APPENDIX A

UCR SEDIMENT FACIES MAPPING
FIELD SURVEY REPORT

Data for this study is available upon request.

China Bend AOI

Field Survey Report

Upper Columbia River
Sediment Facies Mapping
Stevens and Ferry Counties, Washington

Project Number: 60584878

September 2020

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Field Survey Report

Upper Columbia River

Phase 3 Sediment Study

Sediment Facies Mapping

Stevens and Ferry Counties, Washington

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Executive Summary

This Field Survey Report provides information for the 2018 and 2019 Upper Columbia River site (UCR; hereafter, "the Site") Phase 3 Sediment Study Sediment Facies Mapping project that was conducted in the Upper Reach Operable Unit (OU) by AECOM Technical Services Inc. in association with David Evans and Associates, Gravity Consulting, and Columbia Navigation Incorporated. Land-based survey work in the vicinity of the Site was completed the week of September 25, 2018, prior to field data collection. In 2018, 20 survey control points were either installed (new control points) or reoccupied (existing control points) for use during the field data collection. Sediment facies mapping field data collection within the Upper Reach OU was conducted from September 25 to November 10, 2018 and from July 8 to 18, 2019. Work in 2018 was terminated in early November because winter weather created hazardous conditions, and the remaining work was completed in July 2019.

Acoustic Doppler current profiler (ADCP) and imagery data collection was completed in 27 days in 2018. During that time, data were collected at 632 of 682 (92.6%) proposed station locations. Data were not collected at the remaining 50 stations due to a variety of obstructions that precluded data collection, including presence of underwater vegetation, insufficient water depth, location of proposed station on land, or safety concern or hazardous conditions. On July 11, 2019, an additional 11 stations were revisited for imagery data only, per agreement with EPA.

Multibeam echosounder (MBES) data collection occurred for 36 days in 2018. During that time, 30 miles of continuous coverage was obtained from the downstream end of the Upper Reach OU at river mile (RM) 708.8 to the upstream end of the Deadman's Eddy Area of Interest (AOI) at approximately RM 738.8. Approximately 7 RMs of MBES data were collected in 2019 between the Deadman's Eddy AOI and the U.S.-Canada border.

A total of 1.7 terabytes of raw data were collected, compiled, transferred, and provided to Teck American Incorporated for post-processing, data analysis, and archiving.

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Acronyms and Abbreviations

ADCP	acoustic Doppler current profiler
AECOM	AECOM Technical Services, Inc.
AOI	area of interest
CCT	Confederated Tribes of the Colville Reservation
cm	centimeter
CNI	Columbia Navigation Incorporated
CRCP	Cultural Resources Coordination Plan
DC	drop camera
DEA	David Evans and Associates
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
GRS80	Geodetic Reference System of 1980
GNSS	global navigation satellite system
GPS	global positioning system
Gravity	Gravity Consulting LLC
HVF	Hydrographic Information Processing System Vessel File
IMU	Inertial Motion Unit
kHz	kilohertz
LOE	level of effort
m	meter
MBES	multibeam echosounder
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NGS	National Geodetic Survey
OPUS	Online Positioning User Service
OU	Operable Unit
QA	quality assurance
QAPP	Quality Assurance Project Plan
RM	river mile
RMS	root-mean square
RTK	real-time kinematic
RV	research vessel
SD	secure digital
SHSP	Site health and safety plan
SOP	Standard Operating Procedure
TAI	Teck American Incorporated
UCR	Upper Columbia River

USBR	U.S. Bureau of Reclamation
USGS	U.S. Geological Survey
UTC	Coordinated Universal Time
WSDOT	Washington Department of Transportation
WSRN	Washington State Reference Network

1.0 Introduction

This Field Survey Report provides information for the 2018-2019 Upper Columbia River site (UCR; hereafter, "the Site") Sediment Facies Mapping (hereafter, "the Study") that was conducted by AECOM Technical Services Inc. (AECOM) in association with David Evans and Associates (DEA), Gravity Consulting, and Columbia Navigation Incorporated (CNI). The data collection for the field survey was conducted from September 25 to November 10, 2018 and from July 8 to 18, 2019. Work in 2018 was terminated in early November because winter weather created hazardous conditions, and the remaining work was completed in July 2019.

This Study is focused on the Upper Reach Operable Unit (OU) that extends from upstream of Marcus Flats at RM 708 up to the U.S.-Canada border north of river mile (RM) 744 (Figure 1)[1]. The primary objectives the Study were to acquire high-resolution acoustic data and georeferenced underwater photographs of the riverbed within the Upper Reach OU, and generate sediment composition and facies maps of the Upper Reach OU to support development of study plans for the remaining Phase 3 Sediment Study elements, which include characterization of sediment and porewaer conditions and a benthic macroinvertebrate community study within three areas of interest (AOIs) within the Upper Reach OU. The Phase 3 Sediment Study is part of the UCR remedial investigation and feasibility study, which is being conducted under a Settlement Agreement dated June 2, 2006 between Teck American Incorporated (TAI) and the U.S. Environmental Protection Agency (EPA) (USEPA 2006), and with EPA oversight.

1.1 Project Background

In January 2018, a level of effort (LOE; USEPA 2018) issued to TAI by EPA required additional characterization (i.e., sediment bed mapping and nature and extent sampling) to determine the spatial extent of areas in the Upper Reach OU where sediments potentially toxic to benthic organisms might be present. Sediment bed mapping was scoped to characterize physical properties in the entire Upper Reach OU, with more focused data acquisition in three areas of interest (AOIs): 1) Deadman's Eddy, 2) China Bend, and 3) the area upstream of Marcus Flats[2] (Figure 1). This Field Survey Report describes sediment facies mapping field work that was conducted from September 25 to November 10, 2018 and the additional follow up work conducted from July 8 to July 18, 2019. All work was conducted in accordance

[1] On January 8, 2018, EPA defined the upper reaches of the riverine portion of the Site as the Upper Reach OU encompassing "the upper reaches of the Columbia River between Marcus at river mile (RM) 708 and the international border just north of RM 744." However, the RM designations used by EPA in the January 8, 2018 letter differ from the RM designations conventionally used by the National Oceanic and Atmospheric Administration (NOAA) and the United States Geological Survey (USGS). As explained in the Final Baseline Ecological Risk Assessment Work Plan (Page 2-3, footnote 7; Exponent et al. 2011), the discrepancy in RM designations used by USGS and those used by EPA dates back to the 2005 EPA Phase I sampling reports. USGS RMs increase from RM 680 to RM 682 over a river segment that is less than one RM in length when transitioning between the Inchelium and Rice USGS quadrants, whereas the EPA RMs increase from RM 680 to RM 681 over the same segment. As a result, above RM 680 the EPA RMs are *one less than* the USGS RMs. In this report, the USGS RM designations are used, by which the Upper Reach OU encompasses the Columbia River between RM 709 and RM 745.

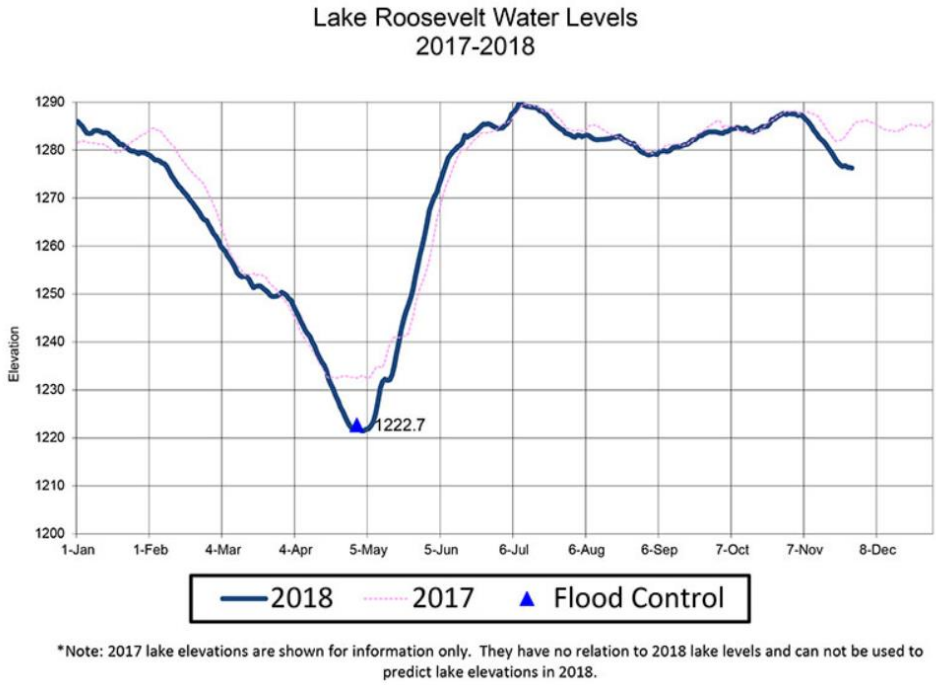
[2] The name for this AOI was changed to Evans in March 2019 during development of the QAPP for the subsequent sampling tasks for the Phase 3 Sediment Study. The name "Upstream of Marcus Flats AOI" is used in this FSR to maintain continuity with the sediment facies mapping QAPP (ERM 2018) and the associated field data collection and data post-processing records. The name "Evans AOI" will be used in reference to the same area in subsequent field sampling records, documentation, reports, and related records that will be developed in the future.

with the Final Quality Assurance Project Plan (QAPP) for the Phase 3 Sediment Study – Sediment Facies Mapping (ERM 2018), approved by EPA on August 17, 2018.

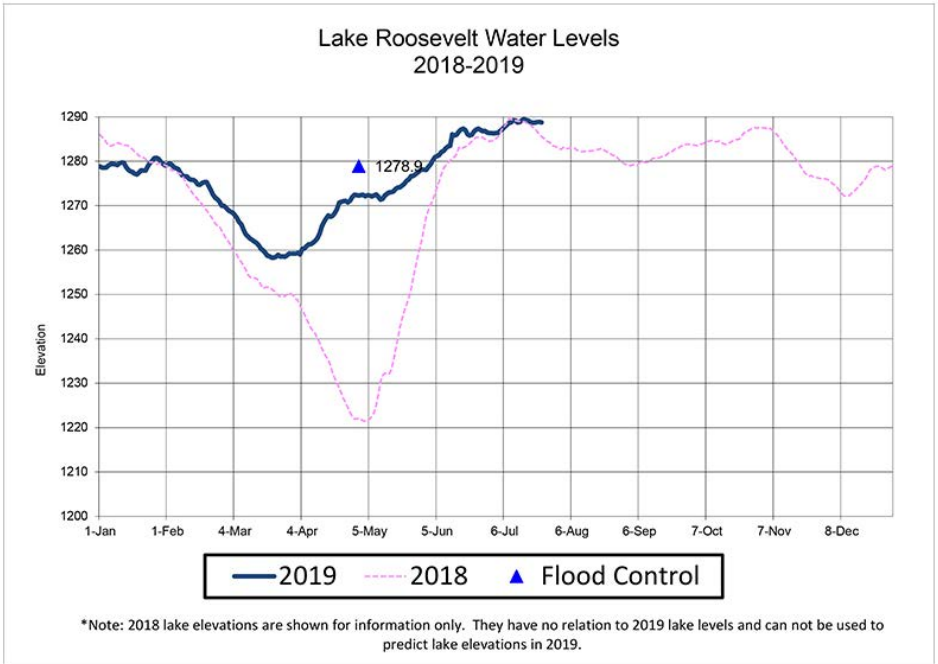
1.2 Project Overview

The 2018 Study was timed to occur when the Lake Roosevelt reservoir would be at or near high pool capacity and during low flow (typically late August through October), per Section 2.3 of the Field Sampling Plan (FSP) (Appendix A of the QAPP). Data for two water level gages are available at the Site: the Lake Roosevelt gaging station, operated by the U.S. Bureau of Reclamation (USBR), measures water level representative the downstream lacustrine portion of the Site where water pools behind the Grand Coulee Dam and affects water levels upstream to Onion Creek; and the International Boundary gaging station, operated by the U.S. Geologic Survey (USGS), which measures water levels representative of the riverine portion of the Site. The USGS webs site for this station advises data users to add 1,200 ft to the gage height shown for elevation with respect to NGVD 1929, adjustment of 1937, Bureau of Reclamation datum.

High pool capacity for Lake Roosevelt reservoir is 1,290 feet. According to the U.S. Bureau of Reclamation (USBR), from September through November 2018, the reservoir water levels ranged between 1,280 and 1,290 feet. In July 2019, levels were around 1,290 feet. The actual recorded water levels are shown below.

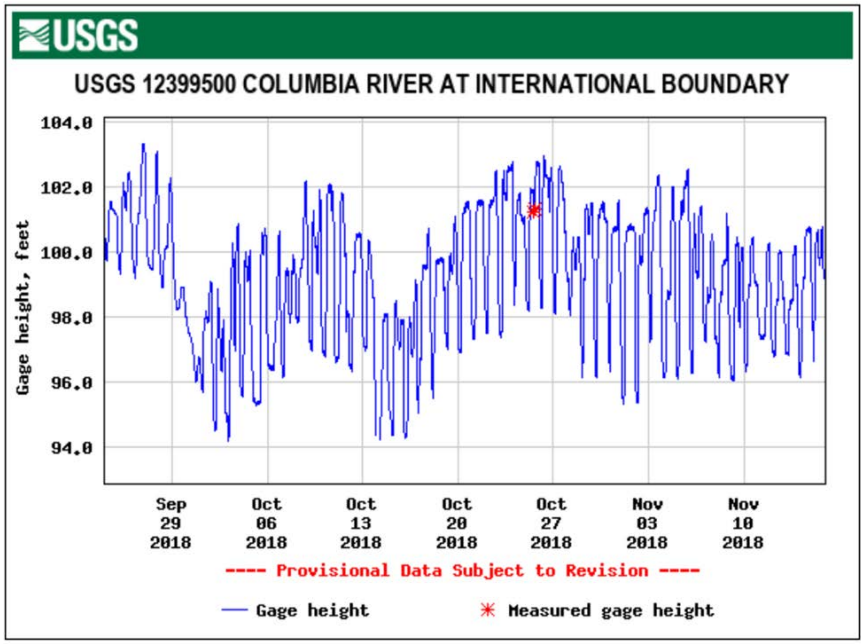


Source: USBR, https://www.usbr.gov/pn/grandcoulee/lakelevel/, accessed on January 2, 2019.

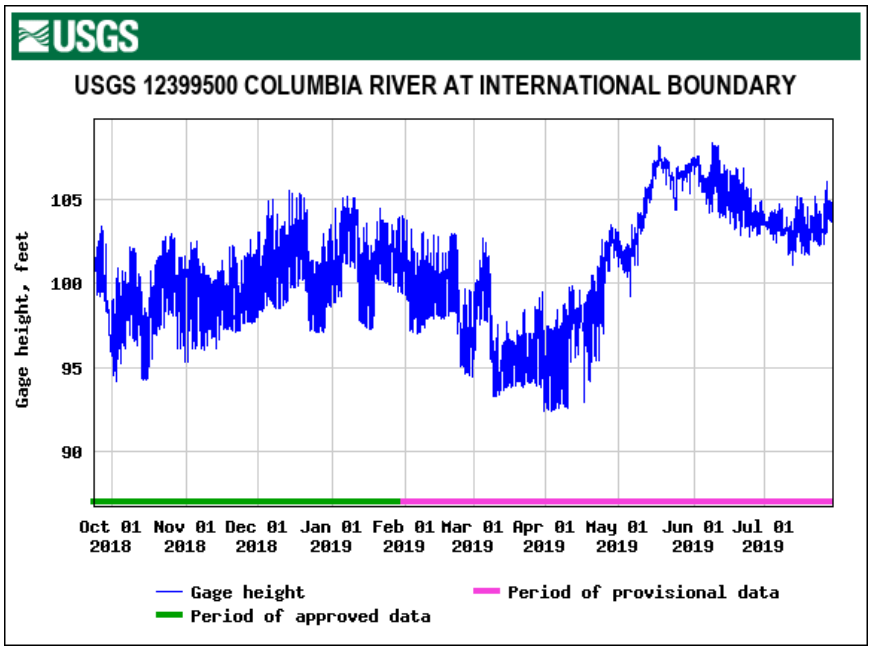


Source: USBR, https://www.usbr.gov/pn/grandcoulee/lakelevel/, accessed on July 29, 2019.

Water gage levels for the UCR are also measured and reported by the USGS gaging station near the international boundary between the United States and Canada. The gage height, in feet, is shown below for the Study survey periods in 2018 and 2019.



Source: USGS, https://waterdata.usgs.gov/wa/nwis/uv?cb_00060=on&cb_00065=on&cb_00065=on&format=gif_default&site_no=12399500&period=&begin_date=2018-09-24&end_date=2018-11-15, accessed on January 2, 2019.



Source: USGS, https://waterdata.usgs.gov/wa/nwis/uv?cb_00060=on&cb_00065=on&cb_00065=on&format=gif_default&site_no=12399500&period=&begin_date=2018-09-24&end_date=2018-11-15, accessed on July 29, 2019

Within the Upper Reach OU, bathymetric coverage was bank-to-bank. Water depth and safety considerations determined the precise limits of survey. In general, survey equipment worked to depths as shallow as 2 meter (6.56 feet) along the bank. As shown in the USGS gage height for the International Boundary station, water levels in the riverine portion of the Upper Reach OU varied daily and seasonally. Some areas that were not accessible due to shallow water in 2018 were accessed in 2019 for additional coverage, particularly Deadman's Eddy AOI.

Winter weather conditions developed in the UCR region in early November 2018. Temperatures dropped below freezing on November 8, 2018, and some snowfall occurred on November 9. The boat launches being used for field work became icy at that time, making it unsafe for continued use by the field crews conducting the work. On November 10, TAI and the Field Supervisor made the decision to halt field data collection, due to forecasted subfreezing temperatures for the foreseeable future. The decision to terminate the 2018 field work was communicated to EPA on November 10, 2018 via electronic mail.

1.3 Project Staffing

The staffing structure for the Study is provided in Section A4.2 of the QAPP and includes a description of the responsibilities of EPA, TAI, and key task personnel. This section identifies field subcontractor teams and oversight personnel that deployed for the 2018 and 2019 survey event. The team members and roles are listed in Table 1.

Table 1. Sediment Facies Mapping Field Team

Primary Team Roles	Personnel
Field Supervisors	Dr. Jennifer Pretare (lead), Nicky Moody, Dave Hose, Mark Hale, Ragan Driver, and Cary Kindberg (AECOM)
Cultural Resources Coordinator/Monitor	Sarah McDaniel (AECOM)
Technical Task Manager and QA Manager	Dr. Tim McClinton (DEA)
Field Data Managers	Denyne McDonald, Josie Smith, Denise Yee (AECOM)
ADCP and Imagery Personnel, including Vessel Captains and Crew	Shawn Hinz (lead), Jeff Wilson (lead), Ryan McEliece, Maggie McKeon, Mike Duffield, Pete Jenkins, John Schaefer, Rene Trudeau (Gravity Consulting)
Hydrographers	John Staly, Jason Dorfman (DEA)
Additional Field Staff	Stuart Holmes, Linda Howard, Michaela McCoog, Josie Smith (AECOM)
Project Surveyor	Greg Baird (DEA)
Survey Base Station Operator	Dave Williams (DEA)
Safety and Logistical Support	Eric Weatherman, Josh Weatherman (CNI)

Acronyms: ADCP = acoustic Doppler current profiler; AECOM = AECOM Technical Services Inc.; CNI = Columbia Navigation Incorporated; DEA = David Evans and Associates; QA = quality assurance

The Field Supervisor was responsible for overseeing all field operations, including coordinating with TAI, maintaining the field logbook, and ensuring data quality and transfer procedures were implemented in accordance with the QAPP. The field staff, hydrographer, and vessel captains/crews identified the location and accessibility of stations and communicated daily results to the Field Supervisor. A global positioning system (GPS) base station was set up and taken down daily by a DEA technician and the hydrographer. The base station was monitored continuously throughout each work day by the technician.

Field data were downloaded daily from onboard instruments and transferred to the field data manager nightly. The field data manager organized the data files and uploaded them to secure online data storage repositories.

An AECOM cultural resources monitor/registered professional archaeologist (Sarah McDaniel) was present when any ground-disturbing activity occurred. The monitor observed the areas of disturbance for artifacts or other cultural deposits.

Additional office-based support for the field team was provided by the following AECOM staff:

- Health and Safety–Fred Merrill
- Spatial Data Management–Cary Kindberg

1.4 Health and Safety

A Site health and safety plan (SHSP) addendum to the general SHSP (TCAI 2009) was prepared for the Study field event (AECOM 2018). The SHSP includes sections on driving and traffic safety, deer/wildlife

collision hazards, work in remote areas, outdoor cold exposure and weather-related hazards, air quality, biological hazards (contact with wildlife, bees/wasps, ticks, mosquitoes), water hazards, and traversing through rough terrain. Health and safety protocols, expectations, and overview of the SHSP addendum were provided to the Field Supervisor and field staff prior to and during the kick-off meeting for the Study. Tailgate health and safety briefings (or task hazard assessments) were conducted each day prior to starting work. Appendix A contains the daily tailgate task hazard assessment forms.

1.5 Cultural Resources Monitoring

A Cultural Resources Coordination Plan (CRCP) was included in Appendix B of the QAPP to provide relevant background information about Site-related cultural resources, define measures for protecting resources, and define procedures for consulting with the appropriate state, federal, and tribal parties with interests in the cultural resources of the Site. The AECOM cultural resources coordinator, Sarah McDaniel, communicated with EPA and the Confederated Tribes of the Colville Reservation (CCT) on behalf of TAI to ensure all necessary consultation and coordination with CCT representatives occurred prior to starting the field work. This coordination included review of existing records of sensitive resources in the vicinity of the planned field activities. In accordance with the CRCP, a cultural resources monitor was present when ground disturbance occurred in order to avoid areas deemed culturally sensitive.

1.6 Technical Oversight and Observers

EPA's contractor, Jacobs, provided technical oversight of the survey activities on behalf of EPA, and a USGS representative, a member of EPA's technical team, observed the work. Technical oversight personnel and observers were present with the survey teams each day and were given the opportunity to observe all field tasks. Technical oversight personnel and observers are listed in Table 2.

AECOM personnel were also present throughout the field event to ensure consistency with the QAPP and to document the survey work, on behalf of TAI. DEA personnel were available for discussions and to answer technical questions regarding field activities.

Table 2. Technical Oversight Personnel and Observers

Affiliation	Personnel/Observers
Jacobs	Marilyn Gauthier (lead), Jeff Johnson, Lisa Raterink
U.S. Geological Survey	Patrick Miller, Steve Cox

2.0 Data Acquisition Equipment

Technical specifications and considerations for gear, software, and instruments selected for use in this survey are described primarily in Standard Operating Procedures (SOPs) 1 through 4 of the FSP (QAPP Appendix A). Where specific models or versions of the instruments or software are available, or a custom configuration was used, they are described in this section.

2.1 ADCP and Underwater Imagery

Acoustic Doppler current profiler (ADCP) and underwater imagery surveys were conducted concurrently on one vessel, as discussed in the following sections.

2.1.1 Survey Vessel

Gravity Consulting (Gravity) provided research vessels for the 2018 and 2019 field survey. Vessels were chosen based on suitability for the field conditions in the Upper Reach OU and passenger capacity. The research vessel (RV) *Tieton*, a custom, 32-foot, aluminum landing craft vessel was used for the duration of the ADCP and underwater imagery data collection. The diesel-fueled vessel has a large, enclosed cabin/lab with inside work space for survey computers and is equipped with a hydraulic winch mounted on an A-frame. This vessel was designed for multi-purpose sampling and deployment of scientific instruments.

The ADCP was mounted on the starboard side of RV *Tieton*, and the imagery frame was deployed from the bow via the A-frame (see Appendix B for Study photos). Both instruments were connected to on-board computers via hard-wired cables. The initial cable length of the imagery frame allowed for data collection to a depth of 150 feet. By mid-October, a longer cable was needed to obtain images in deeper parts of the river channel. A cable suitable for depths of up 250 feet was available on site by October 22, 2018.

2.1.2 ADCP Systems

SOP-3 for ADCP operations and deployment was included in the FSP to provide relevant background information about the equipment and its functions. The equipment used for the 2018 field survey were: Teledyne RDI Sentinel ADCPs (600 and 1200 kilohertz [kHz]). The choice of ADCP frequency depended on water column depth; the 600 kHz ADCP was used for depths exceeding ~55 feet, and the 1200 kHz ADCP was used for depths less than ~55 feet. The ADCP was mounted to the vessel starboard by means of an aluminum pole and was unmounted at the end of each work day.

The plan for the 2019 data acquisition effort, which was approved by EPA on May 20, 2019, focused on acquiring only the remainder of the bathymetry and backscatter data and additional imagery if possible in the Deadman's Eddy AOI. Therefore, no additional ADCP data was collected in 2019.

2.1.3 Underwater Still Imagery System

SOP-2 for drop camera (DC) surveys was included in the FSP to provide technical specifications for still images and videos of the riverbed.

A DC unit designed for seafloor surveys was used to collect images. A Canon EOS Rebel T7i camera body with a fixed, 50-millimeter, f2.8-aperture lens was used. The camera was encased in a custom watertight aluminum housing to protect it from physical damage and water intrusion. Within the housing, mounting brackets were fixed to the camera and held in place with screw mounts. The housing was secured to the inside of a pyramid-shaped aluminum frame and mounted approximately 2 to 3 feet above ground surface. Lights and the scaling laser were mounted outside of the camera housing, but inside the frame. Approximately 200 pounds of additional weights were added to the bottom of the frame for

stability once it reached the bottom of the riverbed. All images collected were recorded on a secure digital (SD) card; no acquisition software was used.

2.1.4 Underwater Video Imagery System

Underwater video imagery surveys were completed concurrently and co-located with the still imagery surveying. HD video was recorded using a DeepSea Power & Light video camera. Settings varied based on river conditions. Video was recorded continuously from DC frame deployment to retrieval.

2.1.5 Position and Heading Reference System

SOP-4 for collecting vertical and horizontal positioning data addresses the position and heading reference system for the Study. Spatial coordinates from Table A7-1 in the QAPP were loaded into the on-board computer prior to the beginning of field surveys.

An accurate heading measurement was supplied to the vessel survey software via a Trimble SPS550 global navigation satellite system (GNSS) GPS receiver, which is an L1/L2 dual antenna receiver capable of calculating and outputting heading information.

2.1.6 Data Acquisition Systems

Task-specific software was used to record field data. Each software program had unique data acquisition qualities to suit the various field activities. The data acquisition software programs consisted of the following:

- **WinRiver II (ADCP Software):** An on-board laptop computer was used to record results from the ADCP via a powered cable. WinRiver II, a software program designed to support ADCP systems, was used to record results on the laptop. WinRiver II data were post-processed in Windows 7.
- **Hauppauge (Underwater Video Capture Software):** Hauppauge video capture software allows for real-time compressed recordings at resolutions up to 1080i to be collected from video capture equipment. Data collection and post-processing software (Windows 7) was used together with the Hauppauge software.
- **HYPACK® Survey 2018 and HYSWEEP® Survey (Spatial Data Collection and Processing Software):** HYPACK® software was designed for use on multiple vessels and was used to perform data collection, navigational, and vessel positioning support. The software provided the tools needed to collect data, process it, reduce it, and generate final products.
- **Trimble® Access™ (Navigation/Survey Control Point):** Trimble® Access™ field software was used to support vessel navigation and base station operation. Trimble® Access™ allows real-time data synchronization and is optimized for use on all Trimble® Survey controllers. Real-time kinematic (RTK) GNSS was used aboard RV *Tieton* for navigation to station locations. RTK correctors were broadcast via landside GNSS base stations and received aboard RV *Tieton* via Trimble® SPS-851 and SPS-550h GNSS “rover” receivers, mounted on top of the vessel. HYPACK® software (version 2018) was used to integrate positioning data for both ADCP and imagery acquisition.

Underwater still imagery did not require specific software for image acquisition. Windows 7 interface allowed for images saved on the Canon EOS Rebel T7i camera SD card to be imported directly to the field laptop and available for post-processing.

2.2 Multibeam Echosounder

Multibeam echosounder (MBES) was used to collect high-resolution acoustic data of the riverbed. The following sections describe the instrumentation used for this purpose.

2.2.1 Survey Vessel

The RV *Discovery* was used for MBES data collection. The 26-foot RV *Discovery* is an aluminum craft with dual outboard engines designed for sampling and survey work. The vessel has a bow deck equipped with a hydraulic winch mounted on an A-frame. The vessel also features an enclosed cabin with work space for survey computers. The MBES system was mounted in a custom-fabricated sonar pole mounted to the port forward side of the vessel; the configuration is described in more detail in Section 3.5.1. Additional MBES acquisition hardware and software were installed and calibrated by DEA in Vancouver, Washington, prior to mobilizing to the Site; calibrations are described in more detail in Section 3.5.4.

2.2.2 Multibeam Sonar System

The RV *Discovery* was outfitted with a Teledyne RESON SeaBat® T50-P precision MBES system. The SeaBat® T50-P is a wide-band sonar system capable of operating at frequencies between 190-420 kHz. The SeaBat® T50-P system logs 512 soundings with each sonar ping over a nominal swath angle of 140 degrees (70 degrees to each side of the sonar). The SeaBat® T50-P system simultaneously acquired high-resolution bathymetric data and normalized acoustic backscatter imagery.

2.2.3 Position, Heading, and Motion Reference System

The position and orientation system for marine vessels (POS/MV) used for the survey was an Applanix POS/MV 320 V5 integrated dual frequency GNSS and inertial reference system was used as the motion reference sensor for the RV *Discovery*. The POS/MV 320 V5 is a 6-degree-of-freedom motion unit, with a stated accuracy of 0.05 meters (m) or 5% for heave, 0.01 degrees for roll and pitch, and 0.02 degrees for heading. The system consists of an inertial motion unit (IMU), dual frequency (L1/L2) GNSS antennas, and a data processor. The POS/MV provided time synchronization of sonar instruments and data acquisition computers using a combination of outputs. All acquisition equipment and computers were synced to Coordinated Universal Time (UTC) time. The acquisition computer was provided a pulse per second and National Marine Electronics Association Global Positioning System Timing Message to achieve synchronization with the POS/MV. All messages contained time strings that enabled the acquisition computers and sonars to synchronize to the time contained within the message. Position, timing, heading, and motion data were output to the HYPACK® data acquisition system using the POS/MV real-time Ethernet option at 25 Hertz. During survey operations, RTK GNSS corrections were broadcast from landside base stations (described in detail in Section 3.3) and received aboard the RV *Discovery* by a Trimble® SPS-851 GNSS receiver. Computed geographic position and ellipsoid height data, along with position quality data, were sent to the acquisition computer to be time tagged and logged with MBES data. All position information was acquired such that post-processed kinematic corrections could be performed, if necessary.

2.2.4 Sound Velocity

An AML Oceanographic Smart•X was used as the primary sound velocity sensor for the RV *Discovery*. During survey operations, sound velocity profiles of the water column were acquired by deploying the Smart•X from a davit on the port side of the vessel. An AML Oceanographic Micro•X SV Xchange sound velocity sensor was also mounted on the RESON SeaBat® T50-P sonar head and provided direct measurements of surface sound velocity to enable proper beamforming[3] and bottom detection. All sound velocity sensors were calibrated prior to acquisition (Appendix C).

2.2.5 Data Acquisition System

The acquisition station aboard the RV *Discovery* was installed and integrated by DEA prior to field deployment. The acquisition station consisted of a Windows PC with HYPACK® (including HYPACK®, HYPACK® Survey 2018, and HYSWEEP®) software, RESON SeaBat® MBES acquisition software, and DEA's proprietary LineLog software for recording acquisition settings, environmental conditions, and survey notes.

3.0 Survey Activities and Documentation

Section 3.0 summarizes the survey activities conducted in the field for ADCP, imagery, and MBES, including pre-field preparations such as Study kick-off meetings, acquisition of permits and permissions, and installation of survey control points.

3.1 Pre-Field Coordination and Kick-Off Meetings

AECOM coordinated closely with the field team, TAI, and TAI's contractors in the weeks leading up to the 2018 and 2019 field survey events. This included leading multiple internal coordination calls, and preparing and distributing a written description of roles and responsibilities, a daily work flow diagram for data management and transfer, and various checklists for field staff. AECOM initiated and managed a Study-specific SharePoint site for file-sharing purposes. AECOM also researched and selected an online storage and sharing platform for large files called ShareFile (www.sharefile.com). Two Quality Management Plans were developed, reviewed, and revised (see details in Section 4.0). A limited-scope kick-off meeting with the DEA survey team was held on September 24, 2018 in Spokane, Washington, to cover health and safety, cultural resources, property owner permissions, and technical objectives. This meeting focused on the activities required and permissions necessary for establishing the network of survey control point locations needed for accurate vessel positioning. Ground-based survey control point installation (or re-location) was conducted from September 25 to 28, 2018 prior to field data collection. See additional details in Section 3.3.

A field data collection kick-off meeting was held on October 1, 2018, in Spokane and on July 8, 2019 in Colville, Washington. All field supervisors, field staff, instrument leads, the quality assurance (QA) manager, TAI personnel, and EPA representatives were present at the October 1, 2018 meeting. All instrument leads discussed the key elements of their work, a health and safety briefing was conducted, and a professional registered archaeologist reviewed the CRCP with the group (see Appendix D for kick-

[3] Beamforming = forming multiple receiving beams

off meeting agenda). The July 8, 2019 meeting was attended by the Field Supervisor, field staff, and hydrographer and focused on reviewing the remaining technical work and the health and safety briefing.

Sections 3.4 and 3.5 describe the configuration, calibrating, testing, and mobilization of vessels and instrumentation.

3.2 Permits and Permissions

TAI coordinated with property owners or government land managers to schedule survey activities. TAI obtained the following permits or permissions before field work began:

- National Park Service Lake Roosevelt National Recreation Area Special Use Permit (Permit # PWR LARO TCAI-012)
- U.S. Bureau of Reclamation (USBR) – email notification from Denise Mills (TAI) to Cory Stolsig and Lon Ottosen
- Federal Communications Commission Radio Station Authorization (File Number 0008292953, FRN 0018068114) to DEA for operation of a base station
- Washington State Department of Natural Resources (DNR) – email notification from Kris McCaig (TAI) to Arne Johnson for work at Deadman's Eddy
- Washington Department of Transportation (WSDOT) General Permit #4-SR25-9422 for permission to work in the right-of-way of State Route 25
- Stevens County – email notification from Denise Mills to Tracy Larson for work along Northport-Waneta Road
- Individual property owners as needed for survey control point work

Study permits and notifications are reproduced in Appendix E.

3.3 Project Datums, Control, and Positioning

Survey control point installation occurred from September 25 to 28, 2018. The names, locations, and coordinates for the final control points are shown in Figure 2 and summarized in Table 3.

Table 3. Sediment Facies Mapping Survey Control Points

Name	RM	L or R Bank	Ownership	Permission for Access?	Land Access	Water Access	Cultural Resource Concerns	Installation Date
CP-1	707.2	L	USBR	Yes, permit acquired	Yes	Yes	Yes	9/27/2018
Evans	710.3	L	USBR	No	Yes	Yes	No	9/25/2018
CP-2	710.5	L	USBR	No	Yes	Yes	Yes	9/27/2018
UCR-1	711	L	WSDOT	No	Yes	No	No	9/25/2018
CP-3	713.1	R	USBR	No	Yes	Yes	No	9/27/2018
Bossburg	714.5	L	WSDOT	No	Yes	No	No	9/25/2018
CP-4	716.8	R	USBR	No	N	Yes	No	9/27/2018

Name	RM	L or R Bank	Ownership	Permission for Access?	Land Access	Water Access	Cultural Resource Concerns	Installation Date
UCR-2	718.7	L	WSDOT	No	Yes	No	No	9/25/2018-9/26/2018
UCR-3	722	L	USBR	No	Yes	Yes	Yes	9/26/2018
CP-10	722	L	USBR	No	Yes	Yes	No	9/25/2018-9/26/2018
CP-5	725.7	R	USBR	No	No	Yes	Yes	9/25/2018 and 9/27/2018
1001-98	726.4	L	Private	Yes, contacted landowner	Yes	No	No	9/26/2018
Black Hawk	727.9	L	WSDOT	No	Yes	No	No	9/26/2018
CP-6	731.5	R	USBR/DNR	No	N	Yes	No	9/28/2018
1001-99	733.1	L	WSDOT	No	Yes	No	No	9/26/2018
CP-7	734.3	L	City of Northport	No	Yes	Yes	No	9/26/2018
CP-8	737.1	R	DNR	No	No	Yes	Monitor required	9/25/2018
UCR-4	738	L	Northport-Waneta Road (County)	No	Yes	No	No	9/26/2018
CP-9	741.7	L	DNR	Yes	Yes	Yes	Monitor required	9/28/2018
New Yonder	743.3	L	Northport-Waneta Road (County)	No	Yes	No	No	9/26/2018 and 9/28/2018

Acronyms: DNR = Washington Department of Natural Resources; L = left; R = right; RM = river mile; USBR = U.S. Bureau of Reclamation; WSDOT = Washington Department of Transportation

The datums for this Study conform to the National Geodetic Survey (NGS) National Spatial Reference System, National Adjustments of 2011.

Horizontal datum, projection, and units for the field work are as follows:

- Datum – North American Datum of 1983, 2011 realization (NAD83) [2011] epoch 2010.00
- Ellipsoid – Geodetic Reference System of 1980 (GRS80)
- Projection – Washington State Plan Coordinate System
- Zone – WA-4601 Washington North
- Coordinate Units – U.S. survey feet

Vertical datum and units for the field work are as follows:

- Datum – North American Vertical Datum of 1988 (NAVD88)
- Geoid model – Geoid12b
- Elevation units – U.S. survey feet

The primary control network for the Study was established by DEA and aligned with the Washington State Reference Network (WSRN). Control network installation occurred from September 25-28, 2018, under the supervision and direction of a DEA Washington-licensed land surveyor and in collaboration with a cultural resource expert. Control point locations for GNSS base station sites were selected with open sky access and on high ground to maximize both satellite coverage and radio broadcast range. Sites were selected on land that is either publicly owned, have access agreements, or on dry banks accessible by land or vessels. In addition to base station control points, the network included check points at locations suitable for conducting position checks from the survey vessels. The network included a combination of current published monuments as well as new monuments installed by the DEA survey team. New, permanent monuments (iron rods) were set with control caps. Permanent markers include a magnetic signature for ease of recovery during follow-on survey efforts.

All monuments were surveyed by DEA with a minimum 4-hour GNSS observation. Post-processing of the control points used the NGS Online Positioning User Service (OPUS), using Rapid Orbits to determine positions and elevations. To validate alignment, the NGS OPUS solutions were checked against the prototype online positioning service provided by WSRN (the WSRN is aligned with the NGS Continuously Operating Reference Station used in NGS OPUS, with NGS OPUS providing a more robust solution). To document that a valid position was obtained from NGS OPUS for each control monument, an NGS OPUS Solution Report is included with this report (Appendix F), which includes observation time, orbit type, latitude root-mean square (RMS), longitude RMS, ellipsoid height RMS, and other quality indicators. The OPUS Solution Report was processed, reviewed, and approved by a DEA Washington-licensed land surveyor.

Due to the poor cellular coverage in some areas of the Site, RTK corrections were sent to the vessels' GNSS receiver systems via radio broadcast from the landside base stations. The RTK base station radio(s) broadcast at a power level of 5 watts, in accordance with Federal Communications Commission licensing and protocols. The vessels' GNSS receivers received RTK corrections via the radio broadcast, and corrections were applied in real-time. Computed geographic position and ellipsoid height data, along with position quality data, were sent to the acquisition computer(s) aboard each vessel to be time tagged and logged with instrument data. Timing messages from the GNSS receivers were used for precise timing of all survey data.

A table showing which survey control points were used for each day of survey work is provided in Appendix G.

3.4 ADCP and Underwater Imagery

3.4.1 Survey Coverage

Data collection within AOIs occurred first, and the areas between AOIs were completed later. The data in AOIs were collected during approximately these date ranges: Upstream of Marcus Flats AOI – October 3 to October 9, 2018; China Bend AOI – October 16 to October 21, 2018; Deadman's Eddy AOI – October

12 to October 15, 2018; and, to fill gaps from the 2018 survey, additional imagery was collected at Deadman's Eddy AOI on July 11, 2019. A complete list of stations, dates of data collection, and spatial coordinates is provided in Appendix H. Figures 3 through 14 show the station locations.

In 2018, ADCP and imagery data were collected at 632 of 682 stations (92.6%). In 2018, data were not collected at the remaining 50 stations due to a variety of obstructions, safety concerns, or logistical issues. At 8 stations underwater vegetation obscured the riverbed. At those stations, an image was collected, but it was of the vegetation. At 24 stations the water was too shallow to collect an image. Approximately 3 feet of water depth was required to submerge the camera and capture an image. At 3 stations the field crew found that the proposed point was located on land. At 15 stations safety considerations prevented the collection of images. There were a number of considerations that created hazardous conditions for either the vessel or the camera frame. Shallow water and high velocity flow caused the camera frame to be turned on its side. In other locations, very deep water, fast current, and an uneven river bottom caused similar results.

In 2019, 11 imagery stations in the Deadman's Eddy AOI were revisited and imagery data was obtained at all 11 stations. Thus, the total stations where imagery was collected at 643 of 682 stations (94.3%).

In general, if an image could not be collected at a particular station, the ADCP data were also not collected. All stations where data were not collected, and the reason, are shown in Table 4.

Table 4. ADCP and Underwater Imagery Stations with Obstructions During the 2018 Field Event

Category of Data	Station ID
Obstructed with Underwater Vegetation	019-01, 019-02, 074-05, 083-04, 083-05, 085-08, 086-01, 092-01 (8 total)
Too Shallow to Collect Data	***013-01***, ***013-09***, ***013-10***, 014-07, 014-08, 014-09, 014-10, 015-09, ***015-10***, 017-03, 017-04, 017-05, ***018-01***, ***018-02***, ***018-08***, ***018-09***, ***018-10***, 020-02, 033-01, 051-01, 053-01, 054-01, 085-07, 093-03 (24 total)
Proposed Stations Located on Land	***019-03***, ***020-10***, 69-05 (3 total)
Safety Concern/ Hazardous Conditions	005-02, 013-08, 038-01, 038-02, 038-03, 039-04, 005-03, 005-04, 005-05, 012-01, 012-02, 012-03, 022-03, 024-01, 52-01 (15 total)

Notes:
1 – Station IDs in bold, all within the Deadman's Eddy AOI, were obstructed during the 2018 field event. Imagery data was successfully obtained at these locations in 2019.
2 – Station 52-01 was located under a log boom.

Table 5 includes a list of 20 stations where alternate locations were used. Alternate locations were selected according to SOP-2, which states that transects or survey locations may be adjusted during the survey due to access restrictions from shoals or other depth limitations.

Duplicates for ADCP and imagery were specified in the QAPP at 5% of the measurement locations. Table 5 identifies the 35 stations at which duplicates were collected (5.1%).

Table 5. ADCP and Underwater Imagery Stations with Alternates and Duplicates

Category of Data	Station ID
Alternate Locations	002-01, 021-05, 026-05, 027-05, 028-05, 029-05, 030-04, 033-01, 034-03, 052-02, 053-02, 068-04, 073-05, 074-04, 084-04, 085-01, 085-09, 086-02, 087-09, 097-01 (20 total)
Duplicates	002-02, 002-04, 003-01, 021-02, 021-03, 016-08, 016-09, 017-09, 017-10, 031-03, 031-04, 036-01, 044-01, 048-07, 050-05, 055-01, 055-02, 058-03, 064-05, 065-03, 065-04, 067-01, 067-02, 067-03, 073-02, 074-01, 079-01, 080-05, 085-05, 088-09, 089-03, 090-08, 091-03, 093-07, 097-05 (35 total) *2019 only imagery duplicates: 013-01, 015-10 (2 total)*

3.4.2 ADCP Operations

Each new field day, the ADCP was mounted to the aluminum pole and lowered into the water. The distance from the transducer head to the water surface was measured, an ADCP performance test was run, and the internal ADCP compass was calibrated. The water temperature (as measured by the MBES vessel sound velocity check) was cross checked against the ADCP temperature sensor to check for malfunction or slow response (particularly after cold nights). In the interest of efficiency, stations were visited in an order that made use of only one ADCP per day; however, it was occasionally necessary to switch ADCPs in the middle of a field day. In this case, the calibration process was repeated upon remounting the alternate ADCP.

Once the vessel was positioned within 10 feet of the target station, data were collected until approximately 300 quality ensembles[4] had been recorded within the target radius. This data collection generally took 3 to 5 minutes; however, it occasionally took longer if strong currents pushed the vessel out of the target radius or the engine wake caused interference. During the data collection process, ensembles were monitored for correlation and data dropout, and the GPS boat track was compared to ADCP bottom-tracking in case of moving riverbed load conditions. When vegetation impaired ADCP data quality, the station was relocated to an alternate location when feasible, otherwise it was skipped.

3.4.3 Underwater Imagery Operations

Imaging surveys were completed concurrently and co-located with velocity profile measurements with the ADCP. At the beginning of each field day, the still camera was set up with a fully charged battery and a memory card with sufficient space to record the day's images. The camera's date and time were checked and set to UTC. Once the camera was installed into the DC frame housing, the camera lens was adjusted with a focus card. Then, scaling lasers were measured and tested. Each day, the camera would collect an image showing the focus card and measured scaling lasers, which served as a daily camera and image QA check. Prior to deployment, the DC frame, camera housing, attachment points, cables, connections, and deployment line were thoroughly inspected for any wear and tear or damage.

Before each deployment, the video camera was turned on, and an image was collected on deck showing a card labeled with the date, transect, and station ID number. Once this card was properly recorded in the

[4] A series of measurements that are collected to derive one sample point.

video and with the still camera, the deployment began. The DC operator continuously monitored the water depth with the altimeter and the video to ensure that the camera frame was not placed on any debris or bedform structure that would either damage or ensnare the DC frame. Once on the riverbed, the captain held the vessel on station, and the DC frame was left to record 1 minute of video, followed by the collection of at least one still image. To mitigate any potential vessel navigation safety risks, in areas of the survey where the water velocity exceeded 5 feet per second, the camera collected an image immediately after the frame touched the bottom. Once an image and video were collected, the DC frame was recovered and set back on deck, and the video recording was stopped. Immediately following the deployment, the DC operator checked the image and quality of the image before the vessel transited to the next station. All deployment notes, including date, time, transect, station ID, and image numbers, were recorded in a digital log.

3.4.4 Quality Control Procedures

Field quality control procedures for ADCP and imagery are discussed above in Sections 3.4.2 and 3.4.3 in the context of daily operations.

3.5 MBES

3.5.1 Mobilization

Mobilization of the RV *Discovery* was conducted September 20-28, 2018 at DEA Marine Division in Vancouver, Washington. A custom sonar mount was fabricated and installed on the port forward side of the RV *Discovery*. The mount featured a survey pole and locking collar that allowed the sonar to be lowered (horizontal) for transport and then raised with a davit and securely locked into place for survey operations.

Other data acquisition hardware and software were also installed aboard the vessel at this time. After the installation and initial testing was complete, a baseline survey was conducted on September 28, 2018. The land-based baseline survey used a Leica total station with integrated GNSS. The baseline survey was performed under the supervision of a Washington-licensed land surveyor. The baseline survey measured precise horizontal and vertical offsets of the fabricated sonar mount in addition to all sensor and vessel reference points, which enabled accurate translation of position and height data between sensors during survey operations. All survey points were positioned (i.e., measured) from a minimum of two locations, which allowed a position uncertainty to be calculated. Offsets and uncertainty values were processed, reviewed, and approved by the licensed land surveyor. Vessel and sensor offsets and uncertainty values were entered into the Teledyne CARIS Hydrographic Information Processing System Vessel File (HVF). There were no changes to the hardware offsets after the vessel baseline survey was conducted.

After mobilization and installation of MBES acquisition equipment, a patch test was conducted by DEA on September 29, 2018 and July 2, 2019, to confirm alignment of the IMU sensor with the sonar transducer and to verify delay times applied to the time-tagged sensor data. The patch test consisted of a series of lines run in a specific pattern, then used in pairs to analyze roll, pitch, and heading alignment bias angles as well as latency (time delays) in the time tagging of the sensor data. The patch test lines were run according to established National Oceanic and Atmospheric Administration and U.S. Army Corps of Engineers specifications and evaluated in the following order: latency, pitch, roll, and heading.

The latency test was performed by running reciprocal lines over a flat bottom and evaluating a small along-track slice of data in the outer swath for motion artifacts. Pitch bias was determined by running reciprocal lines over a smooth slope or noticeable feature, perpendicular to the depth curves. Roll alignment was determined by running reciprocal lines over a flat bottom, in the deepest part of the survey area. Heading bias was determined from running reciprocal lines on each side of a submerged feature in relatively shallow water. Lines were run at a speed allowing for forward overlap. Results of the patch test were analyzed and documented by a DEA hydrographer using the CARIS HVF.

3.5.2 Survey Coverage

Survey coverage was driven by the QAPP requirement for 100% quality MBES bathymetry and backscatter coverage and high-resolution MBES deliverables, including a bathymetric surface gridded at 50 centimeters (cm) and backscatter image mosaic with a 50 cm pixel resolution.

MBES survey operations occurred October 2, to November 10, 2018 and on July 8 to 18, 2019 MBES data acquisition prioritized the AOIs, with areas between AOIs completed later. MBES data in AOIs were acquired during these data ranges: Upstream of Marcus Flats AOI–October 2 to October 9, 2018; Deadman's Eddy AOI–October 12 to October 15, November 1, 2018, and July 8 to 18, 2019; and China Bend AOI–October 16 to October 19, 2018.

In total, MBES coverage (bathymetry data and backscatter imagery) was continuous from approximately RM 707 (southern edge of the Upper Reach OU) to approximately RM 738 (northern edge of Deadman's Eddy AOI) and to the 2 m contour (or shallower in some areas).

In shallow (<4 m water depth) areas in the Upstream of Marcus Flats and China Bend AOIs, significant amounts of vegetation were observed by survey crews and visible in the MBES display. Despite the vegetation, MBES acquisition continued in these areas with the intent to remove the false, vegetation-related soundings during MBES post-processing.

3.5.3 MBES Survey Operations

During MBES survey operations, DEA hydrographers acquired hydrographic data and ensured that all field data acquisition requirements and standards were met. At the start of each survey day, confidence checks and vessel position checks were performed and documented to confirm that all acquisition systems and survey sensors were functioning properly. Survey operations consisted of survey lines to acquire contiguous MBES data with sufficient overlap to ensure quality coverage. Line spacing was adjusted as necessary to meet data quality objectives and to help improve data capture in shallow (i.e., nearshore) areas. Vessel speed was monitored to ensure that sounding frequency maintained a target minimum density of one sounding per 50 cm. Data coverage and quality were monitored in real time using a heads-up display in HYPACK® HYSWEEP® acquisition software; in addition, the display also provided a preliminary assessment of riverbed morphology that was monitored for any features of interest.

The T50-P MBES system was operated at different range scales throughout the survey by adjusting the depth range to obtain the best coverage in varying depths of water. The sonar user interface was continuously monitored by the hydrographer to ensure proper settings and quality. Gain and power were adjusted to record a strong bottom return capable of supporting quality depth and backscatter data. The T50-P system simultaneously recorded bathymetric soundings and backscatter imagery during the survey.

Survey documentation was recorded in digital format using DEA's proprietary LineLog software to record detailed notes describing equipment settings and performance, environmental parameters, and other general information. Each entry was timestamped, and any entries that were updated after initial input were flagged as edited.

3.5.4 Quality Control Procedures

MBES data acquisition methods followed systematic and standardized workflows established by the hydrographer and the task technical lead. The acquisition systems and survey protocols were designed with some redundancy to demonstrate that the required accuracy was being achieved during the survey and provide a backup to the primary systems. Data integrity was monitored throughout the survey through system comparisons.

To verify the accuracy of data acquisition systems, a battery of tests was conducted during RV *Discovery* mobilization and at the beginning (October 2, 2018) and conclusion (November 10, 2018) of survey operations in the Upper Reach OU. Similar testing occurred in July 2019.

Position checks were conducted at the start of each survey day. The NGS OPUS solution for the check point was used to compare the accuracy of horizontal and vertical positioning being received by the SPS-851 GNSS antenna on the RV *Discovery*. Position checks were performed by removing the antenna from the vessel and mounting it on a survey pole with bubble level. The check point was then occupied with the survey pole and antenna, and position and elevation information were recorded in a HYPACK® RAW file[5]. The northing, easting, and elevation were then extracted from the RAW file and compared to the OPUS solution. This process verifies that correctors are being obtained, confirms that position and height data are correctly entered into the GNSS base station, and validates geodetic parameters are entered correctly in HYPACK® software. Application of RTK correctors resulted in maximum differences of 0.07 feet (2.13 cm) horizontal and 0.06 feet (1.82 cm) vertical, well within accuracy requirements stated in the QAPP (5 cm).

Static draft measurements were recorded daily for a quality assessment of the water line height. Draft measurements on the RV *Discovery* were taken from a reference point on the sonar mount down to the waterline. The static draft reading was recorded daily to ensure the best approximation of the true draft at the vessel reference point due to loading changes from fuel consumption and variation in ballast distribution. Static draft changes will be incorporated during MBES data processing.

Bar checks were performed at the start and end of survey operations and periodically during survey operations to confirm that the MBES system was functioning properly and that accurate depths were being recorded at the head of the sonar. A plate attached to the end of a wire cable and chain, marked at 2 m, was used to bar check the T50-P MBES depths. The 2 m marks were checked periodically with a measuring tape. The individual bar check device was lowered to 2 m below the water surface of the sonar, a point above the natural bottom, where it could be clearly ensonified. The depth of the bar was compared to the depth of the bar reported by the sonar. Observations were recorded in a comparison log. The corrected depth accounts for the waterline correction, roll and pitch correctors, and the calculated vessel

[5] RAW files are a format specific to the HYPACK® Survey software program which allows incoming data to be stored as text.

offsets. All bar check comparisons displayed a difference between the corrected depth and the raw bar depth of less than 0.1 foot/3 cm.

Multibeam patch tests were conducted at the start and end of field survey operations to measure alignment offsets between the IMU sensor and the T50-P sonar transducer and to determine time delays between the time-tagged sensor data. Each patch test consisted of a series of lines run in a specific pattern. A precise timing latency test was performed by running a single line over a flat bottom with induced vessel motion. Roll alignment was determined by evaluating the reciprocal lines run over a flat bottom used for the latency test. The pitch tests consisted of set of reciprocal lines located on a steep slope or over a submerged feature. The heading bias was determined by running parallel lines over the same area as the pitch tests. All lines were run at approximately 3 knots to 6 knots. Patch test values will be incorporated during MBES data processing.

Sound velocity profiles are vital to multibeam data acquisition programs. During survey operations, the AML Oceanographic Smart•X sound velocity and temperature profiler was deployed as needed to obtain an adequate number of sound velocity profiles to properly correct the multibeam data for acoustic refraction during data processing. Sound velocity profiles were measured throughout each survey day. The location of casts along the survey track lines were varied to ensure adequate spatial coverage. A real-time comparison was made between the sound velocity profiler and the sound velocity measured at the sonar head and any deviation noted in the log. Casts were extended to at least 80% of water depth, with at least one deep cast (extending to 95% of depth) taken per day.

During survey operations, the hydrographer monitored the MBES system, tracked vessel navigation and motion systems, recorded sound velocity measurements, and maintained the digital line log. The MBES system status was displayed in the RESON SeaBat® user interface. Adjustments to range, power, and gain were made as necessary to optimize data quality and coverage; all changes were noted in the digital line log. Primary and secondary navigation systems were monitored to verify quality position data were acquired at all times; raw attitude and nadir depth were also recorded in HYPACK® RAW format as a supplementary backup. Typical windows for monitoring raw sensor information included timing synchronization, vessel motion, number of satellites, horizontal dilution of precision, and position dilution of precision (amount of error). Vessel motion accuracy was monitored using POSView software. The RESON SeaBat®, HYPACK® HYSWEEP®, and POSView user interfaces were displayed on a monitor mounted at the acquisition station. The hydrographer worked closely with the vessel operator to monitor and adjust vessel speed and track to meet the required along-track coverage and data quality objectives.

3.6 Project Documentation

The following section contains a brief description of the project documentation attached to this report as appendices.

Appendix A Daily Tailgate Task Hazard Assessment Forms

Appendix A contains the AECOM task hazard assessment form, which was completed and signed daily by all field crews. This appendix also includes the safety training sign-in sheet from the kick-off meetings.

Appendix B Project Photos
A selection of photographs showing typical field activities and instruments is included in Appendix B.

Appendix C Sound Velocity Sensor Calibration
Appendix C contains the Sound Velocity Sensor calibration, which is an annual inspection.

Appendix D Kick-Off Meeting Agenda and Sign-In Sheets
Appendix D contains the kick-off meeting agendas and sign in sheets from September 25 and October 1, 2018 and July 2019

Appendix E Project Permits
The project permits, permissions, and email correspondence described in Section 3.2 are included in Appendix E.

Appendix F OPUS Report
The NGS OPUS Solution Report is included in Appendix F. The report is used to document that a valid position was obtained from survey control monuments. It includes observation time, orbit type, latitude root-mean square (RMS), longitude RMS, ellipsoid height RMS, and other quality indicators. The OPUS Solution Report was processed, reviewed, and approved by a DEA Washington licensed land surveyor.

Appendix G Survey Control Points, by Survey Date
Appendix G contains a table showing the base station and survey control point check-ins used for each field day.

Appendix H ADCP and Imagery Data Collection Date, Time, and Spatial Coordinates
Appendix H contains a complete list of all ADCP and Imagery stations where data was collected, with the date, time, and spatial coordinates.

Appendix I Protocol Modification Forms
Five protocol modifications were documented as part of the 2018 field survey. One additional protocol modification was documented in 2019. They are attached in Appendix I and described here:

- Protocol Modification 1 – Where no imagery data is collected due to the presence of underwater vegetation, no ADCP data should be collected.
- Protocol Modification 2 – Latency patch test are only completed at the start of the Study, end of the Study, and when the sonar configuration changes.
- Protocol Modification 3 – Clarification to the FSP text to be in alignment with the QAPP.
- Protocol Modification 4 – In strong river currents, images may be captured immediately upon the DC frame settling on the riverbed.
- Protocol Modification 5 – Non-concurrent collection of ADCP and imagery survey data.
- Protocol Modification 6 - Drop camera survey equipment malfunction.

Appendix J Gravity Quality Management Plan
Appendix J contains the final Gravity Quality Management Plan.

Appendix K DEA Quality Management Plan
Appendix K contains the final DEA Quality Management Plan.

Appendix L Daily Logbook Entries
All six field logbooks have been scanned and included in Appendix L.

Appendix M Raw Field Data Deliverable Structure
The folder and file structure for the raw field data deliverable is outlined in Appendix M.

4.0 Quality Management

Quality control procedures were implemented during the field survey to confirm the accuracy and completeness of the field data. Quality control of field data was implemented according to the QAPP (Sections A9.1, A9.3, B4, C1, and C2); FSP (Section 2.7); and SOPs (SOP-1 [pages 5-6], SOP-2 [pages 2-3], SOP-3 [page 5], and SOP-4 [page 4]).

Tim McClinton (DEA) was the designated QA manager for acoustic and underwater imagery and subcontractor coordinator for the QAPP, and he performed those QA duties for the MBES data as well. He was assisted by various field staff and office-based data management staff.

Prior to field work, Gravity and DEA prepared Quality Management Plans that were reviewed by TAI and its subcontractors. One was for ADCP and imagery work (by Gravity) and one was for MBES (by DEA). They are attached in Appendices J and K, respectively.

The first readiness review was completed during the field survey kick-off meeting, held on October 1, 2018 (described in Section 3.1). No deficiencies were identified during the first readiness review. A readiness review was conducted on June 27, 2019 via email from Jennifer Pretare (AECOM) to Kris McCaig and Denise Mills of TAI.

A formal surveillance mechanism was developed for the field data generated for this Study. After the daily data upload to ShareFile, the QA manager electronically accessed and reviewed the data on a regular basis (typically daily, except on weekends). The QA review progress was documented in a spreadsheet, posted to the Study SharePoint site, and has been retained as part of the Study administrative record.

Technical system audits were conducted during the first few days of field data collection (October 2-4, 2018) by the QA manager. The QA manager was present on-site during that time and observed data collection on both vessels in person. No serious QA problems were encountered during the technical system audit.

Daily summary reports to TAI management were delivered by the field supervisor via conference call (or email during some weekends). The field schedule was updated once per week based on progress of the field teams, rest days, and weather contingencies.

Throughout the 2018-2019 field program, no reports of nonconformance were reported to the QA manager or field supervisor. No change requests occurred during the 2018-2019 field program.

Individual quality standards described in the FSP and SOPs are identified below, along with any details on how they were implemented and recorded in Study documentation (Table 6).

Section 2.7 of the FSP and SOPs identify several quality assurance checks, which are summarized in Table 6.

Table 6. Quality Assurance Checks Performed for Field Data Collection

Quality Assurance Item	When Completed	Completed By	Documentation
Calibration patch test	September 28, October 2, and November 10, 2018 July 2, 8 and 18, 2019	Hydrographer	Raw data and electronic file
Crossline analysis	Data post-processing	N/A	N/A
Annual factory calibration of sound velocity profiler	Annual	DEA	Appendix C
Drop camera calibration; check cables, focus, settings	Daily	Instrument lead	Logbook
Duplicate photographs	At 5% of station locations	Instrument lead	Logbook and tracking table
ADCP correlation strength	Data post-processing	N/A	N/A
ADCP within 3 meters of target station	Data post-processing	N/A	N/A
Duplicate ADCP measurements	At 5% of station locations	Instrument lead	Logbook and electronic data file
Horizontal and vertical position checks	Daily, or whenever the base station is moved	Field team	Logbook and electronic files
NGS OPUS Solution Report	Prior to survey operations	Greg Baird (DEA), a Washington-licensed land surveyor	Appendix F
Data file transfer checked for accuracy	When files were copied from field storage devices to field laptop and from field laptop to cloud-based storage solution.	Field data manager	N/A

Acronyms: ADCP = acoustic Doppler current profiler; DEA = David Evans and Associates; N/A = not applicable; NGS = National Geodetic Survey; OPUS = Online Positioning User Service

5.0 Data Management and Transfer

Data management and transfer tasks were performed daily after the field team had completed its on-water work for the day. A step-wise order of tasks performed by field data management personnel is described in detail below. In general, after data and logbooks were obtained each day, electronic files and scans of logbooks were transferred to a dedicated field laptop. On the laptop, files were organized into a consistent folder structure and checked for completeness. Once the daily batch of files was organized, they were uploaded to one of two places. Raw data files originating from field instruments were uploaded to "ShareFile," a Citrix secure file storage environment available over the Internet that can accommodate the GB-sized files associated with elements of the studies. Scans of logbooks and other paper forms were uploaded to an AECOM enterprise-level SharePoint site. At the completion of field work, all data files were consolidated to portable hard drives and delivered to TAI on November 29, 2018 and, for the work completed in July 2019, on August 6 and 12, 2019. All data storage locations were encrypted and password controlled, with various levels of access available to users determined by TAI.

Consolidated Information and Data Daily: Logbooks (six total for the Study) were transferred from instrument leads to the on-board Field Supervisor. Separate logbooks were completed for ADCP, MBES, ground survey, and base station operations. Flash drives were used for transfer of electronic files from the base station, ADCP, imagery, and MBES instruments. Camera SD card and field forms were collected at the end of each day as well. Once all items were collected, data management and transfer activities would begin.

Base Station and Ground Survey Processing: The survey control logbook (#1) and base station logbook (#5) were scanned and saved separately to a flash drive. In the "Logbook" directory, a dated folder was created in the appropriate field activity folders. The files were copied from the flash drive to the appropriate "Logbook" folders. Once files were in appropriate folders, the Beyond Compare[6] software program was used to confirm that the files correctly copied from the flash drive to the laptop. If the software showed there was a correct match and all files had been correctly transferred over, the flash drive and logbooks were returned to field personnel for the next day of field activities.

Process Logbooks (Paper Version): Logbooks #2 (MBES), #3 (ADCP-AECOM), and #4 (ADCP-Gravity) were scanned into separate PDF files. Files were copied to the laptop into appropriate "Logbook" dated folders. Files were renamed accordingly, and PDF-Xchange Editor software was used to reduce the file size.

Download and Check Drives: Files were created in the "Raw Data" directory for the appropriate date, and files were copied from drives into newly created laptop folders. The Beyond Compare software was used to ensure proper document transfer. Once files from the drive were deleted, the "UCR_Tieton.[date].zip file." (example file name) was unzipped.

[6] "Beyond Compare" is a data comparison software utility that was used to perform side-by-side comparisons of electronic files on the field laptop versus electronic files uploaded to secondary storage locations (ShareFile or AECOM's SharePoint site).

Return Field Materials to the Field Supervisor: Wiped drives and logbooks were returned to field personnel daily for field work to occur the following day.

Process Logbooks (Electronic Version): Electronic logbook files were named according to the nomenclature described in the QAPP. Once named correctly, files were copied to the appropriate logbook directory.

Process Field Forms: Each field form, tailgate form, and photolog form was scanned into single, separate PDF files and named according to the nomenclature described in the QAPP. Files were copied from the flash drive into designated folders on the laptop.

ADCP and Imagery: Gravity Daily Documentation/Files Delivery Checklist: The field data managers completed the field/checkbox form to ensure all tasks required for data management and transfer activities were met.

MBES: DEA Daily Documentation/Files Delivery Checklist: The field data managers completed the field/checkbox form to ensure all tasks required for data management and transfer activities were met.

Upload SharePoint Files: This task was completed from a second laptop using a WiFi hot spot while the larger files were uploading to ShareFile via the dedicated "field" laptop. Once logged into the AECOM Study SharePoint site, all logbooks, field forms, base station data files, and photo files were uploaded to designated folders.

Upload ShareFile Files: Using Google Chrome, raw instrument data files were uploaded into the Citrix ShareFile site. Large data files were uploaded and checked against their folder sizes from the laptop to ensure the entire file was transferred over.

These tasks completed the daily process for field data management.

6.0 References

AECOM. 2018. Health and Safety Plan. Upper Columbia River Sediment Facies Mapping. September 27, 2018.

ERM. 2018. Final Quality Assurance Project Plan for the Phase 3 Sediment Study – Sediment Facies Mapping. Upper Columbia River. Prepared by ERM, Carpinteria, CA for Teck American Incorporated, in association and consultation with HDR, Inc., David Evans and Associates, Windward Environmental LLC, Gravity Consulting, LLC, and Parametrix. August 2018

TCAI (Teck Cominco American Incorporated). 2009. Upper Columbia River Draft General Site Health and Safety Plan for the Remedial Investigation and Feasibility Study. Prepared by Integral Consulting, Inc., Mercer Island, WA and Parametrix, Bellevue, WA. December 27.

USEPA. 2006. Settlement agreement for implementation of remedial investigation and feasibility study at the Upper Columbia River Site. June 2, 2006. U.S. Environmental Protection Agency Region 10, Seattle, WA.

USEPA. 2018. Letter from Kathryn Cerise, USEPA Project Manager, to Kris McCaig, TAI Project Manager, defining the upper reaches of the riverine portion of the UCR Site as a separable OU and identifying the Level of Effort (LOE) for additional characterization in the OU; Level of Effort for Nature and Extent of Sediment Contamination in Upper Reach Operable Unit technical memorandum attached. USEPA Region 10 Seattle, WA. January 8.

Figures

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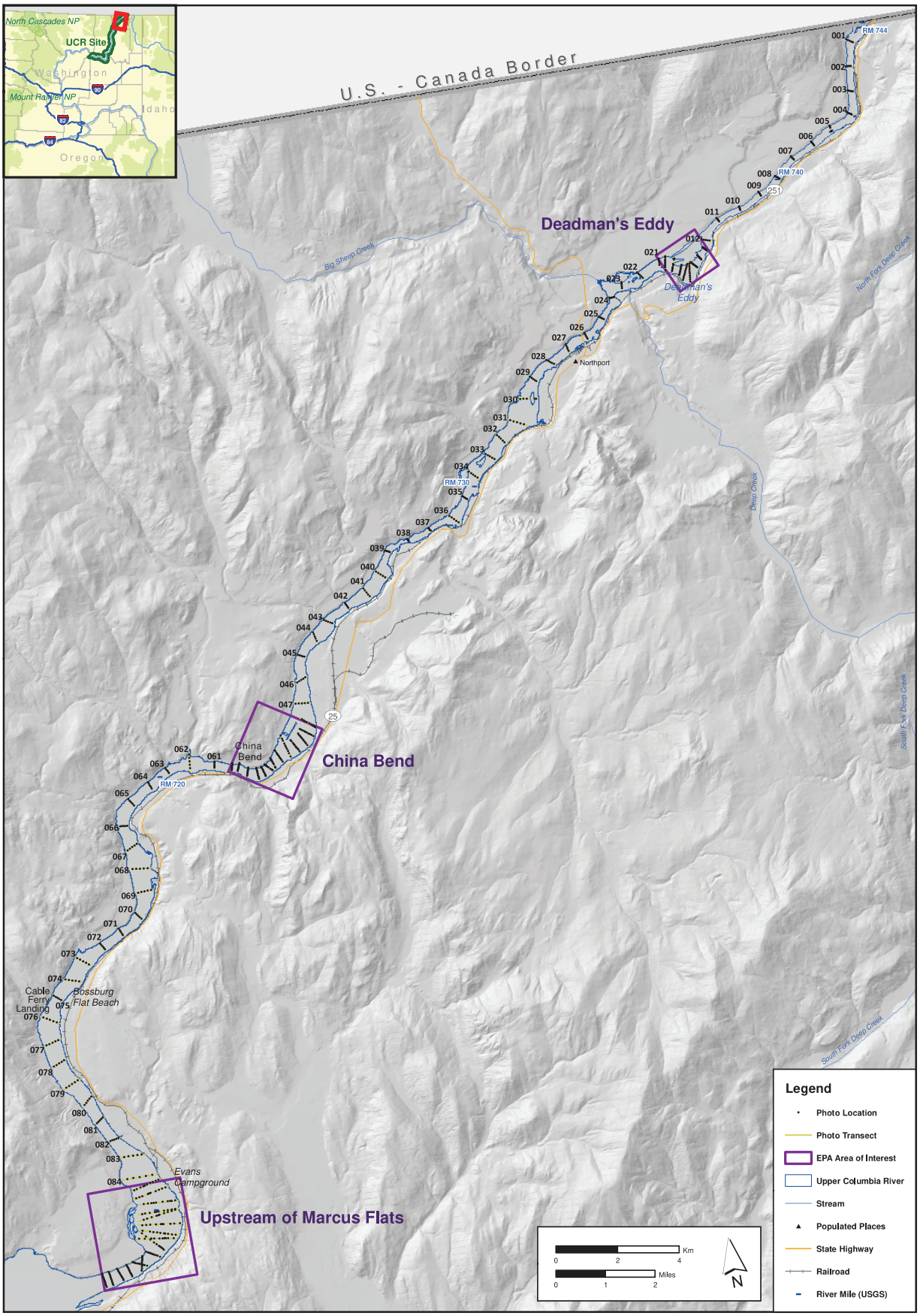


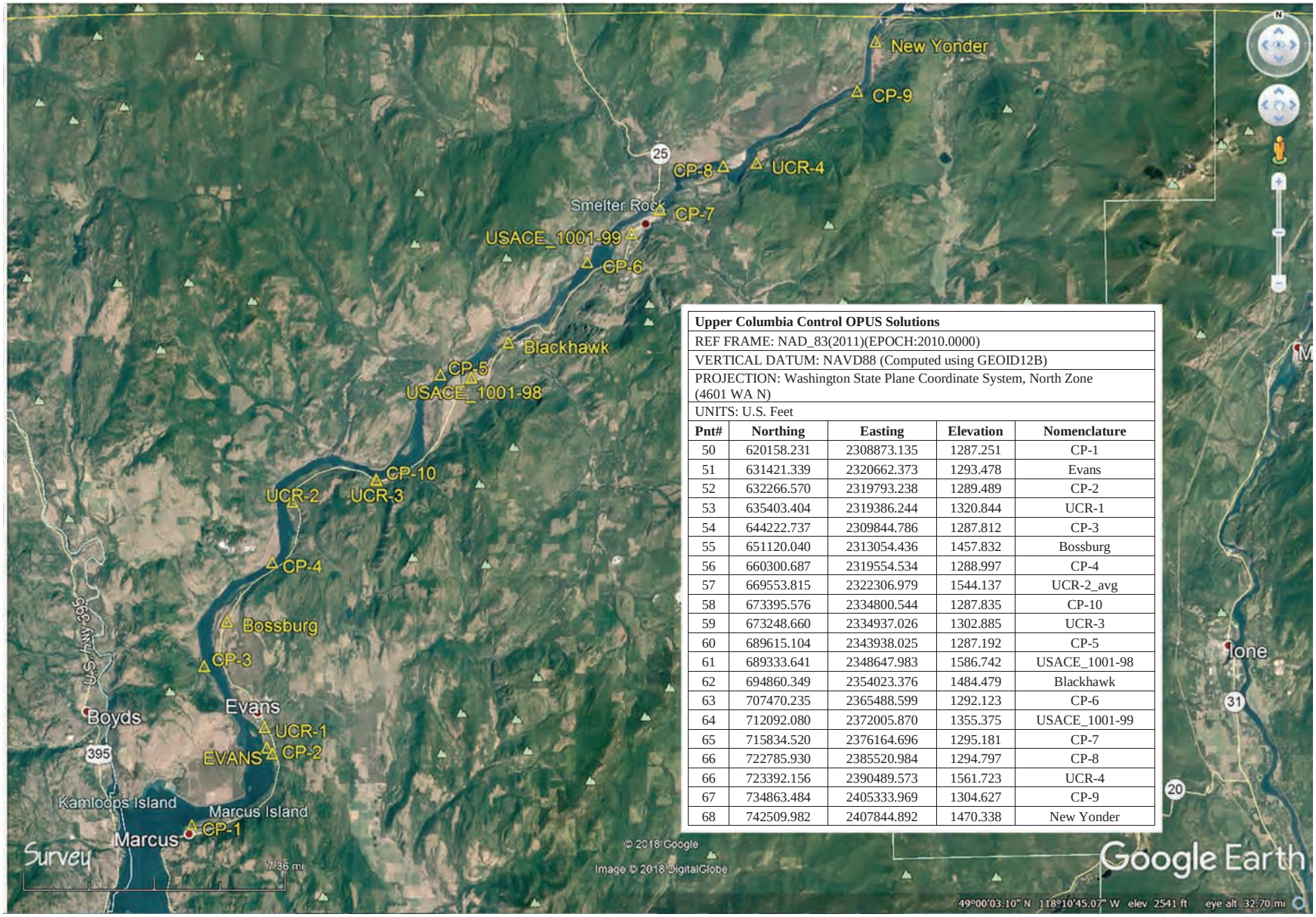
Figure 1

Site Vicinity Map

Source: Windward Environmental

AECOM

Upper Columbia River, WA



Upper Columbia Control OPUS Solutions				
REF FRAME: NAD_83(2011)(EPOCH:2010.0000)				
VERTICAL DATUM: NAVD88 (Computed using GEOID12B)				
PROJECTION: Washington State Plane Coordinate System, North Zone (4601 WA N)				
UNITS: U.S. Feet				
Pnt#	**Northing**	**Easting**	**Elevation**	**Nomenclature**
50	620158.231	2308873.135	1287.251	CP-1
51	631421.339	2320662.373	1293.478	Evans
52	632266.570	2319793.238	1289.489	CP-2
53	635403.404	2319386.244	1320.844	UCR-1
54	644222.737	2309844.786	1287.812	CP-3
55	651120.040	2313054.436	1457.832	Bossburg
56	660300.687	2319554.534	1288.997	CP-4
57	669553.815	2322306.979	1544.137	UCR-2_avg
58	673395.576	2334800.544	1287.835	CP-10
59	673248.660	2334937.026	1302.885	UCR-3
60	689615.104	2343938.025	1287.192	CP-5
61	689333.641	2348647.983	1586.742	USACE_1001-98
62	694860.349	2354023.376	1484.479	Blackhawk
63	707470.235	2365488.599	1292.123	CP-6
64	712092.080	2372005.870	1355.375	USACE_1001-99
65	715834.520	2376164.696	1295.181	CP-7
66	722785.930	2385520.984	1294.797	CP-8
66	723392.156	2390489.573	1561.723	UCR-4
67	734863.484	2405333.969	1304.627	CP-9
68	742509.982	2407844.892	1470.338	New Yonder

Source: David Evans and Associates

Figure 2

Survey Control Point Locations

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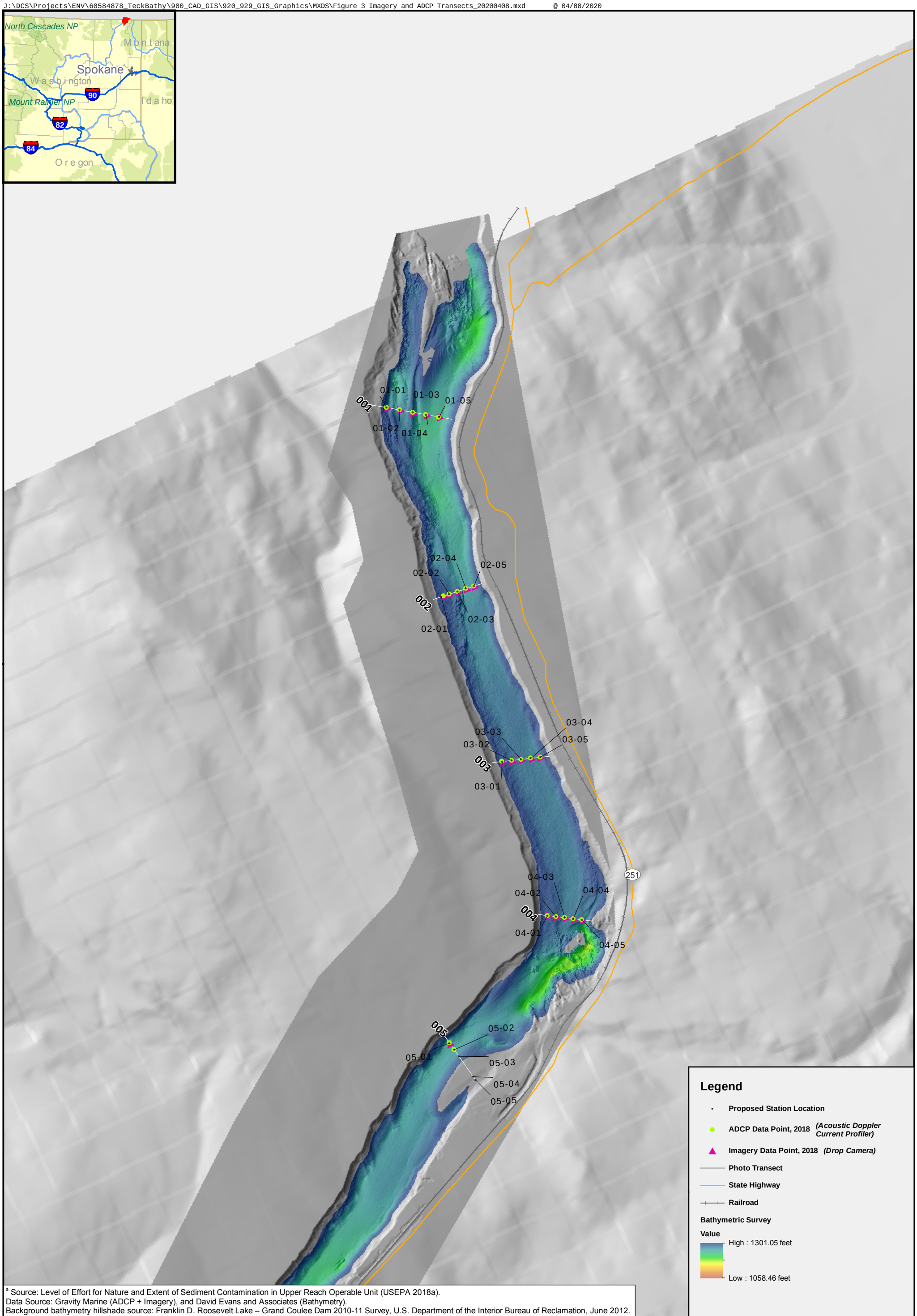


[a] Source: Level of Effort for Nature and Extent of Sediment Contamination in Upper Reach Operable Unit (USEPA 2018a).
Data Source: Gravity Marine (ADCP + Imagery), and David Evans and Associates (Bathymetry).
Background bathymetry hillshade source: Franklin D. Roosevelt Lake – Grand Coulee Dam 2010-11 Survey, U.S. Department of the Interior Bureau of Reclamation, June 2012.

AECOM

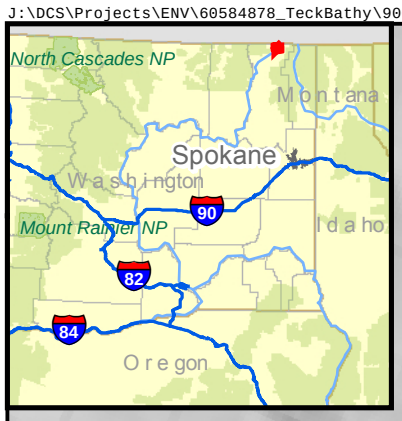
0 0.225 0.45 Km

0 0.1 0.2 Miles

N

Figure 3a **Imagery and Acoustic Doppler Current Profiler Data Point Locations**
Upper Columbia River, WA

J:\DCS\Projects\ENV\60584878_TeckBathy\900_CAD_GIS\920_929_GIS_Graphics\MXDS\Figure 3 Imagery and ADCP Transects_20200408.mxd @ 04/08/2020



251

06-01 06-02 006 06-03 06-04 06-05

07-01 07-02 007 07-03 07-04 07-05

08-01 08-02 008 08-03 08-04 08-05

09-01 09-02 009 09-03 09-04 09-05

10-01 10-02 010 10-03 10-04 10-05

11-01 11-02 011 11-03 11-04 11-05

Legend

- Proposed Station Location
- ADCP Data Point, 2018 *(Acoustic Doppler Current Profiler)*
- Imagery Data Point, 2018 *(Drop Camera)*
- Photo Transect
- State Highway
- Railroad

Bathymetric Survey

Value

High : 1301.05 feet

Low : 1058.46 feet

[a] Source: Level of Effort for Nature and Extent of Sediment Contamination in Upper Reach Operable Unit (USEPA 2018a).
Data Source: Gravity Marine (ADCP + Imagery), and David Evans and Associates (Bathymetry).
Background bathymetry hillshade source: Franklin D. Roosevelt Lake – Grand Coulee Dam 2010-11 Survey, U.S. Department of the Interior Bureau of Reclamation, June 2012.

AECOM

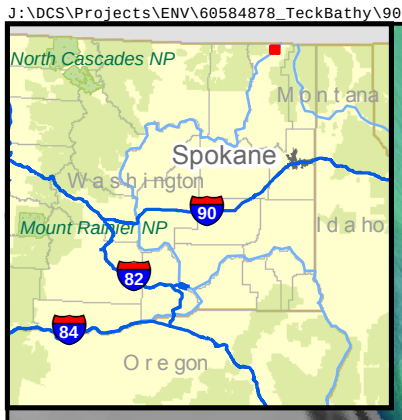
0 0.225 0.45 Km

0 0.1 0.2 Miles

N

Figure 3b **Imagery and Acoustic Doppler Current Profiler Data Point Locations**
Upper Columbia River, WA

J:\DCS\Projects\ENV\60584878_TeckBathy\900_CAD_GIS\920_929_GIS_Graphics\MXDS\Figure 3 Imagery and ADCP Transects_20200408.mxd @ 04/08/2020



Deadman's Eddy AOI

012 013 014 015 016 017 018 019 020 021

251

Legend

- Proposed Station Location
- ADCP Data Point, 2018 *(Acoustic Doppler Current Profiler)*
- Imagery Data Point, 2018 *(Drop Camera)*
- Imagery Data Point, 2019 *(Drop Camera)*
- Photo Transect
- EPA Area of Interest
- State Highway
- Railroad

Bathymetric Survey

Value

High : 1301.05 feet

Low : 1058.46 feet

[a] Source: Level of Effort for Nature and Extent of Sediment Contamination in Upper Reach Operable Unit (USEPA 2018a).
Data Source: Gravity Marine (ADCP + Imagery), and David Evans and Associates (Bathymetry).
Background bathymetry hillshade source: Franklin D. Roosevelt Lake – Grand Coulee Dam 2010-11 Survey, U.S. Department of the Interior Bureau of Reclamation, June 2012.

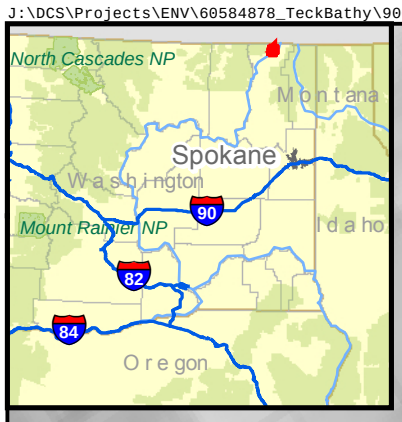
AECOM

Km 0 0.1 0.2

Miles 0 0.05 0.1

Figure 3c **Imagery and Acoustic Doppler Current Profiler Data Point Locations**
Upper Columbia River, WA

J:\DCS\Projects\ENV\60584878_TeckBathy\900_CAD_GIS\920_929_GIS_Graphics\MXDS\Figure 3 Imagery and ADCP Transects_20200408.mxd @ 04/08/2020



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Big Sheep Creek

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24-03
24-04
24-05

251

Deep Creek

025
25-01
25-02
25-03
25-04
25-05

026
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26-02
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25

027
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Northport

Legend

- Proposed Station Location
- ADCP Data Point, 2018 *(Acoustic Doppler Current Profiler)*
- Imagery Data Point, 2018 *(Drop Camera)*
- Photo Transect
- Populated Places
- State Highway
- Local Road
- Railroad

Bathymetric Survey

Value

- High : 1301.05 feet
- Low : 1058.46 feet

[a] Source: Level of Effort for Nature and Extent of Sediment Contamination in Upper Reach Operable Unit (USEPA 2018a).
Data Source: Gravity Marine (ADCP + Imagery), and David Evans and Associates (Bathymetry).
Background bathymetry hillshade source: Franklin D. Roosevelt Lake – Grand Coulee Dam 2010-11 Survey, U.S. Department of the Interior Bureau of Reclamation, June 2012.

AECOM

0 0.225 0.45 Km

0 0.1 0.2 Miles

N

Figure 3d **Imagery and Acoustic Doppler Current Profiler Data Point Locations**
Upper Columbia River, WA

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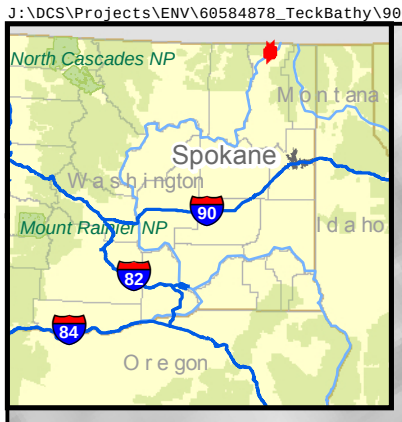

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Legend

- Proposed Station Location
- ADCP Data Point, 2018 *(Acoustic Doppler Current Profiler)*
- Imagery Data Point, 2018 *(Drop Camera)*
- Photo Transect
- Populated Places
- State Highway
- Local Road
- Railroad

Bathymetric Survey

Value

High : 1301.05 feet

Low : 1058.46 feet

[a] Source: Level of Effort for Nature and Extent of Sediment Contamination in Upper Reach Operable Unit (USEPA 2018a).
Data Source: Gravity Marine (ADCP + Imagery), and David Evans and Associates (Bathymetry).
Background bathymetry hillshade source: Franklin D. Roosevelt Lake – Grand Coulee Dam 2010-11 Survey, U.S. Department of the Interior Bureau of Reclamation, June 2012.

AECOM

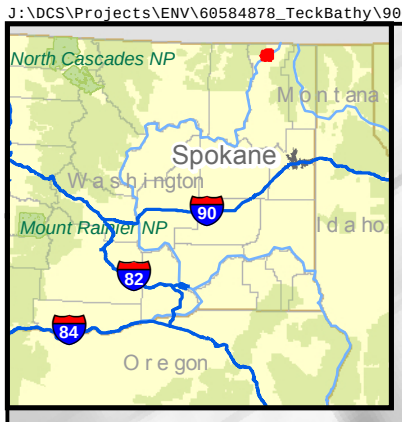
Km
0 0.225 0.45

Miles
0 0.1 0.2

N

Figure 3e **Imagery and Acoustic Doppler Current Profiler Data Point Locations**
Upper Columbia River, WA

J:\DCS\Projects\ENV\60584878_TeckBathy\900_CAD_GIS\920_929_GIS_Graphics\MXDS\Figure 3 Imagery and ADCP Transects_20200408.mxd @ 04/08/2020



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039
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[a] Source: Level of Effort for Nature and Extent of Sediment Contamination in Upper Reach Operable Unit (USEPA 2018a).
Data Source: Gravity Marine (ADCP + Imagery), and David Evans and Associates (Bathymetry).
Background bathymetry hillshade source: Franklin D. Roosevelt Lake – Grand Coulee Dam 2010-11 Survey, U.S. Department of the Interior Bureau of Reclamation, June 2012.

Legend

- Proposed Station Location
- ADCP Data Point, 2018 *(Acoustic Doppler Current Profiler)*
- Imagery Data Point, 2018 *(Drop Camera)*
- Photo Transect
- State Highway
- Railroad

Bathymetric Survey

Value

High : 1301.05 feet

Low : 1058.46 feet

AECOM

0 0.225 0.45 Km

0 0.1 0.2 Miles

N

Figure 3f **Imagery and Acoustic Doppler Current Profiler Data Point Locations**
Upper Columbia River, WA

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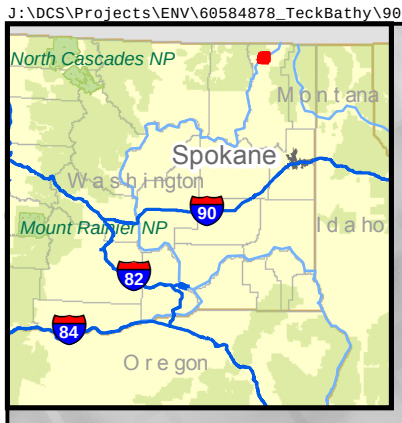

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045
45-01
45-02
45-03
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046
46-01
46-02
46-03
46-04
46-05

047
47-01
47-02
47-03
47-04
47-05

25
Marble

Legend

- Proposed Station Location
- ADCP Data Point, 2018 *(Acoustic Doppler Current Profiler)*
- Imagery Data Point, 2018 *(Drop Camera)*
- Photo Transect
- Populated Places
- State Highway
- Railroad

Bathymetric Survey

Value

High : 1301.05 feet

Low : 1058.46 feet

[a] Source: Level of Effort for Nature and Extent of Sediment Contamination in Upper Reach Operable Unit (USEPA 2018a).
Data Source: Gravity Marine (ADCP + Imagery), and David Evans and Associates (Bathymetry).
Background bathymetry hillshade source: Franklin D. Roosevelt Lake – Grand Coulee Dam 2010-11 Survey, U.S. Department of the Interior Bureau of Reclamation, June 2012.

AECOM

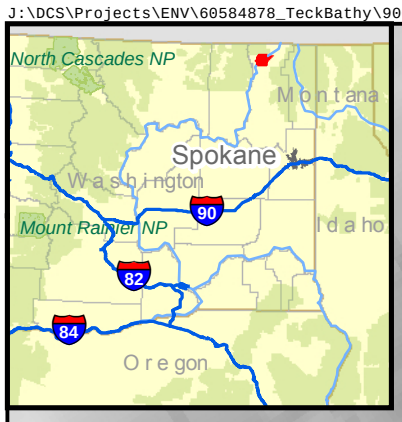
0 0.225 0.45 Km

0 0.1 0.2 Miles

N

Figure 3g **Imagery and Acoustic Doppler Current Profiler Data Point Locations**
Upper Columbia River, WA

J:\DCS\Projects\ENV\60584878_TeckBathy\900_CAD_GIS\920_929_GIS_Graphics\MXDS\Figure 3 Imagery and ADCP Transects_20200408.mxd @ 04/08/2020



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China Bend AOI

Ryan

Legend

- Proposed Station Location
- ADCP Data Point, 2018 *(Acoustic Doppler Current Profiler)*
- Imagery Data Point, 2018 *(Drop Camera)*
- Photo Transect
- EPA Area of Interest
- Populated Places
- State Highway
- Railroad

Bathymetric Survey

Value

High : 1301.05 feet

Low : 1058.46 feet

[a] Source: Level of Effort for Nature and Extent of Sediment Contamination in Upper Reach Operable Unit (USEPA 2018a).
Data Source: Gravity Marine (ADCP + Imagery), and David Evans and Associates (Bathymetry).
Background bathymetry hillshade source: Franklin D. Roosevelt Lake – Grand Coulee Dam 2010-11 Survey, U.S. Department of the Interior Bureau of Reclamation, June 2012.

AECOM

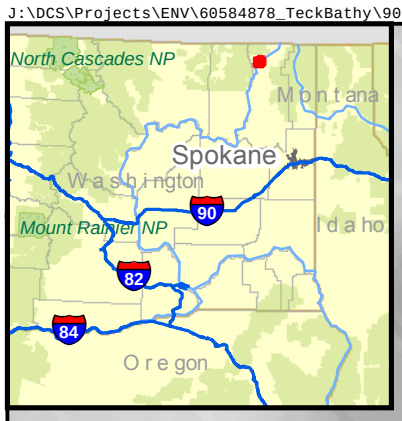
0 0.175 0.35 Km

0 0.075 0.15 Miles

N

Figure 3h **Imagery and Acoustic Doppler Current Profiler Data Point Locations**
Upper Columbia River, WA

J:\DCS\Projects\ENV\60584878_TeckBathy\900_CAD_GIS\920_929_GIS_Graphics\MXDS\Figure 3 Imagery and ADCP Transects_20200408.mxd @ 04/08/2020



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67-01
67-02
67-03
67-04
67-05
068
68-01
68-02
68-03
68-04
68-05
Ryan
China B
25

[a] Source: Level of Effort for Nature and Extent of Sediment Contamination in Upper Reach Operable Unit (USEPA 2018a).
Data Source: Gravity Marine (ADCP + Imagery), and David Evans and Associates (Bathymetry).
Background bathymetry hillshade source: Franklin D. Roosevelt Lake – Grand Coulee Dam 2010-11 Survey, U.S. Department of the Interior Bureau of Reclamation, June 2012.

Legend

- Proposed Station Location
- ADCP Data Point, 2018 *(Acoustic Doppler Current Profiler)*
- Imagery Data Point, 2018 *(Drop Camera)*
- Photo Transect
- Populated Places
- State Highway
- Railroad

Bathymetric Survey

Value

High : 1301.05 feet

Low : 1058.46 feet

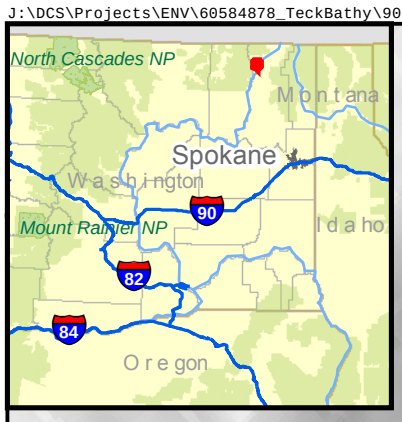
AECOM

Km
0 0.225 0.45
Miles
0 0.1 0.2

N

Figure 3i **Imagery and Acoustic Doppler Current Profiler Data Point Locations**
Upper Columbia River, WA

J:\DCS\Projects\ENV\60584878_TeckBathy\900_CAD_GIS\920_929_GIS_Graphics\MXDS\Figure 3 Imagery and ADCP Transects_20200408.mxd @ 04/08/2020



069
69-01
69-02
69-03
69-04
69-05

070
70-01
70-02
70-03
70-04
70-05

25

071
71-01
71-02
71-03
71-04
71-05

072
72-01
72-02
72-03
72-04
72-05

073
73-01
73-02
73-03
73-04
73-05

074
74-01
74-02
74-03
74-04
74-05

075
75-01
75-02
75-03
75-04
75-05

Legend

- Proposed Station Location
- ADCP Data Point, 2018 *(Acoustic Doppler Current Profiler)*
- Imagery Data Point, 2018 *(Drop Camera)*
- Photo Transect
- Populated Places
- State Highway
- Railroad

Bathymetric Survey

Value

High : 1301.05 feet

Low : 1058.46 feet

[a] Source: Level of Effort for Nature and Extent of Sediment Contamination in Upper Reach Operable Unit (USEPA 2018a).
Data Source: Gravity Marine (ADCP + Imagery), and David Evans and Associates (Bathymetry).
Background bathymetry hillshade source: Franklin D. Roosevelt Lake – Grand Coulee Dam 2010-11 Survey, U.S. Department of the Interior Bureau of Reclamation, June 2012.

AECOM

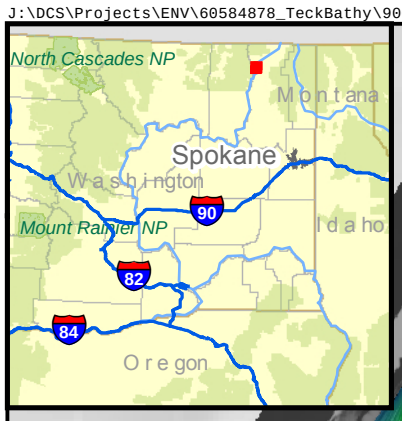
0 0.225 0.45 Km

0 0.1 0.2 Miles

N

Figure 3j **Imagery and Acoustic Doppler Current Profiler Data Point Locations**
Upper Columbia River, WA

J:\DCS\Projects\ENV\60584878_TeckBathy\900_CAD_GIS\920_929_GIS_Graphics\MXDS\Figure 3 Imagery and ADCP Transects_20200408.mxd @ 04/08/2020



076
76-01
76-02
76-03
76-04
76-05
077
77-01
77-02
77-03
77-04
77-05
078
78-01
78-02
78-03
78-04
78-05
079
79-01
79-02
79-03
79-04
79-05
080
80-01
80-02
80-03
80-04
80-05
081
81-01
81-02
81-03
81-04
81-05
082
82-01
82-02
82-03
82-04
82-05
Bossburg
Bear
25

Legend

- Proposed Station Location
- ADCP Data Point, 2018 *(Acoustic Doppler Current Profiler)*
- Imagery Data Point, 2018 *(Drop Camera)*
- Photo Transect
- Populated Places
- State Highway
- Railroad

Bathymetric Survey

Value

High : 1301.05 feet

Low : 1058.46 feet

[a] Source: Level of Effort for Nature and Extent of Sediment Contamination in Upper Reach Operable Unit (USEPA 2018a).
Data Source: Gravity Marine (ADCP + Imagery), and David Evans and Associates (Bathymetry).
Background bathymetry hillshade source: Franklin D. Roosevelt Lake – Grand Coulee Dam 2010-11 Survey, U.S. Department of the Interior Bureau of Reclamation, June 2012.

AECOM

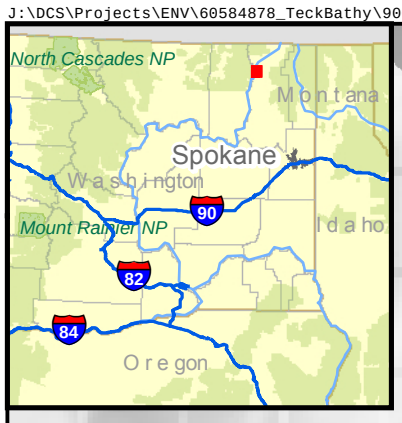
0 0.225 0.45 Km

0 0.1 0.2 Miles

N

Figure 3k **Imagery and Acoustic Doppler Current Profiler Data Point Locations**
Upper Columbia River, WA

J:\DCS\Projects\ENV\60584878_TeckBathy\900_CAD_GIS\920_929_GIS_Graphics\MXDS\Figure 3 Imagery and ADCP Transects_20200408.mxd @ 04/08/2020



Evans
Bear
Powell
East Marcus
Upstream of Marcus Flats AOI

083: 83-01, 83-02, 83-03, 83-04, 83-05
084: 84-01, 84-02, 84-03, 84-04, 84-05
085: 85-01, 85-02, 85-03, 85-04, 85-05, 85-06, 85-07, 85-08, 85-09, 85-10
086: 86-01, 86-02, 86-03, 86-04, 86-05, 86-06, 86-07, 86-08, 86-09, 86-10
087: 87-01, 87-02, 87-03, 87-04, 87-05, 87-06, 87-07, 87-08, 87-09, 87-10
088: 88-01, 88-02, 88-03, 88-04, 88-05, 88-06, 88-07, 88-08, 88-09, 88-10
089: 89-01, 89-02, 89-03, 89-04, 89-05, 89-06, 89-07, 89-08, 89-09, 89-10
090: 90-01, 90-02, 90-03, 90-04, 90-05, 90-06, 90-07, 90-08, 90-09, 90-10
091: 91-01, 91-02, 91-03, 91-04, 91-05, 91-06, 91-07, 91-08, 91-09, 91-10
092: 92-01, 92-02, 92-03, 92-04, 92-05, 92-06, 92-07, 92-08, 92-09, 92-10
093: 93-01, 93-02, 93-03, 93-04, 93-05, 93-06, 93-07, 93-08, 93-09, 93-10
094: 94-01, 94-02, 94-03, 94-04, 94-05, 94-06, 94-07, 94-08, 94-09, 94-10
095: 95-01, 95-02, 95-03, 95-04, 95-05, 95-06, 95-07, 95-08, 95-09, 95-10
096: 96-01, 96-02, 96-03, 96-04, 96-05, 96-06, 96-07, 96-08, 96-09, 96-10
097: 97-01, 97-02, 97-03, 97-04, 97-05, 97-06, 97-07, 97-08, 97-09, 97-10
098: 98-01, 98-02, 98-03, 98-04, 98-05, 98-06, 98-07, 98-08, 98-09, 98-10
099: 99-01, 99-02, 99-03, 99-04, 99-05, 99-06, 99-07, 99-08, 99-09, 99-10
100: 100-01, 100-02, 100-03, 100-04, 100-05, 100-06, 100-07, 100-08, 100-09, 100-10

25

Legend

- Proposed Station Location
- ADCP Data Point, 2018 *(Acoustic Doppler Current Profiler)*
- Imagery Data Point, 2018 *(Drop Camera)*
- Photo Transect
- EPA Area of Interest
- Populated Places
- State Highway
- Railroad

Bathymetric Survey

Value

High : 1301.05 feet

Low : 1058.46 feet

[a] Source: Level of Effort for Nature and Extent of Sediment Contamination in Upper Reach Operable Unit (USEPA 2018a).
Data Source: Gravity Marine (ADCP + Imagery), and David Evans and Associates (Bathymetry).
Background bathymetry hillshade source: Franklin D. Roosevelt Lake – Grand Coulee Dam 2010-11 Survey, U.S. Department of the Interior Bureau of Reclamation, June 2012.

AECOM

0 0.225 0.45 Km

0 0.1 0.2 Miles

N

Figure 3l **Imagery and Acoustic Doppler Current Profiler Data Point Locations**
Upper Columbia River, WA

Appendix A
Daily Tailgate Task
Hazard Assessment Forms

AECOM

TASK HAZARD ASSESSMENT

Customer Teck	**Permit No.**
Location Colville / Northport	**Job No.**
Description of Task SFM Control Point Installation	**Date** 9/25/2018

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Driving - road hazards	deer, turkey	6	have "spotter" in vehicle if poss., go slow	4	SM
Work on side of road	traffic, gravel kick-up	6	wear hard hat / safety goggles	4	SM
Boat safety -	fall in / slips & trips	6	safety vest, 3 point holds	4	SM
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator Sarah McDaniel (Print Name) — Sarah McDaniel (Signature)

Supervisor _____ (Print Name) _____ (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
Sarah McDaniel	Sarah McDaniel
Lloyd Lamar	
Justin Mickiewicz	
DAVE WILLIAMS	
JON PASLEY	

I participated in the development and understand the content of this Task Hazard Assessment.

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Emergency Meeting / Assembly Area

Northport Boat Launch

Emergency Contact #

Jenny Pretare 510 681 6401

Emergency Radio Channel

5 (Boat) 16 (Help!) only

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) Sarah McDaniel

Signature Sarah McDaniel

Task Hazard Assessment Follow-Up/Review.

	Initial
First Break: 10:30 on boat	
LLOYD LAMAR, JUSTIN MICKIEWICZ } ON LAND	RDW, JMM
Lunch Break: 12:30 on boat	
L.L., J.W. } ON LAND	RDW, JMM
Second Break: 2:30 on boat	
L.L., J.W. } ON LAND	RDW, JMM

AECOM

TASK HAZARD ASSESSMENT

Customer Teck	**Permit No.**
Location Colville / Northport	**Job No.**
Description of Task SFM Control Point Installation	**Date** 9/26/2018

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Driving	fatigue, wildlife - turkeys	8	take breaks, use spotter, go slow	4	RDW
Work on side of road	traffic, gravel kick-up	6	PPE including hardhat/goggles	4	RDW
Slips and falls ~~while~~ ↔ walking/hiking while hiking		6	wear high boots/gloves, don't rush	4	RDW
Lone worker in trucks	medical/other emergency	6	Check in via radio at noon + pm, etc.	4	RDW
Working in public areas	~~Avoid~~ distractions/conversations in dangerous location	6	Avoid conversations in road ROW, boat ramps, etc. - find safe place	4	RDW
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator Sarah McDaniel (Print Name) — Sarah McDaniel (Signature)

Supervisor _____ (Print Name) _____ (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

I participated in the development and understand the content of this Task Hazard Assessment.

NAME (Please Print)	SIGNATURE
Sarah McDaniel (Am. only)	Sarah McDaniel
Larry Woodworth	Larry Woodworth
Lloyd Lamar	[signature]
DAVE WILLIAMS	R. David Williams

Emergency Meeting / Assembly Area

China Bend Boat Ramp

Emergency Contact #

Jenny Pretare 510 681 6401

Emergency Radio Channel

Marine Channel 5

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) ____________________

Signature ____________________

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break	Initial	
10:30 AM	RAW	LL
	LW	

Lunch Break	Initial	
12:30 PM	RAW	LL
	LW	

Second Break	Initial	
2:30 PM	RAW	LL
	LW	

AECOM

TASK HAZARD ASSESSMENT

Customer TECK	**Permit No.**
Location COLVILLE / NORTHPORT	**Job No.**
Description of Task SIEM CONTROL PT INSTALLATION	**Date** 9/27/2018

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
ROAD TRAVEL	WILDLIFE ON ROADS	8	REST WHEN NECESSARY	4	RDW
WORKING ON ROAD SHOULDERS -	ROAD TRAFFIC / FLYING ROAD DEBRIS	6	WEAR PPE (HARD HAT, SAFETY GLASSES, BOOTS)	4	RDW
BEACH AREAS.	FALL HAZARDS IN ROAD & BEACH	6	PAY ATTENTION WHEN MOVING ABOUT ESPECIALLY	4	RDW
DATA GATHERING - 1 MAN CREWS	ENVIRONMENTS		WHEN WORKING SOLO.		
BOAT SAFETY	ROUGH WATER / GETTING IN & OUT OF	6	NOT MOVING ABOUT UNTIL VESSEL IS	4	RDW
	VESSEL		STABLE.		
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator DAVE WILLIAMS — Print Name — R. David Will — Signature

Supervisor _____ — Print Name — _____ — Signature

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
DAVE WILLIAMS	R. Dal Will
Lloyd Lamon	
Larry Woodworth	

I participated in the development and understand the content of this Task Hazard Assessment.

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur but possible during task/activity	1/10,000

Emergency Meeting / Assembly Area

CHINA BOAT RAMP

Emergency Contact #

JENNY PRETARE 510-681-6401

Emergency Radio Channel

CHANNEL 05 MARINE VHF

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) DAVE WILLIAMS

Signature R. Dal Will

Task Hazard Assessment Follow-Up/Review.

	Time	Initial	
First Break	10:30 AM	LW	RDW
	RDW (ON BOAT)		
Lunch Break	12:30 PM	LW	RDW
	RDW (ON BOAT)		
Second Break	2:30 PM	LW	RDW
	RDW (ON BOAT)		

AECOM

TASK HAZARD ASSESSMENT

Customer TECK	**Permit No.**
Location COLVILLE / NORTHPORT	**Job No.**
Description of Task SFM CONTROL PT OBSERVATIONS	**Date** 9/28/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
ROAD TRAVEL	WILDLIFE / TRAFFIC ON ROADS	8	BEST WHEN NECESSARY	4	RDW
WORKING ON ROAD SHOULDERS —	ROAD TRAFFIC / FLYNG DEBRIS	6	WEAR PPE. PAY CLOSE ATTENTION WHEN	4	RDW
BEACH AREAS	FALL HAZARDS ON UNEVEN GROUND	6	MOVING ON UNEVEN GROUND	4	RDW
SOLO DATA GATHERING	MEDICAL EMERGENCY / DISTRACTIONS	6	CHECK IN CALLS	4	RDW
BOAT SAFETY	GETTING IN & OUT OF BOAT - MOVING	6	STAY SEATED IN BOAT UNTIL STABLE.	4	RDW
	ABOUT IN BEACH ENVIRONMENT		VIGILANCE WHEN WALKING ON BEACH		
			AREAS		
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator DAVE WILLIAMS (Print Name) — R. Dave Williams (Signature)

Supervisor _____ (Print Name) _____ (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print) SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

DAVE WILLIAMS R. D. Williams

LLOYD LAMAR

Emergency Meeting / Assembly Area

CHINA BEND BOAT RAMP

Emergency Contact #

JENNY PRETAIRE 510-681-6401

Emergency Radio Channel

CHANNEL 05 MARINE VHF

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability

Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) DAVE WILLIAMS

Signature R. D. Williams

VISITOR SIGN ON

NAME (Please Print) SIGNATURE TIME

Task Hazard Assessment Follow-Up/Review.

	Initial
First Break: 10:30 (RDW ON BOAT)	RDW
Lunch Break: 12:30 (RDW ON BOAT)	RDW
Second Break: 2:30	RDW

10-1-18 Kick Off Meeting

12. Personnel Acknowledgement

By signing below, the undersigned acknowledges that he/she has reviewed the AECOM Health and Safety Plan for the Upper Columbia River Sediment Facies Mapping project. The undersigned also acknowledges that he/she has been instructed in the contents of this document and understands the information pertaining to the specified work, and will comply with the provisions contained therein. The employee understands that they are NOT to perform any work that they have not been adequately trained for and that they are to stop work if it is unsafe to proceed. Finally, the employee understands to notify the Site Supervisor and the Incident Hotline at 800-348-5046 for any incident, ***including ANY injury even if no first aid or medical treatment is required.***

Print Name	Signature	Organization	Date
Jennifer Pretare		AECOM	10-1-18
Nicky Moody		AECOM	10-1-18
Josie Smith		AECOM	10-1-18
Denyne McDonald		AECOM	10-1-18
Mike Surowiec		AECOM	10-1-18
John Stahy		DEA	10/1/18
FRED MERRILL		AECOM	10/1/18
TIM MCLINTOCH		DEA	10/1/18
Shelley Brown		AECOM	10/1/18
Ryan McElieece		Gravity	10/1/18
MAGGIE MCKEON		Gravity	10/1/18
Patrick Miller		USGS	10-1-18
Shawn Hall		Gravity	" "
Mike Duffield		Gravity	10-1-18
Marilyn Fountain		Jacobs	10/1/18
Denise Mills		Teck	10/1/18
Rene Tracy		GRAVITY	10/1/18
Eric Weatherman		CNI	10/1/18
Kris McCaig		Teck American Inc.	10/1/18

10-1-18 Kickoff Mtg

12. Personnel Acknowledgement

By signing below, the undersigned acknowledges that he/she has reviewed the AECOM Health and Safety Plan for the Upper Columbia River Sediment Facies Mapping project. The undersigned also acknowledges that he/she has been instructed in the contents of this document and understands the information pertaining to the specified work, and will comply with the provisions contained therein. The employee understands that they are NOT to perform any work that they have not been adequately trained for and that they are to stop work if it is unsafe to proceed. Finally, the employee understands to notify the Site Supervisor and the Incident Hotline at 800-348-5046 for any incident, ***including ANY injury even if no first aid or medical treatment is required.***

Attended by Phone!

Print Name	Signature	Organization	Date
Dave Hose		AECOM	
Misty Kessel		TAI	
Jeff Wilson		Gravity	
Mark Hale		AECOM	
Linda Howard		AECOM	
Ander Under		AECOM	
Ragan Driver		AECOM	
Sarah McDaniels		AECOM	
Victoria Price-Douchet		DEA	
Kevin Lundmark		ERM	
John Schaffer		Gravity	
Peter Jenkins		Gravity	
Jason Dorfman		DEA	

10-2-18 Tailgate

12. Personnel Acknowledgement

By signing below, the undersigned acknowledges that he/she has reviewed the AECOM Health and Safety Plan for the Upper Columbia River Sediment Facies Mapping project. The undersigned also acknowledges that he/she has been instructed in the contents of this document and understands the information pertaining to the specified work, and will comply with the provisions contained therein. The employee understands that they are NOT to perform any work that they have not been adequately trained for and that they are to stop work if it is unsafe to proceed. Finally, the employee understands to notify the Site Supervisor and the Incident Hotline at 800-348-5046 for any incident, ***including ANY injury even if no first aid or medical treatment is required.***

Print Name	Signature	Organization	Date
Rick Wilson	Rick Wilson	Columbia NW	10-3-18
Joseph Graves	Joe Jr	Columbia NW	10-3-18

AECOM

TASK HAZARD ASSESSMENT

Customer Teck American Inc	**Permit No.**
Location Upper Columbia River	**Job No.** 60584878
Description of Task Sediment Facies Mapping	**Date** 10-2-18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Driving / vehicle use	Wildlife @ dawn/dusk		Buddy system, scanning		
Set up base station	Back strain		Buddy system		
man base station	lone worker				
Set up instruments	stress; in public area w/ other		hi viz vests		
	cars, slips trips				
Launch boats	Pinch points, slips trips, falls				
	pfds before		PFD's before		
Collect data	MOB, cold water, pinch points		LI		
motor very slowly around	lifting - 300 lbs for imaging rig		Hard st steel toe boots if w/ i		
small area	pinch points		front deck of Tieton		
overwater work, A frame, winch.					
Work in remote areas			Boats in radio visual contact		
			Communication plan in place		
Data transfer / backup	fatigue				
	Weather report: High of 66° F		Sunscreen?		
	54° F @ 0700. No precip, S wind 5-10, possible		**Highest Risk Index**		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator Jenny Pretare (Print Name) — Jenny (Signature)

Supervisor Nicky Moody (Print Name) — (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
Shawn Hing	[signature]
Jeff Wilson	[signature]
Eric Weatherman	[signature]
Patrick Miller	[signature]
Marilyn Gauthier	[signature]
Dave Williams	[signature]
Rick Wilson	[signature]
Joseph Graves	[signature]
Josh Weatherman	[signature]
René Trudeau	[signature]
Mike Duffield	[signature]
Ryan McCleave	[signature]
Maggie Miller	[signature]
John Staly	[signature]
Tim McClinton	[signature]
Josie Smith	[signature]
Nicky Mosely	[signature]
Jenny Peltier	[signature]

I participated in the development and understand the content of this Task Hazard Assessment.

Emergency Meeting / Assembly Area: Evans Campground

Emergency Contact #: 911

Emergency Radio Channel: 16

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) Nicky Mosely

Signature [signature]

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break — Initial

Lunch Break — Initial

Second Break — Initial

Safety observation = Catching toe on anchor = new tripping hazard. – Alerted vessel staff to its presence.

AECOM

TASK HAZARD ASSESSMENT

Customer Teck American Inc	**Permit No.**
Location Upper Columbia River	**Job No.** 60584878
Description of Task Sediment Facies Mapping	**Date** 10-2-18, Wednesday

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Vehicle Use	Wildlife - @ dawn + dusk		- Watch for the gang; buddy system - lookouts		
			- Stay the course if see deer, brake firmly & calmly, & stay in your lane, Don't swerve		
			- Honk - one long blast		
Set up + Man Base Station	Lifting hazards, Lone worker		- Check in w/ Nicky noon/EOD, proper lifting technique or buddy		
	Slips trips, vehicle traffic		high vis - Safety vest., good shoes/boots.		
Loading vessels	Lifting, vessel boarding hazards		- 3 pt. Stance, hand equipment to someone on-board already		
	Pinch points / hand injuries		PFDs		
Vessel operations	Over-water hazards		- Safety boat		
	MOB		- Captain make sure everyone seated before high speeds		
	Pinch points / Moving parts		- Gloves when operating anchors		
	Overhead hazards, lines		- hard hat / safety glasses		
In Remote Areas			- Boats in Radio or visual contact		
			- Communication plan in place.		
	Medical Emergency - Calling 911				
	motor to closest dock or boat ramp.		AEDs, First Aid kits, ~~Eye~~ wash bottle		
Frost before 8am					
Weather - 34°F in AM / 60°F in PM; wind 3-5 mph gusts to 9 mph.; No Rain			**Highest Risk Index**		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator Nicky Moody (Print Name) _____ (Signature)

Supervisor Nicky Moody (Print Name) _____ (Signature)

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print) SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

NAME (Please Print)	SIGNATURE
Shawn Hinz	[signature]
Rick Wilson	[signature]
J Weatherman	[signature]
Eric Weatherman	[signature]
Joseph Graves	[signature]
Mike Duffield	[signature]
Johnny Stly	[signature]
Josie Smith	[signature]
Jeff Wilson	[signature]
Maurice M...	[signature]
Mike Gault	[signature]
Patrick Miller	[signature]
Nicky Moody	[signature]

Emergency Meeting / Assembly Area

Evans Boat Ramp.

Emergency Contact #

911

Emergency Radio Channel

16

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability

Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) Nicky Morley

Signature [signature]

VISITOR SIGN ON

NAME (Please Print) SIGNATURE TIME

Task Hazard Assessment Follow-Up/Review.

First Break Initial

Lunch Break Initial

Second Break Initial

AECOM

TASK HAZARD ASSESSMENT

Customer Teck American Inc.	**Permit No.**
Location UCR	**Job No.** 60584878
Description of Task Sediment Facies Mapping	**Date** 10-4-18 Thursday

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Vehicle Use	Cell phones + other devices - No		buddy system		
	Wild life		Stay course honk		
Set up base station }	Lifting, lone worker		check ins noon / EOD		
Man base station }	Slips trips falls		Safety vis. vest, good boots		
Loading / unloading vessels	Lifting, pinch pts, over-water hazards		3-pt stance		
			Hand to someone on board		
Vessel operations	MOB		Safety boats		
	Moving parts/lines		PFDs		
	Over head hazards		Hard hat, glasses, Safety Gloves		
	~~Trip~~				
In Remote Areas.			Comm pln.		
			Cell phones work in area		
Emergency - 911 - Evan	boat Ramp				
Weather = 39°F - 56°F	3-4 mph wind				
Forecast 0% precip.	mostly cloudy				
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator Nicky Moody (Print Name) — Lee Leady (Signature)

Supervisor Nicky Moody (Print Name) — Lee Leady (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print) SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

NAME (Please Print)	SIGNATURE
MAGGIE MCKEON	
Mike Duffield	
J WEATHERMAN	
DAVE WILLIAMS	
Marilyn Gauthier	
Patrick Miller	
John M Stuky	
Rene Trudeau	
JEFF WILSON	
Ryan McElrice	
Joseph Graves	
Nicky Moody	
Josie Smith	
Jeff Johnson	

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability

Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Emergency Meeting / Assembly Area

Emergency Contact #

Emergency Radio Channel

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) Nicky Moody

Signature Nicky Moody

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

	Initial
First Break	
Lunch Break	
Second Break	

AECOM

TASK HAZARD ASSESSMENT

Customer Teck American	**Permit No.** —
Location UCR	**Job No.** —
Description of Task Sediment Facies Mapping	**Date** 10/5/2018

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Vehicle Use	Wildlife @ dust-dawn		Watch for gang, buddy system - lookout		
	Accidents		Stay the course if see deer, brake firmly & calmly		
			stay in lane, don't swerve		
			Honk!		
Set up + man base station	Lifting, lone worker		Lifting technique Check-ins		
	Slips trips, vehicle traffic		Good boots high vis vest		
Loading vessels	Lifting, vessel boarding		3-pt stance, hand over equipment		
	Pinch points, hand injuries		PFDs on dock		
Vessel operations	over water hazards		→ Safety boats		
	Cold stress		hand warmers, layers (no cotton)		
	MOB		Captain- check all seated before accelerating		
	Pinch pts, over head hazards, Slips/trips		Gloves- Anchors - HH + glasses + S.toe toes		
In remote Areas			Visual or Cell Photo		
			↳ boosters		
			Comm. Plan in place.		
Medical emergency →	Call 911				
	Motor to Evan dock or boat ramp		~~[illegible]~~		
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator Nicky Moody (Print Name) — Signature

Supervisor Nicky Moody (Print Name) — Signature

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
John M. Staly	
Mike Duffield	
Maggie Wilson	
JEFF WILSON	
Ryan Mylecc	
Scott Mahaney	
Eric Weatherman	
René Tardeau	
Rick Wilson	
JWEATHERMAN	
Joseph Groves	
DAVE WILLIAMS	
Josie Smith	
Jerry Pretaxe	
Nicky Moody	

I participated in the development and understand the content of this Task Hazard Assessment.

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Emergency Meeting / Assembly Area

Evan Campground boat ramp

Emergency Contact #

911

Emergency Radio Channel

16

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name)

Signature

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME
Scott Mahaney		
Darice Mills		
Jeff Johnson		07:55

Task Hazard Assessment Follow-Up/Review.

	Initial
First Break	
Lunch Break	
Second Break	

AECOM

TASK HAZARD ASSESSMENT

Customer Teck American Inc	**Permit No.**
Location Upper Columbia River	**Job No.** 60584878
Description of Task Sediment Facies Mapping	**Date** 10-8-18, Wednesday

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Vehicle use	Wildlife		Same as yesterday.		
Setup + Man Base station	Lifting, lone worker				
	Slip trips falls.				
Loading vessels	Lifting, vessel boarding				
	Pinch pts, hand injuries				
Vessel Operations	Over-water hazards				
	MOB				
	Pinch pts				
	Moving parts/lines				
In Remote Areas	Overhead hazards				
Medical Emergencies - Evans boat ramp					
(911)					
Weather = low 42°F ; high 58°F, Calm, No precipitation			**Highest Risk Index**		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator Nicky Moody (Print Name) — (Signature)

Supervisor Nicky Moody (Print Name) — (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print) SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

J WEATHERMAN J Weatherman
Rick Wilson Rick Wilson
Brandon Howe Brandon Howe
E Weatherman E Weatherman
John Staley John Staley
Mike Duffield Mike Duffield
Josie Smith Josie Smith
Nicky Moody Nicky Moody
JEFF WILSON Jeff Wilson
Rene Trudeau Rene Trudeau
Ryan McElree Ryan McElree
Maggie Mc Maggie Mc

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME
Jeff Johnson	Jeff Johnson	08:00

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability

Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur but possible during task/activity	1/10,000

Task Hazard Assessment Follow-Up/Review.

	Initial
First Break	
Lunch Break	
Second Break	

Emergency Meeting / Assembly Area: Evans Boat Ramp.

Emergency Contact #: 911

Emergency Radio Channel: 16

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name)

Signature

AECOM

TASK HAZARD ASSESSMENT

Customer Teck American, Inc	**Permit No.** –
Location Upper Columbia River	**Job No.** –
Description of Task Sediment Facies Mapping	**Date** 10/7/2018

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
No changes					
No new people.					
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator Nicky Moody (Print Name) — (Signature)

Supervisor Nicky Moody (Print Name) — (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
Maggie McKeon	
Dave Williams	
Mike Duffield	
Jeff Wilson	
Ryan McElroe	
René Trudeau	
J Weatherman	
Rick Wilson	
Brandon Hoover	
Eric Weatherman	
John Staly	
Josie Smith	
Nicky Moody	

I participated in the development and understand the content of this Task Hazard Assessment.

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME
Jeff Johnson		7:40

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability

Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Task Hazard Assessment Follow-Up/Review.

	Initial
First Break	
Lunch Break	
Second Break	

Emergency Meeting / Assembly Area: Evans boat ramp

Emergency Contact #: 911

Emergency Radio Channel: 16

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name): Nicky Moody

Signature:

AECOM

TASK HAZARD ASSESSMENT

Customer Teck American Inc.	**Permit No.** —
Location Upper Columbia River, Near Marcus / Evans	**Job No.** —
Description of Task Sediment Facies Mapping	**Date** 10/8/2018.

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Vehicle use	Wildlife - @ dusk - dawn		- watch for the gang, hank		
			- hold course; don't swerve		
	Fatigue; repetition.		- rest!!		
Set up + man station	Lifting hazards,		- Proper lifting technique		
	Lone worker		- Comm plan / check-in		
	Slips trips		- Sturdy boots		
Loading / boarding vessels	Lifting, 3 pts of contact				
	Pinch pts		- Stay clear		
	hand injuries		- Gloves		
Vessel ops	slips trips falls		- clean / organized deck		
	MOB		- safety boats / trawable		
	Pinch pts. / Moving parts / lines		- hard hat / glasses		
	Overhead hazards				
In remote areas			- Comm plan.		
Medical emergency	Weather = Low 50s, overcast				
- Call 911					
- Evans boat ramp.					
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator Nicky (Print Name) — (Signature)

Supervisor Nicky (Print Name) — (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
Brandon Hoover	Brandon Hoover
Joseph Graves	[signature]
Lee Weatherman	Lee Weatherman
Rick Wilson	Rick Wilson
Mike Duffield	[signature]
John M. Staley	[signature]
Josie Smith	Josie Smith
Stu Holmes	[signature]
Nicky Moody	[signature]
[illegible]	[signature]
[illegible]	Ryan Trudeau
Ryan M	Ryan McElroy
Jeff Wilson	[signature]

I participated in the development and understand the content of this Task Hazard Assessment.

CN12

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	<=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) ______________________

Signature ______________________

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME
Denyne McDonald	Denyne McDonald	0730

Task Hazard Assessment Follow-Up/Review.

	Initial
First Break	
Lunch Break	
Second Break	

Emergency Meeting / Assembly Area

Evans boat ramp

Emergency Contact #

911

Emergency Radio Channel

16

AECOM

TASK HAZARD ASSESSMENT

Customer	Teck American, Inc.	Permit No.	—
Location	UCR - ADCP + Imaging / MBES	Job No.	—
Description of Task	↓	Date	10/9/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
No change in tasks					
No new people.					
	Wet surfaces. - slips / trips / falls.				
	Rex				
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

	Print Name	Signature
Originator	[signature]	Nicky Moody
Supervisor	[signature]	Nicky Moody.

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

J WEATHERMAN	
Eric Workman	
Rick Wilson	
Joseph Jones	
Rene Tinoco	
Ryan McClue	
DAVE WILLIAMS	
Mike Duffield	
Sh Holmes	
John Stahl	
Miguel	
Jeff Wilson	
Nicky Moody	

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME
Jeff John		7:40

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability

Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10 000

Task Hazard Assessment Follow-Up/Review.

	Initial
First Break	
Lunch Break	
Second Break	

Emergency Meeting / Assembly Area: Evan Boat ramp

Emergency Contact #: 911

Emergency Radio Channel: 16

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name): Nicky Moody

Signature:

AECOM

TASK HAZARD ASSESSMENT

Customer Teck American, Inc	**Permit No.** —
Location UCR	**Job No.** —
Description of Task Sediment Facies Mapping	**Date** 10/10/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
No changes. - Lisa t.					
Dave Hose = New supervisor.					
Vehicle use.	~~tett~~ Wildlife		No cells / gps		
			Watch for the gang, honk		
~~Set up base~~			Calm, don't swerve		
Loading vessels	Lifting, Slips trips falls		.		
Vessel ops	Pinch pts				
	over water hazards		PFDs		
	MOB		Make sure seated @ ramp / motoring		
	~~Pinch~~ Overhead hazards		HH, glasses, gloves		
	Moving lines				
	Remote Areas.		Check ins		
			Mobilization plan. / comm plan		
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator Nicky Moody (Print Name) — (Signature)

Supervisor Dave Hose (Print Name) — ~~Dave H~~ Dave Hose (Signature)

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
I participated in the development and understand the content of this Task Hazard Assessment.	
Dan Smith	
Rick Wilson	
Joseph Graves	
Eric Weatherman	
David Hose	
Jeff Wilson	
John Staley	
Mike Dolan	
Chris Holmes	
Nicky Murray	
René Trudeau	
Lisa Raterink	
Mary McKee	
Ryan McElree	

Emergency Meeting / Assembly Area

Evans boat ramp.

Emergency Contact #

911

Emergency Radio Channel

16

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
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Risk Rating (Probability x Severity)	Risk Acceptance Authority
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5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) David R. Hose

Signature

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME
Jeff Johnson		8:00

Task Hazard Assessment Follow-Up/Review.

First Break — Initial

Lunch Break — Initial

Second Break — Initial

AECOM

TASK HAZARD ASSESSMENT

Customer TECK AMERICAN	**Permit No.**
Location UCR	**Job No.**
Description of Task ~~M~~ ADCP AND BATHYMETRY SURVEY	**Date** 10/11/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Driving to Boat Launch	Wildlife on Road		Drive Slowly and Be Hit Vigilant While Driving		
Launching Boats	Slippery Dock		Load Boat Prior To Launching		
Working on Water	Slips, Trips, and Falls		Move Deliberately when working Stay Seated when on Step Be Vigilant for Human Overboard		
Being Seated All Day	Swelling of legs and ankles		Be Sure to Walk in the Evenings as best we can		
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator David R. Hosse (Print Name) — David R. Hosse (Signature)

Supervisor _____ (Print Name) _____ (Signature)

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
David R. Hose	[signature]
René Miller	[signature]
Maggie Miller	[signature]
Ryan McElice	[signature]
Lisa Paterink	[signature]
Rick Wilson	[signature]
Dan Smith	[signature]
Eric Weatherman	[signature]
Joseph Graves	[signature]
DAVE WILLIAMS	[signature]
Mike Duffield	[signature]
JEFF WILSON	[signature]
Sky Holmes	[signature]
John Staly	[signature]

I participated in the development and understand the content of this Task Hazard Assessment.

Emergency Meeting / Assembly Area

Evans Boat Launch

Emergency Contact #

911

Emergency Radio Channel

Coast Guard 16

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

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1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability

Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) David R. Hose

Signature [signature]

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break ____ Initial

Lunch Break ____ Initial

Second Break ____ Initial

AECOM

TASK HAZARD ASSESSMENT

Customer Teck American	**Permit No.**
Location UCR Northpoint To Dorland Eddy	**Job No.** 60584878
Description of Task Conducting MBES Survey	**Date** 10/12/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Drive To Northpoint	Darkness and Wildlife		Drive Slowly		
Loading Boats	Slippery Docks		Load Boats Before Launch		
Motoring in Moving River	Falls and Person overboard		Stay Seated During Motoring		
Working on Boat	Slips, Trips, Falls, and pinch points		Move Deliberately and stay at work station		
				Highest Risk Index	

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator David Hoss (Print Name) — David R Hoss (Signature)

Supervisor David Hoss (Print Name) — David R Hoss (Signature)

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

David Hoge	
Jenn Staby	
DAVE WILLIAMS	
Eric Weatherman	
Joseph Graves	
J. WEATHERMAN	
Mike Duffield	
John Shuster	
[illegible]	
DAN Smith	
Stu Holmes	
MAGGIE McKEON	
Ryan McElroy	
Lisa Rutenink	

Emergency Meeting / Assembly Area

Northpoint Boat Launch

Emergency Contact #

911

Emergency Radio Channel

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability

Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name)

Signature

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

	Initial
First Break	
Lunch Break	
Second Break	

AECOM

TASK HAZARD ASSESSMENT

Customer Teck American	**Permit No.**
Location UCR Deadmans Eddy / Northpoint	**Job No.**
Description of Task ~~Multi~~ Sediment Facies Mapping Survey	**Date** 10/13/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Driving to Boat Launch	Wildlife on Road		Drive Slowly and Stay Vigilant		
Loading Boats	Slippery Docks		Load Boats Prior to Launch		
Motoring on Flowing River	Hitting Submerged obsticles		All Personnel to Stay Seated During Motoring		
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Originator David R. Hosk (Print Name) — David R. Hosk (Signature)

Supervisor David R. Hosk (Print Name) — David R. Hosk (Signature)

Risk Matrix on Reverse

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

I participated in the development and understand the content of this Task Hazard Assessment.

NAME (Please Print)	SIGNATURE
David R. Hose	[signature]
Lisa Raterink	[signature]
J WEATHERMAN	[signature]
DAVE WILLIAMS	[signature]
John Stahy	[signature]
Rene Trudeau	[signature]
Maggie Mullen	[signature]
Ryan McClure	[signature]
John Schaefer	[signature]
Dan Smith	[signature]
Rick Wilson	[signature]
Eric Weatherman	[signature]
Mike Duffield	[signature]
Stu Holmes	[signature]

Emergency Meeting / Assembly Area

Northport Boat Launch

Emergency Contact #

911

Emergency Radio Channel

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) ______________________

Signature ______________________

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break ______________________ Initial

Lunch Break ______________________ Initial

Second Break ______________________ Initial

AECOM

TASK HAZARD ASSESSMENT

Customer Tetra Tech	**Permit No.**
Location UCR Northport Boat Launch	**Job No.**
Description of Task Sediment Facies Mapping Survey	**Date** 10/15/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Driving To Boat Launch	Wildlife on Road and Truck Traffic		Drive Slowly and Remain Vigilant		
Lowering Boats and Loading Gear	~~Load to~~ Slippery Surfaces		Load Boats in Parking Lot And ~~go~~ be careful on wet icy Boat launch		
Working on The Dock	Slips Trips + Falls		Move deliberately and be aware of pinch points		
				Highest Risk Index	

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator David R. Hosley — Print Name — David R. Hosley — Signature

Supervisor _____ — Print Name — _____ — Signature

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

I participated in the development and understand the content of this Task Hazard Assessment.

NAME (Please Print)	SIGNATURE
David R. Hose	[signature]
Linda Howard	[signature]
Eric Weatherman	[signature]
Mike Duffield	[signature]
Jason Du-Fresn	[signature]
Dave Williams	[signature]
Lisa Retermic	[signature]
Dan Smith	[signature]
Ryan McAlicce	[signature]
John Schaefer	[signature]
J Weatherman	[signature]
René Trudeau	[signature]
Maggie Miller	[signature]
Joseph Graves	[signature]

Emergency Meeting / Assembly Area

North Point Boat Launch

Emergency Contact #

911

Emergency Radio Channel

USCG -16

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
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1-Improbable	5	4	3	2	1

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5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) David R. Hose

Signature [signature]

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break	Initial

Lunch Break	Initial

Second Break	Initial

AECOM

TASK HAZARD ASSESSMENT

Customer Teck American	**Permit No.**
Location UCR China Bench ADI	**Job No.**
Description of Task Sediment Facies Mapping	**Date** 10/16/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Travel to Boat Launch	Wildlife on Road		Drive Slowly and Be Vigilant		
Launch Boats & Load Crew and Gear	Icy Dock and Ramp		Load Crew from Grassy Area Beside The Ramp Watch for Icy Surfaces on Boat Dock Step on Rubber Mats		
Working on Boat	Working in Close Quarters and on dock hoisting Equipment from (pinch points)		Don't Make any Quick Movements inside Cabin and Stay off The dock unless Necessary		
				Highest Risk Index	

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Originator David R. Hose (Print Name) — David R. Hose (Signature)

Supervisor _____ (Print Name) _____ (Signature)

Risk Matrix on Reverse

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
David R. Hoose	David R. Hoose
Maggie Mclean	
Lisa Rakowski	
Lindsay Hilyard	
Dan Smith	
John Schaefer	
Bernie Trudeau	
Jason Durfee	
Mike Duffield	
Ryan McGraw	
J Weatherman	
Joseph Graves	
Dave Williams	
Eric Weatherman	

I participated in the development and understand the content of this Task Hazard Assessment.

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
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5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
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Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
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Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Task Hazard Assessment Follow-Up/Review.

First Break	Initial

Lunch Break	Initial

Second Break	Initial

Emergency Meeting / Assembly Area

China Bend Boat Launch

Emergency Contact #

911

Emergency Radio Channel

USCG - 16

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) David R. Hoose

Signature David R. Hoose

AECOM

TASK HAZARD ASSESSMENT

Customer TECK AMERICAN	**Permit No.**
Location CHINA BOND BOAT LAUNCH	**Job No.**
Description of Task UCR SEDIMENT FACIES MAPPING SURVEY	**Date** 10/17/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
TRAVEL TO BOAT LAUNCH	WILDLIFE ON OR NEAR ROAD		DRIVE SLOWLY AND BE VIGILANT		
	SCHOOL CHILDREN WAITING FOR BUS				
	LONG TRUCKS				
LOAD BOATS AND LAUNCH	ICY SURFACES		STEP CAREFULLY ON DECKS USE RUBBER MATS WHERE AVAILABLE. LOAD BOATS IN PARKING LOT OR FROM GRASSY AREA NEXT TO LAUNCH		
WORKING ON BOATS	ICY SURFACES		STAND ON RUBBER MATS STAY OFF FOR-DECK UNLESS WORKING THERE		
				Highest Risk Index	

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator DAVID HOSE — Print Name _____ Signature

Supervisor David R. Hose — Print Name _____ Signature

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
David R. Hose	
Lisa Reterink	
Jason Dofman	
[illegible]	
Mike Duffield	
Ryan McElroy	
John Schaefer	
Renee Truelle	
Joseph Cannes	
Eric Weatherman	
DAN Smith	
J WEATHERMAN	
DAVE WILLIAMS	
Linda Howard	

I participated in the development and understand the content of this Task Hazard Assessment.

Emergency Meeting / Assembly Area

China Bend Boat Launch

Emergency Contact #

911

Emergency Radio Channel

USCR -16

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) David R. Hose

Signature

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break — Initial

Lunch Break — Initial

Second Break — Initial

AECOM

TASK HAZARD ASSESSMENT

Customer Teck American	**Permit No.**
Location China Bend Boat Launch	**Job No.** 60584878
Description of Task	**Date** 10/18/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Travel to Boat Launch	Debris on or next to the Road and Logging Trucks moving way too fast		Drive slowly and keep a vigilant watch		
K Loading and Launching Boats	~~too~~ Slippery Surfaces		Load Boats in Parking Lot prior to Launching Boats		
Working over water	Slips, Trips, Falls and Person overboard		Stay ~~Seated~~ Seated while motoring and stay off the dock unless necessary		
				Highest Risk Index	

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator David R. Hosk (Print Name) — David R. Hosk (Signature)

Supervisor _____ (Print Name) _____ (Signature)

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

I participated in the development and understand the content of this Task Hazard Assessment.

NAME (Please Print)	SIGNATURE
David R Hose	[signature]
Brandon Hoover	[signature]
J WEATHERMAN	[signature]
DAVE WILLIAMS	[signature]
[illegible]	[signature]
John Schaefer	[signature]
Ryan McElrell	[signature]
[illegible] Miller	[signature]
Mike Duffield	[signature]
Linda Howard	[signature]
Lisa Raterink	[signature]
Jason Dorfman	[signature]
Joseph Graves	[signature]
Dan Smith	[signature]

Emergency Meeting / Assembly Area

Boat Launch

Emergency Contact #

N

Emergency Radio Channel

16

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
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	People	Property Damage	Environmental Impact	Public Image/Reputation
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Frequent	Expected to occur during task/activity	9/10
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Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) David R. Hose

Signature [signature]

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break — Initial

Lunch Break — Initial

Second Break — Initial

AECOM

TASK HAZARD ASSESSMENT

Customer TECK AMERICAN	Permit No.
Location UCR SEDIMENT FACIES MAPPING - CHINA BEND	Job No.
Description of Task ADCP IMAGERY SURVEY	Date 10-19-18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
TRAVEL TO BOAT LAUNCH	ICY ROADS, GAME ON ROADS, HUNTERS TRUCK TRAFFIC,		BE AWAKE, DRIVE CAUTIOUSLY, BE VIGILANTE + AWARE		
LOADING + LAUNCHING BOATS	VEHICLES BACKING UP, SLIPPERY SURFACES, PINCH POINTS		LOAD BOATS IN PARKING AREA RATHER THAN IN WATER, WATCH FOOTING, BE VIGILANTE + AWARE		
ON WATER WORK	PINCH POINTS, HEAD BUMPS, EQUIPMENT, SLIP, TRIPS, FALLS, OVERBOARD CONCERNS.		STAY AT WORK STATION, WEAR PPE INCLUDING PFD, SAFETY BOATS, BE VIGILANTE + AWARE		
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator MARK HALL (Print Name) [signature] (Signature)

Supervisor ____ (Print Name) ____ (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

I participated in the development and understand the content of this Task Hazard Assessment.

NAME (Please Print)	SIGNATURE
David R. Hose	[signature]
Joseph Graves	[signature]
MARK HALE	[signature]
Eric Weatherman	[signature]
J WEATHERMAN	[signature]
Jason Dorfman	[signature]
Linda Howard	[signature]
DAVE WILLIAMS	[signature]
Mike Duffield	[signature]
DAN Smith	[signature]
Lisa Reitrink	[signature]
René Trudeau	[signature]
Maggie McKeon	[signature]
John Schaefer	[signature]
Ryan McEliece	[signature]

Emergency Meeting / Assembly Area

China Bend Boat Launch

Emergency Contact #

911

Emergency Radio Channel

USCG -16

Risk Rating Matrix

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Probable	Likely to occur during task/activity	1/10
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Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) MARK HALE

Signature [signature]

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break — Initial

Lunch Break — Initial

Second Break — Initial

AECOM

TASK HAZARD ASSESSMENT

Customer	**Permit No.**
Location	**Job No.**
Description of Task	**Date** 10-20-18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
TO AND FROM BOAT	DEER, ICY ROADS, TRUCK		DRIVE CAUTIOUSLY, USE MIRRORS		
LAUNCH ON PUBLIC ROADS	TRAFFIC, TRUCK, HUNTERS		KEEP EYE OUT, BE DILIGENT		
	FOG				
BOARDING & UNLOADING	ICY CONDITIONS, FALL,		WEAR FOOTWEAR, USE RAILS		
BOATS	SLIPS & TRIPS		& STEPS, LOAD BOAT IN		
			PARKING LOT		
ON WATER WORK	SLIPS, TRIPS, & FALLS,		LISTEN TO CAPT/SKIPPERS		
	OVERBOARD HAZARDS,		OF BOATS, WATCH STEPS,		
	HUNTERS		WEAR PPE, INCLUDING PFD		
			COMMUNICATE CLEARLY		
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator _____ (Print Name) _____ (Signature)

Supervisor _____ (Print Name) _____ (Signature)

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
Mike Duffield	
Maggie McKeon	
DAVE WILLIAMS	
Rene Trudeau	
J WEATHERHEAD	
Rick Wilson	
Eric Weatherman	
John Schaefer	
Ryan McElrea	
Jason Dorman	
Linda Howard	
Lisa Rakrink	
DAN Smith	
MARK HALE	

I participated in the development and understand the content of this Task Hazard Assessment.

Risk Rating Matrix

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10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
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Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Emergency Meeting / Assembly Area

Emergency Contact #

Emergency Radio Channel

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) MARK HALE

Signature

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break	Initial

Lunch Break	Initial

Second Break	Initial

AECOM

TASK HAZARD ASSESSMENT

Customer	TECK AMERICAN INC	**Permit No.**	
Location	UCR CHINA BEND AOI	**Job No.**	
Description of Task	RIVER IMAGERY	**Date**	10-21-18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
TRAVEL TO AND FROM	ICY ROADS, DEER (& MOOSE)		DRIVE CAREFULLY, WATCH SPEED,		
BOAT LAUNCH	ON ROADS, TRUCK TRAFFIC,		LOOK FOR BLACK ICE, USE MIRRORS		
	HUNTERS GLASSING HILLSIDES		BE VERY DILIGENT.		
	FROM VEHICLES				
LOADING ON AND OFF	SLIPS, TRIPS, & FALLS,		WEAR PROPER NON-SLIP FOOTWEAR,		
BOATS	HEAD BUMPS, PINCH POINTS		USE ESTABLISHED LOADING ROUTES		
			WATCH HAND PLACEMENT, WEAR		
			GLOVES		
WORKING ON					
WATER ~~HAZARDS~~	SLIPS, TRIPS, & FALLS,		LISTEN TO BOAT CAPT/SKIPPERS		
WORKING ON COLLECTING	OVERBOARD HAZARDS, ROCKING		COMMUNICATE, WEAR PROPER		
IMAGES	BOAT FROM BOAT WAKES &		PPE INCLUDING PFD, KEEP		
	THE HEAD BANGING THAT COULD		EYES & EARS OPEN, KNOW		
	OCCUR		PROPER CHANNELS TO CONTACT		
			RESCUE BOAT		
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Originator _____ (Print Name) _____ (Signature)

Supervisor _____ (Print Name) _____ (Signature)

Risk Matrix on Reverse

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
Eric Weatherman	E. Weatherman
Josh Weatherman	J. Weatherman
Rick Wilson	R. Wilson
Dan Smith	Dan Smith
Linda Hazard	Linda Hazard
John Schuster	
Jason Dorfman	
Mike Duffield	
Maggie McLean	
Ryan McElree	
Renee Trudeau	
Dave Williams	
Lisa Reitsma	
Michaela McVay	

I participated in the development and understand the content of this Task Hazard Assessment.

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

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1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10 000

Task Hazard Assessment Follow-Up/Review.

First Break	Initial

Lunch Break	Initial

Second Break	Initial

Emergency Meeting / Assembly Area

Emergency Contact #

Emergency Radio Channel

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name)

Signature

AECOM

TASK HAZARD ASSESSMENT

Customer	TECK AMERICA	**Permit No.**	
Location	UCR - CITINA BEND AOI	**Job No.**	
Description of Task	SEDIMENT FACIES STUDY	**Date**	10-22-18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
TRAVEL TO AND FROM HOTELS TO BOAT LAUNCH	DARKNESS, ICY ROADS, DEER, MOOSE, HUNTERS TRUCK TRAFFIC		OBEY TRAFFIC LAWS, WATCH SPEED, KEEP EYE OUT FOR WILDLIFE, BE DILIGENT		
LOAD & LAUNCH BOATS	SLIPS TRIPS & FALLS PINCH POINTS, ICY SURFACES, MOVING VEHICLES,		LOAD BOATS IN PARKING LOTS, WEAR PROPER NON-SLIP SHOES, CLIMB BOATS FROM ESTABLISHED ACCESS POINTS, WEAR GLOVES & WATCH HAND PLACEMENT, WATCH TRUCKS AS THEY BACK UP KEEP IN CONTACT W/ OPERATORS		
WORKING ON BOATS ADCP & INJURY FOR TIE-ON MULTIBEAM SURVEY FOR DISLO	SLIP, TRIPS & FALLS, OVERBOARD SITUATIONS, SUBMERGED WATER HAZARDS, HEAD BUMPS, PINCH POINTS		LISTEN TO SKIPPERS INSTRUCTIONS, WE HAVE SAFETY BOATS EMPLOYED, WEAR PROPER PPE INCLUDING PFDS, WEAR HARD HAT WHEN OUTSIDE HEAD BOOM BE AWARE! WATCH INSTRUMENTS & HAVE SPOTTERS.		
				Highest Risk Index	

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator _____ (Print Name) _____ (Signature)

Supervisor _____ (Print Name) _____ (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print) SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

NAME (Please Print)	SIGNATURE
J WEATHERMAN	J Weatherman
E Weatherman	E Weatherman
Rick Wilson	Rick Wilson
DAN Smith	Dan Smith
DAVE WILLIAMS	R. D. Williams
Maggie McKeon	
Jason Dorfman	
Rene Trudeau	
Ryan McElroy	
John Schaefer	
Mike Duffield	
Lisa Ratering	
Michaela McCloy	
MARK HALE	

Emergency Meeting / Assembly Area

Emergency Contact #

Emergency Radio Channel

Risk Rating Matrix

Probability	Severity				
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Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
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Probability

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Probable	Likely to occur during task/activity	1/10
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Remote	Unlikely to occur during task/activity	1/1 000
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Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name)

Signature

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break	Initial

Lunch Break	Initial

Second Break	Initial

AECOM

TASK HAZARD ASSESSMENT

Customer	TECK AMERICA	**Permit No.**	
Location	UCR CHINA BIND LOCALE	**Job No.**	
Description of Task	RIVER SEDIMENT RACIFS STUDY	**Date**	10-23-18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
TRAVEL TO AND	ICY ROADS, POOR LIGHTING,		FOLLOW TRAFFIC LAWS,		
FROM HOTELS TO	WILDLIFE, HUNTERS,		KEEP EYES OPEN, USE		
BOAT LAUNCH	TRUCK TRAFFIC		MIRRORS		
LOADING VESSELS	SLIPS, TRIPS, FALLS,		LOAD VESSELS IN PARKING		
W/ CREW & EQUIPMENT	PINCH POINTS,		LOT, CLIMB ABOARD ALONG		
			ESTABLISHED ROUTS, WEAR		
			NON-SLIP BOOTS		
WORKING ON WATER,	SLIPS, TRIPS & FALLS		LISTEN TO CAPTAINS,		
COLLECTING IMAGERY	PINCH POINTS, OVERBOARD		COMMUNICATE WEAR PROPER		
FROM RIVER BOTTOM,	ISSUES, SUN GLARE		PPE INCLUDING PFDs. WEAR		
P	HEAD BUMPS		HARDHATS, STEEL TOE BOOTS &		
			GLOVES WHEN ON VESSEL		
			SAFETY VESSEL ALWAYS TRAILING		
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator MARK HALE — Print Name — Signature

Supervisor — Print Name — Signature

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
Maggie Mclean	
Ryan McElroy	
J WEATHERMAN	
DAVE WILLIAMS	
Rick Wilson	
Dan Smith	
René Thibeau	
Stefanie Asalage	
Lisa Ratermann	
Jason Dorfman	
Michaela McCoy	
Mike Duffield	
John Schaefer	
E Weatherman	

I participated in the development and understand the content of this Task Hazard Assessment.

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Emergency Meeting / Assembly Area

Emergency Contact #

Emergency Radio Channel

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) MARK HALE

Signature

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break	Initial

Lunch Break	Initial

Second Break	Initial

AECOM

TASK HAZARD ASSESSMENT

Customer TEK AMERICA	**Permit No.**
Location UCR CHINA BOND BOAT LAUNCH VICINITY	**Job No.**
Description of Task	**Date** 10-24-18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
TRAVEL TO & FROM HOTELS & BOAT LAUNCH	DARKNESS, HEAVY FOG, WILDLIFE, TRUCK TRAFFIC		DRIVE SLOWLY, USE MIRRORS, KEEP EYES OPEN, KEEP RADIO TURNED DOWN & STAY FOCUSED		
LOADING + UNLOADING BOATS	SLIPS, TRIPS, FALLS, PINCH POINTS, DAMP SURFACES		LOAD BOATS IN PARKING LOT, WEAR PROPER FOOTWEAR, DRY OFF HANDRAILS, WEAR GLOVES		
WORKING ON RIVER TAKING MEASUREMENTS	SLIPS, TRIPS, FALLS, OVER BOARD SCENARIO, BOAT TRAFFIC IN FOG, HEAD BUMPS, PINCH POINTS		WEAR PROPER PPE INCLUDING PFDs, BOATS KEEP RADAR ON, SAFETY BOATS KEEP CLOSE, REMAIN IN SIGHT OF EACH OTHER, COMMUNICATE OFTEN		
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator [redacted] HALE (Print Name) _____ (Signature)

Supervisor _____ (Print Name) _____ (Signature)

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print) SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

E Weatherman
Rick Wilson
DAN Smith
J WEATHERMAN
John Schaefer
Ryan McClure
Maggie Miller
Rene Trudeau
Mike Duffield
Stephanie Aselage
Michaela McCoy
Jason Doremus
DAVE WILLIAMS
MARK HALE

Emergency Meeting / Assembly Area

Emergency Contact #

Emergency Radio Channel

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability

Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) MARK HALE

Signature

VISITOR SIGN ON

NAME (Please Print) SIGNATURE TIME

Task Hazard Assessment Follow-Up/Review.

First Break — Initial

Lunch Break — Initial

Second Break — Initial

AECOM

TASK HAZARD ASSESSMENT

Customer TECH AMERICA	**Permit No.**
Location UCR CHINA ~~BAR~~ BOAT LAUNCH	**Job No.**
Description of Task RIVER IMAGING	**Date** 10-25-19

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
TRAVELING BETWEEN	DARKNESS, DE-ICE		OBEY TRAFFIC LAWS, BE		
HOTELS + BOAT LAUNCH	ON ROAD, WILDLIFE,		VERY OBSERVANT, USE MIRRORS		
AND BACK AGAIN	SCHOOL KIDS, TRUCK		PAY ATTENTION TO OTHER		
	TRAFFIC		TRAFFIC		
LOADING + UNLOADING	SLIPS, TRIPS, + FALLS		WATER IS UP SO WE WILL		
OF BOATS, LAUNCHING	PINCH POINTS, HEAD		LOAD FROM DOCK, WATCH		
OF BOATS	BUMPS		FOOTING, BE AWARE OF BOAT		
			WAKES AND SHIFTING WEIGHTS		
ON WATER WORK,	SLIPS, TRIPS + FALLS,		SAFETY BOAT EMPLOYMENT,		
IMAGERY, ADCP,	OVERBOARD SITUATIONS,		WEAR PROPER PPE INCLUDING		
MULTIBEAM. COLLECTING	PINCH POINTS, HEAD		PFDS, ALL WORK ON FOREDECK		
TIDE DATA, GPS STATION	BUMPS.		MUST USE HARDHATS + STEEL		
SET UPS			TOE BOOTS PLUS GLOVES		
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator _____ (Print Name) _____ (Signature)

Supervisor _____ (Print Name) _____ (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
Stephanie Asselage	[signature]
Ryan McElree	[signature]
Rene Trudeau	[signature]
John Schooler	[signature]
Jenny Pretzer	[signature]
Shannon Leach	[signature]
Rick Wilson	Rick Wilson
Dan Smith	Dan Smith
E.Weatherman	E.Weatherman
J.Weatherman	J.Weatherman
Mike Duffield	[signature]
Maggie Walker	[signature]
DAVE WILLIAMS	R.D. Williams
Dan Crofton	[signature]
Michaela McVoy	[signature]
MARK HALE	[signature]

I participated in the development and understand the content of this Task Hazard Assessment.

Emergency Meeting / Assembly Area

Emergency Contact #

Emergency Radio Channel

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur but possible during task/activity	1/10,000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) MARK HALE

Signature [signature]

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break — Initial

Lunch Break — Initial

Second Break — Initial

AECOM

TASK HAZARD ASSESSMENT

Customer TECK AMERICA	**Permit No.**
Location UCR NORTHPORT VICINITY	**Job No.**
Description of Task RIVER WORK, ADCP, IMAGERY, MULTI	**Date** 10-26-18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
TRAVELING TO & FROM	DARKNESS, WET ROADS		OBEY TRAFFIC LAWS, REDUCE		
HOTELS & BOAT LAUNCH	WILDLIFE (ELK), TRUCK		SPEED AS NECESSARY, USE		
	TRAFFIC		MIRRORS, MAKE SURE		
			WINDSHIELD CLEAN, BE		
			OBSERVANT		
LOADING & UNLOADING	SLIPS, TRIPS, & FALLS		LOAD OFF DOCK WITH ASSISTANCE		
BOATS	PINCH POINTS, HEAD		USE 3-POINT CONTACT SYSTEM		
	BUMPS, WET SURFACES		WEAR PROPER PPE ON DECK		
			WEAR NO-SLIP SHOES		
WORKING ON WATER,	SLIPS, TRIPS, & FALLS,		WATCH STEP ROUND BOAT,		
TAKING READINGS &	OVERBOARD SCENARIOS,		3-POINT WHILE MOVING		
PHOTOS, MULTIBEAM	PINCH POINTS, HEAD		ABOUT DECK, WEAR PPE		
SURVEY	BUMPS		INCLUDING PFD, UTILIZE		
			SAFETY BOATS		
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator _____ (Print Name) _____ (Signature)

Supervisor _____ (Print Name) _____ (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
I participated in the development and understand the content of this Task Hazard Assessment.	
John Schcete	[signature]
Mike [illegible]	[signature]
[illegible]	[signature]
[illegible]	[signature]
Wayne Miller	[signature]
J WEATHERMAN	[signature]
Kevin Trudeau	[signature]
Rick Wilson	[signature]
[illegible]	[signature]
DAN Smith	[signature]
DAVE WILLIAMS	[signature]
Stephanie [illegible]	[signature]
Michaela [illegible]	[signature]
MARK HART	[signature]

Emergency Meeting / Assembly Area

Emergency Contact #

Emergency Radio Channel

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
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10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) MARK HART

Signature [signature]

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break — Initial

Lunch Break — Initial

Second Break — Initial

AECOM

TASK HAZARD ASSESSMENT

Customer TECK AMERICA	**Permit No.**
Location UCR Northport vicinity	**Job No.**
Description of Task Sediment facies mapping	**Date** 10/29/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Travel to & from hotels & boat launches	Dark, wet roads, wildlife, other traffic	4	Obey traffic laws, reduce speed as needed, no distracted driving	1	RD
Loading & unloading boats	Slips, trips, falls, pinch points, head bumps, wet surfaces	4	Load on & off dock w/ assistance. Use 3-points of contact, proper PPE on deck, slip resistant shoes	1	RD
Working on water, taking readings, photos, multibeam, collecting data, GPS setup	Slips, trips, & falls, overboard scenarios, pinch points, head bumps	4	Watch steps & head around booms, proper PPE, utilize safety ~~points~~, 3 points of contact	1	RD
Cold stress, rain	cold stress, wet clothing	4	NO cotton, layered clothing, stay dry, warm drinks or food, take breaks as needed	1	RD
				Highest Risk Index	

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator _____ (Print Name) _____ (Signature)

Supervisor Regan Orive (Print Name) _____ (Signature)

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
Michaela McCoy	[signature]
Ryan McElwee	[signature]
DAVE WILLIAMS	[signature]
John Staly	[signature]
Maggie McKee	[signature]
John Schaefer	[signature]
Charlie Kellogg	[signature]
Mike Duffield	[signature]
J WEATHERMAN	[signature]
Rick Wilson	[signature]
DAN Smith	[signature]
Patrick Miller	[signature]
E Weatherman	[signature]
Marlyn Gunther	[signature]
Ragan Driver	[signature]

I participated in the development and understand the content of this Task Hazard Assessment.

Emergency Meeting / Assembly Area: Boats / vehicles / boat launch

Emergency Contact #: 911

Emergency Radio Channel:

Risk Rating Matrix

Probability	Severity: 5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
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5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability

Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name): Ragan Driver

Signature: [signature]

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break — Initial

Lunch Break — Initial

Second Break — Initial

AECOM

TASK HAZARD ASSESSMENT

Customer Teck America	**Permit No.**
Location Upper Columbia River	**Job No.** 605
Description of Task Data collection from boats	**Date** 10/30/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Driving in dark, wildlife, traffic, road construction	wildlife, road construction, fog, dark	4	Obey traffic laws/signals, slow down as necessary, no distracted driving	1	RD
Loading & unloading boats	slips, trips, falls, pinch points, man overboard	4	Use help loading & unloading, 3-pt of contact, PPE,	1	RD
Data collection	slips trips & falls, head bumps man overboard, deck congestion pinch points	4	PPE, mindful of other personnel, 3-pts of contact	1	RD
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Originator _____ Print Name _____ Signature

Supervisor Ragan Drive Print Name _____ Signature

Risk Matrix on Reverse

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

Michaela McVay	
Marshall Smith	
Patrick Miller	
Ryan McVay	
Charles Kellar	
John Schaefer	
John Staly	
J WEATHERMAN	
E. WEATHERMAN	
Dan Smith	
Rick Wilson	
Mike Duffield	
Maggie Moran	
DAVE WILLIAMS	
Ragan Diver	

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability

Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10 000

Emergency Meeting / Assembly Area

Boats / Vehicles / Northport Boat Launch

Emergency Contact #

911

Emergency Radio Channel

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) Ragan Diver

Signature

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

	Initial
First Break	
Lunch Break	
Second Break	

AECOM

TASK HAZARD ASSESSMENT

Customer Teck America	**Permit No.**
Location North port, WA Columbia River	**Job No.**
Description of Task Sediment mapping	**Date** 10/31/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Driving to and from job site	Dark, wildlife, fog, road construction, traffic	4	No distracted driving, slow down, follow traffic laws & signals	1	RD
Loading, unloading & launching boats	Slips, trips, & falls, pinch points, limited space, water	4	Be deliberate w/movements, 3-pts of contact, help with loading & unloading, PPE	1	RD
On deck use of equipment	Slips, trips, & falls, head bumps congested workspace, cold & wet	4	Cold stress remedies, PPE, only needed personnel on deck,	1	RD
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Originator _____ (Print Name) _____ (Signature)

Supervisor Regan Driver (Print Name) _____ (Signature)

Risk Matrix on Reverse

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
I participated in the development and understand the content of this Task Hazard Assessment.	
Marilyn Gustovic [illegible]	[signature]
Ryan McElwee	[signature]
Maggie Millen	[signature]
John Schaefer	[signature]
K Weatherman	[signature]
E Weatherman	[signature]
Rick Wilson	[signature]
Dan Smith	[signature]
Dave Williams	[signature]
John Stahl	[signature]
Jeff Wilson	[signature]
Michael [illegible]	[signature]
Charlie Keller	[signature]
Regan Driver	[signature]

Emergency Meeting / Assembly Area

Boats/vehicles/boat launch

Emergency Contact #

911

Emergency Radio Channel

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
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	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
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Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
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Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) Regan Driver

Signature [signature]

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break — Initial

Lunch Break — Initial

Second Break — Initial

AECOM

TASK HAZARD ASSESSMENT

Customer TECK AMERICAN	**Permit No.**
Location NorthPort, WA Columbia River	**Job No.** 60584878
Description of Task MBES collection, boating	**Date** 11/1/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Driving to and from jobsite	Dark, wildlife, fog, rain, traffic	4	no distracted driving, reduce speed, follow traffic signals & laws	1	RD
Loading & unloading boats	Slips, trips, & falls, pinch points, man overboard	4	careful diligence, help with equipment, 3-pts of contact, PPE	1	RD
Data collection	Slips, trips & falls, head bumps		PPE, stay seated unless necessary only required personnel on deck	1	RD
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Originator _____ (Print Name) _____ (Signature)

Supervisor Ragan Driver (Print Name) _____ (Signature)

Risk Matrix on Reverse

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

I participated in the development and understand the content of this Task Hazard Assessment.

NAME (Please Print)	SIGNATURE
John M Staly	[signature]
Charlie Kelloss	[signature]
John Scheets	[signature]
J. Weatherman	J Weatherman
Rick Wilson	Rick Wilson
DAVE WILLIAMS	R. David Williams
Ragan Driver	[signature]

Emergency Meeting / Assembly Area

Boat / vehicles / boat launch

Emergency Contact #

911

Emergency Radio Channel

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
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2-Remote	10	8	6	4	2
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5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
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Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability

Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) Ragan Driver

Signature [signature]

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break — Initial

Lunch Break — Initial

Second Break — Initial

AECOM

TASK HAZARD ASSESSMENT

Customer TECK AMERICAN	**Permit No.**
Location Northport, WA Upper Columbia River	**Job No.** 60584878
Description of Task Data collection from research vessels	**Date** 11/2/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Driving to and from job site	dark, rain, fog, wildlife, traffic	4	No distracted driving, slower speeds, follow traffic laws & signals	1	RD
Loading & unloading boats	slips, trips, falls, pinch points, head bumps, man overboard	4	Help with loading/unloading, 3 pts of contact, PPE	1	RD
Data collection	slips, trips, falls, head bumps, pinch points, man overboard	4	careful on deck, only essential personnel on deck, PPE	1	RD
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator _____ (Print Name) _____ (Signature)

Supervisor Regan Driver (Print Name) _____ (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print) SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

John Staly
DAVE WILLIAMS
Mike Duffield
John Schaefer
J. WEATHERINGTON
Rick Wilson
Regan Driver

VISITOR SIGN ON

NAME (Please Print) SIGNATURE TIME

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability

Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Emergency Meeting / Assembly Area

Boats/vehicles/boat launch

Emergency Contact #

911

Emergency Radio Channel

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) Regan Driver

Signature

Task Hazard Assessment Follow-Up/Review.

First Break	Initial

Lunch Break	Initial

Second Break	Initial

AECOM

TASK HAZARD ASSESSMENT

Customer TECK AMERICAN	**Permit No.**
Location VIFER Columbia River	**Job No.** 60584378
Description of Task Data collection from boats	**Date** ~~11-3-18~~ 11-3-18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Driving to and from job site	dark, fog, rain, wildlife, traffic	4	no distracted driving, slower speeds obey all traffic signals & laws	1	KD
to					
Loading & unloading boats	slips, trips & falls, pinch points, man overboard	1	diligence, help with equipment, watch hand placement, 3 pts contact PPE	1	KD
Data collection	slips, trips, & falls, man overboard, pinch points, head bumps	4	careful on deck, PPE	1	KD
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Originator _____ (Print Name) _____ (Signature)

Supervisor Rogan Driver (Print Name) _____ (Signature)

Risk Matrix on Reverse

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
DAVE WILLIAMS	R. Williams
E. Watherman	E. Watherman
J Watherman	J Watherman
John Stacy	
Mike Duffell	
John Schaefer	
Reagan Driver	

I participated in the development and understand the content of this Task Hazard Assessment.

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Emergency Meeting / Assembly Area

Boats / vehicles / boat launch

Emergency Contact #

911

Emergency Radio Channel

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) Reagan Driver

Signature

Task Hazard Assessment Follow-Up/Review.

First Break	Initial

Lunch Break	Initial

Second Break	Initial

AECOM

TASK HAZARD ASSESSMENT

Customer FECK AMERICAN	**Permit No.**
Location UPPER COLUMBIA RIVER	**Job No.** 60584878
Description of Task Data collection from boats	**Date** 11/4/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Driving to and from job site	dark, wildlife, rain, fog, traffic	4	slow down, no distracted driving, follow posted signals and laws	1	RD
Loading & unloading boats	slips, trips & falls, pinch points, head bumps, man overboard	4	careful around docks & boats, 3-pts contact, PPE	1	RD
Data collection	slips, trips, falls, pinch points, head bumps, man overboard	4	care deploying equipment, no unnecessary personnel on deck, PPE	1	RD
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator _____ (Print Name) _____ (Signature)

Supervisor Ragan Driver (Print Name) _____ (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
John Schaefer	
J. WEATHERMAN	
E. Weatherman	
John Staly	
Mike Duffield	
Regan Driver	
DAVE WILLIAMS	

I participated in the development and understand the content of this Task Hazard Assessment.

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur but possible during task/activity	1/10,000

Task Hazard Assessment Follow-Up/Review.

	Initial
First Break	
Lunch Break	
Second Break	

Emergency Meeting / Assembly Area

vehicle / boats / boat launch

Emergency Contact #

911

Emergency Radio Channel

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) Regan Driver

Signature

AECOM

TASK HAZARD ASSESSMENT

Customer TECK AMERICAN	**Permit No.**
Location UPPER COLUMBIA RIVER	**Job No.** 60584378
Description of Task Data collection from boats	**Date** 11/5/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Driving to and from job site	dark, rain, fog, wildlife, traffic	4	no distracted driving, follow all traffic laws & signals, slower speeds	1	RD
Loading & unloading boats	slips, trips & falls, pinch points, head bumps, man overboard	4	help loading & unloading, 3-pts. contact, PPE	1	RD
Data collection	slips, trips & falls, pinch points, head bumps, man overboard	4	no unnecessary personnel on deck, PPE, 3 pts contact	1	RD
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator _____ (Print Name) _____ (Signature)

Supervisor Raegan Driver (Print Name) _____ (Signature)

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print)	SIGNATURE
Mike Duffield	
John Staby	
DAVE WILLIAMS	
John Schafer	
DAN Smith	
JWeatherman	
Regan Driver	

I participated in the development and understand the content of this Task Hazard Assessment.

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10 000

Task Hazard Assessment Follow-Up/Review.

	Initial
First Break	
Lunch Break	
Second Break	

Emergency Meeting / Assembly Area

Vehicles / boats / boat launch

Emergency Contact #

911

Emergency Radio Channel

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) Regan Driver

Signature

AECOM

TASK HAZARD ASSESSMENT

Customer Tuck American	Permit No.
Location UCR Sediment Facies Mapping Survey	Job No.
Description of Task Multibeam Survey	Date 11/06/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Travel To Boat Launch	Wildlife on Road		Drive Slow and Be Vigilant		
Load and Launch Boats	Slippery Docks		Load Boats In Parking Lot		
Motoring To Work Area	Slips Trips Falls		Stay Seated while motoring		
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator David R. Hosp (Print Name) — David R. Hosp (Signature)

Supervisor _____ (Print Name) _____ (Signature)

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print) SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

NAME (Please Print)	SIGNATURE
David R. Hose	David R. Hose
Mike Duffield	[illegible]
DAVE WILLIAMS	R. D. Williams
John Staly	[illegible]
John Schafer	[illegible]
J WEATHERMAN	J Weatherman
Scott Niekren	Scott Niek

Emergency Meeting / Assembly Area

China Bend Boat Launch

Emergency Contact #

911

Emergency Radio Channel

USCG 16

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) David R. Hose

Signature David R. Hose

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME

Task Hazard Assessment Follow-Up/Review.

First Break — Initial

Lunch Break — Initial

Second Break — Initial

AECOM

TASK HAZARD ASSESSMENT

Customer	Tuck American	**Permit No.**	
Location	UCR Sediment Fences Mapping Survey RM 715-719	**Job No.**	
Description of Task	Multibeam Survey Mapping	**Date**	11/7/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Travel To Boat Launch	Large Animals on or near Road		Drive slowly and Keep Vigilant		
	Fog in Area				
Load and Launch Boats	Slippery Docks		Load Boats in Parking Lot prior to launching		
Motoring To Work Area	Slips Trips + Falls		Remain Seated When Motoring		
			Highest Risk Index		

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator David R. Hose (Print Name) — David R. Hose (Signature)

Supervisor _____ (Print Name) _____ (Signature)

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print) SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

David R. Hose
J Weatherman
Weston Sellers
John Schooley
Mike Duffie, Jr
John Stanley

Emergency Meeting / Assembly Area

China Board Boat Launch

Emergency Contact #

911

Emergency Radio Channel

USCG 16

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
2-Remote	10	8	6	4	2
1-Improbable	5	4	3	2	1

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1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1 000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10 000

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) David R. Hose

Signature David R. Hose

VISITOR SIGN ON

NAME (Please Print) SIGNATURE TIME

Task Hazard Assessment Follow-Up/Review.

First Break — Initial

Lunch Break — Initial

Second Break — Initial

AECOM

TASK HAZARD ASSESSMENT

Customer Teck American	**Permit No.**
Location UCR Sediment Facies Mapping Survey - China Bend	**Job No.**
Description of Task Multi-Beam Sonar Survey	**Date** 11/8/18

Basic Task Steps (explain how the task will be carried out)	Hazards (identify all hazards and potential hazards)	Risk (initial)	Precautions (describe how that hazard will be controlled)	Risk (final)	Initials
Travel To Boat Launch	Large Animals on or near Road		Drive Slowly and Keep Vigilant for Animals		
Load Boats	Slippery Decks and Icy Docks		Load Boats Prior to Launching		
Motoring	Slips, Trips + Falls		Stay Seated While Motoring		
				Highest Risk Index	

Review and attach to Tailgate Meeting as required. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document.

Risk Matrix on Reverse

Originator David R. Hosk (Print Name) — David R. Hosk (Signature)

Supervisor _____ (Print Name) _____ (Signature)

THIS FORM IS TO BE K[illegible] ON JOB SITE.

AECOM

TASK HAZARD ASSESSMENT

WORKER SIGN ON

NAME (Please Print) SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

David R. Hoyt
John Staly
John Schaefer
DAVE WILLIAMS
J Weatherman
Weston Sellers

VISITOR SIGN ON

NAME (Please Print) SIGNATURE TIME

Risk Rating Matrix

Probability	Severity				
	5-Catastrophic	4-Critical	3-Major	2-Moderate	1-Minor
5-Frequent	25	20	15	10	5
4-Probable	20	16	12	8	4
3-Occasional	15	12	9	6	3
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5 to 9 (Medium)	Risk requires approval by Operations Lead/ Supervisor & Safety Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & Safety Director

Severity – Potential Consequences

	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>$1M USD Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>$250K to $1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> $10K to $250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> $1K to $10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</=$1K USD	Small chemical release contained onsite	Individual complaint

Probability

Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Emergency Meeting / Assembly Area

China Bend Boat Launch

Emergency Contact #

911

Emergency Radio Channel

USCG 16

Area is safe and housekeeping completed at the end of task/shift.

Supervisor (print name) David R. Hoyt

Signature David R. Hoyt

Task Hazard Assessment Follow-Up/Review.

	Initial
First Break	
Lunch Break	
Second Break	

2019 Field Work
Sediment Facies Mapping

12. Personnel Acknowledgement

By signing below, the undersigned acknowledges that he/she has reviewed the AECOM Health and Safety Plan for the Upper Columbia River Sediment Facies Mapping project. The undersigned also acknowledges that he/she has been instructed in the contents of this document and understands the information pertaining to the specified work, and will comply with the provisions contained therein. The employee understands that they are NOT to perform any work that they have not been adequately trained for and that they are to stop work if it is unsafe to proceed. Finally, the employee understands to notify the Site Supervisor and the Incident Hotline at 800-348-5046 for any incident, ***including ANY injury even if no first aid or medical treatment is required.***

Print Name	Signature	Organization	Date
Jennifer Pretare	[signature]	AECOM	7-8-19
John M. Staly	[signature]	DEA	7-8-19
[signature]	Eric Weatherman	CNI	7/8/19
René Trudeau	[signature]	GRAVITY	7/8/19
John Schade	[signature]	Gravity	7/8/19
DAVE WILLIAMS	[signature]	DEA	7/8/19
JACK McCotter	[signature]	CNI	7-9-19
Mike Duffield	[signature]	Gravity	7.10.19
Ed Sloan	[signature]	Gravity	7.10.19
Stephen E Cox	[signature]	USGS	7/11/19
Marilyn Gauthier	[signature]	Jacobs	7/11/19

Ryan
Ryan
Steve
Marilyn
Brandon

AECOM

Americas

Daily Tailgate Meeting

S3AM-209-FM5

Instructions: Conduct meeting prior to sending crews to individual tasks. Require attendance of all AECOM employees and subcontractors. Invite personnel from simultaneous operations for coordination purposes. Review scope of work and briefly discuss required and applicable topics. **This meeting is a daily refresher, not a full orientation.** Task-specific discussions associated with Task Hazard Assessment (THA) follow this meeting at the task location immediately before individual task is started.

AECOM Supervisor Name: Jennifer Pretare
Phone Number: 510-681-6401

AECOM SH&E Rep. Name: Shannon Couch
Phone Number: 510-277-5369

Meeting Leader: Jennifer Pretare

Date: 7/8/19 | **Project Name/Location:** UCR Sediment Facies Mapping | **Project Number:** 60584878

Today's Scope of Work:

Multi-beam Echosounder data collection on research vessels on Upper Columbia River, on-water vessel operations, loading/unloading vessels, driving to/from boat launch.

Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
Northport Boat Launch	Vessel cabin	Vessel cabin	Vessel cabin

1. Required Topics

- [x] Fitness for Duty requirements, all sign in / sign out
- [x] Required training (incl. task specific) completed and current
- [x] SH&E Plan onsite - understood, reviewed, signed by all (incl. scope, preplanning hazard assessments / risk registers, controls, procedures, requirements, etc.)
- [x] Task Hazard Assessments (THAs) are to be reviewed and completed for each task immediately prior to conducting
- [x] STOP WORK Right & Responsibility- all task changes/changed conditions re-assess with THA
- [x] Requirement to report to supervisor any injury, illness, damage, near miss, unsafe act / condition
- [x] Emergency Response Plan – including muster point, first aid kit, fire extinguisher, clinic/hospital location
- [x] Personal Protective Equipment (PPE) - Required items per hazard assessments in good condition / in use by all
- [x] Equipment/machinery inspected (documented as required) and in good condition - operators properly trained/certified
- [ ] Work area set up and demarcation/ barricades in place to protect workers, site staff, and the public
- [x] Required checklists/records available, understood (describe):
- [x] Lessons Learned / SH&E improvements (describe):

2. Discuss if Applicable to Today's Work

Check [x] as reviewed or mark [■] as not applicable

[ ]	Biological/ Chemical / Electrical Hazards
[x]	Ergonomics - Lifting, Body Position
[ ]	Lock Out/ Tag Out
	Short Service Employees - visual identifier and mentor/ oversight assignment
[x]	Simultaneous/ Neighbouring Operations
[x]	Slip/ Trip/ Fall Hazards
[ ]	Specialized PPE Needs
[x]	Traffic Control
[ ]	Waste Management/ Decontamination
[■]	Weather Hazards / Heat Stress / Cold Stress
[x]	Subcontractor Requirements (e.g., JHAs, THAs, procedures, reporting, etc.)
[ ]	Work Permits / Plans required (e.g., Fall Protection, Confined Space, Hot Work, Critical Lifts, etc.); in place, understood (identify/attach):
[ ]	Other Topics (describe/attach):
[ ]	Client specific requirements (describe):

3. Daily Check Out by Site Supervisor

Describe incidents, near misses, observations or Stop Work interventions from today:	Describe Lessons Learned/ Improvement Areas from today:

The site is being left in a safe condition and work crew checked out as fit unless otherwise specified as above.

Site Supervisor Name	Signature	Date / Time (at end of day / shift)
Jennifer Pretare	Jenny a Pr	Date 8 July 2019 Time 0900

Worker Acknowledgement / Sign In Sign Out sheets applicable to this meeting are on reverse and, if applicable, attached.

All employees:

- **STOP WORK if concerned / uncertain about safety / hazard or additional precaution is not recorded on the THA.**
- **Be alert and communicate any changes in personnel or conditions at the worksite to the supervisor.**
- **Reassess task, hazards, & mitigations on an ongoing basis; amend the THA if needed.**

SITE WORKERS (including AECOM Contractors and Subcontractors): Your signature below means that you understand:

* The requirement to participate in creating, reviewing, & updating hazard assessments (THA) applicable to your task(s).
* The hazards & control measures associated with each task you are about to perform.
* The permit to work requirements applicable to the work you are about to perform (if it includes permitted activities).
* That no tasks or work is to be performed without a hazard assessment.
* Your authority & obligation to "Stop Work" intervene, speak up/ listen up.

Your initials (right columns) certify that you arrived & departed fit for duty, & have reported all incidents/near misses; meaning:

* You are physically and mentally fit for duty and have inspected your required PPE to ensure satisfactory condition.
* You are not under the influence of any type of medication, drugs, or alcohol that could affect your ability to work safely.
* You are aware of your responsibility to immediately report any illness, injury (regardless of where or when it occurred), or impairment/fatigue issue to the AECOM Supervisor.
* You signed out as fit / uninjured unless you have otherwise informed the AECOM Supervisor.

Print Name & Company	Signature	Initials & Sign In Time	Initials & Sign Out Time
Jennifer Pretare AECOM		In & Fit	Out & Fit
Eric Weatherman Columbia Navigation Inc	Eric Weatherman	In & Fit	Out & Fit
John M. Staly DEA		In & Fit	Out & Fit
John Schaefer Gravity		In & Fit JS	Out & Fit
René Thudeau GRAVITY		In & Fit R	Out & Fit
DAVE WILLIAMS DAVID EVANS & ASSOCIATES	R. D. Will	In & Fit 8:45	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit

(Attach additional Site Worker sign-in/out sheets if needed) Identify number of attached sheets: _____

SITE VISITOR / SITE REPRESENTATIVE

Name	Company Name	Arrival Time	Departure Time	Signature

AECOM

Americas

Daily Tailgate Meeting

S3AM-209-FM5

Instructions: Conduct meeting prior to sending crews to individual tasks. Require attendance of all AECOM employees and subcontractors. Invite personnel from simultaneous operations for coordination purposes. Review scope of work and briefly discuss required and applicable topics. **This meeting is a daily refresher, not a full orientation.** Task-specific discussions associated with Task Hazard Assessment (THA) follow this meeting at the task location immediately before individual task is started.

AECOM Supervisor Name: Jennifer Pretare
Phone Number: 510-681-6401

AECOM SH&E Rep. Name: Shannon Couch
Phone Number: 510-277-5369

Meeting Leader: Jenny Pretare

Date: 7-9-19 | **Project Name/Location:** UCR Sediment Facies Mapping | **Project Number:** 60584878

Today's Scope of Work:

Multi-beam Echosounder data collection on research vessels on Upper Columbia River, on-water vessel operations, loading/unloading vessels, driving to/from boat launch.

Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
Northport Boat Launch	Vessel cabin	Vessel cabin	Vessel cabin

1. Required Topics

- [x] Fitness for Duty requirements, all sign in / sign out
- [x] Required training (incl. task specific) completed and current
- [x] SH&E Plan onsite - understood, reviewed, signed by all (incl. scope, preplanning hazard assessments / risk registers, controls, procedures, requirements, etc.)
- [x] Task Hazard Assessments (THAs) are to be reviewed and completed for each task immediately prior to conducting
- [x] STOP WORK Right & Responsibility- all task changes/changed conditions re-assess with THA
- [x] Requirement to report to supervisor any injury, illness, damage, near miss, unsafe act / condition
- [x] Emergency Response Plan – including muster point, first aid kit, fire extinguisher, clinic/hospital location
- [x] Personal Protective Equipment (PPE) - Required items per hazard assessments in good condition / in use by all
- [x] Equipment/machinery inspected (documented as required) and in good condition - operators properly trained/certified
- [ ] Work area set up and demarcation/ barricades in place to protect workers, site staff, and the public
- [x] Required checklists/records available, understood (describe):
- [x] Lessons Learned / SH&E improvements (describe):

2. Discuss if Applicable to Today's Work

Check [x] as reviewed or mark [■] as not applicable

[ ]	Biological/ Chemical / Electrical Hazards
[x]	Ergonomics - Lifting, Body Position
[ ]	Lock Out/ Tag Out
	Short Service Employees - visual identifier and mentor/ oversight assignment
[x]	Simultaneous/ Neighbouring Operations
[x]	Slip/ Trip/ Fall Hazards
[ ]	Specialized PPE Needs
[x]	Traffic Control
[ ]	Waste Management/ Decontamination
[■]	Weather Hazards / Heat Stress / Cold Stress
[x]	Subcontractor Requirements (e.g., JHAs, THAs, procedures, reporting, etc.)
[ ]	Work Permits / Plans required (e.g., Fall Protection, Confined Space, Hot Work, Critical Lifts, etc.); in place, understood (identify/attach):
[ ]	Other Topics (describe/attach):
[ ]	Client specific requirements (describe):

3. Daily Check Out by Site Supervisor

Describe incidents, near misses, observations or Stop Work interventions from today:
Yesterday- Discovery took water on back deck briefly. Returned to dock to check blf proceeding.

Describe Lessons Learned/ Improvement Areas from today:
Floating logs, woody debris
Bathroom break procedures

The site is being left in a safe condition and work crew checked out as fit unless otherwise specified as above.

Site Supervisor Name	Signature	Date / Time (at end of day / shift)
Jennifer Pretare		7-9-19 0800

Worker Acknowledgement / Sign In Sign Out sheets applicable to this meeting are on reverse and, if applicable, attached.

All employees:

- **STOP WORK if concerned / uncertain about safety / hazard or additional precaution is not recorded on the THA.**
- **Be alert and communicate any changes in personnel or conditions at the worksite to the supervisor.**
- **Reassess task, hazards, & mitigations on an ongoing basis; amend the THA if needed.**

SITE WORKERS (including AECOM Contractors and Subcontractors): Your signature below means that you understand:

* The requirement to participate in creating, reviewing, & updating hazard assessments (THA) applicable to your task(s).
* The hazards & control measures associated with each task you are about to perform.
* The permit to work requirements applicable to the work you are about to perform (if it includes permitted activities).
* That no tasks or work is to be performed without a hazard assessment.
* Your authority & obligation to "Stop Work" intervene, speak up/ listen up.

Your initials (right columns) certify that you arrived & departed fit for duty, & have reported all incidents/near misses; meaning:

* You are physically and mentally fit for duty and have inspected your required PPE to ensure satisfactory condition.
* You are not under the influence of any type of medication, drugs, or alcohol that could affect your ability to work safely.
* You are aware of your responsibility to immediately report any illness, injury (regardless of where or when it occurred), or impairment/fatigue issue to the AECOM Supervisor.
* You signed out as fit / uninjured unless you have otherwise informed the AECOM Supervisor.

Print Name & Company	Signature	Initials & Sign In Time	Initials & Sign Out Time
John M Sky DEA		In & Fit	Out & Fit 1700 JAP.
René Trudeau GRAVITY		In & Fit	Out & Fit
DAVE WILLIAMS		In & Fit	Out & Fit
JOSH WEATHERMAN		In & Fit	Out & Fit
Eric Weatherman		In & Fit	Out & Fit
Jack McCotter		In & Fit	Out & Fit
John Schafer		In & Fit JJ	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit

(Attach additional Site Worker sign-in/out sheets if needed) Identify number of attached sheets: _____

SITE VISITOR / SITE REPRESENTATIVE

Name	Company Name	Arrival Time	Departure Time	Signature

MBES Crew

AECOM

Americas

Daily Tailgate Meeting

S3AM-209-FM5

Instructions: Conduct meeting prior to sending crews to individual tasks. Require attendance of all AECOM employees and subcontractors. Invite personnel from simultaneous operations for coordination purposes. Review scope of work and briefly discuss required and applicable topics. **This meeting is a daily refresher, not a full orientation.** Task-specific discussions associated with Task Hazard Assessment (THA) follow this meeting at the task location immediately before individual task is started.

AECOM Supervisor Name: Jennifer Pretare
Phone Number: 510-681-6401

AECOM SH&E Rep. Name: Shannon Couch
Phone Number: 510-277-5369

Meeting Leader: J. Pretare

Date: 7/10/19 | **Project Name/Location:** UCR Sediment Facies Mapping | **Project Number:** 60584878

Today's Scope of Work:

Multi-beam Echosounder data collection on research vessels on Upper Columbia River, on-water vessel operations, loading/unloading vessels, driving to/from boat launch.

Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
Northport Boat Launch	Vessel cabin	Vessel cabin	Vessel cabin

1. Required Topics

- [x] Fitness for Duty requirements, all sign in / sign out
- [x] Required training (incl. task specific) completed and current
- [x] SH&E Plan onsite - understood, reviewed, signed by all (incl. scope, preplanning hazard assessments / risk registers, controls, procedures, requirements, etc.)
- [x] Task Hazard Assessments (THAs) are to be reviewed and completed for each task immediately prior to conducting
- [x] STOP WORK Right & Responsibility- all task changes/changed conditions re-assess with THA
- [x] Requirement to report to supervisor any injury, illness, damage, near miss, unsafe act / condition
- [x] Emergency Response Plan – including muster point, first aid kit, fire extinguisher, clinic/hospital location
- [x] Personal Protective Equipment (PPE) - Required items per hazard assessments in good condition / in use by all
- [x] Equipment/machinery inspected (documented as required) and in good condition - operators properly trained/certified
- [ ] Work area set up and demarcation/ barricades in place to protect workers, site staff, and the public
- [x] Required checklists/records available, understood (describe):
- [x] Lessons Learned / SH&E improvements (describe):

2. Discuss if Applicable to Today's Work

- [x] [■] **Check [☑] as reviewed or mark [■] as not applicable**
- [ ] [ ] Biological/ Chemical / Electrical Hazards
- [x] [ ] Ergonomics - Lifting, Body Position
- [ ] [ ] Lock Out/ Tag Out
- Short Service Employees - visual identifier and mentor/ oversight assignment
- [x] [ ] Simultaneous/ Neighbouring Operations
- [x] [ ] Slip/ Trip/ Fall Hazards
- [ ] [ ] Specialized PPE Needs
- [x] [ ] Traffic Control
- [ ] [ ] Waste Management/ Decontamination
- [■] [ ] Weather Hazards / Heat Stress / Cold Stress
- [x] [ ] Subcontractor Requirements (e.g., JHAs, THAs, procedures, reporting, etc.)
- [ ] [ ] Work Permits / Plans required (e.g., Fall Protection, Confined Space, Hot Work, Critical Lifts, etc.); in place, understood (identify/attach):
- [ ] [ ] Other Topics (describe/attach):
- [ ] [ ] Client specific requirements (describe):

3. Daily Check Out by Site Supervisor

Describe incidents, near misses, observations or Stop Work interventions from ~~today~~: yesterday
one moment of scraping bottom w/ boat.

Describe Lessons Learned/ Improvement Areas from today:
Boat to boat transfer techniques

The site is being left in a safe condition and work crew checked out as fit unless otherwise specified as above.

Site Supervisor Name	Signature	Date / Time (at end of day / shift)
Jennifer Pretare		7-10-19

Worker Acknowledgement / Sign In Sign Out sheets applicable to this meeting are on reverse and, if applicable, attached.

AECOM

All employees:

- **STOP WORK if concerned / uncertain about safety / hazard or additional precaution is not recorded on the THA.**
- **Be alert and communicate any changes in personnel or conditions at the worksite to the supervisor.**
- **Reassess task, hazards, & mitigations on an ongoing basis; amend the THA if needed.**

SITE WORKERS (including AECOM Contractors and Subcontractors): Your signature below means that you understand:
* The requirement to participate in creating, reviewing, & updating hazard assessments (THA) applicable to your task(s).
* The hazards & control measures associated with each task you are about to perform.
* The permit to work requirements applicable to the work you are about to perform (if it includes permitted activities).
* That no tasks or work is to be performed without a hazard assessment.
* Your authority & obligation to "Stop Work" intervene, speak up/ listen up.

Your initials (right columns) certify that you arrived & departed fit for duty, & have reported all incidents/near misses; meaning:
* You are physically and mentally fit for duty and have inspected your required PPE to ensure satisfactory condition.
* You are not under the influence of any type of medication, drugs, or alcohol that could affect your ability to work safely.
* You are aware of your responsibility to immediately report any illness, injury (regardless of where or when it occurred), or impairment/fatigue issue to the AECOM Supervisor.
* You signed out as fit / uninjured unless you have otherwise informed the AECOM Supervisor.

Print Name & Company	Signature	Initials & Sign In Time	Initials & Sign Out Time
DAVE WILLIAMS DEA	R. Dail Willi	In & Fit	Out & Fit
DENISE YEE AECOM	[signature]	In & Fit	Out & Fit
Jack McCotter	[signature]	In & Fit	Out & Fit
Jesse WEATHERMAN	J Weatherman	In & Fit	Out & Fit
John Scheefe	[signature]	In & Fit JS	Out & Fit
René Trudeau GRAVITY	[signature]	In & Fit RT	Out & Fit
John M. Staley DEA	JM Staley	In & Fit	Out & Fit
DENNIS GROSS	Dennis Gross	In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit

(Attach additional Site Worker sign-in/out sheets if needed) Identify number of attached sheets: ________

SITE VISITOR / SITE REPRESENTATIVE

Name	Company Name	Arrival Time	Departure Time	Signature

RIDES BOAT - Discovery

AECOM

Americas

Daily Tailgate Meeting

S3AM-209-FM5

Instructions: Conduct meeting prior to sending crews to individual tasks. Require attendance of all AECOM employees and subcontractors. Invite personnel from simultaneous operations for coordination purposes. Review scope of work and briefly discuss required and applicable topics. **This meeting is a daily refresher, not a full orientation.** Task-specific discussions associated with Task Hazard Assessment (THA) follow this meeting at the task location immediately before individual task is started.

AECOM Supervisor Name: Jennifer Pretare
Phone Number: 510-681-6401

AECOM SH&E Rep. Name: Shannon Couch
Phone Number: 510-277-5369

Meeting Leader: Jenny Pretare

Date: 7-11-19 | **Project Name/Location:** UCR Sediment Facies Mapping | **Project Number:** 60584878

Today's Scope of Work:

Multi-beam Echosounder data collection on research vessels on Upper Columbia River, on-water vessel operations, loading/unloading vessels, driving to/from boat launch.

Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
Northport Boat Launch	Vessel cabin	Vessel cabin	Vessel cabin

1. Required Topics

- [x] Fitness for Duty requirements, all sign in / sign out
- [x] Required training (incl. task specific) completed and current
- [x] SH&E Plan onsite - understood, reviewed, signed by all (incl. scope, preplanning hazard assessments / risk registers, controls, procedures, requirements, etc.)
- [x] Task Hazard Assessments (THAs) are to be reviewed and completed for each task immediately prior to conducting
- [x] STOP WORK Right & Responsibility- all task changes/changed conditions re-assess with THA
- [x] Requirement to report to supervisor any injury, illness, damage, near miss, unsafe act / condition
- [x] Emergency Response Plan – including muster point, first aid kit, fire extinguisher, clinic/hospital location
- [x] Personal Protective Equipment (PPE) - Required items per hazard assessments in good condition / in use by all
- [x] Equipment/machinery inspected (documented as required) and in good condition - operators properly trained/certified
- [ ] Work area set up and demarcation/ barricades in place to protect workers, site staff, and the public
- [x] Required checklists/records available, understood (describe):
- [x] Lessons Learned / SH&E improvements (describe):

2. Discuss if Applicable to Today's Work

Check [x] as reviewed or mark [■] as not applicable

[x]	[ ]	Biological/ Chemical / Electrical Hazards
[x]	[ ]	Ergonomics - Lifting, Body Position
[ ]	[ ]	Lock Out/ Tag Out
		Short Service Employees - visual identifier and mentor/ oversight assignment
[x]	[ ]	Simultaneous/ Neighbouring Operations
[x]	[ ]	Slip/ Trip/ Fall Hazards
[ ]	[ ]	Specialized PPE Needs
[x]	[ ]	Traffic Control
[ ]	[ ]	Waste Management/ Decontamination
[■]	[ ]	Weather Hazards / Heat Stress / Cold Stress
[x]	[ ]	Subcontractor Requirements (e.g., JHAs, THAs, procedures, reporting, etc.)
[ ]	[ ]	Work Permits / Plans required (e.g., Fall Protection, Confined Space, Hot Work, Critical Lifts, etc.); in place, understood (identify/attach):
[ ]	[ ]	Other Topics (describe/attach):
[ ]	[ ]	Client specific requirements (describe):

3. Daily Check Out by Site Supervisor

Describe incidents, near misses, observations or Stop Work interventions from today:
Hot day! Stay hydrated

Describe Lessons Learned/ Improvement Areas from today:
None

The site is being left in a safe condition and work crew checked out as fit unless otherwise specified as above.

Site Supervisor Name	Signature	Date / Time (at end of day / shift)
Jenny Pretare	Jenny Pretare	7-11-19

Worker Acknowledgement / Sign In Sign Out sheets applicable to this meeting are on reverse and, if applicable, attached.

All employees:

- **STOP WORK if concerned / uncertain about safety / hazard or additional precaution is not recorded on the THA.**
- **Be alert and communicate any changes in personnel or conditions at the worksite to the supervisor.**
- **Reassess task, hazards, & mitigations on an ongoing basis; amend the THA if needed.**

SITE WORKERS (including AECOM Contractors and Subcontractors): Your signature below means that you understand:

* The requirement to participate in creating, reviewing, & updating hazard assessments (THA) applicable to your task(s).
* The hazards & control measures associated with each task you are about to perform.
* The permit to work requirements applicable to the work you are about to perform (if it includes permitted activities).
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* You are physically and mentally fit for duty and have inspected your required PPE to ensure satisfactory condition.
* You are not under the influence of any type of medication, drugs, or alcohol that could affect your ability to work safely.
* You are aware of your responsibility to immediately report any illness, injury (regardless of where or when it occurred), or impairment/fatigue issue to the AECOM Supervisor.
* You signed out as fit / uninjured unless you have otherwise informed the AECOM Supervisor.

Print Name & Company	Signature	Initials & Sign In Time	Initials & Sign Out Time
DAVE WILLIAMS DEA		In & Fit	Out & Fit
Mike Duffield Gravity		In & Fit 0730 MD	Out & Fit
John M. Stahl DEA		In & Fit	Out & Fit
John Schafer Gravity		In & Fit 0730 JS	Out & Fit
Brandon Hoover		In & Fit	Out & Fit
J Weatherman		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit

(Attach additional Site Worker sign-in/out sheets if needed) Identify number of attached sheets: _____

SITE VISITOR / SITE REPRESENTATIVE

Name	Company Name	Arrival Time	Departure Time	Signature

Imagery Boat - Tieton

AECOM

Americas

Daily Tailgate Meeting

S3AM-209-FM5

Instructions: Conduct meeting prior to sending crews to individual tasks. Require attendance of all AECOM employees and subcontractors. Invite personnel from simultaneous operations for coordination purposes. Review scope of work and briefly discuss required and applicable topics. **This meeting is a daily refresher, not a full orientation.** Task-specific discussions associated with Task Hazard Assessment (THA) follow this meeting at the task location immediately before individual task is started.

AECOM Supervisor Name: Jennifer Pretare
Phone Number: 510-681-6401

AECOM SH&E Rep. Name: Shannon Couch
Phone Number: 510-277-5369

Meeting Leader: Jenny Pretare

Date: 7-11-19 | **Project Name/Location:** UCR Sediment Facies Mapping | **Project Number:** 60584878

Today's Scope of Work:

Multi-beam Echosounder data collection on research vessels on Upper Columbia River, on-water vessel operations, loading/unloading vessels, driving to/from boat launch.

Collecting Imagery Data at 11 locations in DME AOI

Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
Northport Boat Launch	Vessel cabin	Vessel cabin	Vessel cabin

1. Required Topics

- [x] Fitness for Duty requirements, all sign in / sign out
- [x] Required training (incl. task specific) completed and current
- [x] SH&E Plan onsite - understood, reviewed, signed by all (incl. scope, preplanning hazard assessments / risk registers, controls, procedures, requirements, etc.)
- [x] Task Hazard Assessments (THAs) are to be reviewed and completed for each task immediately prior to conducting
- [x] STOP WORK Right & Responsibility- all task changes/changed conditions re-assess with THA
- [x] Requirement to report to supervisor any injury, illness, damage, near miss, unsafe act / condition
- [x] Emergency Response Plan – including muster point, first aid kit, fire extinguisher, clinic/hospital location
- [x] Personal Protective Equipment (PPE) - Required items per hazard assessments in good condition / in use by all
- [x] Equipment/machinery inspected (documented as required) and in good condition - operators properly trained/certified
- [ ] Work area set up and demarcation/ barricades in place to protect workers, site staff, and the public
- [x] Required checklists/records available, understood (describe):
- [x] Lessons Learned / SH&E improvements (describe):

2. Discuss if Applicable to Today's Work

Check [x] as reviewed or mark [■] as not applicable

[ ]	Biological/ Chemical / Electrical Hazards
[x]	Ergonomics - Lifting, Body Position
[ ]	Lock Out/ Tag Out
	Short Service Employees - visual identifier and mentor/ oversight assignment
[x]	Simultaneous/ Neighbouring Operations
[x]	Slip/ Trip/ Fall Hazards
[ ]	Specialized PPE Needs
[x]	Traffic Control
[ ]	Waste Management/ Decontamination
[■]	Weather Hazards / Heat Stress / Cold Stress
[x]	Subcontractor Requirements (e.g., JHAs, THAs, procedures, reporting, etc.)
[ ]	Work Permits / Plans required (e.g., Fall Protection, Confined Space, Hot Work, Critical Lifts, etc.); in place, understood (identify/attach):
[ ]	Other Topics (describe/attach):
[ ]	Client specific requirements (describe):

3. Daily Check Out by Site Supervisor

Describe incidents, near misses, observations or Stop Work interventions from today:
Hot day! Stay hydrated

Describe Lessons Learned/ Improvement Areas from today:
None

The site is being left in a safe condition and work crew checked out as fit unless otherwise specified as above.

Site Supervisor Name	Signature	Date / Time (at end of day / shift)
Jenny Pretare		7-11-19

Worker Acknowledgement / Sign In Sign Out sheets applicable to this meeting are on reverse and, if applicable, attached.

All employees:

- **STOP WORK if concerned / uncertain about safety / hazard or additional precaution is not recorded on the THA.**
- **Be alert and communicate any changes in personnel or conditions at the worksite to the supervisor.**
- **Reassess task, hazards, & mitigations on an ongoing basis; amend the THA if needed.**

SITE WORKERS (including AECOM Contractors and Subcontractors): Your signature below means that you understand:

* The requirement to participate in creating, reviewing, & updating hazard assessments (THA) applicable to your task(s).
* The hazards & control measures associated with each task you are about to perform.
* The permit to work requirements applicable to the work you are about to perform (if it includes permitted activities).
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* Your authority & obligation to "Stop Work" intervene, speak up/ listen up.

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* You are physically and mentally fit for duty and have inspected your required PPE to ensure satisfactory condition.
* You are not under the influence of any type of medication, drugs, or alcohol that could affect your ability to work safely.
* You are aware of your responsibility to immediately report any illness, injury (regardless of where or when it occurred), or impairment/fatigue issue to the AECOM Supervisor.
* You signed out as fit / uninjured unless you have otherwise informed the AECOM Supervisor.

Print Name & Company	Signature	Initials & Sign In Time	Initials & Sign Out Time
René Trudeau GRAVITY		In & Fit	Out & Fit
Stephen Cox U.S.G.S.		In & Fit	Out & Fit
ED SLOAN GRAVITY		In & Fit 8:30	Out & Fit
Ryan McElrece Gravity		In & Fit 830	Out & Fit
CNI Eric Weather man		In & Fit	Out & Fit
CNI Jack McCole		In & Fit	Out & Fit
Jacobs Marilyn Guthrie		In & Fit 830	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit

(Attach additional Site Worker sign-in/out sheets if needed) Identify number of attached sheets: _____

SITE VISITOR / SITE REPRESENTATIVE

Name	Company Name	Arrival Time	Departure Time	Signature

6

AECOM

Americas

Daily Tailgate Meeting

S3AM-209-FM5

Instructions: Conduct meeting prior to sending crews to individual tasks. Require attendance of all AECOM employees and subcontractors. Invite personnel from simultaneous operations for coordination purposes. Review scope of work and briefly discuss required and applicable topics. **This meeting is a daily refresher, not a full orientation.** Task-specific discussions associated with Task Hazard Assessment (THA) follow this meeting at the task location immediately before individual task is started.

AECOM Supervisor Name: Jennifer Pretare
Phone Number: 510-681-6401 CARY KINDBERG

AECOM SH&E Rep. Name: Shannon Couch
Phone Number: 510-277-5369

Meeting Leader: CARY KINDBERG

Date: 7/15/2019 | **Project Name/Location:** UCR Sediment Facies Mapping | **Project Number:** 60584878

Today's Scope of Work:

Multi-beam Echosounder data collection on research vessels on Upper Columbia River, on-water vessel operations, loading/unloading vessels, driving to/from boat launch.

Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
Northport Boat Launch	Vessel cabin	Vessel cabin	Vessel cabin

1. Required Topics

- [x] Fitness for Duty requirements, all sign in / sign out
- [x] Required training (incl. task specific) completed and current
- [x] SH&E Plan onsite - understood, reviewed, signed by all (incl. scope, preplanning hazard assessments / risk registers, controls, procedures, requirements, etc.)
- [x] Task Hazard Assessments (THAs) are to be reviewed and completed for each task immediately prior to conducting
- [x] STOP WORK Right & Responsibility- all task changes/changed conditions re-assess with THA
- [x] Requirement to report to supervisor any injury, illness, damage, near miss, unsafe act / condition
- [x] Emergency Response Plan – including muster point, first aid kit, fire extinguisher, clinic/hospital location
- [x] Personal Protective Equipment (PPE) - Required items per hazard assessments in good condition / in use by all
- [x] Equipment/machinery inspected (documented as required) and in good condition - operators properly trained/certified
- [ ] Work area set up and demarcation/ barricades in place to protect workers, site staff, and the public
- [x] Required checklists/records available, understood (describe):
- [x] Lessons Learned / SH&E improvements (describe):

2. Discuss if Applicable to Today's Work

Check [x] as reviewed or mark [■] as not applicable

[x]	[ ]	Biological/ Chemical / Electrical Hazards
[x]	[ ]	Ergonomics - Lifting, Body Position
[ ]	[ ]	Lock Out/ Tag Out
		Short Service Employees - visual identifier and mentor/ oversight assignment
[x]	[ ]	Simultaneous/ Neighbouring Operations
[x]	[ ]	Slip/ Trip/ Fall Hazards
[ ]	[ ]	Specialized PPE Needs
[x]	[ ]	Traffic Control
[ ]	[ ]	Waste Management/ Decontamination
[■]	[ ]	Weather Hazards / Heat Stress / Cold Stress
[x]	[ ]	Subcontractor Requirements (e.g., JHAs, THAs, procedures, reporting, etc.)
[ ]	[ ]	Work Permits / Plans required (e.g., Fall Protection, Confined Space, Hot Work, Critical Lifts, etc.); in place, understood (identify/attach):
[ ]	[ ]	Other Topics (describe/attach):
[ ]	[ ]	Client specific requirements (describe):

3. Daily Check Out by Site Supervisor

Describe incidents, near misses, observations or Stop Work interventions from today:	Describe Lessons Learned/ Improvement Areas from today:

The site is being left in a safe condition and work crew checked out as fit unless otherwise specified as above.

Site Supervisor Name	Signature	Date / Time (at end of day / shift)
CARY KINDBERG		15 JULY 2019 8:00

Worker Acknowledgement / Sign In Sign Out sheets applicable to this meeting are on reverse and, if applicable, attached.

All employees:

- **STOP WORK if concerned / uncertain about safety / hazard or additional precaution is not recorded on the THA.**
- **Be alert and communicate any changes in personnel or conditions at the worksite to the supervisor.**
- **Reassess task, hazards, & mitigations on an ongoing basis; amend the THA if needed.**

SITE WORKERS (including AECOM Contractors and Subcontractors): Your signature below means that you understand:

* The requirement to participate in creating, reviewing, & updating hazard assessments (THA) applicable to your task(s).
* The hazards & control measures associated with each task you are about to perform.
* The permit to work requirements applicable to the work you are about to perform (if it includes permitted activities).
* That no tasks or work is to be performed without a hazard assessment.
* Your authority & obligation to "Stop Work" intervene, speak up/ listen up.

Your initials (right columns) certify that you arrived & departed fit for duty, & have reported all incidents/near misses; meaning:

* You are physically and mentally fit for duty and have inspected your required PPE to ensure satisfactory condition.
* You are not under the influence of any type of medication, drugs, or alcohol that could affect your ability to work safely.
* You are aware of your responsibility to immediately report any illness, injury (regardless of where or when it occurred), or impairment/fatigue issue to the AECOM Supervisor.
* You signed out as fit / uninjured unless you have otherwise informed the AECOM Supervisor.

Print Name & Company	Signature	Initials & Sign In Time	Initials & Sign Out Time
CARY KINDBORG AECOM		In & Fit 8:00 CK	Out & Fit 1735
PETER JENKINS GRAVITY		In & Fit 800	Out & Fit
John Schade Gravity		In & Fit 8:00 JS	Out & Fit
Jack McCotter CNI		In & Fit	Out & Fit
DAVE WILLIAMS DEA		In & Fit	Out & Fit
Eric Weatherman CNI		In & Fit	Out & Fit
John M Staly DEA		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit

(Attach additional Site Worker sign-in/out sheets if needed) Identify number of attached sheets: _____

SITE VISITOR / SITE REPRESENTATIVE

Name	Company Name	Arrival Time	Departure Time	Signature

AECOM

Americas

Daily Tailgate Meeting

S3AM-209-FM5

Instructions: Conduct meeting prior to sending crews to individual tasks. Require attendance of all AECOM employees and subcontractors. Invite personnel from simultaneous operations for coordination purposes. Review scope of work and briefly discuss required and applicable topics. **This meeting is a daily refresher, not a full orientation.** Task-specific discussions associated with Task Hazard Assessment (THA) follow this meeting at the task location immediately before individual task is started.

AECOM Supervisor Name: Jennifer Pretare
Phone Number: 510-681-6401 CARY

AECOM SH&E Rep. Name: Shannon Couch
Phone Number: 510-277-5369

Meeting Leader: CARY KINDBERG

Date:	Project Name/Location: UCR Sediment Facies Mapping	Project Number: 60584878

Today's Scope of Work:

Multi-beam Echosounder data collection on research vessels on Upper Columbia River, on-water vessel operations, loading/unloading vessels, driving to/from boat launch.

Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
Northport Boat Launch	Vessel cabin	Vessel cabin	Vessel cabin

1. Required Topics

- [x] Fitness for Duty requirements, all sign in / sign out
- [x] Required training (incl. task specific) completed and current
- [x] SH&E Plan onsite - understood, reviewed, signed by all (incl. scope, preplanning hazard assessments / risk registers, controls, procedures, requirements, etc.)
- [x] Task Hazard Assessments (THAs) are to be reviewed and completed for each task immediately prior to conducting
- [x] STOP WORK Right & Responsibility- all task changes/changed conditions re-assess with THA
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- [x] Emergency Response Plan – including muster point, first aid kit, fire extinguisher, clinic/hospital location
- [x] Personal Protective Equipment (PPE) - Required items per hazard assessments in good condition / in use by all
- [x] Equipment/machinery inspected (documented as required) and in good condition - operators properly trained/certified
- [ ] Work area set up and demarcation/ barricades in place to protect workers, site staff, and the public
- [x] Required checklists/records available, understood (describe):
- [x] Lessons Learned / SH&E improvements (describe):

2. Discuss if Applicable to Today's Work

- [x] [■] **Check [x] as reviewed or mark [■] as not applicable**
- [ ] [ ] Biological/ Chemical / Electrical Hazards
- [x] [ ] Ergonomics - Lifting, Body Position
- [ ] [ ] Lock Out/ Tag Out
- Short Service Employees - visual identifier and mentor/ oversight assignment
- [x] [ ] Simultaneous/ Neighbouring Operations
- [x] [ ] Slip/ Trip/ Fall Hazards
- [ ] [ ] Specialized PPE Needs
- [x] [ ] Traffic Control
- [ ] [ ] Waste Management/ Decontamination
- [■] [ ] Weather Hazards / Heat Stress / Cold Stress
- [x] [ ] Subcontractor Requirements (e.g., JHAs, THAs, procedures, reporting, etc.)
- [ ] [ ] Work Permits / Plans required (e.g., Fall Protection, Confined Space, Hot Work, Critical Lifts, etc.); in place, understood (identify/attach):
- [ ] [ ] Other Topics (describe/attach):
- [ ] [ ] Client specific requirements (describe):

3. Daily Check Out by Site Supervisor

Describe incidents, near misses, observations or Stop Work interventions from today:

LOTS OF BIG LOGS ON WATER, HIGH FLOW, WHITE WATER/RAPIDS IN AREA

Describe Lessons Learned/ Improvement Areas from today:

SWAPPED PILOTS FREQUENTLY BTWN TOUGH SPELLS ON WATER.

The site is being left in a safe condition and work crew checked out as fit unless otherwise specified as above.

Site Supervisor Name	Signature	Date / Time (at end of day / shift)
CARY KINDBERG		~~1800~~ July 16, 2019 1800

Worker Acknowledgement / Sign In ~~Sign Out~~ sheets applicable to this meeting are on reverse and, if applicable, attached.

All employees:

- **STOP WORK if concerned / uncertain about safety / hazard or additional precaution is not recorded on the THA.**
- **Be alert and communicate any changes in personnel or conditions at the worksite to the supervisor.**
- **Reassess task, hazards, & mitigations on an ongoing basis; amend the THA if needed.**

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* You are physically and mentally fit for duty and have inspected your required PPE to ensure satisfactory condition.
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* You are aware of your responsibility to immediately report any illness, injury (regardless of where or when it occurred), or impairment/fatigue issue to the AECOM Supervisor.
* You signed out as fit / uninjured unless you have otherwise informed the AECOM Supervisor.

Print Name & Company	Signature	Initials & Sign In Time	Initials & Sign Out Time
DAVE WILLIAMS DEA	R. Bill Will.	In & Fit 7:53	Out & Fit 18:00
John M Stacy DEA		In & Fit	Out & Fit
Eric Weatherman		In & Fit	Out & Fit
STEVE BRUCHMAN		In & Fit	Out & Fit
John Shafer		In & Fit	Out & Fit
Jack McCotta CNT		In & Fit	Out & Fit
CARY KINDBERG AECOM		In & Fit	Out & Fit
PETER JENKINS		In & Fit 940 PJ	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit

(Attach additional Site Worker sign-in/out sheets if needed) Identify number of attached sheets: _____

SITE VISITOR / SITE REPRESENTATIVE

Name	Company Name	Arrival Time	Departure Time	Signature

AECOM

Americas

Daily Tailgate Meeting

S3AM-209-FM5

Instructions: Conduct meeting prior to sending crews to individual tasks. Require attendance of all AECOM employees and subcontractors. Invite personnel from simultaneous operations for coordination purposes. Review scope of work and briefly discuss required and applicable topics. **This meeting is a daily refresher, not a full orientation.** Task-specific discussions associated with Task Hazard Assessment (THA) follow this meeting at the task location immediately before individual task is started.

AECOM Supervisor Name: Jennifer Pretare
Phone Number: 510-681-6401

AECOM SH&E Rep. Name: Shannon Couch
Phone Number: 510-277-5369

Meeting Leader: CARY KINDBORG

Date: 7/17/2019 | **Project Name/Location:** UCR Sediment Facies Mapping | **Project Number:** 60584878

Today's Scope of Work:

Multi-beam Echosounder data collection on research vessels on Upper Columbia River, on-water vessel operations, loading/unloading vessels, driving to/from boat launch.

Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
Northport Boat Launch	Vessel cabin	Vessel cabin	Vessel cabin

1. Required Topics

- [x] Fitness for Duty requirements, all sign in / sign out
- [x] Required training (incl. task specific) completed and current
- [x] SH&E Plan onsite - understood, reviewed, signed by all (incl. scope, preplanning hazard assessments / risk registers, controls, procedures, requirements, etc.)
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- [x] Personal Protective Equipment (PPE) - Required items per hazard assessments in good condition / in use by all
- [x] Equipment/machinery inspected (documented as required) and in good condition - operators properly trained/certified
- [ ] Work area set up and demarcation/ barricades in place to protect workers, site staff, and the public
- [x] Required checklists/records available, understood (describe):
- [x] Lessons Learned / SH&E improvements (describe):

2. Discuss if Applicable to Today's Work

Check [x] as reviewed or mark [■] as not applicable

[ ]	Biological/ Chemical / Electrical Hazards
[x]	Ergonomics - Lifting, Body Position
[ ]	Lock Out/ Tag Out
	Short Service Employees - visual identifier and mentor/ oversight assignment
[x]	Simultaneous/ Neighbouring Operations
[x]	Slip/ Trip/ Fall Hazards
[ ]	Specialized PPE Needs
[x]	Traffic Control
[ ]	Waste Management/ Decontamination
[■]	Weather Hazards / Heat Stress / Cold Stress
[x]	Subcontractor Requirements (e.g., JHAs, THAs, procedures, reporting, etc.)
[ ]	Work Permits / Plans required (e.g., Fall Protection, Confined Space, Hot Work, Critical Lifts, etc.); in place, understood (identify/attach):
[ ]	Other Topics (describe/attach):
[ ]	Client specific requirements (describe):

3. Daily Check Out by Site Supervisor

Describe incidents, near misses, observations or Stop Work interventions from today:

LOTS OF LOGS IN RIVER, LOOSE.
LOTS OF BOULDERS JUST BELOW SURFACE.
PIECE OF WOOD GOT IN OUR WAY.

Describe Lessons Learned/ Improvement Areas from today:

SENDING SOMEONE TO FRONT OF BOAT ON AREAS THAT ARE SHALLOW TO WATCH FOR BOULDERS NEAR SURFACE.

The site is being left in a safe condition and work crew checked out as fit unless otherwise specified as above.

Site Supervisor Name	Signature	Date / Time (at end of day / shift)
CARY KINDBORG		7/17/2019 1700

Worker Acknowledgement / Sign In Sign Out sheets applicable to this meeting are on reverse and, if applicable, attached.

All employees:

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* You signed out as fit / uninjured unless you have otherwise informed the AECOM Supervisor.

Print Name & Company	Signature	Initials & Sign In Time	Initials & Sign Out Time
Gary Kindberg AECOM		In & Fit 0740 GK	Out & Fit 1800
Dave Williams DEA		In & Fit 0741	Out & Fit
John Schaefer		In & Fit 0741 JS	Out & Fit
Peter Jenkins Gravity		In & Fit 0741 PJ	Out & Fit
John M Sterly		In & Fit 0741 JM	Out & Fit
Josh Weatherman CWI		In & Fit 0741	Out & Fit
Jack McCotter CWI		In & Fit 7:42	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit

(Attach additional Site Worker sign-in/out sheets if needed) Identify number of attached sheets: _____

SITE VISITOR / SITE REPRESENTATIVE

Name	Company Name	Arrival Time	Departure Time	Signature

AECOM

Americas

Daily Tailgate Meeting

S3AM-209-FM5

Instructions: Conduct meeting prior to sending crews to individual tasks. Require attendance of all AECOM employees and subcontractors. Invite personnel from simultaneous operations for coordination purposes. Review scope of work and briefly discuss required and applicable topics. **This meeting is a daily refresher, not a full orientation.** Task-specific discussions associated with Task Hazard Assessment (THA) follow this meeting at the task location immediately before individual task is started.

AECOM Supervisor Name: Jennifer Pretare
Phone Number: 510-681-6401

AECOM SH&E Rep. Name: Shannon Couch
Phone Number: 510-277-5369

Meeting Leader: CARY KINDBERG

Date: 7-18-2019 | **Project Name/Location:** UCR Sediment Facies Mapping | **Project Number:** 60584878

Today's Scope of Work:

Multi-beam Echosounder data collection on research vessels on Upper Columbia River, on-water vessel operations, loading/unloading vessels, driving to/from boat launch.

Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
Northport Boat Launch	Vessel cabin	Vessel cabin	Vessel cabin

1. Required Topics

- [x] Fitness for Duty requirements, all sign in / sign out
- [x] Required training (incl. task specific) completed and current
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- [ ] Work area set up and demarcation/ barricades in place to protect workers, site staff, and the public
- [x] Required checklists/records available, understood (describe):
- [x] Lessons Learned / SH&E improvements (describe):

2. Discuss if Applicable to Today's Work

- [x] [■] **Check [✓] as reviewed or mark [■] as not applicable**
- [ ] [ ] Biological/ Chemical / Electrical Hazards
- [x] [ ] Ergonomics - Lifting, Body Position
- [ ] [ ] Lock Out/ Tag Out
  Short Service Employees - visual identifier and mentor/ oversight assignment
- [x] [ ] Simultaneous/ Neighbouring Operations
- [x] [ ] Slip/ Trip/ Fall Hazards
- [ ] [ ] Specialized PPE Needs
- [x] [ ] Traffic Control
- [ ] [ ] Waste Management/ Decontamination
- [■] [ ] Weather Hazards / Heat Stress / Cold Stress
- [x] [ ] Subcontractor Requirements (e.g., JHAs, THAs, procedures, reporting, etc.)
- [x] [ ] Work Permits / Plans required (e.g., Fall Protection, Confined Space, Hot Work, Critical Lifts, etc.); in place, understood (identify/attach): GOING TO BORDER CHECK THAT PERMITS/IN HAND
- [x] [ ] Other Topics (describe/attach): AT END OF SURVEY TODAY DOING PATCH TEST
- [ ] [ ] Client specific requirements (describe):

3. Daily Check Out by Site Supervisor

Describe incidents, near misses, observations or Stop Work interventions from today: TODAYS WORK WAS MEETING, THIS BOATS LIMITS IN TERMS OF RAPIDS/FLOW BOAT LISTED.

Describe Lessons Learned/ Improvement Areas from today: PROTOCOL FOR RADIO/TEXT/PHONE. WHEN TEAM CANT BE REACHED, MAYBE NEED SOME OTHER WAY.

The site is being left in a safe condition and work crew checked out as fit unless otherwise specified as above.

Site Supervisor Name	Signature	Date / Time (at end of day / shift)
CARY KINDBERG	Cary Kindberg	Date 7-18-2019 Time 1700

Worker Acknowledgement / Sign In Sign Out sheets applicable to this meeting are on reverse and, if applicable, attached.

All employees:

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* You signed out as fit / uninjured unless you have otherwise informed the AECOM Supervisor.

Print Name & Company	Signature	Initials & Sign In Time	Initials & Sign Out Time
CARY KINDBERG AECOM		In & Fit CK 0740	Out & Fit CK 1700
Jack McCotter CNI		In & Fit 7:41	Out & Fit
Eric Weatherman		In & Fit	Out & Fit
John Schafer		In & Fit 7:41 JS	Out & Fit
DAVE WILLIAMS DEA		In & Fit 7:42	Out & Fit
John M. Stahly		In & Fit	Out & Fit
PETER D. JENKINS		In & Fit 742 PJ	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit

(Attach additional Site Worker sign-in/out sheets if needed) Identify number of attached sheets: _____

SITE VISITOR / SITE REPRESENTATIVE

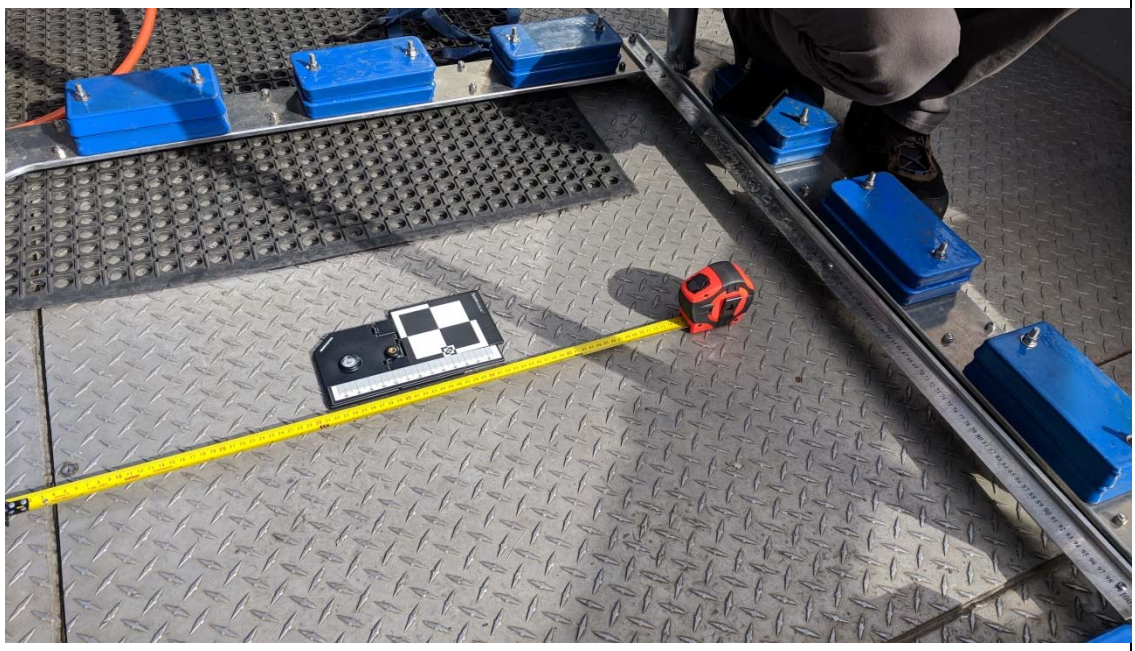
Name	Company Name	Arrival Time	Departure Time	Signature

Appendix B
Project Photos

Sediment Facies Mapping
Field Survey Report
Photo Log

Photo No. 1	Date: 10/02/18
Location: Evans Campground boat launch	
Description: RV Tieton with ADCP and camera frame	
Direction: n/a	

Photo No. 2	Date: 10/02/18
Location: n/a	
Description: Drop camera calibration	
Direction: n/a	



Sediment Facies Mapping
Field Survey Report
Photo Log

Photo No. 3	Date: 10/02/18
Location: n/a	
Description: Drop camera calibration	
Direction: n/a	

Sediment Facies Mapping
Field Survey Report
Photo Log

Photo No. 4	Date: 10/04/18
Location: n/a	
Description: Loading camera into canister	
Direction: n/a	

Sediment Facies Mapping
Field Survey Report
Photo Log

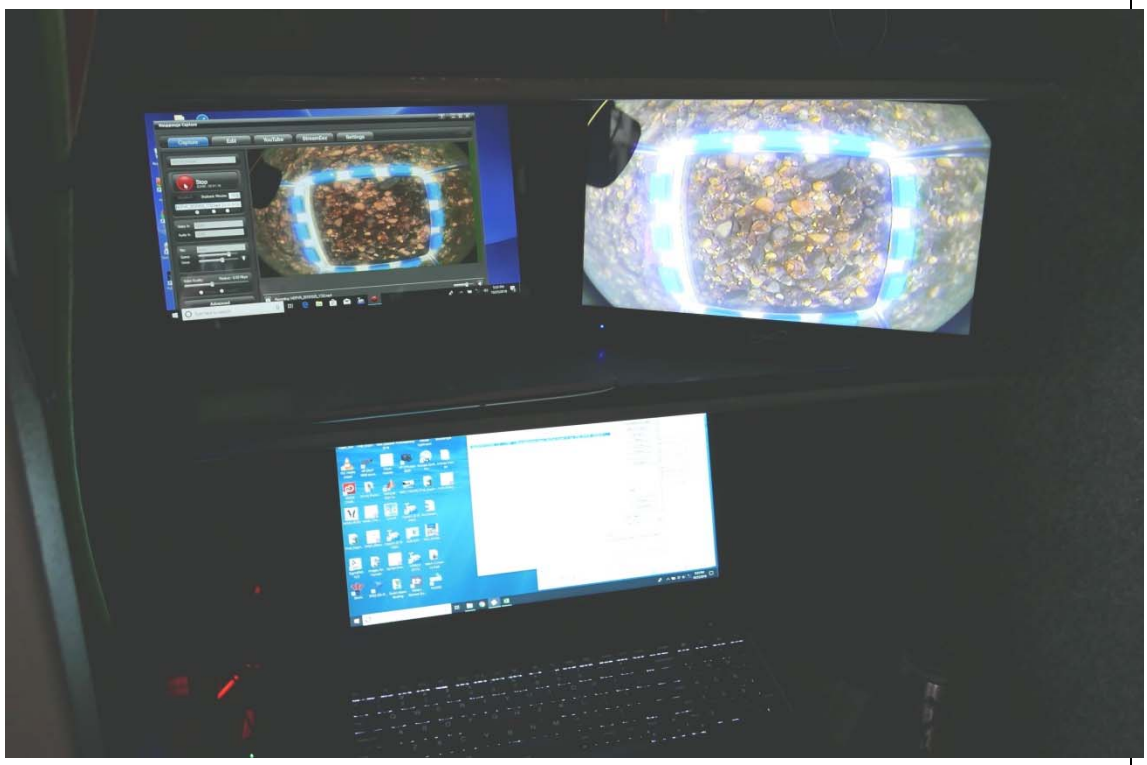
AECOM

Photo No. 5	Date: 10/04/18
Location: Upstream of Marcus Flats AOI	
Description: Camera frame ready for deployment	
Direction: n/a	

Sediment Facies Mapping
Field Survey Report
Photo Log

Photo No. 6	Date: 10/04/18
Location: n/a	
Description: RV Tieton with ADCP in deployment position	
Direction: n/a	

Photo No. 7	Date: 10/25/18
Location:	
Description: Drop camera and video work station	
Direction:	



Sediment Facies Mapping
Field Survey Report
Photo Log

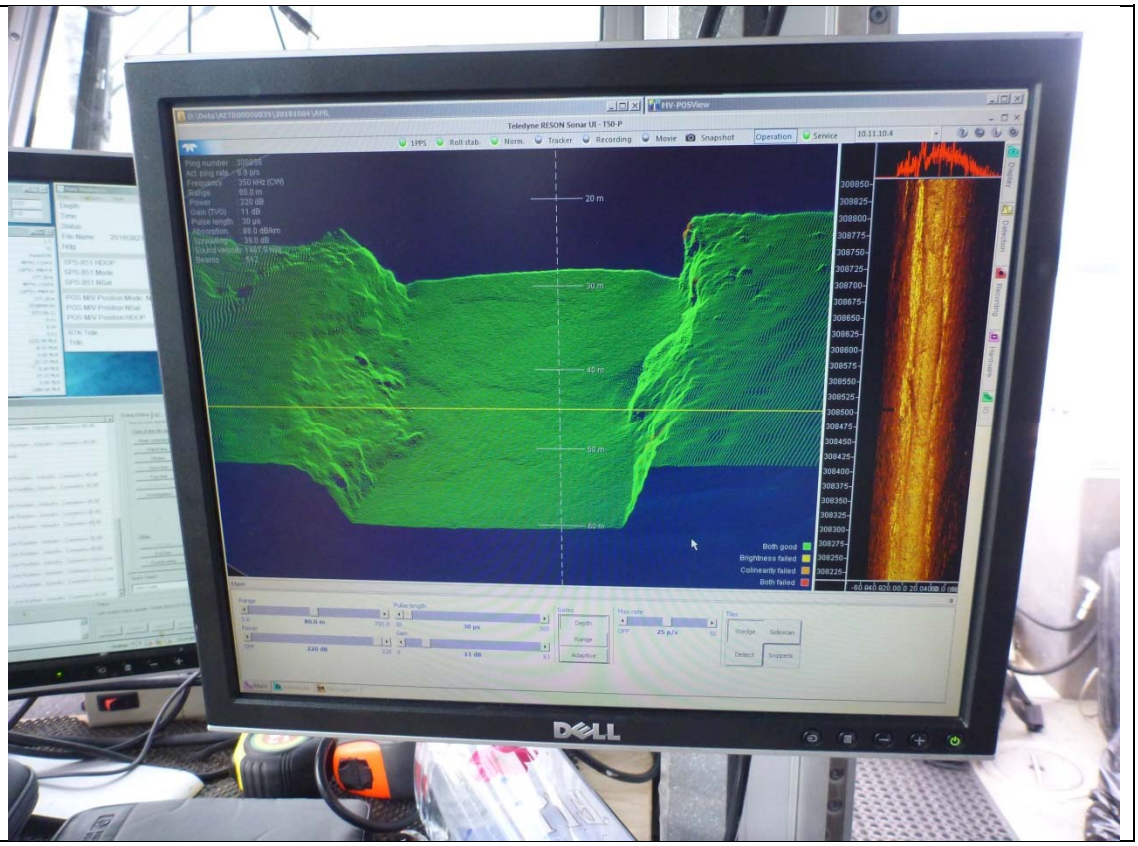
Photo No. 8	Date: 10/07/18
Location:	
Description: RV Discovery with sonar deployed	
Direction:	

Photo No. 9	Date: 10/25/18
Location:	
Description: MBES components on RV Discovery	
Direction:	

Sediment Facies Mapping
Field Survey Report
Photo Log

Photo No. 10	Date: 10/30/18
Location:	
Description: Hydrographer work station on RV Discovery	
Direction:	

Photo No. 11	Date: 10/30/18
Location:	
Description: Screenshot of hydrographer work station	
Direction:	



Sediment Facies Mapping
Field Survey Report
Photo Log

Photo No. 12	Date: 10/03/18
Location:	
Description: Base station configuration	
Direction:	

Photo No. 13	Date: 10/25/18
Location:	
Description: Registering a survey check point	
Direction:	

Sediment Facies Mapping
Field Survey Report
Photo Log

Photo No. 14	**Date:** 10/04/18	
Location:		
Description: Drop camera image with underwater vegetation		
Direction:		

Appendix C
Sound Velocity Sensor Calibration

TABLE C-1 SOUND VELOCITY INSTRUMENTS AND CALIBRATION DATES FOR SFM 2018 FIELDWORK

Asset Serial Number	Type	Calibration Date	Location
304506	Pressure	11/20/2017	AML Smart X
200790	Sound Velocity	11/1/2017	AML Smart X
404148	Temperature	11/20/2017	AML Smart X
204912	Sound Velocity	11/16/2017	Reson T50-P

TABLE C-2 SOUND VELOCITY INSTRUMENTS AND CALIBRATION DATES FOR SFM 2019 FIELDWORK

Asset Serial Number	Type	Calibration Date	Location
304506	Pressure	12/18/2018	AML Smart X
204914	Sound Velocity	6/25/2019	AML Smart X
404148	Temperature	12/7/2018	AML Smart X
204912	Sound Velocity	12/18/2018	Reson T50-P

Certificate of Calibration

Customer:	David Evans & Associates
Asset Serial Number:	304506
Asset Product Type:	P•Xchange™ Calibrated Sensor, 50 dBar
Calibration Type:	Pressure
Calibration Range:	0 to 50 dBar
Calibration RMS Error:	.0056
Calibration ID:	304506 999999 304506 201117 144601
Installed On:	

Coefficient A:	-5.984753E+0	Coefficient H:	0.000000E+0
Coefficient B:	0.000000E+0	Coefficient I:	3.152137E-10
Coefficient C:	0.000000E+0	Coefficient J:	0.000000E+0
Coefficient D:	0.000000E+0	Coefficient K:	0.000000E+0
Coefficient E:	9.395124E-4	Coefficient L:	0.000000E+0
Coefficient F:	0.000000E+0	Coefficient M:	-1.453452E-15
Coefficient G:	0.000000E+0	Coefficient N:	0.000000E+0

Calibration Date (dd/mm/yyyy): 20/11/2017

Certified By:

Robert Haydock

President, AML Oceanographic

AML Oceanographic certifies that the asset described above has been calibrated or recalibrated with equipment referenced to traceable standards. Please note that Xchange™ sensor-heads may be installed on assets other than the one listed above; this calibration certificate will still be valid when used on other such assets. If this instrument or sensor has been recalibrated, please be sure to update your records. Please also ensure that you update the instrument's coefficient values in any post-processing software that you use, if necessary. Older generation instruments may require configuration files, which are available for download at our Customer Centre at www.AMLoceanographic.com/support

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Certificate of Calibration

Asset Serial Number:	200790
Calibration Type:	SVX (External)
Certification Date:	November 01, 2017
Calibration Range:	1414.0 to 1509 m/s
Sensor Range:	1375 to 1625 m/s
Residual (RMSE):	0.001 m/s
Standards:	Hart 1560\3611

Coefficients

Coefficient A:	0.000000E+0	Coefficient H:	1.943771E-7
Coefficient B:	0.000000E+0	Coefficient I:	0.000000E+0
Coefficient C:	1.344487E-6	Coefficient J:	0.000000E+0
Coefficient D:	1.944158E-7	Coefficient K:	0.000000E+0
Coefficient E:	-1.753245E-5	Coefficient L:	0.000000E+0
Coefficient F:	1.951569E-7	Coefficient M:	0.000000E+0
Coefficient G:	1.524958E-6	Coefficient N:	0.000000E+0

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Certificate of Calibration

Customer:	David Evans & Associates
Asset Serial Number:	204912
Asset Product Type:	SV•Xchange™ Calibrated Sensor
Calibration Type:	Sound Velocity
Calibration Range:	1375 to 1625 m/s
Calibration RMS Error:	.014
Calibration ID:	204912 999999 204912 161117 115307
Installed On:	

Coefficient A:	0.000000E+0	Coefficient H:	1.948146E-7
Coefficient B:	0.000000E+0	Coefficient I:	0.000000E+0
Coefficient C:	1.185636E-7	Coefficient J:	0.000000E+0
Coefficient D:	1.948475E-7	Coefficient K:	0.000000E+0
Coefficient E:	-1.794085E-5	Coefficient L:	0.000000E+0
Coefficient F:	1.953480E-7	Coefficient M:	0.000000E+0
Coefficient G:	2.962409E-7	Coefficient N:	0.000000E+0

Calibration Date (dd/mm/yyyy): 16/11/2017

Certified By:

Robert Haydock

President, AML Oceanographic

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Certificate of Calibration

Customer:	David Evans & Associates
Asset Serial Number:	404148
Asset Product Type:	T•Xchange™ Calibrated Sensor, -2 to 32 C Range
Calibration Type:	Temperature
Calibration Range:	-5 to 45 º C
Calibration RMS Error:	.0019
Calibration ID:	404148 999999 404148 201117 210747
Installed On:	

Coefficient A:	-9.525270E+0	Coefficient H:	0.000000E+0
Coefficient B:	1.468881E-3	Coefficient I:	0.000000E+0
Coefficient C:	-2.883969E-8	Coefficient J:	0.000000E+0
Coefficient D:	7.969906E-13	Coefficient K:	0.000000E+0
Coefficient E:	-1.342935E-17	Coefficient L:	0.000000E+0
Coefficient F:	1.327503E-22	Coefficient M:	0.000000E+0
Coefficient G:	-4.771849E-28	Coefficient N:	0.000000E+0

Calibration Date (dd/mm/yyyy): 20/11/2017

Certified By:

Robert Haydock

President, AML Oceanographic

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Certificate of Calibration

Asset Serial Number:	304506
Calibration Type:	Pressure
Certification Date:	December 18, 2018
Calibration Range:	0 to 48 dBar
Sensor Range:	0 to 50 dBar
Residual (RMSE):	0.005 dBar
Standards:	Paro 785

Coefficients

Coefficient A:	-6.247087E+0	Coefficient H:	0.000000E+0
Coefficient B:	0.000000E+0	Coefficient I:	3.405782E-10
Coefficient C:	0.000000E+0	Coefficient J:	0.000000E+0
Coefficient D:	0.000000E+0	Coefficient K:	0.000000E+0
Coefficient E:	9.378647E-4	Coefficient L:	0.000000E+0
Coefficient F:	0.000000E+0	Coefficient M:	-1.498134E-15
Coefficient G:	0.000000E+0	Coefficient N:	0.000000E+0

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Certificate of Calibration

Asset Serial Number:	204912
Calibration Type:	Sound Velocity
Certification Date:	December 18, 2018
Calibration Range:	1414.1 to 1509 m/s
Sensor Range:	1375 to 1625 m/s
Residual (RMSE):	0.009 m/s
Standards:	Hart 1560/4067

Coefficients

Coefficient A:	0.000000E+0	Coefficient H:	1.948730E-7
Coefficient B:	0.000000E+0	Coefficient I:	0.000000E+0
Coefficient C:	-7.786410E-8	Coefficient J:	0.000000E+0
Coefficient D:	1.949189E-7	Coefficient K:	0.000000E+0
Coefficient E:	-1.822192E-5	Coefficient L:	0.000000E+0
Coefficient F:	1.954429E-7	Coefficient M:	0.000000E+0
Coefficient G:	1.472341E-7	Coefficient N:	0.000000E+0

Robert Haydock
President, AML Oceanographic

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Certificate of Calibration

Asset Serial Number:	204914
Calibration Type:	Sound Velocity
Certification Date:	June 25, 2019
Calibration Range:	1419.0 to 1510 m/s
Sensor Range:	1375 to 1625 m/s
Residual (RMSE):	0.010 m/s
Standards:	Hart 1560/4067

Coefficients

Coefficient A:	0.000000E+0	**Coefficient H:**	1.947751E-7
Coefficient B:	0.000000E+0	**Coefficient I:**	0.000000E+0
Coefficient C:	3.290862E-7	**Coefficient J:**	0.000000E+0
Coefficient D:	1.947717E-7	**Coefficient K:**	0.000000E+0
Coefficient E:	-1.839353E-5	**Coefficient L:**	0.000000E+0
Coefficient F:	1.954292E-7	**Coefficient M:**	0.000000E+0
Coefficient G:	3.808183E-7	**Coefficient N:**	0.000000E+0

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Certificate of Calibration

Asset Serial Number:	404148
Calibration Type:	Temperature
Certification Date:	December 07, 2018
Calibration Range:	-4.9 to 45 °C
Sensor Range:	-5 to +45 ° C
Residual (RMSE):	0.002 °C
Standards:	Hart 1560/4040

Coefficients

Coefficient A:	-9.535981E+0	Coefficient H:	0.000000E+0
Coefficient B:	1.471831E-3	Coefficient I:	0.000000E+0
Coefficient C:	-2.918690E-8	Coefficient J:	0.000000E+0
Coefficient D:	8.175154E-13	Coefficient K:	0.000000E+0
Coefficient E:	-1.405027E-17	Coefficient L:	0.000000E+0
Coefficient F:	1.419719E-22	Coefficient M:	0.000000E+0
Coefficient G:	-5.305033E-28	Coefficient N:	0.000000E+0

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Appendix D
Kick-Off Meeting Agenda and Sign-In Sheet

Pretare, Jennifer

Subject: SFM - Survey Control Point Installation Kick Off Meeting
Location: DEA Spokane Office: 908 N Howard Street #300

Start: Mon 9/24/2018 1:00 PM
End: Mon 9/24/2018 3:00 PM

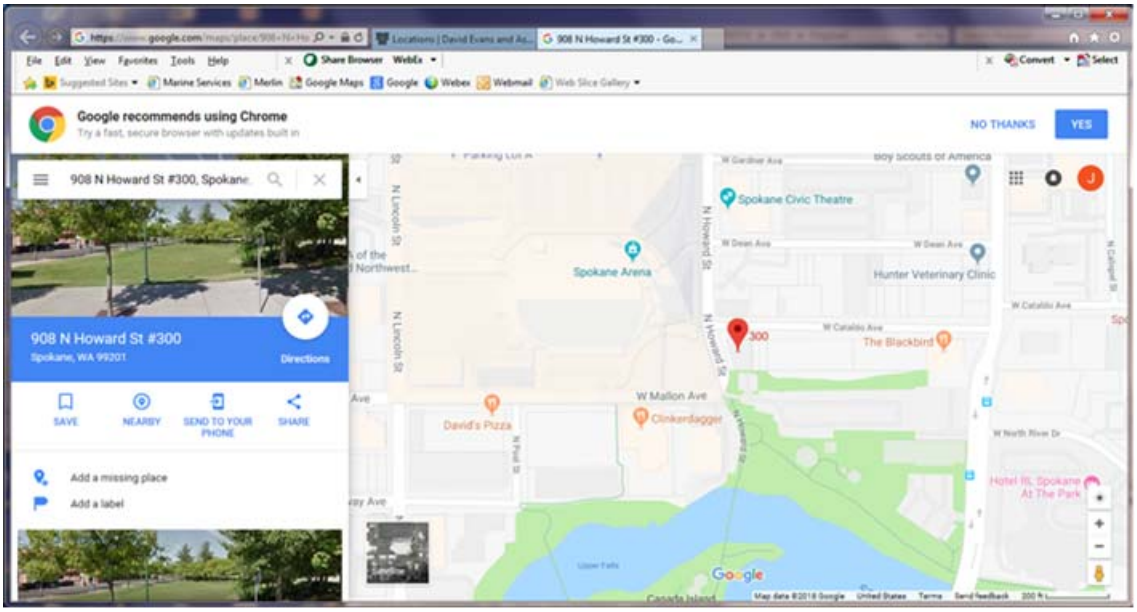
Recurrence: (none)

Meeting Status: Meeting organizer

Organizer: Pretare, Jennifer
Required Attendees: Denise Mills (Denise.Mills@teck.com); kris.mccaig@teck.com; Cristy Kessel (cristy.kessel@teck.com); McDaniel, Sarah; Jon Dasler; Tim McClinton (tmcclinton@deainc.com); Surowiec, Mike; Merrill, Fred
Optional Attendees: Duffy Haggarty

Sediment Facies Mapping Field Work – Survey Control Point Installation Kick Off Meeting
September 24, 2018; 1 to 3 pm
David Evans and Associates Spokane Office: 908 N Howard Street, #300, Spokane.

Draft Agenda:
-Health and Safety
-Cultural Resource briefing
-Locations for control points, and permissions
-Technical objectives
-Deliverable?
-Looking ahead to SFM data collection



-- Do not delete or change any of the following text. --

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UCR 2018 Sediment Facies Mapping Project
Field Sampling Kick-Off Meeting Agenda

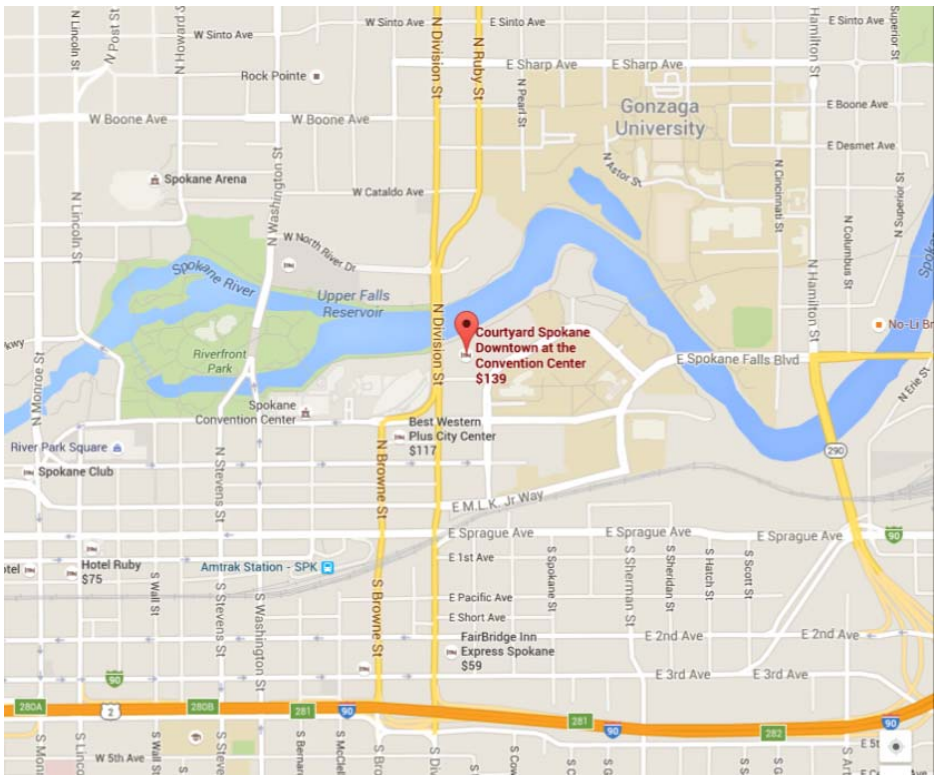
When: **October 1, 2018**
9 am to 1 pm (approximately)
Lunch will be available beginning at 11:45 am

- **The goal is to have the formal agenda completed by the time lunch begins, and then break smaller groups to discuss field logistics and schedule as needed. Field teams will then mobilize to Colville.**

Purpose: **Teck American Incorporated (TAI) and the contractor field team will provide a project overview, health and safety review, permits/permissions, team assignments and schedule.**

Attendees: **TAI, Environmental Protection Agency and consultants, AECOM, David Evans and Associates, Gravity Marine, Columbia Navigation, Confederated Colville Tribes**

Location: **Courtyard Marriott Downtown Spokane – Conference Room reserved for AECOM**
401 N. Riverpoint Blvd, Spokane, WA 99202
509-456-7600



Agenda

9:00—9:20

- Greetings and Introductions (TAI: Kris McCaig and AECOM: Jenny Pretare)
- Overall Project Objective (Kris McCaig and EPA)
- Communication protocols (Kris McCaig)

9:20-10:10 Review of Technical Work to be completed

- Overall project goal - Dr. Tim McClinton (DEA)
- Multi-beam echo-sounder (John Staly or Jon Dasler - DEA)
- Acoustic Doppler current profiler (Gravity)
- Underwater Imagery (Gravity)
- Survey control/base station operation (DEA)
- Data transfer and storage (AECOM)

10:10 Short Break

10:15 —10:50 Health and Safety Orientation (AECOM, Gravity, CNI)

- Presentation by Fred Merrill (AECOM)
- Vessel orientation – Overview (Detailed orientation to be completed the following day at boat launch)
- Sign safety training acknowledgment

10:50-11:00 Cultural Resource Orientation (Sarah McDaniel – AECOM)

11:00-11:15 Permits and Access Agreements (Kris McCaig and Jenny Pretare)

11:15-11:30 Review of schedule for Oct. 2nd and beyond (Jenny Pretare)

11:30-11:45 Question and Answer

11:45 Break for Lunch

This room will remain open for additional coordination and logistics discussions as needed.

Adjourn; Field team to Colville.

Hand Outs

Health and Safety Plan

Contact sheet with phone numbers

Schedule

Appendix E
Project Permits

UNITED STATES DEPARTMENT OF THE INTERIOR
National Park Service
Lake Roosevelt National Recreation Area
Special Use Permit

NAME **Kris R. McCaig**
ORGANIZATION **Teck American Incorporated**
ADDRESS **501 N Riverpoint Blvd., Suite 300** **Spokane, WA 99202**
TELEPHONE NUMBER **509-623-4501** FAX NUMBER **509-459-4400**

Park Alpha Code: **LARO**

Type of Use: 2500

Permit #: PWR LARO TCAI-012 (Extension)

Teck American Incorporated (TAI) is hereby authorized to use those areas within Lake Roosevelt National Recreation Area as described in the EPA approved *Final Quality Assurance Project Plan for the Phase 3 Sediment Study – Sediment Facies Mapping* dated August 2018.

The permit begins at 5:00 am on 11/1/2018 (Month/Day/Year).
The permit expires at 5:00 pm on 11/15/2018 (Month/Day/Year).

SUMMARY OF PERMITTED ACTIVITY: (see attached sheets for additional information and conditions)
Collection of high resolution acoustic data and georeferenced images of the riverbed to identify and map sediment grain size fractions and texture for the Upper Columbia River/Lake Roosevelt Remedial Investigation/Feasibility Study.

Person on site responsible for adherence to the terms and conditions of the permit (include contact information): Same as above

Authorizing legislation or other authority: 16 U.S.C. §§1a-1; 42 U.S.C. §§9601 *et seq.*

NEPA Compliance: CATEGORICALLY EXCLUDED X EA/FONSI ___ EIS ___ PEPC # _____ OTHER _____

APPLICATION FEE Received X Not Required ___ Amount $ Charged to existing account.

PERFORMANCE BOND: Required ___ Not Required X Amount $

LIABILITY INSURANCE: Required X Not Required ___ Amount $ 1,000,000.00

COST RECOVERY: Required X Not Required ___ Amount $ Charged to existing account.

FACILITY USE FEE: Required ___ Not Required X Amount $

LOCATION FEE: Required ___ Not Required X Amount $

ISSUANCE of this permit is subject to the attached conditions. The undersigned hereby accepts this permit subject to the terms, covenants, obligations, and reservations, expressed or implied herein.

PERMITTEE	Kris R. McCaig	Manager, Environment + Public Affairs	10/30/18
	Signature	Title	Date
Authorizing NPS Official	DAN FOSTER Digitally signed by DAN FOSTER Date: 2018.10.30 12:15:18 -07'00'		
	Signature	Superintendent	Date
Authorizing NPS Official (additional if required)			
	Signature	Title	Date

CONDITIONS OF THIS PERMIT

1. The Permittee shall exercise this privilege subject to the supervision of the Park Superintendent and shall comply with all applicable laws, regulations, codes, standards and policies, including but not limited to 29 CFR 1910 and 16 U.S.C. Section 1 *et seq*.

2. The Permittee shall pay the United States for any damage resulting from the activities contemplated by this Permit, which would not reasonably be inherent in the use that the Permittee is authorized to make of the Site. For purposes of this Permit, the Site is that portion of the Upper Columbia River (UCR) Site as defined within the June 2, 2006 Settlement Agreement between the U.S. Environmental Protection Agency (EPA) and Teck Cominco that lies within the boundaries of LARO.

3. No Member of or Delegate to Congress, or Resident Commissioner shall be admitted to any share or part of this Permit or to any benefit that may arise there from, but this provision shall not be construed to extend to this grant if made with a corporation for its general benefit.

4. During the performance of this Permit, the Permittee agrees that it will not discriminate against any person because of race, color, religion, sex, or national origin. The Permittee will take affirmative action to ensure that applicants are employed without regard to their race, color, religion, sex, or national origin.

5. ANTI-DEFICIENCY ACT. No provision of this Permit shall be interpreted as or constitute a commitment or requirement that the United States obligate or pay funds in contravention of the Anti-Deficiency Act, 31 U.S.C. §§1341-1344 and 1511-1519, or any other applicable provision of law.

6. This Permit may not be transferred or assigned to parties not described within the permit application without the prior written consent of the Park Superintendent.

7. The National Park Service (NPS) reserves the right to stop any work being performed on the Site pursuant to this Permit should NPS determine that such work has or will negatively impact any NPS resources, which would not reasonably be inherent in the use that the Permittee is entitled to make of the Site pursuant to this Permit.

8. The Permittee is prohibited from giving false information; to do so will be considered a breach of conditions and be grounds for revocation [Re: 36 CFR 2.32(a)(4)].

9. This Permit is granted upon the express condition that the United States, its agents and employees, shall be free from all liabilities and claims for damages and/or suits for or by any reason, arising from or related to activities conducted pursuant to this Permit, including any releases of Waste Materials (as defined in Paragraph 33 of this Permit), injury, or death to any person or property of the Permittee, its contractors, subcontractors, agents or employees, or third parties, from any cause or causes whatsoever while in or upon the Site or any part thereof during the term of this Permit or occasioned by any use of the Site or any activity carried on by the Permittee or its contractors or subcontractors in connection herewith, and the Permittee hereby covenants and agrees to indemnify, defend, save and hold harmless the United States, its agents and employees, from all liabilities, charges, expenses and costs on account of or by reason of any such injuries, deaths, liabilities, claims, suits or losses however occurring, or damages arising from any acts related to this Permit.

10. This Permit is issued only for the use of the portion of the Site within LARO identified in the EPA approved *Upper Columbia River - Final Quality Assurance Project Plan for the Phase 3 Sediment Study – Sediment Facies Mapping* dated August 2018 (QAPP), and only for the dates and times specified.

11. At no time will Permittee's activities at the Site interfere with a visitor's enjoyment of the Park, except as necessary to conduct the activities contemplated by this Permit. Visitor access to all park facilities, exhibits, resources, etc. will be maintained at all times and the Permittee will not block or obstruct any park walkway, dock, boat launch, trail, or road, except to the extent necessary to conduct the activities authorized by this Permit.

12. The Permittee will comply with any and all instructions from official representatives of the NPS (e.g., Rangers, Point of Contact, and Cultural Resource Representatives), including but not limited to orders to cease and desist work.

13. This Permit does not authorize any use, activity, or purpose other than those expressly described herein.

14. NPS reserves the right to immediately rescind this Permit at any time should any of the Permit conditions be violated, or should the activity in any way interfere with any program of the Park, except as expressly authorized by this Permit, or at the discretion of the Park Superintendent.

15. The issuance of this Permit will grant the Permittee access to the Site to conduct only those activities necessary to perform the work in the EPA approved QAPP and described in the Permit conditions. To the extent practicable, all work performed subject to this Permit shall comply with the EPA guidance, *Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites*, EPA 542-R-08-002 (April 2008).

16. Future access to NPS property or any modifications to this Permit will require a written amendment issued by the NPS.

17. The Permittee shall coordinate the performance of work with the appropriate representative of the NPS. The local NPS point of contact for all aspects of this Permit will be Jon Edwards (Office: 509/754-7876, and Email: jon_edwards@nps.gov). In the event of emergency, accident, injury or death, call 911. For any other environmental accidents, spill or release, NPS law enforcement must be contacted via the local county Sherriff's office, Stevens County (509/684-2555) or Lincoln County (509/725-3501). Additionally, a NPS point of contact must be contacted within one-hour of any incident.

18. REGULATORY REQUIREMENTS: All Site work will be conducted and implemented in accordance with all federal, state, and local laws, regulations and requirements as directed by the NPS, and will be consistent with the NPS mission (*see, e.g.*, 16 U.S.C. Section 1 *et seq*.) and Permit conditions.

19. The Permittee is responsible for complying with any federal, state, or local requirement(s) to obtain any licenses and/or permits for the activities conducted pursuant to this Permit, and for obtaining any utility clearances required before the permitted work is commenced.

20. All work and investigations on NPS property requires a minimum 48-hour advance notice (business days, Monday-Friday except federal holidays) to the NPS point of contact identified above. The Permittee will provide before activities commence the NPS a written list of names with email addresses, phone and fax numbers of its point(s) of contact, including the Permittee's contractors and subcontractors for activities conducted on the Site pursuant to this Permit.

21. The Permittee and its representatives, agents, contractors, and subcontractors must be apprised of, be familiar with, and comply with the contents of this Permit. A copy of this Permit will be available and producible upon request by any NPS representative to the Permittee and/or its contractors and

subcontractors during all phases of the permitted work.

22. This Permit does not grant any property rights, easements, right-of-ways, or any other interest in real property, including ownership of samples collected.

23. Appropriate Occupational Safety and Health Administration personal protective equipment must be used by field crews and other on-Site personnel.

24. A copy of all data (*e.g.*, georeferenced images, sample results, laboratory results, coordinates, wildlife inventories), documentation (*e.g.*, manifests, field notes, maps, photographs, monitoring results), and reports prepared relating to work performed pursuant to this Permit will be made available to the NPS points of contact when submitted to the EPA.

25. The Permittee assumes liability for all activities, releases, incidents and events caused by or associated with any permitted activity, including any and all releases of Waste Materials into the environment resulting from permitted activities. The Permittee assumes responsibility for costs, repairs, and/or restoration to any areas damaged by such releases and/or discharges, whether those areas are within the permitted area or not.

26. In the event of a spill or other release or threatened release of a Waste Material into the environment that constitutes an emergency situation or may present an immediate threat to public health or welfare or the environment, the Permittee shall immediately take all appropriate action to prevent, abate, or minimize such release or threat of release, and shall immediately make proper notification in accordance with all applicable legal and regulatory requirements. Notification of any release of a Waste Material shall be made to the Washington Emergency Management Division at 1-800-258-5990 and NPS law enforcement at (509) 754-7813. Notice also shall be made to the NPS points of contact identified in Paragraph 19 above. Contingency measures will be implemented as noted in the following paragraph, and the Permittee shall be responsible for cleanup of all spills or other releases.

27. Contingency measures:
    a. Permittee and its contractors will immediately stop operations;
    b. All crew members will don appropriate personal protective equipment and take appropriate steps to abate and remediate the release; and
    c. Authorized activities will be suspended until conditions are determined to be stable according to NPS determination.

28. Nothing in the preceding paragraphs shall be deemed to limit any authority of the United States, (a) to take all appropriate action to protect human health and the environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste Materials on, at, or from the Site, or (b) to direct or order such action, or seek an order from the requisite Court, to protect human health and the environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste Materials on, at, or from the Site.

29. "Waste Material" shall mean, for purposes of this Permit, (a) any "hazardous substance" under CERCLA Section 101(14), 42 U.S.C. § 9601(14); (b) any "pollutant or contaminant" under CERCLA Section 101(33), 42 U.S.C. § 9601(33); (c) any "solid waste" under RCRA Section 1004(27); (d) any hazardous waste under RCRA Section 1004(5), 42 U.S.C. § 6903(5); (e) any petroleum product or waste, including crude oil or any fraction thereof or waste; and (f) natural gas, liquefied natural gas, or synthetic gas or any mixtures thereof.

30. The Permittee shall ensure its liability insurance remains in full force during the entirety of the period covered by this Permit. The Permittee agrees to be fully responsible for the management, performance, use and safety of the Site under this Permit and hereby accepts responsibility and assumes liability for any and all claims arising from the intentional, reckless or negligent actions or omissions of its representatives, employees, agents, contractors or subcontractors directly or indirectly connected with the work performed, or the maintenance or use of the Site, to the extent permitted by law. The Permittee shall, and shall require all of its contractors and subcontractors to:

    a. Procure a general liability insurance policy from responsible companies for $1,000,000 (one million dollars), or the minimum required by law, if any, whichever amount is greater. The United States of America shall be named as an additional insured on all policies. The Permit number will be included on said policy. All such policies shall specify that the insured shall have no right of subrogation against the United States for payments of any premiums or deductibles thereunder, and such insurance policies shall be obtained by, be for the account of, and be at the insured's sole risk. A copy of the Certificate of Insurance evidencing proper insurance coverage and referencing the Permit number shall be returned to NPS with the executed Permit to the Park Superintendent. No work shall be allowed to proceed under this Permit until the copy of said Certificate of Insurance is provided to the Park Superintendent.

    b. Pay the United States the full value for all damages to the lands or other property of the United States caused by the Permittee or by the Permittee's employees, agents, contractors, subcontractors, or employees of the contractors or subcontractors.

    c. Indemnify, save and hold harmless and defend the United States against all fines, claims, damages, losses, judgments, and expenses to the extent permitted by law rising out of, or from any omission or activity in connection with activities conducted under this Permit.

31. The Permittee and its contractors and subcontractors shall take adequate measures as directed and approved by NPS to prevent, minimize, and mitigate damage to Park resources during all activities conducted pursuant to this Permit. The Permittee shall restore any injury to NPS property resulting from activities conducted pursuant to this Permit in accordance with NPS, other federal and state requirements, and at the direction of NPS.

32. Equipment, materials, and all other supplies shall be staged in such a way as to allow for the safe use of the area by park visitors, to the extent possible.

33. The Permittee is responsible for the safety of all Site visitors and shall provide the necessary direction, barricades, detours, and other safety measures to ensure visitor safety. All access restrictions to the work area will be coordinated with the NPS points of contact listed above.

34. Other than the immediate work area and the clearly defined safety zone, all sidewalks, walkways, roadways, docks, boat launches, and trails must remain unobstructed to allow for the reasonable use of these areas by pedestrians, vehicles, and other park users.

35. Any injuries to any persons from the activities authorized under this Permit shall be reported immediately to the NPS point of contact. At least one operable cell phone is required to be with each field crew at all times.

36. The United States shall have no liability for any claims or causes of action in any forum regarding any activities conducted pursuant to this Permit, including but not limited to liability for claims or causes of

action for property damage, bodily injury, or death caused by Permittee's use of NPS property in connection with this Permit.

37. The Permittee agrees to comply with and be bound by the terms of this Permit and to undertake all actions set forth in this Permit. In any action by the NPS to enforce the terms of this Permit, the Permittee consents to and agrees not to contest the authority or jurisdiction of NPS to issue or enforce this Permit, and agrees not to contest the validity of the Permit or its terms.

38. All promotional and informational material related to Site activities, including signage, relating to activities undertaken pursuant to this Permit shall be reviewed and approved by the Park Superintendent prior to its release or use.

39. Good order and proper decorum shall be maintained by those persons conducting and participating in Site activities, and public safety and general welfare will not be endangered.

UPON THE ACCEPTANCE OF THE CONDITIONS CONTAINED IN THIS PERMIT, INDICATED BY THE APPROVAL OF THE PERMITTEE IN THE SPACE PROVIDED ON THIS PERMIT, AND THE RETURN OF A PROPERLY EXECUTED ORIGINAL TO THIS OFFICE WITHIN NOT MORE THAN 30 DAYS OF ISSUANCE, THIS PERMIT BECOMES VALID FOR THE ACTIVITIES DESCRIBED.

RETURN ONE SIGNED ORIGINAL TO:

Attention: NPS Superintendent
Dan Foster
1008 Crest Drive
Coulee Dam, WA 99116

Pretare, Jennifer

From: Mills Denise SPOK <Denise.Mills@teck.com>
Sent: Friday, September 21, 2018 9:05 AM
To: cstolsig@usbr.gov; lottosen@usbr.gov
Cc: McCaig Kris SPOK; Kessel Cristy SPOK; Pretare, Jennifer; McDaniel, Sarah; Kevin Lundmark; Jon Dasler; Tim McClinton; 'shawn@gravitymarine.com'
Subject: UCR RI/FS - Phase 3 Sediment Study - Hydrographic Surveys (Sediment Facies Mapping)

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Cory,

Thank you for your time yesterday to speak with me about using URBR control survey monuments on Lake Roosevelt and the Upper Columbia River.

As we discussed, Teck American Incorporated (TAI) plans to use existing USBR survey control monuments and establish new monuments to support hydrographic surveys of the Upper Columbia River from the U.S.-Canada border to approximately river mile 708 (upstream of Marcus Flats). This work will begin next week and continue through the end of October 2019. Based on our phone conversation, I understand that no special permissions or other notification to USBR are needed for this work. Per your request, we will provide shapefiles for any new monuments that are established for your use.

TAI is conducting this work as part of the Upper Columbia River remedial investigation and feasibility study (RI/FS), the with oversight from the U.S. Environmental Protection Agency. EPA-approved Quality Assurance Project Plan for the Sediment Facies Mapping Project is available online (https://www.ucr-rifs.com/assets/Docs/09-06-18-Final-Phase-3-SFM-QAPP.pdf). The new survey maps will be publicly available after we have finished the data compilation, processing, and interpretation, in 2019. We will be sure to inform you when this information is available.

Thank you again for your time. Please feel free to contact me by email or phone (509-623-4515) or Kris McCaig at kris.mccaig@teck.com or by calling 509-623-4501, if you require any additional information about the project and our upcoming activities.

Kind regards,

Denise

Denise Mills, RG, LHG
Program Manager, Upper Columbia River
Teck American Incorporated
+1.509.623.4515, direct
+1 509.904.9375, mobile
www.teck.com

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: DAVID EVANS AND ASSOCIATES, INC.

ATTN: JONATHAN L. DASLER
DAVID EVANS AND ASSOCIATES, INC.
2801 SE COLUMBIA WAY STE 130
VANCOUVER, WA 98661

Call Sign	File Number
WQJH651	0008292953

Radio Service
IG - Industrial/Business Pool, Conventional

Regulatory Status
PMRS

Frequency Coordination Number
RSMR0720180065

FCC Registration Number (FRN): 0018068114

Grant Date	Effective Date	Expiration Date	Print Date
09-21-2018	09-21-2018	09-12-2028	09-22-2018

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation

Loc. 1 **Area of operation**
Operating Nationwide including Hawaii, Alaska, and US Territories.
Location 1 Special Condition
Area of operation is restricted to south of Line A and/or west of Line C.
Area of operation is restricted to south of Line A and/or west of Line C.

Loc. 2 **Area of operation**
Operating Nationwide including Hawaii, Alaska, and US Territories.
Location 2 Special Condition
Area of operation is restricted to south of Line A and/or west of Line C.
Area of operation is restricted to south of Line A and/or west of Line C.

Loc. 3 **Area of operation**
Operating Nationwide including Hawaii, Alaska, and US Territories.

Loc. 4 **Area of operation**
Operating Nationwide including Hawaii, Alaska, and US Territories.

Loc. 5 **Area of operation**
Statewide: WA

Loc. 6 **Area of operation**
Statewide: WA

Loc. 7 **Area of operation**
Statewide: AK

Loc. 8 **Area of operation**
Statewide: AK

Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

Official Copy

Licensee Name: DAVID EVANS AND ASSOCIATES, INC.

Call Sign: WQJH651 **File Number:** 0008292953 **Print Date:** 09-22-2018

Fixed Location Address or Mobile Area of Operation

Loc. 9	**Area of operation** Statewide: ID
Loc. 10	**Area of operation** Statewide: ID
Loc. 11	**Area of operation** Statewide: MT
Loc. 12	**Area of operation** Statewide: MT

Antennas

Loc No.	Ant No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
1	1	000461.07500000	FXOT	30		11K2F1D	35.000	100.000			
1	1	000461.10000000	FXOT	30		11K2F1D	35.000	100.000			
1	1	000462.12500000	FXOT	30		11K2F1D	35.000	100.000			
1	1	000462.37500000	FXOT	30		11K2F1D	35.000	100.000			
1	1	000462.40000000	FXOT	30		11K2F1D	35.000	100.000			
1	1	000464.60000000	FXOT	30		11K2F1D	35.000	100.000			
1	1	000464.62500000	FXOT	30		11K2F1D	35.000	100.000			
1	1	000464.65000000	FXOT	30		11K2F1D	35.000	100.000			
1	1	000464.72500000	FXOT	30		11K2F1D	35.000	100.000			
1	1	000464.75000000	FXOT	30		11K2F1D	35.000	100.000			
1	1	000461.02500000	FXOT	30		11K2F1D	35.000	100.000			
2	1	000464.50000000	FXOI	30		11K2F1D	35.000	100.000			
2	1	000464.55000000	FXOI	30		11K2F1D	35.000	100.000			
3	1	000461.02500000	FXOT	30		11K2F1D	3.000	3.000			

Frequency 000461.02500000 Special Condition

Operation on this frequency is on a non-interference basis to Canadian operations and you must accept all interference from operations in Canada. Licensee is responsible for resolving any complaints of interference to Canadian systems arising from operations on this frequency, including, if necessary, cessation of such operations.

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Licensee Name: DAVID EVANS AND ASSOCIATES, INC.

Call Sign: WQJH651 **File Number:** 0008292953 **Print Date:** 09-22-2018

Antennas

Loc No.	Ant No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
3	1	000461.07500000	FXOT	30		11K2F1D	3.000	3.000			

Frequency 000461.07500000 Special Condition
Operation on this frequency is on a non-interference basis to Canadian operations and you must accept all interference from operations in Canada. Licensee is responsible for resolving any complaints of interference to Canadian systems arising from operations on this frequency, including, if necessary, cessation of such operations.

3	1	000461.10000000	FXOT	30		11K2F1D	3.000	3.000			

Frequency 000461.10000000 Special Condition
Operation on this frequency is on a non-interference basis to Canadian operations and you must accept all interference from operations in Canada. Licensee is responsible for resolving any complaints of interference to Canadian systems arising from operations on this frequency, including, if necessary, cessation of such operations.

3	1	000462.12500000	FXOT	30		11K2F1D	3.000	3.000			

Frequency 000462.12500000 Special Condition
Operation on this frequency is on a non-interference basis to Canadian operations and you must accept all interference from operations in Canada. Licensee is responsible for resolving any complaints of interference to Canadian systems arising from operations on this frequency, including, if necessary, cessation of such operations.

3	1	000462.37500000	FXOT	30		11K2F1D	3.000	3.000			

Frequency 000462.37500000 Special Condition
Operation on this frequency is on a non-interference basis to Canadian operations and you must accept all interference from operations in Canada. Licensee is responsible for resolving any complaints of interference to Canadian systems arising from operations on this frequency, including, if necessary, cessation of such operations.

3	1	000462.40000000	FXOT	30		11K2F1D	3.000	3.000			

Frequency 000462.40000000 Special Condition
Operation on this frequency is on a non-interference basis to Canadian operations and you must accept all interference from operations in Canada. Licensee is responsible for resolving any complaints of interference to Canadian systems arising from operations on this frequency, including, if necessary, cessation of such operations.

3	1	000464.60000000	FXOT	30		11K2F1D	3.000	3.000			

Frequency 000464.60000000 Special Condition
Operation on this frequency is on a non-interference basis to Canadian operations and you must accept all interference from operations in Canada. Licensee is responsible for resolving any complaints of interference to Canadian systems arising from operations on this frequency, including, if necessary, cessation of such operations.

3	1	000464.62500000	FXOT	30		11K2F1D	3.000	3.000			

Frequency 000464.62500000 Special Condition
Operation on this frequency is on a non-interference basis to Canadian operations and you must accept all interference from operations in Canada. Licensee is responsible for resolving any complaints of interference to Canadian systems arising from operations on this frequency, including, if necessary, cessation of such operations.

3	1	000464.65000000	FXOT	30		11K2F1D	3.000	3.000			

Frequency 000464.65000000 Special Condition
Operation on this frequency is on a non-interference basis to Canadian operations and you must accept all interference from operations in Canada. Licensee is responsible for resolving any complaints of interference to Canadian systems arising from operations on this frequency, including, if necessary, cessation of such operations.

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Licensee Name: DAVID EVANS AND ASSOCIATES, INC.

Call Sign: WQJH651 **File Number:** 0008292953 **Print Date:** 09-22-2018

Antennas

Loc No.	Ant No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
3	1	000464.72500000	FXOT	30		11K2F1D	3.000	3.000			
		Frequency 000464.72500000 Special Condition Operation on this frequency is on a non-interference basis to Canadian operations and you must accept all interference from operations in Canada. Licensee is responsible for resolving any complaints of interference to Canadian systems arising from operations on this frequency, including, if necessary, cessation of such operations.									
3	1	000464.75000000	FXOT	30		11K2F1D	3.000	3.000			
		Frequency 000464.75000000 Special Condition Operation on this frequency is on a non-interference basis to Canadian operations and you must accept all interference from operations in Canada. Licensee is responsible for resolving any complaints of interference to Canadian systems arising from operations on this frequency, including, if necessary, cessation of such operations.									
4	1	000464.50000000	FXOI	30		11K2F1D	3.000	3.000			
		Frequency 000464.50000000 Special Condition Operation on this frequency is on a non-interference basis to Canadian operations and you must accept all interference from operations in Canada. Licensee is responsible for resolving any complaints of interference to Canadian systems arising from operations on this frequency, including, if necessary, cessation of such operations.									
4	1	000464.55000000	FXOI	30		11K2F1D	3.000	3.000			
		Frequency 000464.55000000 Special Condition Operation on this frequency is on a non-interference basis to Canadian operations and you must accept all interference from operations in Canada. Licensee is responsible for resolving any complaints of interference to Canadian systems arising from operations on this frequency, including, if necessary, cessation of such operations.									
5	1	000461.02500000	FXOT	30		11K2F1D	35.000	100.000			
5	1	000461.07500000	FXOT	30		11K2F1D	35.000	100.000			
5	1	000461.10000000	FXOT	30		11K2F1D	35.000	100.000			
5	1	000462.12500000	FXOT	30		11K2F1D	35.000	100.000			
5	1	000462.37500000	FXOT	30		11K2F1D	35.000	100.000			
5	1	000464.60000000	FXOT	30		11K2F1D	35.000	100.000			
5	1	000464.62500000	FXOT	30		11K2F1D	35.000	100.000			
5	1	000464.65000000	FXOT	30		11K2F1D	35.000	100.000			
5	1	000464.72500000	FXOT	30		11K2F1D	35.000	100.000			
5	1	000464.75000000	FXOT	30		11K2F1D	35.000	100.000			
6	1	000464.50000000	FXOI	30		11K2F1D	35.000	100.000			

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Loc No.	Ant No.	Frequencies (MHz)	Sta. Cls.	No. Units	No. Pagers	Emission Designator	Output Power (watts)	ERP (watts)	Ant. Ht./Tp meters	Ant. AAT meters	Construct Deadline Date
6	1	000464.55000000	FXOI	30		11K2F1D	35.000	100.000			
7	1	000461.02500000	FXOT	30		11K2F1D	35.000	100.000			
7	1	000461.07500000	FXOT	30		11K2F1D	35.000	100.000			
7	1	000461.10000000	FXOT	30		11K2F1D	35.000	100.000			
7	1	000462.12500000	FXOT	30		11K2F1D	35.000	100.000			
7	1	000462.37500000	FXOT	30		11K2F1D	35.000	100.000			
7	1	000464.60000000	FXOT	30		11K2F1D	35.000	100.000			
7	1	000464.62500000	FXOT	30		11K2F1D	35.000	100.000			
7	1	000464.65000000	FXOT	30		11K2F1D	35.000	100.000			
7	1	000464.72500000	FXOT	30		11K2F1D	35.000	100.000			
7	1	000464.75000000	FXOT	30		11K2F1D	35.000	100.000			
8	1	000464.50000000	FXOI	30		11K2F1D	35.000	100.000			
8	1	000464.55000000	FXOI	30		11K2F1D	35.000	100.000			
9	1	000461.02500000	FXOT	30		11K2F1D	35.000	100.000			
9	1	000461.07500000	FXOT	30		11K2F1D	35.000	100.000			
9	1	000461.10000000	FXOT	30		11K2F1D	35.000	100.000			
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9	1	000464.75000000	FXOT	30		11K2F1D	35.000	100.000			
10	1	000464.50000000	FXOI	30		11K2F1D	35.000	100.000			
10	1	000464.55000000	FXOI	30		11K2F1D	35.000	100.000			
11	1	000461.02500000	FXOT	30		11K2F1D	35.000	100.000			
11	1	000461.07500000	FXOT	30		11K2F1D	35.000	100.000			
11	1	000461.10000000	FXOT	30		11K2F1D	35.000	100.000			
11	1	000462.12500000	FXOT	30		11K2F1D	35.000	100.000			
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11	1	000464.75000000	FXOT	30		11K2F1D	35.000	100.000			
12	1	000464.50000000	FXOI	30		11K2F1D	35.000	100.000			
12	1	000464.55000000	FXOI	30		11K2F1D	35.000	100.000			

Official Copy

Licensee Name: DAVID EVANS AND ASSOCIATES, INC.

Call Sign: WQJH651 **File Number:** 0008292953 **Print Date:** 09-22-2018

Control Points

Control Pt. No. 1

Address: 2801 SE COLUMBIA WAY STE 130

City: VANCOUVER County: CLARK State: WA Telephone Number: (360)314-3200

Associated Call Signs

Waivers/Conditions:

Antenna structures for land, base and fixed stations authorized for operation at temporary unspecified locations may be erected without specific prior approval of the Commission where such antenna structures do not exceed a height of 60.96 meters (200 feet) above ground level; provided that the overall height of such antennas more than 6.10 meters (20 feet) above ground, including their supporting structures (whether natural formation or man-made), do not exceed any of the slope ratios set forth in Section 17.7(b). Any antenna to be erected in excess of the foregoing limitations requires prior Commission approval. Licensees seeking such approval should file application for modification of license. In addition, notification to the Federal Aviation Administration is required whenever the antenna will exceed 60.96 meters (200 feet) above the ground and whenever notification is otherwise required by Section 17.7 of the Commission's Rules. Such notification should be given by filing FAA Form 7460-1, Notice of Proposed Construction or Alteration, in duplicate, with the nearest office of the Federal Aviation Administration, which form is available from that office.

License renewal granted on a conditional basis, subject to the outcome of FCC proceeding WT Docket No. 10-112 (see FCC 10-86, paras. 113 and 126).

Output power limited to 20 watts within 140 km of urbanized areas of 600,000 or more.

Official Copy

Pretare, Jennifer

From: JOHNSON, ARNE (DNR) <ARNE.JOHNSON@dnr.wa.gov>
Sent: Monday, September 10, 2018 10:35 AM
To: McCaig Kris SPOK
Cc: Mills Denise SPOK; Cristy Kessel (ckessel@comcast.net); Pretare, Jennifer; Kevin Lundmark (Kevin.Lundmark@erm.com); Jennifer Holder (jennifer.holder@erm.com); McDaniel, Sarah; Kathryn Cerise (Cerise.Kathryn@epa.gov); Monica Tonel - U.S. Environmental Protection Agency (tonel.monica@epa.gov)
Subject: RE: Notification - UCR RI/FS Phase 3 Sediment Study Sediment Facies Mapping Survey

Kris

Thank you for the notification.

Arne Johnson
East Uplands District Manager
Northeast Region
Department of Natural Resources
225 S. Silke Rd
Colville, WA 99114
(509) 684-7474

From: McCaig Kris SPOK <Kris.McCaig@teck.com>
Sent: Monday, September 10, 2018 9:26 AM
To: JOHNSON, ARNE (DNR) <ARNE.JOHNSON@dnr.wa.gov>
Cc: Mills Denise SPOK <Denise.Mills@teck.com>; Cristy Kessel (ckessel@comcast.net) <ckessel@comcast.net>; Jennifer Pretare (Jennifer.Pretare@aecom.com) <Jennifer.Pretare@aecom.com>; Kevin Lundmark (Kevin.Lundmark@erm.com) <Kevin.Lundmark@erm.com>; Jennifer Holder (jennifer.holder@erm.com) <jennifer.holder@erm.com>; McDaniel, Sarah (sarah.mcdaniel@aecom.com) <sarah.mcdaniel@aecom.com>; Kathryn Cerise (Cerise.Kathryn@epa.gov) <Cerise.Kathryn@epa.gov>; Monica Tonel - U.S. Environmental Protection Agency (tonel.monica@epa.gov) <tonel.monica@epa.gov>
Subject: Notification - UCR RI/FS Phase 3 Sediment Study Sediment Facies Mapping Survey

Good morning Arne,

Thank you for working with us on past sampling programs Teck American Incorporated (TAI) has conducted on the Upper Columbia River (UCR) for the remedial investigation and feasibility study. I am writing to notify the Washington State Department of Natural Resources of our upcoming activities that will occur from late September through October 2018. TAI, under the oversight of the U.S. Environmental Protection Agency (EPA), will be conducting a survey to collect high-resolution acoustic data and georeferenced images of the riverbed to identify and map sediment grain size fractions and texture as part of the Phase 3 Sediment Study – Sediment Facies Mapping. The survey activities to be completed under this program are outlined within the EPA-approved quality assurance project plan (QAPP), which is available at https://www.ucr-rifs.com/assets/Docs/09-06-18-Final-Phase-3-SFM-QAPP.pdf . Survey areas will be reached via boat and will include areas within the UCR from the U.S.-Canada border to Marcus Flats (see first attachment with maps). For your information I have also attached the draft fall field schedule that has further detail on when we will be on the river for the survey.

If you have any questions, please don't hesitate to give me call. We respectfully request you confirm your receipt of this notification.

Thanks,

Kris

Kris McCaig
Manager, Environment & Public Affairs
Teck American Incorporated
501 N Riverpoint Blvd., Suite 300
Spokane, WA 99202
Office: 509.623.4501
Cell: 509.434.8542
kris.mccaig@teck.com

Washington State Department of Transportation

Eastern Region
2714 N. Mayfair Street
Spokane, WA 99207-2090
509-324-6000 / FAX: 509-324-6005
TTY: 1-800-833-6388
www.wsdot.wa.gov

September 21, 2018

Teck American Incorporated
ATTN: Denise Mills
501 N. Riverpoint Blvd, Suite 300
Spokane WA, 99220-3087

Re: Application for General Permit #4-SR25-9422

Denise:

Enclosed is General Permit # 4-SR25-9422, which grants permission to perform the enclosed work.

Teck American shall provide copies of this Permit to their inspector and contractors and/or subcontractors.

A copy of this Permit must be on the job site, protected from the elements, at all times during any construction authorized by this Permit (General Provision No. 1)

Teck American shall inform their inspector and contractors/subcontractors to carefully read and follow all General/Special Provisions as indicated within the approved Permit.

Teck American shall submit the enclosed "Construction Notification" to this office a minimum of three (3) working days prior to the beginning of construction.

The work authorized by this Permit may require inspection to be performed by the Department.

Please contact me at (509) 324-6128 if you have any questions regarding this matter.

Sincerely,

Brad Devine
Franchise/Permit Engineer

BED
Enclosures

cc/encl: Mike Burdick, Utilities Inspector
File

Washington State Department of Transportation

Application for General Permit

Permit No. 4-SR25-9422

Applicant - Please print or type all information Teck American Incorporated

Application is Hereby Made For: ☒ General Permit (No Fee)
☐ General Permit $2.50 (Subject to RCW 47.12.140(2))

Intended Use of State Right of Way is to Construct, Operate, and Maintain a:

Establish new survey control and occupy existing control monuments off the shoulder of SR25 and Northport Waneta Road in support of Upper Columbia River channel bed mapping. After the initial control survey, control will be used for development of GPS base stations to support hydrographic surveys of the Upper Columbia River from the U.S.-Canada border to approximately River Mile 708 (upstream of Marcus Flats).

on a portion of State Route 25 (at/from) MilePost 86 to Mile Post 114 in Stevens County,

to begin in the NW Quarter Section 31 Township 37 North: Range 38 East W.M.

and end in the NE Quarter Section 5 Township 39 North: Range 40 East W.M.

This Permit is issued pursuant to the applicable terms of RCW 47.32.110 (Roadside Users) and RCW 47.12.140 (Sale of Timber and Removal of Nonmarketable Materials).

Teck American Incorporated
Applicant (Referred to as Grantee)

501 N Riverpoint Blvd, Suite 300
Address

Spokane WA 99220-3087
City State Zip Code

(509) 623-4501
Telephone

UCR RI/FS
Applicant Reference (WO) Number

Kris McCaig
Applicant Authorized Signature

Kris McCaig
Print or Type Name

Manager, Environment & Public Affairs
Title

Dated this 19 day of September 2018

26-1974324
Federal Tax ID Number or Social Security Number

Authorization to Occupy Only If Approved Below

The Washington State Department of Transportation referred to as the "Department," hereby grants this Permit subject to the terms and conditions stated in the General Provisions, Special Provisions, and Exhibits attached hereto and by this reference made a part hereof: Construction facilities proposed under this application shall begin within one year and must be completed within three years from date of approval.

For Department Use Only

Exhibits Attached

EXHIBIT A - GENERAL PROVISIONS pgs. 4
EXHIBIT B - SPECIAL PROVISIONS pgs. 2
EXHIBIT C - PROVIDED DISPLAYS pgs. 2
EXHIBIT D - TRAFFIC CONTROL PLAN pgs. 1
EXHIBIT E - VICINITY MAP

Department Approval

By:

Mike Frucci, P.E.

Title: ARA for Operations

Date: 09/21/2018

Expiration Date: 12/31/2019

General Provisions

No changes to these General Provisions may be made without further approval of the Office of the Attorney General

This Permit is issued pursuant to the applicable terms of RCW 47.32.110 (Roadside Users) and RCW 47.12.140 (Sale of Timber and Removal of Nonmarketable Materials).

DOCUMENTS, NON-EXCLUSIVE, COMPLIANCE WITH LAW, WORK

1. A copy of this Permit must be on the job site, protected from the elements, at all times during any Permittee activity, construction or improvement Work as authorized by this Permit. “Work” under this Permit shall include the use of the state-owned right of way as authorized herein.

2. This Permit shall not be deemed or held to be an exclusive one and shall not prohibit the Department from granting rights of like or other nature to other public or private entities, nor shall it prevent the Department from using any of the state-owned highway right of way or other properties for transportation purposes, or affect the Department’s right to full supervision and control over all or any part of the state-owned highway right of way or properties, none of which is hereby surrendered.

3. The Permittee shall be responsible for compliance with all federal, state, and local laws and regulations.

4. Upon approval of this Permit, the Permittee shall diligently proceed with the Work and comply with all General and Special provisions herein.

DEPARTMENT NOTIFICATION: SURVEY MONUMENTS, HIGHWAY SIGNS, FENCES, LANDSCAPING

5. The Permittee shall contact the Department representative(s), listed in Exhibit A, Special Provisions, two (2) weeks prior to conducting Work, to determine the location of survey control monuments within the area in which the Permittee will be working. In the event any monument or right of way marker will be altered, damaged, or destroyed by the Permittee, the Department, prior to Permittee Work, will reference or reset the monument or right of way marker. During the Work, upon discovery of a monument or right of way marker, the Permittee shall cease Work in that area and immediately notify the Department of the discovery. The Department will coordinate with the Permittee to ensure that the monument or right of way marker is recorded or replaced. The Permittee agrees to pay all Department actual direct and related indirect costs and expenses to perform monument or right of way marker work, pursuant to the provisions of Section 18-Invoice and Payment.

6. In the event any milepost, fence, or guardrail is located within the limits of the Permittee’s Work and will be disturbed during Permittee Work, the Permittee agrees to carefully remove these highway facilities prior to Permittee Work and reset or replace these highway facilities after the Permittee Work, to the Department’s sole satisfaction and at the sole cost of the Permittee. The Permittee shall not remove or disturb any highway signs, traffic control devices, or landscaping unless specifically authorized.

PERMIT EXTENSION, ASSIGNMENT, AND REVOCATION:

7. This Permit may not be extended without the Department’s prior written approval.

8. The Permittee shall not assign or transfer this Permit without the Department’s prior written approval. The Permittee understands that any assignment or transfer requires the assignee or transferee to have the means to assume all obligations, duties, and liabilities of the terms and conditions of this Permit, and the Permittee agrees to advise the assignee or transferee of its obligation to apply for an updated or replacement Permit from the Department.

9. This Permit is granted solely within the discretion of the Department. It may be revoked at will and at any time by giving thirty (30) calendar days written notice to the Permittee. Revocation shall automatically take effect on the thirty-first day without further action by the Department. Permittee acknowledges and agrees that it has no due process or appeal rights should the Department decide, for any reason whatsoever, to revoke this Permit. Thereafter, if the Permittee has not removed its facilities or otherwise fails to return the state property back to its original condition as solely determined by the Department, the Department shall perform such work at the Permittee’s sole cost and expense, and the Permittee shall pay the Department’s actual direct and related indirect costs and expenses for performing the work pursuant to the provisions of Section 18-Invoice and Payment.

10. Should the Permittee breach any of the conditions or requirements of this Permit, or should the Permittee fail to proceed with due diligence and in good faith with the Work as authorized by this Permit, the Department may revoke the Permit. The Department shall give thirty (30) calendar days written notice to the Permittee, and upon the thirty-first day, this Permit shall be deemed revoked without further action by the Department. Thereafter, if the Permittee has not removed its facilities or otherwise fails to return the state property back to its original condition as solely determined by the Department, the Department shall perform such work at the Permittee’s sole cost and expense, and the Permittee shall pay the Department’s actual direct and related indirect costs and expenses for performing the work pursuant to the provisions of Section 18-Invoice and Payment.

MODIFICATION OF PERMIT AND/OR WORK:

11. The Department may modify this Permit at any time by giving Permittee written notice. If this Permit is modified, the Permittee will have thirty (30) calendar days from the date of the written notice to modify the Work as required by the Department. If the modifications cannot be made within thirty (30) calendar days, the Permittee shall request the Department, in writing, during the thirty (30) calendar day time period for an extension of time in which to make the modifications. Any extension of time shall be solely within the Department's discretion.

12. If the Permittee desires to modify this Permit and/or the Work, it shall notify the Department representative(s) listed in Exhibit A, Special Provisions, in writing of all proposed changes for the Department's prior approval. The Department agrees to provide written acceptance or rejection of the proposed change(s) to the Permittee within Ten (10) business days.

13. Should the Permittee fail or refuse to comply with the Department's direction pursuant to section 11, the Department will implement section 10 and revoke the Permit.

ADDITIONAL PERMIT OBLIGATIONS

14. The Permittee shall not excavate or place any obstacle within the state-owned highway right of way in such a manner as to interfere with the Department's construction, operation, and maintenance of the state-owned highway right of way or the public's travel thereon without the Department's prior written approval and/or as may be provided in this Permit's Special Provisions.

15. Upon completion of all Work, the Permittee shall immediately remove all rubbish and debris from the state-owned highway right of way, leaving the state-owned highway right of way in a neat, presentable, and safe condition to the Department's sole satisfaction. Any Work-related rubbish and debris clean up, or any necessary slope treatment to restore and/or protect the state-owned right of way, not done within seven (7) calendar days of Work completion, unless the Department approves otherwise, will be done by the Department at the expense of the Permittee. The Permittee agrees to reimburse the Department's actual direct and related indirect costs and expenses for performing the work pursuant to the provisions of Section 18-Invoice and Payment.

16. The Permittee agrees to maintain, at its sole expense, its Work under this Permit in a manner satisfactory to the Department in the Department's sole discretion.

17. If the Department determines that emergency maintenance of the Work is required to (a) protect any aspect of the state highway right of way, or (b) secure the safety of the traveling public due to a failure of the Permittee's Work or its maintenance thereof, the Department may perform the emergency maintenance work without the Permittee's prior approval, and the Permittee agrees to reimburse the Department's actual direct and related indirect costs and expenses for performing the emergency maintenance work pursuant to the provisions of Section 18 – Invoice and Payment. The Department will notify the Permittee of the emergency work performed as soon as practicable.

INVOICE AND PAYMENTS

18. If the Department performs work as provided for in this Permit by state forces or its contractor, including but not limited to any modification, repair, clean up or removal of the Work authorized under this Permit:

a. The Department will assign a reimbursable account to the Permittee as a means of invoicing the Permittee for the costs associated with the work.

b. The Department will provide a detailed invoice, including direct and related indirect costs, to the Permittee for the work performed by the Department or its contractor(s), and the Permittee agrees to pay the Department within fifteen (15) calendar days of receipt of an invoice.

c. The Permittee agrees that if payment is not made to the Department as herein agreed, the Department may charge late fees, interest or refer the debt to a collection agency, all in accordance with Washington State Law.

ADDITIONAL REQUIRED PERMITS

19. The Permittee shall be responsible for securing all necessary permits, including but not limited to, federal, state, and local regulatory, tribal, environmental, archeological, and railroad permits and permits from the Washington State Department of Ecology, the Washington State Department of Fish and Wildlife, and/or the U.S. Army Corps of Engineers prior to beginning the Work authorized by this Permit. The Permittee shall be responsible for mitigation measures where wetlands have been disturbed and agrees that it is solely responsible for any fines imposed for noncompliance with the permit(s) conditions or for failure to obtain the required permits. In addition, the Permittee, on behalf of itself and its contractors, officers, officials, employees, and agents, agrees to indemnify, hold harmless, and defend, at its sole cost and expense, the Department and its officers, officials, employees, and agents from any and all fines, costs, claims, judgments, and/or awards of damages to regulatory agencies, persons, and/or property, arising out of, or in any way resulting from, the Permittee's failure to (1) obtain any required permit for the Permittee Work or (2) comply with permit conditions.

20. The Permittee hereby certifies that its facilities described in this Permit are in compliance with the Clear Zone Guidelines pursuant to Chapter 1600 of the Department's Design Manual (M 22-01) and any revisions thereto.

INDEMNIFICATION, WAIVER, VENUE, ATTORNEYS FEES, AND RELOCATION/EMINENT DOMAIN

21. The Permittee, its successors and assigns, shall indemnify, defend at its sole cost and expense, and hold harmless the State of Washington, its officers, employees, and agents from all claims, demands, damages (both to persons and/or property), expenses, regulatory fines, and/or suits in law and in equity that (1) arise out of or are incident to any acts or omissions of the Permittee, its agents, contractors, employees, invitees and/or any other person in the use of the state-owned highway right of way as authorized by the terms and conditions of this Permit, or (2) are caused by the breach of any of the terms or conditions of this Permit by the Permittee, its successors and assigns, and its contractors, agents, employees, invitees and/or any other person. The Permittee, its successors and assigns, shall not be required to indemnify, defend, or hold harmless the State of Washington, its officers, employees and/or agents, if the claim, suit, or action for damages (both to persons and/or property) is caused by the sole acts or omissions of the State of Washington, its officers, employees and/or agents; provided that, if such claims, suits, or actions result from the concurrent negligence of (a) the State of Washington, its officers, employees and/or agents, and (b) the Permittee, its agents, contractors, employees, invitees, and/or any other person or involves those actions covered by RCW 4.24.115, the indemnity provisions provided herein shall be valid and enforceable only to the extent of the acts or omissions of the Permittee, its agents, contractors, employees, invitees, and/or any other person.

22. The Permittee agrees that its obligations under this Permit extend to any claim, demand, and/or cause of action brought by, or on behalf of, any of its employees or agents while performing Work under this Permit while located on or off state-owned highway right of way. For this purpose, the Permittee, by MUTUTAL NEGOTIATION, hereby WAIVES, with respect to the State of Washington only, any immunity that would otherwise be available to it against such claims under the Industrial Insurance provisions in chapter 51.12 RCW.

23. The indemnification and WAIVER provided for in sections 21 and 22 shall survive the termination of this Permit.

24. In the event that the Permittee or the Department deems it necessary to institute legal action or proceedings to enforce any right or obligation under this Permit, the Permittee and Department agree that any such action or proceedings shall be brought in the superior court situated in Thurston County, Washington. Further, the Permittee agrees that it shall be solely responsible for its own attorneys fees and costs and agrees that it shall not seek nor be entitled to recovery of such attorneys fees and costs.

25. **NONAPPLICABILITY OF RELOCATION ASSISTANCE/EMINENT DOMAIN.** The Permittee acknowledges that this Permit does not at any time entitle the Permittee, its successors or assigns, to assistance under the Uniform Relocation and Real Property Acquisition Policy (ch. 8.26 RCW). Further, the revocation or other termination of this Permit shall not be deemed a taking by the state under the laws of eminent domain.

EXHIBIT "A"

Regional Special Provisions
Permit No. 4-SR25-9422

Washington State Department of Transportation

The following special provisions are made a part of the General Permit and supersede any conflicting provisions in the WSDOT Standard Specifications for Road, Bridge and Municipal Construction, current edition, and amendments thereto.

Applicable provisions are denoted by (X)

☒ 1. No work shall be performed within State right of way until the Grantee is authorized by one of the following Department representative(s):

AREA 4

Jason Ryan
WSDOT Maintenance Supervisor
440 North Hwy. 395
Colville, WA 99114
OFFICE: (509) 324-6580
CELL (509) 675-0574

☒ 2. The Grantee shall notify the TMC at (509) 343-6401 prior to construction and any potential road closures, coordination and scheduling with the local fire, police, and emergency services must be performed by the Grantee.

☒ 3. In the event any milepost, right of way marker, fence or guard rail is located within the limits of this project and will be disturbed during construction, these items will be properly referenced and carefully removed at the Grantee's expense prior to construction and reset or replaced at the conclusion of construction to the satisfaction of WSDOT. All signs and traffic control devices must be maintained in accordance with WSDOT standards during construction.

☒ 4. Prior to construction, the Grantee shall contact the Department's representative to ascertain the location of survey control monuments within the project limits. In the event any monuments will be altered, damaged or destroyed by the project, appropriate action will be taken by the Department, prior to construction, to reference or reset the monuments. Any monuments altered, damaged or destroyed by the Grantee's operation will be reset or replaced by the Department at the sole expense of the Grantee.

☒ 5. During the construction and/or maintenance of this facility, the Grantee shall comply with the Manual on Uniform Traffic Control Devices for Streets and Highways (Federal Highway Administration) and Washington modifications thereto. If determined necessary by the Department, the Grantee shall submit a signing and traffic control plan to the Department's representative for approval by the WSDOT Eastern Region Traffic Office prior to construction or maintenance operations. No lane closures shall be allowed except as approved by the Department's representative. Approvals may cause revision of special provisions, including hours of operation.

☒ 6. Any changes or modifications to the approved permit shall be subject to prior review and approval by the Department. The Grantee shall notify the Department's representative upon completion of the work under this permit so that a final inspection can be made and shall immediately furnish to WSDOT "as constructed" plans if the original permit plans have been revised during the course of construction.

☐ 7. The Grantee agrees to schedule the work herein referred to and perform said work in such a manner as not to delay the Department's contractor in the performance of his contract.

☒ 8. The Grantee is responsible for compliance with all federal, state, and local laws pertaining to the discharge received by the Department under this permit.

☒ 9. The Grantee shall notify the Department's representative (Regional Special Provision #1), by phone or email, three working days prior to the beginning of construction.

☐ 10. The Grantee shall notify the Department's representative, in writing or by email, as to the name, address and telephone number of the contractor, if the work is to be done by other than the Grantee's own forces. The notification shall designate the Grantee's representative on the project who has the authority to make necessary changes as required by WSDOT.

☐ 11. Access of this facility will not be permitted from the shoulder or through the lanes and/or ramps of SR____. All access will be for county roads/or private approaches.

Exhibit "B"

Regional Special Provisions
Permit No. 4-SR25-9422

☐ 12. The Grantee shall use hot mix asphalt for all roadway pavement restoration. WSDOT will not allow the use of cold mix for any roadway patching that will be in place longer than 24 hours, unless special approval is obtained.

☒ 13. In the event that during the source of this project an inadvertent discovery of historical/archeological objects, human remain. Or a bone/bones of uncertain origin is made, the permit holder shall immediately cease operations and contact the Department Representative under #1 of the Regional Special Provisions, and the Department Archaeologist. Determination of necessary follow up action or the ability to continue work shall be at the sole discretion of the Department

☒ 14. The Grantee is responsible to contact the Utility Notification Center at 1-800-424-5555 (or 811) prior to any excavation. Refer to RCW 19.122 and appropriate WAC codes for legal determinations.

☐ 15. The Utility shall be responsible to seed, fertilize and mulch all vegetated areas disturbed as the result of its operations. The seed, fertilizer and mulch shall be applied by the methods approved in Section 8-01.3(2)B of the Standard Specifications. Application shall be performed between October 1 and November 15. The mix design will be provided by the department.

☐ 16. All traffic signs shall be constructed and installed per the WSDOT Standard Specifications and Standard Plans for Road, Bridge, and Municipal Construction.

☐ 17. All signing sheet type shall be in accordance with WSDOT sign sheeting policy.

☐ 19. Pavement markings will be installed by the Grantee.

☐ 20. The method of removing any pavement markings shall be approved by WSDOT.

☐ 21. The plans are schematic and are not intended to depict all details of the work required. The Grantee shall be responsible to familiarize himself with the actual site conditions, requirements, and factors affecting the work. Where lack of detail or conflicts exist between these and other plans, the Grantee shall contact WSDOT and resolve the issue prior to proceeding.

☐ 22. During roadway widening and construction, erosion and sediment control, Best Management Practice (BMP) measures shall be incorporated into this project to limit the potential for impact to adjacent properties and downstream drainage features for this project. Straw bales and silt fences have been identified as appropriate BMP's. It is the Grantee's responsibility to have these BMP measures on site or available to use. Placement is the responsibility of the Grantee to minimize impacts to downstream properties, existing and/or newly installed drywells, and any receiving waters. In the event that silting of culverts, ditches, or drainage structures were to occur, the Grantee at the discretion of WSDOT, shall clean, repair, or replace at no cost to WSDOT.

☐ 23. All compaction shall be in accordance with the current Standard Specifications for Road, Bridge, and Municipal Construction, Section 2-03.3(14)C, Method B.

☐ 24. The Engineer as noted in this agreement is intended to be the WSDOT representative.

☐ 25. The Grantee shall remove the road approach and return any disturbed ground to its original grade and condition by blending the grade with the adjacent ground. In accordance with Special Provisions #15, seed, fertilizer, and mulch shall be applied to all areas of disturbed ground.

☒ 26. This General Permit does not grant permission to work off of the State Highway Right-of-Way.

☒ 27. The Grantee and the WSDOT hereby affirm that upon expiration or termination of this General Permit for any reason and the subsequent use of the highway right-of-way for transportation or other purposes, such use will not be considered the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge within the meaning of 23 U.S.C. 138 and 49 U.S.C. 303 (former 49 U.S.C. 1653(f), Section "4f"). If this General Permit is terminated for highway construction and the WDOT or authorized local, state or federal official having jurisdiction of the land or a court of competent jurisdiction determines that replacement of the Grantee's facility is required under 23 U.S.C. 138 and 49 U.S.C. 303, the Grantee agrees to acquire any necessary replacement lands promptly at its own expense, and hold harmless WSDOT from any such related costs.

Grantee further acknowledges, agrees and promises not to use Outdoor Recreation Funds as provided for in the Land and Water Conservation Act, 16 U.S.C. 460-1, sections 4-11 (see section 8(f)(3) within state owned right of way; such funds may be used outside of the state owned right of way).

☒ 28. The Grantee shall take steps to prevent the tracking of mud or gravel from the path onto the highway pavement. If mud or gravel is tracked onto the highway pavement, the Grantee shall remove it to the satisfaction of the Department.

☐ 29. The Grantee shall be responsible for maintaining the installed sidewalk and traffic signal equipment.

☒ 30. The Grantee shall maintain and repair any damages to State property.

☐ 31. The Grantee shall call the WSDOT Representative listed in Regional Special Provision #1 for an inspection of their work.

☒ 32. Fire suppression equipment shall be required at each work location, and the contractor shall monitor the Industrial Fire Precaution Level at the following link.
https://fortress.wa.gov/dnr/protection/ifpl/

Exhibit "B"

FOR DISCUSSION PURPOSES ONLY

Production Date: 9/14/2018

China Bend

Deadman's Eddy

Marcus Flats

RM706 RM707 RM708 RM709 RM710 RM711 RM712 RM713 RM714 RM715 RM716 RM717 RM718 RM719 RM720 RM721 RM722 RM723 RM724 RM725 RM726 RM727 RM728 RM729 RM730 RM731 RM732 RM733 RM734 RM735 RM737 RM738 RM739 RM740 RM741 RM742 RM743 RM744

DAVID EVANS AND ASSOCIATES INC.
MARINE SERVICES

EXHIBIT "C"
PAGE 1 OF 2

PROPOSED SURVEY CONTROL SITES
Upper Columbia River RI/FS: Phase 3 Sediment Facies Mapping

New Control Site

Existing Control Site

0 1 2 Kilometers

0 1 2 Miles

Sources: Esri, DeLorme, USGS, NPS, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Sediment Facies Mapping Proposed Control Site Information Teck American Incorporated

WS DOT Right of Way Locations

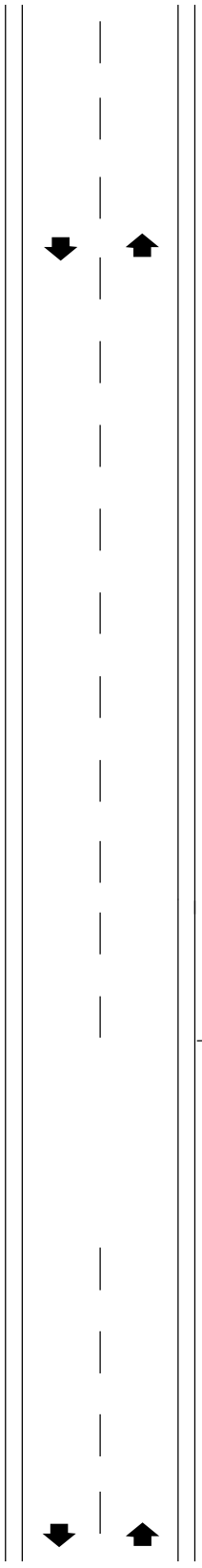
17-Sep-18

Control Site Name	RM	Left or Right Bank	Ownership / Description	Accessible by Land Y/N	Accessible by Water Y/N	Comment
UCR-1	711	L	WSDOT Hwy 25	Y	N	**New point:** Set in right of way for Hwy 25 behind guard rail
Bossburg	714.5	L	WSDOT Hwy 25	Y	N	**New point:** Set in right of way for Hwy 25 at intersection with Bossburg Rd
UCR-2	718.5	L	WSDOT Hwy 25	Y	N	**New point:** Set in right of way for Hwy 25 at intersection with Williams Lake Rd
Onion	726.5	L	WSDOT Hwy 25	Y	N	**New Point:** Alternate control point, to be set instead of occupying 1001-98
Black Hawk	728	L	WSDOT Hwy 25	Y	N	Existing WSDOT control
1001-99	733	L	WSDOT Hwy 25	Y	N	USACE existing control set by DEA in Hwy 25 right of way across from Northport High School
UCR-4	738	L	WSDOT Hwy 25	Y	N	**New point:** Set in Hwy 25 right of way
New Yonder	743	L	WSDOT Hwy 25	Y	N	Existing WSDOT control
UCR-5	742.5	L	WSDOT Hwy 25	Y	N	**New point:** Alternate pont for New Yonder, set in Hwy 25 right of way.

Notes:

Proposed alternate location, if needed

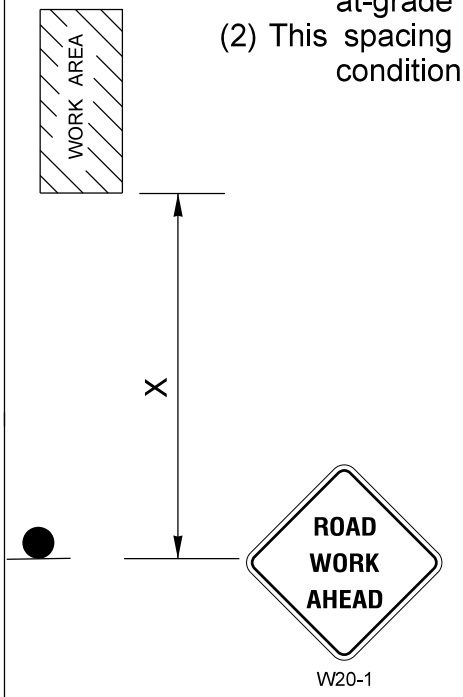
"WORK BEYOND THE SHOULDER"



SIGN SPACING = X (FEET) (1)		
FREEWAYS & EXPRESSWAYS	55/70 MPH	1500'± (OR AS PER MUTCD)
RURAL HIGHWAYS	60/65 MPH	800'±
RURAL ROADS	45/55 MPH	500'±
RURAL ROADS & URBAN ARTERIALS	35/40 MPH	350'±
RURAL ROADS, URBAN ARTERIALS RESIDENTIAL & BUSINESS DISTRICTS	25/30 MPH	200'± (2)
URBAN STREETS	25 MPH OR LESS	100'± (2)
ALL SIGNS ARE 48" X 48" BLACK ON ORANGE UNLESS OTHERWISE DESIGNATED.		

(1) All spacing may be adjusted to accommodate interchange ramps, at-grade intersections, and driveways.

(2) This spacing may be reduced in urban areas to fit roadway conditions.



W20-1

GENERAL NOTES

1. THE ROAD WORK AHEAD SIGN MAY BE REPLACED WITH OTHER APPROPRIATE SIGNS SUCH AS SHOULDER WORK.
2. THE ROAD WORK AHEAD SIGN MAY BE OMITTED WHERE THE WORK SPACE BEHIND BARRIER, MORE THAN 24 INCHES BEHIND THE CURB OR 15 FEET OR MORE FROM THE EDGE OF THE ROADWAY.
3. IF WORK VEHICLES ARE ON THE SHOULDER, A SHOULDER WORK SIGN WILL BE USED.
4. A GENERAL WARNING SIGNSUCH AS ROAD MACHINERY AHEAD SHOULD BE USED IF WORKERS AND EQUIPMENT MUST OCCASIONALLY MOVE ONTO THE SHOULDER.
5. WORK OPERATIONS SUCH AS MOWING WHERE THE MOWER IS OFF THE SHOULDER IS ALLOWED UNDER THIS PLAN.

WSDOT ER UTILITIES
Approved
By:_____
Date:_____

Teck American Incorporated
Install and Occupy Survey Mons
State Route 25 and MP 86-114

General Permit # 4-SR25-9422
Exhibit D

STEVENS COUNTY

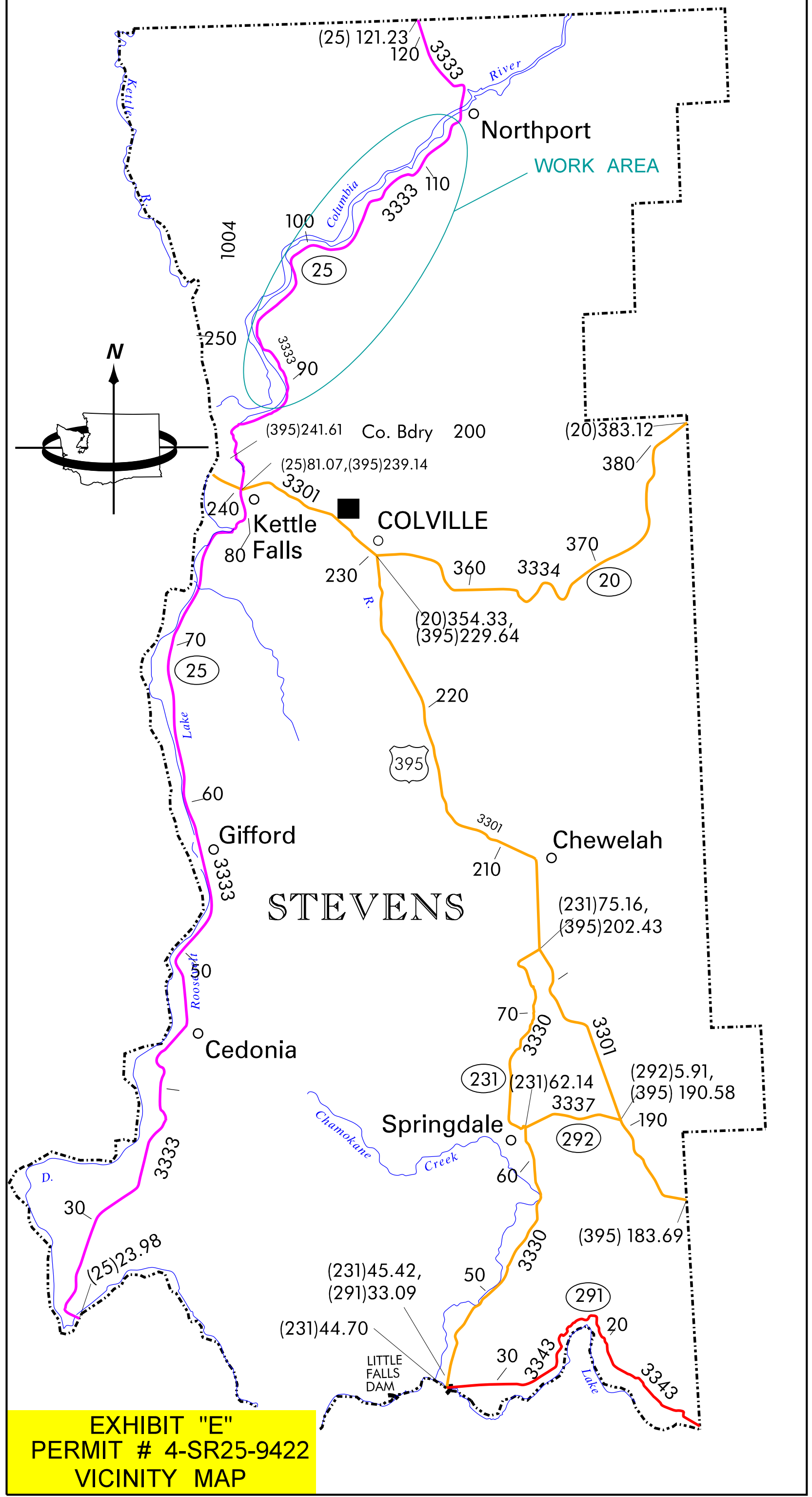


EXHIBIT "E"
PERMIT # 4-SR25-9422
VICINITY MAP

From:	Mills Denise SPOK
To:	tlarson@stevenscountywa.gov
Cc:	Jon Dasler; Pretare, Jennifer; McDaniel, Sarah; McCaig Kris SPOK
Subject:	Follow Up :: UCR - Use of survey control monuments along Northport Waneta Road
Date:	Monday, September 24, 2018 12:59:08 PM
Attachments:	09-24-18_WSDOT_Approved General Permit_SR25_BeyondShoulder.pdf

Hi Tracy,

Thank you again for responding to my question this morning, regarding our upcoming hydrographic survey work on the Upper Columbia River, which requires the use of ground base stations along Northport Waneta Road, north of Northport.

As I stated during our call, WSDOT has approved a general permit for this same project, for occupying control monuments along SR25 from Northport south. An attachment to WSDOT's permit is a reference sheet entitled "Work Beyond the Shoulder," which covers signage requirements for working in WSDOT rights of way. This sheet is attached for your reference.

The survey activities will be conducted by licensed land surveyors with David Evans and Associates. They will start this week to establish the ground control network for our hydrographic work on the river, and this work will continue through the end of October 2018. Their survey crew has done a lot of work in Stevens County and they are familiar with WSDOT's Work Beyond the Shoulder requirements. There is also a project-specific health and safety plan that covers the ground survey activities, which includes a detailed job hazard assessment and requirements for personal protective equipment and best ways to do the work safely and out of traffic.

Please contact me if you have questions or require additional information regarding this work.

Thank you,

Denise

Denise Mills, RG, LHG
Program Manager, Upper Columbia River
Teck American Incorporated
+1.509.623.4515, direct
+1 509.904.9375, mobile
www.teck.com

From:	Pretare, Jennifer
To:	Brownell, Michelle
Subject:	FW: Upper Columbia River - Sediment Bed Mapping Work in July
Date:	Monday, July 29, 2019 1:30:06 PM
Attachments:	06-28-19_email correspondence_UCR - Sediment Bed Mapping Work in July_to_KBalcom_Northport Mayor.pdf 06-28-19_Location_Map_Control Point CP-7_internal reference.pdf

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From: Mills Denise SPOK <Denise.Mills@teck.com>
Sent: Friday, June 28, 2019 3:35 PM
To: Pretare, Jennifer <jennifer.pretare@aecom.com>; Hose, Dave <dave.hose@aecom.com>
Cc: McCaig Kris SPOK <Kris.McCaig@teck.com>
Subject: FW: Upper Columbia River - Sediment Bed Mapping Work in July

Jenny and Dave,

This email (pdf copy attached) should be all you need for the permit notebook. This notification relates to control point CP-7, which DEA established last year during the 2018 facies mapping effort. Also attached is a map showing the location of CP-7, which I did not include in the email to Mayor Balcom. This is for internal reference, as this point was not yet labeled CP-7 on the control point map Jon Dasler created last year when the control points were being established but it was placed at the planned location (RM 734).

Thanks,

Denise

Denise Mills, RG, LHG
Program Manager, Upper Columbia River
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www.teck.com

From: Mills Denise SPOK
Sent: Friday, June 28, 2019 3:20 PM
To: Karene Balcom (kbalcom@eltopia.com) <kbalcom@eltopia.com>
Cc: McCaig Kris SPOK <Kris.McCaig@teck.com>; Kessel Cristy SPOK <Cristy.Kessel@teck.com>; 'Pretare, Jennifer' <jennifer.pretare@aecom.com>; 'Kevin Lundmark (Kevin.Lundmark@erm.com)' <Kevin.Lundmark@erm.com>; 'Tim McClinton' <TMcClinton@deainc.com>
Subject: Upper Columbia River - Sediment Bed Mapping Work in July

Hello Karene,

Thank you for returning my call yesterday to discuss the sediment bed mapping project Teck American Incorporated (TAI) will be performing in the Upper Columbia River (UCR) north of Northport, between Deadman's Eddy and the U.S.-Canada border. The work is scheduled to run from July 8-11, and July 15-18, and will be using the Northport boat launch during this work. Our crew will not work on July 12, 13, and 14 during the fishing derby.

As we discussed, I called to notify you that a member of our field team, a licensed surveyor, will be stationed from time to time at a ground survey control point on the spit of land just west of the Northport boat launch and dock. He will set up the surveying equipment and will stay there for a few hours when he is at this location. I understand from our discussion that you will forward this to town staff so they are aware that this work will be going on.

TAI is conducting this work as part of the UCR remedial investigation and feasibility study (RI/FS), with oversight by the U.S. Environmental Protection Agency (EPA). The EPA-approved Quality Assurance Project Plan for this project is available to view and download at the following URL, https://ucr-rifs.com/assets/Docs/09-06-18-Final-Phase-3-SFM-QAPP.pdf).

As I mentioned during our call, TAI is currently preparing for a longer field sampling program that will start in early September and continue through October 2019. The sampling crews and vessels again will be using the Northport boat launch for some of that work. Please let me know if we should notify you or someone else when we are closer to starting this sampling program.

Please feel free to call me or Kris McCaig (509.623.4501) if you have any questions.

Thank you,

Denise

Denise Mills, RG, LHG
Program Manager, Upper Columbia River
Teck American Incorporated
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+1 509.904.9375, mobile
www.teck.com

From:	Mills Denise SPOK
To:	Karene Balcom (kbalcom@eltopia.com)
Cc:	McCaig Kris SPOK; Kessel Cristy SPOK; "Pretare, Jennifer"; "Kevin Lundmark (Kevin.Lundmark@erm.com)"; "Tim McClinton"
Subject:	Upper Columbia River - Sediment Bed Mapping Work in July
Date:	Friday, June 28, 2019 3:20:00 PM

Hello Karene,

Thank you for returning my call yesterday to discuss the sediment bed mapping project Teck American Incorporated (TAI) will be performing in the Upper Columbia River (UCR) north of Northport, between Deadman's Eddy and the U.S.-Canada border. The work is scheduled to run from July 8-11, and July 15-18, and will be using the Northport boat launch during this work. Our crew will not work on July 12, 13, and 14 during the fishing derby.

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Please feel free to call me or Kris McCaig (509.623.4501) if you have any questions.

Thank you,

Denise

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+1 509.904.9375, mobile
www.teck.com


N
Feet
0
250
500
Location of CP-7

From:	Pretare, Jennifer
To:	Brownell, Michelle
Subject:	FW: UCR - WSDOT notification for 2019 sediment facies mapping work
Date:	Monday, July 29, 2019 1:29:19 PM
Attachments:	09-21-18_New General Permit 4-2015_WSDOT_approved.pdf

---

From: Mills Denise SPOK <Denise.Mills@teck.com>
Sent: Monday, June 24, 2019 3:17 PM
To: Pretare, Jennifer <jennifer.pretare@aecom.com>
Cc: McCaig Kris SPOK <Kris.McCaig@teck.com>; Kessel Cristy SPOK <Cristy.Kessel@teck.com>
Subject: UCR - WSDOT notification for 2019 sediment facies mapping work

Hi Jenny,

Based on the information provided by Tim McClinton, one of the survey control points that will be used for the 2019 sediment facies mapping effort is U.S. Army Corps of Engineers No. 1001-99 (base station location), which is in the WSDOT right of way. The WSDOT permit we obtained for the 2018 sediment facies mapping effort (WSDOT General Permit 4-SR25-9422; attached) is effective through 12/31/2019. The only requirement for the upcoming field mapping effort is to provide notification to WSDOT two weeks prior to conducting the work (see 'Exhibit A' - General Provisions, item no. 5 in the attached permit).

This is to confirm that I called the WSDOT Area 4 Maintenance Supervisor, Jason Ryan, and provided this notification today (June 24, 2019, 2:25 p.m.) for the field mapping program that is scheduled to begin on July 8, 2019. Jason Ryan told me that nothing more is required of TAI beyond making this call. He did caution, however, that there is a lot of activity on the river where our crews will be working, "a lot of sturgeon fishing".

Please review the permit and special provisions provided in Exhibits A and B for other compliance requirements, and Exhibit D showing WSDOT's requirements for working in beyond the shoulder of state roadways. Also, please note that the information shown in Exhibit C was refined since we submitted the permit application last September, based on discussions with WSDOT's permitting staff. Notably, two other stations that will be used, UCR-5 and New Yonder, are in ROWs managed by Stephens County, not WSDOT as indicated in Exhibit C.

Let me know if you have any questions.

Thank you,

Denise

Denise Mills, RG, LHG
Program Manager, Upper Columbia River
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Washington State Department of Transportation

Eastern Region
2714 N. Mayfair Street
Spokane, WA 99207-2090
509-324-6000 / FAX: 509-324-6005
TTY: 1-800-833-6388
www.wsdot.wa.gov

September 21, 2018

Teck American Incorporated
ATTN: Denise Mills
501 N. Riverpoint Blvd, Suite 300
Spokane WA, 99220-3087

Re: Application for General Permit #4-SR25-9422

Denise:

Enclosed is General Permit # 4-SR25-9422, which grants permission to perform the enclosed work.

Teck American shall provide copies of this Permit to their inspector and contractors and/or subcontractors.

A copy of this Permit must be on the job site, protected from the elements, at all times during any construction authorized by this Permit (General Provision No. 1)

Teck American shall inform their inspector and contractors/subcontractors to carefully read and follow all General/Special Provisions as indicated within the approved Permit.

Teck American shall submit the enclosed "Construction Notification" to this office a minimum of three (3) working days prior to the beginning of construction.

The work authorized by this Permit may require inspection to be performed by the Department.

Please contact me at (509) 324-6128 if you have any questions regarding this matter.

Sincerely,

Brad Devine
Franchise/Permit Engineer

BED
Enclosures

cc/encl: Mike Burdick, Utilities Inspector
File

Washington State Department of Transportation

Application for General Permit

Permit No. 4-SR25-9422

Applicant - Please print or type all information Teck American Incorporated

Application is Hereby Made For: ☒ General Permit (No Fee)
☐ General Permit $2.50 (Subject to RCW 47.12.140(2))

Intended Use of State Right of Way is to Construct, Operate, and Maintain a:

Establish new survey control and occupy existing control monuments off the shoulder of SR25 and Northport Waneta Road in support of Upper Columbia River channel bed mapping. After the initial control survey, control will be used for development of GPS base stations to support hydrographic surveys of the Upper Columbia River from the U.S.-Canada border to approximately River Mile 708 (upstream of Marcus Flats).

on a portion of State Route 25 (at/from) MilePost 86 to Mile Post 114 in Stevens County,

to begin in the NW Quarter Section 31 Township 37 North: Range 38 East W.M.

and end in the NE Quarter Section 5 Township 39 North: Range 40 East W.M.

This Permit is issued pursuant to the applicable terms of RCW 47.32.110 (Roadside Users) and RCW 47.12.140 (Sale of Timber and Removal of Nonmarketable Materials).

Teck American Incorporated
Applicant (Referred to as Grantee)

501 N Riverpoint Blvd, Suite 300
Address

Spokane WA 99220-3087
City State Zip Code

(509) 623-4501
Telephone

UCR RI/FS
Applicant Reference (WO) Number

Kris McCaig
Applicant Authorized Signature

Kris McCaig
Print or Type Name

Manager, Environment & Public Affairs
Title

Dated this 19 day of September 2018

26-1974324
Federal Tax ID Number or Social Security Number

Authorization to Occupy Only If Approved Below

The Washington State Department of Transportation referred to as the "Department," hereby grants this Permit subject to the terms and conditions stated in the General Provisions, Special Provisions, and Exhibits attached hereto and by this reference made a part hereof: Construction facilities proposed under this application shall begin within one year and must be completed within three years from date of approval.

For Department Use Only

Exhibits Attached

EXHIBIT A - GENERAL PROVISIONS pgs. 4
EXHIBIT B - SPECIAL PROVISIONS pgs. 2
EXHIBIT C - PROVIDED DISPLAYS pgs. 2
EXHIBIT D - TRAFFIC CONTROL PLAN pgs. 1
EXHIBIT E - VICINITY MAP

Department Approval

By:

Mike Frucci, P.E.

Title: ARA for Operations

Date: 09/21/2018

Expiration Date: 12/31/2019

General Provisions

No changes to these General Provisions may be made without further approval of the Office of the Attorney General

This Permit is issued pursuant to the applicable terms of RCW 47.32.110 (Roadside Users) and RCW 47.12.140 (Sale of Timber and Removal of Nonmarketable Materials).

DOCUMENTS, NON-EXCLUSIVE, COMPLIANCE WITH LAW, WORK

1. A copy of this Permit must be on the job site, protected from the elements, at all times during any Permittee activity, construction or improvement Work as authorized by this Permit. “Work” under this Permit shall include the use of the state-owned right of way as authorized herein.

2. This Permit shall not be deemed or held to be an exclusive one and shall not prohibit the Department from granting rights of like or other nature to other public or private entities, nor shall it prevent the Department from using any of the state-owned highway right of way or other properties for transportation purposes, or affect the Department’s right to full supervision and control over all or any part of the state-owned highway right of way or properties, none of which is hereby surrendered.

3. The Permittee shall be responsible for compliance with all federal, state, and local laws and regulations.

4. Upon approval of this Permit, the Permittee shall diligently proceed with the Work and comply with all General and Special provisions herein.

DEPARTMENT NOTIFICATION: SURVEY MONUMENTS, HIGHWAY SIGNS, FENCES, LANDSCAPING

5. The Permittee shall contact the Department representative(s), listed in Exhibit A, Special Provisions, two (2) weeks prior to conducting Work, to determine the location of survey control monuments within the area in which the Permittee will be working. In the event any monument or right of way marker will be altered, damaged, or destroyed by the Permittee, the Department, prior to Permittee Work, will reference or reset the monument or right of way marker. During the Work, upon discovery of a monument or right of way marker, the Permittee shall cease Work in that area and immediately notify the Department of the discovery. The Department will coordinate with the Permittee to ensure that the monument or right of way marker is recorded or replaced. The Permittee agrees to pay all Department actual direct and related indirect costs and expenses to perform monument or right of way marker work, pursuant to the provisions of Section 18-Invoice and Payment.

6. In the event any milepost, fence, or guardrail is located within the limits of the Permittee’s Work and will be disturbed during Permittee Work, the Permittee agrees to carefully remove these highway facilities prior to Permittee Work and reset or replace these highway facilities after the Permittee Work, to the Department’s sole satisfaction and at the sole cost of the Permittee. The Permittee shall not remove or disturb any highway signs, traffic control devices, or landscaping unless specifically authorized.

PERMIT EXTENSION, ASSIGNMENT, AND REVOCATION:

7. This Permit may not be extended without the Department’s prior written approval.

8. The Permittee shall not assign or transfer this Permit without the Department’s prior written approval. The Permittee understands that any assignment or transfer requires the assignee or transferee to have the means to assume all obligations, duties, and liabilities of the terms and conditions of this Permit, and the Permittee agrees to advise the assignee or transferee of its obligation to apply for an updated or replacement Permit from the Department.

9. This Permit is granted solely within the discretion of the Department. It may be revoked at will and at any time by giving thirty (30) calendar days written notice to the Permittee. Revocation shall automatically take effect on the thirty-first day without further action by the Department. Permittee acknowledges and agrees that it has no due process or appeal rights should the Department decide, for any reason whatsoever, to revoke this Permit. Thereafter, if the Permittee has not removed its facilities or otherwise fails to return the state property back to its original condition as solely determined by the Department, the Department shall perform such work at the Permittee’s sole cost and expense, and the Permittee shall pay the Department’s actual direct and related indirect costs and expenses for performing the work pursuant to the provisions of Section 18-Invoice and Payment.

10. Should the Permittee breach any of the conditions or requirements of this Permit, or should the Permittee fail to proceed with due diligence and in good faith with the Work as authorized by this Permit, the Department may revoke the Permit. The Department shall give thirty (30) calendar days written notice to the Permittee, and upon the thirty-first day, this Permit shall be deemed revoked without further action by the Department. Thereafter, if the Permittee has not removed its facilities or otherwise fails to return the state property back to its original condition as solely determined by the Department, the Department shall perform such work at the Permittee’s sole cost and expense, and the Permittee shall pay the Department’s actual direct and related indirect costs and expenses for performing the work pursuant to the provisions of Section 18-Invoice and Payment.

MODIFICATION OF PERMIT AND/OR WORK:

11. The Department may modify this Permit at any time by giving Permittee written notice. If this Permit is modified, the Permittee will have thirty (30) calendar days from the date of the written notice to modify the Work as required by the Department. If the modifications cannot be made within thirty (30) calendar days, the Permittee shall request the Department, in writing, during the thirty (30) calendar day time period for an extension of time in which to make the modifications. Any extension of time shall be solely within the Department's discretion.

12. If the Permittee desires to modify this Permit and/or the Work, it shall notify the Department representative(s) listed in Exhibit A, Special Provisions, in writing of all proposed changes for the Department's prior approval. The Department agrees to provide written acceptance or rejection of the proposed change(s) to the Permittee within Ten (10) business days.

13. Should the Permittee fail or refuse to comply with the Department's direction pursuant to section 11, the Department will implement section 10 and revoke the Permit.

ADDITIONAL PERMIT OBLIGATIONS

14. The Permittee shall not excavate or place any obstacle within the state-owned highway right of way in such a manner as to interfere with the Department's construction, operation, and maintenance of the state-owned highway right of way or the public's travel thereon without the Department's prior written approval and/or as may be provided in this Permit's Special Provisions.

15. Upon completion of all Work, the Permittee shall immediately remove all rubbish and debris from the state-owned highway right of way, leaving the state-owned highway right of way in a neat, presentable, and safe condition to the Department's sole satisfaction. Any Work-related rubbish and debris clean up, or any necessary slope treatment to restore and/or protect the state-owned right of way, not done within seven (7) calendar days of Work completion, unless the Department approves otherwise, will be done by the Department at the expense of the Permittee. The Permittee agrees to reimburse the Department's actual direct and related indirect costs and expenses for performing the work pursuant to the provisions of Section 18-Invoice and Payment.

16. The Permittee agrees to maintain, at its sole expense, its Work under this Permit in a manner satisfactory to the Department in the Department's sole discretion.

17. If the Department determines that emergency maintenance of the Work is required to (a) protect any aspect of the state highway right of way, or (b) secure the safety of the traveling public due to a failure of the Permittee's Work or its maintenance thereof, the Department may perform the emergency maintenance work without the Permittee's prior approval, and the Permittee agrees to reimburse the Department's actual direct and related indirect costs and expenses for performing the emergency maintenance work pursuant to the provisions of Section 18 – Invoice and Payment. The Department will notify the Permittee of the emergency work performed as soon as practicable.

INVOICE AND PAYMENTS

18. If the Department performs work as provided for in this Permit by state forces or its contractor, including but not limited to any modification, repair, clean up or removal of the Work authorized under this Permit:

a. The Department will assign a reimbursable account to the Permittee as a means of invoicing the Permittee for the costs associated with the work.

b. The Department will provide a detailed invoice, including direct and related indirect costs, to the Permittee for the work performed by the Department or its contractor(s), and the Permittee agrees to pay the Department within fifteen (15) calendar days of receipt of an invoice.

c. The Permittee agrees that if payment is not made to the Department as herein agreed, the Department may charge late fees, interest or refer the debt to a collection agency, all in accordance with Washington State Law.

ADDITIONAL REQUIRED PERMITS

19. The Permittee shall be responsible for securing all necessary permits, including but not limited to, federal, state, and local regulatory, tribal, environmental, archeological, and railroad permits and permits from the Washington State Department of Ecology, the Washington State Department of Fish and Wildlife, and/or the U.S. Army Corps of Engineers prior to beginning the Work authorized by this Permit. The Permittee shall be responsible for mitigation measures where wetlands have been disturbed and agrees that it is solely responsible for any fines imposed for noncompliance with the permit(s) conditions or for failure to obtain the required permits. In addition, the Permittee, on behalf of itself and its contractors, officers, officials, employees, and agents, agrees to indemnify, hold harmless, and defend, at its sole cost and expense, the Department and its officers, officials, employees, and agents from any and all fines, costs, claims, judgments, and/or awards of damages to regulatory agencies, persons, and/or property, arising out of, or in any way resulting from, the Permittee's failure to (1) obtain any required permit for the Permittee Work or (2) comply with permit conditions.

20. The Permittee hereby certifies that its facilities described in this Permit are in compliance with the Clear Zone Guidelines pursuant to Chapter 1600 of the Department's Design Manual (M 22-01) and any revisions thereto.

INDEMNIFICATION, WAIVER, VENUE, ATTORNEYS FEES, AND RELOCATION/EMINENT DOMAIN

21. The Permittee, its successors and assigns, shall indemnify, defend at its sole cost and expense, and hold harmless the State of Washington, its officers, employees, and agents from all claims, demands, damages (both to persons and/or property), expenses, regulatory fines, and/or suits in law and in equity that (1) arise out of or are incident to any acts or omissions of the Permittee, its agents, contractors, employees, invitees and/or any other person in the use of the state-owned highway right of way as authorized by the terms and conditions of this Permit, or (2) are caused by the breach of any of the terms or conditions of this Permit by the Permittee, its successors and assigns, and its contractors, agents, employees, invitees and/or any other person. The Permittee, its successors and assigns, shall not be required to indemnify, defend, or hold harmless the State of Washington, its officers, employees and/or agents, if the claim, suit, or action for damages (both to persons and/or property) is caused by the sole acts or omissions of the State of Washington, its officers, employees and/or agents; provided that, if such claims, suits, or actions result from the concurrent negligence of (a) the State of Washington, its officers, employees and/or agents, and (b) the Permittee, its agents, contractors, employees, invitees, and/or any other person or involves those actions covered by RCW 4.24.115, the indemnity provisions provided herein shall be valid and enforceable only to the extent of the acts or omissions of the Permittee, its agents, contractors, employees, invitees, and/or any other person.

22. The Permittee agrees that its obligations under this Permit extend to any claim, demand, and/or cause of action brought by, or on behalf of, any of its employees or agents while performing Work under this Permit while located on or off state-owned highway right of way. For this purpose, the Permittee, by MUTUTAL NEGOTIATION, hereby WAIVES, with respect to the State of Washington only, any immunity that would otherwise be available to it against such claims under the Industrial Insurance provisions in chapter 51.12 RCW.

23. The indemnification and WAIVER provided for in sections 21 and 22 shall survive the termination of this Permit.

24. In the event that the Permittee or the Department deems it necessary to institute legal action or proceedings to enforce any right or obligation under this Permit, the Permittee and Department agree that any such action or proceedings shall be brought in the superior court situated in Thurston County, Washington. Further, the Permittee agrees that it shall be solely responsible for its own attorneys fees and costs and agrees that it shall not seek nor be entitled to recovery of such attorneys fees and costs.

25. **NONAPPLICABILITY OF RELOCATION ASSISTANCE/EMINENT DOMAIN.** The Permittee acknowledges that this Permit does not at any time entitle the Permittee, its successors or assigns, to assistance under the Uniform Relocation and Real Property Acquisition Policy (ch. 8.26 RCW). Further, the revocation or other termination of this Permit shall not be deemed a taking by the state under the laws of eminent domain.

EXHIBIT "A"

Regional Special Provisions
Permit No. 4-SR25-9422

Washington State Department of Transportation

The following special provisions are made a part of the General Permit and supersede any conflicting provisions in the WSDOT Standard Specifications for Road, Bridge and Municipal Construction, current edition, and amendments thereto.

Applicable provisions are denoted by (X)

☒ 1. No work shall be performed within State right of way until the Grantee is authorized by one of the following Department representative(s):

AREA 4

Jason Ryan
WSDOT Maintenance Supervisor
440 North Hwy. 395
Colville, WA 99114
OFFICE: (509) 324-6580
CELL (509) 675-0574

☒ 2. The Grantee shall notify the TMC at (509) 343-6401 prior to construction and any potential road closures, coordination and scheduling with the local fire, police, and emergency services must be performed by the Grantee.

☒ 3. In the event any milepost, right of way marker, fence or guard rail is located within the limits of this project and will be disturbed during construction, these items will be properly referenced and carefully removed at the Grantee's expense prior to construction and reset or replaced at the conclusion of construction to the satisfaction of WSDOT. All signs and traffic control devices must be maintained in accordance with WSDOT standards during construction.

☒ 4. Prior to construction, the Grantee shall contact the Department's representative to ascertain the location of survey control monuments within the project limits. In the event any monuments will be altered, damaged or destroyed by the project, appropriate action will be taken by the Department, prior to construction, to reference or reset the monuments. Any monuments altered, damaged or destroyed by the Grantee's operation will be reset or replaced by the Department at the sole expense of the Grantee.

☒ 5. During the construction and/or maintenance of this facility, the Grantee shall comply with the Manual on Uniform Traffic Control Devices for Streets and Highways (Federal Highway Administration) and Washington modifications thereto. If determined necessary by the Department, the Grantee shall submit a signing and traffic control plan to the Department's representative for approval by the WSDOT Eastern Region Traffic Office prior to construction or maintenance operations. No lane closures shall be allowed except as approved by the Department's representative. Approvals may cause revision of special provisions, including hours of operation.

☒ 6. Any changes or modifications to the approved permit shall be subject to prior review and approval by the Department. The Grantee shall notify the Department's representative upon completion of the work under this permit so that a final inspection can be made and shall immediately furnish to WSDOT "as constructed" plans if the original permit plans have been revised during the course of construction.

☐ 7. The Grantee agrees to schedule the work herein referred to and perform said work in such a manner as not to delay the Department's contractor in the performance of his contract.

☒ 8. The Grantee is responsible for compliance with all federal, state, and local laws pertaining to the discharge received by the Department under this permit.

☒ 9. The Grantee shall notify the Department's representative (Regional Special Provision #1), by phone or email, three working days prior to the beginning of construction.

☐ 10. The Grantee shall notify the Department's representative, in writing or by email, as to the name, address and telephone number of the contractor, if the work is to be done by other than the Grantee's own forces. The notification shall designate the Grantee's representative on the project who has the authority to make necessary changes as required by WSDOT.

☐ 11. Access of this facility will not be permitted from the shoulder or through the lanes and/or ramps of SR____. All access will be for county roads/or private approaches.

Exhibit "B"

Regional Special Provisions
Permit No. 4-SR25-9422

☐ 12. The Grantee shall use hot mix asphalt for all roadway pavement restoration. WSDOT will not allow the use of cold mix for any roadway patching that will be in place longer than 24 hours, unless special approval is obtained.

☒ 13. In the event that during the source of this project an inadvertent discovery of historical/archeological objects, human remain. Or a bone/bones of uncertain origin is made, the permit holder shall immediately cease operations and contact the Department Representative under #1 of the Regional Special Provisions, and the Department Archaeologist. Determination of necessary follow up action or the ability to continue work shall be at the sole discretion of the Department

☒ 14. The Grantee is responsible to contact the Utility Notification Center at 1-800-424-5555 (or 811) prior to any excavation. Refer to RCW 19.122 and appropriate WAC codes for legal determinations.

☐ 15. The Utility shall be responsible to seed, fertilize and mulch all vegetated areas disturbed as the result of its operations. The seed, fertilizer and mulch shall be applied by the methods approved in Section 8-01.3(2)B of the Standard Specifications. Application shall be performed between October 1 and November 15. The mix design will be provided by the department.

☐ 16. All traffic signs shall be constructed and installed per the WSDOT Standard Specifications and Standard Plans for Road, Bridge, and Municipal Construction.

☐ 17. All signing sheet type shall be in accordance with WSDOT sign sheeting policy.

☐ 19. Pavement markings will be installed by the Grantee.

☐ 20. The method of removing any pavement markings shall be approved by WSDOT.

☐ 21. The plans are schematic and are not intended to depict all details of the work required. The Grantee shall be responsible to familiarize himself with the actual site conditions, requirements, and factors affecting the work. Where lack of detail or conflicts exist between these and other plans, the Grantee shall contact WSDOT and resolve the issue prior to proceeding.

☐ 22. During roadway widening and construction, erosion and sediment control, Best Management Practice (BMP) measures shall be incorporated into this project to limit the potential for impact to adjacent properties and downstream drainage features for this project. Straw bales and silt fences have been identified as appropriate BMP's. It is the Grantee's responsibility to have these BMP measures on site or available to use. Placement is the responsibility of the Grantee to minimize impacts to downstream properties, existing and/or newly installed drywells, and any receiving waters. In the event that silting of culverts, ditches, or drainage structures were to occur, the Grantee at the discretion of WSDOT, shall clean, repair, or replace at no cost to WSDOT.

☐ 23. All compaction shall be in accordance with the current Standard Specifications for Road, Bridge, and Municipal Construction, Section 2-03.3(14)C, Method B.

☐ 24. The Engineer as noted in this agreement is intended to be the WSDOT representative.

☐ 25. The Grantee shall remove the road approach and return any disturbed ground to its original grade and condition by blending the grade with the adjacent ground. In accordance with Special Provisions #15, seed, fertilizer, and mulch shall be applied to all areas of disturbed ground.

☒ 26. This General Permit does not grant permission to work off of the State Highway Right-of-Way.

☒ 27. The Grantee and the WSDOT hereby affirm that upon expiration or termination of this General Permit for any reason and the subsequent use of the highway right-of-way for transportation or other purposes, such use will not be considered the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge within the meaning of 23 U.S.C. 138 and 49 U.S.C. 303 (former 49 U.S.C. 1653(f), Section "4f"). If this General Permit is terminated for highway construction and the WDOT or authorized local, state or federal official having jurisdiction of the land or a court of competent jurisdiction determines that replacement of the Grantee's facility is required under 23 U.S.C. 138 and 49 U.S.C. 303, the Grantee agrees to acquire any necessary replacement lands promptly at its own expense, and hold harmless WSDOT from any such related costs.

Grantee further acknowledges, agrees and promises not to use Outdoor Recreation Funds as provided for in the Land and Water Conservation Act, 16 U.S.C. 460-1, sections 4-11 (see section 8(f)(3) within state owned right of way; such funds may be used outside of the state owned right of way).

☒ 28. The Grantee shall take steps to prevent the tracking of mud or gravel from the path onto the highway pavement. If mud or gravel is tracked onto the highway pavement, the Grantee shall remove it to the satisfaction of the Department.

☐ 29. The Grantee shall be responsible for maintaining the installed sidewalk and traffic signal equipment.

☒ 30. The Grantee shall maintain and repair any damages to State property.

☐ 31. The Grantee shall call the WSDOT Representative listed in Regional Special Provision #1 for an inspection of their work.

☒ 32. Fire suppression equipment shall be required at each work location, and the contractor shall monitor the Industrial Fire Precaution Level at the following link.
https://fortress.wa.gov/dnr/protection/ifpl/

Exhibit "B"

FOR DISCUSSION PURPOSES ONLY

Production Date: 9/14/2018

China Bend

Deadman's Eddy

Marcus Flats

RM706 RM707 RM708 RM709 RM710 RM711 RM712 RM713 RM714 RM715 RM716 RM717 RM718 RM719 RM720 RM721 RM722 RM723 RM724 RM725 RM726 RM727 RM728 RM729 RM730 RM731 RM732 RM733 RM734 RM735 RM737 RM738 RM739 RM740 RM741 RM742 RM743 RM744

DAVID EVANS AND ASSOCIATES INC.
MARINE SERVICES

EXHIBIT "C"
PAGE 1 OF 2

PROPOSED SURVEY CONTROL SITES
Upper Columbia River RI/FS: Phase 3 Sediment Facies Mapping

New Control Site

Existing Control Site

0 1 2 Kilometers

0 1 2 Miles

Sources: Esri, DeLorme, USGS, NPS, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Sediment Facies Mapping Proposed Control Site Information Teck American Incorporated

WS DOT Right of Way Locations

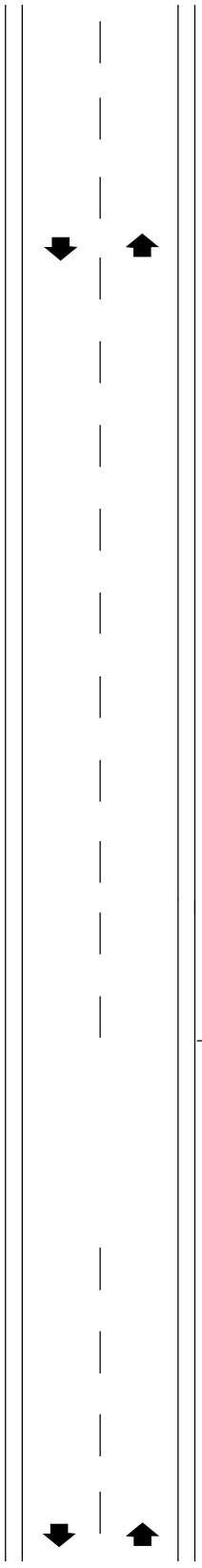
17-Sep-18

Control Site Name	RM	Left or Right Bank	Ownership / Description	Accessible by Land Y/N	Accessible by Water Y/N	Comment
UCR-1	711	L	WSDOT Hwy 25	Y	N	**New point:** Set in right of way for Hwy 25 behind guard rail
Bossburg	714.5	L	WSDOT Hwy 25	Y	N	**New point:** Set in right of way for Hwy 25 at intersection with Bossburg Rd
UCR-2	718.5	L	WSDOT Hwy 25	Y	N	**New point:** Set in right of way for Hwy 25 at intersection with Williams Lake Rd
Onion	726.5	L	WSDOT Hwy 25	Y	N	**New Point:** Alternate control point, to be set instead of occupying 1001-98
Black Hawk	728	L	WSDOT Hwy 25	Y	N	Existing WSDOT control
1001-99	733	L	WSDOT Hwy 25	Y	N	USACE existing control set by DEA in Hwy 25 right of way across from Northport High School
UCR-4	738	L	WSDOT Hwy 25	Y	N	**New point:** Set in Hwy 25 right of way
New Yonder	743	L	WSDOT Hwy 25	Y	N	Existing WSDOT control
UCR-5	742.5	L	WSDOT Hwy 25	Y	N	**New point:** Alternate pont for New Yonder, set in Hwy 25 right of way.

Notes:

Proposed alternate location, if needed

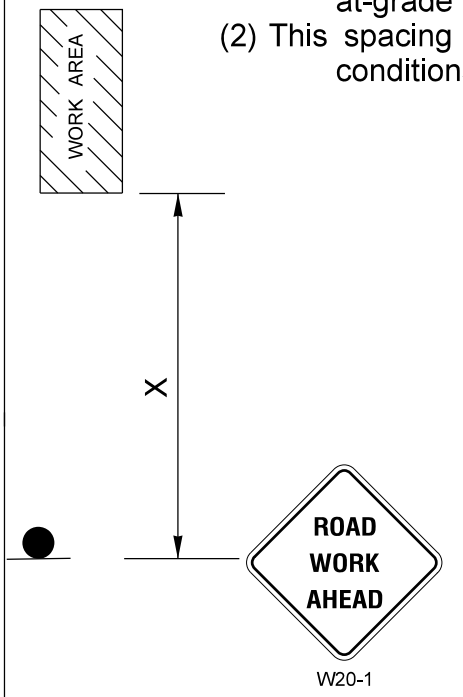
"WORK BEYOND THE SHOULDER"



SIGN SPACING = X (FEET) (1)		
FREEWAYS & EXPRESSWAYS	55/70 MPH	1500'± (OR AS PER MUTCD)
RURAL HIGHWAYS	60/65 MPH	800'±
RURAL ROADS	45/55 MPH	500'±
RURAL ROADS & URBAN ARTERIALS	35/40 MPH	350'±
RURAL ROADS, URBAN ARTERIALS RESIDENTIAL & BUSINESS DISTRICTS	25/30 MPH	200'± (2)
URBAN STREETS	25 MPH OR LESS	100'± (2)
ALL SIGNS ARE 48" X 48" BLACK ON ORANGE UNLESS OTHERWISE DESIGNATED.		

(1) All spacing may be adjusted to accommodate interchange ramps, at-grade intersections, and driveways.

(2) This spacing may be reduced in urban areas to fit roadway conditions.



W20-1

GENERAL NOTES

1. THE ROAD WORK AHEAD SIGN MAY BE REPLACED WITH OTHER APPROPRIATE SIGNS SUCH AS SHOULDER WORK.
2. THE ROAD WORK AHEAD SIGN MAY BE OMITTED WHERE THE WORK SPACE BEHIND BARRIER, MORE THAN 24 INCHES BEHIND THE CURB OR 15 FEET OR MORE FROM THE EDGE OF THE ROADWAY.
3. IF WORK VEHICLES ARE ON THE SHOULDER, A SHOULDER WORK SIGN WILL BE USED.
4. A GENERAL WARNING SIGNSUCH AS ROAD MACHINERY AHEAD SHOULD BE USED IF WORKERS AND EQUIPMENT MUST OCCASIONALLY MOVE ONTO THE SHOULDER.
5. WORK OPERATIONS SUCH AS MOWING WHERE THE MOWER IS OFF THE SHOULDER IS ALLOWED UNDER THIS PLAN.

WSDOT ER UTILITIES
Approved
By:_____
Date:_____

Teck American Incorporated
Install and Occupy Survey Mons
State Route 25 and MP 86-114

General Permit # 4-SR25-9422
Exhibit D

STEVENS COUNTY

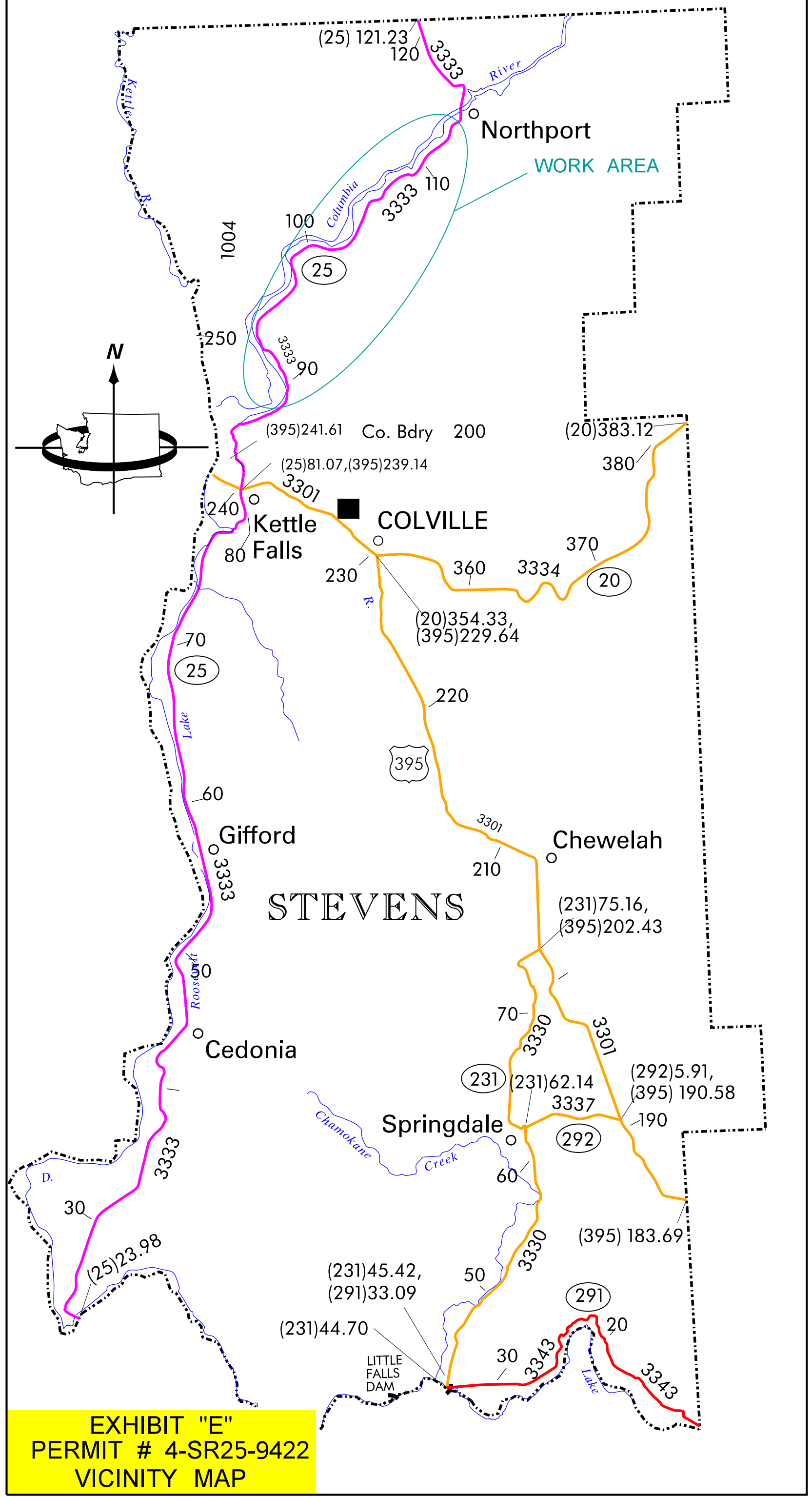


EXHIBIT "E"
PERMIT # 4-SR25-9422
VICINITY MAP

From:	Pretare, Jennifer
To:	Brownell, Michelle
Subject:	FW: Follow Up :: UCR - Use of survey control monuments along Northport Waneta Road
Date:	Monday, July 29, 2019 1:29:23 PM

From: Mills Denise SPOK <Denise.Mills@teck.com>
Sent: Monday, June 24, 2019 3:32 PM
To: tlarson@stevenscountywa.gov
Cc: Pretare, Jennifer <jennifer.pretare@aecom.com>; McCaig Kris SPOK <Kris.McCaig@teck.com>
Subject: RE: Follow Up :: UCR - Use of survey control monuments along Northport Waneta Road

Hello Tracy,

Thank you for taking time to speak with me on the phone this afternoon about the additional hydrographic survey work that Teck American Incorporated (TAI) will be conducting in the Upper Columbia River beginning on July 8, 2019. This project will require the use of ground survey control points along the Northport-Waneta Road. This is a continuation of the field program conducted in fall of 2018, which I outlined in an email dated September 24, 2018 (see below). The field team is the same, with David Evans and Associates providing the ground survey support, as they did last year.

Please contact me if you have any questions or require any additional information about this work.

Thank you,

Denise

Denise Mills, RG, LHG
Program Manager, Upper Columbia River
Teck American Incorporated
+1.509.623.4515, direct
+1 509.904.9375, mobile
www.teck.com

From: Mills Denise SPOK
Sent: Monday, September 24, 2018 12:59 PM
To: 'tlarson@stevenscountywa.gov' <tlarson@stevenscountywa.gov>
Cc: Jon Dasler <Jld@deainc.com>; Pretare, Jennifer <jennifer.pretare@aecom.com>; McDaniel, Sarah <sarah.mcdaniel@aecom.com>; McCaig Kris SPOK <Kris.McCaig@teck.com>
Subject: Follow Up :: UCR - Use of survey control monuments along Northport Waneta Road

Hi Tracy,

Thank you again for responding to my question this morning, regarding our upcoming hydrographic survey work on the Upper Columbia River, which requires the use of ground base stations along Northport Waneta Road, north of Northport.

As I stated during our call, WSDOT has approved a general permit for this same project, for

occupying control monuments along SR25 from Northport south. An attachment to WSDOT's permit is a reference sheet entitled "Work Beyond the Shoulder," which covers signage requirements for working in WSDOT rights of way. This sheet is attached for your reference.

The survey activities will be conducted by licensed land surveyors with David Evans and Associates. They will start this week to establish the ground control network for our hydrographic work on the river, and this work will continue through the end of October 2018. Their survey crew has done a lot of work in Stevens County and they are familiar with WSDOT's Work Beyond the Shoulder requirements. There is also a project-specific health and safety plan that covers the ground survey activities, which includes a detailed job hazard assessment and requirements for personal protective equipment and best ways to do the work safely and out of traffic.

Please contact me if you have questions or require additional information regarding this work.

Thank you,

Denise

Denise Mills, RG, LHG
Program Manager, Upper Columbia River
Teck American Incorporated
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+1 509.904.9375, mobile
www.teck.com

From:	Pretare, Jennifer
To:	Brownell, Michelle
Subject:	FW: UCR RI/FS - Phase 3 Sediment Study - Hydrographic Surveys (Sediment Facies Mapping)
Date:	Monday, July 29, 2019 1:28:02 PM

From: Mills Denise SPOK <Denise.Mills@teck.com>
Sent: Wednesday, July 3, 2019 11:34 AM
To: lottosen@usbr.gov; cstolsig@usbr.gov
Cc: Pretare, Jennifer <jennifer.pretare@aecom.com>; Hose, Dave <dave.hose@aecom.com>; 'Kevin Lundmark (Kevin.Lundmark@erm.com)' <Kevin.Lundmark@erm.com>; Tim McClinton <TMcClinton@deainc.com>; Shawn Hinz <shawn@gravitymarine.com>; McCaig Kris SPOK <Kris.McCaig@teck.com>; Kessel Cristy SPOK <Cristy.Kessel@teck.com>
Subject: FW: UCR RI/FS - Phase 3 Sediment Study - Hydrographic Surveys (Sediment Facies Mapping)

Hello Lon and Cory,

To follow up on the voice messages I left for you last week, from July 8 to July 18, 2019 Teck American Incorporated (TAI) will be conducting the remaining part of the hydrographic survey work that we started on the Upper Columbia River in October 2018, which is described briefly in my September 21, 2018 email, appended below. TAI finished most of the work in October and the first week of November 2018, but was unable to finish before winter weather set in. To complete this project, our field crew will be working from Deadman's Eddy, starting around river mile 737 and continuing north to the U.S. Canada border (RM 744). They will use the Northport boat launch and dock for this project. No work is planned for July 12-14, during the Northport fishing derby.

Please feel free to contact me by email or phone (509-623-4515) if you would like more information about this project.

Thank you,

Denise

Denise Mills, RG, LHG
Program Manager, Upper Columbia River
Teck American Incorporated
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+1 509.904.9375, mobile
www.teck.com

From: Mills Denise SPOK
Sent: Friday, September 21, 2018 9:05 AM
To: cstolsig@usbr.gov; lottosen@usbr.gov
Cc: McCaig Kris SPOK <Kris.McCaig@teck.com>; Kessel Cristy SPOK <Cristy.Kessel@teck.com>; Pretare, Jennifer <jennifer.pretare@aecom.com>; McDaniel, Sarah <sarah.mcdaniel@aecom.com>; Kevin Lundmark <Kevin.Lundmark@erm.com>; Jon Dasler <Jld@deainc.com>; Tim McClinton <TMcClinton@deainc.com>; 'shawn@gravitymarine.com' <shawn@gravitymarine.com>

Subject: UCR RI/FS - Phase 3 Sediment Study - Hydrographic Surveys (Sediment Facies Mapping)

Hi Cory,

Thank you for your time yesterday to speak with me about using URBR control survey monuments on Lake Roosevelt and the Upper Columbia River.

As we discussed, Teck American Incorporated (TAI) plans to use existing USBR survey control monuments and establish new monuments to support hydrographic surveys of the Upper Columbia River from the U.S.-Canada border to approximately river mile 708 (upstream of Marcus Flats). This work will begin next week and continue through the end of October 2019. Based on our phone conversation, I understand that no special permissions or other notification to USBR are needed for this work. Per your request, we will provide shapefiles for any new monuments that are established for your use.

TAI is conducting this work as part of the Upper Columbia River remedial investigation and feasibility study (RI/FS), the with oversight from the U.S. Environmental Protection Agency. EPA-approved Quality Assurance Project Plan for the Sediment Facies Mapping Project is available online (https://www.ucr-rifs.com/assets/Docs/09-06-18-Final-Phase-3-SFM-QAPP.pdf). The new survey maps will be publicly available after we have finished the data compilation, processing, and interpretation, in 2019. We will be sure to inform you when this information is available.

Thank you again for your time. Please feel free to contact me by email or phone (509-623-4515) or Kris McCaig at kris.mccaig@teck.com or by calling 509-623-4501, if you require any additional information about the project and our upcoming activities.

Kind regards,

Denise

Denise Mills, RG, LHG
Program Manager, Upper Columbia River
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+1 509.904.9375, mobile
www.teck.com

From:	Pretare, Jennifer
To:	Brownell, Michelle
Subject:	FW: UCR RI/FS Phase 3 Sediment Study Sediment Facies Mapping Survey
Date:	Monday, July 29, 2019 1:25:38 PM

From: Pretare, Jennifer
Sent: Saturday, July 6, 2019 12:31 PM
To: JOHNSON, ARNE (DNR) <ARNE.JOHNSON@dnr.wa.gov>; McCaig Kris SPOK <Kris.McCaig@teck.com>
Cc: Mills Denise SPOK <Denise.Mills@teck.com>; Cristy Kessel (ckessel@comcast.net) <ckessel@comcast.net>; Kevin Lundmark (Kevin.Lundmark@erm.com) <Kevin.Lundmark@erm.com>; Jennifer Holder (jennifer.holder@erm.com) <jennifer.holder@erm.com>; McDaniel, Sarah <sarah.mcdaniel@aecom.com>; Kathryn Cerise (Cerise.Kathryn@epa.gov) <Cerise.Kathryn@epa.gov>; Monica Tonel - U.S. Environmental Protection Agency (tonel.monica@epa.gov) <tonel.monica@epa.gov>
Subject: RE: UCR RI/FS Phase 3 Sediment Study Sediment Facies Mapping Survey

Hello Arne,

The field crew is mobilizing to the Upper Columbia River to begin work on Monday, July 8th. Monday is planned for equipment set up and calibration, with a chance we make get onto the water in the afternoon. The more likely scenario is that we will begin work in Deadman's Eddy on Tuesday, July 9th. I will be on site all week and can be reached at 510.681.6401 if you have any questions or concerns.

Thanks-

Jennifer (Jenny) Pretare, Ph.D.
Biologist & Project Manager
Environment, Pacific Northwest Region
D +1-206-438-2175
M +1-510-681-6401
Jennifer.Pretare@aecom.com

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aecom.com

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From: JOHNSON, ARNE (DNR) <ARNE.JOHNSON@dnr.wa.gov>
Sent: Monday, June 17, 2019 2:05 PM
To: McCaig Kris SPOK <Kris.McCaig@teck.com>

Cc: Mills Denise SPOK <Denise.Mills@teck.com>; Cristy Kessel (ckessel@comcast.net) <ckessel@comcast.net>; Pretare, Jennifer <jennifer.pretare@aecom.com>; Kevin Lundmark (Kevin.Lundmark@erm.com) <Kevin.Lundmark@erm.com>; Jennifer Holder (jennifer.holder@erm.com) <jennifer.holder@erm.com>; McDaniel, Sarah <sarah.mcdaniel@aecom.com>; Kathryn Cerise (Cerise.Kathryn@epa.gov) <Cerise.Kathryn@epa.gov>; Monica Tonel - U.S. Environmental Protection Agency (tonel.monica@epa.gov) <tonel.monica@epa.gov>
Subject: RE: UCR RI/FS Phase 3 Sediment Study Sediment Facies Mapping Survey

Kris

Thanks for the notification regarding this year's plans. As before, send me an email when you are ready to start.

Thanks you

Arne Johnson
East Uplands District Manager
Northeast Region
Department of Natural Resources
225 S. Silke Rd
Colville, WA 99114
(509) 684-7474

From: McCaig Kris SPOK <Kris.McCaig@teck.com>
Sent: Monday, June 17, 2019 12:45 PM
To: JOHNSON, ARNE (DNR) <ARNE.JOHNSON@dnr.wa.gov>
Cc: Mills Denise SPOK <Denise.Mills@teck.com>; Cristy Kessel (ckessel@comcast.net) <ckessel@comcast.net>; Jennifer Pretare (Jennifer.Pretare@aecom.com) <Jennifer.Pretare@aecom.com>; Kevin Lundmark (Kevin.Lundmark@erm.com) <Kevin.Lundmark@erm.com>; Jennifer Holder (jennifer.holder@erm.com) <jennifer.holder@erm.com>; McDaniel, Sarah (sarah.mcdaniel@aecom.com) <sarah.mcdaniel@aecom.com>; Kathryn Cerise (Cerise.Kathryn@epa.gov) <Cerise.Kathryn@epa.gov>; Monica Tonel - U.S. Environmental Protection Agency (tonel.monica@epa.gov) <tonel.monica@epa.gov>
Subject: UCR RI/FS Phase 3 Sediment Study Sediment Facies Mapping Survey

Hello Arne,

Thank you for working with us on past sampling programs Teck American Incorporated (TAI) has conducted on the Upper Columbia River (UCR) for the remedial investigation and feasibility study. I am writing to notify the Washington State Department of Natural Resources of our upcoming activities that will occur July 8 through July 19. TAI, under the oversight of the U.S. Environmental Protection Agency (EPA), will be finishing work we started in 2018, conducting a survey to collect high-resolution acoustic data and georeferenced images of the riverbed to identify and map

sediment grain size fractions and texture as part of the Phase 3 Sediment Study – Sediment Facies Mapping. The survey activities to be completed under this program are outlined within the EPA-approved quality assurance project plan (QAPP), which is available at https://www.ucr-rifs.com/assets/Docs/09-06-18-Final-Phase-3-SFM-QAPP.pdf . Survey areas will be reached via boat and will include areas within the UCR from the U.S.-Canada border to Deadmans Eddy (see first attachment with maps). For your information I have also attached the draft fall field schedule that has further detail on when we will be on the river for the survey.

If you have any questions, please don't hesitate to give me call. We respectfully request you confirm your receipt of this notification.

Thanks,

Kris

Kris McCaig
Manager, Environment & Public Affairs
Teck American Incorporated
501 N Riverpoint Blvd., Suite 300
Spokane, WA 99202
Office: 509.623.4501
Cell: 509.434.8542
kris.mccaig@teck.com

Appendix F
OPUS Report

Upper Columbia River Remedial Investigation / Feasibility Study
Phase 3 Sediment Facies Mapping

In accordance with the Phase 3 Sediment Facies Mapping Quality Assurance Project Plan, the control survey and position reports were supervised and/or reviewed by DEA licensed land surveyors.

Upper Columbia Control OPUS Solutions				
REF FRAME: NAD_83(2011)(EPOCH:2010.0000)				
VERTICAL DATUM: NAVD88 (Computed using GEOID12B)				
PROJECTION: Washington State Plane Coordinate System, North Zone (4601 WA N)				
UNITS: U.S. Feet				
Pnt#	**Northing**	**Easting**	**Elevation**	**Nomenclature**
50	620158.231	2308873.135	1287.251	CP-1
51	631421.339	2320662.373	1293.478	Evans
52	632266.570	2319793.238	1289.489	CP-2
53	635403.404	2319386.244	1320.844	UCR-1
54	644222.737	2309844.786	1287.812	CP-3
55	651120.040	2313054.436	1457.832	Bossburg
56	660300.687	2319554.534	1288.997	CP-4
57	669553.815	2322306.979	1544.137	UCR-2_avg
58	673395.576	2334800.544	1287.835	CP-10
59	673248.660	2334937.026	1302.885	UCR-3
60	689615.104	2343938.025	1287.192	CP-5
61	689333.641	2348647.983	1586.742	USACE_1001-98
62	694860.349	2354023.376	1484.479	Blackhawk
63	707470.235	2365488.599	1292.123	CP-6
64	712092.080	2372005.870	1355.375	USACE_1001-99
65	715834.520	2376164.696	1295.181	CP-7
66	722785.930	2385520.984	1294.797	CP-8
66	723392.156	2390489.573	1561.723	UCR-4
67	734863.484	2405333.969	1304.627	CP-9
68	742509.982	2407844.892	1470.338	New Yonder

The control survey was supervised by:

NSPS/THSOA Certified Hydrographer #107

Jonathan Lee Dasler, PE, PLS, CH
David Evans and Associates, Inc.
Senior Vice President,
Director of Marine Services
Senior Technical Advisor

The position reports were reviewed and verified by:

Gregory P. Baird, PLS, CH
David Evans and Associates, Inc.
Senior Associate
Project Surveyor/Quality Advisor

Station Name: CP-1

Stamping: "DEA CONTROL"

Description: Set 5/8" Iron Rod with red plastic cap, set on left bank of Columbia River. See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 27, 2018
Solution Source: OPUS Static Solution (4hrs.-2min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.018(m)
LAT:	48° 40' 01.67876"	0.006(m)
LON:	118° 03' 59.77127"	0.066(m)
EL HGT:	374.887(m)	0.052(m)
NAVD-88 Elev.:	392.355(m)	0.060(m)

	Meters	**U.S. Feet**
Northing:	189024.607	620158.231
Easting:	703745.939	2308873.135
NAVD-88 El.:	392.355	1287.251
Convergence [degrees]	2.05988611	
Point Scale	0.99998822	
Combined Factor	0.99992947	

Horizon View

Map

See Reverse for Field Sketch

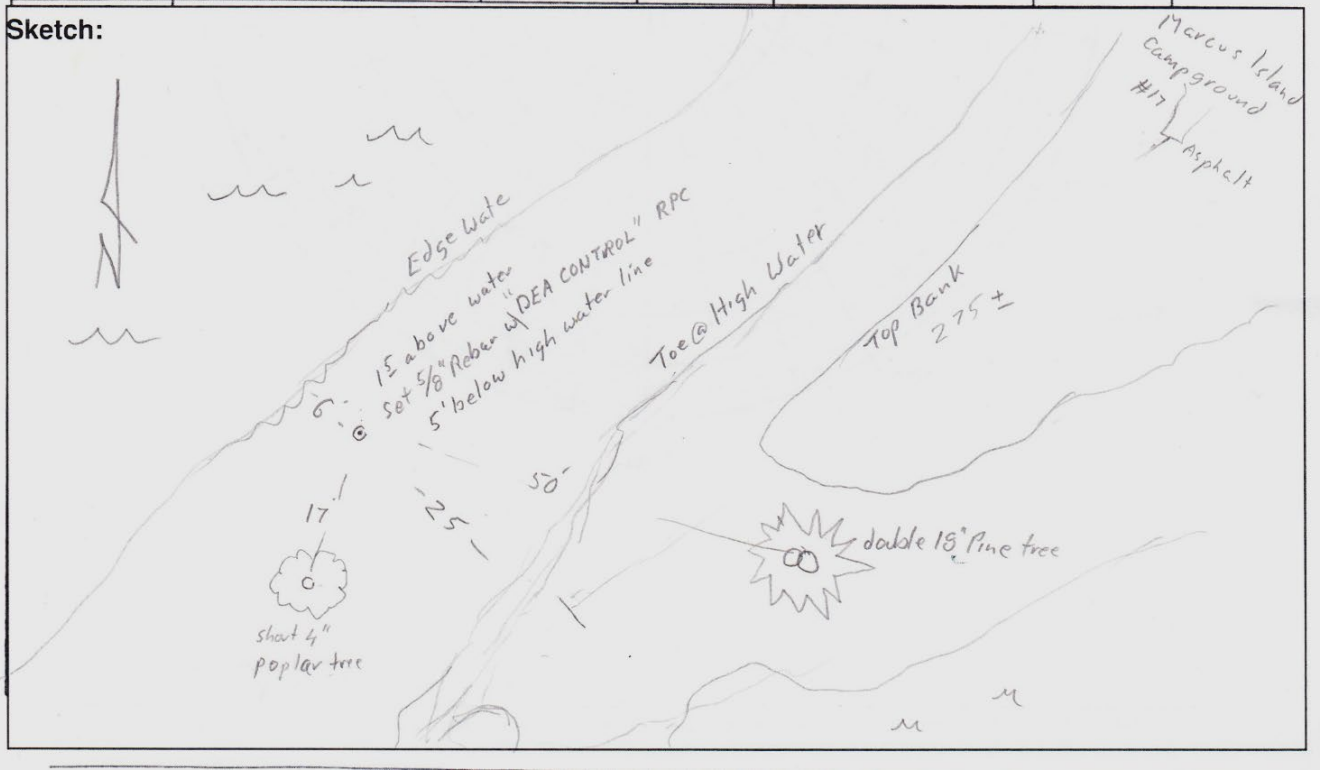
DAVID EVANS
AND ASSOCIATES INC.

GPS STATIC OBSERVATION LOG

Job Number: AETR00000039 **DEA Office:** Spokane
Receiver S/N: 5004K65351 (SPS851) **Date:** 9/27/18
Data Collector S/N: RS51C89309 **Julian Day:** 270
Antenna Type: Zepher 3 **Observer:** LXWO
Ant. Measure To: B.O.M.

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
53512700	CheckPoint -1	CheckPoint-1	1.800	5.906	48° 40' 01.717 N	8:49 AM	12:51
NOTES:					118° 03' 59.794 W		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Station Name: EVANS

Stamping: 1999, EVANS

Description: Found monument box with brass cap set in concrete, on east edge of Evans Campground parking lot. See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 25, 2018
Solution Source: OPUS Static Solution (4hrs.-2min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS-RS Solution RMS (+/-)
	NORMALIZED RMS:	0.014(m)
LAT:	48° 41’ 48.52399”	0.001(m)
LON:	118° 00’ 58.12218”	0.006(m)
EL HGT:	376.821(m)	0.003(m)
NAVD-88 Elev.:	394.253(m)	0.029(m)

	Meters	**U.S. Feet**
Northing:	192457.609	631421.339
Easting:	707339.306	2320662.373
NAVD-88 El.:	394.253	1293.478
Convergence [degrees]	2.09745278	
Point Scale	0.99999334	
Combined Factor	0.99993429	

Horizon View

Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

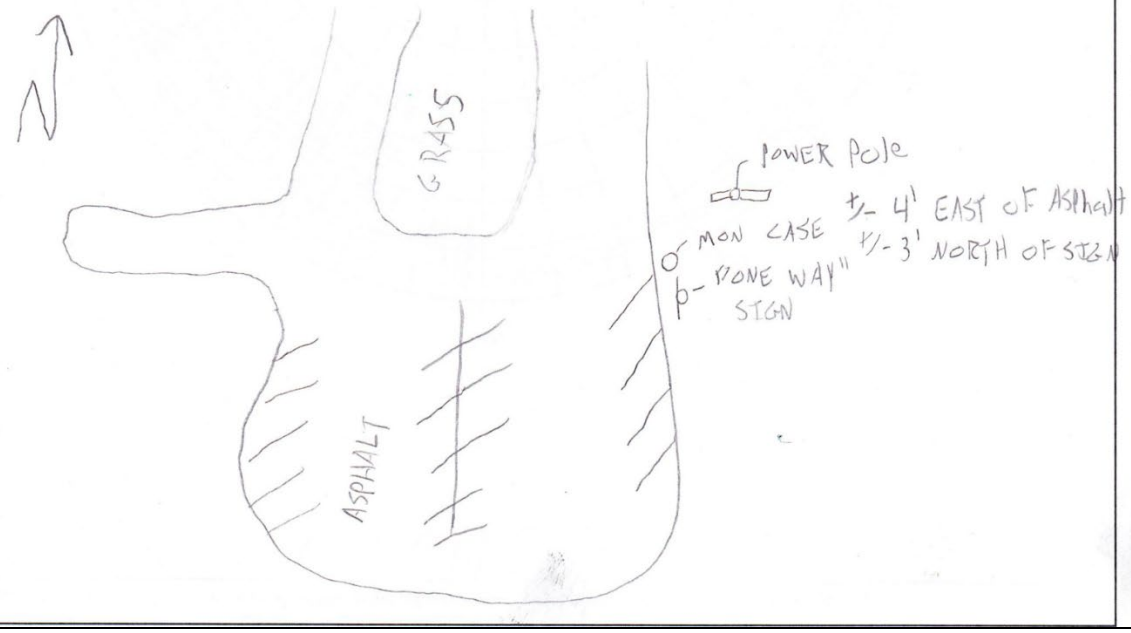
GPS STATIC OBSERVATION LOG

Job Number: AETR00000039
Receiver S/N: 5004K65351
Data Collector S/N: RS51C89309
Antenna Type: Zephyr
Ant. Measure To: BOM

DEA Office: Spokane
Date: 9/25/18
Julian Day: 268
Observer: JNMI

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
53512680	EVANS	EVANS	1.8 M	5.906	48°41'48.51557N	8:50	12:55
NOTES:					118°00'58.21389W		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Station Name: CP-2

Stamping: "DEA CONTROL"

Description: Set 60d nail in concrete expansion joint, on south edge of Evans Campground boat ramp. See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 27, 2018
Solution Source: OPUS Static Solution (2hrs.-9min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.016(m)
LAT:	48° 41' 57.17231"	0.005(m)
LON:	118° 01' 10.60817"	0.003(m)
EL HGT:	375.599(m)	0.010(m)
NAVD-88 Elev.:	393.037(m)	0.031(m)

	Meters	**U.S. Feet**
Northing:	192715.236	632266.570
Easting:	707074.393	2319793.238
NAVD-88 El.:	393.037	1289.489
Convergence [degrees]	2.09487222	
Point Scale	0.99999376	
Combined Factor	0.99993490	

Horizon View

Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

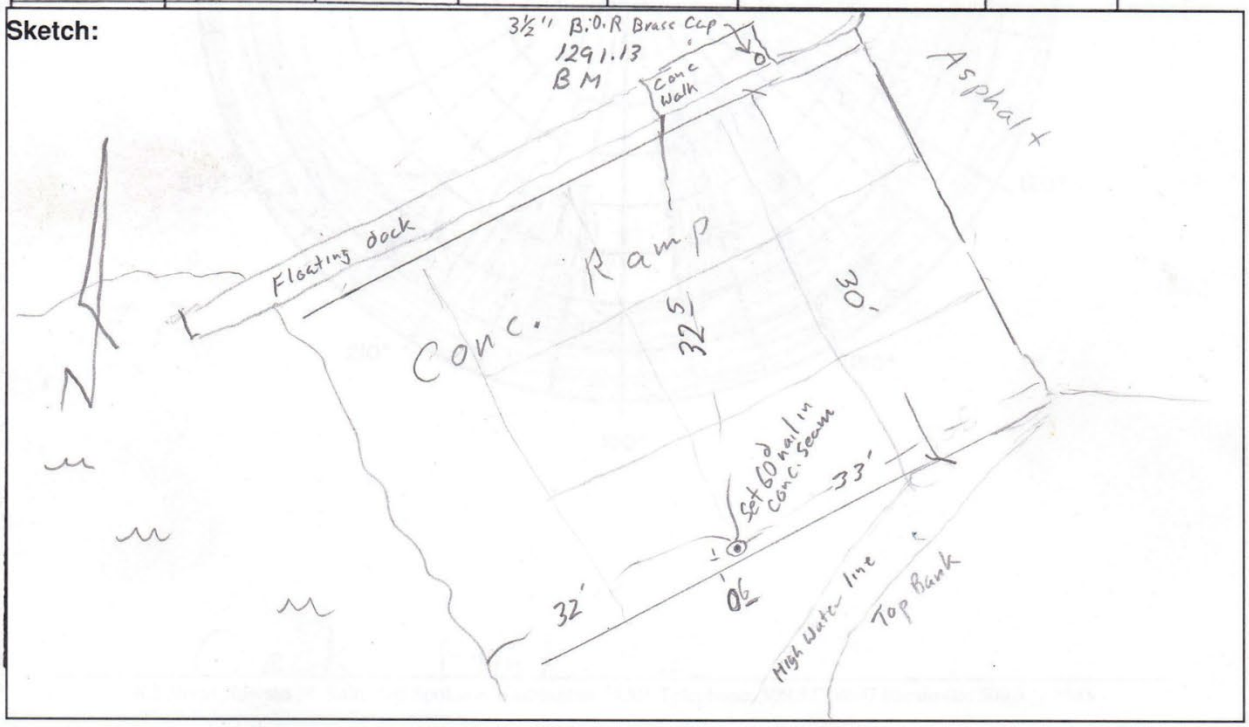
GPS STATIC OBSERVATION LOG

Job Number: AETR000000039
Receiver S/N: 5004K65351
Data Collector S/N: R551C84309
Antenna Type: ZEPHER 3
Ant. Measure To: BOM

DEA Office: Spokane
Date: 9/27/18
Julian Day: 270
Observer: LXWO

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
53512701	CP-2	CheckPoint 2	1.800	5.906	48°41'57.204"	2:34PM	4:42PM
NOTES:					118°01'10.661"		
NOTES:							
NOTES:							

Sketch:



DLPR

Field Sketch

Station Name: UCR-1

Stamping: "DEA CONTROL"

Description: : Set 5/8" Iron Rod with red plastic cap, set on west side of State Highway-25 and east side of rail road tracks. See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 25, 2018
Solution Source: OPUS Static Solution (4hrs.-7min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

	OPUS-RS Solution RMS (+/-)	
	NORMALIZED RMS:	0.017(m)
LAT:	48° 42' 28.25060"	0.017(m)
LON:	118 ° 01' 14.96244"	0.024(m)
EL HGT:	385.161(m)	0.019(m)
NAVD-88 Elev.:	402.594(m)	0.035(m)

	Meters	**U.S. Feet**
Northing:	193671.345	635403.404
Easting:	706950.341	2319386.244
NAVD-88 El.:	402.594	1320.844
Convergence [degrees]	2.09397222	
Point Scale	0.99999531	
Combined Factor	0.99993495	

Horizon View

Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

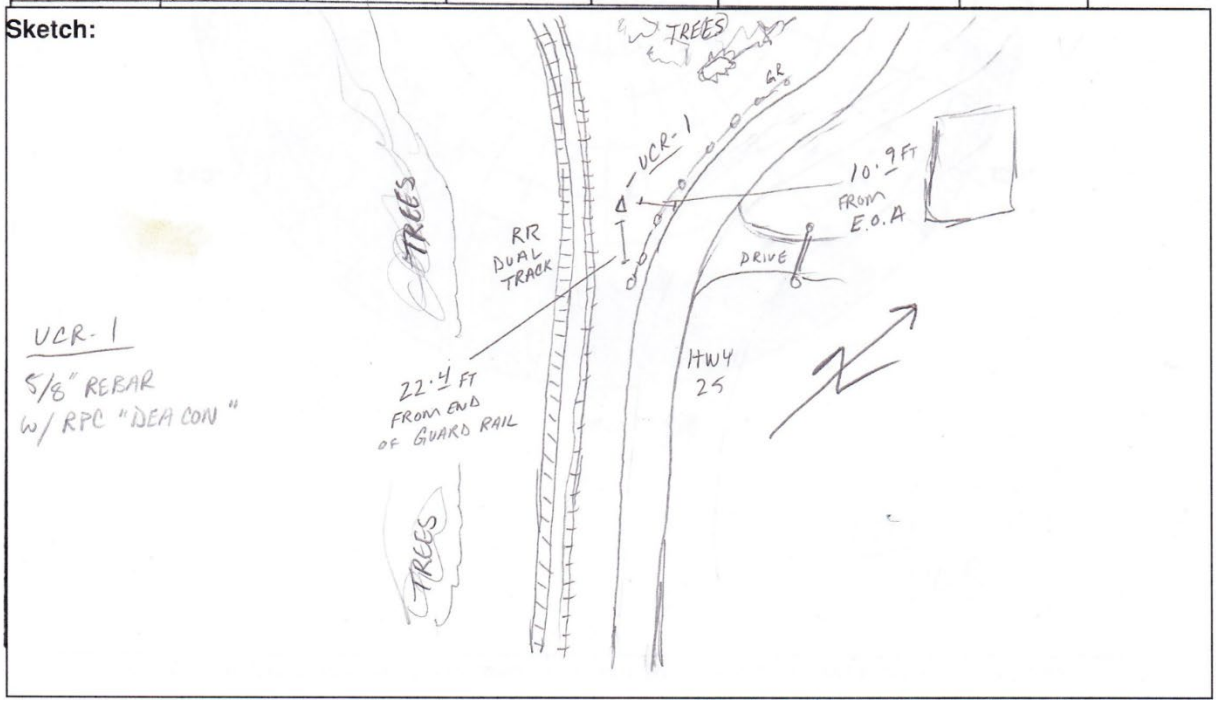
GPS STATIC OBSERVATION LOG

Job Number: AETR-0039
Receiver S/N: 4638122146
Data Collector S/N: RS33C8790
Antenna Type: TRIMBLE GNSS R8-2
Ant. Measure To: BOTTOM OF ANTENNA MOUNT

DEA Office: SPOKANE
Date: 9/25/18
Julian Day: 268
Observer: Lloyd Lamar

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
21462681	VCR-1	VCR-1	1.8 M	5.906 FT	48°42'28.209 N	9:01 AM	1:06 PM
NOTES:					118°01'15.105		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Station Name: CP-3

Stamping: NONE

Description: Set PK Mag nail in concrete expansion joint, on south edge of Snag Cove Campground boat ramp. See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 27, 2018
Solution Source: OPUS Static Solution (4hrs.-9min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.013(m)
LAT:	48° 43’ 58.63289”	0.010(m)
LON:	118° 03’ 32.38477”	0.006(m)
EL HGT:	375.139(m)	0.016(m)
NAVD-88 Elev.:	392.526(m)	0.033(m)

	Meters	**U.S. Feet**
Northing:	196359.483	644222.737
Easting:	704042.099	2309844.786
NAVD-88 El.:	392.526	1287.812
Convergence [degrees]	2.06555000	
Point Scale	0.99999993	
Combined Factor	0.99994114	

Horizon View

Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

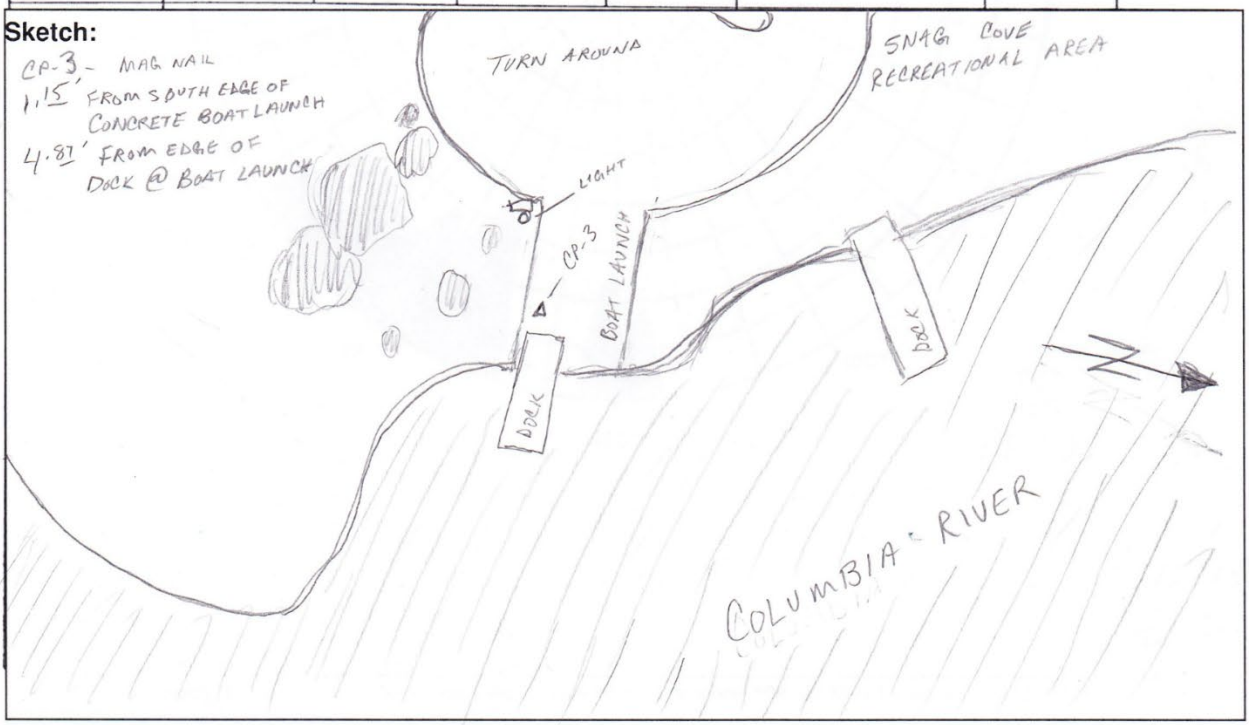
GPS STATIC OBSERVATION LOG

Job Number: AETR-0039
Receiver S/N: 4638122146
Data Collector S/N: RS33C8790
Antenna Type: TRIMBLE GNSS R8-2
Ant. Measure To: BOTTOM OF ANTENNA MOUNT

DEA Office: SPOKANE
Date: 9/27/18
Julian Day: 270
Observer: LLOYD LAMAR (LEL)

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
21462700	CP-3	CP-3	1.5 M	4.921 FT	48°43'58.599"N	9:31 AM	1:36 PM
NOTES:					118°03'32.454"W		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Station Name: BOSSBURG

Stamping: "DEA CONTROL"

Description: Set 5/8" Iron Rod with red plastic cap. Set in the N.E. quadrant at the intersection of Washington State Highway-25 and Bossburg road. +/- 14 ft. SW of wood fence corner and +/- 5 ft. NW from NW corner of stop bar. See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 25, 2018
Solution Source: OPUS Static Solution (4hrs.-2min.)

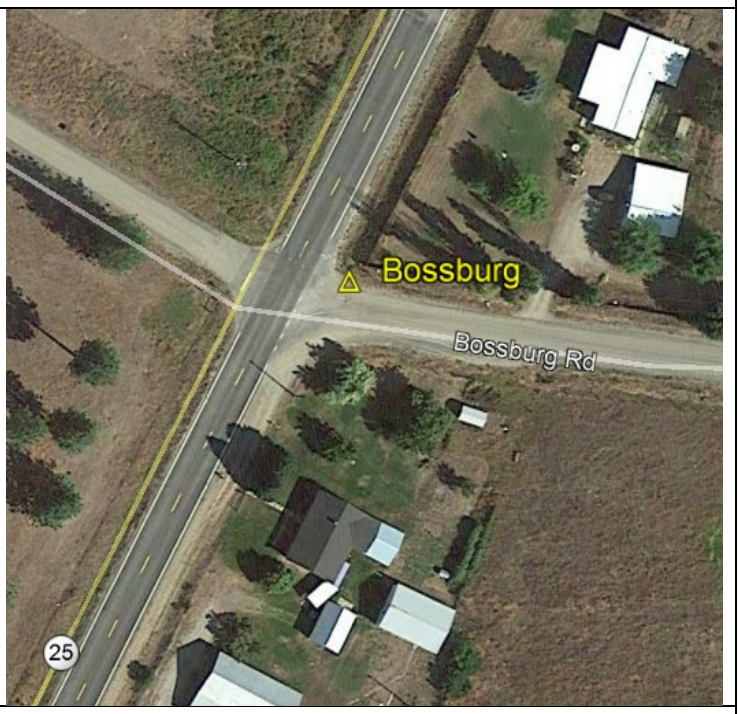
Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.013(m)
LAT:	48° 45' 05.50112"	0.002(m)
LON:	118° 02' 40.81250"	0.006(m)
EL HGT:	426.974(m)	0.014(m)
NAVD-88 Elev.:	444.348(m)	0.032(m)

	Meters	**U.S. Feet**
Northing:	198461.785	651120.040
Easting:	705020.402	2313054.436
NAVD-88 El.:	444.348	1457.832
Convergence [degrees]	2.07621667	
Point Scale	1.00000347	
Combined Factor	0.99993656	

Horizon View



Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

GPS STATIC OBSERVATION LOG

Job Number: AETR00000039
Receiver S/N: 5004K65351
Data Collector S/N: RS51C89309
Antenna Type: ZephyR 3
Ant. Measure To: BoM

DEA Office: Spokane
Date: 9/25/18
Julian Day: 268
Observer: JMMI

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
53512681	Bossburg	Bossburg	1.800	5.906	48°45'05.55095	1:30	5:35
NOTES:					118°02'40.83751		
NOTES:							
NOTES:							

Sketch:

Field Sketch

Station Name: CP-4

Stamping: "DEA CONTROL"

Description: Set 5/8" Iron Rod with red plastic cap on right bank of Columbia River. See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 27, 2018
Solution Source: OPUS Static Solution (2hrs.-4min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.021(m)
LAT:	48° 46' 33.69227"	0.034(m)
LON:	118° 00' 58.87062"	0.021(m)
EL HGT:	375.574(m)	0.023(m)
NAVD-88 Elev.:	392.887(m)	0.037(m)

	Meters	**U.S. Feet**
Northing:	201260.052	660300.687
Easting:	707001.636	2319554.534
NAVD-88 El.:	392.887	1288.997
Convergence [degrees]	2.09730000	
Point Scale	1.00000831	
Combined Factor	0.99994945	

Horizon View

Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

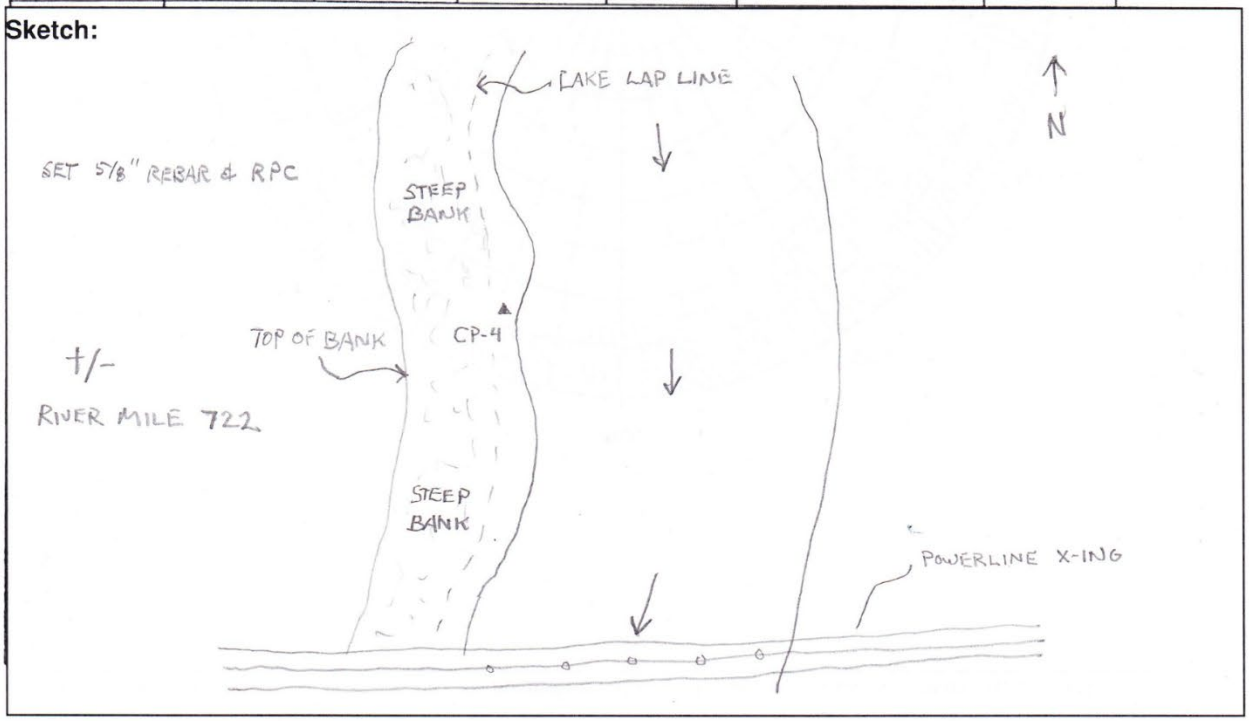
GPS STATIC OBSERVATION LOG

Job Number: AETR 0039
Receiver S/N: 5734470315
Data Collector S/N: RS1AC24076
Antenna Type: R 10
Ant. Measure To: BOTTOM OF QUICK RELEASE

DEA Office: SPK -
Date: 9/27/18
Julian Day: 270
Observer: RDW

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
03152703	CP-4	CP-4	1.499 M	4.918 Ft	48-46-33.69	1:47 PM	3:50 PM
NOTES:					118-00-58.95		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Station Name: CP-2

Stamping: "DEA CONTROL"

Description: Set 60d nail in concrete expansion joint, on south edge of Evans Campground boat ramp. See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 27, 2018
Solution Source: OPUS Static Solution (2hrs.-9min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.016(m)
LAT:	48° 41' 57.17231"	0.005(m)
LON:	118° 01' 10.60817"	0.003(m)
EL HGT:	375.599(m)	0.010(m)
NAVD-88 Elev.:	393.037(m)	0.031(m)

	Meters	**U.S. Feet**
Northing:	192715.236	632266.570
Easting:	707074.393	2319793.238
NAVD-88 El.:	393.037	1289.489
Convergence [degrees]	2.09487222	
Point Scale	0.99999376	
Combined Factor	0.99993490	

Horizon View

Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

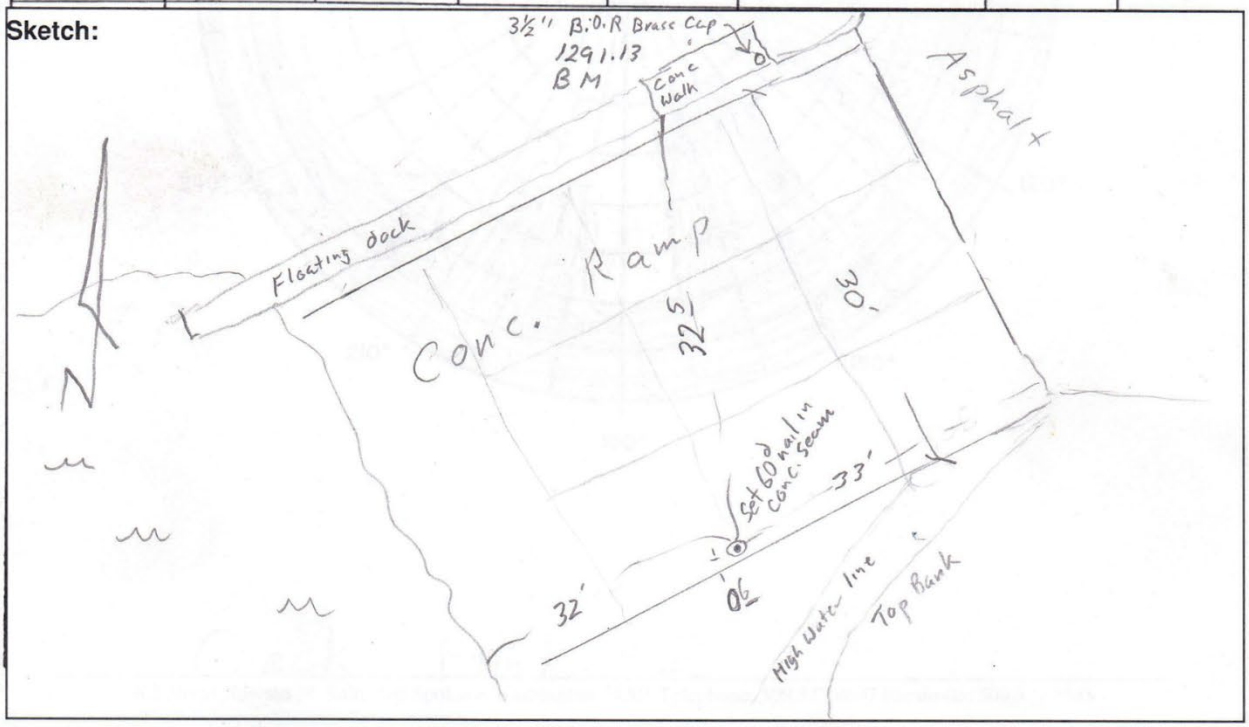
GPS STATIC OBSERVATION LOG

Job Number: AETR000000039
Receiver S/N: 5004K65351
Data Collector S/N: R551C84309
Antenna Type: ZEPHER 3
Ant. Measure To: BOM

DEA Office: Spokane
Date: 9/27/18
Julian Day: 270
Observer: LXWO

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
53512701	CP-2	CheckPoint 2	1.800	5.906	48°41'57.204"	2:34PM	4:42PM
NOTES:					118°01'10.661"		
NOTES:							
NOTES:							

Sketch:



DLPR

Field Sketch

Station Name: CP-10

Stamping: "DEA CONTROL"

Description: Set 5/8" Iron Rod with red plastic cap, set on west edge of concrete boat ramp at Graffiti Bar boat ramp. See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 26, 2018
Solution Source: OPUS-RS Solution (1hrs.-13min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

	OPUS-RS Solution RMS (+/-)	
	NORMALIZED RMS:	0.224(m)
LAT:	48° 48' 37.24225"	0.006(m)
LON:	117° 57' 04.10220"	0.004(m)
EL HGT:	375.312(m)	0.015(m)
NAVD-88 Elev.:	392.533(m)	0.022(m)

	Meters	**U.S. Feet**
Northing:	205251.382	673395.576
Easting:	711648.629	2334800.544
NAVD-88 El.:	392.533	1287.835
Convergence [degrees]	2.14585278	
Point Scale	1.00001540	
Combined Factor	0.99995658	

Horizon View

Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

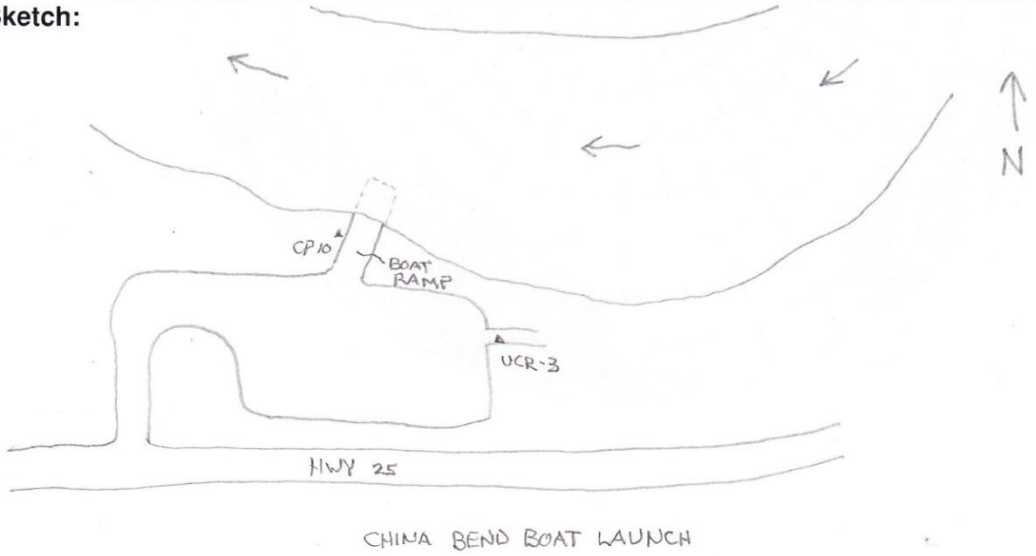
GPS STATIC OBSERVATION LOG

Job Number: AETR-0039
Receiver S/N: 5005K65410
Data Collector S/N: RS52C89516
Antenna Type: ZEPHYR 3
Ant. Measure To: BOTTOM OF ANTENNA MOUNT

DEA Office: SPK-
Date: 9/26/18
Julian Day: 269
Observer: RDW1

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
54102690	CP-10	CP-10	1.498M	4.915 FT	48-48-37.31	10:17	11:31
NOTES:					117-57-04.20		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Station Name: UCR-3

Stamping: "DEA CONTROL"

Description: Set PK Mag Nail, set at entrance to Graffiti Bar boat ramp parking lot. See sketch on reverse.

Close-up View

Observed by: David Evans and Associates, Inc.
Observation: Sept. 26, 2018
Solution Source: OPUS Static Solution (4hrs.-38min.)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.016(m)
LAT:	48° 48' 35.74321"	0.015(m)
LON:	117° 57' 02.14693"	0.008(m)
EL HGT:	379.900(m)	0.010(m)
NAVD-88 Elev.:	397.120(m)	0.030(m)

	Meters	**U.S. Feet**
Northing:	205206.602	673248.660
Easting:	711690.229	2334937.026
NAVD-88 El.:	397.120	1302.885
Convergence [degrees]	2.14625556	
Point Scale	1.00001531	
Combined Factor	0.99995578	

Horizon View

Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

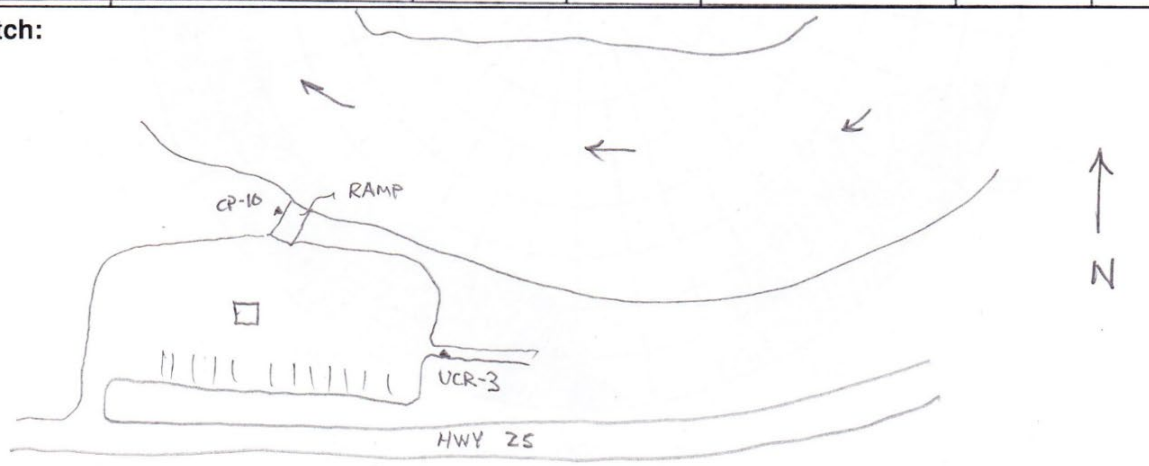
GPS STATIC OBSERVATION LOG

Job Number: AETR-0039
Receiver S/N: 5734470315
Data Collector S/N: RS1AC24076
Antenna Type: R10
Ant. Measure To: BOTTOM OF QUICK RELEASE

DEA Office: SPK -
Date: 9/26/18
Julian Day: 269
Observer: RDW1

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m) EDIT IN	HI (ft) DATA	LATITUDE LONGITUDE	START TIME	END TIME
03152690	UCR-3	UCR-3	1.498M	4.915 FT	48-48-35.77	8:21 AM	12:57
NOTES:					117-57-02.21		
NOTES:							
NOTES:							

Sketch:



CHINA BEND BOAT LAUNCH

Field Sketch

Station Name: CP-5

Stamping: "DEA CONTROL"

Description: Set 5/8" Iron Rod with red plastic cap, set on right bank of Columbia River. See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 27, 2018
Solution Source: OPUS Static Solution (4hrs.-13min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.018(m)
LAT:	48° 51' 13.76492"	0.007(m)
LON:	117° 54' 38.49487"	0.006(m)
EL HGT:	375.152(m)	0.022(m)
NAVD-88 Elev.:	392.337(m)	0.036(m)

	Meters	**U.S. Feet**
Northing:	210195.104	689615.104
Easting:	714433.739	2343938.025
NAVD-88 El.:	392.337	1287.192
Convergence [degrees]	2.17596389	
Point Scale	1.00002489	
Combined Factor	0.99996610	

Horizon View

Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

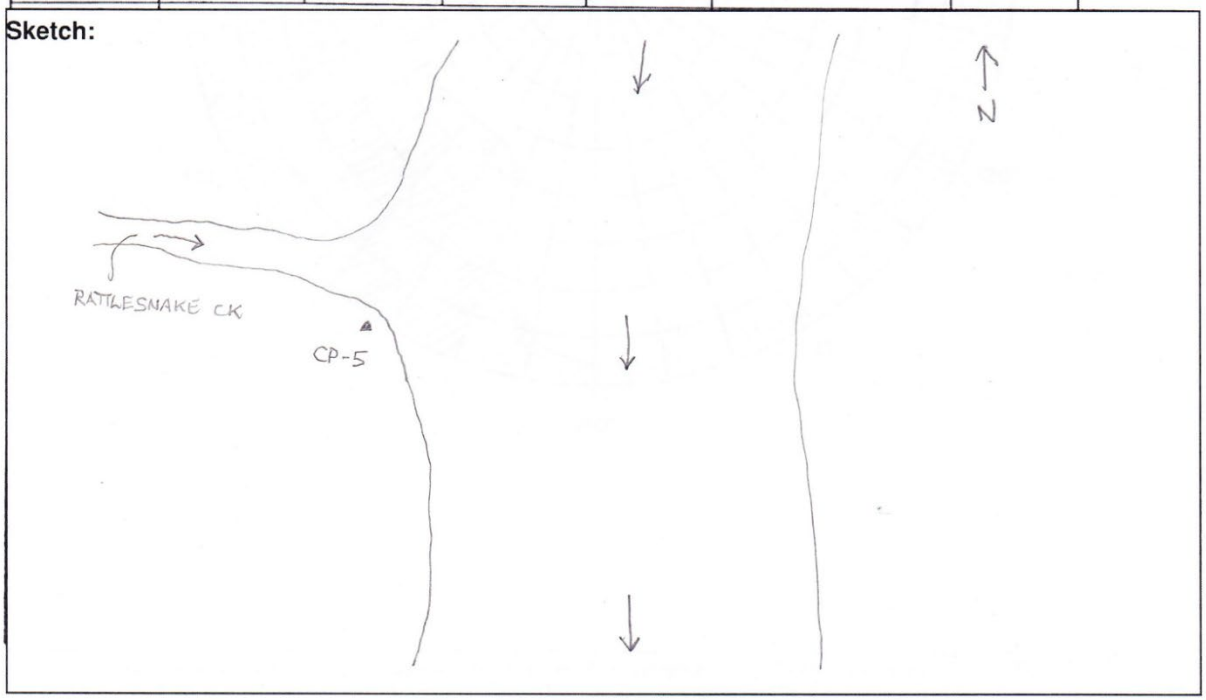
GPS STATIC OBSERVATION LOG

Job Number: AETR 0039
Receiver S/N: 5734470315
Data Collector S/N: RS1AC24076
Antenna Type: R10
Ant. Measure To: BOTTOM OF QUICK RELEASE

DEA Office: SPK
Date: 9/27/18
Julian Day: 270
Observer: RDWI

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
03152700	CP-5	CP-5	1.500 M	4.921 FT	48-51-13.76	8:43 AM	12:56 PM
NOTES:					117-54-38.56		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Station Name: USACE 1001-98

Stamping: "U.S. ARMY C OF E., 2010, 1001-98, PORTLAND DIST."

Description: Found USACE Standard Aluminum cap. Monument is located off Hwy 25, 24 mi N of jct of Hwy 25 and Hwy 395. Turn W on unnamed gravel rd opposite Clugston-Onion Creek Rd and proceed 0.2 mi to fork. Take left fork (the road less traveled) and go <0.1 mi to site on left (S) shoulder. Monument is 12' from centerline of gravel rd to N and 105' from entrance to small quarried area to E.
See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 27, 2018
Solution Source: OPUS Static Solution (4hrs.-13min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.011(m)
LAT:	48° 51' 09.21946"	0.004(m)
LON:	117° 53' 28.28440"	0.003(m)
EL HGT:	466.464(m)	0.005(m)
NAVD-88 Elev.:	483.640(m)	0.029(m)

	Meters	U.S. Feet
Northing:	210109.314	689333.641
Easting:	715869.337	2348647.983
NAVD-88 El.:	483.640	1586.742
Convergence [degrees]	2.19048611	
Point Scale	1.00002461	
Combined Factor	0.99995151	

Horizon View

Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

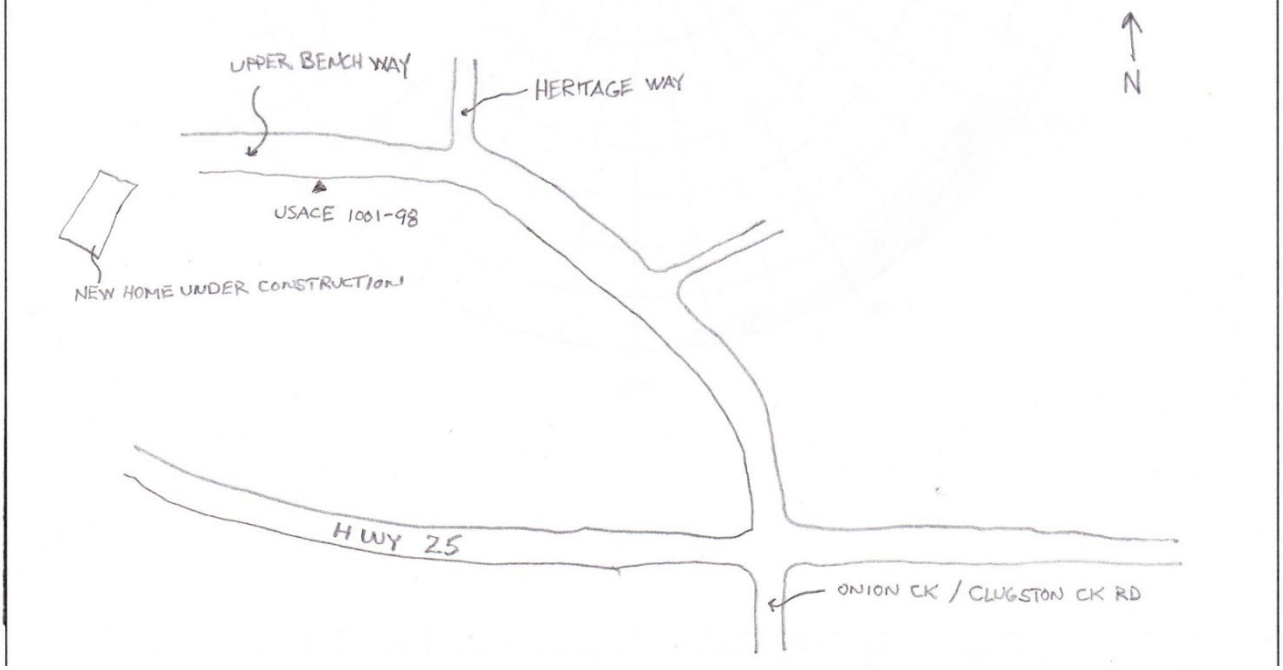
GPS STATIC OBSERVATION LOG

Job Number: AETR-0039
Receiver S/N: 5005K65410
Data Collector S/N: RS52C89514
Antenna Type: ZEPHYR 3
Ant. Measure To: BOTTOM OF ANTENNA MOUNT

DEA Office: SPK -
Date: 9/26/18
Julian Day: 269
Observer: RDW

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
54102691	USACE 1001-98	USACE 1001-98	1.500	4.921 FT	48-51-09.22	12:38 PM	5:05 PM
NOTES:					117-53-28.34		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Station Name: BLACKHAWK

Stamping: WSDOT PRIMARY REFERENCE NETWORK STATION, 1999, BLACK HAWK

Description: Found WSDOT brass disk set in the top of a round concrete monument. WSDOT Description: containing a magnetic locator and under a WSDOT monument case and cover which is set level with the ground surface. To reach the station from the southerly end of the SR 025 bridge over the Columbia river at north port (number 025/130), go southwesterly 6.37 miles along SR 025 to mark on right. It is located in the northwesterly side of SR 025, near the northwesterly side of a gravel turn-out which is on the northeasterly side of a large shared driveway leading to Sloan tractor services, 21.7 meters @ 290 degrees from the approximate centerline of SR 125 and 1.7 meters @ 125 degrees from a witness post See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 26, 2018
Solution Source: OPUS Static Solution (4hrs.-5min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.013(m)
LAT:	48° 52’ 01.67480”	0.008(m)
LON:	117° 52’ 04.79050”	0.004(m)
EL HGT:	435.335(m)	0.012(m)
NAVD-88 Elev.:	452.470(m)	0.031(m)

	Meters	**U.S. Feet**
Northing:	211793.858	694860.349
Easting:	717507.760	2354023.376
NAVD-88 El.:	452.470	1484.479
Convergence [degrees]	2.20775278	
Point Scale	1.00002792	
Combined Factor	0.99995970	

Horizon View

Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

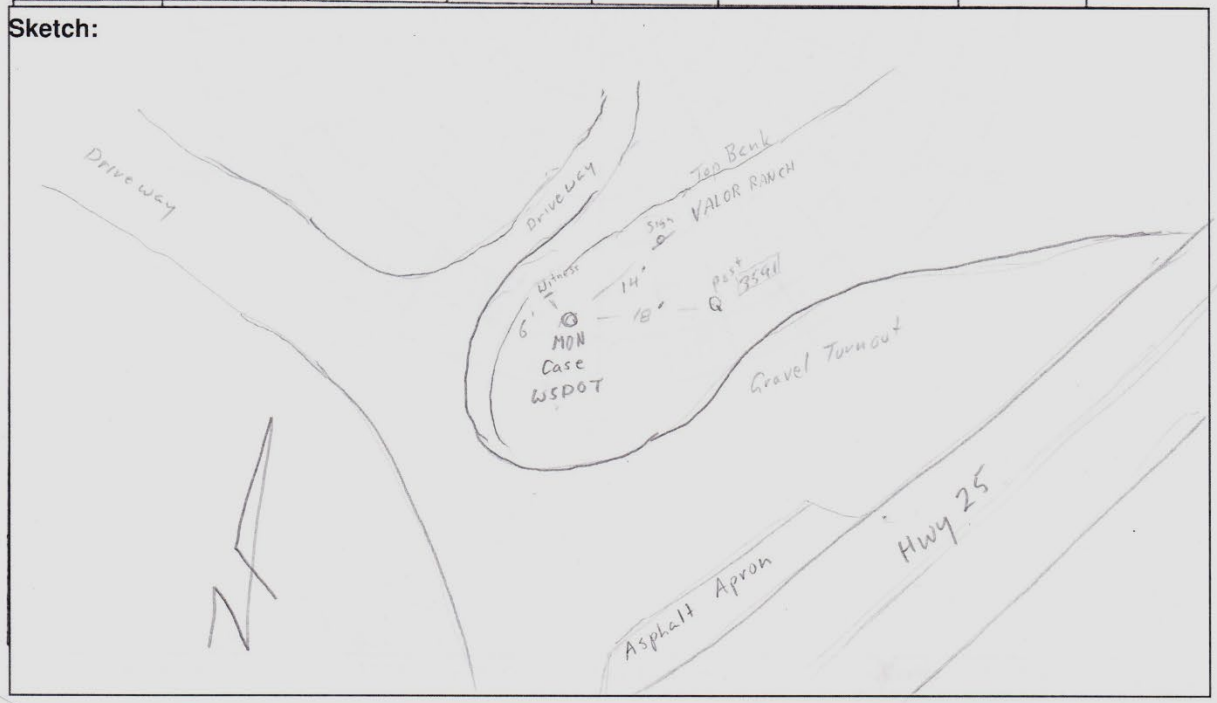
GPS STATIC OBSERVATION LOG

SPS 851

Job Number: AETR00000039 **DEA Office:** SPOKANE
Receiver S/N: 5004K65351 **Date:** 9/26/18
Data Collector S/N: RS51C89309 **Julian Day:** 269
Antenna Type: ZEPHYR 3 **Observer:** LXWO
Ant. Measure To: BOM

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
53512690	Blackhawk	Blackhawk	1.800	5.906	48° 52' 1.54" N	9:05AM	1:07 PM
NOTES:					117° 52' 4.93" W		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Station Name: CP-6

Stamping: "DEA CONTROL"

Description: Set 5/8" Iron Rod with red plastic cap, set on right bank of Columbia River. See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 26, 2018
Solution Source: OPUS Static Solution (4hrs.-17min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.014(m)
LAT:	48° 54' 01.60416"	0.006(m)
LON:	117° 49' 06.06367"	0.006(m)
EL HGT:	376.789(m)	0.009(m)
NAVD-88 Elev.:	393.840(m)	0.030(m)

	Meters	**U.S. Feet**
Northing:	215637.359	707470.235
Easting:	721002.367	2365488.599
NAVD-88 El.:	393.840	1292.123
Convergence [degrees]	2.24471667	
Point Scale	1.00003573	
Combined Factor	0.99997668	

Horizon View

Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

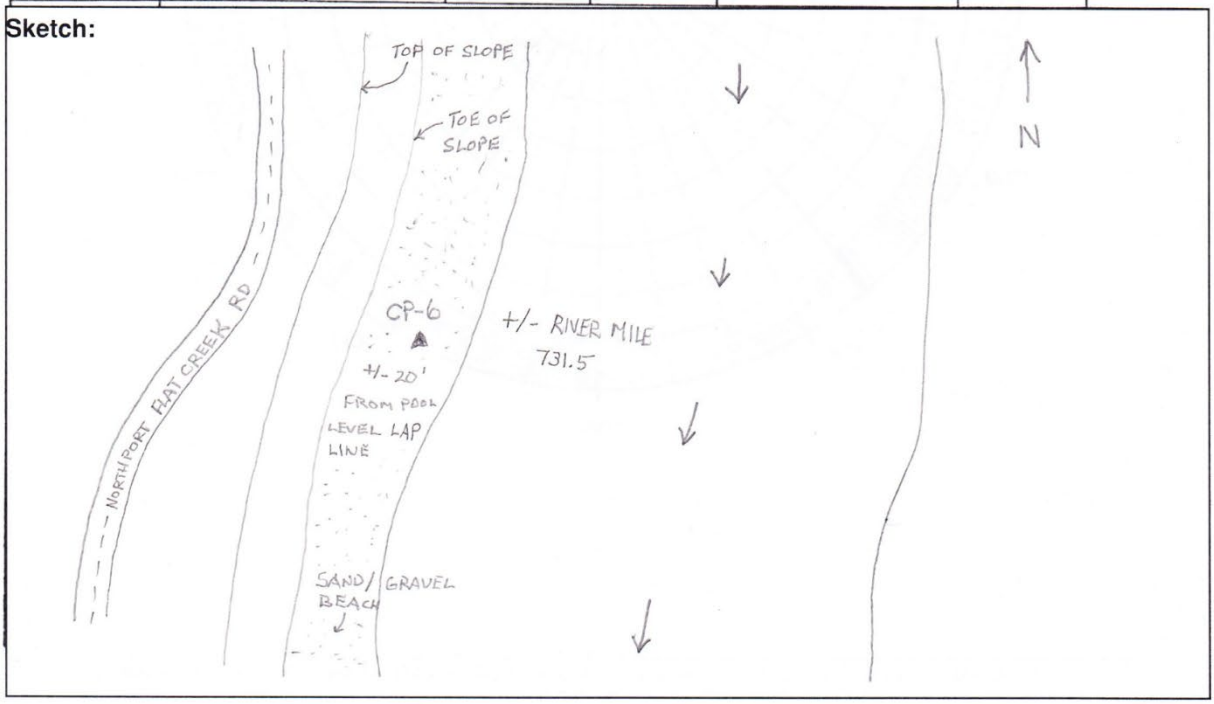
GPS STATIC OBSERVATION LOG

Job Number: AETR 0039
Receiver S/N: 5734470315
Data Collector S/N: RS1AC24076
Antenna Type: R 10
Ant. Measure To: BOTTOM OF QUICK RELEASE

DEA Office: SPK -
Date: 9/28/18
Julian Day: 271
Observer: RDWI

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
03152710	CP-6	CP-6	1.498 M	4.915 FT	48-54-01.63	8:27	12:46 PM
NOTES:					117-49-06.11		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Station Name: USACE 1001-99
Stamping: U.S. ARMY C. OF E. PORTLAND DIST. 2010 1001-99
Description: Found USACE Standard Aluminum cap. located off Hwy 25, +/- 32 miles N of jct of Hwy 25 and Hwy 395 at the SW edge of the town of Northport, WA just before the "Welcome to Northport" sign. Site is on W shoulder of Hwy 25 at the jct of Hwy 25 and an unnamed gravel rd across from Northport school, between a Smokey Bear fire danger sign and a school crossing ahead sign. Monument is 36' S from base of middle leg of Smokey Bear sign, 41' N/NW from centerline of Hwy 25, and 48' N from base of yellow school crossing ahead sign. See sketch on reverse.
Observed by: David Evans and Associates, Inc.
Observation: Sept. 26, 2018
Solution Source: OPUS Static Solution (4hrs.-5min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.012(m)
LAT:	48° 54’ 44.64040”	0.006(m)
LON:	117° 47’ 25.87063”	0.003(m)
EL HGT:	396.105(m)	0.006(m)
NAVD-88 Elev.:	413.119(m)	0.029(m)

	Meters	**U.S. Feet**
Northing:	217046.100	712092.080
Easting:	722988.835	2372005.870
NAVD-88 El.:	413.119	1355.375
Convergence [degrees]	2.26543611	
Point Scale	1.00003861	
Combined Factor	0.99997654	

Horizon View

Map

See Reverse for Field Sketch

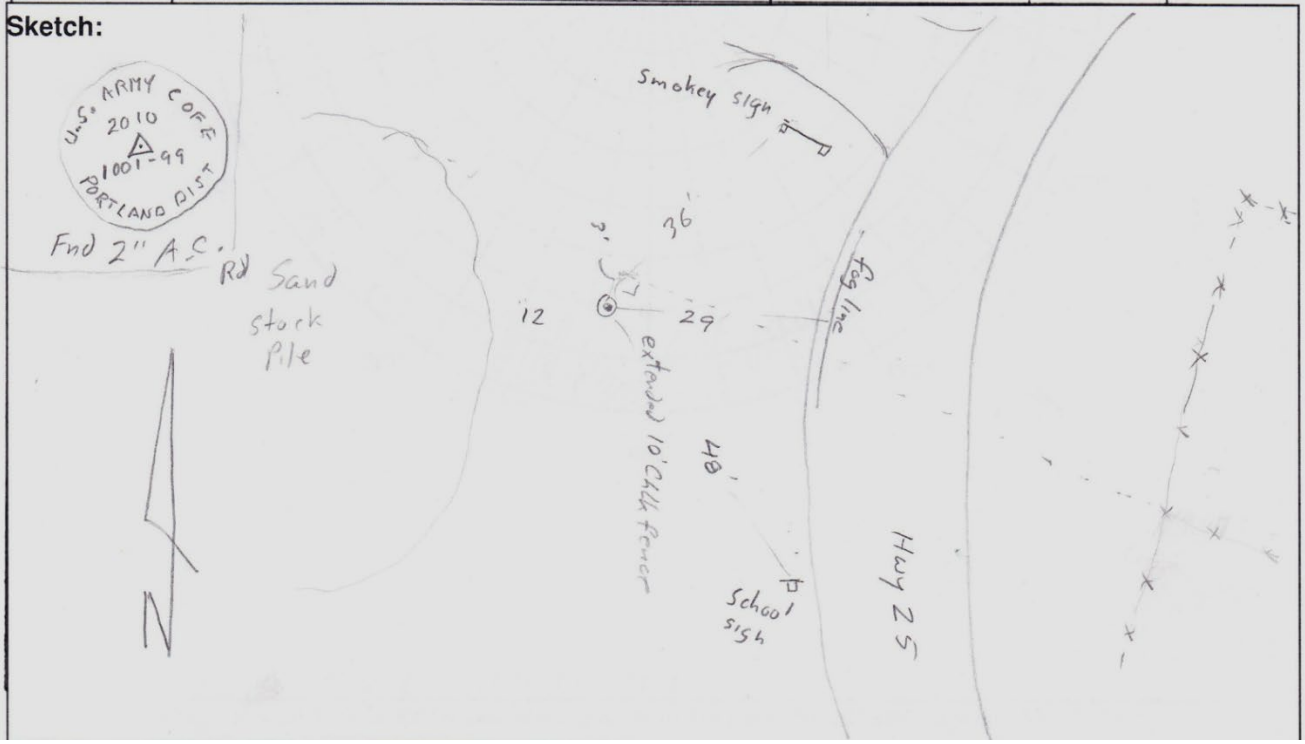
DAVID EVANS
AND ASSOCIATES INC.

GPS STATIC OBSERVATION LOG

Job Number:	AETR 00000039	**DEA Office:**	Spokane
Receiver S/N:	5004K65351	**Date:**	9/26/18
Data Collector S/N:	R551C89309	**Julian Day:**	269
Antenna Type:	ZephyR 3	**Observer:**	LXWG
Ant. Measure To:	B.O.M		

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
5351269	1001-99	1001-99	1.800	5.906	48°54'44.64"	2:08 PM	6:12 PM
NOTES:					117°47'25.87"		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Station Name: CP-7

Stamping: "DEA CONTROL"

Description: Set 5/8" Iron Rod with red plastic cap, set on left bank of Columbia River, on a gravel spit, near North Port boat launch. See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 27, 2018
Solution Source: OPUS Static Solution (4hrs.-5min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.013(m)
LAT:	48° 55' 19.90949"	0.008(m)
LON:	117° 46' 21.43826"	0.008(m)
EL HGT:	377.788(m)	0.024(m)
NAVD-88 Elev.:	394.772(m)	0.038(m)

	Meters	**U.S. Feet**
Northing:	218186.798	715834.520
Easting:	724256.448	2376164.696
NAVD-88 El.:	394.772	1295.181
Convergence [degrees]	2.27876111	
Point Scale	1.00004101	
Combined Factor	0.99998181	

Horizon View

Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

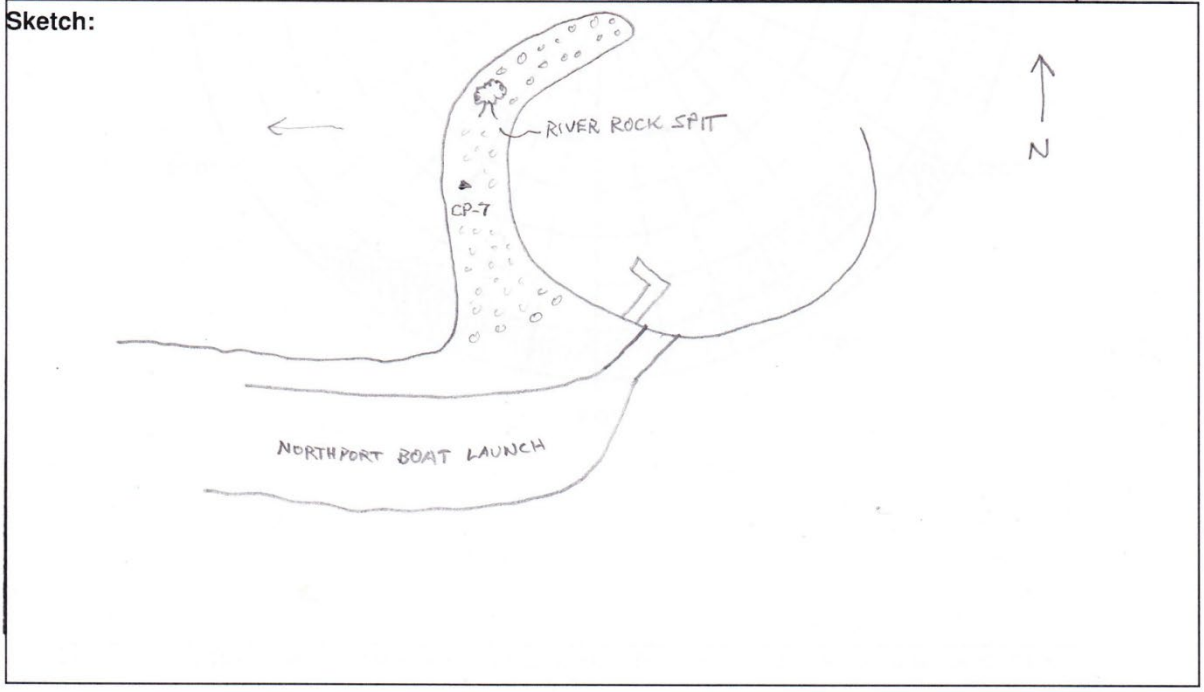
GPS STATIC OBSERVATION LOG

Job Number: AETR-0039
Receiver S/N: 5734470315
Data Collector S/N: RS1AC24076
Antenna Type: R10
Ant. Measure To: BOTTOM OF QUICK RELEASE

DEA Office: SPK-
Date: 9/26/18
Julian Day: 269
Observer: RDW1

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
03152691	CP-7	CP-7	1.498 M	4.915 FT	48-55-19.91	1:47	5:50
NOTES:					117-46-21.50		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Station Name: CP-8

Stamping: "DEA CONTROL"

Description: Set 5/8" Iron Rod with red plastic cap, set on right bank of Columbia River, on a sand spit, near Deadmans Eddy. See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 25, 2018
Solution Source: OPUS Static Solution (5hrs.-0min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.016(m)
LAT:	48° 56' 24.74592"	0.004(m)
LON:	117° 43' 57.27677"	0.006(m)
EL HGT:	377.735(m)	0.014(m)
NAVD-88 Elev.:	394.655(m)	0.032(m)

	Meters	**U.S. Feet**
Northing:	220305.592	722785.930
Easting:	727108.250	2385520.984
NAVD-88 El.:	394.655	1294.797
Convergence [degrees]	2.30857500	
Point Scale	1.00004549	
Combined Factor	0.99998629	

Horizon View

Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

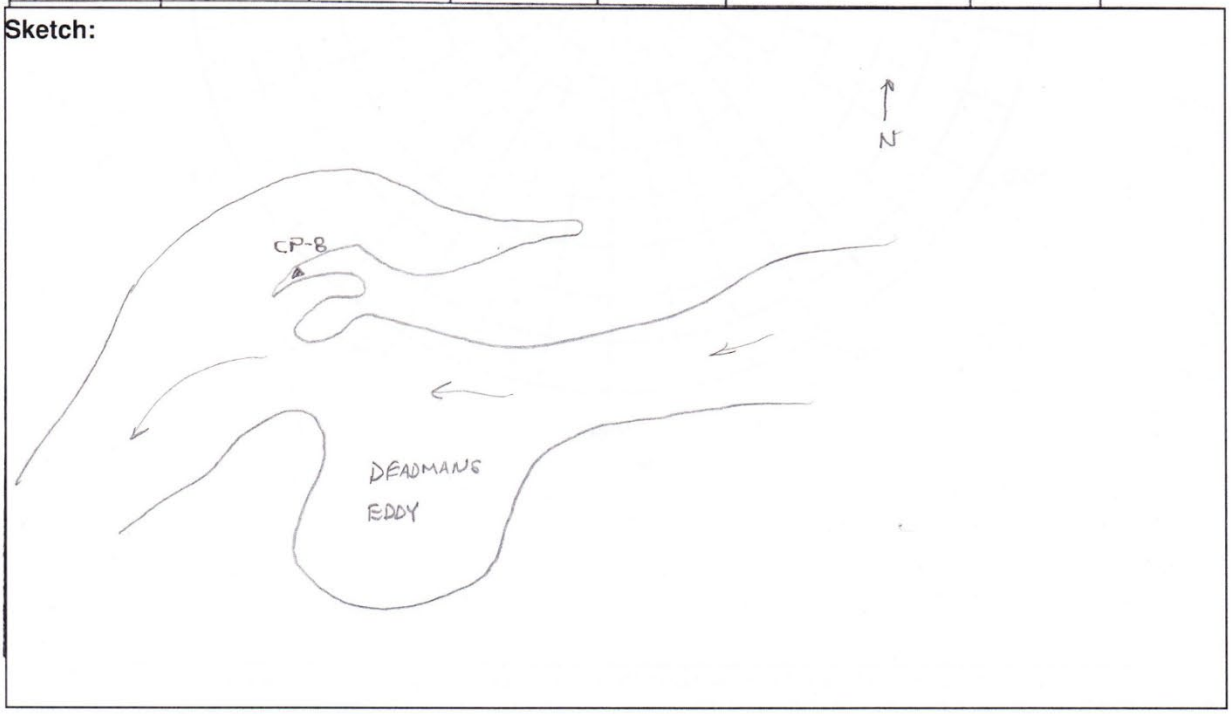
GPS STATIC OBSERVATION LOG

Job Number: AETR-0039
Receiver S/N: 5734470315
Data Collector S/N: RS1AC24076
Antenna Type: TRIMBLE R10
Ant. Measure To: BOTTOM OF QUICK RELEASE

DEA Office: SPK
Date: 9/25/18
Julian Day: 268
Observer: RDW1

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
03152680	CP-8	CP-8	1.480 M	4.856 FT	48-56-24.8	10:40	3:18
NOTES:					117-43-55		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Station Name: UCR-4

Stamping: "DEA CONTROL"

Description: Set 5/8" Iron Rod with red plastic cap, set on west side of Northport Waneta Rd.. See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 26, 2018
Solution Source: OPUS Static Solution (4hrs.-9min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.013(m)
LAT:	48° 56' 28.74106"	0.012(m)
LON:	117° 42' 42.55340"	0.007(m)
EL HGT:	459.126(m)	0.013(m)
NAVD-88 Elev.:	476.014(m)	0.032(m)

	Meters	**U.S. Feet**
Northing:	220490.370	723392.156
Easting:	728622.679	2390489.573
NAVD-88 El.:	476.014	1561.723
Convergence [degrees]	2.32403056	
Point Scale	1.00004577	
Combined Factor	0.99997382	

Horizon View

Map

See Reverse for Field Sketch

DAVID EVANS
AND ASSOCIATES INC.

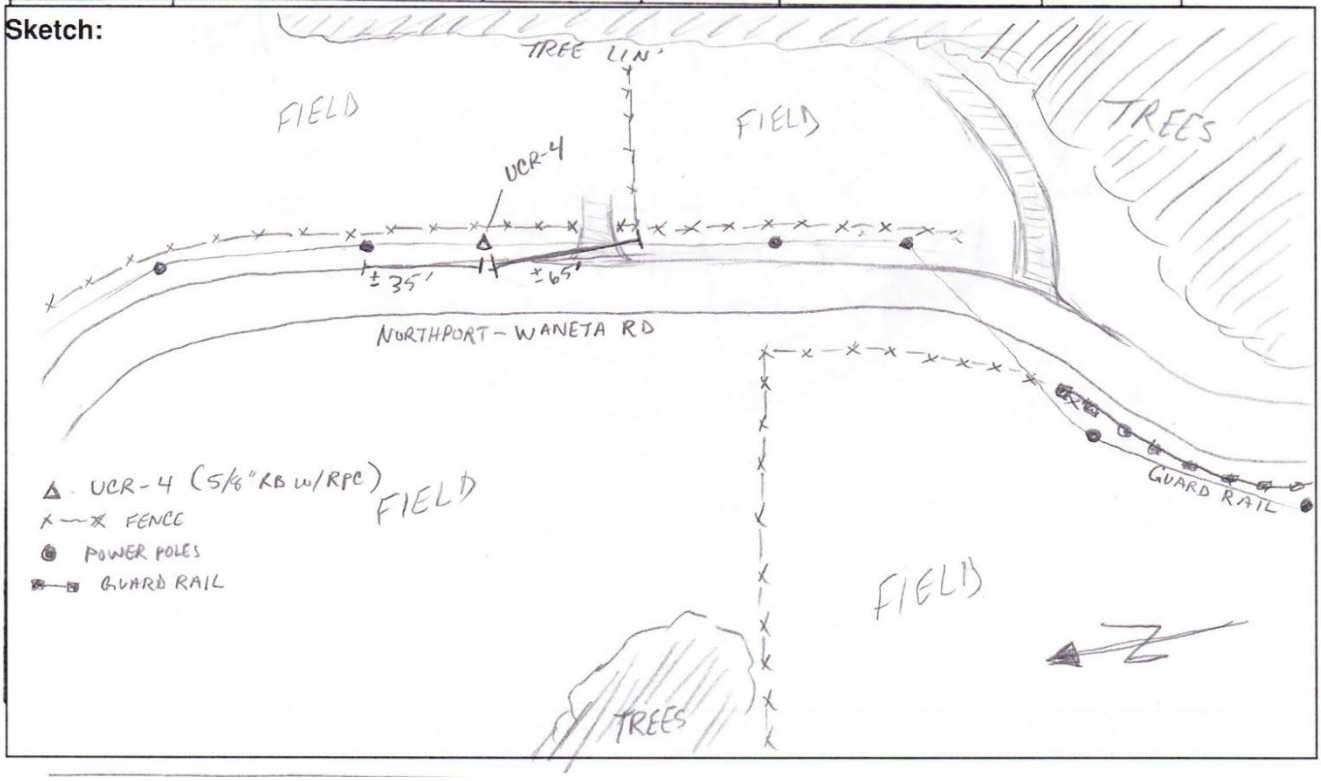
GPS STATIC OBSERVATION LOG

Job Number: AETR-0039
Receiver S/N: 4638122146
Data Collector S/N: RS33C8790
Antenna Type: TRIMBLE GNSS R8-2
Ant. Measure To: BOTTOM OF ANTENNA MOUNT

DEA Office: SPOKANE
Date: 9/26/18
Julian Day: 269
Observer: Lloyd Lamar (LEL)

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
21462691	UCR-4	UCR-4	1.8M	5.904 FT	48°56'28.703"N	9:05 A.M	1:10 PM
NOTES:					117°42'42.630"W		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Station Name: CP-9

Stamping: None

Description: Set PK MAG NAIL, set on rock outcrop, on left side of Columbia river. See sketch on reverse.

Observed by: David Evans and Associates, Inc.
Observation: Sept. 28, 2018
Solution Source: OPUS Static Solution (4hrs.-18min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.012(m)
LAT:	48° 58 15.82676”	0.006(m)
LON:	117° 38 53.29964”	0.003(m)
EL HGT:	380.806(m)	0.010(m)
NAVD-88 Elev.:	397.651(m)	0.030(m)

	Meters	**U.S. Feet**
Northing:	223986.838	734863.484
Easting:	733147.260	2405333.969
NAVD-88 El.:	397.651	1304.627
Convergence [degrees]	2.37144167	
Point Scale	1.00005341	
Combined Factor	0.99999373	

Horizon View

Map

See Reverse for Field Sketch

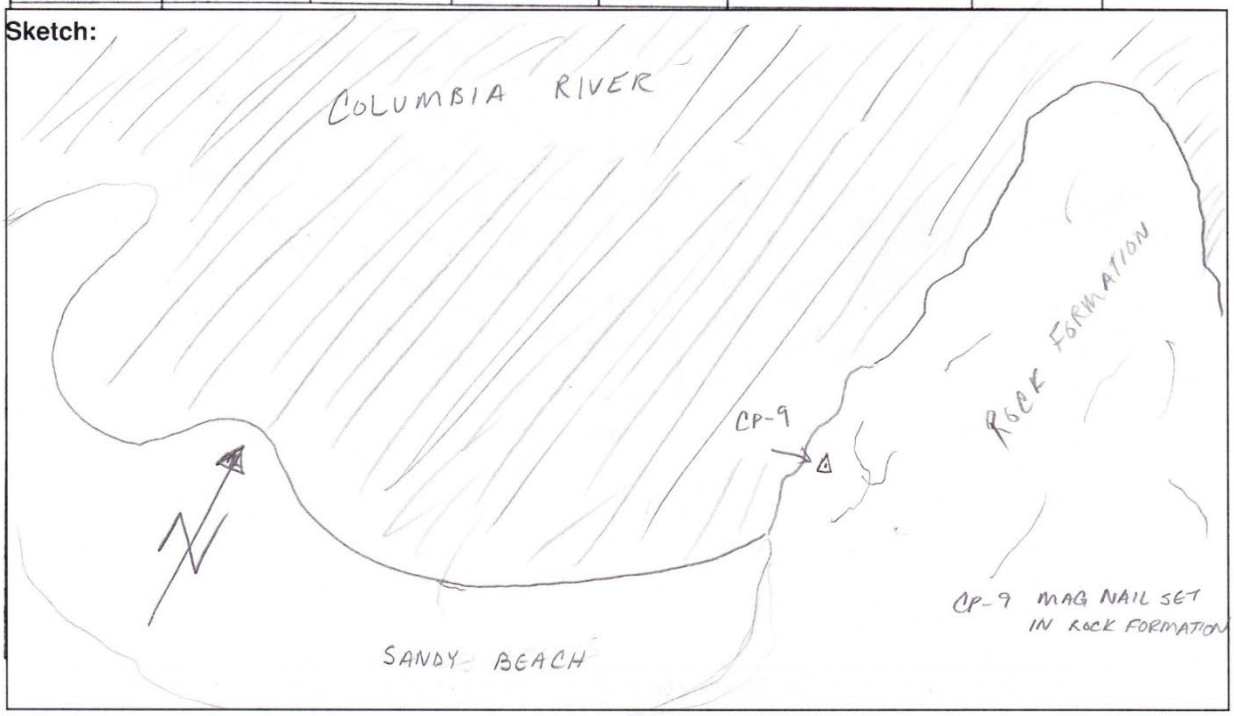
DAVID EVANS
AND ASSOCIATES INC.

GPS STATIC OBSERVATION LOG

Job Number: AETR-0039 **DEA Office:** SPOKANE
Receiver S/N: 4638122146 **Date:** 9/28/17
Data Collector S/N: R533C8790 **Julian Day:** 271
Antenna Type: TRIMBLE GNSS R8-2 **Observer:** Lloyd Lamar (LEL)
Ant. Measure To: BOTTOM OF ANTENNA MOUNT

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
21462710	CP-9	CP-9	1.5m	4.92' FT	48°58'15.862"N	8:55 AM	1:05 P.M.
NOTES:					117°38'53.398"W		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Station Name: NEW YONDER

Stamping: WSDOT, 2011, NEW YONDER, SURVEY MONUMENT

Description: Found 3.25" aluminum cap set in concrete with monument case. WASHDOT Description:
Located in the shoulder on the southerly side of Waneta Customs road, in line with the beam guardrail in the southwest sector of the intersection with north port-deep lake road, 5.6 meters @ 230 degrees from the approximate centerline of waneta road, 42.8 meters @ 280 degrees From the approximate centerline of north port waneta road, 90 cm @ 320 degrees from a witness Post, 3.3 meters @ 325 degrees from the south east end of a guard rail and 90 cm @ 145 degrees from a witness post. See sketch on reverse.
Observed by: David Evans and Associates, Inc.
Observation: Sept. 26 & 28, 2018
Solution Source: OPUS Static Solution (4hrs.-19min.)

Close-up View

REF FRAME: NAD_83(2011)(EPOCH:2010.0000)
PROJECTION: WASHINGTON State Plane Coordinates, Zone 4601 (WA-North Zone)
ELEVATION: NAVD88 (Computed using GEOID12B)

		OPUS Solution RMS (+/-)
	OVERALL RMS:	0.014(m)
LAT:	48° 59' 30.17749"	0.011(m)
LON:	117° 38' 10.9428"	0.005(m)
EL HGT:	431.335 (m)	0.009(m)
NAVD-88 Elev.:	448.16 (m)	0.030(m)

	Meters	**U.S. Feet**
Northing:	226317.495	742509.982
Easting:	733912.591	2407844.892
NAVD-88 El.:	448.160	1470.338
Convergence [degrees]	2.38020278	
Point Scale	1.00005888	
Combined Factor	0.99999128	

Horizon View

Map

See Reverse for Field Sketch

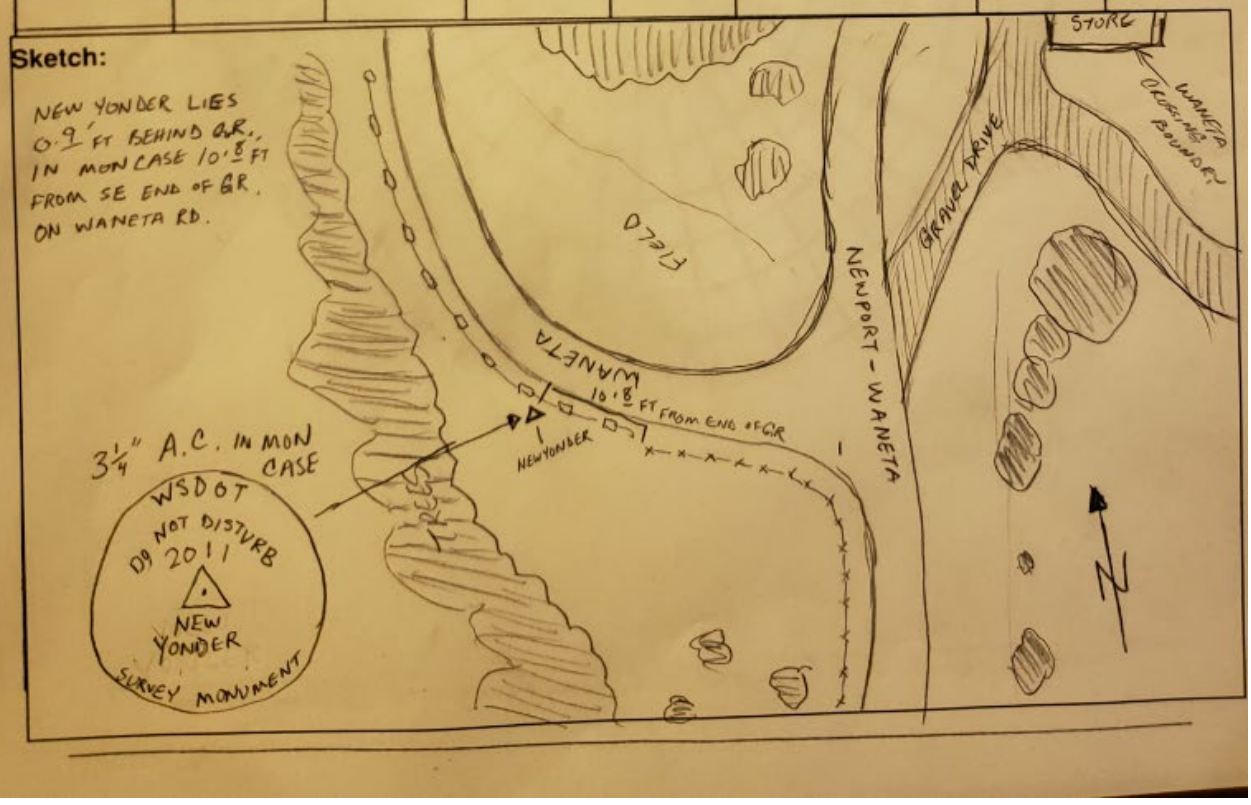
DAVID EVANS
AND ASSOCIATES INC.

GPS STATIC OBSERVATION LOG

Job Number: AETR-6039 **DEA Office:** SPOKANE
Receiver S/N: 4638122146 **Date:** 9/26/2018
Data Collector S/N: RS33C8790 **Julian Day:** 269
Antenna Type: TRIMBLE GNSS R8-2 **Observer:** LLOYD LAMAR (LEL)
Ant. Measure To: BOTTOM OF ANTENNA MOUNT

SESSION NUMBER	STATION NUMBER	STATION NAME	HI (m)	HI (ft)	LATITUDE LONGITUDE	START TIME	END TIME
1	NEWYONDER	NEWYONDER	1.8m	5.906ft	48°59'30.172" N	3:25 pm	5:30 pm
NOTES:					117°38'11.105" W		
NOTES:							
NOTES:							

Sketch:



Field Sketch

Appendix G
Survey Control Points, by Survey Date

Table G-1 Base Station and Survey Control Point Checks

Date	Base Station Location	ADCP/Imagery Control Point Check	MBES Control Point Check
10/2/18	Evans	CP-2	CP-2
10/3/18	Evans	CP-2	CP-2
10/4/18	Evans	CP-2	CP-2
10/5/18	Evans	CP-2	CP-2
10/6/18	Evans	CP-2	CP-2
10/7/18	Evans	CP-2	CP-2
10/8/18	Evans	CP-2	CP-2
10/9/18	Evans	CP-2	CP-2
10/10/18	Evans	CP-2	CP-2
10/11/18	Evans	CP-2	CP-2
10/12/18	UCR-4	CP-2	CP-7
10/13/18	UCR-4	CP-7	CP-7
10/15/18	UCR-4	UCR-7	CP-7
10/16/18	CP-10	UCR-3	CP-10
10/17/18	CP-10	UCR-3	CP-10
10/18/18	UCR-3 and Blackhawk	CP-10	CP-10
10/19/18	UCR-3 and Blackhawk	CP-10	CP-5
10/20/18	UCR-3 and Blackhawk	CP-5	CP-5
10/21/18	UCR-3 and Blackhawk	CP-10	CP-5
10/22/18	UCR-3 and Blackhawk	CP-5	CP-5
10/23/18	UCR-3 and UCR-2	CP-10	CP-10
10/24/18	UCR-2	CP-4	CP-4
10/25/18	UCR-2 and 1001-99	CP-4	CP-10
10/26/18	1001-99	CP-7	CP-7
10/29/18	1001-99 and UCR-4	CP-7	CP-7
10/30/18	1001-99 and UCR-4	CP-4	CP-7
10/31/18	1001-99 and New Yonder	CP-9	CP-7
11/1/18	1001-99	n/a	CP-7
11/2/18	1001-99	n/a	CP-7
11/3/18	1001-99	n/a	CP-7
11/4/18	1001-99	n/a	CP-7
11/5/2018	1001-99	n/a	CP-7
11/6/2018	UCR-2 and repeater at UCR-3	n/a	UCR-3
11/7/2018	UCR-2 and repeater at UCR-3	n/a	UCR-3
11/8/18	UCR-2 and repeater at UCR-3	n/a	UCR-3
11/10/18	UCR-2 and repeater at CP-10	n/a	CP-10
07/08/19	New Yonder	n/a	CP-9
07/09/19	New Yonder	n/a	CP-7
07/10/19	New Yonder	n/a	CP-7
07/11/19	New Yonder	CP-7	CP-7
07/15/19	New Yonder	n/a	CP-7
07/16/19	New Yonder	n/a	CP-9
07/17/19	New Yonder	n/a	CP-9
07/18/19	New Yonder	n/a	CP-9

Appendix H
ADCP and Imagery Data Collection
Date, Time and Spatial Coordinates

Table H-1. Underwater Imagery and Acoustic Doppler Current Measurement Locations

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
001	01	001-01_ADCP	19:02:10	10/31/2018	19.0	2406993.30	743987.99
001	01	001-01_DC	19:08:46	10/31/2018	19.0	2406994.69	743989.19
001	02	001-02_ADCP	18:46:15	10/31/2018	27.0	2407157.27	743878.20
001	02	001-02_DC	18:53:35	10/31/2018	27.0	2407157.05	743879.40
001	03	001-03_ADCP	18:37:17	10/31/2018	41.0	2407319.96	743768.31
001	03	001-03_DC	18:42:00	10/31/2018	23.0	2407311.44	743766.84
001	04	001-04_ADCP	18:26:35	10/31/2018	41.0	2407482.64	743658.51
001	04	001-04_DC	18:31:02	10/31/2018	41.0	2407487.58	743658.16
001	05	001-05_ADCP	18:19:44	10/31/2018	44.0	2407640.77	743546.73
001	05	001-05_DC	18:23:55	10/31/2018	44.0	2407646.15	743550.92
002	01	002-01_ADCP	17:27:44	10/31/2018	11.0	2406635.57	741111.25
002	01	002-01_DC	17:33:28	10/31/2018	11.0	2406633.66	741114.47
002	02	002-02_ADCP	17:35:33	10/31/2018	16.0	2406727.23	741101.83
002	02	002-02_DC	17:44:05	10/31/2018	16.0	2406724.46	741104.74
002	03	002-03_ADCP	17:47:12	10/31/2018	23.0	2406852.72	741090.15
002	03	002-03_DC	17:51:18	10/31/2018	23.0	2406854.87	741090.55
002	04	002-04_ADCP	17:54:32	10/31/2018	30.0	2406980.40	741077.67
002	04	002-04_DC	18:02:09	10/31/2018	30.0	2406986.10	741074.04
002	05	002-05_ADCP	18:04:37	10/31/2018	26.0	2407107.42	741064.20
002	05	002-05_DC	18:09:00	10/31/2018	26.0	2407108.51	741063.26
003	01	003-01_ADCP	22:29:12	10/30/2018	12.0	2406437.98	738537.49
003	01	003-01_DC	22:36:47	10/30/2018	12.0	2406440.33	738537.73
003	02	003-02_ADCP	16:52:03	10/31/2018	17.0	2406573.76	738493.29
003	02	003-02_DC	16:55:57	10/31/2018	17.0	2406578.66	738489.75
003	03	003-03_ADCP	16:59:11	10/31/2018	20.0	2406708.34	738450.42
003	03	003-03_DC	17:03:27	10/31/2018	20.0	2406709.42	738451.94
003	04	003-04_ADCP	17:05:43	10/31/2018	21.0	2406843.82	738409.01
003	04	003-04_DC	17:10:00	10/31/2018	21.0	2406845.51	738409.18
003	05	003-05_ADCP	17:13:43	10/31/2018	20.0	2406978.09	738367.54
003	05	003-05_DC	17:17:03	10/31/2018	20.0	2406972.81	738369.57
004	01	004-01_ADCP	21:34:11	10/30/2018	12.0	2406129.97	736194.21
004	01	004-01_DC	21:38:15	10/30/2018	12.0	2406132.19	736199.93
004	02	004-02_ADCP	21:42:31	10/30/2018	12.0	2406239.86	736129.07
004	02	004-02_DC	21:46:50	10/30/2018	0.0	2406240.60	736129.36
004	03	004-03_ADCP	21:53:32	10/30/2018	20.0	2406349.54	736062.45
004	03	004-03_DC	21:56:44	10/30/2018	20.0	2406349.75	736064.39
004	04	004-04_ADCP	22:01:27	10/30/2018	20.0	2406460.91	735997.25
004	04	004-04_DC	22:06:00	10/30/2018	20.0	2406460.04	735999.25
004	05	004-05_ADCP	22:09:39	10/30/2018	23.0	2406569.73	735929.50
004	05	004-05_DC	22:13:56	10/30/2018	23.0	2406567.67	735935.94
005	01	005-01_ADCP	21:04:52	10/30/2018	29.0	2404053.34	735060.44
005	01	005-01_DC	21:10:46	10/30/2018	29.0	2404049.95	735054.46
005	02	005-02_ADCP	21:18:44	10/30/2018	29.0	2404076.44	734945.00
006	01	006-01_ADCP	18:54:45	10/30/2018	27.0	2401890.93	733585.46
006	01	006-01_DC	18:57:53	10/30/2018	27.0	2401893.60	733586.77
006	02	006-02_ADCP	19:01:44	10/30/2018	30.0	2401963.79	733482.61
006	02	006-02_DC	19:05:55	10/30/2018	30.0	2401963.39	733480.71
006	03	006-03_ADCP	19:09:02	10/30/2018	28.0	2402032.68	733378.43
006	03	006-03_DC	19:12:49	10/30/2018	0.0	2402033.15	733378.69
006	04	006-04_ADCP	19:16:07	10/30/2018	29.0	2402102.19	733275.80
006	04	006-04_DC	19:19:42	10/30/2018	29.0	2402103.23	733274.68
006	05	006-05_ADCP	19:23:42	10/30/2018	30.0	2402171.81	733171.70
006	05	006-05_DC	19:26:17	10/30/2018	30.0	2402171.99	733172.09
007	01	007-01_ADCP	18:03:48	10/30/2018	32.0	2399563.55	732316.31
007	01	007-01_DC	18:08:58	10/30/2018	0.0	2399564.62	732316.45
007	02	007-02_ADCP	18:12:24	10/30/2018	42.0	2399631.55	732219.68
007	02	007-02_DC	18:16:51	10/30/2018	42.0	2399631.57	732219.87
007	03	007-03_ADCP	18:21:58	10/30/2018	37.0	2399698.66	732124.19

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
007	03	007-03_DC	18:25:40	10/30/2018	37.0	2399697.37	732123.89
007	04	007-04_ADCP	18:30:45	10/30/2018	38.0	2399766.59	732028.02
007	04	007-04_DC	18:33:52	10/30/2018	38.0	2399767.24	732026.87
007	05	007-05_ADCP	18:36:32	10/30/2018	33.0	2399834.95	731931.43
007	05	007-05_DC	18:40:56	10/30/2018	33.0	2399835.26	731932.23
008	01	008-01_ADCP	17:14:52	10/30/2018	22.0	2397615.33	730444.25
008	01	008-01_DC	17:19:25	10/30/2018	22.0	2397615.33	730444.33
008	02	008-02_ADCP	17:23:13	10/30/2018	21.0	2397727.12	730359.99
008	02	008-02_DC	17:26:54	10/30/2018	21.0	2397728.97	730360.38
008	03	008-03_ADCP	17:29:48	10/30/2018	20.0	2397838.25	730275.45
008	03	008-03_DC	17:33:53	10/30/2018	20.0	2397838.07	730275.46
008	04	008-04_ADCP	17:36:28	10/30/2018	17.0	2397949.57	730191.35
008	04	008-04_DC	17:40:39	10/30/2018	17.0	2397949.16	730191.17
008	05	008-05_ADCP	17:43:58	10/30/2018	13.0	2398060.39	730107.52
008	05	008-05_DC	17:47:34	10/30/2018	13.0	2398060.84	730106.59
009	01	009-01_ADCP	16:30:37	10/30/2018	18.0	2395654.97	728985.76
009	01	009-01_DC	16:34:37	10/30/2018	18.0	2395656.44	728985.72
009	02	009-02_ADCP	16:38:44	10/30/2018	31.0	2395707.14	728877.05
009	02	009-02_DC	16:43:18	10/30/2018	31.0	2395706.75	728881.59
009	03	009-03_ADCP	16:46:20	10/30/2018	34.0	2395757.58	728771.65
009	03	009-03_DC	16:50:28	10/30/2018	34.0	2395758.98	728772.74
009	04	009-04_ADCP	16:53:08	10/30/2018	27.0	2395809.30	728663.04
009	04	009-04_DC	16:56:55	10/30/2018	27.0	2395808.26	728661.75
009	05	009-05_ADCP	17:01:04	10/30/2018	21.0	2395862.66	728555.06
009	05	009-05_DC	17:03:49	10/30/2018	21.0	2395863.60	728555.37
010	01	010-01_ADCP	23:00:18	10/29/2018	36.0	2393402.74	727702.78
010	01	010-01_DC	23:04:05	10/29/2018	36.0	2393403.02	727704.00
010	02	010-02_ADCP	23:07:00	10/29/2018	43.0	2393423.94	727606.21
010	02	010-02_DC	23:11:18	10/29/2018	43.0	2393423.69	727607.31
010	03	010-03_ADCP	23:16:41	10/29/2018	44.0	2393445.84	727511.46
010	03	010-03_DC	23:18:52	10/29/2018	44.0	2393445.71	727511.65
010	04	010-04_ADCP	23:24:22	10/29/2018	37.0	2393467.43	727413.97
010	04	010-04_DC	23:27:55	10/29/2018	37.0	2393469.09	727414.08
010	05	010-05_ADCP	23:30:37	10/29/2018	21.0	2393488.76	727318.34
010	05	010-05_DC	23:34:26	10/29/2018	21.0	2393491.85	727319.20
011	01	011-01_ADCP	22:47:18	10/29/2018	47.0	2390908.82	726773.62
011	01	011-01_DC	22:50:06	10/29/2018	47.0	2390910.19	726771.59
011	02	011-02_ADCP	22:39:33	10/29/2018	53.0	2390964.01	726674.46
011	02	011-02_DC	22:43:06	10/29/2018	53.0	2390965.51	726670.97
011	03	011-03_ADCP	22:30:29	10/29/2018	34.0	2391018.59	726573.31
011	03	011-03_DC	22:35:22	10/29/2018	34.0	2391019.98	726571.31
011	04	011-04_ADCP	22:23:47	10/29/2018	23.0	2391075.05	726474.15
011	04	011-04_DC	22:28:02	10/29/2018	23.0	2391076.24	726473.32
011	05	011-05_ADCP	22:17:17	10/29/2018	17.0	2391126.93	726373.26
011	05	011-05_DC	22:20:15	10/29/2018	17.0	2391128.80	726375.71
012	04	012-04_ADCP	22:00:14	10/29/2018	18.0	2389670.06	724538.29
012	04	012-04_DC	22:04:16	10/29/2018	18.0	2389671.70	724539.87
012	05	012-05_ADCP	21:49:40	10/29/2018	30.0	2389878.54	724482.48
012	05	012-05_DC	21:52:30	10/29/2018	30.0	2389875.12	724487.13
013	01	013-10_DC	12:49:54	7/11/2019	13.2	2389431.06	723469.94
013	02	013-02_ADCP	17:25:10	10/15/2018	23.4	2389086.11	723824.45
013	02	013-02_DC	17:29:32	10/15/2018	23.4	2389080.22	723824.15
013	03	013-03_ADCP	17:35:02	10/15/2018	44.3	2389128.39	723780.88
013	03	013-03_DC	17:44:46	10/15/2018	45.1	2389130.55	723775.80
013	04	013-04_ADCP	17:52:59	10/15/2018	54.3	2389170.68	723733.12
013	04	013-04_DC	18:00:44	10/15/2018	54.6	2389171.46	723735.42
013	05	013-05_ADCP	21:49:47	10/15/2018	66.2	2389215.65	723689.33
013	05	013-05_DC	21:53:26	10/15/2018	65.5	2389214.83	723687.27
013	06	013-06_ADCP	22:01:36	10/15/2018	77.5	2389258.60	723648.35
013	06	013-06_DC	22:11:27	10/15/2018	78.8	2389260.69	723647.50

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
013	07	013-07_ADCP	22:18:36	10/15/2018	66.4	2389298.19	723604.14
013	07	013-07_DC	22:26:52	10/15/2018	74.9	2389303.96	723601.31
013	09	013-09_DC	12:36:03	7/11/2019	21.4	2389388.17	723518.30
013	10	013-13_DC	12:49:54	7/11/2019	13.2	2389431.06	723469.94
014	01	014-01_ADCP	* 18:03:00	10/13/2018	13.4	2388378.02	723076.36
014	01	014-01_DC	* 18:17:00	10/13/2018	13.2	2388382.37	723074.34
014	02	014-02_ADCP	* 18:24:00	10/13/2018	25.2	2388420.41	723021.95
014	02	014-02_DC	* 18:55:00	10/13/2018	24.8	2388416.78	723017.18
014	03	014-03_ADCP	* 18:58:00	10/13/2018	27.1	2388461.58	722965.44
014	03	014-03_DC	* 19:03:00	10/13/2018	26.6	2388459.66	722963.70
014	04	014-04_ADCP	* 19:10:00	10/13/2018	23.8	2388501.42	722909.41
014	04	014-04_DC	* 19:20:00	10/13/2018	23.8	2388500.07	722904.81
014	05	014-05_ADCP	* 19:25:00	10/13/2018	17.8	2388541.12	722853.31
014	05	014-05_DC	* 19:37:00	10/13/2018	17.9	2388546.66	722857.15
014	06	014-06_ADCP	* 19:45:00	10/13/2018	13.7	2388587.97	722794.88
014	06	014-06_DC	* 19:53:00	10/13/2018	13.9	2388581.64	722796.73
015	01	015-01_ADCP	* 21:25:00	10/13/2018	12.7	2387543.33	722454.34
015	01	015-01_DC	* 21:32:00	10/13/2018	12.4	2387545.74	722458.37
015	02	015-02_ADCP	* 21:38:00	10/13/2018	14.2	2387616.84	722383.05
015	02	015-02_DC	* 21:44:00	10/13/2018	14.5	2387614.79	722375.65
015	03	015-03_ADCP	* 21:46:00	10/13/2018	16.1	2387691.67	722306.23
015	03	015-03_DC	* 21:51:00	10/13/2018	16.1	2387684.05	722305.19
015	04	015-04_ADCP	* 21:54:00	10/13/2018	16.9	2387765.51	722235.14
015	04	015-04_DC	* 22:01:00	10/13/2018	18.1	2387761.66	722230.80
015	05	015-05_ADCP	* 22:08:00	10/13/2018	14.1	2387837.79	722164.31
015	05	015-05_DC	* 22:17:00	10/13/2018	14.8	2387845.26	722166.28
015	06	015-06_ADCP	16:41:22	10/15/2018	12.9	2387913.78	722090.64
015	06	015-06_DC	16:47:53	10/15/2018	11.9	2387916.71	722096.93
015	07	015-07_ADCP	16:53:26	10/15/2018	14.2	2387990.09	722018.35
015	07	015-07_DC	16:57:20	10/15/2018	14.4	2387994.41	722022.37
015	08	015-08_ADCP	17:02:54	10/15/2018	11.2	2388064.62	721945.36
015	08	015-08_DC	17:08:17	10/15/2018	11.2	2388062.34	721945.43
015	10	015-10_DC	11:16:18	7/11/2019	13.2	2388215.89	721804.59
015	10	015-10_DC	11:23:37	7/11/2019	13.2	2388215.11	721804.36
016	01	016-01_ADCP	18:20:30	10/15/2018	13.7	2387397.08	722286.71
016	01	016-01_DC	18:27:25	10/15/2018	13.4	2387398.18	722283.85
016	02	016-02_ADCP	18:32:37	10/15/2018	12.1	2387387.23	722076.28
016	02	016-02_DC	18:38:09	10/15/2018	11.6	2387384.12	722075.09
016	03	016-03_ADCP	18:44:36	10/15/2018	10.5	2387373.03	721867.16
016	03	016-03_DC	18:50:32	10/15/2018	10.2	2387372.10	721868.37
016	04	016-04_ADCP	18:57:29	10/15/2018	11.0	2387359.09	721654.63
016	04	016-04_DC	19:03:42	10/15/2018	10.8	2387361.03	721652.11
016	05	016-05_ADCP	19:10:02	10/15/2018	15.1	2387348.05	721445.14
016	05	016-05_DC	19:13:43	10/15/2018	14.9	2387352.41	721445.91
016	06	016-06_ADCP	19:51:47	10/15/2018	18.5	2387336.51	721230.69
016	06	016-06_DC	19:55:56	10/15/2018	18.9	2387339.66	721233.74
016	07	016-07_ADCP	20:02:26	10/15/2018	17.8	2387324.70	721020.47
016	07	016-07_DC	20:07:40	10/15/2018	17.4	2387320.36	721017.43
016	08	016-08_ADCP	20:19:15	10/15/2018	20.1	2387312.85	720811.15
016	08	016-08_DC	20:26:48	10/15/2018	19.1	2387316.40	720809.88
016	09	016-09_ADCP	20:41:05	10/15/2018	17.5	2387300.97	720599.11
016	09	016-09_DC	20:50:36	10/15/2018	16.8	2387300.60	720601.12
016	10	016-10_ADCP	21:04:48	10/15/2018	24.1	2387288.21	720388.06
016	10	016-10_DC	21:13:08	10/15/2018	21.5	2387289.70	720389.23
017	01	017-01_ADCP	* 21:15:00	10/13/2018	9.8	2387199.93	722280.70
017	01	017-01_DC	* 21:20:00	10/13/2018	10.3	2387200.45	722275.03
017	02	017-02_ADCP	* 21:02:00	10/13/2018	12.2	2387123.78	722098.04
017	02	017-02_DC	* 21:10:00	10/13/2018	11.8	2387127.08	722094.24
017	06	017-06_ADCP	* 20:44:00	10/13/2018	46.5	2386826.52	721381.26
017	06	017-06_DC	* 20:51:00	10/13/2018	48.6	2386827.06	721379.71

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
017	07	017-07_ADCP	* 20:30:00	10/13/2018	49.6	2386753.48	721203.63
017	07	017-07_DC	* 20:38:00	10/13/2018	50.5	2386748.39	721203.83
017	08	017-08_ADCP	22:49:38	10/12/2018	39.5	2386678.87	721023.28
017	08	017-08_DC	22:54:29	10/12/2018	38.9	2386680.06	721026.10
017	09	017-09_ADCP	22:28:46	10/12/2018	35.6	2386604.37	720842.90
017	09	017-09_DC	22:37:29	10/12/2018	36.0	2386602.37	720844.36
017	10	017-10_ADCP	22:04:13	10/12/2018	33.3	2386528.99	720664.19
017	10	017-10_DC	22:15:30	10/12/2018	34.2	2386533.02	720664.54
018	01	018-01_DC	14:01:35	7/11/2019	6.1	2386558.71	722264.83
018	02	018-02_DC	13:54:48	7/11/2019	8.2	2386516.36	722143.46
018	03	018-03_ADCP	20:50:19	10/12/2018	9.1	2386481.89	722040.29
018	03	018-03_DC	20:55:08	10/12/2018	10.7	2386478.04	722039.80
018	04	018-04_ADCP	21:01:01	10/12/2018	20.1	2386446.38	721935.10
018	04	018-04_DC	21:10:06	10/12/2018	22.9	2386440.59	721939.30
018	05	018-05_ADCP	21:18:08	10/12/2018	20.6	2386420.85	721851.64
018	05	018-05_DC	21:23:41	10/12/2018	24.6	2386426.22	721858.60
018	06	018-06_ADCP	21:36:44	10/12/2018	38.7	2386367.37	721701.74
018	06	018-06_ADCP	21:48:50	10/12/2018	23.4	2386334.59	721601.30
018	06	018-06_DC	21:41:50	10/12/2018	34.8	2386373.94	721702.04
018	06	018-06_DC	21:54:09	10/12/2018	25.5	2386324.46	721601.55
018	08	018-08_DC	14:12:00	7/11/2019	16.8	2386296.56	721486.29
018	09	018-09_DC	14:18:15	7/11/2019	9.6	2386252.74	721363.42
018	10	018-10_DC	14:24:31	7/11/2019	14.2	2386210.77	721243.50
019	03	019-03_DC	13:42:21	7/11/2019	5	2385717.59	722458.08
019	04	019-04_ADCP	18:53:58	10/12/2018	14.9	2385679.48	722342.65
019	04	019-04_DC	18:58:30	10/12/2018	14.8	2385678.48	722343.58
019	05	019-05_ADCP	19:07:14	10/12/2018	23.8	2385616.82	722145.64
019	05	019-05_DC	19:12:23	10/12/2018	23.9	2385610.82	722150.76
019	06	019-06_ADCP	19:21:04	10/12/2018	29.4	2385575.76	722019.54
019	06	019-06_DC	19:26:54	10/12/2018	27.9	2385578.47	722024.35
019	07	019-07_ADCP	19:36:11	10/12/2018	34.3	2385530.52	721880.72
019	07	019-07_DC	19:43:50	10/12/2018	35.6	2385526.54	721881.92
019	08	019-08_ADCP	19:51:48	10/12/2018	18.4	2385494.69	721763.22
019	08	019-08_DC	19:55:01	10/12/2018	22.5	2385496.64	721762.68
020	01	020-01_ADCP	16:42:37	10/12/2018	17.7	2384952.44	723390.18
020	01	020-01_DC	16:56:30	10/12/2018	16.8	2384948.74	723386.25
020	03	020-03_ADCP	17:03:30	10/12/2018	16.5	2384914.71	723042.24
020	03	020-03_DC	17:08:55	10/12/2018	17.3	2384914.70	723032.88
020	04	020-04_ADCP	17:14:46	10/12/2018	0.0	2384897.44	722892.54
020	04	020-04_DC	17:19:47	10/12/2018	32.3	2384897.70	722894.73
020	05	020-05_ADCP	17:27:20	10/12/2018	39.6	2384883.51	722765.21
020	05	020-05_DC	17:33:43	10/12/2018	33.5	2384885.18	722763.97
020	06	020-06_ADCP	17:45:34	10/12/2018	37.1	2384868.80	722627.04
020	06	020-06_DC	17:51:27	10/12/2018	37.1	2384872.05	722629.68
020	07	020-07_ADCP	17:59:46	10/12/2018	24.9	2384852.83	722489.75
020	07	020-07_DC	18:02:15	10/12/2018	23.9	2384851.08	722494.56
020	08	020-08_ADCP	18:14:16	10/12/2018	15.2	2384841.44	722359.98
020	08	020-08_DC	18:19:51	10/12/2018	14.5	2384836.64	722366.70
020	09	020-09_ADCP	18:29:06	10/12/2018	10.0	2384827.93	722232.73
020	09	020-09_DC	18:31:35	10/12/2018	10.9	2384825.29	722236.48
20	10	020-10_DC	14:34:33	7/11/2019	6.5	2384794.13	721938.27
021	01	021-01_ADCP	21:27:47	10/29/2018	34.0	2384239.38	723249.98
021	01	021-01_DC	21:30:11	10/29/2018	34.0	2384239.35	723248.96
021	02	021-02_ADCP	21:12:23	10/29/2018	34.0	2384241.49	723079.16
021	02	021-02_DC	21:18:49	10/29/2018	34.0	2384244.13	723076.09
021	03	021-03_ADCP	21:00:52	10/29/2018	36.0	2384243.13	722908.32
021	03	021-03_DC	21:07:18	10/29/2018	36.0	2384244.68	722906.92
021	04	021-04_ADCP	20:51:22	10/29/2018	22.0	2384245.78	722739.22
021	04	021-04_DC	20:53:17	10/29/2018	22.0	2384247.37	722737.38
021	05	021-05_ADCP	20:33:24	10/29/2018	10.0	2384250.34	722639.09

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
021	05	021-05_DC	20:44:27	10/29/2018	10.0	2384249.43	722638.94
022	01	022-01_ADCP	18:43:38	10/29/2018	29.0	2381768.90	722056.12
022	01	022-01_DC	18:46:21	10/29/2018	29.0	2381772.22	722058.47
022	02	022-02_ADCP	18:51:19	10/29/2018	29.0	2381900.04	721900.78
022	02	022-02_DC	18:55:28	10/29/2018	29.0	2381903.95	721905.61
022	04	022-04_ADCP	19:04:45	10/29/2018	47.0	2382159.25	721586.80
022	04	022-04_DC	19:08:51	10/29/2018	47.0	2382173.45	721583.00
022	05	022-05_ADCP	19:13:24	10/29/2018	16.0	2382298.92	721421.88
022	05	022-05_DC	19:16:21	10/29/2018	16.0	2382298.02	721423.57
023	01	023-01_ADCP	18:19:39	10/29/2018	26.0	2379987.56	721239.61
023	01	023-01_DC	18:24:20	10/29/2018	26.0	2379991.75	721239.56
023	02	023-02_ADCP	18:11:15	10/29/2018	35.0	2379983.44	721081.20
023	02	023-02_DC	18:15:40	10/29/2018	35.0	2379987.36	721076.74
023	03	023-03_ADCP	18:04:40	10/29/2018	32.0	2379977.00	720920.17
023	03	023-03_DC	18:08:19	10/29/2018	32.0	2379978.75	720919.63
023	04	023-04_ADCP	17:55:12	10/29/2018	24.0	2379974.95	720761.47
023	04	023-04_DC	17:59:01	10/29/2018	24.0	2379972.24	720762.69
023	05	023-05_ADCP	17:47:29	10/29/2018	17.0	2379967.33	720602.17
023	05	023-05_DC	17:50:44	10/29/2018	17.0	2379969.48	720604.50
024	02	024-02_ADCP	17:32:01	10/29/2018	26.0	2378641.68	719717.75
024	02	024-02_DC	17:37:16	10/29/2018	26.0	2378645.35	719723.50
024	03	024-03_ADCP	17:23:06	10/29/2018	38.0	2378771.72	719728.08
024	03	024-03_DC	17:28:05	10/29/2018	38.0	2378773.06	719732.07
024	04	024-04_ADCP	17:14:18	10/29/2018	53.0	2378901.75	719737.77
024	04	024-04_DC	17:18:43	10/29/2018	53.0	2378898.08	719741.82
024	05	024-05_ADCP	17:05:01	10/29/2018	58.0	2379032.76	719752.20
024	05	024-05_DC	17:10:20	10/29/2018	58.0	2379033.31	719755.93
025	01	025-01_ADCP	16:08:26	10/29/2018	10.0	2377125.09	717876.05
025	01	025-01_DC	16:13:21	10/29/2018	10.0	2377126.77	717876.09
025	01	025-01_DC	16:24:27	10/29/2018	26.0	2377252.97	717796.60
025	02	025-02_ADCP	16:21:05	10/29/2018	26.0	2377249.65	717797.94
025	03	025-03_ADCP	16:30:29	10/29/2018	34.0	2377376.89	717718.00
025	03	025-03_DC	16:33:31	10/29/2018	34.0	2377376.98	717712.85
025	04	025-04_ADCP	16:37:43	10/29/2018	40.0	2377503.54	717638.23
025	04	025-04_DC	16:42:26	10/29/2018	40.0	2377505.45	717635.74
025	05	025-05_ADCP	16:47:41	10/29/2018	33.0	2377629.21	717559.54
025	05	025-05_DC	16:50:19	10/29/2018	33.0	2377629.80	717561.04
026	01	026-01_ADCP	22:57:20	10/26/2018	54.0	2375387.54	716370.11
026	01	026-01_DC	22:59:01	10/26/2018	54.0	2375388.62	716375.37
026	02	026-02_ADCP	23:03:57	10/26/2018	36.0	2375450.97	716209.72
026	02	026-02_DC	23:06:12	10/26/2018	36.0	2375455.23	716215.13
026	03	026-03_ADCP	23:09:46	10/26/2018	22.0	2375515.38	716049.74
026	03	026-03_DC	23:13:09	10/26/2018	22.0	2375520.83	716049.50
026	04	026-04_ADCP	23:23:58	10/26/2018	15.0	2375577.56	715890.16
026	04	026-04_DC	23:28:03	10/26/2018	15.0	2375584.03	715895.45
026	05	026-05_DC	23:39:42	10/26/2018	10.0	2375601.14	715843.29
026	5-	026-5-_ADCP	23:31:30	10/26/2018	10.0	2375597.29	715840.97
027	01	027-01_ADCP	22:40:59	10/26/2018	26.0	2373268.49	715427.69
027	01	027-01_DC	22:44:50	10/26/2018	26.0	2373272.99	715431.64
027	02	027-02_ADCP	22:36:11	10/26/2018	32.0	2373321.94	715235.79
027	02	027-02_DC	22:38:00	10/26/2018	32.0	2373325.84	715233.87
027	03	027-03_ADCP	22:26:15	10/26/2018	34.0	2373374.58	715045.79
027	03	027-03_DC	22:30:01	10/26/2018	34.0	2373372.97	715045.74
027	04	027-04_ADCP	22:17:45	10/26/2018	27.0	2373428.94	714855.83
027	04	027-04_DC	22:21:50	10/26/2018	27.0	2373428.87	714854.48
027	05	027-05_ADCP	22:06:20	10/26/2018	10.0	2373476.22	714689.14
027	05	027-05_DC	22:11:52	10/26/2018	10.0	2373474.46	714688.52
028	01	028-01_ADCP	21:19:28	10/26/2018	27.0	2371033.16	713980.32
028	01	028-01_DC	21:22:22	10/26/2018	27.0	2371028.92	713977.95
028	02	028-02_ADCP	21:28:50	10/26/2018	36.0	2371212.84	713858.92

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
028	02	028-02_DC	21:31:31	10/26/2018	36.0	2371215.16	713859.88
028	03	028-03_ADCP	21:36:26	10/26/2018	36.0	2371395.49	713735.76
028	03	028-03_DC	21:41:02	10/26/2018	36.0	2371390.32	713734.84
028	04	028-04_ADCP	21:47:05	10/26/2018	24.0	2371577.11	713613.08
028	04	028-04_DC	21:50:08	10/26/2018	24.0	2371577.33	713616.17
028	05	028-05_ADCP	21:52:07	10/26/2018	10.0	2371678.39	713545.93
028	05	028-05_DC	21:57:44	10/26/2018	10.0	2371685.10	713546.89
029	01	029-01_ADCP	20:26:08	10/26/2018	34.0	2369091.13	712428.66
029	01	029-01_DC	20:30:24	10/26/2018	34.0	2369093.50	712437.12
029	02	029-02_ADCP	20:35:54	10/26/2018	38.0	2369243.22	712294.03
029	02	029-02_DC	20:40:34	10/26/2018	38.0	2369243.95	712295.31
029	03	029-03_ADCP	20:47:25	10/26/2018	33.0	2369395.70	712158.06
029	03	029-03_DC	20:50:25	10/26/2018	33.0	2369398.03	712161.97
029	04	029-04_ADCP	20:53:16	10/26/2018	11.0	2369546.61	712024.35
029	04	029-04_DC	20:57:16	10/26/2018	11.0	2369544.95	712021.79
029	05	029-05_ADCP	21:01:47	10/26/2018	10.0	2369592.78	711983.25
029	05	029-05_DC	21:07:36	10/26/2018	10.0	2369594.76	711983.62
030	01	030-01_ADCP	22:37:51	10/25/2018	32.0	2367756.34	710214.39
030	01	030-01_DC	22:41:36	10/25/2018	32.0	2367748.54	710218.34
030	02	030-02_ADCP	22:47:29	10/25/2018	33.0	2368096.14	710179.35
030	02	030-02_DC	22:51:00	10/25/2018	33.0	2368103.82	710178.57
030	03	030-03_ADCP	22:55:05	10/25/2018	19.0	2368436.78	710141.59
030	03	030-03_DC	22:58:33	10/25/2018	19.0	2368440.48	710146.60
030	04	030-04_ADCP	23:21:54	10/25/2018	10.0	2369354.63	710040.65
030	04	030-04_DC	23:28:27	10/25/2018	10.0	2369352.86	710043.18
030	05	030-05_ADCP	23:12:47	10/25/2018	14.0	2369446.52	710031.53
030	05	030-05_DC	23:18:18	10/25/2018	13.0	2369445.56	710029.08
031	01	031-01_ADCP	21:20:31	10/25/2018	10.0	2366408.08	708094.04
031	01	031-01_DC	21:25:20	10/25/2018	10.0	2366409.41	708098.55
031	02	031-02_ADCP	21:03:11	10/25/2018	13.0	2366757.40	707938.49
031	02	031-02_DC	21:10:07	10/25/2018	13.0	2366760.47	707942.45
031	03	031-03_ADCP	21:43:20	10/25/2018	28.0	2367105.84	707785.11
031	03	031-03_DC	21:50:05	10/25/2018	28.0	2367108.04	707785.85
031	04	031-04_ADCP	22:03:52	10/25/2018	29.0	2367454.45	707630.59
031	04	031-04_DC	22:09:25	10/25/2018	29.0	2367459.33	707630.00
031	05	031-05_ADCP	22:19:24	10/25/2018	31.0	2367800.23	707477.25
031	05	031-05_DC	22:22:57	10/25/2018	29.0	2367800.11	707478.85
032	01	032-01_ADCP	19:53:45	10/25/2018	20.0	2364817.67	706687.89
032	01	032-01_DC	19:59:50	10/25/2018	20.0	2364820.53	706688.99
032	02	032-02_ADCP	19:43:01	10/25/2018	40.0	2364992.63	706475.44
032	02	032-02_DC	19:48:12	10/25/2018	40.0	2364989.15	706476.93
032	03	032-03_ADCP	19:36:25	10/25/2018	26.0	2365166.15	706263.44
032	03	032-03_DC	19:39:33	10/25/2018	26.0	2365166.46	706262.22
032	04	032-04_ADCP	19:22:26	10/25/2018	31.0	2365341.51	706051.60
032	04	032-04_DC	19:27:07	10/25/2018	31.0	2365340.33	706050.16
032	05	032-05_ADCP	19:13:21	10/25/2018	39.0	2365517.07	705838.13
032	05	032-05_DC	19:17:21	10/25/2018	39.0	2365515.18	705835.64
033	01	033-01_DC	18:59:42	10/25/2018	0.0	2363278.59	704910.91
033	02	033-02_ADCP	18:42:05	10/25/2018	10.0	2363571.47	704693.11
033	02	033-02_DC	18:46:20	10/25/2018	10.0	2363571.94	704692.91
033	03	033-03_ADCP	18:31:56	10/25/2018	49.0	2363789.95	704530.62
033	03	033-03_DC	18:35:28	10/25/2018	49.0	2363793.45	704533.54
033	04	033-04_ADCP	18:21:30	10/25/2018	36.0	2364007.03	704368.03
033	04	033-04_DC	18:24:34	10/25/2018	36.0	2364004.61	704362.59
033	05	033-05_ADCP	18:08:23	10/25/2018	11.0	2364225.37	704206.15
033	05	033-05_DC	18:14:36	10/25/2018	11.0	2364227.72	704211.15
034	01	034-01_ADCP	17:53:07	10/25/2018	13.0	2361365.60	703200.51
034	01	034-01_DC	17:54:26	10/25/2018	13.0	2361367.37	703198.74
034	02	034-02_ADCP	17:30:46	10/25/2018	13.0	2361567.80	703011.74
034	02	034-02_DC	17:35:52	10/25/2018	13.0	2361566.71	703006.16

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
034	03	034-03_ADCP	17:15:28	10/25/2018	11.0	2361832.46	702765.84
034	03	034-03_DC	17:23:26	10/25/2018	11.0	2361832.53	702766.40
034	04	034-04_ADCP	23:13:35	10/20/2018	39.0	2361972.38	702636.12
034	04	034-04_DC	23:17:32	10/20/2018	39.0	2361970.40	702631.27
034	05	034-05_ADCP	23:04:01	10/20/2018	50.0	2362176.82	702445.39
034	05	034-05_DC	23:08:06	10/20/2018	50.0	2362172.58	702444.54
035	01	035-01_ADCP	22:50:11	10/20/2018	25.0	2360332.95	700699.31
035	01	035-01_DC	22:55:18	10/20/2018	25.0	2360334.25	700703.42
035	02	035-02_ADCP	22:41:12	10/20/2018	25.0	2360449.22	700604.31
035	02	035-02_DC	22:45:06	10/20/2018	25.0	2360447.47	700598.46
035	03	035-03_ADCP	22:31:18	10/20/2018	44.0	2360570.06	700507.39
035	03	035-03_DC	22:35:47	10/20/2018	44.0	2360565.26	700505.12
035	04	035-04_ADCP	22:21:13	10/20/2018	51.0	2360692.12	700411.60
035	04	035-04_DC	22:26:17	10/20/2018	51.0	2360694.13	700413.38
035	05	035-05_ADCP	22:09:39	10/20/2018	51.0	2360812.77	700316.13
035	05	035-05_DC	22:13:57	10/20/2018	51.0	2360813.44	700317.54
036	01	036-01_ADCP	21:00:53	10/20/2018	53.0	2358712.45	698774.59
036	01	036-01_DC	21:09:54	10/20/2018	53.0	2358708.80	698770.52
036	02	036-02_ADCP	21:20:59	10/20/2018	35.0	2358936.58	698570.55
036	02	036-02_DC	21:26:42	10/20/2018	35.0	2358930.90	698571.43
036	03	036-03_ADCP	21:35:12	10/20/2018	42.0	2359156.66	698369.89
036	03	036-03_DC	21:37:08	10/20/2018	42.0	2359151.60	698371.13
036	04	036-04_ADCP	21:44:10	10/20/2018	31.0	2359378.61	698167.51
036	04	036-04_DC	21:46:30	10/20/2018	31.0	2359381.02	698161.21
036	05	036-05_ADCP	21:50:45	10/20/2018	15.0	2359601.17	697966.26
036	05	036-05_DC	21:58:05	10/20/2018	15.0	2359603.61	697965.18
037	01	037-01_ADCP	20:45:26	10/20/2018	32.0	2356294.27	697790.62
037	01	037-01_DC	20:47:41	10/20/2018	32.0	2356295.78	697792.03
037	02	037-02_ADCP	19:31:56	10/22/2018	64.0	2356350.79	697705.60
037	02	037-02_DC	19:35:01	10/22/2018	64.0	2356350.50	697706.66
037	03	037-03_ADCP	19:38:18	10/22/2018	83.0	2356411.29	697623.55
037	03	037-03_DC	19:44:22	10/22/2018	84.0	2356411.97	697626.30
037	04	037-04_ADCP	19:49:25	10/22/2018	87.0	2356470.40	697541.28
037	04	037-04_DC	19:54:33	10/22/2018	87.0	2356471.75	697542.29
037	05	037-05_ADCP	19:58:10	10/22/2018	65.0	2356528.95	697457.86
037	05	037-05_DC	20:03:27	10/22/2018	65.0	2356532.56	697461.93
038	04	038-04_ADCP	19:32:01	10/20/2018	31.0	2354042.75	696701.23
038	04	038-04_DC	19:34:40	10/20/2018	31.0	2354046.29	696700.58
038	05	038-05_ADCP	19:23:27	10/20/2018	31.0	2354069.80	696642.48
038	05	038-05_DC	19:28:00	10/20/2018	31.0	2354070.02	696640.12
039	01	039-01_ADCP	18:38:26	10/20/2018	42.0	2351439.86	695964.30
039	01	039-01_DC	18:40:20	10/20/2018	42.0	2351438.46	695966.01
039	02	039-02_ADCP	18:44:21	10/20/2018	47.0	2351563.59	695910.89
039	02	039-02_DC	18:48:46	10/20/2018	47.0	2351569.23	695914.14
039	03	039-03_ADCP	18:54:16	10/20/2018	57.0	2351686.88	695855.27
039	03	039-03_DC	18:59:36	10/20/2018	57.0	2351690.22	695852.92
039	04	039-04_ADCP	19:03:15	10/22/2018	65.0	2351811.54	695799.63
039	05	039-05_ADCP	19:05:12	10/20/2018	59.0	2351936.30	695742.61
039	05	039-05_DC	19:10:25	10/20/2018	59.0	2351940.20	695745.57
040	01	040-01_ADCP	17:52:57	10/20/2018	40.0	2350198.15	693847.71
040	01	040-01_DC	17:56:45	10/20/2018	40.0	2350199.46	693841.13
040	02	040-02_ADCP	18:02:13	10/20/2018	47.0	2350420.41	693669.49
040	02	040-02_DC	18:08:39	10/20/2018	47.0	2350422.68	693672.40
040	03	040-03_ADCP	18:46:10	10/22/2018	105.0	2350644.48	693493.33
040	03	040-03_DC	18:49:40	10/22/2018	105.0	2350642.76	693489.06
040	04	040-04_ADCP	18:34:42	10/22/2018	83.0	2350867.45	693318.50
040	04	040-04_DC	18:39:56	10/22/2018	83.0	2350868.63	693316.20
040	05	040-05_ADCP	18:17:26	10/20/2018	52.0	2351090.03	693140.06
040	05	040-05_DC	18:22:14	10/20/2018	52.0	2351090.95	693134.40
041	01	041-01_ADCP	17:36:35	10/20/2018	29.0	2348645.33	692228.46

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
041	01	041-01_DC	17:41:04	10/20/2018	29.0	2348647.65	692233.03
041	02	041-02_ADCP	17:26:45	10/20/2018	36.0	2348785.22	692001.26
041	02	041-02_DC	17:31:09	10/20/2018	36.0	2348781.62	691998.90
041	03	041-03_ADCP	17:14:49	10/20/2018	43.0	2348923.60	691775.10
041	03	041-03_DC	17:18:47	10/20/2018	43.0	2348924.70	691775.38
041	04	041-04_ADCP	18:18:06	10/22/2018	59.0	2349062.83	691547.43
041	04	041-04_DC	18:23:04	10/22/2018	59.0	2349056.95	691544.40
041	05	041-05_ADCP	17:02:59	10/20/2018	41.0	2349204.25	691319.64
041	05	041-05_DC	17:07:20	10/20/2018	41.0	2349208.38	691323.68
042	01	042-01_ADCP	16:35:48	10/20/2018	25.0	2346532.36	690955.46
042	01	042-01_DC	16:40:48	10/20/2018	25.0	2346526.69	690952.87
042	02	042-02_ADCP	16:46:57	10/20/2018	57.0	2346602.76	690809.46
042	02	042-02_DC	16:50:22	10/20/2018	57.0	2346598.06	690804.40
042	03	042-03_ADCP	17:42:06	10/22/2018	80.0	2346673.12	690664.93
042	03	042-03_DC	17:45:57	10/22/2018	80.0	2346670.44	690660.34
042	04	042-04_ADCP	17:53:18	10/22/2018	89.0	2346744.99	690518.10
042	04	042-04_DC	17:58:27	10/22/2018	89.0	2346740.17	690516.96
042	05	042-05_ADCP	18:03:34	10/22/2018	84.0	2346816.13	690372.88
042	05	042-05_DC	18:07:40	10/22/2018	84.0	2346817.42	690373.20
043	01	043-01_ADCP	22:00:57	10/19/2018	23.0	2344078.81	689404.00
043	01	043-01_DC	22:06:27	10/19/2018	23.0	2344081.28	689403.28
043	02	043-02_ADCP	22:12:02	10/19/2018	41.0	2344287.38	689294.17
043	02	043-02_DC	22:16:02	10/19/2018	41.0	2344283.33	689291.00
043	03	043-03_ADCP	17:24:08	10/22/2018	68.0	2344495.36	689184.20
043	03	043-03_DC	17:26:53	10/22/2018	68.0	2344495.79	689179.91
043	04	043-04_ADCP	17:12:49	10/22/2018	61.0	2344700.71	689075.41
043	04	043-04_DC	17:15:07	10/22/2018	61.0	2344701.15	689071.76
043	05	043-05_ADCP	22:24:09	10/19/2018	47.0	2344909.15	688965.19
043	05	043-05_DC	22:27:30	10/19/2018	47.0	2344908.29	688970.77
044	01	044-01_ADCP	21:39:14	10/19/2018	35.0	2342755.68	688268.99
044	01	044-01_DC	21:46:48	10/19/2018	35.0	2342755.39	688266.44
044	02	044-02_ADCP	21:28:42	10/19/2018	40.0	2342824.86	688027.41
044	02	044-02_DC	21:33:09	10/19/2018	40.0	2342826.48	688027.48
044	03	044-03_ADCP	21:17:53	10/19/2018	50.0	2342894.27	687786.27
044	03	044-03_DC	21:23:20	10/19/2018	50.0	2342889.99	687784.93
044	04	044-04_ADCP	21:09:35	10/19/2018	59.0	2342963.28	687544.51
044	04	044-04_DC	21:13:04	10/19/2018	59.0	2342958.13	687546.35
044	05	044-05_ADCP	20:52:55	10/19/2018	56.0	2343033.19	687300.44
044	05	044-05_DC	20:57:39	10/19/2018	56.0	2343031.79	687301.46
045	01	045-01_ADCP	20:39:37	10/19/2018	33.0	2340849.88	686070.49
045	01	045-01_DC	20:43:31	10/19/2018	33.0	2340850.58	686076.73
045	02	045-02_ADCP	20:26:20	10/19/2018	51.0	2341021.63	686000.84
045	02	045-02_DC	20:29:34	10/19/2018	51.0	2341021.29	685995.61
045	03	045-03_ADCP	16:28:25	10/22/2018	65.0	2341191.37	685931.62
045	03	045-03_DC	16:32:43	10/22/2018	65.0	2341189.32	685926.08
045	04	045-04_ADCP	16:41:47	10/22/2018	73.0	2341365.36	685859.22
045	04	045-04_DC	16:43:41	10/22/2018	73.0	2341365.44	685857.03
045	05	045-05_ADCP	16:49:58	10/22/2018	63.0	2341536.20	685789.12
045	05	045-05_DC	16:54:02	10/22/2018	63.0	2341534.16	685791.43
046	01	046-01_ADCP	19:13:38	10/19/2018	38.0	2340420.48	683143.46
046	01	046-01_DC	19:17:02	10/19/2018	38.0	2340423.13	683140.57
046	02	046-02_ADCP	23:30:41	10/21/2018	77.0	2340648.76	683254.56
046	02	046-02_DC	23:36:02	10/21/2018	77.0	2340647.23	683253.52
046	03	046-03_ADCP	22:58:47	10/21/2018	87.0	2340877.03	683368.21
046	03	046-03_DC	23:04:08	10/21/2018	87.0	2340880.36	683367.02
046	04	046-04_ADCP	23:08:54	10/21/2018	74.0	2341105.73	683480.52
046	04	046-04_DC	23:14:03	10/21/2018	74.0	2341107.01	683482.60
046	05	046-05_ADCP	23:19:28	10/21/2018	50.0	2341334.04	683593.89
046	05	046-05_DC	23:24:06	10/21/2018	50.0	2341335.66	683593.77
047	01	047-01_ADCP	18:57:00	10/19/2018	18.0	2339969.22	680914.16

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
047	01	047-01_DC	19:03:36	10/19/2018	18.0	2339972.47	680908.61
047	02	047-02_ADCP	18:31:05	10/19/2018	13.0	2340293.69	680890.90
047	02	047-02_DC	18:36:58	10/19/2018	13.0	2340296.15	680893.49
047	03	047-03_ADCP	18:18:59	10/19/2018	28.0	2340621.97	680869.55
047	03	047-03_DC	18:25:27	10/19/2018	28.0	2340619.64	680873.51
047	04	047-04_ADCP	18:07:55	10/19/2018	56.0	2340944.04	680847.14
047	04	047-04_DC	18:11:23	10/19/2018	56.0	2340942.88	680848.92
047	05	047-05_ADCP	22:44:04	10/21/2018	89.0	2341270.12	680825.20
047	05	047-05_DC	22:49:04	10/21/2018	89.0	2341267.50	680830.79
048	01	048-01_ADCP	17:43:51	10/19/2018	15.0	2340408.27	679181.47
048	01	048-01_DC	17:49:09	10/19/2018	15.0	2340411.09	679181.13
048	02	048-02_ADCP	17:34:36	10/19/2018	27.0	2340583.17	679047.86
048	02	048-02_DC	17:37:44	10/19/2018	27.0	2340582.93	679047.46
048	03	048-03_ADCP	17:25:28	10/19/2018	37.0	2340715.24	678948.28
048	03	048-03_DC	17:29:22	10/19/2018	37.0	2340715.32	678949.70
048	04	048-04_ADCP	17:16:23	10/19/2018	54.0	2340886.38	678817.35
048	04	048-04_DC	17:20:20	10/19/2018	54.0	2340886.73	678811.30
048	05	048-05_ADCP	17:06:30	10/19/2018	56.0	2341145.01	678622.76
048	05	048-05_DC	17:11:19	10/19/2018	56.0	2341142.62	678617.57
048	06	048-06_ADCP	16:49:32	10/19/2018	54.0	2341362.15	678460.98
048	06	048-06_DC	16:54:22	10/19/2018	54.0	2341358.63	678457.71
048	07	048-07_ADCP	22:16:28	10/21/2018	63.0	2341522.57	678336.53
048	07	048-07_DC	22:25:56	10/21/2018	62.0	2341522.29	678332.74
048	08	048-08_ADCP	16:39:44	10/19/2018	52.0	2341631.10	678256.69
048	08	048-08_DC	16:44:20	10/19/2018	52.0	2341626.89	678260.81
048	09	048-09_ADCP	16:29:27	10/19/2018	36.0	2341683.51	678217.20
048	09	048-09_DC	16:34:26	10/19/2018	36.0	2341682.88	678223.58
048	10	048-10_ADCP	16:18:58	10/19/2018	13.0	2341747.21	678168.85
048	10	048-10_DC	16:25:06	10/19/2018	13.0	2341753.96	678168.37
049	01	049-01_ADCP	* 22:23:00	10/18/2018	10.0	2340080.45	678184.38
049	01	049-01_DC	* 22:31:00	10/18/2018	10.0	2340082.17	678184.73
049	02	049-02_ADCP	* 22:34:00	10/18/2018	21.0	2340223.47	678085.38
049	02	049-02_DC	* 22:43:00	10/18/2018	21.0	2340224.92	678091.57
049	03	049-03_ADCP	* 22:45:00	10/18/2018	32.0	2340366.81	677984.35
049	03	049-03_DC	* 22:51:00	10/18/2018	32.0	2340363.72	677980.80
049	04	049-04_ADCP	* 22:54:00	10/18/2018	36.0	2340531.78	677870.99
049	04	049-04_DC	* 23:00:00	10/18/2018	36.0	2340530.33	677864.54
049	05	049-05_ADCP	* 23:02:00	10/18/2018	39.0	2340652.86	677787.03
049	05	049-05_DC	* 23:09:00	10/18/2018	39.0	2340650.60	677781.46
049	06	049-06_ADCP	* 23:11:00	10/18/2018	44.0	2340754.05	677717.21
049	06	049-06_DC	* 23:17:00	10/18/2018	44.0	2340752.77	677714.55
049	07	049-07_ADCP	* 23:19:00	10/18/2018	52.0	2340941.56	677587.14
049	07	049-07_DC	* 23:25:00	10/18/2018	52.0	2340943.40	677587.22
049	08	049-08_ADCP	* 23:28:00	10/18/2018	56.0	2341081.67	677488.35
049	08	049-08_DC	* 23:34:00	10/18/2018	56.0	2341079.25	677487.80
049	09	049-09_ADCP	22:00:36	10/21/2018	62.0	2341238.40	677381.43
049	09	049-09_DC	22:05:48	10/21/2018	62.0	2341238.78	677379.63
049	10	049-10_ADCP	16:05:13	10/19/2018	35.0	2341439.22	677241.95
049	10	049-10_DC	16:10:12	10/19/2018	35.0	2341435.05	677240.65
050	01	050-01_ADCP	* 22:10:00	10/18/2018	11.0	2339828.08	677712.59
050	01	050-01_DC	* 22:18:00	10/18/2018	11.0	2339834.18	677717.31
050	02	050-02_ADCP	* 22:00:00	10/18/2018	23.0	2339914.94	677569.98
050	02	050-02_DC	* 22:06:00	10/18/2018	23.0	2339913.23	677567.40
050	03	050-03_ADCP	* 21:53:00	10/18/2018	30.0	2340004.78	677429.29
050	03	050-03_DC	* 21:58:00	10/18/2018	30.0	2340008.55	677431.54
050	04	050-04_ADCP	* 21:43:00	10/18/2018	34.0	2340092.91	677285.54
050	04	050-04_DC	* 21:49:00	10/18/2018	34.0	2340090.71	677288.29
050	05	050-05_ADCP	* 21:24:00	10/18/2018	37.0	2340157.40	677181.76
050	05	050-05_DC	* 21:34:00	10/18/2018	37.0	2340153.37	677177.82
050	06	050-06_ADCP	* 21:14:00	10/18/2018	48.0	2340261.47	677015.83

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
050	06	050-06_DC	* 21:21:00	10/18/2018	48.0	2340262.49	677013.27
050	07	050-07_ADCP	* 21:04:00	10/18/2018	54.0	2340345.27	676880.93
050	07	050-07_DC	* 21:11:00	10/18/2018	54.0	2340342.63	676878.96
050	08	050-08_ADCP	* 21:31:00	10/21/2018	66.0	2340444.60	676720.72
050	10	050-10_ADCP	* 21:38:00	10/21/2018	34.0	2340653.56	676387.90
050	10	050-10_DC	* 20:59:00	10/18/2018	33.0	2340651.69	676386.23
051	02	051-02_ADCP	* 18:38:00	10/18/2018	15.0	2339038.31	676978.64
051	02	051-02_DC	* 18:48:00	10/18/2018	15.0	2339037.00	676975.91
051	03	051-03_ADCP	* 18:53:00	10/18/2018	29.0	2339157.15	676788.33
051	03	051-03_DC	* 18:59:00	10/18/2018	29.0	2339154.12	676787.91
051	04	051-04_ADCP	* 19:02:00	10/18/2018	34.0	2339239.40	676657.09
051	04	051-04_DC	* 19:09:00	10/18/2018	34.0	2339235.84	676655.66
051	05	051-05_ADCP	* 19:12:00	10/18/2018	43.0	2339321.30	676527.91
051	05	051-05_DC	* 19:18:00	10/18/2018	43.0	2339317.69	676525.81
051	06	051-06_ADCP	* 19:20:00	10/18/2018	51.0	2339425.09	676363.69
051	06	051-06_DC	* 19:29:00	10/18/2018	51.0	2339420.77	676361.68
051	07	051-07_ADCP	* 20:28:00	10/18/2018	55.0	2339484.81	676265.89
051	07	051-07_DC	* 20:37:00	10/18/2018	55.0	2339479.43	676263.30
051	08	051-08_ADCP	21:18:23	10/21/2018	64.0	2339564.38	676137.17
051	08	051-08_DC	21:23:40	10/21/2018	64.0	2339561.01	676137.17
051	08	051-08_DC	21:37:14	10/21/2018	66.0	2340443.58	676720.15
051	09	051-09_ADCP	21:08:01	10/21/2018	67.0	2339648.17	676007.19
051	09	051-09_ADCP	21:44:17	10/21/2018	67.0	2340533.33	676581.62
051	09	051-09_DC	21:13:32	10/21/2018	67.0	2339644.21	676001.20
051	09	051-09_DC	21:49:00	10/21/2018	67.0	2340534.87	676580.26
051	10	051-10_ADCP	* 20:42:00	10/18/2018	33.0	2339759.86	675828.42
051	10	051-10_DC	* 20:48:00	10/18/2018	33.0	2339757.80	675828.30
052	02	052-02_ADCP	* 18:15:00	10/18/2018	15.0	2338037.20	677366.94
052	02	052-02_DC	* 18:26:00	10/18/2018	15.0	2338039.94	677367.75
052	03	052-03_ADCP	* 17:51:00	10/18/2018	13.0	2338218.47	677087.97
052	03	052-03_DC	* 18:00:00	10/18/2018	13.0	2338220.11	677088.61
052	04	052-04_ADCP	* 17:31:00	10/18/2018	13.0	2338252.33	676829.39
052	04	052-04_DC	* 17:40:00	10/18/2018	13.0	2338252.96	676829.78
052	05	052-05_ADCP	* 17:19:00	10/18/2018	17.0	2338322.06	676626.21
052	05	052-05_DC	* 17:28:00	10/18/2018	17.0	2338315.46	676631.13
052	06	052-06_ADCP	* 17:08:00	10/18/2018	30.0	2338388.94	676424.11
052	06	052-06_DC	* 17:15:00	10/18/2018	30.0	2338391.37	676429.88
052	07	052-07_ADCP	* 16:58:00	10/18/2018	39.0	2338457.51	676224.99
052	07	052-07_DC	* 17:04:00	10/18/2018	39.0	2338455.64	676219.72
052	08	052-08_ADCP	* 16:47:00	10/18/2018	47.0	2338534.79	675993.24
052	08	052-08_DC	* 16:54:00	10/18/2018	47.0	2338531.43	675989.17
052	09	052-09_ADCP	20:56:43	10/21/2018	59.0	2338612.36	675762.43
052	09	052-09_DC	20:59:34	10/21/2018	59.0	2338610.21	675763.13
052	10	052-10_ADCP	* 16:36:00	10/18/2018	33.0	2338740.87	675384.75
052	10	052-10_DC	* 16:42:00	10/18/2018	33.0	2338736.87	675390.13
053	02	053-02_ADCP	22:39:59	10/17/2018	12.0	2337212.88	676118.55
053	02	053-02_DC	22:51:20	10/17/2018	12.0	2337216.96	676115.47
053	03	053-03_ADCP	22:56:12	10/17/2018	45.0	2337303.50	675940.81
053	03	053-03_DC	23:00:12	10/17/2018	45.0	2337302.80	675936.76
053	04	053-04_ADCP	23:09:10	10/17/2018	45.0	2337367.11	675817.54
053	04	053-04_DC	23:10:21	10/17/2018	45.0	2337368.50	675818.57
053	05	053-05_ADCP	23:15:16	10/17/2018	47.0	2337421.32	675714.42
053	05	053-05_DC	23:18:54	10/17/2018	47.0	2337420.45	675712.39
053	06	053-06_ADCP	23:23:41	10/17/2018	51.0	2337497.09	675572.11
053	06	053-06_DC	23:28:42	10/17/2018	51.0	2337496.77	675571.98
053	07	053-07_ADCP	* 16:01:00	10/18/2018	54.0	2337571.86	675430.30
053	07	053-07_DC	* 16:13:00	10/18/2018	54.0	2337567.66	675429.48
053	08	053-08_ADCP	19:28:20	10/21/2018	60.0	2337646.73	675288.49
053	08	053-08_DC	19:33:01	10/21/2018	60.0	2337642.50	675288.58
053	09	053-09_ADCP	19:37:23	10/21/2018	61.0	2337722.75	675144.55

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
053	09	053-09_DC	19:43:37	10/21/2018	61.0	2337715.76	675145.85
053	10	053-10_ADCP	* 16:18:00	10/18/2018	35.0	2337831.62	674938.51
053	10	053-10_DC	* 16:25:00	10/18/2018	35.0	2337828.73	674941.26
054	02	054-02_ADCP	22:23:18	10/17/2018	28.0	2336604.86	675395.56
054	02	054-02_DC	22:27:51	10/17/2018	28.0	2336606.94	675395.35
054	03	054-03_ADCP	19:14:22	10/21/2018	66.0	2336636.47	675310.67
054	03	054-03_DC	19:18:06	10/21/2018	66.0	2336639.45	675311.56
054	04	054-04_ADCP	19:03:58	10/21/2018	63.0	2336657.89	675261.20
054	04	054-04_DC	19:08:00	10/21/2018	63.0	2336656.79	675259.73
054	05	054-05_ADCP	18:53:54	10/21/2018	65.0	2336681.31	675206.01
054	05	054-05_DC	18:58:57	10/21/2018	65.0	2336678.86	675207.61
054	06	054-06_ADCP	18:44:21	10/21/2018	62.0	2336716.02	675117.13
054	06	054-06_DC	18:48:01	10/21/2018	62.0	2336709.83	675118.60
054	07	054-07_ADCP	22:12:10	10/17/2018	56.0	2336785.29	674946.75
054	07	054-07_DC	22:16:27	10/17/2018	56.0	2336783.03	674946.88
054	08	054-08_ADCP	18:32:47	10/21/2018	58.0	2336850.96	674786.88
054	08	054-08_DC	18:36:21	10/21/2018	58.0	2336849.58	674787.22
054	09	054-09_ADCP	21:59:48	10/17/2018	55.0	2336956.25	674521.84
054	09	054-09_DC	22:04:22	10/17/2018	55.0	2336959.15	674521.71
054	10	054-10_ADCP	21:51:27	10/17/2018	37.0	2337002.33	674408.04
054	10	054-10_DC	21:53:04	10/17/2018	37.0	2337006.38	674412.16
055	01	055-01_ADCP	20:51:58	10/17/2018	34.0	2335870.80	674887.36
055	01	055-01_DC	20:55:57	10/17/2018	34.0	2335868.36	674884.27
055	01	055-01_DC	21:10:03	10/17/2018	49.0	2335910.38	674845.23
055	02	055-02_ADCP	21:03:49	10/17/2018	49.0	2335915.38	674845.77
055	03	055-03_ADCP	17:20:01	10/21/2018	75.0	2335981.26	674783.70
055	03	055-03_DC	17:24:56	10/21/2018	75.0	2335983.12	674780.18
055	04	055-04_ADCP	17:32:03	10/21/2018	71.0	2336020.48	674747.13
055	04	055-04_DC	17:37:52	10/21/2018	71.0	2336018.37	674749.63
055	05	055-05_ADCP	17:48:54	10/21/2018	69.0	2336071.94	674697.61
055	05	055-05_DC	17:52:48	10/21/2018	69.0	2336070.46	674697.36
055	06	055-06_ADCP	17:57:42	10/21/2018	66.0	2336137.17	674637.30
055	06	055-06_DC	18:02:19	10/21/2018	66.0	2336137.70	674639.75
055	07	055-07_ADCP	18:09:09	10/21/2018	60.0	2336262.42	674519.71
055	07	055-07_DC	18:11:55	10/21/2018	60.0	2336260.37	674519.22
055	08	055-08_ADCP	18:17:55	10/21/2018	60.0	2336438.90	674354.81
055	08	055-08_DC	18:21:19	10/21/2018	60.0	2336431.26	674356.15
055	09	055-09_ADCP	21:27:48	10/17/2018	49.0	2336555.62	674246.50
055	09	055-09_DC	21:29:43	10/17/2018	49.0	2336557.43	674245.32
055	10	055-10_ADCP	21:38:14	10/17/2018	31.0	2336638.59	674169.73
055	10	055-10_DC	21:42:28	10/17/2018	31.0	2336636.58	674171.02
056	01	056-01_ADCP	20:41:12	10/17/2018	51.0	2335501.75	674698.00
056	01	056-01_DC	20:45:39	10/17/2018	51.0	2335500.88	674696.24
056	02	056-02_ADCP	* 22:36:00	10/16/2018	67.0	2335541.52	674581.46
056	02	056-02_DC	* 22:43:00	10/16/2018	67.0	2335546.97	674580.98
056	03	056-03_ADCP	* 22:45:00	10/16/2018	68.0	2335582.39	674465.10
056	03	056-03_DC	* 22:53:00	10/16/2018	67.0	2335581.87	674466.48
056	04	056-04_ADCP	* 22:55:00	10/16/2018	66.0	2335624.19	674350.95
056	04	056-04_DC	* 23:03:00	10/16/2018	66.0	2335624.59	674353.69
056	05	056-05_ADCP	* 23:05:00	10/16/2018	60.0	2335663.38	674235.08
056	05	056-05_DC	* 23:13:00	10/16/2018	60.0	2335659.76	674236.35
056	06	056-06_ADCP	* 23:16:00	10/16/2018	56.0	2335704.07	674120.52
056	06	056-06_DC	* 23:23:00	10/16/2018	56.0	2335700.55	674118.16
056	07	056-07_ADCP	* 23:25:00	10/16/2018	56.0	2335751.65	673978.44
056	07	056-07_DC	* 23:32:00	10/16/2018	56.0	2335759.20	673975.60
056	08	056-08_ADCP	19:30:49	10/17/2018	35.0	2335810.35	673810.31
056	08	056-08_DC	19:35:36	10/17/2018	35.0	2335812.38	673812.21
056	09	056-09_ADCP	19:23:09	10/17/2018	26.0	2335839.24	673736.96
056	09	056-09_DC	19:28:03	10/17/2018	26.0	2335837.08	673733.26
056	10	056-10_ADCP	19:00:19	10/17/2018	14.0	2335864.82	673658.87

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
056	10	056-10_DC	19:08:31	10/17/2018	14.0	2335866.24	673653.91
057	01	057-01_ADCP	17:57:12	10/17/2018	44.0	2334955.39	674644.20
057	01	057-01_DC	18:00:05	10/17/2018	44.0	2334950.00	674640.73
057	02	057-02_ADCP	* 22:23:00	10/16/2018	65.0	2334972.27	674502.40
057	02	057-02_DC	* 22:30:00	10/16/2018	65.0	2334974.35	674503.80
057	03	057-03_ADCP	* 22:10:00	10/16/2018	76.0	2334985.11	674397.10
057	03	057-03_DC	* 22:20:00	10/16/2018	76.0	2334982.40	674395.35
057	04	057-04_ADCP	* 22:01:00	10/16/2018	65.0	2334998.47	674286.61
057	04	057-04_DC	* 22:08:00	10/16/2018	65.0	2334991.00	674286.83
057	05	057-05_ADCP	* 21:50:00	10/16/2018	64.0	2335011.99	674173.74
057	05	057-05_DC	* 21:58:00	10/16/2018	64.0	2335007.44	674171.42
057	06	057-06_ADCP	18:08:09	10/17/2018	45.0	2335032.71	674006.76
057	06	057-06_DC	18:12:03	10/17/2018	44.0	2335030.96	674007.30
057	07	057-07_ADCP	18:17:44	10/17/2018	44.0	2335055.02	673829.99
057	07	057-07_DC	18:21:28	10/17/2018	44.0	2335056.92	673829.92
057	08	057-08_ADCP	18:30:49	10/17/2018	44.0	2335071.44	673693.98
057	08	057-08_DC	18:34:00	10/17/2018	44.0	2335068.49	673687.59
057	09	057-09_ADCP	18:39:35	10/17/2018	34.0	2335085.71	673572.11
057	09	057-09_DC	18:42:31	10/17/2018	34.0	2335089.53	673576.23
057	10	057-10_ADCP	18:47:24	10/17/2018	21.0	2335101.99	673442.72
057	10	057-10_DC	18:53:47	10/17/2018	21.0	2335104.90	673437.06
058	01	058-01_ADCP	17:45:22	10/17/2018	44.0	2334108.28	674765.81
058	01	058-01_DC	17:49:25	10/17/2018	44.0	2334106.27	674762.70
058	02	058-02_ADCP	* 20:18:00	10/16/2018	67.0	2334075.31	674641.61
058	02	058-02_DC	* 20:27:00	10/16/2018	67.0	2334072.73	674644.91
058	03	058-03_ADCP	* 20:31:00	10/16/2018	73.0	2334058.74	674577.97
058	03	058-03_DC	* 20:44:00	10/16/2018	73.0	2334060.39	674576.16
058	04	058-04_ADCP	* 20:54:00	10/16/2018	83.0	2334032.72	674484.33
058	04	058-04_DC	* 21:02:00	10/16/2018	83.0	2334032.28	674486.36
058	05	058-05_ADCP	* 21:05:00	10/16/2018	92.0	2334015.26	674414.69
058	05	058-05_DC	* 21:13:00	10/16/2018	92.0	2334015.45	674420.24
058	06	058-06_ADCP	* 21:19:00	10/16/2018	74.0	2333985.76	674296.06
058	06	058-06_DC	* 21:25:00	10/16/2018	74.0	2333988.40	674299.78
058	07	058-07_ADCP	* 21:29:00	10/16/2018	63.0	2333960.32	674203.61
058	07	058-07_DC	* 21:37:00	10/16/2018	63.0	2333961.86	674207.60
058	08	058-08_ADCP	17:34:50	10/17/2018	50.0	2333935.34	674110.88
058	08	058-08_DC	17:38:32	10/17/2018	50.0	2333930.94	674109.04
058	09	058-09_ADCP	17:21:59	10/17/2018	31.0	2333910.72	674016.26
058	09	058-09_DC	17:25:45	10/17/2018	31.0	2333909.83	674019.15
058	10	058-10_ADCP	17:11:49	10/17/2018	22.0	2333886.61	673921.51
058	10	058-10_DC	17:16:01	10/17/2018	22.0	2333887.89	673924.07
059	01	059-01_ADCP	16:46:15	10/17/2018	30.0	2333241.83	675364.53
059	01	059-01_DC	16:49:16	10/17/2018	30.0	2333242.95	675365.31
059	02	059-02_ADCP	* 19:08:00	10/16/2018	57.0	2333208.12	675277.79
059	02	059-02_DC	* 19:16:00	10/16/2018	57.0	2333214.56	675271.70
059	03	059-03_ADCP	* 18:58:00	10/16/2018	67.0	2333175.77	675190.07
059	03	059-03_DC	* 19:05:00	10/16/2018	67.0	2333177.03	675184.59
059	04	059-04_ADCP	* 18:45:00	10/16/2018	102.0	2333131.76	675071.22
059	04	059-04_DC	* 18:54:00	10/16/2018	102.0	2333131.73	675070.16
059	05	059-05_ADCP	* 18:32:00	10/16/2018	120.0	2333094.47	674970.01
059	05	059-05_DC	* 18:41:00	10/16/2018	120.0	2333090.68	674969.24
059	06	059-06_ADCP	* 18:24:00	10/16/2018	129.0	2333063.94	674888.59
059	06	059-06_DC	* 17:08:17	10/21/2018	134.0	2333069.59	674890.24
059	07	059-07_ADCP	* 18:17:00	10/16/2018	133.0	2333037.58	674817.39
059	07	059-07_DC	* 16:59:04	10/21/2018	135.0	2333035.79	674817.49
059	08	059-08_ADCP	* 18:05:00	10/16/2018	111.0	2333000.34	674721.71
059	08	059-08_DC	* 18:14:00	10/16/2018	111.0	2332996.76	674724.79
059	09	059-09_ADCP	* 17:55:00	10/16/2018	74.0	2332980.23	674661.14
059	09	059-09_DC	* 18:02:00	10/16/2018	74.0	2332981.05	674665.31
059	10	059-10_ADCP	* 16:56:00	10/17/2018	32.0	2332945.30	674572.76

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
059	10	059-10_DC	17:01:16	10/17/2018	32.0	2332944.93	674571.18
060	01	060-01_ADCP	16:18:23	10/17/2018	30.0	2332475.08	675425.35
060	01	060-01_DC	16:28:50	10/17/2018	30.0	2332479.32	675423.83
060	02	060-02_ADCP	16:32:36	10/17/2018	43.0	2332459.11	675344.29
060	02	060-02_DC	16:37:22	10/17/2018	43.0	2332456.41	675342.41
060	03	060-03_ADCP	* 16:04:00	10/16/2018	55.5	2332440.80	675265.98
060	03	060-03_DC	* 16:24:00	10/16/2018	58.1	2332438.63	675263.42
060	04	060-04_ADCP	* 16:28:00	10/16/2018	94.1	2332424.01	675185.60
060	04	060-04_DC	* 16:36:00	10/16/2018	92.8	2332420.84	675185.67
060	05	060-05_ADCP	* 16:39:00	10/16/2018	116.0	2332406.47	675106.27
060	05	060-05_DC	* 16:47:00	10/16/2018	116.0	2332408.58	675105.46
060	06	060-06_ADCP	* 16:52:00	10/16/2018	125.0	2332389.45	675027.03
060	06	060-06_DC	* 17:01:00	10/16/2018	125.0	2332389.91	675027.36
060	07	060-07_ADCP	* 17:15:00	10/16/2018	134.0	2332372.55	674946.11
060	07	060-07_DC	16:33:36	10/21/2018	135.0	2332369.49	674946.64
060	08	060-08_ADCP	17:21:00	10/16/2018	135.0	2332355.45	674866.79
060	08	060-08_DC	16:50:28	10/21/2018	132.0	2332352.94	674869.98
060	09	060-09_ADCP	* 17:28:00	10/16/2018	117.0	2332343.52	674809.36
060	09	060-09_DC	* 17:36:00	10/16/2018	117.0	2332346.70	674807.43
060	10	060-10_ADCP	* 17:41:00	10/16/2018	57.0	2332321.28	674707.53
060	10	060-10_DC	* 17:49:00	10/16/2018	57.0	2332317.67	674703.71
061	01	061-01_ADCP	* 16:11:00	10/23/2018	35.0	2330618.56	675851.57
061	01	061-01_DC	* 16:19:00	10/23/2018	35.0	2330614.20	675851.97
061	02	061-02_ADCP	* 16:22:00	10/23/2018	55.0	2330594.18	675695.01
061	02	061-02_DC	* 16:29:00	10/23/2018	55.0	2330591.37	675692.38
061	03	061-03_ADCP	22:14:17	10/22/2018	84.0	2330571.63	675533.74
061	03	061-03_DC	22:18:51	10/22/2018	84.0	2330576.53	675533.89
061	05	061-05_ADCP	22:04:22	10/22/2018	70.0	2330548.01	675374.66
061	05	061-05_ADCP	* 16:34:00	10/23/2018	55.0	2330525.04	675216.64
061	05	061-05_DC	22:08:13	10/22/2018	70.0	2330544.66	675376.30
061	05	061-05_DC	* 16:41:00	10/23/2018	55.0	2330520.65	675217.96
062	01	062-01_ADCP	* 16:59:00	10/23/2018	28.0	2328023.47	676963.46
062	01	062-01_DC	* 17:06:00	10/23/2018	28.0	2328023.24	676961.46
062	02	062-02_ADCP	* 16:49:00	10/23/2018	38.0	2328004.72	676595.86
062	02	062-02_DC	* 16:56:00	10/23/2018	38.0	2328007.81	676598.19
062	03	062-03_ADCP	22:56:41	10/22/2018	75.0	2327986.50	676227.79
062	03	062-03_DC	23:01:58	10/22/2018	75.0	2327986.73	676230.30
062	04	062-04_ADCP	22:44:53	10/22/2018	146.0	2327966.25	675860.28
062	04	062-04_DC	22:49:11	10/22/2018	145.0	2327964.79	675861.95
062	05	062-05_ADCP	22:32:42	10/22/2018	68.0	2327946.00	675493.45
062	05	062-05_DC	22:36:58	10/22/2018	68.0	2327951.40	675489.03
063	01	063-01_ADCP	* 17:14:00	10/23/2018	54.0	2325329.36	675838.17
063	01	063-01_DC	* 17:20:00	10/23/2018	54.0	2325322.40	675834.30
063	02	063-02_ADCP	23:14:20	10/22/2018	70.0	2325417.09	675687.92
063	02	063-02_DC	23:19:46	10/22/2018	70.0	2325417.15	675688.57
063	03	063-03_ADCP	23:24:36	10/22/2018	69.0	2325507.67	675540.37
063	03	063-03_DC	23:29:00	10/22/2018	69.0	2325502.32	675539.53
063	04	063-04_ADCP	23:32:21	10/22/2018	60.0	2325593.97	675392.92
063	04	063-04_DC	23:37:49	10/22/2018	60.0	2325591.52	675392.21
063	05	063-05_ADCP	23:42:53	10/22/2018	64.0	2325683.48	675244.78
063	05	063-05_DC	23:46:45	10/22/2018	64.0	2325685.00	675243.71
064	01	064-01_ADCP	* 17:27:00	10/23/2018	40.0	2323334.38	674559.42
064	01	064-01_DC	* 17:33:00	10/23/2018	40.0	2323332.66	674557.07
064	02	064-02_ADCP	* 17:36:00	10/23/2018	55.0	2323411.51	674376.25
064	02	064-02_DC	* 17:42:00	10/23/2018	55.0	2323404.91	674375.29
064	03	064-03_ADCP	22:53:14	10/24/2018	69.0	2323486.97	674195.78
064	03	064-03_DC	22:58:01	10/24/2018	69.0	2323485.45	674194.71
064	04	064-04_ADCP	23:03:42	10/24/2018	70.0	2323562.66	674014.10
064	04	064-04_DC	23:07:50	10/24/2018	70.0	2323556.59	674010.87
064	05	064-05_ADCP	23:12:41	10/24/2018	67.0	2323638.11	673830.81

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
064	05	064-05_DC	23:21:26	10/24/2018	67.0	2323633.76	673832.49
065	01	065-01_ADCP	* 18:04:00	10/23/2018	33.0	2320998.31	673009.36
065	01	065-01_DC	* 18:09:00	10/23/2018	33.0	2321004.58	673009.84
065	02	065-02_ADCP	* 17:55:00	10/23/2018	52.0	2321132.56	672830.21
065	02	065-02_DC	* 18:02:00	10/23/2018	52.0	2321129.54	672830.88
065	03	065-03_ADCP	22:28:29	10/24/2018	63.0	2321268.42	672651.84
065	04	065-04_ADCP	22:15:20	10/24/2018	70.0	2321404.16	672472.88
065	04	065-04_DC	22:19:35	10/24/2018	70.0	2321398.75	672466.72
065	04	065-04_DC	22:38:16	10/24/2018	63.0	2321262.99	672647.49
065	05	065-05_ADCP	22:07:11	10/24/2018	74.0	2321538.49	672293.82
065	05	065-05_DC	22:10:06	10/24/2018	74.0	2321537.30	672287.81
066	01	066-01_ADCP	21:14:20	10/24/2018	72.0	2319795.08	670250.52
066	01	066-01_DC	21:19:12	10/24/2018	72.0	2319793.32	670254.64
066	02	066-02_ADCP	21:26:47	10/24/2018	88.0	2319986.10	670241.17
066	02	066-02_DC	21:31:01	10/24/2018	88.0	2319988.01	670241.08
066	03	066-03_ADCP	21:38:13	10/24/2018	106.0	2320174.95	670230.13
066	03	066-03_DC	21:41:48	10/24/2018	106.0	2320177.14	670224.69
066	04	066-04_ADCP	21:50:31	10/24/2018	75.0	2320364.09	670220.17
066	04	066-04_DC	21:51:49	10/24/2018	75.0	2320364.57	670220.81
066	05	066-05_ADCP	* 18:21:00	10/23/2018	47.0	2320555.79	670208.95
066	05	066-05_DC	* 18:29:00	10/23/2018	47.0	2320554.77	670205.34
067	01	067-01_ADCP	* 22:34:00	10/23/2018	47.0	2320246.45	667593.47
067	01	067-01_DC	* 22:38:00	10/23/2018	47.0	2320247.50	667586.96
067	02	067-02_ADCP	20:46:40	10/24/2018	64.0	2320542.22	667752.88
067	02	067-02_DC	20:50:59	10/24/2018	64.0	2320541.47	667751.47
067	03	067-03_ADCP	* 22:54:00	10/23/2018	56.0	2320804.00	667889.85
067	03	067-03_DC	* 22:58:00	10/23/2018	56.0	2320804.77	667884.55
067	04	067-04_ADCP	* 23:14:00	10/23/2018	54.0	2321066.81	668029.23
067	04	067-04_DC	* 23:20:00	10/23/2018	54.0	2321064.42	668027.92
067	05	067-05_ADCP	* 23:23:00	10/23/2018	57.0	2321325.92	668166.76
067	05	067-05_DC	* 23:29:00	10/23/2018	57.0	2321327.47	668161.90
068	01	068-01_ADCP	19:18:18	10/24/2018	61.0	2320536.12	665561.47
068	01	068-01_DC	19:20:53	10/24/2018	61.0	2320539.54	665560.59
068	02	068-02_ADCP	19:28:26	10/24/2018	93.0	2320940.07	665535.41
068	02	068-02_DC	19:32:00	10/24/2018	93.0	2320935.07	665539.29
068	03	068-03_ADCP	* 21:36:00	10/23/2018	59.0	2321343.82	665507.76
068	03	068-03_DC	* 21:42:00	10/23/2018	59.0	2321340.71	665508.94
068	04	068-04_ADCP	* 21:54:00	10/23/2018	10.0	2321706.65	665487.78
068	04	068-04_DC	* 22:02:00	10/23/2018	10.0	2321704.26	665488.89
068	05	068-05_ADCP	* 22:06:00	10/23/2018	11.0	2322149.91	665460.76
068	05	068-05_DC	* 22:14:00	10/23/2018	11.0	2322151.98	665466.85
069	01	069-01_ADCP	18:53:16	10/24/2018	66.0	2320832.68	662976.16
069	01	069-01_DC	18:57:57	10/24/2018	66.0	2320831.17	662975.09
069	02	069-02_ADCP	19:04:29	10/24/2018	80.0	2321181.64	663008.97
069	02	069-02_DC	19:07:35	10/24/2018	80.0	2321180.24	663009.25
069	03	069-03_ADCP	* 21:00:00	10/23/2018	54.0	2321528.88	663044.57
069	03	069-03_DC	* 21:06:00	10/23/2018	54.0	2321526.98	663045.79
069	04	069-04_ADCP	* 21:01:00	10/23/2018	10.0	2321878.73	663081.47
069	04	069-04_DC	* 21:06:00	10/23/2018	10.0	2321876.30	663081.87
070	01	070-01_ADCP	18:09:44	10/24/2018	77.0	2320266.61	660878.12
070	01	070-01_DC	18:14:14	10/24/2018	77.0	2320264.79	660878.64
070	02	070-02_ADCP	18:19:30	10/24/2018	89.0	2320401.84	660706.56
070	02	070-02_DC	18:23:31	10/24/2018	89.0	2320399.68	660701.88
070	03	070-03_ADCP	18:28:14	10/24/2018	66.0	2320538.19	660535.55
070	03	070-03_DC	18:32:32	10/24/2018	66.0	2320535.02	660535.71
070	04	070-04_ADCP	18:39:03	10/24/2018	65.0	2320675.21	660362.08
070	04	070-04_DC	18:41:27	10/24/2018	65.0	2320674.98	660361.37
070	05	070-05_ADCP	* 20:28:00	10/23/2018	53.0	2320810.50	660192.37
070	05	070-05_DC	* 20:34:00	10/23/2018	53.0	2320812.04	660190.51
071	01	071-01_ADCP	* 20:17:00	10/23/2018	48.0	2318304.30	659435.64

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
071	01	071-01_DC	* 20:23:00	10/23/2018	48.0	2318306.42	659431.56
071	02	071-02_ADCP	17:55:09	10/24/2018	66.0	2318387.70	659253.39
071	02	071-02_DC	18:00:07	10/24/2018	66.0	2318390.45	659252.86
071	03	071-03_ADCP	17:43:23	10/24/2018	132.0	2318473.07	659073.39
071	03	071-03_DC	17:48:42	10/24/2018	132.0	2318467.31	659074.60
071	04	071-04_ADCP	17:34:16	10/24/2018	93.0	2318556.71	658892.84
071	04	071-04_DC	17:39:04	10/24/2018	93.0	2318557.79	658893.67
071	05	071-05_ADCP	* 20:28:00	10/23/2018	48.0	2318641.49	658713.28
071	05	071-05_DC	* 20:34:00	10/23/2018	48.0	2318641.91	658714.59
072	01	072-01_ADCP	16:43:31	10/24/2018	67.0	2316118.27	658121.51
072	01	072-01_DC	16:45:58	10/24/2018	67.0	2316117.95	658122.02
072	02	072-02_ADCP	16:51:19	10/24/2018	68.0	2316234.97	657954.28
072	02	072-02_DC	16:56:02	10/24/2018	67.0	2316231.26	657952.74
072	03	072-03_ADCP	17:01:02	10/24/2018	66.0	2316351.34	657786.31
072	03	072-03_DC	17:05:46	10/24/2018	66.0	2316347.22	657785.32
072	04	072-04_ADCP	17:10:26	10/24/2018	76.0	2316467.61	657618.38
072	04	072-04_DC	17:15:48	10/24/2018	76.0	2316462.18	657617.49
072	05	072-05_ADCP	17:21:23	10/24/2018	65.0	2316584.20	657450.20
072	05	072-05_DC	17:24:43	10/24/2018	65.0	2316587.72	657451.41
073	01	073-01_ADCP	22:24:14	10/11/2018	29.8	2313515.58	656868.76
073	01	073-01_DC	22:32:30	10/11/2018	20.8	2313517.71	656867.44
073	02	073-02_ADCP	21:45:10	10/11/2018	69.1	2313805.40	656661.62
073	02	073-02_DC	21:54:29	10/11/2018	72.4	2313809.52	656663.60
073	03	073-03_ADCP	21:33:05	10/11/2018	79.1	2314095.85	656457.28
073	03	073-03_DC	21:37:46	10/11/2018	82.7	2314095.17	656451.93
073	04	073-04_ADCP	21:21:33	10/11/2018	78.3	2314387.40	656249.61
073	04	073-04_DC	21:26:18	10/11/2018	76.9	2314389.23	656247.72
073	05	073-05_ADCP	22:40:17	10/11/2018	21.7	2314483.08	656181.43
073	05	073-05_DC	22:55:00	10/11/2018	22.4	2314486.12	656179.76
074	01	074-01_ADCP	20:02:05	10/11/2018	65.9	2311997.12	654765.89
074	01	074-01_DC	20:12:03	10/11/2018	69.0	2311996.77	654760.53
074	02	074-02_ADCP	20:24:21	10/11/2018	71.7	2312351.65	654668.28
074	02	074-02_DC	20:29:12	10/11/2018	72.4	2312349.49	654666.89
074	03	074-03_ADCP	20:35:55	10/11/2018	77.2	2312707.58	654573.78
074	03	074-03_DC	20:40:01	10/11/2018	77.6	2312704.48	654570.94
074	04	074-04_ADCP	23:04:50	10/11/2018	47.5	2312892.95	654520.92
074	04	074-04_DC	23:11:28	10/11/2018	40.4	2312893.59	654524.30
075	01	075-01_ADCP	23:22:12	10/11/2018	61.2	2310536.23	653198.94
075	01	075-01_DC	23:27:50	10/11/2018	57.7	2310533.02	653193.06
075	02	075-02_ADCP	19:12:07	10/11/2018	82.2	2310715.31	653064.18
075	02	075-02_DC	19:16:39	10/11/2018	82.5	2310712.87	653060.71
075	03	075-03_ADCP	19:25:54	10/11/2018	70.1	2310893.38	652927.67
075	03	075-03_DC	19:29:45	10/11/2018	70.4	2310893.45	652929.59
075	04	075-04_ADCP	19:34:21	10/11/2018	79.0	2311070.54	652792.75
075	04	075-04_DC	19:38:59	10/11/2018	79.8	2311066.98	652793.20
075	05	075-05_ADCP	19:43:12	10/11/2018	82.2	2311248.40	652658.19
075	05	075-05_DC	19:48:42	10/11/2018	82.2	2311245.74	652658.59
076	01	076-01_ADCP	23:36:53	10/11/2018	45.1	2309133.18	651036.27
076	01	076-01_DC	23:43:14	10/11/2018	52.5	2309134.88	651034.96
076	02	076-02_ADCP	18:45:24	10/11/2018	58.7	2309477.36	650862.48
076	02	076-02_DC	18:51:11	10/11/2018	58.7	2309474.86	650861.00
076	03	076-03_ADCP	18:35:15	10/11/2018	63.2	2309822.55	650689.40
076	03	076-03_DC	18:40:52	10/11/2018	64.6	2309823.58	650690.14
076	04	076-04_ADCP	18:24:20	10/11/2018	62.4	2310165.10	650515.89
076	04	076-04_DC	18:30:24	10/11/2018	60.8	2310165.11	650510.36
076	05	076-05_ADCP	18:13:18	10/11/2018	62.5	2310510.60	650341.46
076	05	076-05_DC	18:18:38	10/11/2018	63.2	2310507.32	650339.88
077	01	077-01_ADCP	23:54:02	10/11/2018	55.6	2309116.96	648043.73
077	01	077-01_DC	23:59:19	10/11/2018	57.1	2309116.24	648041.89
077	02	077-02_ADCP	17:22:54	10/11/2018	66.9	2309443.69	648146.03

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
077	02	077-02_DC	17:28:28	10/11/2018	65.8	2309444.44	648140.58
077	03	077-03_ADCP	17:36:06	10/11/2018	58.6	2309771.12	648248.50
077	03	077-03_DC	17:41:12	10/11/2018	58.8	2309774.12	648245.54
077	04	077-04_ADCP	17:47:11	10/11/2018	69.0	2310100.63	648352.16
077	04	077-04_DC	17:52:04	10/11/2018	70.3	2310097.81	648353.96
077	05	077-05_ADCP	17:59:06	10/11/2018	61.3	2310428.35	648454.03
077	05	077-05_DC	18:04:02	10/11/2018	61.6	2310429.42	648449.65
078	01	078-01_ADCP	21:23:38	10/10/2018	44.4	2309626.90	645692.49
078	01	078-01_DC	21:27:59	10/10/2018	44.1	2309627.68	645693.80
078	02	078-02_ADCP	21:35:37	10/10/2018	50.8	2309913.95	645829.05
078	02	078-02_DC	21:39:43	10/10/2018	51.4	2309912.57	645827.60
078	03	078-03_ADCP	20:11:02	10/10/2018	75.9	2310197.90	645963.57
078	03	078-03_DC	20:16:37	10/10/2018	75.0	2310196.65	645962.65
078	04	078-04_ADCP	20:25:08	10/10/2018	70.9	2310483.11	646098.83
078	04	078-04_DC	20:30:31	10/10/2018	71.9	2310484.55	646099.71
078	05	078-05_ADCP	20:35:05	10/10/2018	72.4	2310767.83	646235.11
078	05	078-05_DC	20:40:11	10/10/2018	73.0	2310769.28	646232.00
079	01	079-01_ADCP	22:04:38	10/10/2018	27.5	2310649.28	643298.58
079	01	079-01_DC	22:09:14	10/10/2018	25.4	2310647.62	643298.48
079	02	079-02_ADCP	21:53:36	10/10/2018	53.7	2310978.01	643455.28
079	02	079-02_DC	21:58:49	10/10/2018	53.1	2310980.62	643453.52
079	03	079-03_ADCP	19:51:11	10/10/2018	76.9	2311305.86	643614.24
079	03	079-03_DC	19:55:47	10/10/2018	76.8	2311308.93	643608.33
079	04	079-04_ADCP	19:40:58	10/10/2018	78.2	2311635.82	643771.98
079	04	079-04_DC	19:44:34	10/10/2018	77.7	2311637.63	643766.91
079	05	079-05_ADCP	19:26:34	10/10/2018	63.6	2311962.70	643928.74
079	05	079-05_DC	19:31:39	10/10/2018	64.0	2311964.69	643926.67
080	01	080-01_ADCP	18:15:39	10/10/2018	71.1	2312352.44	641243.73
080	01	080-01_DC	18:21:18	10/10/2018	70.0	2312354.45	641238.81
080	02	080-02_ADCP	18:27:14	10/10/2018	63.9	2312552.56	641441.90
080	02	080-02_DC	18:31:24	10/10/2018	63.8	2312555.92	641437.78
080	03	080-03_ADCP	18:37:38	10/10/2018	68.4	2312751.98	641639.30
080	03	080-03_DC	18:41:53	10/10/2018	69.2	2312753.53	641641.04
080	04	080-04_ADCP	18:47:43	10/10/2018	84.1	2312951.33	641837.23
080	04	080-04_DC	18:53:20	10/10/2018	85.6	2312950.59	641839.88
080	05	080-05_ADCP	18:59:29	10/10/2018	63.4	2313151.42	642036.16
080	05	080-05_DC	19:09:46	10/10/2018	63.8	2313145.36	642042.61
081	01	081-01_ADCP	17:59:31	10/10/2018	59.8	2313417.03	639122.28
081	01	081-01_DC	18:04:48	10/10/2018	57.9	2313416.58	639120.52
081	02	081-02_ADCP	17:46:53	10/10/2018	83.5	2313588.51	639253.07
081	02	081-02_DC	17:52:02	10/10/2018	82.7	2313589.18	639251.13
081	03	081-03_ADCP	17:25:49	10/10/2018	84.3	2313762.34	639386.51
081	03	081-03_DC	17:32:52	10/10/2018	90.6	2313763.67	639386.71
081	04	081-04_ADCP	17:14:53	10/10/2018	93.5	2313934.76	639519.29
081	04	081-04_DC	17:20:18	10/10/2018	93.4	2313933.64	639515.03
081	05	081-05_ADCP	17:00:27	10/10/2018	80.6	2314107.94	639652.97
081	05	081-05_DC	17:08:12	10/10/2018	80.4	2314107.20	639651.32
082	01	082-01_ADCP	23:26:01	10/9/2018	67.2	2314612.42	637075.21
082	01	082-01_DC	23:31:53	10/9/2018	68.2	2314616.42	637073.71
082	02	082-02_ADCP	23:36:48	10/9/2018	85.8	2314832.44	637126.71
082	02	082-02_DC	23:42:40	10/9/2018	86.2	2314833.84	637123.87
082	03	082-03_ADCP	23:48:07	10/9/2018	90.8	2315052.05	637178.89
082	03	082-03_DC	23:52:43	10/9/2018	91.7	2315047.61	637178.41
082	04	082-04_ADCP	23:57:36	10/9/2018	89.4	2315270.73	637231.51
082	04	082-04_DC	00:03:24	10/10/2018	89.0	2315271.70	637225.42
082	04	082-04_DC	00:03:24	10/10/2018	89.0	2315271.70	637225.42
082	05	082-05_ADCP	16:40:35	10/10/2018	71.8	2315489.77	637282.57
082	05	082-05_DC	16:48:31	10/10/2018	73.5	2315488.46	637282.74
083	01	083-01_ADCP	22:56:16	10/9/2018	82.4	2315857.77	635207.20
083	01	083-01_DC	23:03:01	10/9/2018	82.7	2315860.48	635202.24

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
083	02	083-02_ADCP	23:09:13	10/9/2018	92.3	2316323.90	635215.19
083	02	083-02_DC	23:14:56	10/9/2018	91.5	2316323.87	635211.58
083	03	083-03_ADCP	22:38:48	10/10/2018	35.4	2316793.23	635224.02
083	03	083-03_DC	22:46:37	10/10/2018	34.0	2316789.84	635222.70
083	03	083-03_DC	16:55:07	10/11/2018	33.1	2316790.83	635227.03
084	01	084-01_ADCP	23:54:09	10/10/2018	26.3	2315872.22	632812.94
084	01	084-01_DC	00:01:06	10/11/2018	29.7	2315871.42	632818.40
084	01	084-01_DC	00:01:06	10/11/2018	29.7	2315871.42	632818.40
084	03	084-03_ADCP	22:36:15	10/9/2018	85.8	2317223.55	632879.89
084	03	084-03_DC	22:42:10	10/9/2018	86.7	2317223.72	632878.16
084	04	084-04_ADCP	23:26:49	10/10/2018	27.2	2317831.14	632913.42
084	04	084-04_DC	23:33:28	10/10/2018	32.2	2317830.23	632913.27
084	05	084-05_ADCP	23:13:11	10/10/2018	17.6	2318572.61	632947.37
084	05	084-05_DC	23:19:06	10/10/2018	17.9	2318564.93	632946.25
084	02	084-02_ADCP	23:41:09	10/10/2018	59.2	2316548.18	632847.44
084	02	084-02_DC	23:46:35	10/10/2018	59.7	2316546.82	632848.77
085	01	085-01_ADCP	00:10:31	10/11/2018	27.8	2316658.23	631600.83
085	01	085-01_ADCP	00:10:31	10/11/2018	27.8	2316658.23	631600.83
085	01	085-01_DC	00:16:45	10/11/2018	27.5	2316653.34	631597.74
085	01	085-01_DC	00:16:45	10/11/2018	27.5	2316653.34	631597.74
085	02	085-02_ADCP	00:20:24	10/11/2018	34.4	2316759.51	631631.20
085	02	085-02_ADCP	00:20:24	10/11/2018	34.4	2316759.51	631631.20
085	02	085-02_DC	00:25:12	10/11/2018	33.9	2316755.80	631633.30
085	02	085-02_DC	00:25:12	10/11/2018	33.9	2316755.80	631633.30
085	03	085-03_ADCP	22:12:31	10/9/2018	71.2	2317170.29	631754.76
085	03	085-03_DC	22:18:10	10/9/2018	71.1	2317172.33	631751.27
085	04	085-04_ADCP	22:00:58	10/9/2018	81.5	2317482.96	631848.70
085	04	085-04_DC	22:05:34	10/9/2018	81.7	2317479.54	631848.87
085	05	085-05_ADCP	21:34:08	10/9/2018	83.6	2317659.88	631902.34
085	05	085-05_DC	21:46:38	10/9/2018	83.2	2317660.29	631898.58
085	06	085-06_ADCP	21:23:01	10/9/2018	82.9	2317899.16	631973.57
085	06	085-06_DC	21:27:36	10/9/2018	82.5	2317899.50	631970.04
085	09	085-09_ADCP	16:29:31	10/11/2018	20.6	2318957.30	632291.51
085	09	085-09_DC	16:38:20	10/11/2018	20.0	2318958.50	632296.24
085	10	085-10_ADCP	16:16:57	10/11/2018	30.2	2319163.32	632354.05
085	10	085-10_DC	16:21:57	10/11/2018	29.8	2319161.59	632358.27
086	01	086-01_DC	22:25:28	10/3/2018	8.4	2316565.34	630652.26
086	02	086-02_ADCP	23:29:48	10/8/2018	49.6	2317078.34	630777.45
086	02	086-02_DC	22:16:44	10/3/2018	9.4	2316929.66	630737.28
086	02	086-02_DC	23:35:03	10/8/2018	50.1	2317083.15	630773.89
086	02	086-02_DC	00:07:44	10/9/2018	53.7	2317074.92	630773.07
086	02	086-02_DC	00:07:44	10/9/2018	53.7	2317074.92	630773.07
086	03	086-03_ADCP	18:46:16	10/3/2018	60.9	2317231.69	630816.10
086	03	086-03_ADCP	17:22:17	10/4/2018	60.9	2317230.59	630816.50
086	03	086-03_DC	16:57:00	10/2/2018	0.0	2317114.28	630749.90
086	03	086-03_DC	22:01:59	10/3/2018	61.2	2317233.80	630813.24
086	04	086-04_ADCP	18:32:05	10/3/2018	80.8	2317876.36	630973.38
086	04	086-04_ADCP	17:08:07	10/4/2018	81.8	2317875.51	630976.34
086	04	086-04_DC	21:53:30	10/3/2018	82.3	2317880.20	630968.77
086	05	086-05_ADCP	18:20:25	10/3/2018	84.2	2318006.14	631005.54
086	05	086-05_ADCP	16:55:43	10/4/2018	84.0	2318004.10	631004.03
086	05	086-05_DC	21:44:41	10/3/2018	83.9	2318006.35	631006.77
086	06	086-06_ADCP	18:05:43	10/3/2018	83.9	2318157.04	631042.98
086	06	086-06_ADCP	16:43:39	10/4/2018	83.9	2318158.36	631043.68
086	06	086-06_DC	21:31:36	10/3/2018	84.2	2318156.76	631038.15
086	06	086-06_DC	21:36:24	10/3/2018	83.6	2318156.37	631044.56
086	07	086-07_ADCP	17:50:28	10/3/2018	19.9	2318725.54	631182.73
086	07	086-07_DC	21:21:33	10/3/2018	20.3	2318727.65	631177.86
086	08	086-08_ADCP	17:39:06	10/3/2018	18.5	2319085.09	631270.29
086	08	086-08_DC	21:11:50	10/3/2018	19.3	2319087.61	631265.09

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
086	09	086-09_ADCP	19:23:14	10/3/2018	23.7	2319445.35	631357.34
086	09	086-09_DC	20:59:05	10/3/2018	21.6	2319444.26	631356.17
086	10	086-10_ADCP	19:43:27	10/3/2018	12.5	2319803.21	631446.03
086	10	086-10_DC	20:37:46	10/3/2018	12.5	2319803.27	631445.34
087	01	087-01_ADCP	22:52:43	10/3/2018	63.7	2317298.40	629954.59
087	01	087-01_DC	22:50:00	10/3/2018	64.3	2317300.63	629951.99
087	02	087-02_ADCP	23:07:26	10/3/2018	68.2	2317732.01	629951.43
087	02	087-02_ADCP	17:37:31	10/4/2018	68.1	2317730.73	629952.82
087	02	087-02_DC	23:10:02	10/3/2018	69.3	2317730.21	629949.03
087	03	087-03_ADCP	17:48:38	10/4/2018	79.5	2318114.77	629951.20
087	03	087-03_DC	23:19:42	10/3/2018	79.1	2318112.26	629949.15
087	04	087-04_ADCP	17:58:06	10/4/2018	75.4	2318348.65	629949.68
087	04	087-04_DC	18:11:52	10/4/2018	76.0	2318350.06	629947.53
087	05	087-05_ADCP	18:27:30	10/4/2018	79.3	2318603.17	629946.00
087	05	087-05_DC	18:30:48	10/4/2018	77.8	2318600.01	629946.20
087	06	087-06_ADCP	22:43:05	10/5/2018	22.4	2319322.55	629941.85
087	06	087-06_DC	20:55:24	10/9/2018	22.8	2319320.54	629940.79
087	07	087-07_ADCP	22:09:02	10/5/2018	41.1	2320103.90	629939.23
087	07	087-07_DC	20:43:00	10/9/2018	22.9	2320106.89	629933.82
087	08	087-08_ADCP	22:30:05	10/5/2018	29.6	2319881.93	629940.76
087	08	087-08_DC	20:48:30	10/9/2018	31.0	2319874.69	629937.82
087	09	087-09_	22:14:06	10/5/2018	0.0	2320187.04	629937.71
087	09	087-09_ADCP	22:19:17	10/5/2018	23.2	2320187.87	629938.92
087	09	087-09_DC	20:37:49	10/9/2018	34.4	2320188.07	629932.51
087	10	087-10_ADCP	21:40:24	10/5/2018	21.4	2320650.59	629935.25
087	10	087-10_DC	20:32:01	10/9/2018	21.9	2320651.82	629939.15
088	01	088-01_ADCP	16:30:21	10/6/2018	69.8	2317015.82	628919.32
088	01	088-01_DC	16:37:26	10/6/2018	66.8	2317014.81	628921.12
088	02	088-02_ADCP	16:49:00	10/5/2018	52.0	2317310.47	628929.52
088	02	088-02_DC	16:56:43	10/5/2018	52.3	2317307.06	628928.37
088	03	088-03_ADCP	19:35:49	10/4/2018	66.3	2317796.81	628947.56
088	03	088-03_DC	23:20:39	10/4/2018	66.0	2317798.60	628940.52
088	04	088-04_ADCP	19:26:13	10/4/2018	78.3	2318369.92	628971.76
088	04	088-04_DC	23:12:12	10/4/2018	79.0	2318367.66	628968.12
088	05	088-05_ADCP	19:13:43	10/4/2018	79.4	2318532.44	628972.48
088	05	088-05_DC	23:05:29	10/4/2018	80.0	2318529.79	628970.82
088	06	088-06_ADCP	18:51:43	10/4/2018	82.5	2318753.60	628978.76
088	06	088-06_DC	18:54:29	10/4/2018	82.3	2318751.31	628985.88
088	07	088-07_ADCP	19:56:20	10/5/2018	26.7	2319358.45	629003.82
088	07	088-07_DC	20:02:06	10/5/2018	26.6	2319355.21	629002.84
088	08	088-08_ADCP	20:16:28	10/5/2018	28.2	2319748.82	629016.14
088	08	088-08_DC	20:20:05	10/5/2018	28.3	2319747.40	629023.82
088	08	088-08_DC	20:18:21	10/9/2018	28.9	2319745.65	629020.13
088	09	088-09_ADCP	20:51:24	10/5/2018	27.9	2320141.50	629031.39
088	09	088-09_DC	20:55:26	10/5/2018	28.8	2320140.08	629034.01
088	10	088-10_ADCP	21:07:11	10/5/2018	24.3	2320530.07	629044.80
088	10	088-10_DC	20:11:55	10/9/2018	24.7	2320527.84	629046.78
089	01	089-01_ADCP	16:47:19	10/6/2018	65.8	2317060.95	628288.70
089	01	089-01_DC	16:51:00	10/6/2018	65.8	2317064.33	628293.68
089	02	089-02_ADCP	17:11:44	10/5/2018	41.3	2317445.64	628361.25
089	02	089-02_DC	17:16:39	10/5/2018	38.6	2317446.56	628361.60
089	03	089-03_ADCP	19:51:25	10/4/2018	63.8	2317956.76	628460.66
089	03	089-03_DC	22:42:26	10/4/2018	63.3	2317955.37	628453.35
089	04	089-04_	22:49:15	10/4/2018	78.9	2318491.07	628556.64
089	04	089-04_ADCP	20:12:52	10/4/2018	79.1	2318489.79	628556.89
089	05	089-05_ADCP	20:20:04	10/4/2018	79.9	2318676.38	628593.12
089	05	089-05_DC	22:56:33	10/4/2018	80.1	2318677.40	628590.23
089	06	089-06_ADCP	20:47:34	10/4/2018	83.1	2318810.73	628616.33
089	06	089-06_DC	20:56:18	10/4/2018	82.3	2318808.78	628615.68
089	07	089-07_ADCP	19:25:10	10/5/2018	24.9	2319318.35	628713.69

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
089	07	089-07_DC	19:28:30	10/5/2018	24.8	2319312.19	628713.73
089	07	089-07_DC	19:44:14	10/5/2018	25.2	2319317.23	628710.79
089	08	089-08_ADCP	19:14:36	10/5/2018	28.3	2319718.63	628787.84
089	08	089-08_DC	20:22:46	10/9/2018	29.7	2319720.89	628788.95
089	09	089-09_ADCP	18:57:42	10/5/2018	30.0	2320124.00	628861.65
089	09	089-09_DC	19:01:18	10/5/2018	30.7	2320120.95	628860.77
089	10	089-10_ADCP	18:43:58	10/5/2018	27.9	2320523.82	628939.69
089	10	089-10_DC	20:07:15	10/9/2018	28.6	2320525.82	628940.49
090	01	090-01_ADCP	17:35:41	10/5/2018	22.2	2316861.19	627744.72
090	01	090-01_DC	23:10:16	10/8/2018	20.9	2316862.85	627743.65
090	02	090-02_ADCP	22:28:22	10/4/2018	65.8	2317285.37	627712.52
090	02	090-02_DC	22:32:13	10/4/2018	65.8	2317285.62	627716.53
090	03	090-03_ADCP	17:48:00	10/5/2018	41.1	2317709.29	627682.81
090	03	090-03_DC	23:18:49	10/8/2018	38.8	2317707.95	627679.13
090	04	090-04_ADCP	22:13:07	10/4/2018	71.3	2318321.73	627640.20
090	04	090-04_DC	22:14:51	10/4/2018	74.7	2318326.61	627637.79
090	05	090-05_ADCP	21:56:03	10/4/2018	81.1	2318831.63	627606.15
090	05	090-05_DC	21:58:37	10/4/2018	81.1	2318830.75	627600.06
090	06	090-06_ADCP	21:38:10	10/4/2018	82.3	2318980.56	627592.88
090	06	090-06_DC	21:42:35	10/4/2018	80.4	2318982.22	627590.62
090	07	090-07_ADCP	21:16:37	10/4/2018	71.2	2319101.39	627584.91
090	07	090-07_DC	21:23:14	10/4/2018	72.5	2319100.51	627584.68
090	08	090-08_ADCP	18:08:13	10/5/2018	23.3	2319832.34	627534.10
090	08	090-08_DC	23:52:01	10/5/2018	24.6	2319835.01	627529.98
090	09	090-09_ADCP	18:16:47	10/5/2018	25.9	2320254.93	627503.52
090	09	090-09_DC	19:53:51	10/9/2018	26.2	2320253.70	627502.69
090	10	090-10_ADCP	18:30:25	10/5/2018	42.1	2320854.23	627459.50
090	10	090-10_DC	20:00:24	10/9/2018	40.9	2320854.46	627460.01
091	01	091-01_ADCP	23:00:21	10/8/2018	24.9	2316815.07	627168.63
091	01	091-01_DC	23:01:15	10/8/2018	25.2	2316816.97	627164.65
091	02	091-02_ADCP	22:38:20	10/8/2018	34.5	2317577.20	626972.93
091	02	091-02_DC	22:43:33	10/8/2018	34.9	2317570.91	626969.85
091	03	091-03_ADCP	22:11:12	10/8/2018	22.3	2317959.49	626873.21
091	03	091-03_DC	22:25:17	10/8/2018	22.2	2317957.95	626870.82
091	04	091-04_ADCP	21:59:35	10/8/2018	55.9	2318340.19	626775.66
091	04	091-04_DC	22:05:46	10/8/2018	55.1	2318343.02	626770.01
091	05	091-05_ADCP	17:11:28	10/6/2018	65.1	2318653.73	626694.01
091	05	091-05_DC	17:15:07	10/6/2018	67.1	2318654.08	626690.18
091	06	091-06_ADCP	17:24:15	10/6/2018	107.0	2319044.76	626593.45
091	06	091-06_DC	17:32:11	10/6/2018	107.0	2319048.90	626598.03
091	07	091-07_ADCP	17:43:48	10/6/2018	95.2	2319178.17	626560.71
091	07	091-07_DC	17:46:40	10/6/2018	93.8	2319175.54	626565.57
091	08	091-08_ADCP	17:55:56	10/6/2018	78.0	2319457.58	626488.81
091	08	091-08_DC	18:01:48	10/6/2018	77.9	2319459.47	626486.41
091	09	091-09_ADCP	23:08:56	10/5/2018	23.0	2319864.59	626383.00
091	09	091-09_DC	19:44:28	10/9/2018	24.0	2319861.66	626380.13
091	10	091-10_ADCP	23:21:42	10/5/2018	45.9	2320247.72	626285.52
091	10	091-10_DC	19:39:49	10/9/2018	47.8	2320250.00	626287.64
092	02	092-02_ADCP	19:06:08	10/6/2018	103.0	2319004.87	626066.91
092	02	092-02_DC	19:11:24	10/6/2018	102.0	2318999.44	626067.22
092	02	092-02_DC	19:21:12	10/6/2018	102.0	2319088.65	626057.60
092	03	092-03_ADCP	21:02:14	10/8/2018	18.2	2316955.17	626280.98
092	03	092-03_DC	21:08:47	10/8/2018	17.7	2316953.53	626281.36
092	04	092-04_ADCP	21:25:13	10/8/2018	11.7	2317651.63	626208.57
092	04	092-04_DC	21:26:42	10/8/2018	12.1	2317652.49	626207.77
092	05	092-05_ADCP	21:34:48	10/8/2018	29.1	2317958.26	626175.71
092	05	092-05_DC	21:39:30	10/8/2018	29.5	2317958.57	626171.53
092	06	092-06_ADCP	21:47:54	10/8/2018	42.3	2318492.11	626119.44
092	06	092-06_DC	21:52:48	10/8/2018	51.4	2318494.17	626118.25
092	07	092-07_ADCP	19:30:00	10/6/2018	99.1	2318820.13	626085.37

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
092	07	092-07_DC	19:37:25	10/6/2018	102.0	2318818.69	626082.96
092	08	092-08_ADCP	18:53:41	10/6/2018	93.6	2319170.76	626048.17
092	08	092-08_DC	18:56:48	10/6/2018	94.1	2319169.43	626042.33
092	09	092-09_ADCP	18:16:33	10/6/2018	84.0	2319422.99	626022.70
092	09	092-09_DC	18:23:39	10/6/2018	85.7	2319425.20	626024.61
092	10	092-10_ADCP	23:33:44	10/5/2018	42.3	2319979.66	625966.06
092	10	092-10_DC	19:34:13	10/9/2018	34.5	2319976.54	625958.72
093	01	093-01_ADCP	20:35:35	10/8/2018	22.3	2316711.80	626883.92
093	01	093-01_DC	20:43:11	10/8/2018	22.5	2316709.19	626881.64
093	02	093-02_ADCP	20:27:31	10/8/2018	17.8	2317112.66	626502.25
093	02	093-02_DC	20:29:24	10/8/2018	18.3	2317111.30	626503.10
093	04	093-04_ADCP	19:59:42	10/8/2018	24.8	2317879.84	625774.45
093	04	093-04_DC	20:07:51	10/8/2018	24.8	2317876.39	625770.42
093	05	093-05_ADCP	19:52:04	10/6/2018	59.7	2318111.94	625552.21
093	05	093-05_DC	20:08:54	10/6/2018	58.5	2318107.46	625549.98
093	06	093-06_ADCP	20:24:04	10/6/2018	88.1	2318344.78	625331.00
093	06	093-06_DC	20:25:18	10/6/2018	89.7	2318343.10	625325.87
093	07	093-07_ADCP	20:43:13	10/6/2018	83.2	2318465.95	625218.85
093	07	093-07_DC	20:46:53	10/6/2018	87.4	2318464.74	625219.37
093	08	093-08_ADCP	21:01:36	10/6/2018	91.2	2318578.43	625107.77
093	08	093-08_DC	21:07:44	10/6/2018	91.1	2318577.80	625104.65
093	09	093-09_ADCP	21:14:52	10/6/2018	80.5	2318692.81	624999.48
093	09	093-09_DC	21:21:35	10/6/2018	75.8	2318693.76	625001.05
093	10	093-10_ADCP	21:35:17	10/6/2018	70.7	2318812.75	624885.81
093	10	093-10_DC	21:37:10	10/6/2018	68.1	2318808.38	624881.00
094	01	094-01_ADCP	19:30:21	10/8/2018	25.3	2316905.86	624883.49
094	01	094-01_DC	19:35:15	10/8/2018	25.2	2316904.90	624881.09
094	02	094-02_ADCP	23:23:15	10/6/2018	66.4	2317091.29	624790.05
094	02	094-02_DC	23:28:58	10/6/2018	69.2	2317094.11	624795.38
094	03	094-03_ADCP	23:13:41	10/6/2018	75.8	2317233.12	624719.04
094	03	094-03_DC	23:15:39	10/6/2018	75.9	2317236.37	624718.45
094	04	094-04_ADCP	22:58:50	10/6/2018	80.7	2317360.50	624655.55
094	04	094-04_DC	23:03:21	10/6/2018	80.3	2317355.03	624655.23
094	05	094-05_ADCP	22:45:55	10/6/2018	84.8	2317463.80	624601.96
094	05	094-05_DC	22:49:56	10/6/2018	84.5	2317462.36	624604.16
094	06	094-06_ADCP	22:32:26	10/6/2018	95.4	2317596.23	624535.96
094	06	094-06_DC	22:35:32	10/6/2018	94.3	2317592.28	624537.42
094	07	094-07_ADCP	22:12:57	10/6/2018	97.5	2317705.97	624481.16
094	07	094-07_DC	22:19:07	10/6/2018	100.0	2317703.41	624487.61
094	08	094-08_ADCP	21:59:22	10/6/2018	82.2	2317866.18	624399.83
094	08	094-08_DC	22:06:47	10/6/2018	80.9	2317864.67	624402.39
094	09	094-09_ADCP	21:47:58	10/6/2018	75.5	2318042.28	624310.85
094	09	094-09_DC	21:54:03	10/6/2018	77.5	2318040.56	624309.79
094	10	094-10_ADCP	16:17:20	10/8/2018	38.8	2318304.93	624179.12
094	10	094-10_DC	16:24:35	10/8/2018	37.7	2318304.19	624177.04
095	01	095-01_ADCP	19:17:44	10/8/2018	51.5	2316441.53	624453.82
095	01	095-01_DC	19:23:43	10/8/2018	47.1	2316436.87	624452.51
095	02	095-02_ADCP	23:38:37	10/6/2018	76.5	2316422.55	624337.68
095	02	095-02_DC	23:44:52	10/6/2018	77.1	2316421.38	624336.97
095	03	095-03_ADCP	16:12:28	10/7/2018	83.1	2316401.06	624201.25
095	03	095-03_DC	16:24:30	10/7/2018	83.2	2316398.43	624201.25
095	04	095-04_ADCP	16:34:37	10/7/2018	83.7	2316378.15	624048.42
095	04	095-04_DC	16:39:23	10/7/2018	84.9	2316379.68	624047.22
095	05	095-05_ADCP	16:46:44	10/7/2018	80.9	2316358.66	623930.69
095	05	095-05_DC	16:50:42	10/7/2018	83.3	2316355.87	623930.07
095	06	095-06_ADCP	17:05:25	10/7/2018	85.5	2316331.71	623754.24
095	06	095-06_DC	17:11:46	10/7/2018	87.3	2316330.53	623754.62
095	07	095-07_ADCP	17:21:47	10/7/2018	88.3	2316298.67	623542.07
095	07	095-07_DC	17:24:35	10/7/2018	86.2	2316295.59	623543.04
095	08	095-08_ADCP	17:32:14	10/7/2018	82.4	2316271.73	623372.34

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
095	08	095-08_DC	17:37:00	10/7/2018	82.6	2316267.07	623370.79
095	09	095-09_ADCP	17:42:51	10/7/2018	73.9	2316238.43	623163.93
095	09	095-09_DC	17:48:55	10/7/2018	73.4	2316234.00	623160.65
095	10	095-10_ADCP	16:44:53	10/8/2018	50.1	2316204.99	622950.49
095	10	095-10_DC	16:49:50	10/8/2018	44.1	2316199.80	622951.06
096	01	096-01_ADCP	19:04:56	10/8/2018	35.4	2315325.34	623942.25
096	01	096-01_DC	19:10:00	10/8/2018	33.9	2315320.11	623947.31
096	02	096-02_ADCP	19:25:30	10/7/2018	73.8	2315470.51	623890.54
096	02	096-02_DC	19:27:10	10/7/2018	73.7	2315473.51	623889.09
096	03	096-03_ADCP	19:08:48	10/7/2018	88.3	2315612.89	623840.26
096	03	096-03_DC	19:14:36	10/7/2018	90.4	2315612.06	623837.52
096	04	096-04_ADCP	18:59:22	10/7/2018	88.7	2315796.33	623775.14
096	04	096-04_DC	19:03:38	10/7/2018	89.1	2315793.24	623772.03
096	05	096-05_ADCP	18:47:56	10/7/2018	87.7	2315983.45	623708.29
096	05	096-05_DC	18:52:22	10/7/2018	88.3	2315977.06	623705.10
096	06	096-06_ADCP	18:34:46	10/7/2018	86.6	2316125.14	623659.02
096	06	096-06_DC	18:40:17	10/7/2018	86.3	2316121.82	623657.08
096	07	096-07_ADCP	18:23:06	10/7/2018	89.1	2316333.24	623584.81
096	07	096-07_DC	18:27:53	10/7/2018	87.6	2316328.89	623583.11
096	08	096-08_ADCP	18:11:52	10/7/2018	86.8	2316420.92	623554.26
096	08	096-08_DC	18:16:38	10/7/2018	89.8	2316416.32	623550.72
096	09	096-09_ADCP	18:00:29	10/7/2018	79.2	2316560.26	623504.85
096	09	096-09_DC	18:05:23	10/7/2018	80.1	2316558.20	623506.05
096	10	096-10_ADCP	16:33:14	10/8/2018	44.0	2316846.92	623402.98
096	10	096-10_DC	16:38:11	10/8/2018	43.3	2316841.56	623401.07
097	01	097-01_ADCP	18:53:53	10/8/2018	24.8	2314685.80	623681.02
097	01	097-01_DC	18:59:02	10/8/2018	26.5	2314681.82	623682.72
097	02	097-02_ADCP	18:41:04	10/8/2018	56.7	2314712.54	623609.45
097	02	097-02_DC	18:46:56	10/8/2018	55.6	2314707.55	623611.38
097	03	097-03_ADCP	19:59:39	10/7/2018	82.9	2314763.31	623469.49
097	03	097-03_DC	20:00:48	10/7/2018	83.8	2314757.16	623470.50
097	04	097-04_ADCP	20:09:28	10/7/2018	85.7	2314812.18	623326.99
097	04	097-04_DC	20:12:22	10/7/2018	91.9	2314807.61	623325.36
097	05	097-05_ADCP	20:18:22	10/7/2018	88.1	2314862.53	623185.62
097	05	097-05_DC	20:31:17	10/7/2018	89.3	2314859.07	623178.56
097	06	097-06_ADCP	20:43:44	10/7/2018	82.6	2314913.56	623044.01
097	06	097-06_DC	20:47:55	10/7/2018	83.6	2314912.55	623041.38
097	07	097-07_ADCP	20:56:50	10/7/2018	86.4	2314965.04	622901.90
097	07	097-07_DC	21:01:08	10/7/2018	86.7	2314962.91	622904.76
097	08	097-08_ADCP	21:10:19	10/7/2018	82.9	2315012.29	622761.12
097	08	097-08_DC	21:14:41	10/7/2018	84.2	2315014.00	622762.40
097	09	097-09_ADCP	21:23:39	10/7/2018	79.2	2315066.04	622619.61
097	09	097-09_DC	21:28:46	10/7/2018	77.1	2315061.59	622618.39
097	10	097-10_ADCP	17:00:51	10/8/2018	55.2	2315115.42	622478.19
097	10	097-10_DC	17:07:01	10/8/2018	51.6	2315110.83	622475.11
098	01	098-01_ADCP	18:16:30	10/8/2018	16.6	2313604.30	623463.77
098	01	098-01_DC	18:27:09	10/8/2018	16.2	2313609.76	623464.11
098	02	098-02_ADCP	18:07:10	10/8/2018	29.6	2313665.60	623322.49
098	02	098-02_DC	18:12:28	10/8/2018	30.8	2313666.72	623321.64
098	03	098-03_ADCP	22:59:30	10/7/2018	74.5	2313727.66	623180.33
098	03	098-03_DC	23:06:22	10/7/2018	79.1	2313721.96	623183.00
098	04	098-04_ADCP	22:51:01	10/7/2018	80.5	2313792.00	623041.81
098	04	098-04_DC	22:55:28	10/7/2018	78.5	2313794.46	623038.57
098	05	098-05_ADCP	22:40:30	10/7/2018	98.8	2313853.34	622900.37
098	05	098-05_DC	22:45:45	10/7/2018	96.9	2313849.91	622898.48
098	06	098-06_ADCP	22:29:33	10/7/2018	86.6	2313916.31	622759.38
098	06	098-06_DC	22:35:11	10/7/2018	87.0	2313919.71	622760.21
098	07	098-07_ADCP	22:19:39	10/7/2018	91.1	2313978.26	622618.21
098	07	098-07_DC	22:23:50	10/7/2018	89.2	2313979.91	622619.23
098	08	098-08_ADCP	22:05:24	10/7/2018	83.9	2314039.65	622478.03

Transect No.	Station No.	Station ID	Time	Date	Depth (feet)	UTM 11N X	UTM 11N Y
098	08	098-08_DC	22:10:38	10/7/2018	85.5	2314037.98	622475.86
098	09	098-09_ADCP	21:52:13	10/7/2018	83.7	2314102.89	622336.24
098	09	098-09_DC	21:58:09	10/7/2018	82.5	2314104.72	622339.60
098	10	098-10_ADCP	21:38:59	10/7/2018	63.4	2314163.53	622197.16
098	10	098-10_DC	21:44:53	10/7/2018	64.1	2314167.68	622197.57
099	01	099-01_ADCP	17:45:07	10/8/2018	23.4	2312699.02	623243.43
099	01	099-01_DC	17:51:14	10/8/2018	24.0	2312700.55	623244.28
099	02	099-02_ADCP	17:55:42	10/8/2018	36.6	2312732.29	623084.81
099	02	099-02_DC	18:00:13	10/8/2018	36.4	2312732.04	623082.17
099	03	099-03_ADCP	23:16:54	10/7/2018	77.5	2312764.97	622928.13
099	03	099-03_DC	23:22:03	10/7/2018	75.9	2312764.63	622923.03
099	04	099-04_ADCP	23:27:20	10/7/2018	91.2	2312797.32	622770.31
099	04	099-04_DC	23:31:53	10/7/2018	91.1	2312797.26	622771.78
099	05	099-05_ADCP	23:38:55	10/7/2018	92.2	2312831.97	622611.64
099	05	099-05_DC	23:43:45	10/7/2018	91.7	2312830.09	622612.32
099	06	099-06_ADCP	16:26:30	10/9/2018	88.3	2312864.40	622454.52
099	06	099-06_DC	16:33:57	10/9/2018	88.6	2312858.62	622452.99
099	07	099-07_ADCP	16:39:02	10/9/2018	85.5	2312897.41	622296.91
099	07	099-07_DC	16:45:50	10/9/2018	85.7	2312890.42	622297.03
099	08	099-08_ADCP	16:50:39	10/9/2018	88.6	2312931.90	622138.20
099	08	099-08_DC	16:56:56	10/9/2018	90.1	2312925.28	622139.56
099	09	099-09_ADCP	17:10:25	10/9/2018	87.7	2312965.55	621979.66
099	09	099-09_DC	17:16:54	10/9/2018	86.8	2312959.29	621979.32
099	10	099-10_ADCP	17:21:27	10/9/2018	69.7	2312995.82	621823.02
099	10	099-10_DC	17:27:26	10/9/2018	70.5	2312992.19	621825.29
100	01	100-01_ADCP	17:33:57	10/8/2018	26.3	2311952.89	623167.79
100	01	100-01_DC	17:39:19	10/8/2018	25.4	2311955.93	623167.74
100	02	100-02_ADCP	17:24:08	10/8/2018	43.0	2311989.06	623002.99
100	02	100-02_DC	17:28:55	10/8/2018	44.1	2311988.49	623003.32
100	03	100-03_ADCP	18:54:20	10/9/2018	69.4	2312024.69	622837.17
100	03	100-03_DC	18:58:28	10/9/2018	68.7	2312025.06	622838.98
100	04	100-04_ADCP	18:42:48	10/9/2018	82.4	2312059.98	622670.75
100	04	100-04_DC	18:48:09	10/9/2018	82.4	2312063.97	622674.46
100	05	100-05_ADCP	18:31:32	10/9/2018	83.6	2312095.51	622504.53
100	05	100-05_DC	18:37:02	10/9/2018	84.2	2312093.17	622498.80
100	06	100-06_ADCP	18:21:45	10/9/2018	84.5	2312130.99	622337.27
100	06	100-06_DC	18:26:36	10/9/2018	84.1	2312135.33	622336.50
100	07	100-07_ADCP	18:10:09	10/9/2018	84.5	2312167.12	622171.11
100	07	100-07_DC	18:16:11	10/9/2018	85.2	2312167.07	622173.16
100	08	100-08_ADCP	17:59:30	10/9/2018	87.7	2312202.15	622005.92
100	08	100-08_DC	18:03:47	10/9/2018	86.7	2312201.70	622007.82
100	09	100-09_ADCP	17:47:33	10/9/2018	85.8	2312237.73	621838.93
100	09	100-09_DC	17:53:34	10/9/2018	85.6	2312236.14	621839.68
100	10	100-10_ADCP	17:37:49	10/9/2018	76.2	2312272.46	621674.61
100	10	100-10_DC	17:43:10	10/9/2018	74.4	2312272.59	621676.20

Note:

*Time, as recorded in logbook

Appendix I
Protocol Modification Forms

PROTOCOL MODIFICATION FORM
Upper Columbia River Phase 3 Sediment Facies Mapping

Page: 1 of 1 Field Modification No: 1

Survey Type (MBES, ADCP, Drop Camera):

Drop Camera

Standard Procedure for Field Data Collection or Data Processing (cite reference):

FSP Section 2.5.2:

"In addition, transects and survey areas may require adjustment in the field as a consequence of physical access constraints (e.g., shoals and other water depth limitations) and safety considerations."

FSP Section 2.6:

"Field crews will attempt to conduct survey measurements along all planned transects and sampling intervals across the channel. If a planned location cannot be surveyed due to physical access or safety constraints, field crews will adjust locations and collect images and measurements at the nearest location without access or safety constraints."

Reason for Change in Field Survey Procedure or Data Processing:

Dense vegetation growing in the river in some shallow areas prevents acquisition of usable sediment bed imagery. The FSP describes contingency procedures for physical access constraints and safety issues but not for interference by vegetation. Areas with dense vegetation have been encountered in shallow water depths (2 m or less) where the water is likely too shallow for MBES data acquisition (2 m to 3 m per QAPP Table B4-1).

Variation from Field Survey or Data Processing Procedure:

If vegetation prevents acquisition of a usable sediment bed image at a point location, then a photograph should be collected to document field conditions. No ADCP measurement should be collected, because ADCP measurements (secondary sediment bed classification data) should always be co-located with a usable sediment bed image (primary sediment bed classification data). After collecting a photograph at the vegetation-obscured point, relocate the vessel half the distance to the next point along the transect and collect a second photograph. If the photograph at the alternate location is usable, then collect ADCP at the alternate location. If the photograph at the alternate location shows the sediment bed to be obscured by vegetation, then move to the next point along the transect.

Special Equipment, Materials or Personnel Required:

None

APPROVAL

Initiated by:

Kevin Lundmark Date: 10/5/2018

Project Coordinator: Kris R. McCaig Date: 10/15/2018

Task Manager: for Timothy McElhaney Date: 10/15/2018

PROTOCOL MODIFICATION FORM
Upper Columbia River Phase 3 Sediment Facies Mapping

Page: 1 of 1 Field Modification No: 2

Survey Type (MBES, ADCP, Drop Camera):

MBES

Standard Procedure for Field Data Collection or Data Processing (cite reference):

SOP-1 page 5, DATA QA/QC, System Calibration: Patch Testing, Latency:, first sentence:

"To account for errors due to GPS timing, a latency patch test must be performed daily."

Reason for Change in Field Survey Procedure or Data Processing:

The latency patch test is one type of patch testing to be performed during the survey. The System Calibration: Patch Testing section of the SOP states:

"A calibration patch test must be performed when sonar configuration has changed. As a best practice, start-of-project and end-of-project patch tests will also be performed. Patch tests determine the misalignment relative to the motion sensor and gyro, as well as the time-offset to the GPS system."

The correct frequency for latency patch tests (and other patch test types) is at the start of the project, end of project, and when the sonar configuration is changed; daily patch tests are not required.

Variation from Field Survey or Data Processing Procedure:

Revise the first sentence of the latency patch testing section to state:

"Latency patch tests are performed to account for errors due to GPS timing."

Special Equipment, Materials or Personnel Required:

None

APPROVAL

Initiated by:

Kevin Lundmark Date: 10/9/2018

Project Coordinator: Kris R. McCaig Date: 10/15/2018

Task Manager: Date: 10/15/2018

PROTOCOL MODIFICATION FORM

Upper Columbia River Phase 3 Sediment Facies Mapping

Page: 1 of 1 Field Modification No: 3

Survey Type (MBES, ADCP, Drop Camera):

Video

Standard Procedure for Field Data Collection or Data Processing (cite reference):

FSP Section 2.7.2:

"One image will be captured on the riverbed and one minute of video will be recorded with each camera deployment."

Reason for Change in Field Survey Procedure or Data Processing:

The text of the FSP Section 2.7.2 describing collection of one minute of video is inconsistent with SOP-2, which states that the video will record from the time the camera is deployed to the time it is retrieved. In response to EPA comments on the Draft QAPP / Draft FSP / Draft SOPs, the text of SOP-2 was revised as shown below:

> **Video and Image Recording and Reporting**
>
> All images and video will be recorded using an HD recording system and digitally stamped with date and time. Both HD video and DSLR live-view images will be viewed on the vessel. One image will be captured on the riverbed and ~~one minute of~~ video will be recorded continuously from vessel deployment to retrieval with each camera deployment ~~(continuously from vessel deployment to retrieval)~~. Video will be used as a backup image analysis in the event that the still image captured from the SLR camera was blurry, improperly exposed, or the resolution quality was insufficient for post-processing and analysis. Images will be observed and assessed in real-time at each of the drop locations. If clearly defined geomorphological

However, the corresponding description was not revised in the FSP. The procedures described in the SOP should be followed.

Variation from Field Survey or Data Processing Procedure:

To be consistent with SOP-2, the text in FSP Section 2.7.2 should be revised to:

"One image will be captured on the riverbed and video will be recorded continuously from vessel deployment to retrieval with each camera deployment."

Special Equipment, Materials or Personnel Required:

None

APPROVAL

Initiated by:

Kevin Lundmark Date: 10/11/2018

Project Coordinator: Kris R. McCaig Date: 10/15/2018

Task Manager: [signature] Date: 10/15/2018

PROTOCOL MODIFICATION FORM

Upper Columbia River Phase 3 Sediment Facies Mapping

Page: 1 of 1 Field Modification No: 4

Survey Type (MBES, ADCP, Drop Camera):

Drop Camera

Standard Procedure for Field Data Collection or Data Processing (cite reference):

FSP Section 2.7.2:

"One image will be captured on the riverbed and one minute of video will be recorded with each camera deployment."

Reason for Change in Field Survey Procedure or Data Processing:

The text of the FSP Section 2.7.2 describing collection of images using the drop camera could not be followed due to strong currents in some reaches of the river causing the drop camera frame to tip over after less than a minute of idling on the riverbed. Field personnel determined that frame tipping was highly likely when average water velocities exceeded 5 feet per second at a station. Gravity determined that repeated frame tipping onto the cobbled riverbed surface posed a significant risk to damaging the equipment.

Variation from Field Survey or Data Processing Procedure:

To mitigate the risk of damaging the equipment, images should be captured immediately upon the drop camera frame settling on the riverbed if the average water velocity exceeds 5 feet per second. This action was taken at stations 014-01, 014-02, 014-03, 014-04, 014-05, 014-06, 017-01, 017-02, 015-01, 015-02, 015-03, 015-04, and 015-05 on 10/13/2018.

Special Equipment, Materials or Personnel Required:

None

APPROVAL

Initiated by: Stuart Holmes Date: 10/16/2018

Project Coordinator: Kris R. McCaig Date: 02/19/2019

Task Manager: [signature] Date: 2/19/2019

PROTOCOL MODIFICATION FORM
Upper Columbia River Phase 3 Sediment Facies Mapping

Page: 1 of 1 Field Modification No: 5

Survey Type (MBES, ADCP, Drop Camera):

Drop Camera and ADCP

Standard Procedure for Field Data Collection or Data Processing (cite reference):

SOP-2 and SOP-3 state that ADCP surveys will be completed concurrently and co-located with video and imaging surveys.

Reason for Change in Field Survey Procedure or Data Processing:

There were 3 different scenarios that resulted in ADCP and imagery data to not be collected concurrently.

1. At the beginning of survey work, it was observed that the imagery frame had the potential to distort the flow near the riverbed, and therefore influence the ADCP data. Therefore, at most stations data was collected in tandem (one right after the other), but not precisely at the same time.
2. The depth of the riverbed exceeded the length of the imagery frame cable. This occurred at stations 59-06, 59-07, 60-7 and 60-8 before a longer cable could be acquired and delivered to the field team. At these stations, ADCP data was collected 5 days prior to imagery data.
3. During the initial days of 2018 field work, the still camera experienced some electrical problems in the housing and/or cabling. It has to be taken out of service to be rewired. At 14 stations the imagery was skipped while ADCP data continued to be collected. Those stations were 87-06, 87-07, 87-08, 87-09, 87-10, 88-08, 88-10, 89-8, 89-10, 90-9, 90-10, 91-9, 91-10, and 92-10. At these stations, ADCP data was collected 4 days prior to imagery data.

Variation from Field Survey or Data Processing Procedure:

ADCP and imagery survey data was typically collected approximately 5 to 10 minutes apart in time, except for as described in #2 and #3, above.

Special Equipment, Materials or Personnel Required:

An imagery cable that can reach the depth of at least 250 feet.

APPROVAL

Initiated by: Jennifer Pretare Date: 1/8/2019

Project Coordinator: Kris R. McCaig Date: 02/19/2019

Task Manager: for Timothy McCall Date: 2/19/2019

PROTOCOL MODIFCATION FORM

Upper Columbia River Phase 3 Sediment Facies Mapping

Page: 1 of 1 Field Modification No: 6

Survey Type (MBES, ADCP, Video): Imagery

Standard Procedure for Field Data Collection or Data Processing (cite reference):
SOP - 2 Drop Camera Surveys

Reason for Change in Field Survey Procedure or Data Processing:
Equipment Malfunction

Variation from Field Survey or Data Processing Procedure:
P.3 Laser scale will be turned on during image collection.
- Laser stopped working, battery changed, still not working
- Laser did work while camera scale was calibrated on deck.

Special Equipment, Materials or Personnel Required:
None

APPROVAL

Initiated by [signature] Date: 7-11-19

Project Manager: Kristi McCaig Date: 08-14-19

Task Manager: [signature] Date: 08-19-19

Appendix J
Gravity Quality Management Plan

Quality Management Plan

Sediment Facies Mapping – Upper Columbia River

Gravity Consulting LLC

September 2018

Prepared by:

Gravity Consulting L.L.C
32617 SE 44th ST
Fall City WA

Gravity Consulting, Managing Partner

Shawn Hinz

Jeff Wilson Gravity Consulting, L.L.C. QA Manager

The information in this Plan has been designed for the methods presently contemplated by Gravity Consulting L.L.C. (Gravity) for execution of the proposed work. Therefore, this document may not be appropriate if the work is not performed by or using the methods presently contemplated by Gravity. In addition, as the work is performed, conditions different from those anticipated may be encountered and this document may have to be modified. Therefore, Gravity only makes representations or warranties as to the adequacy of the Plan for currently anticipated activities and conditions.

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Project Specific Quality Control Plan (QCP) **6**

Table 1: Measurement Quality Objectives
Table 2: Potential Nonconformance Issues and Resolutions

Introduction

This quality management plans (QMP) objective is to help establish performance criteria and quality assurance throughout Gravity Consulting's (Gravity) work and deliverable process for survey work in support of the sediment facies mapping program on the Upper Columbia River for Teck America (TA).

Teck America (TA) has developed a survey program to map sediment facies on the Upper Columbia River. As part of this program, Teck has requested Gravity Consulting (Gravity) to conduct Acoustic and Imaging Surveys

A Quality Management System (QMS) enables Gravity to deliver these services in a manner that is consistent with the generally accepted professional standard of care and meets our clients' expectations. The QMS is fully documented and consists of this quality policy, supporting quality procedures and instructions, and other controlled supplemental documents that are presented separately.

The International Organization for Standardization (ISO) has provided guidance in the development and implementation of an effective QMS by establishing ISO 9001:2008 (ISO 9001), an international quality standard. Our QMS conforms to the requirements stated in ISO 9001 and is based on the following organizational principles:

- Promote ethical business practices;
- Focus on meeting client requirements and expectations;
- Provide quality work products and services on time or ahead of schedule while meeting financial goals;
- Foster employee empowerment, teamwork, motivation, and training;
- Develop and sustain a working environment in which people become personally involved in meeting organizational objectives;
- Promote effective communication;
- Enable people throughout the organization to utilize their abilities for the mutual benefit of the organization and themselves;
- Manage inputs, resources, and outputs pertaining to organizational activities as a process;
- Manage relationships among the processes within the organization as a system so that they support organizational effectiveness and efficiency in meeting quality objectives;
- Maintain a Quality Management System compliant with ISO 9001;
- Promote continual process improvement and prevent nonconformances, such as errors and omissions, by sharing best practices and lessons learned; and
- Strive for mutually beneficial and value-enhancing client, subcontractor, subconsultant and supplier relationships.

Purpose of QMP

Gravity prides itself on the delivering only the highest quality products and services. To achieve this level of quality, our QMP principles and procedures are integrated into all aspects of our daily administrative and support operations. Gravity's quality begins with senior management and flows through all levels of its program and project management to the individual team members working on specific client support tasks. Gravity's quality management strategy is manifested by a commitment of time and resources necessary to ensure that project data and resulting deliverables are precise, accurate, complete, and totally satisfy client requirements. Our approach to ensure high quality deliverables is simple: plan, execute, monitor, adjust, and deliver. This approach is focused on defined repeatable processes, which are key to achieving high quality cost effectively. Using this philosophy, we can track the project with scheduled quality reviews and monitor that both deliverables and budgets are within satisfactory levels. The use of independent reviewers for evaluating the project protects the objectivity and injects confidence in the outcome. At each review, the team discusses current state and areas of risk that could affect the project. All risks are continuously reviewed with the team and the client is aware of any potential impacts. Each quality review is documented and any items that cannot be resolved at the meeting are reported.

Beyond the use of project management tools, our QMP uses solid information and change management practices along with status reporting metrics for each project. Built into each deliverable plan are reviews prior to release to the clients. Our collaborative information environment has built in versioning and document control allowing us to track the status of documents for submission to final release.

Although we have a defined and repeatable process, Gravity realizes that each contract brings new and exciting challenges. To ensure that each project receives our utmost attention to quality, we will specifically tailor the details of our QA Procedures into a contract-specific QA Plan that will provide primary guidance to all team members. Each project will have a detailed quality requirements plan that has documented, clear procedures that are key to cost savings and achieving best practice solutions. Gravity encourages the use of our repeatable process approach, but allows proven team member observations for specific task orders to ensure the highest level of provided support. Through continuous quality monitoring we seek continuous improvement of our services.

QMP Objectives

Measurable quality objectives consistent with this QMP are established, monitored and maintained at the administrative and project level. Quality objectives are documented to show the objective, how the objectives are measured and the current status of the objective.

The quality objectives are intended to monitor and communicate the level of implementation of selected QMS requirements. At the Administrative level, the quality objectives address specific requirements in four areas that will be tracked and reported:

- Training;
- Internal Quality Audits;
- Project Reviews; and
- Client Feedback.

Project specific QMS requirements and objectives are supplied in Quality Assurance Project plans (QAPPs) for each project that Gravity is involved with.

Key Quality Management Personnel and Responsibilities

The following people share responsibility for Quality Management.

Gravity Senior Partner: *Shawn Hinz.*	Office: 425-888-8256 Cellular: 425-281-1471
Gravity Site Supervisor: *Ryan McEliece*	Office: 425-945-6074 Cellular: 425-945-6074
Gravity Quality Assurance Officer: *Jeff Wilson*	Office: 425-591-2831 Cellular: 425-591-2831

Every Gravity Staff member is responsible for the quality of their work and for implementing the applicable requirements of the QMP. The interrelationships between members of the Quality Management team and Operations Managers in critical to this.

General Requirements

Gravity maintains a documented QMS designed to set consistent standards and continually improve the effectiveness of QMS processes that support the delivery of work products and services to our clients in accordance with the requirements of ISO 9001. The effectiveness of the QMS is continually reviewed, improved and updated through a system of internal quality audits, project reviews, Corrective/Preventive Actions, quality improvement projects and management reviews.

Gravity QMS meets these requirements through a disciplined approach consisting of the following actions:

- Identify the key processes within the QMS and, through Quality Procedures and Quality Instructions, describe how these processes are applied throughout Gravity;
- Determine and describe the sequence and interaction of these key processes within the QMS;
- Determine criteria and methods needed for the effective operation and control of these key processes;
- Implement these key processes;
- Provide the resources and information necessary to support these key processes;
- Monitor, measure and analyze these key processes; and

- Implement actions necessary to achieve planned results and foster continual improvement of these key processes.

When processes or tasks are subcontracted, Gravity will exercise the necessary control over the subcontractor, subconsultant or supplier to maintain the necessary level of quality in the work products and services delivered to our clients.

Required QMS Documentation

All field documents are controlled through the QMS process. A procedure has been established to address the following controls:

- Approval of all documents prior to issue;
- Review, update and re-approval of QMS documents;
- Change, control and identification of revision status;
- Ready availability of relevant versions of QMS documents;
- Positive identification and legibility of QMS documents;
- Backup of electronic data files and review of information delivered electronically; and
- Prevention of the unintended use of obsolete documents by means such as identification as obsolete if they are retained for any purpose.
- Volume 2, Procedure 1 – Control of Documents, Records and Data describes the methods for document and data control.

Record Keeping

All Gravity records are controlled documents that are subject to approval, identification, distribution, storage and retention requirements. They provide evidence of conformity to the QMS requirements and the effective operation of the QMS. Quality records also result from projects and must be identified in the corresponding QAPPs for that project. Quality records may be maintained in both physical and electronic format.

Examples of quality records include, but are not limited to:

- Completed QMS forms;
- Deliverables and supporting documentation;
- Test reports;
- Laboratory reports;
- Project Review records and Internal Quality Audit reports; and

Quality records must be legible, readily identifiable and indexed for ready retrieval. All physical records are stored in a secure facility for 7 years and electronic copies are stored on a Gravity Cloud server.

Planning and Project Execution

Project execution policies include those related to project planning, client-related processes, developing and delivering work products and services, purchasing, project control and control of monitoring and measuring devices.

Gravity staff plan how each project or assignment will be executed in a manner that is consistent with project requirements, the professional standards of care, client requirements, statutory and regulatory requirements, and the QMS requirements.

The process of planning and developing projects or assignments considers the following, where appropriate:

- Client requirements;
- Quality objectives and requirements;
- Health and Safety objectives and requirements;
- Environmental and sustainability objectives and requirements;
- Processes, documentation and resources specific to the project or assignment;
- Verification, validation, monitoring, measurement, review and test activities specific to the project or assignment; and
- Records needed to provide evidence that the work products or services meet requirements.

are stored in a secure facility for 7 years and electronic copies are stored on a Gravity Cloud server.

Project Specific Quality Control Plan (QCP)

As part of the Sediment Facies Mapping program a Field Sampling Plan (FSP) with associated Standard Operating Procedures (SOP's) were produced identifying project Quality Control Plans (QCP). The specifics for the QCP are summarized in Table 1. Measurement quality objectives as well as by survey method below. For detailed description of the data acquisition methodology for the Sediment Facies Mapping surveys please refer to the SOP's in Attachment A2 of Appendix A of the Final Phase 3 SFM (Sediment Facies Mapping) QAPP (Quality Assurance Project Plan).

Acoustic Doppler Current Profiler (ADCP)

In order to measure water velocity using a vessel-mounted ADCP the motion of the vessel relative to the water must also be accurately measured. When using Differential Global Positioning System (DGPS) to calculate vessel heading and speed the ADCP's internal compass must be well-calibrated to prevent biased water velocity measurements. The internal ADCP compass will be calibrated at the beginning of each day and during the course of the day if necessary (i.e., if sampling near ferromagnetic objects).

A technical systems review will be conducted on all ADCP componentry prior to commencing the day's data collection. This includes conducting a check of all hardware items are in good working order. Gravity and AECOM have collaborated to create a series of checklists that will be used each

day and/or during each survey day to ensure a sufficient check of all equipment is conducted. These checklists will be used and logged each day by the equipment operators and submitted to the AECOM data management representative on each vessel. Such item checks include but are not limited to:

- Physical inspection of all connectors, seals, and transducer heads for visible damage
- Check and confirmation of internal compass calibration
- Review battery and cable voltages for proper power levels
- Review of initial data acquisition and current velocity magnitudes

ADCP data will undergo a formal surveillance mechanism to ensure data quality is maintained throughout the survey. Data will be monitoed real-time for the following QA indicators:

- error velocity,
- correlation, and
- data drop-out.

The data QA manager will also review data daily to ensure data quality is maintained for post processing objectives. Any nonconformances with data quality will be recorded and reported to project management.

For a four-beam configuration the same water velocity can be measure with two different sets of three beams. The difference between the measurement is called the error velocity. A large error velocity can be an indication of flow heterogeneity, one of more corrupt beam velocities, or a hardware malfunction. If high error velocities are observed the ADCP configuration will be examined and adjusted accordingly. Correlation between the outgoing and reflected signal is an indication of the signal to noise ratio.

As an additional QA check, only pings with strong correlations between the outgoing and reflected signal will be retained. Unrealistic data or data drop-out (i.e. a velocity magnitude of -999) can indicate an inappropriate instrument configuration, electrical issues, or poor ADCP-computer communication. The ADCP configuration will be re-evaluated upon observance of significant data drop-out. The instrument and communications cable will be inspected daily for signs of wear or damage.

Boat captains will maintain vessel position as close to the target location as possible given the river current and wind conditions. Only pings collected within 3m of the target station will be accepted for use in calculating flow resistance characteristics at a given station. Data collected outside of 3m will be recorded in survey logs and excluded in post processing.

Each log sheet that is entered into the database by one of the field staff is rechecked for errors by other staff after entry. Date and the technician who entered the data is written on the log sheet for reference after entry. Log sheets should be stored together in a project file.

Following each day of surveying, a daily summary report should be completed and sent electronically to the Task Manager. Report should include a summary of number of transects and locations completed, the number of supplemental locations added (if any), and a summary of any issues and associated corrective actions.

Imagery

The drop camera will be calibrated on a daily basis. Because the frame holds the camera at a known distance above the seabed, the scaling lasers can be quickly adjusted on the vessel deck. To adjust laser scales, a calibration picture will be captured daily with the SLR camera showing the lasers and a ruler. Camera focus will also be set-daily using a calibration card (e.g., Cannon calibration card or comparable) on the deck. Finally, the SLR camera time stamp will be synced with vessel computer time. After scale, time and focus parameters have been verified the system is ready for deployment.

The drop camera system will undergo a technical system review of all componentry prior to commencing the day's activities and/or at any time equipment has experienced a malfunction or loss of data quality. Gravity and AECOM have collaborated to create a series of checklists that will be used each day and/or during each survey day to ensure a sufficient check of all equipment is conducted. These checklists will be used and logged each day by the equipment operators and submitted to the AECOM data management representative on each vessel. Review items will include but will not be limited to the following checks;

- Inspect camera body, lens and housing for proper working order
- Inspect camera setting have held and are in accordance with QAPP and SOP guidelines
- Inspect all connectors and seals for integrity
- Ensure camera has appropriate memory space

All images and video will be recorded using a HD recording system and digitally stamped with date and time. Both HD video and DSLR live-view images will be viewed on the vessel. One image will be captured on the riverbed and in addition, one- minute of video will be recorded with each camera deployment. Video will be used as a backup image analysis in the event that the still image captured from the SLR was blurry, improperly exposed, or the resolution quality was insufficient for post-processing and analysis.

Imagery will undergo an in-field surveillance system to ensure photo and video data quality is maintained. Images will be observed and assessed in real-time at each of the drop locations. If clearly defined geomorphological features are observed or based on a review of bathymetry or acoustic backscatter data, additional images may be collected along transects to help ensure that images are collected to represent the full range representative geomorphic features.

The data QA manager will also review data daily to ensure data quality is maintained for post processing objectives. Any nonconformances with data quality will be recorded and reported to project management.

Daily Record Keeping

Field notes will be taken during all survey activities in a field note book which will be kept with the lead. Included in the field notes will be the following information:

- Names of persons obtaining and reviewing images/video.
- Names of persons operating vessel and/or equipment.

- Weather conditions (and/or any changes in weather).
- Water depth
- Date and time of each transect start and end.
- Brief description of observations.
- Any deviations from the approved plan.

In addition to the field notes, daily project specific checklists and calibration forms have been developed in collaboration with Gravity and AECOM staff. These forms will be filled out before, during and after field activities.

Following each day of surveying, a daily summary report should be completed and sent electronically to the Task Manager. Report should include a summary of number of transects and locations completed, the number of supplemental locations added (if any), and a summary of any issues and associated corrective actions.

Table 1 Measurement Quality Objectives

Data Type	Data Deliverable	Utility for Sediment Facies Mapping	Data Quality Requirements (Drivers for Specifications)	Performance Criteria (Specifications)
ADCP	Point data file containing calculated Coefficient of Friction and Apparent Roughness Height for each location Format: ESRI Shapefile, with FGDC metadata included Vector Point Data * Format: ASCII text file, with X, Y, Z, time, U, V, W (Two ASCII files of velocity data provided: raw data and spatially/temporally averaged data) Raw ADCP data files * * Included in a separate database from the point data shape file	Point data to supplement sediment facies mapping	3 m radius spatial averaging, as deemed appropriate by designated survey design and hardware specifications 0.01 – 0.5 m depth averaging, as deemed appropriate by water depth, designated survey design, and hardware specifications	RTK GPS Positioning Boat speed consistently maintained at a speed less than or equal to the average current velocity SOP that describes corrections and/or calibrations (i.e. compass calibration, moving-bed tests) to USGS suggestions for accuracy and precision (Mueller and Wagner 2009).
Underwater Video/photo	Georeferenced video/photo files in native resolution Point data file containing interpreted grain size composition (percentage of each grain size class) for each photo location Format: ESRI Shapefile, with FGDC metadata included	Visual interpretation of sediment grain size composition using image processing software Point data for training and validation of backscatter sediment classification method	Image quality to support 1) Differentiation between sediment < 2 mm and > 2 mm 2) Differentiation between primarily sand areas and areas with areas of gravel/ cobbles/ boulder embedded with sand Positioning precision and accuracy comparable to or better than multibeam data	RTK GPS positioning Include scale bar or lasers for scale Include position/time data in video to facilitate extraction of individual photos Manual classification of sediment composition for 10 percent of photographs to verify results from automated image analysis

Nonconformance Reporting

Nonconformance issues that arise during survey activities and any in-field resolutions must be documented clearly every time there is any deviation from the outlined methodology in the QAPP and/or project specific SOPs. This includes and in-field decisions that change sampling locations and/or methodology as well as any changes to instrument operation and data collection procedures.

Nonconformance issues must be documented clearly in the field log book. Nonconformance reporting should include at a minimum, the following criteria;

- Date and time of issue
- Vessel
- Location (station ID and Lat/Lon)
- Type of nonconformance (Site access, sample location, equipment malfunction, data quality loss…etc)
- Communication of nonconformance with appropriate personnel (i.e. Project Manager and QA Manager)
- Any in-field resolutions and/or decisions made

Nonconformances should be clearly communicated as well with the QA Manager as soon as possible. The QA manager will notify the appropriate parties for clarification of resolutions and approvals for any deviations from the QAPP and SOP. Some potential nonconformance issues and resolution are presented in Table 2.

The QA Manager will record all nonconformances in a tracking matrix for the duration of the project.

Table 2. Potential Nonconformance issues and resolutions

Survey Activity	Non-conformance	Potential Resolution(s)
Imagery	Image/video out of focus	Check and/or adjust camera lens
		Adjust camera housing heigth on frame
		Turn on/off or adjust lighting
	Scaling lasers calibration incorrect	Check and/or adjust laser angles on camera housing
		Adjust camera housing height on frame
		Use test object to calibrate scaling lasers
	Time sync incorrect	Inspect raw data file for time/ date stamp
		Sync camera with correct date/time stamp
		Confirm on test image/video prior to deployment
ADCP	No or incorrect velocity readings	Check all communication/power cables and junctions between instrument and survey computer
		Perform "rub-test" on all transducers to ensure instrument is powered and receiving feedback
		Correct vessel speed and/or reduce vessel movement
	Excessive vessel movement	Captain reduce vessel movement while collecting ADCP data
		Anchor vessel to reduce vessel movement
		Ensure GPS is operating properly and/or has not lost RTK fix
Navigation/Positioning	GPS position accuracy insufficient	Check all communication/power cables and junctions between GPS and survey computer
		Check RTK radio receiver frequency, and GPS is connected to correct control
		Check number of satellites and HDOP values to ensure sufficient coverage exists

Appendix K
DEA Quality Managment Plan

Upper Columbia River Remedial Investigation/Feasibility Study
Phase 3 Sediment Study - Sediment Facies Mapping

Hydrographic Survey Work and Quality Control Plan
Upper Columbia River, Washington

October 2018

Prepared for

AECOM

Prepared by

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I. INTRODUCTION

Teck American Incorporated (TAI) and the U.S. Environmental Protection Agency (EPA) have entered into an agreement to perform a remedial investigation and feasibility study (RI/FS) on the Upper Columbia River (UCR). The UCR RI/FS Phase 3 Sediment Study includes a sediment facies mapping component. The sediment facies mapping component will focus on acquisition of high-resolution acoustic and imagery data covering the Upper Reach Operable Unit (OU) portion of the UCR. The Upper Reach OU encompasses UCR river miles (RM) 708 to the international border north of RM 744 and includes three areas of interest (AOIs): 1) Deadman's Eddy, 2) China Bend, and 3) an area upstream of Marcus Flats (Figure 1).

David Evans and Associates, Inc. (DEA) will conduct a precision hydrographic survey of the UCR Upper Reach OU during October 2018. Bathymetry and acoustic backscatter imagery will be acquired with a multibeam sonar during the survey. The data collection methods will follow the acceptability criterion established in the UCR RI/FS Phase 3 Sediment Study Quality Assurance Project Plan (QAPP). The results of this survey will provide high-resolution bathymetric maps and acoustic backscatter imagery for subsequent sediment facies mapping.

This work and quality control plan covers staff, equipment, datums, methodology, and quality control procedures to be employed to satisfy the hydrographic survey component of this project. Target accuracy is plus or minus 0.3 feet at a 95% confidence level (two sigma).

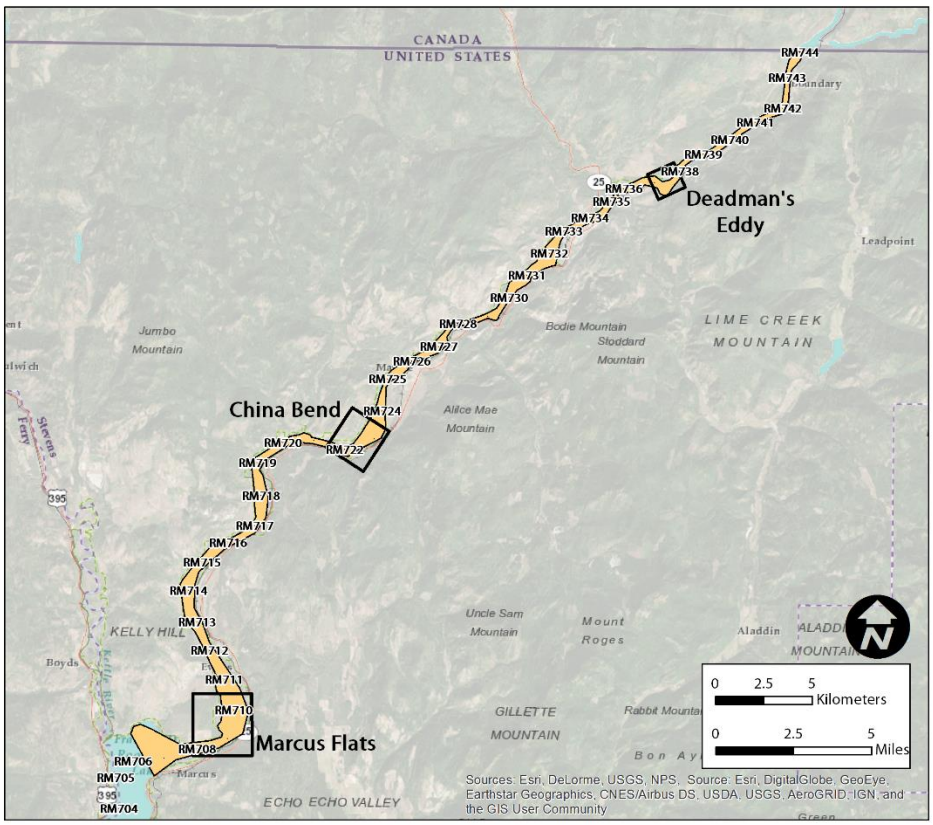


Figure 1. Overview of the UCR Upper Reach OU. AOIs shown as black boxes boxes. DEA will acquire bathymetry and backscatter with 100% coverage from approximately UCR RM708 to the US-Canada border at RM744; approximate extent of survey area shown in orange.

II. GENERAL APPROACH

DEA will conduct a hydrographic survey of the UCR Upper Reach OU from approximately UCR RM708 to the US-Canada border at UCR RM744. Bathymetry and backscatter imagery will be acquired simultaneously during the survey. Multibeam coverage toward shore will depend on river level at the time of survey with the intent to map to elevation 1290 feet. Coverage gaps may occur around restricted areas or areas deemed unsafe for survey work due to shallow depths and/or strong currents. All hydrographic surveying will exceed applicable standards established by the U.S. Army Corps of Engineers, Engineering and Design Manual for Hydrographic Surveying (EM 1110-2-1003), "Hydrographic Surveying", in accordance with requirements for "Navigation & Dredging Support Surveys." All work will be supervised and final deliverables approved by a DEA Washington registered Professional Land Surveyor (PLS) and National Society of Professional Surveyors (NSPS) / The Hydrographic Society of America (THSOA) Certified Hydrographer (CH).

The vessel for this survey will be the R/V *Discovery*, owned and operated by project partner Gravity Marine, LLC (Gravity). The *Discovery* will be outfitted with a Teledyne-Reson SeaBat T50-P precision multibeam sonar. The T50-P logs 512 soundings with each sonar ping over a nominal swath angle of 140 degrees (70 degrees to each side of the sonar). The effective swath width will be determined through cross line analysis to determine the maximum swath angle that meets survey requirements. To maximize swath coverage and extend coverage up along the shoreline, the sonar head may be tilted 15 degrees outboard.

Figure 2. R/V *Discovery*, owned and operated by project partner Gravity Marine LLC.

A. Specific Equipment to be Employed

1. Primary Survey Vessel:
   The R/V *Discovery* will be used as the primary survey platform for survey operations. The *Discovery* is a modified 27-foot aluminum landing craft with twin outboard engines, owned and operated by Gravity Marine LLC. The vessel is inspected annually by a Marine Surveyor and meets all USCG requirements for a vessel of its class. For hydrographic operations the vessel will be equipped with an integrated navigation and data acquisition system, mounts for an integrated GNSS and inertial positioning and motion reference system, custom mounts for the Teledyne-Reson SeaBat T50-P multibeam sonar and is ideal for operating in the UCR Upper Reach OU.

2. Position, Heading and Motion Reference System:
   Applanix POS/MV-320 (Version 5 with POSPac and True Heave capabilities) with kinematic corrections from a land side Global Navigation Satellite System (GNSS) base station. Real-time positioning will use real-time kinematic GNSS techniques (RTK GNSS) with the POS/MV system logging raw GNSS and inertial data for post-processing kinematic (PPK) correctors to improve horizontal and vertical positioning.

3. Sonar Systems:
   Teledyne Reson SeaBat T50-P multibeam system deployed on the *Discovery*.

4. Sound Speed Profiler:
   Applied Microsystems Smart SvT&P (Sound velocity, Temperature, and Pressure) sound speed and temperature profiler.
   AML MicroSV sound speed probe will be located at the Reson T50-P sonar head for input directly to the sonar processor.
   All sound speed systems have had recent calibrations.

5. Data Acquisition System:
   Hypack Hysweep multibeam sonar data acquisition system.

6. GNSS Base Stations:
   Trimble R8 and SPS 851, or equivalent GNSS receiver, deployed on DEA-established control for the project with correctors broadcast over UHF radios to the survey vessels.

7. Secondary dual frequency GNSS for real-time and post-processed kinematic positioning:
   Trimble SPS-851 dual frequency receivers or equivalent for secondary positioning on the R/V *Discovery* and primary positioning system on Gravity ADCP/Imagery vessel.

B. Mobilization and Demobilization

The R/V *Discovery* and multibeam equipment listed will be mobilized from DEA's Marine Services office in Vancouver, Washington. DEA staff will install equipment and systems on the R/V *Discovery* and conduct system calibrations and testing at DEA's Marine Services office. The GNSS receiver for the ADCP vessel will be mobilized on-site in Kettle Falls, WA. During the survey, DEA staff will be based at accommodations in Colville, Washington. After completion of the survey, DEA staff and equipment will return to Vancouver, Washington. The survey vessel will return to Gravity's facility near Seattle, Washington.

C. Datums, Survey Control, and Positioning

The horizontal datum used for this survey will be the North American Datum of 1983, 2011 realization (NAD83 [2011]) epoch 2010.00. The projection will be the Washington State Plane Coordinate System, Zone WA-4601 Washington North. Horizontal units will be in U.S. survey feet.

The vertical datum for this survey will be the North American Vertical Datum of 1988 (NAVD88) using the National Geodetic Survey (NGS) separation model Geoid12b which is one of the separation models that converts NAD83 ellipsoid heights obtained from GNSS receivers to NAVD88 orthometric heights. Vertical units will be in U.S. survey feet.

All position information will be acquired such that postprocess kinematic corrections using a 13 degree elevation mask can be performed relative to the Washington State Reference Network (WSRN).

The primary control network for the project will be established by DEA that will be aligned with the WSRN. All GNSS equipment will log raw satellite observables to allow for a postprocessed solution from the WSRN archived reference stations using a smart base solution.

Due to the poor cellular coverage in some remote areas of the project, RTK corrections will be sent to the vessel GNSS receiver system via radio broadcast. With an FCC license and programmed to FCC protocols, an RTK base station radio will be used that can broadcast at a power level of 5 watts (or 25 watts with a joint FCC and Canadian license). Given the terrain of the survey area and the quality of the signal required, it is anticipated that additional base stations may be required. Control point locations for GNSS base station sites will be selected with open sky access and on high ground to maximize both satellite coverage and radio broadcast range. Sites will be selected on land that is publicly owned, has access agreements, or on dry banks accessible by land or vessel.

To provide control points for GNSS base station occupation, a control network will be established under the direction of a Washington-licensed land surveyor and in collaboration with cultural resources experts. In addition to base station control, the network will include control points suitably located for conducting position checks from the survey vessel for each base station deployment. The network may include a combination of current published monuments as well as new control points installed by the survey team. New, permanent monuments (e.g., iron rod) will be set with control caps. Permanent markers will include a magnetic signature, for ease of recovery during follow-on survey efforts. All monuments will be surveyed with a minimum 4-hour GNSS observation. Postprocessing of the control points will use the NGS Online Positioning User Service (OPUS) using Rapid Orbits to determine positions and elevations. The WSRN is aligned with NGS Continuous Operating Reference Stations (CORS) used in OPUS. To validate alignment, the NGS OPUS solution will be checked against the prototype on line positioning service provided by WSRN. The WSRN is aligned with the NGS CORS used in OPUS, with OPUS providing a more robust solution but there may be some stations in Canada used by the WSRN that are not used in OPUS.

To document a valid position was obtained from NGS OPUS for each control monument, an NGS OPUS Solution Report will be included in the final survey report, which includes: observation time, orbit type, latitude root-mean square (RMS), longitude RMS, ellipsoid height RMS, and other quality indicators. These reports will be reviewed by a Washington-licensed land surveyor and approved or rejected based on minimum quality parameters established by NGS.

To accurately translate position and height data to sensors, precise offsets between the GNSS antenna phase center, reference point for the Motion Reference Unit (MRU), and all sensor reference points

(multibeam sonar, ADCP, etc.) on the survey vessel will be surveyed and documented. Redundant observations shall be conducted such that a measurement uncertainty can be computed.

The onboard GNSS rover receiver and MRU will receive RTK corrections via radio broadcast, or other suitable transmission, to be applied in real-time. Computed geographic position and ellipsoid height data, along with position quality data, will be sent to the navigation and acquisition computer to be time tagged and logged with sensor data. Timing messages from the MRU or GNSS receiver will be used for precise timing of all data. Position quality data shall be monitored and logged during the survey. In the event of radio outages, the base station receiver, rover receiver and MRU will be configured to log raw GNSS observables such that postprocessing of position and height data can be computed and applied to sensor data postsurvey.

D. Data Acquisition

The *Discovery* will operate up to 12 hours a day, as daylight and weather allow, and return to the dock where data will be transferred to backup drives.

Survey Operations

DEA hydrographers will acquire hydrographic data, ensuring that all field data acquisition requirements and standards are met.

A Reson SeaBat T50-P multibeam sonar will be used to acquire multibeam bathymetric data and backscatter imagery over the survey area. Confidence checks will be performed to confirm that the acquisition system and survey sensors are functioning properly prior to initial survey operations, if any significant changes are made, and after completion of survey operations. They will include a bar check or lead line to multibeam comparison, a sound speed confidence check, and a position check. During acquisition of multibeam data, preliminary coverage displays will be generated during acquisition to monitor sonar coverage of the site.

The multibeam survey will consist of contiguous swaths with sufficient overlap to ensure quality coverage (e.g., 50 percent overlap). Line planning must be considered in relation to the survey objectives and the achievable swath width of the sonar. Swath width is impacted by the water depth, bottom geometry (upslope vs. downslope), accurate measurement of sound speed profiles and bottom type. An initial crossline analysis will be conducted to analyze effective swath width for the sonar used for the survey. This will consist of a series of closely spaced main lines filtered to a 45 degree swath and cross lines evaluated at full swath. A histogram of cross line individual sonar beam differences with the main line survey data will determine which beam angles meet project requirements. During survey data acquisition, line spacing will be adjusted as necessary to meet data quality objectives and to help improve data capture in shallow (i.e., nearshore) areas.

To preserve data quality, vessel speed will be constrained such that sounding frequency will maintain a target minimum density of one sounding per 50 cm. For planning purposes, an optimum survey speed over ground of approximately 4 to 6 knots will be targeted. In some areas, the minimal steerable speed may prevent achieving the target minimum density.

A matrix file or files will be created for survey data acquisition. Grid cell sizes of approximately 1m will be considered based on data objectives. A survey matrix will be used to track progress of survey, as well as a first preliminary assessment of bed soundings and river morphology. Data will be logged both in the matrix file and the raw GNSS data and multibeam sounding data.

The multibeam system will simultaneously record backscatter imagery during the survey. Raw files produced from the multibeam system will be controlled using the multibeam software. The operator will continually monitor the received sonar pulse intensity and adjust the transmit, gain, and beam width as necessary to focus sonar energy away from surface multipaths and noisy sonar signals. This will enable the survey operator to produce a backscatter dataset that can be used to delineate changes in riverbed characteristics.

Cross lines will be run for a quality analysis of the data. This will verify sonar swath angle used on a flat bottom meets survey accuracy requirements of plus or minus 0.3 feet at two sigma or 95% percent confidence level. The crossline analysis will be conducted during data processing.

II. QUALITY CONTROL PLAN

The quality of hydrographic data depends on precise calibration and maintenance of the accuracy through automatic calibration techniques, and periodic verification of the results through data monitoring and statistical analysis of the multibeam data set. The proposed system for this task continuously monitors data quality, checks system conditions, and allows for the delivery of quality data.

A. Survey Operations, Quality Control and Quality Assurance

The accuracy of any shallow water multibeam system relies on a number of contributing factors. These factors include settlement and squat (dynamic draft); sensor biases for roll, pitch, yaw and latency; static draft; and changes in the sound velocity profile. To verify multibeam sonar optimal accuracy, a battery of tests will be conducted.

Vessel Baseline Survey

A baseline survey will be performed prior to survey operations. The sensor offset values calculated during the baseline survey will be used for the surveys under this project. Measurement accuracies from the baseline survey will be entered into the CARIS HIPS vessel file (HVF).

Initial System Calibration

A patch test will be conducted for each survey vessel to confirm alignment of the IMU sensor with the sonar transducer and to verify delay times applied to the time-tagged sensor data. The patch test will consist of a series of lines run in a specific pattern, then used in pairs to analyze roll, pitch and heading alignment bias angles, as well as latency (time delays) in the time tagging of the sensor data. The patch test lines will be run according to NOAA and USACE specifications and evaluated in the following order: latency, pitch, roll, and heading.

Pitch bias will be determined by running reciprocal lines over a smooth slope or noticeable feature, perpendicular to the depth curves. Roll alignment will be determined by running reciprocal lines over a flat bottom, in the deepest part of the survey area. This test will be repeated every time the sonar is deployed over a short section. Heading bias will be determined from running reciprocal lines, made on each side of a submerged feature, in relatively shallow water. Lines will be run at a speed allowing for forward overlap. For this survey the Applanix POS/MV will provide precise timing to the Reson SeaBat T50-P sonar and all acquisition computers.

A precise timing latency test will be performed by running reciprocal lines over a flat bottom in a slight to moderate sea state and evaluating a small along-track slice of data in the outer swath for motion artifacts. Two sets of lines will be run and analyzed for pitch, latency, roll and heading. If

analysis of both sets does not yield similar results, then the set will be re-run until a satisfactory solution is obtained.

Once final mounting angles have been determined, the values will be entered into the CARIS HVF and a confidence check will be performed to verify accuracy requirements. Patch tests will be repeated whenever changes are made to equipment hardware or software, sensor failure, replacement, or whenever assessment of the data indicates that system accuracies do not meet specified requirements. The lead hydrographer will monitor equipment/systems and will document corrective actions, if applicable.

Draft Measurement and Bar Check Comparison (Static Draft Check)

While secured to the dock, draft relative to the multibeam sonar will be recorded from port and starboard draft marks abeam of the multibeam sonar mount. A bar check will be conducted pre and post survey to document the sonar static draft. The lead hydrographer will document the results in the digital line log.

Sound Speed Profiles

Sound speed profiles are vital to multibeam data acquisition programs. Sound speed profiles shall be measured frequently enough to meet multibeam depth accuracies and to maximize daily acquisition time. A real-time comparison will be made between the sound speed profiler near surface sound speed to the sound speed measured at the sonar head and any deviation noted in the log. In addition, the lead hydrographer will conduct confidence checks by comparing cast data from the primary sound velocity profiler and a secondary system at the start of the project. The lead hydrographer will document results and any corrective actions, if applicable, in the digital line log.

Crossline Comparisons

Crossline comparisons will be conducted to document that sensor biases, GNSS height data, and sound velocity profiles are accounted for in the data set. A statistical analysis of the crossline comparisons will be conducted using CARIS HIPS which provides a report, compiling statistics by beam number for each junction. In addition, a statistical analysis of the cross-line data to main scheme survey lines will be conducted and included in the survey report. The crossline analysis will be conducted during data processing.

B. Positioning System Quality Control and Quality Assurance

The primary positioning system for this project will be an Applanix POS/MV-320 (Version 5) integrated RTK GNSS/inertial reference system. For quality control, a secondary RTK GNSS positioning system will be simultaneously acquired in Hypack software. Both systems will be receiving RTK GNSS correctors from the project base station GNSS receiver. As the GNSS base station antenna is a permanent mount, there is no need for daily position checks to verify base station setup. The base station is monitored periodically for stability by use of NGS Continuously Operating Reference Stations (CORS) and has not moved since installation in 2009. Hypack will display the vessel track from both positioning systems in real-time for monitoring of the RTK GNSS/Inertial position relative to the RTK GNSS position. Any deviation between the two positioning systems will be apparent on the navigation display screen, which is presented at the data acquisition station and at vessel helm. Deviations will be noted in the log; if necessary, survey lines will be re-run and documented by the lead hydrographer.

Validation of Base Station Position and Height Relative to Project Datums

To verify the OPUS solution for NAD83 position, ellipsoid height, and separation model GEOID12b to obtain NAVD88 orthometric heights, GNSS observations will submitted to the prototype on line positioning service provided by WSRN. Results from the WSRN service will be compared to the OPUS solution. These observations will be made prior to survey operations and results will be in the survey report.

Position Check

For quality assurance, an independent position check will be conducted after each base station deployment. The secondary antenna on the R/V *Discovery* will be connected to a survey rod of known height and a position check conducted on established control. This process verifies correctors are being obtained, position and height data entered into the GNSS base station was entered correctly and validates geodetic parameters are entered correctly in Hypack software. DEA will use this information in the survey report for documentation of survey positioning accuracy. The lead hydrographer will document the position check daily.

C. Project Documentation and Quality Assurance

Survey documentation will primarily be in digital format. DEA hydrographers utilize DEA's proprietary LineLog software to record detailed notes describing equipment settings and performance, environmental parameters, and other general information. Each entry is timestamped and any entries that are updated after initial input are flagged as edited. Other calibration forms (bar checks, position checks, patch tests) will be in digital spreadsheet format. As necessary, additional checklists and/or log forms will be developed in conjunction with AECOM and DEA will use these documents when provided. All daily logs and calibration forms will be transferred to the project archive at the end of each survey day in accordance with the project's data management plan.

The Quality Assurance (QA) manager will review data products daily to ensure data quality is maintained for post processing objectives. Any nonconformances with data quality will be recorded and reported to project management. Nonconformances as well as any in-field resolutions must be documented clearly every time there is any deviation from the outlined methodology in the QAPP and/or project specific SOPs. This includes any in-field decisions that change sampling locations and/or methodology as well as any changes to instrument operation and data collection procedures. Nonconformances must be documented clearly in the field log book(s) on each vessel.

At a minimum, nonconformance reporting should include the following criteria:

- Date and time of issue
- Vessel
- Location (UCR RM, Transect ID, Station ID, Position, as applicable)
- Type of nonconformance (e.g. sample location, equipment malfunction, data quality loss)
- Communication of nonconformance
- Any in-field decisions and/or resolutions

Nonconformances should be clearly communicated as well with the QA manager as soon as possible. The QA manager will notify the appropriate parties for clarification of resolutions and approvals for any deviations from the QAPP and SOP. Potential nonconformances and corresponding resolutions are presented in Table 1.

Table 1. Potential project nonconformances issues and corresponding resolutions.

Project Component	Potential Nonconformance	Potential Resolution(s)
Control Survey	Rejected OPUS solution	Reoccupy control point to obtain additional GNSS observations; resubmit report
		Examine survey equipment for biases, errors, and/or malfunctions
Vessel Baseline Survey	Measurement uncertainty exceeds project standards	Conduct additional offset observations
		Recompute offset positions; examine calculations
MBES Survey	Incorrect data appearance	Check all communication/power cables and junctions between instrument and survey computer
		Perform "rub-test" on MBES transducer to verify instrument is powered and receiving feedback
		Correct vessel speed and/or reduce vessel movement
	Excessive vessel movement	Reduce vessel speed and/or vessel movement
		Ensure GNSS is operating properly and/or has not lost RTK fix
Navigation/Positioning	GNSS position accuracy below project standards	Check all communication/power cables and junctions between GNSS and survey computer
		Check RTK radio receiver frequency and ensure GNSS is connected to correct control
		Check number of satellites and HDOP values to ensure sufficient coverage exists

Appendix L
Daily Logbook Entries

Sediment Facies Mapping

#1

Rite in the Rain®

ALL-WEATHER

UNIVERSAL

№ 973T-MX

09/25/18 Day 1 S. McDaniel

0700 DEA Survey Control Point Crew for Sediment Facies
Tailgate meeting - Colville Comfort Inn

Sarah McDaniel AECOM
Lloyd Lamar DEA
Justin Mickiewicz DEA
DAVE WILLIAMS DEA
Jon Dasler DEA

Weather sunny and 70s, no rain in forecast. Prepared for cooler morning on the water.
Received health and safety protocol.

0800 Visit to Control Check Pt. 1 - Sarah, Jon, and Dave.
Marked ideal location with flagging. Sarah communicated via email w/ NPS re: cultural resource coordination.
No issues identified, will revisit and install check point later this week.
Road crew (Justin, Lloyd) went to install WSDOT ROW controls.

0930 Arrive Northport Boat Launch.
Met with Columbia Navigation. Received H+S Plan and boat safety.
Columbia Nav. Inc boat captain is Josh Weatherman, deckhand is Brendan Hoover.

1030 Arrive Deadmon's Eddy Bar. Establish Check Point (CP) 8, on sandy spit near shoreline.
Trimble **R10** receiver. Trimble TSC Data Collector.
CP8 itself is a 18" rebar ½" dia, with red cap "DEA Control Point." Leave equipment in place for a couple hours to acquire data.

1115 Arrive "Black Sand Beach" and install CP 9
mag nail 1cm head diameter, on south side of rock outcrop, within rock.

1138 Depart Black Sand Beach

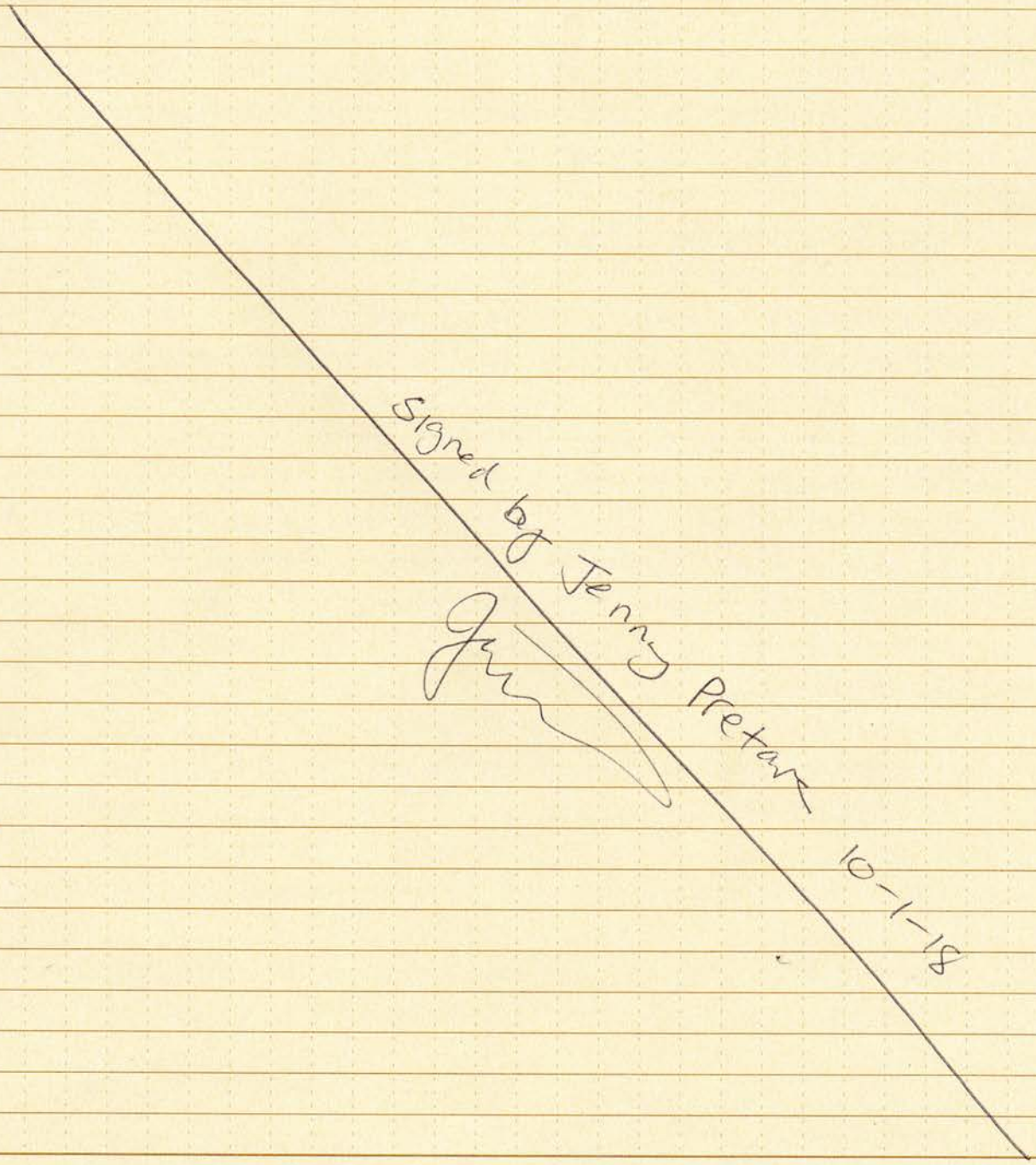
S. McDaniel

Time	Activity
1200	Noon check in with road survey crew. Lloyd at UCR-1, ~ 1 hr. remaining Justin at WSDOT, ~ 1 hr. remaining Trimble GPS R8
1215	Arrive CP 6. Install rebar with red plastic "DEA Control Point" into sand/gravel along west bank beach. Access should be by boat, to avoid climbing bank via road access.
1315	Arrive CP 5. Beach access for original proposed location was not feasible due to rock/current. Moved CP 5 to west bank, south of Rattlesnake Creek. New location is CP 5 - lat. 48.854 Long. -117.911 Set rebar CP with red cap. On edge of water, just above a large boulder.
1325	Arrive at UCR-3, China Bend Boat Launch. CP 10 in parking lot. NPS personnel spoke with Jon. re: general activities. UCR-3 is in asphalt of old road next to parking lot. CP 10 in boat ramp. PK nail. This is a new CP.
1340	Arrive CP-4. Flagged rock with pink flagging. On rocky/sandy shore at bottom of steep eroding slope.
1415	Arrive CP-3 at Smaggs Cove Boat Lanch. PK nail in boatramp.
1425	Depart Smaggs Cove for CP 8
1600	Depart CP 8 after completing GPS observation session.
1615	Back to Northport Boat Lanch. Plan for tomorrow is land based work.
1700	Check in at UCR-2 with Lloyd. One hr. observation remaining. UCR-1 done with 4 hr. observation. Justin finished Bossberg. Moved to Evans. One hr. remaining.

Scale: 1 square = _____

Health + Safety observations
- None observed on boat.
- Turkeys in Hwy 25 – near Northport.
- Pedestrian walked behind truck backing into boat ramp. Was a civilian / not associated with project and was audibly warned. No incident. Truck spotters were present. Continue to use back-up spotters.

end Day 1 Jenn McDevitt



9/26/18

0630 MET @ COMFORT INN FOR SAFETY ORIENTATION FOR LARRY WOODWORTH
DISCUSSED GENERAL SAFETY / CULTURAL CONCERNS ASSOCIATED WITH
THIS PROJECT.
SARAH McDANIEL
JON DASLER
DAVE WILLIAMS
LLOYD LAMAR
LARRY WOODWORTH
WEATHER FORCAST GOOD - NO RAIN HIGH 70'S

08:00 DAVE - SETTING UP GPS UNIT @ PT # UCR-3. BEGAN COLLECTING DATA
@ 8:21 UNIT # R10 5734470315, TSC3 # RS1AC24076

0905 LLOYD HAD SETUP & BEGAN COLLECTING DATA @ PT # UCR-4
R8-2 # 4638122146 & TSC3 # RS33C8790

LARRY HAD SETUP & BEGAN COLLECTING DATA @ PT "BLACKHAWK"
ZEPHYR 3 ANTENNA, RECEIVER # 5004K65351, TSC3 # RS51C89309

~~1257~~ ~~DAVE FINISHED DATA COLLECTION @ PT # UCR-3~~

10:17 DAVE - RE-SET CP-10 WITH @ 5/8" REBAR & RPC @ WEST EDGE OF
CONCRETE BOAT RAMP @ CHINA BEND. REMOVED PREVIOUSLY SET MAG NAIL
THAT WAS SET IN THE ℄ OF THE BOAT RAMP. BEGAN COLLECTING DATA @ 10:17
RECEIVER # 5005K65410, TSC3 # RS52C89516

11:31 DAVE FINISHED DATA COLLECTION @ CP-10. PICKED UP UNIT AND HEADED TO
"USACE 1001-98"

12:38 DAVE BEGAN COLLECTING DATA @ "USACE 1001-98" WITH RECEIVER # ~~RS52C89516~~ 5005K65410,
TSC3 # RS52C89516.

12:57 DAVE FINISHED DATA COLLECTION @ UCR-3. HEADING TO CP-7

1:07 LLOYD & LARRY FINISHED DATA COLLECTION @ UCR-4 & "BLACKHAWK"
LLOYD HEADING TO "NEW YONDER". LARRY HEADING TO "USACE 1001-99".

1:30 LLOYD ARRIVED @ NEW YONDER & BEGAN COLLECTING DATA @ 1:30 PM
RB-2 # 4638122146, TSC3 # RS33C8790.

Scale: 1 square = _____

1:47 DAVE ARRIVED @ ~~USACE 1001-98~~ CP-7 and BEGAN COLLECTING DATA WITH RECEIVER # ~~R51AC~~ 5T3447D315, TSC3 # R51AC24076. SET A 5/8" REBAR & RPC IN ROCK SPIT @ NORTHPORT BOAT RAMP

2:00 LARRY ARRIVED @ USACE 1001-99 & BEGAN COLLECTING DATA @ 2:08 RECEIVER # 5004K65351, TSC3 # R51C84309.

2:30 LLOYD HAD DATA STORAGE ISSUE ON HIS R8-2. HAD TO DELEATE STORED JOBS TO OPEN UP CAPACITY, BEGAN RECOLLECTING DATA @ 3:15

5:05 DAVE FINISHED COLLECTION @ USACE 1001-98. HEADED BACK TO CP-7.

5:30 LLOYD STOPPED COLLECTION @ NEW YONDER - WILL REVISIT FOR 2HRS ON FRIDAY.

5:50 DAVE FINISHED COLLECTION @ CP-7 PICKED UP GEAR

6:12 LARRY FINISHED COLLECTION @ USACE 1001-99.

END OF DAY HEADED TO COLVILLE - NO SAFETY ISSUES OBSERVED.

R. Vinal Wall 9/26/18

9/27/18

0700 - HAD TAILGATE MEETING @ BENNY'S COLVILLE INN. DISCUSSED WHO WAS GOING WHERE / GENERAL SAFETY ISSUES.
DAVE WILLIAMS
LLOYD LAMAR
LARRY WOODWORTH
WEATHER - HIGH UPPER 60's FINE WEATHER

07:45 DAVE MET CNI BOAT (JOSH WEATHERMAN) @ CHINA BEND BOAT RAMP. HEADING TO CP-5

~~0840~~ 0830 DAVE ARRIVED @ CP-5 AND BEGAN COLLECTING DATA @ 8:43 WITH RECEIVER # 5734470315, TSC3 # RS1AC24076

08:00 LARRY ARRIVED @ CP-1. SET A 5/8" REBAR & RPC @ PREDETERMINED LOCATION @ DOWNSTREAM END OF MARCUS ISLAND. BEGAN COLLECTING DATA @ 8:49 WITH RECEIVER # 5004K65351, TSC3 # RS51C89309

APPROX 08:40 LLOYD MISTAKENLY ATTEMPTED TO GO TO CP-4 AND HAD CONTACT WITH A LAND OWNER (DAWN KELLY 509-675-4941). HE REALIZED HE HAD GONE TO THE WRONG PT AND APPOLOGIZED FOR GOING COMING ONTO HER PROPERTY. HIS DESCRIPTION OF THE MEETING WAS VERY POSITIVE AS SHE WAS FRIENDLY AND UNDERSTANDING. LLOYD THEN LEFT AND HEADED TO CP-3.

09:20 LLOYD ARRIVED AT CP-3 AND BEGAN COLLECTING DATA @ 9:31 AM WITH RECEIVER # 4638122146, TSC3 # RS33C8790.

12:51 LARRY DONE COLLECTING DATA @ CP-1. HEADING TO CP-2

12:56 DAVE DONE WITH CP-5. HEADING TO CP-4 (BOAT ACCESS)

1:36 LLOYD DONE COLLECTING DATA @ CP-3. HEADING TO UCR-2 FOR A 2HR OBSERVATION

1:30 DAVE ARRIVED @ CP-4. SET A 5/8" REBAR & RPC ON WEST BANK OF RIVER. BEGAN COLLECTING DATA @ 1:47 FOR A 2HR OBSERVATION WITH RECEIVER # 5734470315, TSC3 # RS1AC24076.

Scale: 1 square = _____

2:10 LARRY ARRIVED @ CP-2. SET A GOD NAIL IN A SEAM ON THE CONCRETE BOAT RAMP AND BEGAN COLLECTING DATA AT 2:34PM WITH RECEIVER # 5004K65351, TSC3 # RS51C89309

2:30 LLOYD ARRIVED AT UCR-2 AND BEGAN COLLECTING DATA FOR 2HRS WITH RECEIVER # 4638122146, TSC3 # RS33C8790

3:50 DAVE FINISHED COLLECTING DATA @ CP-4. HEADING TO CHINA BEACH BOAT RAMP.

4:45 LARRY DONE COLLECTING @ CP-2. LLOYD DONE WITH 2HR OBSERVATION @ UCR-2

5:20 HEADING FOR COLVILLE. NO SAFETY ISSUES DURING THE DAY.

R. Dal Will 9/27/18

9/28/18

06:30 CHECK OUT OF MOTEL. LARRY WOODWORTH HEADING TO SPOKANE
TAILGATE SAFETY MEETING – WILDLIFE HAZARDS, PPE IN HIGHWAY RIGHT OF WAY.
DAVE WILLIAMS
LLOYD LAMAR

WEATHER GOOD, HIGH IN 60'S. MID 40'S IN MORNING
DAVE MEETING BOAT CREW (JOSH WEATHERM-CAPTAIN) @ CHINA BEND RAMP. HEADING TO CP-6.
LLOYD HEADING TO CP-9 AND 2HRS AT NEW YONDER.

~~8:15~~ 7:45 DAVE MET BOAT @ CHINA BEND BOAT RAMP. LOADED GEAR AND DEPARTED UPRIVER FOR CP-6

8:15 ARRIVE AT CP-6. BEGAN COLLECTING DATA AT 8:27AM WITH RECEIVER # 5734470315, TSC3 # RS1AC24076

8:40 LLOYD ARRIVES AT CP-9. BEGAN COLLECTING DATA A 8:55AM WITH RECEIVER # 4838122146, TSC3 # R533C8790

12:00 CALLED LLOYD TO CHECK IN – ALL GOING WELL @ CP-9

12:30 DAVE TALKED WITH BOB SCHALKA. HE IS THE PROPERT OWNER ADJACENT TO CP-6. HE THOUGHT WE "MIGHT" HAVE SET THE 5/8" REBAR & RPC ON HIS PROPERTY. I TOLD HIM WE WERE CONFIDENT THAT WE HAD NOT PUT IT ON HIS PROPERTY. WE HAD A +/- 20 MINUTE CONVERSATION THAT WAS VERY FRIENDLY. HE DID SAY THAT HE WAS FINE WITH WHERE THE REBAR WAS SET. I FURTHER ADDED THAT THE REBAR & RPC WAS A RANDOM CONTROL POINT THAT HAD NOTHING TO DO WITH ANYONES PROPERTY LINES. COWS WERE IN CLOSE PROXIMITY TO CP-6 ON TWO OCCASIONS DURING THIS 4 HR OBSERVATION. THE COWS DO NOT BELONG TO HIM. HE PERIODICALLY DRIVES THE OFF HIS PROPERTY. APPARENTLY IT IS "OPEN RANGE" ON WEST SIDE OF THE RIVER.

Scale: 1 square = _____

12:46 PM DAVE FINISHED COLLECTION AT CP-6

1:00 PM DEPARTED CP-6 HEADING TO CHINA BEND

1:05 PM LLOYD FINISHED COLLECTION AT CP-9, HEADED TO "NEW YONDER" FOR A 2HR OBSERVATION

1:30 PM DAVE ARRIVES AT CHINA BEND BOAT RAMP. LOADED GEAR AND HEADED TO "NEW YONDER" TO MEET WITH LLOYD AND ATTEMPT TO DOWNLOAD DATA. ARRIVED @ 2:00 PM

1:40 PM LLOYD BEGINS DATA COLLECTION AT "NEW YONDER" WITH RECEIVER # 4638122146, TSC3 # R533C8790.

3:00 PM DAVE LEAVES "NEW YONDER" TO TRY TO DOWNLOAD IN NORTH PORT - BETTER CELL SERVICE. COULD NOT GET LAPTOP TO CONNECT TO MY WIFI HOT SPOT.

3:45 PM LLOYD FINISHED COLLECTION AT "NEW YONDER" HEADING TO KETTLE FALLS.

4:50 PM MET LLOYD IN KETTLE FALLS TO DOWNLOAD DATA ON HIS LAPTOP.

5:30 PM FINISHED DOWNLOAD OF ALL DATA AND SENT FINAL EMAIL LEFT KETTL FALLS FOR HOME

R. D. Williams 9/28/18

10/2/18

0700 LEFT COLVILLE HEADED TO EVANS CAMPGROUND FOR TAILGATE SAFETY MEETING AND BOAT PREP

0815 WENT TO PT # 51 (EVANS) TO SET UP BASE UNIT AND RADIO. RECEIVER S/N 5005K65410, TSC3 S/N RS52C89516. BASE RADIO S/N 4718132214. BROADCASTING ON CHANNEL 10 @ 464.625 Mhz

0906 POWERED UP BASE UNIT. CONFIRMED RADIO WAS TRANSMITTING WITH HANDHELD SCANNER.

1000 SET UP MARINE BAND VHF IN TRUCK. TRANSMITS AND RECEIVES.

10:30 WENT TO PT # 55 (BOSSBURG) TO RETAKE PHOTO OF THE SET REBAR AND RED PLASTIC CAP (R & RPC)

12:05 PM RECEIVED CHECK-IN CALL FROM ~~NICKEY~~ NICKY MOODY.

12:30 PM SET UP AND CHECKED OPERATION OF BASE REPEATER. REPEATER WAS RECEIVING AND TRANSMITTING CORRECTIONS FROM THE BASE AT PT # 51 (EVANS)

4:00 CHECKED RANGE OF BASE TRANSMITTER. WAS RECEIVING SIGNAL AT MARCUS ISLAND CAMPGROUND NEAR CP-1 WITH HANDHELD SCANNER. APPROX

5:50 PM SHUT DOWN BASE AND TRANSFERED DATA TO ~~CARD~~ TSC3

6:25 PACKED UP - LEFT EVANS RAMP FOR COLVILLE

7:10 UNLOADED TRUCK — END OF DAY

R. Del Walk. 10/2/18

Scale: 1 square =

10/3/18

0655 LEFT COLVILLE HEADED TO EVANS CAMPGROUND FOR TAILGATE MEETING AND BASE SET UP AT PT# 51 (EVANS)

0752 BEGAN COLLECTING DATA AT PT# 51 (EVANS)
RECEIVER S/N 5005K65410, TSC3 S/N RS52C89516. BASE RADIO S/N: 4718132214. BROADCASTING ON FREQ: 464.625 Mhz CHANNEL 10. CONFIRMED BROADCAST WITH HANDHELD SCANNER.

0830 SAFETY MEETING AT EVANS CAMPGROUND.

1240 PM CHECK IN CALL FROM NICKY MOODY

5:42 PM SHUT DOWN BASE AND TRANSFER DATA

6:10 LEAVE PT# 51 (EVANS) FOR BOAT RAMP

6:15 HEADING TO COLVILLE END OF DAY

R. Dwight Will 10/3/18

10/4/18

0700 DEPART COLVILLE HEADED TO EVANS BOAT LAUNCH FOR SAFETY MEETING

0730 SAFETY MEETING AT EVANS BOAT LAUNCH

0740 HEADED TO PT# 51 (EVANS) TO SET UP BASE.

0800 BEGAN TRANSMITTING AT PT# 51 (EVANS). RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516. TRANSMITTING ON CHANNEL 10 FREQ: 464.625 CONFIRMED BASE RADIO WAS TRANSMITTING WITH HANDHELD SCANNER

11:30 DROVE NORTH TO "BOSSBURG" TO CHECK REPEATER LOCATIONS. WAS RECEIVING SIGNAL AT "BOSSBURG" TRANSMITTING FROM "EVANS" WITH HANDHELD SCANNER. DISTANCE WAS +/- 4 MILES BY ROAD. FOUND SEVERAL LOCATIONS FOR REPEATER IN R/W OF HWY 25 THAT WOULD WORK IF NECESSARY.

1:10 PM RECEIVED CHECK IN TEXT FROM NICKY.

5:02 PM SHUT DOWN BASE - TRANSFERED DATA

5:25 PM BACK AT EVANS BOAT LAUNCH.

6:00 LEAVE EVANS BOAT LAUNCH FOR COLVILLE

R. DeWitt 10/4/18

Scale: 1 square = _____

10/5/18

0700 DEPART COLVILLE HEADING TO EVAN BOAT LAUNCH FOR SAFETY MEETING.

0740 SAFTY MEETING AT EVANS BOAT LAUNCH. WEATHER PT. CLOUDY 30°, LIGHT BREEZE.

0810 BEGAN SETTING UP BASE AT PT #51 (EVANS).

0830 BEGAN COLLECTING DATA / TRANSMITTING AT PT #51 (EVANS) RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516. TRANSMITTING ON CHANNEL 10 FREQ: 464.625 Mhz. CONFIRMED BASE RADIO WAS TRANSMITTING WITH HANDHELD SCANNER.

11:00 CHECKED UCR-1 FOR TRUCK ACCESS. LIKELY THE NEXT CONTROL PT FOR THE BASE

5:33 PM SHUT DOWN BASE - DOWNLOAD DATA AND PICK UP

6:00 PM EVANS BOAT LAUNCH. LEAVE FOR COLVILLE.

R. DeWitt 10/5/18

10/6/18

0700 DEPART COLVILLE HEADED TO EVANS BOAT LAUNCH FOR SAFETY MEETING.

0730 ARRIVE AT EVANS BOAT LAUNCH FOR ~~SURVEY~~ SAFETY MEETING

0750 BEGIN BASE SETUP AT PT #51 "EVANS", RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516

0812 BEGAN TRANSMITTING ON CHANNEL 10 FREQ: 464.625 MHz. CONFIRMED BASE WAS TRANSMITTING WITH AUDIBLE TONE ON HANDHELD SCANNER.

1200 PM CHECKED IN WITH NICKY.

5:20 PM SHUT DOWN BASE ~ TRANFERING DATA

5:40 HEAD TO EVANS BOAT LAUNCH

6:00 LEAVE EVANS BOAT LAUNCH TO COLVILLE

R. D. W. M. 10/6/18

Scale: 1 square = _____

10/7/18

0700 DEPART COLVILLE FOR EVANS BOAT LAUNCH FOR SAFETY MEETING

0730 ARRIVE AT EVANS BOAT LAUNCH FOR SAFETY MEETING

0750 BEGAN BASE SETUP AT PT # 51 (EVANS) RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, T5C3 S/N R552C89516

0810 BEGAN TRANSMITTING ON CHANNEL 10 FREQ: 464.625 MHz CONFIRMED BASE WAS TRANSMITTING WITH AUDIBLE TONE ON HANDHELD SCANNER.

12:10 PM SENT CHECK IN TEXT TO NICKY.

5:31 PM SHUT DOWN BASE - BREAKING DOWN AND TRANSFERRING DATA

HEAD TO EVANS BOAT RAMP

LEAVE EVANS BOAT RAMP FOR COLVILLE

R. D. Will 10/7/18

10/8/18

0700 DEPART COLVILLE FOR EVANS BOAT LAUNCH FOR SAFETY MEETING.

0730 SAFETY MEETING AT EVANS BOAT LAUNCH.

0745 BEGAN BASE SETUP AT PT #51 "EVANS". RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSG3 S/N RS52C89516.

0805 BEGAN TRANSMITTING ON CHANNEL 10 FREQ: 464.625 Mhz. CONFIRMED BASE WAS TRANSMITTING WITH AUDIBLE TONE ON HANDHELD SCANNER.

12:01 PM CHECK IN WITH NICKY.

2:15 CHECKED RECEIVER - INDICATED IT WAS NOT LOGGING DATA. SESSION # 54102810 STOPPED LOGGING @ 542 kb. SESSION # 54102811 STARTED AT 2:15 AND IS LOGGING DATA. BASE WAS TRANSMITTING ENTIRE TIME.

5:45 SHUT DOWN BASE - BREAKING DOWN AND TRANSFERRING DATA

6:10 HEAD TO EVANS BOAT RAMP

6:15 LEAVE EVANS BOAT RAMP FOR COLVILLE

R. D. W. 10/8/18

Scale: 1 square = _____

10/9/18

0700 DEPART COLVILLE FOR EVANS BOAT RAMP FOR SAFETY MEETING.

0730 SAFETY MEETING AT EVANS BOAT RAMP

0745 BEGIN BASE SETUP AT PT #51 "EVANS" RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516

0803 BEGAN TRANSMITTING ON CHANNEL 10 FREQ: 464.625 Mhz. CONFIRMED BASE WAS TRANSMITTING WITH AUDIBLE TONE ON HANDHELD SCANNER.

12:01 PM NICKY CHECKED IN.

5:30 PM SHUT DOWN BASE - BREAKING DOWN AND TRANSFERRING DATA

5:55 ~~HEAD TO EVANS BOAT RAMP~~ ~~RECON~~ CONFIGURE SECOND BASE UNIT

6:15 LEAVE EVANS BOAT RAMP FOR COLVILLE

R. D. Will 10/9/18

10/10/18

0700 LEAVE COLVILLE FOR EVANS BOAT RAMP.

0730 ARRIVE AT EVANS BOAT RAMP FOR SAFETY MEETING.

0755 BEGAN BASE SETUP AT PT # 51 "EVANS" RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516.

0812 BEGAN TRANSMITTING ON CHANNEL 10 FREQ: 464.625 Mhz. CONFIRMED BASE WAS TRANSMITTING WITH AUDIBLE TONE ON HANDHELD SCANNER.

12:01 PM SENT TEXT TO DAVE HOSE. TO CHECK IN.

1:45 PM DAVE RESPONDED - HAD BEEN IN AN AREA WITH NO CELL SERVICE.

2:00 CHECKED REPEATER FOR PROPER OPERATION. REPEATED SIGNAL CONFIRMED WITH HANDHELD SCANNER.

5:55 PM SHUT DOWN BASE - BREAKING DOWN AND TRANSFERRING DATA

6:40 PM LEAVE EVANS BOAT RAMP FOR COLVILLE.

R. D. Will 10/10/18

Scale: 1 square = _____

10/11/18

0700 LEAVE COLVILLE FOR EVANS BOAT LAUNCH.

0730 ARRIVE AT EVANS BOAT RAMP FOR SAFETY MEETING

0755 BEGIN BASE SETUP AT PT #51 "EVANS" RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516.

0811 BEGAN TRANSMITTING ON CHANNEL 10 FREQ: 464.625 MHz. CONFIRMED BASE WAS TRANSMITTING WITH AUDIBLE TONE ON HANDHELD SCANNER.

0821 HEADED TO PT #55 "BOSSBURG" TO SET UP 2nd BASE UNIT.

0830 BEGAN 2nd BASE SET UP AT PT #55 "BOSSBURG" RECEIVER S/N 5004K65351, BASE RADIO S/N 45461012247, TSC3 S/N RS52C89516.

0915 BEGAN TRANSMITTING ON CHANNEL 12 FREQ: 464.725 MHz. CONFIRMED BASE WAS TRANSMITTING WITH AUDIBLE TONE ON HANDHELD SCANNER.

10:32 RE-STARTED BASE AT PT #55 "BOSSBURG" WITH CORRECTED HI OF 1.799(M) 5.902(SFT). BASE WAS INITIALLY SET UP WITH HI OF 1.799 (SFT)

12:20 PM CHECKED IN WITH DAVE.

5:05 PM SHUTTING DOWN BASE AT PT #51 "EVANS – TRANSFERRING DATA

5:40 PM SHUTTING DOWN BASE AT PT #55 "BOSSBURG" - TRANSFERRING DATA

6:00 PM LEAVING "BOSSBURG" FOR COLVILLE.

R. Dale Wilkins 10/11/18

10/12/18

0630 LEAVE COLVILLE FOR NORTHPORT BOAT RAMP

0730 ARRIVE NORTHPORT BOAT RAMP FOR SAFETY MEETING

0810 ARRIVE AT PT#69 "UCR-4" BEGAN BASE SETUP. RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516.

0837 BEGAN TRANSMITTING ON CHANNEL 10 FREQ: 464.625 Mhz CONFIRMED BASE WAS TRANSMITTING WITH AUDIBLE TONE ON HANDHELD SCANNER.

0920 CHECKED WITH "DISCOVERY" – RECEIVING BASE SIGNAL LOUD & CLEAR

12:00 PM CHECKED IN WITH DAVE

4:20 PM SHUTDOWN BASE - BREAKING DOWN AND TRANSFERRING DATA

4:40 PM DEPART UCR-4

5:10 DEPART NORTHPORT BOAT RAMP FOR COLVILLE

R. J. W. M. 10/12/18

Scale: 1 square = _____

10/13/18

0630 DEPART COLVILLE FOR NORTHPORT BOAT LAUNCH

0730 ARRIVE NORTHPORT BOAT LAUNCH FOR SAFETY MEETING

0805 ARRIVE AT PT #64 "UCR-4" BEGAN BASE SETUP. RECEIVER S/N

0826 BEGAN TRANSMITTING ON CHANNEL 10 FREQ: 464.625 Mhz. CONFIRMED BASE WAS TRANSMITTING WITH AUDIBLE TONE ON HANDHELD SCANNER.

12:15 CHECK IN WITH DAVE

3:35 SHUTDOWN BASE BREAKING DOWN AND TRANSFERRING DATA.

4:00 HEAD TO NORTHPORT BOAT RAMP

4:10 PM LEAVE NORTHPORT BOAT RAMP FOR COLVILLE.

R. D. Wilson

10/13/18

Scale: 1 square = _____

10/15/18

0630 LEAVE COLVILLE FOR NORTHPORT BOAT RAMP

0730 ARRIVE AT NORTHPORT BOAT RAMP FOR SAFETY MEETING.

0800 ARRIVE AT PT #69 "UCR-4" BEGIN BASE SETUP.
RECEIVER S/N ~~RS52C89516~~ 5005K65410. BASE RADIO S/N 4718132214
TSC3 S/N RS52C89516.

0818 BEGAN TRANSMITTING ON CHANNEL 10 FREQ: 464.625 Mhz.
CONFIRMED BASE WAS TRANSMITTING WITH AUDIBLE TONE
ON HANDHELD SCANNER.

12:00 CHECK IN WITH DAVE

1:00 PM CHECKED POSSIBLE LOCATIONS FOR REPEATER UPSTREAM FROM
PT #69 "UCR-4"

3:15 PM BASE SIGNAL WAS LOST.

3:21 PM BASE RESTARTED. BASE RADIO WAS ATTACHED TO A NEW BATTERY.
THE 2 BATTERIES THAT THE BASE RADIO WAS ATTACHED TO WERE
FULLY CHARGED THE PREVIOUS DAY. CANT EXPLAIN THE LOSE OF
POWER.

4:10 PM SHUTDOWN BASE - BREAKING DOWN AND TRANSFERRING DATA.

433 PM HEAD TO NORTHPORT BOAT RAMP

5:00 LEAVE NORTHPORT FOR COLVILLE

R. Daniel Will 10/15/18

Scale: 1 square = _____

10/16/18

0630 LEAVE COLVILLE FOR CHINA BEND BOAT RAMP

0715 ARRIVE CHINA BEND BOAT RAMP FOR SAFETY MEETING AND BASE SETUP.

0720 BASE SETUP - BEGAN TRANSMITTING AT 7:40 AM. RECEIVER S/N 5005-K65410, BASE RADIO S/N 4718132214 TSC3 S/N RS52C89516. CONFIRMED BASE WAS TRANSMITTING WITH HANDHELD SCANNER. CHANNEL 10, FREQ: 464.625 MHz.

7:45 SAFETY MEETING AT CHINA BEND BOAT RAMP

11:50 CHECK IN WITH DAVE

5:00 PM SHUTDOWN BASE - BREAKING DOWN AND TRANSFERRING DATA.

5:30 PM LEAVE CHINA BEND BOAT RAMP FOR COLVILLE.

R. Dal Will 10/16/18

Scale: 1 square = _____

10/17/18

0630 LEAVE COLVILLE FOR CHINA BEND BOAT RAMP

0720 ARRIVE CHINA BEND BOAT RAMP FOR SAFETY MEETING AND BASE SETUP.

0740 SAFETY MEETING AT CHINA BEND BOAT RAMP.

0800 BEGAN TRANSMITTING ON CHANNEL 10 FREQ: 464.625 MHz. RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C8951G.

12:00 PM CHECKED IN WITH DAVE

5:25 PM SHUTDOWN BASE - BREAKING DOWN BASE AND TRANSFERRING DATA

5:45 PM LEAVE CHINA BEND BOAT RAMP FOR COLVILLE

C. DeWitt 10/17/18

Scale: 1 square = _____

10/18/18

0630 LEAVE COLVILLE FOR CHINA BEND BOAT RAMP.

0720 ARRIVE CHINA BEND BOAT RAMP FOR SAFETY MEETING AND BASE SETUP

0800 BEGAN TRANSMITTING ON CHANNEL 10 FREQ 464.625 RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214 TSC3 S/N RS52C89516. CONFIRMED TRANSMISSION WITH AUDIBLE TONE ON HANDHELD SCANNER

~~0845~~ 0835 HEAD TO "BLACKHAWK" FOR SECOND BASE SETUP.

0900 ARRIVE AT "BLACKHAWK" FOR SECOND BASE SETUP

0935 BEGAN TRANSMITTING ON CHANNEL 12 FREQ 464.725 @ 10 WATTS RECEIVER S/N 5004K65351, BASE RADIO S/N 4546101247 TSC3 S/N RS52C89516. CONFIRMED TRANSMISSION WITH AUDIBLE TONE ON HANDHELD SCANNER.

0950 HEAD BACK TO CHINA BEND.

11:40 HEAD BACK TO "BLACKHAWK" HAD TO UP RADIO TO 25 WATTS FOR CHECK SHOT AT CP-5

~~4:45~~ ~~5:05~~ PM SHUTDOWN BASE – TRANSFER DATA

5:05 PM HEAD TO CHINA BEND

5:15 PM SHUTDOWN BASE

5:45 PM HEAD TO COLVILLE

R. Dal Wall 10/18/18

10/19/18

0630 LEAVE COLVILLE FOR CHINA BEND BOAT RAMP

0720 ARRIVE CHINA BEND BOAT RAMP FOR SAFET MEETING AND BASE SETUP.

0740 SAFETY MEETING AT CHINA BOAT RAMP.

0752 BEGAN TRANSMITTING ON CHANNEL 10 FREQ: 464.625 AT UCR-3. RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER.

0800 HEAD TO "BLACKHAWK" TO SETUP 2nd BASE.

0834 BEGAN TRANSMITTING ON CHANNEL 12 FREQ: 464.725 Mhz. RECEIVER S/N 5004K65351, BASE RADIO S/N 4546101247, TSC3 S/N RS52C89516. CONFIRMED TRANSMISSION WITH AUDIBLE TONE ON HANDHELD SCANNER.

0930 RETURNED TO BASE AT CHINA BEND

3:10 PM RETURNED TO BASE AT "BLACKHAWK"

3:28 PM SHUTDOWN BASE AT "BLACKHAWK" ~ TRANSFERRING DATA

3:50 PM HEAD BACK TO CHINA BEND.

4:00 PM SHUTDOWN BASE AT UCR-3 - TRANSFERRING DATA

4:25 PM HEAD TO COLVILLE

R. DeWitt 10/19/18

Scale: 1 square = _____

10/20/18

0630 LEAVE COLVILLE FOR CHINA BEND BOAT RAMP

0720 ARRIVE CHINA BEND BOAT RAMP FOR SAFETY MEETING AND BASE SETUP

0735 SAFETY MEETING

0750 BEGAN TRANSMITTING ON CHANNEL 10 FREQ: 464.625 Mhz. AT UCR-3 RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214 TSC3 S/N RS52C89516. CONFIRMED TRASMISSION WITH AUDIBLE TONE ON HANDHELD SCANNER

0755 DEPART CHINA BEND HEADED TO "BLACKHAWK"

0805 ARRIVE AT "BLACKHAWK"

0825 BEGAN TRANSMITTING ON CHANNEL 12 FREQ: 464.725 AT "BLACKHAWK" RECEIVER S/N 5004K65351, BASE RADIO S/N 4546101247, TSC3 S/N RS52C89516. CONFIRMED TRANSMISSION WITH AUDIBLE TONE ON HANDHELD SCANNER.

0930 RETURN TO CHINA BEND

12:00 PM CHECKED IN WITH MARK.

3:00 PM RETURN TO "BLACKHAWK"

5:05 PM SHUTDOWN BASE AT "BLACKHAWK" - TRANSFERRING DATA

5:24 PM HEAD BACK TO CHINA BEND

5:39 PM SHUTDOWN BASE AT UCR-3 - TRANSFERRING DATA

6:05 PM HEAD TO COLVILLE

R. Dirk Will 10/20/18

10/21/18

0630 LEAVE COLVILLE FOR CHINA BEND BOAT RAMP

0720 ARRIVE CHINA BEND BOAT RAMP FOR SAFETY MEETING.

0740 SAFETY MEETING

0750 BASE SETUP AT UCR-3

0817 BEGAN TRANSMITTING ON CHANNEL 10 FREQ: 464.625 MHz AT UCR-3
RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 RS52C89516
AUDIBLE TONE ON HANDHELD SCANNER.

0825 ARRIVE "BLACKHAWK" FOR BASE SETUP.

0851 BEGAN TRANSMITTING ON CHANNEL 12 FREQ: 464.725 MHz.
RECEIVER S/N 5004K65351, BASE RADIO S/N 4546101247, TSC3 RS52C89516
AUDIBLE TONE ON HANDHELD SCANNER.

10:00 RETURN TO UCR-3

11:45 CHECKED IN WITH MARK

4:05 PM RETURNED TO "BLACKHAWK"

4:46 PM SHUTDOWN BASE AT "BLACKHAWK" - TRANSFERRING DATA.

5:07 PM RETURN TO CHINA BEND

5:15 SHUTDOWN BASE AT UCR-3 - TRANSFERRING DATA

RETURN TO COLVILLE.

R. Dail Wilk 10-21-18

Scale: 1 square = _____

10/22/18

0630 LEAVE COLVILLE FOR CHINA BEND BOAT RAMP

0720 ARRIVE CHINA BEND FOR SAFETY MEETING AND BASE SETUP

0740 SAFETY MEETING

0751 BEGAN TRANSMITTING AT UCR-3 ON CHANNEL 10 FREQ 464.625. RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516. AUDIBLE TONE WITH HANDHELD SCANNER.

0800 HEAD TO "BLACKHAWK" FOR BASE SETUP.

0835 BEGAN TRANSMITTING AT "BLACKHAWK" ON CHANNEL 12 FREQ 464.725. RECEIVER S/N 5004K65351, BASE RADIO S/N 4546101247, TSC3 S/N RS52C89516. AUDIBLE TONE WITH HANDHELD SCANNER.

0900 RETURN TO CHINA BEND.

11:45 CHECK IN WITH MARK

3:30 PM HEAD TO "BLACKHAWK"

3:41 PM SHUTDOWN BASE AT "BLACKHAWK" - TRANSFER DATA

4:06 PM RETURN TO CHINA BEND.

5:00 PM SHUTDOWN BASE AT UCR-3 - TRANSFER DATA

5:35 RETURN TO COLVILLE

R. Dirk Will 10/22/18

10/23/18

0630 LEAVE COLVILLE FOR CHINA BEND BOAT RAMP

0720 ARRIVE CHINA BEND BOAT RAMP FOR SAFETY MEETING AND BASE SETUP

0803 BEGAN TRANSMITTING AT UCR-3 CHANNEL 10 FREQ 464.625 Mhz. RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER.

0840 GAS RUN TO NORTHPORT FOR "DISCOVERY" GENERATOR.

11:40 HEAD TO UCR-2 FOR 2nd BASE SETUP

12:09 PM BEGAN TRANSMITTING AT UCR-2 CHANNEL 12 FREQ 464.725 Mhz RECEIVER S/N 5004K65351, BASE RADIO S/N 4546101247, TSC3 S/N RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER.

12:20PM SENT TEXT TO MARK

4:33 AM SHUTDOWN BASE AT UCR-2 ~ TRANSFER DATA

4:50 PM RETURN TO CHINA BEND

4:57 PM SHUTDOWN BASE AT UCR-3 - TRANSFER DATA

5:25 PM RETURN TO COLVILLE

R. Dirt Will 10/23/18

Scale: 1 square = _____

10/24/18

0630 LEAVE COLVILLE FOR CHINA BEND BOAT RAMP

0715 ARRIVE CHINA BEND BOAT RAMP FOR SAFETY MEETING

0740 LEAVE CHINA BEND FOR BASE SETUP AT UCR-2

0812 BEGAN TRANSMITTING AT UCR-2 CHANNEL 10 FREQ: 464.625 MHz RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N R552C8951C. AUDIBLE TONE ON HANDHELD SCANNER. BASE NOT BEING RECEIVED AT CP10 (CHINA BEND RAMP). BOATS CHECKING IN AT CP-4

12:15 PM SENT TEXT TO MARK.

4:56 PM SHUTDOWN BASE AT UCR-2 - TRANSFER DATA.

5:20 PM RETURN TO CHINA BAR.

5:30 PM RETURN TO COLVILLE.

R. Dial Wall 10/24/18

10/25/18

0630 LEAVE COLVILLE HEAD TO CHINA BEND FOR SAFETY MEETING

0720 ARRIVE CHINA BEND BOAT RAMP FOR SAFETY MEETING

0823 BEGAN TRANSMITTING AT UCR-2 CHANNEL 10 FREQ 464.625 MHz. RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER.

0830 SETUP REPEATER FOR "DISCOVERY" CHECK IN AT CP-10 - CHINA BEND RAMP

0850 HEAD TO USACE 1001-99 FOR 2nd BASE SETUP FOR "TIETON"

0932 BEGAN TRANSMITTING AT USACE 1001-99 CHANNEL 12 FREQ 464.725 MHz. RECEIVER S/N 5004K65351, BASE RADIO S/N 4546101247, TSC3 S/N RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER.

12:00 PM CHECKED IN WITH MARK.

2:00 PM CHECKED BASE AT UCR-2 - RETURNED TO 1001-99 (NORTHPORT)

4:40 PM SHUTDOWN BASE AT 1001-99 - TRANSFER DATA.

5:20 PM SHUTDOWN BASE AT UCR-2 - TRANSFER DATA.

5:55 PM RETURN TO COLVILLE.

R. Dal Will.

Scale: 1 square = _____

10/26/18

0630 DEPART COLVILLE FOR NORTHPORT BOAT RAMP FOR SAFETY MEETING

0730 ARRIVE NORTHPORT FOR SAFETY MEETING

0840 BEGAN TRANSMITTING AT USACE 1001-99 CHANNEL 10 FREQ: 464.625 MHz. RECEIVER S/N 5005K65410. BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516. AUDIBLE TONE WITH HANDHELD SCANNER.

12:00 CHECK IN WITH MARK.

5:15 PM SHUTDOWN BASE AT USACE 1001-99 - TRANSFER DATA.

5:45 PM HEAD BACK TO COLVILLE

R. Dal Wilk 10/26/18

10/29/18

0630 LEAVE COLVILLE FOR NORTHPORT BOAT RAMP

0730 ARRIVE NORTHPORT BOAT RAMP FOR SAFETY MEETING

0817 BEGAN TRANSMITTING AT USACE 1001-99 ON CHANNEL 10 FREQ 464.625 Mhz. RECEIVER S/N 5005K65410, ~~DATA CO~~ BASE RADIO S/N 4718132214, TSC3 S/N RS51C89516. AUDIBLE TONE ON HANDHELD SCANNER.

12:00 PM CHECK IN

12:35 PM HEAD TO UCR-4 FOR BASE SETUP.

1:08 PM BEGAN TRANSMITTING AT UCR-4 ON CHANNEL 12 FREQ: 464.725 Mhz RECEIVER S/N 5004K65351, BASE RADIO S/N 4546101247, TSC3 S/N RS51C89516. AUDIBLE TONE ON HANDHELD SCANNER.

4:45 PM SHUTDOWN BASE AT UCR-4 - TRANSFER DATA

5:21 PM SHUTDOWN BASE AT USACE 1001-99 - TRANSFER DATA

5:50 PM HEAD TO COLVILLE

R. DeWitt 10/29/18

Scale: 1 square = _____

10/30/18

0630 LEAVE COLVILLE FOR NORTHPORT BOAT RAMP

0730 ARRIVE NORTHPORT BOAT RAMP FOR SAFETY MEETING

0815 BEGAN TRANSMITTING AT USACE 1001-99 ON CHANNEL 10 FREQ: 464.625 MHz RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, DATA COLLECTOR S/N RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER.

0848 BEGAN TRANSMITTING AT UCR-4 ON CHANNEL 12 FREQ: 464.725 MHz RECEIVER S/N 5004K65351, BASE RADIO S/N 4546101247, TSC3 S/N RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER

0930 RETURN TO USACE 1001-99

12:45 PM RETURN TO UCR-4 - SHUTDOWN - TRANSFER DATA. 1:00 PM

1:34 PM BEGAN TRANSMITTING AT NEW YONDER ON CHANNEL 12. FREQ: 464.725 RECEIVER 5004K65351, BASE RADIO S/N 4546101247, TSC3 S/N RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER.

3:55 PM SHUTDOWN BASE AT "NEW YONDER" - TRANSFER DATA.

4:12 PM RETURN TO USACE 1001-99

4:30 PM SHUTDOWN BASE AT USACE 1001-99 - TRANSFER DATA.

5:06 PM RETURN TO COLVILLE

R. D. Will 10/30/18

10/31/18

0630 LEAVE COLVILLE FOR NORTHPORT BOAT RAMP.

0735 ARRIVE NORTHPORT BOAT RAMP FOR SAFETY MEETING

0832 BEGAN TRANSMITTING AT USACE 1001-99 ON CHANNEL 10 FREQ: 464.625 Mhz. RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER.

0835 HEAD TO PT #68 "NEW YONDER"

0914 BEGAN TRANSMITTING AT "NEW YONDER" ON CHANNEL 12 FREQ: 464.725 Mhz. RECEIVER S/N 5004K65351, BASE RADIO S/N 4546101247, TSC3 S/N RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER.

0945 HEAD BACK TO USACE 1001-99

12:45 PM HEAD BACK TO "NEW YONDER"

1:18 PM SHUTDOWN BASE AT "NEW YONDER ~ TRANSFER DATA,

1:50 PM RETURN TO USACE 1001-99

4:55 PM SHUTDOWN BASE AT USACE 1001-99 → TRANSFER DATA.

5:35 PM RETURN TO COLVILLE.

R. Lee Will 10-31-18

Scale: 1 square = _____

11/1/18

0630 LEAVE COLVILLE FOR NORTHPORT BOAT RAMP

0730 ARRIVE NORTHPORT BOAT RAMP FOR SAFETY MEETING.

0817 BEGAN TRANSMITTING AT UCR-4 CHANNEL 10 FREQ: 464.625 Mhz. RECEIVER S/N ~~4718132214~~ 5005K65410, BASE RADIO S/N 4718132214 TSC3 S/N RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER

0825 RETURN TO USACE 1001-99 - SETUP BASE FOR LATER USE TODAY

11:42 ~~RETURN TO UCR-4~~ BEGAN TRANSMITTING AT USACE 1001-99 CHANNEL 12 FREQ: 464.725 Mhz. RECEIVER S/N 5004K65351, BASE RADIO S/N 4546101247, TSC3 RS52C89516. AUDIBLE TONE WITH HANDHELD SCANNER.

11:55 RETURN TO UCR-4

2:25 PM RETURN TO USACE 1001-99

2:36 PM SHUTDOWN BASE AT USACE 1001-99 - TRANSFER DATA, THIS BASE WAS NOT USED TODAY.

2:50 PM RETURN TO UCR-4

5:00 PM SHUTDOWN BASE AT UCR-4 - TRANSFER DATA.

5:40 PM RETURN TO COLVILLE

R. Dale W. M. 11/1/18

11/2/18

0630 LEAVE COLVILLE FOR NORTHPORT BOAT RAMP

0725 ARRIVE NORTHPORT BOAT RAMP FOR SAFETY MEETING.

0815 BEGAN TRANSMITTING AT USACE 1001-99 CHANNEL 10 FREQ: 464.625 Mhz. RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER.

1:00 PM CHECK IN WITH JOHN ON DISCOVERY.

5:15 PM SHUTDOWN BASE AT USACE 1001-99 - TRANSFER DATA

5:45 PM RETURN TO COLVILLE

R. Dail Will 11/2/18

Scale: 1 square = _____

11/3/18

0630 LEAVE COLVILLE FOR NORTHBORT BOAT RAMP

0730 ARRIVE NORTHBORT ~~BOAT~~ RAMP FOR SAFETY MEETING

0812 BEGAN TRANSMITTING AT USACE 1001-99 CHANNEL 10 FREQ: 464.625 Mhz. RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER.

11:30 CHECK IN WITH JOHN ON DISCOVERY

5:00 PM SHUTDOWN BASE AT USACE 1001-99 ~ TRANSFER DATA

RETURN TO COLVILLE

R. DeWitt 11/3/18

11/4/18

0630 LEAVE COLVILLE FOR NORTHPORT BOAT RAMP

0730 ARRIVE NORTHPORT BOAT RAMP FOR SAFETY MEETING

0806 BEGAN TRANSMITTING AT USACE 1001-99 (PT#64) FREQ: 464.625 Mhz. RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER.

12:00 PM CHECK IN WITH "DISCOVERY"

4:25 PM SHUTDOWN BASE AT USACE 1001-99 - TRANSFER DATA

5:00 PM RETURN TO COLVILLE

R. Dail Will 11/4/18

Scale: 1 square = _____

11/5/18

0630 LEAVE COLVILLE FOR NORTHPORT BOAT RAMP

0730 ARRIVE NORTHPORT BOAT RAMP FOR SAFETY MEETING.

0758 BEGAN TRANSMITTING AT USACE 1001-99 (PT#64) FREQ: 464.625 Mhz
RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N
RS52C89516. AUDIBLE TONE WITH HANDHELD SCANNER.

12:00 PM CHECK IN WITH DISCOVERY.

4:00 PM SHUTDOWN BASE AT USACE 1001-99 - TRANSFER DATA.

5:00 PM RETURN TO COLVILLE.

R. D. Wil... 11/5/18

Rite in the Rain

Scale: 1 square = ________

11/6/18

0630 LEAVE COLVILLE FOR CHINA BEND BOAT RAMP

0720 ARRIVE CHINA BEND BOAT RAMP FOR SAFETY MEETING

0801 BEGAN TRANSMITTING AT UCR-2 (PT#57) ON CHANNEL 10 FREQ: 464.625 Mhz. RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214, TSC3 S/N RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER.

0815 SETUP REPEATER FOR "DISCOVERY" CHECK IN AT UCR-3

12:00 PM CHECK IN WITH DAVE ON "DISCOVERY"

4:00 PM SHUTDOWN BASE AT UCR-2 - TRANFER DATA.

4:25 PM RETURN TO COLVILLE.

R. [signature] 11/6/18

Scale: 1 square = ________

11/7/18

0630 LEAVE COLVILLE FOR CHINA BEND BOAT RAMP.

0720 ARRIVE CHINA BEND BOAT RAMP FOR SAFETY MEETING.

0753 BEGAN TRANSMITTING AT UCR-2 (PT#57) FREQ: 464.625 MHz
RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214,
TSC3 S/N RS52C89516. AUDIBLE TONE WITH HANDHELD SCANNER.

0812 SET UP REPEATER FOR "DISCOVERY" CHECK IN AT UCR-3 · CHINA BEND.

12:00 PM CHECKED IN WITH DAVE ON "DISCOVERY"

4:30 PM SHUTDOWN BASE AT UCR-2 - TRANSFER DATA.

4:50 PM RETURN TO COLVILLE.

R. DeLuca 11/7/18

11/8/18

0630 LEAVE COLVILLE FOR CHINA BEND BOAT RAMP

0700 ARRIVE CHINA BEND BOAT RAMP FOR SAFETY RAMP.

0740 BEGAN TRANSMITTING AT UCR-2 (PT#57) FREQ: 464.625 RECEIVER S/N 5005K65410, BASE RADIO S/N 471813221 4, TSC3 S/N RS52C89516. AUDIBLE TONE ON HANDHELD SCANNER.

0750 SETUP REPEATER FOR "DISCOVERY" CHECKIN AT UCR-3 CHINA BEND.

1145 CHECKED IN WITH DAVE ON "DISCOVERY"

445 PM SHUTDOWN BASE AT UCR-2 — TRANSFER DATA.

RETURN TO COLVILLE.

R. D. Wall 11/8/18

Scale: 1 square = _____

11/10/18

0700 LEAVE COLVILLE FOR EVANS BOAT RAMP

0830 SAFETY MEETING AT EVANS BOAT RAMP

0918 BEGAN TRANSMITTING AT UCR-2 (PT #57) FREQ: 464.625 MHz
RECEIVER S/N 5005K65410, BASE RADIO S/N 4718132214,
T5CL3 S/N R552C89516. AUDIBLE TONE ON HANDHELD SCANNER.

0940 SETUP REPEATER FOR "DISCOVERY" CHECK IN AT CP-10

1000 PULLED REPEATER.

12:15 PM CHECK IN WITH "DISCOVERY"

4:20 PM SHUTDOWN BASE AT UCR-2 - TRANSFER DATA

5:00 PM RETURN TO COLVILLE

R. J. Dillon 11/10/18

7/8/2019

0800 SAFETY MEETING @ COMFORT INN COLVILLE

0915 HEAD TO NORTHPORT BOAT RAMP

1000 - 1100 RECOVER CONTROL FOR CHECK SHOTS @ CP-7 AND CP-9

BEGAN TRANSMITTING @ NEW YONDER (PT #68) FREQ: 464.625
RECEIVER S/N SPS 855 590 BR21632. BASE RADIO S/N 4546101234
TSC3 S/N: RS51C89516.

12:00 BACK TO NP RAMP TO CHECK SIGNAL ON CP-7

5:25 SHUT DOWN REPEATER

5:36 SHUT DOWN BASE

6:00 HEAD TO COLVILLE

R. Dil Wilt

Scale: 1 square = _____

7/9/2019

0630 LEAVE COLVILLE FOR NORTHPORT BOAT RAMP

0745 SAFETY MEETING @ BOAT RAMP

0815 HEAD TO NEW YONDER FOR BASE SETUP

0900 BEGAN TRANSMITTING @ NEW YONDER (PT #68) FREQ: 464.625
RECEIVER S/N: SPS855 59082R21632. BASE RADIO S/N: 4546101234
TSC3 S/N: RS51C89516. FILE: 16321900

0915 STARTED REPEATER - LOCATION +/- 1/4 MILE NORTH FROM UCR-4 ON WEST SIDE OF HIGHWAY ON OLD HIGHWAY ROAD BED.

0950 BASE POSITION N: 742512.759 E: 2407841.010 EL: 1468.040
ANTENNA HT = 6.562 FT.

1230 CHECK IN WITH "DISCOVERY"

5:00 SHUT DOWN BASE. TRANSFERED DATA

5:30 SHUT DOWN REPEATER.

R. D. Will

7/10/19

0630 LEAVE COLVILLE FOR NORTHPORT BOAT RAMP

0730 SAFETY MEETING @ NORTHPORT BOAT RAMP

0810 BEGAN TRANSMITTING @ NEW YONDER (PT #68) FREQ: 464.625
RECEIVER S/N: SPS 855 5908282/632 BASE RADIO S/N: 4546101234
TGC3 S/N: RS51C89516. AUDIBLE TONE ON HANDHELD SCANNER. FILE: 16321910

0825 POWERED UP REPEATER "ECHO" LOCATION +/- 1/4 MILE NORTH FROM UCR-4. WEST SIDE OF HIGHWAY ON OLD HIGHWAY ROAD BED. DOUBLE AUDIBLE TONE CONFIRMED WITH HANDHELD SCANNER. FREQ 464.625

0900 BASE POSITION N: 742512.684 E: 2407837.807 EL: 1467.999

10:50 BASE HAD BATTERY ISSUES. SHUT DOWN REPEATER AND SWAPPED OUT BAD BATTERY. BASE FUNCTIONING NORMALLY.

11:50 CONTACT W/ CNI.

5:20 SHUT DOWN BASE - TRANSFERED DATA.

6:00 RETURN TO COLVILLE FROM NORTHPORT

R. Dale Will

Scale: 1 square =

7/11/19

0630 LEAVE COLVILLE FOR NORTHPORT BOAT RAMP

0730 SAFETY MEETING @ NORTHPORT BOAT RAMP

0815 BEGAN TRANSMITTING @ "NEW YONDER" (PT #68). FREQ: 464.625 RECEIVER S/N: SPS 855 59082R21632. BASE RADIO S/N: 4546101234 TSC3 S/N: RS51C89516. AUDIBLE TONE ON HANDHELD SCANNER. FILE 16321920.

0830 POWERED UP REPEATER "ECHO" S/N 4810146494. LOCATION +/- 1/4 MILE NORTH OF UCR-4 WEST SIDE OF HIGHWAY ON OLD HIGHWAY ROAD BED. DOUBLE AUDIBLE TONE CONFIRMED ON HANDHELD SCANNER. FREQ: 464.625

0905 BASE POSITION N: 742512.770 E: 2407838.611 EL: 1469.976

1210 CHECK IN WITH "DISCOVERY"

5:00 SHUT DOWN BASE - TRANSFERED DATA

5:25 SHUT DOWN REPEATER

5:50 RETURN TO COLVILLE FROM NORTH PORT

R. Dal Will

7/15/19

0630 DEPART COLVILLE FOR NORTHPORT BOAT RAMP

0740 SAFETY MEETING AT NORTHPORT BOAT RAMP

0850 BEGAN TRANSMITTING @ "NEW YONDER" (PT #68) FREQ: 464.625
RECEIVER S/N: SPS 855 5908 2R2 1632. BASE RADIO S/N: 454 6101234
TSC3 S/N: RS51C 89516. TRANSMISSION CONFIRMED ON HANDHELD
SCANNER FREQ: 464.625. FILE: 16321960

0900 REPEATER NOT NECESSARY

0930 BASE POSITION N: 742512.577 E: 2407839.087 EL: 1471.930

1220 CHECK IN WITH "DISCOVERY"

5:05 SHUT DOWN BASE - TRANSFER DATA

5:40 RETURN TO COLVILLE FROM NORTHPORT

R. David Will

Scale: 1 square =

7/16/19

0630 LEAVE COLVILLE FOR NORTHPORT BOAT RAMP

0750 SAFETY MEETING AT NORTHPORT BOAT RAMP

0832 BEGAN TRANSMITTING @ "NEW YONDER" (PT #68) FREQ: 464.625
RECEIVER S/N: SPS855 5908 2R21632, BASE RADIO S/N: 4546101234
TSC3 S/N: RSSIC89516. TRANSMISSION CONFIRMED ON HANDHELD
SCANNER FREQ: 464.625. FILE: 16321970

0845 BASE POSITION N: 742511.428 E: 2407838.487 EL: 1472.901

1200 CHECK IN WITH "DISCOVERY"

5:16 SHUT DOWN BASE - TRANSFER DATA.

5:50 RETURN TO COLVILLE FROM NORTHPORT

R. Dal Will

7/17/19

0630 LEAVE COLVILLE FOR NORTHPORT BOAT RAMP

0740 SAFETY MEETING @ NORTHPORT BOAT RAMP

0818 BEGAN TRANSMITTING @ "NEW YONDER" (PT #68) FREQ: 464.625
RECEIVEN S/N SRS 855 5908 2R21632. BASE RADIO S/N 454610234
TSC3 S/N: RS51C89516. TRANSMISSION CONFIRMED ON HANDHELD
SCANNER FREQ 454.625 FILE: 16321980

0834 BASE POSITION N: 742513.267 E: 2407839.166 EL: 1470.648

1230 CHECK IN WITH "DISCOVERY"

4:36 SHUT DOWN BASE ~TRANSFER DATA

5:15 RETURN TO COLVILLE FROM NORTHPORT

R. DeWitt

Scale: 1 square = _____

7/18/19

0630 LEAVE COLVILLE FOR NORTHPORT

07:41 SAFETY MEETING @ NORTHPORT BOAT RAMP

0817 BEGAN TRANSMITTING @ "NELO YONDER" (PT #68) FREQ: 464.625
RECEIVER S/N: ~~SAS~~855. 5908 2R21632. BASE RADIO S/N: 4546101234
TSC3 S/N: RS51C89516. TRANSMISSION CONFIRMED ON HANDHELD
SCANNER FREQ 464.625. FILE: 16321990

0831 BASE POSITION N: 742512.180 E: 2407839.732 EL: 1469.453

1210 CHECK IN WITH "DISCOVERY"

326 SHUT DOWN BASE - TRANSFER DATA

5:00 RETURN TO COLVILLE FROM NORTHPORT

R. Dal Will

Sediment Facies Mapping

#2

Rite in the Rain
ALL-WEATHER
UNIVERSAL
№ 973T-MX

RV Discovery

10-2-18 UCR Sediment Facies Mapping R/V Discovery
Weather 52°F partly Cloudy
0745 H+S Tailgate meeting Evans Campground
CNI 1 & CNI 2 are Columbia boats
maroon white
Discovery Crew Mike Duffield, Jeff Wilson, Josie Smith
CNI 1 will support R/V Discovery
0830 Begin mobilization for day,
DEA Team Dave William (survey pts) John Staley
1002 Load Gear onto Discovery, DEA give Tim McClinton
MBES Demonstration, Line Log Demonstration
Coordinate Systems
NAD83 is horizontal datum us survey ft
Projection WA North State plane
NADV88 2011 Realization vertical datum
Geoid 2012 B separation model
All bathy systems fired up & operating. Correctly
occupation will be 5hz for ~300 seconds
for fixed RTK
Hypak 2017a software version
Times collected in UTM (Monrovia)
1146 Begin Control point check @ CP-2 G.E.P. 1-11-19

6.53 ft distance to antenna reference point
ARP Antenna Ref pt to APC
Zephyr model 2 antenna
ARP-APC 0.274 Total RTK Check = 6.807
CP2 is control point-Base Evans 289.420 RTK HT
1289.49 is elevation of Control Pt
Measured Horizontal N=632266.643 E=2319793.24
1855 UTM Z = 1289.42
CP2 = N 632266.570 E 2319793.238
Evans = N 631421.339 E 2320662.373
Evans Z = 1293.478 CP2 Z = 1289.489
1215 Weather 68°F Windy partly cloudy W-10 mph 20mph Gusts
1240 Launch Discovery 0 from Evans C6
boat Ramp proceed to public dock Finish
set up of MBES Systems.
Water temp 57.7°F
1315 Discovery Bathy orientation man overboard
procedure

Josie Smith 10-2-2018

10-2-2018 JAS

10-2-2018 UCR Sediment Facies Mapping Page 2

1337 Depart public dock Evans CG proceed to RM 709-710

1352 Arrive vicinity of 709 set MBES Sensor

1421 Perform sound velocity test, for Sound speed profile

2131 UTM Begin collecting Channel data

1431 ~~Run test line from~~ JAS 10-2-18 PDT

JAS 10-2-18

~~1500~~ 1600 Break from MBES data collection

1603 Perform sound velocity test for sound speed profile

1606 Resume, run patch test + latency line

1616 3 lines to align sonar to IMU

~~1627~~ 1629 Begin patch test

1638 Finish patch test

1640 Perform Bar test

1646 Check Battery on AED, charged and ready for use

Note: Draft measurement taken earlier right after launch ~~1424~~ JAS 1416 @ 1416

1700 Return to Evans CG public Dock

1740 Download MBES data to AECOM Harddrive

1752 Depart RV Discoverer

Jason Smith 10-2-2018

10-3-2018 TAI UCR Sediment Facies Mapping
R/V Discovery

0730 Arrive Evans Campground NM+JS @ boat ramp.
Crew Mike Duffield, Jeff Wilson - Gravity
John Staly, David Evans Assoc.
Josie Smith, AECOM
Weather Sunny clear skies 34°F wind 2mph ESE

0800 DEA Setup and collect control point at CP-2

0811 Collect control point at CP-2 for Discovery
Measured N = 6322661.620 E = 7319793.260 Z = 1289.570

0820 Gravity Launch Discovery

0840 Proceed to public Dock / JS + NM

0900 Tailgate, H+S meeting
Driving Hazards, Wildlife on Road

0920 JS Board R/V Discovery

0932 Depart Evans CG public dock for RM 710
All systems up and running

0937 Arrive RM 710 Deploy MBES sensor/unit
measure draft 1.98 ft

0956 Sound Speed Check 1464.3 vs 1464.4 ± 0.1
sound velocity at sonar head vs
Sound velocity profiler 0 + surface sound velocity

1006 Begin logging data for RM 709-710

1112 Water temperature 57.3°F

1125 Pause data logging, perform Sound Speed check

1130 JS depart vessel proceed to Marcus flats
for break aboard CNI-1 with Eric
Weatherman

1145 JS return to R/V Discovery

1150 Resume logging data

1340 Weather 54°F high overcast
wind 3 mph WNW water temp 57.12°F
Encountering areas with vegetation on West bank

1410 Break from logging data on West bank
Perform sound speed check

Josie Smith 10-3-18

Rite in the Rain
NSN: 7530-01-577-8866
Scale: 1 square =

RV Discovery

1415 ~~tor~~ JAS resume Logging data RM 709-710
1419 stop Logging data to check yesterdays project matrix + reload
~~1627~~ 1427 resume logging data
~~1648~~ 1448 JAS Finish Logging for the day, perform sound speed check
Weather 55°F Mostly cloudy
wind 3 mpH SSW water temp 57.5 4°F
~~1455~~ 1655 Log cross lines JAS on RM 710 ~~and~~ JAS
1700 Log test line at 8 kt speed to compare to lines logged at <5 kt
1705 Log cross line on RM 709 MBES system
~~system~~ JAS shut down before cross line could be taken, Will complete cross line and fill one gap in this area, done logging for the day
1709 Pull sonar ~~unit~~ JAS unit on to vessel
1714 Discovery return to Evans C.G dock
1723 Arrive dock JS depart vessel & Will meet at boat launch to collect Hard Drive and checklist
1741 RV Discovery out of Water at boat Ramp
1800 Depart Evans Campground

Josi Santa
10-3-18

10-4-2018 TAI UCR Sediment Facies Mapping
RV Discovery
Crew John Staly - DEA, Mike Duffield Gravity
Josie Smith - AECOM
Weather 41°F Partly Cloudy W 35 mph
0730 Tailgate Meeting H+S safety meeting
Return to dock @ at 1630 today
0754 JS Board RV Discovery (on ramp before launch)
Collect control point at CP-2, EVANS base
N = 632266.60 E = 2319793.25 Z = 1289.48
0816 Launch RV Discovery
Proceed to RM 709-710 to fill gaps then
Swith to 710-711 once gaps are completed
0826 Deploy MBES unit
0837 sound speed check
0841 Water temperature 57.6°F
0847 Begin shoreline line logging
0908 Collect cross line data @ RM 709
0915 JS leave RV Discovery for break aboard CNI-1
0930 Performed roll patch test
0933 Proceed to RM 710-711 area
0938 Draft measurement collected
0940 Sound speed check
0949 Begin logging RM 710-712 starting in center of channel
1125 Weather 54°F high overcast partly cloudy
wind 2 mph N, Water Temp 56.8°F
1143 sound speed check ~~high overcast partly~~ JAS 10-4-18
1301 JS depart vehicle aboard CNI-1 for break
1314 sound speed check
1323 JS return to RV Discovery
1324 Resume logging RM 110-112
1345 Reset clock on Panasonic Lumix
picture times recorded for previous photos should be -8 minutes (photos 501-512)
1548 End logging, run ~~line down channel~~ JAS 10-4-18 cross line ~ RM 712
1559 Proceed to RM 711 to perform cross line

Josie Smith 10-4-2018

Rite in the Rain
NSN 7530-01-577-8866
Scale: 1 square = _____

JAS 10-4-2018

1600 TAI UCR Sediment Facies Mapping
RV Discovery
1605 Log cross line a ~ RM 711
1608 Proceed to ~ bend between RM 710 + 711
1614 Log cross line at bend between RM 710 and 711
~~to 14~~ JAS 10-4-18
~~to 44~~ 1628 Sound speed check
1631 Pull sonar unit out of water.
1638 Return to Boat launch
1646 Arrive Evans CG boat Launch
1648 JS Depart RV Discovery
1800 Depart Evans CG boat Ramp
1830 Arrive Colville

Josie Smith
10-4-2018

10-5-18 TAI UCR Sediment Facies Mapping
0735 Tailgate / H+S meeting
Weather 31°F partly Cloudy 2 mph ESE
Delay work until temperature above 32°F
0825 Josie Smith (JS) board RV Discovery in parking lot Crew John Staly PEA, Mike Duffield-Gravity
0835 Collect control point @ CP-2
N-6322646.590 E-2319793.250 Z-1289.470
0840 Launch RV Discovery MBES Survey
0846 Depart for RM 710
0855 Deploy sonar unit
0901 Perform Sound Speed Check & Roll Test
0918 Begin Logging data RM 710-712
0933 Weather 38°F Cloudy
water temp 56.03 wind 2 mph ESE
1021 Stop logging equipment error (computer software / memory?
1029 JS sound speed check/profile 10-5-18
1030 JS depart RV Discovery for break on CNE-2
1100 JS Return to RV Discovery
1102 Begin Logging data
1211 Weather 48°F Cloudy wind 3mph NE
Water temp 56.04°F
1351 Weather 51°F Cloudy wind 1 mph ESE
water temp 56.16°F
1455 Sound Velocity Check
1634 Weather 53°F Cloudy wind 1 mph W
Water temp 56.06
1635 End logging for the day
1646 Run Cross line @ ~ RM 710
1652 Run Cross line ~ RM 711
1657 Run Cross line ~ RM 711.5
1700 Sound velocity / speed check
1701 Pull up sonar unit
1735 RV Discovery Out of water
JS Depart RV Discovery
1810 Depart Evans CG boat launch

10-5-2018
Josie Smith

Rite in the Rain NSN: 7530-01-577-8866 Scale: 1 square =

10-6-18 TAI UCR Sediment Facies Study
0730 JTS 10-6-18 RV Discovery MBES survey
Crew Mike Duffield - Gravity
John Staley DEA, Josie Smith - AECOM
0740 Tailgate H+S meeting
Weather 43°F, Partly Cloudy Wind 1mph ENE
0810 JS board RV Discovery on shore
0821 Control point at CP-20 60 sec
N=6322666.570 E=2319793.260 Z=1289.470
0825 RV Discovery Launch, on water
0829 Depart Evans CG Boat ramp.
0832 Deploy Sonar unit near RM 711.5
will work 710-712 RM along east bank today
0838 Draft measurement 1.05 + 0.98 ft
Sound speed / velocity check
0843 MBES System up & ready
0845 Begin logging east side of RM 110-112
1110 Stop logging perform sound speed check and roll patch test
JS depart RV Discovery aboard CNI-1 for Break RV Discovery continue Logging
1139 Return to RV Discovery JS
1202 Weather 56°F mostly sunny
wind 2mph ENE water temp 55.63
1247 Weather 56°F mostly sunny wind 2mph NNE
Water temp 55.95°F
Continue Logging east side of river
1328 Sound speed check
1336 Resume Logging east shore
1502 Stop logging Sound speed / velocity profile
JTS 10-6-18 Run cross line ~ RM 712
1506 Run cross line S of RM 712
1509 Resume Logging ~~Eastern~~ E Shore line
1618 Sound speed Velocity JTS 10-6-18 profile check
1620 Resume Logging East Shore line
1645 Stop Logging to Run cross lines
1647 Weather 64°F Sunny wind 4mph NNW
water temp 56.25

10-6-18

Scale: 1 square = _____

JAS 10-6-18

10-6-18 TAI UCR Sediment Facies mapping Page 9

RV Discovery crew JS, MD, JS

1650 Run cross lines Near Evans CG East bank public dock (just north of dock) ~RM 711

1655 Run cross line just south of Evans CG

1701 Run cross line ~ 710.5

1705 Sound speed /velocity profile and pull Sonar unit

1709 Return to Evans CG boat launch

1713 Arrive boat Ramp

1718 Josie Smith Depart RV Discovery

[signature] 10-6-18

Rite in the Rain
NSN: 7530-01-577-8866
Scale: 1 square = ______

Page 10 | RV Discovery | 10-7-2018

Project = Upper Columbia River RIFS, Sediment Facies Mapping. MBES Task

0723 NM + JS at Evan campground boat ramp.
0730 Tailgate meeting; discussed repetition + fatigue; Weather = 34°F, hazy clouds Slight wind.
~~07~~ RV Discovery:
- Nicky Moody (NM) AECOM, SSO/Field Supervisor.
- Mike Duffield, Captain (MD), Gravity
- John Staly, DEA (JS), MBES Lead.

RV Tieton
- Josie Smith (JS) AECOM
- Maggie McKeon (MM) Gravity ADCP Lead
- Rene Trudeau (RT) Gravity Captain.
- Jeff Wilson (JW) Gravity, QA Lead
- Ryan McElrece (RM) Gravity, Imagery Lead.

CNI 1
- Eric Weatherman, Columbia Navigation Inc. (CNI) - Captain.
- Rick Wilson, Columbia Navigation Inc.

CNI 2
- Josh Weatherman - Captain
- Brandon Hoover.

"Evans" Base Station
- Dave Williams, DEA.

0759 CP-2 control point Check-in. complete ✓
0815 RV Discovery on water.
0820 Sound speed profiler/velocity check complete
Deploy sonar unit
0834 System ready.
0837 Start surveying. Rm 710-712 ~~East~~ bank.
0958 Collect cross line survey data.
1008 Sound speed check complete
1013 Rm 710-711 full length West side. - head over
1020 sound speed check complete.
1030 → Surveying again.
1230 NM - Bathroom break via Eric Weathermans CNI 1 - off RV.
1244 NM back on RV Discovery.
1634 Weather - Hazy, ~~high~~ NM 51.4°F., No wind.
1657 Cross line - set up. - RV Tieton heading back to ~~Evans boat~~ Evans NM boat ramp. → done logging.
1707 Completing cross lines
1720 Pulling up Sonar unit.
1725 Heading to boat ramp.
1750 RV Disco off water.
1810 JS + NM Depart Evans campground.

Scale: 1 square =

Page 111 RV Discovery SH OTS 10-8-18 10-8-2018

Project TAI UCRO Sediment Facies mapping

0735 Tailgate H&S Meeting

0805 Josie Smith & Stu J Holmes board RV Discovery

0808 Collect control point at CP-2 EVANS base

0820 RV Discovery on water

E = 2319793.024 N = 632266.62 Z = 1289.49

0843 Weather 43°F Cloudy wind 0 mph E

0847 Begin Logging data / main scheme

0849 water temp 0 @ 54.15°F

0838 Sound speed check

1059 Sound speed check

1108 JS depart aboard CNI-1 for break

1128 JS aboard RV Disco

1133 Begin logging main scheme

1314 Stop logging sound speed check

1318 ~~Patch Line~~ OTS 10-8-18 ~~Roll~~ Patch test roll only

1319 Resume Logging main scheme

1441 Weather 53°F Cloudy wind 2 mph E Light rain

1442 JS depart aboard CNI-1 for break

1448 Resume logging main scheme

1518 Sound speed check #4

1519 JS aboard RV Disco, continue logging main scheme

1605 Begin running cross lines

1645 Weather 51°F, Light rain, wind 7 mph SSW

1647 Resume logging main scheme

1735 Sound Speed Check

1737 Pull Sonar unit

1750 RV Discovery off Water JS & SH depart vessel

10-8-18

Rite in the Rain NSN 7530-01-577-8866 Scale: 1 square = _____

Page 12 | RV Discovery | SH 10-9-18 | 10-9-18

Project TAI UCR Sediment Facies Mapping

0735 H+S tailgate meeting - use extra caution boarding vessels due to rain.

0805 Stu Holmes, Mike Duffield, (Gravity) John Staley (DEA) aboard RV Discovery

0809 Collect control point (CP-2) at Evans Base.
E 2319793.250 N 632266.570 ℇ 1289.470

0816 RV Discovery on water
Weather 43°F, Mostly Cloudy, Wind 0 ^ 5 mph SE

0828 Measure the water line

0831 Sound speed check #1

0836 Begin logging main scheme

0950 Finish logging RM 710-712, steam to RM 713

1010 Conduct sound speed check #2

1015 Begin logging main scheme for RM 712-713

1200 Sound speed check #3

1248 Weather 59°F, Partly cloudy, wind 6 mph WNW

1420 Begin running cross lines

1440 Resume logging main scheme

1610 Sound speed check #4

1611 Weather 59°F, Partly Cloudy, Wind 6 mph N

1616 Resume logging main scheme

1692 Sound speed check #5

1634 Complete roll lines

1636 Steam to RM 713-715, begin logging main scheme

1717 Stop logging main scheme, push spread while head back to boat camp

1745 RV Discovery off water, SH and crew depart vessel.

1800 SH and NM depart Evans Campground

Stuart Holmes

10-9-18

Scale: 1 square =

Page 13 | RV Discovery SH 10-10-18 | 10-10-18

0733 SH and NM arrive at Evans Campground
0745 H&S tailgate meeting – beware of complacency, repetitive tasks
0816 Stu Holmes, Mike Outfield (Gravity), John Stacy (DEA) aboard RV Discovery
0821 Collect control point CP-2 at Evans base
E: 2319795.240 N: 632266.550 Z: 1289.470
0829 RV Discovery on water, heading to RM 713-715.
0847 Sound speed check #1, measure draft.
0851 complete roll lines
0853 Begin logging main scheme.
0855 Weather 44°F, mostly cloudy, wind 2mph E. Water temperature 54.75°F
1055 Sound speed check #2
1354 Sound speed check #3
1558 Weather 59°F, sunny, Wind 1 mph SW
1628 Run cross lines
1632 Resume logging main scheme.
1638 Run cross lines
1645 Resume logging main scheme.
1737 Run cross lines
1741 Sound speed check #4
1746 Pull sonar unit, heading back to boat ramp
1811 RV Discovery off water, SH and crew depart vessel.
1825 SH and DH depart Evans campground

10-10-18

RV Discovery SH 10-11-18 10-11-18
Project TAI UCR Sediment Facies Mapping

0737 H+S tailgate meeting
0813 Collect Control Point CP-2 at Evans Base
E: 2319793.240 N: 6372666.610 Z: 1289.430
0820 Stu Holmes, Mike Duffield (Gravity), John Staly (OEA) aboard RV Discovery. Heading to RM 713-715.
0825 Weather 33°F, partly cloudy, wind 2 mph N
0831 Arrive at station, perform sound speed check #1.
0838 Measure draft
0845 Begin logging main scheme.
1000 Finish logging main scheme in RM 713-715. MD and JS decided to leave gap near NW bank of section due to presence of weeds and danger from boulders/pilings near surface.
1002 Sound speed check #2
1012 Arrive at CP-3, tie boat to dock
1030 CP-3 deemed unusable - dock from boat ramp has been placed over the control point nail which is now displaced/damaged
1037 Leave dock to complete roll lines
1042 Heading to CP-4
1101 Arrive at CP-4, collect control point from Bossburg
E: 2319554.550 N: 660300.690 Z: 1288.980
1130 Conduct relative position check b/t Bossburg and Evans
E: 2316607.270 N: 658583.940 Z: 1287.560
E: 2316607.240 N: 658583.140 Z: 1287.650
1147 Begin logging main scheme in RM 715-717
1200 Weather 55°F, sunny, wind 2 mph NNW
1356 Break at Bossburg boat ramp
1405 Boat back on water, resume logging main scheme
1447 Complete roll lines
1450 Resume logging main scheme
1540 Perform sound speed check.
1651 Run cross lines
1708 Perform sound speed check, pull sonar
1720 Heading back to Evans campground
1758 RV Discovery off water, Stu and crew depart vessel.

Stu Holmes 10-11-18

0730 Arrive at Boat Launch in Northport and Conducted Health and Safety Tailgate Meeting
Topics: wildlife on the road, new people introductions and orientation; Eric Weatherman addressed new conditions that we will encounter in the upper section of the River

Attendees:

RV Tieton
Stuart Holmes AECOM
Rene Trean Gravity
Maggie McKeon Gravity
John Scherfer Gravity
Ryan McAlpen Gravity
Lisa Rateniuk Parsons/EPA

RV Discovery
David Hose AECOM
Mike Duffield Gravity
John Staly CDM

GPS Base Station Operator
Dave Williams

Columbia Navigation
Eric Weatherman
Josh Weatherman
Joseph Graves
Dan Smith

0800 Launch Discovery

0820 Begin Location Checkin at Point on Jetty at Northport Boat Launch
0840 Location Checkin Complete CP-1
0845 Tieton Begin Location Checkin
0900 Location Checkin for Tieton complete CP-1
0902 Depart Northport Boat launch for Deadmans Eddy

Weather: Sunny, no wind Temp 37°F
0915 Arrive at Deadman's Eddy AOI and deploy Multibeam Unit
0920 Performing Sound Speed Check #1 to 6 meters
0928 Begin Multibeam Survey
The current in this area makes it very difficult to hold a steady survey line
1200 Performing Sound Speed Check #2 To 9 meters
1435 Measured Draft of sonar
Performing Sound Speed Check #3 To 12 meters
1445 Perform Sonar Roll Calibration

David R. Hose 10/12/18

1450 Resume Survey Activities
1605 Cross Channel Check in slower water once in central channel data quality decreased because of affect of current on Boat

1606 Perform Sound Speed Check #4 To 7.5 Meters

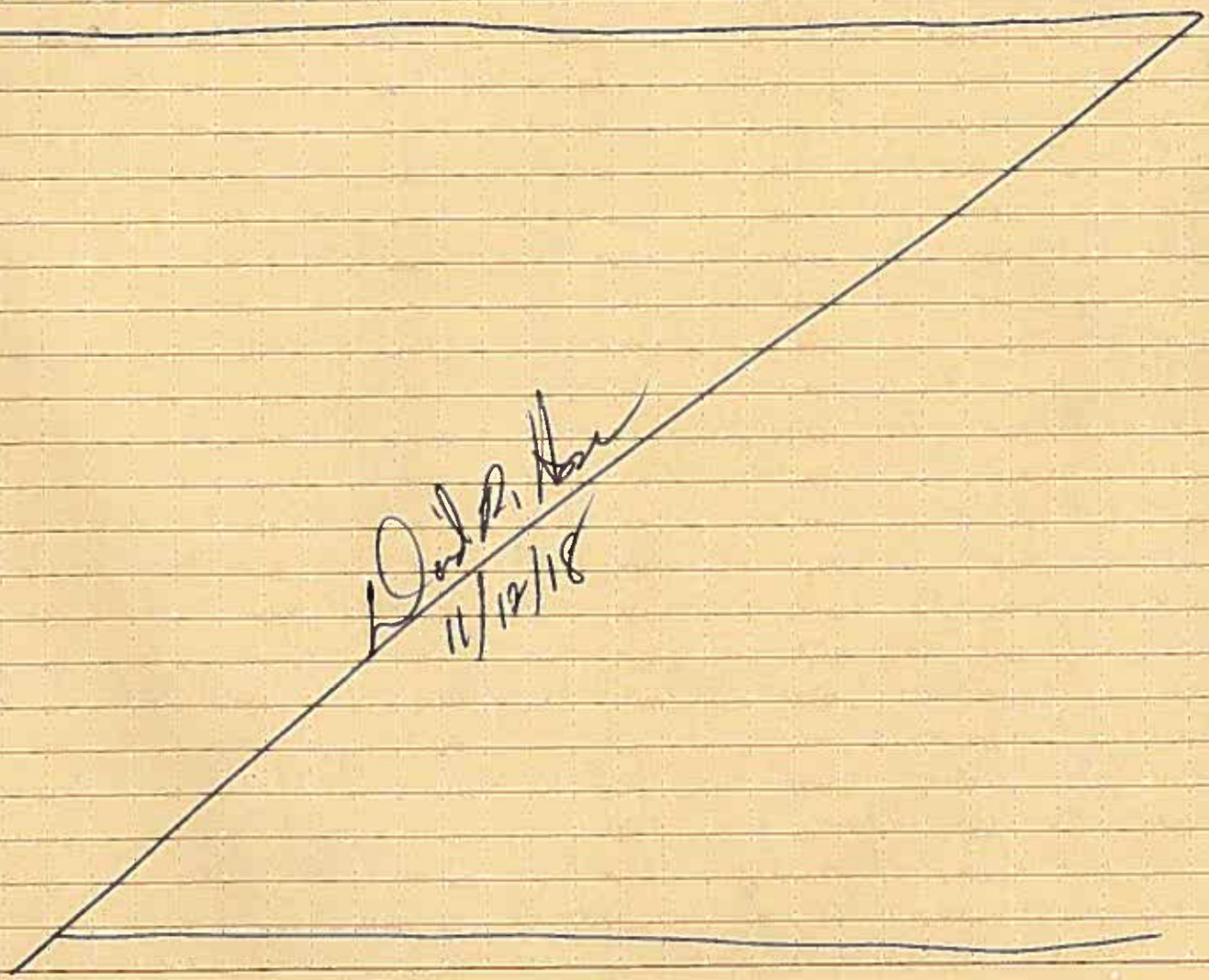
1612 Pulled Multibeam from Water and Motored back To Northport Boat Launch

1630 Arrive Northport Boat Launch.

1700 All Boats out of the Water

Dave Hoge + Stu Holmes Returning to Colville

1750 Arrive in Colville



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0730 Arrive at Northpoint Boat Launch
0745 Conduct Safety Briefing
Topics of the day HUNTERS!! Modern Gun Deer Season Starts so STAY out of the WOODS. Also discussed person overboard Techniques in the Eddy and beginning of cold and flu season.

Weather: 37°F Sunny Clear Skys no wind

Safety Meeting Attendees:

RV: Tiffon
Stu Holmes AECOM
Reno Trudeau Gravity
John Shelton Gravity
Maggie McKeon Gravity
Ryan McElligee Gravity
Lisa Ritenink Parsons/EPA

RV: Discovery
David Rose AECOM Towboat
Mike Duffield Gravity
John Staley DEA

Columbia Navigation
Eric Weatherman Dan Smith
Josh Weatherman Rick Wilson

GPS Base Station Operation
Dave Williams UCR-04

0800 Aboard Discovery CP Gap 1-11-19
0815 Begin GPS Checkin at ~~UCR~~-07 Located on Jetty at Boat Launch
0900 Complete GPS Checkin
Discovery Departs Boat launch for Deadmans Eddy

0915 Deploy Multibeam Unit into Water and Begin initial Checks
0925 Perform Sound Speed Check #1 To 10 Meters in Channel
0930 Begin Multibeam Survey
1210 Perform Sound Speed Check #2 To 11.5 Meters in Eddy
1212 Measured Draft of ~~Sonar~~ Multibeam Unit
1215 Lunch Break
1250 Resume Survey Process
1515 Perform Sound Speed Check #3 To 7 Meters in Eddy
Roll patch Test
1530 Pulled Multibeam out of Water and Motor Back to Launch
1630 All Boats out of the Water
1645 Depart for Colville

David R. Rose 10/13/18

Rite in the Rain
NSN: 7530-01-577-8866
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10/15/13

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0730 Arrive at Northport Boat Launch
Health and Safety Tailgate Meeting

Weather: 30°F, Partly cloudy, slight breeze

0811 Launch RV Discovery: Mike Duffield (Gravity)
0821 Linda Howard (AECOM) & Jason Dorfman (DEA) board RV Discovery
0825 Begin location checkin at ~~UCR~~ CP-07 located on jetty at Northport boat launch; GPS Base Station operator: ~~Ryan McClaren (Gravity)~~ Dave Williams (UCR-04)
0835 Complete location checkin.
0857 RV Discovery depart boat launch for Deadman's Eddy
0905 Perform sound velocity check #1 to 9.5 meters
0911 Deploy multibeam unit into water
0911 Eric Weatherman (Columbia Navigation) call in safety observation - only about 1 foot of water over Deadman today; will flag location.
0921 Text sound velocity check readings to Maggie Dorfman (EPA)
0922 Begin multibeam survey
10:51 Completed multibeam survey at DME AOI; radio in to Eric Weatherman that we are taking break at Sandy beach.
10:54 Pull in at Sandy beach for break
10:59 Linda Howard left RV Discovery and boarded Columbia Navigation GP1 for break at Northport Boat Launch
11:31 Linda Howard reboarded RV Discovery
11:32 Depart to continue multibeam survey of DME AOI - per Tim McClinton DEA communication to Jason Dorfman, need to survey 1,000-foot buffer at both ends of DME AOI and China Bend AOI.
11:35 Began logging multibeam survey in DME AOI 1000-foot buffer at downriver end of AOI
11:44 Program error caused need to restart - lost matrix
11:45 Program back up and running, continuing survey
12:20 Perform sound velocity check #2 to 6 meters in DME AOI
12:23 Continue multibeam survey
12:39 Completed multibeam survey in 1000-ft buffer south end of AOI; heading to north end of AOI.

Linda M. Howard 10/15/18

1256

~~12 53~~ Begin logging multibeam survey;
1458 Perform sound velocity check #3 to 7 meters
1512 Perform draft measurement
1515 Lost GPS signal
1516 GPS signal restored
1458 Break while waiting for Tieton to move to new location.
1524 Resume multibeam survey
1540 Run cross line
1541 Head to downriver section of DMF ADI and run cross lines in 1000-ft. buffer
1551 Run cross lines
1553 Run roll line
1355 Roll lines complete
1358 Pull multibeam out of water and motor back to launch
Weather: 52.8°F clear & sunny
1607 All boats out of the water. Head back to Colville

Linda M Howard 10/15/18

Linda M Howard
10/15/18

Scale: 1 square =

0720 Arrive at China Bend Boat Launch
Hold Health and Safety Tailgate Meeting
Weather: 33°F Foggy with some sun breaks
0818 Launch RV Discovery; wait on ramp for GPS checkin

RV Discovery: Mike Duffied, Jason Dorfman, Linden Holcomb
UCR-3 Base Station: Dan Williams
Columbia Navigation: Eric Weatherman, Josh Weatherman, Dan Smith, Rich Wilson

0818 Begin GPS checkin at CP-10 located adjacent to China Bend Boat Ramp
0828 Complete GPS checkin
0836 Finish launching RV Discovery; boat in the water in China Bend AOI, heading to ~~upper~~ lower end of AOI.

Safety observation: there is a fishing boat in the vicinity.

Safety observation: Island below surface of water at ~~734~~ upper RM 724; rocks protruding above water surface.

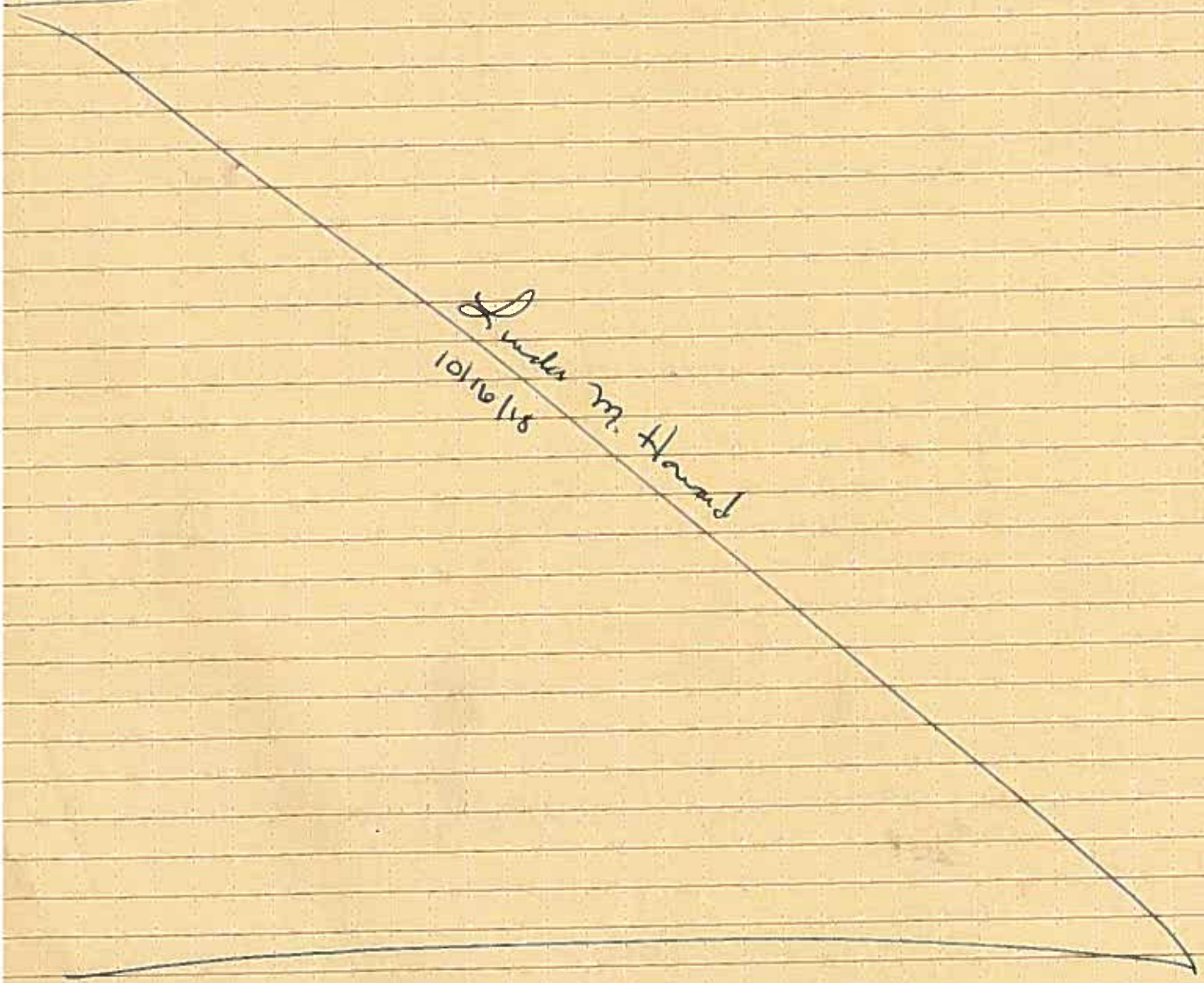
0847 Deploy multibeam unit into water
0852 Perform sound velocity check #1 to 18.2 meters
0853 Complete sound velocity check #1
0857 Conduct roll lines
0906 Begin multi beam survey.
1153 Pause multibeam survey; Perform sound velocity check #2
~~1155~~ to
1155 Complete sound velocity check #2; resume multi beam survey

Safety observation - tripping hazard on deck - cord to sound velocity meter tangled around foot while walking on deck, tucked inside bucket out of way and off deck.

1452 Completed upper 1/3 section of China Bend AOI;
1459 Perform sound velocity check #3
1501 Complete sound velocity check #3 to 17 meters
1507 Perform path test
1520 Complete patch test

Linden M Holcomb 10/16/18

15 22	Perform cross lines
15 28	Program error
1530	Rerun 2nd cross line
1542	Begin multibeam survey in 2nd of sections of China Bend ADI
1632	Pause survey; perform sound velocity check #3 to 12.1 meters
1635	Measure draft of multibeam unit
1632	Resume multibeam survey
1647	Complete survey for day
	Pull up multibeam unit
	Weather 64° Clear & sunny Boat Launch
1052	Head back to China Bend.
17:00	arrive at boat launch



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0730 Arrive at China Bend Boat Launch
Katina Crain is present

Weather Cold 34°F, No Wind, River Fog, Sun not yet Above horizon

0745 Conduct Tail Gate Safety Meeting
Topics: Cold Weather and Very Slippery Decks
Keep Cables wound up on the decks to Minimize the Hazards and Stay off the deck unless you have business on them

Attendees

RV Tiglon
Linda Howard AECOM
Rene Trudeau Gravity
Maggie McKeon Gravity
Ryan McElliece Gravity
John Schaefer Gravity
Lisa Ratenink Parsons/EPA

RV Discovery
David Hose AECOM
Mike Duffield Gravity
Jason Dorfman OEA

GPS Base Station
Dave Williams

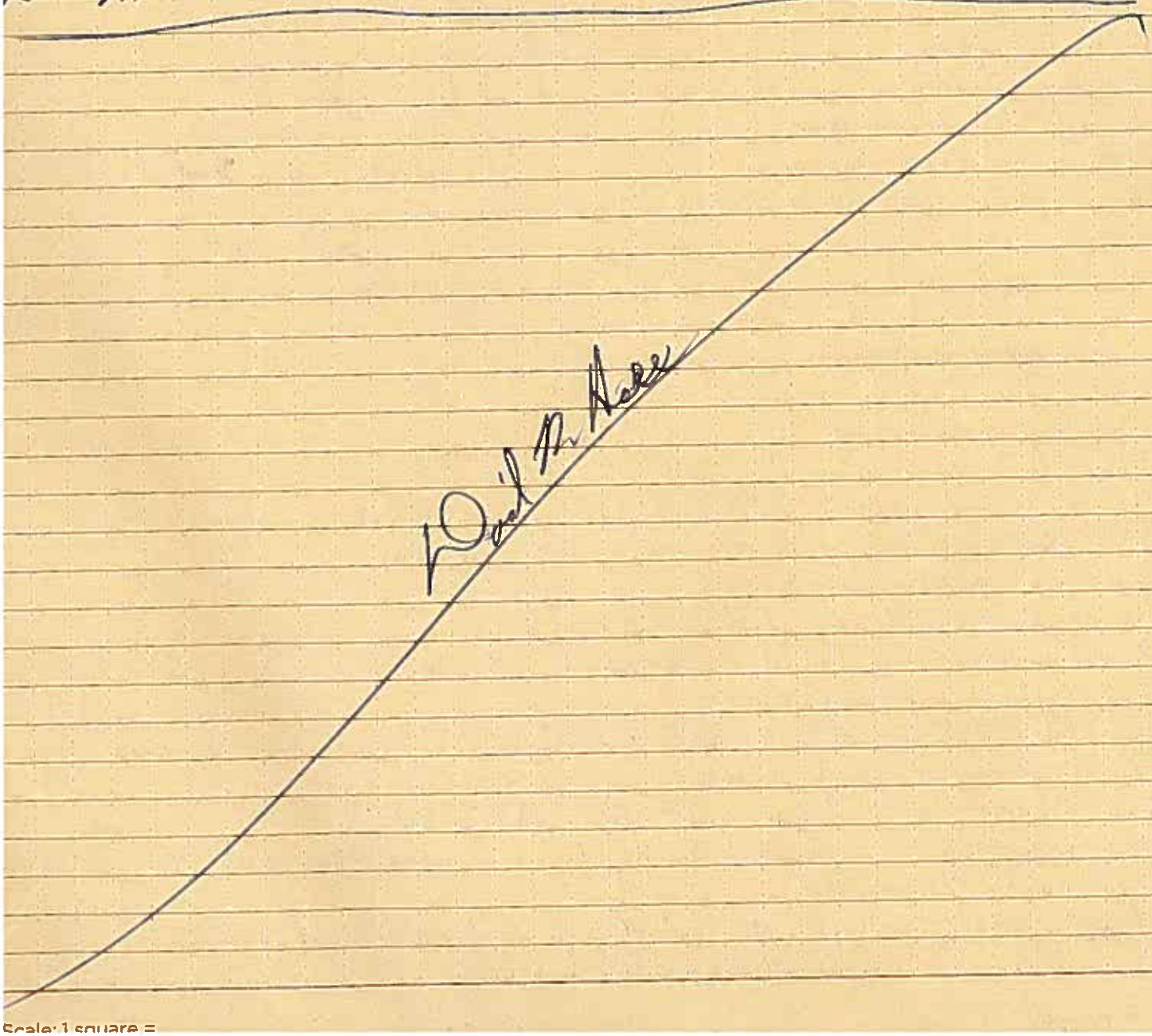
Columbia Navigation
Eric Weatherman
Josh Weatherman
Dan Smith
Joseph Graves

0800 Begin Launching Boats
0830 All Boats in Water Except Discovery
0830 Begin Position Checks Both Boats CP-10
0845 Position Checks Complete Both Boats Accuracy within 0.1 of foot
0850 Launch Discovery
0900 Deploy Multibeam Unit in Water
0905 Conduct Sound Velocity Test #1 To 12.3 Meters in Channel
0915 Begin Survey Activities
1102 Conduct Sound Velocity Test #2 To 23.3 Meters in the Channel
1107 Resume Surveys Activities
1335 Survey Cross Track Line at Upriver End of Survey Area
1345 Survey Cross Track Line at Location near down stream of Sand Island
1344 Conduct Sound Velocity Test #3 To 18.1 Meters at an Area out side the Channel near south shore

David R. Hose 10/17/18

Page 73 UCR Sediment Facies Mapping Survey 10/17/18

1350 Break Survey To Use Restroom
1420 Resume Survey activities
1500 Conduct Sound Velocity Test #4 To 34.5 Meters in deep spot in Channel NEAR Down River edge of China Bend AOI
1505 Resume Survey Activities
1642 Survey Cross Line At China Bend Boat Launch
1652 Begin Patch Test on a steep ~~slope~~ sloped slope
1704 Complete Patch Test
Pull Multibeam Unit out of the water
Return to Boat Launch
1725 All Boats out of the Water
1735 Depart Boat Launch for Colville
1812 Arrive At Comfort Inn



0725 Arrive at China Beach Boat Launch
Weather: Cold and Damp 34°F, Fog across the Valley
No Wind.

0745 Safety Briefing Topics
- Discussed the electrical fire in the Comfort Inn last night that ~~started~~ on started in Mike Duffield's bathroom exhaust fan. Mike and the hotel staff controlled the situation until the fire department arrived. We will keep a close watch on Mike today because he did not get much sleep last night.

Attendees

RV Tioton
Linda Howard AECOM
Rene Tavenas Gravity
Maggie McKeon Gravity
Ryan McElliece Gravity
John Schaefer Gravity
Lisa Rotenink Parsons/EPA

RV Discovery
David Hoese AECOM
Mike Duffield Gravity
Jason Doerman DEA

GPS Base Stations
Dave Williams DEA

Columbia Navigation
Josh Weatherman
Joseph Graves
Don Smith
Brandon Hoover

0815 Start GPS Position Calibration for Both Boats
0830 Complete Position Check in
0835 Launch Discovery
0840 Multibeam Deployed in the Water
0850 Conduct Roll line calibration
0857 Begin Survey activities
0904 Conduct Sound Velocity Check #1 To 16.5 Meters in the channel at the down River extent of today's survey area
1000 Checked water Depth along Transect 62 as requested by Jenny Pretare. Maximum surveyed depth approximately 150 ft.
1105 Resume Surveying
1105 Completed Survey of China Bend AOI

David F. Hoese 10/18/18

1110 Conducted Sound Velocity Check #2 to 14.1 Meters in channel just upstream from Boat Launch

1115 Restroom Break
1125 Begin Motoring up river to The Little Dalles
1140 Arrive at Location CP-5 and Begin GPS Location Check at CP-5
1200 Deploy The Multibeam Unit in Water
1210 Conducted Sound Velocity Check #3 to 12 Meters in Channel at Down River end of Little Dalles
1213 Began Surveying
1446 Conducted Sound Velocity Check #4 to 27.5 Meters in Channel at up river edge of The Little Dalles
1615 Survey cross lines at down river section of ~~Study Area~~ Today's Survey Area
1620 Continue Surveying
1630 Survey Cross line at up river section of Today's survey area
~~1633~~ 1633 Conducted Sound Velocity Check #5 to 12.4 Meters in channel at up river section of Today's survey area
1640 Survey Terminated, Multibeam retracted from water
1645 Return to China Bend Boat Launch
1705 Arrive China Bend Boat Launch
1735 All Boats out of the Water
1745 Depart for Colville
1815 Arrive at Comfort Inn in Colville

[signature] 10/18/18

Scale: 1 square =

10-19-18 (Corrected by J. Pretare on 1-30-19)

0725 Arrive at China Bend boat launch
Weather: 41°F overcast and some fog, no breeze

RV Discovery: Mike Duffield, Gravity
Jason Dorfman, DEA
Linda Howard, AECOM

0825 Launch Discovery into water; will conduct GPS checking upstream at new base station

0849 GPS checkin ~~the~~ #1 10/19 Base station: Blackhawk CP-5

0858 GPS checkin completed

0900 Safety observation from Columbia Navigation (CNI) - dense fog moving in, will wait for fog to move through.

0907 Will move slowly up one bank and assess visibility.

0922 Deploy multibeam unit

0924 Conduct sound velocity check #1 to 12.5 meters

0929 Begin Survey

1112 Conduct sound velocity check # 2 to 26.3 meters

1115 Resume survey

Safety observation: fishing boat coming up river

1215 Pause survey for lunch break

1255 End lunch break; resume survey

Safety observation - small fishing in vicinity

~~1306~~ 1406 Run crosslines

1412 ~~fourth~~ #4 10/19 Patch test

1420 Resume survey

1509 Complete survey for today in the Little Dalles
Sound velocity check #3

1519 Pull up multibeam unit

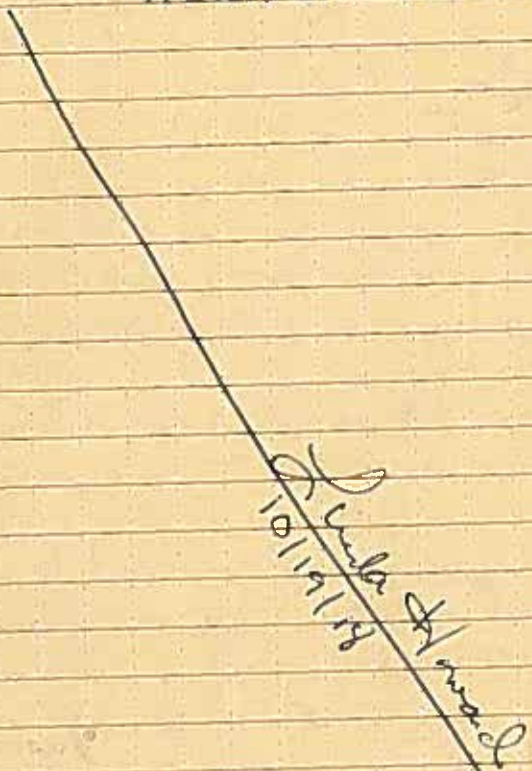
1525 Contacted Dave Williams to take down Blackhawk base station; head back to China Bend boat launch.

Linda Howard

UGR Sediment Facies Study

~~11-19-18~~
10-19-18
(corrected by J. Fretwell on 1-30-19)

1549 RV Discovery off the water.
Tieton off the water



0730 Arrive China Bend Boat Launch
0745 Daily Tailgate meeting & Safety Briefing
Weather: 35° Foggy
0805 Launch RV Discovery: Mike Duffield, Gravity
Jason Dorfman, DEA
Linda Howard, AECOM
0822 Heading to CP-5 for check in.
Safety observations - foggy on the water
0842 Arrived CP-5
0857 Conduct GPS check in
Rm 26.5 → 27.5 is target area (Rattlesnake Creek up to Little Dalles)
0910 Head to target area.
0920 Deploying multibeam unit
0929 Sound velocity check #1 to 24 meters
0932 Begin multi beam survey
1237 Conduct Sound velocity check # 2 to
1329 Resume survey
~~+5~~ 1445 Linda boarded CN1 to take break
1452 Linda reboarded RV Discovery
1627 ~~From Crosslines~~ Sound velocity check # 3 to 29 meters
1642 Run cross lines
1643 Weather 58°F Clear & sunny, no wind
1645 Safety observations - fishing boats in vicinity
1652 Pull up multibeam unit
1714 Arrive at China Bend Boat Launch
17 RV Discovery off the water

Linda M Howard
10/20/18

PAGE 29 UCR SEDIMENT RACER STUDY 10-21-18

0730 ARRIVE AT BOAT LAUNCH, I GAVE MICHAELA POINTERS ON WAY
0740 SAFETY MEETING, TAILGATE PLANS FOR EACH BOAT
0905 START LAUNCHING BOATS, VISITOR BOATS TIE THINGS UP

ATTENDEES

RV TIETON
LINDA HOWARD AECOM
MICHAELA McCOOG AECOM
RENE TRUDEAU GRAVITY
MAGGIE MCKEON GRAVITY
RYAN MCELIECE GRAVITY
JOHN SCHAEFER GRAVITY
LISA RAZNIK JACOBS/EPA

RV DISCOVERY
MARK HALE AECOM
MIKE DURFIELD GRAVITY
JASON DORFMAN DEA

GPS BASE STATION
DAVE WILLIAMS DEA

COLUMBIA NAVIGATION
ERIC WEATHERMAN
JOSH WEATHERMAN
DAN SMITH
RICK WILSON

0815 ISSUE WITH COLUMBIA NAVIGATION BOAT - DIAGNOSTIC CHECK
0830 RV DISCO LEADS LAUNCH TO CPS FOR GPS CHECK IN
0840 ARRIVE CPS, WATER LEVEL IS UP
→ SAFETY OBSERVATION - BE AWARE OF CHANGING WATER LEVELS & BE PREPARED TO DEAL WITH, PPE INCLUDING RUBBER BOOTS & PFD.
0855 FINISH CHECK IN, PULL IN GPS GEAR 726 → 727.5
0900 HEAD OUT TO START MULTIBEAM SURVEY RM ~~725.5 to 726.5~~
0905 DEPLOYING MULTIBEAM UNIT [JASON CORRECTION MH 10-24-18
0910 SOUND VELOCITY CAST - 23.1 M
0925 BEGIN MULTIBEAM SURVEY
0955 - SAFETY OBSERVATION - DON'T REST HAND ON SURFACE BEHIND SKIPPER'S CHAIR W/ FINGERS BETWEEN SURFACE AND CHAIRBACK - PINCH POINT POINTED OUT TO CREW, ALL BE GOOD
10:45 PROGRAM FOR MULTIBEAM IS INTERUPTED
10:50 BACK ONLINE, RESUME SURVEY

10.21.18

cale: 1 square = _____

UCR SEDIMENT FACIES STUDY 10-21-18

11:30 SOUND VELOCITY TEST | CAST - 17.9 M

12:25 FINISH UP ~~725.5 TO 726.5~~ 726 → 727.5
HEAD TO ~~724.5 TO 725.5~~ 725 → 726 } MH 10-21-18 JASON RE-CALCULATED

12:35 - SOUND VELOCITY CAST - 11.9 M

12:50 BEGIN MULTIBEAM SURVEY

13:10 PROGRAM INTERRUPTION - RE-BOOT

13:14 RESTART TRANSECT - MD RIVER SO USING AUTOPILOT

16:15 SWITCH FROM LONG TRANSECTS TO PERPENDICULAR

16:30 SOUND VELOCITY CAST 20.0 M

16:45 TEAR DOWN BASE STATION ORDER

16:46 PULL SONAR

16:50 HEAD BACK TO LAUNCH

17:00 WE ARE IN LINE AT RAMP, RV TIETON IS FIRST

17:30 EVERYBODY OFF WATER

10-21-18

PAGE 31 UCR SEDIMENT FACIES STUDY 10-22-18

0720 ARRIVE AT CHINA BEND BOAT LAUNCH
0730 DISTRIBUTE DRUGS & NOTEBOOKS
0740 HOLD SAFETY MEETING, HIGH 30's - GOOD DAY TODAY
0750 START LAUNCHING BOATS, COLUMBIA NAVIGATION FIRST

ATTENDEES

RV TIETON
MICHAELA McCOOG AECOM
RENE TRUDEAU GRAVITY
MAGGIE McKEON GRAVITY
RYAN McELROE GRAVITY
JOHN SCHAEFER GRAVITY
LISA RATZNIK JACOBS/EPA

RV DISCOVERY
MARK HALE AECOM
MIKE DURFIELD GRAVITY
JASON DURFMAN DEA

GPS BASE STATION
DAVE WILLIAMS

COLUMBIA NAVIGATION
ERIC WEATHERMAN
JOSH WEATHERMAN
DAN SMITH
RICK WILSON

0815 GPS CHECK IN AT LAUNCH
0820 FINISH WITH LAUNCHING - DISCO
0835 ARRIVE CPS FOR CHECK IN. - SAFETY OBS - WATER STILL HIGH
0845 COMPLETE CHECK IN FOR CPS W/ TIETON TOO
0900 DEPLOYING MULTIBEAM UNIT
0910 SOUND VELOCITY CAST 25.3 M
0915 START MULTIBEAM SURVEY START RATTLESNAKE CREEK
1115 OFFSHORE ROCKS SAFETY OBSERVATION. WORKING IN AREA THAT ERIC WEATHERMAN WARNED US ~~ABOUT~~ 10-22 AM ABOUT AT THIS MORNINGS SAFETY MEETING WHEN I ASKED FOR INPUT.
1150 SOUND VELOCITY CAST 13.5 M
1155 TWO TRIBAL BOATS HOVERING ABOUT, NO ISSUES JUST A NOTE THAT THAT ME AROUND.... TRIBE IS SETTING LONG LINES W/ BOUYS.. SAFETY OBSERVATION
12:45 PROGRAM CRASH + REBOOT
12:55 PROGRAM CRASH... RAISE ANTENNAE, REBOOT
14:20 SOUND VELOCITY CAST 22.5 M
14:40 CROSS RIVER TRANSECTS
14:55 FINISH UP @ 725-726
15:05 SWITCHING BASE STATIONS IN PREP OF MOVE

Scale: 1 square = _____

PAGE 32 UCR SEDIMENT FACIES STUDY 10-22-18

15:15 START @ 724 - 725 "LOG BOOM AREA"

15:25 CRASH OF PROGRAM REBOOT ATTEMPTS, LOST MATRIX

15:30 START NEW TRANSECT

16:35 ~~CROSS RIVER TRANSECT~~ MH 10-22-18 SOUND VELOCITY CAST 22.4 M

16:50 SAFETY OBSERVATION - END OF DAY SUN LIGHT INTO EYES WHEN COING DOWNSTREAM. CLEAN WINDSHIELD, WEAR SUNGLASSES

1650 - HEADING BACK TO BOAT LAUNCH

1700 - ERIC'S COLUMBIA NAV BOAT OUT OF WATER

1710 - RV DISCOVERY OUT OF WATER

1720 - COLUMBIA ORANGE PUMPKIN OUT

1730 - TICTON OFF WATER

1740 ALL DATA COLLECTED

MH

10-22-18

P33 UCR Sediment Facies Study 10-23-18

Foggy ~36°F am Clear 60°F afternoon

8:28 Launch Discovery

8:36 GPS check in at CP-10.

8:40 Crew realized gas for generator was low. Dave took gas can and will fill it when he has a chance. We have enough gas for the morning.

847 Heading out to approximately RM ~~17~~ 27.4

900 Deployed multi beam unit. Cast was 15.2 m (sound velocity cast).

901 Turn on sonar

920 starting to map ~~the~~ near the China Bend log boom east side

959 Lisa (Jacobs) left Discovery to head off site. Michaela left to get gas can that Dave filled.

1037 AECOM back on boat.

1110 Continue to fill in areas around buoys and log booms.

1141 Sound velocity check ~24.2

1240 Moving to west side of log boom

1330 Moved to east of the island between min transect RM 48 and min transect RM 51. the area is very shallow and has log booms and other floating logs.

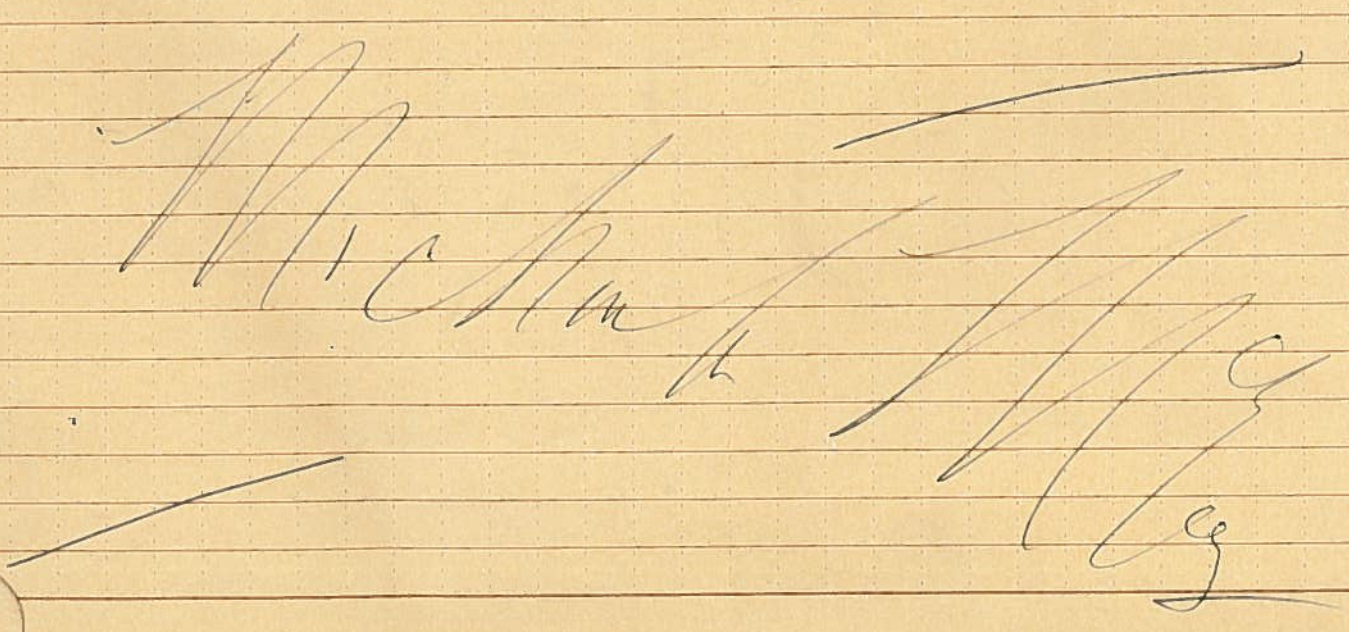
1415 start doing some cross lines across the river where we had already moved through today. Cross check

1627 Sound velocity check 26.7 m

1633 Pulling up multi-beam unit.

1640 Heading back to China Bend launch

1652 Arrive at boat launch. Finishing data transfer activities.



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P34 UCR Sediment Facies Study 10-24-18

Weather: AM Very foggy ~36°F

800 Boats launching. Tailgate safety had a concentration on boating in fog.

819 Launch Discovery. Having a difficult time connecting with Base Station, UCR-2 and CP-4.

824 We have to travel down river before we can connect to CP-4.

852 Arrive at CP-4 to do location check.

908 Complete position check

924 Deploy multibeam unit

930 Cast was complete. Sonar on. Headed to approximately RM 19.5.

1157 Sound velocity cast 24.7 m

1517 Sound velocity cast 17.7 m. Mobing around shallows in the area of transect 62.

1629 Started cross sections on area worked today.

1651 Taking up multi-beam

1653 Mobing to China Bend boat launch

1705 Arrive at China Bend boat launch. completed from approximately RM 719.5 to RM 721. Plan to do ~718 to RM 719.5 tomorrow

1710 Conducting closing activities and data transfer activities

1719 Discovery off of water. All vessels out of water. End of day

p35 UCR Sediment Facies Study 10-25-18

Weather: AM Partly cloudy 39°F

8:00 Tailgate safety with all four boats and crews. Introduced new AECOM staff observer to vessels and operations.

9:00 Positron GPS check at CP-10, base station UCR-2

9:05 Discovery launched. Mobing to approximately RM 721.

9:11 Deploying multibeam unit

9:14 Sound velocity cast 20.5m. moving into shallow inlet around Trasect 62.

1100 finished shallow sections in area ~~bet~~ near Transect 62

1125 Sound velocity cast 16.0. Starting adjacent area

1525 Finishing up shallows around RM 720
Sound cast taken at 14:19 18.7m

1530 Starting to do cross check lines on area done around RM 720

1618 ~~putting the multibeam up.~~ mm Sound cast 21.3m

1624 Starting closing activities and data transfers

1626 pulling sonar / multibeam out for day and transit

1630 Starting to mobilize to China Bend boat launch

1640 Arrive at China Bend boat launch.

1645 Discovery finished 719-721.

1650 Starting to unload boats.

1655 Discovery out of water. FILEs being transfered

1700 End of day. Waiting on Tieton.

Scale: 1 square =

P 36 UCR Sediment Facies Study 10-26-18
Weather: Raining 48°F

800 Tailgate safety meeting at Northport Boat Launch. Talked about Jelk ord roads, new boat launch & weather
845 Boats launching
855 Conducting GPS position check
908 Finished GPS check. Radio check
921 Deploying multi-beam ~~A~~ unit
927 Cast taken (sound velocity) 16.8 m
935 Start sonar
1010 Computer system crashed
1241 Sweeping the shallows and around the islands and rocks where deep enough from trasections 21-24 below Dead Mans Eddy.
1250 Cast (sound velocity) = 13.5 m
1415 sweeping adjacent to rocks on the southern side of the islands in between trasect 22 & 23
1600 Cross lines conducted
1615 Cast (sound velocity) 14.3 m
1627 pulling out multi beam
1632 Heading back to Northport Boat Launch
1658 Unloading boats, removing from river
1705 End of day

Rite in the Rain NSN: 7530-01-577-8866 Scale: 1 square = _____

P37 UCR Sediment Facies Study 10-29-18

Weather - overcast, rain, 40°F Afternoon - 48°F intermittent rain

0715: Daily tailgate meeting at Northport Boat launch. Discuss driving at night & in fog. Road construction south of Northport

0830: Boats launching

0845: GPS Base station check CP07

0850: Radio check

0854: Discovery MoB to RM 736 near Transect 22 ~~upto~~ RD

0903: Deploy Multibeam unit

0911: Sound velocity cast 8.5m

0916: Finishing up shallow sections near RM 737

0917: Start sonar

1050: Raise sonar Completed coverage of shallow sections just south of Dead Man's Eddy.

1055: Start sonar for coverage ~~around~~ among RD rocks in middle of river near RM ~~736~~

1130: Finish passes around Steamboat Rock South side

1135: Start sonar coverage on North side of Steamboat Rock

1230: Complete coverage around Steamboat Rock

1231: Move to section between transects 23 & 24.

1235: LUNCH

1255: Sound velocity cast 15m

1300: Begin sonar coverage downstream of Transect 24 RM 735

1553: Alarm sounds indicating low fuel in generator, fuel added.

1616: Word from [redacted]RD CNI that transducer bracket is exhibiting issues.

1643: Cross Lines conducted

1645: Computer system crashed

1651: Sound velocity cast 21m

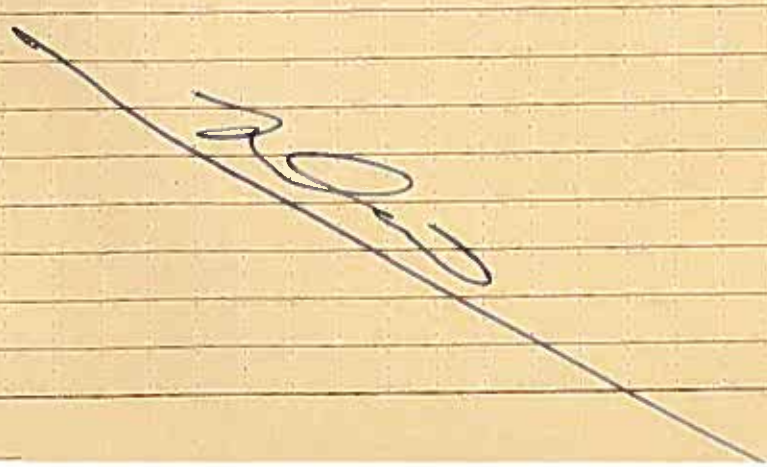
1653: Pull out multibeam

1655: Start closing activities and data transfers

1657: Heading back to Northport boat launch

1700: Unloading boats / remove from river

1715: END OF DAY



Scale: 1 square = _____

P58 VCR Sediment facies Study 10-30-18
Weather Cloudy 42°F
730 Arrive on site. Northport Boat launch
800 Tailgate safety meeting. Talked about deer on road, boat rescue and paying attention to surrounding
823 Launching boat GPS position check. CP-7 Base station VSACT 10 01-99.mm
836 Mobing out to approximate RM 24
846 Deploying multibeam unit
847 Sound velocity cast 11.5m
1021 Finished on 736-736.5. Moving on to 734-735 Cast (sound velocity) 12.5m
1420 Moving around island in 734 area
1547 Starting cross line checks for area just surveyed
1607 Starting roll line checks
1610 pulling sonar out. End of day
1612 Sound velocity check 11m
1615 Mob to Northport Boat Launch
1627 Removing Discovery from water
1700 Boats off of water. Closing activities

Rite in the Rain NSN 7530-01-577-8866 Scale: 1 square = _____

p39 UCR Sediment Facies Study 10-31-18

Weather Raining 39°F

800 Tailgate Safety meeting. Talk about rain, last day complacency, children on roads.

820 Launching boats.

830 GPS position check in at CP-7, Base Station USACE 1001-99.

840 put in multi beam meter.

851 Sound velocity Cast 16.5m

900 Finishing up the shallow areas in between RM 734-736.

1139 Sound velocity cast 9m

1330 Filled in shallows as much as possible just past old bridge around trasect 25 & 26. Could not get up to shoreline due to boulders just under water surface

1351 Sound velocity cast 10m

1544 Filling in areas around Northport dock and island area near dock/boat launch

1620 Conducting cross lines for check

1630 Conducting roll lines

1633 Velocity sound cast 10m

1635 Mobing to Newport boat launch

1700 ~~Sat~~ mmd Boat off water. End of day

Scale: 1 square = _____

PG 4'0 UCR Sediment Facies Study 11/1/18

PDT Weather - 41°F, overcast

0640 - Leave Colville

0730 - Arrive Northport Boat Launch. Tailgate safety meeting

ATTENDEES

RV Discovery	Columbia Navigation
John Schaefer Gravity	Josh Weathcman
Charlie Kellogg Gravity	Rick Wilson
John Stely DEA	GPS BASE STATION
Ragan Driver AECOM	Dave Williams DEA

0810 - Discovery in water

0815 - GPS Position check at CP7 Base station USACE 1001-89

0900 - On way to Dead Man's Eddy after some computer issues.

0915 - DEPLOY MBES

0920 - Sound velocity cast 7.5m

0935 - Begin passes along shore of Dead Man's Eddy.

1335 - Sound velocity cast 12.5m

1555 - Conducting Crosslines

1605 - sound velocity cast 8m

1641 - Conducting roll lines

1646 - Sonar pulled

1647 - Sound velocity cast 10m

1650 - MOB back to Northport Boat Launch

1700 - Arrive Northport boat dock

1715 - Discovery out of water. END OF DAY

11/1/18

11/2/18 UCR Sediment Facies Study #1641

0640 - Leave Colville weather 46°F mostly cloudy no rain
0720 - Arrive Northport Boat Launch
0740 - Tailgate Safety meeting

ATTENDEES

RV Discovery	Colf CD Columbia Navigation
Mike Duffield Gravity	Josh Weatherman
John Schaefer Gravity	Rick Wilson
John Stady DEA	GPS Base Station
Ragan Driver AECOM	Dave Williams DEA

0800 - Discovery in water
0810 - GPS Position check at CP7 Base station USACE1001-99
0837 - Position check complete & passed
0840 - MOB to RM 732
0843 - No connection to satellites. GPS reboot.
0905 - GPS issue ~~Fixed~~ CD diagnosed. Cable is damaged. Return to boat dock to retrieve different cable.
0945 - DEPLOY MULTIBEAM
0950 - Sound velocity cast 11m
0955 - Begin Passes on RM 732-734
1305 - Sound velocity cast 10.5m
1623 - Sound velocity cast 9.5m
1625 - Conducting crosslines
1645 - Continue Sonar passes RM 732-734
1700 - Pull sonar
1705 - MOB back to Northport boat launch
1711 - Arrive Northport boat dock
1715 - Discovery out of ~~the~~ rd water, end of Day

11/2/18

Scale: 1 square =

VG42 UCR Sediment facies Study 11/3/18

0640 - Leave Colville

0725 - Arrive Northport boat launch Weather - 39°F overcast

0745 - Tailgate Safety meeting Afternoon 53°F overcast

ATTENDEES

RV Discovery	Columbia Navigation
Mike Duffield Gravity	Eric Weatherman
John Schaefer Gravity	Josh Weatherman
John Staly DEA	GPS Base Station
Ragan Driver AECOM	Dave Williams DEA

0800 - Launch Discovery

0810 - GPS position check CP7 Base station USACE 1001-99

0825 Position check complete MOB to RM 732-734

0840 - DEPLOY multibeam sonar

0841 - Sound velocity cast 9m

0845 - Begin sonar passes RM 732-734

1206 - sound velocity cast 9m

1620 - Conduct crosslines

1622 - Sound velocity cast 7m

1630 - Continue sonar passes RM 732-734

1640 - Conduct roll lines

1647 - Pull multibeam

1649 - MOB back to Northport boat launch

1700 - Back to Northport boat launch

1705 - Discovery out of water End of Day

11/3/18

P643 UCR Sediment Facies Study 11/4/18

0640 - Leave Colville

0725 - Arrive Northport boat launch

0735 - Tailgate safety meeting

#RD weather - 46°F overcast
Afternoon - 56°F partly cloudy

ATTENDEES

RV Discovery	Columbia Navigation
Mike Duffield Gravity	Eric Weatherman
John Schaefer Gravity	Josh Weatherman
John Sealy DEA	GPS BASE STATION
Ragan Driver AECOM	Dave Williams DEA

0745 - Discovery in water

0755 - GPS position check CBZ Base station USACE 1001-99

0810 - GPS position check complete MOB to RM 732

0830 - DEPLOY multibeam

0831 - Sound velocity cast 9.5m

0840 - Begin sonar passes

1056 - Sound velocity cast ~~9.4m~~ RD 9.6m

1200 - Conduct crosslines

1206 - Sound velocity cast

1215 - Begin sonar passes RM 730-732

1535 - Conduct crosslines

1610 - Sound velocity cast 9.8m

1613 - Pull multibeam

1633 - Arrive back to Northport ~~boat~~ launch

1645 - Discovery out of water End of Day

11/4/18

Scale: 1 square = _____

0645 - Leave Colville
0730 - Arrive Northport boat launch Weather - 38°F overcast
0735 - Tailgate safety meeting

Attendees

RV Discovery	Columbia Navigation
John Schaefer - Gravity	Josh weathermen
Mike Duffield - Gravity	Dan Smith
John Stady - DEA	GPS Base station
Ryan Driver - AECOM	Dave Williams DEA

0750 - Discovery launched
0800 - GPS position check CP7 base station USACE 1001-99
0810 - GPS position check complete MOB to RM 732
0820 - Deploy multibeam
0821 - Sound velocity cast 9m
0830 - Begin sonar passes RM 730-732
1140 - sound velocity cast 9.6m
1300 - Sound velocity cast 9.7m
1356 - Conduct crosslines
1400 - Continue sonar passes RM 731
1538 - Conduct crosslines
1539 - Conduct roll lines
1541 - Pull multibeam
1542 - Sound velocity cast 9.7m
1545 - MOB back to Northport boat launch
1600 - Arrive Northport boat launch
1605 - Discovery out of water End of Day

11/5/18

Page 45 UCR Sediment Mapping Survey 11/06/2018

0715 Arrive at China Bend Boat Launch
Weather: Overcast 37° F, No Wind, No Precipitation Expected

0730 Conduct Safety Briefing, Topic: Weather and What will Shut us Down. The ~~consensus~~ opinion is That The Boat Ramps will not Freeze Until The Temps are in The teens on The snow makes driving Hazardous. Snow is anticipated for The end of The week. Lower temps forecast starting Wednesday

Attendees:
David Hose Aecom
Mike Duffield Gravity
John Schafer Gravity
John Staly DEA
Dave Williams DEA
Josh Weatherman Columbia Nav.
Scott Nielsen Columbia Nav.

0745 Begin Position Check at UCR-3, Base Station at UCR-2
0805 Complete Position Check and Launch Discovery
0815 Discovery departs Boat Launch

Target 715-717 Shoreline
0835 Deploy Sonar into The Water
0840 Sound Speed Velocity 21 Meters
0845 Begin Survey Activities
1200 Sound Speed Velocity Check to 18.5 Meters
1420 Sound Speed Velocity Check to 19.5 Meters
1430 Collect Cross-line survey ~~from~~ at Position ~~along~~ east shore to West shore
Conduct Roll Test survey along same Transverse line
1532 Sound Speed Velocity Check to 17.5 Meters
1535 End Survey Activity and Pull Sonar Head ~~from~~ Water
1600 Discovery out of The Water
1615 Depart Boat Launch
1645 Arrive at Comfort Inn

David T. Hose
11/6/18

0730 Arrive China Bend Boat Launch
0735 Conduct Safety Meeting
Topic: Weather and it's impact on schedule

Attendees
David Rose DOCOM
Mike Duffield Gravity
John Schaefer Gravity
John Staly DEA
Dave Williams DEA
Josh Weatherman Columbia Nav.
Western Sellers Columbia Nav.

0745 Begin Position Check in at UCR-3; Base Station UCR-2
0810 Position Check in Complete
0815 Launch Discovery
Weather: Overcast and Cold (36°F), no Wind
Sunny Skys predicted for the afternoon
0825 Depart for RM 715-716
0845 Deploy Sonar Head into the Water
0850 Conduct Sound Velocity Check #1 To 25 Meters
0855 Commence Survey Activities
0015 Conduct Sound Velocity Check #2 To 21 Meters
1020 Conduct Cross Line Survey
1300 Conduct Sound Velocity Check #3 To 34 Meters
1530 Surveyed Cross Line at upstream of Today's Work Area in RM 717
Surveyed Roll Line at Some Location
1610 Terminated Survey From RM 715-717
Conducted Sound Velocity Check #4 To 24.5 Meters
1615 Pull Sonar Head from Water and Motor to China Bend Boat Launch
1695 Arrive China Bend Boat Launch
Discovery out of Water
1630 All Boats out of Water
1640 Depart for Colville
1715 Arrive at Comfort Inn

David R Rose
11/7/18

0700 Arrive at China Bend Boat Launch
0715 Conduct Safety Briefing
Topic: The Cold Weather and Work Schedule necessary to Complete The Survey to Border
Attendees:
David Hose AECOM
John Schmelter Gravity
John Stoly DEA
Dave Williams DEA
Josh Weatherman Columbia Nav.
Weston Sellers Columbia Nav.

Weather: COLD 25°F, overcast, no Wind, Predicted Highs Low 40s.

0720 Began ~~Base~~ Position Station Check in UCR-3; Base Station at UCR-2
0725 Launched Columbia Navigation Boat
0745 Completed Check in Duration 25 minutes
0750 Attempted to Launch Discovery but water from Launching Columbia Navigation's Boat has frozen to Ramp making the Ramp too Slippery to Risk Launching. We are obtaining Sand to place on the Ramp for Traction prior to Launching
0810 Throttle cable on Port Side Motor Is Frozen and water ports on Motors appear to also Be frozen because Engine are not discharging cooling water.
We are in a holding pattern waiting for the motors to Thaw
0820 Discovery Launched on One Motor. We anticipate that second motor will thaw and become functional soon.
0825 Columbia Navigation Reported That They have lost fuel pressure in one of their Motors
0840 Columbia Navigation is under way
0850 Deploying Sonar Head into Water
Conduct Sound Velocity Check #1 To 18 Meters
0855 Begin Survey Activities
1155 Conducted Sound Velocity Check #2 to 23 Meters
1545 Surveyed Cross Line near RM 119
1555 Surveyed Second Cross Line near RM 118
1605 Surveyed Third Cross Line near RM 117
1610 Conducted Sound Velocity Check #3 To 24 Meters
Pulled Sonar Head from Water
1615 Motored to China Bend Boat Launch

Scale: 1 square = ______

David R. Hose 11/8/18

1625 Arrived at China Bend Boat Launch
1640 All Boats out of the Water
~~1640~~ ~~Both Boats~~
1650 Depart for Colville
1725 Arrive at Comfort Inn

David R. Howe
11/8/18

0600 Team ~~Meet~~ Met in Hotel Lobby to Discuss Weather Conditions (Snow) and Determine a plan for the Day. The decision was to Stand down until 0800 Hrs. at that time we will Move to Evans Boat Launch and Access the Ramp to determine if it is safe to Launch. If safe we will ~~launch~~ pick up the Discovery from Near Northport where it was dropped and Launch.

This was communicated to Jenny Protano of AECOM and Kris McCaig of Teck. Both of ~~those~~ individuals will be notified of the ultimate decision

0700 Based on Icy Conditions at the Boat launch and Concerns that First Responders could not Readily Access the Ramps Should Someone get Hurt we decided to Stand Down for the Day. Weather conditions are predicted to Be improved tomorrow. We will attempt to launch at 0900 Hrs tomorrow from Evans. Forcast is SUNNY and 34°F for that Time

0915 Depart China Bend for Town
0945 Arrived Kettle Falls and Checked in With Jenny Protano to Discuss the plan moving forward

Crew Spent the day in Standby Mode

Don Phipps
11/9/18

0815 Arrived at Evans Camp Ground to Check conditions of Boat Ramp. Ramp is Dry and we decided we can launch
0830 Remainder of Crew arrives at launch and we discussed Weather conditions and Forcast for the next few days.

The consensus of the field crew is that because of the weather we have reached the point that ~~we~~ conducting survey activities beyond today are not safe due to conditions on the Northport Boat Launch. I contacted Jenny Protano to inform her of the situation. She will contact Teck to discuss shutting down the program.

0840 Conducted Safety Meeting
Topics: Weather Conditions and Schedule
Weather today: Overcast, 31°F, no wind, Snow on the ground throughout the Region

Attendees
David Hose Aecom
John Schaefer Gravity
Charlie Kellogg Gravity
John Staly DEA
Dave Williams DEA
Eric Weatherman Columbia Nav.
Weston Sellers Columbia Nav.

0850 Launch Boats
0900 Depart Boat Launch for China Bend to conduct Position Check in
0945 Arrive China Bend Boat Launch for Position Check in at CP-10
Base Station Established at UCR-2
0949 Complete Position Check in
0955 Depart from China Bend Boat Launch
1005 Arrive at work area and Deploy Sonar Head into the Water
Conduct Sound Velocity Reading #1 to 16.5 Meters
We are Experiencing Problems with the GPS and cannot get a Position fix on the Boat
1030 GPS Problem now Resolved and Beginning Survey activities
1325 Conduct Sound Velocity Reading #2 to 17.5 Meters
1440 Conduct Pitch/Roll Tests
1500 Conduct Sound Velocity Reading #3 to 11 Meters
Conduct Bar test

UCR Sediment Facies Mapping Survey 11/10/18

1505 Resume Survey Activities
1600 Complete Survey Activities
1605 Conduct Velocity Test # 4 to Motors
Pull Sonar Unit from the Water
1610 Motor To Evans Campground Boat Launch
1630 Arrive Evans Campground Boat Launch
1640 All Boats Out of the Water
1645 Depart Evans Campground for Comfort Inn
1715 Arrive Colville

Daniel R. Haug
11/10/18

scale: 1 square = _____

8 July 2019 Sediment Facies Mapping Project P.1
Upper Columbia River, WA
Notes by Jennifer Pretare for 2019 Field work to complete MBES data collection from RM 738 to International border (RM 744)

Weather check for Northport today: High 80° F, low 69° F. 50% chance of rain. Rest of week should be in the 80° F's.

USGS Gage at International Boundary
Height is currently ~103 feet
Discharge is currently ~ 92,900 Cfs

0800: Team meeting at Comfort Inn, Colville
AECOM: Jenny Pretare
Gravity: John Schaefer, Rene Trudeau
DEA: John Staley, Dave Williams
CNI: Eric Weatherman, Josh Weatherman

Tasks for this morning.
Fuel in boat
Base equipment set up. New Yorder or UCR-~~2~~ 4 JP.
Check point. CP-7 or Black Sand Beach (CP-9)
DEA look at points for base station
MBES - do another patch test if time } on water
Bar Check

Reviewed permits + permissions - updates for 2019.
Reminded Dave W + John Staley that if any survey points need to be re-set, that we need to stop + call Sarah McDaniel for Cultural Resource clearance.

Handed out updated contact list + numbers

Reviewed water elevation + flow.

H/S: Lightening / thunder - park for 30 minutes + wait
Extra boat traffic for fishing

Rite in the Rain. NSN: 7530-01-577-8866 Scale: 1 square = _____

H/S - continued
Talked extensively about PFDs - ~~risk~~ update to Tecks policy for manually inflated PDFs. Discussed risk from getting trapped in cabin vs immersion + not inflating PFDs.
Examples of previous experience on water work.

Discussed no cell phone use in car.

Shallow water - risk to equipment / sonar head.
Keep sonar on opposite side of bank to keep in deeper water.
Large boulders more likely further upstream
Eric to scan for submerged features

0900 - Group breaks up.
Base station today: Try New Yorder first
Plan is to recover at Northport boat launch at noon.

1242 - Field team at Northport Park.
DEA ~~SF~~ set up base station at New Yorder.
Begin assembling sonar pole + mount on RV Discovery.
CP-9 at Black Sand Beach was undisturbed.
1255 - Setting up GPS antennae and connecting sonar cables.
1300 - Base station at New Yorder ~~doesn't~~ is too far away to connect to sonar at Northport Boat launch. Dave W. going to antenna set up a repeater
1320 - John Staley "turned on" the II imagery station that will be attempted on 7/11/19, in the GPS display.
1352 - Launch RV Discovery and CNI support boat.
1404 - Depart Northport. Sonar computer still not talking to base station so we are going to CP-9 to check in.
1420: H/S Observation: Discovery was taking on an unusual amount of water on the back deck. We ~~turned~~

turned around & went back to the boat launch to check the integrity of the boat. All seems well— internal compartments are dry.

~~1422~~ 1424 - resumed trip to CP-9
1444- Arrive Black Sand Beach + CP-9.
1452- Took GPS point at CP-9 accuracy is good.
1502 — Depart CP-9, head back to DME AOI to check Imagery locations
1515 - Arrive DME AOI

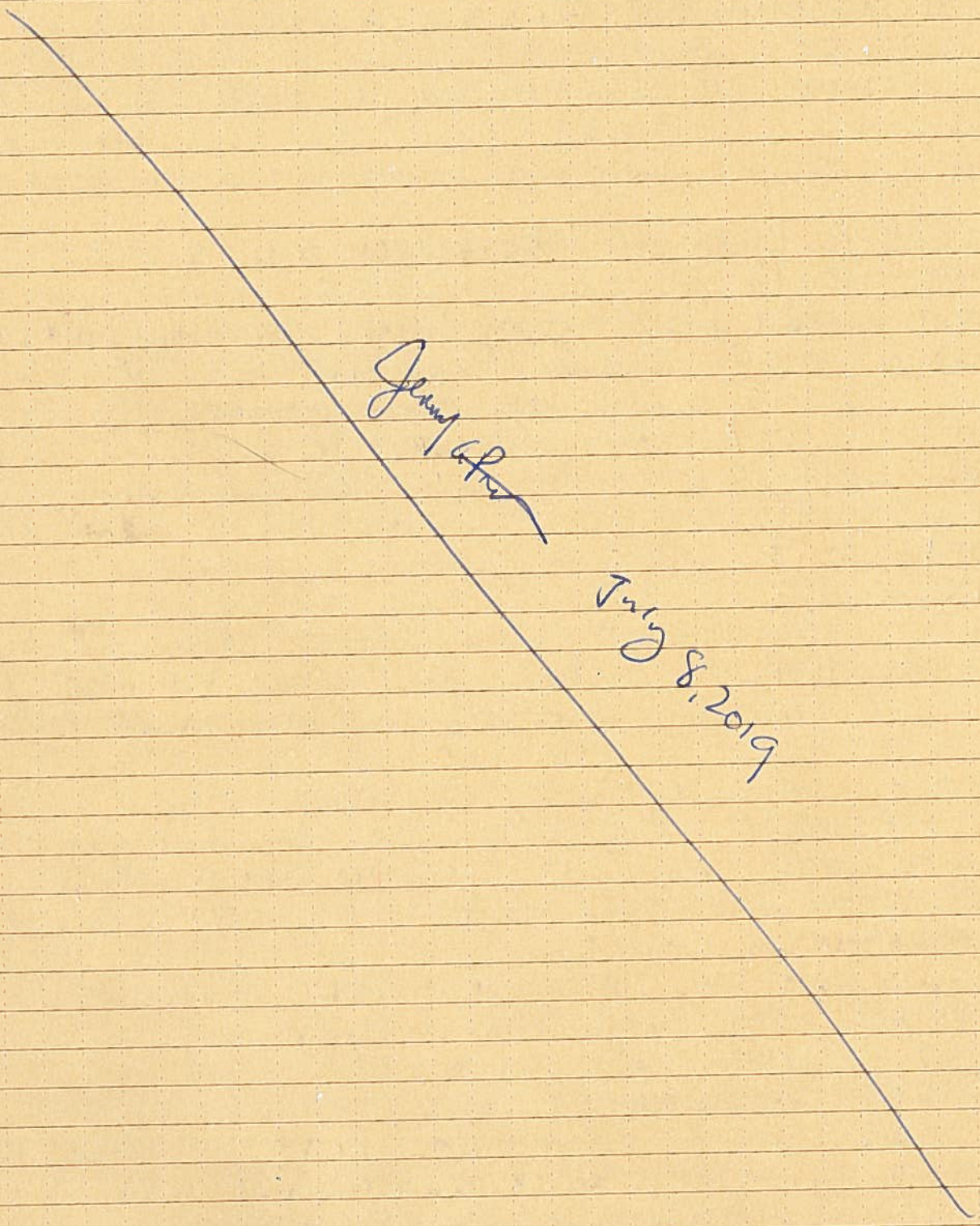
Image Location	Depth (ft)	Notes/Observations
Q13-Q1	10-12	Can likely collect imagery
Q13-Q9	27	very strong current; over 5ft/sec but can probably collect data/image
Q13-1Q	15	same as Q13-1Q
Q15-1Q	14	Can likely collect imagery
Q18-Q1	5-7	Can likely collect imagery
Q18-Q2	9-10	Can likely collect ~~data~~ Imagery
Q18-Q8	18	" " " "
Q18-Q9	9-14	" " " "
Q18-1Q	15	" " " "
Q19-Q3	7	" " " "
~~Q2Q~~ -1Q	~~11-12~~ JP. 7.5	can likely get this one, but might not be exactly on station, might be a little off station.

1604 — Finished collecting information on 11 imagery stations. Headed to DME AOI to put the Sonar Head in the water to check that it's working correctly for tomorrow

~~15~~ 16: Deployed sonar head.
1624: Sound velocity cast
1637: Patch test begin
~~15~~ 1700 patch test + sonar over Deadman completed. All sonar equipment is working correctly.
1702- Sonar head retrieved + stowed.
1706- CP-9. Dave W. break down base station
1709 — J. Staley gave me hard drive w/ all data except Base station (get from D Willing).

8 July 2019 Sediment Facies Mapping
UCR

1720 back to Northport Dock



9 July 2019 Sediment Facies Mapping UCR

0730 Northport Boat Launch
AECOM: Jenny Pretare
DEA: John Staley, Dave Williams
CNI: Eric Weatherman, Josh Weatherman, Jack McCotter
Gravity: John Schaefer, Rene Trudeau

Weather: clear + sunny. Light wind, 60° f going up to ~80° f by mid afternoon. Large stonefly emergence @ Northport. Water = 62° F
0745: Gave Jack M. Cultural resource briefing + reviewed HASP with him.
Field team tailgate. Review day before → water intake on Discovery has been resolved. Discussed boat to boat transfer procedure for bathroom breaks. Talked about equipment in fast water.

0815 - Launched boats, Dave W. left to set up base station and repeater.
0900 - 0915 Control point check in at CP-7.
0915 - Depart Northport boat launch.
0932 - Deploy sonar head.
0938 - Sound velocity check #1 to 10 meters
0943 - Begin logging MBES data.
covering ~ 738.5 to 740.
1112 - Stop logging MBES
perform sound velocity check #2 to 15 m.
1115 - Resume logging MBES data
1200 - Temperate = 80° F.
1335 - Sound velocity CHECK # 3 to 12 m.
1633 - Completed MBES data collection
1636 - Sound velocity check # 4 to 12 m.
1637 - Roll calibration to check alignment
1640 - pull sonar head out of water.
1650 - Told D. Williams to disassemble base station
1700 - Return to Northport boat launch.

Jenny a Pretare
7-9-19

10 July 2019 Sediment Facies Mapping
UCR

H/S: Rain today. No thunder/lighting predicted but if it occurs we will stop work for 30 minutes (at least).
Denise Yee on MBES boat this a.m., extra training for her.
Logs in water
Boat to boat transfer
more fishermen as week goes by.
RM 740-741 → no particular known underwater hazards
Docks slippery today?

0730 at Northport Boat Launch
AECOM: Jenny Pretare, Denise Yee
Gravity: Rene Trudeau, John Schaefer
CNI: Josh Weatherman, Jack McCotter, (Dennis Gross not on boat)
DEA: Dave Williams, John Staley

Weather: Raining in am ~ 60° F.
Should clear in p.m.
0810 - Launching boats
Above notes by J. Pretare, the D. Yee below.

0850 - Vessel Check point in CP-07
0853 - Depart Northport Boat Launch
covering ~740 - 741
0910 - Deploy sonar Head
0918 - Sound velocity checks/cast #1 @ 12m
0921 - Begin logging MBES data
covering ~ 740 to 741
1121 Sound velocity check #2 @ 13m
1225 : J. Pretare transferred to Discovery; D. Yee transferred to CNI boat & then back to Northport boat launch.
1452 sound velocity check #3 7.5 m.
weather - warm ~ 75° F, partly cloudy
1709 SVP #4 8m
1712 Recover multibeam sonar.
1730 Arrive @ boat ramp.

Jenny Pretare
July 10, 2019

11 July 2019 Sediment Facies Mapping
Upper Columbia River

Sunny, scattered cloudy right now. 62° F. Will get to mid 80's this afternoon.

AECOM : Jenny Pretare
Gravity : Mike Duffield, John Schaefer
CNI : Josh Weatherman, Jack McCotter
DEA : John Staley, Dave Williams

H/S Briefing at 0730.
Deer, geese in road
More traffic due to fishing derby
Last night there was a traffic fatality - head on collision.

Objective for today - fill in coverage at Deadmans Eddy AOI.

Notes by John Staley:

0853 Underway to DME

Weather: Sunny and warm.

0908 Bar Creek
0919 Sound Speed cast 001 10 m
1109 Sound Speed cast 002 12 m

1257 weather Partly cloudy.
1400 Sound speed cast 003
1634 Sound speed cast 004
1625 Roll patch Lines
1645 Recover multibeam, return to boat ramp.
1700 Arrive @ boat ramp.

Jenny Pretare
7-11-19

15~~0~~ July 2019 Sediment Facies Mapping UCR

Capt. John Schaefer, Pete Jenkins, John Staley, Dave Williams, Jack McCotter, Cary Kindbeg

HS: Overcast, 60°, slight chance of rain.

0745: Begin tailgate at north port
introduce Cary to boat discovery & Pete Jenkins to HES

0850: GPS checkin at CP07, Base Station recieved w/o repeater
Discovery & ~~0~~ seeing eye mob to site
Deploy multibeam

0937 CI sound velocity check 8m

0940 Logging data - Sonar

1057 Sound velocity 8.5m (27.5f)
Logging data

1247 Started raining

1303 Fill in some tiny gaps

1330 Velocity Sounding 6m

1405 Begin shoreline passes east side

1427 Velocity Sounding 8m

1452 Rain stopped, shoreline pass west side

1528 Temp check / Sound Velocity

~~1627~~

1627

1665 End survey Finish 741-742

1656 Velocity sounding

1658 Pull Sonar head

1700 Call Dave Williams to tear down base station

1720 Arrived Boat Ramp

1735 All boats out of water

July 15, 2019

16th July, 2019

CAPT. JOHN SCHAEFER & PETE JENKINS [GRAVITY] JOHN STALEY & DAVE WILLIAMS [DEA] ERIC WEATHERMAN & JACK McCOTTER & STEVE BRUCHMAN [CNI] CARY KINDBORG [AECOM]

WEATHER AT NORTHPORT BOAT LAUNCH – 60° PARTLY CLOUDY @ 0800

AT TAILGATE MTG TALKED ABOUT A MOOSE COW SEEN ON WILLIAMS RD, DEER & TURKEYS. YESTERDAY MANY WOOD LOGS WERE A LITTLE HARDER TO SEE POSSIBLY DUE TO SUNLIGHT DIFFUSED FROM CLOUDS – PLUS RIVER HEIGHT CHANGES NOTICED (VERIFIED BY CAPT SCHAEFER). ALSO DISCUSSION OF INT'L BORDER AND OUR WORK.

LOTS OF SWALLOWS HITTING WATER SURFACE.

0840 CHECK-IN AT BLACK SAND BEACH (CP-9) TOOK GPS ANTENNA TO NAIL IN ROCK.

0850 INVESTIGATING N OF CHECK-IN, TOUGH WATER AND ROCK OUTCROP HAZARDS

0857 LOWER SONAR HEAD, HAVE PLAN FOR STARTING ABOVE TRICKY AREA, FAR N. ENOUGH TO MAKE TOMORROW'S TRANSITION SAFE, AND DO THE TRICKY STUFF WITH FRESH NERVES.

0902 VELOCITY SOUNDING 5m

0905 · STALEY EXPANDED MATRIX TO ACCOMODATE NORTHERN EXPANSE – – THIS EXPANSION WILL GIVE ENOUGH ROOM TO CONTROL BOAT IN ABOVE "PICKET FENCE" ROCKS AND FOR TURN AROUNDS TOMORROW

0907 START SURVEY

0925 STALEY REQUESTED CNI TO CHECK FLOW SPEED; ~6.5 KNOTS

0940 – WEATHERMAN'S BOAT WENT THROUGH SOME 'MILD' HARDER STUFF. 6-17 FEET DEEP. RAPIDS MAY PRESENT NON-SONAR FRIENDLY ANYWAY. PLAN TO EXPLORE ON OUR 3rd SWATH.

1020 CAPT SWITCH, JENKINS. DOING EAST SIDE, S. OF RAPIDS.

1028 ON ALERT – SEEING CLOUDS.

1100 CLEAR ON LIGHTNING ALERT

1200 STILL HITTING NEAR EDDY. UPSTREAM AGAINST STRONG CURRENT SLOW.

1215 CALLING IT QUITS ON THE BIG EDDY. WE'VE DEFINED THE EDGES – STARTING TO GET DIMINISHING RETURNS, GETTING TIRED OF FIGHTING WHIRLPOOLS, CURRENT, ETC.

1318 SOUND VELOCITY CHECK 8.5m

1531 AWARE OF POSSIBLE THUNDERSTORM. ON ALERT.

1540 STARTING EAST EDGE, SPOTTED LARGE LOG COMING DOWN.

1705 CALLED DAVE W/10 MIN WARNING, PULLING SONAR

1715 HEADING FOR DOCK

1735 BOATS OUT OF WATER

1750 FORMS

July 16, 2019

17TH JULY 2019

CAPTS JOHN SCHAEFER & PETE JENKINS (GRAVITY) JOHN STALEY & DAVE WILLIAMS (DEA)
JOSH WEATHERMAN & JACK MCCOTTER (CNI)

HS. 0730 BEGIN TAILGATE - OVERCAST 57°, WATER CFS DOWN TO 93K FROM 110K TALKED ABOUT LIGHTNING EVENT -, WENT OVER ~~EA~~ SAVE MANEUVRES IF DISCOVERY ~~LO~~ WERE TO LOSE POWER IN RAPIDS - MAIN 2 CHOICES WOULD BE CNI COME UP SIDE OF DISCOVERY - OR GO DOWN STREAM AND DO A CATCH MANEUVRE. ALSO MAN OVERBOARD REFRESHER PLAN IS TO START WITH SHORE, NW SIDE OF YESTERDAY'S MILE. RIGHT AT A PERSON'S DOCK, ACROSS FROM RAPIDS.

0800 BOTH BOATS IN WATER. CNI CHECKED OIL - NOTICED DIF WHEN STILL ON TRAILER. GOOD TO GO, HEADING FOR BLACK SAND B.

0830 CHECKIN AT BLACK SAND BEACH, 1 MIN. CP 9 CONFIRM CFS LOWER TODAY.

0844 SVCHECK AT 10M, SONAR LOWERED, CONFIRM WATER ~8"-12" LOWER

0847 BEGIN SURVEY ON SHORE ABOVE RESIDENTIAL DOCK.

0854 SEEING EYE REPORTS LARGE BOULDERS ~80 FT FROM WEST SHORE, 4 FT UNDER WATER SURFACE, JENKINS ON BOULDER WATCH FOR THIS. LOTS OF BOIL, AND LARGE BOULDER-LIKE OBJECT 10ft UNDER.

0905 CAN SEE BEGIN OF POOL BELOW BORDER.

0927 CALL W/ PRETARE - TEAM AFFIRMS BIG PICTURE COMPLETENESS OVER MINUTIA WITH RESPECT TO TIME. CREW IS ON BOARD WITH THIS.

1045 NOTING BOULDERS, COMM W/ WEATHERMAN ON USGS GAGING AREA HAZARD.

1046 SAFETY OBSERVATION - 2ND CAPT ON BOULDER WATCH FREQUENTLY COMES IN AND LOOKS AT ON-SCREEN CHART TO RETRAIN EYES ON WHAT THE HAZARDS ARE (~~BE~~ BOTH PROGRESS ON SONAR PLUS NOAA CHART)

1050 STARTING TO RAIN

1109 SOUND VELOCITY CHECK ~3.5 m (IN MIDDLE OF CHANNEL)
BOAT CAPT NOTICE BOIL PATTERNS, SHAPE CHANNEL, BEDROCK SHORE MAKES SENSE ~~HIGH~~ IN MIDDLE OF RIVER.

1112 RAIN INCREASED INTENSITY, STARTED DOWN MIDDLE OF CHANNEL ~~GO~~ MOSTLY DONE ON WEST SHORE, ~~HE~~ SWITCH CAPT HEAD FOR E. SHORE

1217 RAIN STOPPED

1247 - SVC

1315 GOING UPSTREAM (MOWING THE LAWN) PILOT EMPLOYS AUTO PILOT. WITH THIS CURRENT PILOT NOTICES THIS IS A BIT MORE SMOOTH THAN HUMAN IS.

1600 NOTICE ~12 INCH RISE IN WATER FROM THIS AM, MORE LOGS NOTICABLY

1620 @ SVC -, @ CALL THE DAY, @ PULL SONAR YEU, CALL DAVE W/ 10 MIN WARN

1627 - CFS 103K, CALLED DATA MANAGER THAT WE'RE HEAD LAUNCH

1640 - HIT DEAD HEAD NEAR DOCK. INSPECTING FOR DAMAGE, NOTHING OF NOTE.

1646 - CALLED US BORDER PATROL TO GIVE THEM A COURTESY CALL OF OUR INTENDED ARR.

1700 - ALL BOATS OUT OF WATER.

July 17, 2019 GK

18th July 2019 RM 743-744 (INT'L BORDER)

0725 MEET AT NORTH PORT BOAT LAUNCH 54° MOSTLY SUNNY (RAIN IN FORECAST)
CAPTS JOHN SCHAEFER & PETE JENKINS (GRAVITY) JOHN STALEY & DAVE WILLIAMS (DEA)
ERIC WEATHERMAN & JOHN McCOTTER CNI BOATS: R/V DISCOVERY & CNI

0730 BEGIN TAILGATE, TALK ABOUT TODAY'S PLAN, ESPECIALLY ISLANDS NEAR BORDER. WEATHERMAN WENT OVER MANEUVRE PLAN FOR RESCUE. TALKED ABOUT LIGHTNING PLAN. SAFETY MOMENTS TALKED ABOUT BATS AND RABIES, WILDLIFE ON ROADWAY, LOOSE WOOD IN WATER.

0800 BOATS ON WATER & HEAD FOR BLACK SAND BEACH & CAPTS BOTH ON HIGH LOG ALERT. [ALSO TALKED ABOUT BORDER APPROACH]

0825 CHECK IN AT CP-9 1 MIN. FISHERMEN ON BLACK SAND BEACH

0835 DROP SONAR, SOUND VELOCITY CHECK 30m

0840 START ON RIVER LEFT, CFS STARTING 85-90k, EXTRA BOULDER ALERT FIRST PAINTING SHOWS BLACK ON LEFT, GREEN ON RIGHT (THIS MEANS VERY STEEP?)

0855 SCANNED LEFT, FERRIED ACROSS & RECON BAR. LEFT RIVER SEEMS TO BE WHERE MAIN FLOW IS, SD CAPTS/HSur AGREE ATTACKING THIS SIDE BEFORE FLOW RISES AGAIN. * NOTE NO CELL SERVICE

~~1055~~ 0945 SOUND VELOCITY CHECK 10m

1045 - LOTS OF DANGEROUS ROCKS, WHITE WATER, 25+ MPH GUSTS, HIGH CURRENT WEST LOBE A COUPLE LARGE LOGS IN AREA, PLUS A DEAD HEAD. THE BANKS ~~AN~~ ARE MOSTLY BEDROCK - WHICH EXTENDS INTO RIVER. JUST SOUTH OF THE ISLANDS ARE LARGE COBBLE AS WELL.

1100 MAY HAVE TOUCHED INTL BOUNDARY ON WEST LOBE OF ISLANDS, GOT UP TO EDGES IN THERE WHERE WE COULD. WIND IS MAYBE 10-15 MPH NOW, FORECAST FOR ~~BE~~ GETTING WORSE AROUND 1300. WE'RE FOCUSING ON GETTING DATA WHERE THERE IS SEDIMENT, AND NOT FOCUSING ON THE ROCKIER/BEDROCK AREAS - WHERE IT IS MORE DANGEROUS ANYWAYS. "SHADOWING" IN DATA ELUDES TO BOULDERS.

1135 NOTICING WATER LEVEL DROP. SAND BAR APPEARED ON TURN AROUND NEARSHORE. LOTS OF COMMUNICATING BETWN HYDOG/CAPT - LOTS OF ROCKY SHORE - BEDROCK

1155 ALSO 'SEEING' VEGETATION IN ONE SPOT TO EAST OF SANDBAR

1203 SOUND VELOCITY CHECK IN DEEP AREA 10.5 m

1250 JUST E & S OF CENTER ISLANDS IS THE STRONGEST CURRENT, LOTS OF BOILS - AND NOTICEABLE SURFACE ELEVATION CHANGE. EDDIES. CAPT SAYS STRONG ENOUGH TO FLIP.

1355 SVC 10m CAN MOVE TO FILLING IN E SIDE. WATER XING IS A FORCE!

1440 END OF WORK AT 744.

1454 PATCH TEST - ALIGNING SONAR SYSTEM TO NAVIGATION SYSTEM TO CHECK INERTIAL. 3 LINES.

1520 HEADING BACK TO NORTH PORT BOAT LAUNCH.

1538 BOTH BOATS ARRIVE AT BOAT LAUNCH. PLAN IS TO DISMANTLE DEAS SONAR, GPS AND COMPUTERS AND LOAD INTO STALEY'S TRUCK.

1705 ALL CREWS HAVE LEFT BOAT LAUNCH. July 18, 2019 [illegible]

Sediment Facies Mapping #3

Rite in the Rain®
ALL-WEATHER
UNIVERSAL
№ 973T-MX

Teck American — Nicky Moody (NM)

10-02-2018 — R/V Tieton - Sediment Facies Mapping, Upper Columbia River. RI/FS

LogBook - Nicky Moody, AEcom - ADCP/Imagery Vessel

0730 Evans Campground boat ramp -

0750 Walk to dock at Evans; Tailgate meeting lead by Jenny Pretare, AEcom

Attendees for tail gate.

* Nicky Moody, AEcom - R/V Tieton → Field supervisor + Site Safety Officer.
Josie Smith, AEcom - R/V Discovery.
* Shawn Hinz Gravity - R/V Tieton
Jeff Wilson Gravity - R/V Discovery
Eric Weatherman, Columbia Navigation - CNI 1 - watch R/V Discovery (Captain)
* Patrick Miller, USGS - R/V Tieton
* Marylyn G. Jacobs - R/V Tieton
Dave Williams, DEA - Base station lead - Evans = today's station
~~Rick~~ Wilson, Columbia Navigation - CNI 1
Joseph Graves, Columbia Navigation - CNI 2 - watching R/V Tieton (captain)
Josh Weatherman, Columbia Navigation - CNI 2 (Captain)
* René Trudeau, Gravity - R/V Tieton (Captain)
Mike Duffield, Gravity - R/V Discovery (Captain)
* Ryan McElrece, Gravity - R/V Tieton
* Maggie McKeon, Gravity - R/V Tieton
~~*~~ John Staly, DEA - RV ~~Tieton~~ Discovery
Tim McClinton, DEA - R/V Discovery

Weather in am = ~ 50°F; partly cloudy. Change of rain at 10 am; wind?

0848 Gravity & DEA setting up boats

1050 On board Tieton for equipment checks. - Camera calibration 1st.

1055:36 focus check complete. - Test image in focus @ (18:55:36 UTC) (SH + RM)

1100 Laser measurement. ~~0 ft + 2 6~~ NM 1.26 ft = distance b/t 2 laser

Camera settings = Shutter Speed = 1/250 s NM ~~Focus~~ F = 8.0 ISO: 100 Ø = exposure adjustment

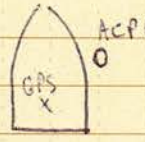
Canon Rebel T7i = Camera type. [Image setting = RAW + L]

Image size of Still Image = 2.65 feet x 1.85 feet.

1107 10-Sec video completed test. - In focus ✓ * Wind speed increase

Platform height. - 2.9 feet. ; 2 sec delay on video camera.

1140 GPS vs. ADCP offset - MN putting in offset into Laptop.



NM

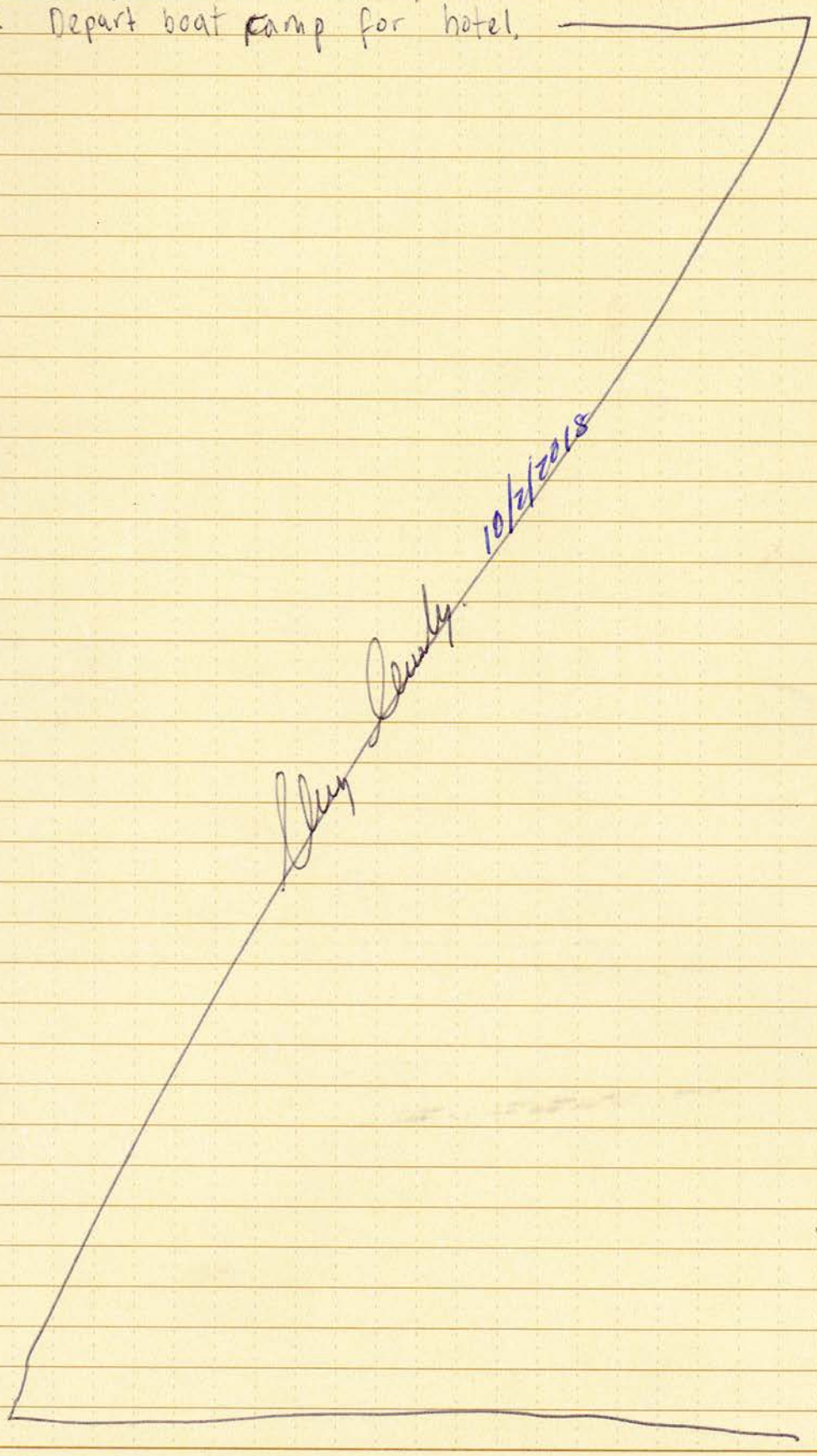
1200 NM contacted Dave Williams at Base Station "EVANS". Checked in.

Ley Staly NM

1244 R/V Discovery on water.
1247 R/V Tieton on ~~water~~. - NM
1251 CP-2 Control Point check at Evans boat ramp.
Used RTS antenae. ~~ARP~~ 6.53 feet.) - Good corrections.
From Tip to ARP = measure reference point.
1301 R/V Tieton on water. - motor to dock w/ Discovery.
1340 R/V Discovery departs dock to start work.
1352 Re-calibrating camera as battery ran out; No change w/ laser
[2208:58 UTC] - Re cal focus 1/320 s F9.0 ISO 100 F-Stop
=1408] Syncronized time on camera to vessel using UTC
Image = IMG_0023.RAW
1422 Video test footage again. 10 sec. - Audio ℄ work.
1424 another Video ~~test~~ footage. HDPVR_20181002-212342.ts
1428 - RM + NM realize UTC time on camera 1 hour ahead. - re cal time. IMG-0023.RAW as 1 hour ahead.
[2130 UTC] Test Image w/ clock corrected. IMG_0026.RAW
=1430 NM-F 1/320 s F8 ISO 100
1430 ADCP Compass calibration - vessel spinning ∠ 1° ✓
1442 Calibration complete within 1 degree. = 0.9°
1445 A-frame going up. for camera deployment.
Transect 86 Station 03 086-03 = Station ID.
1517 Dropping anchors at above station. - moved location off shore as too shallow at the station. Need 5-2 feet w/ ADCP head deployed.
1530 MM operating ADCP computer. - Wind moving vessel around even with anchors.
1558 GPS issue so ADCP not functioning RTK - GPS thinks we as moving 50 ft in our swings when we obviously are not.
1624 GPS now functioning but ADCP laptop is not seeing the GPS.
1654 Camera frame being deployed - SH on deck; RM watching monitors. 53 feet is water depth from bow sonar.
1657 on bottom. 3 images collected → Camera still photo image is not set correct as image is not clear. - on monitor looked like green w/ red dots.
1658 Recording [HDPVR_2018102_2357.mp4] video.
1700 Stop video; when retrieved camera found ↓
1703 Deploy Frame again. ; Images looked ok on camera + phone
1703 on bottom now with light on.
1705 (0005 UTC) collected 3 additional images with light on. looks visible on computer monitor. Bottom is in focus.
GPS E-2317114.28 North-630749.90 - 130 feet off target towards East and 086-04. 1707. Retrieved camera from bottom.
1723 Pulling anchors + ADCP.
1738 R/V Tieton at dock. at Evans. NM

Scale: 1 square = _____

1757 R/V Tieton back to boat ramp. ; raining & wind pickup slightly
1804 R/V Tieton on trailer. at Evans boat ramp. NM + RM doing image download process. JS collected backup from R/V Discovery on hard drive.
1825 RT provided download of GPS RTK data.
1852 Depart boat ramp for hotel.



Page 4 | 10/3/2018 | R/V Tieton | Teck American | Nicky Moody (NM)
Imaging + ADCP Tasks | Upper Columbia River RI/FS
AECOM | Sediment Facies Mapping.

0730 NM, JP, JS onsite at Evan Beatramp.
CP-2 Target ~~Easting~~ coordinates [N = 632266.570 E = 2319793.238] (Elevation Z = 1289.489)
Josie Smith, AECOM, MBES, R/V Discovery
Nicky Moody, AECOM, Field Supervisor / SSO, ADCP + Imaging, R/V Tieton
Jenny Pretare, AECOM, PM on shore.
R/V Tieton = René Trudeau, Gravity, Captain. Shawn Hinz, Gravity, principle
Maggie McKeon, Gravity, ADCP Lead
Ryan McNeece, Gravity, Imaging Lead
Marlyiln Gauthier, ~~Jacobs~~ NM Jacobs, EPA observer.
Patrick Miller, USGS
R/V Discovery = Mike Duffield, Gravity, Captain.
Jeff Wilson, Gravity
John Staly, DEA MBES Lead w/ Tim McClinton
On Shore = Jenny Pretare, AECOM
Tim McClinton, DEA
Dave William, DEA - Base Station EVANS.
Weather = 34°F in AM (clear); very slight wind. forecast = 30°F - 60°F wind 3-5 mph with gusts to 10mph, No rain.

0830 CP-2 control point check for R/V Tieton complete
(1530 UTC) N = 632266.59 E = 2319793.27 V = 1284.96 ↓ Actual.
CNI1 = Eric Weatherman, Columbia Navigation
Rick Wilson, Columbia Navigation
CNI2 = Josh Weatherman,
Joseph Graves,
0832 Tieton ~~tourtes~~ NM heads to dock from ramp
0840 NM + JS at dock; 0900 Tailgate meeting Lead by NM.
0920 Discovery Left dock.
0937 RM indicated for CP-2 check in offset was at the ADCP location.
We will do 2nd check at end of day.
We have 3 offsets 1) Control pt; 2) ADCP; 3) Drop Camera
~~1000 R/V Tieton off dock~~ NM 0940 ADCP Deployment complete. ↓ offset = 2.6'
1005 R/V Tieton off dock.
1010 ADCP Compass Calibration. Error = 0.05° - Double check - 2 spins.
Water conditions = excellent, barely a ripple.
1030 086-08 Station ADCP Collection UTC 1730-1739 - MM
1039 Finish collection; low velocity - slack H2O Water depth = 18.5' From bow sonar
SH + RM setting up Camera.

Nicky Moody NM-

Scale: 1 square = _____

Page 5 | R/V Tiaton | Drop Camera + ADCP | 10/3/18 NM

1047 (1747 ~~UTC~~ NM UTC) Start at Station 086-07 w/ ADCP
1052 stop collecting pts for 086-07. N = 631182.73 E = 2318725.54
1050 (1750 UTC) Image Calibration (IMG_0400; 1/160 F=6.3, ISO-100 Lasers = 1.25' distance) + Added NM ~~External~~ external battery supply to DSLR.
1102 Starting 086-06 ADCP Water Depth = 83.90 ft.
1108 (1806 UTC) Finish. 086-06 N = 631042.98 E 2318157.04
1118 (1818) Start logging 086-05 ADCP Water Depth = 84.2 ft
1121 (1821) Finish collection at 086-05 N = 631005.54 E = 2318006.14
1128 (1828) Start collection 086-04 Water Depth = 80.8 ft
1133 (1833) Stop collection. 086-04 N: 630973.38 E 2317876.36
1143 (1843) Start collection 086-03 water depth = 60.9 ft
1146 (1846) Stop Collection 086-03 N: 630816.10 E: ~~630~~ NM 2317231.69
Windriver 2 Soft ware - Not doing well w/ GPS. with bottom track. Deviation issue currently. As River bottom not moving we can proceed. Switching to high resolution mode as shallower water - 086-02 from NM ~~8~~ 11 to 8 mode. = Water modes for diff NM depths.
Deviation from 10/2/18 - at 086-03 video was ~~not~~ collected from time at bottom only. Not from deployment on deck to retrieval on deck.
1215 (1915) Start Collection 086-09 for ADCP. water Depth = 23.7 ft.
1223 (1923) Stop collection 086-09 N = 631357.34 E = 2319445.35
086-02, 086-01 - too many weeds for ADCP.
1233 (1933) Start collection 086-10 for ADCP. - weeds present ~~interrupting~~ NM interrupting readings. water depth = 12.5ft
1243 (1943) End collection. N = 631446.01 E = 2319803.21.
1248 Bathroom break at Evans campground dock.
~~Datum - NAD83~~ NM
1332 Switching to Imaging NM ~~Transect~~ 086-10 Station.
1336 (2036) Start video; weeds visible. RM + SH operating drop camera
1339 (2039) Collect bottom images (setting for 300x images)
1341 (2041) Frame back on board; video Stopped.
E, 2319803.27 N: 631445.34; 12.50 ft = water Depth.
1355 (2055) On station 086-09
1357 (2057) start video. water depth = 21.6 ft
1358 (2058) on bottom - stirred up sediment - wait 4 mins
1402 (2102) Collect images - weeds visible E = 2319444.26
1403 (2103) On deck. w/ silt. N = 631356.17
1409 Motoring to station 086-08
1410 (2110) start video
1411 (2111) In water
1411 (2111) On bottom = weeds + silt (shorter weeds) NM

[Page 6] 10-3-2018 R/v Tieton NM

1412 (2112) Collected Images at 086-08
E=2319087.61 N=631265.09 Water depth = 19.3 ft.
1414 (2114) Drop camera back on deck.
1419 (2119) Arrive at 086-07 ; start video.
1421 (2121) Drop camera on bottom, Collect images. -
E=2318727.65 N=631177.86 20.3 ft = H2O depth.
1424 (2124) Back on deck ; video off.
1425 Motor to Station 086-06 ;
1428 (2128) Start video.
1432 (2132) Collect images w/ + w/out light. , 1 mussel
E=2318156.76 ; N=631038.15 ; 84.2 feet = H2O depth.
forgot to turn lasers on. - Re-DO image. ↓@ 086-06
1434 (2134) Re-do images - video continueing filming. water =
1436 (2136) on bottom again - images collected. 83.6 feet
1437 (2137) Frame coming up. E=2318156.37 N=631044.56
1438 (2138) On deck. Video off. Sand of old channel (dark colored)
1440 (2140) Motor to 086-05 visible in footage.
1442 (2142) Start video.
1443 (2143) Deploy drop camera in H2O.
1444 (2144) On bottom. - black sand visible in image - Images collected
1445 (2145) Coming up. water depth
1447 (2147) on deck stop. Video. E=2318006.35 N=631006.77 = 83.9 ft.
1451 (2151) Motor to Station 086-04 ; video on
1452 (2152) Drop camera in water.
1453 (2153) Frame on bottom Water Depth = 82.3 ft.
1454 (2153) Collect Images Sand visible E=2317880.20 N=630968.77
1456 (2156) Drop camera frame on deck ; video off.
1459 (2159) Motor to Station 086-03 - Re-do as yesterday we
Did not delay video for 1 min or from deck to deck yesterday
1500 (2200) At Station, Start video.
1501 (2201) Frame in H2O. Water Depth = 61.20 ft
1502 (2202) Frame on bottom ; still images E= 2317233.80 N= 630813.24
Gravels + Cobbles visible in monitor
1515 (2215) Motor to Station 086-02 ; Start video
1516 (2216) On bottom, weeds only., Collect images.
E=2316929.66 ; N=630737.28 Water depth = 9.4 feet.
1519 (2219) Back on deck, video off.
1524 (2224) At Station 086-01 ; Start video.
1525 (2225) on bottom = weeds Water Depth = 8.4 ft.
1526 (2226) Images collected. E=2316565.34 N=630652.26 NM

Scale: 1 square = _____

R/v Tieton

10/3/2018

1527 On deck again. Transect 86 complete for imaging + ADCP
1540 Switching to ADCP collection on transect 87. H2O Depth = 63.7 ft
1540 = 2240 UTC @ Station 087-01 E = 2317298.40
1537 - 1545 (2240 - 2245) Collect ADCP for this station. N = 629954.59
1547 (2247) Switch to Drop camera; video on. on 087-01
1549 (2249) Frame in water
1550 (2250) Frame on bottom - cobbles visible Water Depth = 64.3 ft.
1551 (2251 NM) Still images collected E = 2317300.63 N = 629951.99
1553 (2253) Frame on deck.
1557 (2257) Motoring to 087-02 Station
1601 (2301) ~~Collect~~ NM Start collecting ADCP ~~data~~ NM at station.
1607 (2307) Finish Collecting data for ADCP Water Depth = 68.20 ft.
NM ~~E = 2317730.21 N = 62~~ E = 2317732.01 N = 629951.43
1609 (2309) Drop camera in water @ 087-02 video ON. water = 69.3 ft
1610 (2310) On bottom → E = 2317730.21 N = 629949.03
1611 (2311) Pulling up → image collected = cobbles.
1613 (2313) Drop camera on deck. video off
1614 (2314) Motor to 087-03 Station. - time for image only as water depth is too deep for this ADCP - don't have time to switch & re-calibrate. 600 kHz vs. 1200 kHz → shallow H2O → Deep (low - deeper H2O penetration)
1617 (2317) Motor to Station 087-03
1618 (2318) Video on; Drop camera frame in H2O
1619 (2319) Frame on bottom E = 2318112.26 N = 629949.15 Water depth = 79.1 feet
1620 (2320) Still Image collected = Sand (some black sand)
1621 (2321) Pulling up frame.
1623 (2323) Video stopped; frame on deck.
1633 (2333) Checking water depths at 87 transect for ADCP on way to dock. to plan for tomorrow.
1638 (2333) Pulling ADCP from water.
1645 (2345) R/V Tieton at dock. MM hands off ADCP data + log book to NM, RM working on his image/video hand off.
1702 (2402) R/V Tieton off dock to boat ramp to re-do control pt check
1708 (2408) At boat ramp. boat ~~onto~~ NM.
1710 (2410) off water on trailer.
1716 (2416) CP-2 control pt. check complete with correct offset. v.g. AM.
1749 (2416) Hand off GPS + image/video files to USB drives.
1730 (2430) R/V Discovery at boat ramp.
1800 (2500) Depart Evans campground.

MM

Sediment Facies Mapping, ADCP + Drop camera Tasks - Nicky Moody (NM)

0720 (1420) NM + Josie Smith (JS) at Evans Campground boat ramp.

0730 (1420) Tailgate meeting; Attendees below:

Maggie McKeon, Gravity, RV Tieton - ADCP Lead
Mike Duffield, Gravity, RV Discovery - Captain
Josh Weatherman, Columbia Navigation, CNI 2
Dave Williams, DEA - Base Station EVANS, ~~R/V Tieton~~ NM
Marilyn Gauthier, Jacobs - EPA oversight., R/V Tieton
Patrick Miller, USGS. - RV Tieton
John Staly, DEA - RV Discovery MBES lead
René Trudeau, Gravity - RV Tieton Captain
Jeff Wilson, Gravity - RV Tieton
Ryan McElece, Gravity - RV Tieton, Imaging lead
Joseph Graves, Columbia Navigation, CNI 2
Nicky Moody, AECOM, Field Supervisor / SSO, R/V Tieton
Josie Smith, AECOM, RV Discovery

0818 (1518) R/V Discovery on water / Weather = Partly cloudy, calm, 44°F.

0827 (1527) CH-2 control check at Evans boat ramp. - logging for 20 secs.

E = 2319693.238 E = 2319743.238
N = 632266.61 N = 632266.~~60~~ NM 570
→ Hypack Reading → CH-2 Check point Position
Elevation = 1289.000 ft Elevation = 1289.489 Ft.

0838 (1538) 2nd CH-2 Check w/ Corrected elevation → setting b/t diff. 0.21 ft. on antenae head.

E = 2319793.23 E = 2319793.238
N = 632266.61 N = 632266.570
Elevation = 1289.44 Elevation = 1289.489

H = 0.041' difference from Hypack vs. CH-2 position ✓
V = 0.064' difference. ✓

0853 (1553) RV Tieton on water, still on boat trailer though.

0900 (1600) RV Tieton off trailer.

0915 (1615) ADCP (600 khz) deployed into H_2O.

0919 (1619) ADCP compass calibration. 0.2° Error. = Evaluation w/ 600 Htz ADCP

0928 (1628) ADCP Calibration Complete. 0.1° Error = Cali

0935 (1635) Start collecting at ADPC data at Station 086-06

Rechecking location with 600 Htz as correlation is better than 1200 Htz. Uncertainty before ~~at~~ NM yesterday at bottom so re-do location.

0944 (1644) END < 55' depth → Using 1200 htz

GPS Pt = > 55' depth → Using 600 htz.

Acr2 { E = 2318158.36 Water depth = 83.9 ft.
N = 631043.68

NM

0950 (1650) Start collecting at ADCP - Station 086-05 RE-DO
0955 (1655) End [East = 2318004.10 water depth = 84.0 ft.] Again as nonconforming before & better data.
[North = 631004.03]
1000 (1700) Start collecting at 086-04 for ADCP - Redo again with 600hz ADCP.
1008 (1708) Finish collection at 086-04 Redo
East = 2317875.51 Water Depth = 81.8 ft. } "__2ACT" = GPS Point.
North = 630976.34 }
1015 (1715) Start collecting at 086-03 for ADCP - Redo again.
1022 (1722) finish collection
East = 2317230.59 water depth = 60.9 feet. = "__2ACT" GPS point
North = 630816.50
1025 (1725) Motoring to 087-02 ~~New f~~ on another re-do w/ 600 Htz ADCP.
1031 (1731) Start collecting at 087-02 for ADCP.
1035 (1735) RM + JW completing Camera calibration. Lasers = 1.265'
1036 (1736) End collecting at 087-02 for ADCP.
East = 2317730.73 Water Depth = 68.1 ft.
North = 629952.82
1040 (1740) Motoring to 087-03 for ADCP - Not Redo.
1042 (1742) Start collecting data at 087-03 for ADCP
[1/160 s F5.6 ISO 100 ; RAW+L (large format JPEG)
↳ Camera image Setting ↳ Raw format. (test image ✓)
Focus + scaling lasers complete ✓ on DSLR camera.] ← Camera settings.
1048 (1748) End collecting ADCP at 087-03
East = 2318114.77 Water Depth = 79.5 ft.
North = 629951.20
1054 ~~(1758)~~ (1754) Motoring to 087-04
1055 (1755) Start collecting data for ADCP at 087-04 RM + JW ↑
1101 (1801) Finish collecting data at 087-04.; switching to Drop Camera.
East = 2318348.65 Water Depth = 75.40 ft
North = 629949.68
1109 (1809) at station 087-04 - Drop Camera off deck
1110 (1810) Drop camera in water.
1112 (1812) Camera frame on bottom - Cobbles with some silt + black sand
1113 (1813) Image collected. at 087-04
East = 2318350.06 Water depth = 76.0 ft.
North = 629947.53
1114 (1814) Drop Camera coming back up - off bottom.
1115 (1815) Frame on deck. - Coiling hose

Rey Lusby

1116 ~~Moto~~(1816) Motoring to 087-05
1121 (1821) Start Collection of ADCP at 087-05
1127 (1827) Finish ADCP
East = 2318603.17 H_2O = 79.3 ft.
North = 629946.00
1128 (1828) Start video at 087-05
1129 (1829) Drop famera frame off deck + in H_2O.
1131 (1831) Video - see more cobbles but similar to 087-04 - Frame on bottom
1132 (1832) Image collected
East = 2318600.01 H_2O = 77.8 ft
North = 629946.20
1133 (1833) Camera frame off bottom.
1134 (1834) Frame on deck; video off. (19:29 sec) min.
Targeting deep H_2O while have 600 khz ADCP
1140 (1840) Motoring to 088-06
1144 (1844) Start collecting data at 088-06 for ADCP.
1150 (1850) Finish ADCP
East = 2318753.60 H_2O = 82.5 ft.
North = 628978.76
1152 (1852) Video on; frame up off deck.
1153 (1852) Frame in H_2O.
1154 (1854) Frame on bottom
1155 (1855) Image collected - black sand visible
East = 2318751.31 H_2O depth = 82.3 ft
North = 628985.88
1156 (1856) Frame off bottom.
1158 (1858) Frame on deck, video off.
1204 (1904) Motoring to 088-05
1208 (1908) Start collecting data for ADCP @ 088-05
1214 (1914) Finish ADCP
East = 2318532.44 N = 628972.48 78.4 ft = H_2O Depth
088-04 - Motor here; Drop camera issues - connection problem.
NM 1219 (1919) Start collecting data at 088-04 for ADCP.
1225 (1925) End stop ADCP.
E = 238369.92 H_2O = 78.3'
N = 628971.76
1229 (1929) Motoring to 088-03

NM

Scale: 1 square = _____

1232 (1932) Start collecting data at 088-03 for ADCP ✓
1239 (1939) Finish at 088-03
E = ~~231956~~ NM 2317796.81 H_2O = 66.30 ft.
N = 628947.56

(1946)
1246 ~~Motor~~ NM ~~Start~~ NM Start collecting data at ~~088-~~ NM 089-03 for ADCP
1252 (1952) Finish collection
East = 2317956.76 63.8 ft = H_2O depth.
North = 628460.66
1252 (1952) Start duplicate ensemble collection at NM ~~088-03~~ 089-03
Using same gps coordinates as primary. Staying in the same target radius as primary
NM ~~1258~~ 1259 (1959) Finish Duplicate collection at ~~088-03~~ NM 089-03
1304 (2004) Re-calibration of image camera focus after shortening cable wires inside camera waterproof housing.
1306 (2006) Start collecting data at 089-04 for ADCP.
1312 (2012) Finish collecting data
E = 2318489.79 H_2O Depth = 79.1 ft
N = 628556.89

1314 (2014) Motor to 089-05 for ADCP only for now. Camera still down.
1317 (2017) Start Collecting data for ADCP at 089-05
1323 (2023) Finish collection
E = 2318676.38 H_2O Depth = 79.9 ft.
N = 628593.12

1332 (2032) Jeff Johnson, Jacobs dropped off by Josh Weatherman.
Jeff is subsituting in for ~~Marlyl~~ Marlylin G from Jacobs.
1341 (2041) Marlylin leaving us in ~30 mins.
→ Motor to 089-06 for ADCP
1344 (2044) Start collecting data for ADCP at 089-06
1354 (2054) Finish Collection
E = 2318810.73 H_2O Depth = 83.1 ft
N = 628616.33
1348 (2048) Switching to NM ~~AR~~ imaging Drop camera. Wire shorting issue resolved.
1354 (2054) Drop Camera off deck; Video was on @ 1348.
1355 (2055) Camera frame in H_2O =
1356 (2056) Frame on bottom
1357 (2057) Image Collected - See sand ripples w/ black sand.
E = 2318808.78 82.3 ft = H_2O Depth.
N = 628615.68
1358 (2058) Frame coming up. ; [Video turned off ~~after~~ after 1 min on bottom but not till on deck. NM So turned off early by mistake NM] *
1400 (2100) Frame on deck.

[signature]

1403 (2103) Marylin G. off RV Tieton via Columbia Nav vessel CNI2
1411 (2111) Start collecting data (still 600kHz ADCP) at 090-07
Finish collecting ADCP data.
E= 2319101.39 H2O Depth = 71.2 ft.
N= 627584.91
1418 (2118) Switched to drop camera; video on.
1419 (2119) Frame in water.
1420 (2120) Frame on bottom, forgot to turn on camera., pulling back up.
1421 (2121) Restart process; camera - video on.
1422 (2122) Frame in water.
1423 (2123) Frame on bottom.
E = 2319100.51 H2O Depth = 72.5 ft.
N = 627584.68
1425 (2125) Image collected - Course cobbles + black sands visible
1426 (2126) On deck. Video off.

1430 (2130) Motor to next Station 090-06
1434 (2134) Start collecting ADCP data at Station 090-06
1440 (2140) Finish ADCP., start video for drop camera task.
E = 2318980.56 H2O Depth = 82.3 ft.
N = 627592.88
1441 (2141) Frame in H2O.
1442 (2142) Frame on bottom
E = 2318982.22 H2O Depth = 80.4 ft.
N = 627590.62
1443 (2143) Image collected = Sand w/ black sand visible.
1446 (2146) Frame back on deck.

1447 (2147) Motor to Station 090-05.
1449 (2149) Start collecting ADCP data at 090-05
1456 (2156) Finish ADCP
E = 2318831.63 H2O Depth = 81.1 ft.
N = 627606.15
1456 (2156) Video on - on Drop Camera.; Image collected of board
1457 (2157) Drop Camera frame in water
1458 (2158) Frame on bottom.
E = 2318830.75 H2O Depth = 81.1 feet.
N = 627600.06
1459 (2159) Image collected on bottom - Sand w/ black Sand visible
1501 (2201) Frame back on deck, video off.

[signature] NM

Scale: 1 square = ______

1506 (22:06) Start collecting data at Station 090-04 for ADCP
1512 (22:12) Finish ADCP.
N = 627640.20 H_2O Depth = 71.3 ft.
E = 2318321.73
1513 (22:13) Video turned on; card image collected on deck.
1514 (22:14) Drop camera frame in water.
N = 627637.79 H_2O Depth = 74.7 ft.
E = 2318326.61
1516 (22:16) Image collected on bottom.
1518 (2218) Frame back up on deck, Video off.
1524 (2224) Start ADCP data collection at 090-02; 090-03 is too shallow. We will use 1200 Khz ADCP for 090-03.
1530 (2230) Finish ADCP at 090-02
N = 627712.52 H_2O Depth = 65.8 ft
E = 2317285.37
1530 (2230) Video on Drop camera turned on
1531 (2231) Frame in water 1532 (2232) Frame on bottom
N = 627716.53 H_2O Depth = 65.8
E = 2317285.62
1533 (2233) Image collected view = Silt or Sand a few cobbles.
1535 (2235) Frame on deck.
1536 (2235) Scouting water depths at locations for tomorrow. Then plan to do imaging task at locations we skipped this morning when camera was not operating.
1540 (2240) Camera video on for 089-03
1541 (2241) Camera frame in water now.
N = 628453.35 H_2O Depth = 63.3 Ft.
E = 2317955.37
1543 (2243) Camera frame on bottom
1544 (2244) Images collected on bottom. = mix Cobbles, Sand, Silt
1545 (2245) Frame back on deck.
1546 (2246) Motoring to Station 089-04 for Imaging.
1547 (2247) Video on, Image of board collected.
1547 (2247) Camera frame in water
1549 (2249) Camera frame on bottom.
E = 2318491.07 H_2O Depth = 78.9ft.
N = 628556.64
1550 (2250) Image Collected Sand w/ black Sand.
1552 (2252) frame back on deck

Greg Lady

1554 Motor to Station 089-05.
1555 Video on + image collected of dry erase board.
1556 (2256) Drop camera in water
1557 (2257) Drop camera frame on bottom
E = 2318677.40 H2O Depth = 80.1 ft.
N = 628590.23
1558 (2258) Image collected + Saw Sand with black sand
1600 ~~Mot~~ (2300) Frame on deck.

1602 (2302) Motor to 088-05 Station
1603 (2303) Video on Drop camera, image collected on dry erase board.
1604 (2304) Frame in water
1605 (2305) On bottom
E = 2318529.79 H2O Depth = 80.
N = 628970.82
1606 (2306) Image collected - sand w/ black sand.
1608 (2308) Frame back on deck.

1610 (2310) Motor to 088-04 Statation; video on drop camera + image collected
1611 (2311) Frame in water.
1612 (2312) Frame on bottom.
1613 (2313) Image collected - Same as 088-05.
X E = 2318367.66 H2O = 79 ft Depth
N = 628968.12
1615 (2315) Frame on deck

1617 (2317) timing issue w/ 2 GPS layers (latency issue) -
~~Now on to~~ NM comp. port milisec delay - dropped down.
MM = RDI Software discussion. ADCP GPS fixed likely
Doing test to confirm. after 088-03 imaging.
Changed 16 to 1 millisecond on latency Timer. (Advanced button)
1618 (2318) at Station 088-03; video on; image on deck
1619 (2319) Drop camera in water
1620 (2320) Frame on bottom.
1621 (2321) Image collected on bottom - Cobbles visible
E = 2317798.60 H2O Depth = 66 ft
N = 628940.52
1623 (2323) Frame on deck - caught up with ADCP for today.

1631 (2331) Bottom track and GGA are on top of each other on
the ADCP read out. = Testing. "Look beautiful"
1633 (2333) Heading to boat ramp., collecting data from MM, RM, RT
1658 (2358) Off Water - downloading data
1800 (2500) Depart Evans campground

NM [signature]

Scale: 1 square = ________

ADCP + Imaging Vessel = RV Tieton. Nicky Moody (NM)

0730 (1430) Nicky Moody (NM) + Josie Smith (JS) arrive at Evans campground. Jenny Pretare kicks off meeting as Teck visitors with us.

0740 (1440) Safety Kick off meeting.

0840 (1540) RV Discovery on water

~~RV Tieton on water~~ NM

Visitors today =
- Scott Maloney, Teck American, Inc., VP Environment.
- Denise Mills, Teck American, Inc., Ass. Project Coordinator

RV Tieton today =
- Nicky Moody, AECOM (NM), Field supervisor/SSO
- Jeff Johnson, Jacobs (JJ), EPA observer
- Maggie McKeon, Gravity (MM), ADCP Equipment lead
- Jeff Wilson, Gravity (JW); René Trudeau, Gravity (RT) Captain
- Ryan McElece, Gravity (RM); Imaging lead

RV Discovery today =
- John M Staly, DEA, (JS) MBES Equipment Lead
- Mike Duffield, Gravity (MD) Captain
- Josie Smith, AECOM (JS)

CNI1 today =
- Eric Weatherman (EW), Columbia Navigation (CN) Captain
- Rick Wilson (RW), CN

CNI2 today =
- Josh Weatherman (JW), CN
- Joseph Graves (JG), CN

0850 (1550) CP-2 check in completed at boat ramp

0856 (1556) Stop logging at CP-2

0911 (1611) RV Tieton on water.

Base Station "EVANS" manned by Dave Williams, DEA.

0918 (1618) ADCP Diagnostic test

0928 (1628) Compass calibration - 0.5° error

0938 (1638) Compass Evaluation - 0.4° error.

1200 khz ADCP today as hitting Shallow H20 Stations.

0939 (1639) Camera calibration/setup.

0942 (1642) Motor to station 088-02

0943 (1643) Start collecting ADCP data at 088-02

0949 (1649) Finish ADCP

E 2317310.47

N 628929.52

H20 Depth = 52.0 ft (From bar sonar)

Nicky Moody

10-5-2018 | Page 16 | (RV Tretan) | (NM

0953 (1653) Video recording @ Station 088-02 ; Image collected
0954 (1654) Camera frame off deck.
0955 (1655) Frame in water
0956 (1656) Camera frame on bottom.
E 2317307.06 H2O Depth = 52.3 ft
N 628928.37
0958 (1658) Camera taking too many photos & can't view on monitor.
1001 (1701) Camera frame on deck Confirmed @ 1730 (0030) - Image collected w/ Lasers
1002 (1702) Motoring to 089-02 ; fixing image connection.
1006 (1706) Start ADCP
1011 (1711) Finish ADCP
E = 2317445.64 41.3 ft = H2O Depth.
N = 628361.25
1015 (1715) Video on drop camera turned on.
Camera frame in water.
1016 (1716) Frame on bottom
1017 (1717) Image collected - still no visual on still camera
E = 2317446.56 38.6 Ft = H2O Depth
N = 628361.60
17:32 confirm & No Image
still having issue w/ still DSLR camera - need to open it up to see. switch to ADCP only for now
1020 (1720) Motoring to 090-01
1028 (1728) Start ADCP * ADCP only for now *
1035 (1735) Finish ADCP
E = 2316861.19 H2O Depth = 22.2ft.
N = 627744.72
1037 (1737) Motor to 090-03
1043 (1743) Start ADCP * ADCP only again *
1048 (1748) Finish ADCP
E = 2317709.29 H2O Depth = 41.1 ft
N = 627682.81
1050 (1750) Motor to 090-08
1103 (1803) Start ADCP * ADCP only *
1109 (1809) Finish ADCP
E = 2319832.34 23.3ft = H2O Depth
N = 627534.10
1110 (1810) Motor to 090-09
1112 (1812) Start ADCP
1118 (1518) Finish ADCP
E = 2320254.93 N = 627803.52 H2O Depth = 25.9 ft

Scale: 1 square = _____ Levi Woody NM

1120 (1820) Motor to 090-10 - close to shore.
1125 (1825) Start ADCP
1133 (1833) Finish ADCP
E = 2320854.23 NM Dep H2O Depth = 42.1 ft.
N = 627459.50

Camera tech issues - ADCP only so far here.

1140 (1840) Start ADCP at ~~090~~ NM 089-10 - also along shore.
1147 (1847) Finish ADCP
E = 2320523.82 H2O Depth = 27.9 ft.
N = 628939.69

1148 (1848) Motoring to 089-09
Camera/video re-calibration happening. -
1152 (1852) Start ADCP
1159 (1859) Finish ADCP.
E = 2320124.00 H2O Depth = 30.0 ft.
N = 628861.65

1159 (1859) Video recording; still DSLR camera image. - Frame on deck still.
1208 (1900) Frame in water.
1201 (1901) Frame on bottom. - Camera attempted but lasers interfering with camera trigger. Image collected but no lasers visible however
E = 2320120.95 Depth = 30.7 ft. @1733 confirm lasers present
N = 628860.77
1204 (1904) Prop camera frame back on deck. - still trouble shooting.
1206 (1906) Motoring to 089-08
1210 (1910) Start ADCP (No still image or video)
1215 (1915) Finish ADCP
E = 2319718.63 H2O Depth = 28.3 ft.
N = 628787.84

1216 (1916) Motoring to 089-07
1219 (1919) Start ADCP (No image/video acceptable)
1224 (1924) Finish ADCP
E = 2319318.35 H2O Depth = 24.9 ft.
N = 628713.69

1225 (1925) Camera/video calibration complete.
1227 (1927) Prop camera frame on deck, video on, image collected.
1228 (1928) Frame in H2O
1229 (1929) Frame on bottom. - Sand + silt. visible.
E = 2319312.19 H2O Depth = 24.8 ft.
N = 628713.73
No image collected; video off. - still not fully functioning.
1231 (1931) Frame on deck NM

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1235 (1935) Scott Maloney ~~+ Denise Mills~~ NM from Teck on board.
1239 (1939) - Motor back to 089-07 to retry image collection
1242 (1942) Video on.; still image collected.
1244 (1944) Frame in water.
1245 (1945) Frame on bottom. - Silt visible - waiting > 1 min as kicked up fines.
E 2319317.23 Water Depth = 25.7 ft.
N 628710.79 (Still Images collected? monitor not working)
1248 (1948) Frame back on deck. @1738 - confirmed image w/ Lasers ✓
1250 (1950) Motor to 088-07
1251 (1951) Start ADCP Both ADCP + Image/video ✓
1256 (1956) Finish ADCP
E = 2319358.45 26.7 ft = H2O depth.
N = 629003.82
1259 (1959) Video recording ; Still Image Collected.
1300 (2000) Drop camera frame in water
1302 (2002) Frame on bottom.
E = 2319355.21 26.6 ft = H2O depth
N = 629002.84
1304 (2004) Photo collected w/ Lasers ✓ Silt visible - when turn on laser - it shorts out.
1306 (2006) Frame on deck
1308 (2008) Motor to 088-08
1310 (2010) Start ADCP
1316 (2016) Finish ADCP
E = 2319748.82 H2O depth = 28.2 ft.
N = 629016.14
1317 (2017) Recalibrated camera/video as made adjustments.
1318 (2018) Video on camera turned on ; Image collected. of board
1319 (2019) Frame in water
1320 (2020) Frame on bottom E = 2319747.40 N = 629023.82 28.3 ft H2O depth
1321 (2021) * Light on (No lasers?) - Photo - Silt visible
Appears laser is bad or interrupting signal to DSLR.
1323 (2023) Frame on deck. @1743 - confirmed image w/ NO Lasers
1330 (2030) Scott Maloney off RV Tieton ; Lunch break.
1340 (2040) Motor to Station 088-09 - Dup location - ADCP
1343 (2043) ADCP Start collecting data.
1348 (2048) Stop Primary + start dup ADCP collection.
E = 2320141.50 Depth = 27.9 feet.
N = 629031.39
coordinates for both primary + dup.

Scale: 1 square = _____

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1353 (2053) Start video + collect still image of dry erase board.
still at 088-09

1354 (2054) Frame in water

1355 (2055) Frame on bottom

1356 (2056) Bottom image w/ ~~no~~ laser collected ✓ NM

E = 2320140.08 Depth = 28.8 ft

N = 629034.01

1359 (2059) ~~TWA~~ Drop camera frame on deck.

1400 (2100) Motor to 088-10

1404 (2104) Start ADCP

1413 (2113) Finish ADCP

E = 2320530.07 24.3 ft = H_2O Depth

N = 629044.80

1416 (2116) Camera not functioning; motor to ~~088~~ NM 087-10

1430 (2130) Arrive at ~~088~~ 087-10 ~~– weeds present likely so~~ NM
ADCP won't work w/ weeds ~~in weeds~~ distorts accoustic signal
NM discussed w/ MM + JJ what JP + NM discussed on
Phone. If weeds found ~~the~~ NM at station, move 1/2
way to next station, on same transect and check again. JJ says sounds
reasonable.

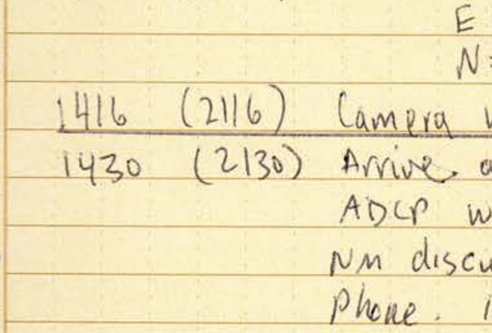
1439 (2139) Start ADCP

1445 (2145) Finish ADCP

E = 2320650.59 21.4 ft = H_2O Depth.

N = 629935.25

1455 (2155) 087-09 ~ ~~2~~ 5 ft of weeds present obvious from ADCP + Nav.
Stern ecosounder. RW + RM trouble shooting camera still.
Now checking at 087-07 for weeds, none present



1504 (2204) Start ADCP at 087-07

1511 (2211) Finish ADCP

E = 2320103.90 H_2O depth = 41.1 ft

N = 629939.23

1512 (2212) Checking 1/2 way b/t 87-07 and 87-09 as weeds
at 087-09 (~~note~~ check NM map ~~as~~ NM not in numerical order here on transect)

~~T54~~ 1514 (2214) No weeds at this 1/2 way pt. - Calling it 087-09
RT documenting as Alt location in GPS notes [signature] NM

Rite in the Rain. NSN: 7530-01-577-8866 Scale: 1 square = ______

1516 (2216) Start ADCP at Revised location for station 087-09
1521 (2221) Finish
E = 2320187.87 H_2O Depth = 23.2ft
N = 629938.92

1523 (2223) Motoring to station 087-08
1526 (2226) Start ADCP at 087-08
1531 (2231) Finish
E = 2319881.93 H_2O Depth = 29.6 feet
N = 629940.76

1532 (2231) Motor to Station 087-06
1541 (2241) Start ADCP at 087-06
1546 (2246) Finish
E = 2319322.55 H_2O Depth = 22.4 ft
N = 629941.85

1554 (2254) Motor to area of 091-09, 091-10, 092-10. @ ~River Mile 709.5
1607 (2307) Start ADCP at 091-09
1612 (2312) Finish
E = 2319864.59 H_2O Depth = 23.0 ft
N = 626383.00

1618 (2318) Start ADCP at 091-10
1623 (2323) Finish
E = 2320247.72 H_2O Depth = 45.9 ft.
(2328) N = 626285.52

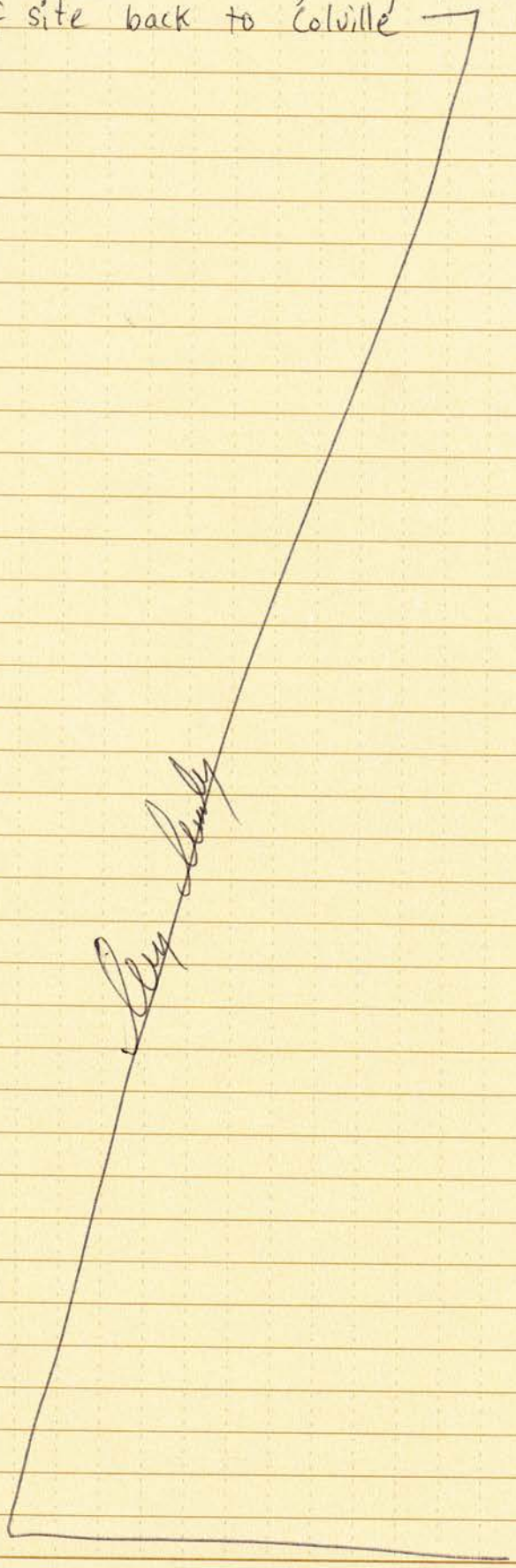
1628 ~~(1628)~~ (2328) Motoring to 092-10
1632 ~~(2332)~~ (2332) Start ADCP
1638 (2338) Finish
E = 2319479.66 H_2O Depth = 42.3 ft.
N = 625966.06

1632 (2332) Bad wires, loose connection, grounds disconnected. - trouble shooting. Still troubleshooting Camera. but getting closer.
1645 (2345) Calibration on camera/video. Image
1651 (2351) Video on; Still Image collected
1652 (2352) Frame in water
1653 (2353) Frame on bottom @ Station 090-08
E = 2319835.01 H_2O Depth = 24.6 ft.
N = 627529.98
1654 (2354) Everything working for camera ✓ Bottom image collected w/ Lasers Waiting 3 mins then collecting Image duplicate; video still running.
1659 (2359) Duplicate image
E = 2319835.01 N = 627529.98 24.6 ft = H_2O Depth

NAN

Scale: 1 square = _____

1703 Wrapping up; head to boat ramp.
1732 Tieton off water at boat ramp.
1755 Downloading data from ADCP, Images/Video, & Navigation.
1810 NM + JS off site back to Colville



 Teck American, Inc; Upper Columbia River, Sediment Facies Mapping. 10/6/2018
ADCP + Bottom Imaging Task - R/V Tieton.

0725 (1425) NM + JS at Evans campground.
0740 (1440) Tailgate meeting - New person today - Brandon Hoover. w/ CNI
0800 (1500) CNI 1 & CNI 2 on water.

Meeting attendees + on water =

RV Tieton
Nicky Moody (NM) AECOM, SSO / Field Supervisor
René Trudeau (RT) Gravity, Captain / Jeff Johnson, Jacobs EPA oversight
Maggie McKeon (MM) Gravity, ADCP Lead
Ryan McKenzie (RM) Gravity, Imaging Lead
~~Ryan~~ Jeff Wilson (JW) Gravity, QA Manager

RV Discovery
Josie Smith (JS) AECOM
John Staly (JS) MEA, MBES Lead
Mike Duffield (MD) Captain.

CNI 1
Eric Weatherman, Captain
Rick Wilson

Weather: 42°F, calm, Partly cloudy = Am

CNI 2
Josh Weatherman, Captain
Brandon Hoover

1513
0813 (~~0~~ 1534) RV Discovery doing CP-2 check-in
0825 (1525) RV Discovery on water.
0829 (1529) RV Tieton doing CP-2 check-in
0834 (1534) Logging at CP-2 started.
0836 (1536) Done logging at CP-2
0910 (1610) ADCP Compass calibration ✓ 0.3° (need <1°)
0913 (1613) ADCP Compass Evaluation ✓ 0.2° - Using 600kHz ADCP today -
0918 (1618) Drop camera setup Calibration for Video + DSLR Camera.
0926 (1626) Start ADCP collection of Data at Station 088-01
0933 (1633) Stop ADCP
E 2317015.82 69.8 ft = H2O depth.
N 628919.32
0934 (1634) Test ~~vide~~ Image; Video ON.
0935 (1635) Frame in water
0937 (1637) On bottom
E 2317054.81 66.8 ft = H2O depth
N 628921.12
0938 (1638) Image collected - Sand + Silt visible
0939 (1639) Frame on deck; video off.

Scale: 1 square = _____

0940 Motoring to station 089-01
0944 (1644) Start ADCP
0949 (1649) Finish ADCP (Bowers-sounder)
N = 628288.70 E = 2317060.95 H_2O Depth = 65.8ft
0949 (1649) Video on; image on deck
0950 (1650) Frame in water.
0951 (1651) Frame on bottom.
0952 (1652) Image collected - Sand/silt small piece of wood-like debris.
0954 (1654) Frame on deck.
N = 628293.68 E = 2317064.33 H_2O Depth = 65.8ft.
1000 (1700) Motoring to Scout H_2O depth at 091-02, -03, -04 and too shallow for 600khz.
1006 (1706) NM ~~Heading to~~ Going to Station 091-05 as deeper H_2O.
1007 (1707) Start ADCP
1012 (1712) Finish ADCP E=2318653.73; N=626694.01 H_2O Depth =65.1ft.
1013 (1713) Video on; image on deck - still at 091-05
1014 (1714) Frame in H_2O
1015 (1715) Frame on bottom.. N=626690.18 E=2318654.08 H_2O Depth = 67.1ft
1016 (1716) Image collected - Coarse angular cobbles ~~or bedrock~~
1018 (1718) Frame on deck; motor to 091-06
1023 (1723) Start ADCP at 091-06
1029 (1729) Finish ADCP; N=626593.45 E=2319044.76 H_2O Depth = 107ft
1028 (1728) Video on Drop camera turned on; image collected on deck.
1030 (1730) Frame in H_2O
1032 (1732) Frame on bottom - N=626598.03 E=2319048.90 H_2O Depth = 107ft
1033 (1733) Image collected - silt/sand NM ~~maybe~~ some black sand visible.
1036 (1736) Motor to 091-07
1038 (1738) Start ADCP
1044 (1744) Finish ADCP; N=626560.71 E=2319178.17 H_2O Depth = 95.2ft
1044) (1744) Video on Drop Camera turned on; image on deck
1045 (1745) Frame in H_2O
1046 (1746) Frame on bottom - Sand ripples visible
1047 (1747) IMage Collected; N=626565.57 E=2319175.54 (H_2O Depth = 93.8 ft)
1050 (1750) Frame on deck.
1051 (1751) Motor to 091-08
1053 (1753) Start ADCP
1059 (1759) Finish ADCP; N=626488.81 E=2319457.58 H_2O Depth = 78.0 NM ~~ft~~ FE
1059 (1759) Video on; still image collected
1101 (1801) Frame on bottom - Cobbles, boulders, gravels, + Sand.
1102 (1802) Image Collected; N=626486.41 E=2319459.47 H_2O Depth = 77.9 NM

Rite in the Rain
NSN 7530-01-5...
Scale: 1 square = ____

1103 (1803) Motoring to next Station = 092-09
1115 (1815) Start ADCP
1121 (1821) Finish ADCP E = 2319422.99 N = 626022.70 H_2O Depth = 84.0 ft
1120 (1820) Video recording; still image on deck
1123 (1823) Frame on bottom E = 2319425.20 N = 626024.61 H_2O Depth = 85.7 ft
1125 (1825) Image collected = Cobbles + Sand/silt. visible.

PDT	UTC	Frame on deck @ 1127 (1827) video off
1128	1828	Motor to 092-08
1130	1830	Start ADCP - Not recording, aborted - no connection. Troubleshooting cables.
1138	1838	Start ADCP - cable issue fixed.
1154	1854	Finish ADCP; E = 2319170.76; N = 626048.17; H_2O Depth = 93.6 ft.
1154	1854	Video recording; Still image collected on deck.
1155	1855	Frame in water
1156	1856	frame on bottom; E = 2319169.43, N = 626042.33
1157	1857	Image collected (silt/sand) H_2O Depth = 94.1 ft
1159	1859	Frame on deck., Video off
1202	1902	Motor to 092-02
1203	1903	Start ADCP
1209	1909	Finish ADCP; E = 2319004.87 N = 626066.91 H_2O Depth = 103 ft
1209	1909	Recording video on; image collected on deck.
1211	1911	Frame on bottom E = 2318999.44; N = 626067.22; 102 ft
1212	1912	image collected - on bed rock + slope. Moved off per SOP "we may" move and take new image. Moving 1/2 way b/t. 092-02 + 092-08 & collecting 2nd image.
1221	1921	on bottom 092-02 - Alternate location = Sand + Silt w/ black sand visible E = 2319088.65 N = 626057.60 Depth = 102 ft.
1225	1925	frame on deck.; Video off
1229	1929	Start ADCP at 092-07
1235	1935	Finish E = 2318820.13 N = 626085.37 H_2O Depth = 99.1 ft. Start recording Video.; Still image collected.
1236	1936	Frame in water
1238	1938	Frame on bottom, E = 2318818.69; N = 626082.96; H_2O Depth = 102 ft
1239	1939	Image collected - Sandy appearence
1241	1941	Frame on deck., video off
1244	1944	Scoping station 092-06 = need 1200 khz ADCP (too shallow for 600 khz)
1247	1947	Recalibration on Drop Camera DSLR as changed out battery.
1249	1949	At 093-05 now depth good for 600 khz. = deep ✓ NM

[signature]

Scale: 1 square = ________

PDT	UTC	Log of activity
1251	1951	Start ADCP at Station 093-05
1257	1957	Finish ; E=2318111.94 ; N=625552.21 ; H2O Depth (WD) = 59.7 ft
		Start recording video, collect still image on deck
1307	2007	Frame in water
1309	2009	Frame on bottom. E=2318107.46 ; N=625549.98, WD=58.5 ft
1310	2010	Image collected. = Silt+Sand (black sand also) visible.
1311	2011	Frame on deck, video off
1307	2017	Start ADCP at Station 093-06
1323	2023	Finish ; E=2318344.78 N=625331.00 WD=88.1 ft
		Start recording video, still image collected on deck.
1324	2024	Frame in water
1325	2025	Frame on bottom; E=2318343.10 N=625325.87 WD=89.7 ft
1327	2027	Image collected
1328	2028	Frame back on deck. ; video off
1332	2032	Start ADCP at station 093-07
1339	2039	Finish ; E=2318465.95 N=625218.85 WD=83.2 ft.
		Start ADCP Duplicate immediately
1345	2045	Finish.
		Start recording video, still image collected on deck
1346	2046	Frame in water
1347	2047	Frame on bottom; E=2318464.74 N=625219.37 WD=87.4 ft.
1348	2048	Image collected = appears to be bedrock.
		Waiting 5 mins to collect duplicate.
1354	2054	Duplicate image collected
1356	2056	Frame on deck. ; video off
1400	2100	Start ADCP at station 093-08
1406	2106	Finish ; E=2318578.43 ; N=625107.77 WD=91.2 ft.
		Start recording video, Still image collected on deck.
1407	2107	Frame in water
1408	2108	Frame on bottom; E=2318577.80 N=625104.65 WD=91.1 ft
1409	2109	Image collected. - cobbles + sand/silt.
1411	2111	Frame back on deck. ; video off.
1414	2114	Start ADCP at Station 093-09
1419	2119	Finish ; E=2318692.81 N=624999.48 WD=80.5 ft
		Start recording video, still frame image collected on deck
1420	2120	Frame in water
1422	2122	Frame on bottom ; E=2318693.76 N=625001.05 WD=75.8 ft
1423	2123	Image collected - Cobbles, Asian Clams, + sand
1424	2124	Frame back on deck. ; video off

[signature] NM

Rite in the Rain Scale: 1 square = ______

RV Tieton.

10/6/2018

PDT	UTC	Log of Activity
1429	2129	Start ADCP at Station 093-10
1435	142135	Finish; E= 2318812.75 N= 624885.81 WD= 70.7ft.
		Video recording started; still image collected on deck.
1436	2136	Frame in water
1437	2137	Frame on bottom; E= 2318803.38 N= 624881.00 WD= 68.1ft.
1438	2138	Image collected = mix of cobbles, gravels, & sand.
1440	2140	Frame back on deck; Video off
1442	2142	Scoped 094-10 - too shallow; Do later with 1200 Hz.
1446	2146	Start ADCP at station 094-09
1452	2152	Finish; E=2318042.28 N=624310.85 WD= 75.5ft.
		Video recording started; still image collected on deck
1453	2153	Frame in water
1454	2154	Frame on bottom; E= 2318040.56, N = 624309.79, WD = 77.5ft
1455	2155	Image collected = similar to 093-10
1457	2157	Frame back on deck, Video off
1459	2159	Start ADCP at 094-08
1505	2205	Finish, E = 2317866.18; N = 624399.83; WD= 82.2ft.
		Video recording started; still image collected on deck.
1506	2206	Frame in water
1507	2207	Frame on bottom; E=2317864.69; N= 624402.39; WD = 80.9ft.
1508	2208	Image collected - fish visible w/ cobbles + sand.
1510	2210	Frame back on deck, Video off
1511	2211	Start ADCP at 094-07
1517	2217	Finish, E=2317705.97; N = 624481.16; WD=97.50ft.
		Video recording started, Still image collected on deck.
1518	2218	Frame in water
1519	2219	Frame on bottom; E = 2317703.41; N= 624487.61; WD= 100ft
1520	2220	Image collected - centered on coarse cobble.
1522	2222	Frame back on deck, Video off
1527	2227	Start ADCP at 094-06
1533	2233	Finish; E = 2317596.23; N = 624535.96 WD= 95.4 ft
		Video recording started; still image collected on deck.
1534	2234	frame in water
1535	2235	frame on bottom; E=2317592.28 N= 624537.42 WD=94.3ft
1537	2237	Image collected - ~~centered~~ Gravels + Sand observed.
1539	2239	frame back on deck; Video off
1542	2242	Start ADCP at 094-05
1548	2248	Finish ADCP, E= 2317463.86; N= 624601.96. WD= 84.8 ft
		Video recording started; still image collected on deck. NM

Scale: 1 square = _____

PDT	UTC	Log of Activities
1549	2249	At station 094-05; frame in water
1550	2250	NM ~~Finish At~~ frame on bottom - looks like sand. E = 2317462.36; N = 624604.16; WD = 84.5 ft.
1553	2253	Frame back on deck
1555	2255	Start ADCP at 094-04
1601	2301	Finish; E = 2317360.50; N = 624655.55; WD = 80.7 ft. Video recording started; still image collected on deck.
1602	2302	Drop camera frame in water
1603	2303	Frame on bottom; E = 2317355.03 N = 624655.23 WD = 80.30 ft.
1604	2304	Image collected, sand (w/ black sand) visible. Frame back on deck; video off.
1607	2307	Start ADCP at 094-03
1613	2313	Finish; E = 2317233.12; N = 624719.04; WD = 75.8 ft. Video recording started; still image collected on deck.
1614	2314	Drop camera frame in water
1615	2315	Frame on bottom; E = 2317236.37; N = 624718.45; WD =
1617	2317	Image collected (Sand w/ some black sand visible)
1618	2318	Frame back on deck; video off.
1621	2321	Start ADCP at 094-02
1627	2327	Finish; E = 2317091.29; N = 624790.05; WD = 66.4 ft. Video recording started; still image collected on deck.
1628	2328	Drop camera frame in water
1629	2329	Frame on bottom; E = 2317094.11; N = 624795.38; WD = 69.2 ft.
1630	2330	Image collected - Sand + Cobbles. Frame back on deck; video off.
1637	2337	Start ADCP at 095-01
1643	2343	Finish; E = 2316422.55; N = 624337.68; WD = 76.5 ft. Video recording started; still image collected on deck.
1644	2344	Drop camera frame in water
1645	2345	Frame on bottom; E = 2316421.38; N = 624336.97; WD = 77.1 ft
1646	2346	Image collected - Sand w/ trace sticks + edge of cobble.
1648	2348	Frame back on deck; video off
1655	~~1655~~ 2355 NM	Weather in PM = Clear, 64°F, Calm.
	↳	Motor back to Evans boat ramp; waiting for CNI 1 to Exit.
1725	2425	Arrive at boat ramp.
1532	2432	Off water = RV Tieton
1540	2440	off water = RV Discovery.
1555	2455	Depart Evans campground

Page 27 | Teck American Inc Sediment Facies Mapping | 10-7-18 DAS 10-7-18
ADCP + Bottom Imaging Task RV Tiglon

0725 NM + JS Arrive Evans CG Boat Launch
0735 (1435) Tailgate Meeting (Notes in Field Supervisor Logbook)
~~0735~~ DAS 10-7-18 Weather 31°F high overcast wind 1 mph E
0750 JS Board RV Tiglon
0755 Using 600 Khz unit today
0825 Take control Point at CP-2, EVANS base 1524-1525 UTC 60 sec
measured N = 6322246.55 E = 2319793.21 Z = 1289.44

PDT	UTC	
		Crew Rene Thadeau, Jeff Wilson, Ryan McElhiecy Maggie McKeon - Gravity, Jeff Johnson - Jacobs Josie Smith AECOM
0847	1547	RV Tiglon depart Evans CG boat ramp Head toward RM 709
0855	1555	Deploy ADCP unit MM + JW Calibrate still camera (RM) MM Run ADCP Diagnostics
0858	1558	Compass calibration (MM)
0907	1607	Start ADCP Station 095-03
0912	1612	Finish N = ~~6241401.06~~ DAS 10-7-18 624201.25 E = 2316401.06 WD = 83.1
~~0917~~ DAS 10-7-18		
0921	1621	Start Video, collect still image
0923	1623	Frame in water
~~0923~~ DAS 10-7-18		
0924	1624	Camera on bottom N = 624201.25 E = 2316398.43
~~0928~~ DAS 10-7-18		WD = 83.2 ft Image Collected Sand + Cobbles
0928	1628	Frame back on deck camera off
0931	1631	Start ADCP Station 095-04
0936	1636	Finish N = 624048.42 E = 2316378.15 WD = 83.7 Start video, collect still image
0938	1638	Frame in water
0939	1639	Frame on bottom N = 624047.22 E = 2316379.68 WD = 84.9 Image Collected Cobbles + Sand
0941	1641	Frame back on deck. video off
0944	1644	Start ADCP station 095-05
0949	1649	Finish N = 623930.69 E = 2316358.66 WD = 80.9
~~0948~~ DAS 10-7-18		Start video, collect still image
		Frame in Water
0950		Camera on bottom

Josie Smith 10-7-18

Scale: 1 square = _____

Page 28 | RV Tieton ~~JAS 10-7-18~~ | 10-7-18

PDT	UTC	Log of Activity
		N = 623930.07 E 2316355.87 WD 83.3
0952	1652	Image Collected, Sand and / Boulder
0953	1653	Frame on deck video off
1004	1704	Start ADCP Station 095-06
1010	1710	Finish E = 2316331.71 N = 623754.24 WD = 85.5
1012	1712	Start Video collect still image
		Frame in water
1013	1713	on bottom E = 2316330.53 N 623754.62 WD = 87.3
		Image collected Sand & large Boulder
1014	1714	Frame on deck video off
1017	1717	Start ADCP Station 095-07
1022	1722	Finish E = 2316298.67 N = 623542.07 WD = 88.3
		Start video collect still image
1023	1723	Frame in water
1024	1724	Frame on bottom E = 2316295.59 N-62354.04 WD = 86.2
		Image Collected Bedrock in frame, boulder, gravel
1026	1726	Frame on deck, video off
1029	1729	Start ADCP Station 095-08
1034	1734	Finish E = ~~62316~~ JAS 07-18 2316271.73 N = 623372.34 WD = 82.4
		Start video collect still image
1035	1735	Frame in water
1037	1737	Frame on bottom E = 2316267.07 N = 623370.79 WD = 82.6
		Image Collected Cobble + gravel
1038	1738	Frame on Deck, Video off
1038	1738	Weather 44° F Cloudy high over cast wind 2mph E
		water temp 56.28° F
1042	1742	Start ADCP Station 095-09
1047	1747	Finish E = 2316238.43 N = 623163.93 WD = 73.9
		Start video collect still image
~~104~~ JAS 10-7-18		Frame in Water
1048	1748	Frame on Bottom E = 2316234 N = 623160.65 WD = 73.4
		Image collected, gravel + cobble
1051	1751	Frame on deck video off
1058	1758	Start ADCP Station 096-09
1103	1803	Finish E = 2316560.24 N = 623504.85 WD = 79.2
		Start video collect still image
1104	1804	Frame in water
		Frame on bottom ~~E~~ E-2316558.20 N = 623506.05 WD = 80.1
		Image Collected Bedrock ledge, cobble + gravel

Josie Smith 10-7-18

Rite in the Rain NSN: 7530-01-577-8666 Scale: 1 square = ______

RV Tiekon Log of Activi JAS 10-7-18

10-7-2018

PDT	UTC	
1107	1807	Frame on deck video off
1109	1809	Start ADCP station 096-08
1114	1814	Finish E=2316420.52 N=623554.26 WD=86.8
		Start video, collect still image
1115	1815	Frame in water
		Image collected possible bedrock, cobble + gravel
		Frame on bottom
		E=2316416.32 N=623550.72 WD=89.8
1119	1819	Frame on Deck video off
1121	1821	Start ADCP station 096-07
1126	1826	Finish E=2316333.24 N=623584.81 WD=89.1
		Frame in water
1127	1827	Frame on bottom E=2316328.89 N=623583.11 WD=87.6
1126	1826	Start video, collect still image
1127	1827	Image collected rock on edge, gravel
1130	1830	Frame on deck video off
1133	1833	Start ADCP station 096-06
1138	1838	Finish E=2316625.14 N=623659.02 WD=86.6
1138	1838	Start video, collect still image
1139	1839	Frame in water
1140	1840	Frame on bottom E=2316421.82 N=623657.08 WD 86.3
		Image collected Bedrock with sand
1143	1843	Frame on deck video off
1145	1845	Start ADCP Station 096-05
1150	1850	Finish E=~~2316~~ 2315983.45 N=623708.29 WD=87.7
1150	1850	Start video, collect still image
1151	1857	Frame in water
1152	1852	Frame on bottom E=~~2315~~ 2315977.06 N=623705.1 WD=88.3
		Image collected Large rock sandy
1154	1854	Frame on Deck video off
1157	1857	Start ADCP Station 096-04
1202	1902	Finish E=2315796.33 N=623775.14 WD=88.7
1202	1902	Start video collect still image
		Frame in water
1203	1903	Frame on bottom E=2315793.24 N=623772.03 WD=89.1
1204	1904	Image collected bedrock, sand
		Frame on deck video off

Josie Stitt 10-7-18

Scale: 1 square = _____

RV Tieton JAS 10-7-18 10-7-18

Activity log

PDT	UTC	
1208	1908	START ADCP & Station 096-03
1213	1913	Finish N=2315612.89 E=623840.26 WD=88.3 Start video, collect still image Frame in water
1214	1914	Frame on bottom image collected bedrock, sand E=2315612.06 N=623837.52 WD=90.4
1217	1917	Frame on deck video off
1219	1919	Start ADCP Station 096-02
1225	1925	Finish N=2315470.51 E=623890.54 WD=73.8 Start video collect still image Frame in water
1227	1927	Frame on bottom image collected boulder+sand E=2315473.51 N=623889.09 WD 73.7
1229	1929	Frame on deck video off
1253	1953	Start ADCP Station ~~096-01~~ JAS 10-7-18 097-03
1259	1959	Finish N=2314763.31 E=623469.49 WD=82.9 Start video, collect still image Frame in water
1301	2001	Frame on bottom image collected boulders, sand E=2314757.16 N=623470.5 WD=83.8
1302	2002	Frame on deck video off
1305	2005	Start ADCP Station 097-04
1310	2010	Finish E=2314812.18 N=623326.99 WD=85.7
1310	2010	Start video, collect still image
1311	2011	Frame in water
1312	2012	Frame on bottom image collected bedrock, sand N=623325.36 E=2314807.61 WD=91.9
1315	2015	Frame on deck video off
1317	2017	Start ADCP Station 097-05 Duplicate
1323	2023	Finish E=2314862.53 N=623185.62 WD=88.1
1317	2017	Change battery on still camera + re-calibrate
1327	2027	Start video, collect still image
1330	2030	Frame in water
1332	2032	Frame on bottom, collect image bedrock an edge, sand some coarse E=2314859.07 N=623178.56 WD=89.3
1339	2039	Frame on deck video off
1337	2037	Collect duplicate image

Josie Smith 10-7-18

Rite in the Rain NSN: 7530-01-577-8866 Scale: 1 square = _____

RV Tieton Activity Log 10-7-18

10-7-18

PDT	UTC	
1341	2041	Start ADPC station 097-06
1346	2046	Finish E=2314913.56 N=623044.01 WD=82.6
1346	2046	Start video, Collect still image
1346	2046	Frame in water
1348	2048	Frame on bottom, image collected bedrock
		E=2314912.55 N=623041.38 WD=83.6
1350	2050	Frame on deck video off
1353	2053	Start ADPC Station 097-07
1359	2059	Finish E=2314965.04 N=622901.90 WD=86.4
		Start video, collect still image
		Frame in water
1401	2101	Frame on bottom, image collected gravel & Sand
1404	2104	E=2314962.91 N=622904.76 WD=86.7
1404	2104	Frame on deck video off
1407	2107	Start ADCP station 097-08
1412	2112	Finish E=2315012.29 N=622761.12 WD=82.9
1412	2112	Start video, collect still image
1413	2113	Frame in water
1414	2114	Frame on bottom collect image cobble, sand
1417	2117	Frame on deck video off
		N=622762.40 E=2315014.0 WD=84.2
1422	2122	Start ADCP Station 097-09
1427	2127	Finish E=2315066.04 N=622619.61 WD=79.2
1427	2127	Start video, Collect still image
		Frame in water
1428	2128	Frame on bottom, collect still image Cobble, sand
		E=2315061.59 N=622618.39 WD=77.1
		Frame on deck, video off
1438	2138	Start ADCP Station 098-10
1443	2143	Finish E=~~2315~~ 2314163.53 N=622197.16 WD=63.4
1443	2143	Start video, Collect still image
1444	2144	Frame in water
1445	2145	Frame on bottom, collect image gravel, coarse
		E=2314167.68 N=622197.57 WD=64.1
1447	2147	Frame on Deck video off

Joni Smith 10-7-18

Scale: 1 square =

Page 32 | RV Tieton | 10-7-18

Activity Log

JAB 10-7-18

PDT	UTC	
1451	2151	Start ADCP Station 098-09
1456	2156	Finish E = 2314102.89 N = 622336.24 WD = 83.7
		Start Video Collect still image
		E = 2314104.72 N = 622339.60 WD = 82.5
1457	2157	Frame in Water
		Frame on bottom collect image Boulders, gravel, sand
1500	2200	Frame on deck, video off
1503	2203	Start ADCP Station 098-08
1508	2208	Finish E = 2314039.65 N = 622478.03 WD = 83.9
1508	2208	Start video, collect still image
1509	2209	Frame in water
1510	2210	Frame on bottom, collect image Gravel
1514	2214	Frame on deck video off
		N = 2314037.98 E = 622475.86 WD = 85.5
1517	2217	Start ADCP Station 098-07
1522	2222	Finish E = 2313978.26 N = 622618.21 WD = 91.1
		Start video, collect still image
1523	2223	Frame in water
1525	2225	Frame on bottom, collect image Sand, Fine gravel
		~~N~~ JAB 10-7-18 E = 2313979.91 N = 622619.23 WD = 89.2
1526	2226	Frame on deck video off
1528	2228	Start ADCP Station ~~098-08~~ JAB 10-7-18 098-06
1533	2233	Finish E = 231916.31 N = 622759.38 WD = 86.6
1533	2233	Start video, collect still image
		Frame in water
1535	2235	Frame on bottom Collect still image Sand, some black
		E = ~~2313919~~ JAB 10-7-18 2313919.71 N = 622760.21 WD = 87
1537	2237	Frame on deck, video off
1539	2239	Start ADCP Station 098-05
1544	2244	Finish E = 2313853.34 N = 622900.37 WD = 98.8
1543	2243	Start Video, collect still image
1544	2244	Frame in water
1545	2245	Frame on bottom collect still image Sand, some black
		E = 2313849.91 N = 622898.48 WD = 96.9
		Frame on deck, video off

Josie [signature] 10-7-18

Rite in the Rain
NSN: 7530-01-577-8866
Scale: 1 square = ________

RV Tieton
Activity Log

JAS 10-7-18

10-7-18

PDT	UTC	
1549	2249	Start ADCP Station 098-04
1554	2254	~~E~~ (JAS 10-7-18) Finish E=2313792.0 ~~E~~ N (JAS) =623041.81 WD=80.5 ft
1553	2253	Start Video, collect still image
1554	2254	Frame in Water
1556	2256	Frame on bottom image collected bedrock w/sand
		E=2313794.46 N=623038.57 WD= 78.5 ft
1557	2257	Frame on deck video off
1559	2259	Start ADCP Station 098-03
1603	2303	Finish E=2313727.66 N=623180.33 WD=74.5
1604	2304	Start Video, collect still image
1604	2304	Frame in Water
1605	2305	Frame on bottom, image collected Bedrock, silt
		E=2313721.96 N=623183 WD= 79.1
1608	2308	Frame ondeck video off
1602	2302	Weather 53°F highovercast wind 2mph SW
		water temp 56.84°F
1615	2315	Start ADCP Station 099-03
1620	2320	Finish E=2312764.97 N=622928.13 WD=77.5
1619	2319	Start video, collect still image
1620	2320	Frame in water
1622	2322	Frame on bottom, image collected large cobble, fine sand
		E=2312764.63 N=622923.03 WD = 75.9
1623	2323	Frame on deck video off
1625	2325	Start ADCP Station 099-04
		Finish E=2312797.32 N=622770.31 WD= 91.2
1630	2330	Start Video, collect still image
		Frame in Water
1633	2333	Frame on bottom, ~~co~~ (JAS) image collected cobbles, sand
		E=2312797.26 N=622771.78 WD= 91.1
1634	2334	Frame ondeck, Video off
1636	2336	Start ADCP Station 099-05
1641	2341	Finish E=2312831.97 N=622611.64 WD=92.2
1642	2342	Start video collect still image, frame inwater
1643	2343	Frame on bottom, image collected
		E=2312830.09 N=622612.32 WD= 91.7
1646	2346	Frame on deck, Video off
1647	2347	Pullup ADCP Unit, Return to boat Launch
1705	2405	~~Arrive Boat Launch Depart RV Tieton~~

Josie S[illegible] JAS 10-7-18

Scale: 1 square = ________

0730 NM, SH, JS, DM Arrive at Evan Campground.
0740 Tailgate meeting. - Discuss not jumping off vessels; fatigue.
0823 RV Discovery on water w/ CNI 1 ; CP-2 control pt check ✓
0840 RV Tieton on water w/ CNI 2 (Tieton)

Tailgate Attendees =

RV Tieton
- Nicky Moody (NM) AECOM, SSO + Field Supervisor.
- René Trudeau (RT) Gravity, Captain
- Jeff Wilson. (JW) Gravity; QA lead + Deckhand
- Ryan McElrece (Gravity) RM, Imagery lead
- Maggie McKeon (Gravity) (MM), ADCP lead
- Jeff Johnson (Jacobs) EPA observer
- Denyone McDonald (DM) Visitor, AECOM

RV Discovery
- Stu Holmes AECOM (SH) ~~- New day~~ 1st day out.
- Josie Smith AECOM (JS)
- Mike Duffield Gravity (MD)
- John Staly DEA (JS) MBES task lead

Evans Base station
- Dave Williams - Base station lead (DW)

CNI 1
- Josh Weatherman
- Rick Wilson

CNI 2
- Joseph Graves
- Brandon Hoover

0904 ADCP (1200 kHz deployed) - Camera + video calibration complete
0905 ADCP Diagnostic test complete - pass.

[complete shallow water stations today]

0907	1607	Start compass calibration - pass	1.0°
0912	1612	compass Evaluation - pass	0.3°
0917	1617	Motor to station 094-10 --> start ADCP. E = 2318304.93; N = 624179.12; WD = 38.8 ft.	
0922	1622	Finish ADCP; video on; Still image collected on deck.	
0923	1623	Frame in water	
0924	1624	Frame on bottom.; E = 2318304.19 N = 624177.04	WD = 37.7 ft.
0925	1625	Image collected = Cobbles, gravels, sand mix.	
0927	1627	Frame on deck.	

Alex Staly

10-8-18 R/V Tiffon ADCP + Imaging

PDT	UTC	Log of activity
0932	1632	Start ADCP N = 623402.98 ; E = 2316846.92 ; WD = 44.0 ft. 096-10
0936	1636	Finish ADCP ; Video + Still Image
0937	1637	Drop camera frame in H2O.
0938	1638	Frame on bottom; N = 623402.98; E = 2316846.92; WD = 43.3ft.
0939	1639	Collect Image = cobbles, sand.
0941	1641	Frame on deck. ; Video off
0942	1642	Motor to 095-10
0943	1643	Start ADCP. N = 622950.49 ; E = 2316204.99 ; WD = 50.1 ft.
0948	1648	Stop ADCP ; Start video on deck + image collected.
0949	1649	Frame in water.
0950	1650	Frame on bottom; N = 622951.06, E = 2316199.80 ; WD = 44.1 ft.
0952	1652	Frame on deck; Video off
0953	1653	Motor to 097-10
1000	1700	ADCP started. N = 622478.19 (NM) ; E = 2315115.42 ; WD = 55.2 ft.
1005	1705	Stop ADCP, Start video on deck + image collected
1006	1706	Frame in water.
1007	1707	Frame on bottom; N = 622475.11, E = 2315110.83; WD = 51.6 ft
1009	1709	Frame on deck ; video off
1010	1710	Motor to ~~099-10~~ (NM) ~~100-10~~ (NM) 100-02 (Other 2 Stations were too deep)
1022	1722	ADCP started N = 623002.99 ; E = 2311989.06; WD = 43.0 ft
1027	1727	Stop ADCP; Start video on deck + image collected.
1028	1728	Frame in water
1029	1729	frame on bottom ; N = 623003.32 ; E = 2311988.49 ; WD = 44.1 ft
1031	1731	Frame on deck; video off
1032	1732	ADCP Started at 100-01 ; E = 2311952.89; N = 623167.79; WD = 26.3 feet
1037	1737	Stop ADCP ; Start video on deck + image collected.
1038	1738	frame in water
1039	1739	frame on bottom ; ~~E~~ = 2311955.93 ; N = 623167.74 ; WD = 25.4 ft
1042	1742	frame on deck; video off. "until bed has Stabilized"
		* Change freq = 1 min on bottom requirement. "until sediment settled on video ~~displace~~ (NM) ~~has~~ monitor." Safety / timing DUP to 1min?
1045	1745	ADCP Start @ 99-01 ; E = 2312699.02 ; N = 623243.43
1050	1750	Stop ADCP ; Video recording + image collected. WD = 23.4 ft
		frame in Water
1051	1751	frame on bottom, E = 2312700.55 N = 623244.28 WD = 24.0 ft.
1052	1752	Image Collected = Sand (some green weeds + woody sticks)

Lilly ready — NM

Scale: 1 square = _____

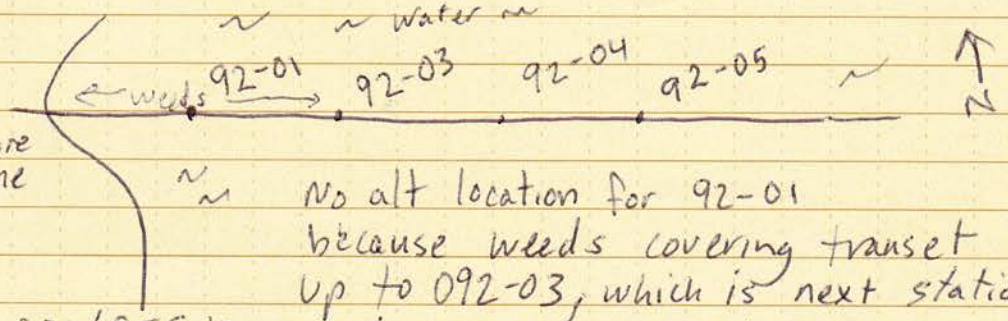
PDT	UTC	Log of activity
1053	1753	Motor to 099-02
1054	1754	ADCP started E = 2312732.29; N = 623084.81; WD = 36.6 ft
1059	1759	ADCP Stopped; Video Recording; image collected.
1100 ~~1000~~ NM	1800	Frame on bottom E = 2312732.04; N = 623082.17; WD = 36.4 ft.
1101 ~~1001~~ NM	1801	Image Collected = sand.
1103 ~~1003~~ NM	1803	Frame on deck, video off.
1104 ~~1004~~ NM	1804	Motor to 098-02
1106 ~~1006~~ NM	1806	ADCP Started. E = 2313665.60 N = 623322.49 WD = 29.6 ft
1111	1811	Stop ADCP; Start video on deck; image collected on deck.
1112	1812	Frame on bottom; E = 2313666.72 N = 623321.64 WD = 30.8 ft
1113	1813	Image collected = sand w/ trace weeds.
1114	1814	Frame on deck; video off.
1115	1815	Motor to 098-01
1117	1817	Start ADCP; E = 2313604.30; N = 623463.77; WD = 16.6 ft.
1126	1826	Stop ADCP; Start video on deck; image collected on deck.
1127	1827	Frame on bottom; E = 2313609.76; N = 623464.11; WD = 16.2 ft
1128	1828	Image collected = Significant weeds.
1129	1829	Frame on deck; video off.
~~1130~~	1830	Motor to 097-01 ~moved ½ way to 097-02; as visual on NM Significant weeds
1133	~~1833~~	Start ADCP; E = N = WD = ft
		Stop ADCP; start video + ~~take~~ image on deck.
		Frame on bottom; E = ; N = WD = ft
		Image collected =
		Frame on deck; video off. NM — Abandoned
1135	1835	Abandon for now 097-01 as significant weeds observed. NM WD =
1141	1841	Start ADCP @ 097-02; E = 2314712.54; N = 623609.45; ~~5.6~~ 56.7 ft
1145	1845	Stop ADCP; start video + take image on deck.
1146	1846	Frame in water
1147	1847	Frame on bottom; E = 2314707.55; N = 623611.38; WD = 55.6 ft.
1148	1848	Collected image = Sand + Silt - compacted. maybe bedrock.
1149	1849	Frame on deck; video off.
1150	1850	Motor ½ way between 097-02 + 097-01 to check 097-01 as alternate location due to weeds at original location
1152	1852	Start ADCP @ 097-01; E = 2314685.80; N = 623681.02; WD = 24.8 ft.
1158	1858	Stop ADCP; start video + take image on deck.
		Frame in H2O
		Frame on bottom; E = 2314681.82; N = 623682.72; WD = 26.5 ft
1200	1900	Image collected; Silt w/ moderate short weeds.
1202	1902	Frame on deck, video stopped — Ken Leedy — NM

PDT	UTC	
1204	1904	Start ADCP @096-01; E = 2315325.34, N = 623942.25, WD = 35.4ft.
1208	1908	Stop ADCP, start video & take still image on deck.
1209	1909	Frame in water
1210	1910	Frame on bottom; E = 2315320.11; N = 623947.31; WD = 33.9ft.
1211	1911	Image collected - Cobbles, Sand. visible
1212	1912	Frame on deck, video stopped. 51.5
1217	1917	Start ADCP @ 095-01; E = 2316441.53; N = 624453.82; WD = ~~44~~ ft nm
1222	1922	Stop ADCP; Start video; take still image on deck.
1223	1923	Frame in water
1224	1924	Frame on bottom; E = 2316436.87; N = 624452.51; WD = 47.1 ft.
1225	1925	Image collected - Cobble
1226	1926	Frame on deck, video stopped
1229	1929	Start ADCP @ 094-01; E = 2316905.86; N = 624883.49; WD = 25.3 ft
1234	1934	Stop ADCP; Start video; take still image on deck.
	~~19~~ nm	Frame in water
1235	1935	frame on bottom; E = 2316904.90 N = 624881.09 WD = 25.2 ft
1236	1936	Image collected - Silt + green weeds
1237	1937	Frame on deck; Video stopped
		Stop for lunch; D.M departs vessel via CNI2.
1259	1959	Start ADCP @ 093-04; E = 2317879.84; N = 625774.45, WD =
1306	2006	Stop ADCP; Start video; take still image on deck. 24.8 ft
1307	2007	frame on bottom; E = 2317876.39; N = 625770.42, WD = 24.8 ft.
1308	2008	Image ~~collected~~ nm Collected. - Sand/Silt. some vegetation.
1310	2010	Frame on deck; video stopped.
1315	2015 nm	~~Start ADCP @~~ 093-03; ~~E =~~ nm → on island (inundated now). ↳ station @ original target was too shallow. Abandoned location → ~3 feet of H_2O. other stations close = Can see cobbles
1322	2022	Now @ 093-02 - Start ADCP. E = 2317112.66; N = 626502.25, WD = 17.8 ft.
1328	2028	Stop ADCP; start video & take still image on deck.
		~~frame on bottom; E = 2317112.66; N = 626502.25 WD =~~ nm
1329	2029	Frame on bottom; ~~E = 2317111.00; N = 626503.10 WD =~~
1330	2030	Image collected; Missed GPS point. + water depth; logged
1332	2032	frame on deck; video stopped.
1335	2035	start ADCP @ 093-01; E = 2316711.80; N = 626883.92; WD = 22.3 ft
1342	2042	Stop ADCP. start video & take still image on deck.
1343	2043	frame on bottom; E = 2316709.19; N = 626881.64; WD = 22.5 ft
1344	2044	Image collected = silt
1345	2045	frame on deck

NM

Scale: 1 square = _____

PDT	UTC	
1355	2055	092-01 = dense weeds visible → + ADCP not working.
1401	2101	@ 092-03 start ADCP - → from vessel deck.



No alt location for 092-01 because weeds covering transet up to 092-03, which is next station.

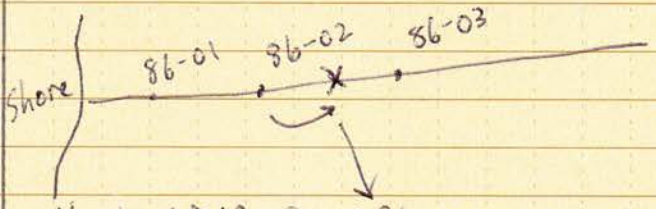
E = 2316955.17, N = 626280.98; WD = 18.2 ft.

1407	2107	Stop ADCP at 092-03; start video + take image on deck.
1409	2109	Frame on bottom; E = 2316953.53; N = 626281.36; 17.7 ft.
1410	2110	Image collected ½ weeds; ½ silt/sand.
1411	2111	Frame on deck, video off
1419	2119	Start ADCP at 092-04; E = 2317651.63; N = 626208.57; WD = 11.7 ft.
1425	2125	Stop ADCP; start video + take image on deck.
1426	2126	Frame on bottom → weeds only.
1427	2127	Image collected - E = 2317652.49, N = 626207.77, WD = 12.1 ft.
1428	2128	Frame on deck, video off.
1429	2129	Motoring to 092-05
1434	2134	Start ADCP at 092-05; E = 2317958.26; N = 626175.71; WD = 29.1 ft
1438	2138	Stop ADCP; Start video + take image on deck.
1439	2139	Frame on bottom; E = 2317958.57; N = 626171.53; WD = 29.5 ft.
1441	2141	Image collected = 1 cobble, trace - mod milfoil; sand.
1442	2142	Frame on deck, video off.
1444	2144	Motor to 092-06
1446	2146	Start ADCP; E = 2318492.11; N = 626119.44; WD = 42.3 ft.
1451	2151	Stop ADCP, start video + take image on deck.
1452	2252	frame on bottom; E = 2318494.17; N = 626118.25; WD = 51.4 ft.
1453	2253	Image collected = Cobbles + gravels
		Weather change - rain = light now.
1455	2255	Frame on deck; video off
1459	2259	Start ADCP at station 091-04 E = 2318340.19; N = 626775.66
1503	2203	Stop ADCP; Start video + take image on deck WD = 55.9 ft.
1505	2205	frame on bottom; E = 2318343.02; N = 626770.01; WD = 55.10 ft.
1506	2206	Image collected = Cobbles + gravels.
1507	2207	Frame on deck; video off.
1509	2209	Motor to Station 091-03 →

NM

PDT	UTC	
1510	2210	ADCP start 091-03 (collecting Dup) E = 2317959.49; N = 626873.21; WD = 22.3 ft.
1517	2217	~~Start/Stop~~ Stop / start primary & Dup ADCPs.
1524	2224	Stop dup ADCP; start video + take still image on deck.
1525	2225	Frame on bottom. E = 2317957.95; N = 626870.82; WD = 22.2 ft.
1526	2226	Image collected., gravels + sand = primary
1531	2231	~~Frame on deck~~ Image collected for duplicate
1533	2233	Frame on deck., battery change out. Video off.
1536	2236	Start ADCP @ 091-02; E = ~~2315~~ 2317577.20;
		Stop ADCP; ~~Video on, image collected~~ N = 626972.93; WD = 34.5 feet.
1542	2242	~~Frame on bottom~~ Focus, recalibration image - @ 1541 (2241)
		↳ Start video; image collected on deck.
1543	2243	Frame on bottom; E = 2317570.91; N = 626969.85; WD = 34.9 ft
1545	2245	Image collected.
1546	2246	Frame on deck; video off.
1552	2252	Start ADCP @ 091-01; E = 2316815.07, N = 627168.63; WD = 24.9 ft
1553	2253	Stop & needs to be in different mode.
1555	2255	Restart ADCP.
1600	2300	Stop ADCP; start video + collect ~~vide~~ still image on deck
1601	2301	Frame on bottom; E = 2316816.97; N = 627164.65; WD = 25.2 ft
1602	2302	Image collected.; Milfoil w/ silt/sand.
1604	2304	Frame on deck; video off.
1605	2305	Motor to 090-01 - image/video only as ADCP completed on 10/5/2018 *
1609	2309	Video recording started; still image on deck. Water Depth = 20.9 feet.
1610	2310	Frame on bottom., lots of silt puffed up. E = 2316862.85 ~~Image collected~~ - NM N = 627743.65
1612	2312	Something on camera - image collected..
1613	2313	Picked up frame to shake off sense then re-take
1614	2314	Re-take image at same point. after waiting 1 minute
1615	2315	Frame on deck; video off.
1616	2316	Motor to 090-03 - same image/video only. *
1617	2317	Video recording started; image on deck collected.
1619	2319	Frame on bottom; E = 2317707.95; N = 627679.13; WD = 38.8 ft.
1620	2320	Image collected.; silt.
1621	2321	Frame on deck, video off.
1622	2322	Motor to ~~085-01~~ 086-02

NM

PDT	UTC	
162		Moving ADCP location to alt due to weeds. at 086-02
		
1629	2329	Start ADCP @ 086-02 Alt. location. "X" E = 2317078.34 ; N = 630777.45 ; 49.60 ft = WD
1633	2333	Stop ADCP, Video started ; still image collected.
1635	2335	Frame on bottom. ; E = 2317083.15; N = 630773.89 ; WD = 50.1 ft.
1636	2336	Image collected. = gravels + cobbles.
1638	2338	Frame on deck, video stopped questionable if look image.
1639	2339	Checking camera to see if image collected.
1702	~~24~~ 2402	Camera wire fixed. - back to 086-02 as no image with lights + lasers. ; recalibrated focus.
1705	2405	Motor back to 086-02 Alt location
1706	2406	Video on ; image collected on deck
1707	2407	Frame on bottom ; ~~image co~~ vm
1708	2408	Image collected. - cobbles + gravels.
1709	2409	Frame on deck. 2317074.92; 630773.07 , ~~5~~ 353.7 feet
1723	2423	Tiefon at rock beach.
1740	2440	Tiefon off water.
1750	2450	all off H_2O.
1805	2505	RS, SH, NM offsite from Evans

RV Tieton - UCR RIFS - Sediment Facies Mapping | 10-9-18

ADCP + Imaging Task. NM

PDT	UTC	
0730	1430	JH + NM onsite at Evans boat ramp.
0740	1440	Tailgate meeting; discuss rain impacts - wet roads, boats - slippery Attendees = Dave Williams, DEA - "EVANS" basestation (DW) & ~~DE~~ NM RV Tieton - Maggie Mckeon (MM) ADCP Lead — Gravity - Ryan Mc Eliece (RM) Imaging Lead — ↓ - Jeff Wilson (JW) QA Lead / Deck hand - Jeff Johnson (JJ) EPA observer — Jacobs - René Trudeau (RT) Captain — Gravity - Nicky Moody (NM) Field supervisor / SSO — AECOM RV Discovery - Mike Duffield (MD) Captain. - Stu Holmes (SH) AECOM - John Staly (JS) MBES lead DEA CNI 1 - Eric Weatherman (EW) Captain - Rick Wilson (RW) CNI 2 - Josh Weatherman (JW) Captain. - Joseph Graves (JG)
0828	1528	Start logging Control point CP-2 check in.
0830	1530	Stop logging; RM + JW troubleshooting camera.
0855	1555	RV Tieton off trailer in water. - Motor to 099-06
0920	1620	Compass calibration 0.4° ⇒ ADCP using 600 kHz ADCP
0922	1622	Evaluation complete ⇒ ADCP 0.2° Error
		Heading ~~to~~ 099-06.
0925	1625	E = 2312864.40; N = 622454.52; WD = 88.3 ft.
0931	1631	Stop ADCP; ~~vide~~ NM Calibration on camera complete Video started; Still image on deck collected.
0934	1634	Frame on bottom.; E = 2312858.62; ~~N~~ NM N = 622452.99; WD = 88.6 ft.
0935	1635	Image collected. = Sand w/ black sand.
0937	1637	Frame on deck; video off.; motor to 099-07
0938	1638	ADCP started at 099-07
		E = 2312897.41; N = 622296.91; WD = 85.5 ft.
0944	1644	Stop ADCP; video started; image on deck collected.
0945	1645	Frame on bottom; E = ~~622~~ NM 2312890.42, N = 622297.03, WD = 85.7 ft.
0946	1646	~~Fram~~ Image collected = Sand
0948	1648	Frame on deck.

Nicky Moody NM

Scale: 1 square = _____

PDT	UTC	ADCP + Imaging Task Summary	10/9/18	Page 42
0950	1650	Start ADCP @ 099-08; E=2312931.90, N=622138.20, WD=88.6 ft.		
0952	1652	Weather = Clearing after overnight rain 45°F., partly cloudy No wind - flat water.		
0955	1655	Stop ADCP; image collect on deck; video started.		
0956	1656	Frame on bottom; E=2312925.28; N=622139.56; WD=90.1 ft.		
0959	1659	Frame on deck.; motor to 099-09; video off		
1010	1710	Start ADCP @ 099-09 ⟶ E=2312965.55; N=621979.66; WD=		
1015	1715	Stop ADCP; Image collected on deck; video started.	87.7ft	
1017	1717	Frame on bottom; E=621979.32 N=2312959.29 WD=86.8ft.		
1018	1718	~~Frame on deck; Video off; motor to~~ Image collected = cobbles,		
1020	1720	Frame on deck, video off, motor to 099-10	Sand.	
1021	1721	Start ADCP at 099-10; E=2312995.82, N=621823.02, WD=69.7 ft.		
1026	1726	Stop ADCP; Video Starts, image collected on deck.		
1027	1727	Frame on bottom, E=2312992.19, N=621825.29; WD=70.5ft		
1028	1728	Image collected = Sand.		
1030	1730	Frame on deck, video off, motor to 100-10		
1036	1736	Start ADCP at 100-10; E=2312272.46; N=621674.61; WD=76.2ft.		
1041	1741	Stop ADCP; Start Video, Still image collected on deck.		
1043	1743	Frame on bottom, E=2312272.54; N=621676.20; WD=74.4ft.		
1044	1744	Image collected = cobbles;		
1046	1746	Frame on deck; video off; motor to next station.		
1047	1747	start ADCP at 100-09; E=2312237.73; N=621838.93; WD=85.8ft		
1052	1752	Stop ADCP; Start video; still image collected on deck.		
1053	1753	Frame on bottom; E=2312236.14; N=621839.68 WD=		
1054	1754	Image collected = cobbles		
1056	1756	Frame on deck; video off; motor to next Station.		
1057	1757	Start ADCP at 100-08; E=2312202.15; N=622005.92; WD=87.7ft.		
1102	1802	Stop ADCP; Start video; Still image collected on deck.		
1104	1804	Frame on bottom; E=2312201.70; N=622007.82; WD=86.7ft.		
1105	1805	Image collected = Sand w/ black Sand.		
1107	1807	Frame on deck; video off, motor to next station.		
1109	1809	Start ADCP at 100-07; E=2312167.12; N=622171.11; WD=84.5ft.		
1114	1814	Stop ADCP; start video; still image collected on deck.		
1116	1816	Frame on bottom; E=2312167.07; N=622173.16; WD=85.2ft.		
1117	1817	Image = sand + cobbles.		
1119	1819	Frame on deck. Video off; motoring to next station.		
1120	1820	Start ADCP at 100-06; E=2312130.99; N=622337.27; WD=84.5ft		
1125	1825	Stop ADCP; Start Video; Still image collected on deck.		
1127	1827	Frame on bottom; E=2312135.33; N=622336.50; WD=84.1 ft.		
1128	1828	Image collected = Sand	NW	

PDT	UTC	
1130	1830	Start ADCP = 100-05 ; E = 2312095.51 ; N = 622504.53 ; Depth = 83.6 ft.
1135	1835	Stop ADCP ; start video ; Still image collected on deck.
1137	1837	Frame on bottom. E = 2312093.17 ; N = 622498.80 ; WD = 84.2 ft.
1138	1838	Image collected. = Sand
1139	1839	Frame on deck ; video off.
1142	1842	Start ADCP ; 100-04 ; E = 2312059.98 ; N = 622670.75 , WD = 82.4 ft.
1147	1847	Stop ADCP ; start video ; Still image collected on deck.
1148	1848	Frame on bottom ; E = 2312063.97 ; N = 622674.46 ; WD = 82.4 ft
1149	1849	Image collected = Sand (moderate bleck sand) . Frame on deck/video off
1152	1952	Start ADCP ; 100-03 ; E = 2312024.69 ; N = 622837.17 ; WD = 69.4 ft @1151
1157	1857	Stop ADCP ; start video ; Still image collected on deck.
1159	1859	Frame on bottom ; E = 2312025.06 ; N = 622838.98 ; 68.70 ft backed up already
1200	1900	Image collected = Cobbles + Sand
1202	1902	Frame on deck ; video off early – computer full. Delete old footage
1205	1905	Motor to 092-10 imagery only. – Lunch break. *
1233	1933	start recording ; still image collected on deck
1234	1934	frame on bottom ; E = 2319976.54 ; N = 625958.72 , 34.5 ft.
1235	1935	image collected. = silt ~~or sand~~ nn
1237	1937	frame on deck ; video off No ADCP on these as filling in missing
1238	1938	@ 091-10 – start recording ; still image collected on deck. *
1240	1940	frame on bottom ; E = 2320250.00 ; N = 626287.64 , 47.8 ft.
1241	1941	image collected = silt – cloud of silt after hitting bottom
1242	1942	frame on ~~bottom~~ deck, video off
1244	1944	@ 091-09 – start recording ; still image collected. *
1245	1945	on bottom ; E = 2319861.66 ; N = 626380.13 ; 24.0 ft.
1246	1946	image collected = sand/silt. – slight cloud. – bubble. give Frame a shake ; – re-set frame on bottom. ↳ on camera.
1247	1947	~~@ 090-09~~ nn – extend video 1 minute + retake image. better now ; no bubble. = sand/silt. ; some organics.
1249	1949	Frame on deck ; video stopped
1253	1953	@ 090-09 ⇒ start recording ; image on deck collected.
1254	1954	frame on bottom ; E = 2320253.70 ; N = ~~627502~~ 627502.69 ; Depth = 26.2 ft.
1255	1955	Image collected = sand/silt. some organics
1257	1957	Frame on deck ; video stopped
1259	1959	@ 090-10 ⇒ Start recording video ; image on deck collected
~~1300~~	~~1900~~ nn	Frame on bottom ; E = 2320854.46 N = 627460.01 WD = 40.9 ft.
1301	2000 2001	Image collected = silt/sand
1303	2003	Frame on deck ; Stop recording

Scale: 1 square = _____

PDT	UTC	
1306	2006	@ 089-10 Start recording; still image ✓ on deck.
1307	2007	Frame on bottom; E = 2320525.82; N = 628940.49, Depth = 28.6 Ft
1308	2008	Image collected = Silt + Organics
1309	2009	Frame on deck; Stop recording.
1310	2010	@ 088-10 Start recording, still image ✓ on deck.
1311	2011	Frame on bottom; E = 2320527.84; N = 629046.78; Depth = 24.7ft
1312	2012	Image collected = silt + some green weeds (clay maybe?)
1314	2014	Frame on deck; stop recording
1316	2016	@ 088-08 start recording; still image on deck - Re-do as prior image had no lasers. (on 10/5/18).
1318	2018	Frame on bottom - "088-08-DC-2ACT" E = 2319745.65; N = 629020.13 28.9 feet.
1319	2019	Image Collected - silt + some vegetation (green weeds)
1320	2020	Frame on deck, stop video
1321	2021	@ 089-08 Start recording; still image on deck.
1322	2022	Frame on bottom; E = 2319720.89; N = 628788.95; WD = 29.7 Feet
1323	2023	Image out of focus. ✓ ~~switching to manual on this location~~ NM
1325	2025	Gave it extra minute + re-took image; in focus now.
1326	2026	Frame on deck, Stop video. - Image = 'silty clay' based on sediment on frame.
1330	2030	@ 087-10; video started; Still image ✓ on deck.
1342	2032	Frame on bottom → E = 2320651.82; N = 629939.15; 21.9 feet = WD
1333	2033	~~Fram~~ Image Collected; Silt w/ veg
1334	2034	Frame on deck, Video stopped
		@ 087-09; video started; image on deck ✓ - At Alternate location as Weeds at target. ADCP at Alt location
1337	N2 2037	On bottom. E = 2320188.07; N = 629932.51; WD = 34.4 ft. Frame tilted + disturbed silt. - 2 mins on bottom.
1339	2039	Image collected.; cobbles, silt/sand.
1341	2041	Frame on deck; video stopped
1341	2041	@ 087-07; video started; image on deck ✓
1343	2043	Frame on bottom; E = 2320166.89; N = 629933.82 WD = 22.9 ft.
1344	2044	Image collected = silt
1345	2045	Frame on deck; Stop video
1347	2047	@ 087-08; video started; image on deck ✓
1348	2048	Frame on bottom; E = 2319874.64; N = 629937.82; WD = 31.0
1349	2049	Image collected = silt w/ vegetation.
1350	2050	Frame on deck; stop video
1354	2054	@ 87-06; video started; image on deck. ✓
1355	2055	Frame on bottom; E = 2319320.54; N = 629940.79; WD = 22.8 ft
2056	2056	Image collected = silt + veg; 3 total taken waiting on camera to focus. NM

PDT	UTC	
~~1400~~	2100	Frame on deck, motor to 85 Transect.
1404	2104	Re-calibrate camera; change out camera battery. Scouting 85 line for the depths to determine which Stations which we can use 600 Khz (>55ft deep) ADCP head.
1416	2116	Wind speed has increased slightly ~ 7 mph.
1421	2121	Start ADCP at 085-06 ; E = 2317899.16; N = 631973.57; WD = 82.9
1426	2126	Stop ADCP; video started; still image collected on deck.
1427	2127	Frame on bottom; E = 2317899.50; N = 631970.04; WD = 82.5 ft.
1428	2128	Image collected = cobbles, sands, black sand.
1430	2130	Frame on deck, Stop video.
1433	2133	Start ADCP at 085-05 ; E = 2317659.88; N = 631902.34; WD = 83.6 ft
1440	2140	Stop ADCP; video started; still image collected on deck., collecting Dup ~~#~~ ~~Frame on bottom; E~~ = Immediately start duplicate ~~+5~~ ADCP collection. ~~Image collected~~
1449	2149	~~Frame on deck~~ Stop ADCP Dup; Start video; Image on deck.
1446	2146	Frame on bottom; E = 2317660.29; N = 631898.58; WD = 83.2 ft.
1447	2147	Image collected; = ~~Cobble~~ Sand
		Wait 5 mins
1453	2153	Duplicate Image collected ✓ No change visible.
1455	2155	Frame on deck; stop video.
1459	2159	Start ADCP at 085-04; E = 2317482.96; N = 631848.70; WD = 81.5 ft
1503	2203	Stop ADCP; Video started; still Image collected on deck.
1505	2205	Frame on bottom; E = 2317479.54; N = 631848.87, 81.7 feet
1506	2206	Image collected = Sand.
1508	2208	Frame on deck, stop video
1512	2212	Start ADCP at 085-03; E = 2317170.29; N = 631754.16; WD = 71.2
1517	2217	Stop ADCP; Video started; still image collected on deck.
1518	2218	Frame on bottom; E = 2317172.33; N = 631751.27; WD = 71.1 ft
1519	2219	Image collected = cobbles
1521	2221	Frame on deck; stop video.
		085-02 = too shallow for 600 Khz ADCP - scouting ~~085-04~~
		085-01 = weedy, shallow also
		084-01 = too shallow.
1536	2236	Start 084-03 ADCP; E = 2317223.55; N = 632879.89; WD = 85.8 ft.
1540	2240	Stop ADCP; Video Started; Still image on deck.
1542	2242	Frame on bottom; E = 2317223.72; N = 632878.16, WD = 86.7 ft.
1543	2243	Sand = Image collected
1546	2246	Frame on deck; Stop Video.

Alex Neely

Scale: 1 square = _____

PDT	UTC	
1547	2247	Scouting for deep locations > 55 ft for 600 kHz ADCP.
1555	2255	Start ADCP at 083-01; E = 2315857.77; N = 635207.20; WD = 82.4
1601	2301	Stop ADCP; Start video; Still image collected on deck.
1603	2303	Frame on bottom; E = 2315820.48; N = 635202.24, WD = 82.7 ft.
1604	2304	Image collected = cobbles
1606	2306	Frame on deck; Stop video.
1608	2308	Start ADCP at 083-02; E = 2316323.90; N = 635215.19; WD = 92.3 ft
1613	2313	Stop ADCP; Start video; still image collected on deck.
1615	2315	Frame on bottom, E: ↑ N = 635211.58; WD = ~~91~~ 91.5 ft
1616	2316	Image collected = 2316323.87 ↑ = cobbles, sand.
1618	2318	Frame on deck; Stop video.
1625	2325	Start ADCP at 082-01; E = 2314612.42; N = 637075.21, WD = 67.2 ft.
1630	2330	Stop ADCP; start video; Still image collected on deck
1631	2331	Frame on bottom; E = 2314616.42; N = 637073.71; WD = 68.2 ft
1633	2333	Image collected = Sand + cobbles
1635	2335	Frame on deck; Stop video.
1636	2336	Start ADCP at 082-02; E = 2314832.44; N = 637126.71, WD = 85.8 ft
1641	2341	Stop ADCP; Start video; Still Image collected on deck
1642	2342	Frame on bottom; E = 2314833.84 N = 637123.87; 86.2 ft = WD.
1643	2343	Image collected = Cobbles - multicolored.
1645	2345	Frame on deck; Stop video.
1646	2346	Start ADCP at 082-03; E = 2315052.05; N = 637178.89, WD = 90.8
1651	2351	Stop ADCP; Start video; Still Image collected on deck
1652	2352	Frame on bottom; E = 2315047.61 N = 637178.41 WD = 91.7 ft.
1653	2353	Image collected = Silt + Sand
1656	2356	Frame on deck; Stop video.
1657	2357	Start ADCP at 082-04; E = 2315270.73; N = 637231.51; WD = 89.4 ft
1701	2401	Stop ADCP; Start video; Still Image collected on deck
1704	2404	Frame on bottom; E = 2315271.70; N = 637225.42; WD = 89.0 ft.
1705	2405	~~Image on deck;~~ Image collected = Sand + gravels
1707	2407	~~Tow~~ Frame on deck; Stop video
1720	2420	Motoring back to Boat ramp - Evans campground.
1723	2423	Arrive at beach next to ramp.
1732	2432	Tiefon off water.
		Discovery off water
1745	2445	All boats off water.
1800	2500	NM + SH depart evans campground for kettle falls →

NM

0730 | 1430 DH, NM, + JH on site at Evans Boat Launch
Tail Gate Safety Meeting: Discuss Weather conditions, driving safety
Wet Boat Ramps and Docks

Attendees:

Weather Conditions
Sunny 37°F No Wind

RV Tiston

David Hosé	AECOM Lead	
Nicky Moody	AECOM	
Maggie McKoon	ADCP Lead	Gravity
Ryan McElligott	Imagery Lead	Gravity
Ross Trudeau	Captain	Gravity
Jeff Wilson	QA Lead/Deckhand	
Lisa Antkiewicz	EPA Observer	

RV Discovery

Mike Duffield	Captain	
Stu Holmes	AECOM Lead	
John Staly	MBES Lead	

COM

Dave Williams Base Station

CNE 1

Eric Workman	Captain
Rick Wilson	

CNE 2

Dan Smith	Captain
Joseph Grimes	

0845 | 1545 Start logging Control Point CP-2
0849 | 1549 Stop logging Control Point
0859 | 1559 RV Tiston in Water Motor to 82-05
0925 | 1625 ADCP Diagnostic Test
0929 | 1629 Begin Compass Calibration Test 0.7° ⇒ ADCP using GOOKI ADCP
0935 | 1635 Evaluation Complete ⇒ ADCP 0.2°

Moving to 82-05 (All water Depths from Storm Sonar)
0942 | 1640 E: 7315489.77 N: 639282.57 WD: 71.8 ft
Start ADCP
0940 | 1646 Stop ADCP (Camera Calibration Completed at 1552)
Video Started, Still images on Deck Collected
0948 | 1648 Frame on Bottom E: 7315488.46 N: 639282.74 WD: 73.5
0950 | 1650 Image Collected Cobbles Gravels and Sand
0951 | 1651 Frame on Deck
0951 | 1651 Video off

Moving to 81-05
1000 | 1700 Start ADCP E: 7314107.94 N: 639652.97 WD: 80.6
1006 | 1706 Stop ADCP, video Started, Still photo on deck
1008 | 1708 Frame on Bottom E: 7314107.2 N: 639651.32 WD: 80.4
1008 | 1708 Image: Cobbles, gravels and sand
1011 | 1711 Frame on Deck Video Stopped

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Scale: 1 square = _____

PDT	UTC	RV Tolton | ADCP + Imagery Survey	10/10/18	Page 46
1012	1712	Start ADCP 81-04 E: 2313934.76 N: 639519.29	WD: 93.5 ft	
1018	1718	Stop ADCP, Start Video, Still photo on dock		
1020	1720	Frame on Bottom E: 2313933.64 N: 639515.03	WD: 93.4	
1021	1721	Image: Cobbles		
1023	1723	Frame on Dock Video Stopped		
1025	1725	Start ADCP 81-03 E: 2313762.34 N: 639386.51	WD: 84.3 ft	
1031	1731	Stop ADCP, Start Video, Still photo on dock		
1032	1732	Frame on Bottom E: 2313763.67 N: 639386.71	WD: 90.6	
1036	1736	Image: Bedrock with Cobbles and Sand on Surface		
1038	1738	Frame on Dock Video Stopped (Nicky Moody Departs RV Tolton)		
1045	1745	Start ADCP 81-02 E: 2313588.51 N: 639253.07	WD: 93.5 ft	
1050	1750	Stop ADCP, Start Video, Still photo on dock		
1052	1752	Frame on Bottom E: 2313589.18 N: 639251.13	WD: 87.7	
1053	1753	Image: Bedrock		
1055	1755	Frame on Dock Video Stopped		
1057	1757	Start ADCP 81-01 E: 2313417.03 N: 639122.78	WD: 57.8 ft	
1103	1803	Stop ADCP, Start Video, Still photo on dock		
1105	1805	Frame on Bottom E: 2313416.58 N: 639120.52	WD: 57.9	
1106	1806	Image: Gravel+Sand on Rock		
1107	1807	Frame on Dock Video Stopped		
1115	1815	Start ADCP 80-01 E: 2312357.44 N: 641743.73	WD: 71.1 ft	
1119	1819	Stop ADCP, start video, still photo on dock		
1121	1821	Frame on Bottom E: 2312354.45 N: 641738.81	WD: 70.0	
1122	1822	Image: Cobbles		
1124	1824	Frame on Dock Video Stopped		
1125	1825	Start ADCP 80-02 E: 2312552.56 N: 641441.90	WD: 63.9 ft	
1130	1830	Stop ADCP, start video, still photo no dock		
1131	1831	Frame on Bottom E: 2312555.92 N: 641437.78	WD: 63.8	
1132	1832	Image: Cobbles		
1134	1834	Frame on Dock Video Stopped		
1136	1836	Start ADCP 80-03 E: 2312751.98 N: 641639.30	WD: 68.4 ft	
1140	1840	Stop ADCP, start video, still photo on Dock		
1142	1842	Frame on Bottom E: 2312753.53 N: 641641.04	WD: 69.2	
1143	1843	Image: Cobbles		
1144	1844	Frame on Dock Video Stopped		
1147	1847	Start ADCP 80-04 E: 2312951.33 N: 641837.73	WD: 84.1	
1151	1851	Stop ADCP, start video, still photo on Dock		
1153	1853	Frame on Bottom E: 2312950.59 N: 641839.88	WD: 85.6	
1154	1854	Image: Sand		
1156	1856	Frame on Dock Video Stopped		

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PDT	UTC	
1158	1858	Duplicate at 80-05 Start ADCP E: 2313151.92 N: 642036.16 WD: 63.4
1203	1903	Stop ADCP ~~start video, still photo on dock~~ DOH 10/10/18
1203	1903	Start Duplicate ADCP
1207	1907	Stop ADCP, start video, still photo on Dock
1209	1909	Frame on Bottom (with Duplicate) E: 2313145.36 N: 642042.61 WD: 63.8
1211	1911	Image: Cobbles and Sand
1216	1916	Duplicate Image: Cobbles + Sand
1217	1917	Frame on Dock Video Stopped
1226	1926	Start ADCP 79-05 E: 2311967.70 N: 643928.74 WD: 63.6 ft
1230	1930	Stop ADCP, start video, still photo on Dock
1231	1931	Frame on Bottm E: 2311964.69 N: 643926.67 WD: 64.0
1233	1933	Image: Sand
1234	1934	Frame on Dock Video Stopped
1238	1938	Start ADCP 79-04 E: 2311635.82 N: 643771.98 WD: 78.2 ft
1243	1943	Stop ADCP, start video, still photo on Dock
1244	1944	Frame on Botton E: 2311637.63 N: 643766.91 WD: 77.7
1246	1946	Image: Gravel + Cobbles with Silt Matrix
1247	1947	Frame no Dock, Video Stopped
1250	1950	Start ADCP 79-03 E: 2311305.86 N: 643614.24 WD: 76.9 ft
1254	1954	Stop ADCP, start video, still photo on Dock
1255	1955	Frame on Botton E: 2311308.93 N: 643608.33 WD: 76.8
1257	1957	Image: Cobbles with Silt Matrix
1258	1958	Frame on Dock, Video Stopped
1310	2010	Start ADCP 78-03 E: 2310197.90 N: 645963.57 WD: 75.9 ft
1315	2015	Stop ADCP, start video, still photo on dock
1316	2016	Frame on Botton E: 2310196.65 N: 645962.65 WD: 75.0
1318	2018	Image: Cobbles and Boulders
1320	2020	Frame on dock, video stopped
1324	2024	Start ADCP 78-04 E: 2310483.11 N: 646098.83 WD: 70.9 ft
1329	2029	Stop ADCP, start video, still photo on dock
1330	2030	Frame on Bottom E: 2310484.55 N: 646099.71 WD: 71.9
1331	2031	Image: Cobbles
1334	2034	Frame on dock, video stopped
1334	2034	Start ADCP 78-05 E: 2310767.83 N: 646235.11 WD: 77.4 ft
1339	2039	Stop ADCP, start video, still photo on dock
1340	2040	Frame on Botton E: 2310769.28 N: 646232.00 WD: 77.0
1341	2041	Image: Sand
1343	2043	Frame on Dock, video stopped

David R Hoe 10/10/18

Scale: 1 square = _____

PDT	UTC	R/V Tieton — ADCP and Imagery Survey — 10/10/18 — Page 48
		~~Start ADCP 78 77-05 E: N: WD: Dont~~
1350	2050	Lost sufficient connection with GPS Base Station to continue up River with the current setup. The plan is to switch to the 1200 KH ADCP antenna and work back down River collecting Points in shallow water
1405	2105	Conduct ADCP Diagonistic Test (results ok)
~~1405~~	~~2105~~	~~Start~~
1409	2109	Begin Compass Calibration 1.0° ⇒ ADCP 1200 KH Head
1413	2113	Evaluation Complete ADCP 0.1°
1422	2122	Start ADCP 78-01 E: 2309626.90 N: 645697.49 WD: 44.4 ft
1426	2126	Stop ADCP, Start video, still photo on deck
1428	2128	Frame on Bottom E: 2309627.68 N: 645693.80 WD: 44.1
1429	2129	Image: Cobbles with Silt matrix
1431	2131	Frame on Deck, video stopped
1434	2134	Start ADCP 78-02 E: 2309913.95 N: 645829.05 WD: 50.8 ft
1438	2138	Stop ADCP, Start video, still photo on deck
1439	2139	Frame on Bottom E: 2309912.57 N: 645827.60 WD: 51.4
1440	2140	Image: Small Boulder and Cobbles
1442	2142	Frame on Deck, video stopped
1453	2153	Start ADCP 79-02 E: 2310978.01 N: 643455.78 WD: 53.7 ft
1457	2157	Stop ADCP, Start video, still photo on deck
1459	2159	Frame on Bottom E: 2310980.62 N: 643453.52 WD: 53.1
1500	2200	Image: Cobbles with Silt
1501	2201	Frame on Deck, video stopped
1504	2204	Start ADCP 79-01 E: 2310649.78 N: 643298.58 WD: 27.5 ft
1508	2208	Stop ADCP, Start video, still photo on deck
1510	2210	Frame on Bottom E: 2310647.62 N: 643298.48 WD: 25.4
1511	2211	Image: Sand and Silt
1516	2216	Duplicate Image: Sand and Silt
1517	2217	Frame on Deck, video stopped
1538	2238	Start ADCP 83-03 E: 2316793.73 N: 635774.02 WD: 35.4 ft
1545	2245	Stop ADCP, Start video, still photo on deck
1546	2246	Frame on Bottom E: 2312789.84 N: 635777.70 WD: 34.0
1547	2247	Image: Camera failed to trigger
1550	2250	Frame on Deck, video stopped (Crew swapping Battery) Fixing Trigger
1605	2305	There are too many woods at stations 83-04 and 83-05 for the ADCP to operate and this appears to be the case for this end of Transect 83. It is too shallow to sample between 83-04 and 83-03. These stations will be abandoned and will not be collected for ADCP

David R. Hose 10/10/18

Rite in the Rain

NSN: 7530-01-577-8866

Scale: 1 square = ______

PDT	UTC	RV Tioton | ADCP and Imagery Survey | 10/10/18	Page 49
1613	2313	START ADCP 84-05 E: 2318542.61 N: 632947.37	WD: 17.6ft
1618	2318	Stop ADCP, Start video, still photo on Deck	
1619	2319	Frame on Bottom E: 2318564.93 N: 632946.25	WD: 17.9
1620	2320	Image: Weeds	
1623	2323	Frame on Deck Video Stopped	
1628	2328 DST	START ADCP 84-04Alt E: 2317831.14 N: 632913.42	WD: 27.2ft
		Alternate Location moved toward Channel to clear the weeds at 84-04	
1632	2332	Stop ADCP, Start video, still photo on Deck	
1633	2333	Frame on Bottom E: 2317830.23 N: 632913.21	WD 32.2ft
1634	2334	Image: ~~Silt on Clay~~ Sandy Silt	
1636	2336	Frame on Deck, Video Stopped	
1640	2340	START ~~84~~ ADCP 84-02 E: 2316548.18 N: 632847.44	WD: 59.2ft
1645	2345	Stop ADCP, Start Video, still photo on Deck	
1645	2346	Frame on Bottom E: 2316546.82 N: 632848.77	WD 59.7
1647	2347	Image: Sand and Cobbles	
1649	2349	Frame on Deck, Video Stopped	
1653	2353	START ADCP 84-01 E: 2315872.22 N: 632818.94	WD: 26.3ft
1700	2400	Stop ADCP, Start Video, still photo on Deck	
1701	2401	Frame on Bottom E: 2315871.42 N: 632818.40	WD: 29.7
1702	2402	Image: Silt with Some Weeds	
1703	2403	Frame on Deck, Video Stopped	
1711	2411	START ADCP 85-01 Alternate E: 2316658.23 N: 631600.83	WD: 27.8ft
1715	2415	Stop ADCP, Start video, still photo on Deck	
1716	2416	Frame on Bottom E: 2316653.34 N: 631597.74	WD: 27.5ft
1717	2417	Image: Silt and Sand	
1719	2419	Frame on Deck, Video Stopped	
1730	2430	START ADCP 85-02 E: 2316759.51 N: 631631.20	WD: 34.4ft
1734	2434	Stop ADCP, Start video, still photo on Deck	
1735	2435	Frame on Bottom E: 2316755.80 N: 631633.30	WD: 33.9ft
1735	2436	Image: Silt and Sand	
1737	2437	Frame on Deck, Video Stopped	
1735	2435	Motoring Back to Evans Campground Boat Launch	
1755	2455	RV Tioton off the water	
1810	2510	RV Discovery off the Water	
1815	2515	All Boats off the Water	
		Weather Calm and 60°F No Wind	
1820	2520	DH + SH depart for Colville	

David A. Hoon 10/10/18

Scale: 1 square = _____

0730 | 1430 | Arrive at Evans Boat Launch

0745 | 1445 | Conduct Boat Launch H&S Meeting, discuss cold weather, slippery surfaces, Boat Safety, and effects of older Team Members Experiencing ankle swelling from being seated all day

Attendees:

- David Hose AECOM (Team Lead)
- Stuart Holmes AECOM
- Rene Taylor Gravity (Tiekon) — Mike Duffield Gravity (Discovery)
- Maggie Aitken McKoon Gravity — John Staly CDM ↓
- Ryan McElice Gravity
- Jeff Wilson Gravity
- Lisa Ratterink Jacobs EPA Oversight

Columbia Navigation: Eric Wetherman, Dan Smith, Joseph Graves, Rick Wilson

CDM Basestation: David Williams

0830 | 1530 | Began Control Point Calibration CP-2

0833 | 1533 | Completed Control Point Calibration

0845 | 1545 | Tiekon in The Water — (All Depths Measured from Stern of Boat)
Conducting Imagery Calibration
Weather: Sunny and Cold 32°F, No Wind, Forcast High 57°F

0855 | 1555 | ADCP Diagnostic Test

0900 | 1600 | Begin Compass Calibration 0.5° ⇒ using 1200KH ADCP

0906 | 1606 | Calibration Complete ADCP 0.3°

0906 | 1609 | Motor to Station 85-10

0913 | 1613 | Start ADCP 85-10 E: 2319163.32 N: 632354.05 WD: 30.2 ft

0920 | 1620 | Stop ADCP, start video, still photo on Deck

0922 | 1622 | Frame on Bottom E: 2319161.59 N: 632358.27 WD: 29.8

0923 | 1623 | Image: Sand + Silt with ~~Woods~~ A few Woods

0925 | 1625 | Frame on Deck, video stopped

0930 | 1630 | Start ADCP 85-09 Alternate E: 2318957.30 N: 632291.51 WD: 20.6 ft

0937 | 1637 | Stop ADCP, start video, still photo on Deck

0938 | 1638 | Frame on Bottom E: 2318958.50 N: 632296.24 WD: 20.0

0939 | 1639 | Image: Sand + Silt with A few Woods

0940 | 1640 | Frame on The Deck, Video Stopped

0943 | 1643 | Locations 85-07 and 85-08 were abandoned:

- 85-07 because water is too Shallow
- 85-08 because there are too many Woods for ADCP To obtain Usable Data

David R. Hose 10/11/18

Rite in the Rain NSN: 7530-01-5[illegible] Scale: 1 square = _____

PDT	UTC	
0948	1648	Motor to Station 83-03 To obtain Imagery That was Missed on 10/10/18
0954	1654	Start Video, still Photo on Deck
0955	1655	Frame on Bottom E: 7316790.83 N: 635277.03 WD: 33.1
0956	1656	Image: Cobbles, Gravel, sand + Silt
0957	1657	Frame on Deck, Video Stopped
1000	1700	Motoring to Transect 77
1007	1707	ADCP Diagostic Test for 600 KH ADCP antenna
1009	1709	Begin Compass Calibration 0.7°
1014	1714	Calibration Complete 0.1°
1020	1720	Start ADCP 77-02 E: 7309443.69 N: 648146.03 WD: 66.9 ft
1026	1726	Stop ADCP, start video, still photo on Deck
1028	1728	Frame on Bottom E: 7309444.44 N: 648140.58 WD: 65.8
1029	1729	Image: Sand Silt and Cobbles
1031	1731	Frame on Deck, video Stopped
1035	1735	Start ADCP 77-03 E: 7309771.12 N: 648248.50 WD: 58.6ft
1039	1739	Stop ADCP, start video, still photo on Deck
1041	1741	Frame on Bottom E: 7309774.12 N: 648245.54 WD: 58.8
1042	1742	Image: Cobbles + Sand
1044	1744	Frame on Deck, Video Stopped
1046	1746	Start ADCP 77-04 E: 7310100.63 N: 648352.16 WD: 69.0ft
1050	1750	Stop ADCP, start video, still photo on Deck
1052	1752	Frame on Bottom E: 7310097.81 N: 648353.96 WD: 70.3
1053	1753	Image: Cobbles + Sand
1055	1755	Frame on Deck, video stopped
1058	1758	Start ADCP 77-05 E: 7310428.35 N: 648454.03 WD: 61.3ft
1102	1802	Stop ADCP, start video, still photo on Deck
1104	1804	Frame on Bottom E: 7310429.42 N: 648449.65 WD: 61.9
1105	1805	Image: Cobbles and Sand
1107	1807	Frame on Deck, video stopped
1113	1813	Start ADCP 76-05 E: 7310510.60 N: 650341.96 WD: 62.5 ft
1117	1817	Stop ADCP, start video, still photo on Deck
1118	1818	Frame on Bottom E: 7310507.32 N: 650339.88 WD: 63.2
1119	1819	Image: Sand and Silt
1121	1821	Frame on Deck, video stopped
1123	1823	Start ADCP 76-04 E: 7310165.10 N: 650515.89 WD: 62.4 ft
1129	1829	Stop ADCP, start video, still photo on Deck
1130	1830	Frame on Bottom E: 7310165.11 N: 650510.36 WD: 60.8 ft
1131	1831	Image: Cobbles
1133	1833	Frame on Deck, video stopped

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Scale: 1 square = _____

PDT	UTC		
1135	1835	START ADCP 76-03 E: 2309892.55 N: 650688.40	WD: 63.9 ~~ft~~
1139	1839	Stop ADCP, start video, still photo on Deck	
1141	1841	Frame on Bottom E: 2309893.58 N: 650690.14	WD: 64.6
1142	1842	Image: Cobbles and Sand	
1143	1843	Frame on Deck, video stopped	
1145	1845	START ADCP 76-02 E: 2309477.36 N: 650862.48	WD: 58.70 ft
1149	1849	Stop ADCP, start video, still photo on Deck	
1151	1851	Frame on Bottom E: 2309479.86 N: 650861.20	WD: 58.7 ft
1152	1852	Image: Cobbles and Sand	
1154	1854	Frame on Deck, video stopped	
1210	1910	START ADCP 75-02 E: 2310715.31 N: 653064.18	WD: 87.2 ft
1215	1915	Stop ADCP, start video, still photo on Deck	
1216	1916	Frame on Bottom E: 2310717.87 N: 653060.71	WD: 87.5 ft
1217	1917	Image: Cobbles and gravel	
1219	1919	Frame on Deck, video stopped	
1223	1923	START ADCP 75-03 E: 2310893.38 N: 652927.67	WD: 90.1 ft
1228	1928	Stop ADCP, start video, still photo on Deck	
1229	1929	Frame on Bottom E: 2310893.45 N: 652929.59	WD: 90.4 ft
1230	1930	Image: Cobbles and Gravel	
1232	1932	Frame on Deck, video stopped	
1233	1933	START ADCP 75-04 E: 2311070.54 N: 652792.75	WD: 79.0 ft
1237	1937	Stop ADCP, start video, still photo on deck	
1239	1939	Frame on Bottom E: 2311066.98 N: 652793.2	WD: 79.8 ft
1240	1940	Image: Cobble, gravel and sand	
1241	1941	Frame on ~~Bottom~~ Deck, video stopped	
1243	1943	START ADCP 75-05 E: 2311248.40 N: 652658.19	WD: 87.7 ft
1249	1947	Stop ADCP, start video, still photo on Deck	
1248	1948	Frame on Bottom E: 2311245.74 N: 652658.59	WD: 87.2 ft
1249	1949	Image: Sand	
1252	1952	Frame on Deck, video stopped	
1301	2001	START ADCP 74-01 E: 2311997.12 N: 654765.89	WD: 65.9 ft
1308	2008	Start Duplicate ADCP (Changed Battery in Camera)	
1310	2010	Stop ADCP, start video, still photo on deck	
1312	2012	Frame on Bottom E: 2311996.77 N: 654960.53	WD: 69.0 ft
1313	2013	Image: Bedrock	
		~~Frame on Deck, video Stopped~~ DRH	
1318	2018	Duplicate Image:	
1320	2020	Frame on Deck, video stopped	

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PDT	UTC	RV Tiston | ADCP and Imagery Survey | 10/11/18 | Page 53		
1323	2023	Start ADCP 74-02 E: 2317351.65	N: 654668.78	WD: 71.7 ft
1327	2027	Stop ADCP, start video, still photo on deck		
1329	2029	Frame on Bottom E: 2317349.49	N: 654666.89	WD: 72.4 ft
1330	2030	Image: Bedrock and Cobble		
1332	2032	Frame on Deck, video stopped		
1334	2034	Start ADCP 74-03 E: 2312707.58	N: 654573.78	WD: 77.2 ft
1338	2038	Stop ADCP, start video, still photo on deck		
1340	2040	Frame on Bottom E: 2317704.48	N: 654570.94	WD: 77.6 ft
1341	2041	Image: Sand + Cobbles		
1342	2042	Frame on Deck, video stopped		
1401	2101	Location 74-05 was abandoned because of Too Many Weeds		
		Location 74-04 Too Shallow for 600 KH Antenna		
		Motoring to Transect 73		
1420	2120	Start ADCP 73-04 E: 2314387.40	N: 656749.61	WD: 78.3 ft
1424	2124	Stop ADCP, Start Video, still photo on deck		
1426	2126	Frame on Bottom E: 2314388.73	N: 656749.72	WD: 76.9 ft
1427	2127	Image: Cobbles and Sand		
1429	2129	Frame on Deck, video Stopped		
1432	2132	Start ADCP 73-03 E: 234095.85	N: 656757.28	WD: 79.1 ft
1436	2136	Stop ADCP, start video, still photo on Deck		
1438	2138	Frame on Bottom E: 2314095.17	N: 656451.93	WD: 82.7 ft
1439	2139	Image: Sand		
1441	2141	Frame on Deck, video Stopped		
1444	2144	Start ADCP 73-02 E: 2313805.40	N: 656661.62	WD: 69.1 ft
		~~Stop ADCP, start video, still photo on deck~~ DAH		
1448	2148	Start Duplicate ADCP 73-02		
		~~Frame on Bottom E:~~	~~N:~~	~~WD:~~ DAH
1453	2153	Stop ADCP, start video, still photo on deck		
1454	2154	Frame on Bottom E: 2313809.52	N: 656663.60	WD: 72.4 ft
1455	2155	Image: Bed Rock, Sand and Cobble		
1501	2201	Duplicate Image: Bed Rock, Sand and Cobble		
1503	2203	Frame on Deck, Video Stopped		
1504	2204	~~Start~~ DAH Crew switched out the 600 KH antenna for the 1200 KH antenna		
1512	2212	ADCP Diagnostics Test		
1518	2218	Begin Compass Calibration 0.1°	⇒ 1200 KH antenna	
1520	2220	Compass calibration complete 0.1°		

David R Hart

Scale: 1 square = _____

PDT	UTC	RV Tiktok | ADCP and Imagery Survey | 10/11/18 | Page 54	
1525	2225	Start ADCP at 73-01 E: 2313515.58 N: 656868.76	WD: 79.8
1531	2231	Stop ADCP, Start Video, still photo on deck	
1532	2232	Frame on Bottom E: 2313517.71 N: 656867.44	WD: 70.8
1533	2233	Image: Cobbles and Sand	
1534	2234	Frame on Deck, Video Stopped	
1543	2243	Start ADCP at 73-05 Alternate Primary Location was Too Shallow (Normal Resolution Mode) E: 2314483.08 N: 656181.43	WD: 71.7 ft
1548	2248	Start Duplicate ADCP at 73-05 in High Resolution Mode	
1554	2254	Stop ADCP, Start video, still photo on Deck	
1555	2255	Frame on Bottom E: 2314486.12 N: 656179.76	WD: 72.4 ft
1556	2256	Image: Cobbles, silt and Sand	
1557	2257	Frame on Deck, Video Stopped	
1606	2306	Start ADCP 74-04 Alternate E: 2312892.95 N: 654590.92 Alternate Location Chosen Because Primary Location Too Shallow	WD: 47.5
1610	2310	Stop ADCP, Start Video, still photo on deck	
1611	2311	Frame on Bottom E: 2312893.59 N: 654524.30	WD: 40.4
1612	2312	Image: Sand and Cobbles	
1614	2314	Frame on Deck, Video Stopped	
1622	2322	Start ADCP 75-01 E: 2310536.23 N: 653198.94	WD: 61.2 ft
1626	2326	Stop ADCP, Start video, still photo on deck	
1628	2328	Frame on Bottom E: 2310533.02 N: 653193.06	WD: 59.9
1629	2329	Image: Cobbles, gravel + sand	
1630	2330	Frame on Deck, Video Stopped	
1636	2336	Start ADCP 76-01 E: 2309133.18 N: 651036.79	WD: 45.1 ft
1642	2342	Stop ADCP, start video, still photo on deck	
1643	2343	Frame on Bottom E: 2309134.88 N: 651034.96	WD: 52.5
1644	2344	Image: Sand and Silt	
1645	2345	Frame on Deck, Video Stopped	
1653	2353	Start ADCP 77-01 E: 2309116.96 N: 648043.73	WD: 55.6 ft
1658	2358	Stop ADCP, start video, still photo on deck	
1659	2359	Frame on Bottom E: 2309116.24 N: 648041.89	WD: 57.1 ft
1700	2400	Image: Boulders and Cobbles	
1702	2402	Frame on Deck, Video Stopped	
1720	2420	Motor To Evans Campground Boat Launch	
1733	2433	Arrive At Boat Launch	
1830	0500	All Boats out of Water	
1815	0515	D.A. + S.H. Depart for Colville	

10/11/18

PDT	UTC	
0725	1425	Arrive at Northport boat launch
0735	1435	Conduct HAS tailgate meeting – go over man overboard procedures
0830	1530	Tieton in water, S+I onboard w/ Maggie, Rene, Ryan, John S. (Grant) and Lisa (Jacobs).
0845	1545	Began control Point Calibration CP-7
0850	1550	Complete control point calibration
0915	1615	Conducted imagery calibration Weather 45°F, partly cloudy, wind 1 mph WSW
0930	1630	ADCP diagnostics test
0933	1633	Begin compass calibration, 0.4° error
0934	1634	Conduct calibration evaluation, 0.1° error
0936	1636	Heading to ADCP 020-01
0948	1648	Start ADCP 020-01 E: 2384952.44 N: 723390.18 WD: 17.7'
0952	1652	Stop ADCP, start video, still photo on deck
0956	1656	Frame on bottom E: 2384948.74 N: 723386.25 WD: 16.8'
0957	1657	Image: cobbles and sand
0959	1659	Frame on deck, video stopped
1000	1700	ADCP 020-02 ~~aborted~~ obstructed – too shallow, Heading to ADCP 020-03
1002	1702	Start ADCP 020-03 E: 2384914.71 N: 723042.24 WD: 16.5
1007	1707	Stop ADCP, start video, still photo on deck
1009	1709	Frame on bottom E: 2384914.70 N: 723032.88 WD: 17.3
1010	1710	Image: Sand
1011	1711	Frame on deck, video stopped
1014	1714	Start ADCP 020-04 E: 2384898.00 N: 722894.00 WD: 33.1
1018	1718	Stop ADCP, start video, still photo on deck
1020	1720	Frame on bottom E: 2384897.70 N: 722894.73 WD: 32.3
1021	1721	Image: Gravel
1022	1722	Frame on deck, video stopped
1026	1726	Start ADCP 020-05 E: 2384883.51 N: 722765.21 WD: 39.6
1030	1730	Stop ADCP, start video, still photo on deck
1033	1733	Frame on bottom E: 2384885.18 N: 722763.47 WD: 33.5
1034	1734	Image: Gravel and cobbles
1036	1736	Frame on deck, video stopped
1045	1745	Start ADCP 020-06 E: 2384868.80 N: 722627.04 WD: 37.1
1049	1749	Stop ADCP, start video, still photo on deck
1051	1751	Frame on bottom E: 2384872.05 N: 722629.68 WD: 37.1
1052	1752	Image: Gravel and cobbles
1054	1754	Frame on deck, video stopped
1059	1756	Start ADCP 020-07 E: 2384852.83 N: 722489.75 WD: 24.9
1100	1800	Stop ADCP, start video, still photo on deck

Scale: 1 square = _____

PDT	UTC				
1102	1802	Frame on bottom	E: 2384851.08	N: 722494.56	WD: 23.9
1103	1803	Image: Gravel + cobbles			
1104	1804	Frame on deck, video stopped			
1113	1813	Start ADCP: 020-08	E: 2384841.44	N: 722359.98	WD: 15.2
1117	1817	Stop ADCP, start video, still photo on deck			
1120	1820	Frame on bottom	E: 2384836.64	N: 722366.70	WD: 14.5
1121	1821	Image: Gravel + cobbles			
1122	1822	Frame on deck, video stopped			
1125	1825	Start ADCP 020-09	E: 2384827.93	N: 722232.73	WD: 10.0
1130	1830	Stop ADCP, start video, still photo on deck			
1132	1832	Frame on bottom	E: 2384825.29	N: 722236.48	WD: 10.9
1133	1833	Image: Gravel + cobbles			
1134	1834	Frame on deck, video stopped			
1135	1835	Station 020-10 is obstructed (on land), Finished transect. Heading to 019-01			
1141	1841	Station 019-01 and 019-02 obstructed by weeds.			
1150	1850	Station 019-03 obstructed (on shore).			
1152	1852	Start ADCP 019-04	E: 2385679.48	N: 722342.65	WD: 14.9
1156	1856	Stop ADCP, start video, still photo on deck			
1158	1858	Frame on bottom	E: 2385678.48	N: 722343.58	WD: 14.8
1159	1859	Image: Sand, gravel and cobbles			
1200	1900	Frame on deck, video stopped			
1204	1904	Start ADCP 019-05	E: 2385616.82	N: 722145.64	WD: 23.8
1209	1909	Stop ADCP, start video, still photo on deck.			
1212	1912	Frame on bottom	E: 2385610.82	N: 722150.76	WD: 23.9
1213	1913	Image: Cobbles			
1215	1915	Frame on deck, video stopped			
1221	1921	Start ADCP 019-06	E: 2385575.76	N: 722019.54	WD: 29.4
1225	1925	Stop ADCP, start video, still photo on deck			
1227	1927	Frame on bottom	E: 2385578.47	N: 722024.35	WD: 27.9
1228	1928	Image: cobbles			
1229	1929	Frame on deck, video stopped			
1234	1934	Start ADCP 019-07	E: 2385530.52	N: 721880.72	WD: 34.3
1241	1941	Stop ADCP, start video, still photo on deck.			
1243	1943	Frame on bottom	E: 2385526.54	N: 721881.92	WD: 35.6
1244	1944	Image: cobbles			
1246	1946	Frame on deck, video stopped			
1249	1949	Start ADCP 019-08	E: 2385494.69	N: 721763.22	WD: 18.4
1253	1953	Stop ADCP, start video, still photo on deck			
1255	1955	Frame on bottom	E: 2385496.64	N: 721762.68	WD: 22.5

PDT	UTC					
1256	1956	Image: Cobbles on sand				
1257	1957	Frame on deck, video stopped				
1300	2000	Break (on shore)				
1331	2031	Tiebon on water, heading to next station (ADCP head up)				
1339	2039	Stations 018-09 and 018-10 and 018-08 deemed obstructed due to shallow water.				
1343	2043	Stations 018-01 and 018-02 deemed obstructed (too shallow).				
1344	2044	Put ADCP head down, heading to 018-03				
1349	2049	Start ADCP 018-03	E: 2386481.89	N: 722040.29	WD: 9,1	
1353	2053	Stop ADCP, start video, still photo on deck				
1354	2054	Frame on bottom	E: 2386478.04	N: 722039.80	WD: 10.7	
1355	2055	Image: Gravel and cobbles				
1357	2057	Frame on deck, video stopped				
1400	2100	Start ADCP 018-04	E: 2386446.38	N: 721935.10	WD: 20.1	
1404	2104	Stop ADCP, start video, still photo on deck				
1410	2110	Frame on bottom	E: 2386440.59	N: 721939.30	WD: 22.9	
1411	2111	Image: Gravel + cobbles				
1412	2112	Frame on deck, video stopped				
1414	2114	Start ADCP 018-05	E: 2386420.85	N: 721851.64	WD: 20.6	
1420	2120	Stop ADCP, start video, still photo on deck				
1422	2122	Frame on bottom	E: 2386426.22	N: 721858.60	WD: —	
1424	2124	Frame fell over after ~40s, no photo taken				
1427	2127	Frame on bottom (attempt #2)	E: 2386426.22	N 721858.60	WD: 24.6	
1428	2128	Image: boulders / bedrock				
1429	2129	Frame on deck, video stopped				
1435	2135	Start ADCP 018-06	E: 2386367.37	N: 721701.74	WD: 38.7	
1439	2139	Stop ADCP, start video, still photo on deck				
1442	2142	Frame on bottom	E: 2386373.94	N. 721702.04	WD: 34.8	
1443	2143	Image: cobble and bedrock				
1444	2144	Frame on deck, video stopped				
1448	2148	Start ADCP 018-07	E: 2386334.59	N: 721601.30	WD: 23.4	
1452	2152	Stop ADCP, start video, still photo on deck				
1454	2154	Frame on bottom	E: 2386324.46	N. 721601.55	WD: 25.5	
1455	2155	Image: gravel, cobbles, and boulders				
1456	2156	Frame on deck, video stopped				
1458	2158	Heading to transect 017-10				
1503	2203	Start ADCP 017-10	E: 2386528.99	N. 720664.19	WD: 33.3	
1507	2207	Start ADCP 017-10-DUP				
1513	2213	Stop ADCP, still photo on deck				
1515	2215	Frame on bottom	E: 2386533.02	N: 720664.54	WD: 34.2	

Scale: 1 square = _____

PDT	UTC				
1516	2216	Image: sand and cobbles			
1517	2217	Pause for DUP photo			
1522	2222	Image (DUP): sand and cobbles			
1523	2223	Frame on deck, video stopped			
1527	2227	Start ADCP 017-09	E: 2386609.37	N: 720842.40	WD: 35.6
		~~Stop ADCP, start video, still photo on deck~~		SM 10-12-18	
		~~Frame on bottom~~	E:	N:	WD: SM 10-12-18
1533	2233	Start ADCP 017-09-DUP			
1536	2236	Stop ADCP, start video, still photo on deck			
1537	2237	Frame on bottom	E: 2386602.37	N: 720844.36	WD: 36.0
1538	2238	Image: Sand - Pause for DUP photo			
1543	2243	Image (DUP): Sand			
1545	2245	Frame on deck, video stopped			
1548	2248	Start ADCP 017-08	E: 2386678.87	N: 721023.28	WD: 39.5
1552	2252	Stop ADCP, start video, still photo on deck			
1554	2254	Frame on bottom	E: 2386680.06	N: 721026.10	WD: 38.9
1555	2255	Image: Sand and cobbles			
1556	2256	Frame on deck, video stopped			
1613	2313	Heading to Northport Boat Launch			
1622	2322	Arrive at boat launch			
1700	2400	All boats off water, SM and DM depart for Colville			
1750	2450	SM + DM arrive in Colville			

Steve Helman
10-12-18

PDT	UTC	
0725	1425	Arrive at Northport Boat launch
0735	1435	Conduct H+S tailgate meeting
0832	1532	Tieton in water, SH onboard w/ Maggie, Rene, John S. (Gravity) and Lisa (Jacobs). Waiting to use CP-7.
0849	1549	Weather 40°F, mostly sunny, wind 1 mph S.
0855	1555	Begin control point calibration CP-7
0903	1603	Complete control point calibration
0916	1616	Tieton experiencing issues w/ starboard motor, heading back to Northport boat ramp to troubleshoot.
0946	1646	Tieton back on water, engine fully operational.
1040	1740	Deploy ADCP
SH 1047	1747	Compass calibration 02° error Calibration evaluation 0.1° error
1045	1745	ADCP diagnostics test
1055	1755	Deemed 013-01, 013-09, 013-10, 014-07, 014-08, 014-09, 014-10, 015-09, 015-10 obstructed due to shallow water. 013-07 and 013-08 may be obstructed (strong current, safety concerns).
1057	1757	Heading to station 014-01
1103	1803	Start ADCP 014-01 E: 2388378.02 N: 723076.36 WD: 13.4
1106	1806	Stop ADCP, start video, still photo on deck
1110	1810	Frame on bottom, fell over ~~E:~~ SH after 20s ~~N:~~ SH ~~WD:~~ SH
1114	1814	Frame on bottom (attempt #2), fell over after 15 s
1117	1817	Frame on bottom (attempt #3), fell over after 5s. Photo was taken upon frame landing, was good image quality
1117	1817	Image: gravel and cobbles E: 2388382.37 N: 723074.34 WD: 13.2
1119	1819	Frame on deck, video stopped
1124	1824	Start ADCP 014-02 E: 2388420.41 N: 723021.95 WD: 25.2
1127	1827	Stop ADCP, start video, still image on deck
1128	1828	Frame on bottom, landed on large cobble and fell over
1132	1832	Frame on bottom, fell over after 52 s. (attempt #2)
1134	1834	Pause to discuss safety and practicality of leaving frame on bottom of river for extended period of time in very strong current. Gravity determines it unsafe to leave drop frame on riverbed for one minute if average velocity of water column exceeds 5 ft/s. If avg. velocity of water column does exceed 5 ft/s at a station, Gravity will lower the frame to the bottom of river and immediately take the image to mitigate risk of damaging equipment. Shawn (Gravity) is making calls to stakeholders to discuss.
1155	1855	Frame on bottom (attempt #3) E: 2388446.78 N: 723014.18 WD: 24.8

Scale: 1 square = _____

Steve Hahn 10/13/18

SH

PDT	UTC	
1155	1855	Image: gravel and cobbles
1156	1856	Frame on deck, video stopped
1158	1858	Start ADCP 014-03 E: 2388461.58 N: 722965.44 WD: 27.1
1201	1901	Stop ADCP, start video, still photo on deck
1203	1903	Frame on bottom E: 2388459.66 N: 722963.70 WD: 26.6
		Image captured immediately, river velocity > 5 ft/s (6.5 ft/s).
1203	1903	Image: gravel and cobbles
1205	1905	Frame on deck, video stopped
1210	1910	Start ADCP 014-04 E: 2388501.42 N: 722909.41 WD: 23.8
1215	1915	Stop ADCP, start video, still photo on deck
1220	1920	Frame on bottom E: 2388500.07 N: 722904.81 WD: 23.8
1		Image captured immediately, river velocity > 5 ft/s (~6.5 ft/s)
1220	1920	Image: Cobbles
1222	1922	Frame on deck, video stopped
1225	1925	Start ADCP 014-05 E: 2388541.12 N: 722853.31 WD: 17.8
1229	1929	Stop ADCP, start video, still photo on deck
1231	1931	Frame on bottom E: 2388546.66 N: 722857.15 WD: ——
		Image captured immediately, river velocity >5 ft/s (~6.5 ft/s)
1231	1931	Image: Blurred – frame fell over immediately
1232	1932	Frame on deck, ~~video stopped~~ SH 10-13-18 video still rolling
1237	1937	Frame on bottom E: 2388546.66 N: 722857.15 WD: 17.9
1237	1937	Image: Cobbles
1239	1939	Frame on deck, video stopped
1245	1945	Start ADCP 014-06 E: 2388587.97 N: 722794.88 WD: 13.7
1249	1949	Stop ADCP, start video, still photo on deck
1253	1953	Frame on bottom E: 2388581.64 N: 722796.73 WD: 13.9
		Image captured immediately, river velocity >5 ft/s (~6.5 ft/s)
1253	1953	Image: Cobbles (slightly blurry)
1254	1954	Frame on deck, video stopped
1256	1956	Break for lunch
1324	2024	Heading to station 017-07
1330	2030	Start ADCP 017-07 E: 2386753.48 N: 721203.63 WD: 49.6
1334	2034	Stop ADCP, start video, still photo on deck
1337	2037	Frame on bottom E: 2386748.39 N: 721203.83 WD: 50.5
1338	2038	Image: Gravel and cobbles
1339	2039	Frame on deck, video stopped
1344	2044	Start ADCP 017-06 E: 2386826.52 N: 721381.26 WD: 46.5
1348	2048	Stop ADCP, start video, still photo on deck
1350	2050	Frame on bottom E: 2386827.06 N: 721379.71 WD: 48.6
1351	2051	Image: Gravel and cobbles

PDT	UTC	
1353	2053	Frame on deck, video stopped
1357	2057	Stations ~~017-02~~, 017-03, 017-04, 017-05 deemed to be obstructed (too shallow). SH 10-13-18
1402	2102	Start ADCP 017-02 E: 2387123.76 N: 722098.04 WD: 12.2
1406	2106	Stop ADCP, start video, still image on deck
1409	2109	Frame on bottom E: 2387127.08 N: 722094.24 WD: 11.8
		Image captured immediately, river velocity > 5 ft/s (~6.5 ft/s).
1410	2110	Image: cobbles
1411	2111	Frame on deck, video stopped
1415	2115	Start ADCP 017-01 E: 2387199.93 N: 722280.70 WD: 9.8
1418	2118	Stop ADCP, start video, still image on deck
1420	2120	Frame on bottom E: 2387200.45 N: 722275.03 WD: 10.3
		Image captured immediately, river velocity > 5 ft/s (~5.5 ft/s)
1422	2122	Frame on deck, video stopped
1420	2120	Image: gravel and cobbles.
1425	2125	Start ADCP 015-01 E: 2387543.33 N: 722454.34 WD: 12.7
1430	2130	Stop ADCP, start video, still image on deck
1431	2131	Frame on bottom E: 2387545.74 N: 722458.37 WD: 12.4
		Image captured immediately, river velocity > 5 ft/s (~5.5 ft/s).
1432	2132	Image: Gravel and cobbles
1434	2134	Frame on deck, video stopped
1438	2138	Start ADCP 015-02 E: 2387616.84 N: 722383.05 WD: 14.2
1442	2142	Stop ADCP, start video, still image on deck
1444	2144	Frame on bottom E: 2387614.79 N: 722375.65 WD: 14.5
		Image captured immediately, river velocity > 5 ft/s
1444	2144	Image: cobbles
1445	2145	Frame on deck, video stopped
1446	2146	Start ADCP 015-03 E: 2387691.67 N: 722306.23 WD: 16.1
1450	2150	Stop ADCP, start video, still image on deck
1451	2151	Frame on bottom E: 2387684.05 N: 722305.19 WD: 16.1
		Image captured immediately, river velocity > 5 ft/s (~6 ft/s)
1451	2151	Image: Cobbles
1452	2152	Frame on deck, video stopped
1454	2154	Start ADCP 015-04 E: 2387765.51 N: 722235.14 WD: 16.9
1458	2158	Stop ADCP, start video, still image on deck
1501	2201	Frame on bottom E: 2387761.66 N: 722230.80 WD: 18.1
		Image captured immediately, river velocity > 5 ft/s (~6.5 ft/s).
1501	2201	Image: cobbles
1502	2202	Frame on deck, video stopped

Silas Hahn 10/13/18 SH

Scale: 1 square = _____

PDT	UTC	RV Tieton — ADCP and Imagery Survey — 10/13/18 — Page 62
1508	2208	Start ADCP 017-05 E: 2387837.79 N: 722164.31 WD: 14.1
1513	2213	Stop ADCP, start video, still photo on deck
1517	2217	Frame on bottom E: 2387845.26 N: 722166.28 WD: 14.8
		Image captured immediately, Near velocity > 5 ft/s (~6 ft/s)
1517	2217	Image: cobbles
1518	2218	Frame on deck, video stopped
		~~Start ADCP 017-06 E: N: WD:~~ SH 10-13-18
1524	2224	Done collecting data for day, begin breaking down equipment, ADCP out of the water
1552	2252	Arrive at Northport boat launch
1645	2345	Leaving boat launch (SH and DH), heading to Colville

SH

PDT	UTC	UCR Sediment Basins Study ADCP Survey | 10/15/18 | Page 63
0930	1430	Arrive northport Boat Launch
0945	1445	Weather: Cold 31°F Sunny no Wind
		Safety tailgate Meeting in Parking lot: Topics Working in cold Morning weather. Eric Weatherman Ran through the Person overboard for the two new crew Members
		Attendees:
		RV Tieton: David Hose AECOM; Rene Trudon Gravity; Maggie McKeon Gravity; John Schafer Gravity; Ryan McElliece Gravity; Lisa Rotermink Parsons/EPA
		RV Tieton: Linda Howard AECOM; Mike Duffield Gravity; Jason Dorfman DEA
		Base Station: Dave Williams DEA
		Columbia Navigation: Eric Weatherman; Josh Weatherman; Dan Smith; Joseph Graves
0830	1530	Dock very slippery added Sand for Better ~~traction~~ footing
0850	1550	All boats in the water. Experienced Some problems launching Tieton due to mechanical Problems with the Crank on the Trailer. New Parts have been ordered and should be in Kettle falls tonight so crank can be Repaired
0841	1541	Began GPS position Check at UCR-7
0842	1542	Completed position Check (Total Setup an Check Time 2 minutes
0915	1615	Depart Dock for Deadmans Eddy AOI
0925	1625	Arrive Deadmans Eddy Deployed ADCP and began diagnostic test
0927	1627	Begin Compass Check 0.5° ⇒ ADCP 1200 KH
0933	1633	Calibration Check complete 0.2°
0941	1641	Start ADCP at 15-06 E: 2387913.78 N: 722090.64 WD: 12.9 ft
0945	1645	Stop ADCP, start Video, Still photo on Deck
0948	1648	Frame on Bottom E: 2387916.71 N: 722096.93 WD: 11.9
0949	1649	Image: Cobbles
0950	1650	Frame on Deck, Video Stopped
0951	1651	Start ADCP at 15-07 E: 2387990.09 N: 722018.35 WD: 14.2 ft
0955	1655	Stop ADCP, start Video, still photo on Deck
0957	1657	Frame on Bottom E: 2387994.41 N: 722022.37 WD: 14.4
0958	1658	Image: Cobbles
0959	1659	Frame on Deck Video Stopped

David R. Hose 10/15/18

Scale: 1 square = ________

PDT	UTC	UCR Sediment Facies Survey	10/15/18	Page 64
1002	1702	START ADCP AT 15-05 E: 2388064.62 N: 721945.36 WD: 11.2 ft		
1005	1705	Stop ADCP, Start Video, Still photo on Deck		
1008	1708	Frame on Bottom E: 2388062.34 N: 721945.43 WD: 11.2		
1009	1709	Image: Cobbles		
1010	1710	Frame on Deck Video Stopped		
1021	1721	START ADCP AT 13-02 E: 2389086.11 N: 723824.45 WD: 23.4 ft		
1027	1727	Stop ADCP, Start Video, Still photo on Deck		
1029	1729	Frame on Bottom E: 2389080.22 N: 723824.15 WD: 23.4		
1030	1730	Image: Cobbles		
1032	1732	Frame on Deck, Video Stopped		
1034	1734	START ADCP AT 13-03 E: 2389198.39 N: 723780.88 WD: 44.3 ft		
1041	1741	Stop ADCP, Start Video, Still photo on Deck		
1044	1744	Frame on Bottom E: 2389130.55 N: 723775.80 WD: 45.1		
1045	1745	Image: Cobbles		
1047	1747	Frame on Deck, Video Stopped		
1051	1751	START ADCP AT 13-04 E: 2389170.68 N: 723733.12 WD: 54.3 ft		
1057	1757	Stop ADCP, Start Video, Still photo on Deck		
1101	1801	Frame on Bottom E: 2389171.46 N: 723735.42 WD: 54.6		
1102	1802	Image: Sand and Gravel		
1103	1803	Frame on Deck, Video Stopped		
1120	1820	START ADCP AT 16-01 E: 2387397.08 N: 722286.71 WD: 13.7 ft		
1126	1826	Stop ADCP, Start Video, Still photo on Deck		
1127	1827	Frame will not sit on Bottom due to Current too Fast > 5 ft/sec (6 ft/sec) E: 2387398.18 N: 722283.85 WD: 13.4 ft		
1129	1829	Image: Cobbles		
1129	1829	Frame on Deck Video Stopped		
1131	1831	START ADCP AT 16-02 E: 2387387.23 N: 722076.28 WD: 12.1		
1136	1836	Stop ADCP, Start Video, Still photo on Deck		
1138	1838	Frame on Bottom E: 2387384.12 N: 722075.09 WD: 11.6 Photo Taken as Soon as Frame on Bottom Current > 5 ft/sec (6.5 ft/sec)		
1138	1838	Image: Cobbles		
1139	1839	Frame on Deck Video Stopped		
1143	1843	START ADCP AT 16-03 E: 2387373.03 N: 721867.16 WD: 10.5 ft		
1149	1849	Stop ADCP, Start Video Still photo on deck		
1150	1850	Frame on Bottom E: 2387372.10 N: 721868.37 WD: 10.2 ft Photo Taken as soon as Frame on Bottom Current 6.5 ft/sec		
1150	1850	Image: Cobbles		
1151	1851	Frame on Deck, Video stopped		
1152	1852	Changing Battery in Imagery Camera		

David R. Ross 10/15/18

UCR Sediment Facies Mapping Survey

PDT	UTC		
1157	1857	Start ADCP at 16-04 E: 2387359.09 N: 721654.63	WD: 11.0 ft
1202	1902	Stop ADCP, Start Video, still Photo on Deck	
1203	1903	Frame on Bottom E: 2387361.03 N: 721658.11	WD: 10.8 ft
		Photo Taken on Touchdown - current is 6.0 ft/sec	
1203	1903	~~Image~~ : Cobbles	
1205	1905	Frame on Deck Video Stopped	
1208	1908	Start ADCP at 16-05 E: 2387348.05 N: 721445.14	WD: 15.1 ft
1212	1912	Stop ADCP, Start Video, still Photo on Deck	
1213	1913	Frame on Bottom E: 2387353.41 N: 721445.91	WD: 14.9
		Photo Taken on Touchdown - current is 5.0 ft/sec	
1213	1913	Image : Cobbles	
1214	1914	Frame on Deck, Video Stopped	
1250	1950	Start ADCP at 16-06 E: 2387336.51 N: 721230.69	WD: 18.5 ft
1254	1954	Stop ADCP, start video, still photo on Deck	
1256	1956	Frame on Bottom E: 2387339.66 N: 721233.74	WD: 18.9 ft
1257	1957	Image : Cobbles	
1258	1958	Frame on Deck, Video Stopped	
1301	2001	Start ADCP at 16-07 E: 2387324.70 N: 721020.47	WD: 17.8 ft
~~1305~~ 1306	~~2005~~ 2006	Stop ADCP, start video, still photo on Deck	
1307	2007	Frame on Bottom E: 2387320.36 N: 721017.43	WD: 17.4 ft
1308	2008	Image : Cobbles and Gravel	
1310	2010	Frame on Deck, Video Stopped	
1313	2013	Start ADCP at 16-08 E: 2387312.85 N: 720811.15	WD: 20.1 ft
1318	2018	~~Stop~~ Start Duplicate ADCP at 16-08	
1325	2025	Stop ADCP, start Video, still photo on deck	
1327	2027	Frame on Bottom E: 2387316.40 N: 720809.88	WD: 19.1 ft
1328	2028	Image : Cobble and Gravel	
1333	2033	Duplicate Image: Cobble and Gravel	
1334	2034	Frame on Deck, Video Stopped	
1336	2039	Start ADCP at 16-09 E: 2387300.97 N: 720599.11	WD: 17.5 ft
		~~Stop ADCP, start video, still photo on deck~~ ORN	
		~~Frame on Bottom E: N:~~	~~WD: DRN~~
1344	2044	Duplicate ADCP at 16-09 started	
1349	2049	Stop ADCP, Start Video, still photo on deck	
1350	2050	Frame on Bottom E: 2387300.60 N: 720601.12	WD: 16.8 ft
1351	2051	Image: Cobble, ~~and~~ Silt, Sand Gravel	
1356	2056	Duplicate Image: Cobble, and Silt, Sand, Gravel	
1358	2058	Frame on Deck, Video Stopped	

David R Haas 10/15/18

Scale: 1 square = _____

PDT	UTC	UCR Sediment Facies Mapping Survey	10/15/18	Page 66
1404	2104	Start ADCP at 16-10 E: 738772.88.71 N: 720988.06		WD: 24.1
1411	2111	Stop ADCP, Start Video; Still photo on Deck		
1413	2113	Frame on Bottom E: 738789.70 N: 720989.73		WD: 21.5
1414	2114	Image: Cobbles and Silt		
1415	2115	Frame on Deck, Video Stopped		
1417	2117	Switched to ~~1500~~ 600 KH ADCP Sensor Unit		
1422	2122	Run Diagnostic Test on ADCP		
1424	2124	Begin Compass Calibration 0.1°	ADCP ~~1200~~ 600 KH Unit	
1432	2132	Calibration Complete 0.1°		
1447	2147	Start ADCP at 13-05 E: 738915.65 N: 723689.33		WD: 65 ft
1451	2151	Stop ADCP, Start Video, still photo on Deck		
1453	2153	Frame on Bottom E: 738914.83 N: 723687.27		WD: 65.5 ft
1454	2154	Image: Cobbles		
1456	2156	Frame on Deck, Video off		
1458	2158	Start ADCP at 13-06 E: 738958.58 N: 723648.35		WD: 77.5 ft
1506	2206	Stop ADCP, Start Video, still photo on ~~Deck~~ Deck		
1512	2212	Photo Taken in ~~Fuck~~ Touchdown Mode Because flow at bottom 7-10 ft/sec		
~~1512~~	~~2212~~	Frame on Bottom E: ~~738775.00~~ 738966.7 N: ~~723648.00~~ 723647.5		WD: ~~80.5~~ ft 78.8
~~1512~~	~~2212~~	Image: Cobbles and some gravels		
1513	2213	Frame on Deck, Video stopped		
1518	2218	Start ADCP at 13-07 E: 738998.19 N: 723604.14		WD: 66.4 ft
1521	2221	Stop ADCP, start video, still photo on Deck		
1527	2227	Frame on Bottom E: 738903.96 N: 723601.31		WD: 74.9
		Photo Taken on ~~Fuck~~ Touchdown / Flow at Bottom 7-8 ft/sec		
1527	2227	Image: Boulders and Cobbles		
1529	2229	Frame on Deck, Video off		
1533	2233	Start ADCP at 13-08 E: N:		WD:
1534	2234	Condition of Current Prevented collection of ADCP Data at this location 7-8 ft/sec at the surface		
1540	2240	Completes Survey of All Locations within Deadmans Eddy AOI We are having problems with a component in the Video Stream. Contacted Dwayne ~~Ayer~~ to ask him to look for a replacement at Radio Shack		
1555	2255	Pull ADCP from water and stow it in Hard Case		
1615	2315	Arrive at Boat Launch in Northport		
1700	2400	All Boats are out of the water		
1710	2410	D. Hosé and L. Howard Returning to Colville		
800	2500	Arrive at Colville Comfort Inn		

David R. Hoon
10/15/18

0730 | 1430 | Arrive at China Beach boat launch
0745 | 1445 | Weather: Cold 37° F, River Fog (Sunny later), No Wind
Conduct Safety Tailgate Meeting: topics Cold Icy Surfaces on Boats This Morning; crew witnessed a car Hitting a deer This morning; We have been at this for 3 weeks and we need to not become complacient

Attendees:

RV Tioton
David Hoge Person
Rene Trudeau Gravity
Maggie McKeon Gravity
Ryan McElhiece Gravity
John Schaefer Gravity
Lisa Ratekink Parsons/LEPA

RV Discovery
Linda Howard AECOM
Mike Duffield Gravity
Jason Dorfman DFA

GPS Base Station
David Williams

Columbia Navigation
Eric Weatherman
Josh Weatherman
Dan Smith
Joseph Graves

0800 | 1500 | Calibrate Boat GPS to Point UCR-3
0845 | 1545 | Tioton Pulls away from Launch
0850 | 1550 | Conducted Calibration Test 600 KH ADCP Unit
0852 | 1552 | Begin Compass Calibration 0.1°
0858 | 1558 | Compass Calibration Complete 0.1°

0904 | 1604 | Start ADCP at 60-03 E: 2332440.80 N: 675265.98 WD: ~~65ft~~ 55.5 ft
0909 | 1609 | Stop ADCP, Completed Cammona Calibrations; Tech was connecting a problem with the video cammona, ~~video started~~ ORH
0920 | 1620 | Video Started, still photo on dock
0923 | 1623 | Frame on Bottom E: 2332438.63 N: 675263.42 WD: 58.1ft
0924 | 1624 | Image: Sand
0926 | 1626 | Frame on Deck, video stopped

0926 | 1628 | Start ADCP at 60-04 E: 2332424.01 N: 675185.60 WD: 57.2ft
0932 | 1632 | Stop ADCP, start Video, still photo on the deck
0935 | 1635 | Frame on Bottom: E: 2332420.84 N: 675185.67 WD: 58.8ft
0936 | 1636 | Image: Sand
0938 | 1638 | Frame on Deck, video stopped

David Hoge
10/16/18

Scale: 1 square = _____

PDT	UTC	UCR Sediment Facies Mapping Survey	10/16/18	Page 68
0939	1639	Start ADCP at 60-05 E: 2332406.47 N: 675106.27		WD: 116 ft
0944	1644	Stop ADCP, start video, still photo on deck		
0946	1646	Frame on Bottom E: 2332408.58 N: 675105.46		WD: 116 ft
0947	1647	Image: Cobble and Sand		
0949	1649	Frame on Deck, video stopped		
0952	1652	Start ADCP at 60-06 E: 2332389.45 N: 675027.03		WD: 125 ft
0957	1657	Stop ADCP, start video, still photo on deck		
1000	1700	Frame on Bottom E: 2332389.91 N: 675027.36		WD: 125
1001	1701	Image: Sand		
1003	1703	Frame on Deck, video stopped (This is Max Depth we can go)		
		We determined that the imagery is limited to 125 feet of water Decided to Collect ADCP at Locations where Water is too deep for Imagery and continue with survey		
1015	1715	Start ADCP at 60-07 E: 2332372.55 N: 674946.11		WD: 134 ft
1019	1719	Stop ADCP, No Imagery collected because WD > 125 ft		
1021	1721	Start ADCP at 60-08 E: 2332355.45 N: 674866.79		WD: 135 ft
1026	1726	Stop ADCP, No Imagery collected because WD > 125 ft		
1028	1728	Start ADCP at 60-09 E: 2332343.52 N: 674809.36		WD: 117 ft
1033	1733	Stop ADCP, ~~no Imagery collected~~ ORH Start video, still photo on deck		
1035	1735	Frame on Bottom E: 2332346.70 N: 674807.43		WD:
1036	1736	Image: Boulders, Gravel, sand		
1039	1739	Frame on deck, video stopped		
1041	1741	Start ADCP at 60-10 E: 2332321.28 N: 674707.53		WD: 57 ft
1046	1746	Stop ADCP, start video, still photo on deck		
1048	1748	Frame on Bottom E: 2332317.67 N: 674703.71		WD: 57 ft
1049	1749	Image: Angular small boulders and silt (Rocks similar to those at bank)		
1051	1751	Frame on deck, video stopped		
1055	1755	Start ADCP at 59-09 E: 2332980.23 N: 674661.14		WD: 74 ft
1100	1800	Stop ADCP, start video, still photo on deck		
1101	1801	Frame on Bottom E: 2332981.05 N: 674665.31		WD: 74 ft
1102	1802	Image: Large Rock		
1104	1804	Frame on Deck, video stopped		
1105	1805	Start ADCP at 59-08 E: 2333000.34 N: 674771.71		WD: 111 ft
1110	1810	Stop ADCP, start video, still photo on deck		
1113	1813	Frame on Bottom E: 2332996.76 N: 674774.79		WD: 111 ft
1114	1814	Image: Angular Boulders		
1116	1816	Frame on Deck, video stopped		

David R. Hart 10/16/18

PDT	UTC	UCR Sediment Facies Mapping Survey
1117	1917	START ADCP AT 59-04 E: 2333037.58 N: 674817.39 WD: 133 ft
1122	1822	Stop ADCP, NO Imagery Collected Because WD > 125 ft
1124	1824	START ADCP AT 59-06 E: 2333063.94 N: 674888.59 WD: 129 ft
1129	1829	Stop ADCP, NO Imagery Collected because WD > 125 ft
1132	1832	START ADCP AT 59-05 E: 2333094.47 N: 674970.01 WD: 120 ft
1137	1837	Stop ADCP, start video, still photo on deck
1140	1840	Frame on Bottom E: 2333090.68 N: 674969.24 WD: 120 ft
1141	1841	Image: Sand and Cobbles
1143	1843	Frame on Deck, Video stopped
		Replace Battery in Camera
1145	1845	START ADCP AT 59-04 E: 2333131.76 N: 675071.22 WD: 103 ft
1150	1850	Stop ADCP, start video, still photo on deck
1153	1853	Frame on Bottom E: 2333131.73 N: 675070.16 WD: 103 ft
1154	1854	Image: Sand
1156	1856	Frame on Deck, video stopped
1158	1858	START ADCP AT 59-03 E: 2333175.77 N: 675190.07 WD: 67 ft
1203	1903	Stop ADCP, start video, still photo on deck
1204	1904	Frame on Bottom E: 2333177.03 N: 675184.59 WD: 67 ft
1205	1905	Image: Sand
1207	1907	Frame on Deck, video stopped
1208	1908	START ADCP AT 59-02 E: 2333208.12 N: 675277.79 WD: 57 ft
1214	1914	Stop ADCP, start video, still photo on deck
1215	1915	Frame on Bottom E: 2333214.56 N: 675276.70 WD: 57 ft
1216	1916	Image: ~~Sand~~ Boulders Cobbles + Sand
1218	1918	Frame on Deck, video stopped
		Lunch Break
1318	2018	START ADCP AT 58-02 E: 2334057.31 N: 674641.61 WD: 67 ft
1323	2023	Stop ADCP, start video, still photo on deck
1326	2026	Frame on Bottom E: 2334072.73 N: 674644.91 WD: 67 ft
1327	2027	Image: Gravel
1328	2028	Frame on Deck, video stopped
1331	2031	START ADCP AT 58-03 E: 2334058.74 N: 674577.97 WD: 73 ft
1336	2036	START Duplicate ADCP AT 58-03
1341	2041	Stop ADCP, start video, still photo on deck
1343	2043	Frame on Bottom E: 2334060.39 N: 674577.97 WD: 73
1344	2044	Image: Cobbles and Gravel
1349	2049	Duplicate Image: Cobbles and Gravel
1351	2051	Frame on deck, Video Stopped
		David R. Rose 10/16/18

Scale: 1 square = _____

PDT	UTC	UCR Sediment Facies Mapping Survey	10/16/18	Page 70
1354	2054	Start ADCP at 58-04 E: 2334032.92 N: 674484.33		WD: 83ft
1358	2058	Stop ADCP, start video, still photo on dock		
1401	2101	Frame on Bottom E: 2334032.78 N: 674486.36		WD: 83ft
1402	2102	Image: Gravel and Cobbles		
1404	2104	Frame on dock, video Stopped		
1405	2105	Start ADCP at 58-05 E: 2334015.76 N: 674414.69		WD: 92ft
1410	2110	Stop ADCP, start video, still photo on dock		
1412	2112	Frame on Bottom E: 2334015.45 N: 674420.24		WD: 92ft
1413	2113	Image: Gravel		
1415	2115	Frame on Dock, video Stopped		
1419	2119	Start ADCP at 58-06 E: 2333985.76 N: 674296.06		WD: 74ft
1422	2122	Stop ADCP, start video, still photo on dock		
1424	2124	Frame on Bottom E: 2333988.40 N: 674299.78		WD: 74ft
1425	2125	Image: Cobbles		
1427	2127	Frame on Dock, video Stopped		
1429	2129	Start ADCP at 58-07 E: 2333960.32 N: 674203.61		WD: 63ft
1434	2134	Stop ADCP, start video, still photo on dock		
1436	2136	Frame on Bottom E: 2333961.86 N: 674207.60		WD: 63ft
1437	2137	Image: Boulders and Cobbles		
1439	2139	Frame on Dock, video Stopped		
1450	2150	Start ADCP at 57-05 E: 2335011.99 N: 674173.74		WD: 64ft
1455	2155	Stop ADCP, start video, still photo on dock		
1457	2157	Frame on Bottom E: 2335007.44 N: 674191.42		WD: 64ft
1458	2158	Image: Cobbles and Gravel		
1459	2159	Frame on Dock, video Stopped		
1501	2201	Start ADCP at 57-04 E: 2334998.47 N: 674286.61		WD: 65ft
1505	2205	Stop ADCP, start video, still photo on dock		
1507	2207	Frame on Bottom E: 2334991.00 N: 674286.83		WD: 65ft
1508	2208	Image: Large Boulder		
1510	2210	Frame on Dock, video stopped		
1510	2210	Start ADCP at 57-03 E: 2334985.11 N: 674397.10		WD: 76ft
1515	2215	Stop ADCP, start video, still photo on dock		
1519	2219	Frame on ~~Dock~~ Bottom E: 2334982.40 N: 674395.35		WD: 76ft
1520	2220	Image: Gravel		
1522	2222	Frame on Dock, video stopped		
1523	2223	Start ADCP at 57-02 E: 2334972.27 N: 674502.40		WD: 65ft
1528	2228	Stop ADCP, start video, still photo on Dock		
1529	2229	Frame on Bottom E: 2334974.35 N: 674503.80		WD: 65ft
1530	2230	Image: Small Gravel		
1531	2231	Frame on Dock, video Stopped		

PDT	UTC	
1536	2336	Start ADCP at 56-02 E: 733554.52 N: 674581.46 WD: 67ft
1541	2341	Stop ADCP, start video, still photo on dock
1542	2342	Frame on Bottom, E: 733546.97 N: 674580.98 WD: 67ft
1543	2343	Image: Cobbles and Sand with gravel
1545	2345	Frame on Dock, video stopped
1545	2345	Start ADCP at 56-03 E: 733558.36 N: 674465.10 WD: 68ft
1551	2351	Stop ADCP, start video, still photo on dock
1552	2352	Frame on Bottom, E: 733558.87 N: 674466.48 WD: 68ft
1553	2353	Image: Cobbles and Gravel
1555	2355	Frame on Dock, video Stopped
1555	2355	Start ADCP at 56-04 E: 733562.19 N: 674350.95 WD: 66ft
1600	2300	Stop ADCP, start video, still photo on dock
1602	2302	Frame on Bottom E: 733562.59 N: 674353.69 WD: 66ft
1603	2303	Image: ~~Cobbles~~ Dirt Cobbles and Gravel
1604	2304	Frame on Dock, video Stopped
1605	2305	Start ADCP at 56-05 E: 733566.38 N: 674235.08 WD: 60ft
1610	2310	Stop ADCP, start video, still photo on dock
1612	2312	Frame on Bottom E: 733569.76 N: 674236.35 WD: 60ft
1613	2313	Image: Cobbles and Gravel
1614	2314	Frame on dock, video stopped
1616	2316	Start ADCP at 56-06 E: 733570.07 N: 674120.52 WD: 56ft
1621	2321	Stop ADCP, start video, still photo on dock
1622	2322	Frame on Bottom E: 733570.55 N: 674118.16 WD: 56ft
1623	2323	Image: Cobbles
1624	2324	Frame on dock, video stopped
1625	2325	Start ADCP at 56-07 E: 733575.65 N: 673978.44 WD: 56ft
1630	2330	Stop ADCP, start video, still photo on dock
1631	2331	Frame on Bottom E: 733579.20 N: 673975.60 WD: 56ft
1632	2332	Image: Cobbles and Gravel
1635	2335	Frame on dock, video stopped
1645	2345	Tides Return to Dock
1720	2420	All Boats out of the water
1725	2425	Depart China Bend for Colville
1750	2450	Arrive Comfort Inn in Colville

Dirk Rhoer
10/16/18

Scale: 1 square = _____

PDT	UTC	
0826	1526	Calibrate boat GPS to ~~EP-3~~ ~~LH~~. UCR-3
0857	1557	Tieton pulls away from launch
0900	1600	Conducted calibration test ADCP Unit
0908	1608	Begin compass calibration 0.2°
0915	1615	End compass calibration 0.1°
0917	1617	Start ADCP at 60-01 E: 2332475.05 N: ~~675~~ LH. 10/17/18 675425.35 WD: 30
0921	1621	Stop ADCP, Start video, still photo on deck
0929	1629	Frame on bottom E: 2332479.32 N: 675423.83 WD: 30
0931	1631	Image: sand plus a few small rocks
0931	1631	Frame on deck, ~~video stop~~
0932	1632	Start ADCP at 60-02 E: 2332459.11 N: ~~E~~ LH. 675341.29 WD: 43
0935	1635	Stop ADCP, Start video, still photo on deck
0937	1637	Frame on bottom E: 2332456.41 N: 675342.41 WD: 43
0938	1638	Image: Black Sand
0939	1639	Frame on deck, video ~~stopped~~
0941	1641	Start ADCP at 59-1 E: ~~2333341.00~~ LH. 10/17/18 N: 675364.53 WD: 30 E: 2333241.83
0947	1647	Stop ADCP, Start video, still photo on deck
0949	1649	Frame on bottom E: 2333342.95 N: 675265.31 WD: 30
0949	1649	Image: Sand
0951	1651	Frame on deck, video stopped
0956	1656	Start ADCP at 59-10 E: 2332945.30 N: 674572.76 WD: 32
1000	1700	Stop ADCP, Start video, still photo on deck
1001	1701	~~Image 3~~ Frame on bottom E: 2332944 N: 674571.18 WD: 32
1001	1701	~~Frame on deck~~ image: Sand and rocks
1003	1703	Frame on deck, Video ~~stopped~~
1011	1711	Start ADCP at 58-10 E: 2339886.61 N: 673921.51 WD: 22
1014	1714	Stop ADCP, Start video, still photo on deck
1014	1714	Frame on bottom E: 2333887.89 N: 673924.07 WD: 22
1014	1714	Image: Vegetation covers substrate
1018	1718	Frame on deck, stop video
10:20	17:20	Start at ADCP 58-09 E: 2333910.72 N: 674016.26 WD: 31
10:23	17:23	Stop ADCP, Start Video, still photo on deck
10:26	17:26	Frame on bottom
10:27	17:27	Image: Cobbles
10:28	17:28	Frame on deck, stop video

Linda Howard
10/17/18

PDT	UTC	UCR Sediment Facies Study / 10/17/18 / Page 7I
10:32	1732	Start ADCP at 58-08 E: 2333935.34 N: 674110.88 WD: 50
1036	1736	Stop ADCP, start video, still photo on deck
1038	1738	Frame on bottom
1038	1738	Image: Sand, cobble, boulder
1041	1741	Frame on deck, stop video
1044	1744	Start ADCP at 58-01 E: 2334108.28 N: 674765.81 WD: 44
1047	1747	Stop ADCP, start video, still photo on deck
1049	1749	Frame on bottom E: N:
1049	1749	Image: gravel and cobble
1051	1751	Frame on deck, stop video
1055	1755	Start ADCP at 57-01 E: 2334955.39 N: 674644.20 WD: 44
1058	1758	Stop ADCP, start video, still photo on deck LH 10/17/18
1100	1800	Frame ~~on~~ on bottom E: 2334950.00 N: 674640.73 WD: 44
1100	1800	Image: gravel & cobble
1102	1802	Frame on deck, stop video
1107	1807	Start ADCP at 57-06 E: 2335033.71 N: 674026.76 WD: 45
1110	1810	Stop ADCP, start video, still photo on deck
1112	1812	Frame ~~on~~ bottom E: 2335058.00 N: 673998.00 WD: 45
1112	1812	Image: Cobble and gravel
1115	1815	Frame on deck, stop video
1116	1816	Start ADCP at 57-07 E: 2335055.02 N: 673829.99 WD: 44
1120	1820	Stop ADCP, start video, still photo on deck
1121	1821	Frame on bottom E: 2335056.92 N: 673829.92 WD: 44
1121	1821	Image: cobble
1124	1824	Frame on deck, stop video
1129	1829	Start ADCP at 57-08 E: 2335071.44 N: 673693.98 WD: 44
1133	1833	Stop ADCP, start video, still photo on deck
1134	1834	Frame on bottom E: 2335068.49 N: 673687.59 WD: 44
1135	1835	Image: Sand, gravel, cobble.
1136	1836	Frame on deck, stop video
1137	1837	Start ADCP at 57-09 E: 2335085.71 N: 673572.11 WD: 34
1140	1840	Stop ADCP, start video, still photo on deck
1142	1842	Frame on bottom E: 2335089.53 N: 673576.23 WD: 34
1142	1842	Image: Sand
1145	1845	Frame on deck, stop video
1146	1846	Start ADCP at 57-~~08~~ 10 E: 2335101.99 N: 673442.72 WD: 21 LH 11/17
1152	1852	Stop ADCP, start video, still photo on deck
1153	1853	Frame on bottom E: 2335104.90 N: 673437.04 WD: 21
1154	1854	Image: Vegetation and sand
1155	1855	Frame on deck, stop video

Scale: 1 square = _____

Lisa M Howard 11/17/18

LH. 10/17 74

PDT	UTC	UCR Sediment Facies Study | 10/17/18 | Page ~~73~~
1158	1858	Change battery on ~~X~~ imagery unit
1200	1900	Start ADCP at 56-10 E: 2335864.82 N: 673658.87 WD: 14
1207	1907	Stop ADCP, Start Video, still photo on deck
1209	~~18~~1909	Frame on bottom E: 2335866.24 N: 673653.91 WD: ~~21~~ 14 (LH 10/17/18)
1209	1909	Image: Sand and vegetation
1210	1910	Frame on deck, stop video
1224	1924	Start ADCP at 56-09 E: 2335839.24 N: 673736.96 WD: 26
1226	1926	Stop ADCP, start video, still photo on deck
1228	1928	Frame on bottom E: 2335837.08 N: 673733.26 WD: 26
1228	1928	Image: Sand and vegetation
1230	1930	Frame on deck, Stop Video
1230	1930	Start ADCP at 56-08 E: 2335810.35 N: 673810.31 WD: 35
1234	1934	Stop ADCP, Start Video, Still photo on deck
1235	1935	Frame on bottom E: 2335812.38 N: 673812.21 WD: 35
1235	1935	Image: Sand
1237	1937	Frame on deck, stop video
1238	1938	Heading to boat launch for lunch break
1332	2032	Left boat launch after lunch break
1340	2040	Start ADCP at 56-01 E: 2335501.75 N: 674698.00 WD: 51
1344	2044	Stop ADCP, Start video, still photo on deck
1346	2046	Frame on bottom E: 2335502.00 N: 674697.00 WD: 51
1346	2046	Image: Gravel and cobble
1348	2048	Frame on deck, Stop Video
1350	2050	Start ADCP at 55-01 E: 2335870.80 N: 674887.36 WD: 34
1354	2054	Stop ADCP, start video, still photo on deck
1356	2056	Frame on bottom E: 2335868.36 N: 674884.27 WD: 34
1356	2056	Image: gravel
1358	2058	Frame on deck, stop Video
1400	2100	Start ADCP at 55-02 E: 2335915.38 N: 674845.77 WD: 49
1404	2104	Stop ADCP, Duplicate Start
1410	2110	Frame on bottom E: 2335910.38 N: 674845.23 WD: 49
1410	2110	Image: Cobble
1417	2117	Frame on deck, stop video
1408	2108	Duplicate Stop ADCP
1416	2116	Duplicate Image: Cobble
1424	2124	Start ADCP at 55-09 ~~E: 2336555.00~~ ~~N: 674247.00~~ WD: ~~48~~ 49 (LH 10/17/18)
1428	2128	Stop ADCP, Still photo on deck E: 2336555.62 N: 674246.50
1429	2129	Frame on bottom E: 2336557.43 N: 674245.32 WD: 49
1430	2130	Image: cobble and sand (Corrected by J.Pratare 1-30-19)
1432	2132	Frame on deck, stop Video

10/17/18

Linda Howard ~~11/17/18~~

(corrected by J. Petrue 1-30-19) 10-17-18 LH 11/17 75

PDT	UTC	UCR Sediment Facies ~~10/17/18~~	Page 74
1437	2137	Start ADCP at 55-10 E: 2336638.59 N: 674169.73 WD: 31	
1441	2141	Stop ADCP, start video, still photo on deck	
1442	2142	Frame on bottom E: 2336636.58 N: 674171.02 WD: 31	
1443	2143	Image: cobble	
1444	2144	Frame on deck	
		Start ADCP LH 10/17	
1447	2147	Start ADCP at 54-10 E: 2337002.33 N: 674408.04 WD: 37	
1452	2152	Stop ADCP, start video, still photo on deck	
1453	2153	Frame on bottom E: 2337006.38 N: 674412.16 WD: 37	
1453	2153	Image: Sand	
1455	2155	Frame on deck, stop video	
1459	2159	Start ADCP at 54-09 E: 2336956.25 N: 674521.84 WD: 55	
1502	2202	Stop ADCP, start video, still photo on deck	
1504	2204	Frame on bottom E: 2336959.15 N: 674521.71 WD:	
1505	2205	Image: cobble	
1506	2206	Frame on deck, stop video	
1511	2211	Start ADCP at 54-07 E: 2336785.29 N: 674946.75 WD: 56	
1515	2215	Stop ADCP, start video, still photo on deck	
1516	2216	Frame on bottom E: 2336783.03 N: 674946.88 WD: 56	
1517	2217	Image: Gravel	
1518	2218	Frame on deck, stop video	
		Start ADCP at 54:06 E: N: WD:	
		Abort 54-06 today	
1822	2222	Start ADCP at 54-02 E: 2336604.86 N: 675395.56 WD: 28	
1826	2226	Stop ADCP, start video, still photo on deck	
1827	2227	Frame on bottom E: 2336606.94 N: 675395.35 WD:	
1829	2229	Image: Sand and cobble	
1830	2230	Frame on deck, stop video	
1833	2233	54-01 is on land. No ADCP or Imagery collected	
		53-01 is on land. No ADCP or Imagery collected	
		53-02 is too shallow; relocated as far from	
		53-03 as possible and as shallow as possible w/o being in weeds.	
1842	2242	53-02 (Alternate) Start ADCP E: 2337212.88 N: 676118.58	
		WD: 12	
1849	2249	Stop ADCP, start video, still photo on deck	
1851	2251	Frame on bottom E: 2337216.96 N: 676115.47 WD: 12	
1852	2252	Image: Sand	
1853	2253	Frame on deck, stop video	
		Linda Howard 10/19/18	

Scale: 1 square =

PDT	UTC	
1555	2255	Start ADCP at 53-03 E: 2337303.50 N: 675940.81 WD: 45
1558	2258	Stop ADCP, start video, still photo on deck
1600	~~2354~~ 2300	Frame on bottom E: 2337302.80 N: 675936.76 WD: 45
1601	2301	Image: Sand
1602	2302	Frame on deck, stop video
1605	2305	Start ADCP at 53-04 E: 2337367.11 N: 675817.54 WD: 45
1609	2309	Stop ADCP, start video
1610	2310	Frame on bottom E: 2337368.50 N: 675818.57 WD: 45
1611	2311	Image: Sand
1612	2312	Frame on deck, stop video
1613	2313	Start ADCP at 53-05 E: 2337431.32 N: 675714.42 WD: 47
1617	2317	Stop ADCP, start video still photo on deck
1618	2318	Frame at bottom E: 2337420.45 N: 675712.39 WD: 47
1619	2319	Image: Cobble, gravel, sand
1620	2320	Frame on deck, stop video
		53-01 and 54-01 are on land.
1623	2323	Start ADCP at 53-06 E: 2337497.09 N: 675572.11 WD: 51
1627	2327	Stop ADCP, Start video, still photo on deck
1628	2328	Frame on bottom E: 2337496.77 N: 675571.98 WD: 51
1629	2329	Image: Black sand and cobble
1631	2331	Frame on deck, stop video.
1641	2341	Weather 64°F clear & sunny; no breeze
1725	2425	All boats off water

Linda M. Howard
10/17/18

PDT	UTC	
0730	1430	Arrive China Bend Boat Launch
		Daily Tailgate Safety briefing
0813	1513	Tieton launched, pull up adjacent to launch
		GPS ADCP Diagnostics Test
		ADCP Compass calibration
		ADCP Compass evaluation
0840	1540	Tieton leaves launch area.
0842	1542	Weather: 42° F overcast / foggy
0850	1550	Begin compass calibration 1.0°
0855	1555	End compass calibration 0.4°
0901	1601	Start ADCP at 53-07 E: 2337571.86 N: 675430.30 WD: 54
0906	1606	Stop ADCP, Start Video, Still photo on deck
0912	1612	Frame on bottom E: 2337567.66 N: 675429.48 WD: 54
0913	1613	Image: Cobble and gravel
0915	1615	Frame on deck, stop video
0918	1618	Start ADCP at 53-10 E: 2337831.62 N: 674938.51 WD: 35
0922	1622	Stop ADCP, Start video, Still photo on deck
0924	1624	Frame on bottom E: 2337828.73 N: 674941.26 WD: 35
0925	1625	Image: Sand, gravel, cobble
0926	1626	Frame on deck, stop video
0936	1636	Start ADCP at 52-10 E: 2338140.87 N: 675874.75 WD: 33
0940	1640	Stop ADCP, Start video, Still photo on deck
0941	1641	Frame on bottom E: 2338136.87 N: 675390.13 WD: 33
0942	1642	Image: Boulders and cobble
0943	1643	Frame on deck, stop video
0947	1647	Start ADCP at 52-08 E: 2338534.79 N: 675993.34 WD: 47
0950	1650	Stop ADCP, Start video, Still photo on deck
0953	1653	Frame on bottom E: 2338531.43 N: 675989.17 WD: 47
0954	1654	Image: gravel and cobble
0955	1655	Frame on deck, stop video
0958	1658	Start ADCP at 52-07 E: 2338457.51 N: 676224.99 WD: 39
1001	1701	Stop ADCP, Start video, still photo on deck
1003	1703	Frame on bottom: E: 2338455.64 N: 676219.72 WD 39
1004	1704	Image: Sand, gravel, cobble
1005	1705	Frame on deck, stop video
1008	~~1708~~ 1708	Start ADCP at 52-06 E: 2338388.94 N: 676424.11 WD: 30
1012	1712	Stop ADCP, start video, still photo on deck
1013	1713	Frame on bottom E: 2338391.37 N: 676429.89 WD: 30
1015	1715	Image: Sand and gravel
10/16	1716	Frame on deck, stop video

Linda M. Howard 10/18/18

Scale: 1 square = _____

PDT	UTC	UCR Sediment Facies Study | 10/18/18 | Page 78	
1019	1719	Start ADCP at 52-05 E: 2338322.80 N: 676626.21	WD: 17
1025	1725	Stop ADCP, start video, still photo on deck	
1026	1726	Frame on bottom	
1028	1728	Image: Vegetation, sand	
1028	1728	Frame on deck, stop video	
1031	1731	Start ADCP at 52-04 E: 2338252.33 N: 676829.39	WD: 13
1037	1737	Stop ADCP, start video, still photo on deck	
1039	1739	Frame on bottom E: 2338253.00 N: 676829.00	WD: 13
1040	1740	Image: Vegetation	
1042	1742	Frame on ~~bottom~~ deck, rinse vegetation off Frame	
1051	1751	Start ADCP at 52-03 Alternate point, 52-03 is in area that	
1057	1757	is too weedy to obtain good data. Adjacent areas on line also weedy	
		E: 2338218.47 N: 677087.97	WD: 13
1057	1757	Stop ADCP, start video, still photo on deck	
1059	1759	Frame on bottom	
1100	1800	Image: Vegetation, sand	
1102	1802	Frame on deck, stop video, remove noxious weeds and rinse frame	
		52-02 is in a location that is to weedy; adjacent areas on	
		transect line are also too weedy. Moving alternative 52-02 off line.	
1115	1815	Start 52-02 Alternative location ADCP	
		E: 2338037.20 N: 677366.94	WD: 15
1123	1823	Start video, still photo on deck, stop ADCP	
1125	1825	Frame on bottom E: 2338039.94 N: 677367.75	WD: 15
1126	1826	Image: Vegetation	
1128	1828	Frame out of water, remove noxious weeds, rinse frame, frame	
		on deck.	
1138	1838	Start ADCP at 51-02 E: 2339038.31 N: 676978.64	WD: 15
1146	1846	Start video, still photo on deck, stop ADCP	
1146	1846	Frame on bottom E: 2339037.00 N: 676975.91	WD: 15
1148	1848	Image: sand, vegetation	
1148	1848	Frame out of water, remove weeds, Frame on deck.	
		51-01 is to shallow; no ADCP or imagery collected	
		52-01 is behind log boom; no ADCP or imagery collected	
11:53	~~1153~~ 1853	Start ADCP at 51-03 E: 2339157.15 N: 676883.33	WD: 29
1156	1856	Stop ADCP, start video, still photo on deck	
1158	1858	Frame on bottom E: 2339154.12 N: 676887.91	WD: 29
1159	1859	Image: sand, gravel, cobble	
1201	1901	Frame back on deck, Stop video	
		Linda M Hawal	
		10/18/18	

Sediment Facies Mapping

#4

Rite in the Rain®
ALL-WEATHER
UNIVERSAL
№ 973T-MX

ADCP instrument

10/3/2018 SUNNY

16:33 VERY LITTLE WIND

ADCP Test COMPLETE

OFFSET = 2.6'

TEMPERATURE CHECK

17:12 COMPASS CALIBRATION 2.1°

17:14 COMPASS CALIBRATION 0.1

17:18 COMPASS EVALUATION 0.05°

17:30 086-08 TAKING EXTRA DATA DUE TO DROP OUT TRANSECT 006

END 17:39 006_18_10-03.PD0 WM1

17:47 086-07 EXTRA DATA DUE TO DROP OUT TRANSECT 007

END 17:52 007_18-10-03.PD0 WM1

086-06 ~100 MORE ENSEMBLES DEPTH ~80' TRANSECT 008

END 18:06 008_18-10-03.PD0 WM1

18:18 086-05 VERY LITTLE VELOCITY DEPTH ~ 80' TRANSECT 009

END 18:22 009_18-10-03.PD0 (check near bottom measurements) WM1

18:29 086-04 VERY LITTLE VELOCITY DEPTH ~ 79' TRANSECT 010

END 18:33 010_18-10-03.PD0 WM1

18:43 086-03 VERY LITTLE VELOCITY DEPTH - 60' TRANSECT 011

END 18:47 011_18-10-03.PD0 WM1

086-02 TOO MANY WEEDS

086-01 TOO MANY WEEDS

19:15 086-09 DEPTH - 25' TRANSECT 012

END 19:23 012_18-10-03.PD0 WM1

19:33 086-10 SOME WEEDS - DATA MAY NOT BE GOOD B - 14' TRANSECT 013

END 19:43 013_18-10-03.PD0 WM 8

19:33 TRANSECT 086 COMPLETE

Scale: 1 square = _____

10/3/2018

22:37 START TRANSECT 087

22:37 087-01 DEPTH ~ 58' TRANSECT 014

END 23:45 014_18-10-03.PDO

23:01 087-02 DEPTH ~ 60' TRANSECT 015

END 23:08 015_18-10-03.PDO

23:36 FINISH RECON OF REST OF TRANSECT

TOMORROW START 087-03 w/600 kHz ADCP

10/04/2018 MAGGIE McKEON UCR BED FACIES MAPPING

WEATHER: CLOUDY, CALM — ADCP = 57.4°F

USING 600 kHz — AML = 56°

15:59 BOAT LAUNCH

16:16 ADCP DIAGNOSTIC TEST - PASS

16:25 ADCP COMPASS CALIBRATION - 0.1° ERROR

16:25 ADCP COMPASS EVALUATION - 0.2° ERROR

16:38 086-06 REDO w/600 kHz — DEPTH ~ 84' — TRANSECT 000

END 16:44 ucr_000_18-10-04.PD0

NAV 086-06-ADCP-2ACT

16:49 086-05 REDO w/600 kHz — DEPTH ~ 82' — TRANSECT 001

END 16:55 ucr_001_18-10-04.PD0

NAV 086-05-ADCP-2ACT

17:01 086-04 REDO w/600 kHz — DEPTH ~ 80' — TRANSECT 002

END 17:08 ucr_002_18-10-04.PD0

NAV 086-04-ADCP-2ACT — MBES VESSEL BRIEFLY CAME CLOSE

EXTRA DATA COLLECTED, SOME REMNANT INTENSITY IN

17:15 086-03 REDO w/600 kHz — DEPTH ~ 60' — TRANSECT 003

END 17:22 ucr_003_18-10-04.PD0

END NAV 086-03-ADCP-2ACT — SLIGHT ~2' DRIFT OUTSIDE RADIUS FOR

086 ~~END~~ FIRST 25 PINGS, 292-315

087 CONT'D

17:31 087-02 REDO w/600 kHz — DEPTH ~ 66' — TRANSECT 004

END 17:36 ucr_004_18-10-04.PD0

NAV 087-02-ADCP-2ACT

17:42 087-03 600 kHz — DEPTH ~ 79' — TRANSECT 005

END 17:48 ucr_005_18-10-04.PD0

NAV 087-03-ADCP-1ACT

17:55 087-04 600 kHz — DEPTH ~ 75' — TRANSECT 006

END 18:01 ucr_006_18-10-04.PD0

NAV 087-04-ADCP-1ACT

18:21 087-05 600 kHz — DEPTH ~ 76' — TRANSECT 007

END 18:27 ucr_007_18-10-04.PD0

NAV 087-05-ADCP-1ACT

EVEN CALMER

Scale: 1 square = (4)

10/04/2018 MAGGIE McKEON UCR BED FACIES MAPPING

18:44 088-06 600 kHz DEPTH ~ 80' TRANSECT 008
END 18:50 ucr_008_18-10-04.PDO
NAV 088-06-ADCP-1.ACT

19:08 088-05 600 kHz DEPTH ~ 78' TRANSECT 009
END 19:14 ucr_009_18-10-04.PDO
NAV 088-05-ADCP-1ACT

19:19 088-04 600 kHz DEPTH ~ 76' TRANSECT 010
END 19:25 ucr_010_18-10-04.PDO
NAV 088-04-ADCP-1ACT

19:32 088-03 600 kHz DEPTH ~ 65' TRANSECT 011
END 19:39 ucr_011_18-10-04.PDO
NAV 088-03-ADCP-1ACT

19:46 089-03 600 kHz DEPTH ~ 64' TRANSECT 012
END 19:52 ucr_012_18-10-04.PDO
NAV 089-03-ADCP-1ACT

19:52 089-03-DUP 600 kHz DEPTH ~ 64' TRANSECT 013
END 19:59 ucr_013_18-10-04.PDO
NAV 089-03-ADCP-1ACT

20:06 089-04 600 kHz DEPTH ~ 78' TRANSECT 014
20:12 ucr_014_18-10-04.PDO NAV 089-04-ADCP-1ACT

20:17 089-05 600 kHz DEPTH ~ 78' TRANSECT 015
20:23 ucr_015_18-10-04.PDO NAV 089-05-ADCP-1ACT

20:44 089-06 600 kHz DEPTH ~ 81' TRANSECT 016
20:54 ucr_016_18-10-04.PDO NAV 089-06-ADCP-1ACT
LEFT TARGET RADIUS FOR ~3 MIN, TAKING EXTRA DATA TO COMPENSATE

21:11 090-07 600 kHz DEPTH ~ 71' TRANSECT 017
21:17 ucr_017_18-10-04.PDO NAV 090-07-ADCP-1ACT

21:34 090-06 600 kHz DEPTH ~ TRANSECT 018
21:40 ucr_018_18-10-04.PDO NAV-090-06-ADCP-1ACT

10/04/2018 MAGGIE MCKEON UCR BED FACIES MAPPING

21:50 090-05 600 KHZ DEPTH ~ 79' TRANSECT 019
21:56 ucr_019_18-10-04.PDO NAV 090-05-ADCP-1ACT

WIND INCREASE SLIGHTLY 22:01

20:06 090-04 600 KHZ DEPTH ~ 71 TRANSECT 020
20:13 ucr_020_18-10-04.PDO NAV 090-04-ADCP-1ACT

22:23 090-02 600KHZ DEPTH ~65' TRANSECT 021
20:30 ucr_020_18-10-04.PDO NAV 090-02-ADCP-1ACT

TRANSECT 022 NOT ANYTHING! CHECKING RDI GPS FIX
DGPS NOW FUNCTIONAL AND A VIABLE REFERENCE
OPTION GOING FORWARD

10/07/2018

MM

Scale: 1 square = (6)

10/05/2018 MAGGIE McKEON UCR SEDIMENT FACIES MAPPING

PARTLY CLOUDY, CALM — ADCP = 56.4 °F
USING 1200 KHZ — AML = 56.98 °F

16:00 BOAT LAUNCH
16:18 ADCP DIAGNOSTIC TEST - PASS
16:28 COMPASS CALIBRATION - 0.5° ERROR
16:38 COMPASS EVALUATION - 0.4° ERROR

16:43 088-02 1200 KHZ BT, WM1 DEPTH ~52' TRANSECT 000
16:49 UCR_0_000_18-10-05.PDO NAV 088-02-ADCP-1ACT

17:06 089-02 1200 KHZ BT, WM1 DEPTH ~40.8' TRANSECT 001
17:11 UCR_0_001_18-10-05.PDO NAV 089-02-ADCP-1ACT
OUTSIDE RADIUS #111-126

[WIND PICKED UP A BIT FROM NORTH]

17:28 090-01 1200 KHZ BT, WM1 DEPTH ~22' TRANSECT 002
17:35 UCR_0_002_18-10-05.PDO NAV 090-01-ADCP-1ACT

[WIND DIED DOWN]

17:43 090-03 1200 KHZ BT, WM1 DEPTH ~40.1' TRANSECT 003
17:48 UCR_0_003_18-10-05.PDO NAV 090-03-ADCP-1ACT

18:03 090-08 1200 KHZ BT, WM1 DEPTH ~24.2' TRANSECT 004
18:09 UCR_0_004_18-10-05.PDO NAV 090-08-ADCP-1ACT

18:12 090-09 1200 KHZ BT, WM1 DEPTH ~26.8' TRANSECT 005
18:18 UCR_0_005_18-10-05.PDO NAV 090-09-ADCP-1ACT
OUTSIDE RADIUS #120-130

18:26 090-10 1200 KHZ BT, WM1 DEPTH ~42.7' TRANSECT 006
18:33 UCR_0_006_18-10-05.PDO NAV 090-10-ADCP-1ACT

18:41 089-10 1200 KHZ BT, WM1 DEPTH ~28' TRANSECT 007
18:47 UCR_0_007_18-10-05.PDO NAV 089-10-ADCP-1ACT

18:53 089-09 1200 KHZ BT, WM1 DEPTH ~30.6' TRANSECT 008
18:59 UCR_0_008_18-10-05.PDO NAV 089-09-ADCP-1ACT

10/5/2018 MAGGIE MCLEOD UCR SEDIMENT FACIES MAPPING

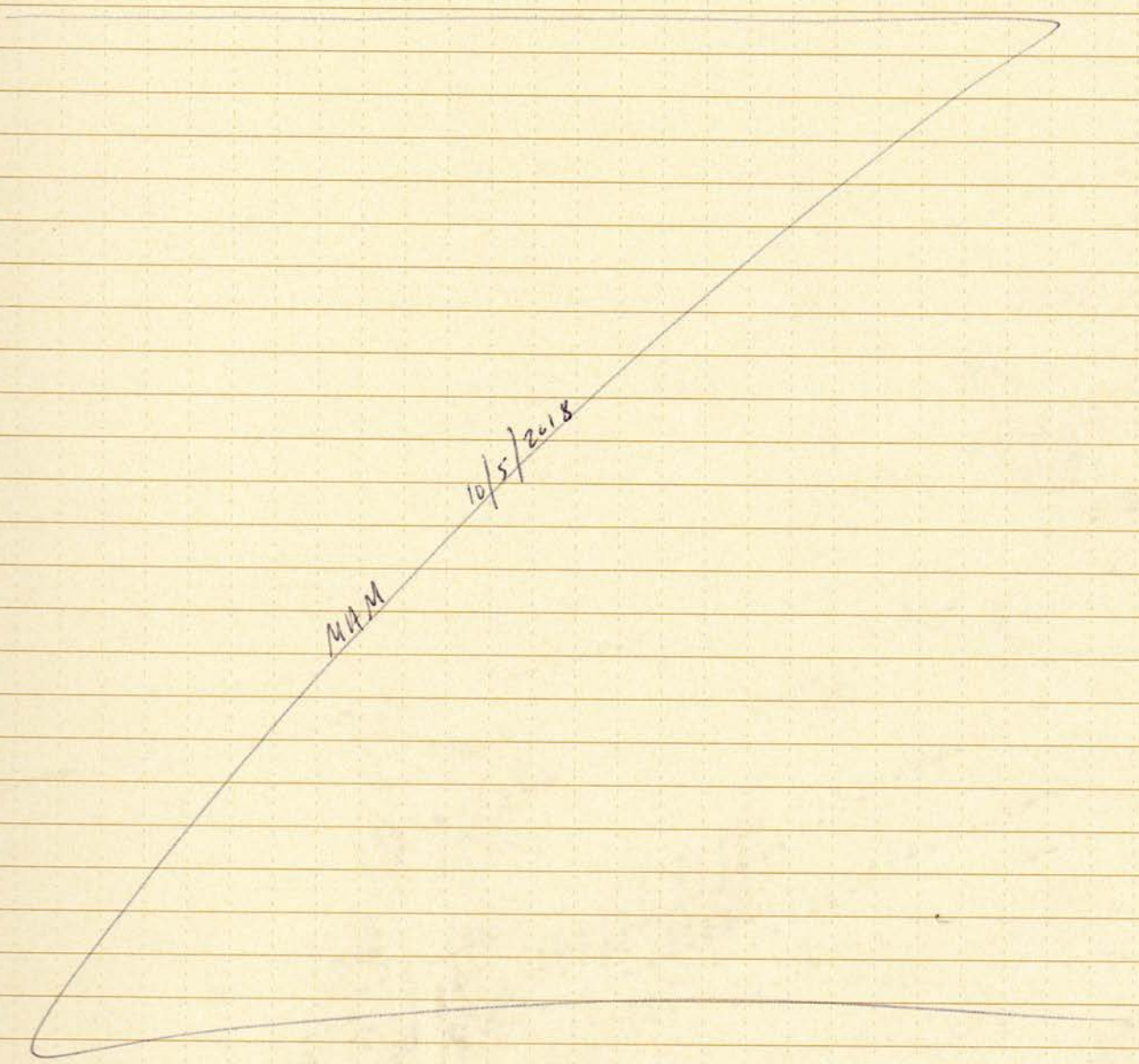
19:10	089-08	1200KHZ	BT, WMI	DEPTH - 29.0' TRANSECT 009
19:15	UCR_0_009_18-10-05.PDO			NAV 089-08-ADCP-1ACT
19:14	089-07	1200 KHZ	BT, WMI	DEPTH - 25' TRANSECT 010
19:24	UCR_0_010_18-10-05.PDO			NAV 089-07-ADCP-1ACT
19:51	088-07	1200 KHZ	BT, WMI	DEPTH - 27.2' TRANSECT 011
19:56	UCR_0_011_18-10-05.PDO			NAV 088-07-ADCP-1ACT
20:11	088-08	1200 KHZ	BT, WMI	DEPTH - 28.7' TRANSECT 012
20:16	UCR_0_012_18-10-05.PDO			NAV 088-08-ADCP-1ACT
20:43	088-09	1200 KHZ	BT, WMI	DEPTH - 28.4' TRANSECT 013
20:48	UCR_0_013_18-10-05.PDO			NAV 088-09-ADCP-1ACT
20:48	088-09-DUP	1200 KHZ	BT, WMI	DEPTH - 28.4' TRANSECT 014
20:53	UCR_0_014_18-10-05.PDO			NAV 088-09-ADCP-1ACT
21:04	088-10	1200KHZ	BT, WMI	DEPTH - 25.5' TRANSECT 15
21:13	UCR_0_015_18-10-05.PDO			NAV 088-10-ADCP-1ACT
				OUTSIDE #89-94
~~MAM~~	~~MAM~~	~~MAM~~	~~MAM~~	~~MAM~~
~~087-10~~	~~1200KHZ~~	~~BT, WMI~~	~~DEPTH -~~	~~TRANSECT 016~~
~~UCR_0_016_18-10-05.PDO~~			~~NAV 087-10-ADCP-1ACT~~	
~~087-10 2 TOO MANY WEEDS~~				
21:39	087-10	1200 KHZ	BT, WMI	DEPTH - 22.8 TRANSECT 016
21:45	UCR_0_016_18-10-05.PDO			NAV 087-10-ADCP-1ACT
	087-09 TOO MANY WEEDS			~~DEPTH 41.2' 2 TRA~~ MAM
22:04	087-07	1200 KHZ	BT, WMI	DEPTH - 41.2' TRANSECT 017
20:11	UCR_0_017_18-10-05.PDO			NAV 087-07-ADCP-1ACT
22:16	087-09	1200 KHZ	BT, WMI	DEPTH -33.6' TRANSECT 018
22:22	UCR_0_018_18-10-05.PDO			NAV 087-09-ACT-1ACT
				#120-155
22:26	087-08	1200 KHZ	BT, WMI	DEPTH - 30.2' TRANSECT 019
22:31	UCR_0_019_18-10-05.PDO			NAV 087-08-ADCP-1ACT

Scale: 1 square = (8)

10/5/2018 MAGGIE McKEON UCR SEDIMENT FACIES MAPPING

22:41	087-06	1200 kHz	BT, WMI	DEPTH - 22.4 TRANSECT 020
22:46	UCR_0_020_18-10-05.PDO			NAV 087-06 -ADCP -1ACT
23:07	091-09	1200 kHz	BT, WMI	DEPTH - 24' TRANSECT 021
23:12	UCR_0_021_18-10-05.PDO			NAV 091-09 -ADCP -1ACT
				OUTSIDE #190-210
~~23:18~~	~~091-10~~	~~1200 kHz~~ MM	~~BT~~	
23:18	091-10	1200 kHz	BT, WMI	DEPTH - 47' TRANSECT 022
23:23	UCR_0_022_18-10-05.PDO			NAV 091-10 -ADCP -1ACT
23:32	092-10	1200 kHz	BT, WMI	DEPTH - 37' TRANSECT 023
23:38	UCR_0_023_18-10-05.PDO			NAV 092-10 -ADCP -1ACT

[WIND PICKED UP SLIGHTLY FROM NORTH]



10/6/2018 MAGGIE McKEON UCR SEDIMENT FACIES MAPPING

MOSTLY SUNNY, CALM — ADCP = 56.64 °F
USING 600 KHZ — AML = 56.75 °F

16:00 BOAT LAUNCH
16:04 ADCP DIAGNOSTIC TEST -
16:10 ADCP COMPASS CALIBRATION - 0.3°
16:13 ADCP COMPASS EVALUATION - 0.2°

16:26	088-01	600 KHZ	BT, WMI	DEPTH - 68.4' TRANSECT 000
16:33	UCR_000_18-10-06.PDO			NAV 088-01-ADCP-IACT (CHECK ADCP OFFSET)
	~~088-01~~	~~600 KHZ~~		
16:44	089-01	600 KHZ	BT, WMI	DEPTH - 71.7' TRANSECT 001
16:49	UCR_001_18-10-06.PDO			NAV 089-01-ADCP-IACT (CHECK ADCP OFFSET)
17:07	091-05	600KHZ	BT, WMI	DEPTH - 65' TRANSECT 002
17:13	UCR_002_18-10-06.PDO			NAV 091-05 - ADCP - IACT #190-220
17:23	091-06	600 KHZ	BT, WMI	DEPTH - 106' TRANSECT 003
17:30	UCR_003_18-10-06.PDO			NAV 091-06 - ADCP - IACT
17:38	091-07	600 KHZ	BT, WMI	DEPTH - 94' TRANSECT 004
17:44	UCR_004_18-10-06.PDO			NAV 091-07 - ADCP - IACT
17:53	091-08	600 KHZ	BT, WMI	DEPTH - 76' TRANSECT 005
16:00	UCR_005_18-10-06.PDO			NAV 091-08 - ADCP - IACT #260-290
18:15	092-09	600KHZ	BT, WMI	DEPTH - 83' TRANSECT 006
18:21	UCR_006_18-10-06.PDO			NAV 092-09 - ADCP - IACT
18:30	092-08	600 KHZ	BT, WMI	DEPTH - 93.6' TRANSECT 007
	UCR_007_18-10-06.PDO			NAV 092-08 - ADCP - IACT
	* ABORTED DUE TO CONNECTIVITY * [CURRUPED USB-SERIAL CABLE]			
18:38	092-08 REDO	600 KHZ	BT, WMI	DEPTH - 92.7' TRANSECT 008
18:54	UCR_008_18-10-06.PDO			NAV 092-08 - ADCP - IACT
19:03	092-02	600 KHZ	BT, WMI	DEPTH - 107.3' TRANSECT 009
19:10	UCR_009_18-10-06.PDO			NAV 092-02 - ADCP - IACT

NITE: BUMP = LARGE BOULDER BED ROCK, SEE CAMERA IMAGE

Scale: 1 square = 10

10/06/2018 MAGGIE McKEON UCR SEDIMENT FACIES MAPPING

19:29 092-07 600 KHZ BT, WMI DEPTH - 96' TRANSECT 010
19:35 UCR_010_18-10-06.PDO NAV 092-07-ADCP-1ACT
#90-100

19:51 093-05 600 KHZ BT, WMI DEPTH - 56.5' TRANSECT 011
19:57 UCR_011_18-10-06.PDO NAV 093-05-ADCP-1ACT
#280-305

20:17 893-06 600KHZ BT, WMI DEPTH - 86.9' TRANSECT 012
20:23 UCR_012_18-10-06.PDO NAV 093-06-ADCP-1ACT

20:32 093-07 600 KHZ BT, WMI DEPTH - 86' TRANSECT 013
20:39 UCR_013_18-10-06.PDO NAV 093-07-ADCP-1ACT

20:39 693-07 DVP 600 KHZ BT, WMI DEPTH - 86' TRANSECT 014
21:45 UCR_014_18-10-06.PDO NAV 093-07-ADCP-1ACT

21:00 093-08 600KHZ BT, WMI DEPTH - 88.5 TRANSECT 015
21:06 UCR_015_18-10-06.PDO NAV 093-08-ADCP-1ACT

21:14 093-09 600 KHZ BT, WMI DEPTH - 77.5 TRANSECT 016
21:20 UCR_016_18-10-06.PDO NAV 093-09-ADCP-1ACT

21:29 093-10 600KHZ BT, WMI DEPTH - 72.8 TRANSECT 017
21:35 UCR_017_18-10-06.PDO NAV 093-10-ADCP-1ACT

21:46 094-09 600KHZ BT, WMI DEPTH - 75.3' TRANSECT 018
21:52 UCR_018_18-10-06.PDO NAV 094-09-ADCP-1ACT

21:59 094-08 600 KHZ BT, WMI DEPTH - 79.9 TRANSECT 019
22:05 UCR_019_18-10-06.PDO NAV 094-08-ADCP-1ACT

22:11 094-07 600 KHZ BT, WMI DEPTH - 92' TRANSECT 020
22:17 UCR_020_18-10-06 PDO NAV 094-07-ADCP-1ACT

22:27 094-06 600 KHZ BT, WMI DEPTH - 93.5 TRANSECT 021
22:33 UCR_021_18-10-06.PDO NAV 094-06-ADCP-1ACT

22:42 094-05 600 KHZ BT, WMI DEPTH - 84' TRANSECT 022
22:48 UCR_022_18-10-06 PDO NAV 094-05-ADCP-1ACT

10/6/2018 MAGGIE McKEON UCR SEDIMENT FACIES MAPPING

22:55 094-04 600 KHZ BT, WMI DEPTH - 78.9 TRANSECT 023
23:02 UCR_023_18-10-06.PDO NAV 094-04 -ADCP -1ACT
#250 - 270

23:07
23:13 094-03 600 KHZ BT, WMI DEPTH - 75' TRANSECT 024
UCR_024_18-10-06.PDO NAV 094-03 -ADCP -1ACT

[WIND DIED DOWN; CALM]

23:21 094-02 600 KHZ BT, WMI DEPTH - 65.8 TRANSECT 025
23:27 UCR_025_18-10-06.PDO NAV 094-02-ADCP -1ACT

23:37 095-02 600KHZ BT, WMI DEPTH - 77' TRANSECT 026
23:44 UCR_026-18-10-06.PDO NAV 095-01 -ADCP -1ACT

MAM 10/6/18

Scale: 1 square = 12

10/7/2018 MAGGIE McKEON UCR SEDIMENT FACIES MAPPING

CLOUDY, CALM — ADCP = 55.9°F
USING 600 kHz — AML = 55.9°F

15:40 BOAT LAUNCH
15:58 ADCP DIAGNOSTIC TEST - PASS
16:00 ADCP COMPASS CALIBRATION - 0.7°
16:03 ADCP COMPASS EVALUATION - 0.9°

16:07 095-03 BT, WMI — DEPTH - 81.7' — TRANSECT 000
16:12 UCR_000_18-10-07.PDO — NAV 095-03-ADCP-1ACT

16:31 095-04 BT, WMI — DEPTH - 83.5' — TRANSECT 001
16:37 UCR_001_18-10-07.PDO — NAV 095-04-ADCP-1ACT

16:44 095-05 BT, WMI — DEPTH - 83' — TRANSECT 002
16:49 UCR_002_18-10-07.PDO — NAV 095-05-ADCP-1ACT

17:05 095-06 BT, WMI — DEPTH - 80.5 — TRANSECT 003
17:10 UCR_003_18-10-07.PDO — NAV 095-06-ADCP-1ACT

17:17 095-07 BT, WMI — DEPTH - 83' — TRANSECT 004
17:23 UCR_004_18-10-07.PDO — NAV 095-07-ADCP-1ACT

17:29 095-08 BT, WMI — DEPTH - 82' — TRANSECT 005
17:35 UCR_005_18-10-07.PDO — NAV 095-08-ADCP-1ACT

17:42 095-09 BT, WMI — DEPTH - 72' — TRANSECT 006
17:47 UCR_006_18-10-07.PDO — NAV 095-09-ADCP-1ACT

17:58 096-09 BT, WMI — DEPTH - 82' — TRANSECT 007
18:03 UCR_007_18-10-07.PDO — NAV 096-09-ADCP-1ACT

18:09 096-08 BT, WMI — DEPTH - 83.4' — TRANSECT 008
18:15 UCR_008_18-10-07.PDO — NAV 096-08-ADCP-1ACT

18:21 096-07 BT, WMI — DEPTH - 86'. — TRANSECT 009
18:26 UCR_009_18-10-07.PDO — NAV 096-07-ADCP-1ACT

18:33 096-06 BT, WMI — DEPTH - 85' — TRANSECT 010
18:38 UCR_010_18-10-07.PDO — NAV 096-06-ADCP-1ACT

10/7/18 MAGGIE McKEON UCR SEDIMENT FACIES MAPPING

18:46	096-05	BT, WMI	DEPTH - 86'	TRANSECT 011
18:51	UCR_011_18-10-07.PDO		NAV 096-05 - ADCP - 1ACT	
18:57	096-04	BT, WMI	DEPTH - 84.5'	TRANSECT 012
19:02	UCR_012_18-10-07.PDO		NAV 096-04 - ADCP - 1ACT	
19:08	096-03	BT WMI	DEPTH - 86.6'	TRANSECT 013
19:13	UCR_013_18-10-07.PDO		NAV 096-03 - ADCP - 1ACT	
19:19	096-02	BT, WMI	DEPTH - 76'	TRANSECT 014
19:25	UCR_014_18-10-07.PDO		NAV 096-02 - ADCP - 1ACT	
19:54	097-03	BT WMI	DEPTH - 82'	TRANSECT 015
19:59	UCR_015_18-10-07.PDO		NAV 097-03 ADCP - 1ACT	
20:05	097-04	BT-WMI	DEPTH - 89'	TRANSECT 016
20:11	UCR_016_18-10-07.PDO		NAV 097-04 - ADCP - 1ACT	
20:17	097-05	BT, WMI	DEPTH - 87'	TRANSECT 017
20:23	UCR_017_18-10-07.PDO		NAV 097-05 - ADCP - 1ACT	
20:24	097-05-DUP	BT, WMI	DEPTH - 87'	TRANSECT 018
20:29	UCR_018-18-10-07.PDO		NAV 097-05 - ADCP - 1ACT	
20:41	097-06	BT, WMI	DEPTH - 81'	TRANSECT 019
20:46	UCR_019_18-10-07.PDO		NAV 097-06 - ADCP - 1ACT	
20:53	097-07	BT, WMI	DEPTH - 85'	TRANSECT 020
20:59	UCR_020_18-10-07.PDO		NAV 097-07 - ADCP - 1ACT	
21:08	097-08	BT, WMI	DEPTH - 80'	TRANSECT 021
21:13	UCR_021_18-10-07.PDO		NAV 097-08 - ADCP - 1ACT	
21:22	097-09	BT, WMI	DEPTH - 77'	TRANSECT 022
21:27	UCR_022_18-10-07.PDO		NAV 097-09 - ADCP - 1ACT	
21:38	098-10	BT, WMI	DEPTH - 60'	TRANSECT 023
21:43	UCR_023_18-10-07.PDO		NAV 098-10 - ADCP - 1ACT	
21:51	098-09	BT, WMI	DEPTH - 82'	TRANSECT 024
21:56	UCR_024_18-10-07.PDO		NAV 098-09 - ADCP - 1ACT	

Scale: 1 square = 1/4

10/7/18 MAGGIE McKEON UCR SEDIMENT FACIES MAPPING

22:03 098-08 BT, WMI DEPTH - 84' TRANSECT 025
22:08 UCR_025_18-10-07.PDO NAV 098-08-ADCP-1ACT

22:17 098-07 BT, WMI DEPTH - 84' TRANSECT 026
22:22 UCR_026_18-10-07.PDO NAV 098-07-ADCP-1ACT

22:28 098-06 BT, WMI DEPTH - 85' TRANSECT 027
22:33 UCR_027_18-10-07.PDO NAV 098-06-ADCP-1ACT

22:39 098-05 BT, WMI DEPTH - 95' TRANSECT 028
22:44 UCR_028_18-10-07.PDO NAV 098-05-ADCP-1ACT

22:49 098-04 BT, WMI DEPTH - 78' TRANSECT 029
22:54 UCR_029_18-10-07.PDO NAV 098-04-ADCP-1ACT

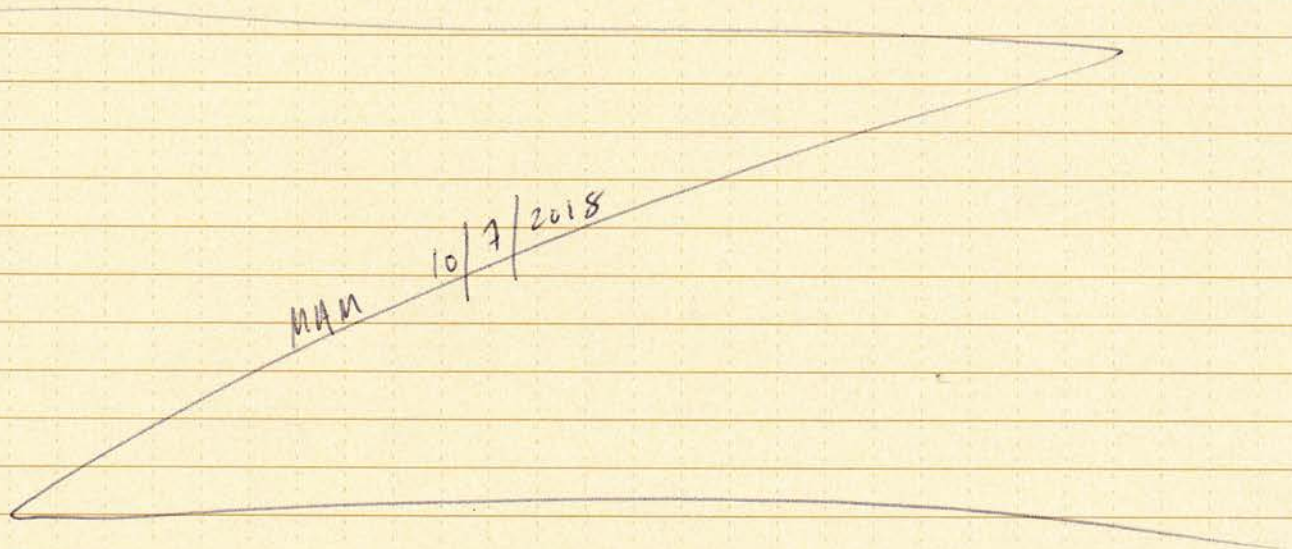
22:59 098-03 BT, WMI DEPTH - 74 TRANSECT 030
23:04 UCR_030_18-10-07.PDO NAV 098-03-ADCP-1ACT

23:15 099-03 BT, WMI DEPTH - 78' TRANSECT 031
22:21 UCR_031_18-10-07.PDO NAV 099-03-ADCP-1ACT

[WIND UP SLIGHTLY FROM NORTH, PARTLY SUNNY]

23:25 099-04 BT, WMI DEPTH - 89' TRANSECT 032
23:30 UCR_032_18-10-07.PDO NAV 099-04-ADCP-1ACT

23:37 099-05 BT, WMI DEPTH - 90' TRANSECT 033
23:42 UCR_033_18-10-07.PDO NAV 099-05-ADCP-1ACT



10/8/2018 MAGGIE McKEON UCR SEDIMENT FACIES MAPPING

CLOUDY, CALM — ADCP =
USING 1200 KHZ — AML = 56.1

15:39 BOAT LAUNCH
16:05 ADCP DIAGNOSTIC TEST - PASS
16:10 ADCP COMPASS CALIBRATION - 1.0°
16:13 ADCP COMPASS EVALUATION - 0.3°

16:17 094-10 BT, WM1 DEPTH - 42.5' TRANSECT 000
16:22 UCR_000_18-10-08.PD0 NAV 094-10 - ADCP - 1ACT

16:32 096-10 BT, WM1 DEPTH - 44.4' TRANSECT 001
16:37 UCR_001_18-10-08.PD0 NAV 096-10 - ADCP - 1ACT

16:43 095-10 BT, WM1 DEPTH - 44.8' TRANSECT 002
16:48 UCR_002_18-10-08.PD0 NAV 095-10 - ADCP - 1ACT

17:00 097-10 BT, WM1 DEPTH - 55' TRANSECT 003
17:05 UCR_003_18-10-08.PD0 NAV 097-10 - ADCP - 1ACT

17:22 ~~099-10~~ 100-02 MAN BT, WM1 DEPTH - 46' TRANSECT 004
17:28 UCR_004_18-10-08.PD0 NAV ~~099-10~~ MAN 100-02 - ADCP - 1ACT

17:32 100-01 BT, WM1 DEPTH - 26' TRANSECT 005
17:38 UCR_005_18-10-08.PD0 NAV 100-01 - ADCP - 1ACT

17:45 099-01 BT, WM1 DEPTH - 25' TRANSECT 006
17:50 UCR_006_18-10-08.PD0 NAV 099-01 - ADCP - 1ACT

17:54 099-02 BT, WM1 DEPTH - 39' TRANSECT 007
17:59 UCR_007-18-10-08.PD0 NAV 099-02 - ADCP - 1ACT

18:06 098-02 BT, WM1 DEPTH - 32' TRANSECT 008
18:11 UCR_008_18-10-08.PD0 NAV 098-02 - ADCP - 1ACT

18:17 098-01 BT, WM11 DEPTH - 16' TRANSECT 009
18:24 UCR_009_18-10-08.PD0 NAV 098-01 - ADCP - 1ACT
MAY BE TOO MANY WEEDS

19:33 097-01 BT, WM11 DEPTH - 10' TRANSECT 010
ABORT DUE TO WEEDS

Scale: 1 square = 1/6

10/8/2018 MAGGIE McKEON UCR SEDIMENT FACIES MAPPING

18:41 097-02 BT, WM1 DEPTH - 52' TRANSECT 011
18:46 UCR_011_18-10-08.PDO NAV 097-02 - ADCP - 1ACT

18:53 097-01 BT, WM1 DEPTH - 27 TRANSECT 012
18:58 UCR-012_18-08.PDO NAV 097-01 - ADCP - 1ACT

19:04 096-01 BT, WM1 DEPTH - 35' TRANSECT 013
19:09 UCR_013_18-08.PDO NAV 096-01 - ADCP - 1ACT

19:17 095-01 BT, WM1 DEPTH - 51' TRANSECT 014
19:22 UCR_014_18-08.PDO NAV 095-01 - ADCP - 1ACT

19:29 094-01 BT, WM1 DEPTH - 25' TRANSECT 015
19:34 UCR_015_18-10-08.PDO NAV 094-01 - ADCP - 1ACT

19:59 093-04 BT, WM11 DEPTH - 25' TRANSECT 016
20:07 UCR_016_18-10-08.PDO NAV 093-04 - ADCP - 1ACT
093-03 TOO SHALLOW, ALMOST GROUNDED ADCP

20:22 093-~~03~~ 02 BT, WM11 DEPTH - 18' TRANSECT 017
20:28 UCR_017_18-10-08 PDO NAV 093-~~03~~ 02 - ADCP - 1ACT

22:35 093-01 BT, WM11 DEPTH - 25' TRANSECT 018
20:43 UCR_018_18-10-08.PDO NAV 093-01 - ADCP - 1ACT

092-01 BT, WM11 DEPTH - TRANSECT 019
UCR_019_18-10-08.PDO NAV 092-01 - ADCP - 1ACT
TOO MANY WEEDS

21:01 092-03 BT, WM11 DEPTH - 19' TRANSECT 019
21:07 UCR_019_18-10-08.PDO NAV 092-03 ADCP - 1ACT

21:19 092-04 BT, WM11 DEPTH - 12' TRANSECT 020
21:26 UCR_020_18-10-08.PDO NAV 092-04 - ADCP - 1ACT

21:34 092-05 BT, WM1 DEPTH - 30' TRANSECT 021
21:39 UCR_021_18-10-08.PDO NAV 092-05 - ADCP - 1ACT

21:46 092-06 BT, WM1 DEPTH - 53' TRANSECT 022
21:51 UCR_022_18-10-08.PDO NAV 092-06 - ADCP - 1ACT

[LIGHT RAIN 21:50]

10/8/18 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

21:59	091-04	BT, WM1	DEPTH - 59'	TRANSECT 023
22:04	UCR_023_18-10-08.PDO		NAV 091-04 - ADCP - 1ACT	
22:10	091-03	BT, WM11	DEPTH - 24.5	TRANSECT 024
22:17	UCR_024_18-10-08.PDO		NAV 091-03 - ADCP - 1ACT	
22:17	091-03-DUP	BT, WM11	DEPTH - 24.5	TRANSECT 025
22:24	UCR_025_18-10-08.PDO		NAV 091-03 - ADCP - 1ACT	
22:36	091-02	BT, WM1	DEPTH - 35'	TRANSECT 026
22:43	UCR_026_18-10-08.PDO		NAV 091-02 - ADCP - 1ACT	
22:52	091-01	BT, WM11	DEPTH -	TRANSECT 027
	UCR_027_18-10-08.PDO		NAV 091-01 - ADCP - 1ACT	
	/ABORT WM11 SWITCH TO WM1/			
22:55	091-01	BT, WM1	DEPTH - 26'	TRANSECT 028
23:00	UCR_028_18-10-08.PDO		NAV 091-01 - ADCP - 1ACT	
23:29	086-02	BT, WM1	DEPTH - 40'	TRANSECT 029
23:34	UCR_029_18-10-08.PDO		NAV 086-02 - ADCP - 1ACT	
			ALT LOCATION	

~~086-01~~

Scale: 1 square = 18

10/9/2018 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

CLOUDY, CALM, END OF RAIN — ADCP = 55.5°F
USING 600 KHZ — AML = 55.8°F

15:55 BOAT LAUNCH
16:16 ADCP DIAGNOSTIC TEST - PASS
16:20 ADCP COMPASS CALIBRATION - 0.4°
16:22 ADCP COMPASS EVALUATION - 0.2°

16:25 099-06 BT, WMI DEPTH - 86.6' TRANSECT 000
16:31 UCR_000_18-10-09.PDO NAV 099-06-ADCP-1ACT

16:38 099-07 BT, WMI DEPTH - 84' TRANSECT 001
16:44 UCR_001_18-10-09.PDO NAV 099-07-ADCP-1ACT

16:50 099-08 BT, WMI DEPTH - 87' TRANSECT 002
16:55 UCR_002_18-10-09.PDO NAV 099-08-ADCP-1ACT

17:10 099-09 BT, WMI DEPTH - 85' TRANSECT 003
17:15 UCR_003_18-10-09.PDO NAV 099-09-ADCP-1ACT

17:21 099-10 BT, WMI DEPTH - 64' TRANSECT 004
17:26 UCR_004-18-10-09.PDO NAV 099-10-ADCP-1ACT

17:36 100-10 BT, WMI DEPTH - 75' TRANSECT 005
17:41 UCR_005_18-10-09.PDO NAV 100-10-ADCP-1ACT

17:47 100-09 BT, WMI DEPTH - 84' TRANSECT 006
17:52 UCR_006_18-10-09.PDO NAV 100-09-ADCP-1ACT

17:57 100-08 BT, WMI DEPTH - 85' TRANSECT 007
18:02 UCR_007_18-10-09.PDO NAV 100-08-ADCP-1ACT

18:09 100-07 BT, WMI DEPTH - 83' TRANSECT 008
18:15 UCR_008-18-10-09.PDO NAV 100-07-ADCP-1ACT

18:20 100-06 BT, WMI DEPTH - 83' TRANSECT - 009
18:25 UCR_009_18-10-09.PDO NAV 100-06-ADCP-1ACT

18:30 100-05 BT, WMI DEPTH - 82' TRANSECT 010
18:35 UCR_010_18-10-09.PDO NAV 100-05-ADCP-1ACT

10/09/2018 MAGGIE McKEON UCR SEDIMENT FACIES MAPPING

18:42 100-04 BT, WMI DEPTH - 81' TRANSECT 011
18:47 UCR_011_18-10-09.PDO NAV 100-04 - ADCP - 1ACT

18:52 100-03 BT, WMI DEPTH - 70' TRANSECT 012
18:57 UCR_012_18-10-09.PDO NAV 100-03 - ADCP - 1ACT

CATCH UP ON CAMERA STATIONS
20:56 WIND FROM NORTH 7-9 MPH

21:21 085 - 06 BT, WMI DEPTH - 81' TRANSECT 013
21:26 UCR_013_18-10-09.PDO NAV 085-06 - ADCP - 1ACT

21:33 085-05 BT, WMI DEPTH - 82' TRANSECT 014
21:37 UCR_014_18-10-09.PDO NAV 085-05 - ADCP - 1ACT

21:40 085-05 -DUP BT, WMI DEPTH - 82' TRANSECT 015
21:45 UCR_015_18-10-09 PDO NAV 085-05 - ADCP - 1ACT

21:59 085-04 BT, WMI DEPTH - 80' TRANSECT 016
22:04 UCR_016_18-10-09.PDO NAV 085-04 - ADCP - 1ACT

22:12 085-03 BT, WMI DEPTH - 70' TRANSECT 017
22:17 UCR_017_18-10-09.PDO NAV 085-03 - ADCP - 1ACT

22:36 084-03 BT, WMI DEPTH - 85' TRANSECT - 018
22:41 UCR_018-18-10-09.PDO NAV 084-03 - ADCP - 1ACT

22:55 083-01 BT, WMI DEPTH - 81' TRANSECT 019
23:01 UCR_019-18-10-09.PDO NAV 083-01 - ADCP - 1ACT

23:08 083-02 BT, WMI DEPTH - 91' TRANSECT 020
23:13 UCR_020_18-10-09.PDO NAV 083-02 - ADCP - 1ACT

23:25 082-01 BT, WMI DEPTH - 67 TRANSECT 021
23:30 UCR_021_18-10-09.PDO NAV 082-01 - ADCP - 1ACT

23:36 082-02 BT, WMI DEPTH - 85' TRANSECT 022
23:41 UCR_022_18-10-09.PDO NAV 082-02 - ADCP - 1ACT

Scale: 1 square = 20

10/9/18 MAGGIE MCLEON UCR SEDIMENT FACIES MAPPING

23:46 082-03 BT, NMI DEPTH - 89' TRANSECT 023

23:51 UCR_023_18-10-09.PDO NAV 082-03-ADCP-1ACT

23:57 082-04 BT, NMI DEPTH - 88 TRANSECT 024

UCR_024_18-10-09.PDO NAV 082-04-ADCP-1ACT

10/10/2018 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

SUNNY, ~~CALM~~, COLD, SLIGHT WIND FROM NORTH — ADCP = 54.9° F
USING 600 KHZ — AML = 54.75° F

16:10 BOAT LAUNCH
16:26 ADCP DIAGNOSTIC TEST - PASS
16:31 ADCP COMPASS CALIBRATION - 0.2°
16:34 ADCP COMPASS EVALUATION - 0.2°

16:40 082-05 BT, WMI — DEPTH - 71' — TRANSECT 000
16:46 UCR_000_~~18nov18~~.PDO — NAV 082-05 - ADCP - 1ACT

17:00 081-05 BT, WMI — DEPTH - 82' — TRANSECT 001
17:06 UCR_001_~~18nov18~~.PDO — NAV 081-05 - ADCP - 1ACT

17:12 081-04 BT, WMI — DEPTH - 90' — TRANSECT 002
17:19 UCR_002_~~18nov18~~.PDO — NAV 081-04 - ADCP - 1ACT
~~18nov~~

17:25 081-03 BT, WMI — DEPTH - 87' — TRANSECT 003
17:31 UCR_003.PDO — NAV 081-03 - ADCP - 1ACT

17:45 081-02 BT, WMI — DEPTH - 80' — TRANSECT 004
17:51 UCR_004.PDO — NAV 081-02 - ADCP - 1ACT

17:57 081-01 BT, WMI — DEPTH - 60' — TRANSECT 005
18:03 UCR_005.PDO — NAV 081-01 - ADCP - 1ACT

18:15 080-01 BT, WMI — DEPTH - 70' — TRANSECT 006
~~18:18~~ 18:19 UCR_006.PDO — NAV 080-01 - ADCP - 1ACT

18:26 080-02 BT, WMI — DEPTH - 63' — TRANSECT 007
18:30 UCR_007.PDO — NAV 080-02 - ADCP - 1ACT

18:36 080-03 BT, WMI — DEPTH - 68' — TRANSECT 008
18:40 UCR_008.PDO — NAV 080-03 - ADCP - 1ACT

18:47 080-04 BT, WMI — DEPTH - 83 — TRANSECT 009
18:52 UCR_009.PDO — NAV 080-04 - ADCP - 1ACT

18:58 080-05 BT, WMI — DEPTH - 63' — TRANSECT 010
~~19:00~~ 19:03 UCR_010.PDO — NAV 080-05 - ADCP - 1ACT

Scale: 1 square = 22

10/10/18 MAM

10/10/18 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

19:03	080-05-DUP	BT, WMI	DEPTH - 63'	TRANSECT 011
19:08	UCR_011.PDO		NAV 080-05 - ADCP-1ACT	
19:26	079-05	BT, WMI	DEPTH - 63'	TRANSECT 012
19:30	UCR_012.PDO		NAV 079-05 - ADCP-1ACT	
19:39	079-04	BT, WMI	DEPTH - 77'	TRANSECT 013
19:43	UCR_013.PDO		NAV 079-04 - ADCP-1ACT	
19:50	079-03	BT, WMI	DEPTH - 75'	TRANSECT 014
19:54	UCR_014.PDO		NAV 079-03 - ADCP-1ACT	
20:10	078-03	BT, WMI	DEPTH - 74'	TRANSECT 015
20:15	UCR_015.PDO		NAV 078-03 - ADCP-1ACT	
20:24	078-04	BT, WMI	DEPTH - 70.5'	TRANSECT 016
20:29	UCR_016.PDO		NAV 078-04 - ADCP-1ACT	
20:34	078-05	BT, WMI	DEPTH - 71'	TRANSECT 017
20:39	UCR_017.PDO		NAV 078-05 - ADCP-1ACT	
	~~077-04~~ WTA	~~BT, WMI~~	DEPTH -	~~TRANSECT 018~~
	~~UCR_018.PDO~~		~~NAV 077-04 - ADCP-1ACT~~	

[20:47 CALM] [LOST FIXED RTK] [SWITCH TO 1200 KHZ]

21:06 ADCP DIAGNOSTIC TEST - PASS
21:10 ADCP COMPASS CALIBRATION - 1.0°
21:12 ADCP COMPASS EVALUATION - 0.1°

21:22	078-01	BT, WMI	DEPTH - 44'	TRANSECT 018
21:26	UCR_018.PDO		NAV 078-01 - ADCP-1ACT	
21:34	078-02	BT, WMI	DEPTH - 52'	TRANSECT 019
21:38	UCR_019.PDO		NAV 078-02 - ADCP-1ACT	
21:53	079-02	BT, WMI	DEPTH - 53.5'	TRANSECT 020
21:58	UCR_020.PDO		NAV 079-02 - ADCP-1ACT	

22:04 079-01 BT, WM1 DEPTH - 28' TRANSECT 021
22:08 UCR_021.PDO NAV 079-01 - ADCP - 1ACT

22:38 083-03 BT, WM11 DEPTH - 29' TRANSECT 022
[TOO DEEP FOR WM11, ABORTED]

22:41 083-03 BT, WM1 DEPTH - 26' TRANSECT 023
22:45 UCR_023.PDO NAV 083-03 - ADCP - 1ACT

TOO MANY WEEDS 083-04 DEPTH - ~~TRANSECT 024~~
UCR_024.PDO ~~NAV 083-04 - ADCP - 1ACT~~

083-04 TOO MANY WEEDS - ABANDONED
083-05 TOO MANY WEEDS - ABANDONED

23:13 084-05 BT, WM1 DEPTH - 18' TRANSECT 024
23:16 UCR_024.PDO NAV 084-05.PDO
MAY BE TOO MANY WEEDS

23:28 084-04 BT, WM1 DEPTH - 28' TRANSECT 025
23:32 UCR_025.PDO NAV 084-04 - ADCP - 1ACT
ALTERNATE LOCATION

23:40 084-02 BT, WM1 DEPTH - 59' TRANSECT 026
23:45 UCR_026.PDO NAV 084-02 - ADCP - 1ACT

23:53 084-01 BT, WM1 DEPTH - 28' TRANSECT 027
24:00 UCR_027.PDO NAV 084-01 - ADCP - 1ACT

24:11 085-01 BT, WM1 DEPTH - 28' TRANSECT 028
24:16 UCR_028.PDO NAV 085-01 - ADCP - 1ACT
ALTERNATE LOCATION DUE TO WEEDS

24:20 085-02 BT, WM1 DEPTH - 36' TRANSECT 029
24:24 UCR_029.PDO NAV 085-02 - ADCP - 1ACT

MAM 10/10/18

10/11/18

SUNNY, CALM, COLD — ADCP = 54.8° F
USING 1200 KHZ TO START — AML = 55.7° F

15:40 BOAT LAUNCH
15:59 ADCP DIAGNOSTIC TEST - PASS
16:01 ADCP COMPASS CALIBRATION - 0.5°
16:04 ADCP COMPASS EVALUATION - 0.3°

16:13 085-10 BT, WM11 DEPTH - 27' TRANSECT 000
16:40 STATION UCR_000_18-10-11.PD0 NAV 085-10-ADCP-1ACT

16:31 085-09 BT, WM11 DEPTH - 23' TRANSECT 001
16:37 STATION UCR_001_18-10-11.PD0 NAV 085-09-ADCP-1ACT
ALTERNATE LOCATION, WEEDS DUE T

085-07 TOO SHALLOW
085-08 TOO MANY WEEDS

16:51 SWITCH TO 600 KHZ

17:07 ADCP DIAGNOSTIC TEST - PASS — ADCP = 54.6° F
17:09 ADCP COMPASS CALIBRATION - 0.7° — AML = 55.7° F
ADCP COMPASS EVALUATION -0.1°

17:21 077-~~01~~ 02 BT, WM1 DEPTH - 65' TRANSECT 002
17:27 STATION UCR_~~001~~ 002_18-10-11.PD0 NAV 077-~~01~~ 02-ADCP-1ACT

17:35 077-03 BT, WM1 DEPTH - 58' TRANSECT 003
17:40 Station UCR_003_18-10-11.PD0 NAV 077-03-ADCP-1ACT

17:46 077-04 BT, WM1 DEPTH - 69' TRANSECT 004
17:51 Station UCR_004_18-10-11.PD0 NAV 077-04-ADCP-1ACT

[17:45 SLIGHT WIND FROM SOUTH]

17:58 077-05 BT, WM1 DEPTH - 61' TRANSECT 005
18:03 Station UCR_005_18-10-11.PD0 NAV 077-05-ADCP-1ACT

10 - 11 - 2018 M.A.M.

18:13	076 - 05	BT, WMI	DEPTH - 62'	TRANSECT 006
18:17	STATION UCR_006_18-10-11.PDO		NAV 076 - 05 - ADCP - 1ACT	
18:23	076 - 04	BT, WMI	DEPTH - 62'	TRANSECT 007
18:29	STATION UCR_007_18-10-11.PDO		NAV 076 -04 - ADCP - 1ACT	
18:35	076 - 03	BT, W MI	DEPTH - 64'	TRANSECT 008
18:39	Station UCR_008_18-10-11.PDO		NAV 076 - 03 - ADCP - 1ACT	
18:45	076 - 02	BT, WMI	DEPTH - 60'	TRANSECT 009
18:49	Station UCR_009_18-10-11.PDO		NAV 076 - 02 - ADCP - 1ACT	
19:10	075 - 02	BT, WMI	DEPTH - 82'	TRANSECT 010
19:15	Station UCR_010_18-10-11.PDO		NAV 075 -02 - ADCP - 1ACT	
19:24	075 - 03	BT, WMI	DEPTH - 70'	TRANSECT 011
19:28	Station UCR_011_18-10-11.PDO		NAV 075 - 03 - ADCP - 1ACT	
19:33	075 - 04	BT, WMI	DEPTH - 78'	TRANSECT 012
19:38	Station UCR_012_18-10-11.PDO		NAV 075 - 04 - ADCP - 1ACT	
19:43	075 - 05	BT, WMI	DEPTH - 81'	TRANSECT 013
19:47	Station_UCR_013_18-10-11.PDO		NAV 075 - 05 - ADCP - 1ACT	
20:01	074 - 01	BT, WMI	DEPTH - 62'	TRANSECT 014
20:06	Station_UCR_014_18-10-11.PDO		NAV 074 - 01 - ADCP - 1ACT	
20:06	074 - 01 - DUP	BT, WMI	DEPTH - 62'	TRANSECT 015
20:11	Station_UCR_015_18-10-11.PDO		NAV 074 01 - ADCP - 1ACT	
20:23	074 - 02	BT, WMI	DEPTH - 71'	TRANSECT 016
20:28	Station UCR_016_18-10-11.PDO		NAV 074 - 02 - ADCP - 1ACT	
20:34	074 - 03	BT, WMI	DEPTH - 78'	TRANSECT 017
20:39	Station UCR_017_18-10-11.PDO		NAV 074 - 03 - ADCP - 1ACT	
21:20	073 - 04	BT, WMI	DEPTH - 70'	TRANSECT 018
21:25	Station UCR_018_18-10-11.PDO		NAV 073 - 04 - ADCP - 1ACT	

10-11-18 AM

21:32 073-03 BT, WMI DEPTH - 92' TRANSECT 019
21:36 Station UCR_019_18-10-11.PDO NAV 073-03 - ADCP-1ACT

21:44 073-02 BT, WMI DEPTH - 73' TRANSECT 020
21:48 Station UCR_020_18-10-11.PDO NAV 073-02 - ADCP-1ACT

21:48 073-02-DUP BT, WMI DEPTH - 73' TRANSECT 021
21:53 Station UCR_021_18-10-11.PDO NAV073-02-ADCP-1ACT

22:11 SWITCH TO 1200 KHZ

22:12 ADCP DIAGNOSTIC TEST - PASS ADCP =
22:18 ADCP COMPASS CALIBRATION - 0.7° AML = 55.7°
20:22 ADCP COMPASS EVALUATION - 0.1°

22:25 073-01 BT, WMII DEPTH - 24 TRANSECT 022
22:32 Station UCR_022_18-10-11 PDO NAV 073-01-ADCP-1ACT

22:43 073-05 BT, WMII DEPTH - 17-20' TRANSECT 023
22:48 Station UCR_023_18-10-11 PDO NAV 073-05-ADCP-1ACT
ALTERNATE LOCATION DUE TO SHALLOW
22:49 073-05 BT, WMII DEPTH - 17-20' TRANSECT 024
22:54 Station UCR_024_18-10-11.PDO NAV 073-05-1ADCP-1ACT (ALT SEE ABOVE)
MAY BE TOO WEEDY, TOO SLOPED

23:06 074-04 BT, WMI DEPTH - 37' TRANSECT 025
23:10 Station UCR_025_18-10-11.PDO NAV 074-04-ADCP-1ALT
ALTERNATE LOCATION DUE TO DEPTH
23:22 075-01 BT, WMI DEPTH - 58' TRANSECT 026
23:26 Station UCR_026_18-10-11.PDO NAV 075-01-ADCP-1ACT

23:37 076-01 BT, WMI DEPTH - 45' TRANSECT 026
23:42 Station UCR_026_18-10-11.PDO NAV 076-01-ADCP-1ACT

[23:28 WIND DIED DOWN]

23:53 077-01 BT, WMI DEPTH - 55' TRANSECT 027
23:58 Station UCR_027_18-10-11.PDO NAV 077-01-ADCP-1ACT

10-12-2018 M.A.M.

SUNNY, CALM, COLD — ADCP = 54.9°F
USING 1200 KHZ — AML = 55.17°F

16:00	BOAT LAUNCH			
16:30	ADCP DIAGNOSTIC TEST - PASS			
16:32	ADCP COMPASS CALIBRATION - 0.4°			
16:34	ADCP COMPASS EVALUATION - 0.4°			
16:42	020-01	BT, WMI	DEPTH -	TRANSECT 000
	UCR_000_18-10-12.PDO		NAV 020-01-ADCP-1ACT	
	REDO, ADJUSTING SETTINGS			TRANSECT 001
16:48	020-01	BT, WMI	DEPTH -13'	TRANSECT 002
16:52	UCR_002_18-10-12.PDO		NAV 020-01-ADCP-1ACT	
	020-02 TOO SHALLOW, OBSTRUCTED			
17:02	020-03	BT, WMI	DEPTH -17'	TRANSECT 003
17:07	UCR_003_18-10-12.PDO		NAV 020-03-ADCP-1ACT	
17:14	020-04	BT, WMI	DEPTH - 34'	TRANSECT 004
17:18	UCR_004_18-10-12.PDO		NAV 020-04-ADCP-1ACT	
17:26	020-05	BT, WMI	DEPTH - 40'	TRANSECT 005
17:31	UCR_005_18-10-12.PDO		NAV 020-05-ADCP-1ACT	
17:45	020-06	BT, WMI	DEPTH - 36'	TRANSECT 006
17:49	UCR_006_18-10-12.PDO		NAV 020-06-ADCP-1ACT	
17:56	020-07	BT, WMI	DEPTH - 24'	TRANSECT 007
18:00	UCR_007_18-10-12.PDO		NAV 020-07-A	
18:14	020-08	BT, WMI	DEPTH - 15'	TRANSECT 008
18:18	UCR_008_18-10-12.PDO		NAV 020-08-ADCP-1ACT	
18:25	020-09	BT, WMI	DEPTH - 11'	TRANSECT 009
18:30	UCR_009-18-10-12.PDO		NAV 020-09-ADCP-1ACT	
	020-10 OBSTRUCTED, DEPTH			

Scale: 1 square = 28 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

019-01 OBSTRUCTED BY WEEDS
019-02 OBSTRUCTED BY WEEDS
019-03 OBSTRUCTED BY DEPTH (ON GRAVEL BAR)

18:52 019-04 BT, WMI DEPTH-16' TRANSECT 010
18:57 UCR_010-18-10-12.PDO NAV 019-04-ADCP-1ACT

19:04 019-05 BT, WMI DEPTH-25' TRANSECT 011
19:09 UCR_011_18-10-12.PDO NAV 019-05-ADCP-1ACT

19:21 019-06 BT, WMI DEPTH-34' TRANSECT 012
19:25 UCR_012_18-10-12.PDO NAV 019-16-ADCP-1ACT

19:34 019-07 BT, WMI DEPTH-36' TRANSECT 013
19:41 UCR_013_18-10-12.PDO NAV 019-07-ADCP-1ACT

19:49 019-08 BT, WMI DEPTH-16' TRANSECT 014
19:54 UCR_014_18-10-12.PDO NAV 019-08-ADCP-1ACT

018-01 OBSTRUCTED, DEPTH
018-02
018-08
018-09
018-10

20:49 018-03 BT, WMI DEPTH-12' TRANSECT 015
20:54 UCR_015_18-10-12.PDO NAV 018-03-ADCP-1ACT

21:00 018-04 BT, WMI DEPTH-21' TRANSECT 016
21:05 UCR_016_18-10-12.PDO NAV 018-04-ADCP-1ACT

21:14 018-05 BT, WMI DEPTH-20' TRANSECT 017
21:20 UCR_017_18-10-12.PDO NAV 018-05-ADCP-1ACT

21:35 018-06 BT, WMI DEPTH-40' TRANSECT 018
21:39 UCR_018_18-10-12.PDO NAV 018-06-ADCP-1ACT

21:48 018-07 BT, WMI DEPTH-29 TRANSECT 019
21:52 UCR_019_18-10-12.PDO NAV 018-07-ADCP-1ACT

10-12-2018 M.A.M.

22:03	017-10	BT, WMI	DEPTH-34'	TRANSECT 020
22:07	UCR_020_18-10-12.PDO		NAV 017-10-ADCP-1ACT	
22:07	017-10-DUP	BT, WMI	DEPTH-34'	TRANSECT 021
22:14	UCR_021_18-10-12.PDO		NAV ~~017-10-ADCP-1ACT~~ M.M. 017-10-ADCP-1ACT	
22:27	017-09	BT, WMI	DEPTH-36'	TRANSECT 022
22:32	UCR_022_18-10-12.PDO		NAV 017-09-ADCP-1ACT	
22:32	017-09-DUP	BT, WMI	DEPTH-36'	TRANSECT 023
22:36	UCR_023_18-10-12.PDO		NAV 017-09-ADCP-1ACT	
22:48	017-08	BT, WMI	DEPTH-38'	TRANSECT 024
22:52	UCR_024_18-10-12.PDO		NAV 017-08-ADCP-1ACT	

M.A.M.
10/12/18

Scale: 1 square = 30 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

10/13/18 M.A.M

CLEAR, CALM, COLD — ADCP = 54.8°F

USING 1200 kHz — AML = 55.6°F

16:00 BOAT LAUNCH, SCOUTING TRANSECTS 013 - 015, ENGINE

17:45 ADCP DIAGNOSTIC TEST - PASS

17:49 ADCP COMPASS CALIBRATION - 0.2°

17:51 ADCP COMPASS EVALUATION - 0.1°

18:03 014-01 BT, WMI — DEPTH - 13' — TRANSECT 000

18:07 UCR_000_18-10-13.PDO — NAV 014-01 - ADCP - IACT

18:24 014-02 BT, WMI — DEPTH - 27' — TRANSECT 001

18:27 UCR_001_18-10-13.PDO — NAV 014-02 - ADCP - IACT

18:58 014-03 BT, WMI — DEPTH - 28' — TRANSECT 002

19:02 UCR_002_18-10-13.PDO — NAV 014-03 - ADCP - IACT

19:10 014-04 BT, WMI — DEPTH - 24' — TRANSECT 003

19:10 UCR_003_18-10-13.PDO — NAV 014-04 - ADCP - IACT

19:25 014-05 BT, WMI — DEPTH - 18' — TRANSECT 004

19:29 UCR_004_18-10-13.PDO — NAV 014-05 - ADCP - IACT

19:45 014-06 BT, WMI — DEPTH - 15' — TRANSECT 005

19:50 UCR_005_18-10-13.PDO — NAV 014-06 - ADCP - IACT

20:30 017-07 BT, WMI — DEPTH - 48' — TRANSECT 006

20:34 UCR_006_18-10-13.PDO — NAV 017-07 - ADCP - IACT

20:44 017-06 BT, WMI — DEPTH - 41' — TRANSECT 007

20:48 UCR_007_18-10-13.PDO — NAV 017-06 - ADCP - IACT

017-05

017-04

017 F03

~~CANCELLED~~

21:02 017-02 BT, WMI — DEPTH - 12' — TRANSECT 008

21:07 UCR_008_18-10-13.PDO — NAV 017-02 - ADCP - IACT

10-13-18 M.A.M.

21:15	017-01	BT, WMI	DEPTH - 11'	TRANSECT 009
21:19	ULR_009_18-10-13.PDO		NAV 017-01-ADCP-1ACT	
21:26	015-01	BT, WMI	DEPTH - 13'	TRANSECT 010
21:31	ULR_010_18-10-13.PDO		NAV 015-01-ADCP-1ACT	
21:38	015-02	BT, WMI	DEPTH - 15'	TRANSECT 011
21:42	ULR_011_18-10-13.PDO		NAV 015-02-ADCP-1ACT	
21:46	015-03	BT, WMI	DEPTH - 17'	TRANSECT 012
21:51	ULR_012-18-10-13.PDO		NAV 015-03-ADCP-1ACT	
21:54	015-04	BT, WMI	DEPTH - 18'	TRANSECT 013
21:58	ULR_013_18-10-13.PDO		NAV 015-04-ADCP-1ACT	
22:08	015-05	BT, WMI	DEPTH - 14'	TRANSECT 014
22:13	ULR_014_18-10-13.PDO		NAV 015-05-ADCP-1ACT	
	05-06	BT, WMI M.A.M.	DEPTH-	TRANSECT 015
	ULR_015_18-10-13.PDO		NAV ~~015~~-06-ADCP-1ACT	

STOPPING DUE TO PRE-BREAK DAY

M.A.M.

10/13/18

Scale: 1 square = 32 MAGGIE MCKEON SEDIMENT PACKED MAPPING

10/15/2015 M.A.M.

SUNNY, CALM, CLEAR — ADCP = 52.3° F

RSING 1200 KHz — AML = 53.0° F

16:08	BOAT LAUNCH			
16:26	ADCP DIAGNOSTIC TEST - PASS			
16:31	ADCP COMPASS CALIBRATION - 0.5°			
16:33	ADCP COMPASS EVALUATION - 0.2°			
16:41	D15-06	BT, WMI	DEPTH - 13'	TRANSECT 000
16:45	UCR_000_18-10-15.PD0		NAV 015-06 - ADCP - IACT	
16:51	015-07	BT, WMI	DEPTH - 14'	TRANSECT 001
16:56	UCR_001_18-10-15.PD0		NAV 015-07 - ADCP - IACT	
17:02	015-08	BT, WMI	DEPTH - 11'	TRANSECT 002
17:05	UCR_002_18-10-15.PD0		NAV 015-08 - ADCP - IACT	
17:21	013-02	BT, WMI	DEPTH - 23'	TRANSECT 003
17:27	UCR_003_18-10-15.PD0		NAV 013-02 - ADCP - IACT	
17:34	013-03	BT, WMI	DEPTH - 39'	TRANSECT 004
17:41	UCR_004_18-10-15.PD0		NAV 013-03 - ADCP - IACT	
17:51	013-04	BT, WMI	DEPTH - 52'	TRANSECT 005
17:57	UCR_005_18-10-15.PD0		NAV 013-04 - ADCP - IACT	
15:20	016-01	BT, WMI	DEPTH - 14'	TRANSECT 006
18:24	UCR_006_18-10-15.PD0		NAV 016-01 - ADCP - IACT	
18:31	016-02	BT, WMI	DEPTH - 13'	TRANSECT 007
18:37	UCR_007_18-10-15.PD0		NAV 016-02 - ADCP - IACT	
15:43	016-03	BT, WMI	DEPTH - 11'	TRANSECT 008
18:48	UCR_008_18-10-15.PD0		NAV 016-03 - ADCP - IACT	
18:57	016-04	BT, WMI	DEPTH - 11'	TRANSECT 009
19:01	UCR_009_18-10-15.PD0		NAV 016-04 - ADCP - IACT	
19:08	016-05	BT, WMI	DEPTH - 15'	TRANSECT 010
19:12	UCR_010_18-10-15.PD0		NAV 016-05 - ADCP - IACT	

10-15-18 M.A.M.

19:50	016-06	BT, WMI	DEPTH - 18'	TRANSECT 011
19:54	UCR_011_18-10-15.PDO		NAV 016-06-ADCP-1ACT	
20:01	016-07	BT, WMI	DEPTH - 17'	TRANSECT 012
20:05	UCR_012_18-10-15.PDO		NAV 016-07-ADCP-1ACT	
20:13	016-08	BT, WMI	DEPTH - 16'	TRANSECT 013
20:21	UCR_013_18-10-15.PDO		NAV 016-08-ADCP-1ACT	
20:21	016-08-DUP	BT, WMI	DEPTH - 16'	TRANSECT 014
20:25	UCR_014_18-10-15.PDO		NAV 016-08-~~DUP~~ ADCP -1ACT	
20:34	016-09 ~~DUP~~	BT, WMII	DEPTH - 16'	TRANSECT 015
20:44	UCR_015_18-10-15.PDO		NAV 016-09-ADCP-1ACT	
20:44	016-09-DUP	BT, WMI	DEPTH - 16'	TRANSECT 016
20:49	UCR_016_18-10-15.PDO		NAV 016-09-ADCP-1ACT	
21:03	016-10	BT, WMI	DEPTH - 20'	TRANSECT 017
21:11	UCR_017=18-10-15.PDO		NAV 016-10-ADCP-1ACT	
21:21	SWITCHING TO 600 kHz			
21:23	ADCP DIAGNOSTIC TEMP - PASS		ADCP = 52.8° F	
21:30	ADCP COMPASS CALIBRATION - 0.1°		AML - 53.5° F	
21:32	ADCP COMPASS EVALUATION - 0.1°			
21:47	013-05	BT, WMI	DEPTH - 65'	TRANSECT 018
21:51	UCR_018_18-10-15.PDO		NAV 013-05-ADCP-1ACT	
21:58	013-06	BT, WMI	DEPTH - 73'	TRANSECT 019
20:05	UCR_019_18-10-15.PDO		NAV 013-06-ADCP-1ACT	
22:18	013-07	BT, WMI	DEPTH - 64'	TRANSECT 020
22:21	UCR_020_18-10-15.PDO		NAV 017-07-ADCP-1ACT	
22:32	013-08	BT, WMI	DEPT - 38-48	TRANSECT 021
22:34	UCR_021_18-10-15.PDO		~~NAV 013-08~~ M.A.M	
	SUSF FOR KICKS.			

Scale: 1 square = 34 MAGGIE McKEON UCR SEDIMENT FACIES MAPPING

10-16-2018 M.A.M

CLEAR, MISTY, CALM, COLD — ADCP = 52.63° F
USING 600 KHZ — AML = 53.33° F

15:37 BOAT LAUNCH
15:51 ADCP DIAGNOSTIC TEST - PASS
15:56 ADCP COMPASS CALIBRATION - 0.1°
ADCP COMPASS EVALUATION - 0.1°

16:04 060-03 BT, WMI — DEPTH - 63' — TRANSECT 000
16:09 UCR_000_18-10-16.PD0 — NAV 060-03 - ADCP - IACT

[16:10 SLIGHT WIND FROM NORTH]

16:28 060-04 BT, WMI — DEPTH - 94' — TRANSECT 001
16:33 UCR_001_18-10-16.PD0 — NAV 060-04 - ADCP - IACT

16:39 060-05 BT, WMI — DEPTH - 116' — TRANSECT 002
16:44 UCR_002_18-10-16.PD0 — NAV 060-05 - ADCP - IACT

16:52 060-06 BT, WMI — DEPTH - 125' — TRANSECT 003
16:57 UCR_003_18-10-16.PD0 — NAV 060-06 - ADCP - IACT

17:15 060-07 BT, WMI — DEPTH - 134' — TRANSECT 004
17:20 UCR_004_18-10-16.PD0 — NAV 060-07 - ADCP - IACT

17:21 060-08 BT, WMI — DEPTH - 135' — TRANSECT 005
17:26 UCR_005_18-10-16.PD0 — NAV 060-08 - ADCP - IACT

17:28 060-09 BT, WMI — DEPTH - 120' — TRANSECT 006
17:33 UCR_006_18-10-16.PD0 — NAV 060-09 - ADCP - IACT

17:41 060-10 BT, WMI — DEPTH - 57' — TRANSECT 007
17:46 UCR_007_18-10-16.PD0 — NAV 060-10 - ADCP - IACT

17:55 059-09 BT, WMI — DEPTH - 74' — TRANSECT 008
18:00 UCR_008_18-10-16.PD0 — NAV 059-09 - ADCP - IACT

18:06 059-08 BT, WMI — DEPTH - 111' — TRANSECT 009
18:10 UCR_009_18-10-16.PD0 — NAV 059-08 - ADCP - IACT

10-16-18 M.A.M.

18:17	059-07	BT, WMI	DEPTH - 133'	TRANSECT 010
18:22	UCR_010_18-10-16.PDO		NAV 059-07-ADCP-1ACT	
18:24	059-06	BT, WMI	DEPTH - 129'	TRANSECT 011
18:30	UCR_011_18-10-16.PDO		NAV 059-06-ADCP-1ACT	
18:33	059-05	BT, WMI	DEPTH - 120'	TRANSECT 012
18:37	UCR_012_18-10-16.PDO		NAV 059-05-ADCP-1ACT	
18:45	059-04	BT, WMI	DEPTH - 102'	TRANSECT 013
18:50	UCR_013_18-10-16.PDO		NAV 059-04-ADCP-1ACT	
18:58	059-03	BT, WMI	DEPTH - 67'	TRANSECT 014
19:03	UCR_014_18-10-16.PDO		NAV 059-03-ADCP-1ACT	
19:08	059-02	BT, WMI	DEPTH - 57'	TRANSECT 015
19:14	UCR_015_18-10-16.PDO		NAV 059-02-ADCP-1ACT	
20:18	058-02	BT, WMI	DEPTH - 67'	TRANSECT 016
20:23	UCR_016-18-10-16.PDO		NAV 058-02-ADCP-1ACT	
20:31	058-03	BT, WMI	DEPTH - 73'	TRANSECT 017
20:36	UCR_017_18-10-16.PDO		NAV 058-03-ADCP-1ACT	
20:36	058-03-DUP	BT, WMI	DEPTH - 73'	TRANSECT 018
20:41	UCR_018_18-10-16.PDO		NAV 058-03-ADCP-1ACT	
20:54	058-04 M.A.M.	BT, WMI	DEPTH - 83'	TRANSECT 019
20:58	UCR_019_18-10-16.PDO		NAV 058-04-ADCP-1ACT	
21:05	058-05	BT, WMI	DEPTH - 92'	TRANSECT 020
21:10	UCR_020_18-10-16.PDO		NAV 058-05-ADCP-1ACT	
21:18	058-06	BT, WMI	DEPTH - 75'	TRANSECT 021
21:22	UCR_021_18-10-16.PDO		NAV 058-06-ADCP-1ACT	
21:29	058-07	BT, WMI	DEPTH - 63'	TRANSECT 022
21:34	UCR_022_18-10-16.PDO		NAV 058-07-ADCP-1ACT	

Scale: 1 square = 36 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

10-16-18 M.A.M.

21:50	057-05	BT, WMI	DEPTH - 64'	TRANSECT 023
21:55	UCR_023_18-10-16.PDO		NAV 057-05 - ADCP-1ACT	
22:01	057-04	BT, WMI	DEPTH - 65'	TRANSECT 024
22:05	UCR_024_18-10-16.PDO		NAV 057-04 - ADCP-1ACT	
22:10	057-03	BT, WMI	DEPTH - 76'	TRANSECT 025
22:15	UCR_025_18-10-16.PDO		NAV 057-03 - ADCP-1ACT	
22:23	057-02	BT, WMI	DEPTH - 65'	TRANSECT 026
22:24	UCR_026_18-10-16.PDO		NAV 057-02 - ADCP-1ACT	

[WIND DIED DOWN]

22:36	056-02	BT, WMI	DEPTH - 66'	TRANSECT 027
22:41	UCR_027_18-10-16.PDO		NAV 056-02 - ADCP-1ACT	
22:45	056-03	BT, WMI	DEPTH - 65'	TRANSECT 028
22:50	UCR_028_18-10-16.PDO		NAV 056-03 - ADCP-1ACT	
22:56	056-04	BT, WMI	DEPTH - 66'	TRANSECT 029
23:00	UCR_029_18-10-16.PDO		NAV 056-04 - ADCP-1ACT	
23:05	056-05	BT, WMI	DEPTH - 60'	TRANSECT 030
23:10	UCR_030_18-10-16.PDO		NAV 056-05 - ADCP-1ACT	
23:16	056-06	BT, WMI	DEPTH - 56'	TRANSECT 031
23:21	UCR_031_18-10-16.PDO		NAV 056-06 - ADCP-1ACT	
23:25	056-07	BT, WMI	DEPTH - 56'	TRANSECT 032
23:30	UCR_032_18-10-16.PDO		NAV 056-07 - ADCP-1ACT	

M.A.M.
10/16/18

10-17-18 M.A.M.

CLEAR, MISTY, COLD, CALM — ADCP = 53.1°F
USING 1200 KHZ — AML = 53.2°F

15:21	BOAT LAUNCH			
16:07	ADCP DIAGNOSTIC TEST – PASS			
16:13	ADCP COMPASS CALIBRATION – 0.2°			
16:15	ADCP COMPASS EVALUATION – 0.1°			
16:17	060-01	BT, WMI	DEPTH – 30'	TRANSECT 000
16:21	UCR_000_18-10-17.PD0		NAV 060-01-ADCP-IACT	
16:32	060-02	BT, WMI	DEPTH – 43'	TRANSECT 001
16:35	UCR_001_18-10-17.PD0		NAV 060-02-ADCP-IACT	
16:44	059-01	BT, WMI	DEPTH – 30'	TRANSECT 002
16:48	UCR_002_18-10-17.PD0		NAV 059-01-ADCP-IACT	
16:56	059-10	BT, WMI	DEPTH – 32'	TRANSECT 003
17:00	UCR_003_18-10-17.PD0		NAV 059-10-ADCP-IACT	
17:11	058-10	BT, WMI	DEPTH – 22'	TRANSECT 004
17:14	UCR_004_18-10-17.PD0		NAV 058-10-ADCP-IACT	
17:20	058-09	BT, WMI	DEPTH – 31'	TRANSECT 005
17:24	UCR_005_18-10-17.PD0		NAV 058-09-ADCP-IACT	
17:33	058-08	BT, WMI	DEPTH – 50'	TRANSECT 006
17:36	UCR_006_18-10-17.PD0		NAV 058-08-ADCP-IACT	
17:44	058-01	BT, WMI	DEPTH – 44'	TRANSECT 007
17:48	UCR_007_18-10-17.PD0		NAV 058-01-ADCP-IACT	
17:55	057-01	BT, WMI	DEPTH – 44'	TRANSECT 008
17:59	UCR_008_18-10-17.PD0		NAV 057-01-ADCP-IACT	
18:07	057-06	BT, WMI	DEPTH – 45'	TRANSECT 009
18:11	UCR_009_18-10-17.PD0		NAV 057-06-ADCP-IACT	
18:17	057-07	BT, WMI	DEPTH – 44'	TRANSECT 010
18:20	UCR_010_18-10-17.PD0		NAV 057-07-ADCP-IACT	

10-17-18 M.A.M.

18:29	057-08	BT, WMI	DEPTH ~~-0~~ 45'	TRANSECT 011
18:33	UCR_011_18-10-17.PDO		NAV 057-08 - ADCP - 1ACT	
18:37	057-09	BT, WMI	DEPTH - 34'	TRANSECT 012
18:41	UCR_012_18-10-17.PDO		NAV 057-09 - ADCP - 1ACT	
18:47	057-10	BT, WMI	DEPTH - 21'	TRANSECT 013
18:52	UCR_013_18-10-17.PDO		NAV 057-10 - ADCP - 1ACT	
19:00	056-10	BT, WMI	DEPTH - 14'	TRANSECT 014
19:09	UCR_014_18-10-17.PDO		NAV 056-10 - ADCP - 1ACT	
			MAY BE TOO WEEDY	
19:23	056-09	BT, WMI	DEPTH - 26'	TRANSECT 015
19:26	UCR_015_18-10-17.PDO		NAV 056-09 - ADCP - 1ACT	
19:31	056-08	BT, WMI	DEPTH - 35'	TRANSECT 016
19:34	UCR_016_18-10-17.PDO		NAV 056-08 - ADCP - 1ACT	
20:40	056-01	BT, WMI	DEPTH - 51'	TRANSECT 017
20:44	UCR_017_18-10-17.PDO		NAV 056-01 - ADCP - 1ACT	
20:51	055-01	BT, WMI	DEPTH - 34'	TRANSECT 018
20:55	UCR_018_18-10-17.PDO		NAV 055-01 - ADCP - 1ACT	
21:01	055-02	BT, WMI	DEPTH - 49'	TRANSECT 019
21:05	UCR_019_18-10-17.PDO		NAV 055-02 - ADCP - 1ACT	
21:05	055-02-DUP	BT, WMI	DEPTH - 49'	TRANSECT 020
21:08	UCR_020_18-10-17.PDO		NAV 055-02 - ADCP - 1ACT	
21:24	055-09	BT, WMI	DEPTH - 48'	TRANSECT 021
21:28	UCR_021_18-10-17.PDO		NAV 055-09 - ADCP - 1ACT	
21:37	055-10	BT, WMI	DEPTH - 31'	TRANSECT 022
21:41	UCR_022_18-10-17.PDO		NAV 055-10 - ADCP - 1ACT	
21:48	054-10	BT, WMI	DEPTH - 37'	TRANSECT 023
21:51	UCR-023_18-10-17.PDO		NAV 054-10 - ADCP - 1ACT	

10-17-18 M.A.M.

21:58	054-09	BT, WM1	DEPTH-55'	TRANSECT 024
22:03	UCR_024_18-10-17.PDO		NAV 054-09-ADCP-1ACT	
20:11	054-07	BT, WM1	DEPTH-56'	TRANSECT 025
22:15	UCR_025_18-10-17.PDO		NAV 054-07-ADCP-1ACT	
22:23	054-02	BT, WM1	DEPTH-28'	TRANSECT 026
22:26	UCR_026_18-10-17.PDO		NAV 054-02-ADCP-1ACT	
	054-01	ON LAND		
	053-01	ON LAND		
22:42	053-02	BT, WM1	DEPTH-12'	TRANSECT 027
22:49	UCR_027_18-10-17.PDO		NAV 053-02-ADCP-1ACT	
			ALT DUE TO DEPTH + WEEDS	
22:55	053-03	BT, WM1	DEPTH-45'	TRANSECT 028
22:59	UCR_028_18-10-17.PDO		NAV 053-03-ADCP-1ACT	
23:05	053-04	BT, WM1	DEPTH-45'	TRANSECT 029
23:09	UCR_029_18-10-17.PDO		NAV 053-04-ADCP-1ACT	
23:13	053-05	BT, WM1	DEPTH-47'	TRANSECT 030
23:17	UCR_030_18-10-17.PDO		NAV 053-05-ADCP-1ACT	
23.24	053-06	BT, WM1	DEPTH-51'	TRANSECT 031
23:27	UCR_031_18-10-17.PDO		NAV 053-06-ADCP-1ACT	

10-18-18 M.A.M.

FOGGY, CALM — ADCP = 52.3° F
USING 1200 KHZ — AML = 52.8° F

15:37	BOAT LAUNCH			
15:45	ADCP DIAGNOSTIC TEST - PASS			
15:52	ADCP COMPASS CALIBRATION - 1.0°			
15:54	ADCP COMPASS EVALUATION - 0.4°			
16:02	053-07	BT, WM1	DEPTH - 54'	TRANSECT 000
16:05	UCR_000_18-10-18.PD0		NAV 053-07 - ADCP - 1ACT	
16:18	053-10	BT, WM1	DEPTH - 35'	TRANSECT 001
16:22	UCR_001_18-10-18.PD0		NAV 053-10 - ADCP - 1ACT	
16:36	052-10	BT, WM1	DEPTH - 33'	TRANSECT 002
16:40	UCR_002_18-10-18.PD0		NAV 052-10 - ADCP - 1ACT	
16:47	052-08	BT, WM1	DEPTH - 47'	TRANSECT 003
16:51	UCR_003_18-10-18.PD0		NAV 052-08 -18-10-18.PD0	
16:58	052-07	BT, WM1	DEPTH - 39'	TRANSECT 004
17:02	UCR_004_18-10-18.PD0		NAV 052-07 - ADCP - 1ACT	
17:08	052-06	BT, WM1	DEPTH - 30'	TRANSECT 005
17:12	UCR_005_18-10-18.PD0		NAV 052-06 - ADCP - 1ACT	
17:20	052-05	BT, WM1	DEPTH - 17'	TRANSECT 006
17:26	UCR_006_18-10-18.PD0		NAV 052-05 - ADCP - 1ACT	
17:31	052-04	BT, WM1	DEPTH - 13'	TRANSECT 007
17:38	UCR_007_18-10-18.PD0		NAV 052-04 - ADCP - 1ACT	
17:51	052-03	BT, WM1	DEPTH - 13'	TRANSECT 008
17:57	UCR_008_18-10-18.PD0		NAV 052-03 - ADCP - 1ACT	
			ALTERNATE DUE TO DEPTH TWEEPS	
18:15	052-02	BT, WM1	DEPTH - 15'	TRANSECT 009
18:23	UCR_009_18-10-18.PD0		NAV 052-02 - ADCP - 1ACT	
			ALT. DUE TO LOG BUMP + DEPTH TWEEPS	

10-18-18 M.A.M.

18:38	051-02	BT, WMII	DEPTH - 15'	TRANSECT 010
18:46	UCR_010_18-10-18.PDO		NAV 051-02 - ADCP - IACT	
18:53	051-03	BT, WMI	DEPTH - 29	TRANSECT 011
18:57	UCR_011_18-10-18.PDO		NAV 051-03 - ADCP - IACT	
19:03	051-04	BT, WMI	DEPTH - 34'	TRANSECT 012
19:07	UCR_012_18-10-18.PDO		NAV 051-04 - ADCP - IACT	
19:12	051-05	BT, WMI	DEPTH - 43'	TRANSECT 013
19:16	UCR_013_18-10-18.PDO		NAV 051-05 - ADCP - IACT	
19:23	051-06	BT, WMI	DEPTH - 51'	TRANSECT 014
19:26	UCR_014_18-10-18.PDO		NAV 051-06 - ADCP - IACT	
20:28	051-07	BT, WMI	DEPTH - 55'	TRANSECT 015
20:34	UCR_015_18-10-18.PDO		NAV 051-07 - ADCP - IACT	
20:42	051-10	BT, WMI	DEPTH - 33'	TRANSECT 016
20:45	UCR_016_18-10-18.PDO		NAV 051-10 - ADCP - IACT	
20:54	050-10	BT, WMI	DEPTH - 34'	TRANSECT 017
20:57	UCR_017_18-10-18.PDO		NAV 050-10 - ADCP - IACT	
21:05	050-07	BT, WMI	DEPTH - 54'	TRANSECT 018
21:08	UCR_018_18-10-18.PDO		NAV 050-07 - ADCP - IACT	
21:14	050-06	BT, WMI	DEPTH - 48'	TRANSECT 019
21:19	UCR_019_18-10-18.PDO		NAV 050-06 - ADCP - IACT	
21:25	050-05	BT, WMI	DEPTH - 37	TRANSECT 020
21:28	UCR_020_18-10-18.PDO		NAV 050-05 - ADCP - IACT	
21:28	050-05-DUP	BT, WMI	DEPTH - 37	TRANSECT 021
21:32	UCR_021_18-10-18.PDO		NAV 050-05 - ADCP - IACT	
21:43	050-04	BT, WMI	DEPTH - 34'	TRANSECT 022
21:47	UCR_022_18-10-18.PDO		NAV 050-04 - ADCP - IACT	

Scale: 1 square = 42 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

10-18-18 M.A.M.

21:53	050-03	BT, WM1	DEPTH-30'	TRANSECT 023
21:56	UCR_023_18-10-18.PDO		NAV 050-03-ADCP-1ACT	
22:01	050-02	BT, WM1	DEPTH-23'	TRANSECT 024
22:04	UCR_024_18-10-18.PDO		NAV 050-02-ADCP-1ACT	
22:10	050-01	BT, WM11	DEPTH-11	TRANSECT 025
22:16	UCR_025_18-10-18.PDO		NAV 050-01-ADCP-1ACT	
22:24	049-01	BT, WM11	DEPTH-10	TRANSECT 026
22:29	UCR_026_18-10-18.PDO		NAV 049-01-ADCP-1ACT	
22:34	049-02	BT, WM11	DEPTH-21'	TRANSECT 027
22:41	UCR_027_18-10-18.PDO		NAV 049-02-ADCP-1ACT	
22:45	049-03	BT, WM1	DEPTH-32'	TRANSECT 028
22:49	UCR_028_18-10-18.PDO		NAV 049-03-ADCP-1ACT	
22:54	049-04	BT, WM1	DEPTH-36'	TRANSECT 029
22:58	UCR_029-18-10-18.PDO		NAV 049-04-ADCP-1ACT	
23:02	049-05	BT, WM1	DEPTH-39'	TRANSECT 030
23:06	UCR_030_18-10-18.PDO		NAV 049-05-ADCP-1ACT	
23:11	049-06	BT, WM1	DEPTH-43'	TRANSECT 031
23:15	UCR_031_18-10-18.PDO		NAV 049-06-ADCP-1ACT	
23:20	049-07	BT, WM1	DEPTH-52'	TRANSECT 032
23:24	UCR_032_18-10-18.PDO		NAV 049-07-ADCP-1ACT	
23:28	049-08	BT, WM1	DEPTH-56'	TRANSECT 033
23:32	UCR_033_18-10-18.PDO		NAV 049-08-ADCP-1ACT	

10/18/18 M.A.M.

10-19-18 M.A.M.

FOGGY, CALM — ADCP = 51.6°F
USING 1200 KHZ — AML = 52.4° F

15:21	BOAT LAUNCH		
15:53	ADCP DIAGNOSTIC TEST - PASS		
15:58	ADCP COMPASS CALIBRATION - 0.4°		
15:59	ADCP COMPASS EVALUATION - 0.2°		
16:05	049 - 10	BT, WM 1	DEPTH - 35' TRANSECT 000
16:08	UCR_000_18-10-19.PD0		NAV 049 - 10 - ADCP - 1ACT
16:18	048 - 10	BT, WM11	DEPTH - 13' TRANSECT 001
16:24	UCR_001_18-10-19.PD0		NAV 048 - 10 - ADCP - 1ACT
16:29	048-09	BT, WM1	DEPTH - 36' TRANSECT 002
16:33	UCR_002_18-10-19.PD0		NAV 048-09 - ADCP - 1ACT
16:39	048 - 08	BT, WM1	DEPTH - 52' TRANSECT 003
16:42	UCR_003_18-10-19.PD0		NAV 048-08 - ADCP - 1ACT
16:49	048-06	BT, WM1	DEPTH - 54' TRANSECT 004
16:52	UCR_004_18-10-19.PD0		NAV 048-06 - ADCP - 1ACT
17:06	048-05	BT, WM1	DEPTH - 57' TRANSECT 005
17:10	UCR_005_18-10-19.PD0		NAV 048-05 - ADCP - 1ACT
17:15	048-04	BT, WM1	DEPTH - 54' TRANSECT 006
17:19	UCR_006_18-10-19.PD0		NAV 048-04 - ADCP - 1ACT
17:24	048-03	BT, WM1	DEPTH - 37' TRANSECT 007
17:28	UCR_007_18-10-19.PD0		NAV 048-03 - ADCP - 1ACT
17:33	048-02	BT, WM1	DEPTH - 27' TRANSECT 008
17:37	UCR_008_18-10-19.PD0		NAV 048-02 - ADCP - 1ACT
17:42	048-01	BT, WM11	DEPTH - 15' TRANSECT 009
17:48	UCR_009_18-10-19.PD0		NAV 048-01 - ADCP - 1ACT

Scale: 1 square = 44 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

10-19-18 M.A.M.

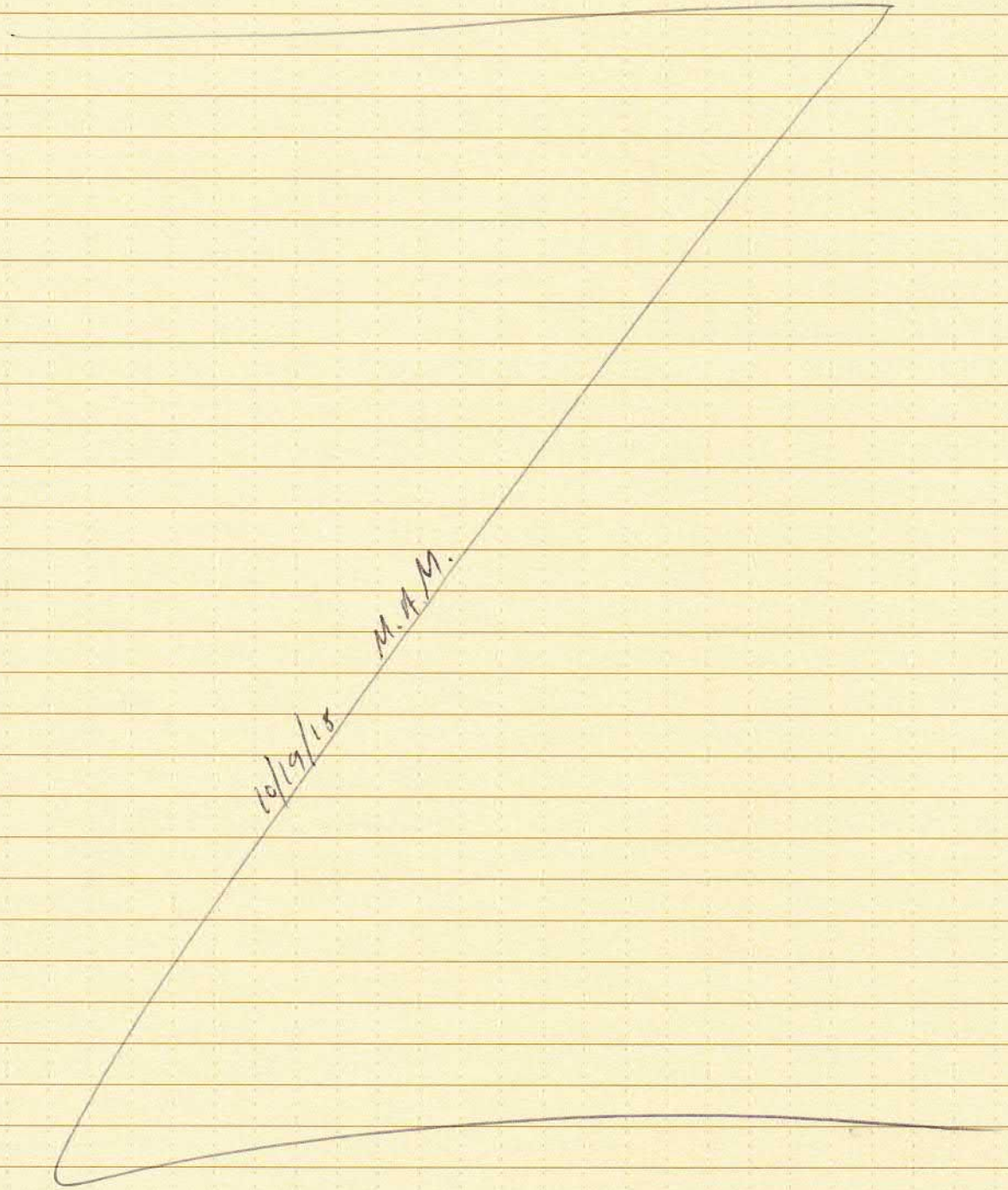
18:06	047-~~05~~ 04	BT, WM1	DEPTH - 56'	TRANSECT 010
18:10	UCR_010_18-10-19.PDO		NAV 047-~~05~~ 04 - ADCP-1ACT	
18:17	047-03	BT, WM1	DEPTH - 28'	TRANSECT 011
18:23	UCR_011_18-10-19.PDO		NAV 047-03 - ADCP-1ACT	
18:30	047-02	BT, WM1	DEPTH - 13'	TRANSECT 012
18:36	UCR_012_18-10-19.PDO		NAV 047-02-ADCP-1ACT	
18:56	047-01	BT, WM1	DEPTH -18'	TRANSECT 013
19:02	UCR_013_18-10-19.PDO		NAV 047-01 - ADCP - 1ACT	
19:12	046-01	BT, WM1	DEPTH - 38'	TRANSECT 014
19:16	UCR_014_18-10-19.PDO		NAV 046-01 - ADCP - 1ACT	
20:23	045-02	BT, WM1	DEPTH - 51'	TRANSECT 015
20:28	UCR_015_18-10-19.PDO		NAV 045-02 - ADCP - 1ACT	
20:38	045-01	BT, WM1	DEPTH - 33'	TRANSECT 016
20:42	UCR_016_18-10-19.PDO		NAV 045-01 - ADCP - 1ACT	
20:52	044-05	BT, WM1	DEPTH - 56'	TRANSECT 017
20:56	UCR_017_18-10-19.PDO		NAV 044-05 - ADCP - 1ACT	
21:02	044-04	BT, WM1	DEPTH - 59'	TRANSECT 018
21:11	UCR_018_18-10-19.PDO		NAV 044-04 - ADCP - 1ACT	
21:17	044-03	BT, WM1	DEPTH - 58'	TRANSECT 019
21:22	UCR_018_18-10-19.PDO		NAV 044-03 - ADCP - 1ACT	
21:28	044-02	BT, WM1	DEPTH - 40'	TRANSECT 020
21:32	UCR_020_18-10-19.PDO		NAV 044-02 - ADCP - 1ACT	
21:38	044-01	BT, WM1	DEPTH - 35'	TRANSECT 021
21:42	UCR_021_18-10-19.PDO		NAV 044-01 - ADCP - 1ACT	
21:42	044-01-DUP	BT, WM1	DEPTH - 35'	TRANSECT 022
21:45	UCR_022_18-10-19.PDO		NAV 044-01 - ADCP - 1ACT	

10-19-18 M.A.M.

22:00 043-01 BT, WMI DEPTH-23' TRANSECT 023
22:05 UCR_023_18-10-19.PDO NAV 043-01-ADCP-1ACT

22:11 043-02 BT, WMI DEPTH-41' TRANSECT 024
22:15 UCR_024_18-10-19.PDO NAV 043-02-ADCP-1ACT

22:22 043-05 BT, WMI DEPTH-47' TRANSECT 025
22:26 UCR_025_18-10-19.PDO NAV 043-05-ADCP-1ACT



10-20-2018 M.A.M.

FOGGY, CALM — ADCP = 51.9°F

USING 1200 KHZ — AML = 52.5° F

15:25	BOAT LAUNCH		
16:16	ADCP DIAGNOSTIC TEST - PASS		
16:22	ADCP COMPASS CALIBRATION - 0.3°		
16:24	ADCP COMPASS EVALUATION - 0.1°		
16:35	042-01	BT, WMI	DEPTH - 25' TRANSECT 000
16:39	ULR_000_18-10-20.PD0		NAV 042-01 - ADCP - 1ACT
16:45	042-02	BT, WMI	DEPTH - 57' TRANSECT 001
16:49	ULR_001_18-10-20.PD0		NAV 042-02 - ADCP - 1ACT
17:02	041-05	BT, WMI	DEPTH - 41' TRANSECT 002
17:06	ULR_002_18-10-20.PD0		NAV 041-05 - ADCP - 1ACT
17:14	041-03	BT, WMI	DEPTH - 43' TRANSECT 003
17:17	ULR_003_18-10-20.PD0		NAV 041-03 - ADCP - 1ACT
17:26	041-02	BT, WMI	DEPTH - 36' TRANSECT 004
17:29	ULR_004_18-10-20.PD0		NAV 041-02 - ADCP - 1ACT
17:34	041-01	BT, WMI	DEPTH - 29' TRANSECT 005
17:40	ULR_005_18-10-20.PD0		NAV 041-01 - ADCP - 1ACT
17:51	040-01	BT, WMI	DEPTH - 40' TRANSECT 006
17:55	ULR_006_18-10-20.PD0		NAV 040-01 - ADCP - 1ACT
18:02	040-02	BT, WMI	DEPTH - 47' TRANSECT 007
18:06	ULR_007_18-10-20.PD0		NAV 040-02 - ADCP - 1ACT
18:16	040-05	BT, WMI	DEPTH - 52' TRANSECT 008
18:20	ULR_008_18-10-20.PD0		NAV 040-05 - ADCP - 1ACT
18:33	039-01	BT, WMI	DEPTH - 42' TRANSECT 009
18:39	ULR_009_18-10-20.PD0		NAV 039-01 - ADCP - 1ACT
18:44	039-02	BT, WMI	DEPTH - 47' TRANSECT 010
18:47	ULR_010_18-10-20.PD0		NAV 039-02 - ADCP - 1ACT

10-20-18 M.A.M.

18:53	039-03	BT, WMI	DEPTH-57'	TRANSECT 011
18:58	UCR_011_18-10-20.PDO		NAV 039-03-ADCP-1ACT	
19:05	039-05	BT, WMI	DEPTH-59'	TRANSECT 012
19:09	UCR_012_18-10-20.PDO		NAV 039-05-ADCP-1ACT	
19:23	038-05	BT, WMI	DEPTH-31'	TRANSECT 013
19:26	UCR_013_18-10-20.PDO		NAV 038-05-ADCP-1ACT	
19:30	038-04	BT, WMI	DEPTH-31'	TRANSECT 014
19:33	UCR_014_18-10-20.PDO		NAV 038-04-ADCP-1ACT	
20:42	037-01	BT, WMI	DEPTH-32'	TRANSECT 015
20:46	UCR_015_18-10-20.PDO		NAV 037-01-ADCP-1ACT	
21:00	036-01	BT, WMI	DEPTH-53'	TRANSECT 016
21:04	UCR_016_18-10-20.PDO		NAV 036-01-ADCP-1ACT	
21:04	036-01-DUP	BT, WMI	DEPTH-53'	TRANSECT 017
21:08	UCR_017_18-10-20.PDO		NAV 036-01-ADCP-1ACT	
21:21	036-02	BT, WMI	DEPTH-35'	TRANSECT 018
21:25	UCR_018_18-10-20.PDO		NAV 036-02-ADCP-1ACT	
21:32	036-03	BT, WMI	DEPTH-42'	TRANSECT 019
31:36	UCR_019_18-10-20.PDO		NAV 036-03-ADCP-1ACT	
21:41	036-04	BT, WMI	DEPTH-31'	TRANSECT 020
21:45	UCR_020_18-10-20.PDO		NAV 036-04-ADCP-1ACT	
21:50	036-05	BT, WMI	DEPTH-~~36~~ M.A.M. 15'	TRANSECT 021
21:57	UCR_021_18-10-20.PDO		NAV 036-05-ADCP-1ACT	
22:08	035-05	BT, WMI	DEPTH-51'	TRANSECT 022
22:12	UCR_022_18-10-20.PDO		NAV 035-05-ADCP-1ACT	
22:19	035-04	BT, WMI	DEPTH-51'	TRANSECT 023
22:24	UCR_023_18-10-20.PDO		NAV 035-04-ADCP-1ACT	

Scale: 1 square = 48 MAGGIE MILLEON UCR SEDIMENT FACIES MAPPING

10-20-18 M.A.M.

22:30	035-03	BT, WMI	DEPTH - 44'	TRANSECT 024
22:34	HCR_024_18-10-20.PDO		NAV 035-03-ADCP-1ACT	
22:40	035-02	BT, WMI	DEPTH - 25'	TRANSECT 025
22:44	HCR_025_18-10-20.PDO		NAV 035-02-ADCP-1ACT	
22:49	035-01	BT, WMI	DEPTH - 25'	TRANSECT 026
22:54	HCR_026_18-10-20.PDO		NAV 035-01-ADCP-1ACT	
23:03	034-05	BT, WMI	DEPTH - 50'	TRANSECT 027
23:07	HCR_027_18-10-20.PDO		NAV 034-05-ADCP-1ACT	
23:13	034-04	BT, WMI	DEPTH - 39'	TRANSECT 028
23:17	HCR_028_18-10-30.PDO		NAV 034-04-ADCP-1ACT	

10/20/18 M.A.M.

10-21-18 M.A.M.

LIGHT FOG, CALM — ADCP = 52.05°F
600 KHZ — AML = 52.2°F

15:39	BOAT LAUNCH			
16:06	ADCP DIAGNOSTIC TEST - PASS			
16:15	ADCP COMPASS CALIBRATION - 0.1°			
16:18	ADCP COMPASS EVALUATION - 0.1°			
17:19	055-03	BT, WMI	DEPTH - 75'	TRANSECT 000
17:23	UCR_000_18-10-21.PD0		NAV 055-03 - ADCP - IACT	
17:32	055-04	BT, WMI	DEPTH - 71'	TRANSECT 001
17:36	UCR_001_18-10-21.PD0		NAV 055-04 - ADCP - IACT	
17:47	055-05	BT, WMI	DEPTH - 69'	TRANSECT 002
17:51	UCR_002_18-10-21.PD0		NAV 055-05 - ADCP - IACT	
17:56	055-06	BT, WMI	DEPTH - 66'	TRANSECT 003
18:01	UCR_003_18-10-21.PD0		NAV 055-06 - ADCP - IACT	
18:10	055-07	BT, WMI	DEPTH - 60'	TRANSECT 004
18:15	UCR_004_18-10-21.PD0		NAV 055-07 - ADCP - IACT	
18:16	055-08	BT, WMI	DEPTH - 60'	TRANSECT 005
19:20	UCR_005_18-10-21.PD0		NAV 055-08 - ADCP - IACT	
18:31	054-08	BT, WMI	DEPTH - 58'	TRANSECT 006
18:35	UCR_006_18-10-21.PD0		NAV 054-08 - ADCP - IACT	
18:43	054-06	BT, WMI	DEPTH - 62'	TRANSECT 007
18:47	UCR_007_18-10-21.PD0		NAV 054-06 - ADCP - IACT	
18:53	054-05	BT, WMI	DEPTH - 65'	TRANSECT 008
18:58	UCR_008_18-10-21.PD0		NAV 054-05 - ADCP - IACT	
19:02	054-04	BT, WMI	DEPTH - 63'	TRANSECT 009
19:06	UCR_009_18-10-21.PD0		NAV 054-04 - ADCP - IACT	
19:12	054-03	BT, WMI	DEPTH - 66'	TRANSECT 010
19:16	UCR_010_18-10-21.PD0		NAV 054-03 - ADCP - IACT	

Scale: 1 square = 50 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

10-21-18. M.A.M.

19:27	053-08	BT, WMI	DEPTH - 60'	TRANSECT 011
19:31	UCR_011_18-10-21.PDO		NAV 053-08-ADCP-1ACT	
19:38	053_09	BT, WMI	DEPTH - 61'	TRANSECT 012
19:42	UCR_012_18-10-21.PDO		NAV 053-09-ADCP-1ACT	
20:53	052-09	BT, WMI	DEPTH - 59'	TRANSECT 013
20:58	UCR_013_18-10-21.PDO		NAV 052-09-ADCP-1ACT	
21:09	051-09	BT, WMI	DEPTH - 67'	TRANSECT 014
21:12	UCR_014_18-10-21.PDO		NAV 051-09-ADCP-1ACT	
21:17	051-08	BT, WMI	DEPTH - 64'	TRANSECT 015
21:21	UCR_015_18-10-21.PDO		NAV 051-08-ADCP-1ACT	
21:32	050-08	BT, WMI	DEPTH - 66'	TRANSECT 016
21:36	UCR_016_18-10-21.PDO		NAV 050-08-ADCP-1ACT	
21:43	050-09	BT, WMI	DEPTH - 67'	TRANSECT 017
21:47	UCR_017_18-10-21.PDO		NAV 050-09-ADCP-1ACT	
22:00	049-09	BT, WMI	DEPTH - 62'	TRANSECT 018
22:04	UCR_018_18-10-21.PDO		NAV 049-09-ADCP-1ACT	
22:16	048-07	BT, WMI	DEPTH - 63'	TRANSECT 019
22:20	UCR_019_18-10-21.PDO		NAV 048-07-ADCP-1ACT	
22:20	048-07-DUP	BT, WMI	DEPTH - 63'	TRANSECT 020
22:24	UCR_020_18-10-21.PDO	END MOI (CB)	NAV 048-07-ADCP-1ACT	
22:44	047-05	BT, WMI	DEPTH - 89	TRANSECT 021
22:47	UCR_021_18-10-21.PDO		NAV 047-05-ADCP-1ACT	
22:58	046-03	BT, WMI	DEPTH - 87'	TRANSECT 022
23:02	UCR_022_18-10-21.PDO		NAV 046-03-ADCP-1ACT	

[WIND FROM NORTH]

10-21-18 M.H.M.

23:08	046-04	BT, WMI	DEPTH - 72	TRANSECT 023
23:12	UCR_023_18-10-21.PDO		NAV 046-04 - ADCP - IACT	
23:19	046-05	BT, WMI	DEPTH - 50'	TRANSECT 024
23:23	UCR_024_18-10-21.PDO		NAV 046-05 - ADCP - IACT	
23:30	046-02	BT, WMI	DEPTH - 77'	TRANSECT 025
23:34	UCR_025_18-10-21.PDO		NAV 046-02 - ADCP - IACT	

M.H.M.
10/21/18

Scale: 1 square = 52 MAGGIE MCKOON UCR SEDIMENT FACIES MAPPING

10-22-18 M.A.M.

LIGHT FOG, CLEAR — ADCP = 52.12° F
USING 600 KHZ — AML = 52.01° F

15:28 BOAT LAUNCH
16:11 ADCP DIAGNOSTIC TEST - PASS.
16:14 ADCP COMPASS CALIBRATION - 0.9°
16:17 ADCP COMPASS EVALUATION - 0.1°

16:26 045-03 BT, WM1 — DEPTH - 65' — TRANSECT 000
16:31 UCR_000_18-10-22.PD0 — NAV 045-03 - ADCP-1ACT

16:38 045-04 BT, WM1 — DEPTH - 73' — TRANSECT 001
16:42 UCR_001_18-10-22.PD0 — NAV 045-04 - ADCP-1ACT

16:48 045-05 BT, WM1 — DEPTH - 63' — TRANSECT 002
16:52 UCR_002_18-10-22.PD0 — NAV 045-05 - ADCP-1ACT

17:08 043-04 BT, WM1 — DEPTH - 61' — TRANSECT 003
17:13 UCR_003_18-10-22.PD0 — NAV 043-04 - ADCP-1ACT

[WIND FROM NORTH]

17:19 043-03 BT, WM1 — DEPTH - 68' — TRANSECT 004
17:24 UCR_004_18-10-22.PD0 — NAV 043-05 - ADCP-1ACT

17:40 042-03 BT, WM1 — DEPTH - 80' — TRANSECT 005
17:44 UCR_005_18-10-22.PD0 — NAV 042-03 - ADCP-1ACT

17:52 042-04 BT, WM1 — DEPTH - 89' — TRANSECT 006
17:56 UCR_006_18-10-22.PD0 — NAV 042-04 - ADCP-1ACT

18:02 042-05 BT, WM1 — DEPTH - 84' — TRANSECT 007
18:06 UCR_007_18-10-22.PD0 — NAV 042-05 - ADCP-1ACT

18:17 041-04 BT, WM1 — DEPTH - 59' — TRANSECT 008
18:21 UCR_008_18-10-22.PD0 — NAV 041-04 - ADCP-1ACT

18:34 040-04 BT, WM1 — DEPTH - 83' — TRANSECT 009
18:38 UCR_009_18-10-22.PD0 — NAV 040-04 - ADCP-1ACT

10-22-18.PDO

18:44	040-03	BT, WMI	DEPTH - 105'	TRANSECT 010
18:48	UCR_010_18-10-22.PDO		NAV 040-03 - ADCP - IACT	
19:01	039-04	BT, WMI	DEPTH - 65'	TRANSECT 011
19:06	UCR_011_18-10-22.PDO		NAV 039-04 - ADCP - IACT	
	038-0 → MAM			
	UCR_012 → MAM _18-10-22.PDO	BT, WMI	DEPTH - 9 MAM NAV 038- - ADCP - IACT	TRANSECT 012

038-01, 038-02, 038-03: Beam depths varied by ~150' in each ensemble, so ADCP could not measure velocities reliably. Any measurements would be very suspect,* and conditions also violate assumptions for log-profile analysis. Data was briefly collected at 038-03, TRANSECT 012, UCR_012_18-10-22.PDO, but not completed due to poor data quality.

*and not measure close enough to the bed for roughness analysis.

19:29	037-02	BT, WMI	DEPTH - 64'	TRANSECT 013
19:33	UCR_013_18-10-22.PDO		NAV 037-02 - ADCP - IACT	
19:38	037-03	BT, WMI	DEPTH - 83'	TRANSECT 014
19:43	UCR_014_18-10-22.PDO		NAV 037-03 - ADCP - IACT	
19:49	037-04	BT, WMI	DEPTH - 87'	TRANSECT 015
19:53	UCR_015_18-10-22.PDO		NAV 037-04 - ADCP - IACT	
19:58	037-05	BT, WMI	DEPTH - 65	TRANSECT 016
20:02	UCR_016_18_10-22.PDO		NAV 037-05 - ADCP - IACT	
22:02	061-04	BT, WMI	DEPTH - 70'	TRANSECT 017
22:07	UCR_017_18-10-22.PDO		NAV 061-04 - ADCP - IACT	
22:13	061-03	BT, WMI	DEPTH - 84'	TRANSECT 018
22:17	UCR_018-18-10-22.PDO		NAV 061-03 - ADCP - IACT	

TRANSECT 019 = MISFIRE, TWITCHY FS FINGER...

22:31	062-05	BT, WMI	DEPTH - 68'	TRANSECT 020
22:36	UCR_020_18-10-22.PDO		NAV 062-05 - ADCP - IACT	

10-22-18 M.A.M.

22:42	062-04	BT, WMI	DEPTH - 146' TRANSECT 021
22:47	UCR_021_18-10-22.PDO		NAV ~~ADCP~~ 062-04-ADCP-1ACT M.A.M.
22:56	062-03	BT, WMI	DEPTH - 75 TRANSECT 022
23:01	UCR_022_18-10-22.PDO		NAV 062-03-ADCP-1ACT
23:14	063-02	BT, WMI	DEPTH - 70' TRANSECT 023
23:19	UCR_023_18-10-22.PDO		NAV 063-02-ADCP-1ACT
23:23	063-03	BT, WMI	DEPTH - 69' TRANSECT 024
23:28	UCR_024_18-10-22 PDO		NAV 063-03-ADCP-1ACT
23:32	063-04	BT, WMI	DEPTH - 60' TRANSECT 025
23:36	UCR_025_18-10-22.PDO		NAV 063-04-ADCP-1ACT
23:41	063-05	BT, WMI	DEPTH - 64 TRANSECT 026
23:45	UCR_026_18-10-22.PDO		NAV 063-05-ADCP-1ACT

NOTE: .PDO FILES DO NOT HAVE UCR PREFIX (FOR TODAY). WRH BUG.

10/22/18 M.A.M.

10-23-18 M.A.M

PARTLY CLOUDY, LIGHT WIND FROM NORTH — ADCP = 51.1°F
USING 1200 kHZ — AML = 51.8°F

15:39	BOAT LAUNCH		
15:54	ADCP DIAGNOSTIC TEST - PASS		
16:02	ADCP COMPASS CALIBRATION - 1.0°		
16:04	ADCP COMPASS EVALUATION - 0.1°		
16:11	061 - 01	BT, WMI	DEPTH - 35' TRANSECT 000
16:15	UCR_000_18-10-23.PDO		NAV 061-01 - ADCP-IACT
16:22	061-02	BT, WMI	DEPTH - 55' TRANSECT 001
16:26	UCR_001_18-10-23.PDO		NAV 061-02 - ADCP-IACT
16:34	061-05	BT, WMI	DEPTH - 55' TRANSECT 002
16:38	UCR_002_18-10-23.PDO		NAV 061-05 - ADCP-IACT
16:49	062-02	BT, WMI	DEPTH - 38' TRANSECT 003
16:54	UCR_003_18-10-23.PDO		NAV 062-02 - ADCP-IACT
16:58	062-01	BT, WMI	DEPTH - 28' TRANSECT 004
17:03	UCR_004_18-10-23.PDO		NAV 062-01 - ADCP-IACT
17:14	063-01	BT, WMI	DEPTH - 54' TRANSECT 005
17:18	UCR_005_18-10-23.PDO		NAV 063-01 - ADCP-IACT
17:27	064-01	BT, WMI	DEPTH - 40' TRANSECT 006
17:31	UCR_006_18-10-23.PDO		NAV 064-01 - ADCP-IACT
17:36	064-02	BT, WMI	DEPTH - 55' TRANSECT 007
17:40	UCR_007_18-10-23.PDO		NAV 064-02 - ADCP-IACT
17:55	065-02	BT, WMI	DEPTH - 52' TRANSECT 008
17:59	UCR_008_18-10-23.PDO		NAV 065-02 - ADCP-IACT
18:04	065-01	BT, WMI	DEPTH - 33' TRANSECT 009
18:07	UCR_009_18-10-23.PDO		NAV 065-01 - ADCP-IACT
18:21	066-05	BT, WMI	DEPTH - 47' TRANSECT 010
18:26	UCR_010_18-10-23.PDO		NAV 066-05 - ADCP-IACT

10-23-18.PDO

20:17	071 06 MAM - 01	BT, WMI	DEPTH - 48'	TRANSECT 011
20:21	UCR_011_18-10-23.PDO		NAV 071 MAM - 01 - ADCP - 1ACT	
20:28	071-05	BT, WMI	DEPTH - 48'	TRANSECT 012
20:32	UCR_012_18-10-23.PDO		NAV 071-05 - ADCP - 1ACT	
20:43	070-05	BT, WMI	DEPTH - 53'	TRANSECT 013
20:46	UCR_013_18-10-23.PDO		NAV 070-05 - ADCP - 1ACT	
21:00	069-03	BT, WMI	DEPTH - 54'	TRANSECT 014
21:03	UCR_014_18-10-23.PDO		NAV 069-03 - ADCP - 1ACT	
21:10	069-04	BT, WMI	DEPTH - 10'	TRANSECT 015
21:16	UCR_015_18-10-23.PDO		NAV 069-04 - ADCP - 1ACT	
	069-05 TOO SHALLOW MOVING IMMEDIATELY RIVER LEFT SHOREWARD OF 069-04			
21:36	068-03	BT, WMI	DEPTH - 59'	TRANSECT 016
21:40	UCR_016_18-10-23.PDO		NAV 068-03 - ADCP - 1ACT	
21:55	068-04	BT, WMI	DEPTH - 10'	TRANSECT 017
22:00	UCR_017_18-10-23.PDO		NAV 068-04 - ADCP - 1ACT	
			ALT DVE TO DEPTH, 40 FT TO CTR	
22:07	068-05	BT, WMI	DEPTH - 11'	TRANSECT 018
22:12	UCR_018_18-10-23.PDO		NAV 068-05 - ADCP - 1ACT	
			MAY BE TOO WEEDY	
			CANT RELOCATE + TOO SHALLOW	
22:34	067-01	BT, WMI	DEPTH - 47'	TRANSECT 019
22:38	UCR_019_18-10-23.PDO		NAV 067-01 - ADCP - 1ACT	
	ALT DVE TO GILL NETS FROM TRIBAL STURGEON FISHING RESEARCH			
22:38	067-01-DVP	BT, WMI	DEPTH - 47'	TRANSECT 020
22:42	UCR_020_18-10-23.PDO		NAV 067-01 - ADCP - 1ACT	
22:54	067-03	BT, WMI	DEPTH - 56'	TRANSECT 021
22:58	UCR_021_18-10-23.PDO		NAV 067-03 - ADCP - 1ACT	
22:58	067-03-DVP	BT, WMI	DEPTH - 56'	TRANSECT 022
23:02	UCR_022_18-10-23.PDO		NAV 067-03 - ADCP - 1ACT	

10 - 23 - 15 M.A.M.

23:14 067-04 BT, WM1 DEPTH - 54' TRANSECT 023

23:17 UCR_023_18-10-23.PDB ADCP NAV 067-04-ADCP-1ACT

23:23 067-05 BT, WM1 DEPTH - 57' TRANSECT 024

23:27 UCR_024_18-10-23.PDB NAV 067-05-ADCP-1ACT

Scale: 1 square = 58 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

10-24-18 M.A.M.

FOGGY, CALM — ADCP = 51.42° F
USING 600 KHZ — AML = 51.87° F

15:08	BOAT LAUNCH		
16:18	ADCP DIAGNOSTIC TEST - PASS		
16:23	ADCP COMPASS CALIBRATION - 0.2°		
16:25	ADCP COMPASS EVALUATION - 0.1°		
16:40	072-01	BT, WM1	DEPTH - 67' TRANSECT 000
16:44	UCR_000_18-10-24.PD0		NAV 072-01 - ADCP - 1ACT
16:50	072-02	BT, WM1	DEPTH - 68' TRANSECT 001
16:54	UCR_001_18-10-24.PD0		NAV 072-02 - ADCP - 1ACT
17:00	072-03	BT, WM1	DEPTH - 66' TRANSECT 002
17:04	UCR_002_18-10-24.PD0		NAV 072-03 - ADCP - 1ACT
17:10	072-04	BT, WM1	DEPTH - 76' TRANSECT 003
17:14	UCR_003_18-10-24.PD0		NAV 072-04 - ADCP - 1ACT
17:19	072-05	BT, WM1	DEPTH - 65' TRANSECT 004
17:23	UCR_004_18-10-24.PD0		NAV 072-05 - ADCP 1ACT
17:34	071-04	BT, WM1	DEPTH - 93' TRANSECT 005
17:37	UCR_005_18-10-24.PD0		NAV 071-04 - ADCP - 1ACT
17:43	071-03	BT, WM1	DEPTH - 132' TRANSECT 006
17:47	UCR_006_18-10-24.PD0		NAV 071-03 - ADCP - 1ACT
17:54	071-02	BT, WM1	DEPTH - 66' TRANSECT 007
17:58	UCR_007_18-10-24.PD0		NAV 071-02 - ADCP - 1ACT
18:08	070-01	BT, WM1	DEPTH - 77' TRANSECT 008
18:13	UCR_008_18-10-24.PD0		NAV 070-01 - ADCP - 1ACT
18:18	070-02	BT, WM1	DEPTH - 89' TRANSECT 009
18:22	UCR_009_18-10-24.PD0		NAV 070-02 - ADCP - 1ACT
18:27	070-03	BT, WM1	DEPTH - 66' TRANSECT 010
18:31	UCR_010_18-10-24.PD0		NAV 070-03 - ADCP - 1ACT

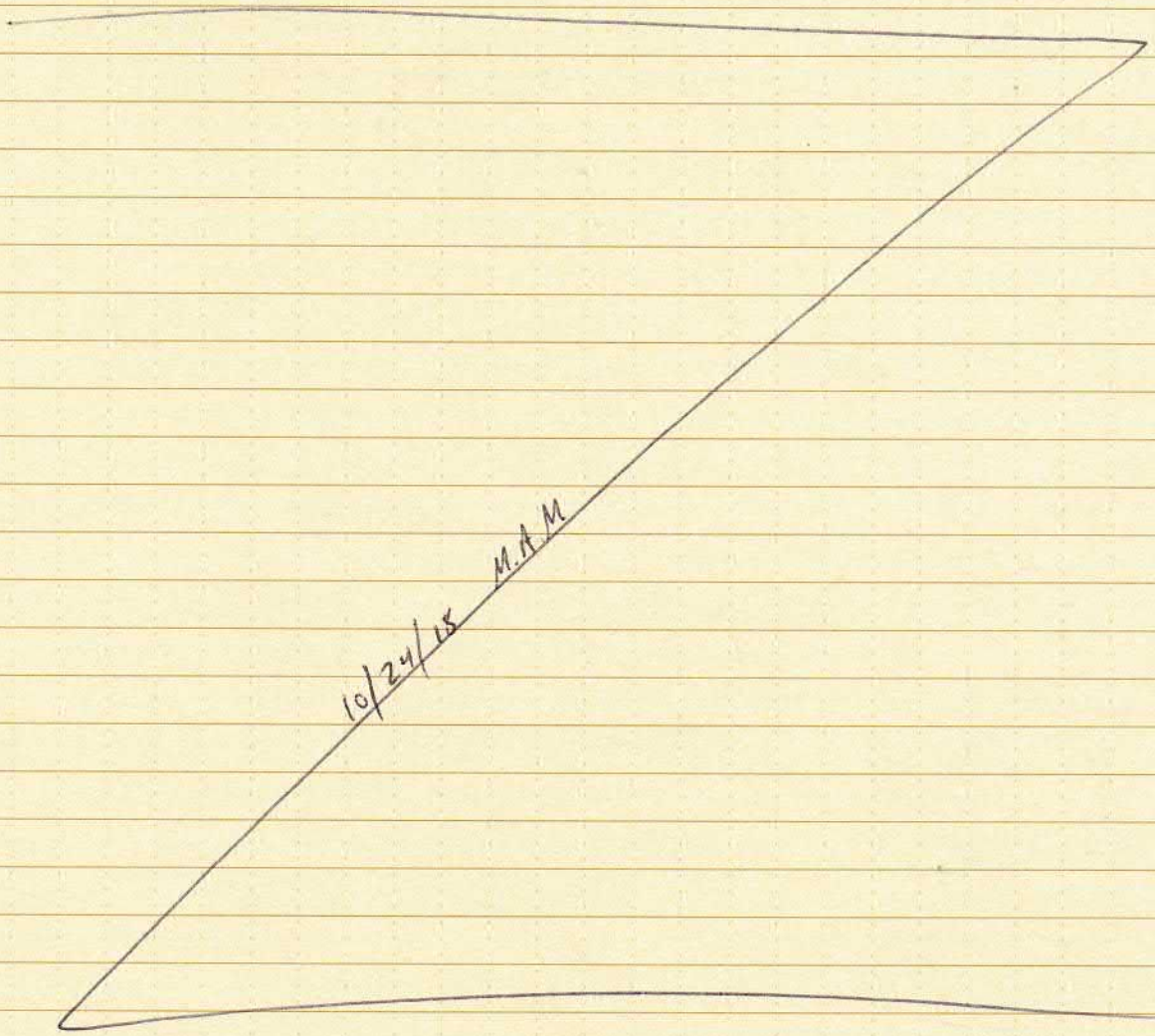
10-24-18.PDO M.A.H.

18:37	070-04	BT, WMI	DEPTH - 65' TRANSECT 011
18:40	UCR_011_18-10-24.PDO		NAV 070-04 - ADCP - IACT
18:53	069-01	BT, WMI	DEPTH - 66' TRANSECT 012
18:57	UCR_012_18-10-24.PDO		NAV 069-01 - ADCP - IACT
19:02	069-02	BT, WMI	DEPTH - 80' TRANSECT 013
19:06	UCR_013_18-10-24.PDO		NAV 069-02 - ADCP - IACT
19:16	068-01	BT, WMI	DEPTH - 61' TRANSECT 014
19:19	UCR_014_18-10-24.PDO		NAV 065-01 - ADCP - IACT
19:27	068-02	BT, WMI	DEPTH - 93' TRANSECT 015
19:30	UCR_015_18-10-24.PDO		NAV 068-02 - ADCP - IACT
20:45	067-02	BT, WMI	DEPTH - 64 TRANSECT 016
20:49	UCR_016_18-10-24.PDO		NAV 067-02 - ADCP - IACT
21:00	067-02-DVP	BT, WMI	DEPTH - 64' TRANSECT 017
21:04	UCR_017_18-10-24.PDO		NAV 067-02 - ADCP - IACT
21:14	066-01	BT, WMI	DEPTH - 72' TRANSECT 018
21:18	UCR_018_18-10-24.PDO		NAV 066-01 - ADCP - IACT
21:26	066-02	BT, WMI	DEPTH - 88' TRANSECT 019
21:29	UCR_019_18-10-24.PDO		NAV 066-02 - ADCP - IACT
21:36	066-03	BT, WMI	DEPTH - 106' TRANSECT 020
21:40	UCR_020_18-10-24.PDO		NAV 066-03 - ADCP - IACT
21:46	066-04	BT, WMI	DEPTH - 75' TRANSECT 021
21:50	UCR_021_18-10-24.PDO		NAV 066-04 - ADCP - IACT
22:05	065-05	BT, WMI	DEPTH - 74' TRANSECT 022
22:09	UCR_022_18-10-24.PDO		NAV 065-05 - ADCP - IACT
22:14	065-04	BT, WMI	DEPTH - 70' TRANSECT 023
22:18	UCR_023_18-10-24.PDO		NAV 065-04 - ADCP - IACT

Scale: 1 square = 60 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

10-24-18 M.A.M.

22:28	065-03	BT, WMI	DEPTH - 63' TRANSECT 024
22:32	UCR_024_18=10-24.PDO		NAV 065-03-ADCP-1ACT
22:32	065-03-DUP	BT, WMI	DEPTH - 63' TRANSECT 025
22:37	UCR_025-18-10-24.PDO		NAV 065-03-ADCP-1ACT
22:52	064_03	BT, WMI	DEPTH - 69' TRANSECT 026
22:56	UCR_026_18-10-24.PDO		NAV 064-03 - ADCP-1ACT
23:02	064-04	BT, WMI	DEPTH - 70' TRANSECT 027
23:06	UCR_027_18-10-24.PDO		NAV 064-04 - ADCP-1ACT
23:12	064-05	BT, WMI	DEPTH - 67' TRANSECT 028
23:16	UCR_028_18-10-24.PDO		NAV 064-05 - ADCP-1ACT
23:16	064-05-DUP	BT, WMI	DEPTH - 67' TRANSECT 029
23:20	UCR_029_18-10-24.PDO		NAV 064-05 - ADCP-1ACT



10-25-18 M.A.M

MOSTLY CLEAR, CALM — ADLP = 50.94° F
USING 1200 KHZ — AML = 51.90° F

15:10 BOAT LAUNCH
16:53 ADLP DIAGNOSTIC TEST -
16:56 ADLP COMPASS CALIBRATION - 0.7°
17:00 ADCP COMPASS EVALUATION -0.10

17:18 034-03 BT, WM11 DEPTH - 11' TRANSECT 000
17:23 UCR_000_18-10-25.PD0 NAV 034-03 - ADLP-1ACT
ALTERNATE LOCATION DUE TO DEPTH

17:30 034-02 BT, WM11 DEPTH -13' TRANSECT001
17:35 UCR_001_18-10-25.PD0 NAV 034-02 - ADLP-1Act
MAY BE TOO WEEDY

17:48 034-01 BT, WM11 DEPTH - 12' TRANSECT 002
17:53 UCR_002_18-10-25.PD0 NAV 034-01-ADLP-1ACT

18:08 033-05 BT, WM11 DEPTH-11' TRANSECT003
18:14 UCR_003_18-10-25.PD0 NAV 033-05-ADLP-1ACT

18:19 033-04 BT, WM1 DEPTH - 36' TRANSECT 004
19:23 UCR_004_18-10-25.PD0 NAV 033-04-ADLP-1AT

18:30 033-03 BT, WM1 DEPTH-49' TRANSECT 005
18:34 UCR_005_18-10-25.PD0 NAV 033-03-ADLP-1ACT

18:41 033-02 BT, WM1 DEPTH-10' TRANSECT 006
18:45 UCR_006-18-10-25.PD0 NAV 033-02-ADLP-1ACT

033-01 TOO SHALLOW FOR ADLP 4-5', TOO SHALLOW TO RELOCATE

19:12 032-05 BT, WM1 DEPTH - 39' TRANSECT 007
19:16 UCR_007_18-10-25.PD0 NAV 032-05-ADLP-1ACT

19:22 032-04 BT, WM1 DEPTH - 31' TRANSECT 008
19:25 UCR_008_18-10-25.PD0 NAV 032-04-ADLP-1Act

Scale: 1 square = 62 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

10-25-18 M.A.M

19:35	032-03	BT, WM1	DEPTH - 26'	TRANSECT 009
19:38	HCR_009_18-10-25.PDO		NAV 032-03-ADCP-1ACT	
19:43	032-02	BT, WM1	DEPTH - 40'	TRANSECT 010
19:47	HCR_010-18-10-25.PDO		NAV 032-02-ADCP-1ACT	
19:52	032-01	BT, WM1	DEPTH - 20'	TRANSECT 011
19:59	HCR_011-18-10-25.PDO		NAV 032-01-ADCP-1ACT	
21:02	031-02	BT, WM1	DEPTH - 14'	TRANSECT 012
21:09	HCR_012_18-10-25.PDO		NAV 031-02-ADCP-1ACT	
	STRANGE READINGS 3' OFF BOTTOM FROM BOW SONAR			
21:20	031-01	BT, WM1	DEPTH - 10'	TRANSECT 013
21:23	HCR_013_18-10-25.PDO		NAV 031-01-ADCP-1ACT	
21:29	031-01-#2	BT, WM1	DEPTH - 10'	TRANSECT 014
21:34	HCR_014_18-10-25.PDO		NAV 031-01-ADCP-1ACT	
	SECOND MEASUREMENT IN HIGH RES WM1 TO ENSURE DATA QUALITY (NOT SURE WHICH IS BEST IN THESE CONDITIONS*) * DEPTH, VELOCITY ARE BORDERLINE			
21:41	031-03	BT, WM1	DEPTH - 28'	TRANSECT 015
21:45	HCR_015_18-1025.PDO		NAV 031-03-ADCP-1ACT	
21:45	031-03-DUP	BT, WM1	DEPTH - 28'	TRANSECT 016
21:48	HCR_016_18-10-25.PDO		NAV 031-03-ADCP-1ACT	
22:01	031-04	BT, WM1	DEPTH - 29'	TRANSECT 017
22:05	HCR_017_18-10-25.PDO		NAV 031-04-ADCP-1ACT	
22:05	031-04-DUP	BT, WM1	DEPTH - 29'	TRANSECT 018
22:08	HCR_018_18-10-25.PDO		NAV 031-04-ADCP-1ACT	
22:18	031-05	BT, WM1	DEPTH - 31'	TRANSECT 019
22:22	HCR_019_18-10-25.PDO		NAV 031-05-ADCP-1ACT	
22:36	030-01	BT, WM1	DEPTH - 32'	TRANSECT 020
22:40	HCR_020_18-10-25.PDO		NAV 030-01-ADCP-1ACT	
22:46	030-02	BT, WM1	DEPTH - 33'	TRANSECT 021
22:50	HCR_021_18-10-25.PDO		NAV 030-02-ADCP-1ACT	

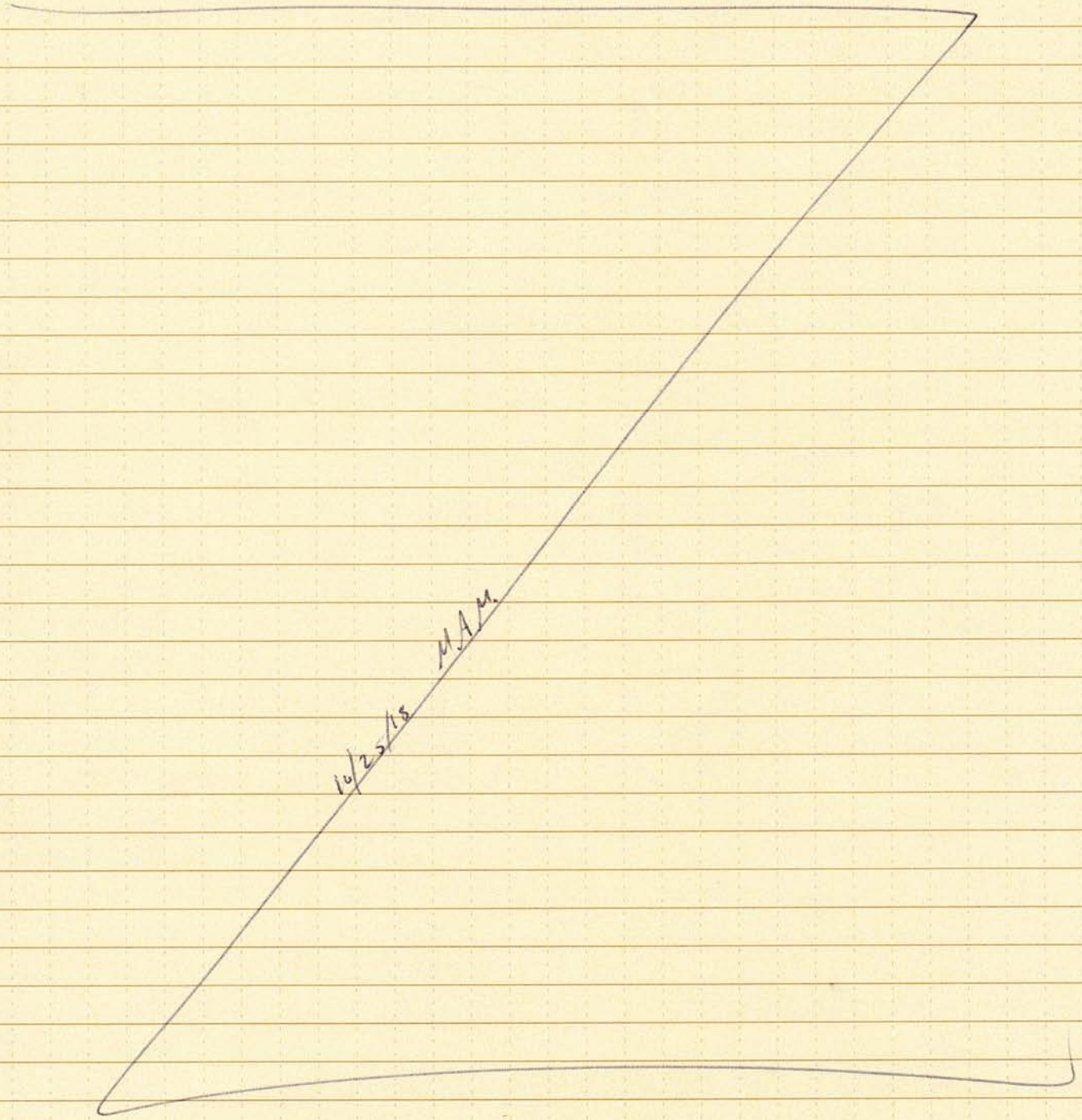
10-25-18 M.A.M.

22:54 030-03 BT, WMI DEPTH - 19' TRANSECT 022
22:58 UCR_022_18-10-25.PDO NAV 030-03-ADCP-1ACT

23:12 030-05 BT, WMI DEPTH - 14' TRANSECT 023
23:17 UCR_023_18-10-25.PDO NAV 030-05 MA-ADCP-1ACT

23:22 030-04 BT, WMI DEPTH -10' TRANSECT 024
23:28 UCR_024_18-10-25.PDO NAV 030-04-ADCP-1ACT

ALTERNATE LOCATION DUE TO DEPTH & STEEP SLOPE



Scale: 1 square = 64 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

10-26-18 M.A.M.

LIGHT RAIN, CALM
USING 1200 KHZ

ADCP = 51.2° F
AML = 51.90° F

15:45	BOAT LAUNCH → STARBOARD IMPELLER REPLACEMENT			
20:11	ADCP DIAGNOSTIC TEST - PASS			
20:13	ADCP COMPASS CALIBRATION - 0.8°			
20:15	ADCP COMPASS EVALUATION - 0.3°			
20:22	029-01	BT, WM1	DEPTH - 34'	TRANSECT 000
20:25	UCR_000_18-10-26.PD0		NAV 029-01-ADCP-1ACT	
20:34	029-02	BT, WM1	DEPTH - 38'	TRANSECT 001
20:38	UCR_001_18-10-26.PD0		NAV 029-02-ADCP-1ACT	
20:45	029-03	BT, WM1	DEPTH - 33'	TRANSECT 002
20:49	UCR_002_18-10-26.PD0		NAV 029-03-ADCP-1ACT	
20:52	029-04	BT, WM1	DEPTH - 11'	TRANSECT 003
20:56	UCR_003_18-10-26.PD0		NAV 029-04-ADCP-1ACT	
21:03	029-05	BT, WM1	DEPTH - 10'	TRANSECT 004
21:07	UCR_004-18-10-26.PD0		NAV 029-05-ADCP-1ACT	
	ALTERNATE LOCATION DUE TO DEPTH < 10'			
21:17	028-01	BT, WM1	DEPTH - 27'	TRANSECT 005
21:21	UCR_005_18-10-26.PD0		NAV 028-01-ADCP-1ACT	
21:27	028-02	BT, WM1	DEPTH - 36'	TRANSECT 006
21:30	UCR_006_18-10-26.PD0		NAV 028-02-ADCP-1ACT	
21:35	028-03	BT, WM1	DEPTH - 36'	TRANSECT 007
21:40	UCR_007_18-10-26.PD0		NAV 028-03-ADCP-1ACT	
21:45	028-04	BT, WM1	DEPTH - 24'	TRANSECT 008
21:49	UCR_008_18-10-26.PD0		NAV 028-04-ADCP-1ACT	
21:53	028-05	BT, WM1	DEPTH - 10'	TRANSECT 009
21:57	UCR_009_18-10-26.PD0		NAV 028-05-ADCP-1ACT	

10-26-18 M.A.M

22:07	027-05	BT, WM1	DEPTH - 10' TRANSECT 010
22:11	UCR_010_18-10-26.PDO		NAV 027-05 - ADCP - 1ACT
22:16	027-04	BT, WM1	DEPTH - 27' TRANSECT 011
22:20	UCR_011_18-10-26.PDO		NAV 027-04 - ADCP - 1ACT
22:25	027-03	BT, WM1	DEPTH - 34' TRANSECT 012
22:29	UCR_012-18-10-26.PDO		NAV 027-03 - ADCP - 1ACT
22:33	027-02	BT, WM1	DEPTH - 32' TRANSECT 013
22:37	UCR_013_18-10-26.PDO		NAV 027-02 - ADCP - 1ACT
22:40	027-01	BT, WM1	DEPTH - 26' TRANSECT 014
22:44	UCR_014_18-10-26.PDO		NAV 027-01 - ADCP - 1ACT
22:53	026-01	BT, WM1	DEPTH - 54' TRANSECT 015
22:57	UCR_015_18-10-26 PDO		NAV 026-01 - ADCP - 1ACT
23:01	026-02	BT, WM1	DEPTH - 36' TRANSECT 016
23:05	UCR_016_18-10-26.PDO		NAV 026-02 - ADCP - 1ACT
23:09	026-03	BT, WM1	DEPTH - 22' TRANSECT 017
23:12	UCR_017_18-10-26 PDO		NAV 026-03 - ADCP - 1ACT
23:18	026-04	BT, WM1	DEPTH - 15' TRANSECT 018
23:24	UCR_018_18-10-26.PDO		NAV 026-04 - ADCP - 1ACT
	026-04-DUP	BT, WM1	M.A.M. DEPTH - 18' TRANSECT 019
	UCR_019-18-10-26.PDO		NAV 026-04 - ADCP - 1ACT
23:35 23:39	026-05	BT, WM1	DEPTH - 10' TRANSECT 019
23:35 NM	UCR_019_18-10-26.PDO		NAV 026-05 - ADCP - 1ACT
	ALTERNATE LOCATION DUE TO DEPTH < 10'		

10/26/18 M.A.M.

Scale: 1 square = 66 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

10-29-18 M.A.M.

CLOUDY, LIGHT RAIN, CALM — ADCP = 51.2°F
USING 1200 KHZ — AML = 51.37°F

15:19	BOAT LAUNCH		
16:00	ADCP DIAGNOSTICS - PASS		
16:02	ADCP COMPASS CALIBRATION -0.8°		
16:04	ADCP COMPASS EVALUATION -0.7°		
16:07	025-01	BT, WM1	DEPTH - 10' TRANSECT 000
16:11	UCR_000_18-10-29.PD0		NAV 025-01-ADCP-1ACT
16:19	025-02	BT, WM1	DEPTH - 24' TRANSECT 001
16:23	UCR_001_18-10-29.PD0		NAV 025-02-ADCP-1ACT
16:28	025-03	BT, WM1	DEPTH - 34' TRANSECT 002
16:32	UCR_002_18-10-29.PD0		NAV 025-03-ADCP-1ACT
16:37	025-04	BT, WM1	DEPTH - 40' TRANSECT 003
16:41	UCR_003_18-10-29.PD0		NAV 025-04-ADCP-1ACT
16:45	025-05	BT, WM1	DEPTH - 33' TRANSECT 004
16:49	UCR_004-18-10-29.PD0		NAV 025-05-ADCP-1ACT
17:04	024-05	BT, WM1	DEPTH - 58' TRANSECT 005
17:08	UCR_005_18-10-29.PD0		NAV 024-05-ADCP-1ACT
17:13	024-04	BT, WM1	DEPTH - 53' TRANSECT 006
17:17	UCR_006_18-10-29.PD0		NAV 024-04-ADCP-1ACT
17:22	024-03	BT, WM1	DEPTH - 38' TRANSECT 007
17:26	UCR_007_18-10-29.PD0		NAV 024-03-ADCP-1ACT
17:31	024-02	BT, WM1	DEPTH - 26' TRANSECT 008
17:35	UCR_008_18-10-29.PD0		NAV 024-02-ADCP-1ACT
	024-01 OBSTRUCTED BY CURRENT, ROCKS, EDDY LINE		
17:46	023-05	BT, WM1	DEPTH - 17' TRANSECT 009
17:49	UCR_009_18-10-29.PD0		NAV 023-05-ADCP-1ACT

10-29-18 M.A.M.

17:53	023-04	BT, WMI	DEPTH -24' TRANSECT 010
17:57	UCR_010_18-10-29.PDO		NAV 023-04-ADCP-1ACT
18:02	023-03	BT, WMI	DEPTH-32' TRANSECT 011
18:07	UCR_011_18-10-29.PDO		NAV 023-03-ADCP-1ACT
18:11	023-02	BT, WMI	DEPTH-35' TRANSECT 012
18:14	UCR_012_18-10-29.PDO		NAV 023-02-ADCP-1ACT
18:18	023-01	BT, WMI	DEPTH-26' TRANSECT 013
18:23	UCR_013_18-10-29.PDO		NAV 023-01-ADCP-1ACT
18:41	022-01	BT, WMI	DEPTH-29' TRANSECT 014
18:45	UCR_014_18-10-29.PDO		NAV 022-01-ADCP-1ACT
18:50	022-02	BT, WMI	DEPTH-29' TRANSECT 015
18:54	UCR_015_18-10-29.PDO		NAV 022-02-ADCP-1ACT
	022-05 OBSTRUCTED BY STEAMBOAT ROCK		
19:01	022-04	BT, WMI	DEPTH-47' TRANSECT 016
19:07	UCR_016_18-10-29.PDO		NAV 022-04-ADCP-1ACT
19:11	022-05	BT, WMI	DEPTH-16' TRANSECT 017
19:15	UCR_017_18-10-29.PDO		NAV 022-05-ADCP-1ACT
20:40	021-05	BT, WMI	DEPTH-10' TRANSECT 018
20:43	UCR_018_18-10-29.PDO		NAV 021-05-ADCP-1ACT
	ALT DUE TO DEPTH <10'		
20:48	021-04	BT, WMI	DEPTH-22' TRANSECT 019
20:52	UCR_019_18-10-29.PDO		NAV 021-04-ADCP-1ACT
20:57	021-03	BT, WMI	DEPTH-36' TRANSECT 020
21:01	UCR_020_18-10-29.PDO		NAV 021-03-ADCP-1ACT
21:01	021-03-DVP	BT, WMI	DEPTH-36' TRANSECT 021
21:05	UCR_021_18-10-29.PDO		NAV 021-03-ADCP-1ACT

Scale: 1 square = 6 8 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

10-29-~~PDT~~ 18 M.A.M.

21:10	021-02	BT, WMI	DEPTH-34' TRANSECT 022
21:14	UCR_022_18-10-29.PDT		NAV 021-02-ADCP-IACT
21:14	021-02-DVP	BT, WMI	DEPTH-34' TRANSECT 023
21:18	UCR_023_18-10-29.PDT		NAV 021-02-ADCP-IACT
21:24	021-01	BT, WMI	DEPTH-34' TRANSECT 024
21:28	UCR_024-18-10-29.PDT		NAV 021-01-ADCP-IACT
21:48	012-05	BT, WMI	DEPTH-30' TRANSECT 025
21:51	UCR_025_18-10-29.PDT		NAV 012-05-ADCP-IACT
21:59	012-04	BT, WMI	DEPTH-18' TRANSECT 026
22:03	UCR_026_18-10-29.PDT		NAV 012-04-ADCP-IACT
	012-03 012-02 012-01	TOO SHALLOW, TOO FAST LARGE RIFFLE	
22:15	011-05	BT, WMI	DEPTH-17' TRANSECT 027
22:19	UCR_027_18-10-29.PDT		NAV 011-05-ADCP-IACT
22:23	011-04	BT, WMI	DEPTH-23' TRANSECT 028
22:27	UCR_028-18-10-29.PDT		NAV 011-04-ADCP-IACT
22:30	011-03	BT, WMI	DEPTH-34' TRANSECT 029
22:34	UCR_029_18-10-29.PDT		NAV 011-03-ADCP-IACT
22:38	011-02	BT, WMI	DEPTH-~~33~~53' TRANSECT 030
22:42	UCR_030_18-10-29.PDT		NAV 011-02-ADCP-IACT
22:45	011-01	BT, WMI	DEPTH-47' TRANSECT 031
22:49	UCR_031_18-10-29.PDT		NAV 011-01-ADCP-IACT
22:59	010-01	BT, WMI	DEPTH-36' TRANSECT 032
23:03	UCR_032_18-10-29.PDT		NAV 010-01-ADCP-IACT
23:06	010-02	BT, WMI	DEPTH-43' TRANSECT 033
23:10	UCR_033_18-10-29.PDT		NAV 010-02-ADCP-IACT

21:10	021-02	BT, WMI	DEPTH-34' TRANSECT 022
21:14	UCR_022_18-10-29 PD0		NAV 021-02-ADCP-1ACT
21:14	021-02-DUP	BT, WMI	DEPTH-34' TRANSECT 023
21:18	UCR_023-18-10-29.PD0		NAV 021-02-ADCP-1ACT
21:24	021-01	BT, WMI	DEPTH-34' TRANSECT 024
21:28	UCR_024-18-10-29.PD0		NAV 021-01-ADCP-1ACT
21:48	012-05	BT, WMI	DEPTH-30' TRANSECT 025
21:51	UCR_025_18-10-29.PD0		NAV 012-05-ADCP-1ACT
21:59	012-04	BT, WMI	DEPTH-18' TRANSECT 026
22:03	UCR_026_18-10-29.PD0		NAV 012-04-ADCP-1ACT

012-03, 012-02, 012-01 } TOO SHALLOW, TOO FAST LARGE RIFFLE

22:15	011-05	BT, WMI	DEPTH- 17' TRANSECT 027
22:19	UCR_027_18-10-29.PD0		NAV 011-05-ADCP-1ACT
22:23	011-04	BT, WMI	DEPTH-23' TRANSECT 028
22:27	UCR_028-18-10-29.PD0		NAV 011-04-ADCP-1ACT
22:30	011-03	BT, WMI	DEPTH-34' TRANSECT 029
22:34	UCR_029_18-10-29.PD0		NAV 011-03-ADCP-1ACT
22:38	011-02	BT, WMI	DEPTH-~~3~~53' TRANSECT 030
22:42	UCR_030_18-10-29.PD0		NAV 011-02-ADCP-1ACT
22:45	011-01	BT, WMI	DEPTH-47' TRANSECT 031
22:49	UCR_031_18-10-29.PD0		NAV 011-01-ADCP-1ACT
22:59	010-01	BT, WMI	DEPTH-36' TRANSECT 032
23:03	UCR_032_18-10-29.PD0		NAV 010-01-ADCP-1ACT
23:06	010-02	BT, WMI	DEPTH-43' TRANSECT 033
23:10	UCR_033_18-10-29.PD0		NAV 010-02-ADCP-1ACT

10-29-18 M.A.M.

23:13 010-03 BT, WMI DEPTH - 44' TRANSECT 034

23:18 UCR_034_18-10-29.PDO NAV 010-03-ADCP-1ACT

23:23 010-04 M.M. BT, WMI DEPTH - 37' TRANSECT 035

23:27 UCR_035_18-10-29.PDO NAV 010-04 M.M. -ADCP-1ACT

23:30 010-05 BT, WMI DEPTH - 21' TRANSECT 036

23:33 UCR_036_18-10-29.PDO NAV 010-05-ADCP-1ACT

10/29/18 M.A.M.

Scale: 1 square = 70 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

10-30-18 M.A.M

CLOUDY, CALM
USING 1200 KHZ

ADCP = 51.7°F (ET)
AML = 50.88 °F

15:32	BOAT LAUNCH		
16:13	ADCP DIAGNOSTICS - PASS		
16:15	ADCP COMPASS CALIBRATION - 0.4°		
16:16	ADCP COMPASS EVALUATION - 0.3°		
16:29	090-01	BT, WMI	DEPTH - 18' TRANSECT 000
16:33	UCR_000_18-10-30.PD0		NAV 090-01 -ADCP-1ACT
16:38	090-02	BT, WMI	DEPTH - 31' TRANSECT 001
16:42	UCR_001_18-10-30.PD0		NAV 090-02-ADCP-1ACT
16:45	090-03	BT, WMI	DEPTH - 34' TRANSECT 002
16:49	UCR_002-18-10-30.PD0		NAV 090-03-ADCP-1ACT
16:52	090-04	BT, WMI	DEPTH - 27' TRANSECT 003
16:56	UCR_003-18-10-30.PD0		NAV 090-04-ADCP-1ACT
16:59	090-05	BT, WMI	DEPTH - 21' TRANSECT 004
17:03	UCR_004-18-10-30.PD0		NAV 090-05-ADCP-1ACT
17:14	080-01	BT, WMI	DEPTH - 22' TRANSECT 005
17:18	UCR_005_18-10-30.PD0		NAV 080-01 -ADCP-1ACT
17:22	080-02	BT, WMI	DEPTH - 21' TRANSECT 006
17:26	UCR_006_18-10-30 PD0		NAV 080-02-ADCP-1ACT
17:29	080-03	BT, WMI	DEPTH - 20' TRANSECT 007
17:33	UCR_007_18-10-30.PD0		NAV 080-03-ADCP-1ACT
17:36	080-04	BT, WMI	DEPTH - 17' TRANSECT 008
17:40	UCR_008_18-10-30.PD0		NAV 080-04-ADCP-1ACT
17:43	080-05	BT, WMI	DEPTH - 13' TRANSECT 009
17:47	UCR_009_18-10-30.PD0		NAV 080-05-ADCP-1ACT

Remarks: UCR SEDIMENT FACIES MAPPING

NSN: 7530-01-577-8866

MAGGIE MCKEON

Scale: 1 square = 1'

10-30-18-MAM

18:03	007-01	BT, WMI	DEPTH - 32' TRANSECT 010
18:08	UCR_010_ADCP_18-10-30.PDO		NAV 007-01 - ADCP - IACT
18:12	007-02	BT, WMI	DEPTH-42' TRANSECT 011
18:16	UCR_011_18-10-30.PDO		NAV 007-02 - ADCP - IACT
18:21	007-03	BT, WMI	DEPTH-37' TRANSECT 012
18:24	UCR_012_18-10-30.PDO		NAV 007-03 - ADCP - IACT
18:28	007-04	BT, WMI	DEPTH-38' TRANSECT 013
18:32	UCR_013_18-10-30.PDO		NAV 007-04-ADCP-IACT
18:36	007-05	BT, WMI	DEPTH-33' TRANSECT 014
18:40	UCR_014_18-10-30.PDO		NAV 007-05-ADCP-IACT
18:52	006-01	BT, WMI	DEPTH-27' TRANSECT 015
18:56	UCR_015_18-10-30.PDO		NAV 006-01 - ADCP - IACT
19:01	006-02	BT, WMI	DEPTH-30' TRANSECT 016
19:05	UCR_016_18-10-30.PDO		NAV 006-02-ADCP-IACT
19:08	006-03	BT, WMI	DEPTH-28' TRANSECT 017
19:11	UCR_017_18-10-30.PDO		NAV 006-03-ADCP-IACT
19:14	006-04	BT, WMI	DEPTH-29' TRANSECT 018
19:18	UCR_018_18-10-30.PDO		NAV 006-04-ADCP-IACT
19:22	006-05	BT, WMI	DEPTH-30' TRANSECT 019
19:26	UCR_019_18-10-30.PDO		NAV 006-05-ADCP-IACT
21:03	005-01	BT, WMI	DEPTH-29' TRANSECT 020
21:06	UCR_020-18-10-30.PDO		NAV 005-01-ADCP-IACT
21:17	005-02	BT, WMI	DEPTH-29' TRANSECT 021
21:22	UCR_021-18-10-30.PDO		NAV 005-01-ADCP-IACT

005-03
005-04
005-06
} SHALLOW FAST MOVING > 10 ft/s

Scale: 1 square = 72 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

10-30-18 M.A.M

21:33	004 - 01	BT, WMI	DEPTH - 12'	TRANSECT 022
21:37	ULR_022_18-10-30.PDO		NAV 004 - 01	- ADCP - IACT
21:42	004-02	BT, WMI	DEPTH - 12'	TRANSECT 023
21:45	ULR_023_18-10-30.PDO		NAV 004-02 - ADCP - IACT (MB ?)	
21:51	004-03	BT, WMI	DEPTH - 20'	TRANSECT 024
21:55	ULR_024_18-10-30.PDO		NAV 004-03 - ADCP - IACT	
22:00	004-04	BT, WMI	DEPTH - 20'	TRANSECT 025
22:04	ULR_025_18-10-30.PDO		NAV 004-04 - ADCP - IACT	
22:08	004-05	BT, WMI	DEPTH - 23'	TRANSECT 026
22:12	ULR_026_18-10-30.PDO		NAV 004-05 - ADCP - IACT	
22:27	003-01	BT, WMI	DEPTH - 12'	TRANSECT 027
22:31	ULR_027_18-10-30.PDO		NAV 003-01 - ADCP - IACT	
22:31	003-01-DVP	BT, WMI	DEPTH - 12'	TRANSECT 028
22:35	ULR_028_18-10-30.PDO		NAV 003-01 - ADCP - IACT	

10/30/18 M.A.M

Remarks ULR SEDIMENT FACIES MAPPING

10-31-18 M.A.M.

RAINY, CALM — ADCP = 49.97°F
USING 1200 KHZ — AML = 50.94°F

15:42	BOAT LAUNCH		
15:58	ADCP DIAGNOSTICS - PASS		
16:01	ADCP COMPASS CALIBRATION -0.9°		
16:02	ADCP COMPASS EVALUATION -0.2°		
#16:49	003-02	BT, NMI	DEPTH-17' TRANSECT 000
16:54	UCR_000-18-10-31.PD0		NAV 003-02 - ADCP-1ACT
16:58	003-003	BT, WMI	DEPTH-20' TRANSECT 001
17:02	UCR_001-18-10-31.PD0		NAV 003-03 - ADCP-1ACT
17:05	003-04	BT, WMI	DEPTH-21' TRANSECT 002
17:08	UCR_002-18-10-31.PD0		NAV 003-04 - ADCP-1ACT
17:12	003-05	BT, WMI	DEPTH-~~21'~~ 20' TRANSECT 003
17:15	UCR_003-18-10-31.PD0		NAV 003-05 - ADCP-1ACT
17:28	002-01	BT, WMI	DEPTH-11' TRANSECT 004
17:32	UCR_004-18-10-31.PD0		NAV 002-01 - ADCP-1ACT
	ALTERNATE LOCATION DUE TO SHALLOW + CLOSE TO SHORE		
17:35	002-02	BT, WMI	DEPTH-16' TRANSECT 005
17:39	UCR_005-18-10-31.PD0		NAV 002-02 - ADCP-1ACT
17:39	002-02-DUP	BT, WMI	DEPTH-16' TRANSECT 006
17:42	UCR_006-18-10-31.PD0		NAV 002-02 - ADCP-1ACT
17:45	002-03	BT, WMI	DEPTH-23' TRANSECT 007
17:49	UCR_007-18-10-31.PD0		NAV 002-03 - ADCP-1ACT
17:53	002-04	BT, WMI	DEPTH-30' TRANSECT 008
17:57	UCR_008-18-10-31.PD0		NAV 002-04 - ADCP-1ACT
17:57	002-04-DUP	BT, WMI	DEPTH-30' TRANSECT 009
18:00	UCR_009-18-10-31.PD0		NAV 002-04 - ADCP-1ACT

Scale: 1 square = 74 MAGGIE MCKEON UCR SEDIMENT FACIES MAPPING

10-31-18 M.A.M

18:04	002-05	BT, WM1	DEPTH-26'	TRANSECT 010
18:07	ULR_010_18-10-31.PDO		NAV 002-05 - ADCP - 1 ACT	
18:17	001-05	BT, WM1	DEPTH-44'	TRANSECT 011
18:21	ULR_011_18-10-31.PDO		NAV 001-05 - ADCP - 1 ACT	
18:26	001-04	BT, WM1	DEPTH-41'	TRANSECT 012
18:29	ULR_012_18-10-31.PDO		NAV 001-04 - ADCP - 1 ACT	
18:33	001-03	BT, WM1	DEPTH-23'	TRANSECT 013
18:38	ULR_013_18-10-31.PDO		NAV 001-03 - ADCP - 1 ACT	
18:45	001-02	BT, WM1	DEPTH-27'	TRANSECT 014
18:49	ULR_014_18-10-31.PDO		NAV 001-02 - ADCP - 1 ACT	
19:00	001-01	BT, WM1	DEPTH-19'	TRANSECT 015
19:06	ULR_015_18-10-31.PDO		NAV 001-01 - ADCP - 1 ACT	

TRANSECT 015 WAS IN MODE 1

10/31/18 M.A.M

#5

Rite in the Rain®

ALL-WEATHER

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№ 393N

WorkCare®
MAKING HEALTH COUNT

DCS Americas
Employee Hotline #

1-800-348-5046

AECOM

2

JOB NUMBER: AETR0000-0039 10-2-2018

RECEIVER S/N: 5005K65410

DATA COLLECTON S/N: RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM OF ANT MOUNT

JULIAN DAY 275

OBSERVER DAVE WILLIAMS

SESSION # 54102754

STA # 51

STA NAME EVANS

HI (M) 1.998

HI (FT) 6.555

LAT 48-41-48.52 WA NORTH 631420.914 (N)

LONG 118-00-58.20 2320657.086 (E)

START 9:06 AM 1303.55 (EL)

END 5:47 PM

RADIO: "GOLF" 4718132214 FREQ: 464.625

4 JOB # AETR00000039 10-3-18

RECEIVER S/N : 5005K65410

DATA COLLECTOR S/N: RS52C89516

ANTENNA TYPE : ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT. MOUNT

JULIAN DAY: 276

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54102760

STA # 51

STA NAME : "EVANS"

HI (M) 1.998

HI (SFT) 6.555

LAT : 48-41-48.52

LONG: 118-00-58.18

WA NORTH (N) 631421.06

" (E) 2320658.578

(EL) 1300.792

START TIME 7:52 AM

END TIME 5:42 PM

RADIO: "GOLF" 471813221 4 FREQ: 464.625

6

JOB # AETR 00000039 10/4/18

RECEIVER S/N: 5005K65410

DATA COLLECTOR S/N: RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM OF ANTENNA MOUNT

JULIAN DAY: 277

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54102770

STA # 51

STA NAME: EVANS

HI (M): 1.998

HI (SFT) 6.555

LAT: 48-41-48.53

LONG: 118-00-58.21

WA NORTH (N) 631421.745

" (E) 2320656.405

(EL) 1289.90

START TIME: 8:00 AM

END TIME: 5:02 PM

RADIO: "GOLF" 4718132214 FREQ: 464.625 MHz

8

JOB# AETR00000039 10/5/18

RECEIVER S/N: 5005K65410

DATA COLLECTOR S/N: RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM OF ANT MOUNT

JULIAN DAY: 278

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54102780

STA #: 51

STA NAME: EVANS

HI (M) 1.998

HI (SFT) 6.555

LAT: 48-41-48.53

LONG: 118-00-58.30

WA NORTH (N) 631421.37

" (E) 2320650.45

(EL) 1313.74

START TIME: 8:30 AM

STOP TIME: 5:33 PM

RADIO: "GOLF" 4718132214 FREQ: 464.625

10 JOB# AETR0000 0039 10/6/18

RECEIVER S/N: 5005K65410

DATA COLLECTOR S/N: RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM OF ANT MOUNT

JULIAN DAY: 279

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 54102790

STA # 51

STA NAME: "EVANS"

HI (M) 1.998

HI (SFT) 6.555

LAT: 48-41-48.56

LONG: 118-00-58.19

WA NORTH (N) 631424.71

" (E) 2320657.65

(EL) 1292.702

START TIME: 8:12 AM

STOP TIME: 5:20 PM

RADIO: "GOLF" 4718132214 FREQ: 464.625

12 JOB # AETR00000039 10/7/18

RECEIVER S/N : 5005K65410

DATA COLLECTOR S/N: RS52C89516

ANTENNA TYPE : ZEPHYR 3 BASE

ANTENNA MEASURE TO : BTM OF ANTENNA MOUNT

JULIAN DAY : 280

OBSERVER : RDWI (DAVE WILLIAMS)

SESSION # 54102800

STA # 51

STA NAME : EVANS

HI (M) 1.998

HT (SFT) 6.555

LAT : 48-41-48.52

LONG : 118-00-58.24

WA NORTH (N) 631420.82

" (E) 2320654.30

(EL) 1288.53

START TIME : 8:09 AM

STOP TIME : 5:31 PM

RADIO : "GOLF" 4718132214 FREQ: 464.625

14 JOB # AETR0000 0039 10/8/18

RECEIVER S/N: 5005K65410

DATA COLLECTOR S/N: RS52CB9516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM OF ANT MOUNT

JULIAN DAY:

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54102810 / 54102811

STA # 51

STA NAME: EVANS

HI (M) 1.998

HI (SFT) 6.555

LAT: 48-41-48.53

LONG: 118-00-58.22

WA NORTH (N) 631422.07

" (E) 2320655.691

(EL) 1306.83

START TIME: 8:05 AM

STOP TIME: 5:45 PM

RADIO: "GOLF" 4718132214 FREQ: 464.625

16 JOB # AETR00000039 10/9/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZYPHYR 3 BASE - BTM ANT MOUNT

JULIAN DAY: 282

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 54102820

STA # 51

STA NAME: "EVANS"

HI (M) 1.998

HI (SFT) 6.555

LAT : 48-41-48.55

LONG: 118-00-58.24

WA NORTH: (N) 631424.26

" (E) 2320654.27

(EL) 1294.762

START TIME : 8:03 AM

STOP TIME : 5:30 PM

RADIO "GOLF" 4718132214 FREQ: 464.625 MHz

18

JOB# AETR 0000 0039 10/10/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM OF ANTENNA MOUNT

JULIAN DAY: 283

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 54102830

STA # 51

STA NAME: EVANS

HI (M) 1.998

HI (SFT) 6.555

LAT: 48-41-48.53

LONG: 118-00-58.22

WA NORTH (N) 631422.11

" (E) 232056.23

(EL) 1287.776

START TIME: 8:12

STOP TIME: 5:55

RADIO: "GOLF" 4718132214 FREQ: 464.625

JOB # AETR00000039 10/11/18

RECEIVER S/N: 5005K65410

DATA COLLECTOR S/N: RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM OF ANT. MOUNT

JULIAN DAY: 284

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 54102840

STA # 51

STA NAME: EVANS

HI (M) 1.998

HI (SFT) 6.555

LAT: 48-41-48.45

LONG: 118-00-58.27

WA NORTH (N) 631413.58

" (E) 2320652.65

(EL) 1288.21

START TIME: 8:11

STOP TIME: 5:05 PM

RADIO "GOLF" 4716132214 FREQ: 464.625

JOB # AETR00000039 10/11/18

RECEIVER S/N: 5004K65351

DATA COLLECTOR S/N: RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM OF ANT MOUNT

JULIAN DAY: 284

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 53512840 / 53512841

STA # 55

STA NAME: ~~DOSSBURG~~

HI (M) 1.799

HI (SFT) 5.902

LAT: 48-45-05.50

LONG: 118-02-40.86

WA NORTH (N) 651119.59

" (E) 231051.51

(EL) 1448.84

START TIME: ~~9:15~~ / 10:32

STOP TIME: 5:40

RADIO "DELTA" 4546101247 FREQ: 464.725

Rite in the Rain

22 JOB # AETR0000 0039 10/12/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C895K6

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM OF ANT. MOUNT

JULIAN DAY: 285

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54102850

STA # 69

STA NAME: UCR-4

HI (M) 1.798

HI (SFT) 5.899

LAT: 48-56-28.74

LONG: 117-42-42.63

WA NORTH (N) 723391.983

" (E) 2390484.277

(EL) 1567.52

START TIME: 8:37

STOP TIME: 4:20 PM

RADIO: "GOLF" 4718132214 FREQ: 464.625 MHz

24 JOB # AETR00000039 10/13/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM OF ANT MOUNT

JULIAN DAY: 286

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54102860

STA # 69

STA NAME: UCR-4

HI (M) 1.799

HI (SFT) 5.902

LAT: 48-56-28.83

LONG: 117-42-42.63

WA NORTH (N) 723400.600

" (E) 2390483.92

(EL) 1556.61

START TIME: 8:26

STOP TIME: 3:35 PM

RADIO: "GOLF" 4718132214 FREQ: 464.625 MHz.

26 JOB # AETRO0000039 10/15/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE : ZEPHYR 3 BASE

ANTENNA MEASURE TO : BTM ANT. MOUNT

JULIAN DAY : 288

OBSERVER : RAWI (DAVE WILLIAMS)

SESSION # 54102880 / 54102881

STA # 69

STA NAME : UCR-4

HI (M) 1.798

HI (SFT) 5.899

LAT : 48-56-28.75

LONG : 117-42-42.61

WA NORTH (N) 723392.73

" (E) 2390485.77

(EL) 1555.72

START TIME : 8:18

STOP TIME : 4:12

RADIO : "GOLF" 4718132214 FREQ : 464.025

28 JOB # AETR00000039 10/16/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT. MOUNT

JULIAN DAY: 289

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54102890

STA # 59

STA NAME: UCR-3

HI(M) 1.799

HI (SFT) 5.902

LAT: 48-48-35.78

LONG: 117-57-02.24

WA NORTH (N) 673252.174

" (E) 2334930.804

(EL) 1299.56

START TIME: 7:40

STOP TIME: 5:00

RADIO: "GOLF" 4718132214 FREQ: 464.625

30 JOB # AETR00000039 10/17/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT. MOUNT

JULIAN DAY: 290

OBSERVER. RDW1 (DAVE WILLIAMS)

SESSION # 54102900

STA # 59

STA NAME: UCR-3

HI (M) 1.799

HI (SFT) 5.902

LAT: 48-48-35.81

LONG: 117-57-02.21

WA NORTH (N) 673255.619

" (E) 2334932.201

(EL) 1303.86

START TIME: 8:00

STOP TIME: 5:25

RADIO "GOLF" 4718132214 FREQ: 464.625

JOB # AETR00000039 10/18/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 291

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54102910

STA # 59

STA NAME: UCR-3

HI (M) 1.799

HI (SFT) 5.902

LAT: 48-48-35.73

LONG: 117-57-02.27

WA NORTH (N) 673247.17

" (E) 2334929.23

(EL) 1297.02

START TIME: 8:00

STOP TIME: 5:15

RADIO "GOLF" 4718132214 FREQ: 464.625

JOB # AETR00000039 10/18/18

RECEIVER S/N 5004K65351

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT. MOUNT

JULIAN DAY: 291

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 53512910

STA # 62

STA NAME: BLACKHAWK

HI (M) 1.999

HI (SFT) 6.558

LAT: 48-52-01.68

LONG: 117-52-04.89

WA NORTH (N) 694860.87

" (E) 2354016.51

(EL) 1489.12

START TIME: 9:34

STOP TIME: 4:45

RADIO "DELTA" 4546101247 FREQ: 464.725

Rite in the Rain

JOB# AETR00000039 10/19/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT. MOUNT

JULIAN DAY: 292

OBSERVER: ROWI (DAVE WILLIAMS)

SESSION# 54102920

STA# 59

STA NAME: UCR-3

HI (M) 1.799

HI (SFT) 5.902

LAT: 48-48-35.75

LONG: 117-57-02.28

WA NORTH (N) 673249.00

" (E) 2334927.83

(EL) 1302.20

START TIME: 7:52

STOP TIME: 4:00

RADIO: "GOLF" ~~"DELTA"~~ ~~4546101247~~ 4718132214 FREQ: 464.~~725~~ 625

JOB# AETR00000039 10/19/18

RECEIVER S/N 5004K65351

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 292

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION# 53512920

STA# 62

STA NAME: "BLACKHAWK"

HI (m) 1.999

HI (SFT) 6.558

LAT: 48-52-01.70

LONG: 117-52-04.87

WA NORTH (N) 694863.18

" (E) 2354018.20

(EL) 1496.45

START TIME: 8:34

STOP TIME: 3:30

RADIO "DELTA" 4546101247 FREQ: 464.725

Rite in the Rain

JOB # AETR00000039 10/20/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 293

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 54102930

STA # 59

STA NAME: UCR-3

HI (M) 1.799

HI (SFT) 5.902

LAT: 48-48-35.94

LONG: 117-57-02.18

WA NORTH (N) 6073269.35

" (E) 2334933.95

(EL) 1322.87

START TIME: 7:50

STOP TIME: 5:87

RADIO "GOLF" A7181322214 FREQ: 464.625

JOB # AETR00000039 10/20/18

RECEIVER S/N 5004K65351

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 293

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 53512930

STA # 62

STA NAME: "BLACKHAWK"

HI (M) 1.999

HI (SFT) 6.558

LAT: 48-52-01.76

LONG: 117-52-04.92

WA NORTH (N) 6074869.07

" (E) 2354014.33

(EL) 1493.35

START TIME: 8:28

STOP TIME: ~~5:07~~ 5:39

RADIO "DELTA" 45461012A7 FREQ: 464.725

Rite in the Rain

JOB # AETR00000039 10/21/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 294

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 54102940

STA # 59

STA NAME: UCR -3

HI (M) 1.799

HI (SFT) 5.902

LAT: 48-48-35.78

LONG: 117-57-02.24

WA NORTH (N) 673251.24

" (E) 2334930.35

(EL) 1301.81

START TIME: 8:17

STOP TIME: 5:15

RADIO "GOLF" 4718132214 FREQ: 464.625

JOB # AETR00000039 10/21/18

RECEIVER S/N 5004K65351

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 294

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 53512940

STA # 62

STA NAME: BLACKHAWK

HI (M) 1.999

HI (SFT) 6.558

LAT: 48-52-01.80

LONG: 117-52-04.88

WA NORTH (N) 694873.28

" (E) 2354016.62

(EL) 1478.73

START TIME: 8:51

STOP TIME: 4:46

RADIO "DELTA" 4546101247 FREQ 464.725

Rite in the Rain

JOB # AETR0000039 10/22/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 295

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54102950

STA # 59

STA NAME: UCR-3

HI (M) 1.799

HI (SFT) 5.902

LAT: 48-48-35.77

LONG: 117-57-02.22

WA NORTH (N) 673251.36

" (E) 2334932.15

(EL) 1288.82

START TIME: 7:51

STOP TIME: 5:00

RADIO: "GOLF" 4718132214 FREQ: 464.625

JOB # AETR0000039 10/22/18

RECEIVER S/N 5004K65351

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 295

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 53512950

STA # 62

STA NAME: BLACKHAWK

HI (M) 1.999

HI (SFT) 6.558

LAT: 48-52-01.73

LONG: 117-52-04.85

WA NORTH (N) 694865.47

" (E) 2354019.20

(EL) 1480.50

START TIME: 8:35

STOP TIME: 3:41

RADIO: "DELTA" 4546101247 FREQ: 464.725

Rite in the Rain

JOB# AETR00000039 10/23/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE : ZEPHYR 3 BASE

ANTENNA MEASURE TO : BTM ANT MOUNT

JULIAN DAY : 296

OBSERVER : RDWI (DAVE WILLIAMS)

SESSION # 54102960

STA # 59

STA NAME : UCR-3

HI (M) 1.799

HI (SFT) 5.902

LAT : 48-48-35.72

LONG : 117-57-02.19

WA NORTH (N) 673246.41

" (E) 2334934.27

(EL) 1313.19

START TIME : 8:03

STOP TIME : 4:57 PM

RADIO : "GOLF" 4718132214 FREQ : 464.625

JOB# AETR00000039 10/23/18

RECEIVER S/N 5004K65351

DATA COLLECTOR S/N RS52C89576

ANTENNA TYPE : ZEPHYR 3 BASE

ANTENNA MEASURE TO : BTM ANT MOUNT

JULIAN DAY : 296

OBSERVER : RDWI (DAVE WILLIAMS)

SESSION # 53512960

STA # 57

STA NAME : UCR-2

HI (M) 1.797

HI (SFT) 5.896

LAT : 48-48-03.99

LONG : 118-00-12.78

WA NORTH (N) 669557.78

" (E) 2322302.15

(EL) 1536.82

START TIME : 12:09 PM

STOP TIME : 4:33 PM

RADIO : "DELTA" 4546101247 FREQ : 464.725

Rite in the Rain

44 JOB# AETR00000039 10/24/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MOUNT TO: BTM ANT MOUNT

JULIAN DAY: 297

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 54102970

STA # 57

STA NAME: UCR-2

HI (M) 1.797

HI (SFT) 5.896

LAT: 48-48-03.98

LONG: 118-00-12.85

WA NORTH (N) 669558.17

" (E) 2322298.86

(EL) 1547.39

START TIME: 8:12

STOP TIME: 4:56

RADIO "GOLF" 4718132214 FREQ: 464.625

JOB # AETR00000039 10/25/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 298

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54102980

STA # 57

STA NAME: UCR-2

HI (M) 1.796

HI (SFT) 5.892

LAT: 48-48-04.07

LONG: 118-00-12.78

WA NORTH (N) 669568.14

" (E) 2322302.88

(EL) 1535.16

START TIME: 8:23

STOP TIME: 5:20

RADIO "GOLF" 4718132214 FREQ: 464.625

Rite in the Rain

46 JOB # AETRO0000039 10/25/18

RECEIVER S/N 5004K65351

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 298

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 53512980

STA # 64

STA NAME: USACE 1001-99

HI (M) 1.800

HI (SFT) 5.906

LAT: 48-54-44.67

LONG: 117-47-25.93

WA NORTH (N) 712095.14

" (E) 2372001.74

(EL) 1349.56

START TIME: 9:32

STOP TIME: 4:40

RADIO "DELTA" 4546101247 FREQ: 464.725

JOB # AETR00000039 10/26/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 299

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54102990

STA # 64

STA NAME USACE 1001-99

HI (M) 1.799

HI (SFT) 5.902

LAT: 48-54-44.67

LONG: 117-47-25.93

WA NORTH (N) 712095.08

" (E) 2372001.59

(EL) 1354.45

START TIME: 8:40

STOP TIME: 5:15

RADIO "GOLF" 4718132214 FREQ: 464.625 Mhz

Rite in the Rain

JOB # AETR00000039 10/29/18

RECEIVER # 5005K65410

DATA COLLECTOR # RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 302

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 54103020

STA # 64

STA NAME: USACE 1001-99

HI (M) 1.800

HT (SFT) 5.906

LAT: 48-54-44.77

LONG: 117-47-25.98

WA NORTH (N) 712105.558

" (E) 2371998.03

(EL) 1349.22

START TIME: 8:17

STOP TIME: 5:21

RADIO "GOLF" 4718132214 FREQ 464.625

JOB # AETR00000039 10/29/18

RECEIVER S/N 5004K65351

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 302

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 53512020

STA # 69

STA NAME: UCR-4

HI (M) 1.797

HI (SFT) 5.896

LAT: 48-56-28.80

LONG: 117-42-42.62

WA NORTH (N) 723398.40

" (E) 2390485.00

(EL) 1562.50

START TIME: 1:08 PM

STOP TIME 4:45 PM

RADIO "DELTA" 4546101247 FREQ 464.725

Rite in the Rain

JOB# AETR00000039 10/30/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JUHAN DAY: 303

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54103030

STA # 64

STA NAME: USACE 1001-99

HI (M) 1.799

HI (SFT) 5.902

LAT: 48-54-44.68

LONG: 117-47-25.93

WA NORTH (N) 712095.67

" (E) 2372001.57

(EL) 1354.93

START TIME: 8:15

STOP TIME 4:30

RADIO "GOLF" 4718132214 FREQ: 464,625

JOB# AETR00000039 10/30/18

RECEIVER S/N 5004K65351

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 303

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 53513030

STA # 69

STA NAME: UCR-4

HI (M) 1.797

HI (SFT) 5.896

LAT: 48-56-28.78

LONG: 117-42-42.61

WA NORTH (N) 723395.91

" (E) 2390485.34

(EL) 1564.25

START TIME: 8:48

STOP TIME: 1:00

RADIO: "DELTA" 4546101247 FREQ 464.725

Rain or Shine

52 JOB# AETR00000039 10/30/18

RECEIVER S/N 5004K65351

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 303

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION# 53513031

STA# 68

STA NAME: NEW YONDER

HI (M) 1.800

HI (SFT) 5.906

LAT: 48-59-30.19

LONG: 117-38-10.97

WA NORTH (N) 742511.08

" (E) 2407842.76

(EL) 1461.63

START TIME: 1:34 PM

STOP TIME: 3:55 PM

RADIO "DELTA" 4546101247 FREQ 464.725

JOB # AETR0000 0039 10/31/18

RECEIVER # 5005K65410

DATA COLLECTOR # RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 304

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54103040

STA # 64

STA NAME: USACE 1001-99

HI (M) 1.799

HI (SFT) 5.902

LAT: 48-54-44.67

LONG: 117-47-25.94

WA NORTH (N) 712094.98

" (E) 2372001.42

(EL) 1360.34

START TIME: 8:32

STOP TIME: 4:55

RADIO "GOLF" 4718132214 FREQ: 464.625

Rite in the Rain

54 JOB# AETR00000039 10/31/18

RECEIVER # 5004K65351

DATA COLLECTOR # RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 304

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 53513040

STA # 68

STA NAME: NEW YONDER

HI (M) 1.802

HI (SFT) 5.912

LAT: 48-59-30.22

LONG: 117-38-11.02

WA NORTH (N) 742514.79

" (E) 2407839.48

(EL) 1476.01

START TIME: 9:14

STOP TIME: 1:18

RADIO: "DELTA" 4546101247 FREQ: 464.725

JOB # AETR00000039 11/1/18 55

RECEIVER # 5005K65410

DATA COLLECTOR # RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 305

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54103050

STA # 69

STA NAME: UCR-4

HI (M) 1.797

HI (SFT) 5.896

LAT: 48-56-28.77

LONG: 117-42-42.64

WA NORTH (N) 723394.96

" (E) 2390483.82

(EL) 1568.56

START TIME: 8:17

STOP TIME: 5:00

RADIO "GOLF" 4718132214 FREQ: 464.625

Rite in the Rain

56 JOB # AETR00000039 11/1/18

RECEIVER. S/N 5004K65351

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE : ZEPHYR 3 BASE

ANTENNA MEASURE TO : BTM ANT. MOUNT

JULIAN DAY : 305

OBSERVER : RDW1 (DAVE WILLIAMS)

SESSION # 53513050

STA # 64

STA NAME : USACE 1001-99

HI (M) 1.801

HI (SFT) 5.909

LAT : 48-54-44.65

LONG : 117-47-25.98

WA NORTH (N) 712093.07

" (E) 2371998.83

(EL) 1356.30

START TIME : 11:42

STOP TIME : 2:36

RADIO : "DELTA" 4546101247 FREQ : 464.725

JOB # AETR00000039 11/2/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 306

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54103060

STA # 64

STA NAME: USACE 1001-99

HI (m) 1.799

HI (SFT) 5.902

LAT: 48-54-44.68

LONG: 117-47-25.94

WA NORTH (N) 712095.56

" (E) 2372000.46

(EL) 1351.82

START TIME: 8:15

STOP TIME: 5:15

RADIO: "GOLF" 471813221 4 FREQ: 464.625

Rite in the Rain

58 JOB # AETR00000039 11/3/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT. MOUNT

JULIAN DAY: 307

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 54103070

STA # 64

STA NAME: USACE 1001-99

HI (M) 1.800

HI (SFT) 5.906

LAT: 48-54-44.60

LONG: 117-47-25.89

WA NORTH (N) 712088.04

" (E) 2372004.67

(EL) 1361.92

START TIME: 8:12

STOP TIME: 5:00

RADIO: "GOLF" 4718132214 FREQ: 464.625

JOB # AETR 00000039 11/4/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT. MOUNT

JULIAN DAY: 308

OBSERVER: RDW1 (DAVE WILLIAMS)

SESSION # 54103080

STA # 64

STA NAME: USACE 1001-99

HI (M) 1.799

HI (SFT) 5.902

LAT: 48-54-44.67

LONG: 117-47-25.94

WA NORTH (N) 712095.59

" (E) 2372000.60

(EL) 1360.64

START TIME: 8:06

STOP TIME: 4:25

RADIO: "GOLF" 4718132214 FREQ: 464.625

Rite in the Rain

60 JOB # AETR00000039 11/5/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 309

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 54103090

STA # 64

STA NAME: USACE 1001-99

HI (M) 1.799

HI (SFT) 5.902

LAT: 48-54-44.77

LONG: 117-47-25.92

WA NORTH (N) 712105.69

" (E) 2372002.28

(EL) 1346.92

START TIME: 7:58

STOP TIME: 4:00

RADIO: "GOLF" 4718132214 FREQ: 464.625

JOB # AETR00000039 11/6/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 310

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 54103100

STA # 57

STA NAME: UCR-2

HI (M) 1.796

HI (SFT) 5.892

LAT: 48-48-03.96

LONG: 118-00-12.77

WA NORTH (N) 669556.15

" (E) 2322304.21

(EL) 1542.80

START TIME: 8:01

STOP TIME: 3:57

RADIO: "GOLF" 4718132214 FREQ: 464.625

Rite in the Rain

JOB # AETR 00000039 11/7/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 311

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 54103110

STA # 57

STA NAME: UCR-2

HI (M) 1.796

HI (SFT) 5.892

LAT: 48-48-03.93

LONG: 118-00-12.79

WA NORTH (N) 669553.31

" (E) 2322302.51

(EL) 1539.12

TIME START: 7:53

TIME STOP: 4:30

RADIO: "GOLF" 4718132214 FREQ: 464.625

JOB# AETR000©0039 11/8/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N R952C89516

ANTENNA TYPE : ZEPHYR 3 BASE

ANTENNA MEASURE TO : BTM ANT MOUNT

JULIAN DAY : 312

OBSERVER : RDW1 (DAVE WILLIAMS)

SESSION # 5410312.0

STA # 57

STA NAME : UCR-2

HI (M) 1.796

HI (SFT) 5.892

LAT : 48-48-03.96

LONG : 118-00-12.78

WA NORTH (N) 669556.39

" (E) 2322303.29

(EL) 1546.99

START TIME : 7:40

STOP TIME : 4:30

RADIO : "GOLF" .4718132214 FREQ : 464.625

JOB # AETR00000039 11/10/18

RECEIVER S/N 5005K65410

DATA COLLECTOR S/N RS52C89516

ANTENNA TYPE: ZEPHYR 3 BASE

ANTENNA MEASURE TO: BTM ANT MOUNT

JULIAN DAY: 314

OBSERVER: RDWI (DAVE WILLIAMS)

SESSION # 54103140

STA # 57

STA NAME: UCR-2

HI (M) 1.796

HI (SFT) 5.892

LAT: 48-48-03.94

LONG: 118-00-12.82

WA NORTH (N) 6669553.66

" (E) 2322300.34

(EL) 1544.32

START TIME: 9:18

STOP TIME: 4:20

RADIO: "GOLF" H7181322214 FREQ: 464.625

Rite in the Rain

Sediment Facies Mapping

#6

Rite in the Rain

ALL-WEATHER

UNIVERSAL

№ 973T-MX

RV Tieton ~~[illegible]~~ - 2

PDT	UTC	UCR Sediment Facies Study 10/18/18 Page 1
1202	1902	Start ADCP at 51-04 E: 2339239.40 N: 676657.09 WD: 34
1207	1907	Stop ADCP, start video, still photo
1208	1908	Frame on bottom E: 2339235.84 N: 676658.66 WD: 34
1209	1909	Image: sand, gravel, cobble
1210	1910	Frame on deck
1212	1912	Start ADCP at 51-05 E: 2339321.30 N: 676527.91 WD: 43
1216	1916	Start video, take still photo on deck, stop ADCP
1217	1917	Frame on bottom E: 2339317.69 N: 676525.81 WD: 43
1218	1918	Image: sand, cobble
1219	1919	Frame on deck, stop video
1220	1920	Start ADCP at 51-06 E: 2339425.09 N: 676363.69 WD: 51
1226	1926	Stop ADCP, start video, still photo on deck
1228	1928	Frame on bottom E: 2339420.77 N: 676361.68 WD: 51
1229	1929	Image: black sand, gravel, cobble
1230	1930	Frame on deck, stop video
1235	1935	At boat launch for lunch break
1318	2018	Head back out after lunch break J.H. 10/18
1328	2028	Start ADCP at 51-07 E: 2339484.81 N: 676625.89 WD: 55
1332	2032	Stop ADCP, Start video, still photo on deck
1336	2036	Frame on bottom E: 2339479.43 N: 676263.30 WD: 55
1337	2037	Image: cobble
1338	2038	Frame on deck, stop video
		Skipping 51-08 and 51-09 for now because they are in deep water. Heading to 51-10
1342	2042	Start ADCP at 51-10 E: 2339759.86 N: 675828.42 WD: 33
1345	2045	Stop ADCP, start video, still photo on deck
1346	2046	Frame on bottom E: 2339757.80 E: 675828.30 WD: 33
1348	2048	Image: sand and cobble
1349	2049	Frame on deck, stop video
1354	2054	Start ADCP at 50-10 E: 2340653.56 N: 676387.90 WD: 34
1357	2057	Stop ADCP, start video, still photo on deck
1358	2058	Frame on bottom: E: 2340651.69 N: 676386.23 WD: 34
1359	2059	Image: Sand and cobble
1400	2100	Frame on deck, stop video
		Skipping 50-09 and 50-08 for now because they are in deep water
1404	2104	Start ADCP at 50-07 E: 2340345.27 N: 676880.93 WD: ~~34~~ 54 J.H. 10/18
1409	2109	Stop ADCP, start video, still video on deck
1410	2110	Frame on bottom E: 2340342.63 N: 676878.96 WD: 54
1411	2111	Image: cobble and gravel
1412	2112	Frame on deck, stop video

Linda M. Howard 10/18/18

Scale: 1 square = _____
NSN: 7530-01-577-8866 Rite in the Rain

 10/18/18 UCR Sediment Facies Study

PDT	UTC	
1414	2114	Start ADCP at 50-06 E: 2340261.47 N: 677015 WD: 48
1418	2118	Stop ADCP, start video still photo on deck
1420	2120	Frame on bottom E: 2340262.49 N: 677013.27 WD: 49
1421	2121	Image: cobble, gravel, sand
1422	2122	Frame on deck, stop video
1424	2124	Weather: 65°F Sunny, slight breeze
1424	2124	Start ADCP at 50-05 E: 2340157.40 N: 677181.76 WD: 37
~~1428~~ 1428	~~2128~~ 2128	Stop ADCP, start video, still photo on deck
~~1432~~ 1432	~~2132~~ 2132	
1433	2133	Frame on bottom E: 2340153.37 N: 677177.82 WD: 37
1434	2134	Image: sand, cobble
1439	2139	~~Frame on deck~~ Image dupe: sand cobble 10/18/18
1428	2128	ADCP Dupe
1443	2143	Start ADCP at 50-04 E: 2340092.91 N: 677285.54 WD: 34
1447	2147	Stop ADCP, start video, still photo on deck
1448	2148	Frame on bottom E: 2340090.71 N: 677288.29 WD: 34
1449	2149	Image: Cobble, gravel, sand
1451	2151	Frame on deck, stop video
1453	2153	Start ADCP at 50-03 E: 2340004.78 N: 677429.29 WD: 30
1456	2156	Stop ADCP, start video, still photo on deck
1457	2157	Frame on bottom E: 2340008.55 N: 677431.54 WD: 30
1458	2158	Image: Cobble, gravel, sand
1459	2159	Frame on deck, stop video
1500	2200	Start ADCP at 50-02 E: 2339914.94 N: 677569.98 WD: 23
1504	2204	Stop ADCP, start video, still photo on deck
1505	2205	Frame on bottom E: 2339913.23 N: 677567.40 WD: 23
1506	2206	Image: Sand + cobble
1508	2208	Frame on deck, stop video
1510	2210	Start at ADCP 50-01 E: 2339828.08 N: 677712.59 WD: 11
1515	2215	Stop ADCP, start video, still photo on deck
1517	2217	Frame on bottom E: 2339834.18 N: 677717.31 WD: 11
1518	2218	Image: vegetation, Sand
1519	2219	Frame on deck, stop video
1523	2223	Start ADCP at 49-01 E: 2340080.45 N: 678184.38 WD: 10
1529	2229	Stop ADCP, Start video, still photo
1530	2230	Frame on bottom E: 2340082.17 N: 678184.73 WD: 10
1531	2231	Image: Sand, vegetation, cobble
1532	2232	Frame on deck, stop video

Linda M. Howard
10/18/18

Scale: 1 square = _____

PDT	UTC	
1534	2234	Start ADCP at 49-02 E: 2340223.47 N: 6778085.38 WD: 21
1540	2240	Stop ADCP, start video, still photo on deck
1542	2242	Frame on bottom E: 2340224.92 N: 678091.52 WD: 21
1543	2243	Image: sand, gravel/cobble, vegetation
1544	2244	Frame on deck, stop video
1545	2245	Start ADCP at 49-03 E: 2340366.81 N: 677984.35 WD: 32
1549	2249	Stop ADCP, start video, still photo on deck
1550	2250	Frame at bottom E: 2340363.72 N: 677980.80 WD: 32
1551	2251	Image: Black sand, cobble
1553	2253	Frame on deck, stop video
1554	2254	Start ADCP at 49-04 E: 2340531.78 N: 677870.99 WD: 36
1558	2258	Stop ADCP, start video, still photo on deck
1559	2259	Frame on bottom E: 2340530.33 N: 677864.54 WD: 36
1600	2300	Image: cobble and sand
1601	2301	Frame on deck, stop video
1602	2302	Start ADCP at 49-05 E: 2340652.86 N: 677787.03 WD: 39
1606	2306	Stop ADCP, start video, still photo on deck
1608	2308	Frame on bottom E: 2340650.60 N: 677781.46 WD: 39
1609	2309	Image: Sand, gravel, cobble
1610	2310	Frame on deck, stop video
1611	2311	Change camera battery
1611	2311	Start ADCP at 49-06 E: 2340754.05 N: 677717.21 WD: 44
1615	2315	Stop ADCP, start video, still photo on deck
1616	2316	Frame on bottom E: 2340752.77 N: 677714.55 WD: 44
1617	2317	Image: Sand, gravel, cobble
1618	2318	Frame on deck, stop video
1619	2319	Start ADCP at 49-07 E: 2340941.56 N: 677587.14 WD: 52
1623	2323	Stop ADCP, start video, still photo on deck
1624	2324	Frame on bottom E: 2340943.40 N: 677587.22 WD: 52
1625	2325	Image: Black sand, cobble
1626	2326	Frame on deck, stop video
1628	2328	Start ADCP at 49-08 E: 2341081.67 N: 677488.35 WD: 56
1632	2332	Stop ADCP, start video, still photo on deck
1633	2333	Frame on bottom E: 2341079.25 N: 677487.80 WD: 56
1634	2334	Image: Sand, cobble
1635	2335	Frame on deck, stop video

Linda M. Howard
10/18/18

PAGE 4 10-19-18 UCR SEDIMENT FACIES STUDY

PDT	UTC	
7:30	1430	ARRIVE CHINA BEND BOAT LAUNCH. @ 35°, LIGHT FOG, NO WIND
7:45	1445	CONDUCT SAFETY MEETING: TRAVEL TO LAUNCH, LAUNCHING BOATS, WATER SAFETY
		ATTENDEES
		RV Tieton / RV Discovery
		MARK HALE AECOM / LINDA HOWARD AECOM
		RENE TRUDEAU GRAVITY / MIKE DUFFIELD GRAVITY
		MAGGIE MCKEON GRAVITY / JASON DUNFORD DEA
		RYAN MCELHENEY GRAVITY
		JOHN SCHAEFER GRAVITY / GPS BASE STATION
		LISA RATERINK JACOBS/EPA / DAVE WILLIAMS DEA
		COLUMBIA NAVIGATION / DAN SMITH
		ERIC LEATHERMAN / JOSEPH CRAVES
		JOSH LEATHERMAN
8:20	15 20	LAUNCH BOAT
8:25	15 25	BEGIN POSITION CHECK "GPS" CP-10
8:35	15 35	COMPLETED POSITION CHECK, DEPART TO BOAT LAUNCH
8:55	15:55	CALIBRATED ADCP
8:58	1558	BEGIN COMPASS CALIBRATION 1200 KHZ ADCP 0.4°
8:59	1559	COMPLETED COMPASS CALIBRATION 0.2°
9:04	1604	START ADCP E: 2341439.22 N: 677241.95 WD: 35 #48-10
9:08	1608	STOP ADCP START VIDEO STILL PHOTOS ON DECK
9:10	1610	FRAME ON BOTTOM E: 2341435.05 N: 677240.65 WD: 35
9:11	1611	IMAGE: SILT + GRAVEL
9:12	1612	FRAME ON DECK. VIDEO STOPPED
9:18	1618	START ADCP #49-10 E: 2341747.21 N: 678168.85 WD 13
9:24	1624	STOP ADCP START VIDEO, STILL PHOTO ON DECK
9:25	1625	FRAME ON BOTTOM E: 2341753.96 N: 678168.37 WD 13
9:26	16:26	IMAGE: SAND + WEEDS
9:28	1628	FRAME ON DECK VIDEO STOPPED
9:30	16:30	START ADCP 48-09 E: 2341693.51 N: 678217.20 WD 36
9:33	1633	STOP ADCP START VIDEO STILL PHOTO ON DECK
9:34	16:34	FRAME ON BOTTOM E: 2341692.58 N: 678223.58 WD 36
9:35	16:35	IMAGE: SAND, SILT + COBBLE
9:37	16:37	FRAME ON DECK, VIDEO STOPPED

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Scale: 1 square = _____

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PDT	UTC	
939	1639	START ADCP 48-08 E: 2341631.10 N: 678256.69 WD 52
942	1642	STOP ADCP START PHOTO STILL PHOTOS ON DECK
944	1644	FRAME ON BOTTOM E: 2341626.89 N: 678260.81 WD 52
945	1645	IMAGE: COBBLES & SILT, SAND
947	1647	FRAME ON DECK VIDEO STOPPED
949	1649	START ADCP 48-06 E: 2341362.15 N: 678460.98 WD 54
952	1652	STOP ADCP START PHOTO STILL PHOTOS ON DECK
955	1655	FRAME ON BOTTOM E: 2341358.63 N 678457.71 WD 54
956	1656	IMAGE: COBBLES, SILT, SAND
957	1657	FRAME ON DECK VIDEO STOPPED
1006	1706	START ADCP 48-05 E: 2341145.01 N: 678622.76 WD 56
1010	1710	STOP ADCP START PHOTO STILL ON DECK
1011	1711	FRAME ON BOTTOM E: 2341142.62 N: 678617.57 WD 56
1012	1712	IMAGE: COBBLES, SAND
1013	1713	FRAME ON DECK VIDEO STOPPED
1015	1715	START ADCP 48-04 E: 2340886.38 N: 678817.35 WD 54
1019	1719	STOP ADCP START PHOTO STILL PHOTOS ON DECK
1020	1720	FRAME ON BOTTOM E: 2340886.73 N: 678811.20 WD 54
1021	1721	IMAGE: COBBLES, SAND, SILT
1023	1723	FRAME ON DECK VIDEO STOPPED
1024	1724	START ADCP 48-03 E: 2340715.24 N: 678949.28 WD 37
1028	1728	STOP ADCP START PHOTO
1029	1729	FRAME ON BOTTOM E: 2340715.32 N: 678949.70 WD 37
1030	1730	IMAGE COBBLES, SILT, SAND
1031	1731	FRAME ON DECK VIDEO STOPPED
1033	1733	START ADCP 48-02 E: 2340583.17 N: 679047.86 WD 27
1037	1737	STOP ADCP START PHOTO
1038	1738	FRAME ON BOTTOM E: 2340582.93 N: 679047.46 WD 27
1039	1739	IMAGE COBBLES, GRAVEL, STICK
1040	1740	FRAME ON DECK VIDEO STOPPED
1042	1742	START ADCP 48-01 E: 2340408.27 N: 679181.47 WD 15
1048	1748	STOP ADCP START PHOTO
1049	1749	FRAME ON BOTTOM E 2340411.09 N 679181.13 WD 15
1050	1750	IMAGE COBBLES, PLANTS, SAND
1051	1751	FRAME ON DECK VIDEO STOPPED
1106	1806	START ADCP 47-05 E: 2340944.04 N: 680847.14 WD 56
1110	1810	STOP ADCP START PHOTO
1111	1811	FRAME ON BOTTOM E: 2340942.88 N: 680848.92 WD 56
1112	1812	IMAGE COBBLES, SAND
1114	1814	FRAME ON DECK VIDEO STOPPED

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Scale: 1 square = _____

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PDT	UTC	
11 17	18 17	START ADCP 47-03 E: 2340621.97 N 680869.55 WD 28
11 23	18 23	STOP ADCP START VIDEO STILL PHOTO ON DECK
11 25	18 25	FRAME ON BOTTOM E 2340619.64 N 680873.51 WD28
11 26	18 26	IMAGE COBBLES, SAND
11 27	18 27	FRAME ON DECK VIDEO STOPPED
11 30	18 30	START ADCP 47-02 E 2340293.69 N: 680890.90 WD 13
11 36	18 36	STOP ADCP START VIDEO STILL PHOTO ON DECK
11 37	18 37	FRAME ON BOTTOM E 2340296.15 N 680893.49 WD 13
11 38	18 38	IMAGE PLANTS, POCKET OF SAND
11 39	18 39	FRAME ON DECK VIDEO STOPPED
11:56	18:56	START ADCP 47-01 E: 2339929.22 N: 680914.16 WD: 18
12:02	1902	STOP ADCP START VIDEO STILL PHOTO ON DECK
12:03	1903	FRAME ON BOTTOM E: 2339972.47 N: 680908.61 WD: 18
12:04	1904	IMAGE FEW COBBLES, SAND, FEW PLANTS
12:05	1905	FRAME ON DECK VIDEO STOPPED
12:12	1912	START ADCP 46-01 E: 2340420.48 N 683143.46 WD 38
12:16	1916	STOP ADCP START VIDEO STILL PHOTO ON DEK
12:17	19:17	FRAME ON BOTTOM E: 2340423.13 N: 683140.57 WD 38
12:18	1918	IMAGE: SILT & SAND
12:19	1919	FRAME ON DECK VIDEO STOPPED
*B 28	20:23	START ADCP 45-02 E: 2341021.63 N: 686000.84 WD: 51
B 28	20 28	STOP ADCP START VIDEO STILL PHOTO ON DECK
B 30	20 30	FRAME ON BOTTOM E: 2341021.29 N: 685995.61 WD: 51
B 31	20 31	IMAGE: BIG COBBLES, SILT
13 32	20 32	FRAME ON DECK VIDEO STOPPED
13 38	20 38	START ADCP 45-01 E: 2340849.88 N: 686070.49 WD 33
13 42	20 42	STOP ADCP START VIDEO STILL PHOTO ON DECK
13 43	20 43	FRAME ON BOTTOM E: 2340850.58 N: 686076.73 WD 33
13 44	20 44	IMAGE BOULDER, COBBLES, SAND
13 45	20 45	FRAME ON DECK VIDEO STOPPED
13:52	20:52	START ADCP 44-05 E: 2343033.19 N: 687300.44 WD 56
13:56	20:56	STOP ADCP START VIDEO STILL PHOTO ON DECK
13 57	20:57	FRAME ON BOTTOM E: 2343031.79 N: 687301.46 WD: 56
13 59	20:59	IMAGE BOULDERS, COBBLES
14:00	21:00	FRAME ON DECK VIDEO STOPPED
14:10	21:10	START ADCP 44-04 E: 2342963.28 N: 687544.51 WD: 59
14:11	21 11	STOP ADCP START VIDEO STILL PHOTO ON DECK
14 13	21 13	FRAME ON BOTTOM E. 2342958.13 N: 687546.35 WD: 59
14 14	21 14	IMAGE: BIG COBBLES
14 15	21 15	FRAME ON DECK VIDEO STOPPED

Scale: 1 square = _____ *LUNCH BREAK 12:40 ⇒ 13:10 +/- 10-19-18

UCR SEDIMENT FACIES STUDY

PDT	UTC	
1418	2118	START ADCP 44-03 E: 2342894.27 N: 687786.27 WD: 50
1422	2122	STOP ADCP START VIDEO STILL PHOTO ON DECK
1423	2123	FRAME ON BOTTOM E: 2342889.99 N: 687784.93 WD: 50
1424	2124	IMAGE: GRAVEL
14	2125	FRAME ON DECK VIDEO STOPPED
1428	2128	START ADCP 44-02 E: 2342824.86 N: 688027.41 WD: 40
1432	2132	STOP ADCP START VIDEO STILL PHOTO ON DECK
1433	2133	FRAME ON BOTTOM E: 2342826.48 N: 688027.48 WD: 40
1434	2134	IMAGE SILT COVERED COBBLES
1435	2135	FRAME ON DECK VIDEO STOPPED
1436	2136	START ADCP 44-01 E: 2342755.68 N: 688268.99 WD: 35
1445	2145	STOP ADCP START VIDEO STILL PHOTO ON DECK
1447	2147	FRAME ON BOTTOM E: 2342755.39 N: 688266.44 WD: 35
1448 *	2148 *	IMAGE SAND
1454 *	2154 *	FRAME ON DECK VIDEO STOPPED * * *
1502	2202	START ADCP 43-01 E: 2344078.81 N: 689404.00 WD: 23
1505	2205	STOP ADCP START VIDEO STILL PHOTO ON DECK
1506	2206	FRAME ON BOTTOM E: 2344081.28 N: 689403.25 WD: 23
1507	2207	IMAGE BIG COBBLES, VEGETATION, SILT
1509	2209	FRAME ON DECK VIDEO STOPPED
1511	2211	START ADCP 43-02 E: 2344287.38 N: 689294.17 WD: 41
1515	2215	STOP ADCP START VIDEO STILL PHOTO ON DECK
1516	2216	FRAME ON BOTTOM E: 2344283.33 N: 689291.00 WD: 41
1517	2217	IMAGE: BEDROCK OR BIG BOULDER, COBBLES
1518	2218	FRAME ON DECK VIDEO STOPPED
1524	2224	START ADCP 43-05 E: 2344909.15 N: 688965.19 WD 47
1526	2226	STOP ADCP START VIDEO STILL PHOTO ON DECK
1527	2227	FRAME ON BOTTOM E: 2344908.29 N: 688970.77 WD: 47
1528	2228	IMAGE: SAND w/ SLIGHT GRAVEL
1530	2230	FRAME ON DECK VIDEO STOPPED
15:31	22:31	SHUT DOWN - PULL UP AND HEAD TO LAUNCH
15:40	22:40	ARRIVE LAUNCH - PULL OUT BOATS
16:15	23:15	HEAD OUT - ALL OFF WATER

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* * * DUPLICATE 44-01 21:48 ⇒ 21:53 IMAGE SAND

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PDT	UTC	
7:30	1430	ARRIVE CANA SEND BOAT LAUNCH, FOGGY MID-30s, HUNTERS
7:40	1440	CONDUCT SAFETY MEETING, LOAD BOATS, LAUNCH BOATS

ATTENDEES

RV TIETON
MARK HALE AECOM
RENE TRUJILLO GRAVITY
MAGGIE MCKEON GRAVITY
RYAN MCELHERE GRAVITY
JOHN SCHAEFER GRAVITY
LISA PATRNIK JACOBS/EPA

RV DISCOVERY
LINDA HOWARD AECOM
MAG DUFFIELD GRAVITY
JASON HOFFMAN DEA

GPS BASE STATION
DAVE WILLIAMS DEA

COLUMBIA NAVIGATION
ERIC WEATHERMAN
JOSH WEATHERMAN
DAN SMITH
RICK WILSON

8:10	1510	LAUNCH TIETON
8:45	1545	LAND AT CPS ~~POSITION CHECK~~ SET UP CPS UNIT
9:00	1600	DO POSITION CHECK - TAKE DOWN CPS UNIT

~~START ADCP E: N: WD:~~
~~STOP ADCP START VIDEO STILL PHOTO ON DECK~~
~~FRAME ON BOTTOM E: N: WD:~~
~~IMAGE~~
~~FRAME ON DECK VIDEO STOPPED~~

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9:15	1615	DIAGNOSTIC CHECK
9:16	1616	DIAGNOSTIC CHECK PASSES
9:18	1618	CALIBRATION of ADCP
9:20	1620	BEGIN COMPASS CALIBRATION 1200 KHZ ADCP 0.3°
9:25	1625	COMPLETED COMPASS CALIBRATION 0.1°
9:35	1635	START ADCP 42-01 E:2346532.36 N:690955.46 WD:25
9:39	1639	STOP ADCP START VIDEO STILL PHOTO ON DECK
9:41	1641	FRAME ON BOTTOM E-2346526.69 N: 690952.97 WD: 25
9:42	1642	IMAGE: COBBLES, GRAVEL, SAND
9:43	1643	FRAME ON DECK VIDEO STOPPED
9:45	1645	START ADCP 42-02 E:2346602.76 N:690809.46 WD:57
9:49	1649	STOP ADCP START VIDEO STILL PHOTO ON DECK
9:51	1651	FRAME ON BOTTOM E:2346598.06 N:690804.40 WD:57
9:52	1652	IMAGE: COBBLES, GRAVEL, SAND
9:53	1653	FRAME ON DECK VIDEO STOPPED

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Scale: 1 square = _____

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PDT	UTC	
10:03	1703	START ADCP 41-05 E: 2349204.25 N: 691319.64 WD: 41
10:06	1706	STOP ADCP START VIDEO STILL PHOTO ON DECK
10:07	1707	FRAME ON BOTTOM E: 2349208.39 N: 691323.68 WD: 41
10:08	1708	IMAGE: BIG COBBLES, POCKETS of SAND
10:09	1709	FRAME ON DECK VIDEO STOPPED
10:14	1714	START ADCP 41-03 E: 2348923.60 N: 691775.10 WD: 43
10:18	1718	STOP ADCP START VIDEO STILL PHOTO ON DECK
10:19	1719	FRAME ON BOTTOM E: 2348924.70 N: 691775.38 WD: 43
10:20	1720	IMAGE: COBBLES, GRAVEL
10:21	1721	FRAME ON DECK VIDEO STOPPED
10:26	1726	START ADCP 41-02 E: 2348785.22 N: 692001.26 WD: 36
10:29	1729	STOP ADCP START VIDEO STILL PHOTO ON DECK
10:31	1731	FRAME ON BOTTOM E: 2348781.62 N: 691998.90 WD: 36
10:32	1732	IMAGE: COBBLES, GRAVEL
10:33	1733	FRAME ON DECK VIDEO STOPPED
10:36	1736	START ADCP 41-01 E: 2348645.33 N: 692229.46 WD: 29
10:40	1740	STOP ADCP START VIDEO STILL PHOTO ON DECK
10:41	1741	FRAME ON BOTTOM E: 2348647.65 N: 692233.03 WD: 29
10:42	1742	IMAGE: ~~BEDROCK?~~ GRAVEL, SILT, COBBLES UNDR SILT
10:43	1743	FRAME ON DECK VIDEO STOPPED
10:51	1751	START ADCP 40-01 E: 2350158.15 N: 693847.71 WD: 40
10:55	1755	STOP ADCP START VIDEO STILL PHOTO ON DECK
10:56	1756	FRAME ON BOTTOM E: 2350199.46 N: 693941.13 WD 40
10:57	1757	IMAGE: BEDROCK + BIG COBBLES, SAND
10:59	1759	FRAME ON DECK VIDEO STOPPED
11:02	1802	START ADCP 40-02 E: 2350420.41 N: 693669.49 WD: 47
11:06	1806	STOP ADCP START VIDEO STILL ON DECK
11:08	1808	FRAME ON BOTTOM E: 2350422.68 N: 693672.40 WD: 47
11:09	1809	IMAGE COBBLES, GRAVEL SAND
11:11	1811	FRAME ON DECK VIDEO STOPPED
11:16	1816	START ADCP 40-05 E: 2351090.03 N: 693140.06 WD 52
11:20	1820	STOP ADCP START VIDEO STILL PHOTO ON DECK
11:22	1822	FRAME ON BOTTOM E: 2351090.95 N: 693134.40 WD: 52
11:23	1823	IMAGE SAND
11:24	1824	FRAME ON DECK VIDEO STOPPED:
11:32	1832	START ADCP 39-01 E: 2351439.86 N: 695964.30 WD: 42
11:39	1839	STOP ADCP START VIDEO STILL PHOTO ON DECK
11:40	1840	FRAME ON BOTTOM E: 2351438.46 N: 695966.01 WD: 42
11:41	1841	IMAGE BEDROCK, THIN SILT
11:42	1842	FRAME ON DECK VIDEO STOPPED 10-20-18

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PDT	UTC	
11:41	18:44	START ADCP 39-02 E: 2351563.59 N: 695910.89 WD: 47
11:48	18:48	STOP ADCP START VIDEO STILL PHOTO ON DECK
11:49	18:49	FRAME ON BOTTOM E: 2351569.23 N: 695914.14 WD: 47
11:50	18:50	IMAGE: BEDROCK
11:51	18:51	FRAME ON DECK VIDEO STOPPED
11:53	18:53	START ADCP 39-03 E: 2351686.88 N: 695855.27 WD: 57
11:58	18:58	STOP ADCP START VIDEO STILL PHOTO ON DECK
11:59	18:59	FRAME ON BOTTOM E: 2351690.22 N: 695852.92 WD: 57
11:59	18:59	IMAGE BEDROCK - TOUCHDOWN - NO TIMER - CURRENT
12:00	19:00	FRAME ON DECK VIDEO STOPPED
12:05	19:05	START ADCP 39-05 E: 2351936.30 N: 695742.61 WD: 59
12:09	19:09	STOP ADCP START VIDEO STILL PHOTO ON DECK
12:10	19:10	FRAME ON BOTTOM E: 2351940.20 N: 695745.57 WD: 59
12:10	19:10	IMAGE GRAVEL - TOUCHDOWN - NO TIMER - CURRENT
12:12	19:12	FRAME ON DECK VIDEO STOPPED
12:23	19:23	START ADCP 38-05 E: 2354069.80 N: 696642.48 WD: 31
12:26	19:26	STOP ADCP START VIDEO STILL PHOTO ON DECK
12:28	19:28	FRAME ON BOTTOM E: 2354070.02 N: 696640.12 WD:
12:28	19:28	IMAGE - BEDROCK - COBBLES - TOUCHDOWN - NO TIMER - CURRENT
12:29	19:29	FRAME ON DECK VIDEO STOPPED
12:30	19:30	START ADCP 38-04 E: 2354042.75 N: 696701.23 WD: 31
12:33	19:33	STOP ADCP START VIDEO STILL PHOTO ON DECK
12:34	19:34	FRAM ON BOTTOM E: 2354046.29 N: 696700.58 WD: 31
12:34	19:34	IMAGE: BEDROCK TOUCHDOWN - NO TIMER - CURRENT
12:35	19:35	FRAME ON DECK VIDEO STOPPED
13:43	20:43	START ADCP 37-01 E: 2356294.27 N: 697790.62 WD: 32
13:46	20:46	STOP ADCP START VIDEO STILL PHOTO ON DECK
13:47	20:47	FRAME ON BOTTOM E: 2356295.79 N: 697792.03 WD: 32
13:48	20:48	IMAGE COBBLES
13:50	20:50	FRAME ON DECK VIDEO STOPPED
14:04	21:04	START ADCP 36-01 E: 2358712.45 N: 698774.59 WD: 53
14:08	21:08	STOP ADCP START VIDEO STILL PHOTO ON DECK
14:10	21:10	FRAME ON BOTTOM E: 2358708.80 N: 698770.52 WD: 53
14:11	21:11	IMAGE SMALL COBBLES, GRAVEL
14:16	21:16	~~FRAME ON DECK VIDEO STOPPED~~ DUPLICATE
14:18	21:18	FRAME ON DECK VIDEO STOPPED

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Scale: 1 square = *** 12:45/19:45 LUNCH ⇒ 1:30/2030

 UCR SEDIMENT FACIES STUDY

PDT	UTC	
1421	2121	START ADCP 3602 E: 2358936.58 N: 698570.55 WD: 35
1426	2126	STOP ADCP START VIDEO STILL PHOTO ON DECK
1427	2127	FRAME ON BOTTOM E: 2358930.90 N: 698571.43 WD: 35
1428	2128	IMAGE COBBLES, GRAVEL
1429	2129	FRAME ON DECK VIDEO STOPPED
1432	2132	START ADCP 36-03 E: 2359156.66 N: 698369.89 WD: 42
1436	2136	STOP ADCP START VIDEO STILL PHOTO ON DECK
1437	2137	FRAME ON BOTTOM E: 2359151.60 N: 698371.13 WD: 42
1438	2138	IMAGE GRAVEL, BIT OF SAND
1439	2139	FRAME ON DECK VIDEO STOPPED
1441	2141	START ADCP 36-04 E: 2359378.61 N: 698167.51 WD: 31
1445	2145	STOP ADCP START VIDEO STILL PHOTO ON DECK
1446	2146	FRAME ON BOTTOM E: 2359381.02 N: 698161.2 WD: 31
1447	2147	IMAGE SAND
1448	2148	FRAME ON DECK VIDEO STOPPED
1450	2150	START ADCP 3605 E: 2359601.17 N: 697966.26 WD: 15
1457	2157	STOP ADCP START VIDEO STILL PHOTO ON DECK
1458	2158	FRAME ON BOTTOM E: 2359603.61 N: 697965.18 WD: 15
1459	2159	IMAGE WEEDS, SILT
1500	2200	FRAME ON DECK VIDEO STOPPED
1509	2209	START ADCP 3505 E: 2360812.77 N: 700316.13 WD: 51
1512	2212	STOP ADCP START VIDEO STILL PHOTO ON DECK
1514	2214	FRAME ON BOTTOM E: 2360813.44 N: 700317.54 WD: 51
1515	2215	IMAGE COBBLES + GRAVEL
1516	2216	FRAME ON DECK VIDEO STOPPED
1519	2219	START ADCP 35-04 E: 2360692.12 N: 700411.60 WD: 51
1524	2224	STOP ADCP START VIDEO STILL PHOTO ON DECK
1526	2226	FRAME ON BOTTOM E: 2360694.13 N: 700413.38 WD: 51
1527	2227	IMAGE GRAVEL
1529	2229	FRAME ON DECK VIDEO STOPPED
1530	2230	START ADCP 35-03 E: 2360570.06 N: 700507.39 WD: 44
1534	2234	STOP ADCP START VIDEO STILL PHOTO ON DECK
1535	2235	FRAME ON BOTTOM E: 2360565.26 N: ~~700505.39~~ 700505.12 WD 44
1536	2236	IMAGE: COBBLES + GRAVEL
1538	2238	FRAME ON DECK VIDEO STOPPED
1540	2240	START ADCP 35-02 E: 2360449.22 N: 700604.31 WD: 25
1544	2244	STOP ADCP START VIDEO STILL PHOTO ON DECK
1545	2245	FRAME ON BOTTOM E: 2360447.47 N: 700598.46 WD: 25
1546	2246	IMAGE SMALL COBBLES, GRAVEL
1547	2247	FRAME ON DECK VIDEO STOPPED

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Scale: 1 square = _____
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PDT	UTC	
1549	2249	START ADCP 35-01 E: 2360332.95 N: 700699.31 WD: 25
1554	2254	STOP ADCP START VIDEO STILL PHOTO ON DECK
1555	2255	FRAME ON BOTTOM E: 2360334.25 N: 700703.42 WD: 25
1556	2256	IMAGE GRAVEL, SMALL COBBLES
1557	2257	FRAME ON DECK VIDEO STOPPED
1603	2303	START ADCP 34-05 E: 2362176.82 N: 702445.39 WD: 50
1607	2307	STOP ADCP START VIDEO STILL PHOTO ON DECK
1608	2308	FRAME ON BOTTOM E: 2362172.58 N: 702444.54 WD: 50
1609	2309	IMAGE: SMALL COBBLES, GRAVEL
1610	2310	FRAME ON DECK VIDEO STOPPED
1613	2313	START ADCP 34:04 E: 2361972.38 N: 702636.12 WD: 39
1616	2316	STOP ADCP START VIDEO STILL PHOTO ON DECK
1617	2317	FRAME ON BOTTOM E: 2361970.40 N: 702631.27 WD 39
1618	2318	IMAGE: BIG COBBLES, SMALL COBBLES
1620	2320	FRAME ON DECK VIDEO STOPPED
		START ADCP E: N: WD:
		STOP ADCP START VIDEO STILL PHOTO ON DECK
		FRAME ON BOTTOM E: N: WD
		IMAGE
		FRAME ON DECK VIDEO STOPPED
		START ADCP E: N: WD:
		STOP ADCP START VIDEO STILL PHOTO ON DECK
		FRAME ON BOTTOM E: N: WD:
		IMAGE
		FRAME ON DECK VIDEO STOPPED
		START ADCP E: N: WD:
		STOP ADCP START VIDEO STILL PHOTO ON DECK
		FRAME ON BOTTOM E: N: WD:
		IMAGE
		FRAME ON DECK VIDEO STOPPED
		STOP ADCP E: N: WD:
1623	2323	CALL IT A DAY, TO SHALLOW IN TRANSECT W/ SET UP
1624	2324	PULL UP ADCP UNIT, START DISMANTLING CAMERA, ETC
1635	2335	DOWNLOADING DATA BY MAGGIE & RYAN
1640	2340	HEAD BACK FOR LAUNCH
1655	2355	ARRIVE BACK AT LAUNCH, PULL BOATS
1720	2720	ALL BOATS OUT OF WATER

10-20-18

Scale: 1 square = _____

PDT	UTC	
520	1520	Launch Tieton from China Bend BOAT LAUNCH
525	1525	Conduct GPS check in CP-10
547	1547	Columbia Navigation - 2 Safety Boat. They ARE GOING TO SWAP OUT Boat.
902	1602	Weather: Foggy 42°F
905	1605	Diagnostic check
906	1606	Diagnostic check passes
911	1611	A new video camera will be used today. Gravity said better in low light.
912	1612	START ADCP Calibration
915	1615	Compas Calibration 600KHZ ADCP 0.1°
917	1617	Completed Calibration 0.1°
924	1624	Conducting imagery only in deep water locations previously skipped
930	1630	60-07 start video, still photo on deck
933	1633	Frame on bottom E 2332369.49 N 674946.64 WD 135
934	1634	Image: Gravel
939	1639	Frame on deck
948	1648	60-08 start video, still photo check on deck
950	1650	Frame on bottom E 233235.94 N 674869.98 WD ~~130~~ 132
951	1651	Image: ANGULAR BOULDERS, logs
953	1653	Frame on deck
957	1657	59-07 START VIDEO, STILL PHOTO CHECK
959	1659	FRAME ON BOTTOM E 2333035.79 N 674817.49 WD 135
1000	1700	IMAGE: Gravel & COBBLES
1002	1702	FRAME ON DECK
1006	1706	59-06 START VIDEO, STILL PHOTO CHECK
1008	1708	FRAME ON BOTTOM E 2333069.59 N 674890.24 WD 134
1009	1709	IMAGE: SEDIMENT, vegitation
1011	1711	FRAME ON DECK
1019	1719	START ADCP 55-03 E: 2335981.26 N: 674783.70 WD: 75
1023	1723	STOP ADCP START VIDEO STILL PHOTO on DECK
1024	1724	FRAME on BOTTOM N 2335983.12 E 674780.18 WD 75
1025	1725	IMAGE: Cobbles
1027	1727	FRAME ON DECK: VIDEO STOPPED
1031	1731	START ADCP 55-04 E: 2336020.48 N: 674747.13 WD: 71
1036	1736	STOP ADCP START VIDEO STILL PHOTO ON DECK
1037	1737	FRAME ON BOTTOM N 2336018.37 E 674749.63
1038	1738	IMAGE: COBBLES & GRAVEL ROUNDED
1039	1739	FRAME ON DECK: video stopped

Michaela McCoy

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P18 arm 14 10-21-18 UCR SEDIMENT FACIES STUDY

PDT	UTC	
1044	1744	CN-2 came to pick up Linda Howard to bring her to China Bend Boat Launch to leave site.
1047	1747	START ADCP 55-05 E: 2336071.94 N: 674697.61 WD 69
1051	1751	STOP ADCP START VIDEO, STILL PHOTO ON DECK E 2336070.46 N 674697.36
1053	1753	~~IMAGE:~~ FRAME ON BOTTOM IMAGE: SAND
1054	1754	FRAME ON DECK VIDEO STOPPED
1056	1756	START ADCP 55-06 E 2336137.17 N 674637.30 WD 66
1100	1800	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1102	1802	FRAME ON BOTTOM E 2336137.70 N 674639.75
1103	1803	IMAGE: COBBLES & gravel
1104	1804	FRAME ON DECK VIDEO STOPPED
1105	1805	START ADCP 55-07 E 2336262.42 N 674519.71 WD 60
1110	1810	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1112	1812	FRAME ON BOTTOM E 2336260.37 N 674519.22
1113	1813	IMAGE: COBBLES
1114	1814	FRAME ON DECK VIDEO STOPPED
1115	1815	START ADCP 55-08 E 2336438.90 N 674354.81 WD 60
1119	1819	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1121	1821	FRAME ON BOTTOM ~~NE~~ E 2336431.26 N 674356.15 WD 60
1122	1822	IMAGE: COBBLES
1123	1823	FRAME ON DECK VIDEO STOPPED
1130	1830	START ADCP 54-08 E 2336850.96 N 674786.88 WD 58
1134	1834	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1136	1836	FRAME ON BOTTOM ~~NE~~ E 2336849.58 ~~EN~~ N 674787.22 WD 58
1137	1837	IMAGE: COBBLES
1138	1838	FRAME ON DECK VIDEO STOPPED
1142	1842	START ADCP 54-06 E 2336716.02 N 675117.13 WD 62
1146	1846	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1148	1848	FRAME ON BOTTOM ~~NE~~ E 2336709.83 ~~&~~ N 675118.60 WD 62
1148	1848	IMAGE: SAND & COBBLES (ROUNDED & SUBROUNDED)
1149	1848	FRAME ON DECK VIDEO STOPPED
1153	1853	START ADCP 54-05 E 2336681.31 N 675206.01 WD 65
1157	1857	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1159	1859	FRAME ON BOTTOM E 2336678.86 N 675207.61
1200	1900	IMAGE: Tire, sticks, gravel, sand, cobbles
1201	1901	FRAME ON DECK VIDEO STOPPED
1202	1902	START ADCP 54-04 E 2336657.89 N 675261.20 WD 63
1206	1906	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1208	1908	FRAME ON BOTTOM E 2336656.79 N 675259.73
1209	1909	IMAGE SA COBBLES and GRAVEL
1210	1910	FRAME ON DECK VIDEO STOPPED

Scale: 1 square =

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10-21-18 UCR SEDIMENT FACIES STUDY

PDT	UTC	
1212	1912	START ADCP 54-03 E 2336636.47 N 675310.67 WD 66
1216	1916	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1218	1918	FRAME ON BOTTOM E ~~2337647.~~ 2336639.45 N 675311.56
1219	1919	IMAGE: GRAVEL
1220	1920	FRAME ON DECK VIDEO STOPPED
1227	1927	START ADCP 53-08 E 2337646.73 N 67522.49 WD 60
1231	1931	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1233	1933	FRAME ON BOTTOM E 233764.50 N 675288.58
1234	1934	IMAGE: COBBLES
1235	1935	FRAME ON DECK VIDEO STOPPED
1237	1937	START ADCP 53-09 E 2337722.75 N 675144.55 WD 61
1242	1942	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1243	1943	FRAME ON BOTTOM E 2337715.76 N 675145.85 WD 61
1244	1944	IMAGE COBBLES
1245	1945	FRAME ON DECK VIDEO STOPPED
1249	1949	LUNCH BREAK
1353	2053	START ADCP 52-09 E 2338612.36 N 675762.43 WD 59
1358	2058	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1359	2058	FRAME ON BOTTOM E 2338610.21 N 675763.13 WD 59
1400	2100	IMAGE: COBBLES
1401	2101	FRAME ON DECK VIDEO STOPPED
1408	2108	START ADCP 51-09 E 2339648.17 N 676007.19 WD 67
1412	2112	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1413	2113	FRAME ON BOTTOM E 2339644.21 N 676001.20
1414	2114	IMAGE: Cobbles
1415	2115	FRAME ON DECK VIDEO STOPPED
1417	2117	START ADCP 51-08 E 2339564.38 N 676137.17 WD 64
1421	2121	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1423	2123	FRAME ON BOTTOM E 2339561.01 N 676137.17
1424	2124	IMAGE: COBBLES
1425	2125	FRAME ON DECK. VIDEO STOPPED
1431	2131	START ADCP 50-08 E 2340444.60 N 676720.72 WD 66
1435	2135	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1437	2137	FRAME ON BOTTOM E 2340443.58 N 676720.15
1438	2138	IMAGE: COBBLES
1439	2139	FRAME ON DECK VIDEO STOPPED

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P1516 DRM 10-21-18 UCR SEDIMENT FACIES STUDY

PDT	UTC	
1442	2142	START ADCP 50-09 E 2340533.33 N 676581.62 WD 67
1446	2146	STOP ADCP START VIDEO STILL PHOTO ON DECK
1449	2149	FRAME ON BOTTOM E 2340534.87 N 676580.26
1450	2150	IMAGE: COBBLES
1451	2151	FRAME ON DECK VIDEO STOPPED
1500	2200	START ADCP 49-09 E 2341238.40 N 677381.43 WD 62
1504	2204	STOP ADCP START VIDEO STILL PHOTO ON DECK
1505	2205	FRAME ON BOTTOM E 2341238.78 N 677379.63
1506	2206	IMAGE: COBBLES & SAND
1507	2207	FRAME ON DECK VIDEO STOPPED
1515	2215	START ADCP 48-07 E 2341522.57 N 678336.53 WD 63
1520	2220	STOP ADCP START ~~START VIDEO STILL PHOTO ON DECK~~ DUPLICATE
1524	2224	~~FRAME ON BOTTOM E~~ N STOP ADCP Duplicate start video
1525	2225	~~IMAGE:~~ FRAME ON BOTTOM E 2341522.29 N 678332.74
1526	2226	~~FF~~ DUPLICATE IMAGE: SAND & COBBLES
1533	2233	FRAME ON DECK VIDEO STOPPED
1544	2244	START ADCP 47-05 E 2341270.12 N 680825.20 WD 89
1547	2247	STOP ADCP START VIDEO STILL PHOTO ON DECK
1549	2249	FRAME ON BOTTOM
1550	2250	IMAGE: SAND
1551	2251	FRAME ON DECK VIDEO STOPPED
1558	2258	START ADCP 46-03 E 2340877.03 N 683368.21 WD 87
1602	2302	STOP ADCP START VIDEO STILL PHOTO ON DECK
1604	2304	FRAME ON BOTTOM E 2340880.36 N 683367.02
1605	2305	IMAGE: COBBLES & GRAVEL
1606	2306	FRAME ON DECK VIDEO STOPPED
1608	2308	START ADCP 46-04 E 2341105.73 N 683480.52 WD 74
1612	2312	STOP ADCP START VIDEO STILL PHOTO ON DECK
1614	2314	FRAME ON BOTTOM E 2341107.01 N 683482.60
1615	2315	IMAGE: GRAVEL
1616	2316	FRAME ON DECK VIDEO STOPPED
1618	2318	START ADCP 46-05 E 2341334.04 N 683593.89 WD 50
1622	2322	STOP ADCP START VIDEO STILL PHOTO ON DECK
1624	2324	FRAME ON BOTTOM E 2341335.66 N 683593.77
1625	2325	IMAGE: SAND
1626	2326	FRAME ON DECK VIDEO STOPPED

Mr Mark McCoy

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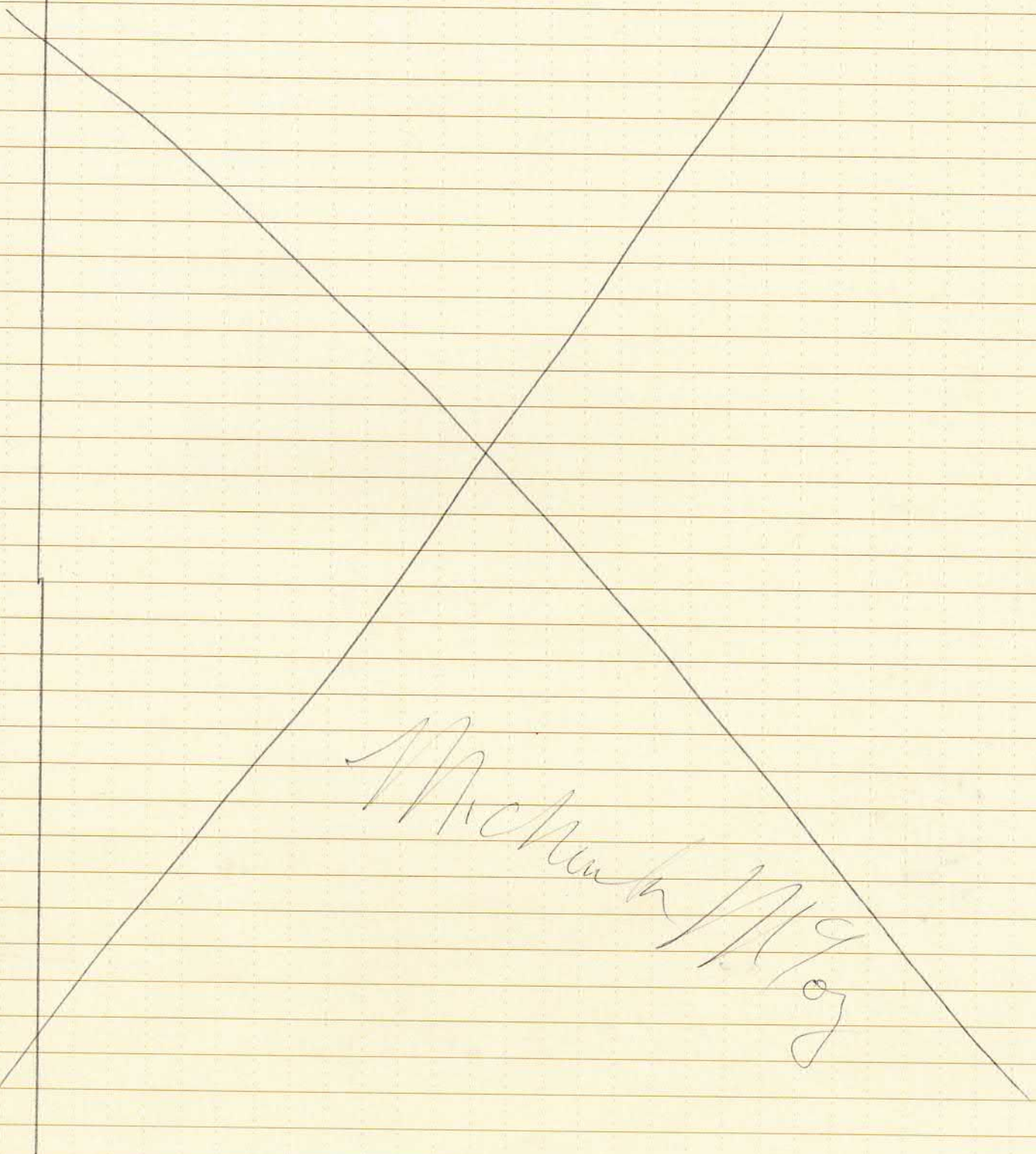
10-21-18 UCR SEDIMENT FACIES STUDY

PDT	UTC	
1630	2330	START ADCP 46-02 E 2340648.76 N 683254.56 WD 77
1634	2334	STOP ADCP START VIDEO STILL PHOTO ON DECK
1636	2336	FRAME AT BOTTOM NE ~~NW~~ 683253.52 ~~NE~~ E 2340647.23
1637	2337	IMAGE: GRAVEL
1638	2338	FRAME ON DECK VIDEO STOPPED
1648	2348	Moving to China Boat Launch
1760	2400	Arrive at boat launch



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10-22-18 VCR Sediment Facies Study

PDT	UTC	
800	1500	Launching Tiefon.
805	1505	Weather: Foggy, 38°F
840	1540	Land at CP-5.
546	1546	Position check at CP-5 using the Black Hawk base station
912	1612	Begin ADCP calibration
916	1616	Compass Calibration initial 0.9° completed 0.1° 600 kHz
~~1411~~		Diagnostic check done @ 1611 UTC and passed
919	1619	Moving to Transect 45
~~1626~~	1626	Start ADCP E 2341191.37 N 685931.62 45-03 WD 65
930	1630	STOP ADCP START VIDEO, STILL PHOTO ON DECK
932	1632	FRAME ON BOTTOM E 2341189.22 N 685926.08
933	1633	IMAGE: LARGE COBBLES
935	1635	FRAME ON DECK VIDEO STOPPED
938	1638	START ADCP 45-04 E 2341365.36 N 685859.22 WD 73
942	1642	STOP ADCP START VIDEO, STILL PHOTO ON DECK
943	1643	FRAME ON BOTTOM E 2341365.44 N 685857.03 WD 73
944	1644	IMAGE: COBBLES
946	1646	FRAME ON DECK VIDEO STOPPED
948	1648	START ADCP 45-05 E 2341536.20 N 685789.12 WD 63
952	1652	STOP ADCP START VIDEO, STILL PHOTO ON DECK
954	1654	FRAME ON BOTTOM E 2341534.16 N 685791.43
955	1655	IMAGE: COBBLES AND SAND
956	1656	FRAME ON DECK VIDEO STOPPED
1008	1708	START ADCP 43-04 E 2344700.71 N 689075.41 WD 61
1012	1712	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1015	1715	FRAME ON BOTTOM E 2344701.15 N 689071.76
1016	1716	IMAGE: COBBLES
1017	1717	FRAME ON DECK
1019	1719	START ADCP 43-03 E 2344495.36 N 689184.20 WD 68
1024	1724	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1026	1726	FRAME ON BOTTOM E 2344495.79 N 689179.91
1027	1727	IMAGE: COBBLES
1028	1728	FRAME ON DECK
1039	1739	START ADCP 42-03 E 2346673.12 N 690664.93 WD 80
1044	1744	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1046	1746	FRAME ON BOTTOM E 2346670.44 N 690660.34
1047	1747	IMAGE: COBBLES & GRAVEL
1048	1748	FRAME ON DECK

McMark

Scale: 1 square = _____

10-22-18 UCR SEDIMENT FACIES STUDY

PDT	UTC	
1052	1752	START ADCP 42-04 E 2346744.99 N 690518.10 WD 89
1056	1756	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1058	1758	FRAME ON BOTTOM E 2346740.17 N 690516.96
1059	1759	IMAGE: COBBLES & GRAVEL
1101	1801	FRAME ON DECK VIDEO STOPPED
1102	1802	START ADCP 42-05 E 2346816.13 N 690372.88 WD 84
1105	1805	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1107	1807	FRAME ON BOTTOM E 2346817.42 N 690373.20
1108	1808	IMAGE: BOULDER
1110	1810	FRAME ON DECK VIDEO STOPPED
1117	1817	START ADCP 41-04 E 2349062.83 N 691547.43 WD 59
1121	1821	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1123	1823	FRAME ON BOTTOM E N
1124	1824	IMAGE: COBBLES and GRAVEL
1124	1824	FRAME ON DECK VIDEO STOPPED
1134	1834	START ADCP 40-04 E 2350867.45 N 693318.50 WD 83
1138	1838	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1140	1840	FRAME ON BOTTOM E 2350868.63 N 693316.20
1141	1841	IMAGE: SAND
1141	1841	FRAME ON DECK VIDEO STOPPED
1149 AMM	1849	START ADCP 40-03 E 2350644.48 N 693493.33 WD 105
1148	1848	STOP ADCP START VIDEO, START VIDEO, STILL PHOTO ON DECK
1149	1849	FRAME ON BOTTOM E 2350642.76 N 693489.06
1150	1850	IMAGE: Cobbles & GRAVEL
1151	1851	FRAME ON DECK VIDEO STOPPED
1201	1901	START ADCP 39-04 E 2351811.54 N 695799.63 WD 65
1205	1905	STOP ADCP START VIDEO, START VIDEO, STILL PHOTO ON DECK
1211	1911	~~FRAME ON BOTTOM E N~~ MM IMAGE: → No photo. Data (video collected) very large sp rock outcrop ~~FRAME ON DECK VIDEO STOPPED~~ MM Did not want to get equipment stuck. Did not set on bottom. Depths varied greatly in small area
1219	1919	Transection 38. Having difficulty getting data. Readings from bottom are varying from 30 feet to 180 feet. 38-02 and 38-01. Water moving rapidly. The ADCP cannot take meaningful data. The beams were reading differently and cannot solve for velocity. Did not drop camera. Too narrow to relocate. Skipping 38-03, 38-02 & 38-01.

M. Mark Tom

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PDT	UTC	P20	10-22-18	UCR Sediment Facies Study
1228	1928	START ADCP 37-02	E 2356350.79	N 697705.60 WD 64
1233	1933	STOP ADCP	START CAMERA	STILL PHOTO ON DECK
1235	1935	FRAME ON BOTTOM	E 2356350.50	N 697706.66
1236	1936	IMAGE: Angular cobbles		
1236	1936	FRAME ON DECK	STOP VIDEO	
1238	1938	START ADCP 37-03	E 2356411.29	N 697623.55 WD 53
1242	1942	STOP ADCP	START CAMERA	STILL PHOTO ON DECK
1244	1944	FRAME ON BOTTOM	E 2356411.97	N 697626.30
1245	1945	IMAGE ANGULAR COBBLES and rounded		
1246	1946	FRAME ON DECK	STOPPED VIDEO	
1248	1948	START ADCP 37-04	E 2356470.40	N 697541.28 WD 87
1253	1953	STOP ADCP	START CAMERA	STILL PHOTO ON DECK
1254	1954	FRAME ON BOTTOM	E 2356471.75	N 697542.29
1255	1955	IMAGE: Cobbles & GRAVEL		
1256	1956	FRAME ON DECK	STOPPED VIDEO	
1258	1958	START ADCP 37-05	E 2356528.95	N 697457.86 WD 65
1302	2002	STOP ADCP	START CAMERA	STILL PHOTO ON DECK
1303	2003	FRAME ON BOTTOM	E 2356532.6	N 697461.9
1304	2004	IMAGE: Boulder & Cobbles		
1305	2005	FRAME ON DECK	STOPPED VIDEO	
1429	2129	Position check at CP-10. Finished deep stations above		
~~1502~~ mm	~~2202~~ mm	China Bend. Going below China Bend for next stations		
1502	2202	START ADCP 61-04	E 2330548.01	N 675374.66 WD 70
1506	2206	STOP ADCP	START CAMERA	STILL PHOTO ON DECK
1508	2208	FRAME ON BOTTOM	E 2330544.66	N 675376.30
1509	2209	IMAGE: Cobbles & Gravels		
1510	2210	FRAME ON DECK	Video stopped	
1512	2212	START ADCP 61-03	E 2330571.63	N 675533.74 WD 84
1517	2217	STOP ADCP	START VIDEO, STILL PHOTO ON DECK	
1519	2219	FRAME ON BOTTOM	E 2330576.53	N 675533.89
1520	2220	IMAGE: Bedrock, gravel		
1521	2221	FRAME ON DECK	VIDEO STOPPED	
~~1522~~	~~2222~~	~~START ADCP 61-~~ mm		
1531	2231	START ADCP 62-05	E 2327946.00	N 675493.45 WD 68
1535	2235	STOP ADCP	START VIDEO, STILL PHOTO ON DECK	
1537	2237	FRAME ON BOTTOM	E 2327951.40	N 675489.03
1538	2238	IMAGE: Bedrock & sand		
1539	2239	FRAME ON DECK	VIDEO STOPPED	

Michaela Mohr

Scale: 1 square =

p21 10-22-18 UCR SEDIMENT FACIES STUDY

PDT	UTC	
1542	2242	START ADCP 62-04 E 2327966.25 N 675860.28 WD 146
1547	2247	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1549	2249	FRAME ON BOTTOM E 2327964.79 N 675861.95 WD 145
1550	2250	IMAGE: ~~Bedrock~~ mm gravel & sand
1551	2251	FRAME ON DECK STOPPED VIDEO
1556	2256	START ADCP 62-03 E 2327986.50 N 676227.79 WD 75
1600	2300	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1601	2301	FRAME ON BOTTOM E 2327986.73 N 676230.30
1602	2302	IMAGE: SAND & GRAVEL
1603	2303	FRAME ON DECK STOPPED VIDEO
1614	2314	START ADCP 63-02 E 2325417.09 N 675687.92 WD 70
1618	2318	STOP ADCP START VIDEO STILL ~~VIDEO~~ PHOTO ON DECK
1619	2319	FRAME ON BOTTOM E 2325417.15 N 675688.57
1620	2320	IMAGE: COBBLES
1621	2321	FRAME ON DECK STOPPED VIDEO
1623	2323	START ADCP 63-03 E 2325507.67 N 675540.37 WD 69
1627	2327	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1629	2329	FRAME ON BOTTOM E 2325502.32 N 675539.53
1630	2330	IMAGE: COBBLES & SAND
1631	2331	FRAME ON DECK VIDEO STOPPED
1632	2332	START ADCP 63-04 E 2325593.97 N 675392.92 WD 60
1636	2336	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1638	2338	FRAME ON BOTTOM E 2325596.52 N 675392.21
1639	2339	IMAGE: Cobbles, gravel, sand
1640	2340	FRAME ON DECK VIDEO STOPPED
1641	2341	START ADCP 63-05 E 2325683.48 N 675244.78 WD 64
1645	2345	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1646	2346	FRAME ON BOTTOM E 2325685.00 N 675243.71
1647	2347	IMAGE: COBBLES & SAND
1648	2348	FRAME ON DECK VIDEO STOPPED
1654	2354	Finished mapping for the day. Beginning closing procedures & mobilizing to China Bend
1720	2420	Arrive at China Bend boat launch.

Michael McCoy

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P22 UCR SEDIMENT FACIES STUDY 10-23-18

0645 MEET UP & HEAD OUT FOR LAUNCH
07:25 ARRIVE AT CHINA BEND BOAT LAUNCH
07:30 HAND OUT DRIVES + NOTEBOOKS
07:40 HOLD SAFETY MEETING

ATTENDEES

RV TIETON
MARK HALE AECOM
RENE TRUDEAU GRAV
MAGGIE MCKEON GRAVITY
RYAN MCELVERE GRAVITY
JOHN SCHAFER GRAVITY
STEPHANIE ASELAGE JACOBS/EPA

RV DISCOVERY
MICHAELA MCCOY AECOM
MIKE DUFFIELD GRAVITY
JASON LORMAN DOA

GPS BASE STATION
DAVE WILLIAMS EPA

COLUMBIA NAVIGATION
ERIC WEATHERMAN
JOSH WEATHERMAN
DAN SMITH
RICK WILSON

0750 COLUMBIA BOATS START LAUNCHING
0755 MISSING UNITS + DATA W/ JOINT, MUCH SCRAMBLING
0805 LAUNCH TIETON
0810 WEATHER CLEAR, LIGHT TULE FOG AVG 30s/LOW 40s THIS AM

PTD	UTC	UCR SEDIMENT FACIES STUDY 10-23-18
0920	1520	POSITION CHECK AT CHINA BEND BOAT LAUNCH
0925	1525	LAUNCH DISCOVERY
0939	1539	FINISH CALIBRATION AT UCR 10
0850	1550	HEAD OUT FROM BOAT LAUNCH
0855	1555	COMPASS CALIBRATION 1200 KHZ 1.0°
0900	1600	TRIBAL BOAT 200MS PAST, WAKES AROUND, CALIBRATION STOPPED
0902	1602	COMPASS CALIBRATION RESUMES MJ 10-23
0905	1605	COMPASS CALIBRATION COMPLETED ~~P.C~~ 0.1°
0911	1611	START ADCP 61.01 E: 2330618.56 N: 675951.57 WD: 35
0915	1615	STOP ADCP START VIDEO, STILL PHOTO ON DECK
0918	1618	FRAME ON BOTTOM E 2330614.20 N 675951.97 WD: 35
0919	1619	IMAGE COBBLES, SILT ANGULAR COBBLES
0920	1620	FRAME ON DECK VIDEO STOPPED

10-23-18

Scale: 1 square = _____

P23 UCR SEDIMENT FACIES STUDY 10-23-18

PTD	UTC	
0922	1622	START ADCP 61-02 E:2330594.18 N:675675.01 WD: 55
0926	1626	STOP ADCP START VIDEO STILL PHOTO ON DECK
0928	1628	FRAME ON BOTTOM E:2330591.37 N:675692.39 WD55
0929	1629	IMAGE: COBBLES, GRAVEL, SAND
0930	1630	FRAME ON DECK VIDEO STOPPED
0934	1634	START ADCP 61-05 E:2330525.04 N:675216.64 WD:55
0938	1638	STOP ADCP START VIDEO STILL PHOTO ON DECK
0940	1640	FRAME ON BOTTOM E:2330520.65 N:675217.96 WD:55
0941	1641	IMAGE: COBBLES, GRAVEL, SAND
0942	1642	FRAME ON DECK VIDEO STOPPED
0949	1649	START ADCP 62-02 E:2329002.16 N:676596.14 WD:38
0954	1654	STOP ADCP START VIDEO STILL PHOTO ON DECK
0955	1655	FRAME ON BOTTOM E:2329007.91 N:676598.19 WD:38
0956	1656	IMAGE COBBLES, VEGETATION,
0957	1657	FRAME ON DECK VIDEO STOPPED
0959	1659	START ADCP 62-01 E:2328023.47 N:676963.46 WD:28
1003	1703	STOP ADCP START VIDEO STILL PHOTO ON DECK
1004	1704	FRAME ON BOTTOM E:2328023.24 N:676961.46 WD:28
1006	1706	IMAGE COBBLES, SAND, LITTE VEG MAYBE, CLOUDY
1007	1707	FRAME ON DECK VIDEO STOPPED
1014	1714	START ADCP 63-01 E:2325329.36 N:675838.17 WD54
1018	1718	STOP ADCP START VIDEO STILL PHOTO ON DECK
1019	1719	FRAME ON BOTTOM E:2325322.40 N:675831.30 WD:54
1020	1720	IMAGE: GRAVEL
1021	1721	FRAME ON DECK VIDEO STOPPED
1027	1727	START ADCP 64-01 E:2323334.39 N:674559.42 WD:40
1031	1731	STOP ADCP START VIDEO STILL PHOTO ON DECK
1032	1732	FRAME ON ~~DECK~~ BOTTOM E:232332.66 N:674557.07 WD,40
1033	1733	IMAGE BIG COBBLE RIGHT IN FRAME, GRAVEL
1034	1734	FRAME ON DECK VIDEO STOPPED
1036	1736	START ADCP 64-02 E:2323411.51 N:674376.25 WD:55
1040	1740	STOP ADCP START VIDEO STILL PHOTO ON DECK
1041	1741	FRAME ON BOTTOM E:2323404.91 N:674375.29 WD:55
1042	1742	IMAGE COBBLES GRAVEL
1044	1744	FRAME ON DECK VIDEO STOPPED
1055	1755	START ADCP 65-02 E:2321[illegible]32.56 N:672930.21 WD:52
1059	1759	STOP ADCP START VIDEO STILL PHOTO ON DECK
1101	1801	FRAME ON BOTTOM E:2321129.54 N:672930.88 WD:52
1102	1802	IMAGE: COBBLES, GRAVEL, SAND
1103	1803	FRAME ON DECK VIDEO STOPPED

Scale: 1 square = _____
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P24 UCR SEDIMENT FACIES STUDY 10-23-18

MH 10-23 MH 10-23

PTD	UTC	
1104	1804	START ADCP 65-01 E: 2320998.31 N: 673009.36 WD: 33
1107	1807	STOP ADCP START VIDEO STILL PHOTO ON DECK
1109	1809	FRAME ON BOTTOM E: 2321004.58 N: 673009.84 WD:
1109	1809	IMAGE: SAND, LITTLE VEGETATION, PLANT FRAGS - NO SILT
1110	1810	FRAME ON DECK VIDEO STOPPED
1121	1821	START ADCP 66-05 E: 2320555.79 N: 670208.95 WD: 47
1126	1826	STOP ADCP START VIDEO STILL PHOTO ON DECK
1128	1828	FRAME ON BOTTOM E: 2320554.77 N: 670205.34 WD: 47
1129	1829	IMAGE: BOXROCK, SAND
1130	1830	FRAME ON DECK VIDEO STOPPED
11	18	START ADCP E: N: WD:
11	18	STOP ADCP START VIDEO STILL PHOTO ON DECK
11	18	FRAME ON BOTTOM E: N:
11	18	IMAGE
11	18	FRAME ON DECK VIDEO STOPPED
		START ADCP E: N: WD:
		STOP ADCP START VIDEO, STILL PHOTO ON DECK
		FRAME ON BOTTOM, E: N: WD
		IMAGE
		FRAME ON DECK VIDEO STOPPED
11:45	18:45	66 TRANSECT TOO DEEP AFTER LOOKING AT A FEW TARGETS
11:48	18:48	MOVED TO 67 TRANSECT, OUT OF RANGE OF STATION
11:49	18:49	REQUEST DAVE WILLIAMS TO SET UP ON UCR2
1154	1854	MOVE TO CP4
12:00	1900	LUNCH AT CP4 AND GPS COORDINATION
12:55	1955	MOVE OFF CP4 AFTER LUNCH + GPS SET UP ACTIVITIES
1305	2005	REDEPLOY UNIT (ADCP), BATTERY CHANGE for CAMERA
1307	2007	MOVE TO 72 TRANSECT, TOO DEEP
1312	2012	MOVE TO 71 TRANSECT
1316	2016	HUNT FOR SHALLOW ENOUGH TARGET IN 71 TRANSECT
1317	2017	START ADCP 71-01 E: 2319304.30 N: 659435.64 WD: 48
1321	2021	STOP ADCP START VIDEO, STILL PHOTO ON DECK
1322	2022	FRAME ON BOTTOM E: 2319306.42 N: 659431.56 WD: 48
1323	2023	IMAGE: SAND
1324	2024	~~FRAME~~ DUPLICATE FRAME ON DECK
13	13	~~FRAME ON DECK VIDEO STOPPED~~ ~~DUPLICATE CANCELLED~~

MH 10-23

MH 10-23-18

Scale: 1 square = _____

P25 MH 10-23 UCR SEDIMENT FACIES STUDY 10-23-18

PTD	UTC	
1328	2028	START ADCP 71-05 E: 2318641.49 N: 658713.28 WD 48
1332	2032	STOP ADCP START VIDEO STILL PHOTO ON DECK
1333	2033	FRAME ON BOTTOM E: 2318641.91 N: 658714.59 WD 49
1334	2034	IMAGE: BEDROCK SAND
1335	2035	FRAME ON DECK VIDEO STOPPED
1343	2043	START ADCP 70.05 E: 2320810.50 N: 660192.37 WD: 53
1346	2046	STOP ADCP START VIDEO STILL PHOTO ON DECK
1348	2048	FRAME ON BOTTOM E: 2320812.04 N: 660190.51 WD 53
1349	2049	IMAGE: COBBLES
1350	2050	FRAME ON DECK VIDEO STOPPED
1400	2100	START ADCP 69-03 E: 2321528.88 N: 663044.57 WD: 54
1404	2104	STOP ADCP START VIDEO STILL PHOTO ON DECK
1405	2105	FRAME ON BOTTOM E: 2321526.98 N: 663045.71 WD: 54
1406	2106	IMAGE: COBBLES, SAND
1407	2107	FRAME ON DECK VIDEO STOPPED
1410	2110	START ADCP 69-04 E: 2321878.73 N: 663081.47 WD: 10 MH
1416	2116	STOP ADCP START VIDEO STILL PHOTO ON DECK
1417	2117	FRAME ON BOTTOM E: 2321876.30 N: 663081.87 WD: 10
1418	2118	IMAGE: SAND, VEGETATION
1419	2119	FRAME ON DECK VIDEO STOPPED
1436	2136	START ADCP 68-03 E: 2321343.82 N: 665507.76 WD: 59
1440	2140	STOP ADCP START VIDEO STILL PHOTO ON DECK
1441	2141	FRAME ON BOTTOM E: 2321340.71 N: 665508.94 WD: 59
1442	2142	IMAGE BEDROCK, SAND
1444	2144	FRAME ON DECK VIDEO STOPPED
1454	2154	START ADCP 68-04 ALT E: 2321706.65 N: 665487.78 WD: 10
1500	2200	STOP ADCP START VIDEO STILL PHOTO ON DECK
1501	2201	FRAME ON BOTTOM E: 2321704.26 N: 665488.89 WD: 10
1502	2202	IMAGE: VEGETATION
1503	2203	FRAME ON DECK VIDEO STOPPED
		— NOTES - THIS ALT WAS COMPLETED AS TOO SHALLOW AT 68.04 ORIGINAL TARGET. ALT SITE @ 40 FT TOWARDS CENTER OF CHANNEL
	MH	
1506	2206	START ADCP 68-05 E: 2322149.91 N: 665460.76 WD: 11
1512	2212	STOP ADCP START VIDEO STILL PHOTO ON DECK
1513	2213	FRAME ON BOTTOM E: 2322151.98 N: 665466.85 WD: 11
1514	2214	IMAGE: VEGETATION
1517	2217	FRAME ON DECK VIDEO STOPPED

10-23-18

NSN: 7530-01-577-8866 Rite in the Rain

UCR SEDIMENT RATES STUDY

10-23-18

PTD	UTC	
1534	2234	START ADCP 67.01 ALT E: 232024.45 N: 667593.47 WD 47
1538	2238	STOP ADCP START VIDEO STILL PHOTO ON DECK
15	22	~~FRAME ON BOTTOM~~ ~~E:~~ ~~N:~~ ~~WD:~~
15	22	~~IMAGE~~ MH 10-23-18
22	22	DUPLICATE IMAGE
↓	↓	~~FRAME ON DECK~~ ~~VIDEO STOPPED~~
		NOTE: ALTERNATIVE LOCATION. TRIBAL STURGEON LINES (RESEARCH) TOO CLOSE TO ORIGINAL 67.01
1539	2239	DUPLICATE ADCP
1542	2242	STOP DUPLICATE ADCP
1543	2243	FRAME ON BOTTOM E: 2320247.50 N: 667586.96 WD: 47
1544	2244	IMAGE: COBBLES, SAND
1549	2249	DUPLICATE IMAGE: SAME
1551	2251	FRAME ON DECK VIDEO STOPPED
1554	2254	START ADCP 67-03 E: 2320804.00 N: 667889.95 WD: 56
1558	2258	STOP ADCP START VIDEO STILL PHOTO ON DECK
↓	↓	~~FRAME ON BOTTOM E: N: WD:~~ MH 10-23 ~~IMAGE~~
1558	2258	DUPLICATE ADCP
1602	2302	STOP DUPLICATE ADCP
1604	2304	FRAME ON BOTTOM E: 2320804.77 N: 667884.55 WD 56
1605	2305	IMAGE: COBBLES + GRAVEL
1609	2309	DUPLICATE IMAGE: SAME
1611	2311	FRAME ON DECK
1614	2314	START ADCP 67-04 E: 2321066.81 N: 668029.23 WD: 54
1617	2317	STOP ADCP START VIDEO STILL PHOTO ON DECK
1619	2319	FRAME ON BOTTOM E: 2321064.42 N: 668027.92 WD: 54
1620	2320	IMAGE: COBBLES + GRAVEL
1621	2321	FRAME ON DECK VIDEO STOPPED
1623	2323	START ADCP 67-05 E: 2321325.92 N: 668166.76 WD: 57
1627	2327	STOP ADCP START VIDEO STILL PHOTO ON DECK
1628	2328	FRAME ON BOTTOM E: 2321327.47 N: 668161.90 WD: 57
1629	2329	IMAGE: COBBLES, GRAVEL, SAND
1631	2331	FRAME ON DECK VIDEO STOPPED
1650	2350	TIE ON HEADS TO LAUNCH AFTER SECURING GEAR & UPLOADING
1700	2400	ARRIVE BACK AT CHINA BEND BOAT LAUNCH
1715	2415	EVERYBODY OFF WATER
1720	2420	ALL DATA COLLECTED

10-23-18

Scale: 1 square = _____

UCR SEDIMENT FACIES STUDY

10-24-18

PTD	UTC	
0640	1340	MEET UP IN LOBBY, HEAD TO BOAT LAUNCH
7:20	1420	ARRIVE AT CHINA BEND BOAT LAUNCH, LOW 40's FOGGY
7:30	1430	HAND OUT DRIVES + NOTEBOOKS,
7:40	1440	HOLD SAFETY MEETING - FOG!!

ATTENDEES

RV TIETON

MARK HALE AECOM
RENE TRUDEAU GRAVITY
MAGGIE MCKEON GRAVITY
RYAN MCELIESE GRAVITY
JOAN SCHAEFER GRAVITY
STEPHANIE ASERAGE JACOBS/EPA

RV DISCOVERY

MICHAELA MCCOOL AECOM
MIKE DUSFIELD GRAVITY
JASON DORFMAN DEA

GPS BASE STATION

DAVE WILLIAMS EPA

COLUMBIA NAVIGATION

ERIC WEATHERMAN
JOSH WEATHERMAN
DAN SMITH
RICK WILSON

0745	1445	COLUMBIA BOATS LAUNCHING
0755	1455	TIETON LAUNCHING
0810	1510	HEAD OUT TO CP4 IN VERY DENSE FOG
0835	1535	ARRIVE AT CP4 FOR CHECK IN
0840	1540	NO RADIO CONNECTION, CHECK FREQUENCY W/ BASE STATION
0842	1542	FREQUENCY CHANGE FROM YESTERDAY, ALL BE GOOD NOW
0845	1545	GPS IS NOT "ON", MEASUREMENTS FOR CHECK IN ARE "OFF"
0855	1555	DISCOVERY ARRIVES AT CP4, DORFMAN TO GIVE IT A TRY
0900	1600	JASON DORFMAN OF DEA SAYS THERE IS A VERTICAL SHIFT IN THE MONUMENT, PROBABLY SETTLING OF SAND/CLAY THAT MONUMENT IS SET IN. HE SAID JUST NOTE THE MINOR DIFFERENCE AND WE BE GOOD.
0905	1605	CHECK COMPLETE
0908	1608	PULL OFF SHORE AT CP4
0915	1615	DEPLOY 600 KHZ ADCP
0916	1616	DIAGNOSTIC CHECK + PASS
0918	1618	COMPASS CALIBRATION INITIAL 0.2° COMPLETED 0.1°
0920	1620	HEAD TO TRANSECT 72
0940	1640	START ADCP 72-01 E: 2316118.27 N: 658121.51 WD: 67
0944	1644	STOP ADCP START VIDEO STILL PHOTO ON DECK
0946	1646	FRAME ON BOTTOM E: 2316117.95 N: 658122.03 WD: 67
0947	1647	IMAGE SMALL COBBLES AND SAND
0948	1648	FRAME ON DECK VIDEO STOPPED

10-24-18

Scale: 1 square =
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UCR SEDIMENT FACIES STUDY

10-24-18

PTD	UTC	
0950	1650	START ADCP 72:02 E: 2316234.97 N: 657954.28 WD: 68
0954	1654	STOP ADCP START VIDEO STILL PHOTO ON DECK
0956	1656	FRAME ON BOTTOM E: 2316231.26 N: 657952.74 WD 68
0957	1657	IMAGE BEDROCK
0958	1658	FRAME ON DECK VIDEO STOPPED
1000	1700	START ADCP 72-03 E: 2316351.34 N: 657786.31 WD: 66
1004	1704	STOP ADCP START VIDEO STILL PHOTO ON DECK
1005	1705	FRAME ON BOTTOM E: 2316347.22 N: 657785.32 WD: 66
1006	1706	IMAGE BEDROCK
1008	1708	FRAME ON DECK VIDEO STOPPED
1010	1710	START ADCP 72-04 E: 2316467.61 N: 657618.38 WD 76
1014	1714	STOP ADCP START VIDEO STILL PHOTO ON DECK
1016	1716	FRAME ON BOTTOM E: 2316462.18 N: 657617.49 WD: 76
1017	1717	IMAGE BEDROCK & COBBLES
1018	1718	FRAME ON DECK VIDEO STOPPED
1019	1719	START ADCP 72-05 E: 2316584.20 N: 657450.20 WD: 65
1023	1723	STOP ADCP START VIDEO STILL PHOTO ON DECK
1025	1725	FRAME ON BOTTOM E: 2316587.72 N: 657451.4 WD 65
1026	1726	IMAGE COBBLES, GRAVEL, SAND
1027	1727	FRAME ON DECK VIDEO STOPPED
1034	1734	START ADCP 71-04 E: 2318556.71 N: 658892.84 WD: 93
1037	1737	STOP ADCP START VIDEO STILL PHOTO ON DECK
1039	1739	FRAME ON BOTTOM E: 2318557.79 N: 658893.67 WD 93
1040	1740	IMAGE BEDROCK
1042	1742	FRAME ON DECK VIDEO STOPPED
1043	1743	START ADCP 71-03 E: 2318473.07 N: 659073.39 WD: 132
1047	1747	STOP ADCP START VIDEO STILL PHOTO ON DECK
1049	1749	FRAME ON BOTTOM E: 2318467.31 N: 659074.60 WD: 132
1050	1750	IMAGE GRAVEL
1052	1752	FRAME ON DECK VIDEO STOPPED
1055	1755	START ADCP 71-02 E: 2318397.70 N: 659253.39 WD: 66
1056	1758	STOP ADCP START VIDEO STILL PHOTO ON DECK
1100	1800	FRAME ON BOTTOM E: 2318390.45 N: 659252.86 WD: 66
1101	1801	IMAGE BEDROCK / SAND
1102	1802	FRAME ON DECK VIDEO STOPPED
1108	1808	START ADCP 70-01 E: 2320266.61 N: 660878.12 WD: 77
1113	1813	STOP ADCP START VIDEO STILL PHOTO ON DECK
1114	1814	FRAME ON BOTTOM E: 2320264.79 N: 660878.64 WD 77
1115	1815	IMAGE COBBLES, GRAVEL, LITTLE SAND
1116	1816	FRAME ON DECK VIDEO STOPPED

10-24-18

Scale: 1 square = _____

UCR SEDIMENT FACIES STUDY

10-24-18

PTD	UTC	
1118	1818	START ADCP 70-02 E: 2320401.84 N: 660706.56 WD: 89
1122	1822	STOP ADCP START VIDEO STILL PHOTO ON DECK
1123	1823	FRAME ON BOTTOM E: 2320399.68 N: 660701.88 WD: 89
1124	1824	IMAGE: COBBLES, GRAVEL
1126	1826	FRAME ON DECK VIDEO STOPPED
1127	1827	START ADCP 70-03 E: 2320538.19 N: 660535.55 WD: 66
1131	1831	STOP ADCP START VIDEO STILL PHOTO ON DECK
1132	1832	FRAME ON BOTTOM E: 2320535.02 N: 660535.71 WD: 66
1133	1833	IMAGE GRAVEL
1135	1835	FRAME ON DECK VIDEO STOPPED
1137	1837	START ADCP 70-04 E: 2320675.21 N: 660362.08 WD: 65
1140	1840	STOP ADCP START VIDEO STILL PHOTO ON DECK
1141	1841	FRAME ON BOTTOM E: 2320674.96 N: 660361.37 WD: 65
1142	1842	IMAGE COBBLES
1144	1844	FRAME ON DECK VIDEO STOPPED
1153	1853	START ADCP 69.01 E: 2320832.68 N: 662976.16 WD: 66
1153	1857	STOP ADCP START VIDEO STILL PHOTO ON DECK
1158	1858	FRAME ON BOTTOM E: 2320831.17 N: 662975.09 WD: 66
1159	1859	IMAGE COBBLES
1200	1900	FRAME ON DECK VIDEO STOPPED
1202	1902	START ADCP 69-02 E: 2321181.64 N: 663008.97 WD: 80
1206	1906	STOP ADCP START VIDEO STILL PHOTO ON DECK
1207	1907	FRAME ON BOTTOM E: 2321180.24 N: 663009.25 WD: 80
1208	1909	IMAGE COBBLES, GRAVEL
1210	1910	FRAME ON DECK VIDEO STOPPED
1216	1916	START ADCP 68-01 E: 2320536.12 N: 665561.47 WD: 61
1220	1920	STOP ADCP START VIDEO STILL PHOTO ON DECK
1221	1921	FRAME ON BOTTOM E: 2320539.54 N: 665560.59 WD: 61
1222	1922	IMAGE COBBLES
1223	1923	FRAME ON DECK VIDEO STOPPED
1227	1927	START ADCP 68-02 E: 2320940.07 N: 665535.41 WD: 93
1231	1931	STOP ADCP START VIDEO STILL PHOTO ON DECK
1232	1932	FRAME ON BOTTOM E: 2320935.07 N: 665539.29 WD: 93
1233	1933	IMAGE SAND, FEW COBBLES
1234	1934	FRAME ON DECK VIDEO STOPPED
1235	1935	PULL UP ADCP IN PREPARATION FOR LUNCH
1242	1942	PULL IN AT BOAT RAMP FOR LUNCH
1320	2020	CHANGING BATTERIES IN CAMERA, OTHER ROUTINE TASKS
1325	2025	HEAD BACK OUT DESTINATION TAE 67 TRANSECT

10-29-18

Scale: 1 square = _____
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Rite in the Rain

UCD SEDIMENT FACIES STUDY

10-24-18

PTD	UTC	
1345	2045	START ADCP 67-02 E:2320542.22 N:667752.88 WD:64
1349	2049	STOP ADCP START VIDEO STILL PHOTO ON DECK
		~~FRAME ON BOTTOM E: N: WD:~~
		~~IMAGE~~
		~~FRAME~~
		~~DUPLICATE ADCP~~
		~~STOP DUPLICATE ADCP~~
		MH 10-24-18 CHANGE IN PLANS!!! AND AGAIN
1351	2051	FRAME ON BOTTOM E:2320541.47 N:667751.47 WD64
1352	2052	IMAGE: COBBLES
1357	2057	DUPLICATE IMAGE
1358	2058	FRAME ON DECK STOP VIDEO
1400	2100	DUPLICATE ADCP
1404	2104	STOP DUPLICATE ADCP
1414	2114	START ADCP 66-01 E:2319795.08 N:670250.52 WD:72
1418	2118	STOP ADCP START VIDEO STILL PHOTO ON DECK
1419	2119	FRAME ON BOTTOM E:2319793.32 N:670259.64 WD 72
1420	2120	IMAGE; COBBLES SAN
1421	2121	FRAM ON DECK VIDEO STOPPED
1426	2126	START ADCP 66-02 E:2319996.10 N:670241.17 WD 88
1430	2130	STOP ADCP START VIDEO STILL PHOTO ON DECK
1431	2131	FRAME ON BOTTOM E:2319998.01 N:670241.08 WD 88
1432	2132	IMAGE: COBBLES
1433	2133	FRAME ON DECK VIDEO STOPPED
1436	2136	START ADCP 66-03 E:2320174.95 N:670230.13 WD:106
1440	2140	STOP ADCP START VIDEO STILL PHOTO ON DECK
1441	2141	FRAME ON BOTTOM E:2320177.14 N:670224.69 WD 106
1442	2142	IMAGE COBBLES
1445	2145	FRAME ON DECK VIDEO STOPPED
1446	2146	START ADCP 66-04 E:2320364.09 N:670220.17 WD:75
1450	2150	STOP ADCP START VIDEO STILL PHOTO ON DECK
1452	2152	FRAME ON BOTTOM E:2320364.57 N:670220.81 WD 75
1453	2153	IMAGE COBBLES, GRAVEL, SAND
1454	2154	FRAME ON DECK VIDEO STOPPED
1505	2205	START ADCP 65-05 E:2321538.49 N:672293.82 WD:74
1509	2209	STOP ADCP START VIDEO STILL PHOTO ON DECK
1510	2210	FRAME ON BOTTOM E:2321537.30 N:672287.81 WD:74
1511	2211	IMAGE: BEDROCK AND SAND
1512	2212	FRAME ON DECK VIDEO STOPPED

MRDL 10-24-18

Scale: 1 square = _____

UCR SEDIMENT FACIES STUDY

10-24-18

PDT	UTC	
1514	2214	START ADCP 65-04 E: 2321404.16 N: 672472.88 WD 70
1518	2218	STOP ADCP START VIDEO STILL PHOTO ON DECK
1519	2219	FRAME ON BOTTOM E: 2321398.71 N: 672466.72 WD: 70
1520	2220	IMAGE COBBLES, GRAVEL, SAND
1522	2222	FRAME ON DECK VIDEO STOPPED
1526	2226	START ADCP 65-03 E: 2321268.42 N: 672651.84 WD: 63
1532	2232	STOP ADCP ~~START VIDEO STILL PHOTO ON DECK~~
		~~FRAME ON BOTTOM E: N: WD:~~
		~~IMAGE :~~ MH 10-28
		~~FRAME ON DECK VIDEO STOPPED~~
1532	2232	START DUPLICATE ADCP
1537	2237	STOP DUPLICATE ADCP
1538	2238	FRAME ON BOTTOM E: 2321262.99 N: 672647.49 WD: 63
1539	2239	IMAGE: COBBLES, GRAVEL, SAND
1544	2244	~~FRAME ON DECK VIDEO STOPPED~~ DUPICATE IMAGE SAME
1545	2245	FRAME ON DECK VIDEO STOPPED
1552	2252	START ADCP 6403 E: 2323486.97 N: 674195.78 WD: 69
1557	2257	STOP ADCP START VIDEO STILL PHOTO ON DECK
1558	2258	FRAME ON BOTTOM E: 2323485.45 N: 674194.71 WD: 69
1559	2259	IMAGE COBBLES
1600	2300	FRAME ON DECK VIDEO STOPPED
1602	2302	START ADCP 64-04 E: 2323562.66 N: 674014.10 WD: 70
1607	2307	STOP ADCP START VIDEO STILL PHOTO ON DECK
1608	2308	FRAME ON BOTTOM E: 2323556.59 N: 674010.87 WD: 70
1609	2309	IMAGE COBBLE + SAND
1610	2310	FRAME ON DECK VIDEO STOPPED
1612	2312	START ADCP 64-05 E: 2323638.11 N: 673830.81 WD: 67
1616	2316	STOP ADCP
1616	2316	START DUPLICATE ADCP
1620	2320	STOP DUPLICATE ADCP
1621	2321	START VIDEO STILL PHOTO ON DECK
1621	2321	FRAME ON BOTTOM E: 232633.76 N: 673832.49 WD 67
1622	2322	IMAGE: COBBLES, GRAVEL
1627	2327	DUPLICATE IMAGE SAME
1629	2329	FRAME ON DECK VIDEO STOPPED
1630	2330	EQUIPMENT TAKEDOWN, PULL UP ADCP, ~~DOWNLOADING~~ / COPYING
1640	2340	HEAD BACK TO LAUNCH
1651	2351	ARRIVE CHINA BAR LAUNCH
17:20	24:20	ALL BOATS OFF WATER

MH 10-24-18

NSN: 7530-01-577-8866

Rite in the Rain

UCR SEDIMENT FACIES STUDY

10-25-18

PDT	UTC	
0640	1340	DOWN IN LOBBY
0725	1425	ARRIVE CHINA BOND BOAT LAUNCH
0730	1430	HAND OUT NOTEBOOKS + DRIES
0740	1440	HOLD SAFETY MEETING
		ATTENDEES
		RV TIETON
		MARK HALE AECOM
		JOHNNY PIETRZ AECOM
		SHANNON COUCH AECOM
		ROVE TRUDEAU GRAVITY
		MAGGIE MCKEON GRAVITY
		RYAN MCREESE GRAVITY
		JOHN SCHAEFER GRAVITY
		STEPHANIE ASELAGE JACOBS/DPA
		COLUMBIA NAVIGATION
		ERIC WEATHERMAN
		JOSH WEATHERMAN
		RV DISCOVERY
		MICHAELA MCLOOC AECOM
		MIKE DUFFIELD GRAVITY
		JASON DORFMAN DGA
		OPS BASE STATION
		DAVE WILLIAMS DGA
		RICK WILSON
		DAN SMITH
		LOW 40'S, SLIGHTLY OVERCAST, PERHAPS RAIN IN P/M
0750	1450	LOADING BOATS
0755	1455	COLUMBIA LAUNCHING
0810	1510	LAUNCH TIETON
0835	1535	LEAVE LAUNCH, HEADING NORTH TO CP6
0900	1600	LAND AT CP6 FOR POSITION CHECK IN
0937	1637	CHECK IN AT CP6 COMPLETED
0940	1640	RYAN VERIFIES CHECK IN IS GOOD
0945	1645	PULL OFF CP6
0950	1650	DEPLOY 1200 KHZ ADCP
0952	1652	ADCP DIAGNOSTIC CHECK
0955	1655	START COMPASS CALIBRATION 1200 KHZ 0.7
1000	1700	COMPLETE CALIBRATION 0.1
1002	1702	HEAD TO TRANSECT 34
1019	1719	START ADCP 34-03 ALT E: 2361832.46 N: 702765.84 WD 11
1023	1723	STOP ADCP START VIDEO STILL ADD ON DECK
1023	1723	FRAME ON BOTTOM E: 2361832.53 N: 702766.40 WD 11
1024	1724	IMAGE SMALL COBBLES, GRAVEL
1025	1725	FRAME ON DECK, VIDEO STOPPED

10-25-18

Scale: 1 square = _____

UCR SEDIMENT GAUGE STUDY

~~PAGE~~ MH
10-25-19

PDT	UTC			
1030	1730	START ADCP 34-02 E: 2361567.80	N: 703011.74	WD: 13
1035	1735	STOP ADCP START VIDEO, STILL PHOTO ON DECK		
1036	1736	FRAME ON BOTTOM E: 2361566.71	N: 703006.16	WD: 13
1037	1737	IMAGE VEGETATION + SAND		
1038	1738	FRAME ON DECK VIDEO STOPPED		
1049	1749	START ADCP 34-01 E: 2361365.60	N: 703200.51	WD: 12
1053	1753	STOP ADCP START VIDEO, STILL PHOTO ON DECK		
1054	1754	FRAME ON BOTTOM E: 2361367.37	N: 703198.14	WD: 12
1055	1755	IMAGE: GRAVEL, SAND, SILT, LITTLE VEGETATION		
1056	1756	FRAME ON DECK VIDEO STOPPED		
1108	1808	START ADCP 33-05 E: 2364225.37	N: 704206.15	WD: 11
1114	1814	STOP ADCP START VIDEO STILL PHOTO ON DECK		
1114	1914	FRAME ON BOTTOM E: 2364227.72	N: 704211.15	WD: 11
1115	1815	IMAGE: GRAVEL, MIXED UP TO COBBLE SIZE		
1116	1816	FRAME ON DECK, VIDEO STOPPED		
1119	1819	START ADCP 33-04 E: 2364007.03	N: 704368.03	WD: 36
1123	1823	STOP ADCP START VIDEO STILL PHOTO ON DECK		
1124	1824	FRAME ON BOTTOM E: 2364004.61	N: 704362.59	WD 36
1125	1825	IMAGE COBBLES, GRAVEL		
1127	1827	FRAME ON DECK VIDEO STOPPED		
1130	1830	START ADCP 33-03 E: 2363789.95	N: 704530.62	WD: 49
1134	1834	STOP ADCP START VIDEO STILL PHOTO ON DECK		
1135	1835	FRAME ON BOTTOM E: 2363793.45	N: 704533.54	WD 49
1136	1836	IMAGE SMALL COBBLES, GRAVEL		
1138	1838	FRAME ON DECK VIDEO STOPPED	* ADCP 33-03	
1141	1841	START ADCP 33-02 E: 2363571.47	N: 704693.11	WD: 10
1145	1845	STOP ADCP START VIDEO STILL PHOTO ON DECK		
1146	1846	FRAME ON BOTTOM E: 2363571.94	N: 704692.91	WD: 10
1147	1847	IMAGE COBBLES, GRAVEL, VEGETATION		
1148	1848	FRAME ON DECK VIDEO STOPPED		
1155	1955	M ~~START~~ ADCP 33-01 ~~OK~~ TOO SHALLOW	M ~~ADJ~~ NO ADCP	WD: 5
1159	1959	M ~~STOP ADCP~~ START VIDEO	STILL PHOTO ON DECK	
1200	1900	FRAME ON BOTTOM E: 2363278.59	N: 704910.91	WD: 5
1200	1900	IMAGE 33-01 ALT GRAVEL, VEG	TOUCH DOWN ONLY	
1200	1900	FRAME ON DECK VIDEO STOPPED		
1212	1912	START ADCP 32-05 E: 2365517.07	N: 705838.13	WD: 39
1216	1916	STOP ADCP START VIDEO STILL PHOTO ON DECK		
1217	1917	FRAME ON BOTTOM E: 2365515.18	N: 705835.64	WD: 39
1218	1918	IMAGE COBBLES		
1219	1919	FRAME ON DECK VIDEO STOPPED		

10-25-19

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UCR SEDIMENT FACIES STUDY

10-25-18

PDT	UTC	
1222	1922	START ADCP 32-04 E: 2365341.51 N: 706051.60 WD 31
1226	1926	STOP ADCP START VIDEO STILL ON DECK
1227	1927	FRAME ON BOTTOM E: 2365340.33 N: 706050.16 WD 31
1228	1928	IMAGE COBBLES, GRAVEL
1230	1930	FRAME ON DECK VIDEO STOPPED
1235	1935	START ADCP 32-03 E: 2365166.15 N: 706263.44 WD 26
1238	1938	STOP ADCP START VIDEO STILL ON DECK
1239	1939	FRAME ON BOTTOM E: 2365166.46 N: 706262.22 WD 26
1240	1940	IMAGE COBBLES, GRAVEL
1241	1941	FRAME ON DECK VIDEO STOPPED
1243	1943	START ADCP 32-02 E: 2364992.63 N: 706475.44 WD: 40
1247	1947	STOP ADCP START VIDEO STILL ON DECK
1248	1948	FRAME ON BOTTOM E: 2364989.15 N: 706476.93 WD: 40
1249	1949	IMAGE COBBLES & SAND
1250	1950	FRAME ON DECK VIDEO STOPPED
1252	1952	START ADCP 3201 E: 2364817.67 N: 706687.89 WD 20
1259	1959	STOP ADCP START VIDEO STILL ON DECK
1300	2000	FRAME ON BOTTOM E: 2364820.53 N: 706688.99 WD 20
1301	2001	IMAGE BEDROCK, SAND, A LITTLE VEGETATION TOO
1303	2003	FRAME ON DECK VIDEO STOPPED
1303	2003	PULL UP ADCP, TIME TO HEAD TO SHORE FOR LUNCH
1306	2006	LAND ON BEACH FOR LUNCH
1350	2050	PULL OFF SHORE, LUNCH BE OVER, HEAD TOWARDS 31 LINE
1356	2056	REDEPLOY ADCP
1402	2102	START ADCP 31-02 E: 2366757.40 N: 707938.49 WD: 14
1409	2109	STOP ADCP START VIDEO STILL ON DECK
1410	2110	FRAME ON BOTTOM E: 2366760.47 N: 707942.45 WD: 14
1411	2111	IMAGE COBBLES, GRAVEL
1412	2112	FRAME ON DECK VIDEO STOPPED
1419	2119	START ADCP 31-01 E: 2366408.08 N: 708094.04 WD 10
1423	2123	STOP ADCP START VIDEO STILL ON DECK
1425	2125	FRAME ON BOTTOM E: 2366409.41 N: 708098.55 WD 10
1426	2126	IMAGE COBBLES & SAND
1427	2127	FRAME ON DECK VIDEO STOPPED
1429	2129	START ANOTHER ADCP 31-01, NOT AN ALTERNATIVE OUT MAGGIE WANTS TO TRY DIFFERENT RESOLUTION
1434	2134	FINISH SECOND RUN OF ADCP 31.01

MJ 10-25-18

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UCR SEDIMENT FACIES STUDY

10-25-18

PDT	UTC	
1441	2141	START ADCP 31-03 E: 2367105.84 N: 707785.11 WD28
1445	2145	STOP ADCP ~~START VIDEO STILL ON DECK~~ MH
1445	2145	START DUPLICATE ADCP STILL MH
1448	2148	STOP DUPLICATE START VIDEO ~~SHOT~~ ON DECK
1450	2150	FRAME ON BOTTOM E: 2367108.04 N: 707785.85 WD28
1451	2151	IMAGE COBBLES, GRAVEL
1456	2156	DUPLICATE IMAGE SAME
1457	2157	FRAME ON DECK VIDEO STOPPED
1500	2200	START ADCP 31-04 E: 2367454.45 N: 707630.59 WD29
1505	2205	STOP ADCP
1505	2205	START DUPLICATE ADCP STILL MH
1508	2208	STOP DUPLICATE START VIDEO ~~SHOT~~ ON DECK
1509	2209	FRAME ON BOTTOM E: 2367459.33 N: 707630.00 WD: 29
1510	2210	IMAGE COBBLES + GRAVEL
1515	2215	DUPLICATE IMAGE SAME
1517	2217	FRAME ON DECK VIDEO STOPPED
1518	2218	START ADCP 31-05 E: 2367800.23 STILL MH N: 707477.25 WD: 31
1522	2222	STOP ADCP START VIDEO ~~SHOT~~ ON DECK
1523	2223	FRAME ON BOTTOM E: 2367800.11 N: 707478.85 WD: 31
1524	2224	IMAGE COBBLES + SAND
1525	2225	FRAME ON DECK VIDEO STOPPED
1537	2237	START ADCP 30-01 E: 2367756.34 STILL MH N: 710214.39 WD: 32
1540	2240	STOP ADCP START VIDEO ~~SHOT~~ ON DECK
1542	2242	FRAME ON BOTTOM E: 2367748.54 N: 710218.34 WD 32
1542	2242	IMAGE COBBLES - TOUCH DOWN MODE E: 2367756.34 N: 710214.39 MH 10-25
1542	2242	FRAME ON DECK VIDEO STOPPED
1546	2246	START ADCP 30-02 E: 2368096.14 STILL MH N: 710179.35 WD: 33
1550	2250	STOP ADCP START VIDEO ~~SHOT~~ ON DECK
1551	2251	FRAME ON BOTTOM E: 2368103.82 N: 710178.57 WD: 33
1551	2251	IMAGE COBBLES, ~~GRAVEL~~ TOUCHDOWN MODE
1552	2252	FRAME ON DECK VIDEO STOPPED
1554	2254	START ADCP 30-03 E: 2368436.78 N: 710141.59 WD 19
1558	2258	STOP ADCP START VIDEO STILL ON DECK
1559	2259	FRAME ON BOTTOM E: 2368440.48 N: 710146.60 WD 19
1600	2300	IMAGE COBBLES, GRAVEL
1601	2301	FRAME ON DECK VIDEO STOPPED
1602	2302	PULL UP ADCP UNIT TO MOVE INTO SHALLOW WATER

MH 10-25-18

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 UCR SEDIMENT FACIES STUDY 10-25-18

PDT	UTC	
1612	2312	START ADCP 30.05 E: 2369446.52 N: 710031.53 WD: 14
1617	2317	STOP ADCP START VIDEO STILL ON DECK
1618	2318	FRAME ON BOTTOM E: 2369445.56 N: 710029.08 WD: 14
1619	2319	IMAGE COBBLES, GRAVEL + SAND
1620	2320	FRAME ON DECK VIDEO STOPPED
1623	2323	START ADCP 30.04 ALT E: 2369354.63 N: 710040.65 WD 10
1628	2328	STOP ADCP START VIDEO STILL ON DECK
1629	2329	FRAME ON BOTTOM E: 2369352.86 N: 710043.18 WD: 10
1629	2329	IMAGE COBBLES, GRAVEL SAND [IT WAS 1 MINUTE]
1630	2330	FRAME ON DECK VIDEO STOPPED
1631	2331	START PULLING UP ADCP, SECURE GEAR, BREAKDOWN CAMERA AND ANTENNAE, START UPOADING OF DATA BY GRAVITY CREW
1648	2348	START HEADING BACK TO CHINA BEND BOAT LAUNCH
1709	2309	ARRIVE BACK AT CHINA BEND BOAT LAUNCH
1720	2420	ALL BOATS OUT - TIETON IS LAST

10-25-18

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UCR SEDIMENT FACIES STUDY

10-26-18

06 45	1345	HOTEL LOBBY CLOUDS + RAIN MID-40s
0800	1500	HEALTH + SAFETY TALK, HAND OUT DRIVES + NOTEBOOKS
0840	1540	LAUNCH TIETON
08 50	1550	POSITION CHECK CP7
0900	1600	FINISH POSITION CHECK

TODAYS CREW - ATTENDEES

RV TIETON
MARK/HALE AECOM
RENE TRUJILLO GRAVITY
MAGGIE MCKEON GRAVITY
RYAN MCELROY GRAVITY
JOHN SCHAEFER GRAVITY
STEPHANIE ASELAGE JACOBS/EPA
COLUMBIA NAVIGATION
ERIC WEATHERMAN
JOSH WEATHERMAN

RV DISCOVERY
MICHAELA MCCOOL AECOM
MIKE DUFFIELD GRAVITY
JASON DORFMAN DEA
GPS BASE STATION
DAVE WILLIAMS DEA

RICK WILSON
DAN SMITH

RAIN + CLOUDS IN NORTHPORT TOO

0905	1605	RV DISCOVERY POSITION CHECK
1910	1610	DISCOVERY DEPARTS CP7
1911	1611	TIETON HAS BEEPING NOISE AS WE START TO DEPART
0930	1630	NO SOLUTION TO BEEPING, FURTHER, MORE INTENSIVE INVESTIGATION REQUIRED, LEAVE CP7 AND PULL UP TO DOCK
0935	1635	DECISION TO PULL BOAT OUT OF WATER AND ONTO TRAILER WE DISEMBARK BOAT SO BOAT CAN BE PULLED AND THE JETS / INTAKES INSPECTED. CALLS TO SEAN + GREASY GREG FOR GUIDANCE, NO RESOLUTION W/ LAPTOP HOOKED UP
1040	1740	DECISION TO GO OUT AND TRY TO GET SOME WORK DONE, WE CAN RETURN TO DOCK WITH ONE ENGINE IF THE ONE W/ ISSUES NEEDS TO BE SHUT DOWN.
10:45	1745	ON RIVER, RENE PUTTING UNDER LOAD TO TEST
10:54	1754	SOMETHING AIN'T RIGHT, DECISION TO GO BACK TO DOCK SLOW RETURN, NOT GOING FOR MUCH POWER USEAGE, MAYBE ONLY ON ONE ENGINE. PLAN IS TO PULL OUT OF WATER AGAIN AND SEE IF THEY CAN SOLVE, PLUS CALL SEAN FOR THOUGHTS
11 20	1820	BACK AT NORTHPORT DOCK, CREW WILL TRY IMPELLER CHANGE
1245	19:45	IMPELLER EXCHANGED AND TIETON A TEST RUN
12:55	19 55	LOAD BACK UP AND HEAD FOR 29 TRANSECT

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UCR SEDIMENT FACIES STUDY

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PDT	UTC	
		START ADCP E: N: WD:
		STOP ADCP START VIDEO STILL ON DECK MH 10-26-18
1310	2010	DIAGNOSTIC TEST
1312	2012	PASS DIAGNOSTIC TEST
1312	2012	COMPASS CALIBRATION BEGIN 0.8°
1315	2015	COMPASS CALIBRATION EVALUATION DONE 0.3°
1322	2022	START ADCP 29-01 E: 2369091.13 N: 712428.66 WD: 34
1326	2026	STOP ADCP START VIDEO STILL ON DECK
1330	2030	FRAME ON BOTTOM E: 2369093.50 N: 712437.12 WD: 34
1330	2030	IMAGE: COBBLES, GRAVEL TOUCHDOWN MODE NO TIMER
1331	2031	FRAME ON DECK VIDEO STOPPED
1334	2034	START ADCP 29-02 E: 2369243.22 N: 712294.03 WD: 38
1338	2038	STOP ADCP START VIDEO STILL ON DECK
1341	2041	FRAME ON BOTTOM E: 2369243.95 N: 712295.31 WD: 38
1341	2041	IMAGE COBBLES, GRAVEL TOUCHDOWN MODE NO TIMER
1342	2042	FRAME ON DECK VIDEO STOPPED
1345	2045	START ADCP 29-03 E: 2369395.70 N: 712158.06 WD: 33
1349	2049	STOP ADCP START VIDEO STILL ON DECK
1350	2050	FRAME ON BOTTOM E: N: WD: 33
1350	2050	IMAGE COBBLES, GRAVEL TOUCHDOWN MODE NO TIMER
1351	2051	FRAME ON DECK VIDEO STOPPED
1352	2052	START ADCP 29-04 E: 2369546.61 N: 712024.35 WD: 11
1356	2056	STOP ADCP START VIDEO STILL ON DECK
1357	2057	FRAME ON BOTTOM E: 2369544.95 N: 712021.79 WD: 11
1357	2057	IMAGE COBBLES TOUCHDOWN MODE NO TIME
1358	2058	FRAME ON DECK VIDEO STOPPED
1403	2103	START ADCP 29-05ALT E: 2369592.78 N: 711983.25 WD 10
1407	2107	STOP ADCP START VIDEO STILL ON DECK
1408	2108	FRAME ON BOTTOM E: 2369594.76 N: 711983.62 WD 10
1409	2109	IMAGE: COBBLES, GRAVEL
1409	2109	FRAME ON DECK VIDEO STOPPED
1417	2117	START ADCP 29-01 E: 2371033.16 N: 713980.32 WD: 27
1421	2121	STOP ADCP START VIDEO STILL ON DECK
1422	2122	FRAME ON BOTTOM E: 2371028.92 N: 713977.95 WD: 27
1422	2122	IMAGE BEDROCK TOUCHDOWN MODE NO TIMER
1423	2123	FRAME ON DECK VIDEO STOPPED

MH 10-26-18

Scale: 1 square = _____

UCR SEDIMENT FACIES STUDY

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PDT	UTC	
1427	2127	START ADCP 28-02 E: 2371212.84 N: 713858.92 WD: 36
1430	2130	STOP ADCP START VIDEO STILL ON DECK
1431	2131	FRAME ON BOTTOM E: 2371215.16 N: 713859.88 WD: 36
1431	2131	IMAGE COBBLES, GRAVEL TOUCHDOWN MODE NO TIMER
1432	2132	FRAME ON DECK VIDEO STOPPED
1435	2135	START ADCP 28-03 E: 2371395.49 N: 713735.76 WD: 56
1440	2140	STOP ADCP START VIDEO STILL ON DECK
1441	2141	FRAME ON BOTTOM E: 2371390.32 N: 713734.84 WD: 56
1441	2141	IMAGE COBBLES, GRAVEL TOUCHDOWN MODE NO TIMER
1442	2142	FRAME ON DECK VIDEO STOPPED
1446	2146	START ADCP 28-04 E: 2371577.11 N: 713613.08 WD: 24
1449	2149	STOP ADCP START VIDEO STILL ON DECK
1450	2150	FRAME ON BOTTOM E: 2371577.33 N: 713616.17 WD: 24
1450	2150	IMAGE COBBLES, GRAVEL TOUCHDOWN MODE NO TIMER
1451	2151	FRAME ON DECK VIDEO STOPPED
1453	2153	START ADCP 28-05 ALT E: 2371678.39 N: 713645.93 WD: 10
1457	2157	STOP ADCP START VIDEO STILL ON DECK
1458	2158	FRAME ON BOTTOM E: 2371695.10 N: 713546.87 WD: 10
1459	2159	IMAGE COBBLES GRAVEL
1459	2159	FRAME ON DECK VIDEO STOPPED
1507	2207	START ADCP 27-05 ALT E: 2373476.72 N: 714689.14 WD: 10
1511	2211	STOP ADCP START VIDEO STILL ON DECK
1512	2212	FRAME ON BOTTOM E: 2373474.46 N: 714688.52 WD: 10
1512	2212	IMAGE COBBLES, GRAVEL, VEG TOUCHDOWN MODE NO TIMER
1513	2213	FRAME ON DECK VIDEO STOPPED
1516	2216	START ADCP 27-04 E: 2373428.94 N: 714855.83 WD: 27
1520	2220	STOP ADCP START VIDEO STILL ON DECK
1522	2222	FRAME ON BOTTOM E: 2373428.87 N: 714854.48 WD: 27
1522	2222	IMAGE COBBLES GRAVEL TOUCHDOWN MODE NO TIMER
1523	2223	FRAME ON DECK VIDEO STOPPED
1525	2225	START ADCP 27-03 E: 2373371.58 N: 715045.79 WD: 34
1529	2229	STOP ADCP START VIDEO STILL ON DECK
1530	2230	FRAME ON BOTTOM E: 2373372.97 N: 715045.74 WD: 34
1530	2230	IMAGE COBBLES, GRAVEL TOUCHDOWN MODE NO TIMER
1531	2231	FRAME ON DECK VIDEO STOPPED
1533	2233	START ADCP 2702 E: 2373321.94 N: 715235.79 WD: 32
1537	2237	STOP ADCP START VIDEO STILL ON DECK
1538	2238	FRAME ON BOTTOM E: 2373325.84 N: 715233.87 WD: 32
1538	2238	IMAGE COBBLES, GRAVEL TOUCHDOWN MODE ~~NO TIMER~~
1539	2239	FRAME ON DECK VIDEO STOPPED

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 UCR SEDIMENT FACIES STUDY 10-26-18

PDT	UTC	
15 40	2240	START ADCP 27-01 E: 2373268.49 N: 715427.69 WD 26
15 44	2244	STOP ADCP START VIDEO STILL ON DECK
15 45	2245	FRAME ON BOTTOM E: 2373272.99 N: 715431.64 WD 26
1545	2245	IMAGE COBBLES, GRAVEL TOUCHDOWN MODE NO TIMER
15 46	2246	FRAME ON DECK VIDEO STOPPED
15 53	2253	START ADCP 26-01 E: 2375387.5 N: 716370.11 WD: 54
1557	2257	STOP ADCP START VIDEO STILL ON DECK
1559	2259	FRAME ON BOTTOM E: 2375398.62 N: 716375.37 WD 54
1559	2259	IMAGE COBBLES GRAVEL TOUCHDOWN MODE NO TIMER
16 00	2300	FRAME ON DECK VIDEO STOPPED
1601	2301	START ADCP 26-02 E: 2375450.97 N: 716209.72 WD: 36
1605	2305	STOP ADCP START VIDEO STILL ON DECK
1606	2306	FRAME ON BOTTOM E: 2375455.23 N: 716215.13 WD: 36
1606	2306	IMAGE COBBLES, GRAVEL TOUCHDOWN MODE NO TIMER
1607	2307	FRAME ON DECK VIDEO STOPPED
1609	2309	START ADCP 26-03 E: 2375515.38 N: 716049.74 WD 22
1612	2312	STOP ADCP START VIDEO STILL ON DECK
1613	2313	FRAME ON BOTTOM E: 2375520.83 N: 716049.50 WD 22
1613	2313	IMAGE COBBLES TOUCHDOWN MODE NO TIMER
1614	2314	FRAME ON DECK VIDEO STOPPED
16	23	START ADCP E: N: WD 2X
16	23	STOP ADCP START VIDEO STILL ON DECK
16	23	FRAME ON BOTTOM E: N: WD: 21
16	23	IMAGE
16	23	FRAME ON DECK VIDEO STOPPED
		START ADCP E: N: WD:
		STOP ADCP E: N: WD

CHANGE IN PLANS
WILL DO DUPLICATE NOW MH 10-26-18

1619	2319	START ADCP 26-04 E: N: WD 15
16	23	STOP ADCP CHANGE IN PLANS AGAIN
16	23	START DUPLICATE ADCP NO DUPLICATE MH 10-26-18
1619	2319	START ADCP 26-04 E: 2375577.56 N: 715890.16 WD 15
1624	2324	STOP ADCP START VIDEO STILL ON DECK
1628	2328	FRAME ON BOTTOM E: 2375584.03 N: 715895.45 WD: 15
1628	2328	IMAGE COBBLES, GRAVEL TOUCHDOWN MODE NO TIMER
16 29	2329	FRAME ON DECK

MH 10-26-18

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UCR SEDIMENT FACIES STUDY 10.26.18

PDT	UTC	
1635	2335	START ADCP 26-05ALT E:2375597.29 N:715840.97 WD 10
1639	2339	STOP ADCP START VIDEO STILL ON DECK
1640	2340	FRAME ON BOTTOM E:2375601.14 N:715843.29 WD 10
1640	2340	IMAGE COBBLES, GRAVEL TOUCHDOWN MODE NO TIMER
1640	2340	FRAME ON DECK VIDEO STOPPED
1641	2341	START PULLING UP INSTRUMENTS + DOWNLOADING DATA
1643	2343	HEAD BACK FOR NORTHPORT BOAT LAUNCH
1650	2350	BACK AT LAUNCH OUR BOATS ARE IN QUEUE TO GET OUT
1700	2400	DISCOVERY OUT OF WATER
1710	2410	TIETON OUT OF WATER
1715	2415	REQUEST MAPS OF JENNY FOR MAGGIE

10-26-18

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P42 UCR Sediment Facies Study 10-29-18

PDT WEATHER: CLOUDY 40°F, SCATTERED LIGHT SHOWERS

730 ARRIVE AT NORTHPORT BOAT LAUNCH.

800 TAILGATE SAFETY MEETING. TALKED ABOUT TRAVEL AND COMPLACIENCY

830 VESSELS IN WATER, ADDITIONAL SAFETY TALK ON TIETON AS A REMINDER TO RETURNING STAFF.

845 GPS POSITION CHECK AT CP-7. USACE1001-99 BASE STATION.

850 VESSEL DEPARTING FOR TRASECT 25

PDT	UTC	
900	1600	Diagnostic check complete passed
901	1601	START ADCP COMPASS CALIBRATION 1200 kHz
903	1603	COMPASS CALIBRATION initial 0.8° final 0.9°
PDT	UTC	
907	1607	START ADCP TRASECT 25-01 E: 2377125.09 N: 717876.05 WD 10
911	1611	STOP ADCP START VIDEO STILL PHOTO ON DECK
913	1613	FRAME ON BOTTOM TOUCH DOWN MODE E 2377126.77
		RAPID MOVING WATER N 717876.09
913	1613	IMAGE: COBBLES
914	1614	FRAME ON DECK VIDEO STOP
919	1619	START ADCP 25-02 E 2377249.65 N 717797.94 WD 26
922	1622	STOP ADCP START VIDEO STILL PHOTO OUDECK
924	1624	FRAME ON BOTTOM ~~START~~ mm TOUCH DOWN MODE RAPID WATER ~~#2~~ mm
		E 2377252.97 N 717796.60
924	1624	IMAGE: COBBLES
925	1625	FRAME ON DECK STOP VIDEO
928	1628	START ADCP 25-03 E 2377376.89 N 717718.00 WD 34
932	1632	STOP ADCP START VIDEO STILL PHOTO ON DECK
933	1633	FRAME ON BOTTOM TOUCH DOWN MODE RAPID WATER 4.2
		E 2377376.98 N 717712.85
933	1633	IMAGE: COBBLES
934	1634	FRAME ON DECK STOP VIDEO
937	1637	START ADCP 25-04 E 2377503.54 N 717638.23 WD 40
941	1641	STOP ADCP START VIDEO STILL PHOTO ON DECK
942	1642	FRAME ON BOTTOM TOUCH DOWN MODE · RAPID WATER
942	1642	E 2377505.45 N 717635.74
942	1642	IMAGE: COBBLES
943	1643	FRAME ON DECK STOP VIDEO
945	1645	START ADCP 25-05 E 2377629.21 N 717559.54 WD 33
949	1649	STOP ADCP START VIDEO STILL PHOTO
950	1650	E 2377629.80 N 717561.04 FRAME AT BOTTOM
		TOUCH DOWN MODE
950	1650	IMAGE: COBBLES SOME GRAVEL
951	1651	FRAME ON DECK STOP VIDEO

Scale: 1 square = Michaela McCoy

P43 SEDIMENT FACES STUDY 10-29-18

PDT	UTC	
954	1654	MOBING TO TRASECT ~~26~~ MW 24
958	1658	Station 24-01 is not accessible. RAPID WATER CLOSE TO ROCK OUTCROP
~~1004~~	~~1704~~ MW	
1004	1704	START ADCP 24-05 E 2379033.76 N 719752.20 WD 58
1007	1707	STOP ADCP START VIDEC STILL PHOTO
1009	1709	FRAME ON BOTTOM TOUCH DOWN MODE RAPID WATER
		E 2379033.31 N 719755.93 IMAGE: COBBLES
1011	1711	FRAME ON DECK STOP VIDEO
1013	1713	START ADCP 24-04 E 2378901.75 N 719737.77 WD 53
1017	1717	STOP ADCP START VIDEO STILL PHOTO
1018	1718	FRAME ON BOTTOM TOUCH DOWN MODE
		E 2378898.08 N 719741.52
1018	1718	IMAGE: Bedrock
1019	1719	FRAME ON DECK STOP VIDEO
1022	1722	START ADCP 24-03 E 2378772 N 719728.08 WD 38
1026	1726	STOP ADCP START VIDEO STILL PHOTO
1028	1728	FRAME ON BOTTOM TOUCH DOWN MODE
		E 2378773.06 N 719732.07
1028	1728	IMAGE: Bedrock
1028	1728	FRAME ON DECK STOP VIDEO
1031	1731	START ADCP 24-02 E 2378641.68 N 719717.75 WD 26
1035	1735	STOP ADCP START VIDEO STILL PHOTO
1037	1737	FRAME ON BOTTOM TOUCH DOWN MODE RAPID WATER
		E 2378645.35 N 719723.50
1037	1739	IMAGE: BEDROCK:
1038	1738	FRAME ON DECK STOP VIDEO
1045	1745	START ADCP 23-05 E 2379967.33 N 720602.17 WD 17
1049	1749	STOP ADCP START VIDEO STILL PHOTO
1050	1750	FRAME ON BOTTOM TOUCH DOWN MODE
1050	1750	IMAGE: COBBLES SOME GRAVEL
1051	1751	FRAME ON DECK STOP VIDEO
1053	1753	START ADCP 23-04 E 2379974.95 N 720761.47 WD 24
1057	1757	STOP ADCP START VIDEO STILL PHOTO
1058	1758	FRAME ON BOTTOM TOUCH DOWN MODE RAPID WATER 4.8 ft/sec
1058	1758	IMAGE: COBBLES E 2379972.24 N 720762.69
1059	1759	FRAME ON DECK STOP VIDEO

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UCR SEDIMENT FACIES 10-29-18

PDT	UTC	
1102	1802	START ADCP 23-03 E 2379977.00 N 720920.17 WD 32
1107	1807	STOP ADCP START VIDEO STILL VIDEO ON DECK
1108	1808	FRAME ON BOTTOM TOUCH DOWN MODE 5 FT/S
		E 2379978.75 N 720919.63
1108	1808	IMAGE: COBBLES & GRAVEL
1109	1809	FRAME ON DECK VIDEO STOPPED
1110	1810	START ADCP 23-02 E 2379983.44 N 721081.20 WD 35
1114	1814	STOP ADCP START VIDEO STILL PHOTO ON DECK
1115	1815	FRAME ON BOTTOM TOUCH DOWN MODE
		E 2379987.36 N 721076.74
1115	1815	IMAGE: GRAVEL & COBBLES
1116	1816	FRAME ON DECK STOPPED VIDEO
1118	1818	START ADCP 23-01 E 2379987.56 N 721239.61 WD 26
1122	1822	STOP ADCP START VIDEO STILL PHOTO ON DECK
1124	1824	FRAME ON BOTTOM TOUCH DOWN MODE velocity ~ 5 FT/sec
		E 2379991.75 N 721239.56
1124	1824	IMAGE: COBBLES & GRAVEL
1125	1825	FRAME ON DECK STOPPED VIDEO
1133	1833	Mobilizing across TRANSECT 22 to see what we may be able to get with ADCP & VIDEO. WILL NOT BE ABLE TO DO 22-03 Due to proximity of station to rock & velocity of WATER PUSHING VESSEL TOWARD Rock.
1141	1841	START ADCP 22-01 E 2381768.90 N 722056.12 WD 29
1145	1845	STOP ADCP START VIDEO STILL PHOTO ON DECK
1146	1846	FRAME ON BOTTOM TOUCH DOWN MODE
		E 2381772.22 N 722058.47
1146	1846	IMAGE: COBBLES
1147	1847	FRAME ON DECK VIDEO STOPPED
1149	1849	START ADCP 22-02 E 2381900.04 N 721900.78 WD 29
1154	1854	STOP ADCP START VIDEO STILL PHOTO ON DECK
1155	1855	FRAME ON BOTTOM TOUCH DOWN MODE WATER VELOCITY 5.5 FT/sec
		E 2381903.95 N 721905.61
1155	1855	IMAGE: GRAVEL & COBBLES
1156	1856	FRAME ON DECK VIDEO STOPPED
1201	1901	START ADCP 22-04 E 2382159.25 N 721586.80 WD 47
1206	1906	STOP ADCP START VIDEO STILL PHOTO ON DECK
1208	1908	FRAME ON BOTTOM TOUCH DOWN MODE
		E 2382173.45 N 721583.00
1208	1908	IMAGE GRAVEL
1209	1909	FRAME ON DECK VIDEO STOPPED

Scale: 1 square = ____ Michaela McCoy

P45

PDT	UTC	SEDIMENT FACIES STUDY 10-29-18
1211	1911	START ADCP 22-05 E 2382298.92 N 721421.88 WD 16
1215	1915	STOP ADCP START VIDEO STILL PHOTO ON DECK
1216	1916	FRAME ON BOTTOM
		E 2382298.02 N 721423.57
1216	1916	IMAGE: GRAVEL
1217	1917	FRAME ON DECK VIDEO STOPPED
1306	2006	GPS location check at CP-8
1325	2025	MOBing to TRASECT 21
1333	2033	Placed an alternate point at/for 21-05 due to shallow conditions. Approx ½ between 21-05 & 21-04
1340	2040	START ADCP 21-05 ALT E 2384250.34 N 722639.09 WD 10
1343	2043	STOP ADCP START VIDEO STILL PHOTO ON DECK TOUCH DOWN MODE
1344	2044	FRAME on BOTTOM E 2384249.43 N 722638.94
1345	2045	FRAME ON DECK STOPPED VIDEO IMAGE: COBBLES
1348	2048	START ADCP 21-04 E 2384245.75 N 722739.22 WD 22
1352	2052	STOP ADCP START VIDEO STILL PHOTO ON DECK
1353	2053	FRAME ON BOTTOM TOUCH DOWN MODE Velocity 4.5 Ft/Sec
		E 2384247.37 N 722737.38
1353	2053	IMAGE: COBBLES & GRAVEL
1353	2053	FRAME ON DECK STOPPED VIDEO
1357	2057	START ADCP 21-03 E 2384243.13 N 722908.32 WD 36
1401	2101	STOP ADCP ~~START VIDEO STILL PHOTO ON DECK~~ MM IMAGE
1401	2101	~~FRAME ON BOTTOM~~ MM START ADCP DUPLICATE E 2384244.68 N 722906.82
1404	2104	STOP ADCP ~~E~~ START VIDEO ~~N~~ STILL PHOTO ON DECK
1406	2106	~~IMAGE~~ MM FRAME ON BOTTOM & DUPLICATE TOUCH DOWN MODE
~~1407~~ 1406	2107	FRAME ON DECK STOPPED VIDEO IMAGE: COBBLES & GRAVEL
1410	2110	START ADCP 21-02 E 2384241.49 N 723079.16 WD 34
1414	2114	STOP ADCP
1414	2114	START ADCP 21-02 DUPLICATE
1417	2117	STOP ADCP START VIDEO STILL PHOTO ON DECK
1418	2118	FRAME ON BOTTOM & DUPLICATE TOUCH DOWN MODE
		E 2384244.13 N 723076.09
1418	2118	IMAGE: GRAVEL & COBBLES
1419	~~2~~119	FRAME ON DECK STOPPED VIDEO
1424	2124	START ADCP 21-01 E 2384239.35 N 723249.98 WD 34
1427	2127	STOP ADCP START VIDEO STILL PHOTO ON DECK
1430	2130	FRAME ON BOTTOM E 2384239.35 N 723249.98
1431	2131	IMAGE: SAND & SILT
1431	2131	FRAME ON DECK VIDEO STOPPED

Scale: 1 square = _____

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UCR SEDIMENT FACES STUDY 10-29-18

P46 PDT	UTC	
1440	2140	MOBING and SCOUTING TRANSECT 12. SOME OF THE STATIONS ARE IN VERY SHALLOW WATER
1447	2147	START ADCP 12-05 E 2389878.54 N 724482.48 WD 30
1451	2151	STOP ADCP START VIDEO STILL PHOTO ON DECK
1452	2152	FRAME ON BOTTOM TOUCH DOWN MODE Velocity ~ 6 Ft/sec E 2389875.12 N 724487.13
1452	2152	IMAGE: GRAVEL & COBBLES
1453	2153	FRAME ON DECK STOP VIDEO
1459	2159	START ADCP 12-04 E 2389670.06 N 724538.29 WD 18
1503	2203	STOP ADCP START VIDEO STILL PHOTO ON DECK
1504	2204	FRAME ON BOTTOM TOUCH DOWN MODE WATER VELOCITY 6.7 Ft/sec
1504	2204	IMAGE: COBBLES E 2389671.70 N 724539.87
1505	2205	FRAME ON DECK VIDEO STOPPED
1506	2206	STATIONS 12-03, 12-02 & 12-01 ARE TO SHALLOW & WATER VELOCITY IS TOO FAST TO COMPLETE, DEPTHS WERE FROM 8-8.5' MOBING TO TRANSECT 11
1515	2215	START ADCP 11-05 E 2391126.93 N 726373.26 WD 17
1518	2218	STOP ADCP START VIDEO STILL PHOTO ON DECK
1520	2220	FRAME ON BOTTOM E 2391128.80 N 726375.71
1521	2221	IMAGE: SILTY SAND
1521	2221	FRAME ON DECK STOP VIDEO
1523	2223	START ADCP 11-04 E 2391075.05 N 726474.15 WD 23
1527	2227	STOP ADCP START VIDEO STILL PHOTO ON DECK
1528	2228	FRAME ON BOTTOM E 2391076.24 N 726473.32
1528	2228	IMAGE: BOULDER or bedrock TOUCH DOWN MODE. IMAGE BLURRY
1529	2229	FRAME ON DECK STOPPED VIDEO BUT HAVE VIDEO
1530	2230	START ADCP 11-03 E 2391018.59 N 726573.31 WD 34
1534	2234	STOP ADCP START VIDEO STILL PHOTO ON DECK
1535	2235	FRAME ON BOTTOM TOUCH DOWN MODE E 2391019.98 N 726571.31
1535	2235	IMAGE: Bedrock?
1536	2235	FRAME ON DECK STOPPED VIDEO
1538	2238	START ADCP 11-02 E 2390964.01 N 726674.46 WD 53
1541	2241	STOP ADCP START VIDEO STILL PHOTO ON DECK
1543	2243	FRAME ON BOTTOM TOUCH DOWN MODE E 2390965.51 N 726670.97
1543	2243	IMAGE: COBBLES & GRAVEL
1543	2243	FRAME ON DECK STOPPED VIDEO

Scale: 1 square = _____

UCR SEDIMENT FACIES STUDY

10-29-18

PDT	UTC	
1545	2245	START ADCP 11-01 E 2390908.82 N 726773.62 WD 47
1549	2249	STOP ADCP START VIDEO STILL PHOTO ON DECK
1550	2250	FRAME ON BOTTOM TOUCH DOWN MODE
		E 2390910.19 N 726771.59
1550	2250	IMAGE: COBBLES
1550	2250	FRAME ON DECK VIDEO STOPPED
1554	2254	MOBING TO TRASECT 10
1559	2259	START ADCP 10-01 E 2393402.74 N 727702.75 WD 36
1603	2303	STOP ADCP START VIDEO STILL PHOTO ON DECK
1604	2304	FRAME ON BOTTOM TOUCH DOWN MODE
		E 2393403.02 N 727704.00
1604	2304	IMAGE: COBBLES & SAND
1605	2305	FRAME ON DECK VIDEO STOPPED
1606	2306	START ADCP 10-02 E 2393423.94 N 727606.21 WD 43
1610	2310	STOP ADCP START VIDEO STILL PHOTO ON DECK
1611	2311	FRAME ON BOTTOM TOUCH DOWN MODE ~5ft/sec
		E 2393423.69 N 727607.31
1611	2311	IMAGE COBBLES & GRAVEL & BOULDERS
1612	2312	FRAME ON DECK VIDEO STOPPED
1613	2313	START ADCP 10-03 E 2393445.84 N 727511.46 WD 44
1617	2317	STOP ADCP START VIDEO STILL PHOTO ON DECK
1618	2318	FRAME ON BOTTOM TOUCH DOWN MODE
		E 2393445.71 N 727511.65
1618	2318	IMAGE: COBBLES
1619	2319	FRAME ON DECK STOPPED VIDEO
1623	2323	START ADCP 10-04 E 2393467.43 N 727413.97 WD 37
1626	2326	STOP ADCP START VIDEO STILL PHOTO ON DECK
1628	2328	FRAME ON BOTTOM TOUCH DOWN MODE
		E 2393469.09 N 727414.05
1628	2328	IMAGE: BOULDERS & COBBLES
1628	2328	FRAME ON DECK STOPPED VIDEO
1629	2329	START ADCP 10-05 E 2393488.76 N 727318.34 WD 21
1633	2333	STOP ADCP START VIDEO STILL PHOTO ON DECK
1634	2334	FRAME ON BOTTOM TOUCH DOWN MODE
		E 2393491.55 N 727319.20
1634	2334	IMAGE: BOULDER
1635	2335	FRAME ON DECK STOP VIDEO
1640	2340	PULLING UP INSTRUMENTATION & PREPARING TO MOB TO NORTHPORT BOAT LAUNCH
1655	2355	Arrive at NORTHPORT BOAT LAUNCH

Scale: 1 square =

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PE48 UCR Sediment Facies Study 10-30-18

0630 - Meet at Comfort Inn lobby & MOB to Northport Boat launch

0730 - Safety Meeting weather 37°F overcast

ATTENDEES

RV Tieton

Ragan Driver AECOM
Maggie McKean Gravity
Ryan McElrese Gravity
John Schafer Gravity
Marilyn Guthrie Jacobs
Patrick Miller USGS
Charlie Kellogg Gravity

GPS Base station

Dave Williams DEA

RV Discovery

Michaela McCoog AECOM
Mike Duffield Gravity
John Staly DEA

Columbia Navigation

Eric Weatherman Dru Smith
Josh Weatherman Rick Wilson

PDT	UTC	
0800	1500	Haul out log books and hard drives
0820	1520	Launch Tieton
0840	1540	Tieton departs for Transect 9
0855	1555	GPS Position check at CB4/UCR4
0910	1610	GPS Position check complete
0913	1613	Diagnostics Passed ADCP
0914	1614	Start ADCP compass calibration initial - 0.4° Final - 0.3° 1200 KHZ
PDT	UTC	
0829	1629	Start ADCP Transect 9-01 E 2395684.97 N 728985.76 WD 18'
0933	1633	STOP ADCP START VIDEO STILL PHOTO ON DECK
0934	1634	FRAME ON BOTTOM E 2395656.44 N 728985.72
0935	1635	IMAGE: COBBLES
0937	1637	FRAME ON DECK STOPPED VIDEO
0940	1640	START ADCP Transect 9-02 E 2395707.14 N 728877.05 WD 31'
0942	1642	STOP ADCP START VIDEO STILL PHOTO ON DECK
0943	1643	FRAME ON BOTTOM E 2395706.75 N 728881.59 Touchdown Mode
0944	1644	IMAGE: Gravels & cobbles
0944	1644	Frame on deck STOPPED VIDEO
0946	1646	START ADCP Transect 9-03 E 2395757.58 N 728771.65 WD 34'
0949	1649	STOP ADCP START VIDEO STILL PHOTO ON DECK
0950	1650	FRAME ON BOTTOM TOUCHDOWN MODE E 2395758.98 N 728772.74
0951	1651	IMAGE: COBBLES
0951	1651	FRAME ON DECK STOPPED VIDEO

Scale: 1 square = _____ 10/30/18

PDT	UTC	
0953	1653	START ADCP Transect 9-04 E 2395809.30 N 728663.04 WD 27'
0956	1656	STOP ADCP START VIDEO STILL PHOTO ON DECK
0957	1657	FRAME ON BOTTOM TOUCHDOWN MODE E 2395808.26 N 728661.75
0957	1657	IMAGE: BIGGER COBBLE & STILK
0958	1658	FRAME ON DECK STOPPED VIDEO
0959	1659	START ADCP Transect 9-05 E 2395862.66 N 728555.06 WD 21'
1003	1703	STOP ADCP START VIDEO STILL PHOTO ON DECK
1004	1704	FRAME ON BOTTOM TOUCHDOWN MODE E 2395863.60 N 728555.37
1004	1704	IMAGE: COBBLES
1005	1705	FRAME ON DECK STOPPED VIDEO
1005	1705	~~START ADCP Transect~~ RD MOB to Transect 8
1015	1715	START ADCP Transect 8-01 E 2397615.33 N 730444.25 WD 22'
1018	1718	STOP ADCP START VIDEO STILL PHOTO ON DECK
1019	1719	FRAME ON BOTTOM TOUCHDOWN MODE E 2397615.33 N 730444.33
1019	1719	IMAGE: BOULDERS & COBBLES
1020	1720	FRAME ON DECK STOPPED VIDEO
1022	1722	START ADCP Transect 8-02 E 2397727.12 N 730359.99 WD 21'
1026	1726	STOP ADCP START VIDEO STILL PHOTO ON DECK
1027	1727	FRAME ON BOTTOM Touchdown mode E 2397728.97 N 730360.38
1027	1727	IMAGE: COBBLES
1028	1728	FRAME ON DECK STOPPED VIDEO
1029	1729	START ADCP Transect 8-03 E 2397838.25 N 730275.45 WD 20'
1033	1733	STOP ADCP START VIDEO STILL PHOTO ON DECK
1034	1734	FRAME ON BOTTOM Touchdown Mode E 2397838.07 N 730275.46
1034	1734	IMAGE: COBBLES & GRAVELS
1035	1735	FRAME ON DECK STOPPED VIDEO
1036	1736	START ADCP Transect 8-04 E 2397949.57 N 730191.35 WD 17'
1040	1740	STOP ADCP START VIDEO STILL PHOTO ON DECK
1041	1741	FRAME ON BOTTOM Touchdown mode E 2397949.16 N 730191.17
1041	1741	IMAGE: COBBLES & GRAVELS
1041	1741	FRAME ON DECK STOPPED VIDEO
1043	1743	START ADCP Transect 8-05 E 2398060.39 N 730107.52 WD 13'
1047	1747	STOP ADCP START VIDEO STILL PHOTO ON DECK
1048	1748	FRAME ON BOTTOM Touchdown mode E 2398060.84 N 730106.59
1048	1748	IMAGE: COBBLES & GRAVELS
1048	1748	FRAME ON DECK STOPPED VIDEO
1049	1749	MOB to Transect 7

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PDT	UTC	
1102	1802	START Transect 7-01 E2399563.55 N732316.31 WD 32'
1108	1808	STOP ADCP START VIDEO STILL PHOTO ON DECK
1109	1809	FRAME ON BOTTOM TOUCHDOWN MODE E2399564.62 N732316.45
1110	1810	IMAGE: COBBLES, GRAVELS & some sand
1111	1811	FRAME ON DECK STOPPED VIDEO
1112	1812	START Transect 7-02 E2399631.55 N732219.68 WD 42'
1116	1816	STOP ADCP START VIDEO STILL PHOTO ON DECK
1116	1816	FRAME ON BOTTOM Touchdown E2399631.37 N732219.87
1117	1817	IMAGE: COBBLES
1117	1817	FRAME ON DECK STOPPED VIDEO
1121	1821	START Transect 703 E2399698.66 N732124.19 WD 37'
1124	1824	STOP ADCP START VIDEO STILL PHOTO ON DECK
1126	1826	FRAME ON BOTTOM Touchdown mode E2399697.37 N732123.89
1126	1826	IMAGE: COBBLES & GRAVELS
1126	1826	FRAME ON DECK STOPPED VIDEO
1129	1829	START ADCP Transect 7-04 E2399766.59 N732028.02 WD 38'
1133	1833	STOP ADCP START VIDEO STILL PHOTO ON DECK
1134	1834	FRAME ON BOTTOM Touchdown mode E2399767.04 N732026.87
1134	1834	IMAGE: COBBLES & SMALLER GRAVELS
1135	1835	FRAME ON DECK STOPPED VIDEO
1136	1836	START ADCP Transect 7-05 E2399834.95 N731931.43 WD 33'
1140	1840	STOP ADCP START VIDEO STILL PHOTO ON DECK
1141	1841	FRAME ON BOTTOM Touchdown mode E2399835.6 N731932.23
1141	1841	IMAGE: Large COBBLES
1142	1842	FRAME ON DECK STOPPED VIDEO
1143	1843	MOB TO TRANSECT 6
1153	1853	START ADCP Transect 6-01 E2401890.93 N733585.46 WD 27'
1157	1857	STOP ADCP START VIDEO STILL PHOTO ON DECK
1158	1858	FRAME ON BOTTOM Touchdown mode E2401893.60 N733586.77
1158	1858	IMAGE: GRAVEL & COBBLES
1158	1858	FRAME ON DECK STOPPED VIDEO
1201	1901	START ADCP Transect 6-2 E2401963.79 N733482.61 WD 30'
1205	1905	STOP ADCP START VIDEO STILL PHOTO ON DECK
1206	1906	FRAME ON BOTTOM Touchdown mode E2401963.39 N733480.71
1206	1906	Image: COBBLES & GRAVELS
1206	1906	FRAME ON DECK STOPPED VIDEO

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UCR Sediment Facies Study 10/30/18

PDT	UTC	
12 08	19 08	START ADCP Transect 6-03 E2402032.68 N733378.43 WD 28'
12 12	19 12	STOP ADCP START VIDEO STILL PHOTO ON DECK
12 13	19 13	FRAME ON BOTTOM Touchdown mode E 2402033.15 N733378.69
12 13	19 13	IMAGE: COBBLES & GRAVELS
12 14	19 14	FRAME ON DECK STOPPED VIDEO
12 15	19 15	START ADCP Transect 6-04 E2402102.19 N733275.80 WD 29'
12 18	19 18	STOP ADCP START VIDEO STILL PHOTO ON DECK
12 20	19 20	FRAME ON BOTTOM Touchdown mode E 2402103.23 N733274.68
12 20	19 20	IMAGE: GRAVELS
12 20	19 20	FRAME ON DECK STOPPED VIDEO
12 23	19 23	START ADCP Transect 6-05 E 2402171.81 N 733171.70 WD 30'
12 26	19 26	STOP ADCP START VIDEO STILL PHOTO ON DECK
12 27	19 27	FRAME ON BOTTOM E2402171.99 N733172.09
12 28	19 28	IMAGE: GRAVEL & WHITE SAND
12 29	19 29	FRAME ON DECK STOPPED VIDEO
12 40	19 40	GPS Location check at CP9 Black sand Beach
		GPS Not picking up Base Station, Dave Williams set up new base
13 38	20 38	Station NEW YONDER, Location Check complete
13 40	20 40	MOB to Transect 5
		Afternoon WEATHER 48°F overcast
14 00	21 00	DEPLOY ADCP
14 03	21 03	START ADCP Transect 5-01 E2404053.34 N735060.44 WD 29'
14 07	21 07	STOP ADCP START VIDEO STILL PHOTO ON DECK
14 11	21 11	FRAME NEAR BOTTOM FAST CURRENT E2404049.95 N735054.46
14 11	21 11	IMAGE: COBBLES TOUCH DOWN MODE
14 11	21 11	FRAME ON DECK STOPPED VIDEO
14 18	21 18	START ADCP Transect 5-02 E2404076.44 N734945.00 WD 29'
14 21	21 21	STOP ADCP NO PHOTO DUE TO HIGH VELOCITY CURRENT
14 22	21 22	PULL ADCP, STATIONS 5-03 THRU 5-05 NO GO DUE TO SHALLOW
		WATER AND HIGH VELOCITY CURRENTS
14 30	21 30	MOB TO Transect 4
14 32	21 32	DEPLOY ADCP
14 33	21 33	START ADCP Transect 4-01 E2406129.97 N736194.21 WD 12'
14 37	21 37	STOP ADCP START VIDEO STILL PHOTO ON DECK
14 38	21 38	FRAME ON BOTTOM E2406130.19 N 736199.93 TOUCHDOWN MODE
14 38	21 38	IMAGE: LARGE ROCKS
14 39	21 39	FRAME ON DECK STOPPED VIDEO

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PDT	UTC	
14 42	21 42	START ADCP Transect 4-02 E 2406239.86 N 736129.07 WD 12'
14 45	21 45	STOP ADCP START VIDEO STILL PHOTO ON DECK
14 46	21 46	FRAME ON BOTTOM Touchdown mode ~~E 2406240.60 N 736129.36~~ RD
14 47	21 47	IMAGE: BOULDERS & COBBLES E 2406240.60 N 736129.36
14 47	21 47	FRAME ON DECK STOPPED VIDEO
14 51	21 51	START ADCP Transect 4-03 E 2406349.51 N 736062.45 WD 20'
14 55	21 55	STOP ADCP START VIDEO STILL PHOTO ON DECK
14 56	21 56	FRAME ON BOTTOM Touchdown mode E 2406349.75 N 736064.39
14 57	21 57	IMAGE: boulders, cobbles & some gravels
14 57	21 57	FRAME ON DECK STOPPED VIDEO
15 00	22 00	START ADCP Transect 4-04 E 2406460.91 N 735997.25 WD 20'
15 04	22 04	STOP ADCP START VIDEO STILL PHOTO ON DECK
15 05	22 05	FRAME ON BOTTOM Touchdown mode E 2406460.04 N 735999.25
15 06	22 06	IMAGE: COBBLES & GRAVELS
15 06	22 06	FRAME ON DECK STOPPED VIDEO
15 09	22 09	START ADCP Transect 4-05 E 2406569.73 N 735929.50 WD 23'
15 12	22 12	STOP ADCP START VIDEO STILL ~~PHOTO~~ RD PHOTO ON DECK
15 13	22 13	FRAME ON BOTTOM Touchdown mode E 2406567.67 N 735935.94
15 13	22 13	IMAGE: COBBLES & GRAVELS
15 15	22 15	FRAME ON DECK STOPPED VIDEO
15 19	22 19	PULL ADCP & MOB TO Transect 3
15 25	22 25	DEPLOY ADCP
15 27	22 27	START ADCP Transect 3-01 E 2406437.98 N 738537.49 WD 12'
15 31	22 31	STOP ADCP
15 31	22 31	START ADCP DUPLICATE 3-01
15 35	22 35	STOP ADCP DUPLICATE START VIDEO STILL PHOTO ON DECK
15 36	22 36	FRAME ON BOTTOM & DUPLICATE Touchdown mode E 2406440.33
15 36	22 36	IMAGE: COBBLES N 738537.73
15 37	22 37	FRAME ON DECK STOPPED VIDEO
15 38	22 38	PULL INSTRUMENTS & MOB BACK TO NORTHPORT BOAT LAUNCH

TAILGATE Saftey MEETING ATTENDEES 10/29/18 (ADDITIONS)

RV Tielon	RV Discovery	GPS Base Station
John Schafer Gravity	Mike Duffield Gravity	Dave Williams DEA
Maggie McKean Gravity	John Staly DEA	
Ryan McElliese Gravity	Ragan Driver AECOM	
Charlie Kellogg Gravity	Columbia Navigation	
Marilyn Guthrie Jacobs	Eric Weatherman	
Patrick Miller USGS	Josh weatherman	
Michaela McCoy AECOM	Dan Smith	
	Rick Wilson	

Scale: 1 square =

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UCR Sediment Facies Study

10/30/18

PDT	UTC	
16 25	23 25	ARRIVE AT NORTHPORT BOAT LAUNCH. Data transferred and collected along with log books and paperwork.
16 30	23 30	DISEMBART TIETON ~~[illegible]~~ RD
16 55	23 55	TIETON OUT OF WATER

10/30/18

P654 — UCR sediment Facies Study — 10/31/18

PDT	UTC	
		Weather 38°F rain
06 40	13 40	- Leave Colville
07 30	14 30	- Arrive Northport Boat Lauch
07 55	14 55	- Tailgate safety Meeting

ATTENDEES

RV Tieton	RV Discovery
John Schaefer Gravity	Jeff Wilson Gravity
Maggie McKean Gravity	John Staly DEA
Ryan McElrese Gravity	Michaela McLaug AECOM
Charlie Kellogg Gravity	Columbia Navigation
Marilya Guthrie Jacobs	Eric Weatherman Dan Smith
Reagan Driver AECOM	Josh Weatherman Rick Wilson
GPS Base Station - Dave Williams DEA	

PDT	UTC	
08 39	15 39	Tieton in water
08 42	15 42	ADCP Diagnostics check complete passed
09 05	16 05	ADCP Compass calibration 1200 KHz initial 0.4° final 0.2°
09 30	16 30	GPS Position check CP9 Black Sand Beach
09 40	16 40	GPS Position check complete
09 45	16 45	MOB to Transect 3
09 46	16 46	DEPLOY ADCP
09 49	16 49	START ADCP Transect 3-02 E 2406573.76 N 738493.29 WD 17'
09 54	16 54	STOP ADCP START VIDEO STILL PHOTO ON DECK
09 55	16 55	FRAME ON BOTTOM Touchdown mode E 2406578.66 N 738489.75
09 56	16 56	IMAGE: BOULDERS & COBBLES
09 56	16 56	FRAME ON DECK STOPPED VIDEO
09 59	16 59	START ADCP Transect 3-03 E 2406708.34 N 738450.42 WD 20'
10 02	17 02	STOP ADCP START VIDEO STILL PHOTO ON DECK
10 03	17 03	FRAME ON BOTTOM Touchdown mode E 2406709.42 N 738451.94
10 03	17 03	IMAGE: COBBLES
10 03	17 03	FRAME ON DECK STOPPED VIDEO
10 05	17 05	START ADCP Transect 304 E 2406843.82 N 738409.01 WD 21'
10 08	17 08	STOP ADCP START VIDEO STILL PHOTO ON DECK
10 09	17 09	FRAME ON BOTTOM Touchdown mode E 2406845.51 N 738409.18
10 10	17 10	IMAGE: COBBLES
10 10	17 10	FRAME ON DECK STOPPED VIDEO
10 12	17 12	START ADCP Transect 3-05 E 2406978.09 N 738367.54 WD 20'
10 15	17 15	STOP ADCP START VIDEO STILL PHOTO ON DECK
10 16	17 16	FRAME ON BOTTOM Touchdown mode E 2406972.81 N 738369.57
10 16	17 16	IMAGE: COBBLES
10 17	17 17	FRAME ON DECK STOPPED VIDEO

10/31/18

Scale: 1 square = _____

PDT	UTC	
10 18	17 18	PULL ADCP and MOB to Transect 2
10 24	17 24	DEPLOY ADCP
		MOVE Transect 2-01 due to depth near shore 37' toward 2-02
10 28	17 28	START ADCP ALT Transect ~~20~~ 11/03/18 2-01 ALT
		E2406635.57 N741111.35 WD 11'
10 32	17 32	STOP ADCP START VIDEO STILL PHOTO ON DECK
10 33	17 33	FRAME ON BOTTOM Touchdown mode E2406673.66 N741114.47
10 33	17 33	IMAGE: COBBLES
10 33	17 33	FRAME ON DECK STOPPED VIDEO
10 35	17 35	START ADCP Transect 2-02 E2406727.23 N741101.83 WD 16'
10 39	17 39	STOP ADCP
10 39	17 39	START ADCP DUPLICATE 2-02 E2406727.23 N741101.83
10 42	17 42	STOP ADCP DUPLICATE 2-02 START VIDEO STILL PHOTO ON DECK
10 43	17 43	FRAME ON BOTTOM & DUPLICATE Touchdown mode
		E2406724.46 N741104.74
10 44	17 44	IMAGE: COBBLES
10 44	17 44	FRAME ON DECK STOPPED VIDEO
10 46	17 46	START ADCP Transect 2-03 E2406852.72 N741090.15 WD 23'
10 49	17 49	STOP ADCP START VIDEO STILL PHOTO ON DECK
10 51	17 51	FRAME ON BOTTOM Touchdown mode E2406854.87 N741090.55
10 51	17 51	IMAGE: BEDROCK & COBBLES
10 52	17 52	FRAME ON DECK STOPPED VIDEO
10 53	17 53	START ADCP Transect 2-04 E2406980.40 N741077.67 WD 30'
10 57	17 57	STOP ADCP
10 57	17 57	START ADCP DUPLICATE 2-04
11 00	18 00	STOP ADCP DUP 2-04 START VIDEO STILL PHOTO ON DECK
11 02	18 02	FRAME ON BOTTOM & DUPLICATE Touchdown mode
		E2406986.10 N741074.04
11 02	18 02	IMAGE: COBBLES
11 02	18 02	FRAME ON DECK STOPPED VIDEO
11 04	18 04	START ADCP Transect 2-05 E2407107.42 N741064.20 WD 26'
11 07	18 07	STOP ADCP START VIDEO STILL PHOTO ON DECK
11 08	18 08	FRAME ON BOTTOM touchdown mode E2407108.51 N741063.26
11 08	18 08	IMAGE: COBBLES
11 09	18 09	FRAME ON DECK STOPPED VIDEO
11 11	18 11	PULL ADCP MOB TO Transect 1
11 13	18 13	DEPLOY ADCP

10/31/18

UCR Sediment Facies Study 10/31/18

PDT	UTC	
11 17	18 17	START ADCP Transect 1-05 E2407640.77 N743546.73 WD 44'
11 22	18 22	STOP ADCP START VIDEO STILL PHOTO ON DECK
11 23	18 23	FRAME ON BOTTOM Touchdown mode E2407646.15 N743550.92
11 23	18 23	IMAGE: COBBLES & SOME GRAVELS
11 24	18 24	FRAME ON DECK STOPPED VIDEO
11 26	18 26	START ADCP Transect 1-04 E2407482.64 N743658.51 WD 41'
11 29	18 29	STOP ADCP START VIDEO STILL PHOTO ON DECK
11 30	18 30	FRAME ON BOTTOM Touchdown mode E2407487.58 N743658.
11 31	18 31	IMAGE: COBBLES & GRAVELS
11 31	18 31	FRAME ON DECK STOPPED VIDEO
11 33	18 33	START ADCP Transect 1-03 E2407319.96 N743768.31 WD 23'
11 39	18 39	STOP ADCP START VIDEO STILLPHOTO ON DECK
11 41	18 41	FRAME ON BOTTOM Touchdown mode E2407311.44 N743766.84
11 41	18 41	IMAGE: COBBLES
11 42	18 42	FRAME ON DECK VIDEO STOPPED
11 45	18 45	START ADCP Transect 1-02 E2407157.27 N743878.20 WD 27'
11 49	18 49	STOP ADCP START VIDEO STILL PHOTO ON DECK
11 52	18 52	FRAME ON BOTTOM E2407157.05 N743879.40
11 54	18 54	IMAGE: SAND & SILT, DEBRIS, VEGETATION
11 55	18 55	FRAME ON DECK STOPPED VIDEO
11 58	18 58	START ADCP Transect 1-01 E2406993.30 N743987.99 WD 19'
12 06	19 06	STOP ADCP START VIDEO STILL PHOTO ON DECK
12 08	19 08	FRAME ON BOTTOM E2406994.64 N743989.19
12 10	19 10	IMAGE: SILTY SAND & ROCK
12 10	19 10	FRAME ON DECK STOPPED VIDEO
12 12	19 12	PULL ADCP
12 57	19 57	LUNCH at Black Sand Beach. Marilyn Guthie w/Jacobs disembarked to leave project.
13 21	20 21	LEAVE Black Sand Beach for Underwater find at Steamboat Rock
13 45	20 45	Arrive at underwater find. Overview photos collected
13 50	20 50	DEPLOY CAMERA FRAME
14 04	21 04	PULL CAMERA
14 14	21 14	MOB back to Northport Boat Launch
14 20	21 20	Arrive Northport Boat launch Gravity crew begins disassembling Tieton.
16 04	23 04	Tieton OUT OF WATER
17 00	00 00	Discovery out of water Data & notebooks collected, End of Day

10/31/18

Scale: 1 square = _____

8 July 2019 Sediment Facies Mapping
Upper Columbia River

Pre-Field Work Notes:

Copying imagery reconnaissance information collected on 8 July 2019 on MBES boat:

Locations:	Depth (ft)	Notes / Observations.
Q13 - Q1	10 - 12	
Q13 - Q9	27	strong current > 5 ft/sec
Q13 - 1Q	15	" " " "
Q15 - 1Q	14	
Q18 - Q1	5 - 7	
Q18 - Q2	9 - 10	
Q18 - Q8	18	
Q18 - Q9	9 - 14	
Q18 - 1Q	15	
Q19 - Q3	7	
Q2Q - 1Q	7.5	can likely get image, but might be a little off station.

Note: Duplicates needed at 2 stations to maintain 5% requirement in QAPP.

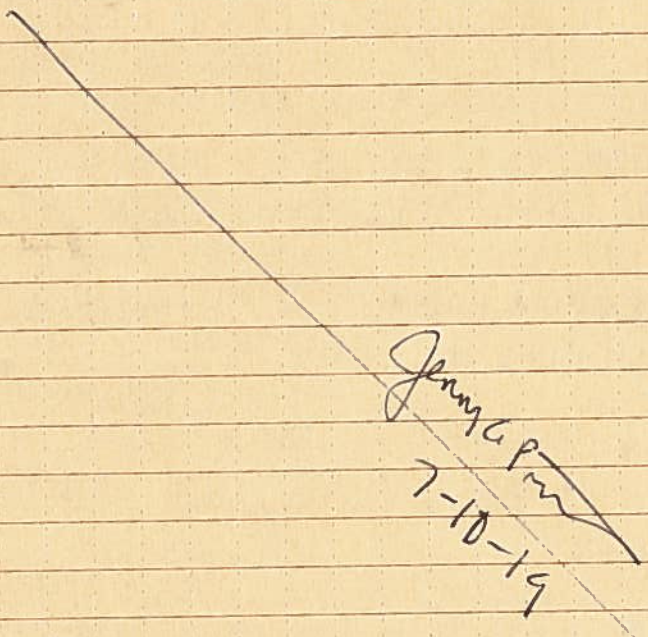
Jennings
7-8-19

Scale: 1 square =
NSN 7530-01-577-8866
Rite in the Rain

10 July 2019 — Sediment Facies Mapping, Upper Columbia River — p.1

0900 – At CNI shop in Kettle Falls w/ Ed Sloan + Mike Duffield.
- Completed refresher on Health + Safety.
- Ryan to have H/S later when he arrives
- Reviewed equipment set up and plans for tomorrow.

1045. Head back to Northport to meet MBES boat. Ed, Mike + Ryan McCleese to be setting up equipment during the day.



11 July 2019 Sediment Facies Mapping
Upper Columbia River
Imagery Data Collection only today at 11 locations.

ABLOM : Jenny Pretare (note taker)
Gravity : Rene Trudeau, Ed Sloan, Ryan McCliese
CNI : Eric Weatherman, Jack McCotter.
Jacobs : Marilyn Gauthier
USGS : Steve Cox

Weather today: 62° F at 0700, partly cloudy. Temps to increase to 81-82° F. Looks like there was some rain last night.
- Introductions, objectives for the day

0830 H/S Briefing
- Extra boat traffic, car traffic
- High temps ~ mid 80's
- wildlife crossing roads
- floating wood debris
- Visitors / guests
- PPE / overhead lift

We need 2 duplicates today
0900 - Break & meet Int / launch in ~30 minutes
0913 - Launch Tieton, proceed to CP-7
Image frame is set up with the maximum number of weight bricks it will hold. which is 12.5 ~~10~~ U.P. pounds each by 24 = 300 ~~240~~ U.P. pounds. Ryan M. to verify from last years notes
0938 - Begin ~~co~~ check in at CP-7
1030 - Focus test shot with camera J.A.P.
1035 - Camera Scaling Lazers test. ~~1.35~~ ft 1.35 ft.
1045 - Shove off from Northport launch.
1049 - Test image on deck.
1055 - Test image in water (not on station)
1058 - Underway to DME AOI
1110 - Arrive DME AOI
Data collection on next page.

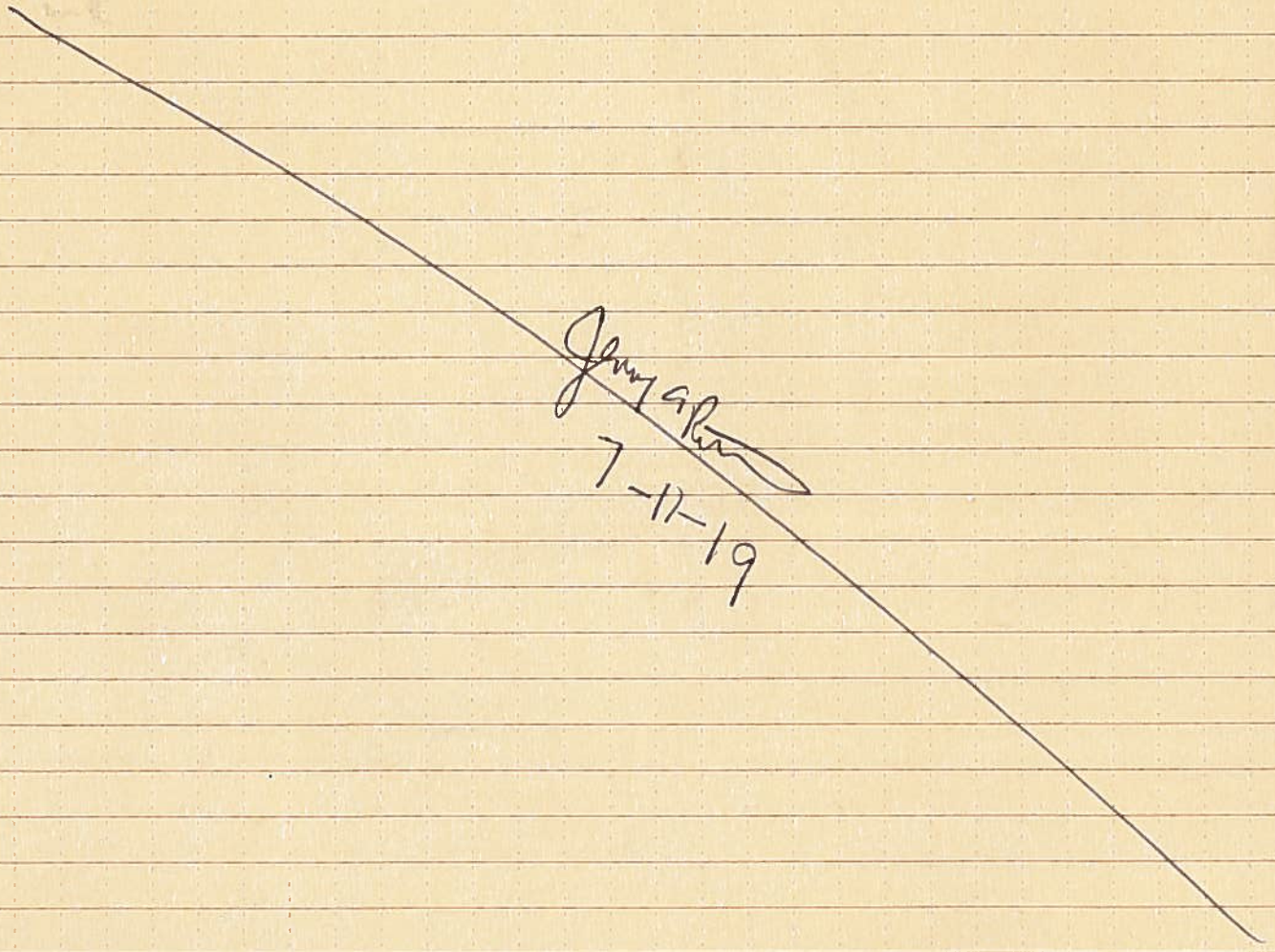
Scale: 1 square = NSN: 7530-01-577-8866 Rite in the Rain

Station	Time	GPS	Substrate	Notes
Q13-Q1	~~1215~~ 1219	E2389049.37 N723846.26	cobble w/ sand/silt	8.5 ft deep; Did Duplicate for 5min, camera held for full duration
Q13-Q9	1238	E E2389388.17 N723518.30	bedrock	Attempt touch + go; 21.4 ft. depth successful
Q13-1Q	1250	E2389431.06 N723469.94	bedrock	13.2 ft. depth touch + go.
Q15-1Q	1117	E2388215.89 N721804.59	cobble w/ sand/silt	12 ft. deep; did duplicate for 5min Camera held for full duration.
Q18-Q1 ~~1250 JP~~	~~E 2389431.06 JP N 723469.94 JP~~ 1401	E2386558.71 N722264.83	gravel + cobble	6.1 ft. deep camera held for full 1 minute
Q18-Q2	1355	E2386516.36 N722143.46	cobble	8.2 ft. deep camera held for full 1 minute
Q18-Q8	1412	E2386296.56 N721486.29	bedrock some algae?	16.8 ft. touch + go photo.
Q18-Q9	1419	E 2386625.74 N721363.42	bedrock	9.6 ft touch + go photo
Q18-1Q	1424	E 2386210.77 N721243.50	bedrock	14.2 ft. touch + go photo
Q19-Q3	1341	E2385717.59 N722458.08	cobble + gravel, sand	5 ft. deep. full duration at bottom.
Q20-1Q	1433	E 2384794.13 N721938.27	cobble + gravel	6.5 ft. ~~touch + go photo~~. Full minute duration

Scale: 1 square = _____

1145 – Field crew discovers that the laser scale on the camera frame is not working, though it DID work in the Calibration picture this morning. J. Pretare and Marilyn Gauthier reviewed the language in the Field Sampling Plan and SOP-2. It was acceptable to both that imagery data collection could continue without the laser, since the laser was working during calibration. J. Pretare to write Protocol Modification.
- Batteries changed in laser; did not help.

1210 – Change battery in camera.
1300 – Lunch break
1335 – Back to work
1437 – Completed data collection at all 11 Stations.
1454 – Back to Northport dock.



Appendix M
Raw Field Data Deliverable

Upper Columbia River – Phase 3 Sediment Study Sediment Facies Mapping
2018-2019 Raw Field Data Deliverable Structure

1. Survey Control Points

\YYYYMMDD*'control point name'*
\Pictures\YYYYMMDD_*'picture number'*.jpg
\Observation Log.jpg
\Sky Plot.jpg
GNSS base station (transmitter) files (.T02)*

2. Base Station

\YYYYMMDD*GNSS base station (transmitter) files (*.T02)*

3. R/V Tieton – ADCP data and underwater imagery

\MM.DD.YYYY
\DropCam_Data_MMDDYYYY
\DropCam_Images_MMDDYYYY
Raw images (.jpg and *.cr2)*
\DropCam_Video_MMDDYYYY
Raw video (.mp4)*

Imagery_Daily_Log_MMDDYYYY.log

Tieton_Position_Checks.xlsx

\UCR ADCP MM-DD-YY
*Raw ADCP data files (*PD0 and *.TXT)*

\UCR_TIETON_MMDDYY
\RAW
*Raw navigation files (Hypack *.raw and *.log)*
\TARGETS
Position data for acquisition stations (.txt)*

4. R/V Discovery – Multibeam sonar data

\MM.DD.YYYY
AETR0039_Discovery_Position_Checks.xlsx
\YYYYMMDD
\AML
Raw sound velocity measurements (.txt)*
\Base
GNSS base station (transmitter) files (.T02)*
\Hypack
\Raw
*Raw multibeam sonar data files (*raw, *.hsx, *.7k)*
\Logs
Survey line log (.lin, *.htm)*
\POSPAC
Raw inertial data (POSPAC_YYYYMMDD.)*
\Rover
*GNSS rover (receiver) files (*T02)*

APPENDIX B

DESCRIPTION OF GEOSPATIAL DATA DELIVERABLES

APPENDIX B
DESCRIPTION OF GEOSPATIAL DATA DELIVERABLES

\ADCP

\RawData

Contains one directory for each ADCP station. Each directory includes raw data in tabular form for each measured velocity component (east, north, vertical, error).

\PostprocessedData_GIS

Contains postprocessed ADCP data formatted for GIS applications. ESRI shapefile of ADCP data ("UCRPh3SFM_ADCP.shp") with attribute table including date, time, position, station, east velocity, north velocity, vertical velocity, mean current magnitude, mean current direction, apparent roughness height, coefficient of friction, and nonlogarithmic flag (if applicable)

\Symbology

Contains an ESRI ArcGIS layer file ("SYMBOLOGY_adcp.lyr") with suggested mean current velocity symbology for the ADCP shapefile

\PostprocessedData_Tabular

Contains postprocessed ADCP data in tabular form, including comma-separated value format (.csv), text file format (*.txt), and Microsoft Excel spreadsheet format (*.xlsx). These tabular data contain the same information as the attribute table for the ADCP shapefile.*

\Backscatter

Contains a 32-bit floating point GeoTIFF raster file of the MBES acoustic backscatter imagery ("UCRPh3SFM_backscatter50cm.tif") and an ESRI ArcGIS layer file ("SYMBOLOGY_backscatter.lyr") with suggested symbology for the GeoTIFF raster

\Bathymetry

Contains two 32-bit floating point GeoTIFF raster files of the MBES bathymetry DEM ("UCRPh3SFM_bathymetry50cm.tif") and shaded-relief bathymetry ("UCRPh3SFM_bathymetry50cm_hillshade.tif")

\Imagery

Contains an ESRI shapefile of the underwater imagery data ("UCRPh3SFM_images.shp") with attribute table including date, time, position, station, corresponding underwater image file, interpreted sediment composition, and flags (if applicable)

\Images

Contains underwater photographs in JPEG format