UPPER COLUMBIA RIVER

FINAL
Plant Tissue Study Data Summary Report

Prepared for

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ACRONYMS AND ABBREVIATIONS

Agreement	June 2, 2006, Settlement Agreement
ACG	analytical concentration goal
ALS	ALS Environmental
CCT	Confederated Tribes of the Colville Reservation
COC	chain-of-custody
DL	detection limit
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
ESI	Environmental Standards, Inc.
FSR	field summary report
GPS	global positioning system
HHRA	human health risk assessment
ID	identification
ICP	inductively coupled plasma
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
Lodestone	Lodestone Environmental Consulting
MDL	method detection limit
MRL	method reporting limit
MQO	measurement quality objective
MS	matrix spike
MSD	matrix spike duplicate
PARCC	precision, accuracy or bias, representativeness, completeness, and comparability
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RBC	risk-based concentration
RI/FS	remedial investigation and feasibility study
RL	reporting limit
RPD	relative percent difference
SA	sampling area
SD	standard deviation
Site	Upper Columbia River site

SOP	standard operating procedure
SRM	standard reference material
TAI	Teck American Incorporated
TAL	target analyte list
UCR	Upper Columbia River

UNITS OF MEASURE

°C	degree(s) Celsius
cm	centimeter(s)
dw	dry weight
ft	foot or feet
g	gram(s)
in.	inch(es)
m	meter(s)
m^2	square meter
mg/kg	milligram(s) per kilogram
mm	millimeter(s)
ng/g	nanogram(s) per gram
µm	micron(s)

1 INTRODUCTION

This report presents the results of the 2018 field sampling effort for the plant tissue study (hereafter, the study) conducted for the Upper Columbia River (UCR) Site (hereafter, the Site).[1] The study was designed to characterize the concentrations of metals in the tissues of wild upland plants sampled from tribal allotments in the study area. Sampling and chemical analyses were conducted under the U.S. Environmental Protection Agency (EPA)-approved plant tissue study quality assurance project plan (QAPP) (Ramboll 2018). This study represents one of the tasks being completed as part of the remedial investigation and feasibility study (RI/FS) and baseline human health risk assessment (HHRA) being completed for the Site under the June 2, 2006 Settlement Agreement (USEPA 2006) between Teck American Incorporated (TAI) and EPA. The objective of the RI/FS is to investigate the nature and extent of contamination and potential for risk to humans and the environment. EPA is conducting the HHRA. TAI is conducting the RI/FS and this study with EPA oversight.

TAI collected plant tissue and co-located soil samples from the Site during three sampling events in 2018: April (April 24 through May 2), June (June 18 through June 20), and August (August 20 through August 28) (hereafter, the Spring, June, and August sampling events, respectively). Upon completion of sample collection during each field event, samples were sent to ALS Environmental (ALS) in Kelso, Washington, for chemical analysis. ALS analyzed the samples for target analyte list (TAL) metals (except calcium, magnesium, potassium, and sodium) and mercury.

1.1 STUDY PURPOSE AND DATA QUALITY OBJECTIVES

The primary objective of this study is to collect data to characterize the levels of lead, arsenic, and other metals in wild upland plants sampled from tribal allotments in the study area that are ingested or mouthed or otherwise used by Confederated Tribes of the Colville Reservation (CCT) members. Chemistry data for plant tissues will be used in the HHRA to evaluate the potential human exposure to metals and mercury by ingestion, mouthing, or other uses that may result in ingestion of the plant parts analyzed in this study. Mercury was only analyzed in stem and leaf tissue due to research demonstrating that mercury was highest in these tissues (Li et al. 2017). The development of the requirements and design rationale for data collection activities were

[1] The Site, as defined in the June 2, 2006, Settlement Agreement (USEPA 2006) is "the areal extent of hazardous substances contamination within the United States in or adjacent to the Upper Columbia River, including the Franklin D. Roosevelt Lake ("Lake Roosevelt"), from the border between the United States and Canada downstream to the Grand Coulee Dam, and all suitable areas in proximity to such contamination necessary for implementation of the response actions.…"

guided by meetings and telephone calls with EPA's team on June 22, September 28, and November 9, 2017, and by the following additional documents or communications:

- A letter dated December 8, 2016, from Laura C. Buelow, EPA, to Kris McCaig, TAI, directing TAI to fund a UCR plant study and attached "Data Quality Objectives (DQO) for the Sampling of Terrestrial Plants and Laboratory Analysis of Tissues for Metals" for DQO steps 1 through 5 (USEPA 2016).
- A letter dated February 17, 2017, from Kris McCaig, TAI, to Laura C. Buelow, EPA, notifying EPA of TAI's dispute of the December 8, 2016, letter directive for TAI to fund a UCR plant study and documenting TAI's technical concerns regarding EPA's "Data Quality Objectives for the Sampling of Terrestrial Plants and Laboratory Analysis of Tissues for Metals" (TAI 2017).
- A letter dated June 14, 2017, from Laura C. Buelow, EPA, to Kris McCaig, TAI, documenting TAI's agreement to conduct limited plant tissue sampling focused on collection of plant tissue from the three tribal allotments sampled in the 2014 Residential Soil Study that had concentrations of lead above 700 mg/kg in the soil, in addition to a reference area (USEPA 2017a).
- An undated letter and table transmitted via email on September 5, 2017, from Laura C. Buelow, EPA, to Kris McCaig, TAI, documenting EPA's responses to the technical concerns raised in TAI's dispute letter regarding EPA's directive to TAI to fund plant sampling (USEPA 2017b).
- Memoranda pertaining to prior plant reconnaissance efforts and cultural plant sampling recommendations prepared by Lodestone Environmental Consulting (Lodestone 2016a,b and 2017a,b) for the CCT.
- The UCR RI/FS Tribal Consumption and Resource Use Survey (Westat 2012).
- UCR Final Field Reconnaissance Plan: Upper Columbia River Site Plant Tissue Study (Ramboll Environ 2017a).
- Field Reconnaissance Summary Report: Upper Columbia River Plant Tissue Study (AECOM 2017).
- Personal communication (e-mail correspondence with Kris McCaig, TAI, regarding responses from Don Matheny, USEPA, to follow-up questions for EPA regarding the UCR Plant Study). USEPA. December 21, 2017 (Tonel 2017).
- Personal communication between D. Johnson, Ramboll Environ, and M. Stifelman, EPA, during a November 28, 2017, conference call approving removal of essential elements

(calcium, magnesium, potassium, and sodium) in addition to mercury from the target analyte list (TAL[2]) (Johnson 2017).

- Personal communication between D. Mills, TAI, and M. Tonel, EPA, via an April 3, 2018, email documenting the addition of total mercury analysis for selected plant targets (kinnikinnick leaves, wild rose leaves and stems, wild mint, willows, and tules only) and co-located soil/sediment samples when sufficient plant material is available to support analysis of both TAL metals (except calcium, magnesium, potassium, and sodium) and mercury[3] (Mills 2018).
- Various literature and online sources as cited in this QAPP.

The questions developed to meet the study objectives were initially presented in the QAPP (Ramboll 2018). The principal study question was:

Does exposure to total concentrations of TAL metals in wild plant tissues pose unacceptable risk to human consumers?

A secondary study question to be addressed by this work was:

Do the chemical concentrations of TAL metals in wild plant tissues collected across a range of soil lead concentrations vary with concentrations of TAL metals in soil?

After the study objectives had been approved, mercury analysis in stem and leaf target plant tissues was added. This change was based on research showing that mercury could be sequestered in those tissues (Li et al. 2017).

1.2 REPORT ORGANIZATION

This report is organized into the following sections:

- **Section 1—Introduction.** This section provides background information, identifies the purpose of the study, and outlines the organization of the report.
- **Section 2—Study Design and Methods.** This section describes the study design, field sampling methods, sample compositing approach, and laboratory methods, including tissue processing and chemical analytical methods.
- **Section 3—Quality Assurance Project Plan Deviations.** This section discusses deviations from the QAPP.

[2] The original TAL for the study was provided in Table 5 of USEPA (2016).
[3] Where the quantity of plant material is limited, allocation of sample mass collected will be prioritized for analysis of TAL metals (except calcium, magnesium, potassium, and sodium).

- **Section 4—Data Validation Assessment.** This section provides a summary of the validation assessment of the analytical results.
- **Section 5—Results.** This section presents a summary of the analytical results.
- **Section 6—Summary.** This section presents a summary and results of the study.
- **Section 7—References.** This section presents bibliographic information for the documents cited in this report.

Figures, maps, and data tables are provided following Section 7. Data tables presented herein are also provided in electronic format, including raw data (provided on CD-ROM). Data may also be obtained directly from the project database, accessible at http://teck-ucr.exponent.com.

2 STUDY DESIGN AND METHODS

This section summarizes the study design and methods (including field collection and laboratory methods). Additional details are presented in the QAPP (Ramboll 2018).

2.1 STUDY DESIGN

The following sections describe the study design, including sampling areas and numbers of samples, and chemical analyses for tissue samples.

2.1.1 Sampling Areas

Plants were collected from 12 of 16 sampling areas (SAs) at the Site. The SAs sampled during the three field events included three 'high lead' SAs (SA01, SA02, and SA03) and nine 'lower lead' SAs (SA04, SA05, SA06, SA07, SA08, SA09, SA14, SA15, and SA16) (Map 2-1) per the EPA-approved QAPP (Ramboll 2018). The designation of high lead and lower lead SAs was initially established and utilized for the reconnaissance study, in accordance with the EPA-approved Field Reconnaissance Plan for the Plant Tissue Study (Ramboll Environ 2017a). High lead SAs were based on three tribal allotment decision units from the 2014 Residential Soil Study (CH2M Hill 2016) where incremental composite samples yielded lead concentrations greater than the time-critical removal action level of 700 mg/kg. Lower lead SAs were selected based on consideration of a range of lead concentrations at tribal allotments where other decision units have been sampled during one of the three soil studies conducted as part of the UCR RI/FS (2014 Residential Soil Study, 2014 Upland Soil Study, or 2016 Residential Soil Study).

Sixteen SAs were originally targeted for sampling in the QAPP (Ramboll 2018); however, four SAs were not sampled because these areas were either inaccessible, did not have the target plant species, or an adequate number of samples had already been collected at one or more of the other SAs and no more samples were needed to meet the study objectives. Of the SAs that were sampled, two lower lead SAs (SA15 and SA16) were exclusively sampled for willows because the habitat in those locations was unsuitable for other target plant species. All the other SAs were sampled for upland plant species. The SAs were located within the boundaries of soil or sediment sampling decision units established for previous soil studies at the Site (Integral 2014; Windward et al. 2015; CH2M HILL 2016; Ramboll Environ 2017b). The following factors were considered when selecting the sampling areas, as detailed in the QAPP (Ramboll 2018).

- **Inclusion of high lead and lower lead sampling areas.** High lead sampling areas were identified based on agreement between EPA and TAI (USEPA 2017a), which identified SA01, SA02, and SA03 as high lead SAs where soil lead concentrations were >700 mg/kg based on the 2014 residential soil study and the beach sediment study (Integral 2014;

CH2M HILL 2016; Ramboll Environ 2017b). Lower lead SAs were selected based on a range of lead concentrations lower than 700 mg/kg reported during prior UCR RI/FS soil studies (Integral 2014; Windward et al. 2015; CH2M HILL 2016; Ramboll Environ 2017b).

- **Presence of target plant species.** The 2017 plant tissue study reconnaissance results (AECOM 2017) informed the selection of SAs. The target species list was developed based on parts of plants consumed, mouthed, or otherwise utilized by CCT members (Westat 2012; Lodestone 2016a,b and 2017a,b). Based on the results of the 2017 plant tissue study field reconnaissance survey (AECOM 2017), a flow chart was developed as a guide to select the order of SAs to visit during each sampling event. Information from the Spring and June sampling events was used to refine the flow charts for the June and August events, respectively. The flow charts guided sample collection to further the goal of collecting the target number samples for the highest number of plant species.

2.1.2 Sample Collection

A total of six high lead and six lower lead plant tissue and soil co-located samples were targeted for each plant species and tissue type, as specified in the QAPP (Ramboll 2018). Sample collection was conducted during the Spring, June, and August sampling events to collect the maximum number of plant tissues on the target species list (QAPP Table A7-4), and to evaluate different plant tissues when multiple plant tissues from the same species are used by CCT members (e.g., rose leaves and stems in Spring and fruit from the same plants in August). Plant tissues targeted for collection were determined based on their expected stage of growth in each season, typical CCT collection times (Lodestone 2017b), and field observations during reconnaissance and sampling events. The Spring sampling event took place from late April to early May of 2018. The first summer sampling event took place in late June 2018, and the second summer event in late August 2018.

The locations of plant tissue and co-located soil samples collected for the study are presented by SA in Maps 2-2 through 2-13. Table 2-1 summarizes the number of samples collected at each SA.

2.1.3 Field Quality Control Samples

Field quality control (QC) samples included field replicate samples and split samples, as indicated on Tables 2-1 and 2-2. In accordance with the QAPP (Ramboll 2018), 18 field replicates were collected (a minimum of 5 percent frequency) across both the high lead and lower lead SAs to assess the variability associated with sample processing.

2.1.4 EPA Split Samples

Sixteen split samples were collected (a minimum of 5 percent frequency) for possible analysis by EPA's laboratory, pending EPA's selection of which samples to analyze as splits as part of its quality assurance (QA)/QC program. During sample collection, when there was sufficient plant tissue to comprise a split sample twice as much tissue mass was collected to supply the amount of material needed for split sample analysis, as required by the QAPP (Ramboll 2018). These samples were logged as having sufficient mass for an EPA split sample, with the expectation that these samples would be the only samples with sufficient mass for split sample analysis. However, after sample preparation and all analyses were completed by ALS, it was discovered that most of the samples contained enough remaining mass for analyses by EPA's laboratory. Thus, EPA was able to select split samples from a broader group of samples, rather than being constrained to only the plant materials collected in larger quantity. Samples collected and identified in the field as potential split samples and the samples that were selected by EPA for split sample analysis are both identified in Table 2-2.

2.1.5 Chemical Analyses

All of the plant tissue samples and co-located soil samples were analyzed for TAL metals (except calcium, magnesium, potassium, and sodium) and total solids. Selected plant tissues (kinnikinnick leaves, wild rose leaves and stems, wild mint leaves, willow branches, and tule culms) and the associated co-located soil samples were also analyzed for total mercury. The methods used for the tissue and soil chemical analyses are listed in Table 2-3.

2.2 FIELD SAMPLING METHODS

This section summarizes field methods used for the collection, labeling, and transport of the plant tissue and soil samples. A field survey was conducted in each SA by a scouting team at the beginning of each sampling event to verify that the target plants and plant parts were present and at the growth stage targeted for sampling, and to select individual plants for potential sampling. Plant species were identified to the lowest practical taxonomic level and flagged by the survey team as candidate sampling locations. When possible, selected plants were in good health and physically dispersed throughout the SA.

As stated earlier in Section 2.1.2, sample collection was conducted in accordance with the QAPP (Ramboll 2018), as described in the field summary report (FSR) (Appendix A). The minimum sample mass and target sample mass required for each plant tissue type, as discussed in the following sections, were specified in the QAPP (Ramboll 2018). These quantities were estimates of the amount of plant tissue required for chemical analyses. Cultural resource monitors and EPA technical oversight personnel were present during all three sampling events.

Co-located soil samples were collected next to small plants or below the crown of larger bushes and trees in accordance with the QAPP. For individual plant samples, one co-located individual soil sample was collected. For composite plant samples, a co-located soil sample was collected for each individual plant sampled and soil was composited in the field proportionally to the weight of the plant tissue from each plant in the composite. The collection of soil for black tree lichen was an exception and is further described in Section 2.2.1 below.

2.2.1 Spring 2018 Sample Collection

The following plant tissue and co-located soil samples were collected during the Spring sampling event (April 25 to May 2, 2018).

- Camas (*Camassia quamash*) sampling was conducted in SA01, SA03, SA05, and SA07. Camas bulbs were collected using hand spades until the target sample mass (4.5 g) was obtained. If all the bulbs of a single plant did not meet the target sample mass, bulbs from the closest camas plant or plants were also collected to create a composite sample.
- Lomatium (*Lomatium triternatum*) sampling was conducted in SA02, SA03, SA05, and SA08. Lomatium roots were also collected by hand spade until the total sample weight met the minimum sample mass (4.1 g). If a single root weighed less than the minimum sample weight, the root of the next closest lomatium plant or plants were added to the sample to create a composite sample.
- Spring beauty/Indian potatoes (*Claytonia lanceolate*) were sampled in SA01, SA02, SA03, SA04, SA05, and SA08. The corms of Indian potato plants were collected by hand until the minimum sample mass (1.9 g) was exceeded. If the combined mass of corms did not meet the minimum sample mass, corms from the closest Indian potato plant were added to the sample until the minimum mass was met to create a composite sample.
- Black tree lichen (*Bryoria fremontii*) was sampled by hand from SA01, SA05, and SA08. At the locations sampled, 20-m-diameter circles (65.6-ft) were selected as "plots," from which black tree lichen was picked from trees in that area to make a composite sample. Lichen was added to the sample until the target sample mass of 2.3 g was obtained. Soil samples were taken from the center of the 20-m circular plot in each SA.
- Kinnikinnick (*Arctostaphylos uva-ursi*) was sampled by hand from SA02, SA03, SA04, and SA06. Kinnikinnick grows in large patches, forms roots from multiple branches, and an individual plant can spread up to 15 ft. Therefore, it is difficult to determine what constitutes an individual plant based on field observation. To avoid sampling the same individual multiple times, kinnikinnick samples were taken from different patches of plants when possible. If a site had only one patch of kinnikinnick, "individual" samples

were collected at least 20 ft apart. In order to avoid damaging plants by over picking, only up to one-third of an individual plant's leaves was collected.

- Willow (*Salix exigua*) collection was conducted in SA16. Branches measuring up to 0.5 in. in diameter were selected and cut off from individual trees using hand-held clipping shears. Branches were collected from individual trees for each sample until the combined branch length was 189 cm.

2.2.2 June 2018 Sample Collection

The following plant tissue samples were collected during the June sampling event (June 18 to June 20, 2018; early summer):

- Lomatium (*Lomatium triternatum*) sampling was conducted only in SA03. Lomatium roots were collected using a hand spade until the minimum sample mass (4.1 g) was obtained. If a single root weighed less than the minimum sample weight, the root of the next closest lomatium plant or plants were added to the sample to create a composite sample.
- Wild rose stems and leaves (*Rosa* sp.) were collected from *Rosa gymnocarpa, R. nutkana,* and *R. woodsi.* Wild rose sampling was conducted in SA01, SA03, SA04, and SA06. Wild rose stems and leaves were collected individually by hand until the target sample length of 48.5 cm was obtained. Samples included young tender stems and leaves attached to the stems. To increase the likelihood of rose hips being available to sample in August, the tops of large plants and plants with flower buds were not snipped if sufficient mass could be collected without snipping.
- Huckleberry (*Vaccinium cespitosum*) sampling was conducted in SA04. Whenever possible, individual plants with abundant berries were selected for sampling. Berries were picked individually by hand until at least the minimum sample mass of 16 g was obtained. If more berries were available on the plant, more berries were added to the sample until either the target sample mass (31 g) was obtained or until all the berries (both ripe and immature) were collected.

2.2.3 August 2018 Sample Collection

The following plant tissue samples were collected during the August sampling event (August 20 to August 28, 2018; late summer):

- Chokecherry (*Prunus virginiana*) sampling was conducted in SA01, SA03, SA07, and SA09. Whenever possible, individual plants with abundant berries were selected for sampling. Chokecherries were picked by hand until the target sample mass of 62 g was obtained.

- Hazelnut (*Corylus cornuta var. californica*) was sampled by hand from SA02, SA03, SA04, SA06, and SA09. Hazelnuts were picked by hand from the bushes. All available nuts on each bush were included in the sample; nuts that were visually determined to have insect damage or were rotten were discarded.
- Ponderosa pine (*Pinus ponderosa*) was sampled from SA01, SA02, SA03, SA04, and SA07. Cones were picked up from the ground, from the branches of individual trees by hand, or from the branches of individual trees with landscaping tree trimmers. The distance between trees targeted for sampling was more than 1.5 times the estimated height of the tallest tree sampled. Pine cones that had visible pine nuts were preferentially selected for the samples. A trial pinecone dissection at the beginning of the field effort did not find a characteristic that strongly predicted the number of seeds per cone (such as being closed, whole, humid, etc.). Instead, the field sampling team simply tried to find cones where some seeds were visible. Pine nuts had a target sample mass of 1.4 g.
- Sarvisberry (*Amelanchier alnifolia*) was sampled from SA01, SA03, SA07, SA08, and SA14. Whenever possible, individual plants with abundant berries were selected for sampling. Berries were picked by hand until the target sample mass of 3.1 g was obtained.
- Tule (*Schoenoplectus acutus*) was sampled from SA14. Since tule grows in large patches, it is difficult to determine what constitutes an "individual" plant. In SA14, the entire area that contained tule was roughly 30 m x 23 m (100 ft x 75 ft); individual patches were typically 1 m^2 or less. Within the larger area, individual tule culms as far from one another as possible were selected for different samples. Individual culms no more than 0.5 in. in diameter were selected and cut close to the rhizome. The reproductive parts were removed and discarded near mature plants. The specimen was then measured. The soil was dry when collected; no sediment sampling was necessary.
- Willow (*Salix exigua*) was sampled from SA15. Branches measuring up to 1.3 cm (0.5 in.) in diameter were selected and cut off from individual trees using hand-held clipping shears. Branches were collected from individual trees for each sample until the combined branch length was 189 cm (74.4 in.). A soil sample was collected from beneath the crown of the willow tree.
- Wild rose hips (*Rosa spp.*) were collected from *Rosa gymnocarpa, R. nutkana,* and *R. woodsi* in SA06, SA09, and SA14. Rose hips were handpicked from individual rose bushes until the mass exceeded the minimum sample mass of 4.4 g. If there were many rose hips on a bush, more hips were added until the sample met or exceeded the 8.7 g target sample mass. When an individual plant did not have enough rose hips for a single sample, the next closest plant or plants were collected for a composite sample.

- Wild mint (*Mentha arvensis*) was collected from SA14. Since wild mint grows in patches, it is difficult to differentiate individual plants. One individual plant usually did not have enough leaves for a whole sample, so leaves from the next closest plant were collected to add to the sample. Since nearby mint plants are likely the same individual, this sample was not considered a composite sample. One soil sample was taken from the middle of the wild mint plant sample area. Mint samples were collected approximately 6 m (20 ft) apart to minimize repeated collection of the same individual.

2.2.4 Sample Identification, Labeling, and Shipping

The sampling team documented sample locations using a handheld global positioning system (GPS) unit and took digital photographs before sampling at each sampling location. Plants were sampled as described in Sections 2.2.1, 2.2.2, and 2.2.3. (The procedures for collecting composite samples are discussed in Section 2.2.5.) Sampled plants were photographed and weighed or, when applicable, the length was measured, in accordance with the plant species-specific standard operating procedure (SOP). Plant tissue samples were double-bagged in resealable plastic bags with a label containing the specific sample identification (ID). After removing the organic duff layer, soil samples were collected from 0 to 3 in. below the ground surface using a decontaminated auger, coring, or spade tool. The 0- to 3-in. depth interval was selected as all plants have roots that pass through that depth range, and because this depth was consistent with previous soil studies conducted as part of the RI/FS. Soil samples were inspected by a cultural resource monitor following collection, as required by the Cultural Resource Coordination Plan (Appendix C of the QAPP). Following this inspection, the soil sample was hand mixed in a resealable plastic bag and transferred to a laboratory-supplied sample jar with the appropriate sample ID. Packaged plant tissue and soil samples were stored in coolers with ice in the field and transferred to freezers or coolers with dry ice at 4 ±2 °C until shipment to the laboratory. Samples were hand-delivered to ALS by field personnel.

Each sample ID contained a unique sampling location identifier followed by an individual organism identifier. Sampling location identifiers consisted of the following:

- Four-digit sampling area code—SA01 to SA16
- Two-digit sample event designation—SP for spring, JU for late June, and AU for late August[4]
- Two-digit sequential number to indicate location of sample

[4] See Section 3.1.2.3 for QAPP modification.

- One-digit code to designate a plant or co-located soil/sediment sample—P for plant, S for soil/sediment
- Two-digit number to indicate if more than one specimen was collected from that location.

Examples are:

- SA04-SP05-P01 = Plant tissue sample collected from lower lead SA number 4, sampled in the spring from location 5
- SA01-JU03-S01 = Co-located soil sample collected in high lead SA number 1 sampled in late June from location 3.

Sample IDs did not contain species-specific codes, so plant species information was matched to sample IDs using field records.

2.2.5 Sample Compositing

When an individual plant did not meet the sample mass requirement for laboratory analysis, a composite sample was collected as described in the QAPP (Ramboll 2018). Briefly, plant tissue from an individual plant was weighed in the field to determine if it met the mass required for analysis. If not, additional plants of the same species were weighed and sampled until the desired sample mass was obtained. Plants included in the composite sample were sampled within a 3-m (9.8-ft) radius of the original plant when possible. This is because plants in close proximity are more likely to be genetically related (seeds fall nearby more often than farther away), are more likely to be sharing nutrients through connected root networks, and are more likely to obtain nutrients from soil with similar contaminant of interest concentrations. A single GPS point was recorded for plants in the composite if the plants were within a 3-m radius. If additional plants had to be included in the composite sample that were located outside the initial 3-m radius to collect the minimum mass required, a separate GPS point was collected for those plants, and a centroid coordinate was calculated for the composite sampling location as described in Appendix B.

A co-located composite soil sample was collected for each composite plant tissue sample. A 0-to-3-in.-deep soil sample was collected from the location of each plant that was part of the composite sample. The amount of soil from each individual sample included in the final composite sample was proportional to the relative mass contributed by its co-located plant sample to the composite plant tissue sample (i.e., two-thirds, one-third). The number of units that compose each composite sample are identified in Table 2-2, along with average plant sample mass/length, and total sample mass/length.

2.3 LABORATORY METHODS

The plant tissue samples were received by ALS and stored frozen at or below -20 °C until processing. Plant tissue samples were processed, dried, and homogenized prior to chemical analysis. Soil samples specified for mercury analysis were frozen at or below -15 °C until processing. Soil samples not specified for mercury analysis were stored at room temperature until processing. All soil samples were dried and sieved prior to analysis.

2.3.1 Sample Processing

The plant tissue samples were processed in accordance with the ALS tissue processing SOP presented in Appendix B of the QAPP. Additional laboratory processing not specified in the QAPP was required for chokecherries, hazelnuts, pine cones, and willows. Additional processing included removing portions of the sample that were not consumed or used by CCT members (i.e., pits, shells, leaves). After processing, plant tissue samples were freeze-dried. After freeze drying, the plant tissue samples were homogenized with a stainless-steel grinder or a mortar and pestle depending on tissue type. Additional sample mass was stored frozen at -20 °C to be available for re-analysis, if necessary. None of the collected plant tissue samples resulted in low sample mass, so prioritization of metals analyses due to low mass was not needed. In the event that samples had low mass, analysis for TAL metals would have taken priority over mercury testing as specified in the QAPP.

The soil samples were processed in accordance with the ALS soil processing SOP presented in Appendix B of the QAPP. Soil samples were air dried and passed through a No. 100 sieve to isolate the target particle size of <150 µm. This particle size fraction is intended to represent the fraction expected to adhere to skin via dermal contact (Ruby and Lowney 2012). If laboratory duplicate samples were required from a particular sample, an additional 2 g of soil was placed in each jar. Additional sample mass was stored at room temperature to be available for re-analysis, if necessary.

EPA split samples were taken from a subset of samples for TAL metals analysis, as discussed earlier in Section 2.1.4 (see Table 2-2).

2.3.2 Chemical Analyses

Samples were analyzed in accordance with the QAPP (Ramboll 2018) for TAL metals and total solids using the methods listed in Table 2-3. Analytical procedures used for this study were standard EPA-approved methods with method detection limits (MDLs) sufficiently low to provide concentration data below risk-based concentrations (RBCs) when possible (Table 2-4). A comparison of actual MDLs to analytical concentration goals (ACGs) is provided in Section 5.2.

Mercury was analyzed in a subset of plant tissues identified as having a higher potential for mercury bioaccumulation (Li et al. 2017; Table 2-2) and the associated co-located soil samples. For the subset of plants selected for mercury analysis, the QAPP specified an analytical priority of TAL metals over mercury, in the event that the sample mass required for mercury analysis could not be obtained; however, the target sample mass was met in all cases, which allowed for mercury analysis in all of the samples where it was intended.

3 QUALITY ASSURANCE PROJECT PLAN DEVIATIONS

This section describes deviations from the QAPP (Ramboll 2018) that occurred during field sampling and chemical analyses.

3.1 FIELD SAMPLING

Procedures presented in the QAPP (Ramboll 2018) were followed to the extent possible during field sampling. Deviations from the QAPP were categorized as either "changes" or "modifications". Changes would have occurred prior to sampling and would have been approved by EPA and recorded on the change request form (included in Appendix A of the QAPP). Modifications were usually minor procedural adjustments (e.g., to increase sampling efficiency) made in the field during sampling based on the feasibility of plant tissue collection and recorded in AECOM's field logbook. In the field, suggested modifications were approved by representatives from TAI, EPA, and CCT before the modification was implemented.

3.1.1 QAPP Changes

No change requests were made during the three field sampling events.

3.1.2 QAPP Modifications

Several procedure modifications happened over the course of the three field sampling events and are described below. For each of these, agreement was obtained from EPA, TAI, and CCT representatives before the modification was accepted and implemented. Discussions regarding changes and the individuals who agreed to the change for each entity are documented in AECOM's field logbook (see FSR, Appendix A).

The field team strived to collect the plant tissue and co-located soil samples within the boundaries of the SAs. However, when additional plant tissue mass was needed for a sample and there was an acceptable specimen within the tribal allotment near the SA, additional plant tissue was collected and added to the sample. Locations where samples or some of the sample mass was collected outside the designated SA boundaries are identified in the FSR and shown on Maps 2-3, 2-4, 2-6, 2-11, and 2-12; the affected SAs are SA02, SA03, SA05, SA14, and SA15.

3.1.2.1 Spring Sampling Event

- **Wild rose (stems and leaves).** Wild rose stems and leaves were targeted for collection in the Spring sampling event, but the roses that were found did not yet have leaves. According to CCT representatives, wild rose stems would not be collected without leaves, so collection was rescheduled for the June sampling event.

- **Red willow/red-osier dogwood.** CCT clarified that the species identified in the QAPP as "red willow" and, alternately, as "red-osier dogwood" (*Cornus sericea*) is not ingested or mouthed by CCT members. Therefore, this plant was not sampled.

3.1.2.2 June Sampling Event

- **Sarvisberry.** During the June sampling event, field teams found that sarvisberry was not ripe. According to CCT consultant Whitney Fraser from Lodestone, sarvisberry would not be collected if the berries were not ripe. Based on this information, TAI, EPA, and CCT agreed to wait and collect sarvisberry during the August sampling event, even though the berries would be desiccated. For the August event, the minimum and target sample weights for sarvisberry were changed to 1.5 and 3.1 g, respectively, to account for the desiccation of the berries.

- **Huckleberry.** During the June sampling event, the sampling team discovered ripe dwarf huckleberry on SA04. Huckleberry was originally scheduled for collection during the August sampling event in the QAPP. However, according to botanist Jeff Walker from AECOM, given that the huckleberry was ripe in June, it was unlikely to remain ripe through August. Therefore, the huckleberry samples were collected in June.

3.1.2.3 August Sampling Event

- **Sample IDs.** During the August sampling event at the first sampling location, it was noticed that the pre-printed labels for sample containers had been misprinted. The sample ID printed on the labels included the letters AU instead of LA, which was given in the QAPP (see Appendix A) as the identifier for the August sampling event. The decision was made to change the identifier for the August sampling event to AU to be able to use the pre-printed sample labels and reduce the number of field corrections that might be needed.

- **Ponderosa pine (pine nuts).** During the August sampling event, only 10 to 12 pine cones were collected per sample, not 20 as was stated in the QAPP. The number of cones to collect was refined following an experiment conducted at the start of the sampling event to get a better estimate of the number and weight of pine nuts per pine cone. Eighteen pine cones were opened for this assessment. The average mass of pine nuts per pine cone in the experiment was 0.578 g. Given the target sample mass of 1.4 g identified in the QAPP (Ramboll 2018), the minimum sample size was adjusted to 3 pine cones and the target sample mass adjusted to 6 pine cones. If additional pine cones were available at the sampling locations, 10 to 12 pine cones were collected per sample.

- **Hazelnuts.** During the August sampling event, the method for collecting hazelnuts was modified from the methods recommended in SOP-4 steps 2 through 4. In the field, it was determined that shaking the hazelnut bush to collect ripe nuts had the potential to lose nuts in the underbrush, so this method was not used. Instead, hazelnuts were picked by hand. Another modification involved the assessment of the presence (or absence) and condition of nuts in the shells. During the August 2017 field reconnaissance survey (Ramboll Environ 2017a), AECOM collected hazelnuts for inspection and found that it was difficult to determine whether there were nuts inside the shells by examining the hazelnut shell. Therefore, a float test to help separate shells with nuts from hollow shells was found in the literature and included in the QAPP. Theoretically, hazelnuts that floated would not have nuts and could be discarded. The float test was used on hazelnuts collected from the first bush sampled. As an experiment, some of the hazelnuts that floated were opened by the field sampling team and found to contain nuts. This showed that the float test was not reliable. Therefore, it was decided to collect all intact nuts available from each bush sampled; nuts with visible rot or insect damage on the shells were discarded.

3.2 CHEMICAL ANALYSES

The following deviations from the QAPP occurred as a result of laboratory sample processing or analysis.

- Mercury analysis was performed on one rose hip sample (SA14-AU15-P01), three sarvisberry samples (SA08-AU01-P01, SA08-AU02-P01, and SA14-AU16-P01), and the four co-located soil samples (SA14-AU15-S01, SA08-AU01-S01, SA08-AU02-S01, and SA14-AU16-S01) although these samples were not specified for mercury analysis in the QAPP. This occurred because of errors on four chain-of-custody (COC) forms. ALS had already analyzed the four soil samples before the error was identified, so it was decided that the associated co-located plant tissue samples should also be analyzed for mercury for consistency. Because all soil samples were shipped on wet ice to ALS regardless of whether they were specified for mercury analysis, the accuracy of the mercury analysis was not affected.
- Total solids analysis was performed and reported by ALS for both the bulk and sieved (< 150 µm) soil sample fractions in sample delivery group K1804201. The sieved soil samples were air dried before analysis, the bulk samples were not. The sieved soil samples were the fraction intended for analysis. The total solids results from the bulk samples were not included in this data summary report. Therefore, the bulk sample results were retained in the project database as "Reportable = No" and were excluded from the data tables.

- Soil samples were not passed through a No. 10 sieve (2 mm) prior to using the No. 100 sieve (150 μm) as specified in the QAPP due to time constraints at ALS.

4 DATA VALIDATION ASSESSMENT

Data validation was performed by Environmental Standards, Inc. (ESI) of Valley Forge, Pennsylvania, in accordance with the QAPP (Ramboll 2018) based on EPA guidance from applicable analytical methods and the following documents:

- Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (EPA 540-R-08-005) (USEPA 2009)
- National Functional Guidelines for Inorganic Superfund Methods Data Review (EPA-540-R-2017-001) (USEPA 2017c)

Stage 2B validation was conducted for the majority of the chemistry data. Approximately 14 percent of the data underwent Stage 4 validation. Data were qualified, as needed, based on an evaluation of the following QC criteria:

- Holding times
- Condition of samples upon receipt by laboratory
- Sample preparation
- Initial and continuing calibration results
- Laboratory and equipment blank results
- Matrix spike/matrix spike duplicate (MS/MSD) results
- Standard reference material (SRM) results
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) results
- Laboratory duplicate and field replicate relative percent differences (RPDs)
- Reporting limit (RL) standard results
- Interference check sample results
- Serial dilution results
- Internal standard performance
- Instrument sensitivity
- Instrument raw data and qualitative identification
- Analytical sequence.

The ESI data validation reports are available on the Downloads page of the project database (http://teck-ucr.exponent.com). The results of the data validation for overall data quality of chemistry results, sample transport and holding times, and equipment blank data are summarized in Sections 4.1, 4.2, and 4.3, respectively. ESI reviewed laboratory QC samples as part of the data validation process. Specific data quality considerations identified by the data validator for the plant tissue and soil data are summarized in Sections 4.4 and 4.5, respectively.

4.1 OVERALL DATA QUALITY

Chemistry data for equipment rinsate blanks, plant tissues, and soils met quality requirements in the QAPP (Ramboll 2018). A summary of the qualifiers assigned by ESI to equipment blank, plant tissue, and soil sample results is presented in Tables 4-1 through 4-3, along with the original laboratory data qualifiers. All data were deemed usable with the qualifiers presented with no data rejected. The following data qualifiers were applied by ESI:

- J—The result was considered estimated. For this dataset, J flags were applied due to high field split RPD, low and high MS/MSD recovery, high serial dilution percent difference, laboratory duplicate imprecision, and/or concentration between the MDL and the RL.
- J- —The result was considered estimated and may be biased low. For this dataset, J- flags were applied due to low MS/MSD or standard reference material (SRM) recovery and negative instrument bias, according to the functional guidelines.
- J+ —The result was considered estimated and may be biased high. For this dataset, J+ flags were applied due to inductively coupled plasma (ICP) interference, according to the functional guidelines.
- U—The analyte was not detected at or above the MDL.
- U*—The analyte was considered not detected because a similar concentration was detected in an associated blank sample. Values for the MDL and RL (if the reported result exceeded the RL) were replaced with the reported result.
- UJ—The analyte was not detected, and the MDL was considered approximate due to bias identified during the QA review. For this dataset, UJ flags were applied due to low SRM recovery and negative instrument bias, according to the functional guidelines.

Data quality indicators for precision, accuracy or bias, representativeness, completeness, and comparability (PARCC) were specified in the QAPP, and measurement quality objectives (MQOs) were listed in Table B5-2 of the QAPP (Ramboll 2018). The data validator used the project-specific MQOs to evaluate soil and tissue data for the quantitative components of PARCC (i.e., precision and accuracy or bias), and an additional MQO (≤ 40 RPD) for soil field replicates was added by ESI. Laboratory duplicates, MS/MSDs, and field replicates were used to assess precision. The evaluation of accuracy and bias was based on the results of QC samples such as

MSs, internal standards, and equipment and method blanks. The data validator also assessed sample handling, laboratory methods, and holding times to evaluate the representativeness and comparability of analytical data. Data were qualified as necessary by ESI when MQOs were not met. A data completeness goal of 90 percent was specified in the QAPP for the analysis of all composite samples (Ramboll 2018). Data completeness was 100 percent for all analytes.

Tables 4-1 through 4-3 show both the number of qualifiers applied by the analytical laboratory and the number of qualifiers applied by the data validator.[5]

4.2 SAMPLE TRANSPORT AND HOLDING TIMES

There were no issues related to sample transport or holding times. A holding time of 180 days was specified in the QAPP for TAL metals in plant tissue and soil samples, except mercury which had a holding time of 1 year. All samples were prepared and analyzed by the laboratory within the QAPP-specified holding times (Ramboll 2018).

4.3 EQUIPMENT BLANK DATA

Data qualifiers applied to equipment blank results are summarized in Table 4-1 (excluding the two laboratory duplicates). Six iron results were qualified due to negative instrument bias. Of these, three results were qualified as estimated (biased low, J- flagged),[6] and the other three results were not detected and the MDL was considered approximate (UJ flagged).

Equipment blank concentrations were compared to the plant tissue data on a similar unit basis (i.e., parts per million) to evaluate contamination. Equipment blanks were not prepared for soil sample processing equipment. One plant tissue result for aluminum was qualified as not detected (U* flagged) due to equipment blank contamination.

4.4 PLANT TISSUE DATA

This section summarizes data quality considerations for the plant tissue analytical results (i.e., TAL metals and mercury) as qualified by ESI (Table 4-2). Qualifiers were applied based on an evaluation of various QC factors (e.g., calibration, LCS/LCSD and MS/MSD recoveries, laboratory blank concentrations, SRM results, interference checks, serial dilutions, and internal standards).

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[5] ESI validates and qualifies laboratory QC samples (e.g., laboratory duplicates) for all UCR datasets. However, laboratory duplicates are not included in the analyses of UCR Site data and thus are excluded from the qualifier counts tables (Tables 4-1, 4-2, and 4-3).

[6] These results are J flagged (not J- flagged) in the database to account for an additional unknown direction of bias due to results being reported between the MDL and the RL.

Six laboratory QC samples were analyzed for total solids in plant tissue, none of which were qualified. There were no laboratory QC samples for TAL metals or mercury in plant tissue.[7] Numbers of qualified plant tissue sample results are shown. Tissue data were qualified due to laboratory blank, MS/MSD, and SRM results, as detailed in the following subsections. All other QC parameters were within control limits.

No quality control indicator was applied to field replicate results for plant tissues because a set criterion is not biologically meaningful. Different portions of a plant likely draw nutrients from the roots that are closest to that part of the plant, because in many species sap does not circulate throughout the plant (Perry 1982). For example, different roots are likely to draw nutrients from soil with different chemical properties, so it is unlikely that different plant parts, such as wild rose stems on different sides of the plant, would contain the same concentrations of metals or mercury. Each side of the plant draws nutrients from the roots that are closest to that side of the plant. Instead of comparing these data to a set criterion for reproducibility, Section 5 includes a discussion of the variation in field replicates of plant tissue samples in the context of intra-plant variation in analyte concentrations.

4.4.1 Blanks

Tissue concentrations were qualified as not detected (U* flagged) due to the presence of the analyte at concentrations similar to those in the associated laboratory or equipment blanks for the following analytes and numbers of samples:

- Aluminum – 12 of 174
- Antimony – 3 of 174
- Lead – 5 of 174
- Silver – 25 of 174
- Thallium – 5 of 174.

4.4.2 Matrix Spikes

Iron concentrations in 9 of 174 sample results were qualified as estimated (J flagged) due to a low recovery in the MS and a high recovery in the MSD.

Mercury concentrations in 19[8] of 63 sample results were qualified as estimated (biased low, J- flagged) due to a low MS/MSD recovery.

[7] Due to sample mass limitations.

[8] One of these results is J flagged (not J- flagged) in the database to account for an additional unknown direction of bias due to results being reported between the MDL and the RL.

4.4.3 Standard Reference Materials

Tissue concentrations were qualified as estimated (biased low, J- flagged) due to low SRM recoveries for the following analytes and numbers of samples:

- Aluminum – 144 of 174
- Nickel – 48 of 174
- Vanadium – 48 of 174.

In addition, 1 result for aluminum and 15 results for vanadium were not detected and the MDL was considered approximate (UJ flagged) due to low SRM results.

4.5 SOIL DATA

This section summarizes data quality considerations for the soil analytical results (i.e., TAL metals and mercury), including the seven laboratory duplicates (for TAL metals only, no laboratory duplicates analyzed for mercury), as qualified by ESI (Table 4-3). Qualifiers were applied based on an evaluation of various QC factors (e.g., calibration, LCS and MS/MSD recoveries, laboratory blank concentrations, laboratory duplicate and field replicate results, interference checks, serial dilutions, and internal standards). Numbers of qualified soil sample results (excluding laboratory QC samples) are shown, followed by numbers of qualified laboratory QC samples in parentheses.[9] Soil data were qualified due to laboratory blank, MS/MSD, laboratory duplicate and field replicate, interference check, and serial dilution results, as detailed in the following subsections. All other QC parameters were within control limits.

4.5.1 Blanks

Thallium concentrations in 16 (1) of 174 (8) soil samples were qualified as not detected (U* flagged) due to the presence of the analyte at concentrations similar to those in the associated laboratory blanks in multiple sample delivery groups.

4.5.2 Matrix Spikes

Cadmium concentrations in 9 (1) of 174 (8) soil sample results were qualified as estimated (J flagged) due to a low MS recovery. Antimony concentrations in 166 (7) of 174 (8) sample results were qualified as estimated (J flagged) due to high and low MS recoveries.

[9] ESI validates and qualifies laboratory QC samples (e.g., laboratory duplicates) for all UCR datasets. However, laboratory duplicates are not included in the analyses of UCR Site data and thus are excluded from the qualifier counts tables (Tables 4-1, 4-2, and 4-3).

4.5.3 Laboratory Duplicates and Field Replicate Samples

Soil concentrations were qualified as estimated (J flagged) due to laboratory and/or field replicate RPDs that were not within control limits for the following analytes and numbers of samples:

- Aluminum – 2 of 174 (8)
- Antimony – 4 of 174 (8)
- Arsenic – 2 of 174 (8)
- Barium – 2 of 174 (8)
- Beryllium – 11 (1) of 174 (8)
- Cadmium – 4 of 174 (8)
- Iron – 2 of 174 (8)
- Lead – 6 of 174 (8)
- Manganese – 2 of 174 (8)
- Mercury – 2 of 63
- Silver – 11 (1) of 174 (8)
- Thallium – 11(1) of 174 (8)
- Zinc – 4 of 174 (8).

4.5.4 Interference Check Samples

Soil concentrations were qualified as estimated (J+ flagged) due to ICP interference for cobalt in 41[10] of 174 (8) samples.

4.5.5 Serial Dilutions

Soil concentrations were qualified as estimated (J flagged) due to a high serial dilution percent difference for the following analytes and numbers of samples:

- Antimony – 9 (1) of 174 (8)
- Barium – 9 (1) of 174 (8)
- Beryllium – 29 (1) of 174 (8)
- Cadmium – 29 (1) of 174 (8)
- Chromium – 9 (1) of 174 (8)
- Cobalt – 9 (1) of 174 (8)
- Copper – 16 (1) of 174 (8)
- Nickel – 25 (2) of 174 (8)
- Silver – 56 (3) of 174 (8)
- Thallium – 20 of 174 (8).

[10] Three of these results are J flagged (not J- flagged) in the database to account for additional unknown direction of bias identified in the serial dilution results.

5 RESULTS

This section summarizes the plant tissues found, analytical results for plant tissue and co-located soil samples, ACG screen, and field replicate RPD results for soils.

Summary statistics for all analytes are presented in Tables 5-1a through 5-1o for each plant part and associated soil samples for high lead and lower lead areas. The mean analyte concentration and standard deviation for plant tissue samples and soil samples within each SA are presented in Table 5-2 and Table 5-3, respectively. Total solids results are presented by SA in Figure 5-1 for the plant tissue samples, and in Figure 5-3 for soil. Metals concentrations are plotted by SA in Figures 5-2a through 5-2s for plants and Figures 5-4a through 5-4s for soil. Analyte concentrations are not compared to the human health RBCs in the figures or tables because updated RBCs are being developed for the HHRA that are more applicable to CCT exposures (USEPA 2016). ACGs are compared to the method reporting limits (MRLs) for nondetected concentrations of TAL metals in Table 5-4, and field replicate RPDs are summarized in Table 5-5 for plant tissue and Table 5-6 for soil. Co-located plant tissue and soil concentrations by metal are presented as scatterplots in Figures 5-5a through 5-5s.

5.1 PLANT SPECIES SAMPLED

Fifteen of 22 target plant tissues specified in the QAPP (Ramboll 2018) were collected during the study. One species (red willow/red osier-dogwood) was not sampled because it is not ingested or mouthed by CCT members, as discussed in Section 3.1.2.1. The 10 plant tissues listed below were sampled at both high lead and lower lead SAs:

- Black tree lichen
- Camas bulbs
- Chokecherry berries
- Hazelnuts
- Kinnikinnick leaves
- Lomatium roots
- Ponderosa pine nuts
- Sarvisberry berries
- Spring beauty/Indian potato corms
- Wild rose stems and leaves.

The following five plant tissues were only sampled at lower lead SAs:

- Huckleberry berries
- Tule culms
- Wild rose hips
- Wild mint leaves
- Willow branches[11].

The following six plant tissues were not sampled because they were not present in sufficient abundance to collect the minimum sample mass required for the minimum three samples:

- Bitterroot roots
- Indian carrot roots
- Morel mushrooms
- Puffball mushrooms[12]
- Shaggy mane mushrooms
- Wild strawberry berries.

5.2 TAL METALS, MERCURY, AND PERCENT SOLIDS

All soil and plant tissue samples were analyzed for TAL metals (except calcium, magnesium, potassium, and sodium) and total solids. Leaf and stem samples collected from kinnikinnick, willow, wild rose, tule, and wild mint plants, and the associated co-located soil samples were also analyzed for mercury. Mercury was only tested in leaves and stems due to research demonstrating that mercury was highest in these tissues (Li et al. 2017).

Summary statistics for TAL metals and mercury in plant tissues and soil are presented in Tables 5-1a through 5-1o, Table 5-2, and Table 5-3. Figures 5-1a through 5-1s and 5-4a through 5-4s present results for the plant tissue and soil samples, respectively.

[11] Willow was collected in SA15 and SA16 only, which are lower lead SAs. The average soil lead concentration reported in the 2014 upland soil study for SA15 was 389 mg/kg (Windward et al. 2015), and the average soil lead concentration reported for SA16 was 46 mg/kg based on the UCR 2010 beach sediment study (Integral 2014). These concentrations are below the time-critical removal action level of 700 mg/kg that was used to designate high lead SAs for this study.

[12] Puffballs were found during sampling, but they did not match the description and pictures provided by CCT showing the type of puffball that is consumed. When consulted and shown images of the puffballs found, CCT members said they would not consume that type of puffball. See Appendix G of the FSR for more detail.

Actual MRLs for nondetected TAL metals were compared to the ACGs specified in the QAPP (Ramboll 2018). All nondetected metals results for the plant tissue samples were below their respective ACGs (Table 5-4). Of the soil sample results, thallium was the only metal with nondetected results that exceeded the ACG (Table 5-4). These thallium results were U* qualified by the data validator because a similar concentration was detected in the associated laboratory blank. The maximum exceedance was 2.46 times the ACG.

Field replicate RPDs for plant tissue samples are summarized in Table 5-5, and in Table 5-6 for soil samples. As discussed in Section 4.4, plant tissue field replicate RPDs were not compared to a set QC criterion because it is not biologically meaningful. Mean plant tissue RPDs ranged from 2 to 59 percent. Plant tissue RPDs exceeded 100 percent for several metals in several plant species, with a maximum RPD of 168 percent for lead in chokecherry tissue. The mean RPD for mercury from plant tissue was 22.9 percent, and the highest RPD for mercury was 87.6 percent in wild rose stems and leaves. Based on these results, metals concentrations in plant tissue can vary widely within an individual plant.

Soil sample field replicate RPDs were compared to a control criterion of 40 percent. Metals results exceeded the control criterion of 40 percent in 22 out of 317 results—approximately 7 percent. These results indicate that the majority of soil field replicate RPDs are below 40 percent, but metals concentrations in soil can vary substantially in localized areas.

All plant species were tested for percent solids as part of chemical analyses. Black tree lichen collected in SA01 had particularly high moisture content as compared to black tree lichen sampled in SA05 and SA08 (Figure 5-1 and Table 5-1a). This is probably due to the fact that it was raining on the day that SA01 was sampled which wetted the lichen, likely increased the water content of the samples, and resulted in a reduction of the percent solids.

6 SUMMARY

TAI collected plant tissue from 12 of 16 SAs at the Site, including three high lead SAs (SA01, SA02, and SA03) and nine lower lead SAs (SA04, SA05, SA06, SA07, SA08, SA09, SA14, SA15, and SA16), with an objective to obtain samples of 22 types of plant tissue. A total of 174 plant tissue and 174 co-located soil samples were collected and analyzed for TAL metals, including 63 plant tissue and co-located soil samples which were analyzed for mercury in accordance with the QAPP (Ramboll 2018). Sampling took place during three separate sampling events (Spring, June, and August). During the Spring event, red willow (*Cornus sericea*) was taken off the target plant list because it is not usually ingested or mouthed by CCT members. Of the remaining 21 tissue types targeted for the study, 15 were collected: black tree lichen, camas bulbs, kinnikinnick leaves, lomatium roots, Indian potato corms, willow branches, huckleberry berries, wild rose (stems and leaves in June and rose hips in August), chokecherry berries, hazelnuts, ponderosa pine nuts, sarvisberry berries, tule culms, and wild mint leaves (Table 2-1). The plant tissues not collected were either not present or not present in high enough abundance to collect for this study.

Consistent with the QAPP (Ramboll 2018), all of the plant tissue and soil samples were analyzed for TAL metals (except calcium, magnesium, potassium, and sodium), and leaf and stem tissues collected from kinnikinnick, wild rose, willows, tule, and wild mint (59 plant tissue samples) and the associated soil samples were also analyzed for mercury. Additionally, as noted in Section 3.2, three sarvisberry samples and one wild rosehip sample were also analyzed for mercury, although this was not required per the QAPP. Data completeness was greater than the 90 percent goal specified in the QAPP. The ACGs specified in the QAPP were met for 100 percent of nondetected plant tissue results.

Of the soil sample results, only 16 results (thallium) were not detected. However, all 16 nondetected results exceeded the ACG. All exceedances were less than three times the ACG. No data were rejected as part of the data validation and all of the data are considered usable with the qualifiers presented.

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FIGURES

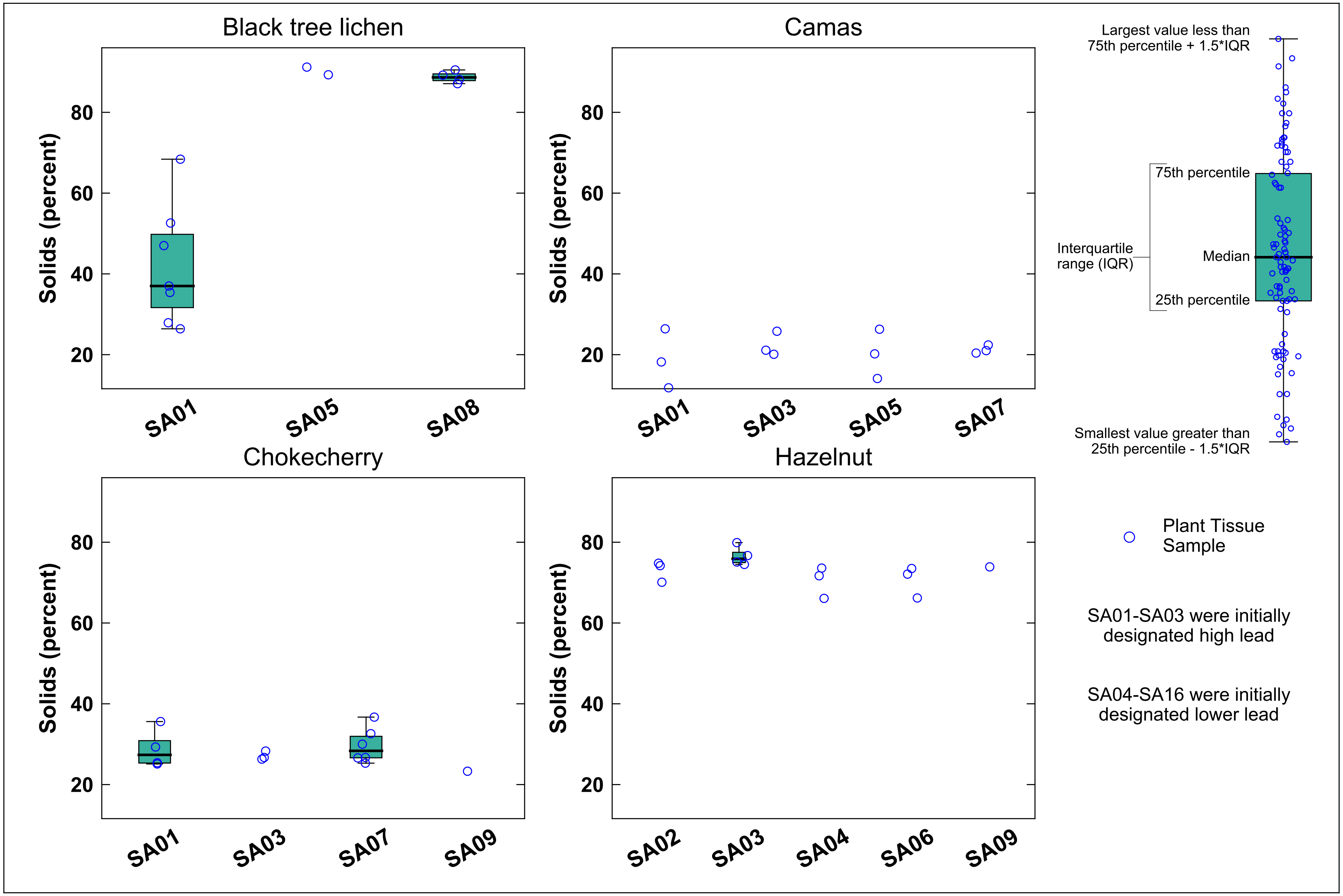


Figure 5-1a. Percent Solids in Plant Tissue Samples by Sample Area

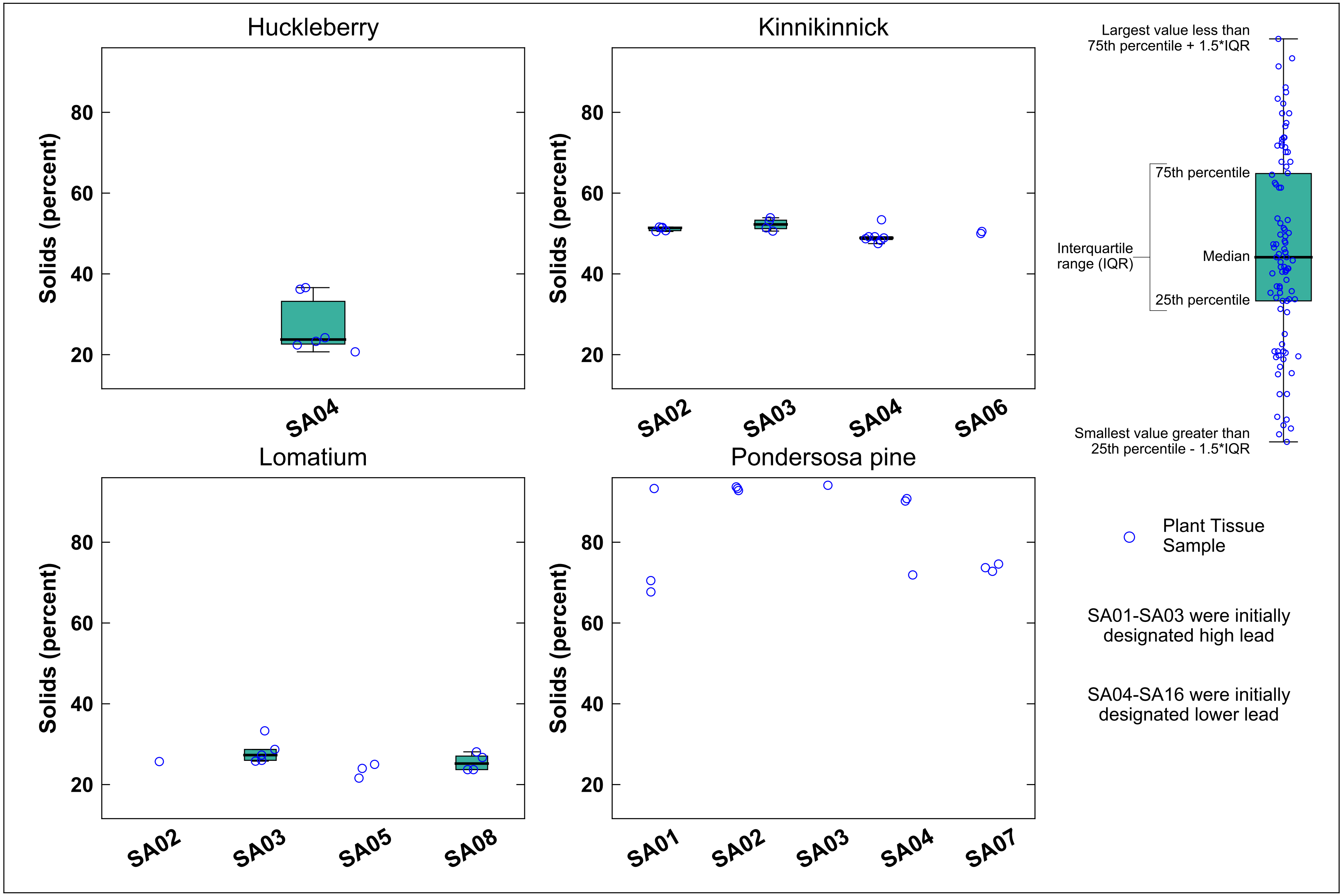


Figure 5-1b. Percent Solids in Plant Tissue Samples by Sample Area

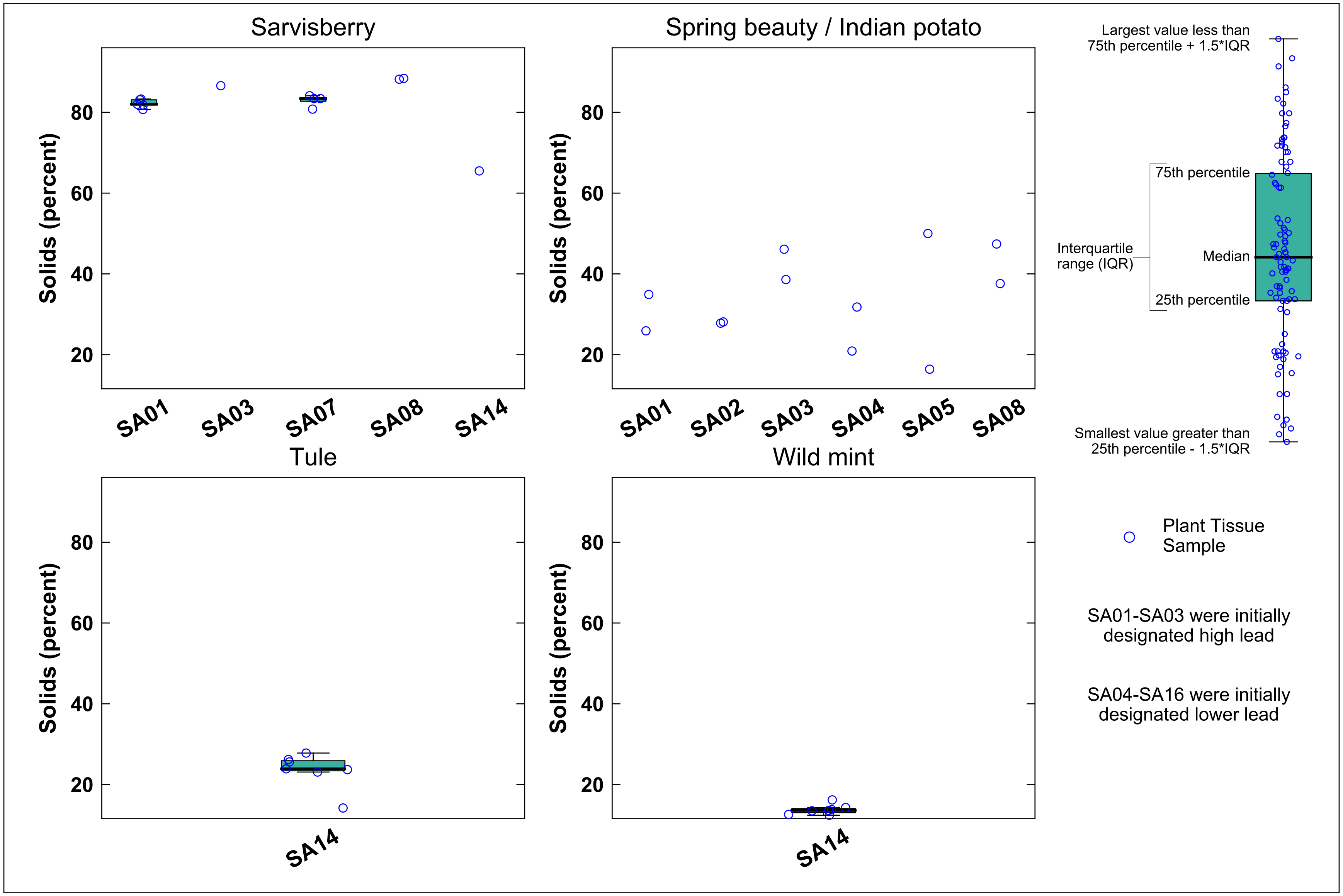


Figure 5-1c. Percent Solids in Plant Tissue Samples by Sample Area

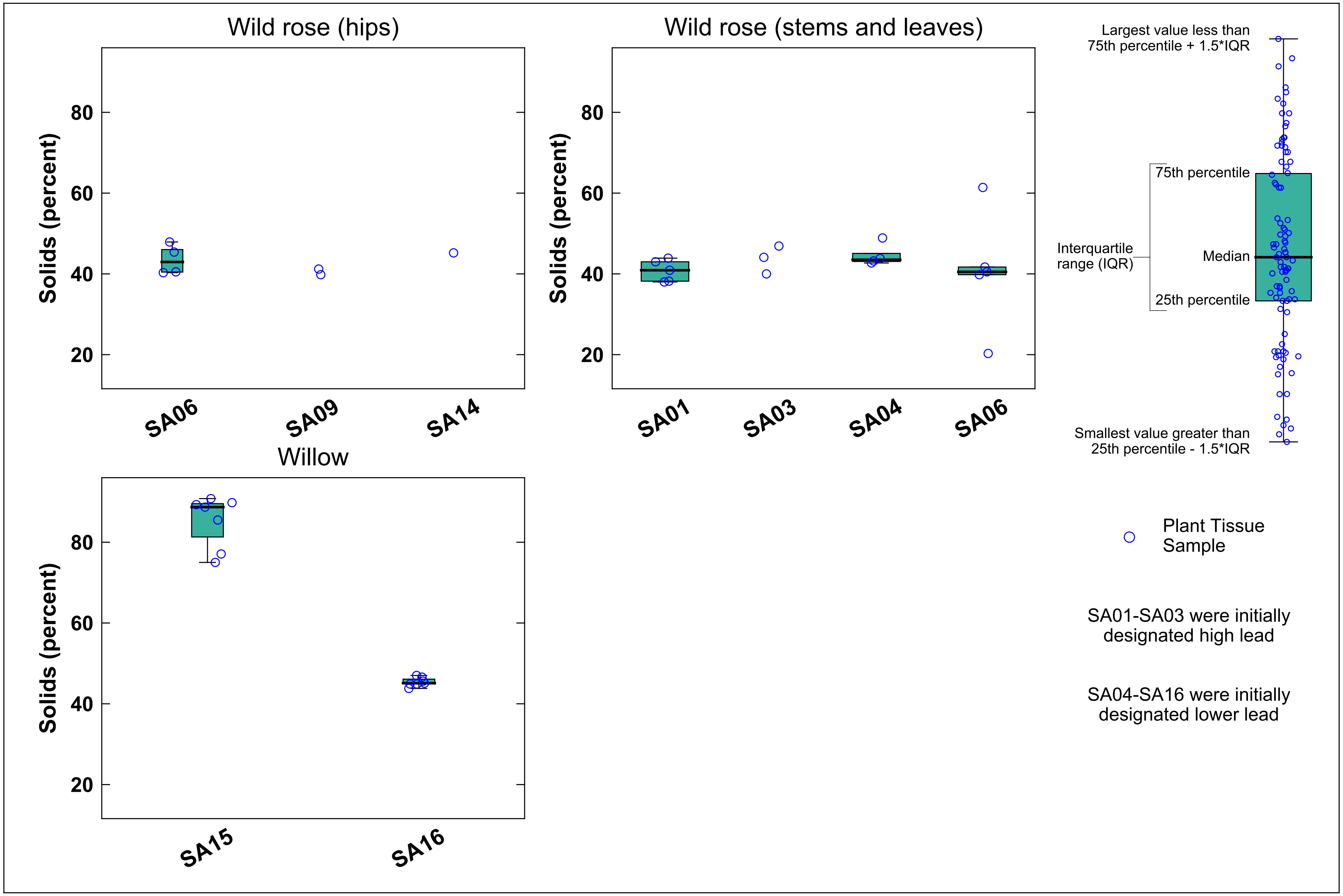


Figure 5-1d. Percent Solids in Plant Tissue Samples by Sample Area

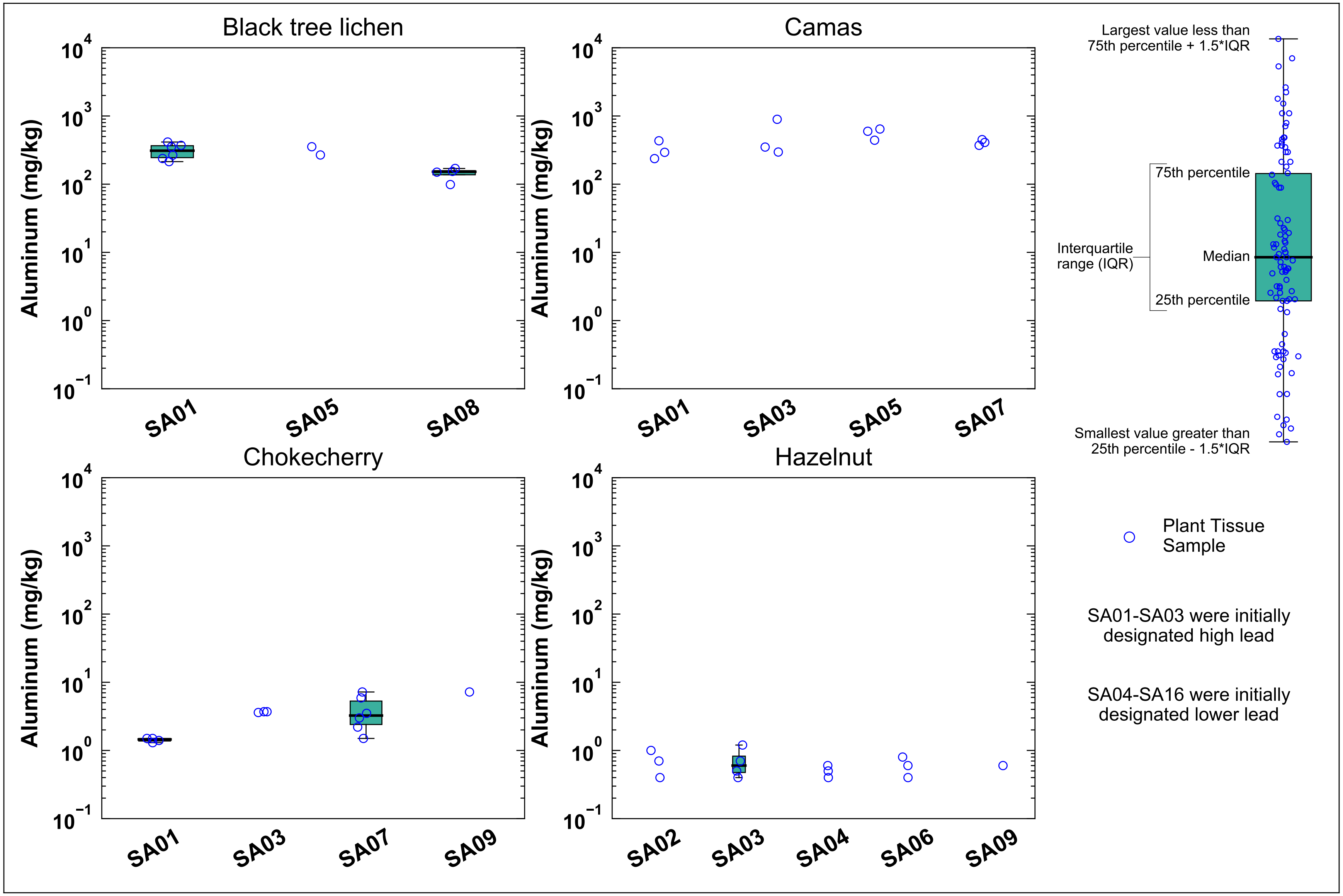


Figure 5-2a. Aluminum Concentrations in Plant Tissue Samples by Sample Area

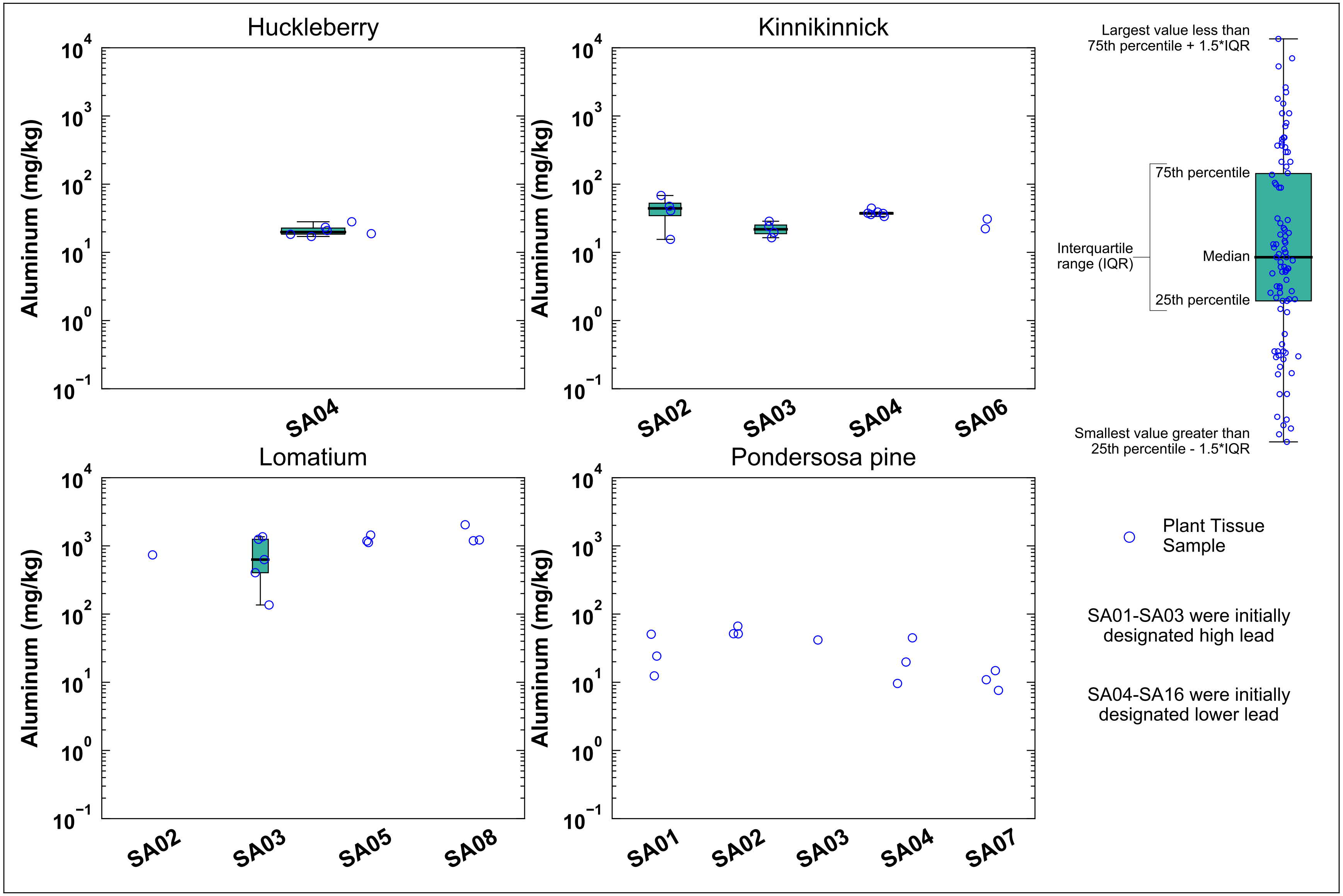


Figure 5-2b. Aluminum Concentrations in Plant Tissue Samples by Sample Area

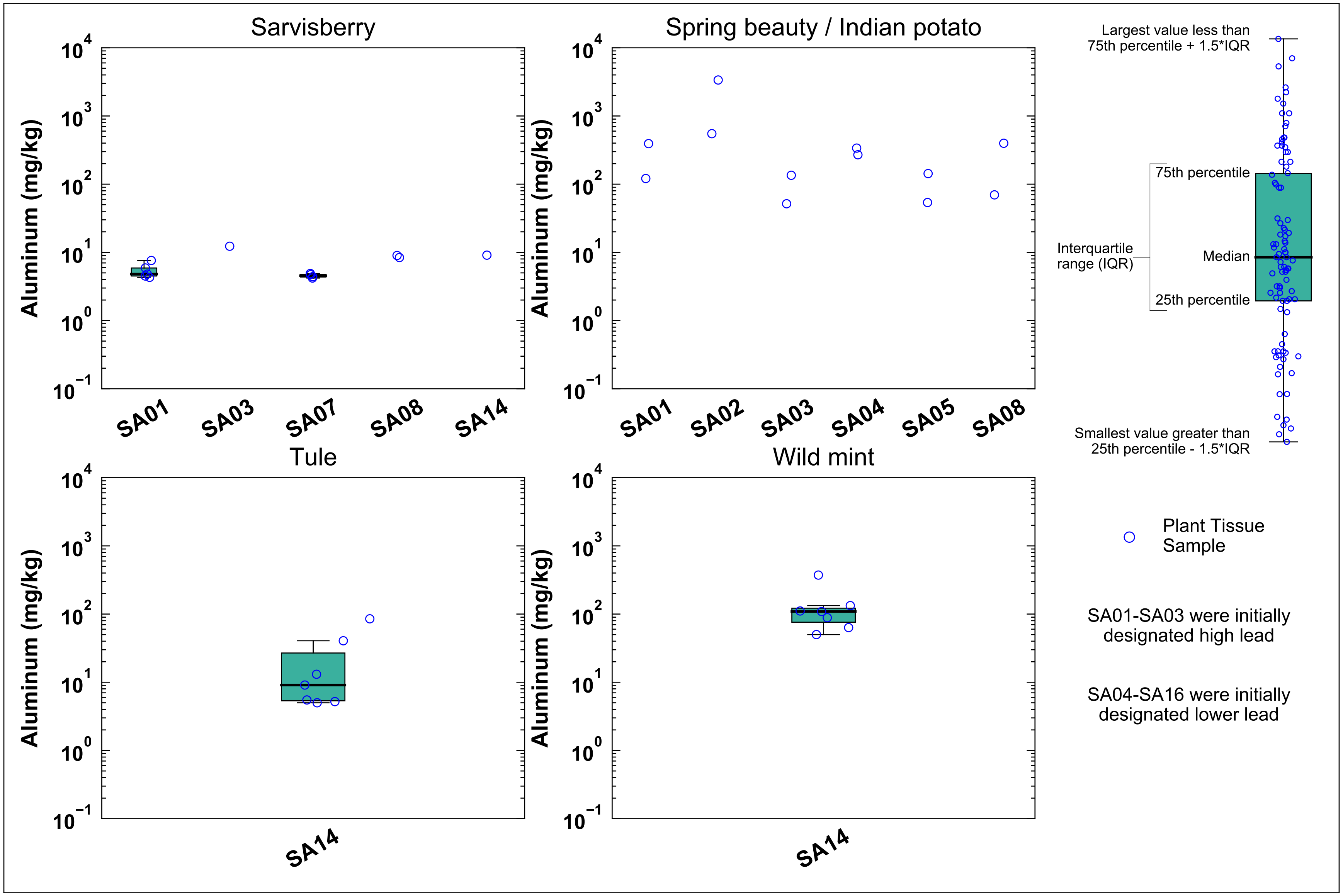


Figure 5-2c. Aluminum Concentrations in Plant Tissue Samples by Sample Area

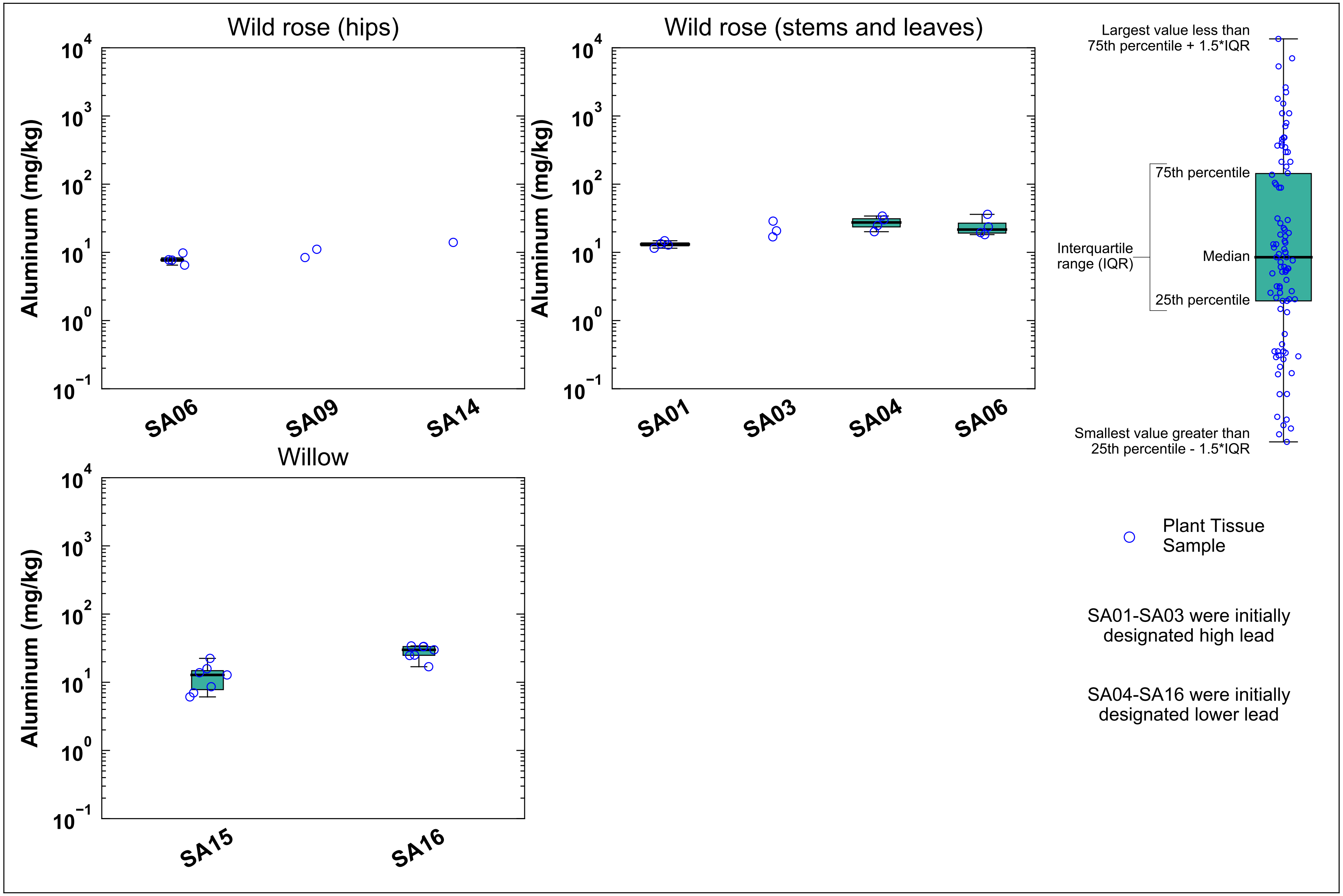


Figure 5-2d. Aluminum Concentrations in Plant Tissue Samples by Sample Area

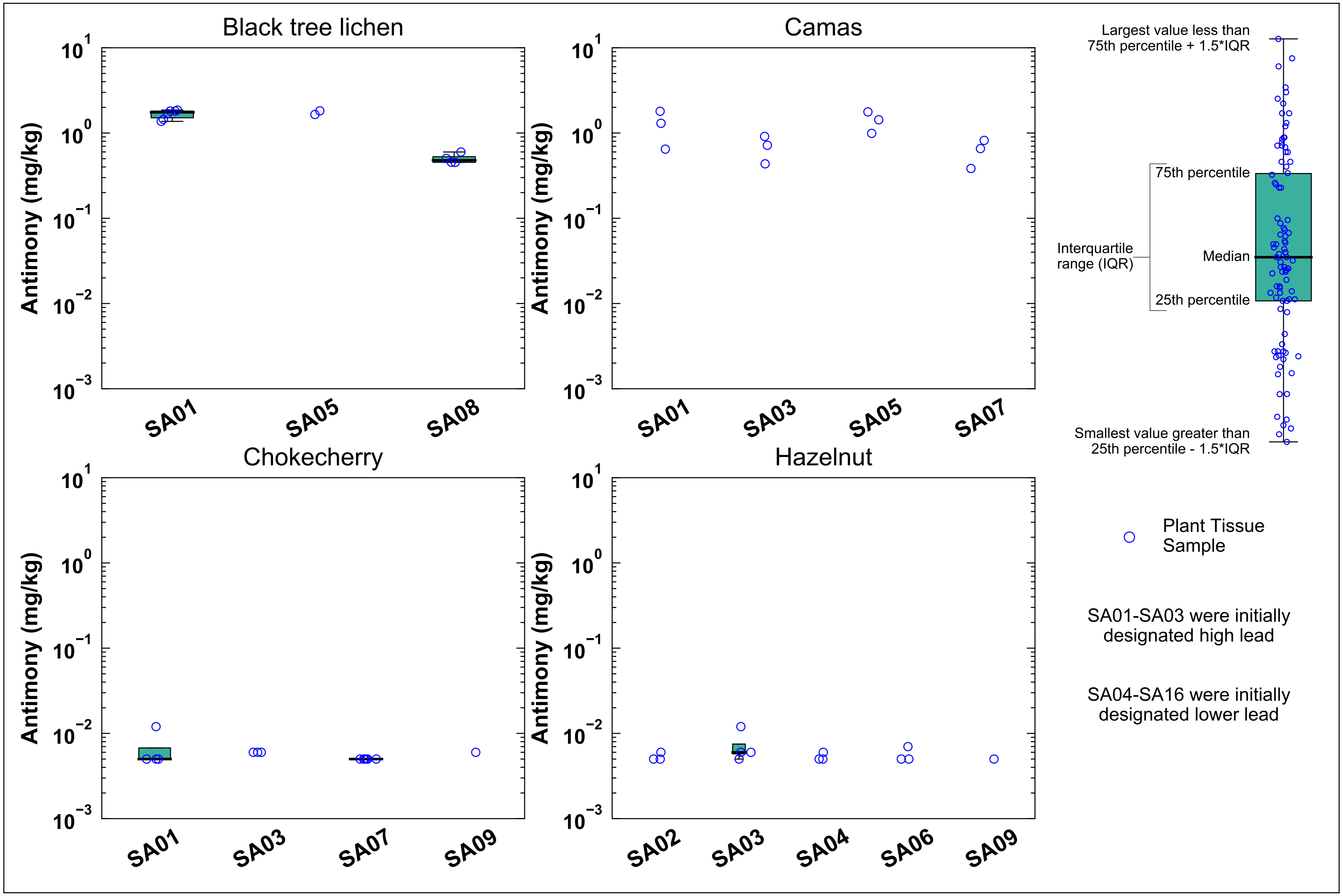


Figure 5-2e. Antimony Concentrations in Plant Tissue Samples by Sample Area

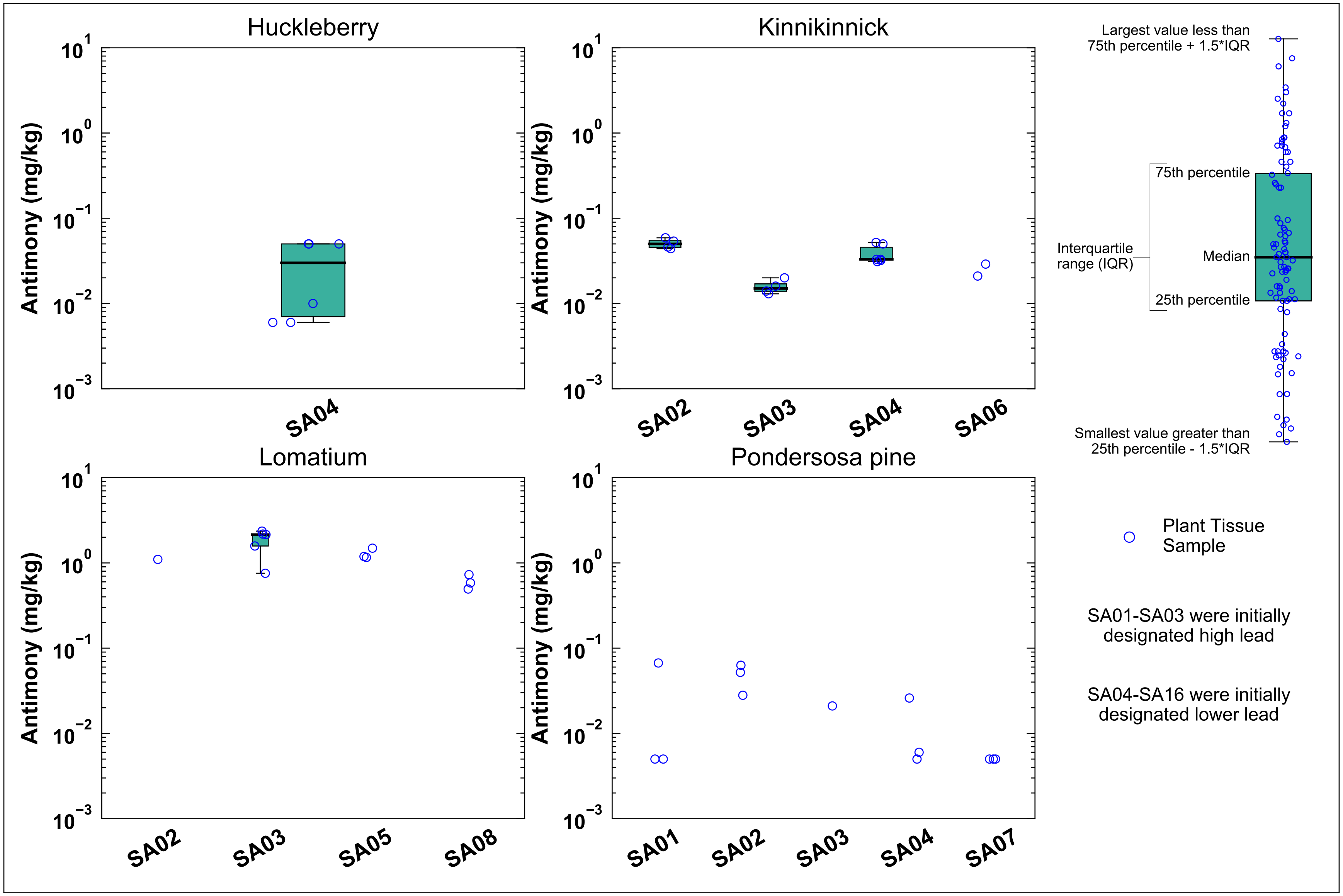


Figure 5-2f. Antimony Concentrations in Plant Tissue Samples by Sample Area

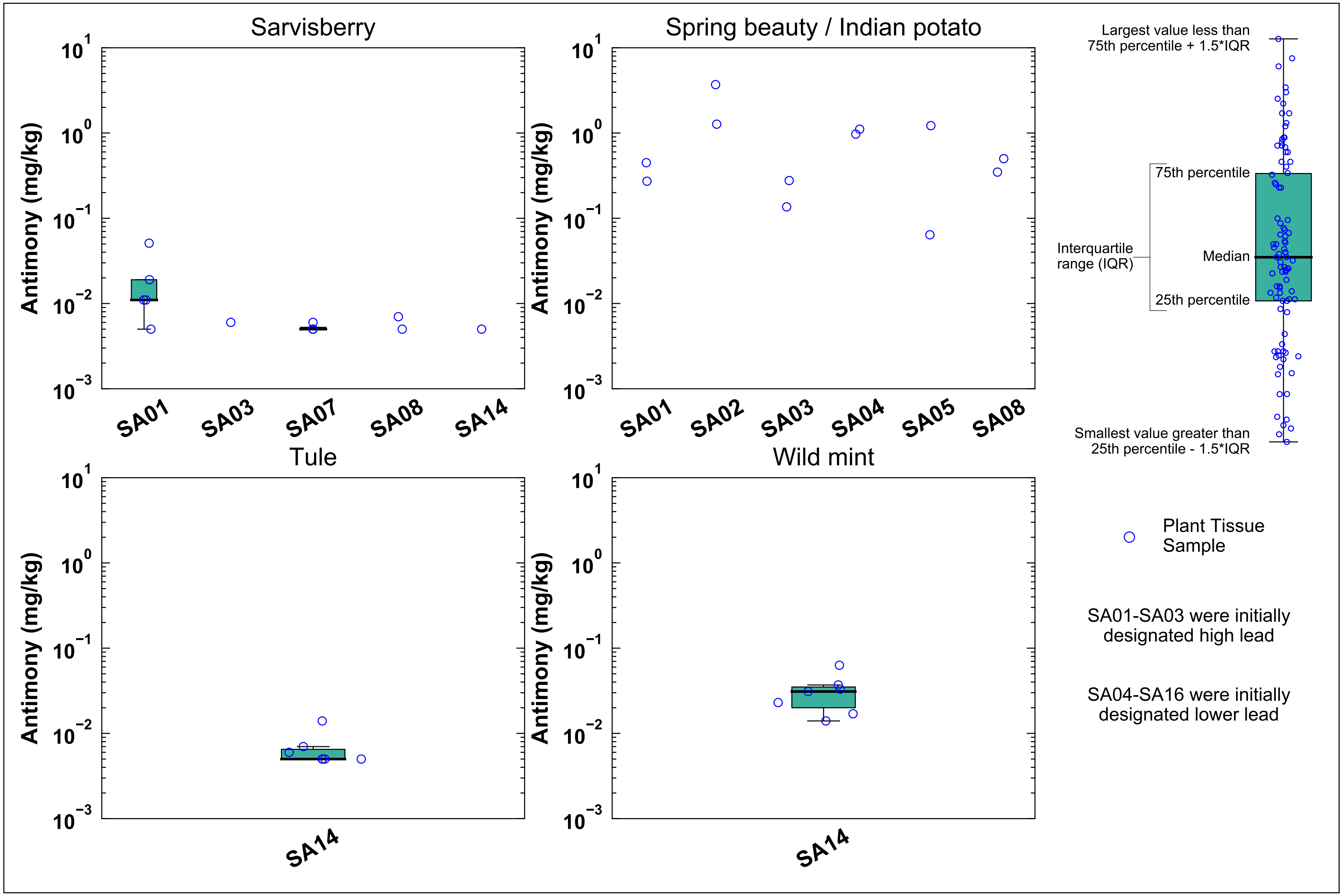


Figure 5-2g. Antimony Concentrations in Plant Tissue Samples by Sample Area

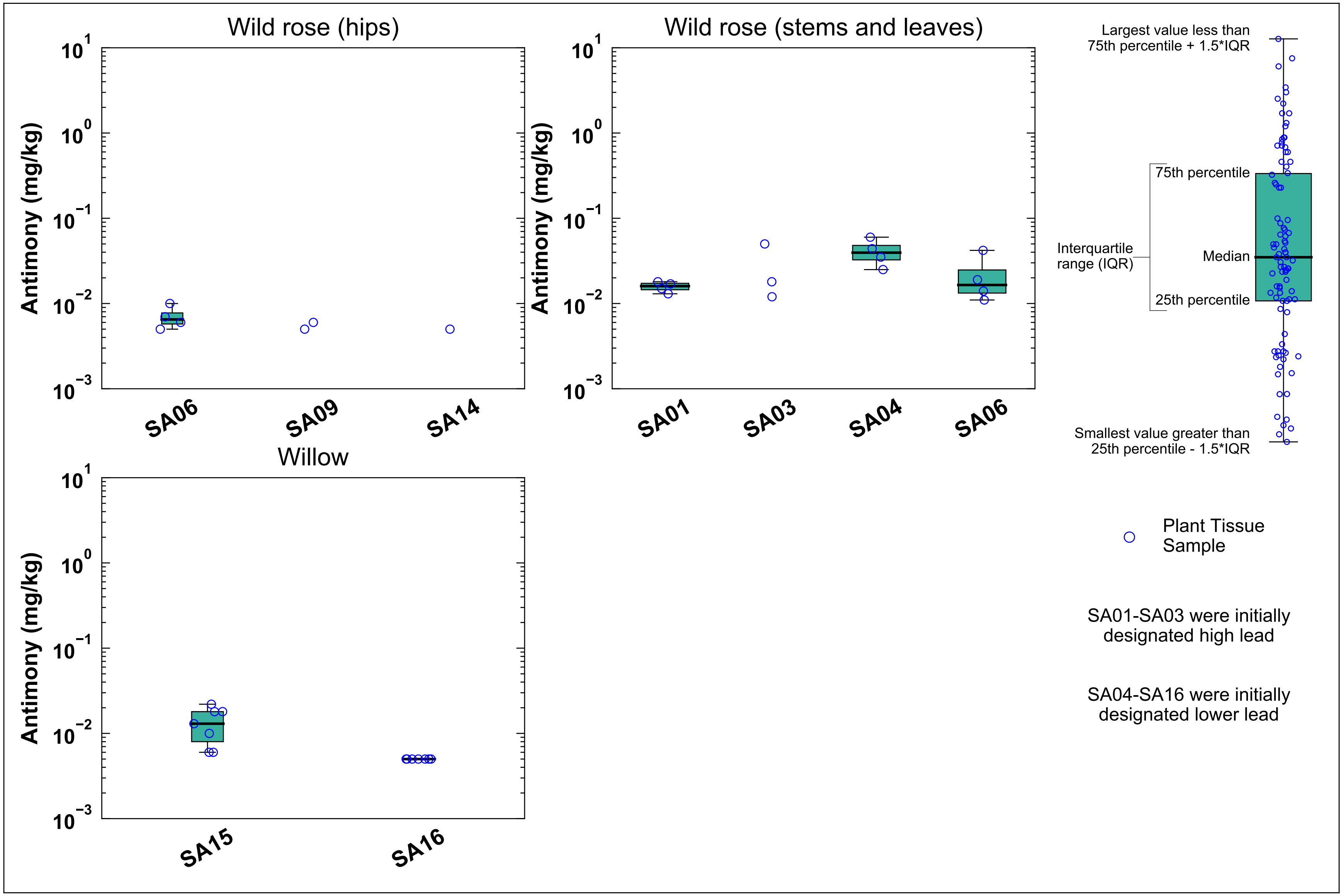


Figure 5-2h. Antimony Concentrations in Plant Tissue Samples by Sample Area

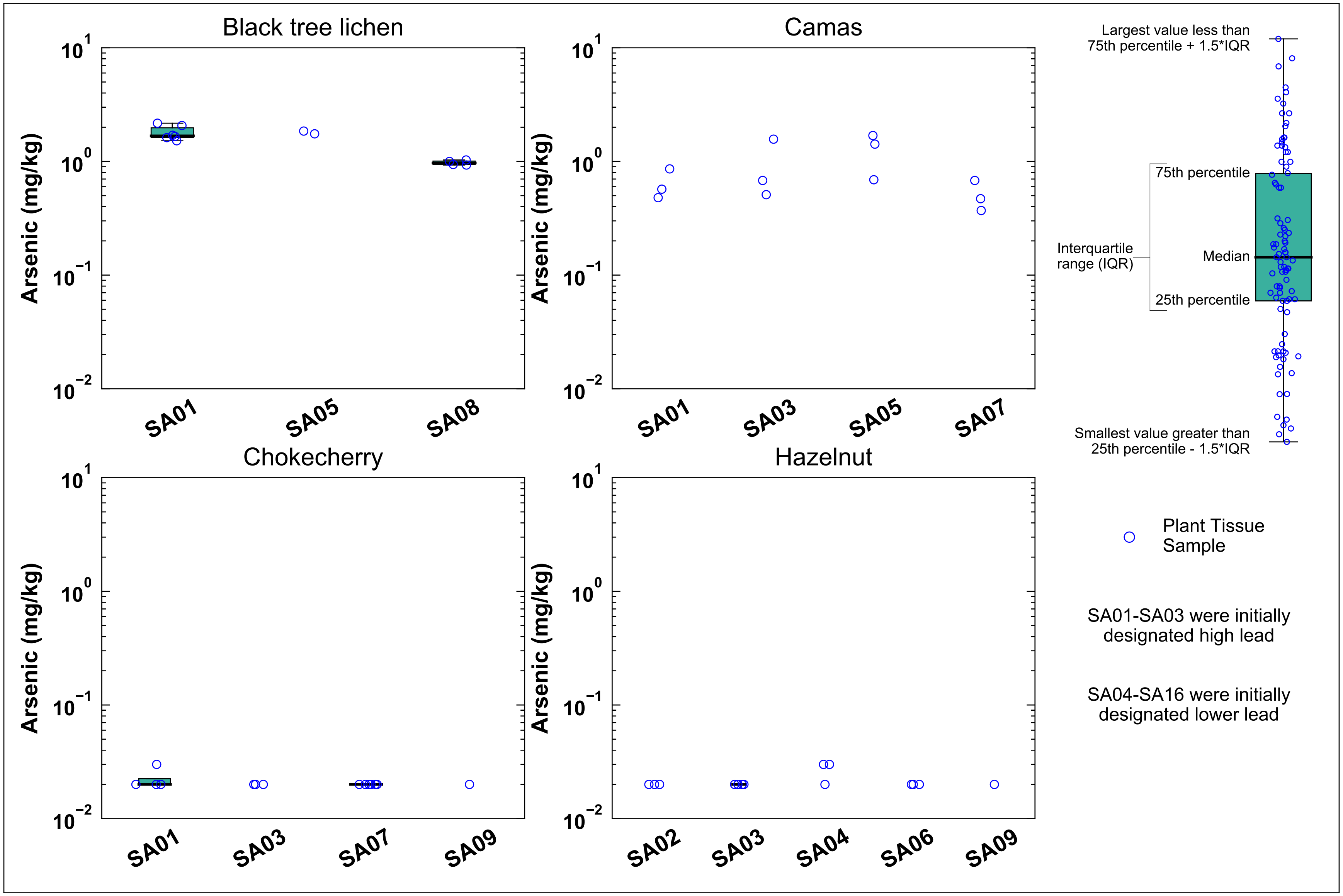


Figure 5-2i. Arsenic Concentrations in Plant Tissue Samples by Sample Area

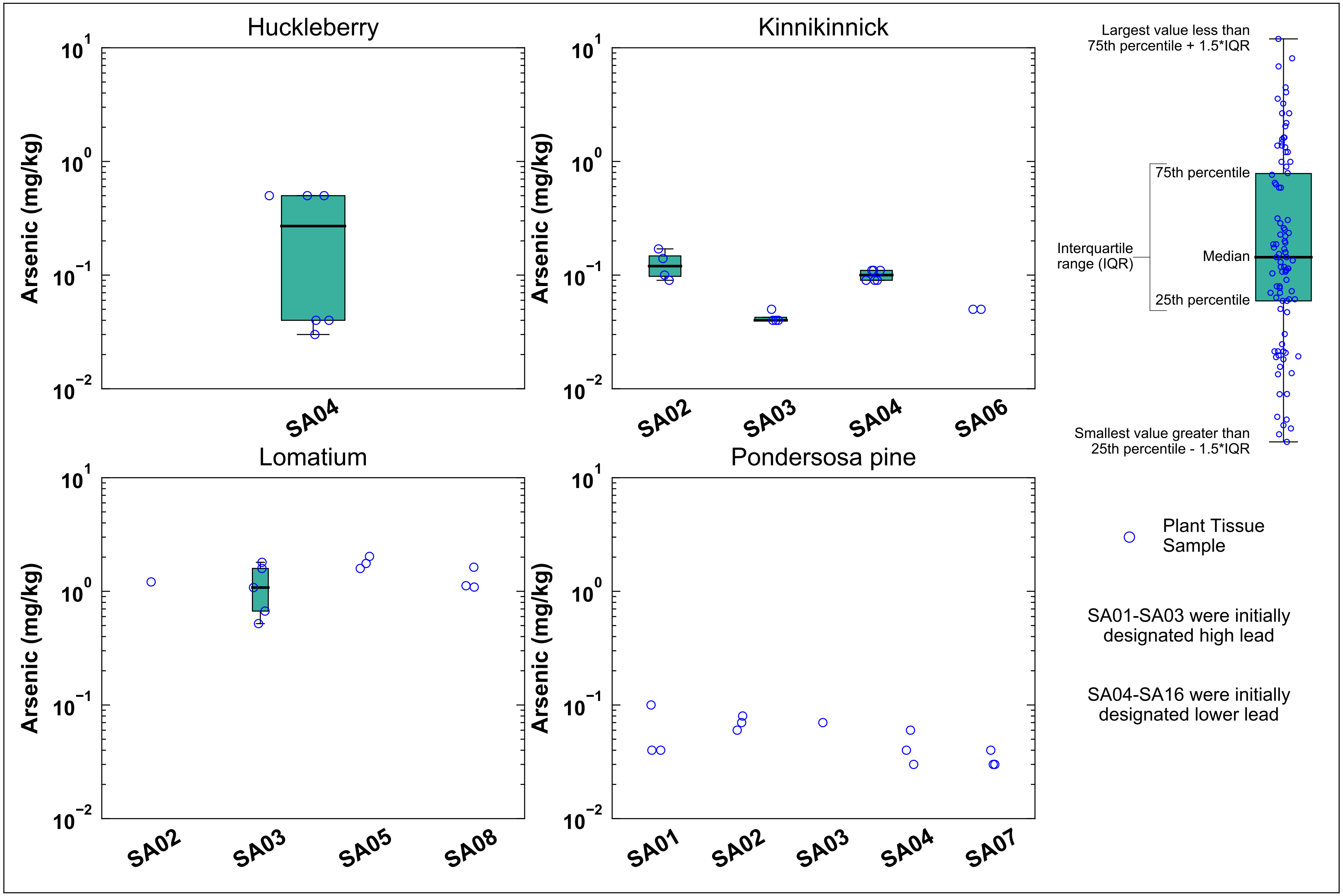


Figure 5-2j. Arsenic Concentrations in Plant Tissue Samples by Sample Area

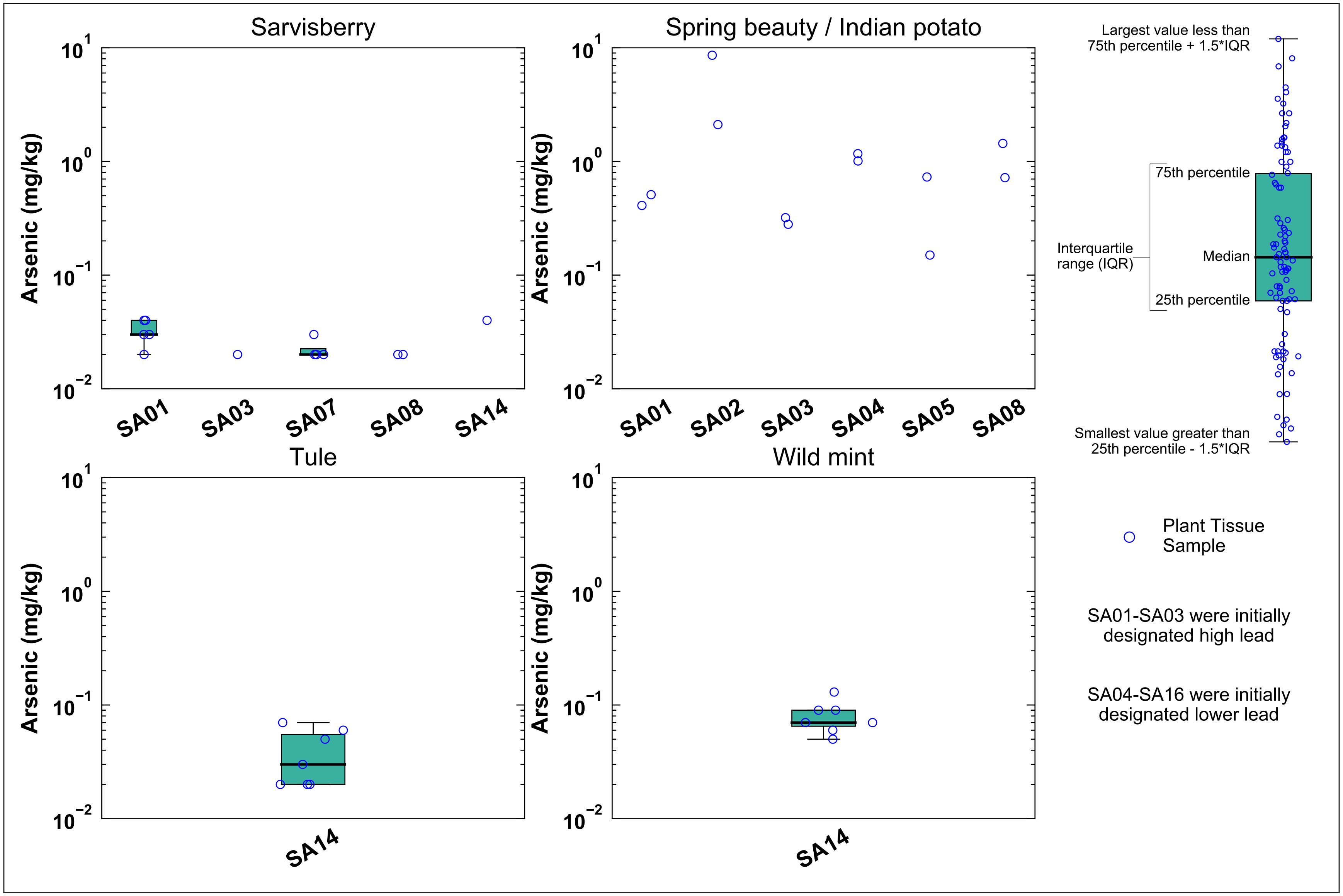


Figure 5-2k. Arsenic Concentrations in Plant Tissue Samples by Sample Area

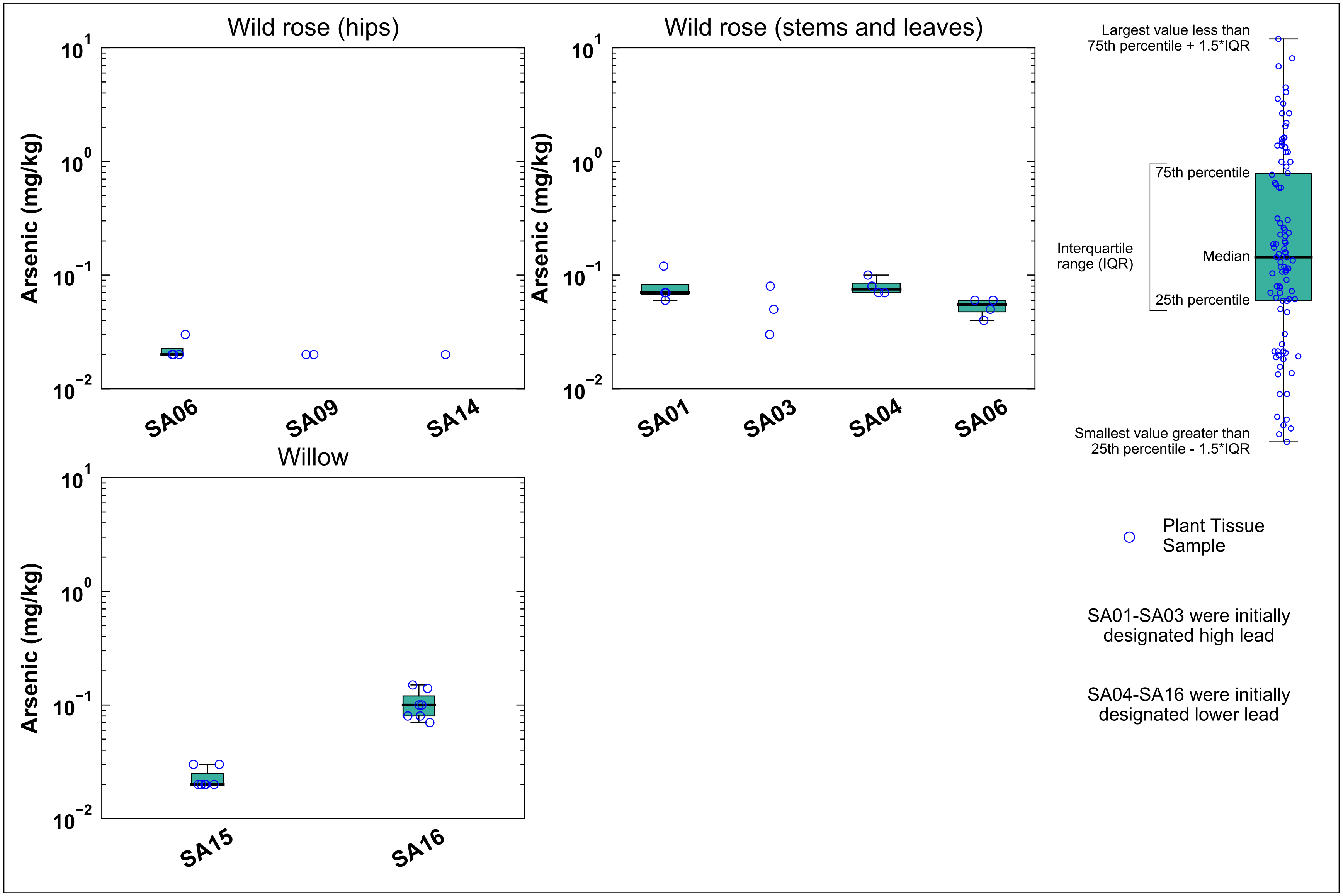


Figure 5-2l. Arsenic Concentrations in Plant Tissue Samples by Sample Area

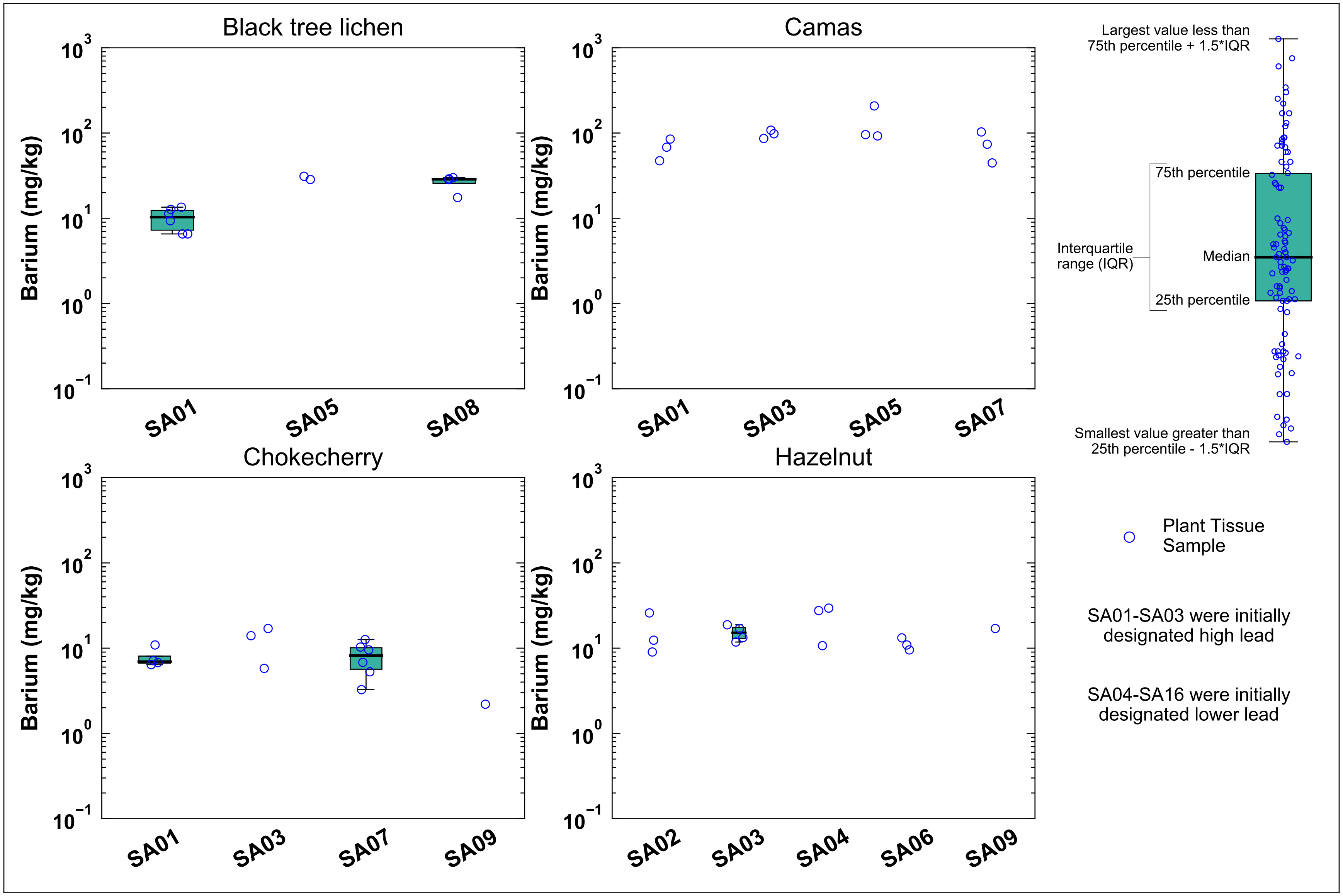


Figure 5-2m. Barium Concentrations in Plant Tissue Samples by Sample Area

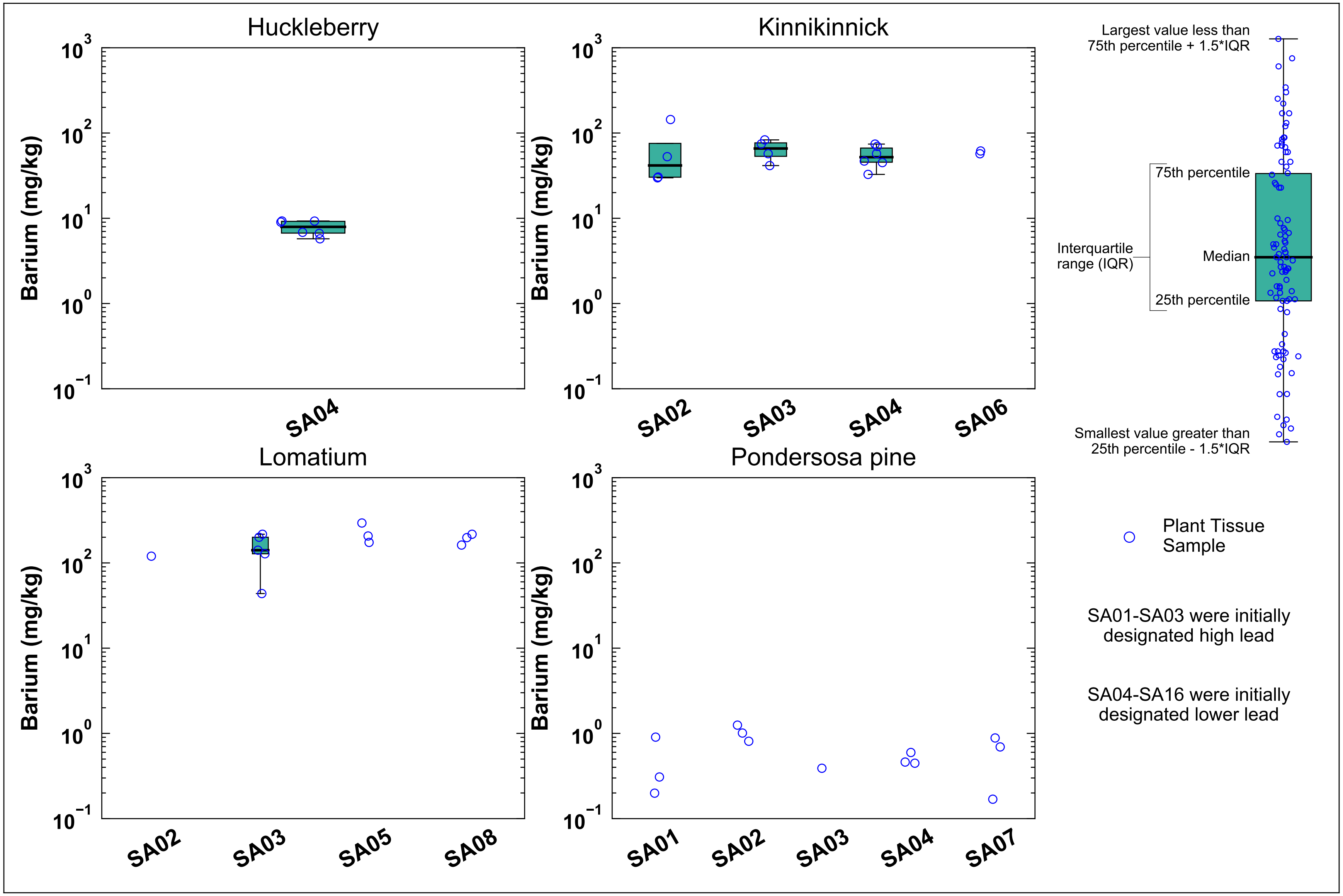


Figure 5-2n. Barium Concentrations in Plant Tissue Samples by Sample Area

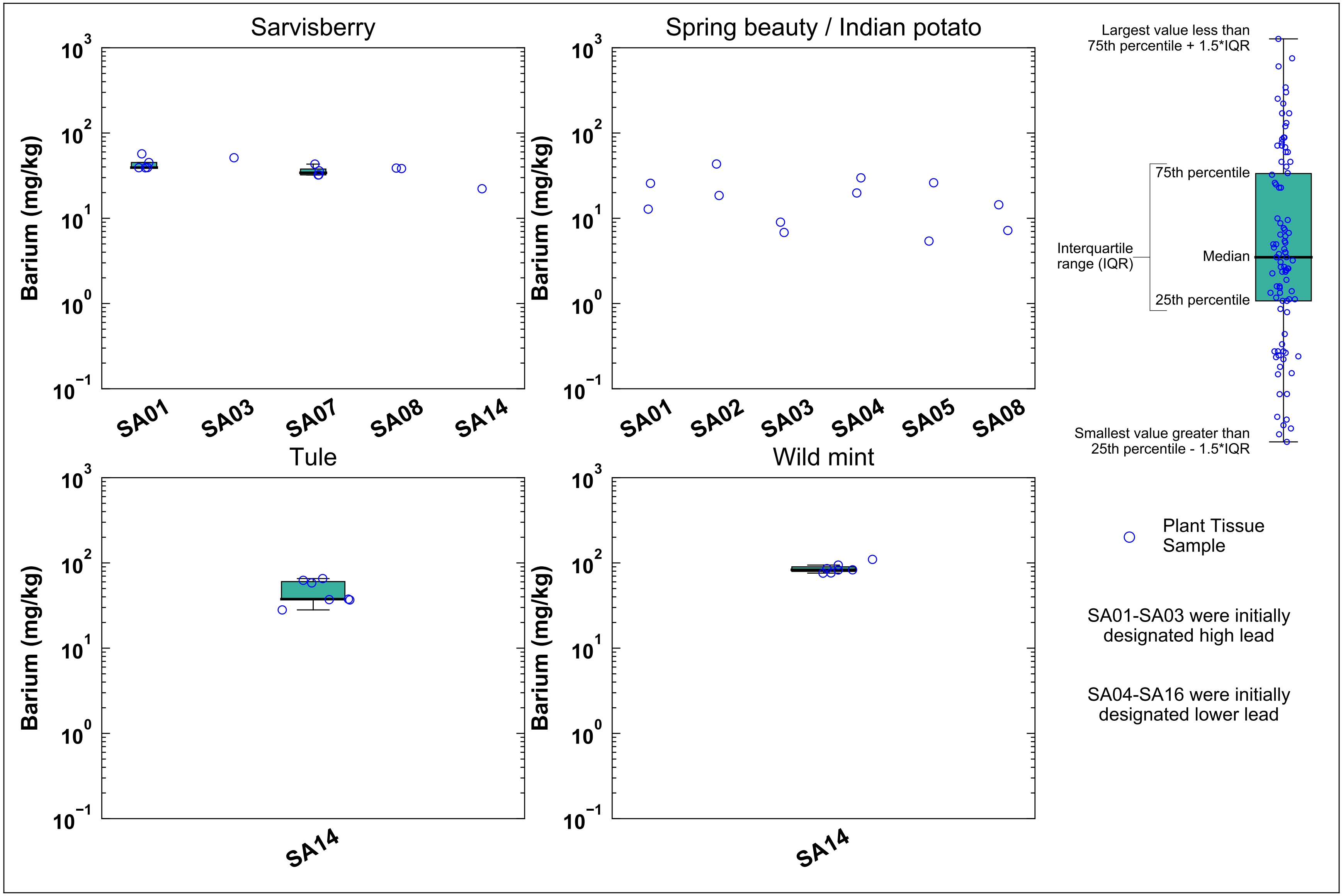


Figure 5-2o. Barium Concentrations in Plant Tissue Samples by Sample Area

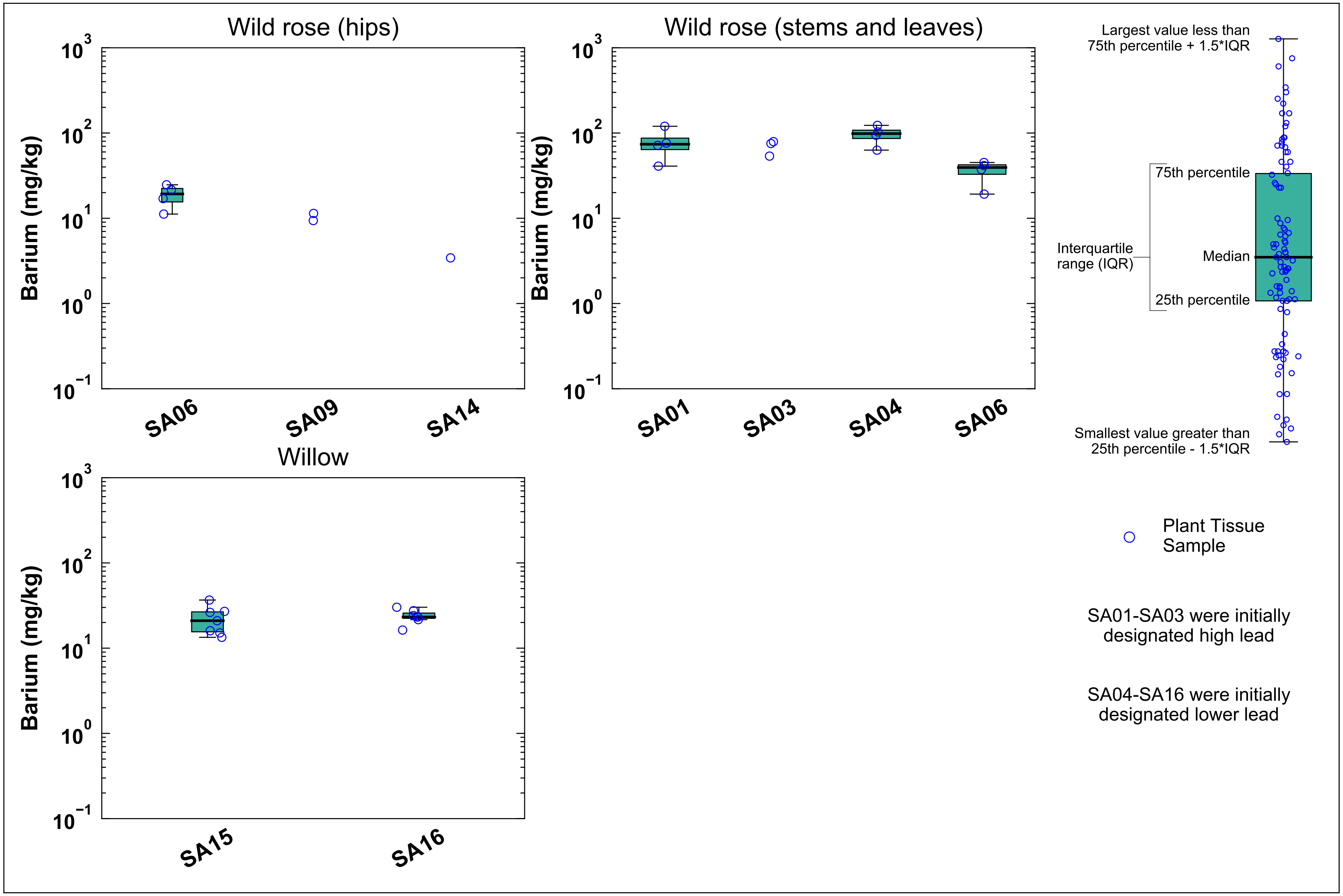


Figure 5-2p. Barium Concentrations in Plant Tissue Samples by Sample Area

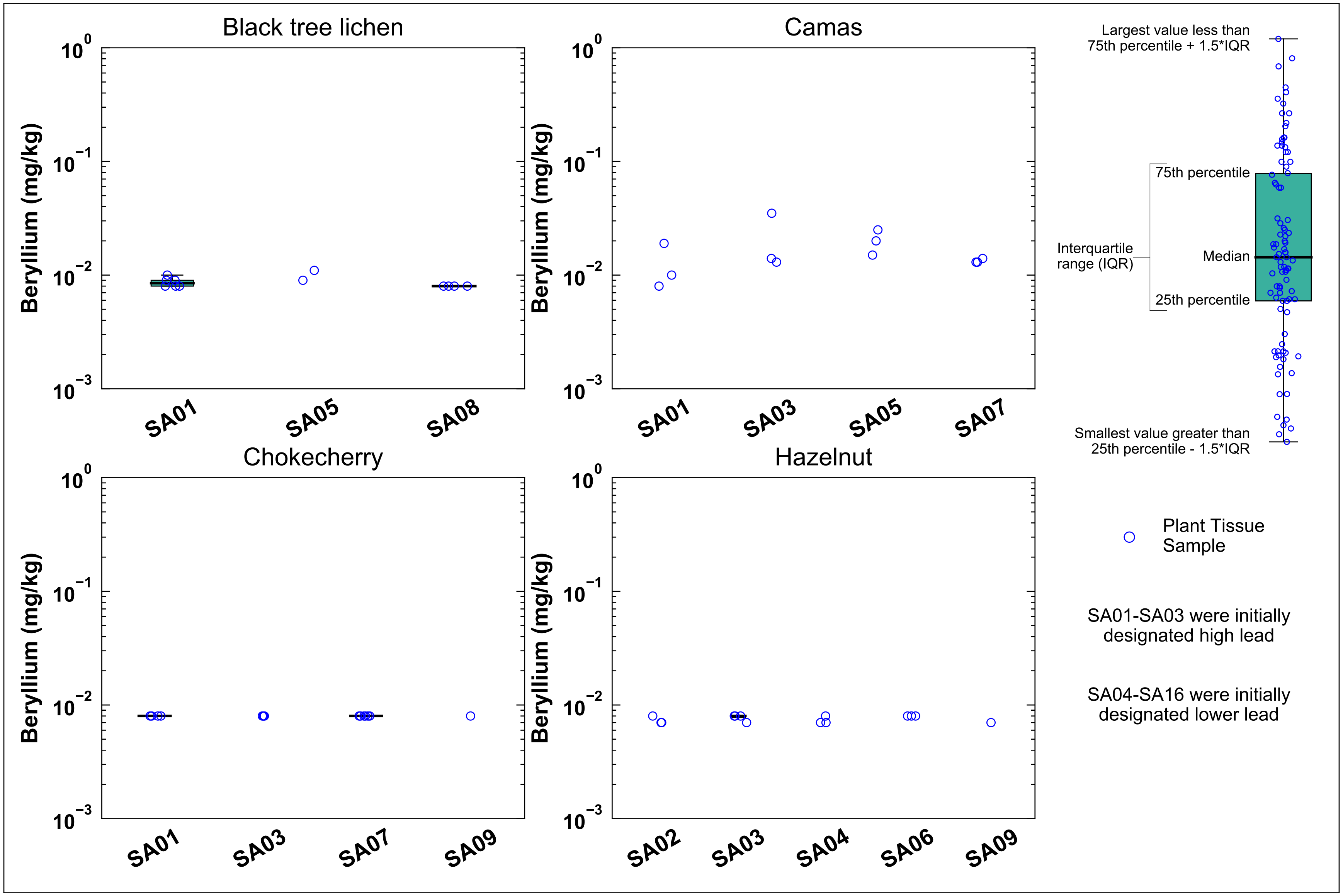


Figure 5-2q. Beryllium Concentrations in Plant Tissue Samples by Sample Area

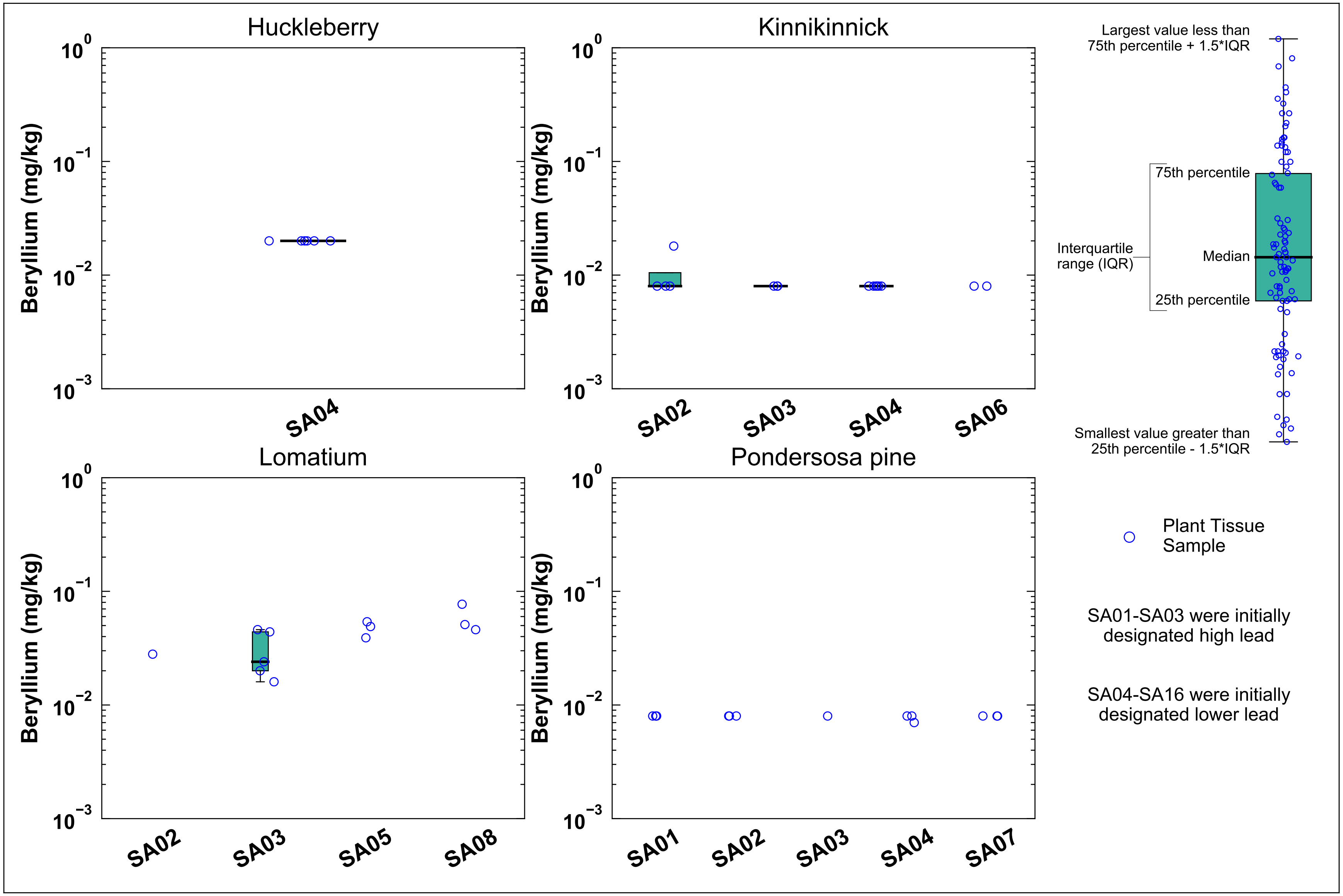


Figure 5-2r. Beryllium Concentrations in Plant Tissue Samples by Sample Area

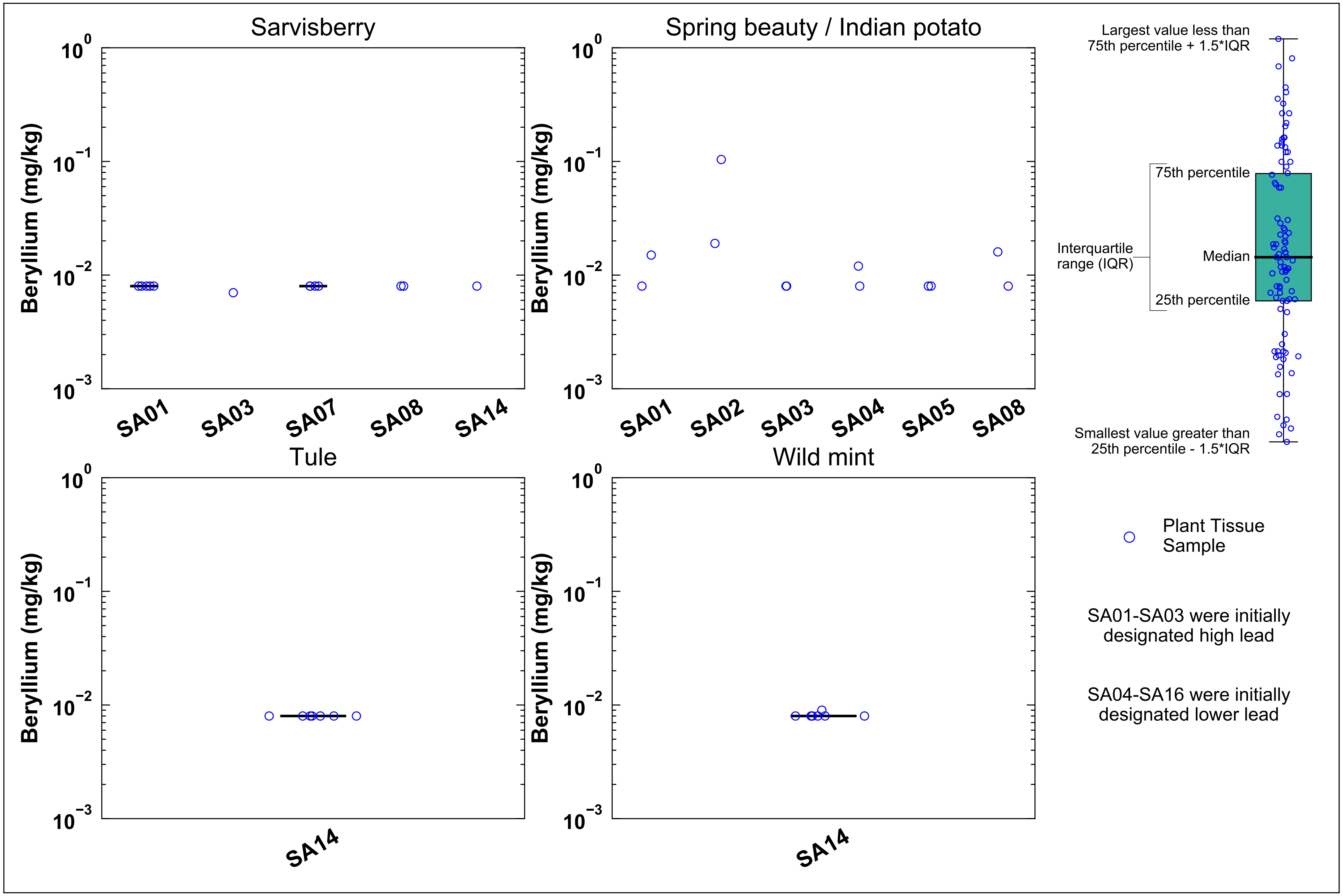


Figure 5-2s. Beryllium Concentrations in Plant Tissue Samples by Sample Area

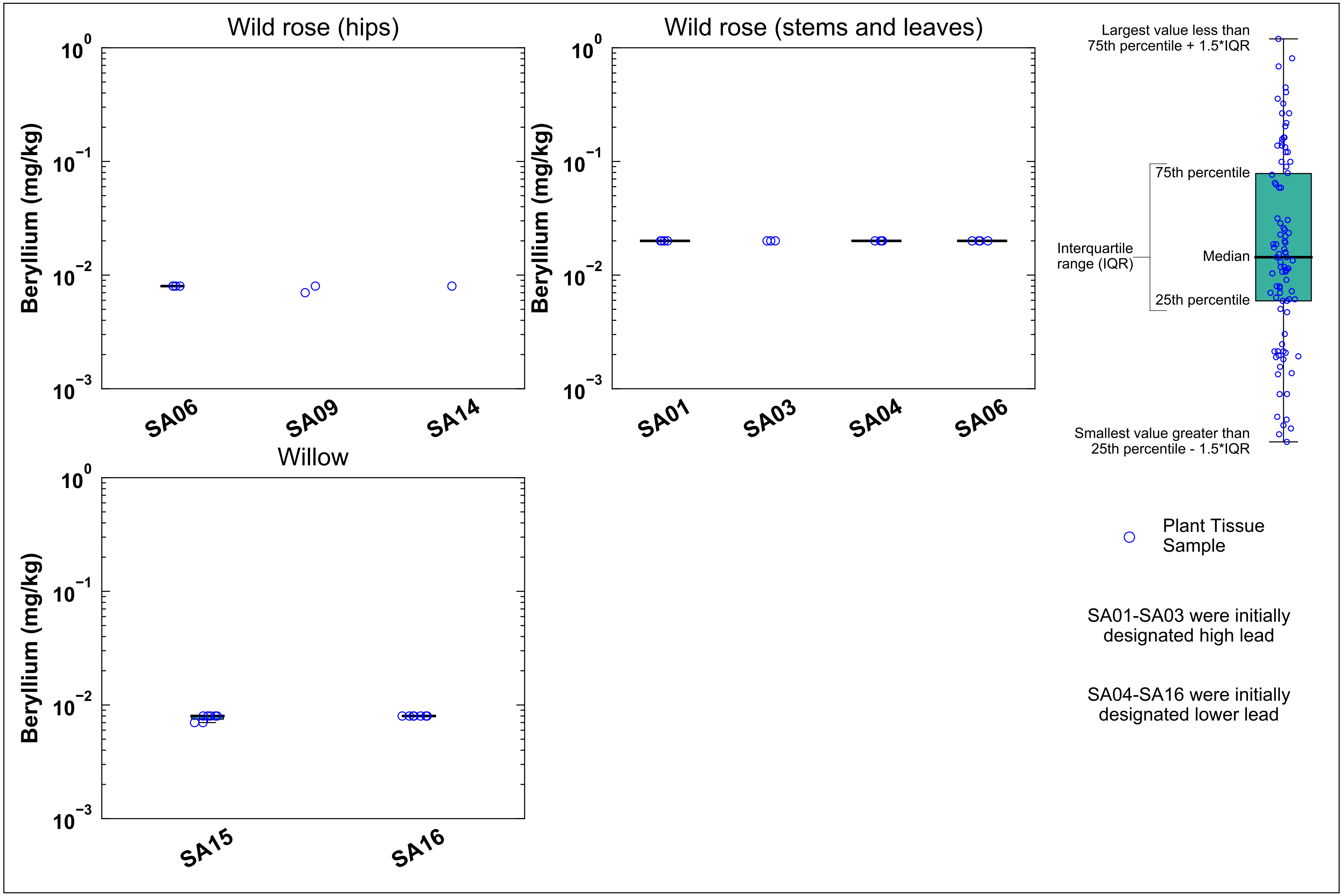


Figure 5-2t. Beryllium Concentrations in Plant Tissue Samples by Sample Area

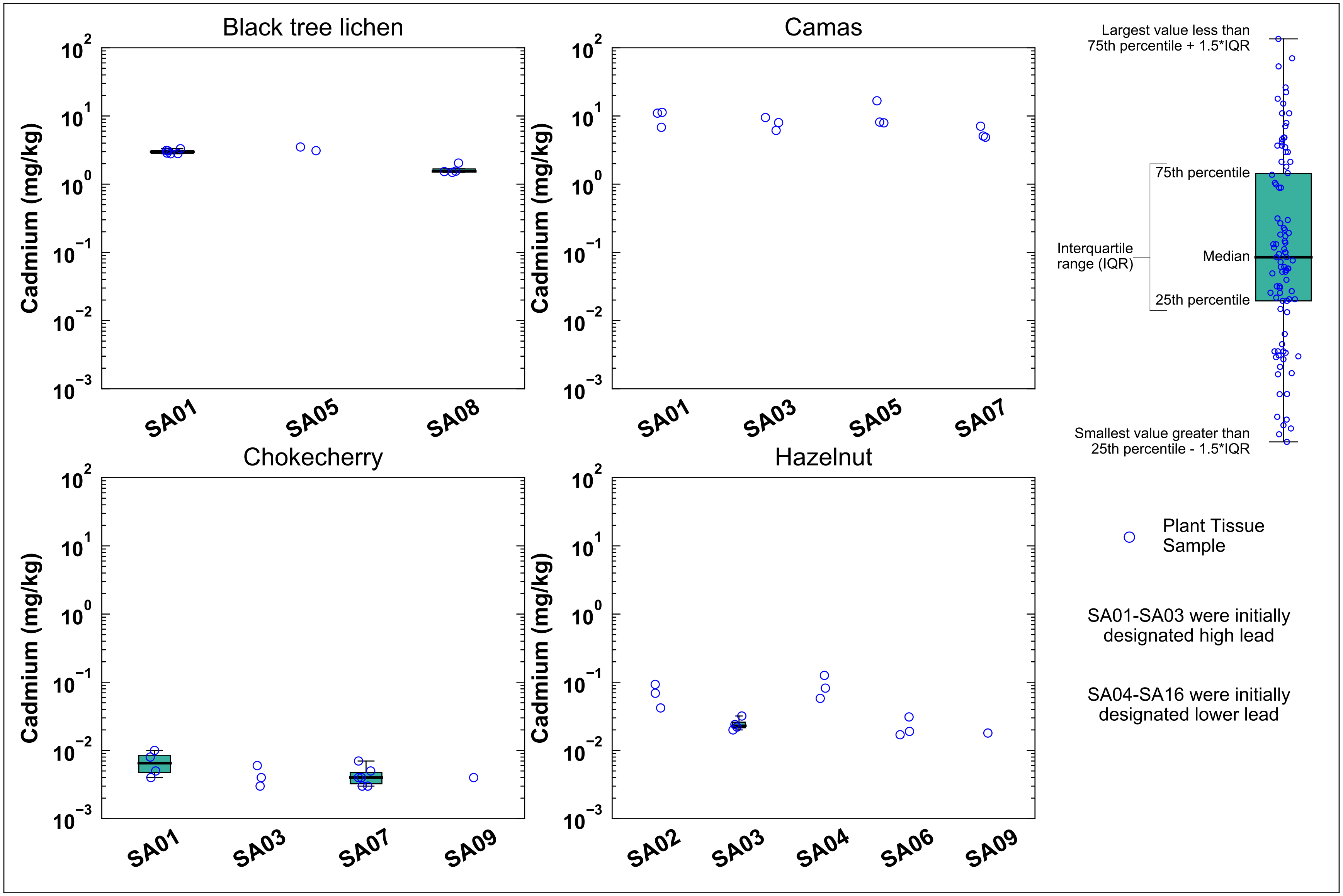


Figure 5-2u. Cadmium Concentrations in Plant Tissue Samples by Sample Area

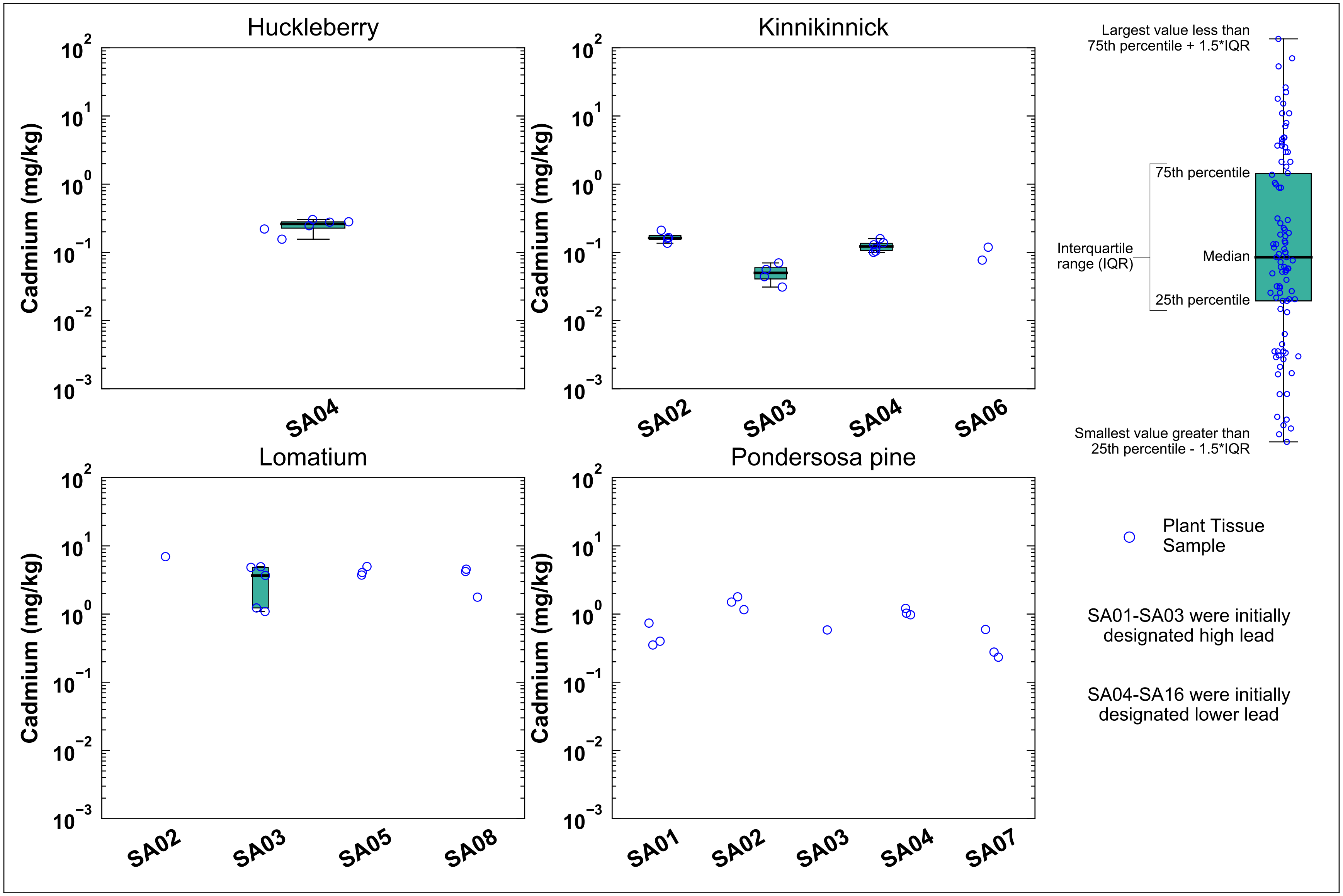


Figure 5-2v. Cadmium Concentrations in Plant Tissue Samples by Sample Area

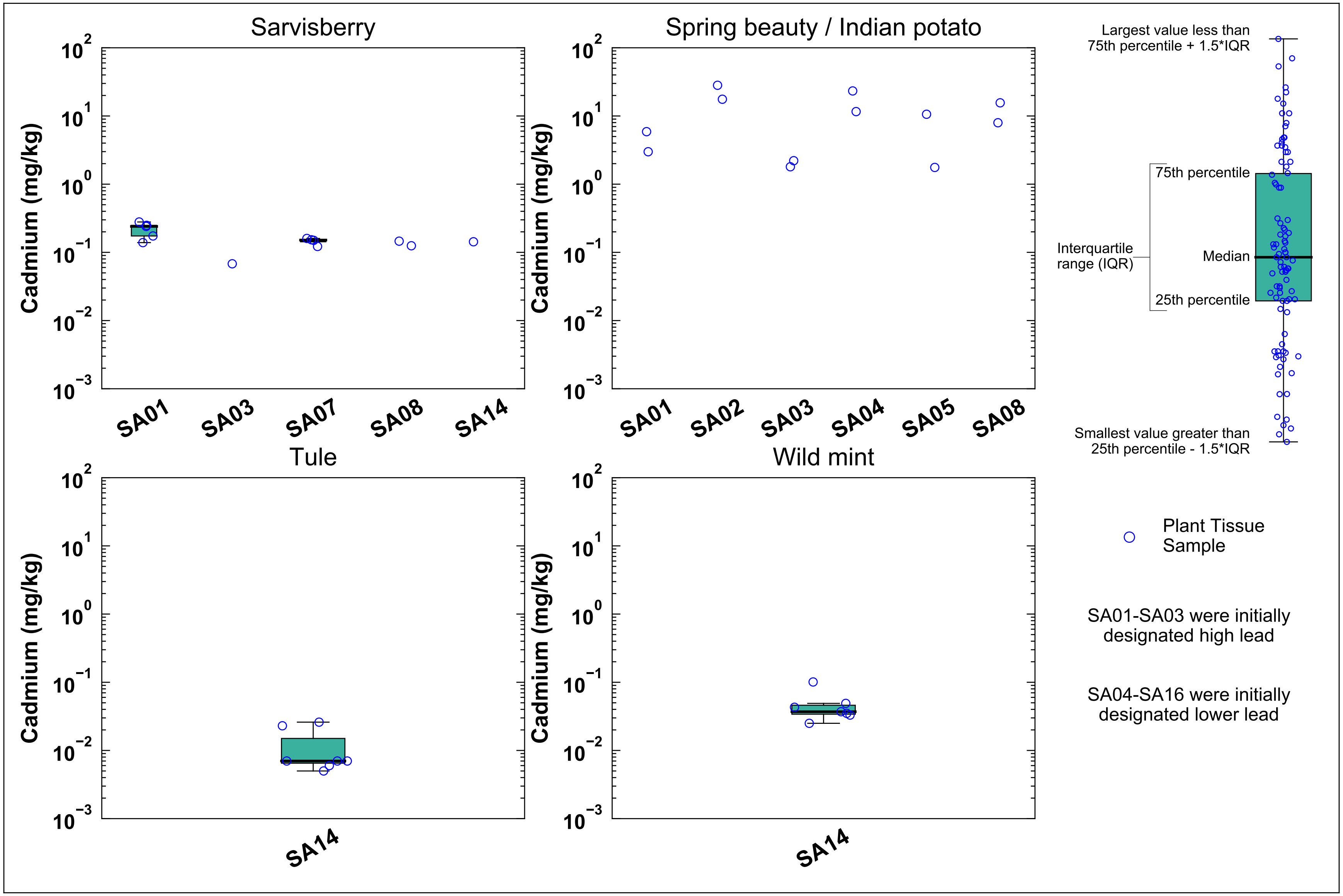


Figure 5-2w. Cadmium Concentrations in Plant Tissue Samples by Sample Area

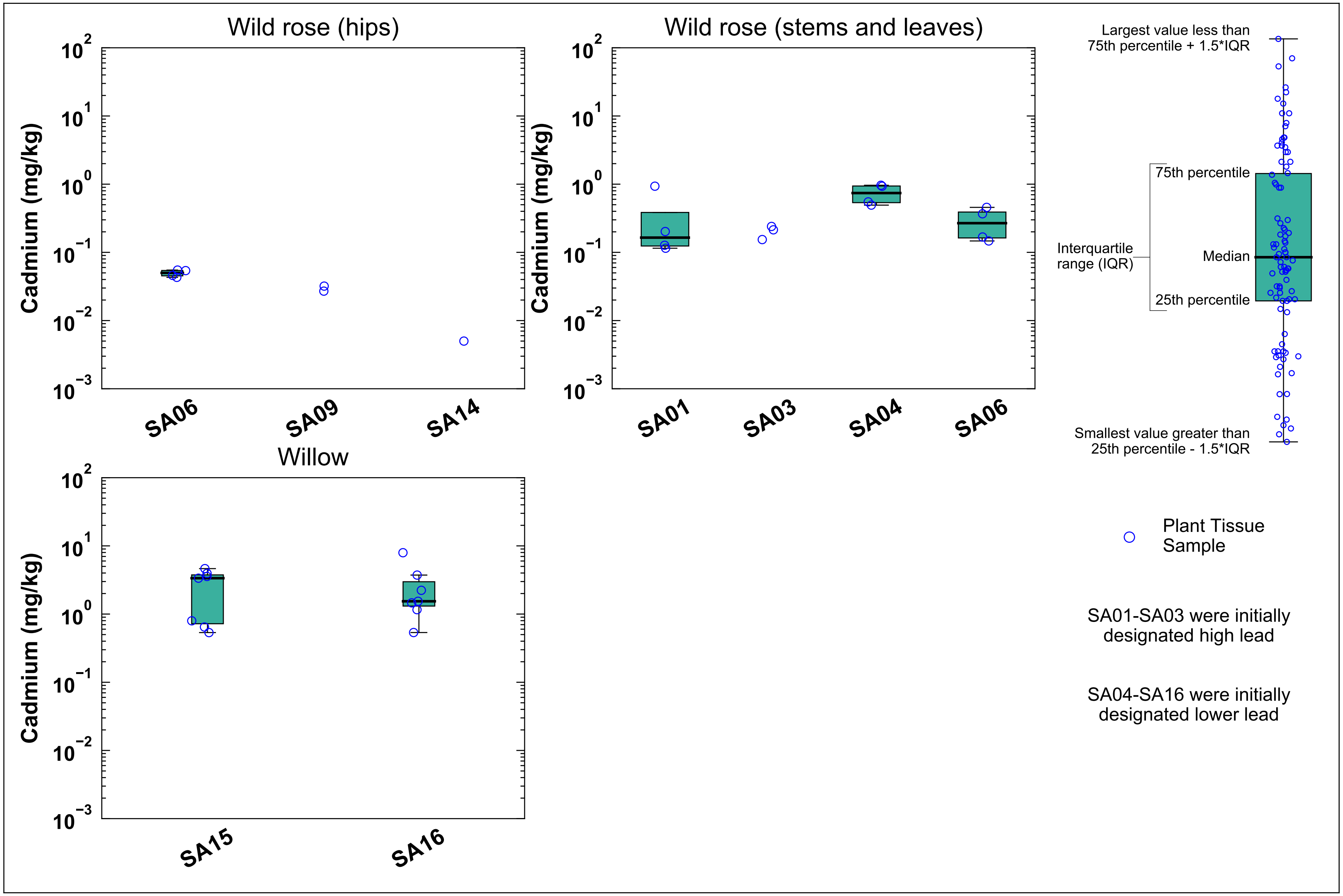


Figure 5-2x. Cadmium Concentrations in Plant Tissue Samples by Sample Area

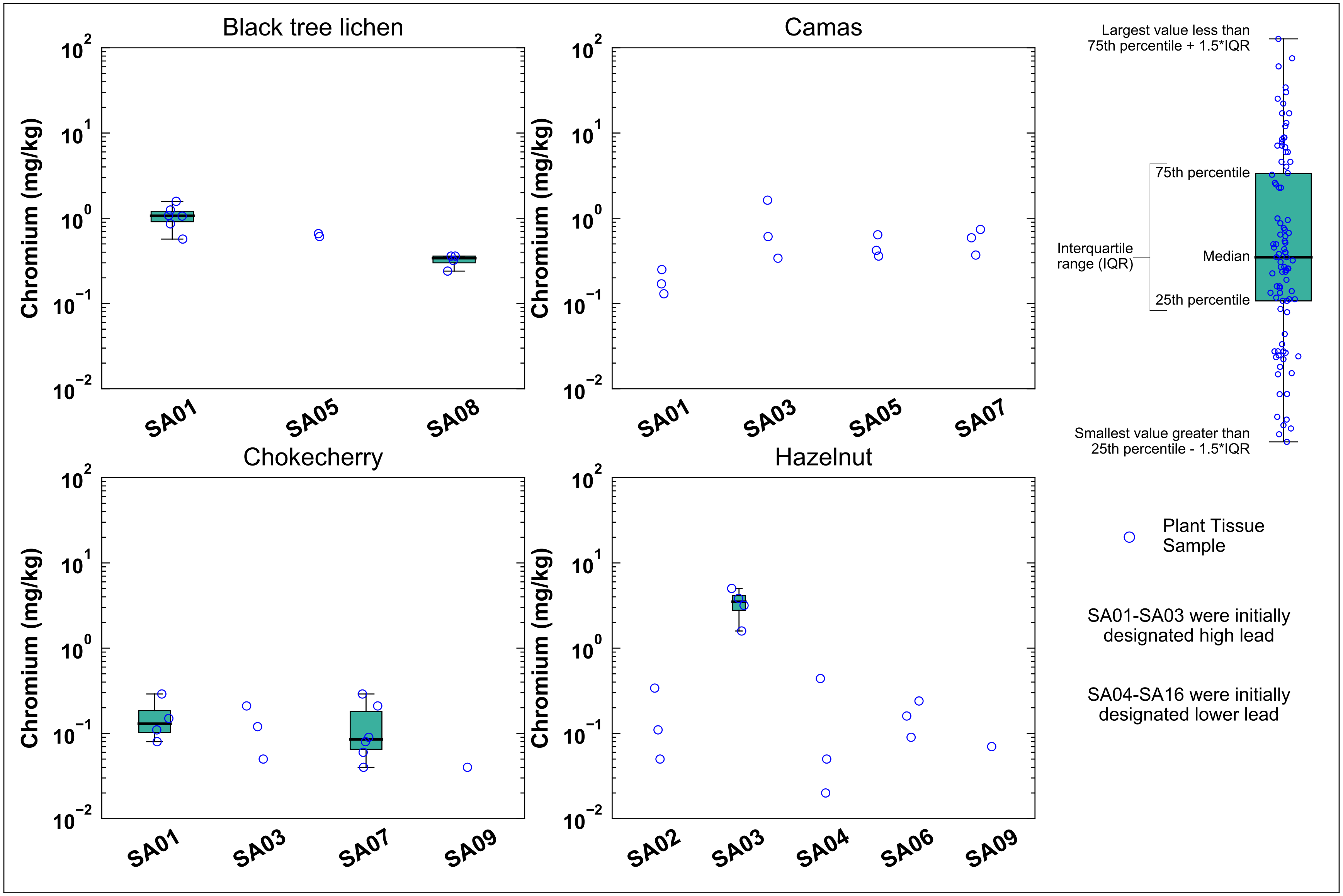


Figure 5-2y. Chromium Concentrations in Plant Tissue Samples by Sample Area

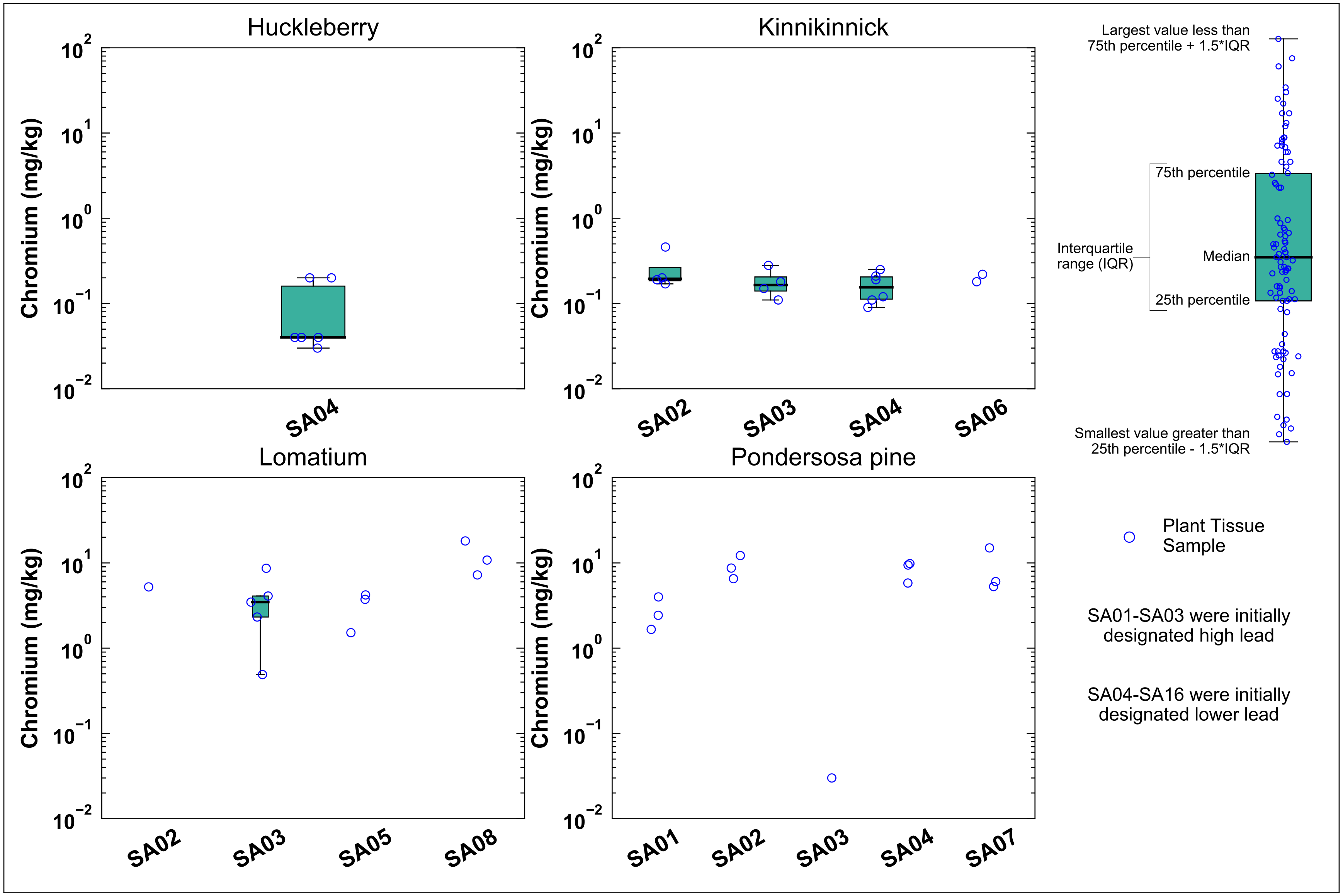


Figure 5-2z. Chromium Concentrations in Plant Tissue Samples by Sample Area

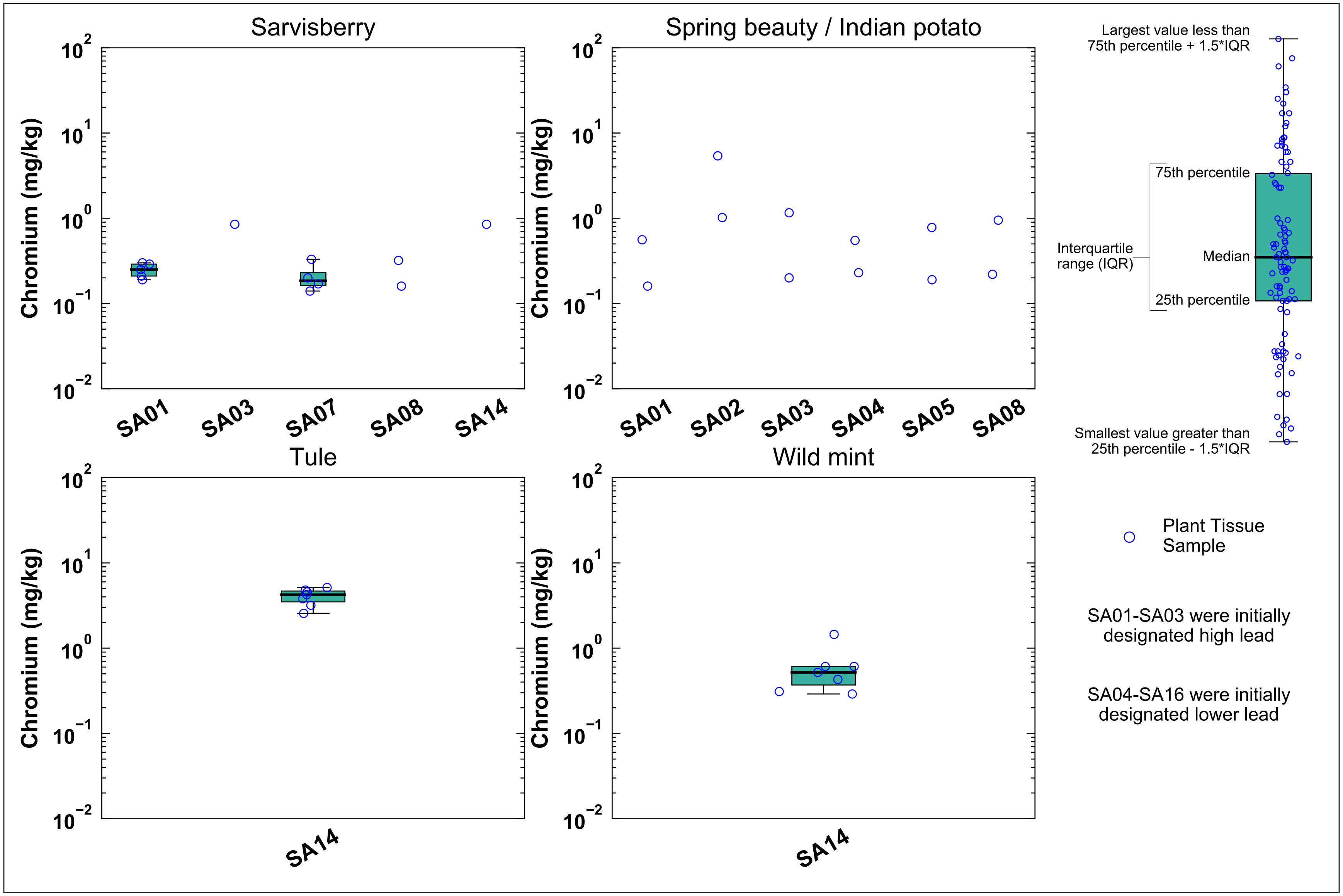


Figure 5-2aa. Chromium Concentrations in Plant Tissue Samples by Sample Area

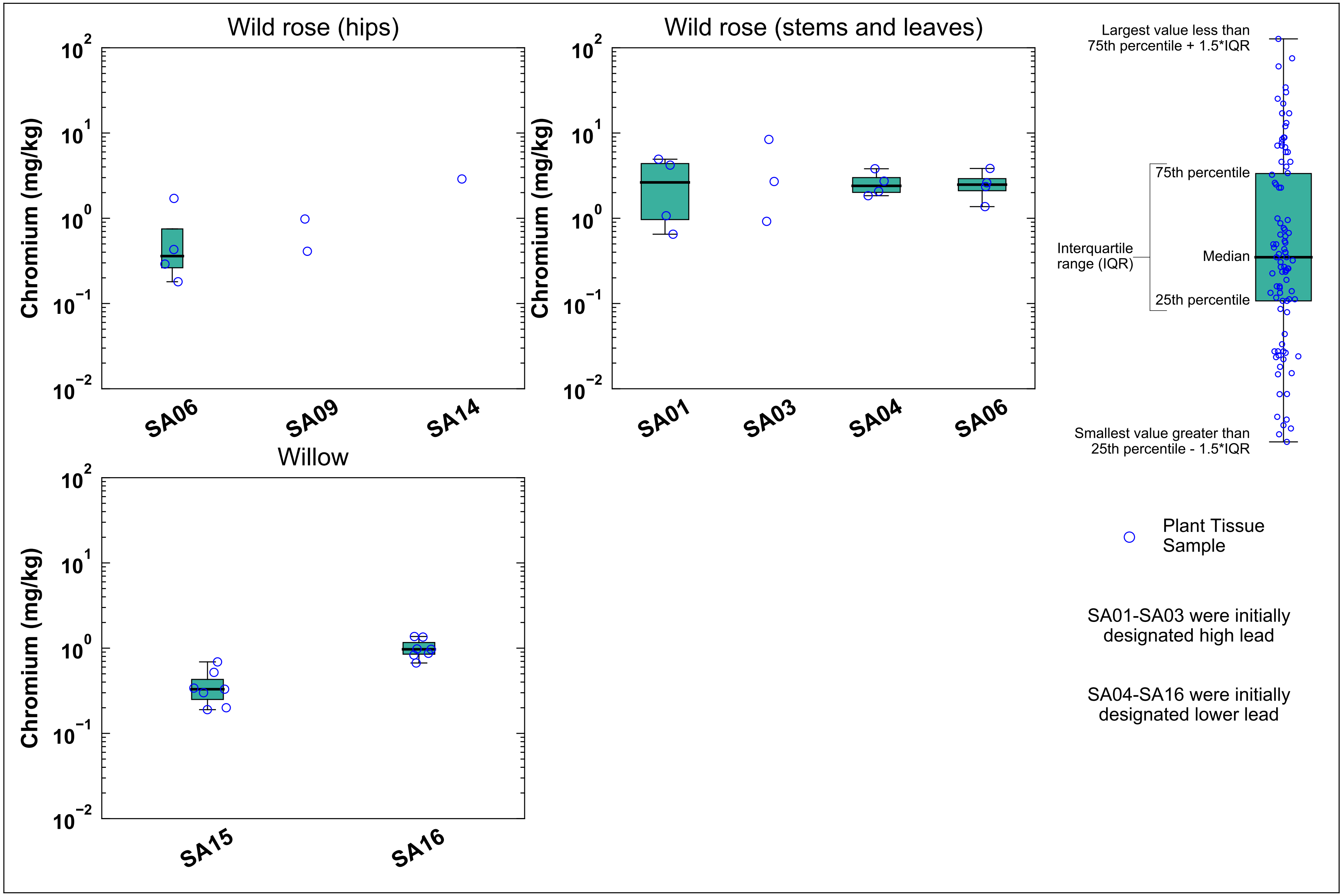


Figure 5-2ab. Chromium Concentrations in Plant Tissue Samples by Sample Area

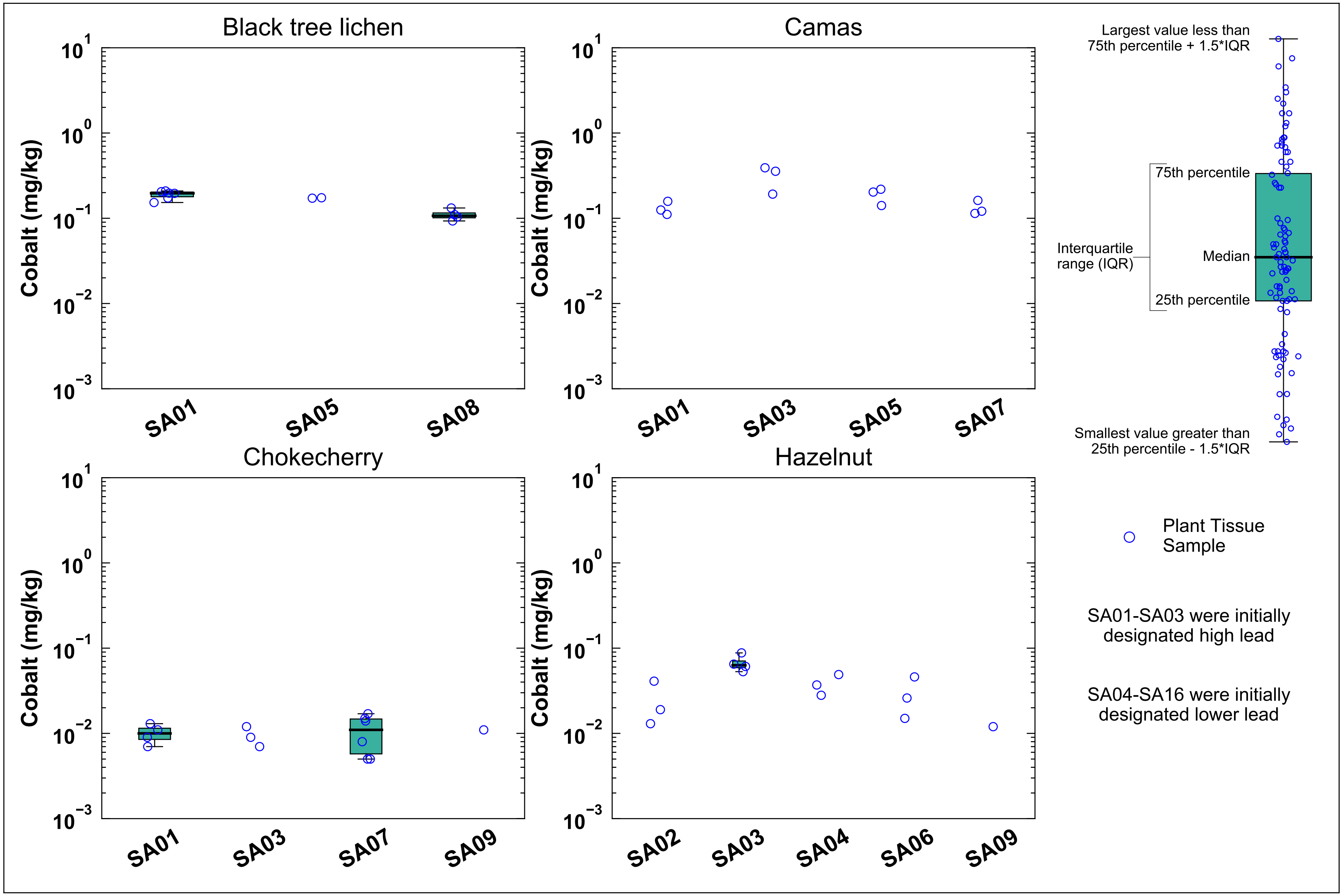


Figure 5-2ac. Cobalt Concentrations in Plant Tissue Samples by Sample Area

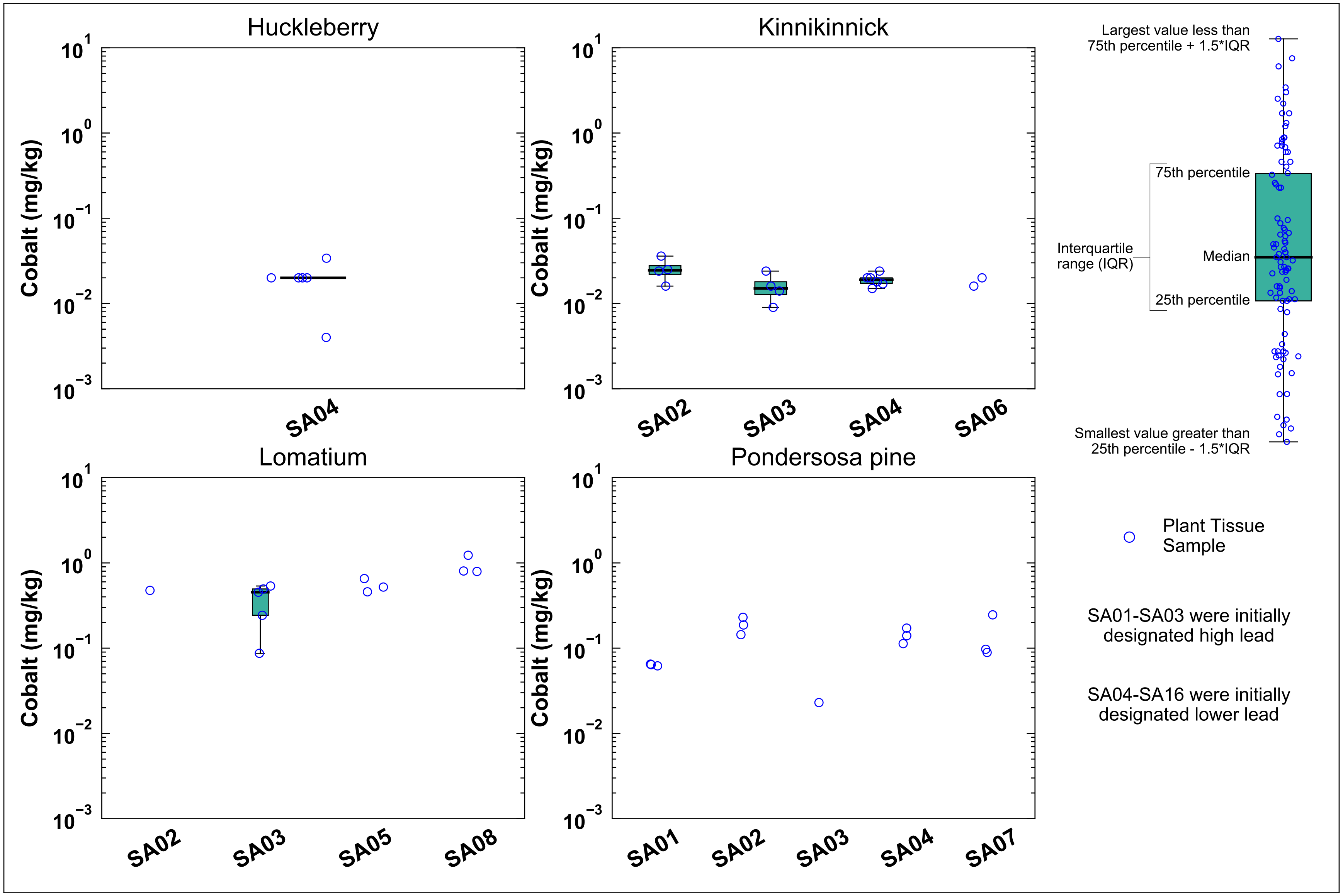


Figure 5-2ad. Cobalt Concentrations in Plant Tissue Samples by Sample Area

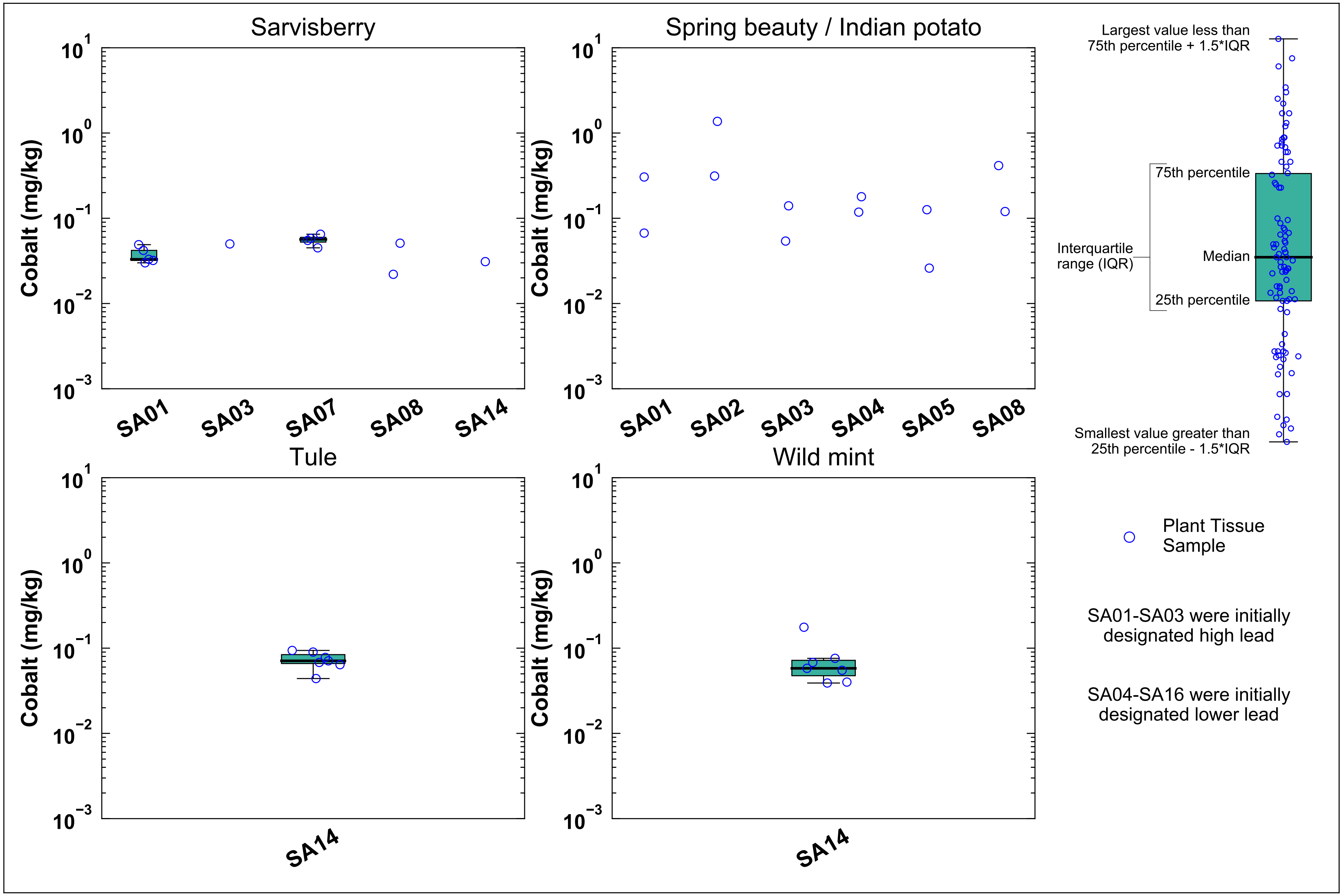


Figure 5-2ae. Cobalt Concentrations in Plant Tissue Samples by Sample Area

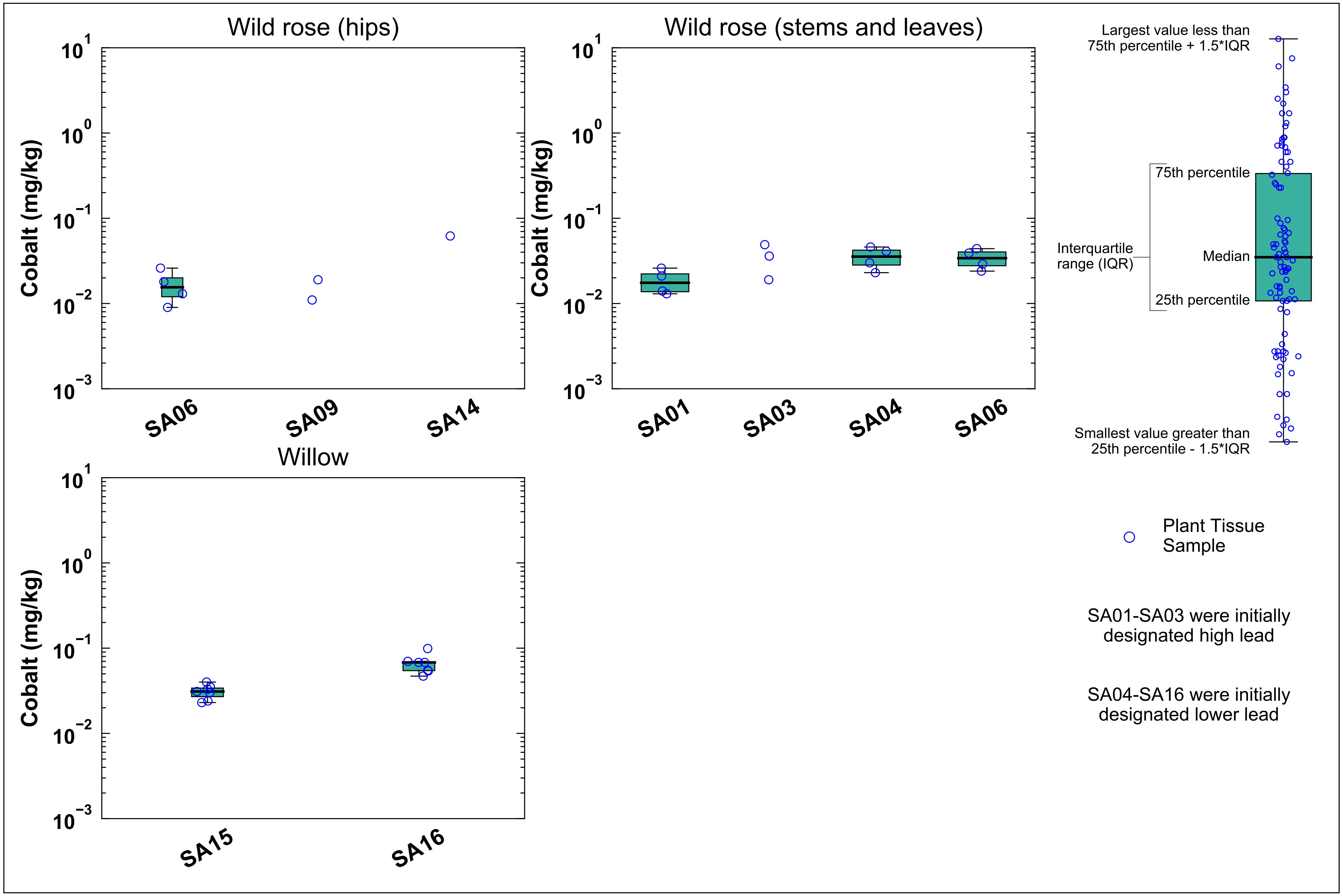


Figure 5-2af. Cobalt Concentrations in Plant Tissue Samples by Sample Area

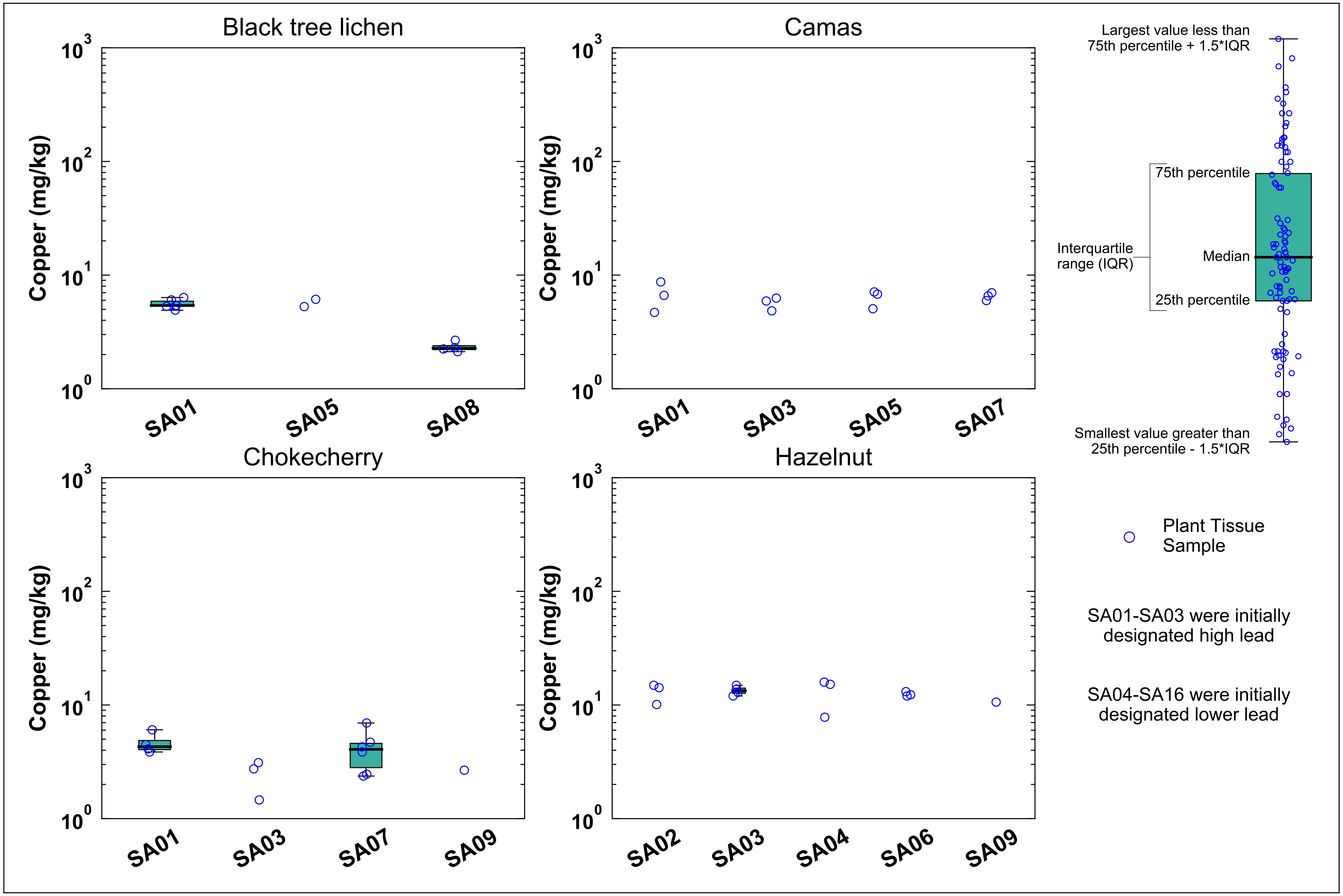


Figure 5-2ag. Copper Concentrations in Plant Tissue Samples by Sample Area

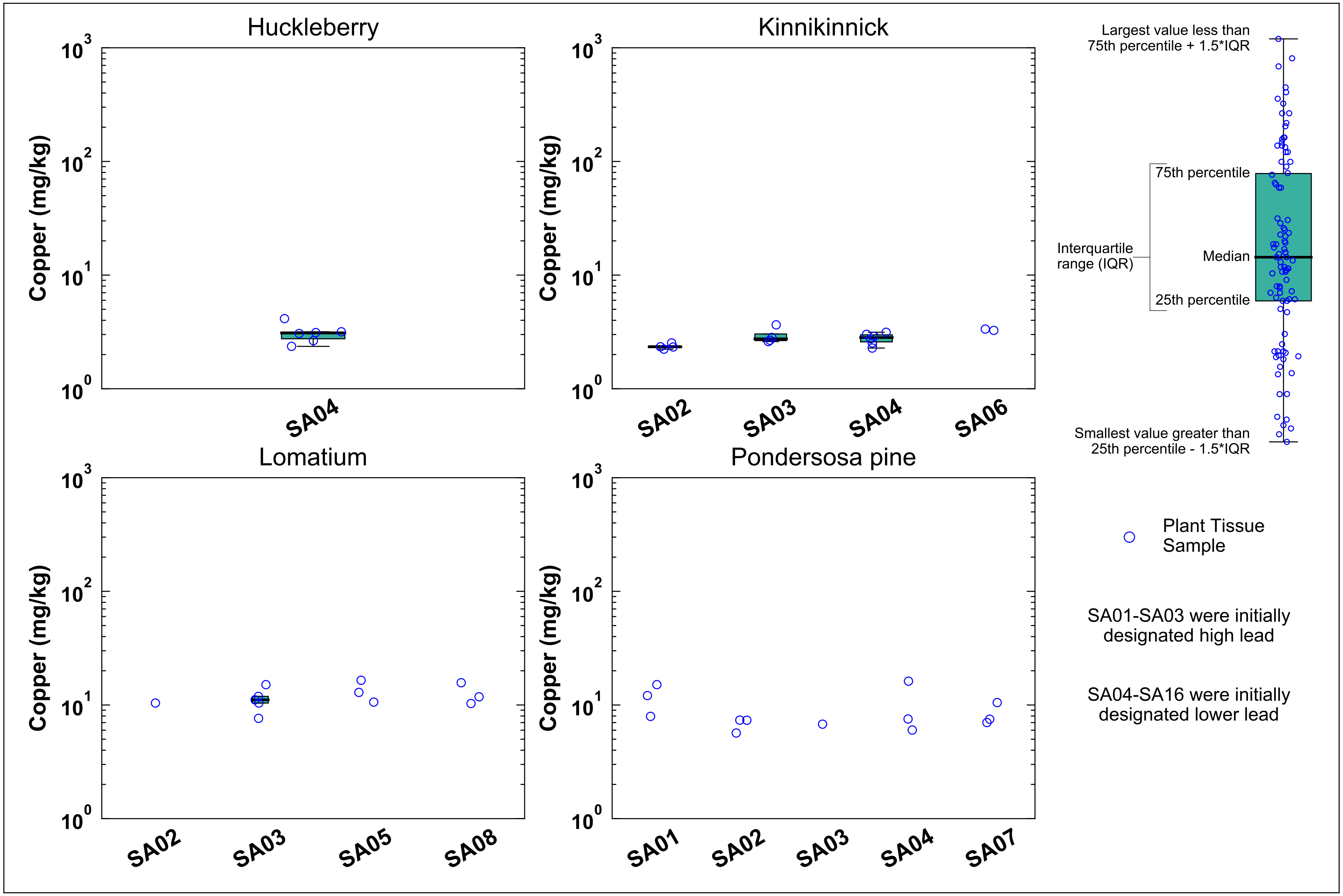


Figure 5-2ah. Copper Concentrations in Plant Tissue Samples by Sample Area

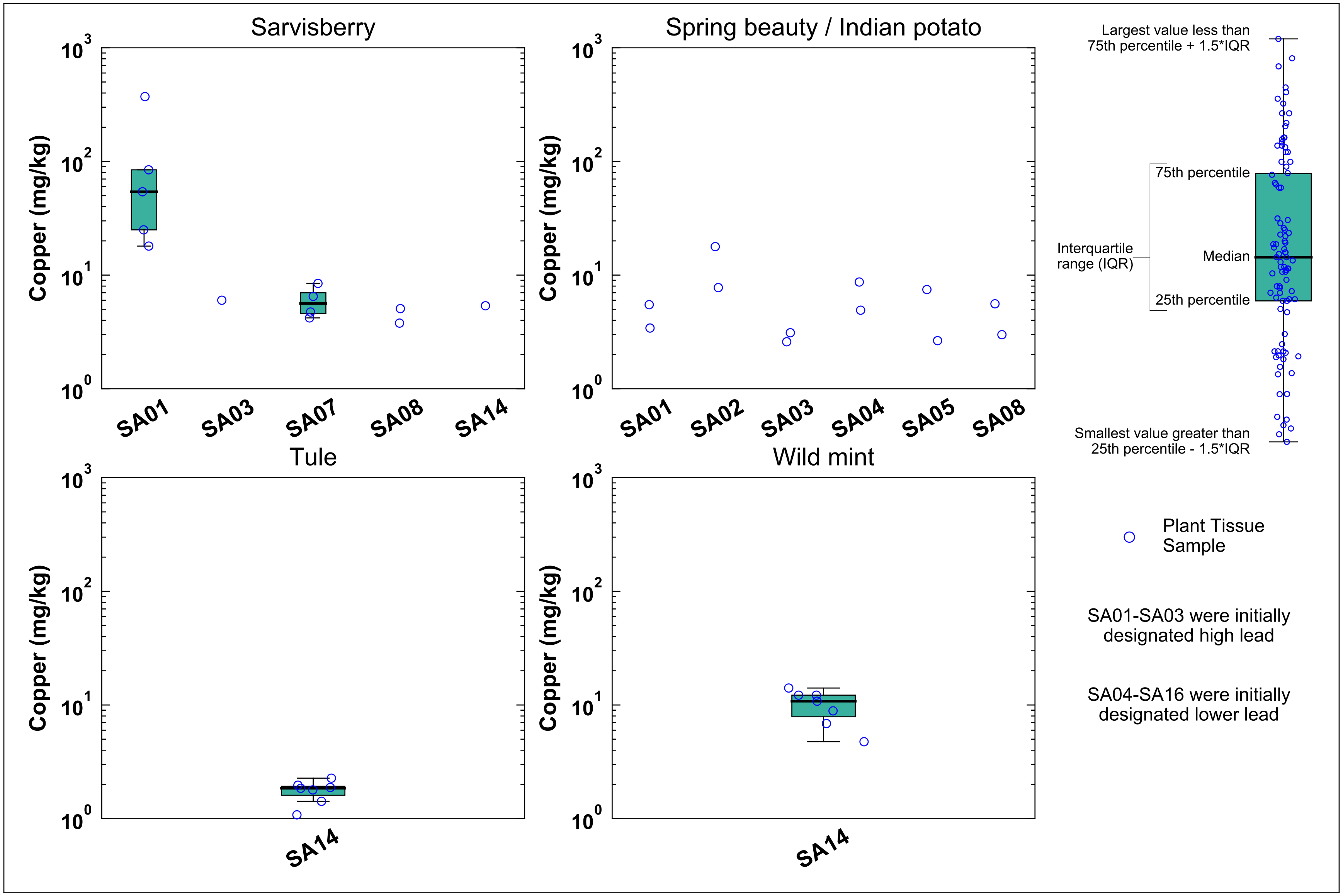


Figure 5-2ai. Copper Concentrations in Plant Tissue Samples by Sample Area

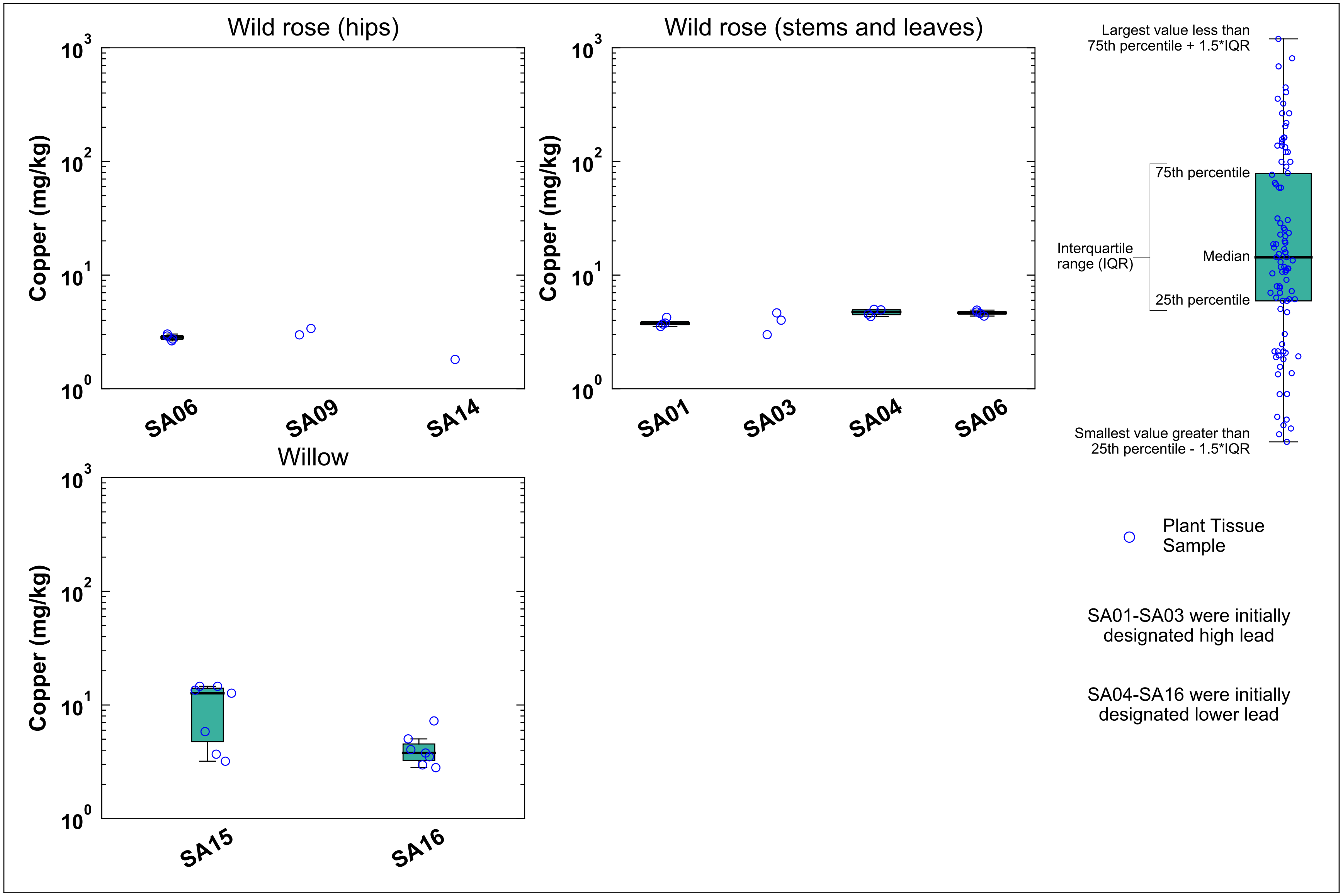


Figure 5-2aj. Copper Concentrations in Plant Tissue Samples by Sample Area

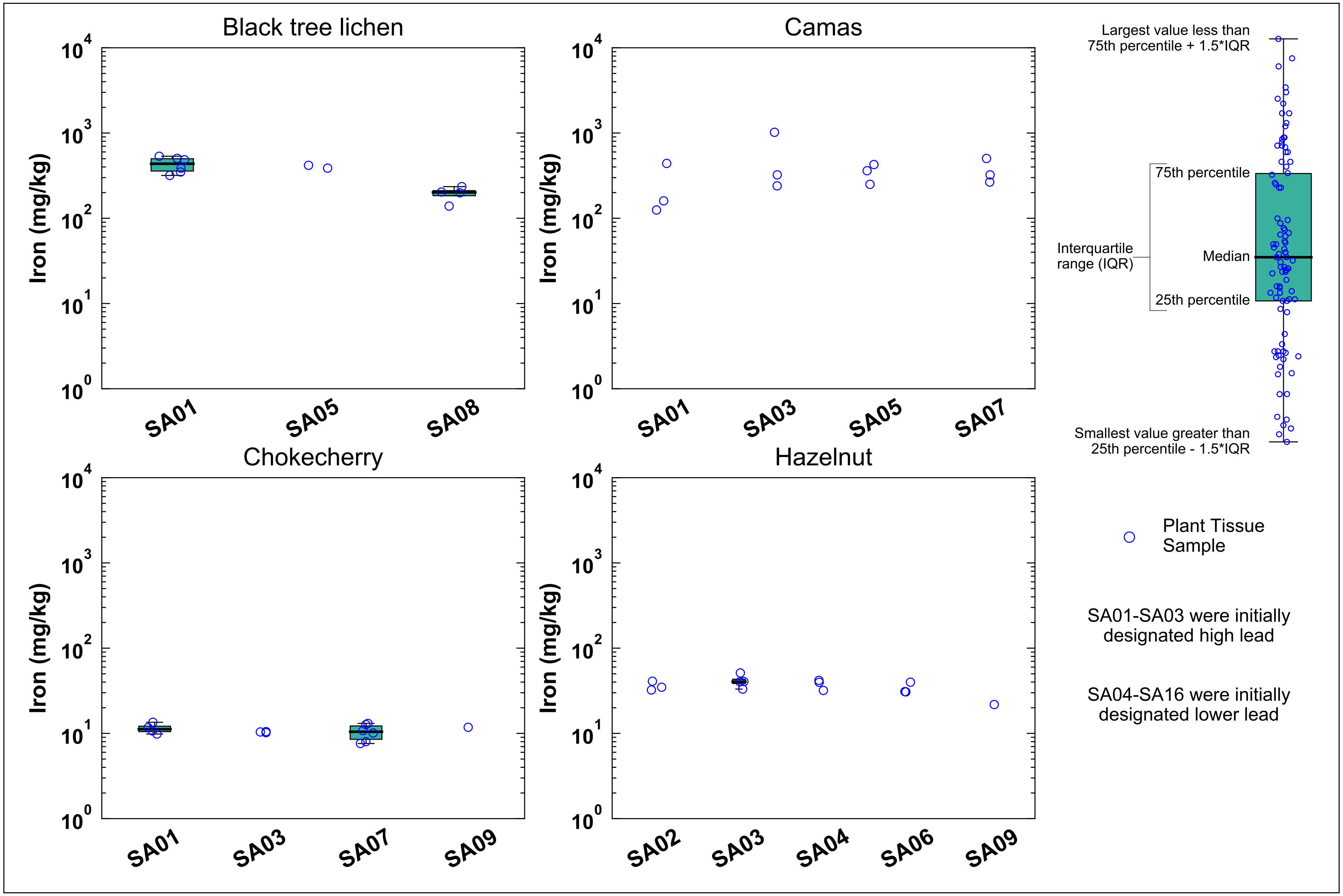


Figure 5-2ak. Iron Concentrations in Plant Tissue Samples by Sample Area

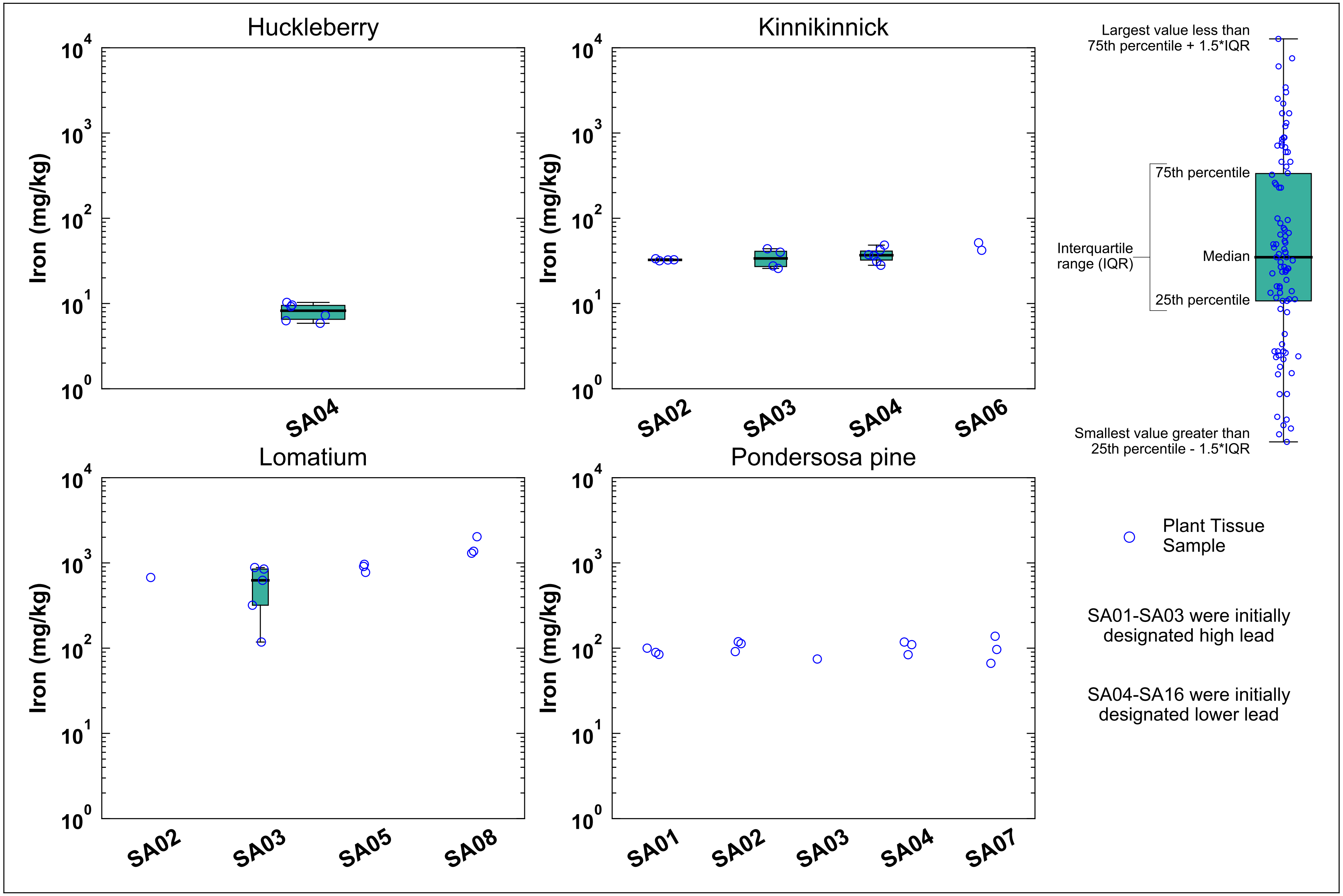


Figure 5-2al. Iron Concentrations in Plant Tissue Samples by Sample Area

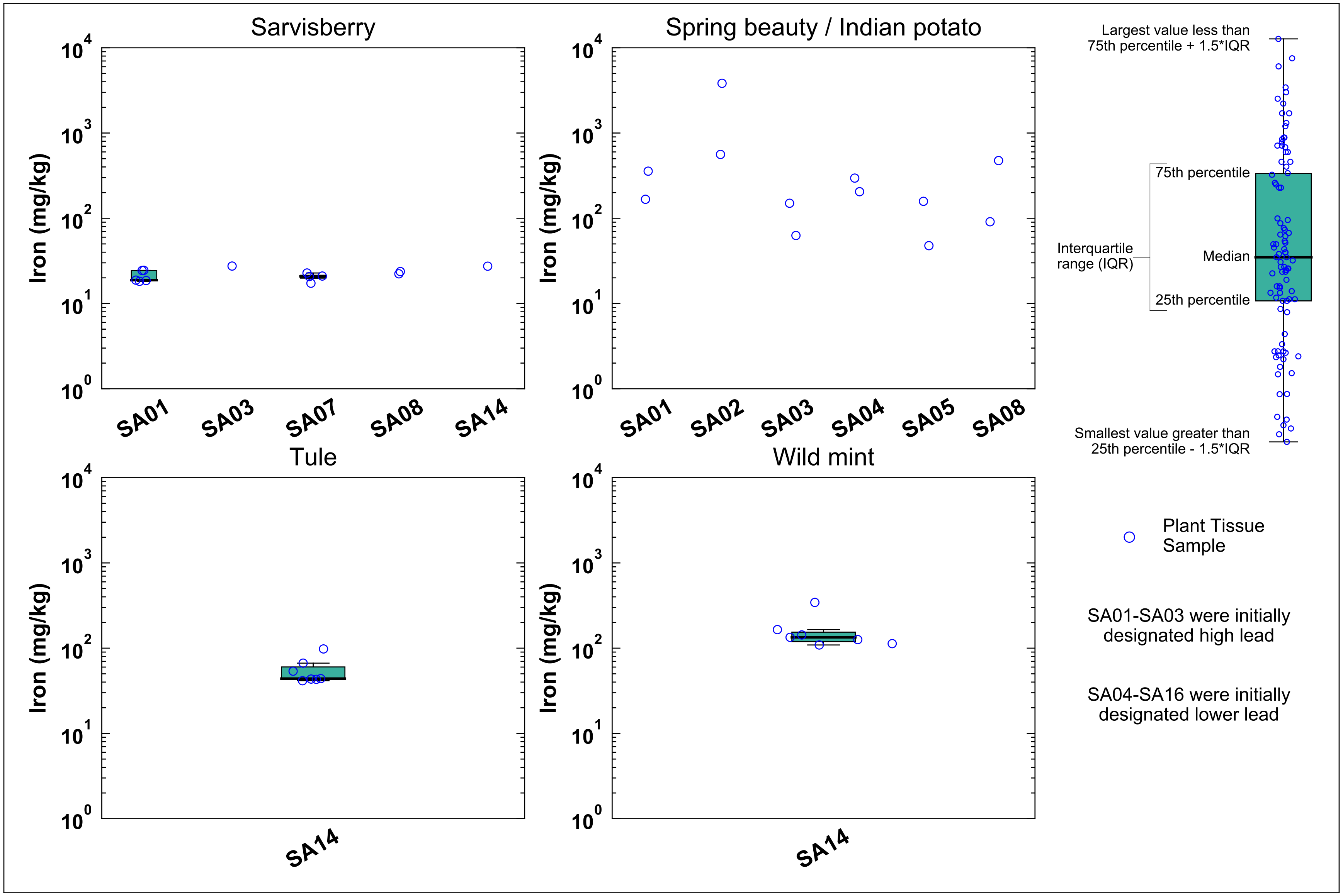


Figure 5-2am. Iron Concentrations in Plant Tissue Samples by Sample Area

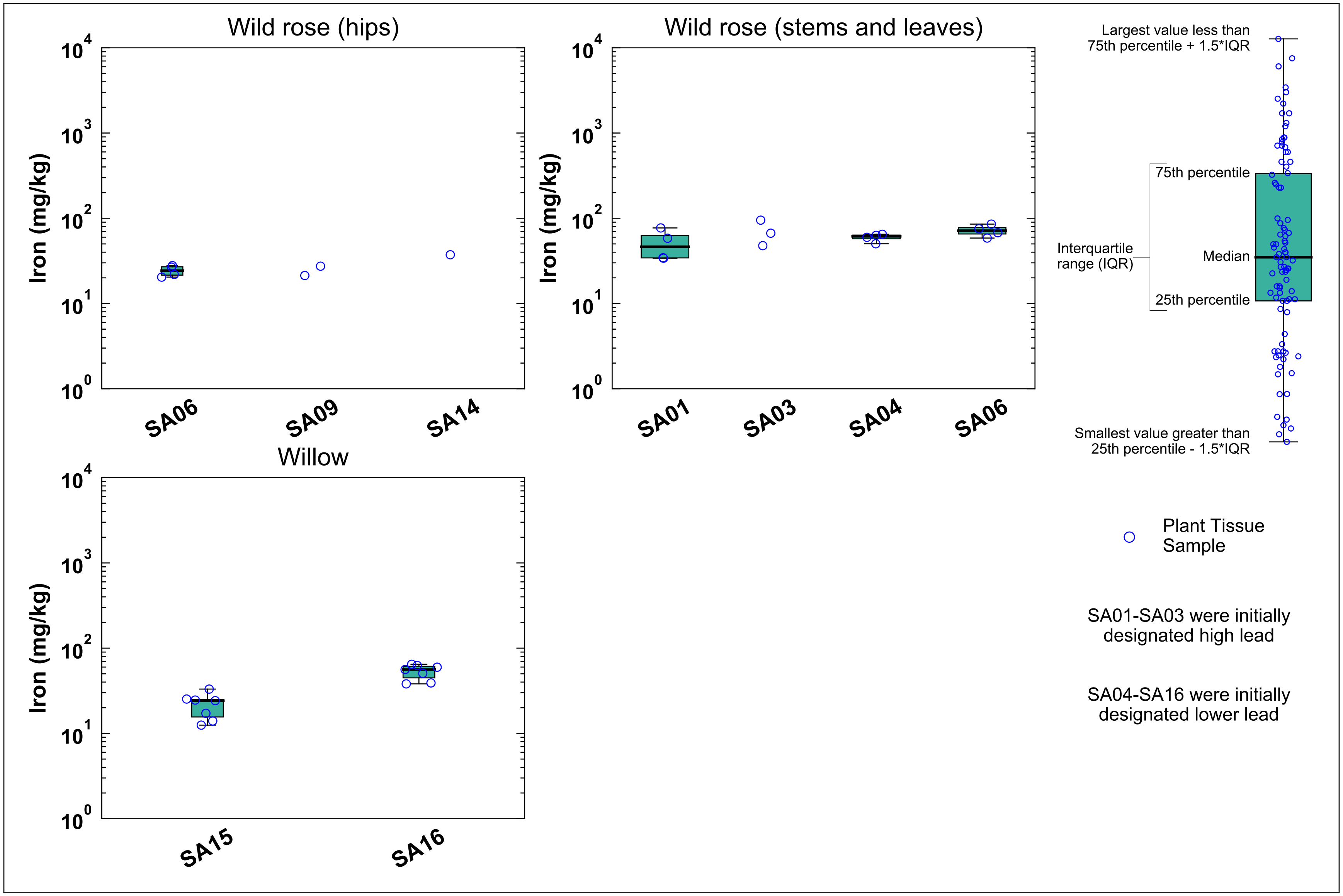


Figure 5-2an. Iron Concentrations in Plant Tissue Samples by Sample Area

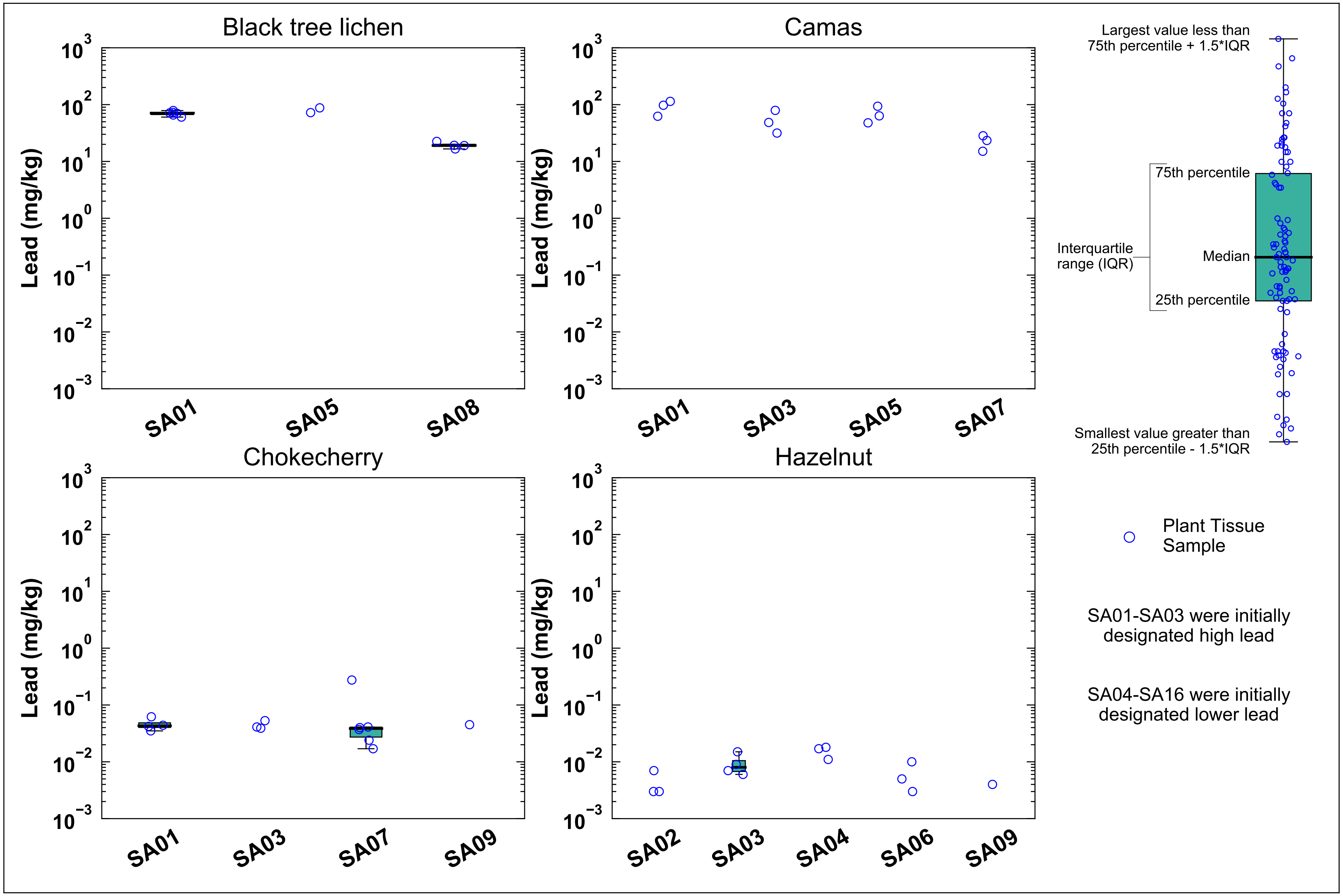


Figure 5-2ao. Lead Concentrations in Plant Tissue Samples by Sample Area

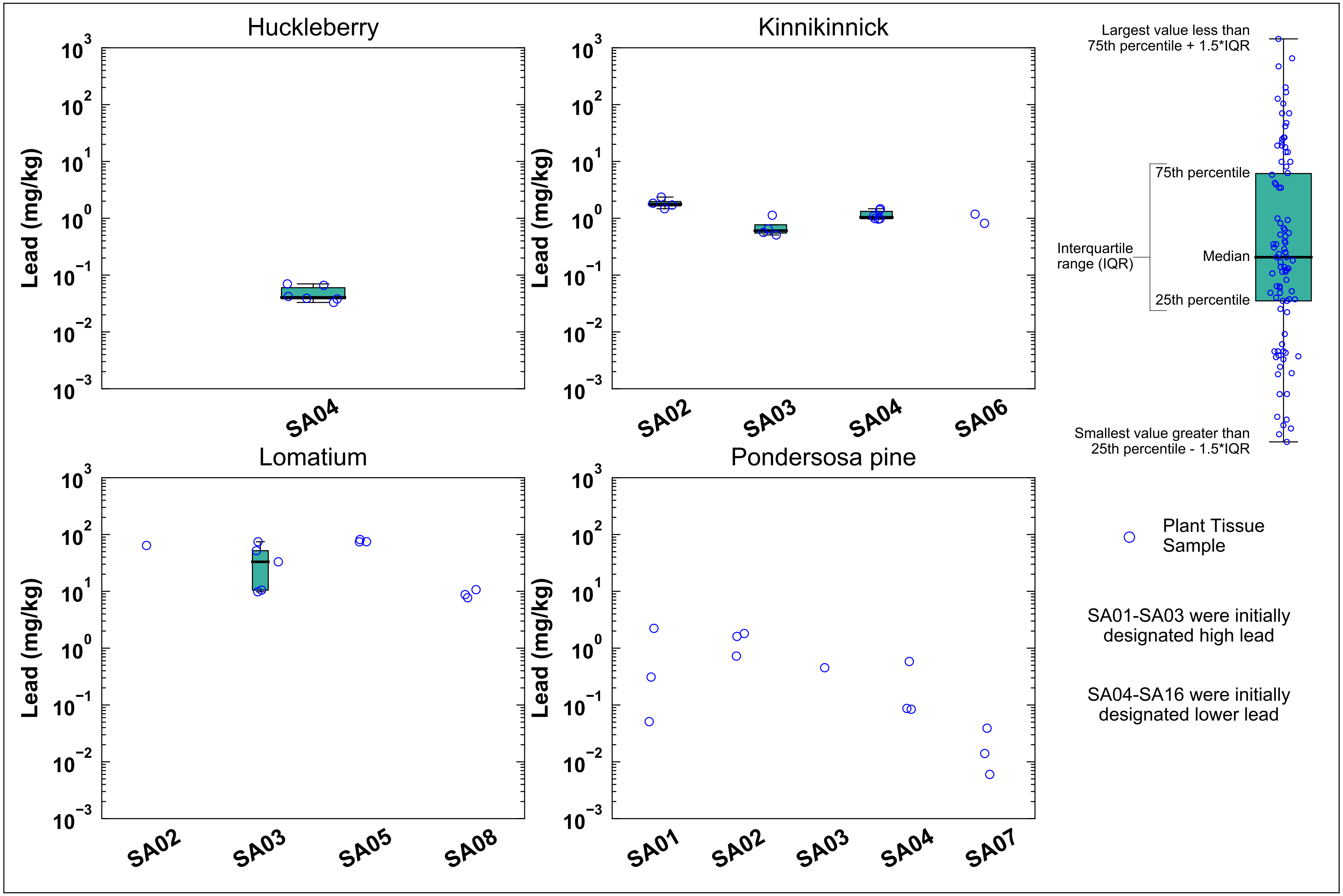


Figure 5-2ap. Lead Concentrations in Plant Tissue Samples by Sample Area

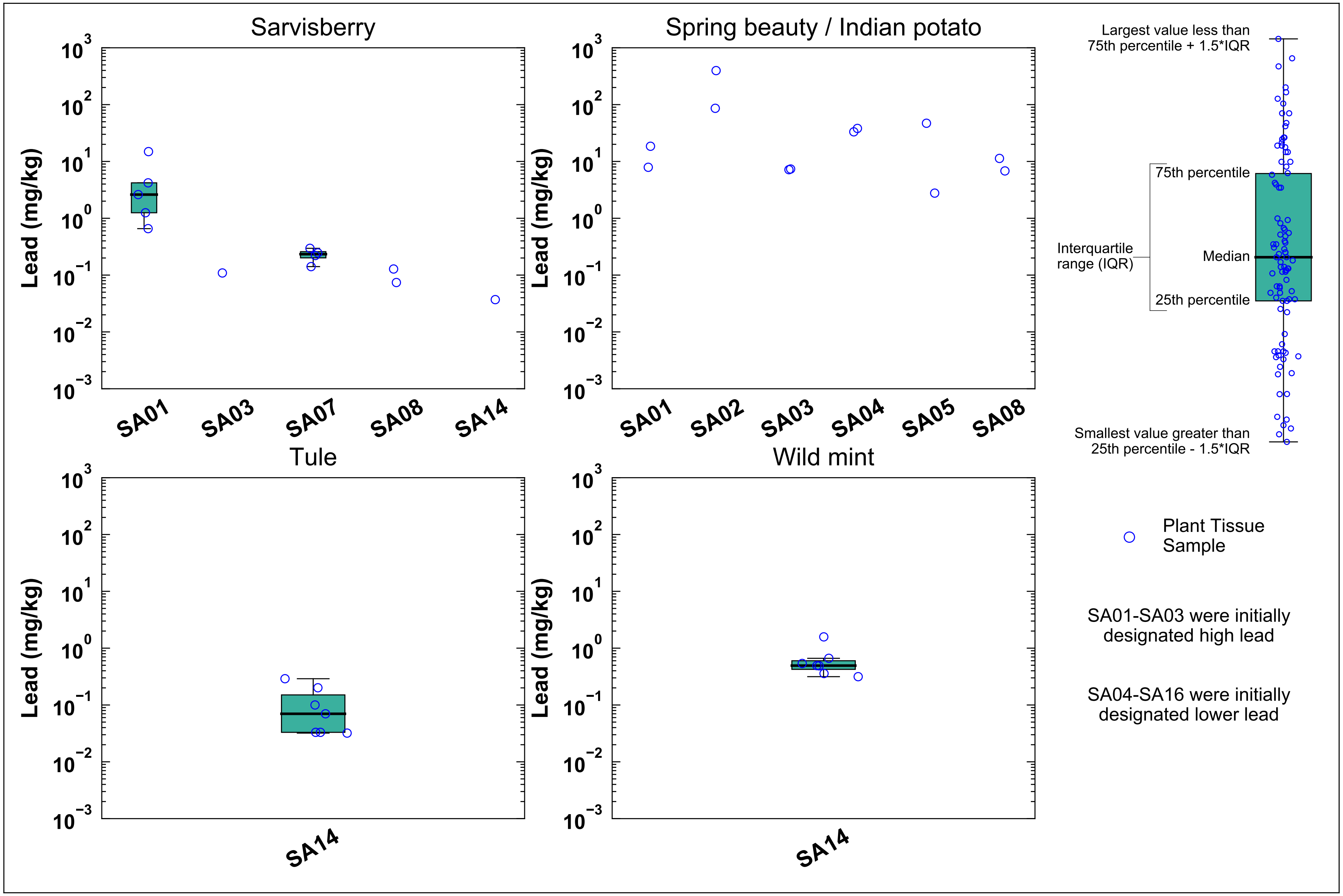


Figure 5-2aq. Lead Concentrations in Plant Tissue Samples by Sample Area

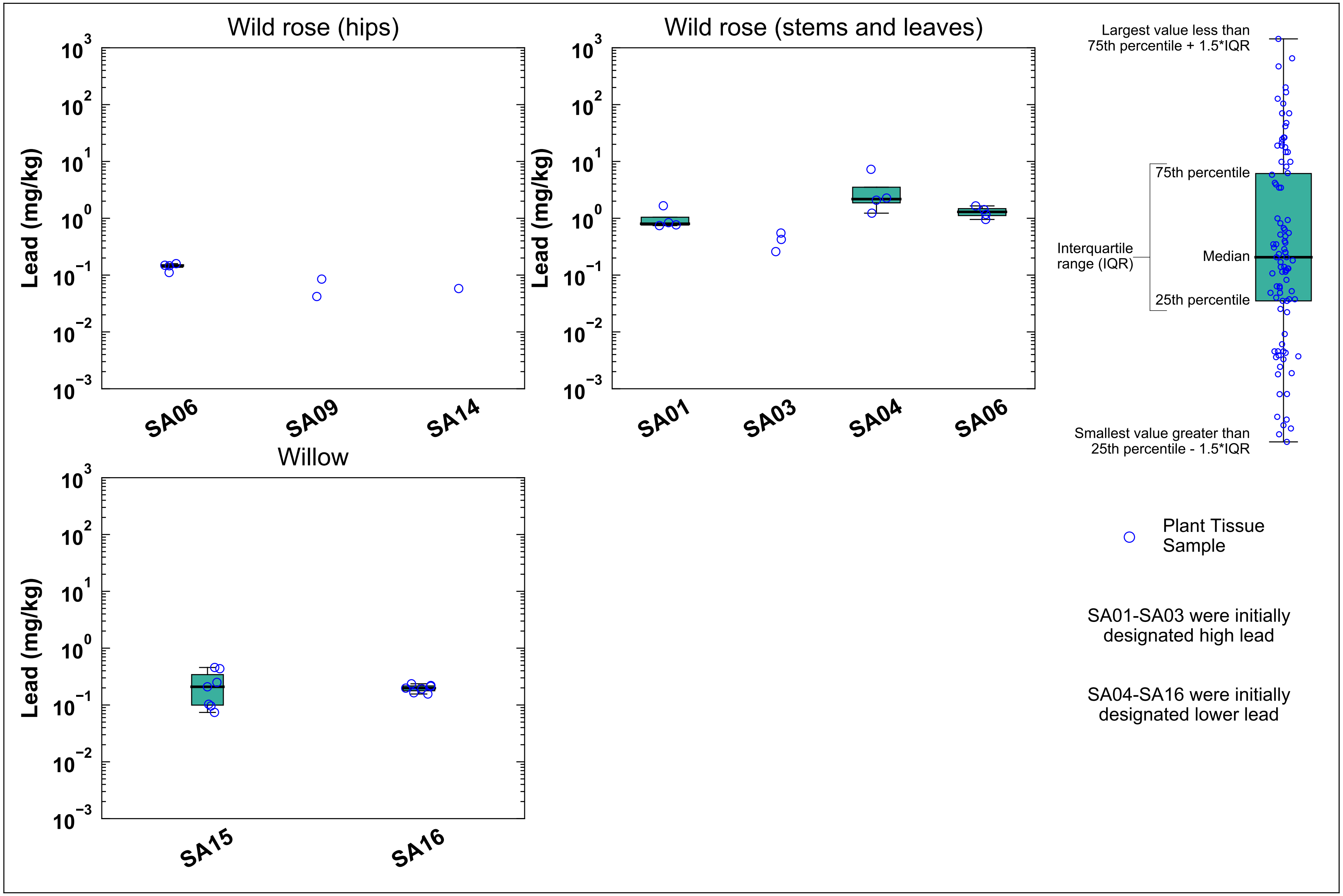


Figure 5-2ar. Lead Concentrations in Plant Tissue Samples by Sample Area

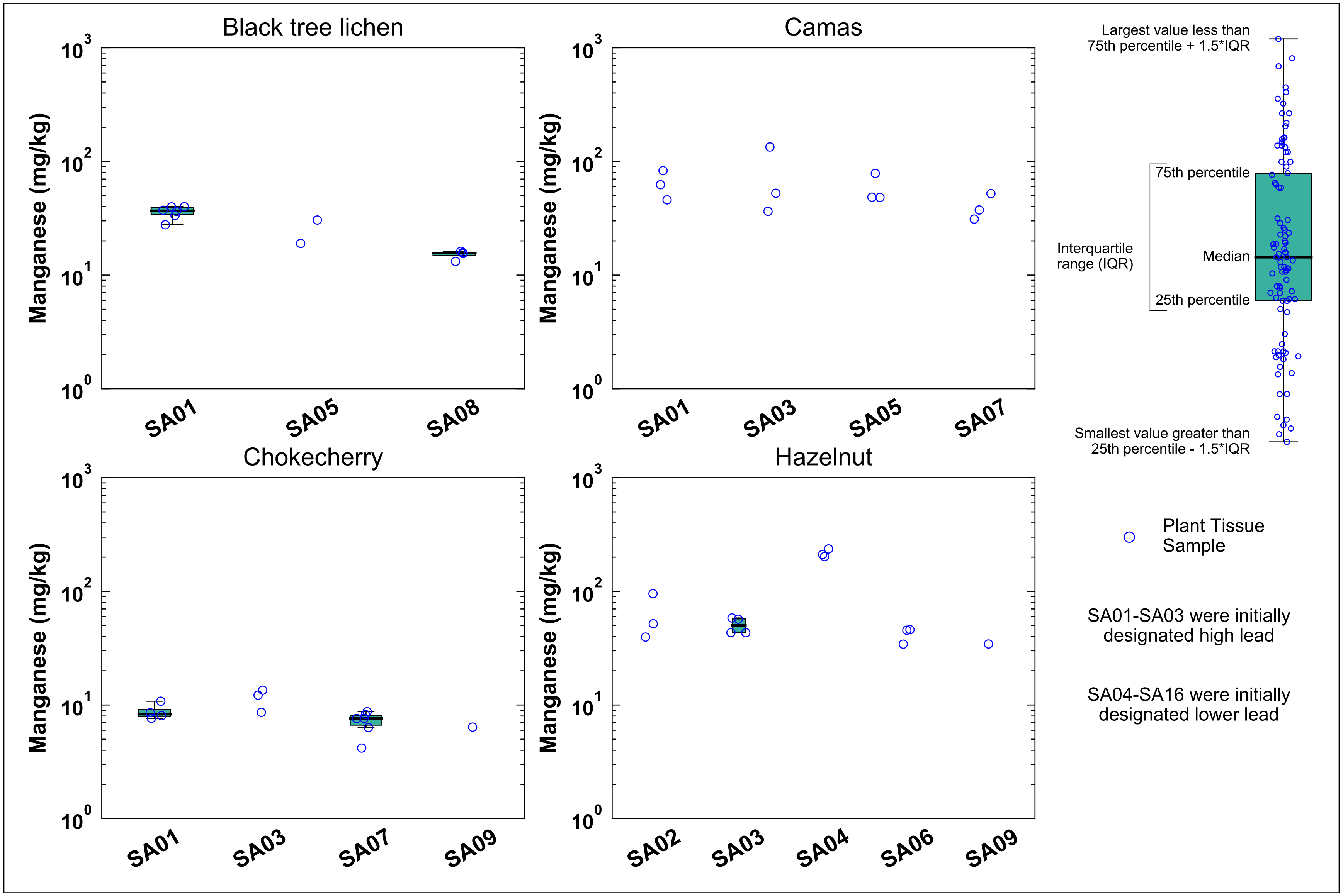


Figure 5-2as. Manganese Concentrations in Plant Tissue Samples by Sample Area

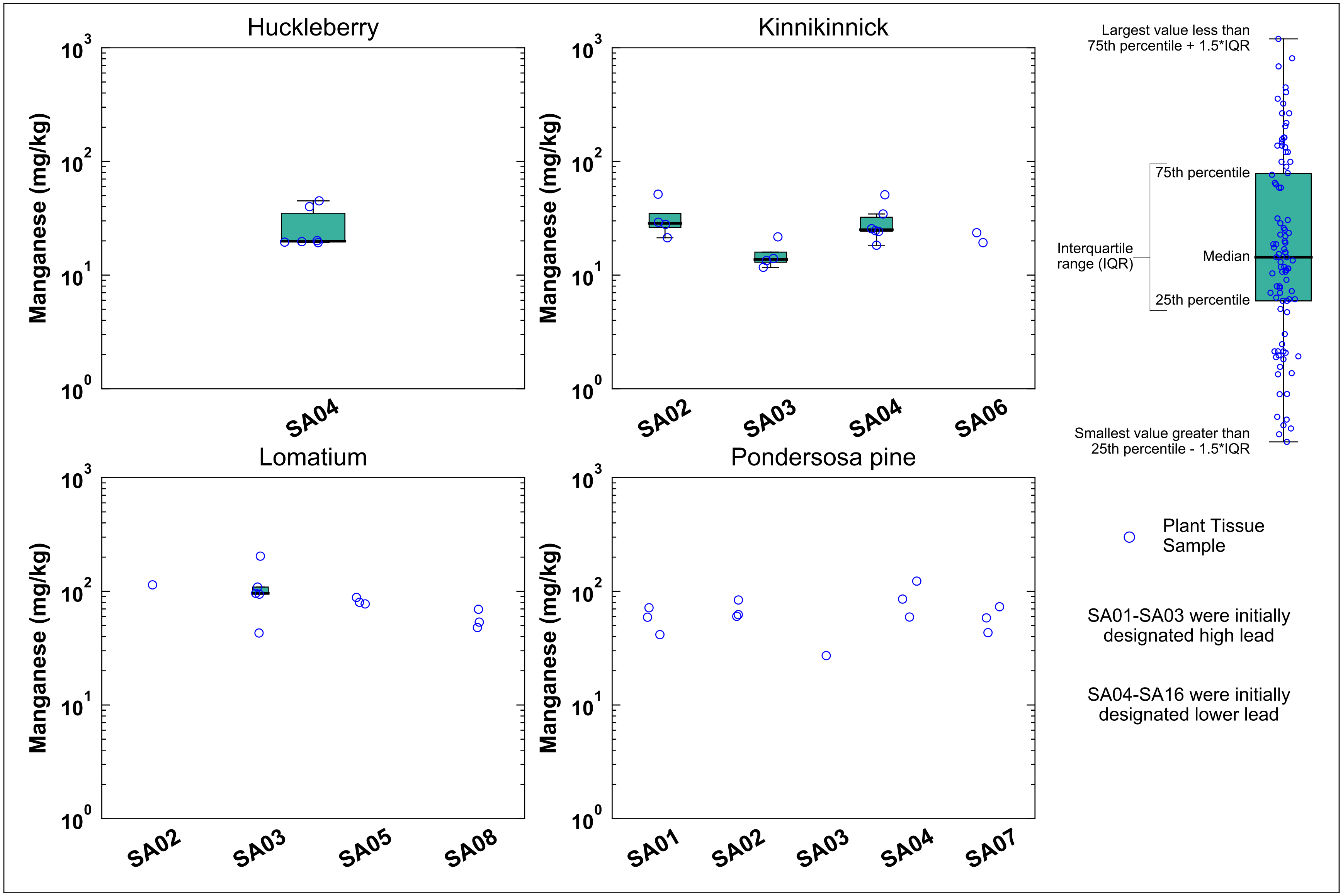


Figure 5-2at. Manganese Concentrations in Plant Tissue Samples by Sample Area

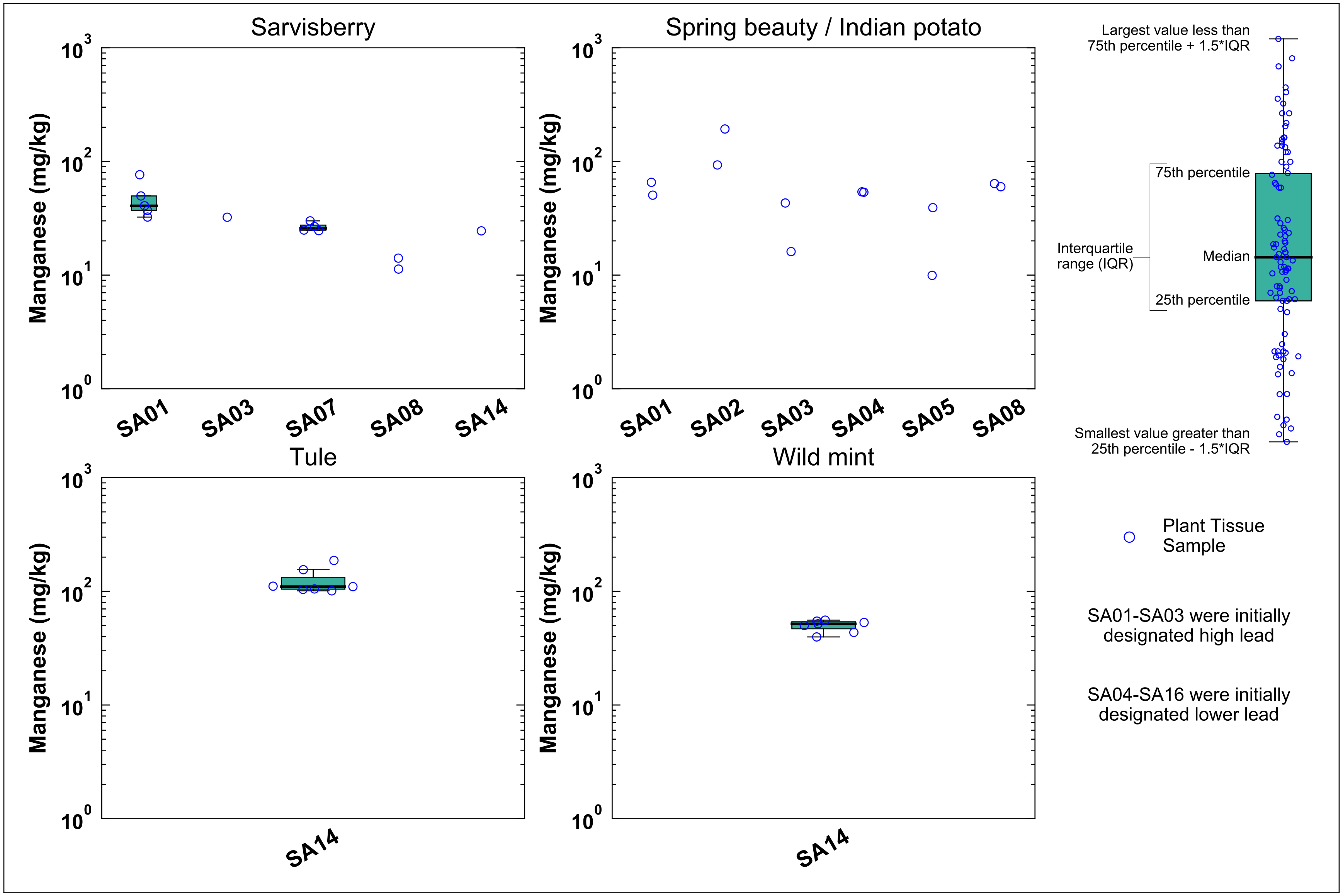


Figure 5-2au. Manganese Concentrations in Plant Tissue Samples by Sample Area

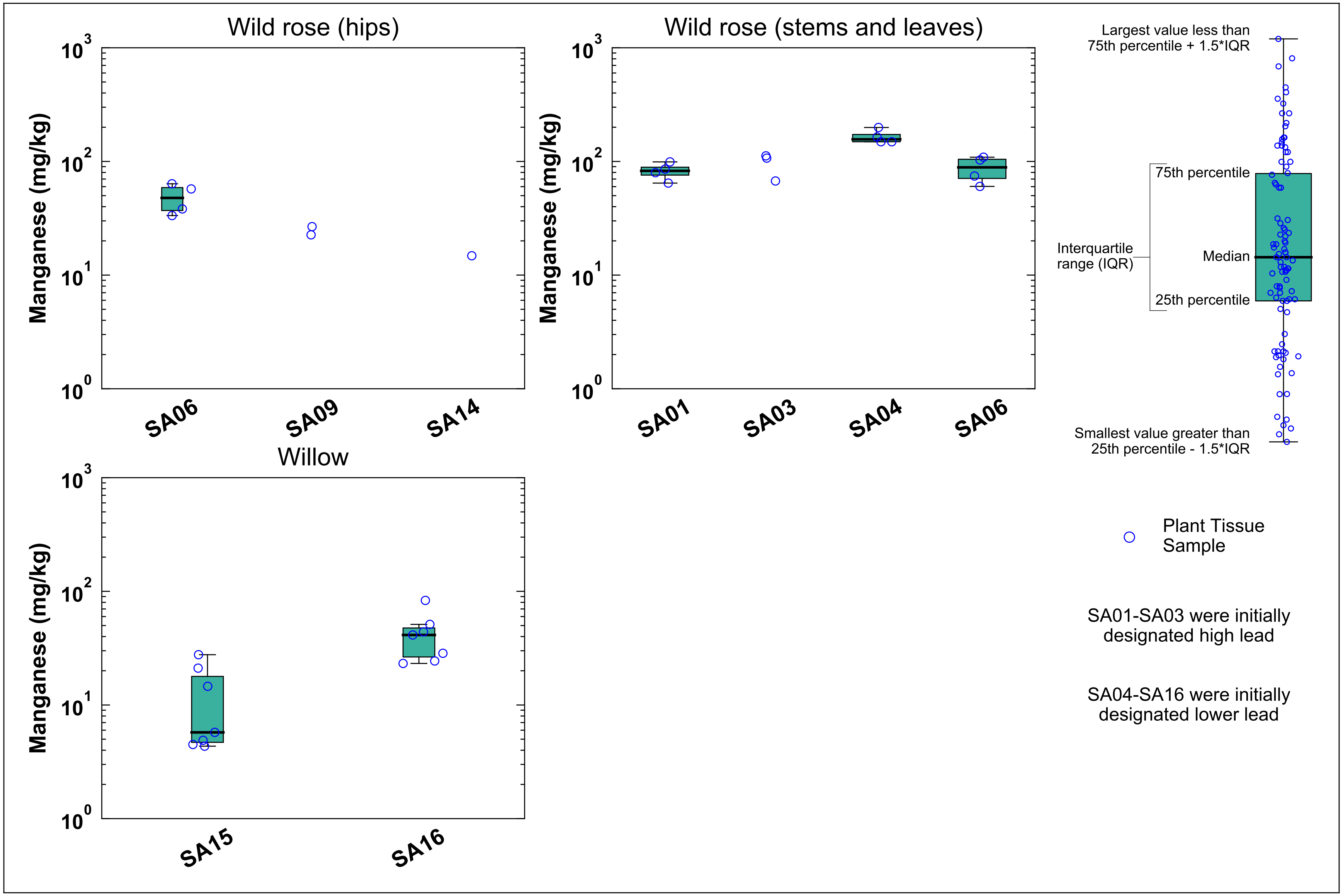
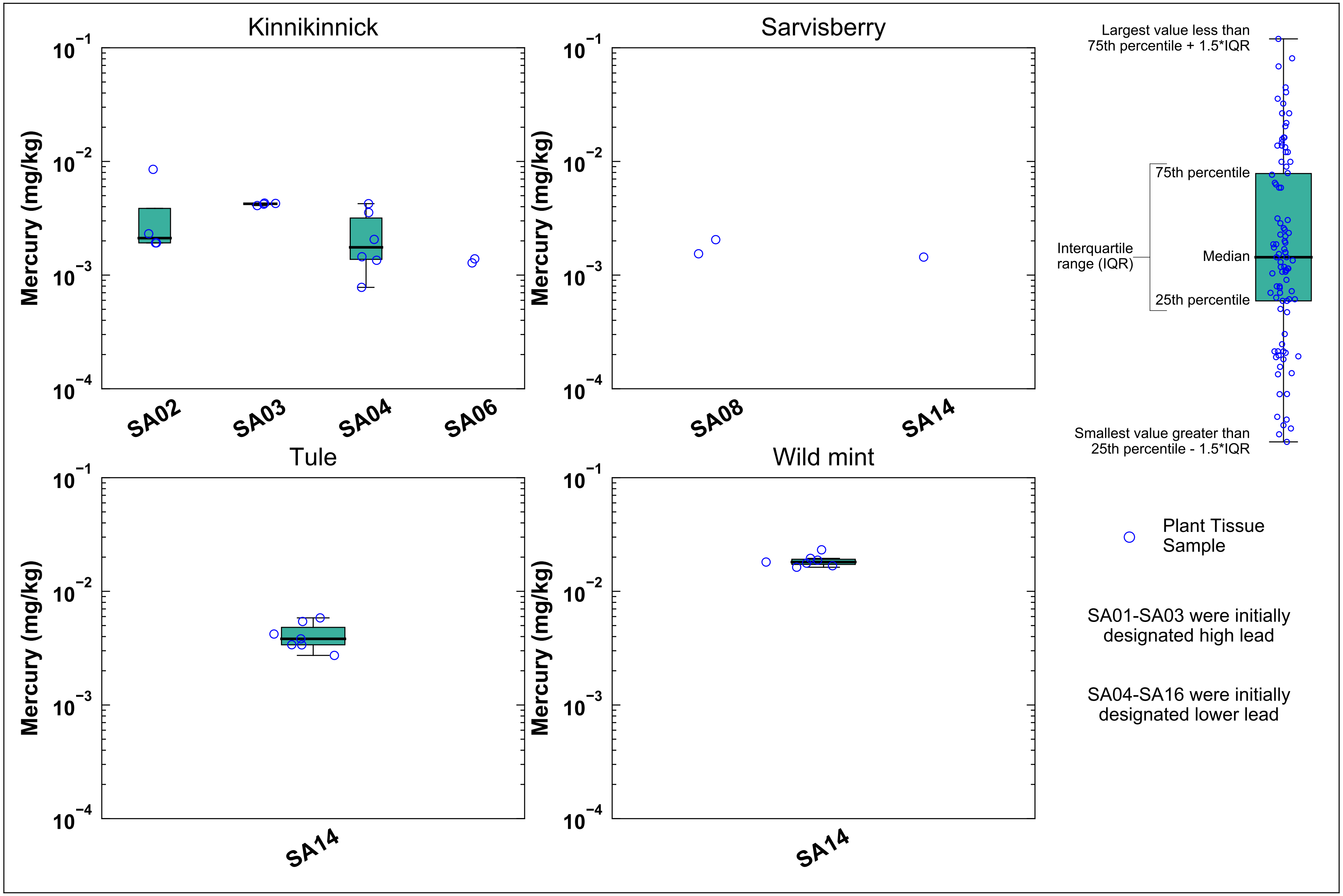
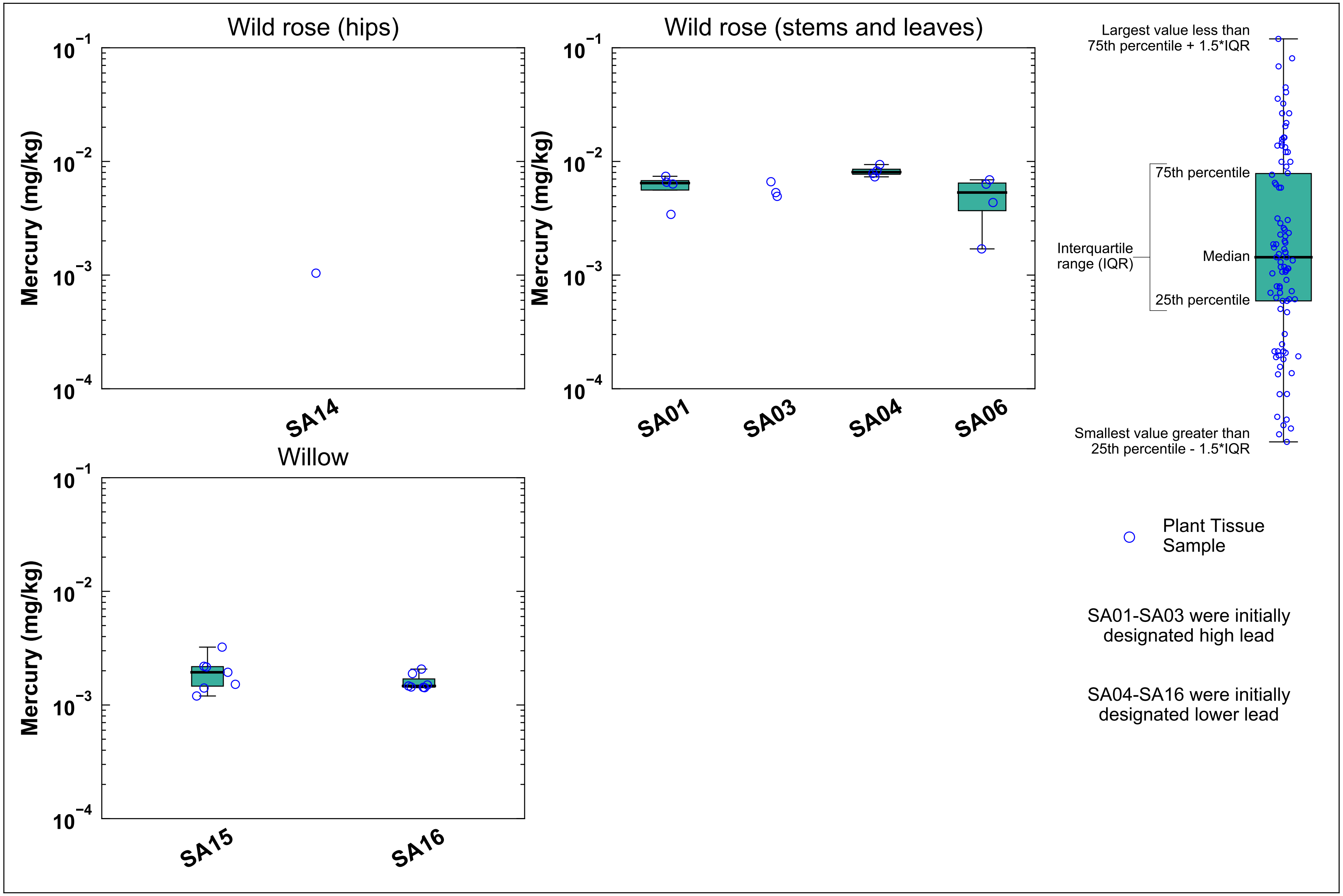


Figure 5-2av. Manganese Concentrations in Plant Tissue Samples by Sample Area



Note:
Mercury units were converted to mg/kg from ng/g values reported by ALS

Figure 5-2aw. Mercury Concentrations in Plant Tissue Samples by Sample Area



Note:
Mercury units were converted to mg/kg from ng/g values reported by ALS

Figure 5-2ax. Mercury Concentrations in Plant Tissue Samples by Sample Area

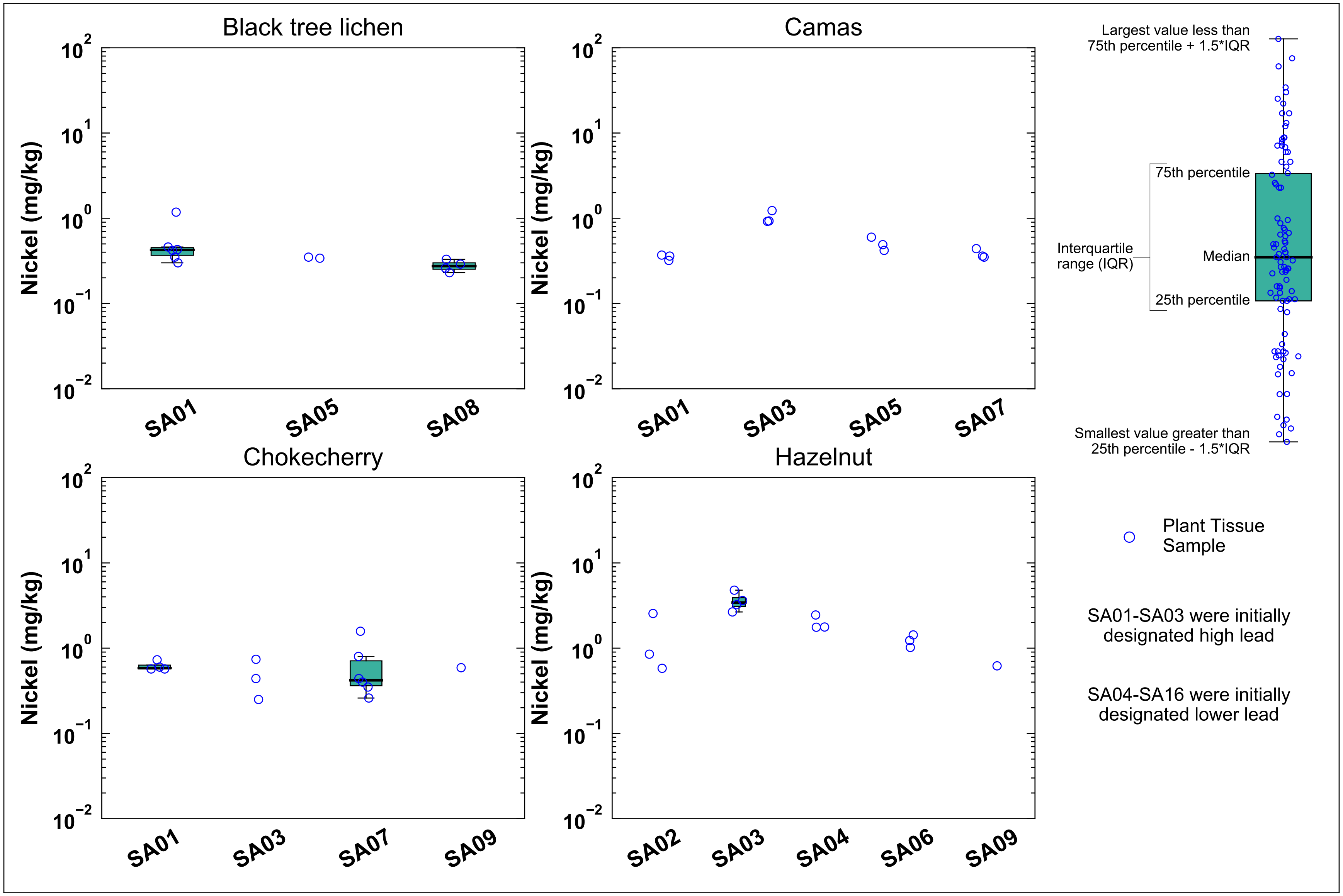


Figure 5-2ay. Nickel Concentrations in Plant Tissue Samples by Sample Area

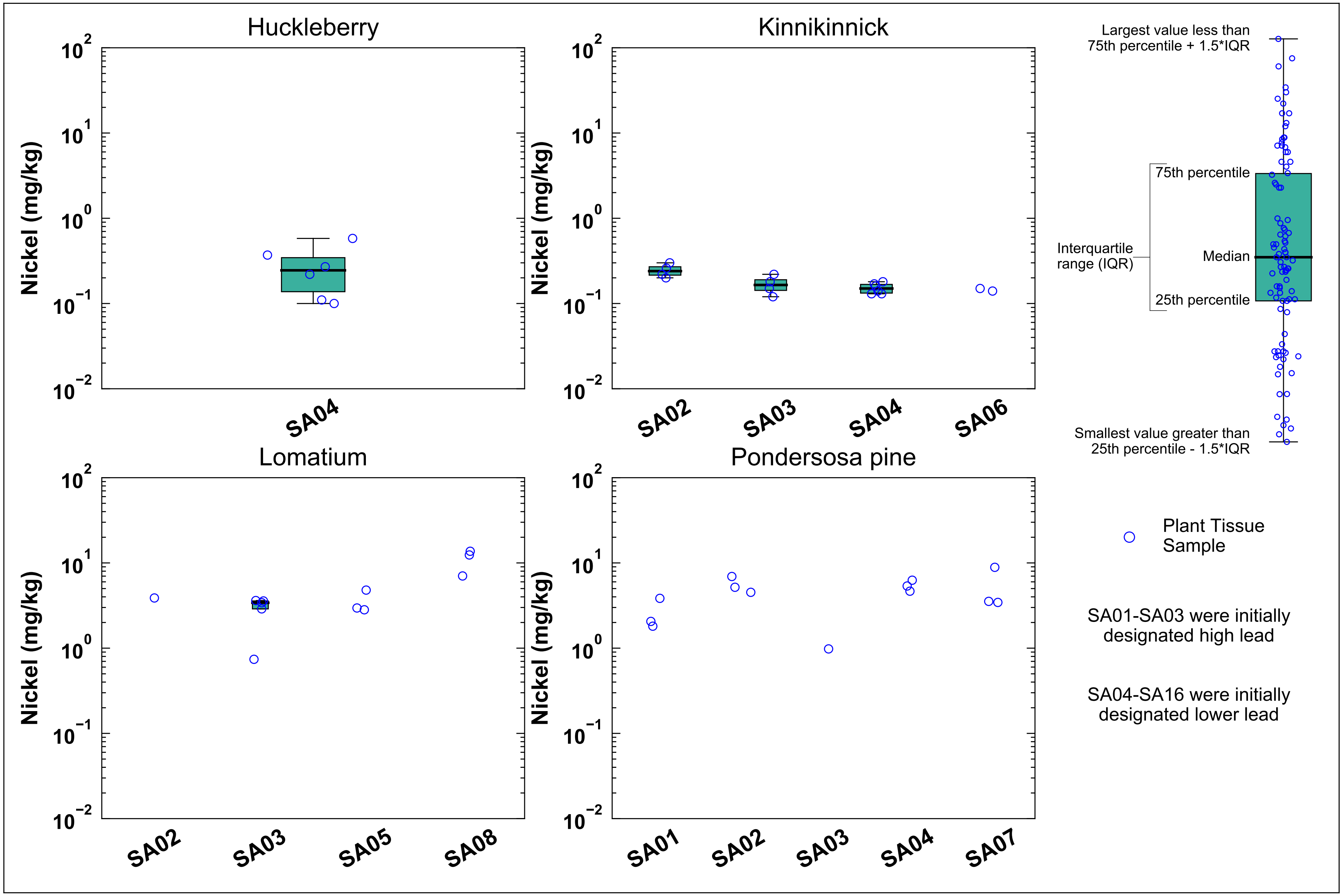


Figure 5-2az. Nickel Concentrations in Plant Tissue Samples by Sample Area

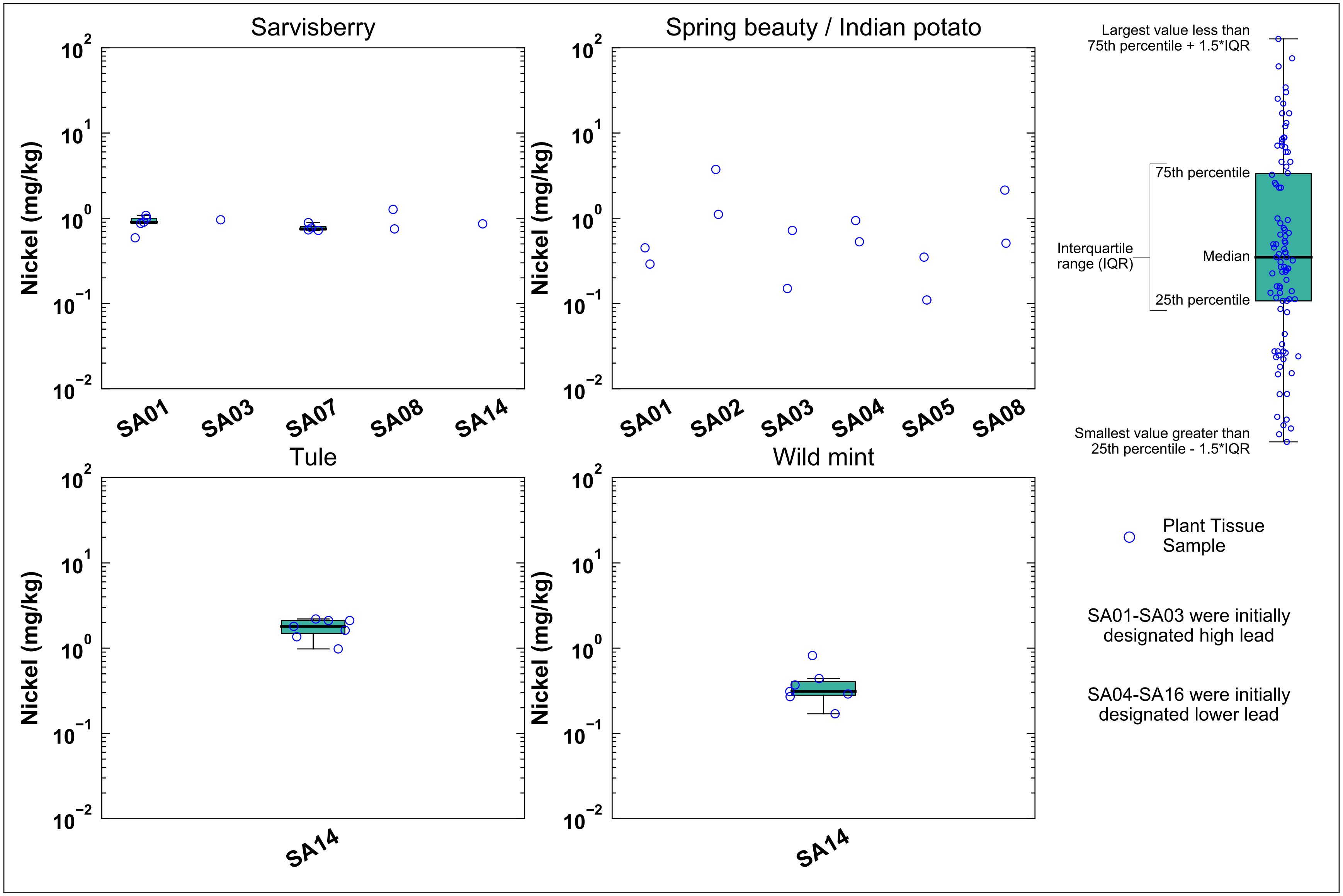


Figure 5-2ba. Nickel Concentrations in Plant Tissue Samples by Sample Area

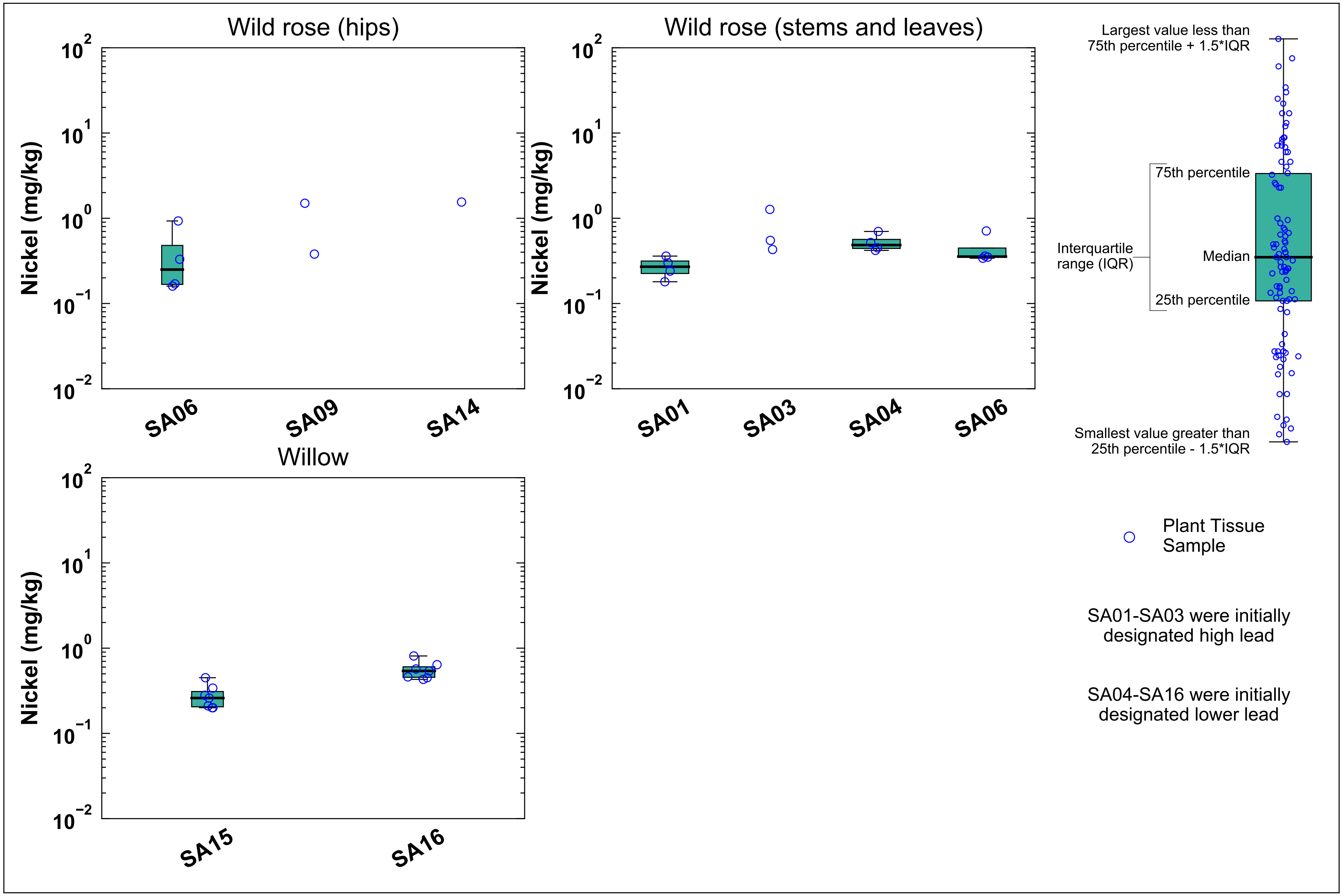


Figure 5-2bb. Nickel Concentrations in Plant Tissue Samples by Sample Area

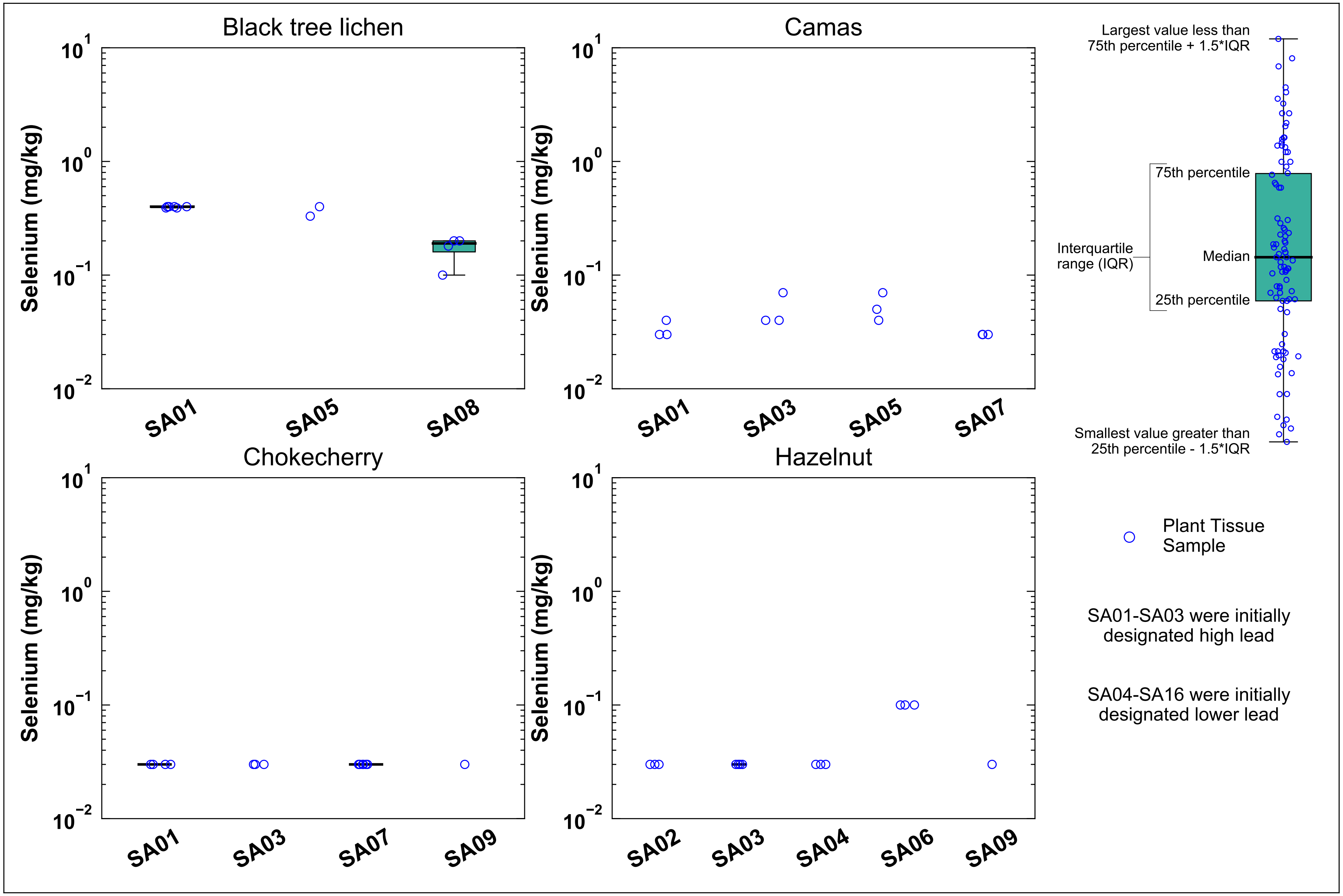


Figure 5-2bc. Selenium Concentrations in Plant Tissue Samples by Sample Area

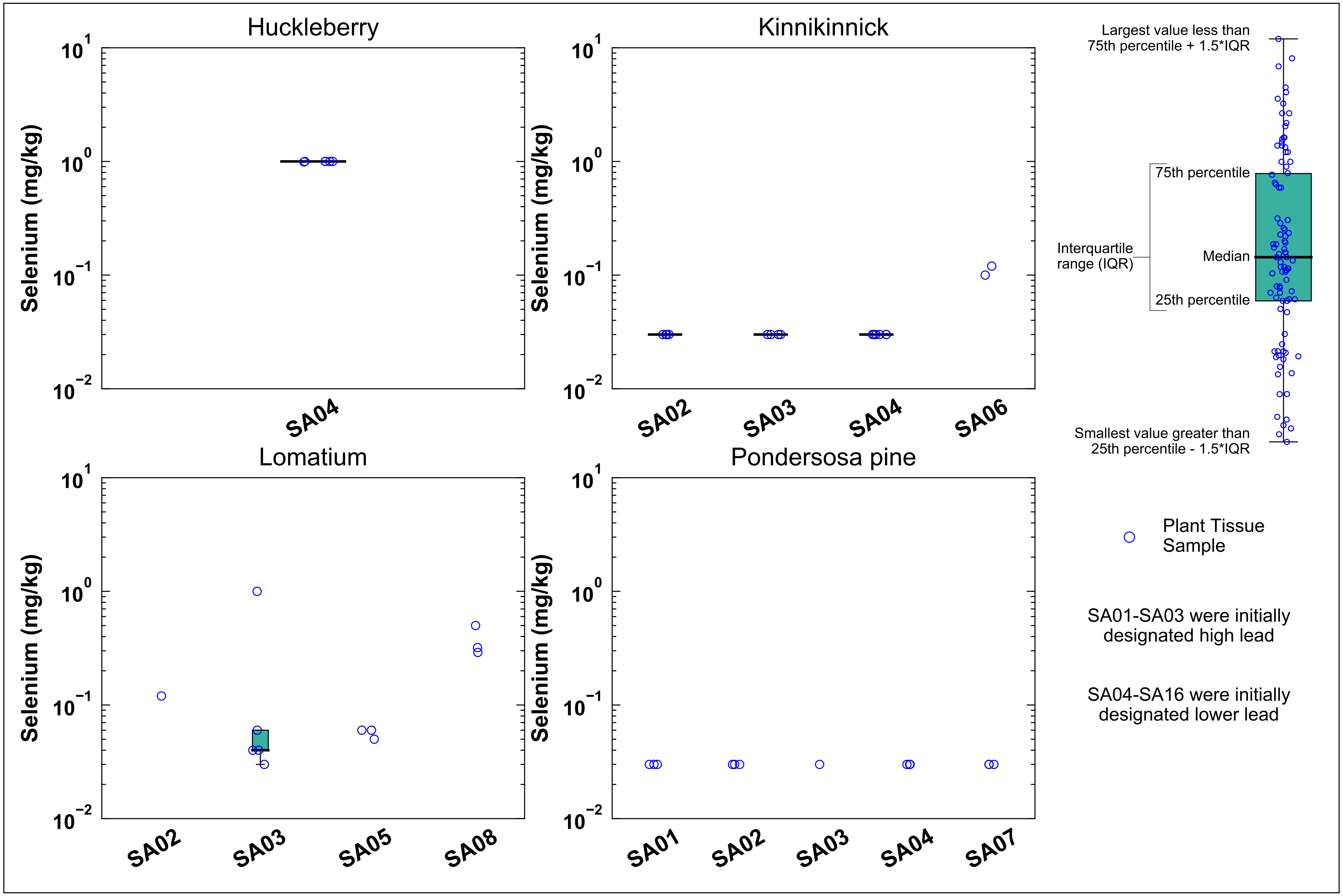


Figure 5-2bd. Selenium Concentrations in Plant Tissue Samples by Sample Area

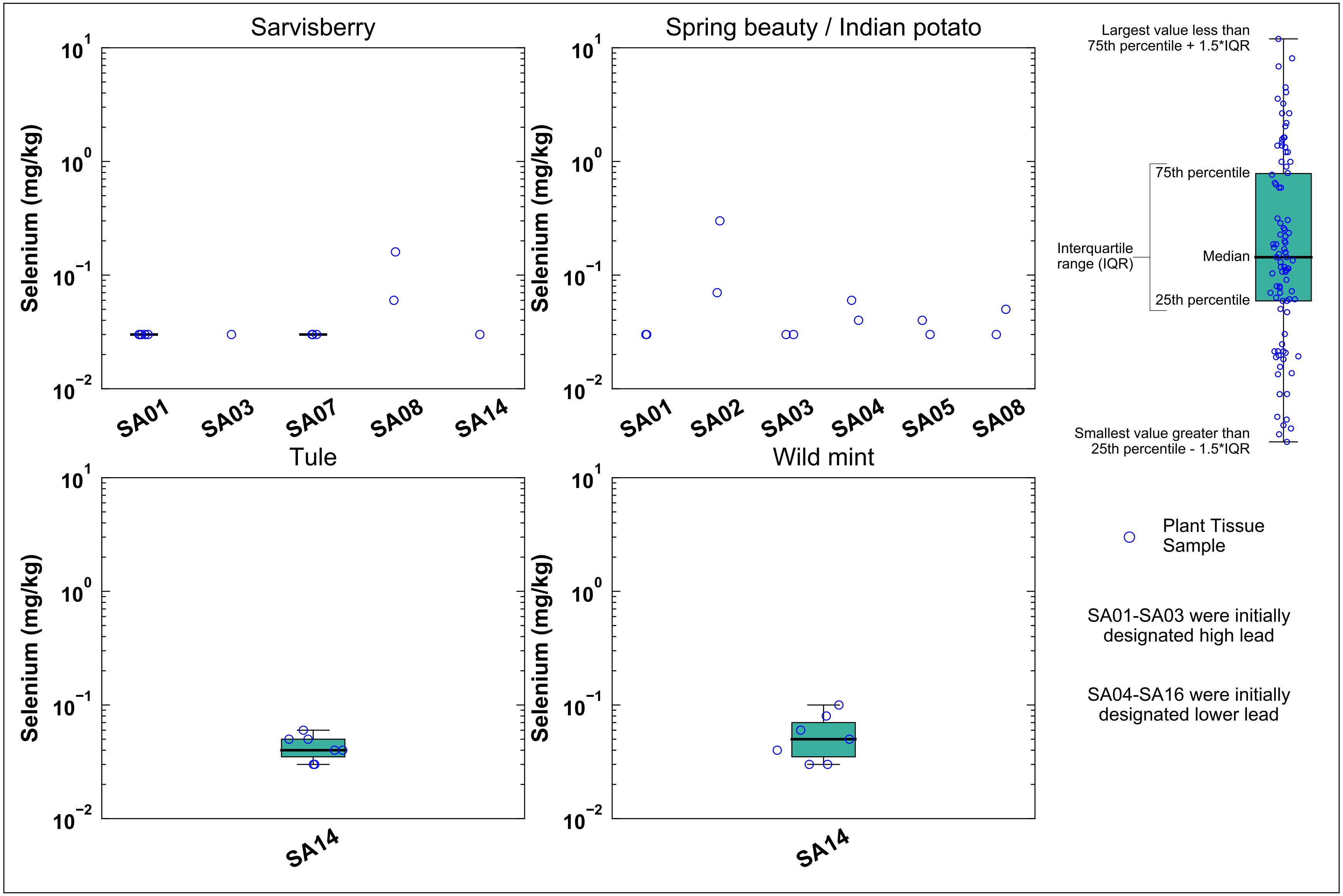


Figure 5-2be. Selenium Concentrations in Plant Tissue Samples by Sample Area

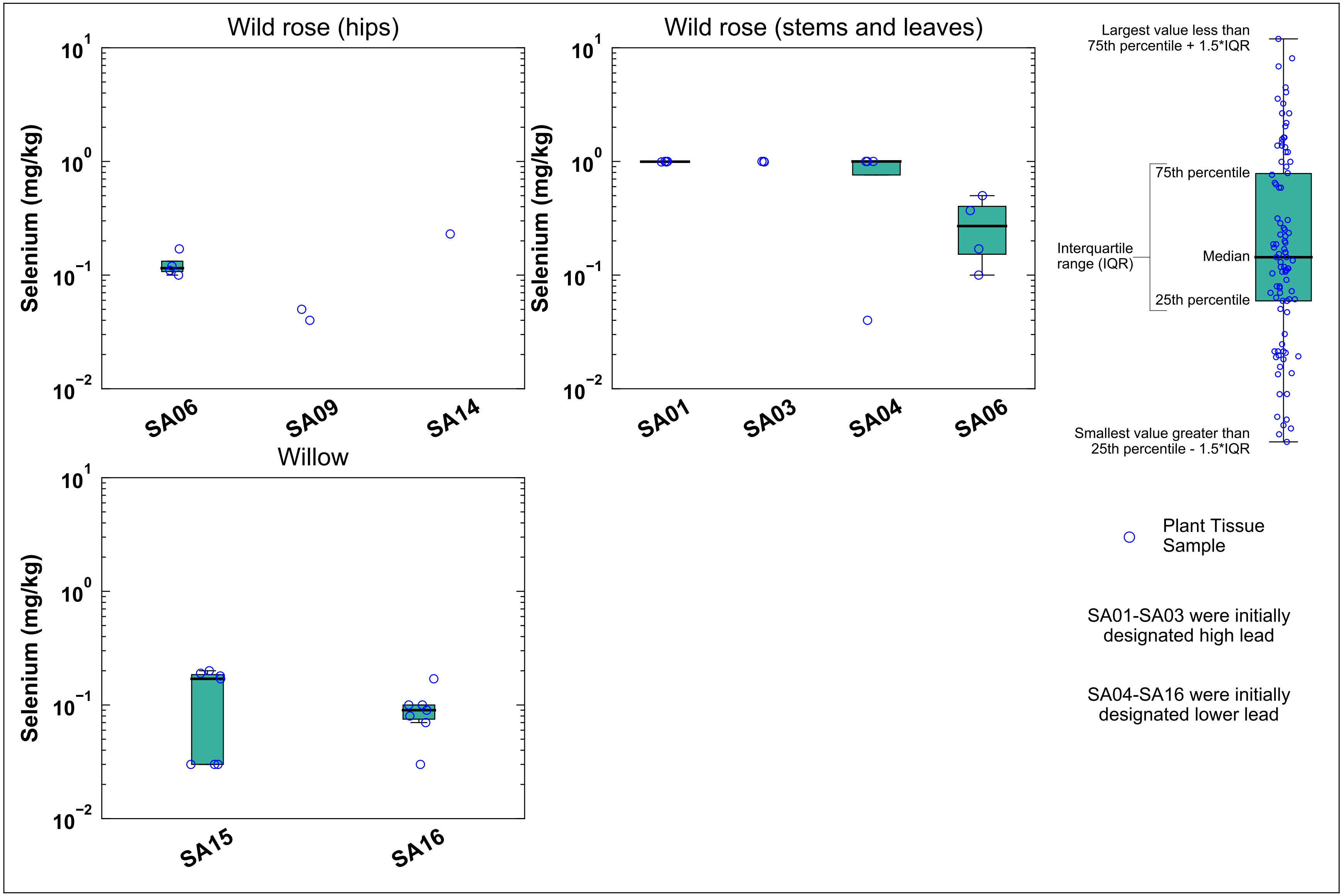


Figure 5-2bf. Selenium Concentrations in Plant Tissue Samples by Sample Area

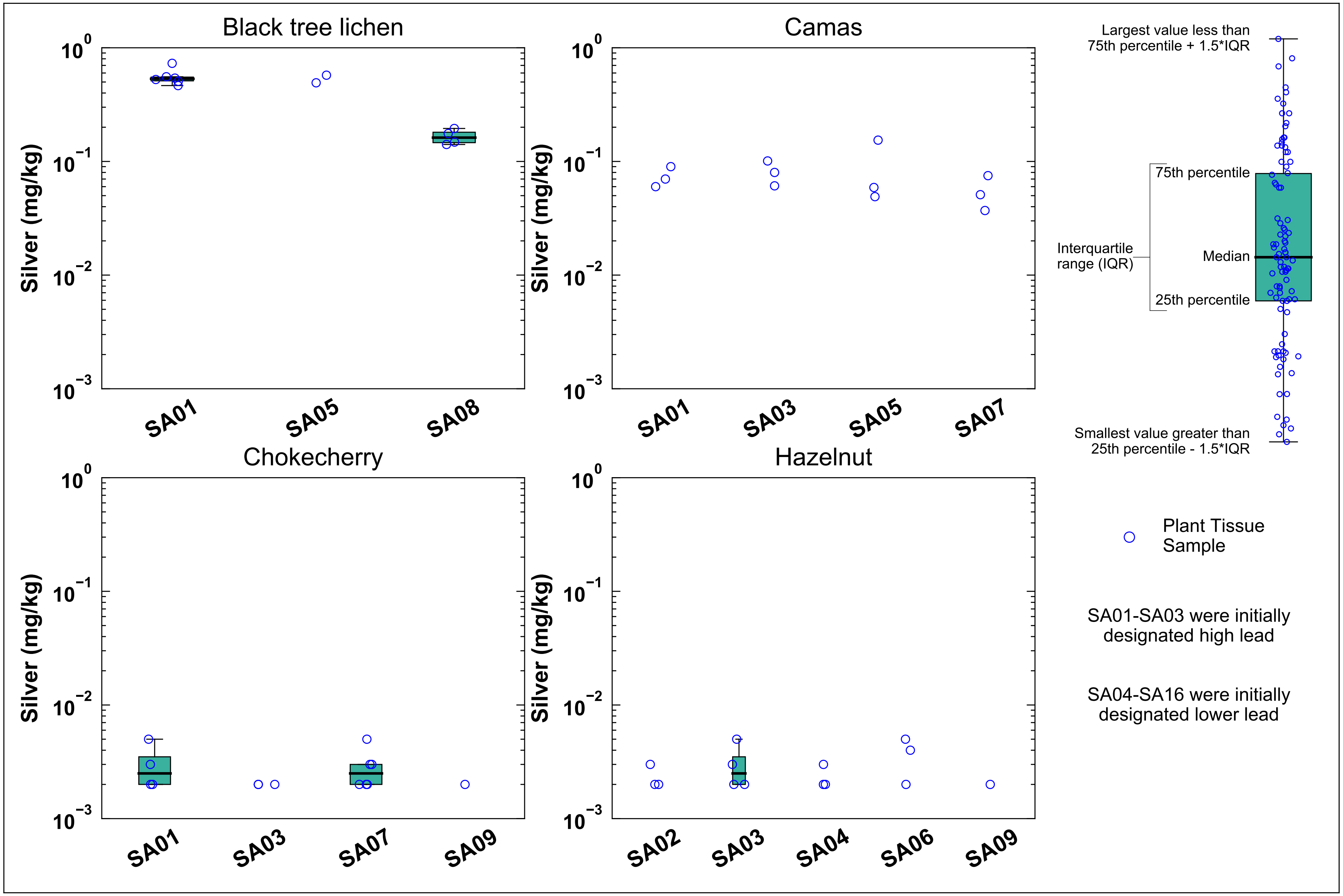


Figure 5-2bg. Silver Concentrations in Plant Tissue Samples by Sample Area

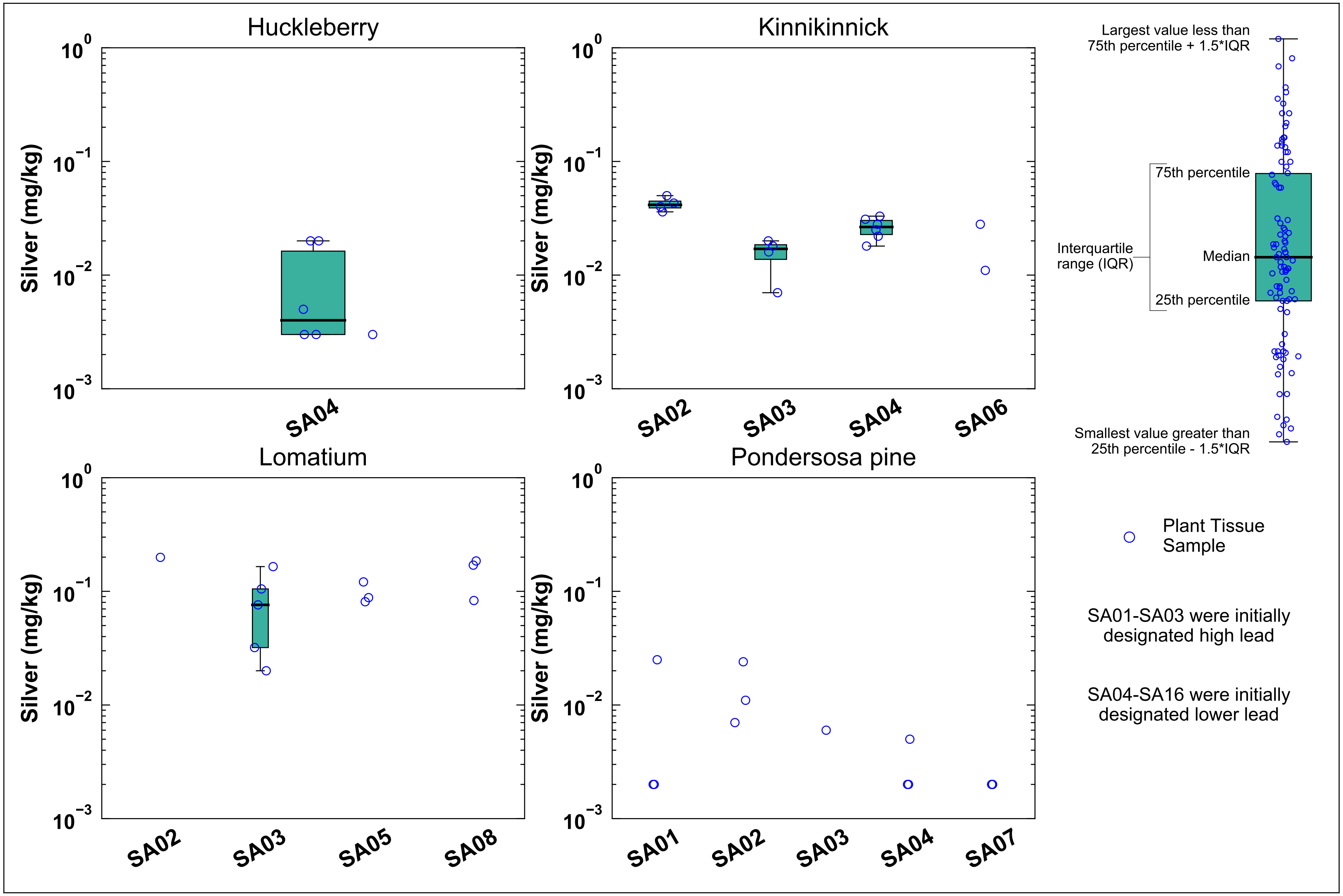


Figure 5-2bh. Silver Concentrations in Plant Tissue Samples by Sample Area

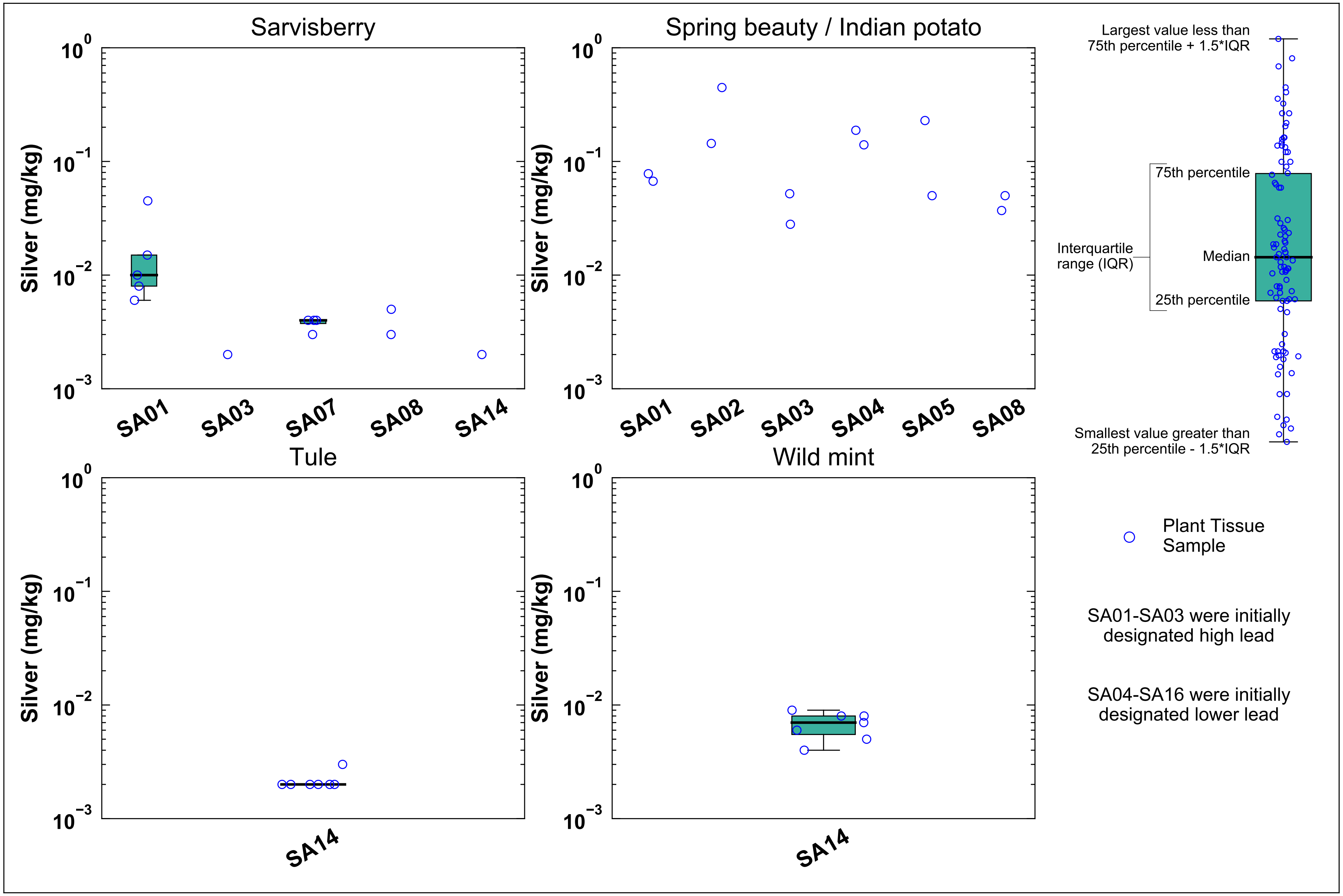


Figure 5-2bi. Silver Concentrations in Plant Tissue Samples by Sample Area

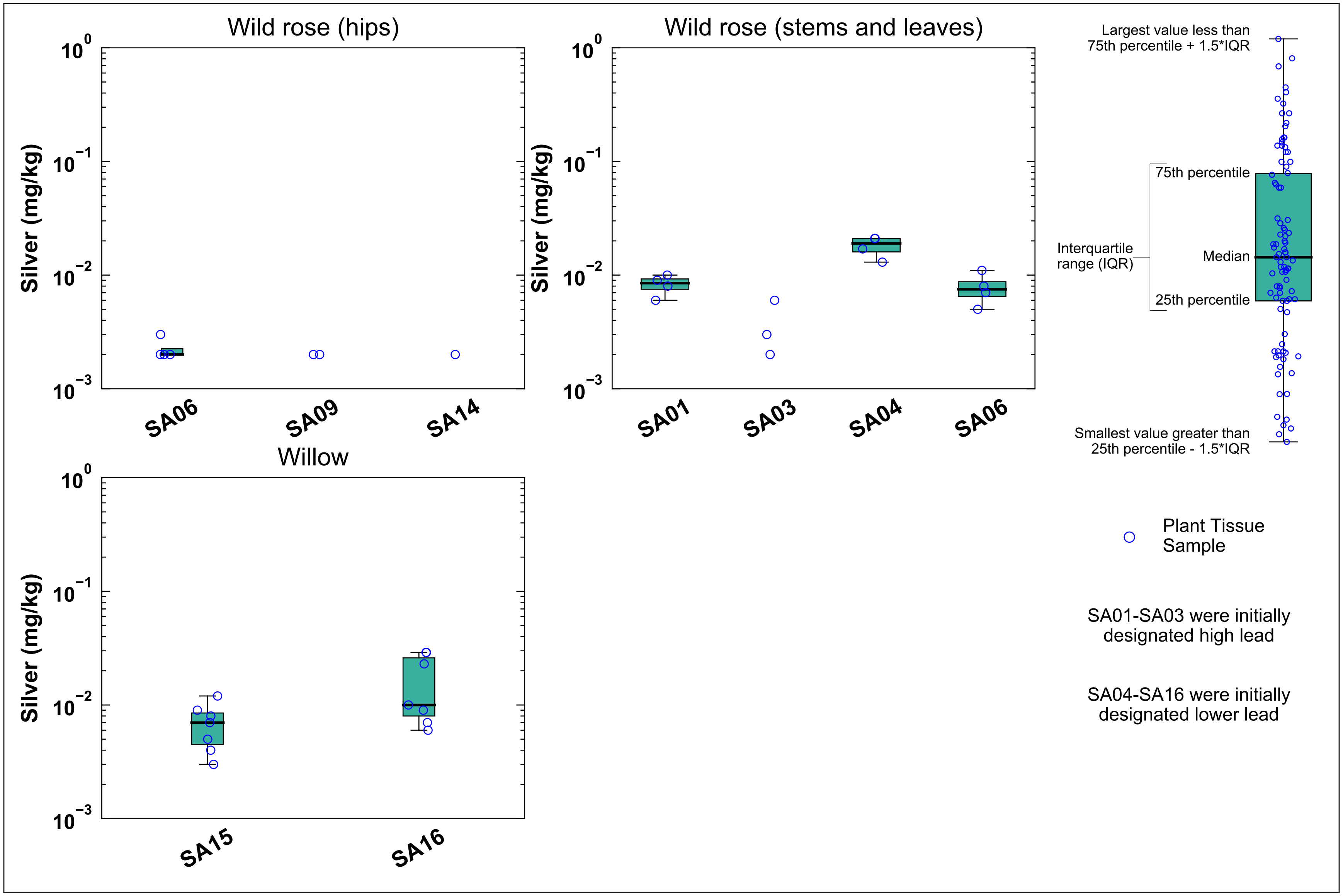


Figure 5-2bj. Silver Concentrations in Plant Tissue Samples by Sample Area

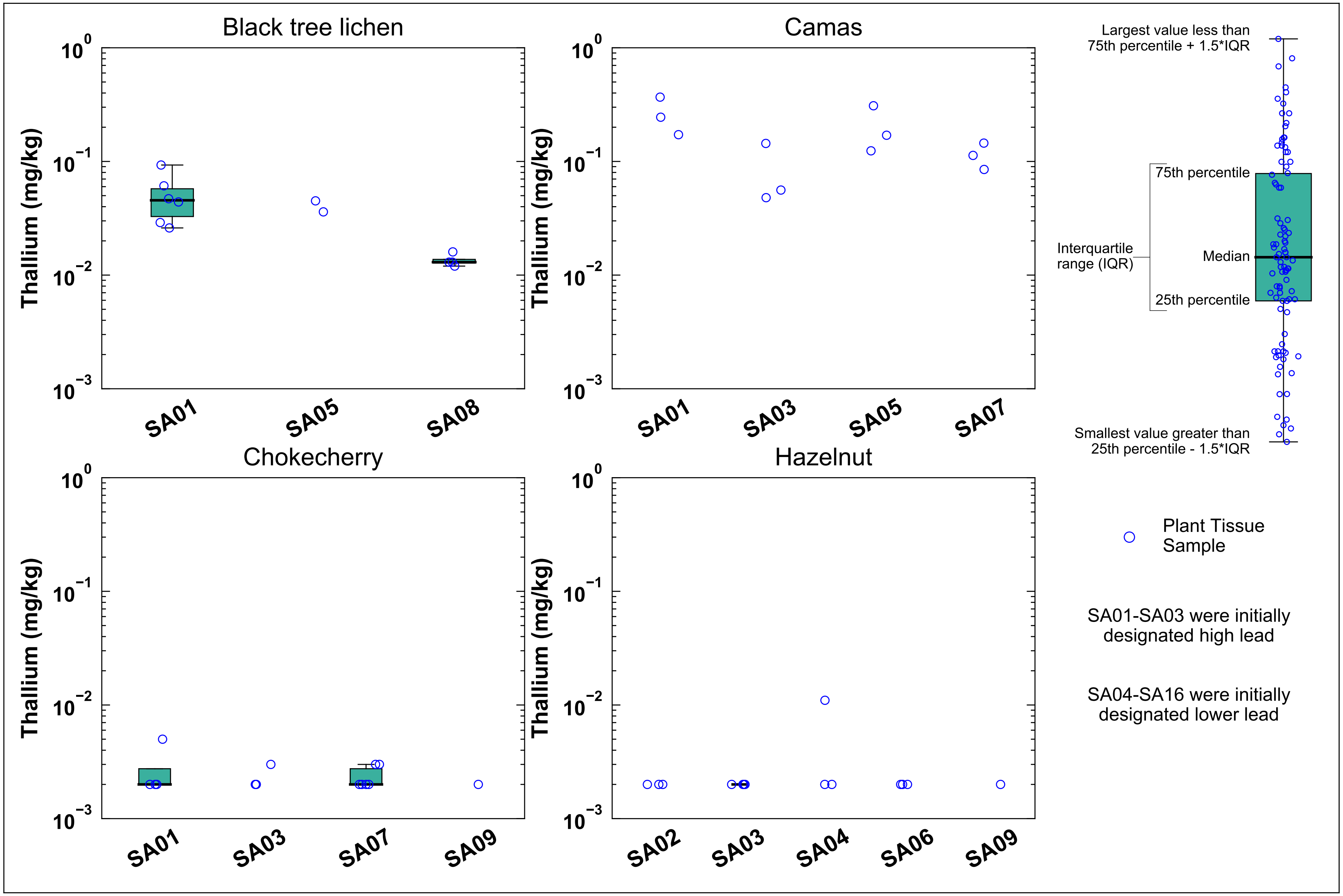


Figure 5-2bk. Thallium Concentrations in Plant Tissue Samples by Sample Area

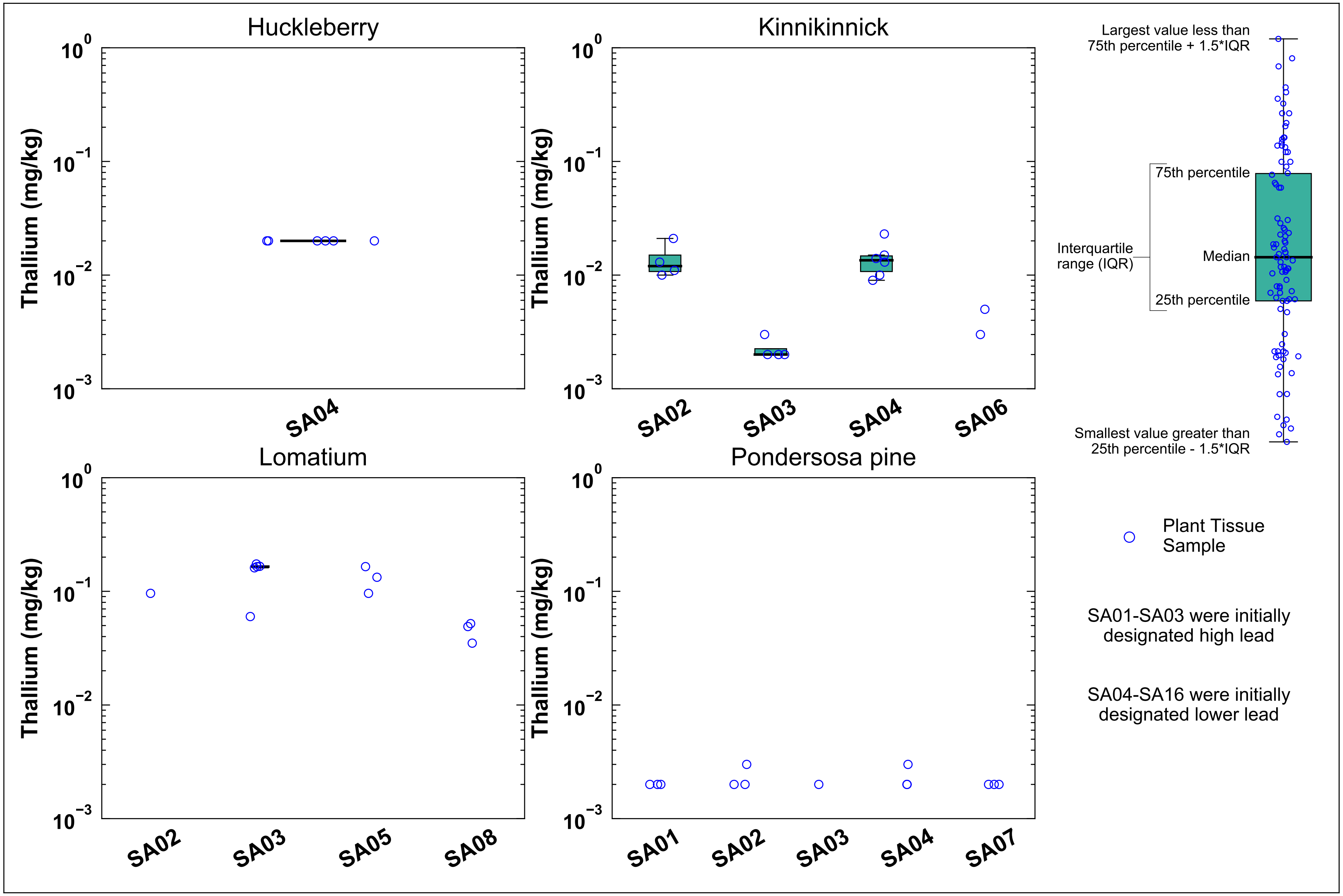


Figure 5-2bl. Thallium Concentrations in Plant Tissue Samples by Sample Area

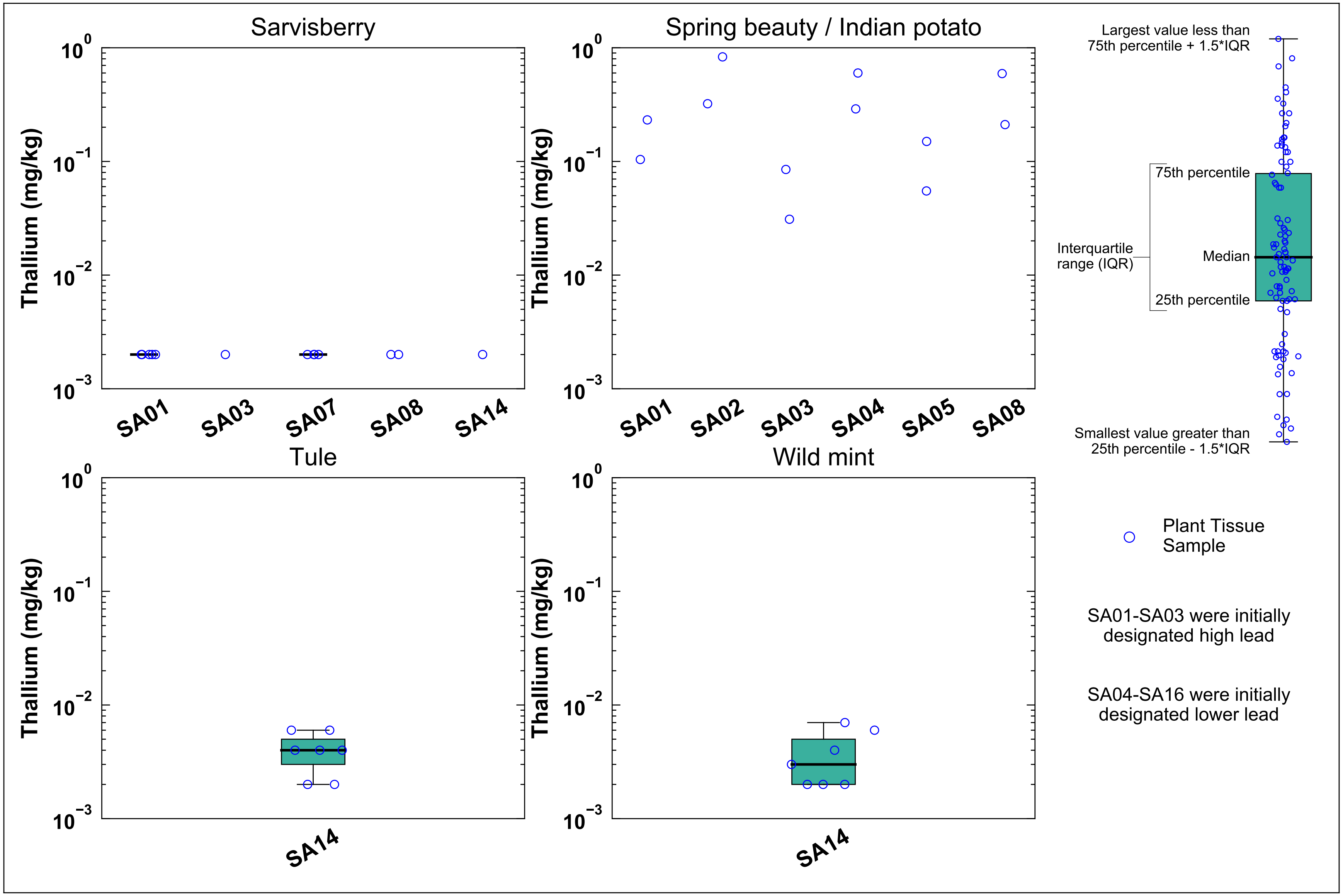


Figure 5-2bm. Thallium Concentrations in Plant Tissue Samples by Sample Area

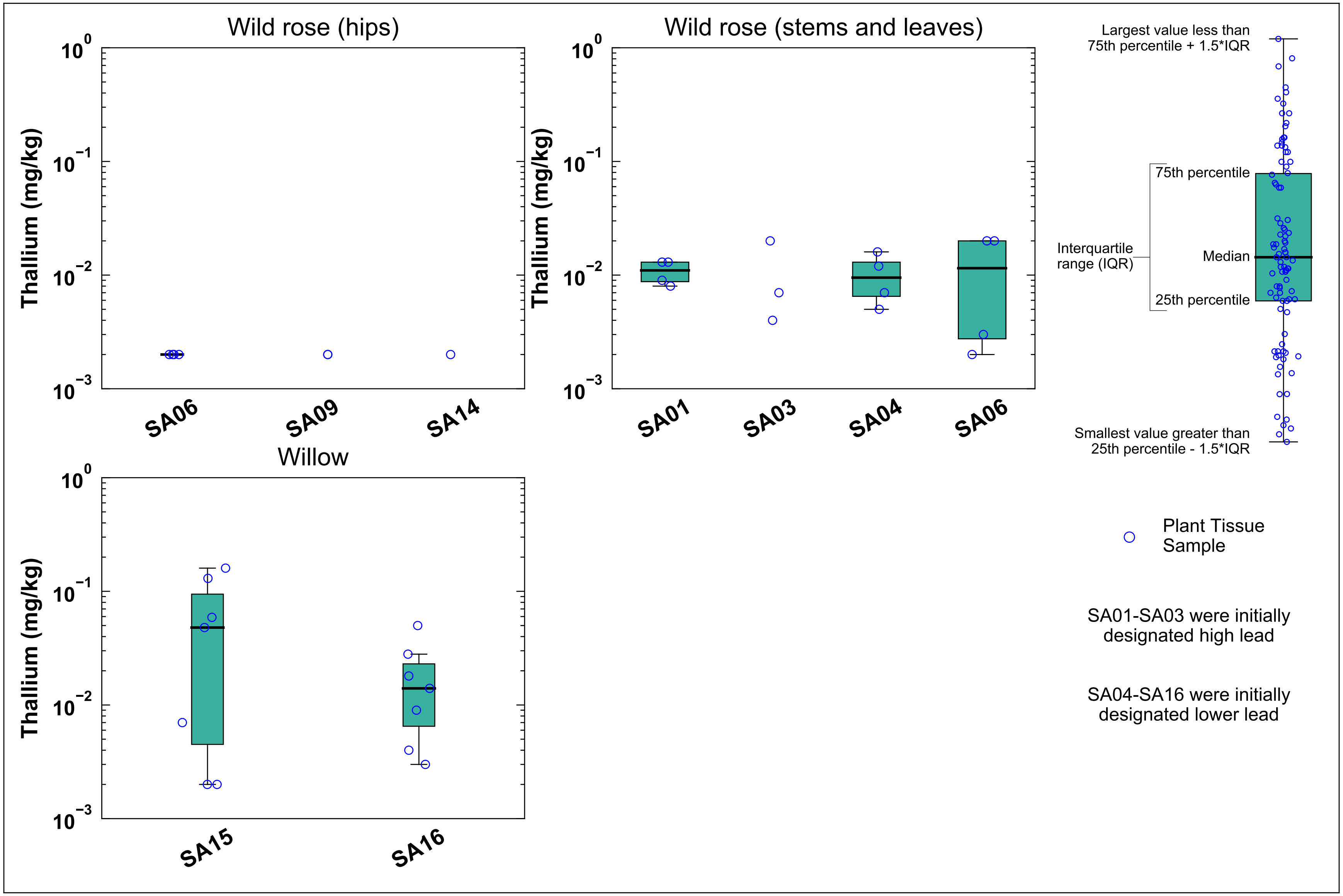


Figure 5-2bn. Thallium Concentrations in Plant Tissue Samples by Sample Area

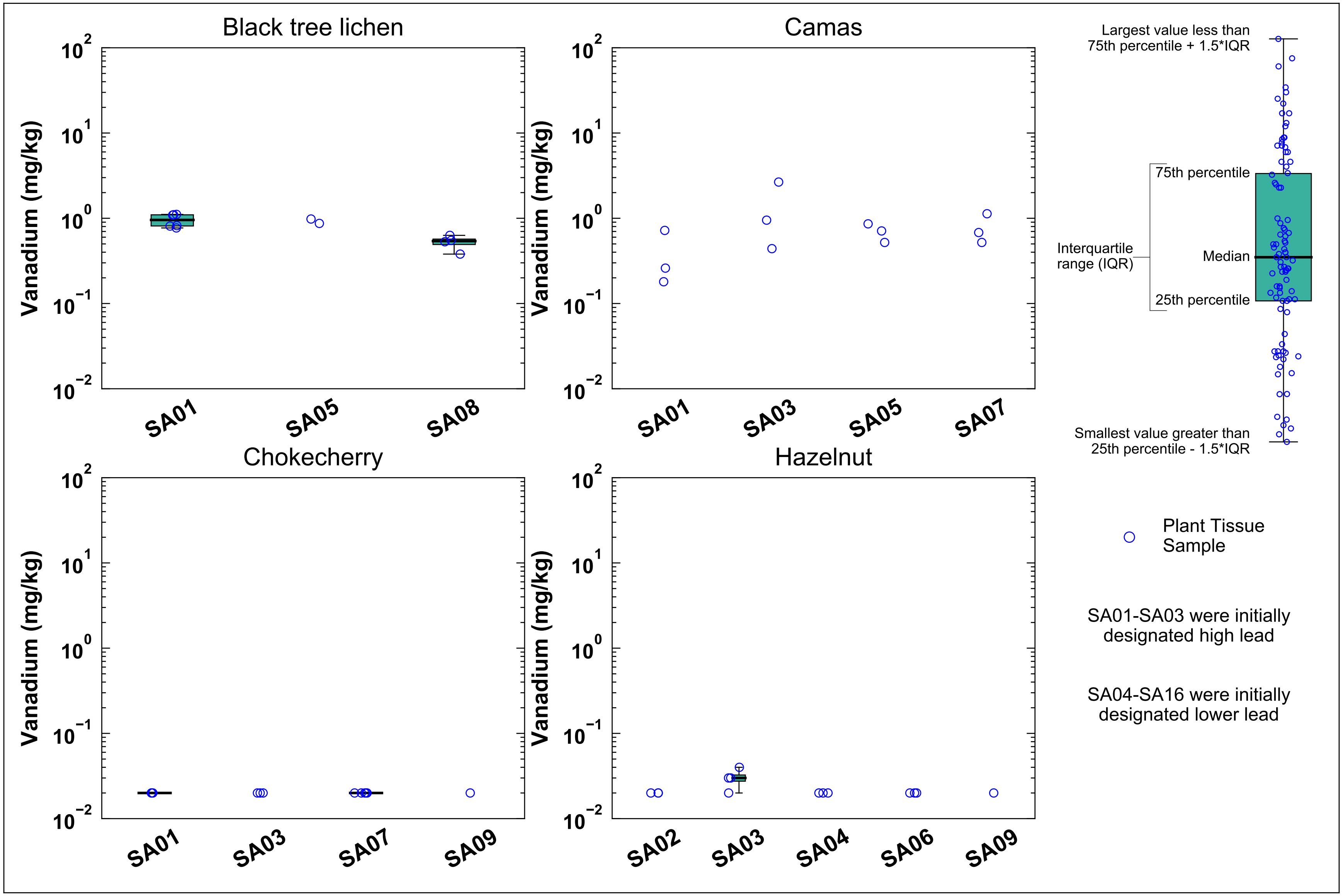


Figure 5-2bo. Vanadium Concentrations in Plant Tissue Samples by Sample Area

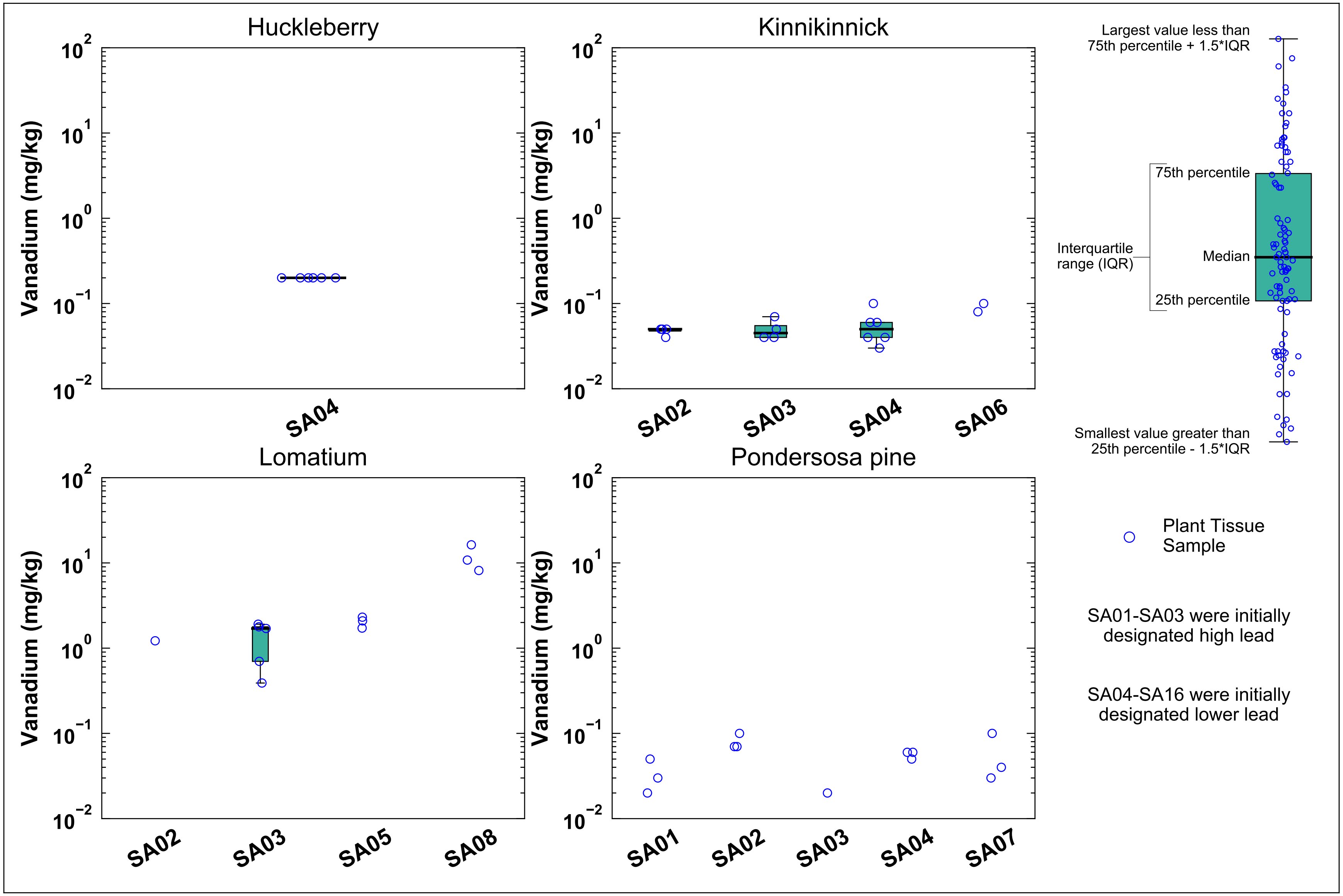


Figure 5-2bp. Vanadium Concentrations in Plant Tissue Samples by Sample Area

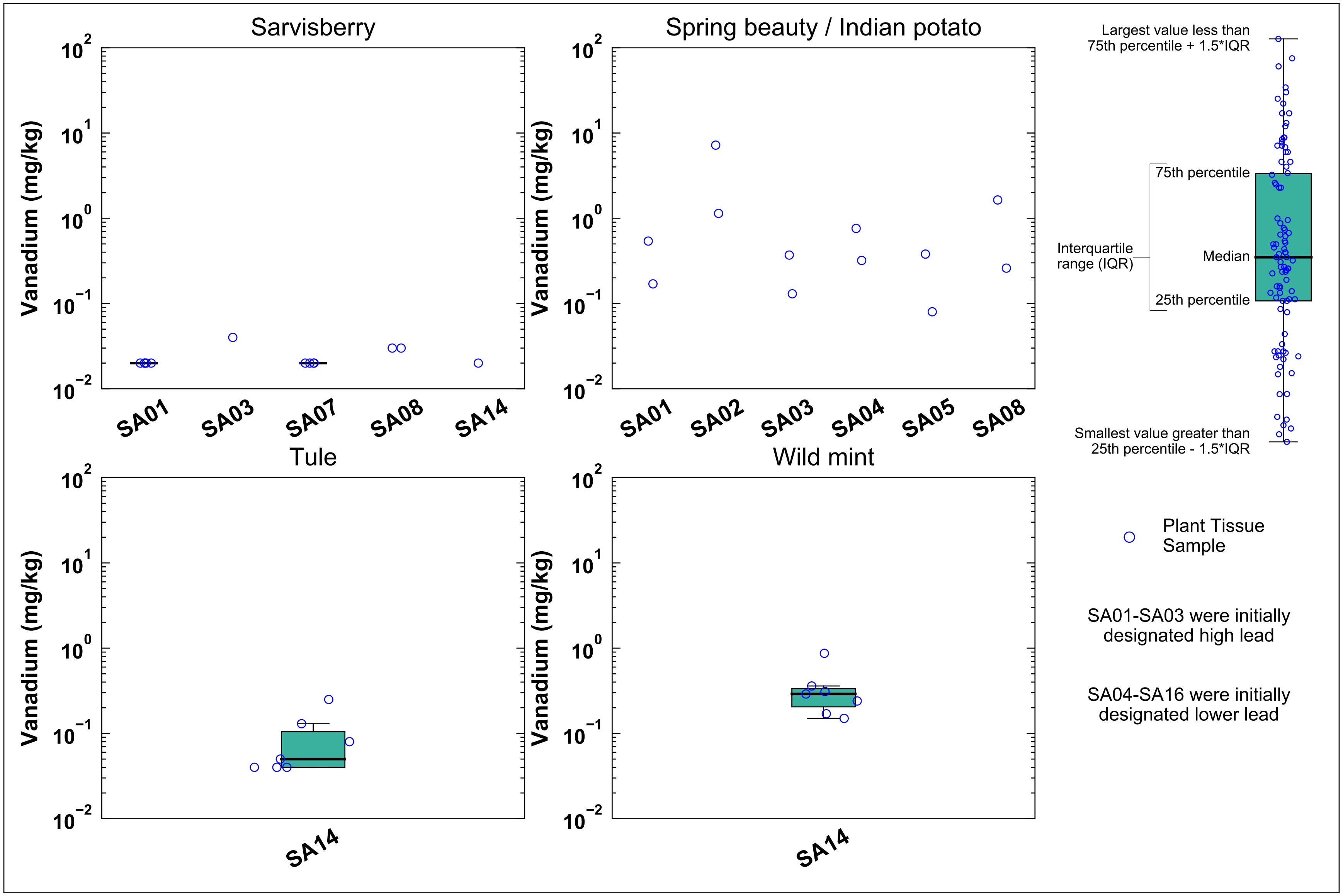


Figure 5-2bq. Vanadium Concentrations in Plant Tissue Samples by Sample Area

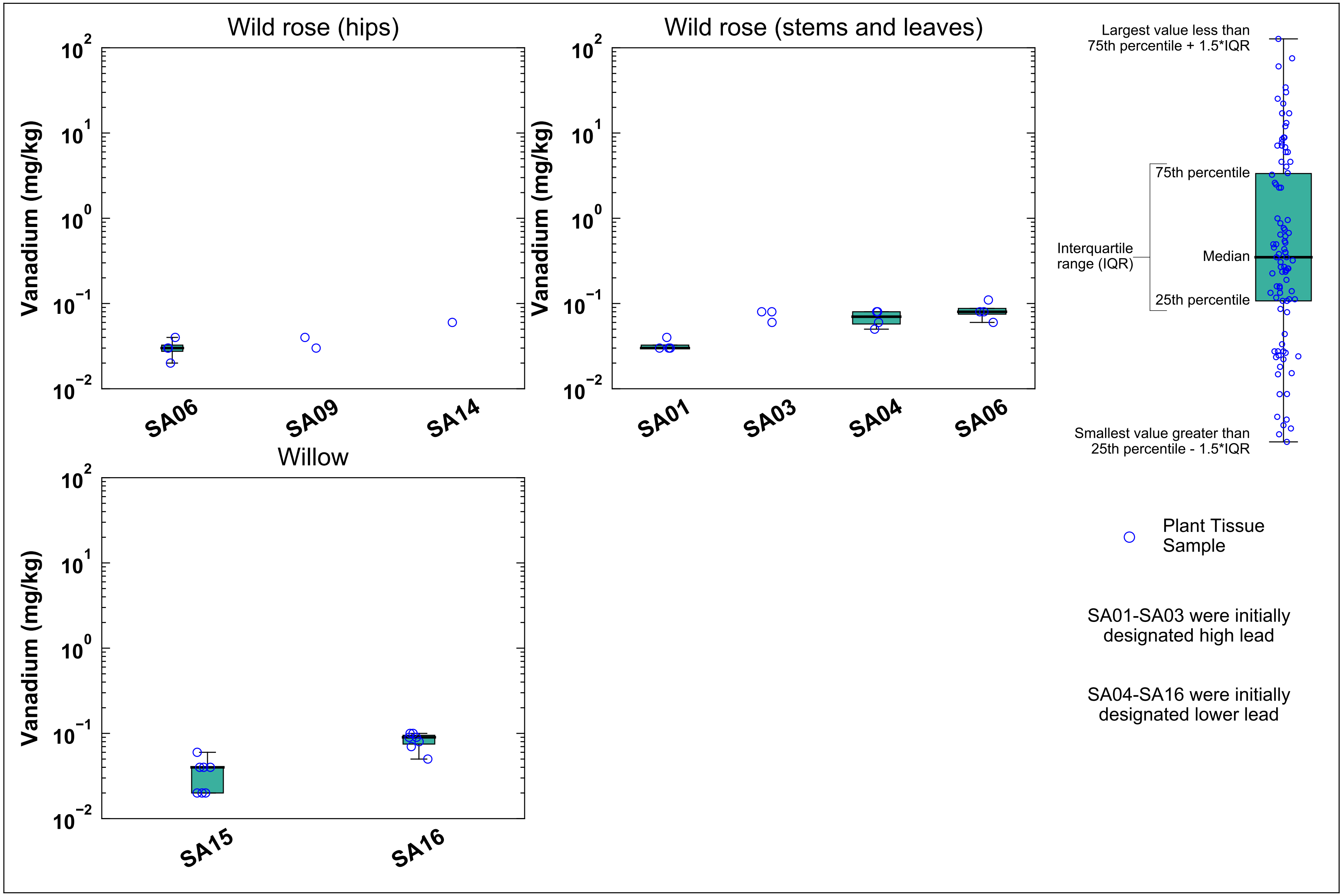


Figure 5-2br. Vanadium Concentrations in Plant Tissue Samples by Sample Area

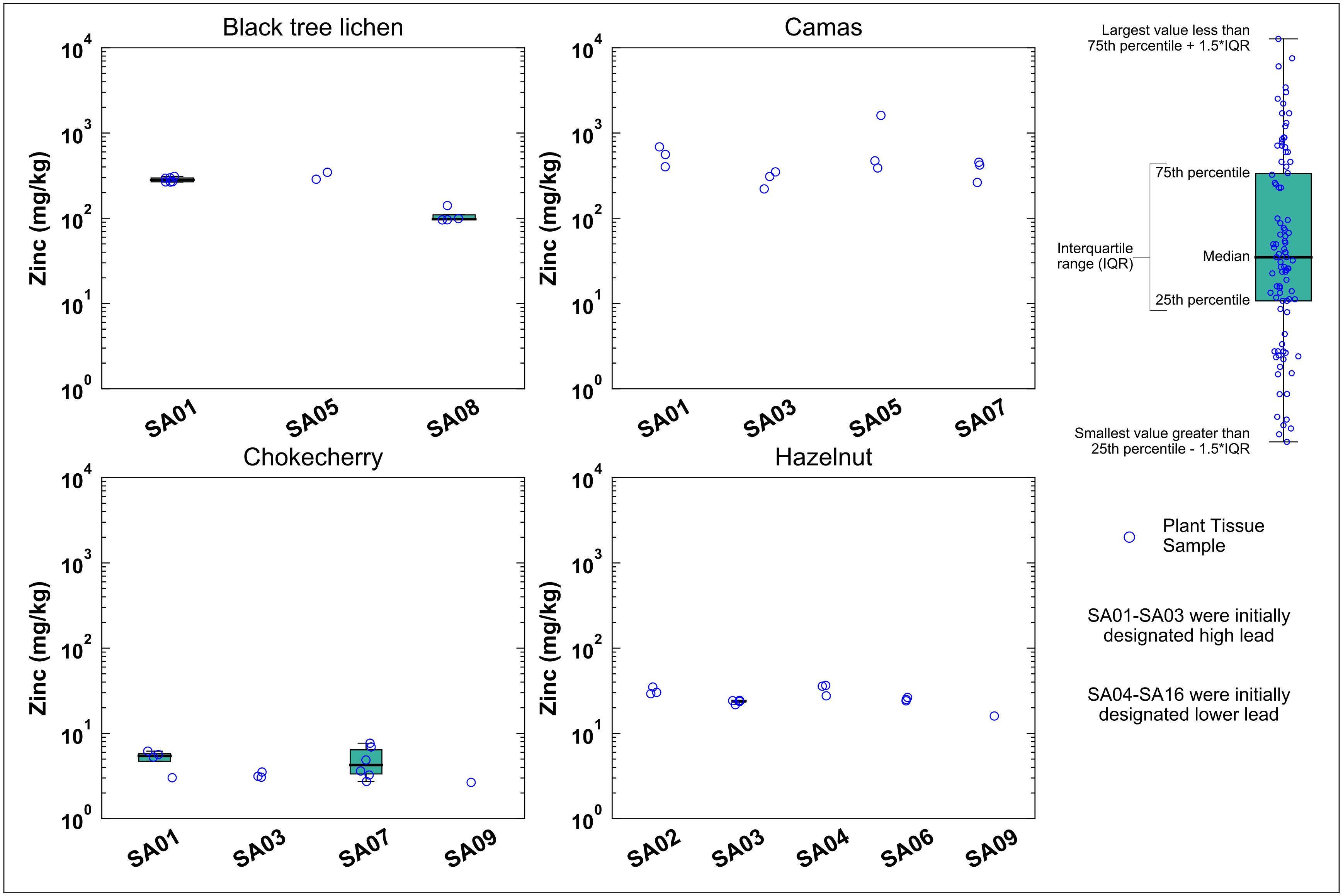


Figure 5-2bs. Zinc Concentrations in Plant Tissue Samples by Sample Area

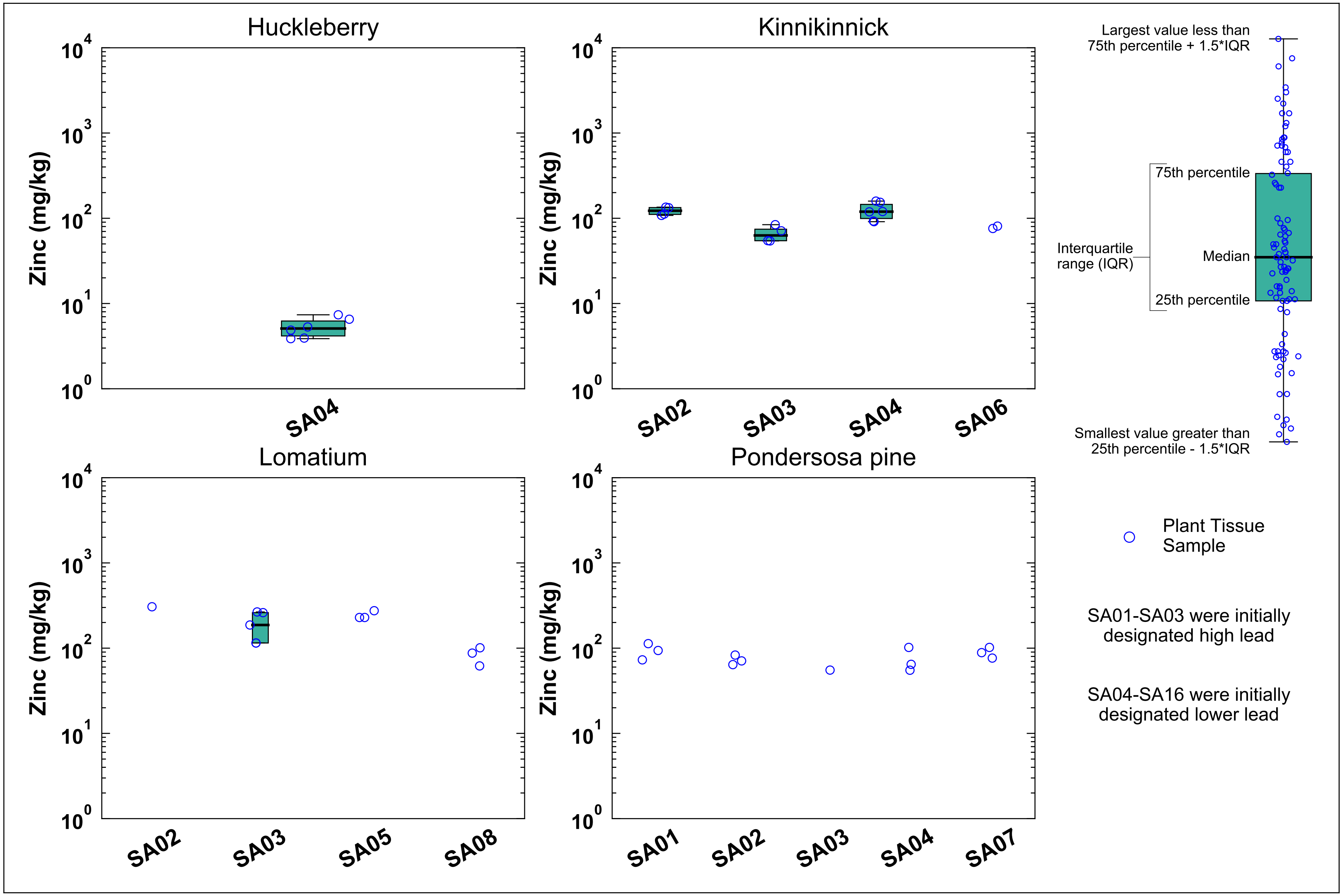


Figure 5-2bt. Zinc Concentrations in Plant Tissue Samples by Sample Area

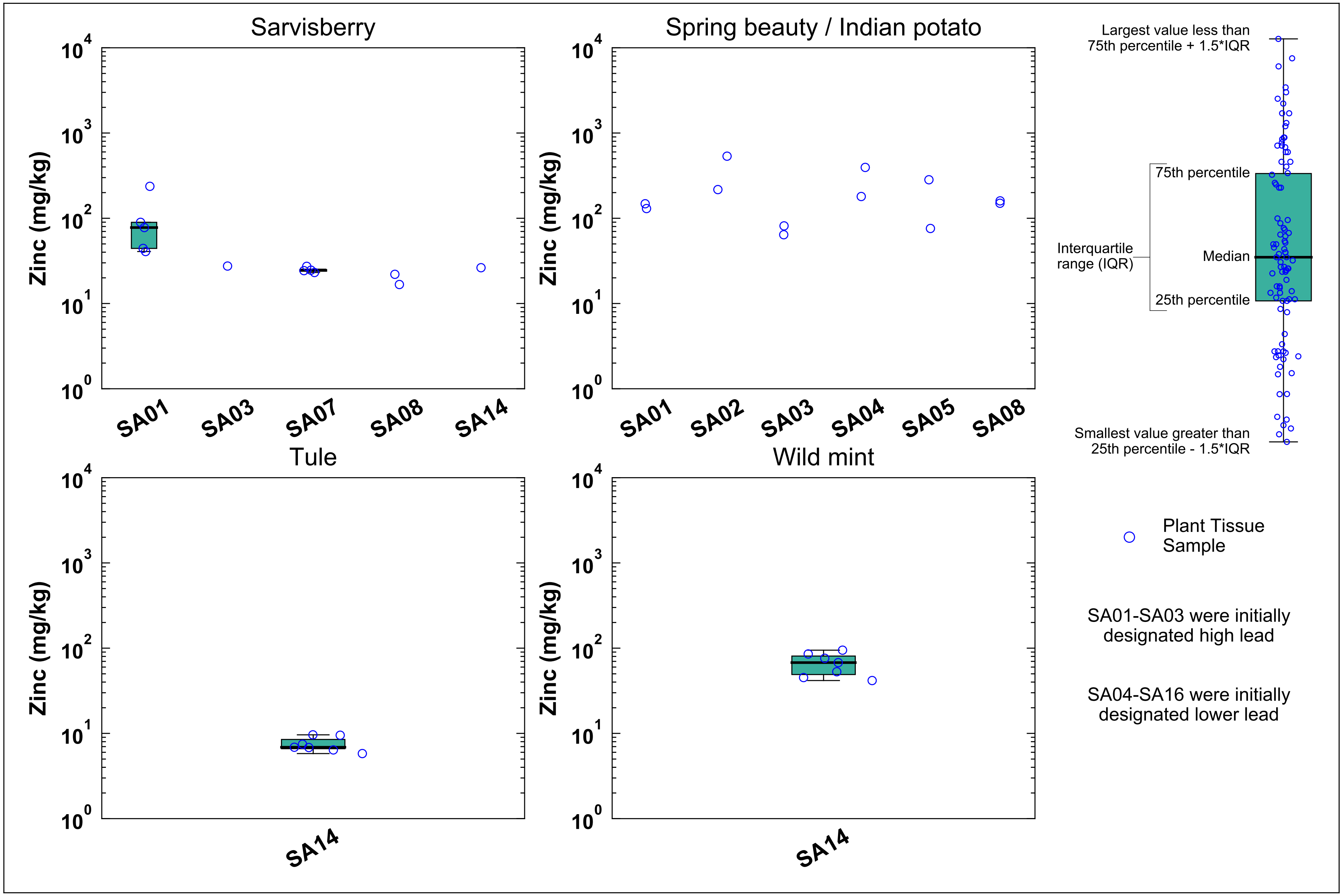


Figure 5-2bu. Zinc Concentrations in Plant Tissue Samples by Sample Area

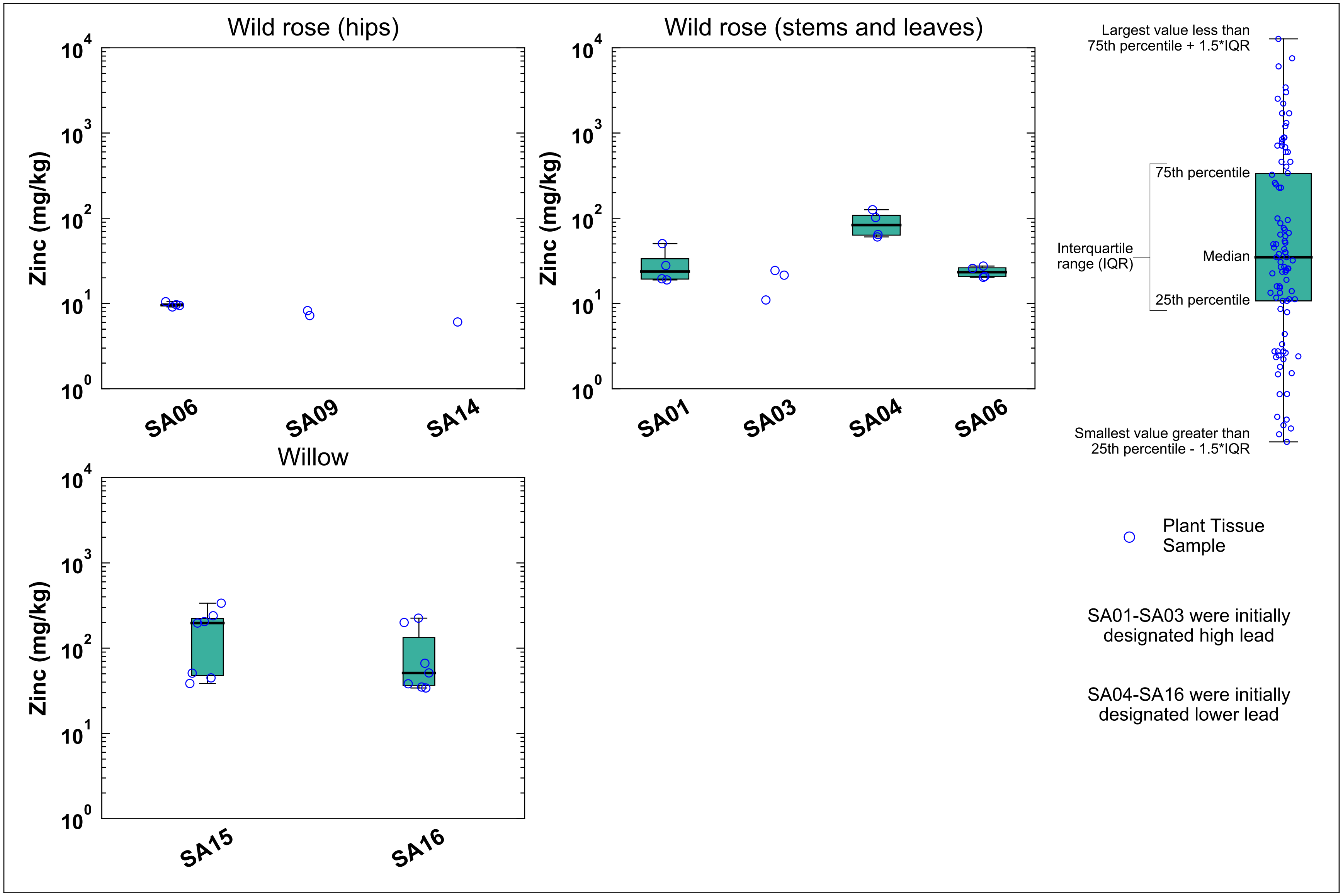


Figure 5-2bv. Zinc Concentrations in Plant Tissue Samples by Sample Area

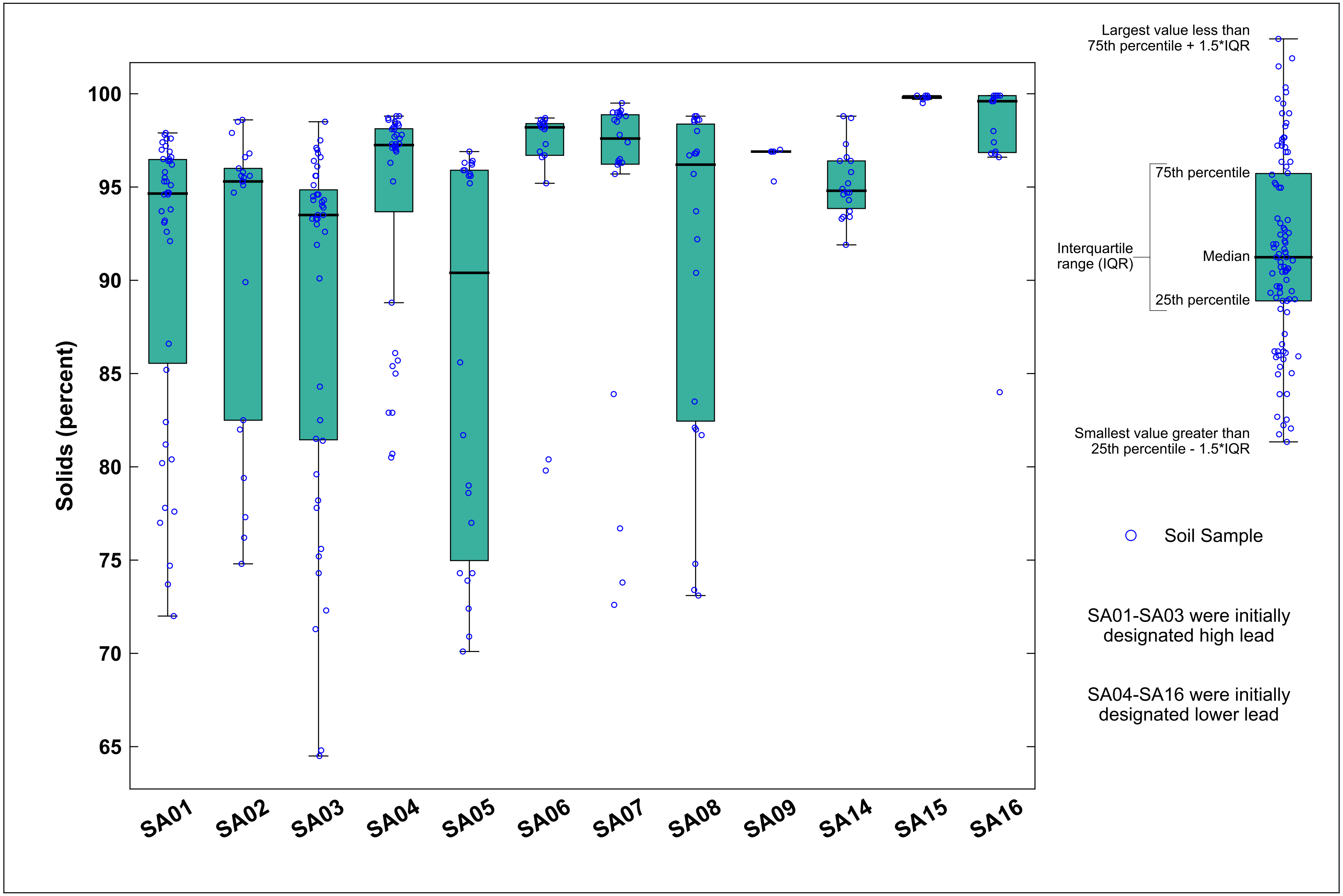


Figure 5-3. Percent Solids in Soil Samples by Sample Area

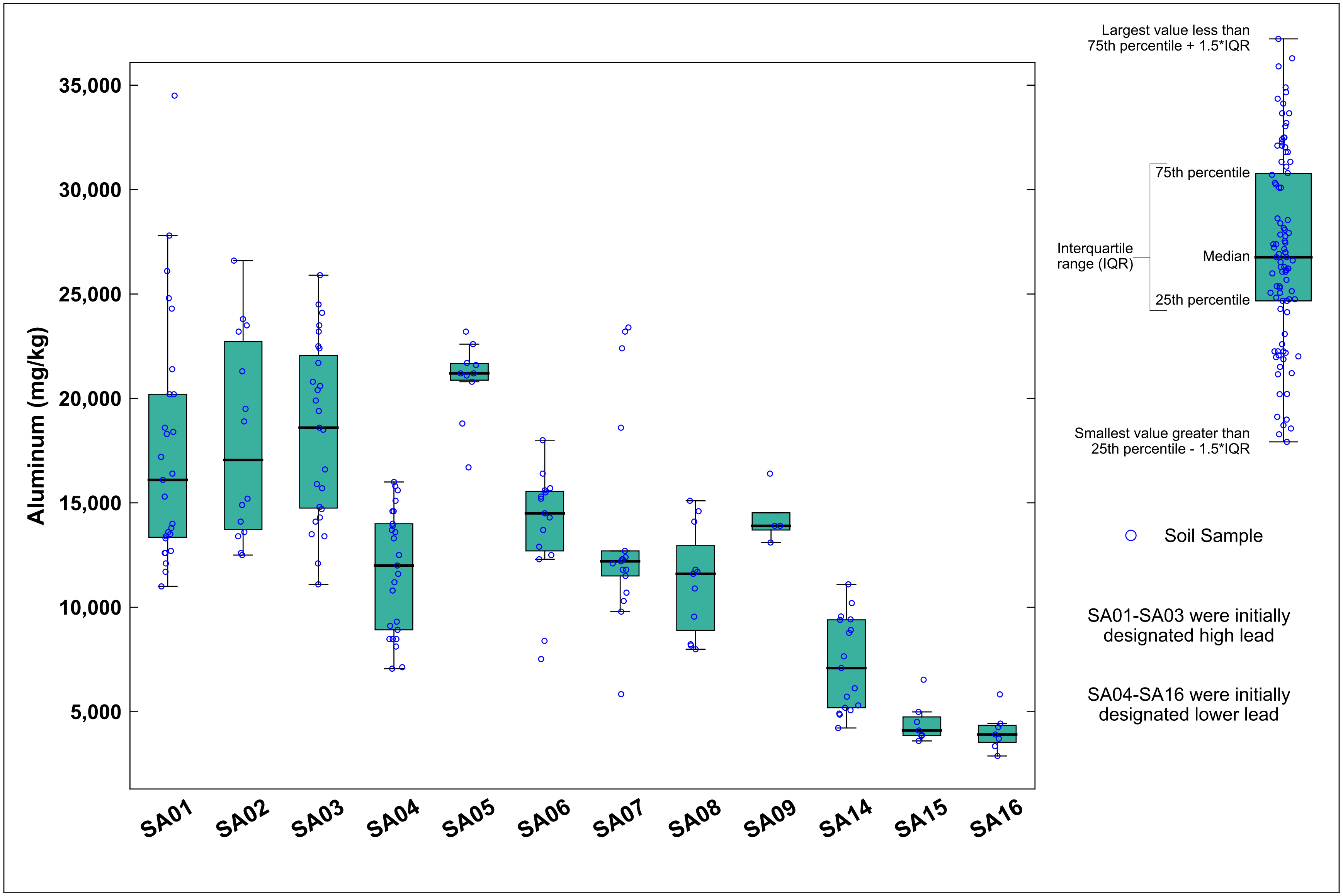


Figure 5-4a. Aluminum Concentrations in Soil Samples by Sample Area

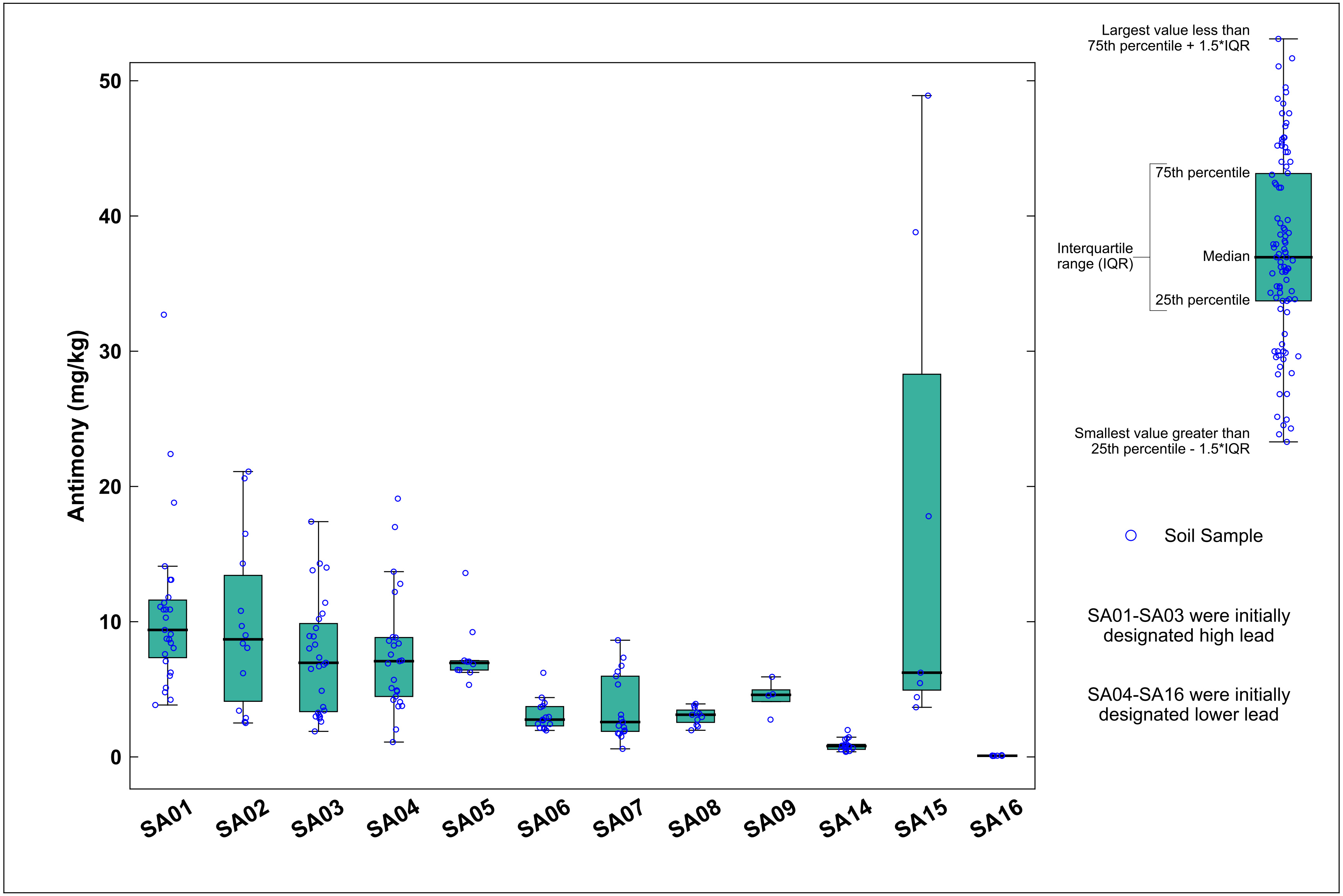


Figure 5-4b. Antimony Concentrations in Soil Samples by Sample Area

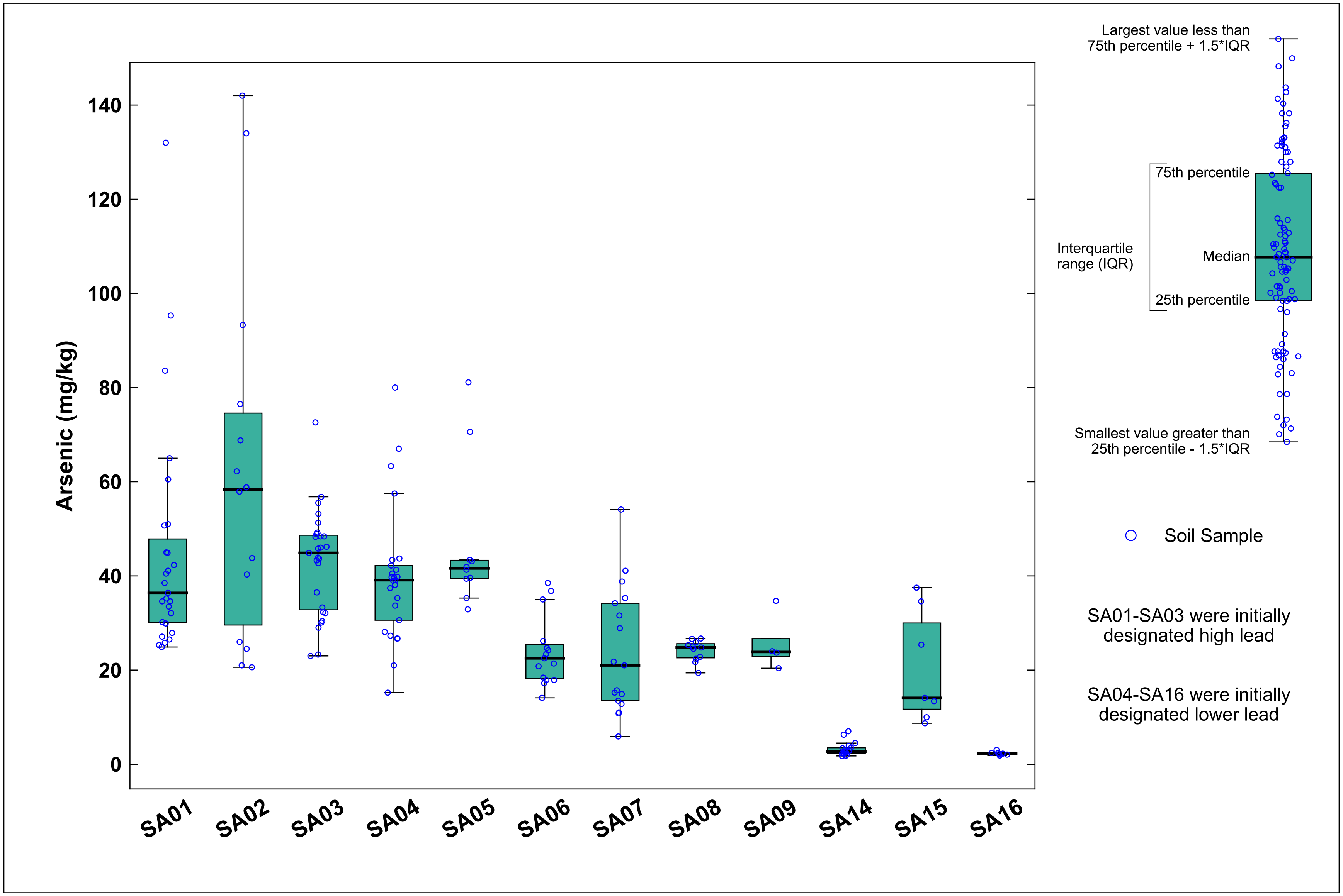


Figure 5-4c. Arsenic Concentrations in Soil Samples by Sample Area

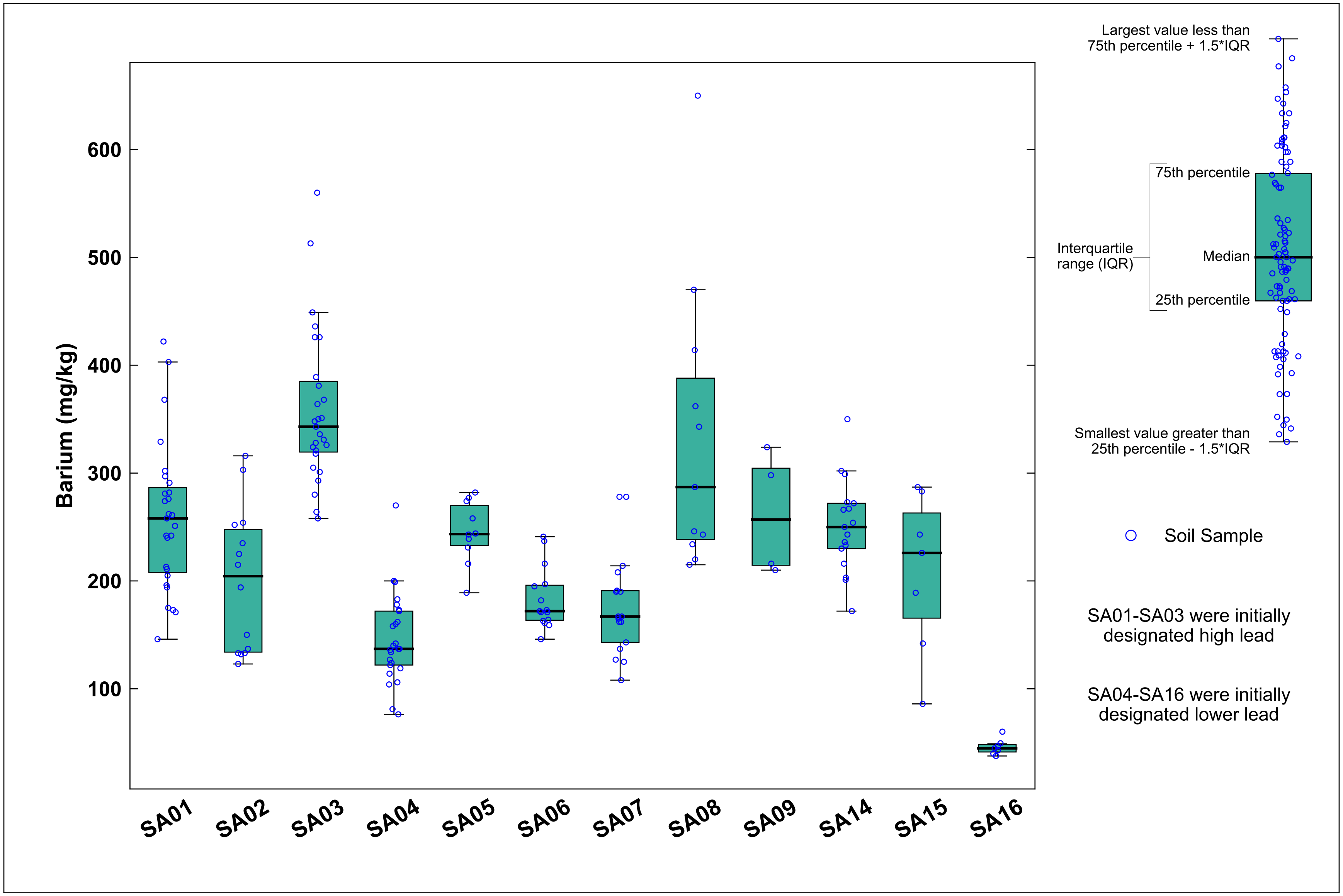


Figure 5-4d. Barium Concentrations in Soil Samples by Sample Area

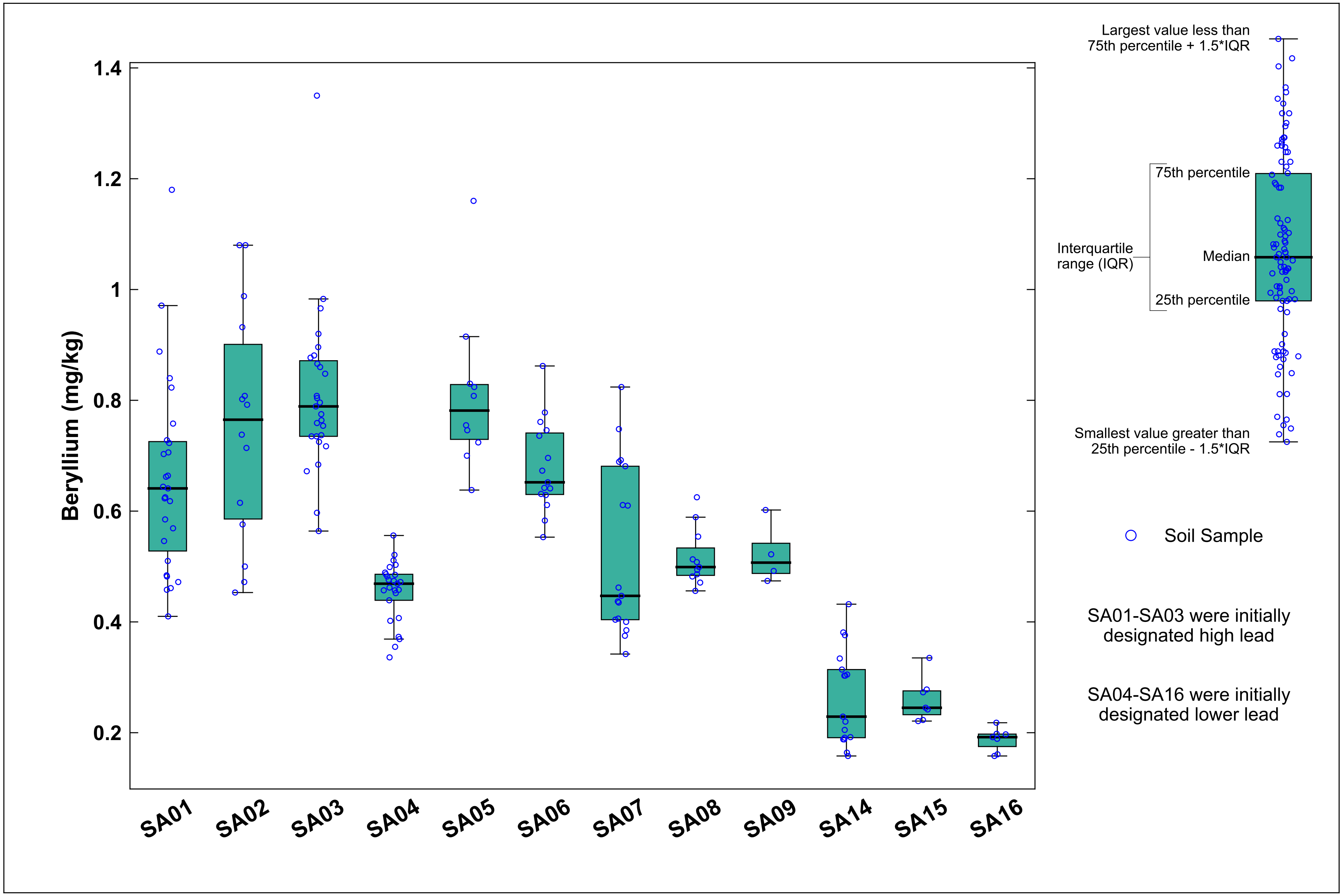


Figure 5-4e. Beryllium Concentrations in Soil Samples by Sample Area

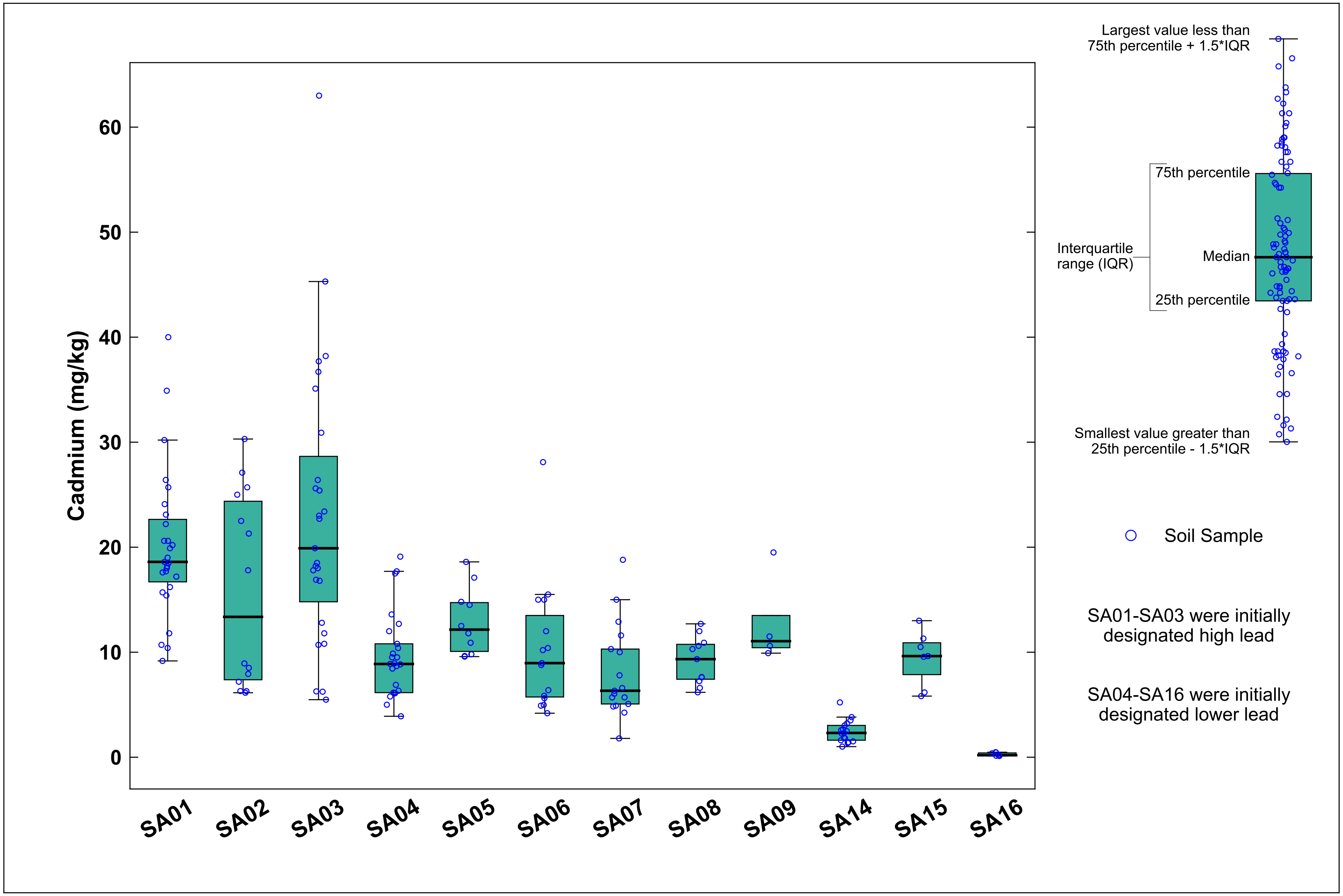


Figure 5-4f. Cadmium Concentrations in Soil Samples by Sample Area

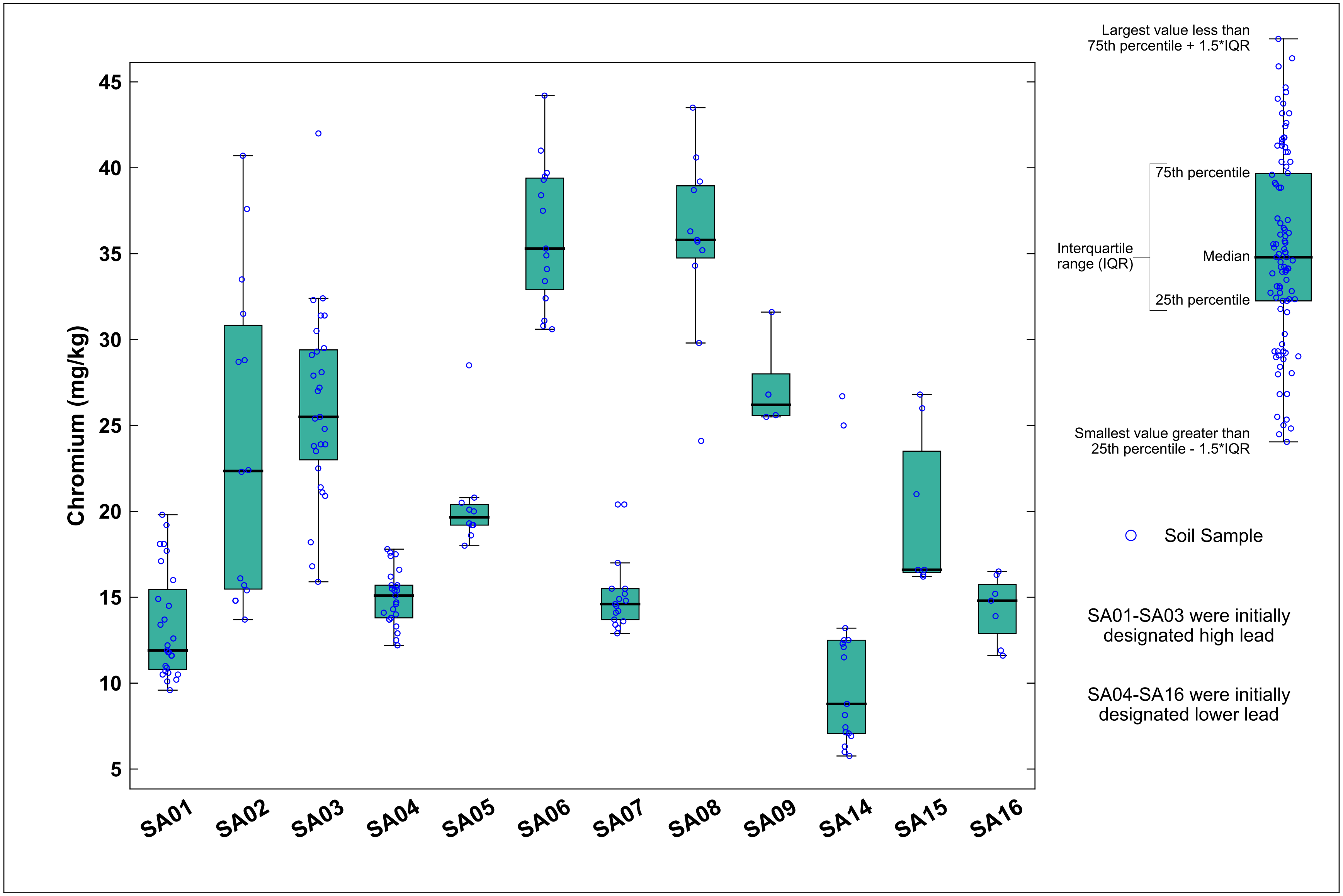


Figure 5-4g. Chromium Concentrations in Soil Samples by Sample Area

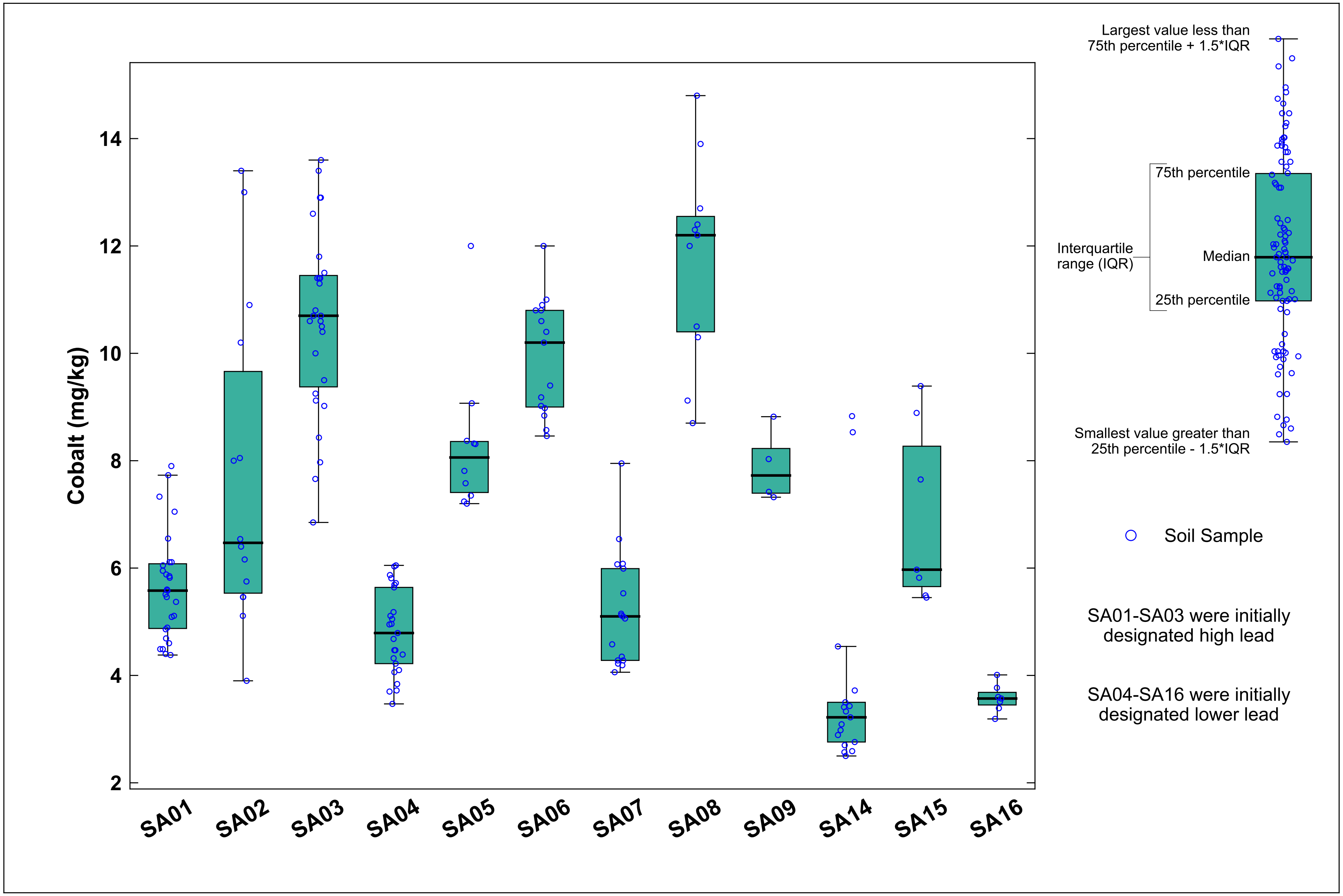


Figure 5-4h. Cobalt Concentrations in Soil Samples by Sample Area

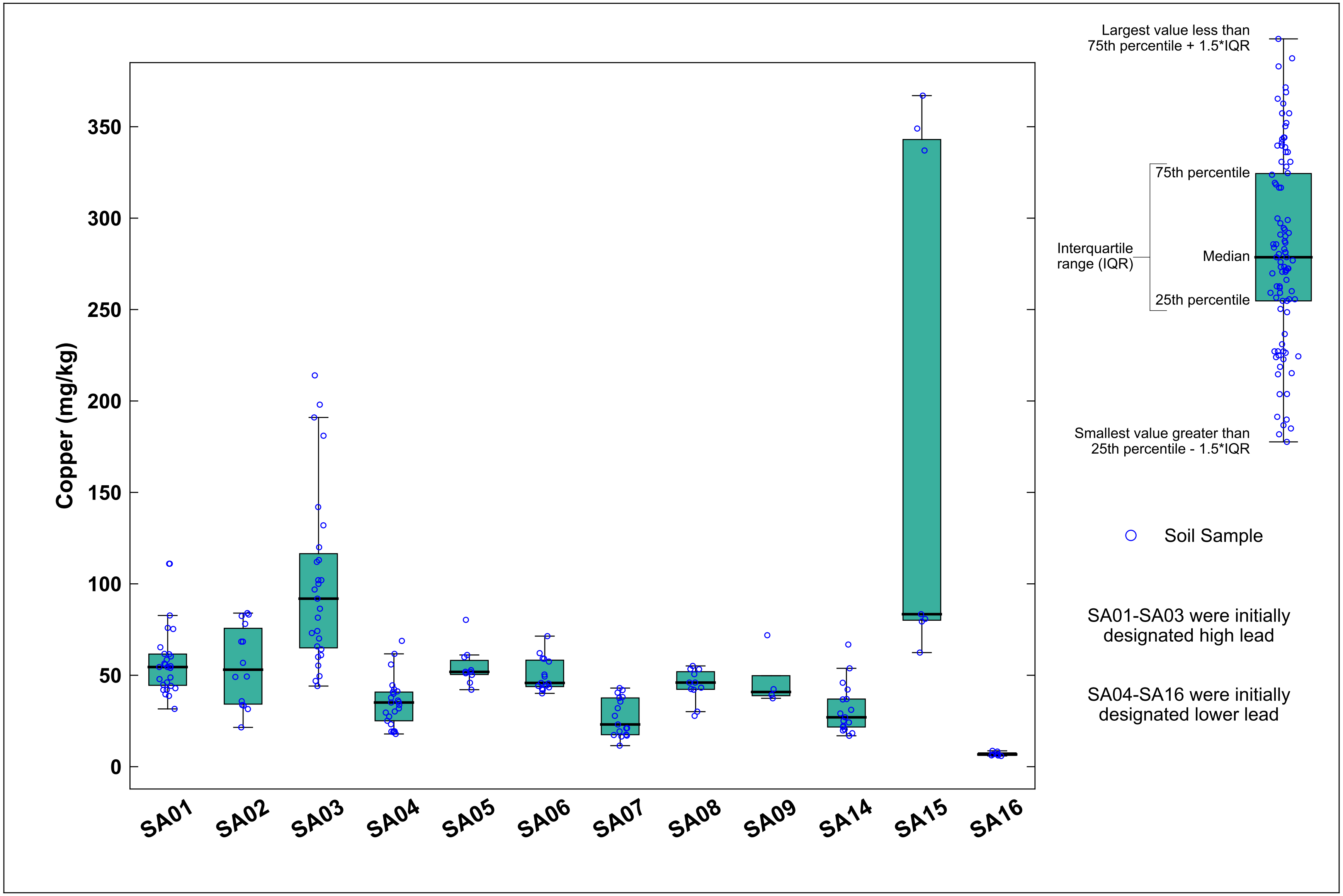


Figure 5-4i. Copper Concentrations in Soil Samples by Sample Area

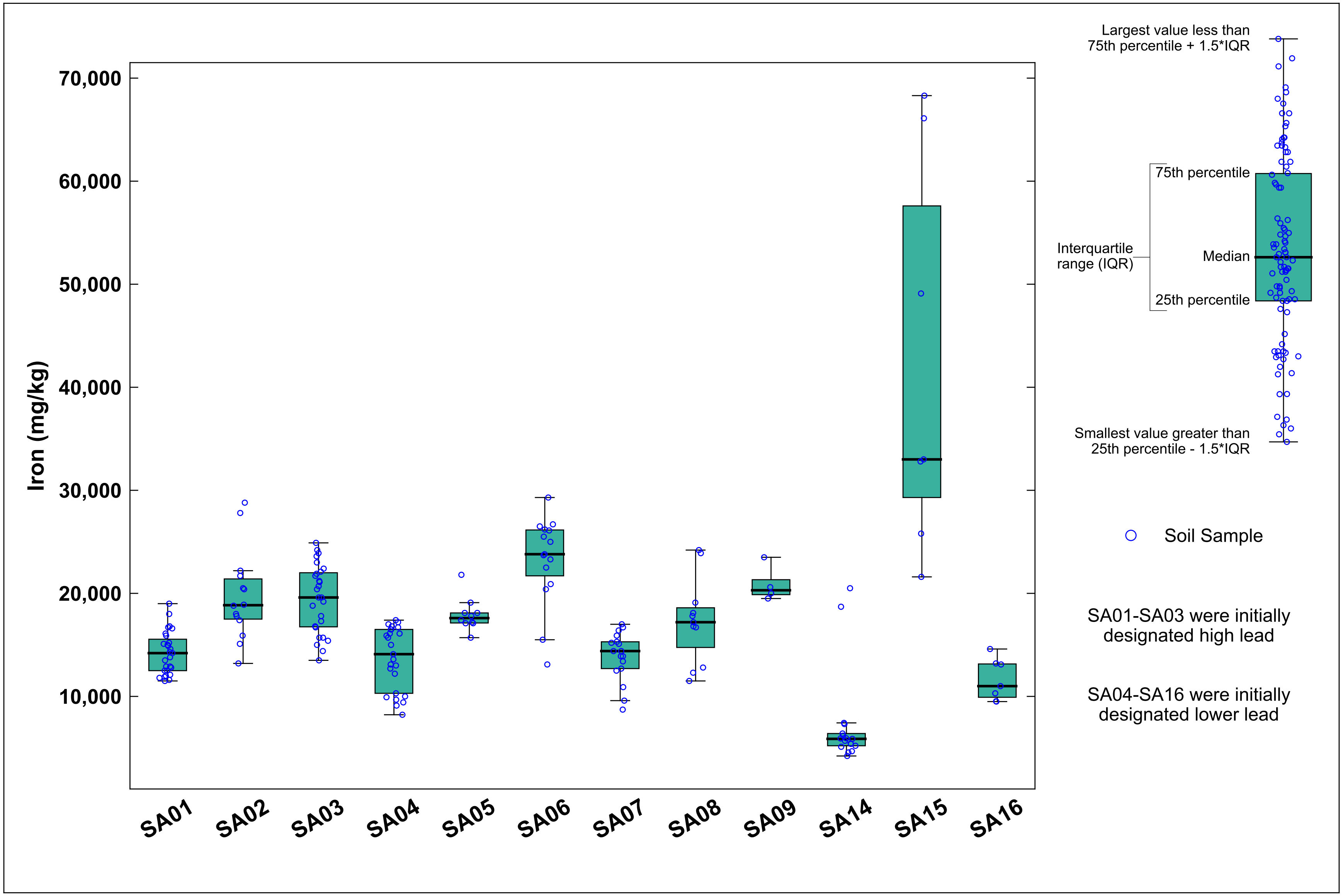


Figure 5-4j. Iron Concentrations in Soil Samples by Sample Area

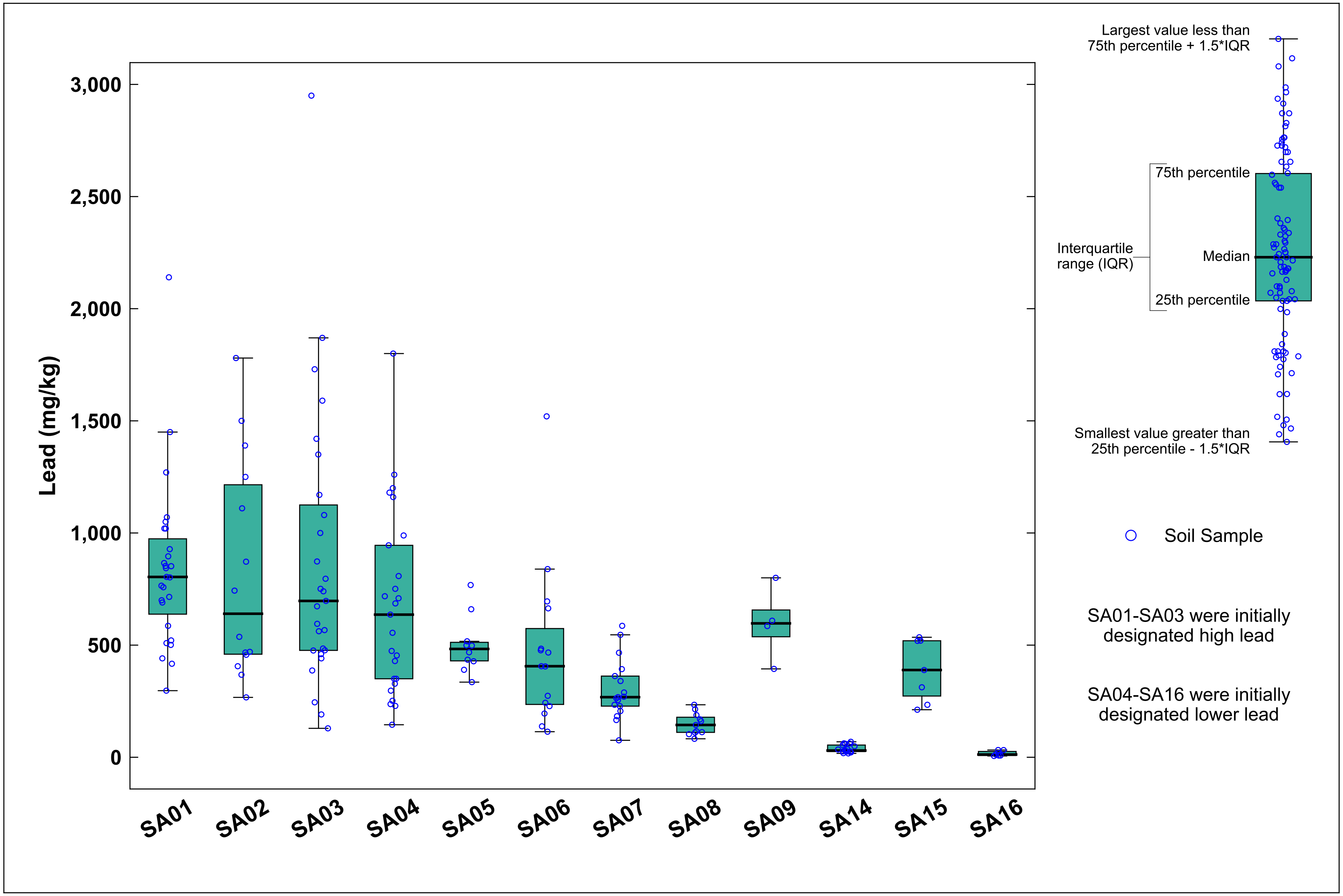


Figure 5-4k. Lead Concentrations in Soil Samples by Sample Area

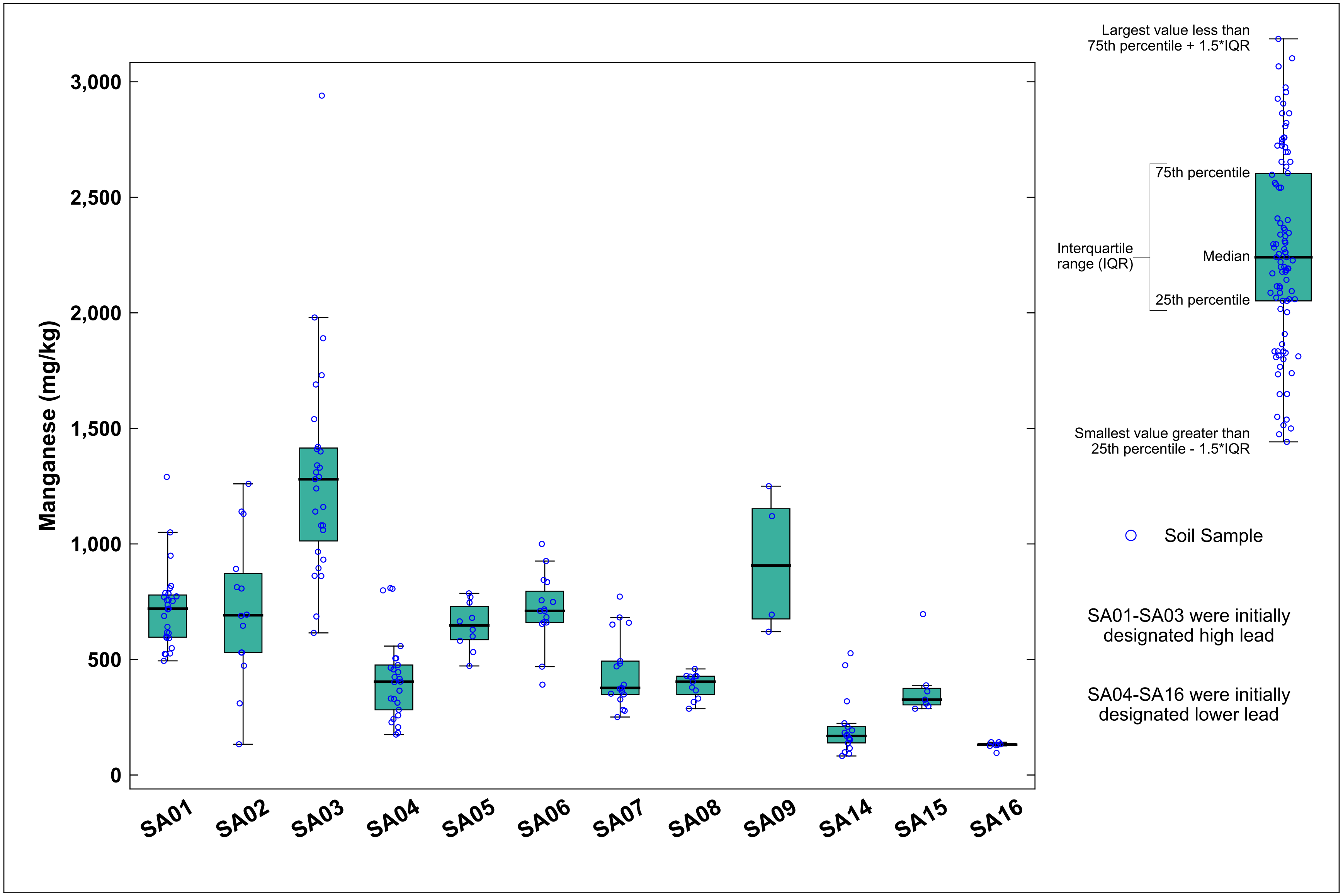
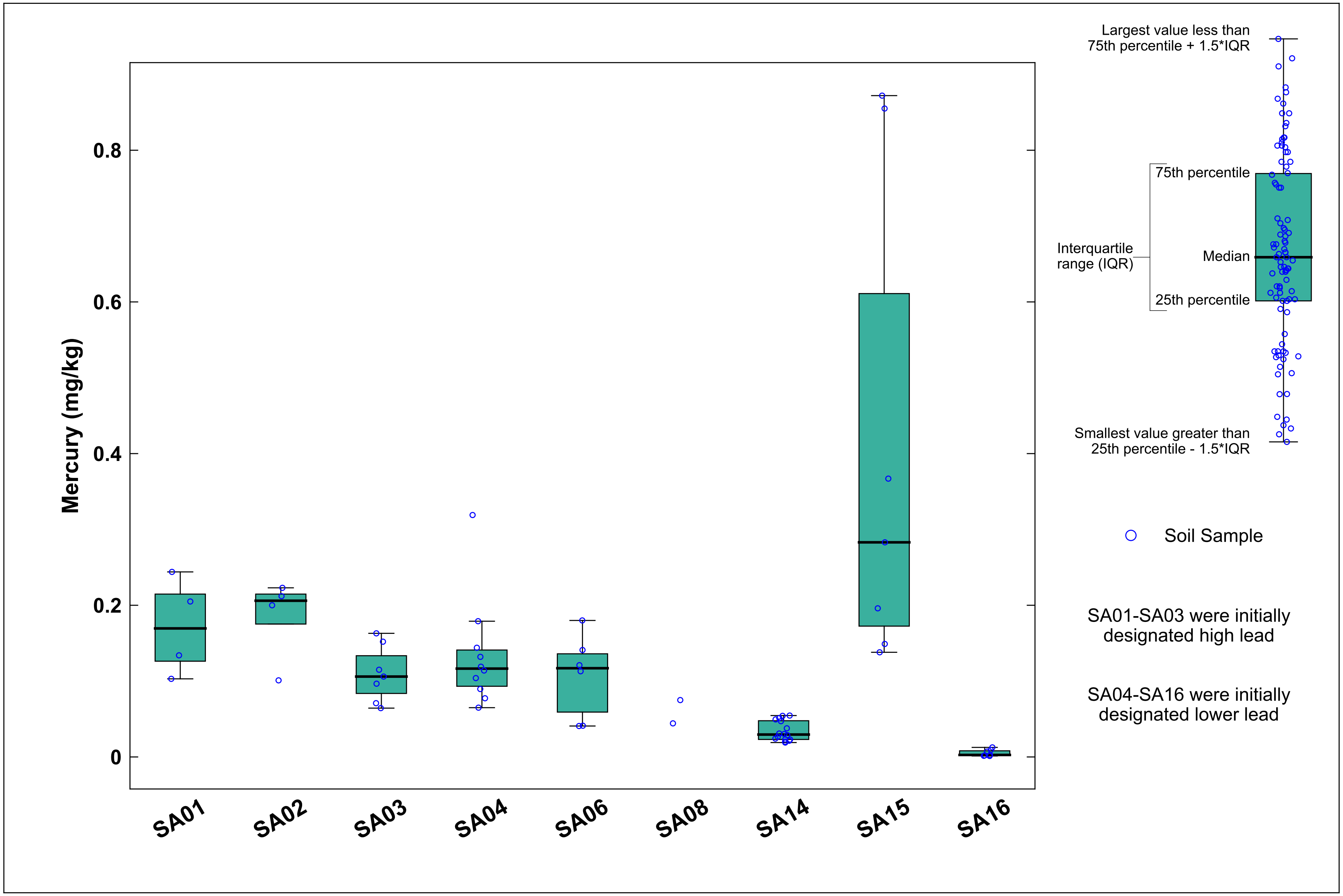


Figure 5-4l. Manganese Concentrations in Soil Samples by Sample Area



Note:

Mercury units were converted to mg/kg from ng/g values reported by ALS

Figure 5-4m. Mercury Concentrations in Soil Samples by Sample Area

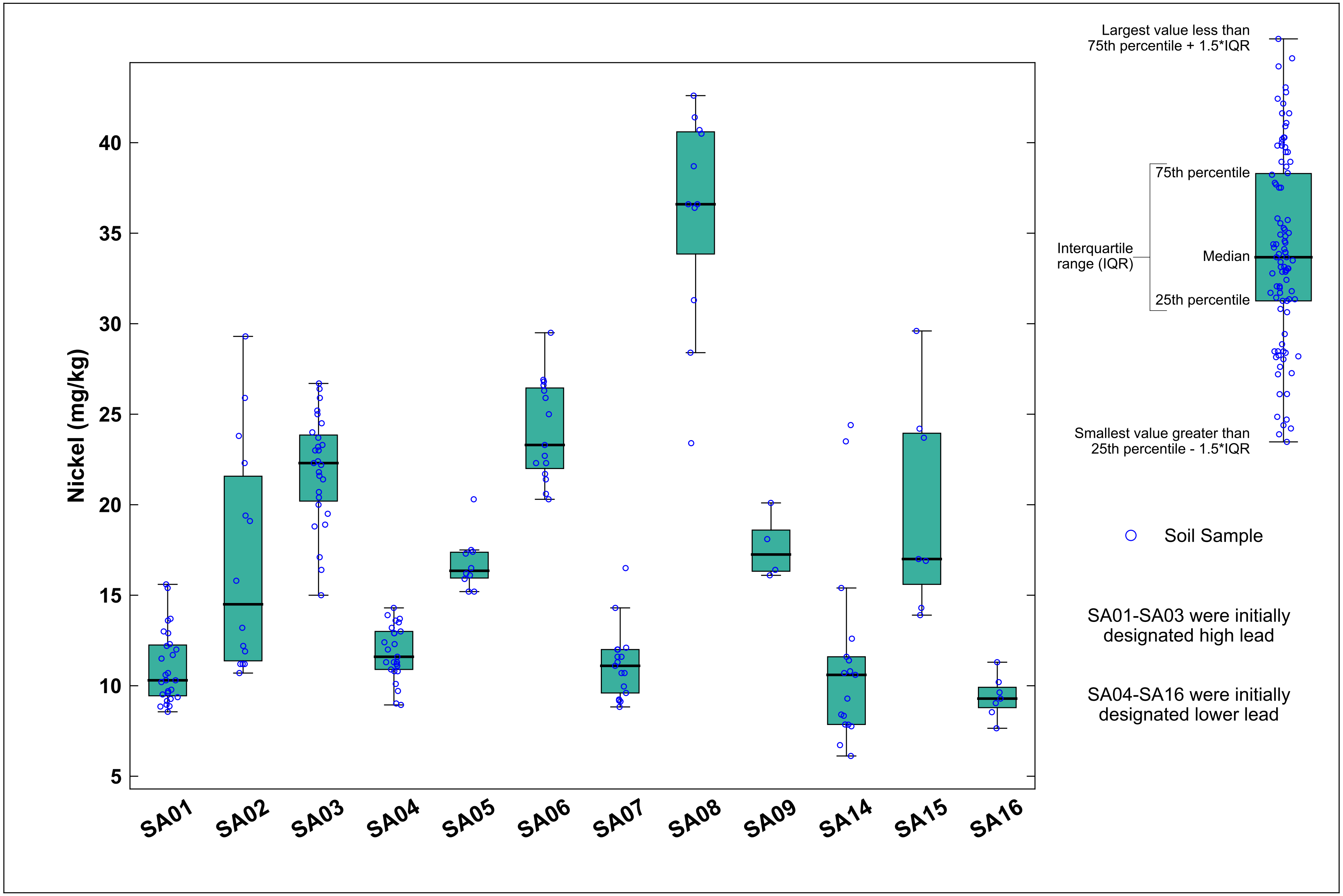


Figure 5-4n. Nickel Concentrations in Soil Samples by Sample Area

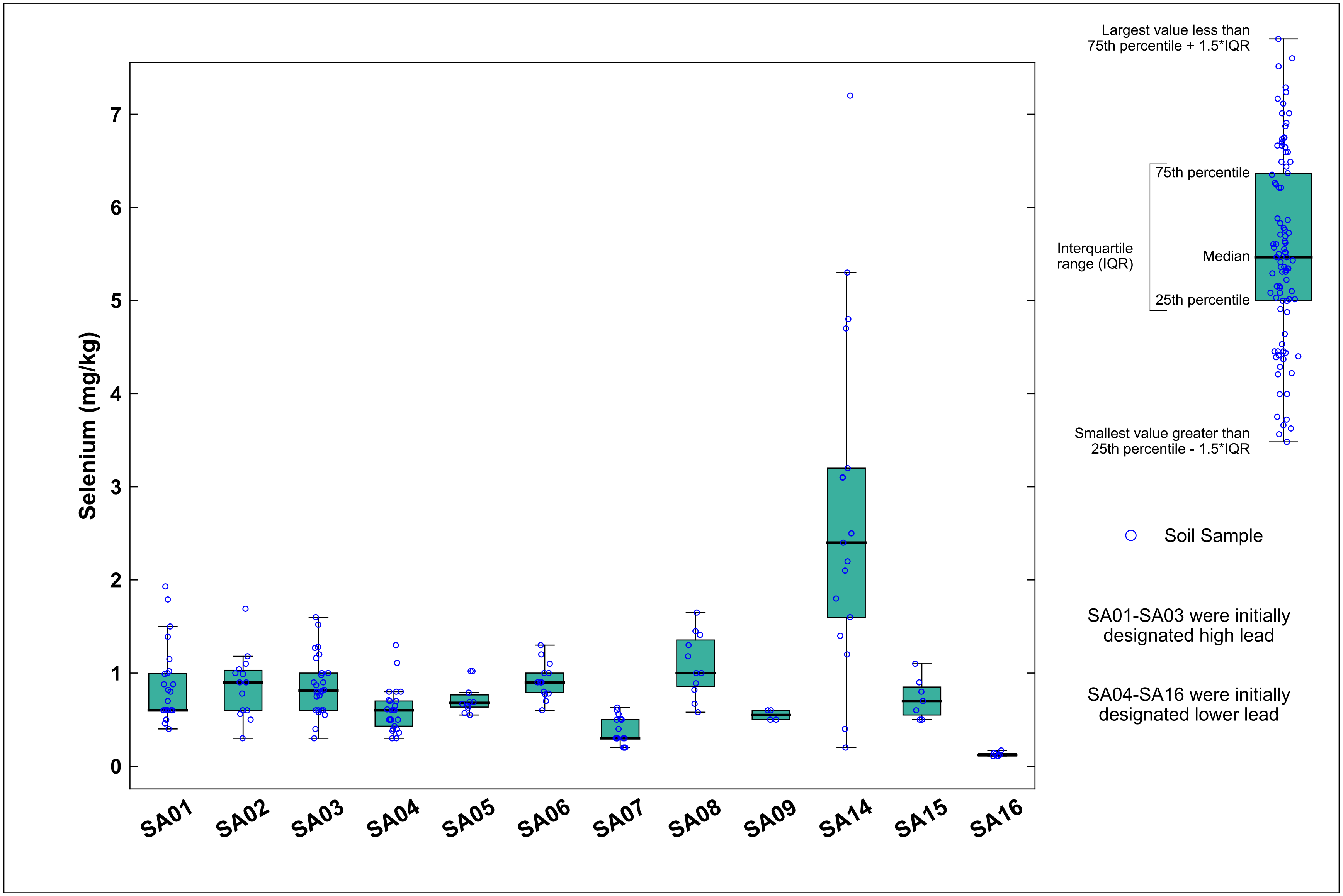


Figure 5-4o. Selenium Concentrations in Soil Samples by Sample Area

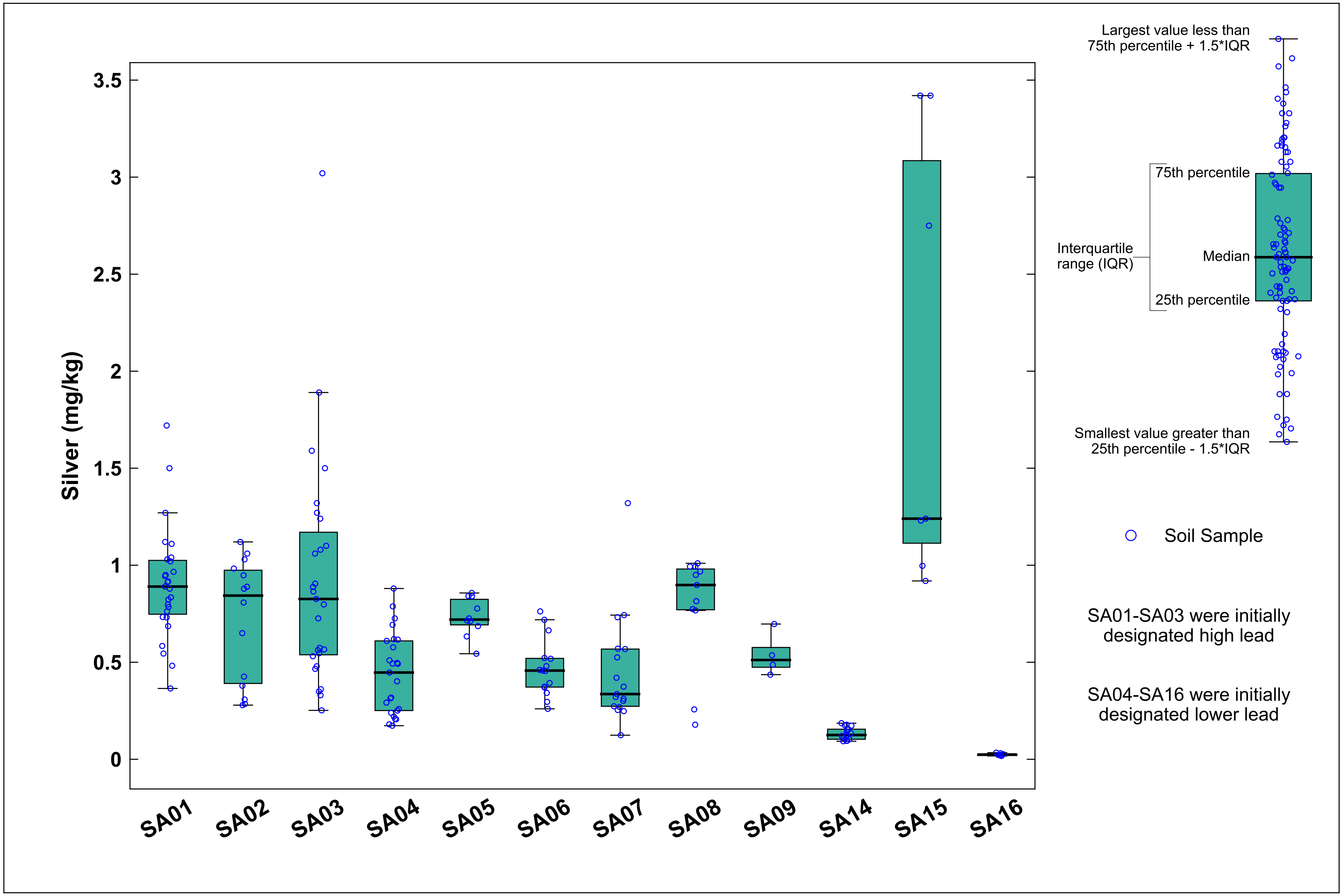


Figure 5-4p. Silver Concentrations in Soil Samples by Sample Area

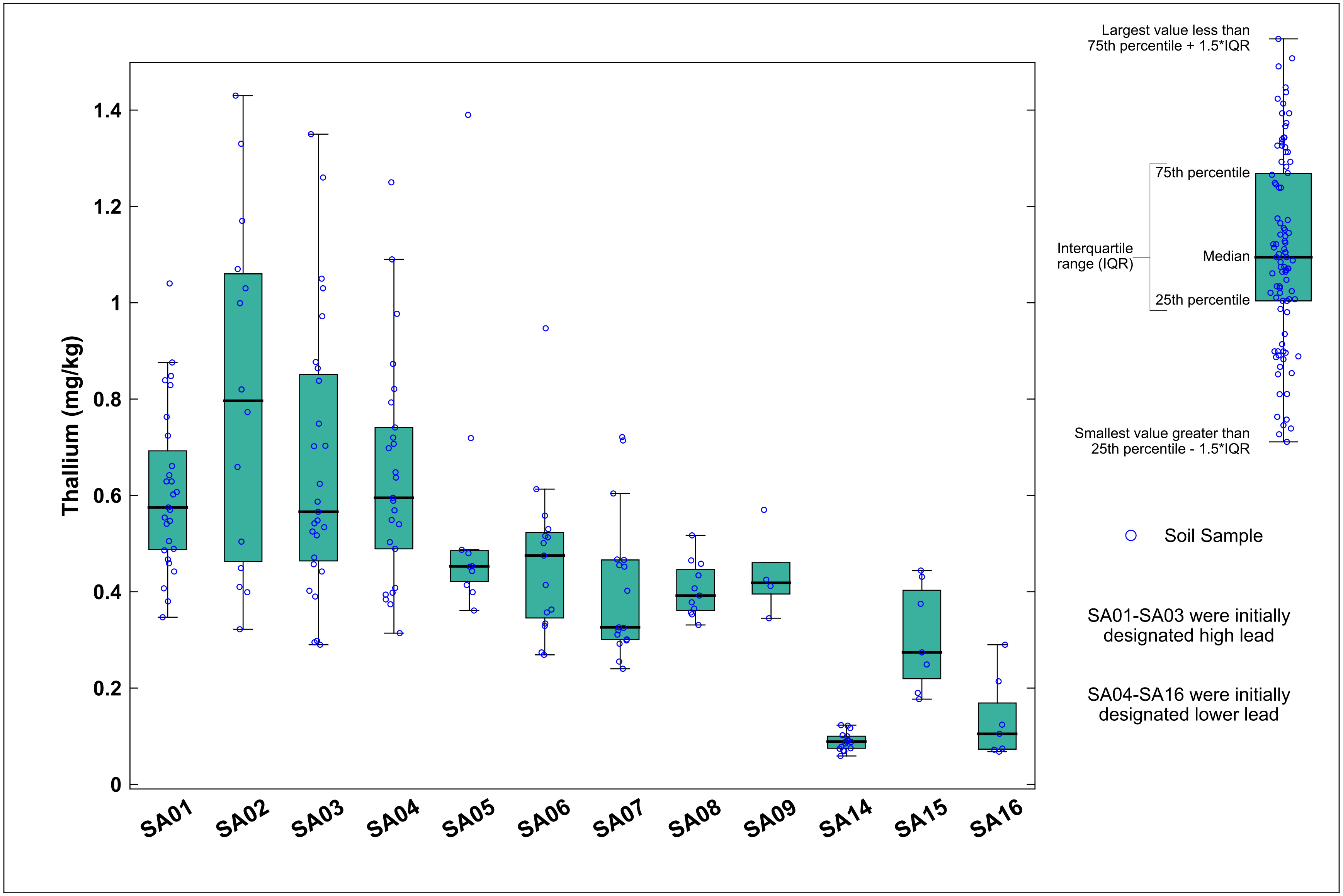


Figure 5-4q. Thallium Concentrations in Soil Samples by Sample Area

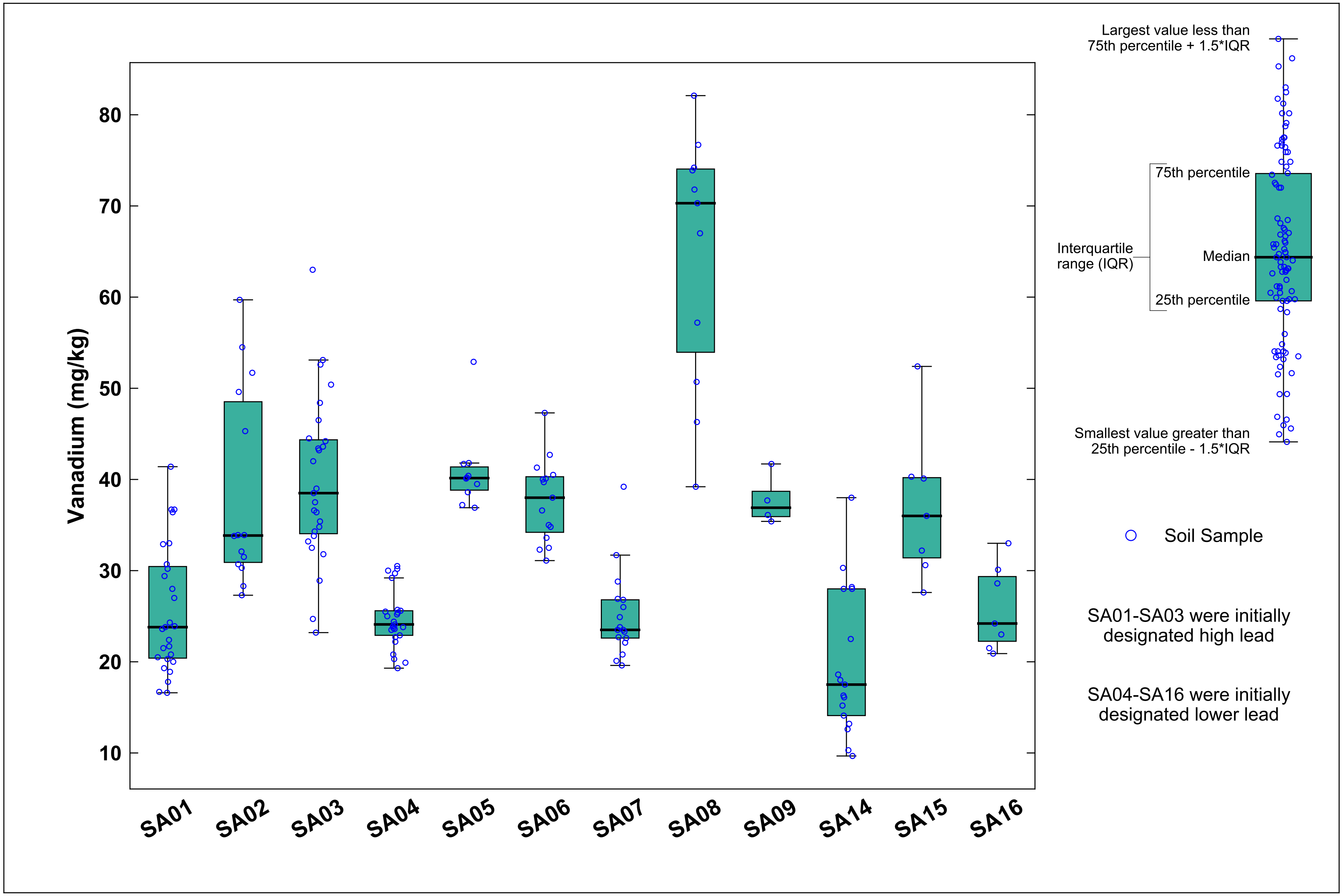


Figure 5-4r. Vanadium Concentrations in Soil Samples by Sample Area

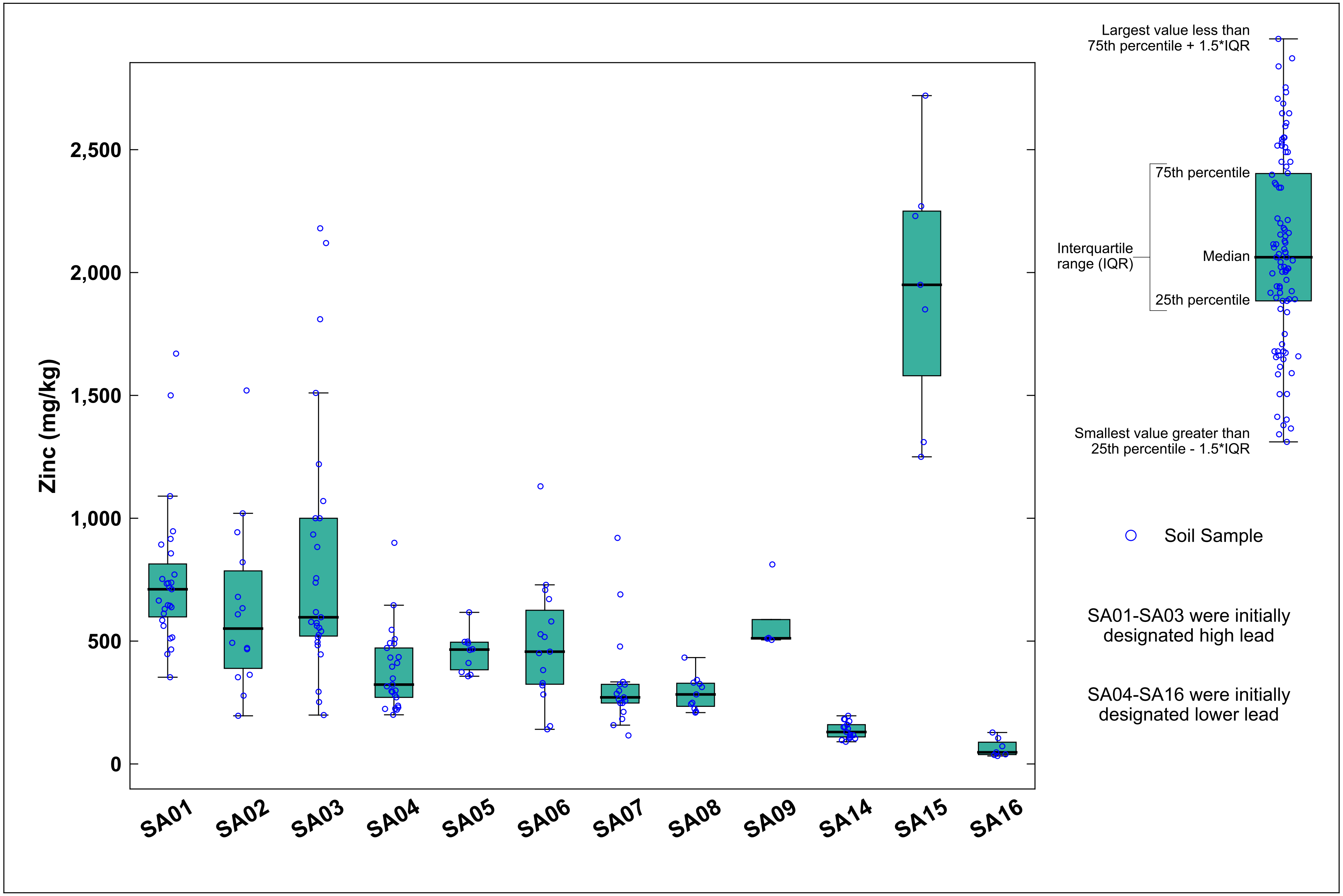


Figure 5-4s. Zinc Concentrations in Soil Samples by Sample Area

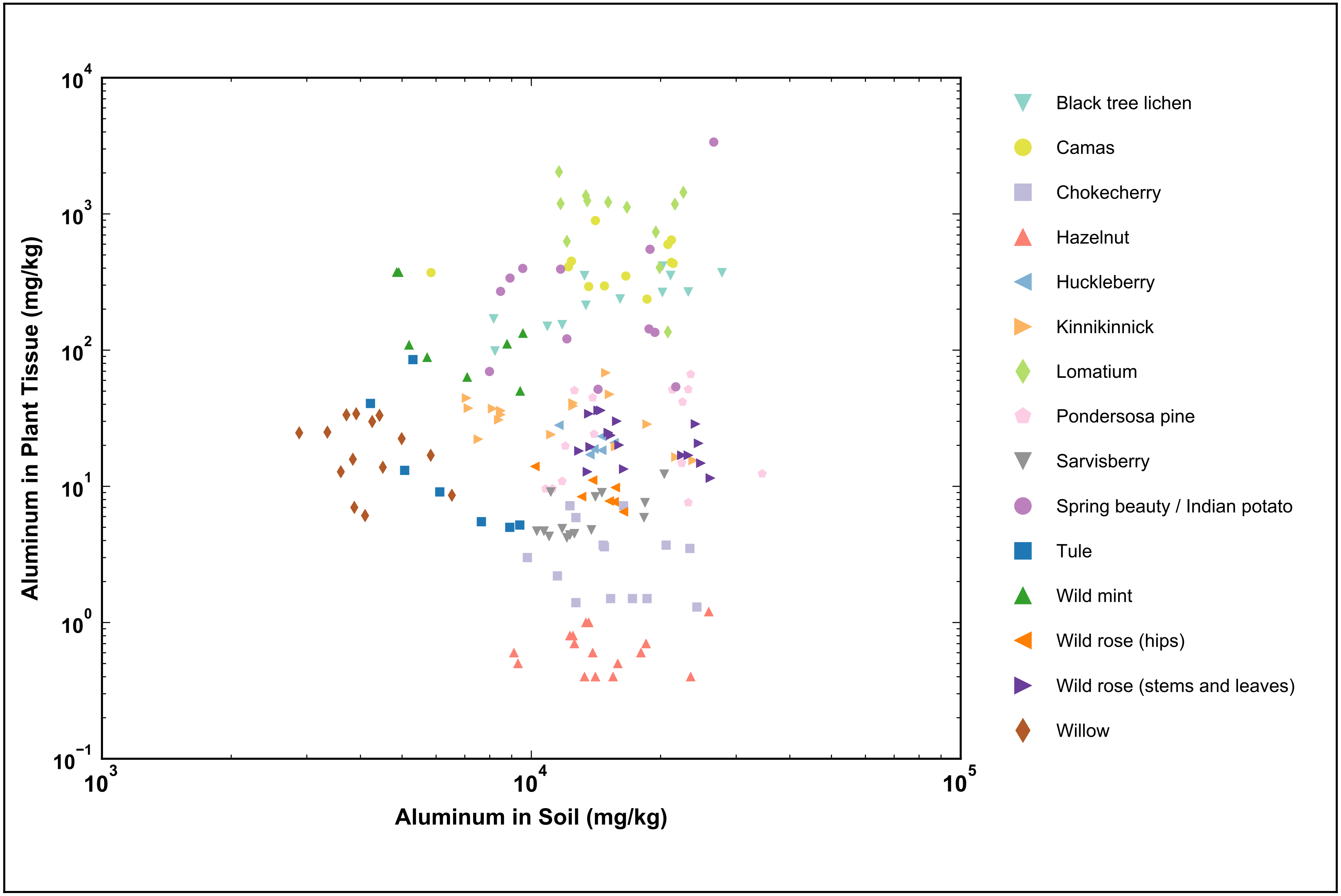


Figure 5-5a. Aluminum Concentrations in Soil vs. Plant Tissue Samples

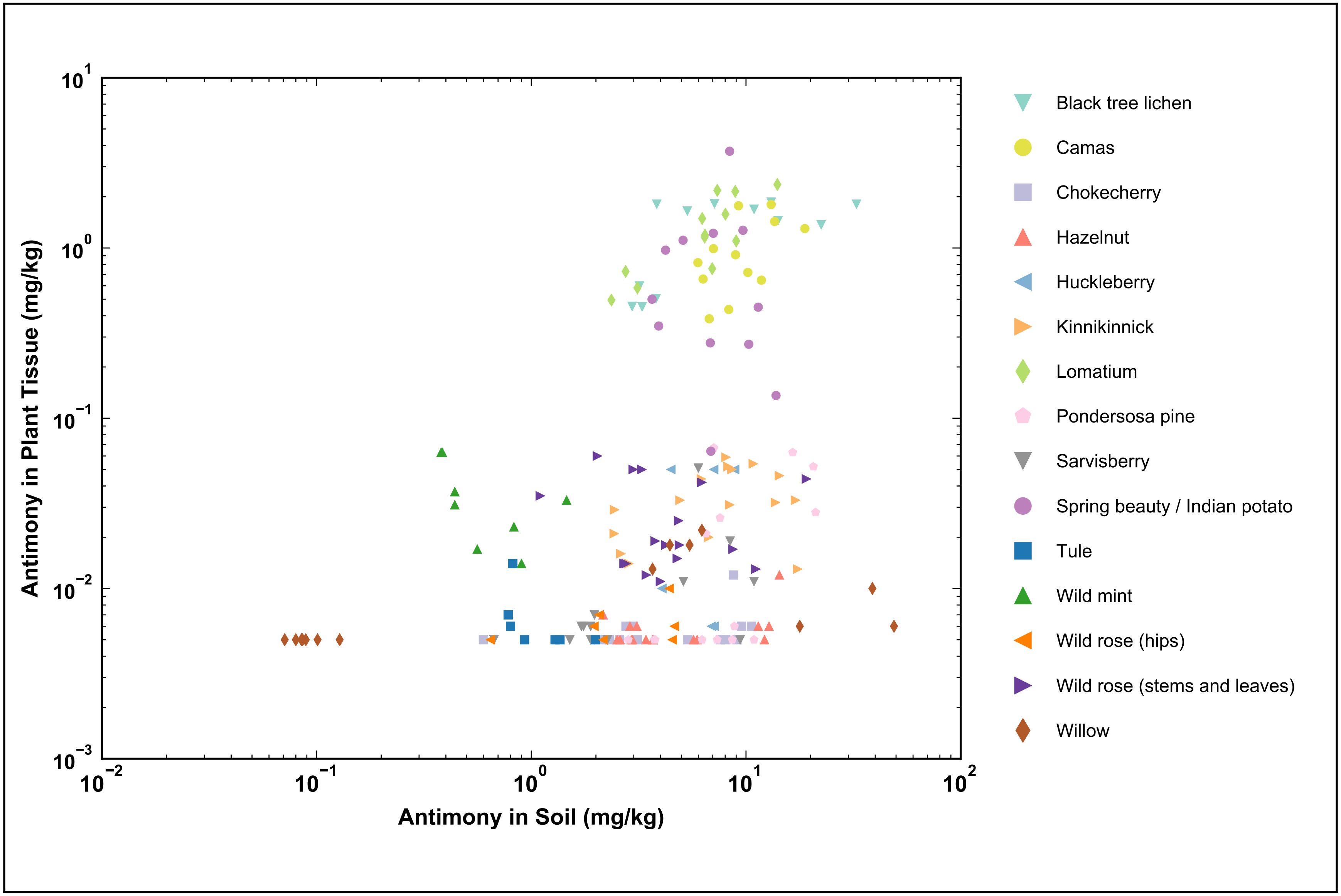


Figure 5-5b. Antimony Concentrations in Soil vs. Plant Tissue Samples

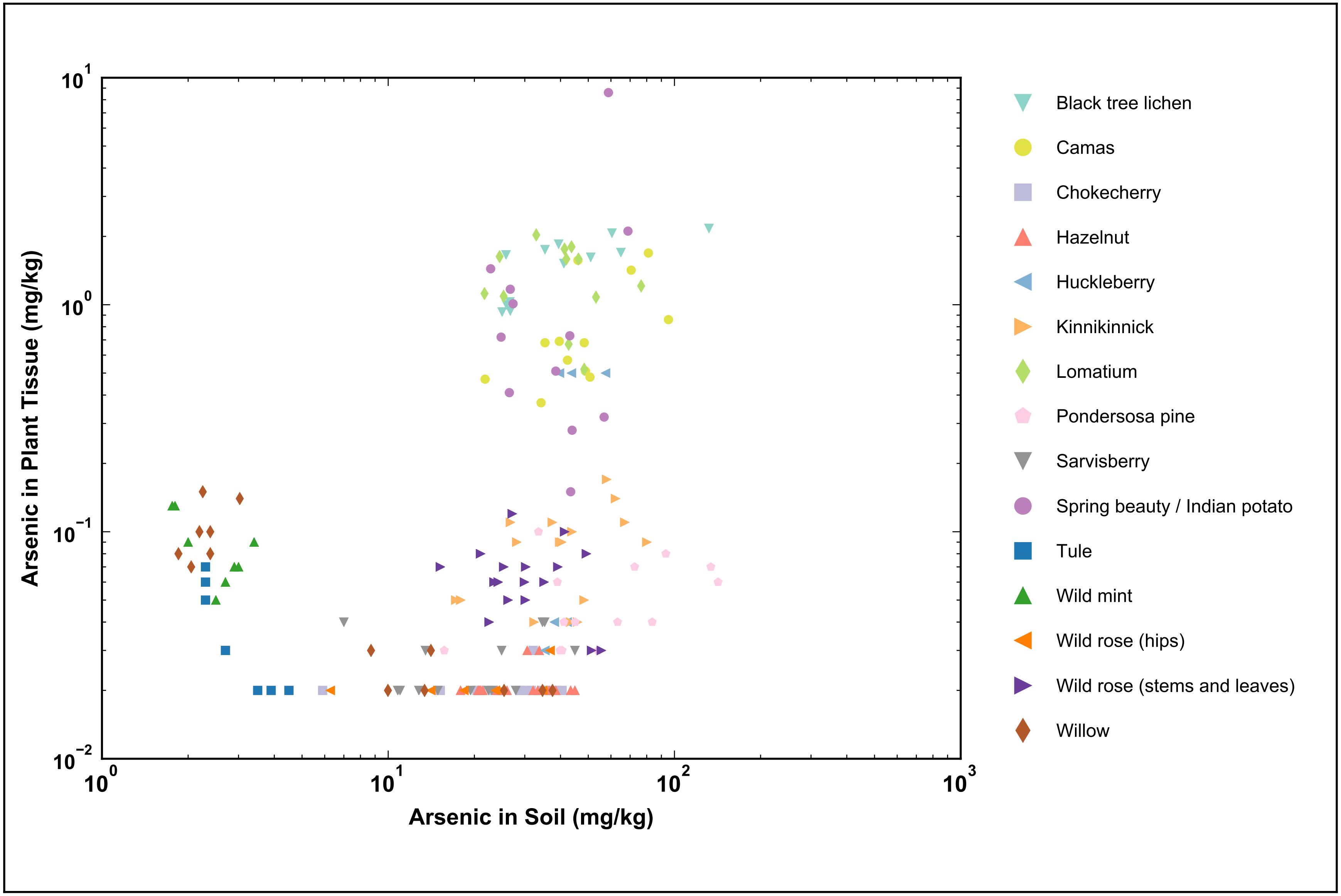


Figure 5-5c. Arsenic Concentrations in Soil vs. Plant Tissue Samples

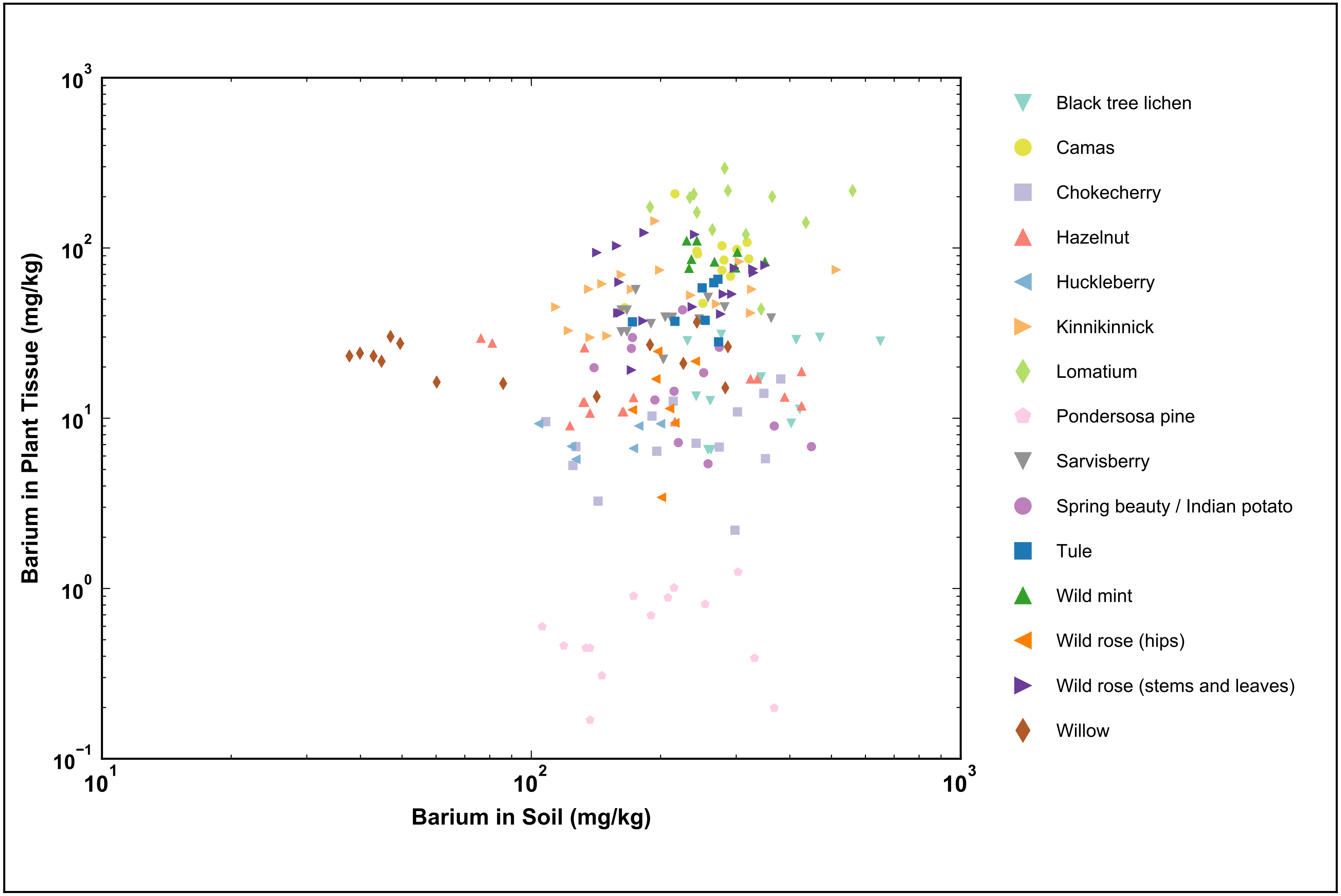


Figure 5-5d. Barium Concentrations in Soil vs. Plant Tissue Samples

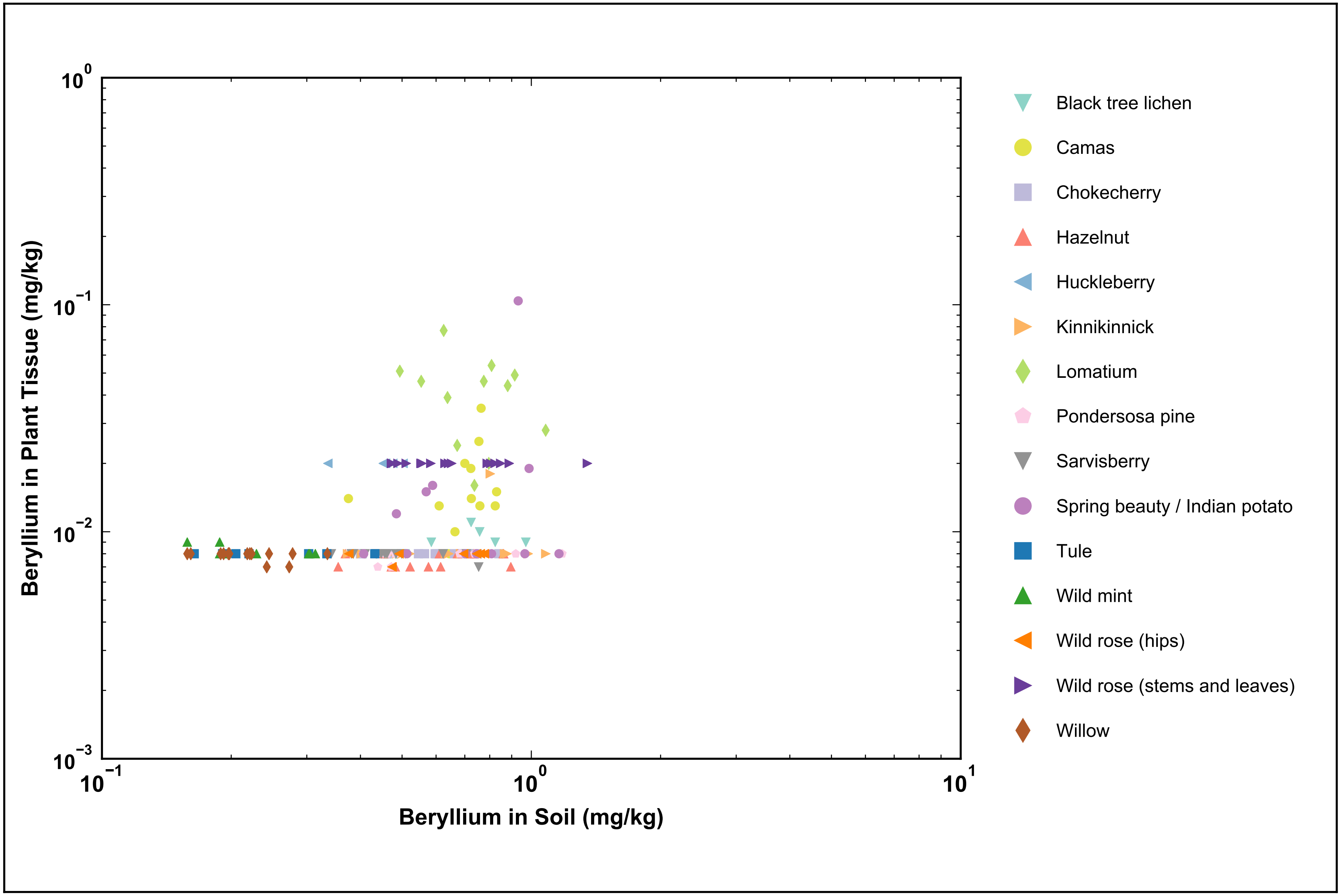


Figure 5-5e. Beryllium Concentrations in Soil vs. Plant Tissue Samples

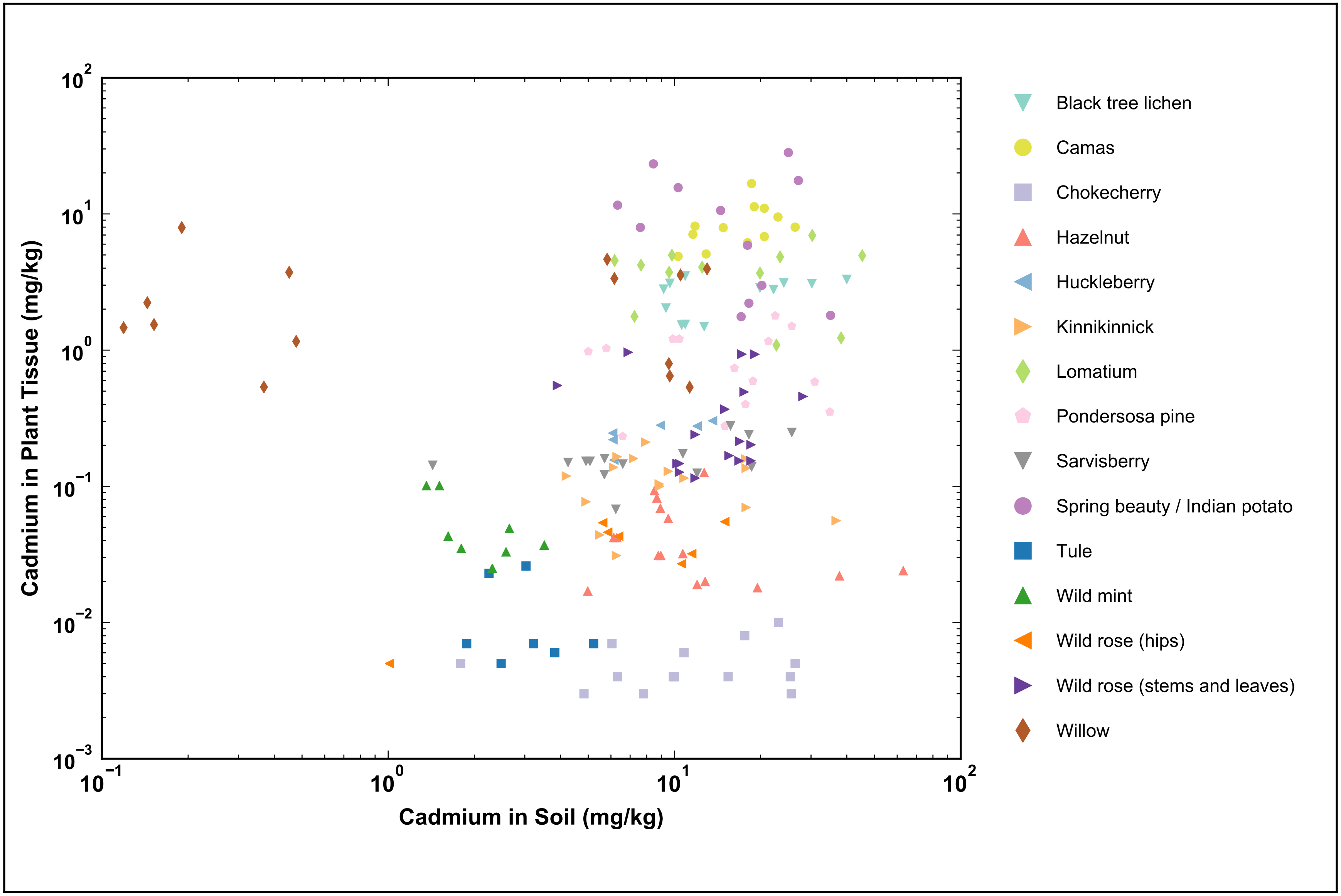


Figure 5-5f. Cadmium Concentrations in Soil vs. Plant Tissue Samples

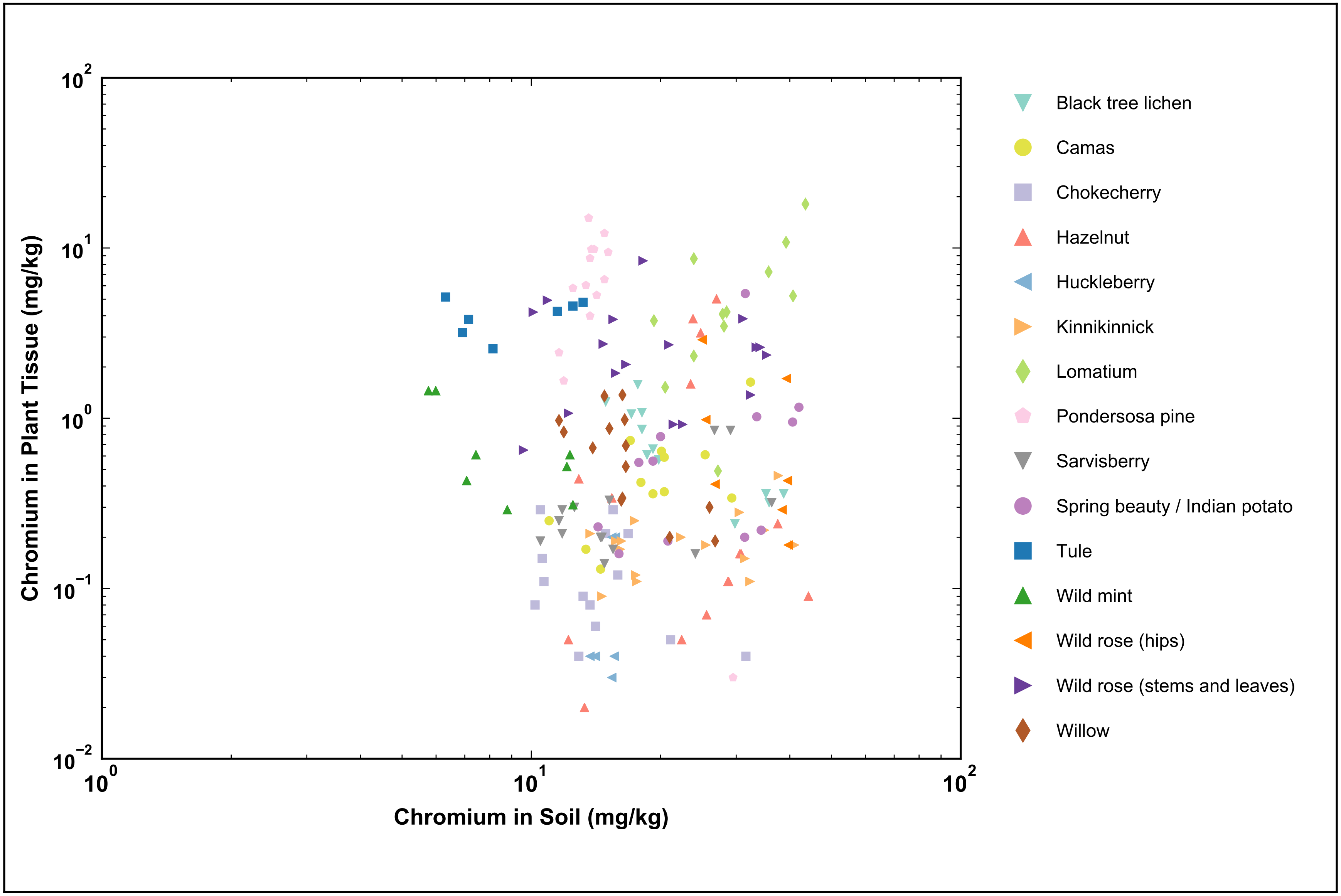


Figure 5-5g. Chromium Concentrations in Soil vs. Plant Tissue Samples

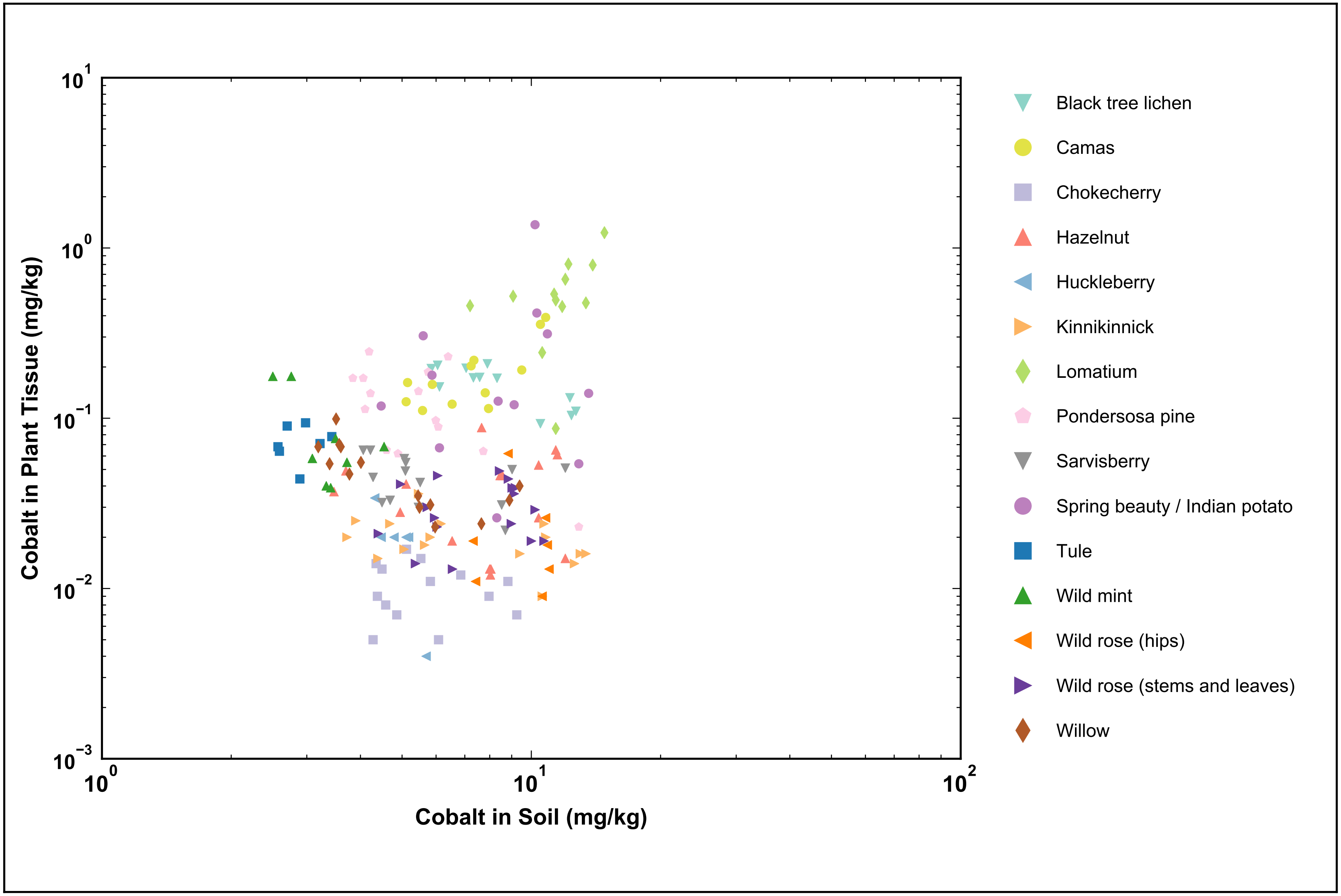


Figure 5-5h. Cobalt Concentrations in Soil vs. Plant Tissue Samples

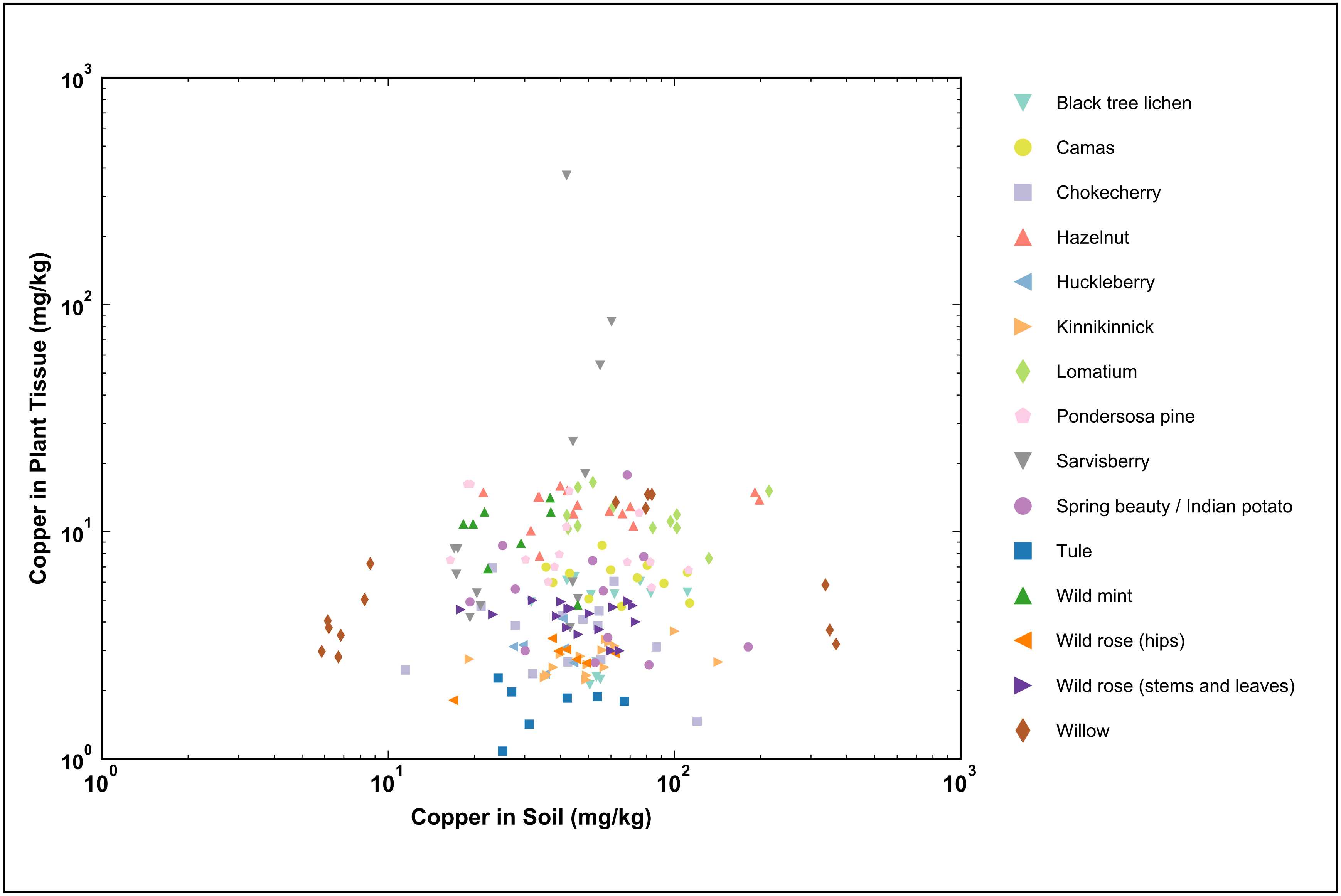


Figure 5-5i. Copper Concentrations in Soil vs. Plant Tissue Samples

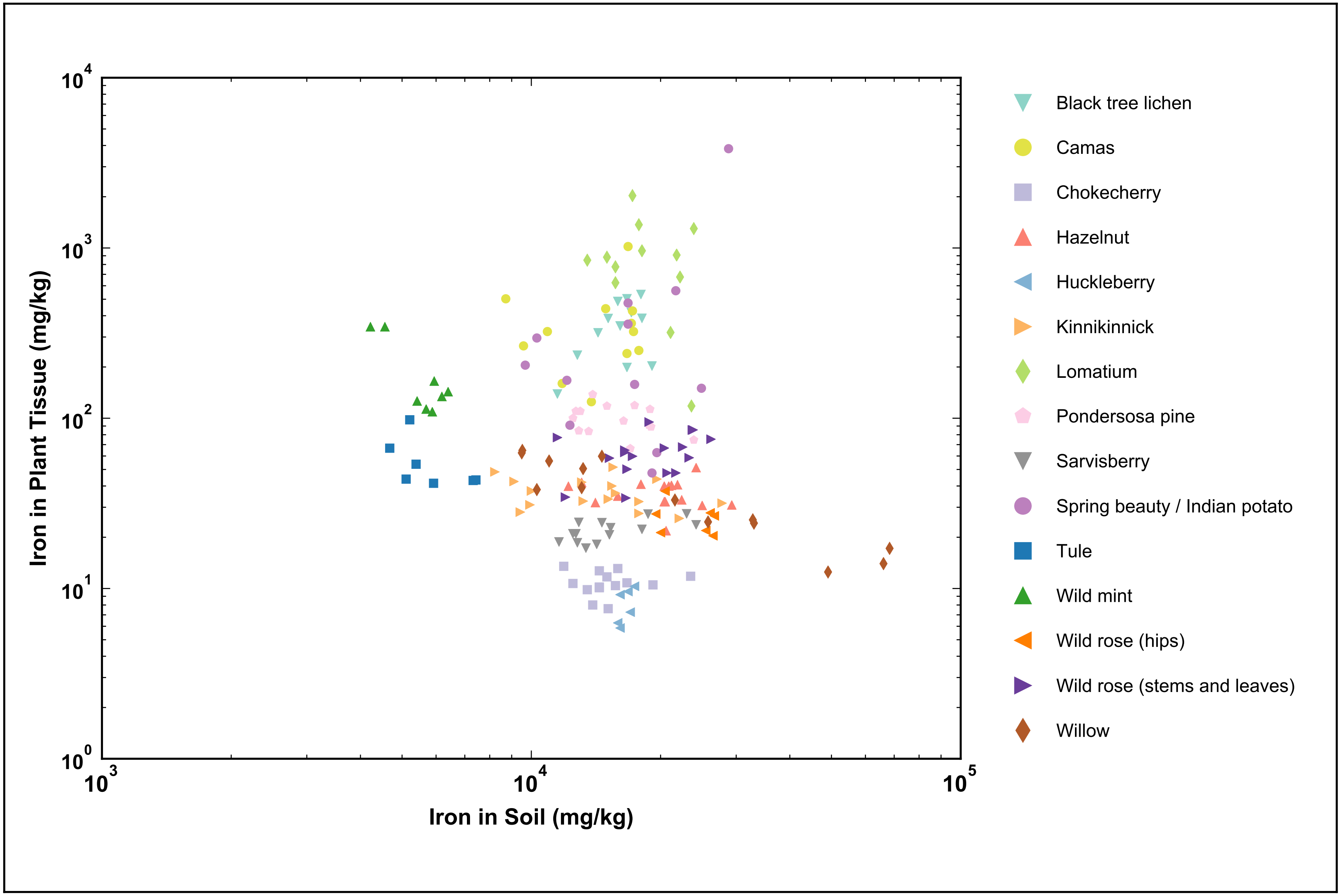


Figure 5-5j. Iron Concentrations in Soil vs. Plant Tissue Samples

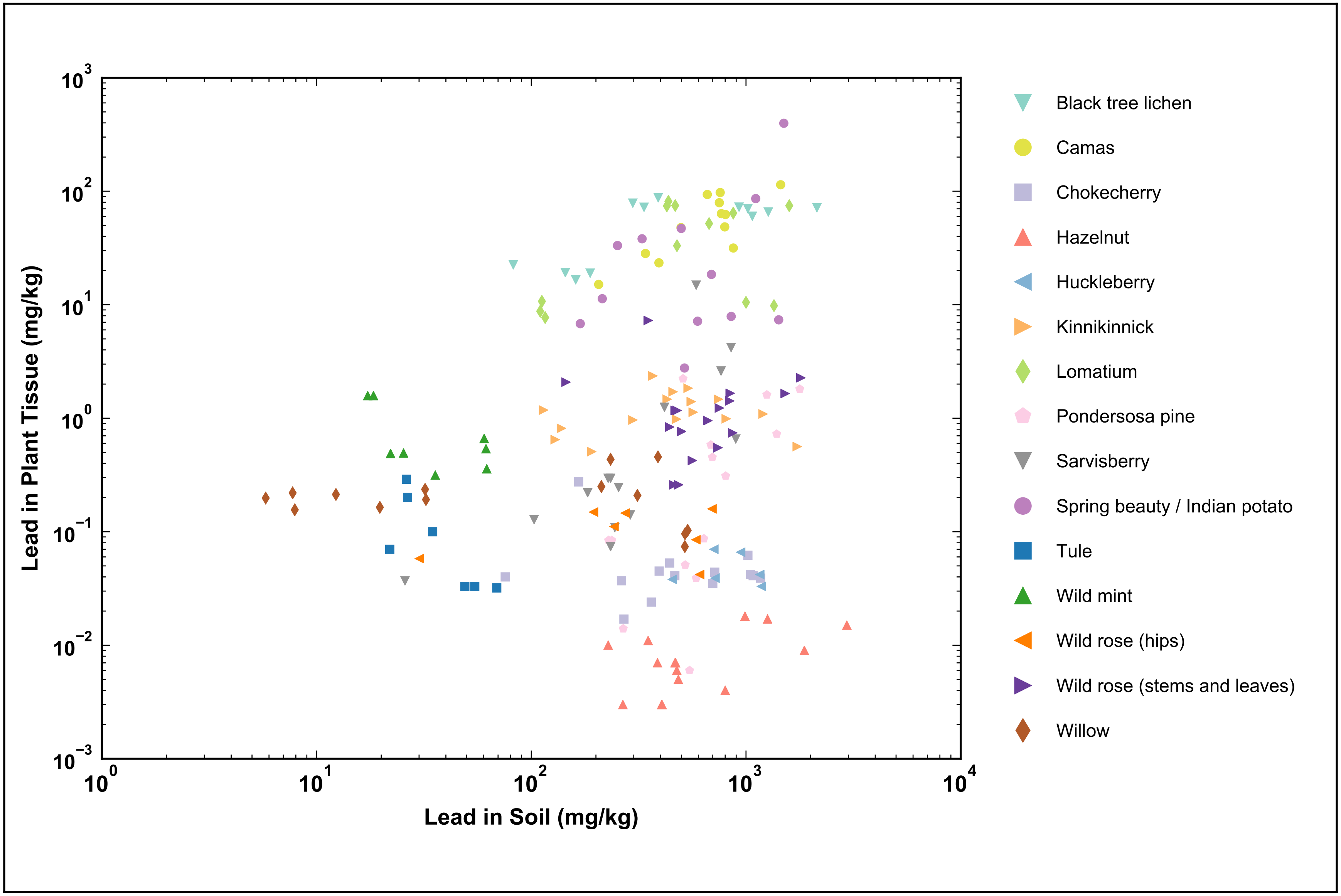


Figure 5-5k. Lead Concentrations in Soil vs. Plant Tissue Samples

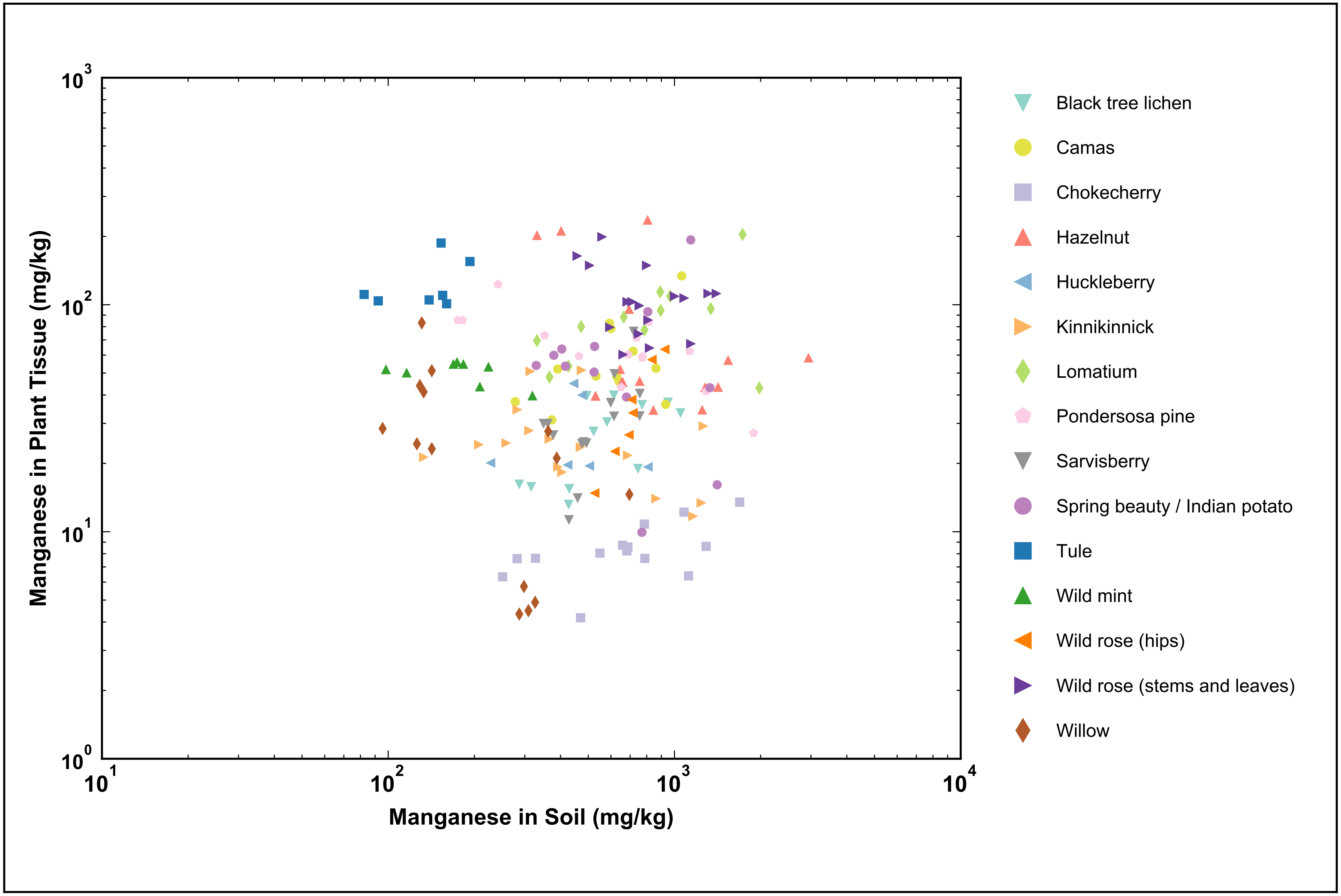
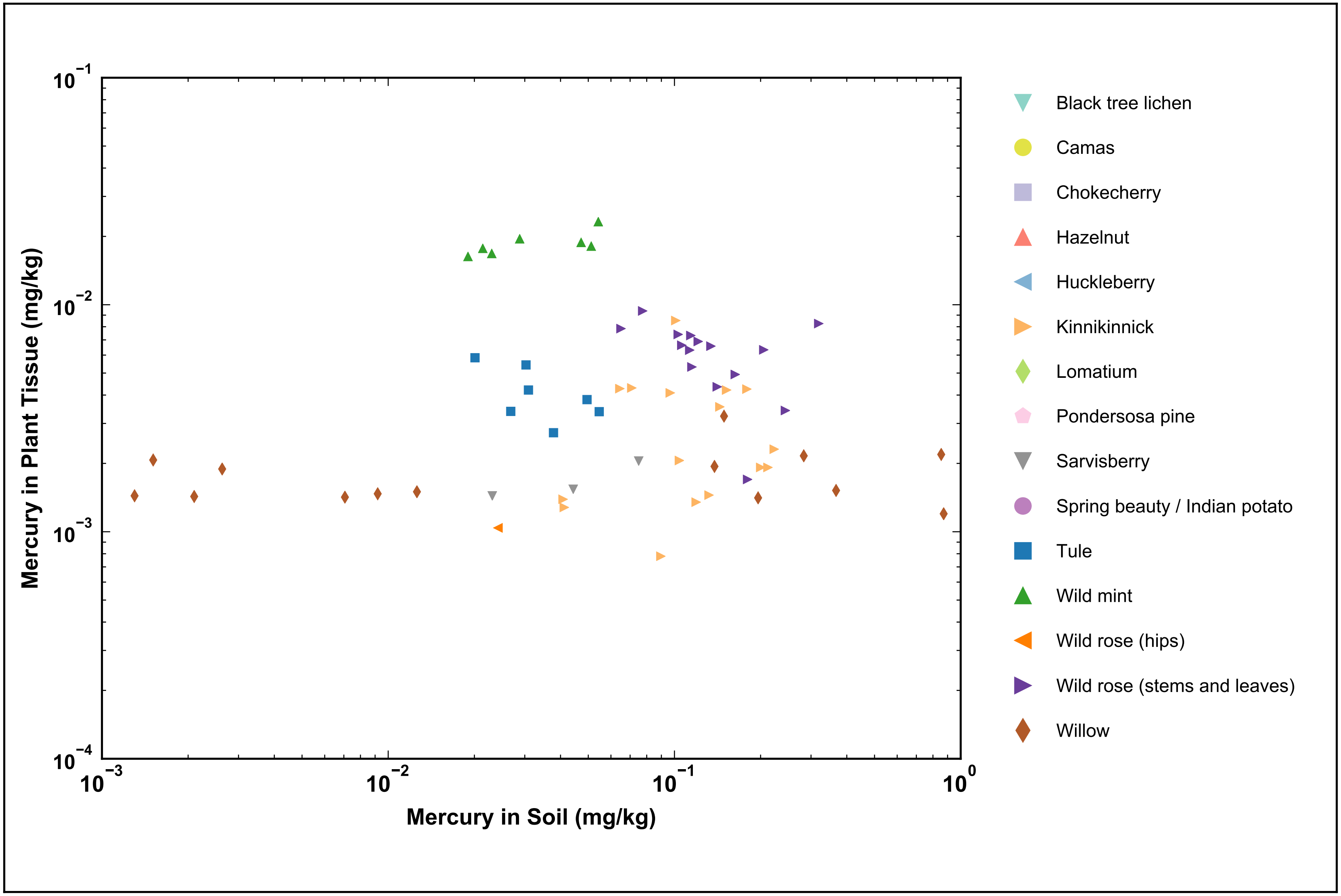


Figure 5-5l. Manganese Concentrations in Soil vs. Plant Tissue Samples



Note:
Mercury units were converted to mg/kg from ng/g values reported by ALS

Figure 5-5m. Mercury Concentrations in Soil vs. Plant Tissue Samples

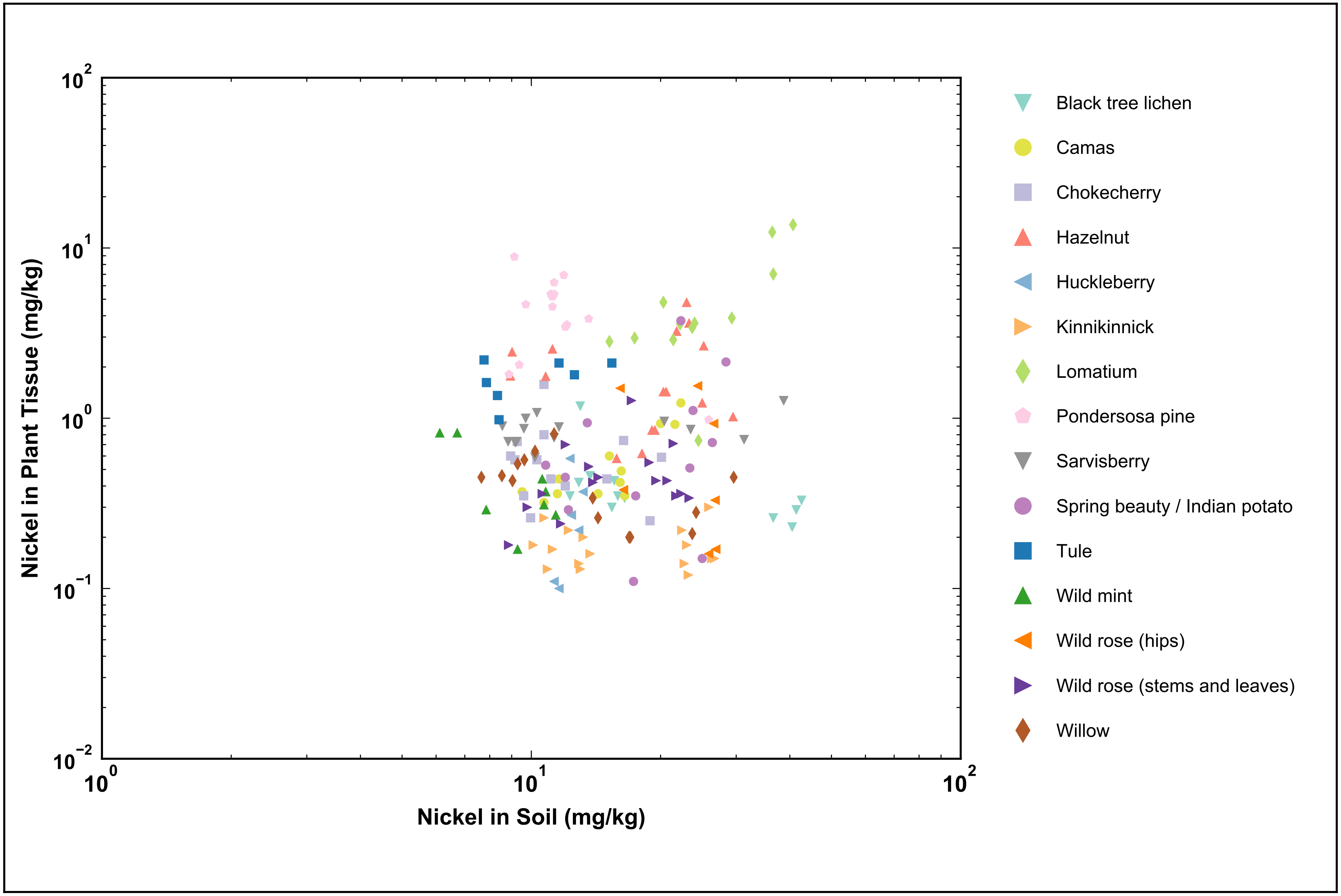


Figure 5-5n. Nickel Concentrations in Soil vs. Plant Tissue Samples

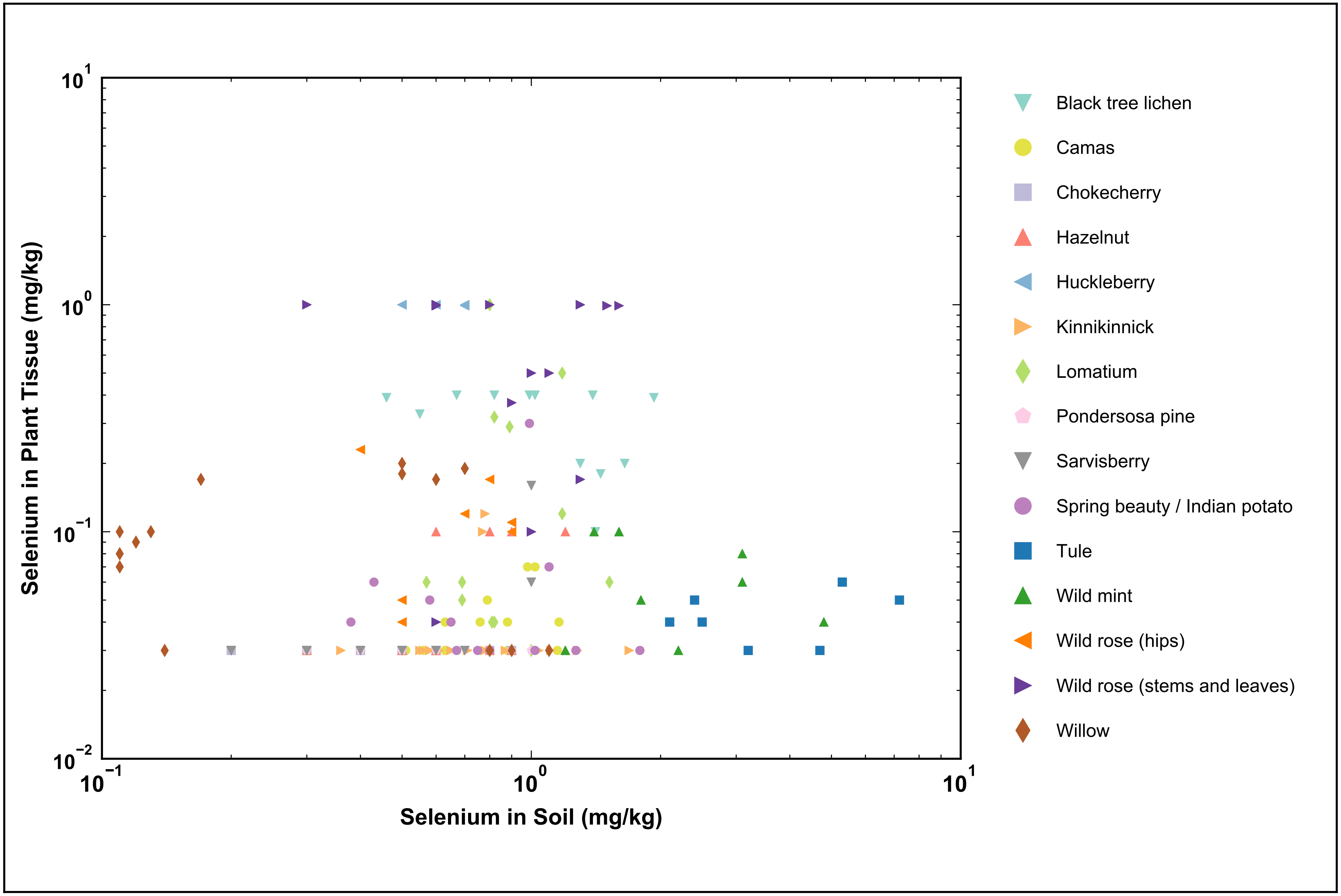


Figure 5-5o. Selenium Concentrations in Soil vs. Plant Tissue Samples

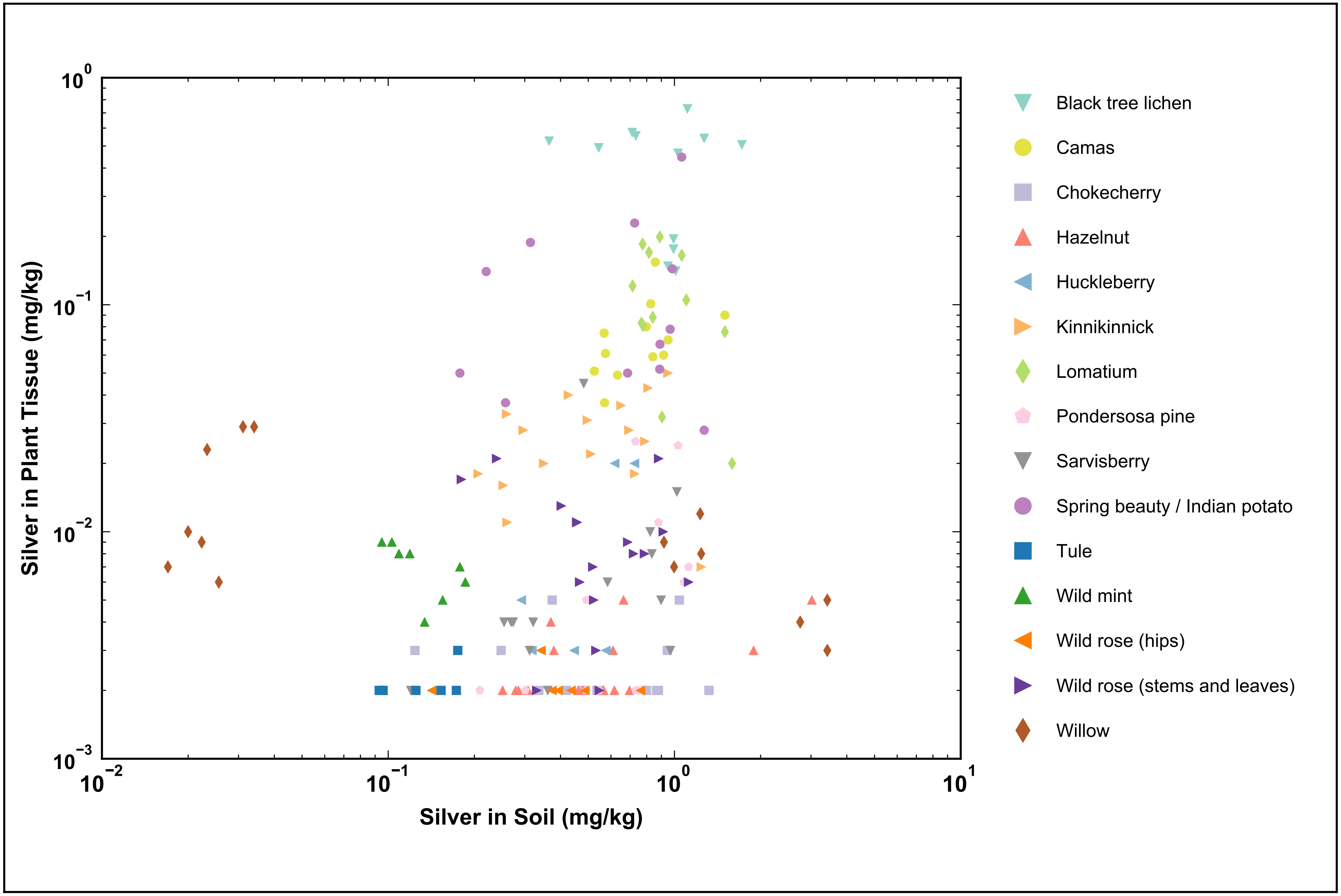


Figure 5-5p. Silver Concentrations in Soil vs. Plant Tissue Samples

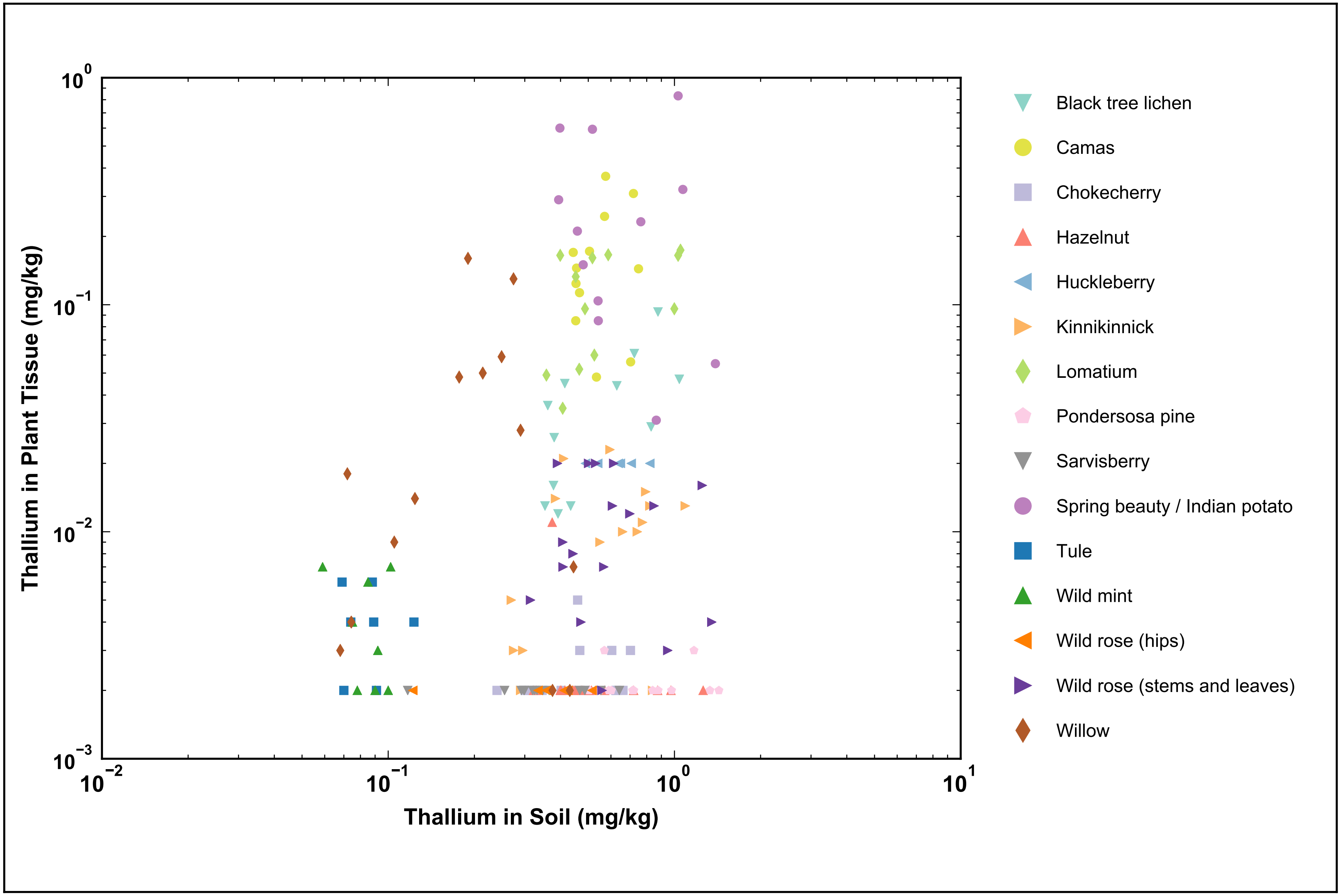


Figure 5-5q. Thallium Concentrations in Soil vs. Plant Tissue Samples

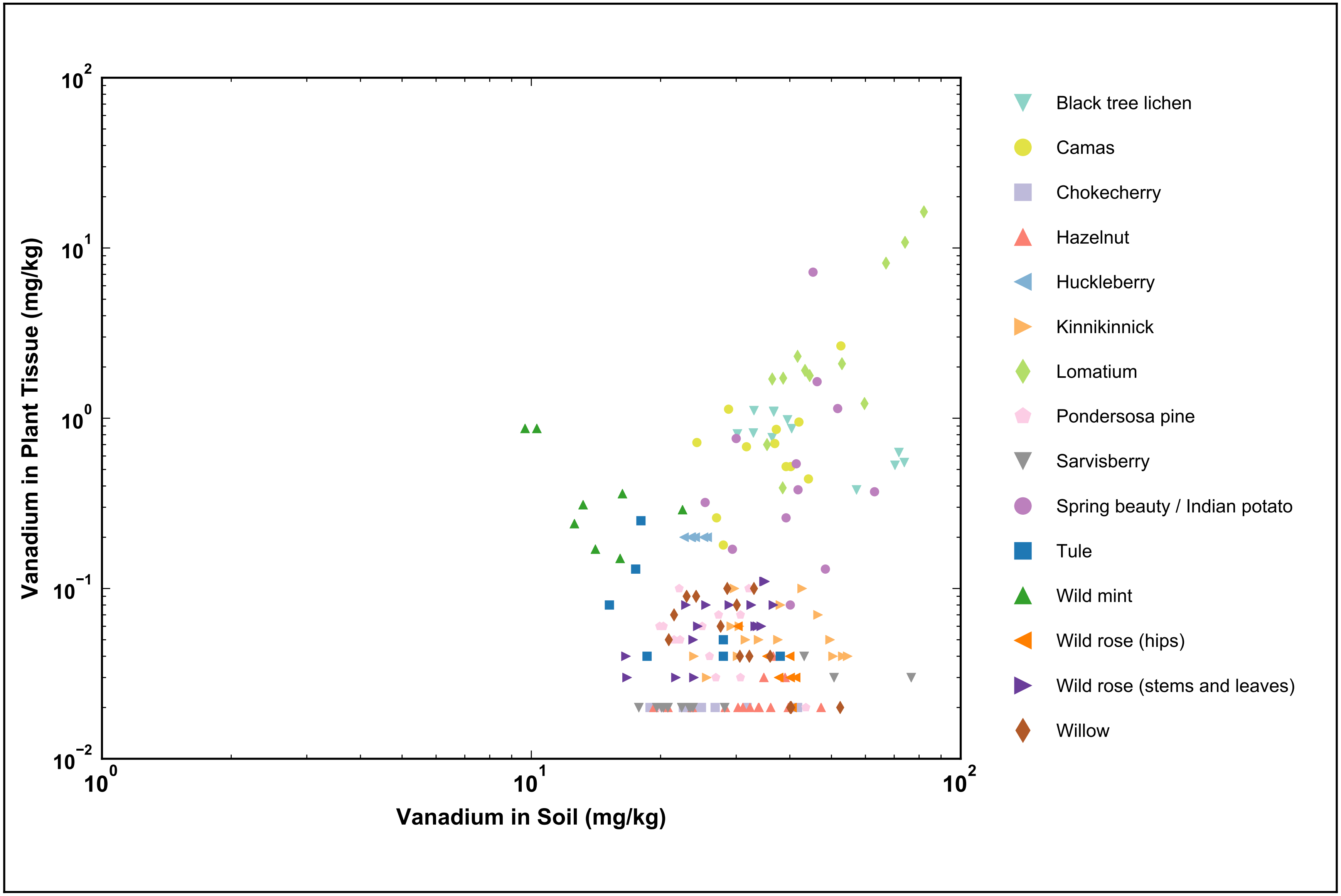


Figure 5-5r. Vanadium Concentrations in Soil vs. Plant Tissue Samples

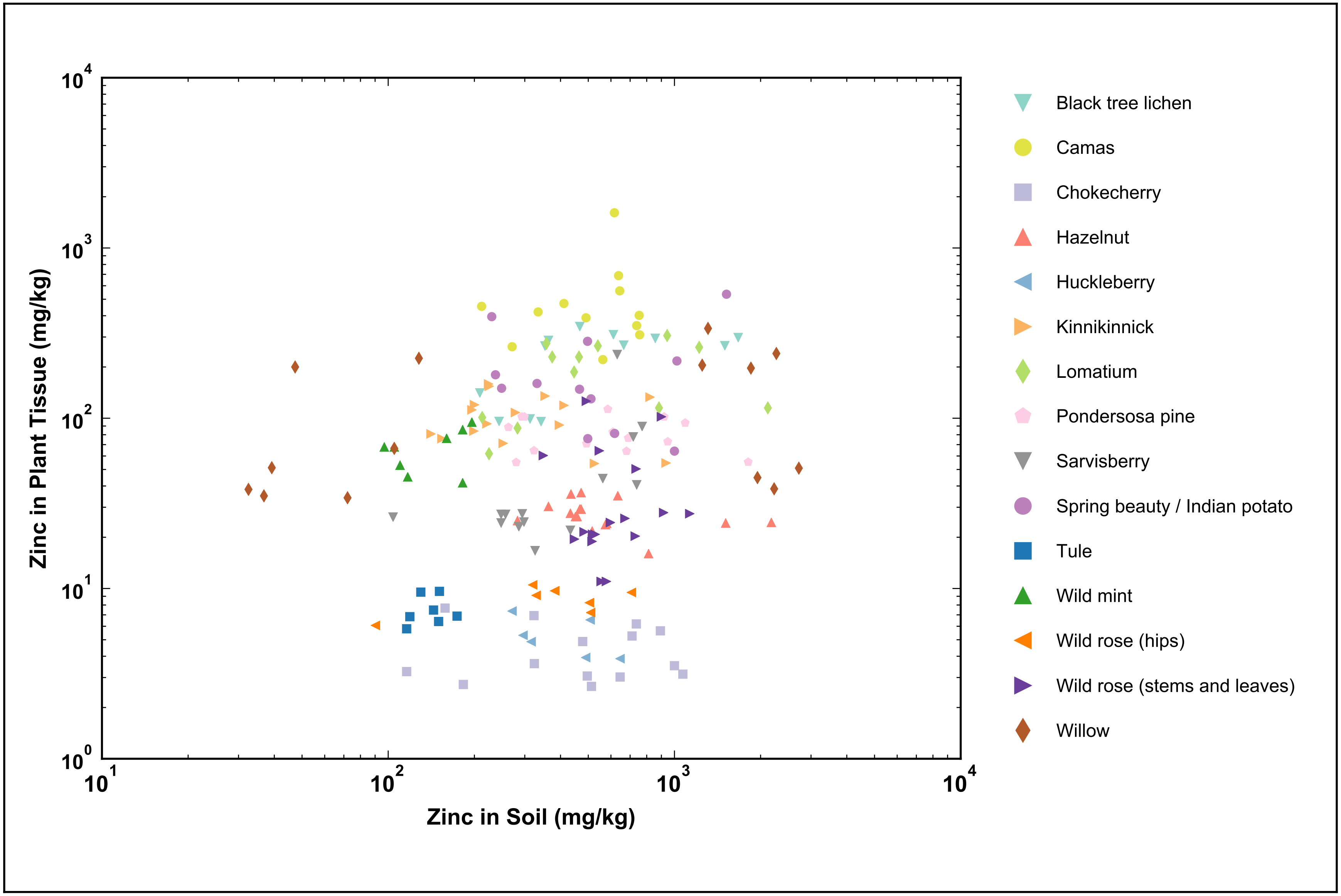
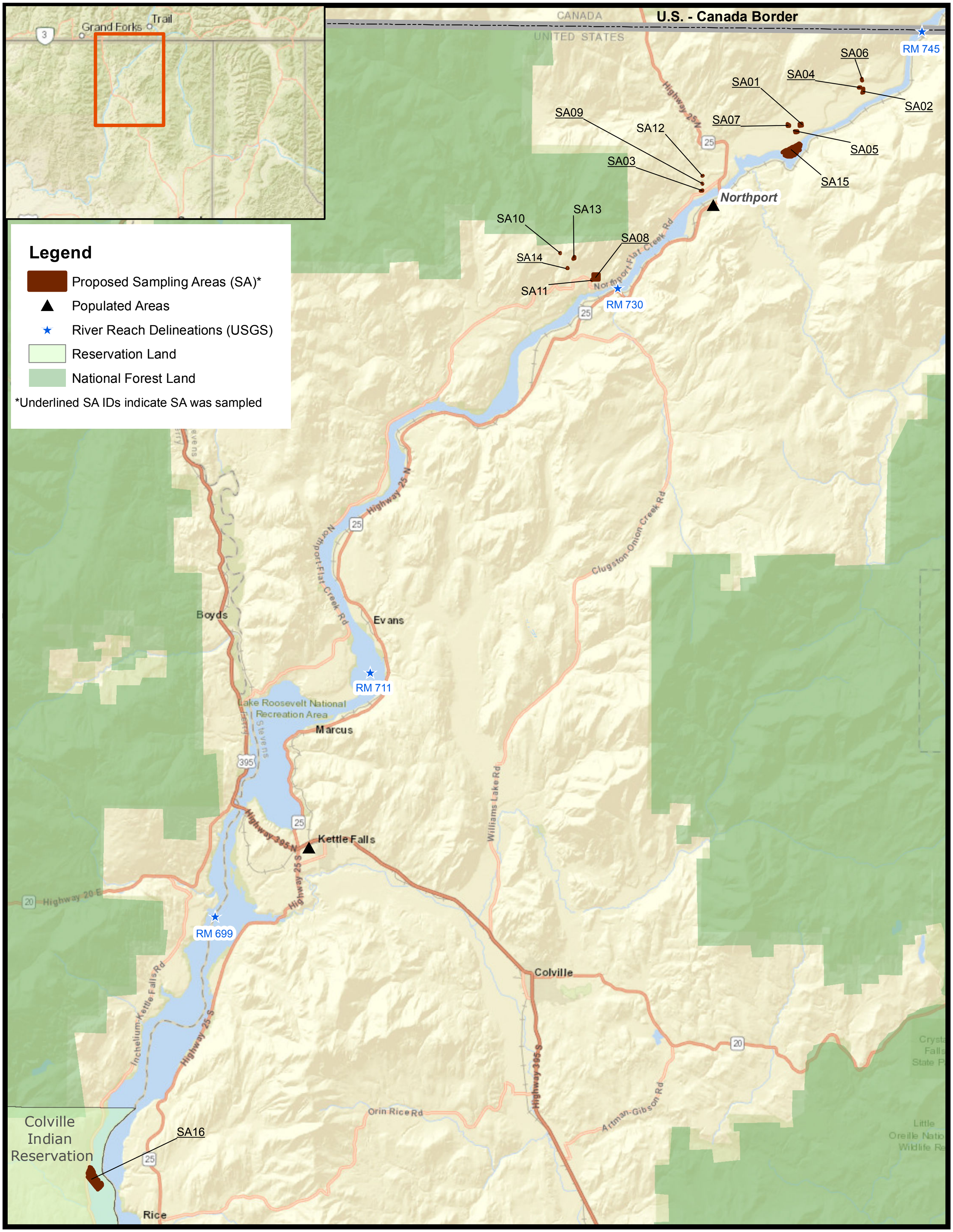


Figure 5-5s. Zinc Concentrations in Soil vs. Plant Tissue Samples

MAPS



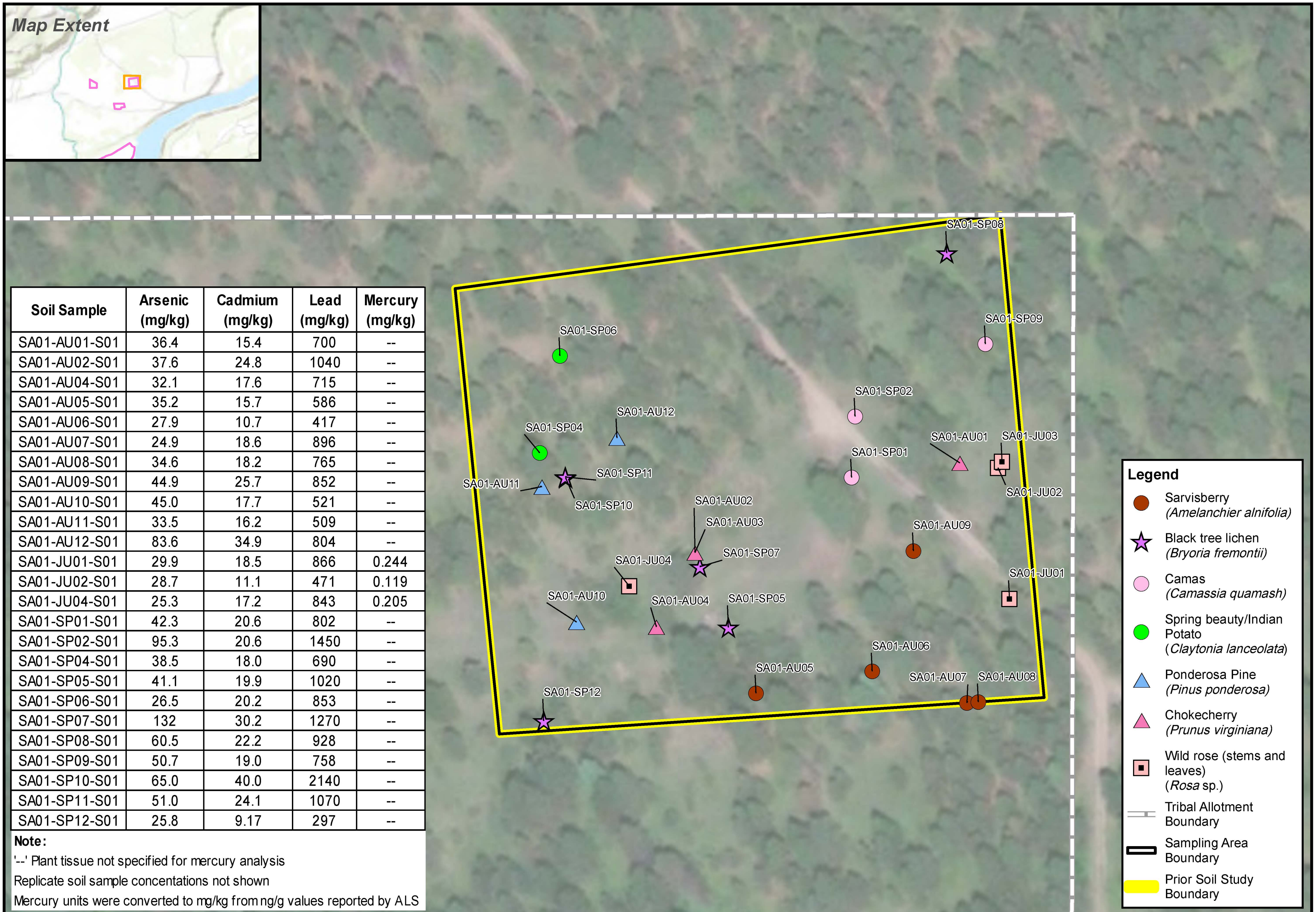
RAMBOLL ENVIRON

0 1 2 4 Kilometers

0 1 2 4 Miles

N

Map 2-1. Study Area Map
Upper Columbia River, WA



Soil Sample	Arsenic (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
SA01-AU01-S01	36.4	15.4	700	--
SA01-AU02-S01	37.6	24.8	1040	--
SA01-AU04-S01	32.1	17.6	715	--
SA01-AU05-S01	35.2	15.7	586	--
SA01-AU06-S01	27.9	10.7	417	--
SA01-AU07-S01	24.9	18.6	896	--
SA01-AU08-S01	34.6	18.2	765	--
SA01-AU09-S01	44.9	25.7	852	--
SA01-AU10-S01	45.0	17.7	521	--
SA01-AU11-S01	33.5	16.2	509	--
SA01-AU12-S01	83.6	34.9	804	--
SA01-JU01-S01	29.9	18.5	866	0.244
SA01-JU02-S01	28.7	11.1	471	0.119
SA01-JU04-S01	25.3	17.2	843	0.205
SA01-SP01-S01	42.3	20.6	802	--
SA01-SP02-S01	95.3	20.6	1450	--
SA01-SP04-S01	38.5	18.0	690	--
SA01-SP05-S01	41.1	19.9	1020	--
SA01-SP06-S01	26.5	20.2	853	--
SA01-SP07-S01	132	30.2	1270	--
SA01-SP08-S01	60.5	22.2	928	--
SA01-SP09-S01	50.7	19.0	758	--
SA01-SP10-S01	65.0	40.0	2140	--
SA01-SP11-S01	51.0	24.1	1070	--
SA01-SP12-S01	25.8	9.17	297	--

Note:
'--' Plant tissue not specified for mercury analysis
Replicate soil sample concentations not shown
Mercury units were converted to mg/kg from ng/g values reported by ALS

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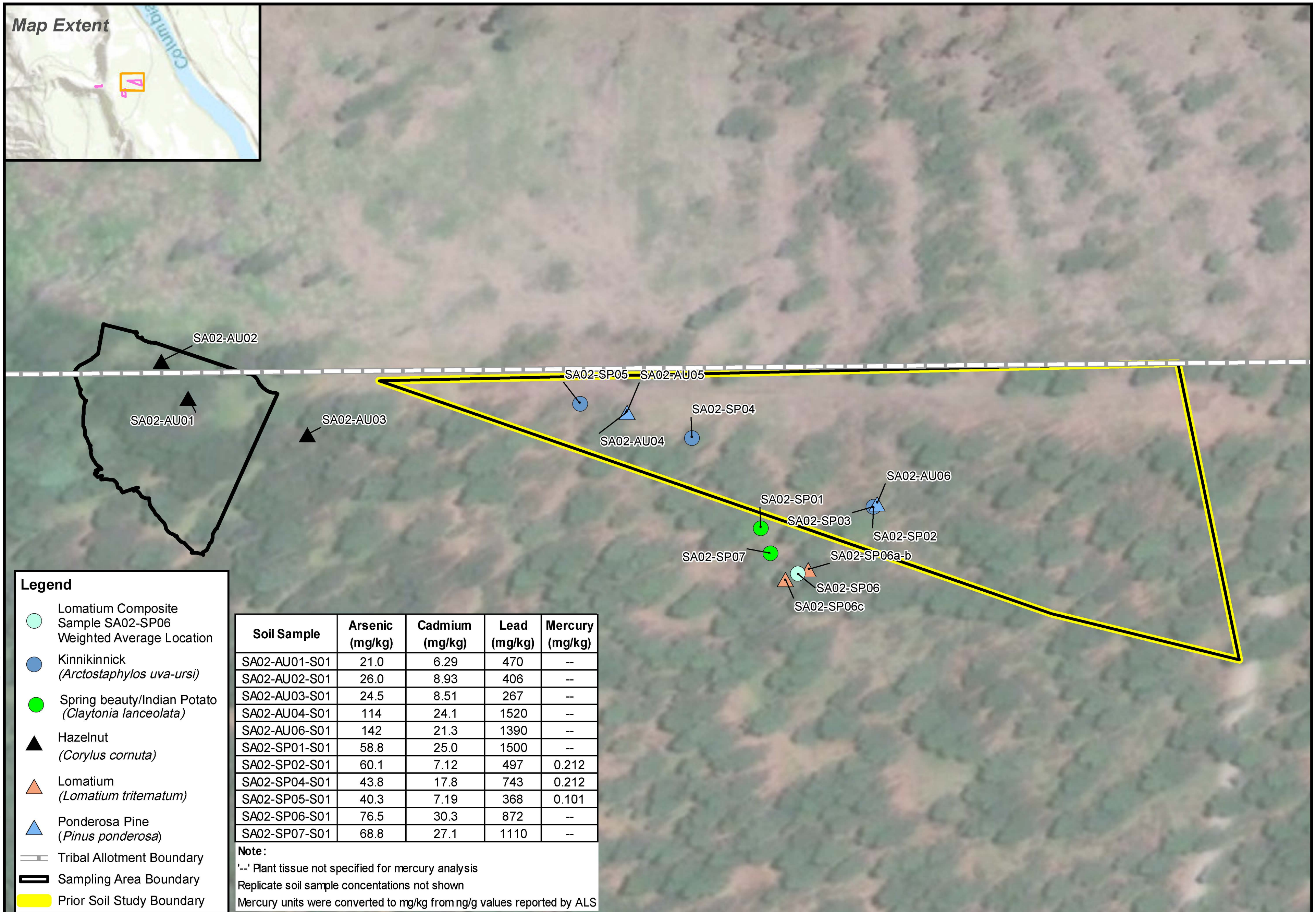
RAMBOLL

0 15 30 60 Meters
0 45 90 180 Feet
N

Map 2-2. Detail for Sampling Area 01
Upper Columbia River, WA



Soil Sample	Arsenic (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
SA02-AU01-S01	21.0	6.29	470	--
SA02-AU02-S01	26.0	8.93	406	--
SA02-AU03-S01	24.5	8.51	267	--
SA02-AU04-S01	114	24.1	1520	--
SA02-AU06-S01	142	21.3	1390	--
SA02-SP01-S01	58.8	25.0	1500	--
SA02-SP02-S01	60.1	7.12	497	0.212
SA02-SP04-S01	43.8	17.8	743	0.212
SA02-SP05-S01	40.3	7.19	368	0.101
SA02-SP06-S01	76.5	30.3	872	--
SA02-SP07-S01	68.8	27.1	1110	--

Note:
'--' Plant tissue not specified for mercury analysis
Replicate soil sample concentrations not shown
Mercury units were converted to mg/kg from ng/g values reported by ALS

RAMBOLL

Map 2-3. Detail for Sampling Area 02
Upper Columbia River, WA

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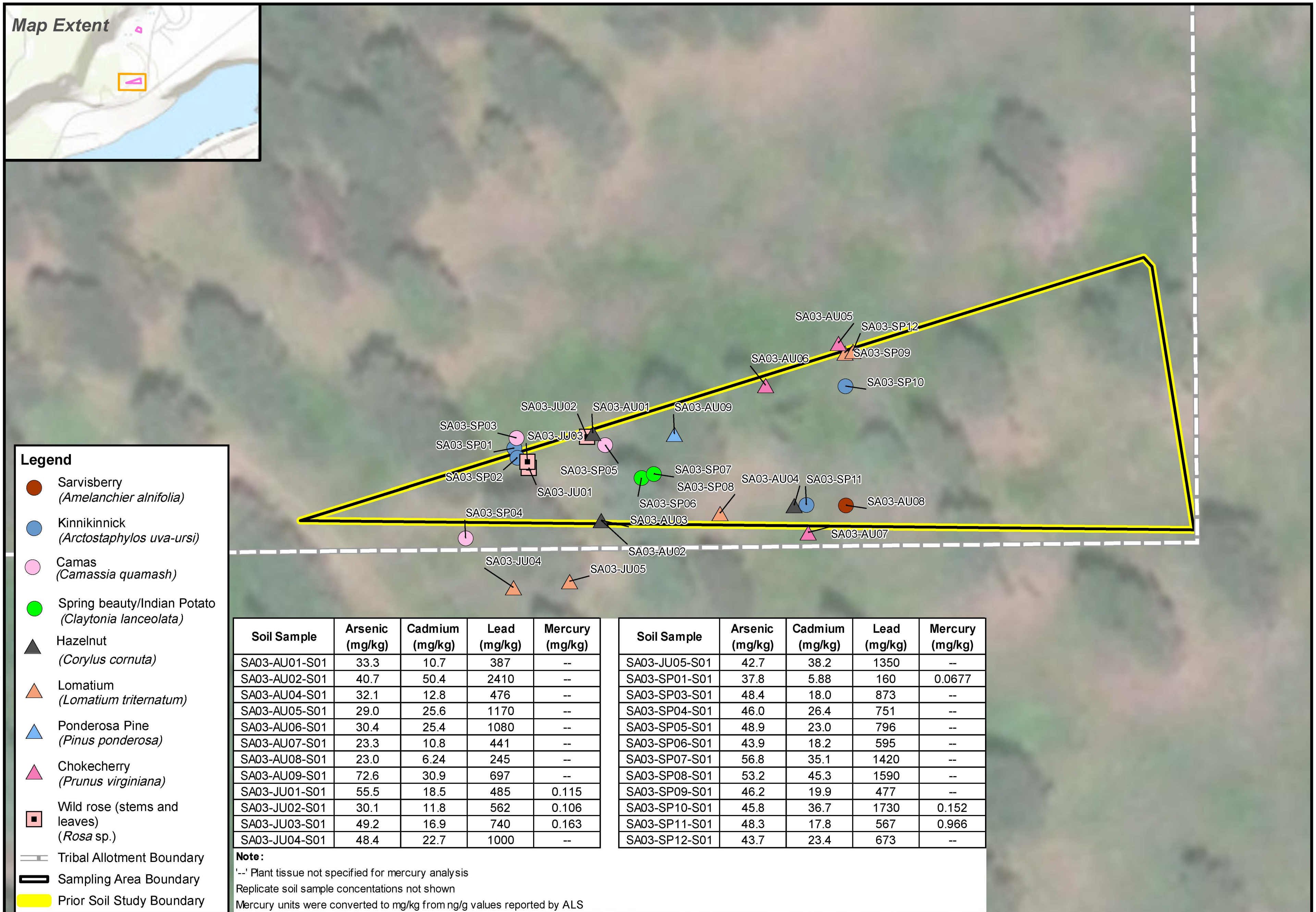

Soil Sample	Arsenic (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
SA03-AU01-S01	33.3	10.7	387	--
SA03-AU02-S01	40.7	50.4	2410	--
SA03-AU04-S01	32.1	12.8	476	--
SA03-AU05-S01	29.0	25.6	1170	--
SA03-AU06-S01	30.4	25.4	1080	--
SA03-AU07-S01	23.3	10.8	441	--
SA03-AU08-S01	23.0	6.24	245	--
SA03-AU09-S01	72.6	30.9	697	--
SA03-JU01-S01	55.5	18.5	485	0.115
SA03-JU02-S01	30.1	11.8	562	0.106
SA03-JU03-S01	49.2	16.9	740	0.163
SA03-JU04-S01	48.4	22.7	1000	--

Soil Sample	Arsenic (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
SA03-JU05-S01	42.7	38.2	1350	--
SA03-SP01-S01	37.8	5.88	160	0.0677
SA03-SP03-S01	48.4	18.0	873	--
SA03-SP04-S01	46.0	26.4	751	--
SA03-SP05-S01	48.9	23.0	796	--
SA03-SP06-S01	43.9	18.2	595	--
SA03-SP07-S01	56.8	35.1	1420	--
SA03-SP08-S01	53.2	45.3	1590	--
SA03-SP09-S01	46.2	19.9	477	--
SA03-SP10-S01	45.8	36.7	1730	0.152
SA03-SP11-S01	48.3	17.8	567	0.966
SA03-SP12-S01	43.7	23.4	673	--

Note:
'--' Plant tissue not specified for mercury analysis
Replicate soil sample concentations not shown
Mercury units were converted to mg/kg from ng/g values reported by ALS

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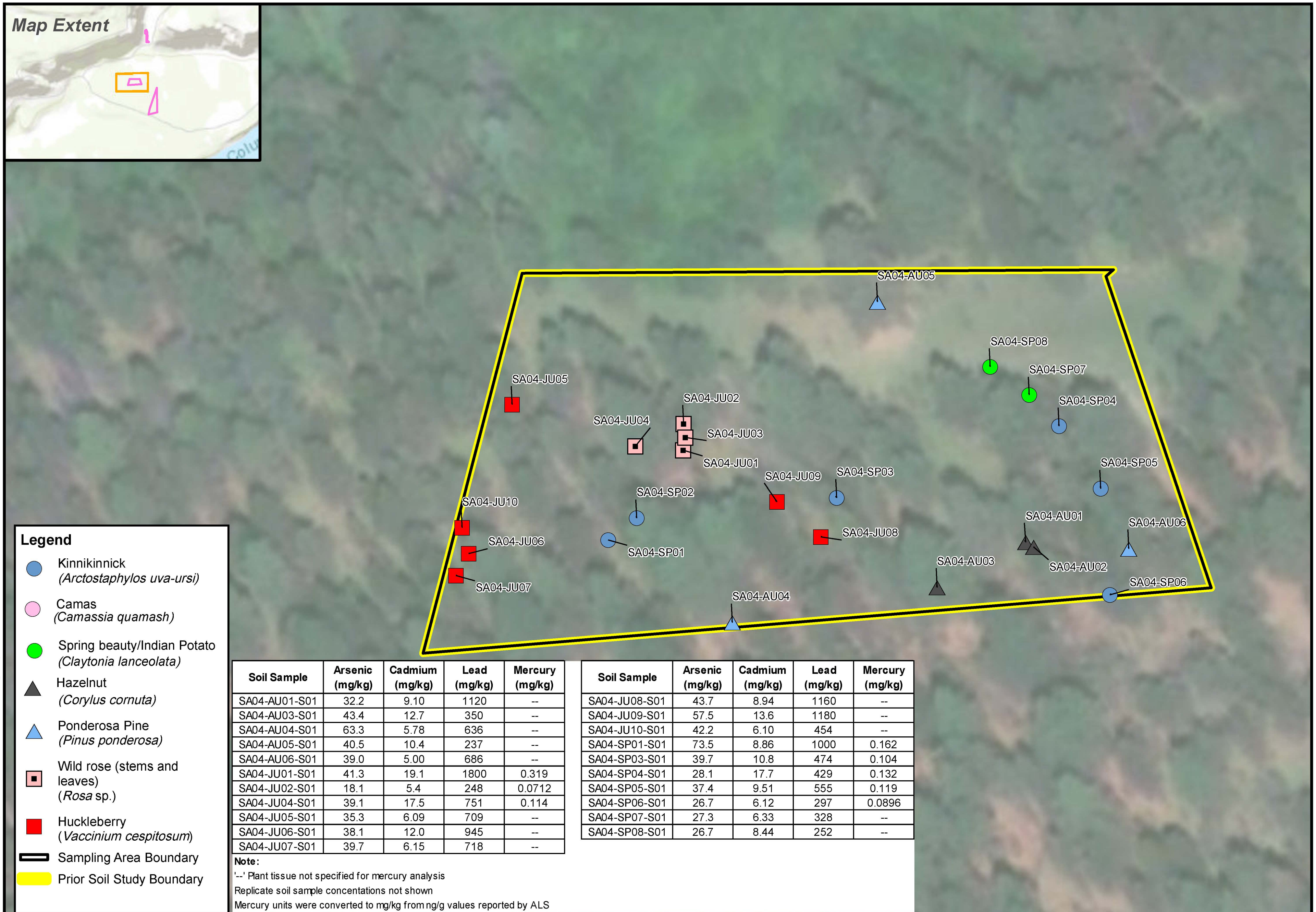
RAMBOLL

0 5 10 20 Meters
0 20 40 80 Feet
N

Map 2-4. Detail for Sampling Area 03
Upper Columbia River, WA



Soil Sample	Arsenic (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
SA04-AU01-S01	32.2	9.10	1120	--
SA04-AU03-S01	43.4	12.7	350	--
SA04-AU04-S01	63.3	5.78	636	--
SA04-AU05-S01	40.5	10.4	237	--
SA04-AU06-S01	39.0	5.00	686	--
SA04-JU01-S01	41.3	19.1	1800	0.319
SA04-JU02-S01	18.1	5.4	248	0.0712
SA04-JU04-S01	39.1	17.5	751	0.114
SA04-JU05-S01	35.3	6.09	709	--
SA04-JU06-S01	38.1	12.0	945	--
SA04-JU07-S01	39.7	6.15	718	--

Soil Sample	Arsenic (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
SA04-JU08-S01	43.7	8.94	1160	--
SA04-JU09-S01	57.5	13.6	1180	--
SA04-JU10-S01	42.2	6.10	454	--
SA04-SP01-S01	73.5	8.86	1000	0.162
SA04-SP03-S01	39.7	10.8	474	0.104
SA04-SP04-S01	28.1	17.7	429	0.132
SA04-SP05-S01	37.4	9.51	555	0.119
SA04-SP06-S01	26.7	6.12	297	0.0896
SA04-SP07-S01	27.3	6.33	328	--
SA04-SP08-S01	26.7	8.44	252	--

Note:
'--' Plant tissue not specified for mercury analysis
Replicate soil sample concentations not shown
Mercury units were converted to mg/kg from ng/g values reported by ALS

RAMBOLL

Map 2-5. Detail for Sampling Area 04
Upper Columbia River, WA

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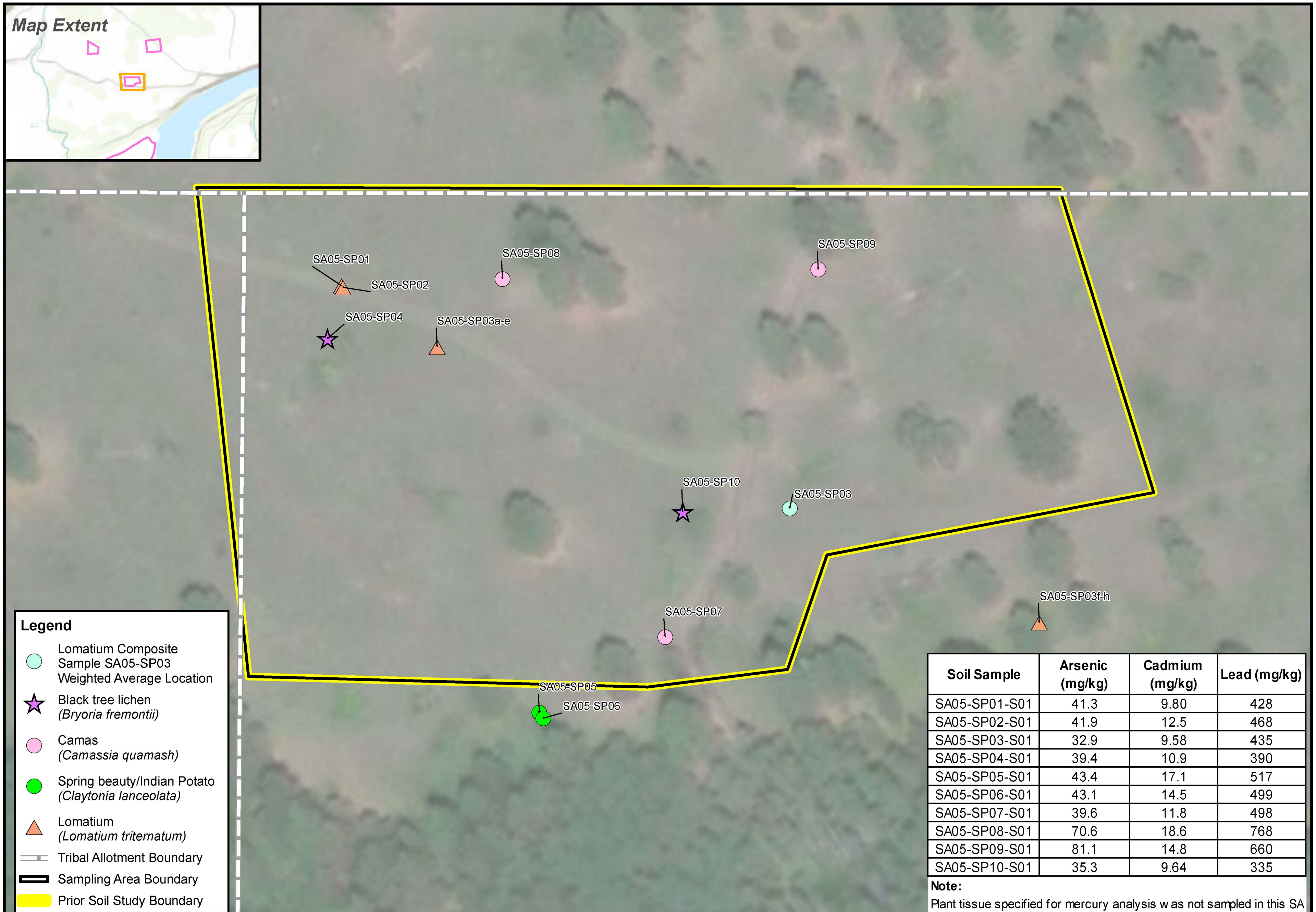

Soil Sample	Arsenic (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)
SA05-SP01-S01	41.3	9.80	428
SA05-SP02-S01	41.9	12.5	468
SA05-SP03-S01	32.9	9.58	435
SA05-SP04-S01	39.4	10.9	390
SA05-SP05-S01	43.4	17.1	517
SA05-SP06-S01	43.1	14.5	499
SA05-SP07-S01	39.6	11.8	498
SA05-SP08-S01	70.6	18.6	768
SA05-SP09-S01	81.1	14.8	660
SA05-SP10-S01	35.3	9.64	335

Note:
Plant tissue specified for mercury analysis w as not sampled in this SA

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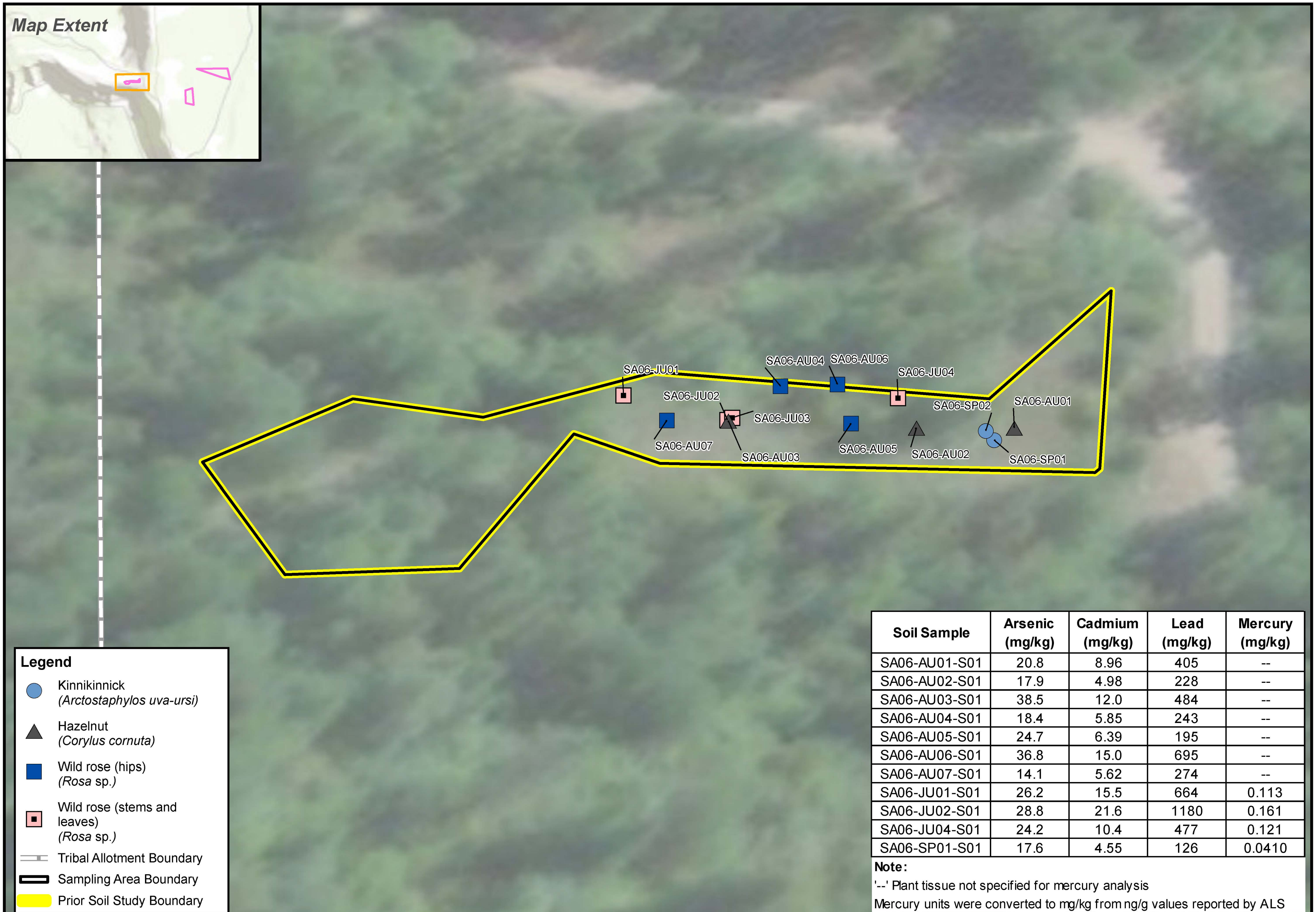
RAMBOLL

0 10 20 40 Meters
0 30 60 120 Feet
N

Map 2-6. Detail for Sampling Area 05
Upper Columbia River, WA



Soil Sample	Arsenic (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
SA06-AU01-S01	20.8	8.96	405	--
SA06-AU02-S01	17.9	4.98	228	--
SA06-AU03-S01	38.5	12.0	484	--
SA06-AU04-S01	18.4	5.85	243	--
SA06-AU05-S01	24.7	6.39	195	--
SA06-AU06-S01	36.8	15.0	695	--
SA06-AU07-S01	14.1	5.62	274	--
SA06-JU01-S01	26.2	15.5	664	0.113
SA06-JU02-S01	28.8	21.6	1180	0.161
SA06-JU04-S01	24.2	10.4	477	0.121
SA06-SP01-S01	17.6	4.55	126	0.0410

Note:
'--' Plant tissue not specified for mercury analysis
Mercury units were converted to mg/kg from ng/g values reported by ALS

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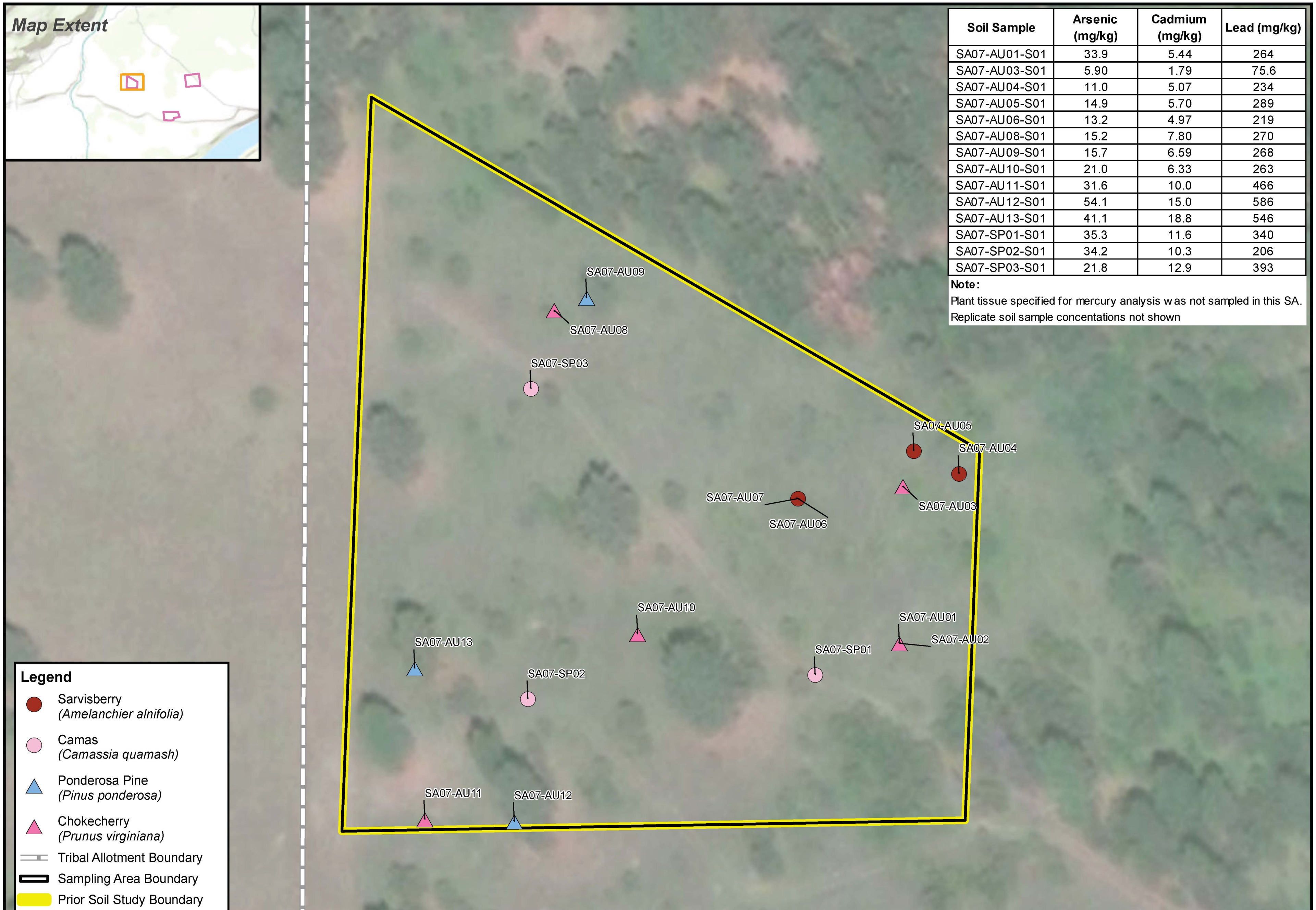
RAMBOLL

Map 2-7. Detail for Sampling Area 06
Upper Columbia River, WA



Soil Sample	Arsenic (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)
SA07-AU01-S01	33.9	5.44	264
SA07-AU03-S01	5.90	1.79	75.6
SA07-AU04-S01	11.0	5.07	234
SA07-AU05-S01	14.9	5.70	289
SA07-AU06-S01	13.2	4.97	219
SA07-AU08-S01	15.2	7.80	270
SA07-AU09-S01	15.7	6.59	268
SA07-AU10-S01	21.0	6.33	263
SA07-AU11-S01	31.6	10.0	466
SA07-AU12-S01	54.1	15.0	586
SA07-AU13-S01	41.1	18.8	546
SA07-SP01-S01	35.3	11.6	340
SA07-SP02-S01	34.2	10.3	206
SA07-SP03-S01	21.8	12.9	393

Note:
Plant tissue specified for mercury analysis was not sampled in this SA.
Replicate soil sample concentations not shown

RAMBOLL

0 10 20 40 Meters
0 30 60 120 Feet
N

Map 2-8. Detail for Sampling Area 07
Upper Columbia River, WA

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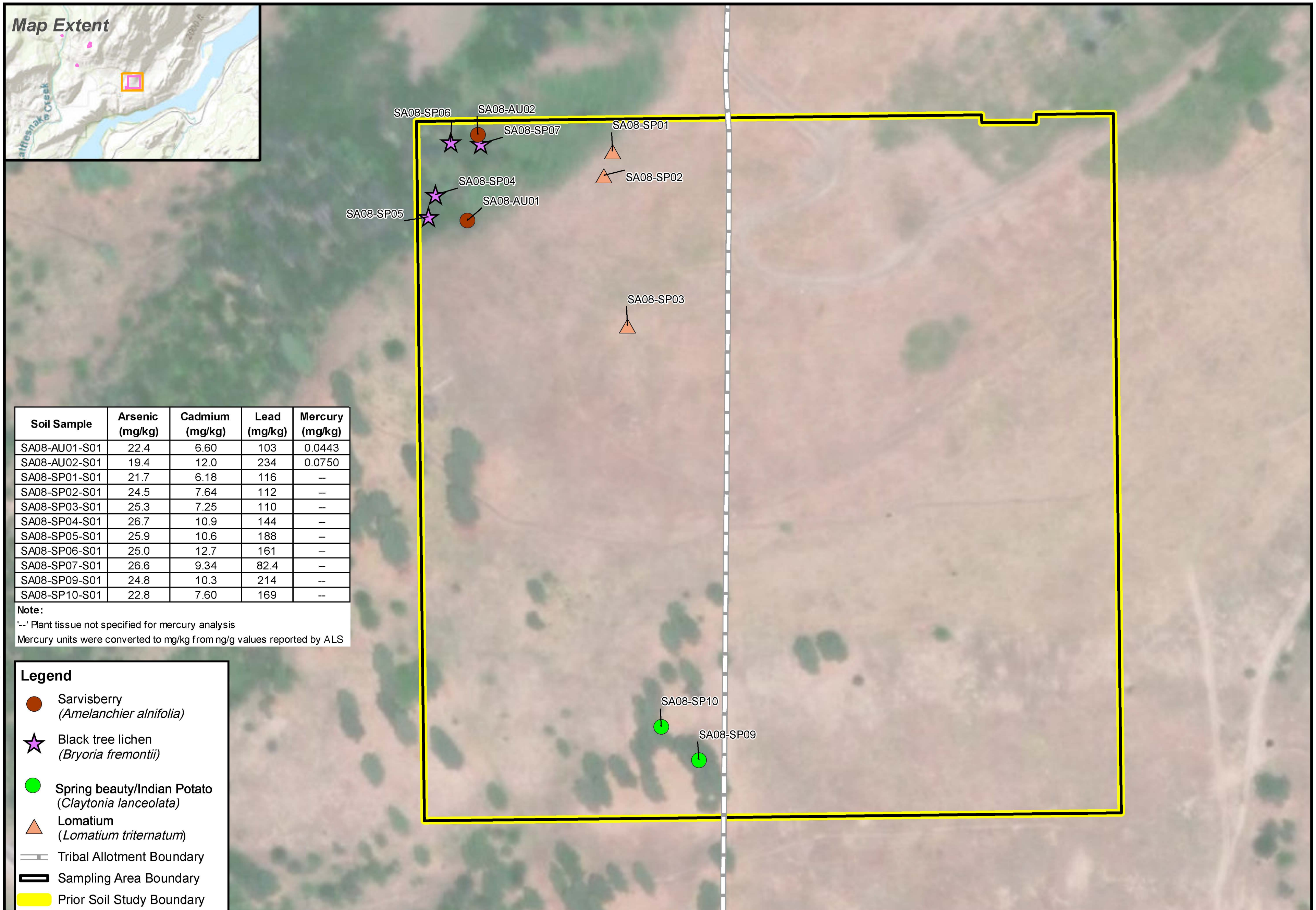

Soil Sample	Arsenic (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
SA08-AU01-S01	22.4	6.60	103	0.0443
SA08-AU02-S01	19.4	12.0	234	0.0750
SA08-SP01-S01	21.7	6.18	116	--
SA08-SP02-S01	24.5	7.64	112	--
SA08-SP03-S01	25.3	7.25	110	--
SA08-SP04-S01	26.7	10.9	144	--
SA08-SP05-S01	25.9	10.6	188	--
SA08-SP06-S01	25.0	12.7	161	--
SA08-SP07-S01	26.6	9.34	82.4	--
SA08-SP09-S01	24.8	10.3	214	--
SA08-SP10-S01	22.8	7.60	169	--

Note:
'--' Plant tissue not specified for mercury analysis
Mercury units were converted to mg/kg from ng/g values reported by ALS

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RAMBOLL

Map 2-9. Detail for Sampling Area 08
Upper Columbia River, WA

Soil Sample	Arsenic (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)
SA09-AU01-S01	24.0	19.5	800
SA09-AU02-S01	29.2	11.1	597
SA09-AU04-S01	20.4	9.91	394

Note:
Plant tissue specified for mercury analysis was not sampled in this SA.
Replicate soil sample concentations not shown

Map 2-10. Detail for Sampling Area 09
Upper Columbia River, WA

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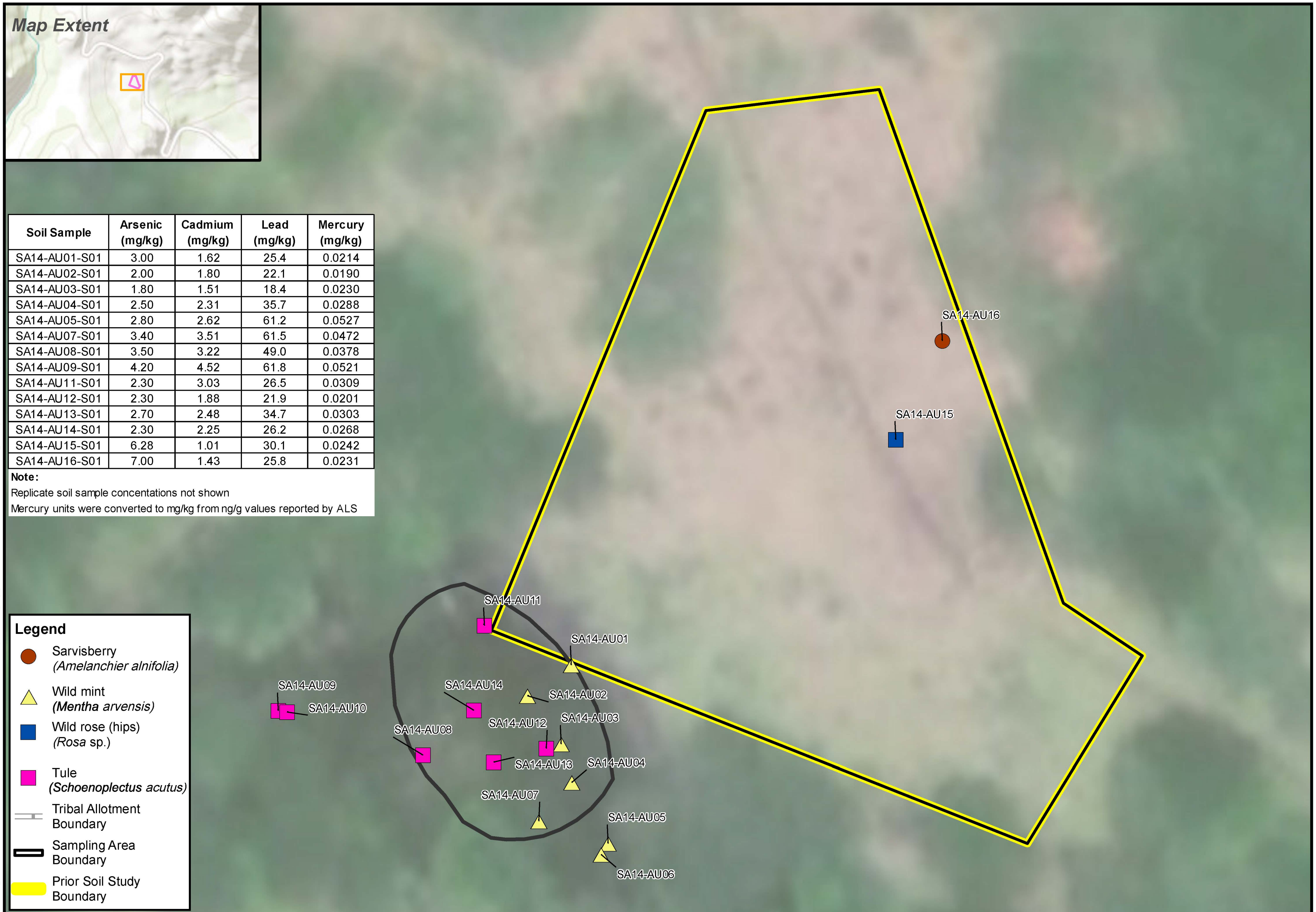
Soil Sample	Arsenic (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
SA14-AU01-S01	3.00	1.62	25.4	0.0214
SA14-AU02-S01	2.00	1.80	22.1	0.0190
SA14-AU03-S01	1.80	1.51	18.4	0.0230
SA14-AU04-S01	2.50	2.31	35.7	0.0288
SA14-AU05-S01	2.80	2.62	61.2	0.0527
SA14-AU07-S01	3.40	3.51	61.5	0.0472
SA14-AU08-S01	3.50	3.22	49.0	0.0378
SA14-AU09-S01	4.20	4.52	61.8	0.0521
SA14-AU11-S01	2.30	3.03	26.5	0.0309
SA14-AU12-S01	2.30	1.88	21.9	0.0201
SA14-AU13-S01	2.70	2.48	34.7	0.0303
SA14-AU14-S01	2.30	2.25	26.2	0.0268
SA14-AU15-S01	6.28	1.01	30.1	0.0242
SA14-AU16-S01	7.00	1.43	25.8	0.0231

Note:
Replicate soil sample concentations not shown
Mercury units were converted to mg/kg from ng/g values reported by ALS



RAMBOLL

Map 2-11. Detail for Sampling Area 14
Upper Columbia River, WA

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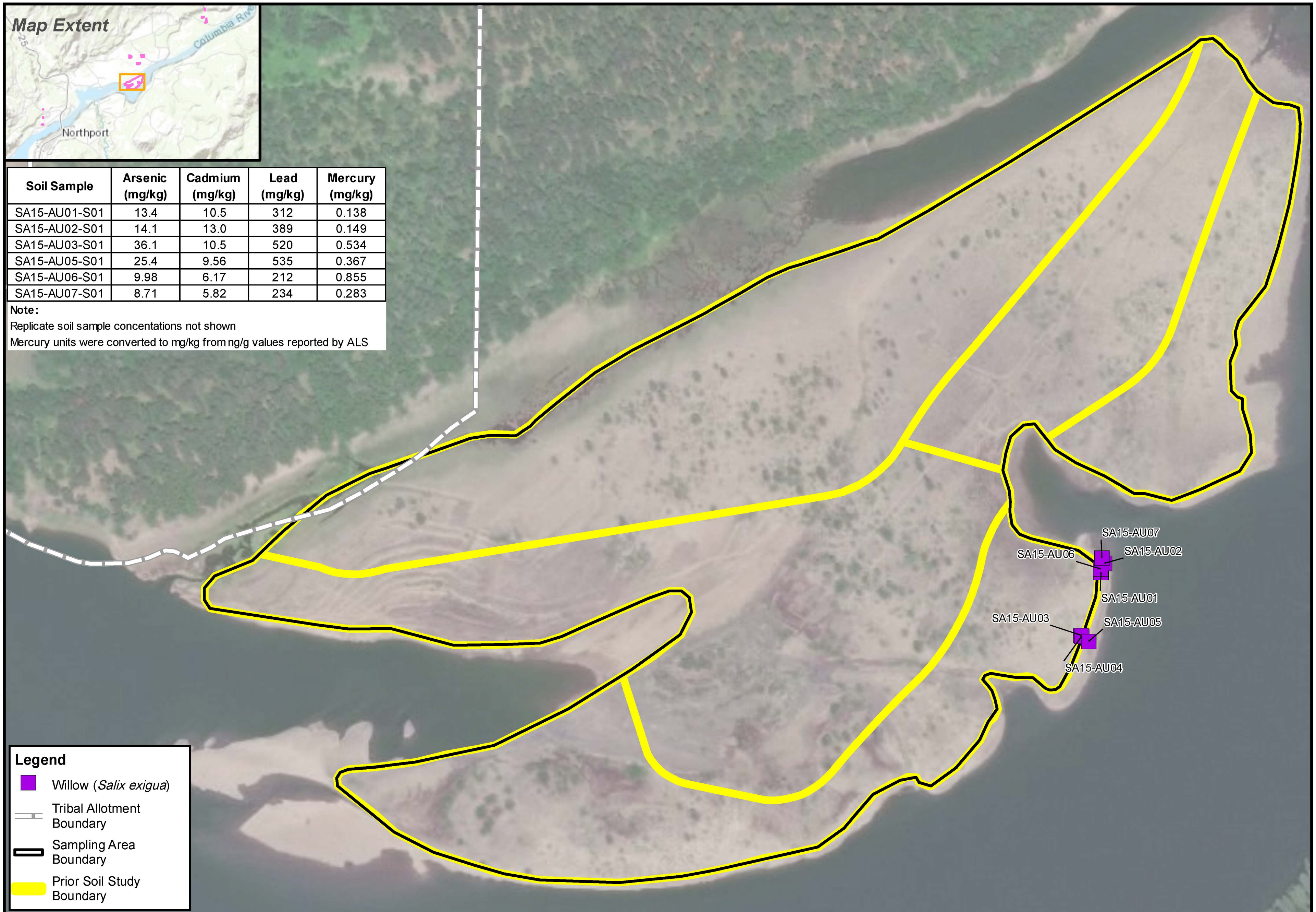


Soil Sample	Arsenic (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
SA15-AU01-S01	13.4	10.5	312	0.138
SA15-AU02-S01	14.1	13.0	389	0.149
SA15-AU03-S01	36.1	10.5	520	0.534
SA15-AU05-S01	25.4	9.56	535	0.367
SA15-AU06-S01	9.98	6.17	212	0.855
SA15-AU07-S01	8.71	5.82	234	0.283

Note:
Replicate soil sample concentations not shown
Mercury units were converted to mg/kg from ng/g values reported by ALS

RAMBOLL

0 55 110 220 Meters

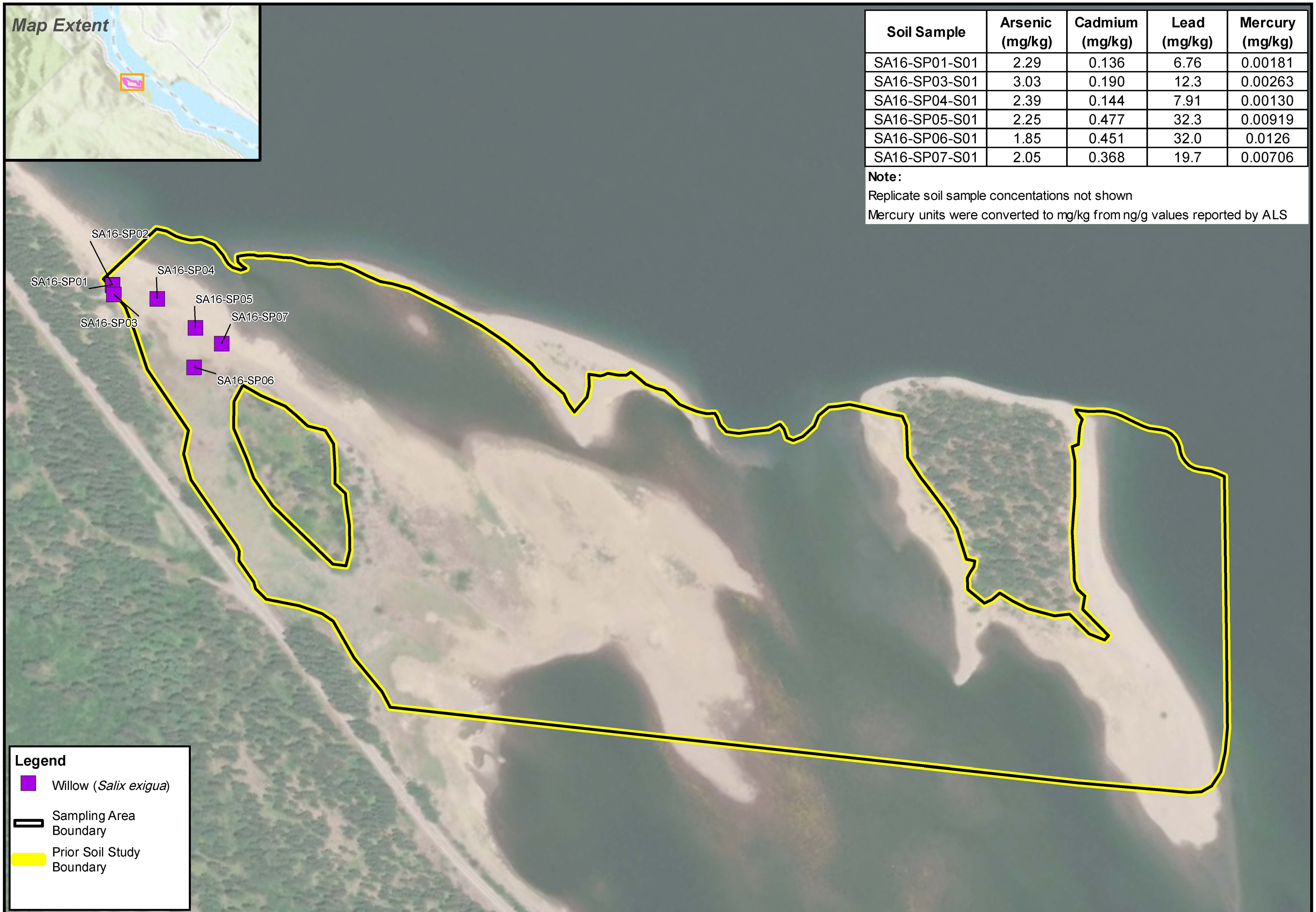
0 145 290 580 Feet

N

Map 2-12. Detail for Sampling Area 15
Upper Columbia River, WA

Soil Sample	Arsenic (mg/kg)	Cadmium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
SA16-SP01-S01	2.29	0.136	6.76	0.00181
SA16-SP03-S01	3.03	0.190	12.3	0.00263
SA16-SP04-S01	2.39	0.144	7.91	0.00130
SA16-SP05-S01	2.25	0.477	32.3	0.00919
SA16-SP06-S01	1.85	0.451	32.0	0.0126
SA16-SP07-S01	2.05	0.368	19.7	0.00706

Note:
Replicate soil sample concentations not shown
Mercury units were converted to mg/kg from ng/g values reported by ALS



RAMBOLL

Map 2-13. Detail for Sampling Area 16
Upper Columbia River, WA

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TABLES

Table 2-1. Number of Plant Tissue and Soil Samples Collected[a]

Species Common Name	Species Scientific Name	High Lead Sampling Areas[b]				Lower Lead Sampling Areas[b,c]									
		SA01	SA02	SA03	Sampling Event High Lead Total	SA04	SA05	SA06	SA07	SA08	SA09	SA14	SA15[d]	SA16	Sampling Event Lower Lead Total
Spring Sampling Event															
Black tree lichen	*Bryoria fremontii*	6	--	--	6	--	2	--	--	4	--	--	--	--	6
Camas	*Camassia quamash*	3	--	3	6	--	3	--	3	--	--	--	--	--	6
Kinnikinnick	*Arctostaphylos uva-ursi*	--	$3^{e,f}$	$3^{e,f}$	6	$5^{e,f}$	--	1^{e}	--	--	--	--	--	--	6
Lomatium	*Lomatium triternatum*	--	1	3	4	--	3	--	--	3	--	--	--	--	6
Spring beauty / Indian potato	*Claytonia lanceolata*	2	2	2	6	2	2	--	--	2	--	--	--	--	6
Willow	*Salix exigua*	--	--	--	0	--	--	--	--	--	--	--	--	$6^{e,f}$	6
June Sampling Event															
Lomatium	*Lomatium triternatum*	--	--	2	2	--	--	--	--	--	--	--	--	--	0
Huckleberry	*Vaccinium cespitosum*	--	--	--	0	6	--	--	--	--	--	--	--	--	6
Wild rose (stems and leaves)	*Rosa* sp.	$3^{e,f}$	--	3	6	$3^{e,f}$	--	$3^{e,f}$	--	--	--	--	--	--	6
August Sampling Event															
Chokecherry	*Prunus virginiana*	3^{e}	--	3	6	--	--	--	$5^{e,f}$	--	1	--	--	--	6
Hazelnut	*Corylus cornuta var. californica*	--	3	$3^{e,f}$	6	2^{e}	--	3^{f}	--	--	1	--	--	--	6
Ponderosa pine	*Pinus ponderosa*	3	2^{e}	1	6	3^{f}	--	--	3	--	--	--	--	--	6
Sarvisberry	*Amelanchier alnifolia*	5	--	1^{f}	6	--	--	--	$3^{e,f}$	2	--	1	--	--	6
Tule	*Schoenoplectus acutus*	--	--	--	0	--	--	--	--	--	--	$6^{e,f}$	--	--	6
Willow	*Salix exigua*	--	--	--	0	--	--	--	--	--	--	--	$6^{e,f}$	--	6
Wild rose (hips)	*Rosa* sp.	--	--	--	0	--	--	4	--	--	1^{e}	1	--	--	6
Wild mint	*Mentha arvensis*	--	--	--	0	--	--	--	--	--	--	$6^{e,f}$	--	--	6
Target Species Not Collected[g]															
Bitterroot	*Lewisia rediviva*	--	--	--	0	--	--	--	--	--	--	--	--	--	0
Indian carrot	*Perideridia gairdneri*	--	--	--	0	--	--	--	--	--	--	--	--	--	0
Morel	*Morchella esculenta*	--	--	--	0	--	--	--	--	--	--	--	--	--	0
Puffball	*Calvatia gigantea*	--	--	--	0	--	--	--	--	--	--	--	--	--	0
Red willow / red-osier dogwood	*Cornus sericea*	--	--	--	0	--	--	--	--	--	--	--	--	--	0
Shaggy mane	*Coprinus comatus*	--	--	--	0	--	--	--	--	--	--	--	--	--	0
Wild strawberry	*Fragaria vesca, F. virginiana*	--	--	--	0	--	--	--	--	--	--	--	--	--	0

Notes:

[a] A co-located soil sample was collected with each plant tissue sample, so numbers reflect both plant tissue and soil sample counts.

[b] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[c] SA10, SA11, SA12, and SA13 were designated as additional potential lower lead SAs in the QAPP (Ramboll 2018). However, they were not sampled because they were either inaccessible, did not have the target plant species, or an adequate number of samples had already been collected at one or more of the other SAs and no more samples were needed to meet the study objectives.

[d] Willow was collected in SA15, which has higher lead concentrations in soil than SA16. The average soil lead concentration reported in the 2014 upland soil study (CH2MHill 2016; Ramboll Environ 2017b) for SA15 was 389 mg/kg, which is below the time-critical removal action level of 700 mg/kg and was therefore not identified as a "high lead" sampling area in the QAPP.

[e] One replicate sample was collected.

[f] One potential EPA split sample was collected.

[g] Species were not collected because they could not be found or could not be found in high enough mass to meet minimum sampling requirements. The exception is red willow / red-osier dogwood, which was not sampled because Confederated Tribes of the Colville Reservation (CCT) determined that the species was not mouthed. Some puffballs were found, but CCT determined that they were the wrong type for consumption thus they were not collected.

-- - not sampled

Table 2-2. Plant Tissue and Soil Sample List

Sampling Event	Sample ID[a]	Sampling Date	Species or Soil	Study Element	Composite Unit Count	Average Composite Sample Measurement	Total Sample Measurement	Sample Measurement Units
SA01								
Spring	SA01-SP01-P01	4/27/2018	Camas	Field sample	3	1.63	4.9	g
	SA01-SP01-S01	4/27/2018	Soil	Field sample	3	N/A	N/A	NA
	SA01-SP02-P01	4/27/2018	Camas	Field sample	6	0.82	4.9	g
	SA01-SP02-S01	4/27/2018	Soil	Field sample	6	N/A	N/A	NA
	SA01-SP04-P01	4/28/2018	Spring beauty/Indian potato	Field sample	9	0.51	4.6	g
	SA01-SP04-S01	4/28/2018	Soil	Field sample	9	N/A	N/A	NA
	SA01-SP05-P01	4/28/2018	Black tree lichen	Field sample, EPA split	N/A[b]	N/A[b]	2.3	g
	SA01-SP05-S01	4/28/2018	Soil	Field sample	NA[c]	NA[c]	N/A	NA
	SA01-SP06-P01	4/28/2018	Spring beauty/Indian potato	Field sample	11	0.40	4.4	g
	SA01-SP06-S01	4/28/2018	Soil	Field sample	11	N/A	N/A	NA
	SA01-SP07-P01	4/28/2018	Black tree lichen	Field sample	N/A[b]	N/A[b]	16	g
	SA01-SP07-S01	4/28/2018	Soil	Field sample	NA[c]	NA[c]	N/A	NA
	SA01-SP08-P01	4/28/2018	Black tree lichen	Field sample	N/A[b]	N/A[b]	9	g
	SA01-SP08-S01	4/28/2018	Soil	Field sample	NA[c]	NA[c]	N/A	NA
	SA01-SP09-P01	4/28/2018	Camas	Field sample	2	2.30	4.6	g
	SA01-SP09-S01	4/28/2018	Soil	Field sample	2	N/A	N/A	NA
	SA01-SP10-P01	4/28/2018	Black tree lichen	Field sample	N/A[b]	N/A[b]	6.1	g
	SA01-SP10-S01	4/28/2018	Soil	Field sample, EPA split	NA[c]	NA[c]	N/A	NA
	SA01-SP11-P01	4/28/2018	Black tree lichen	Field sample	N/A[b]	N/A[b]	5.3	g
	SA01-SP11-S01	4/28/2018	Soil	Field sample	NA[c]	NA[c]	N/A	NA
	SA01-SP12-P01	4/28/2018	Black tree lichen	Field sample	N/A[b]	N/A[b]	10.3	g
	SA01-SP12-S01	4/28/2018	Soil	Field sample	NA[c]	NA[c]	N/A	NA
June	**SA01-JU01-P01**	6/19/2018	Wild rose (stems and leaves)	Field sample, potential EPA split	--	--	275	cm
	SA01-JU01-S01	6/19/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA01-JU02-P01	6/19/2018	Wild rose (stems and leaves)	Field sample	--	--	98	cm
	SA01-JU02-S01	6/19/2018	Soil	Field sample	--	--	N/A	NA
	SA01-JU03-P01	6/19/2018	Wild rose (stems and leaves)	Replicate sample	--	--	77	cm
	SA01-JU03-S01	6/19/2018	Soil	Replicate sample	--	--	N/A	NA
	SA01-JU04-P01	6/19/2018	Wild rose (stems and leaves)	Field sample, EPA split	--	--	100	cm
	SA01-JU04-S01	6/19/2018	Soil	Field sample	--	--	N/A	NA
August	SA01-AU01-P01	8/22/2018	Chokecherry	Field sample	--	--	76.5	g
	SA01-AU01-S01	8/22/2018	Soil	Field sample	--	--	N/A	NA
	SA01-AU02-P01	8/22/2018	Chokecherry	Field sample	--	--	82	g
	SA01-AU02-S01	8/22/2018	Soil	Field sample	--	--	N/A	NA
	SA01-AU03-P01	8/22/2018	Chokecherry	Replicate sample	--	--	112	g
	SA01-AU03-S01	8/22/2018	Soil	Replicate sample	--	--	N/A	NA
	SA01-AU04-P01	8/22/2018	Chokecherry	Field sample	--	--	79	g
	SA01-AU04-S01	8/22/2018	Soil	Field sample	--	--	N/A	NA
	SA01-AU05-P01	8/22/2018	Sarvisberry	Field sample	--	--	8.9	g
	SA01-AU05-S01	8/22/2018	Soil	Field sample	--	--	N/A	NA
	SA01-AU06-P01	8/22/2018	Sarvisberry	Field sample	--	--	10	g
	SA01-AU06-S01	8/22/2018	Soil	Field sample	--	--	N/A	NA
	SA01-AU07-P01	8/22/2018	Sarvisberry	Field sample	--	--	6.2	g

Table 2-2. Plant Tissue and Soil Sample List

Sampling Event	Sample ID[a]	Sampling Date	Species or Soil	Study Element	Composite Unit Count	Average Composite Sample Measurement	Total Sample Measurement	Sample Measurement Units
SA01 (continued)								
August (cont.)	SA01-AU07-S01	8/22/2018	Soil	Field sample	--	--	N/A	NA
	SA01-AU08-P01	8/22/2018	Sarvisberry	Field sample	--	--	7.5	g
	SA01-AU08-S01	8/22/2018	Soil	Field sample, EPA split	--	--	N/A	NA
	SA01-AU09-P01	8/22/2018	Sarvisberry	Field sample	--	--	6	g
	SA01-AU09-S01	8/22/2018	Soil	Field sample	--	--	N/A	NA
	SA01-AU10-P01	8/22/2018	Pondersosa pine	Field sample	--	--	12	cones
	SA01-AU10-S01	8/22/2018	Soil	Field sample	--	--	N/A	NA
	SA01-AU11-P01	8/22/2018	Pondersosa pine	Field sample	--	--	11	cones
	SA01-AU11-S01	8/22/2018	Soil	Field sample	--	--	N/A	NA
	SA01-AU12-P01	8/22/2018	Pondersosa pine	Field sample	--	--	10	cones
	SA01-AU12-S01	8/22/2018	Soil	Field sample	--	--	N/A	NA
SA02								
Spring	SA02-SP01-P01	4/25/2018	Spring beauty/Indian potato	Field sample	7	0.33	2.3	g
	SA02-SP01-S01	4/25/2018	Soil	Field sample	7	N/A	NA	NA
	SA02-SP02-P01	4/26/2018	Kinnikinnick	Field sample	--	--	6.5	g
	SA02-SP02-S01	4/26/2018	Soil	Field sample	--	--	N/A	NA
	SA02-SP03-P01	4/26/2018	Kinnikinnick	Replicate sample, EPA split	--	--	5.9	g
	SA02-SP03-S01	4/26/2018	Soil	Replicate sample	--	--	N/A	NA
	SA02-SP04-P01	4/26/2018	Kinnikinnick	Field sample, potential EPA split	--	--	11.4	g
	SA02-SP04-S01	4/26/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA02-SP05-P01	4/26/2018	Kinnikinnick	Field sample	--	--	6	g
	SA02-SP05-S01	4/26/2018	Soil	Field sample	--	--	N/A	NA
	SA02-SP06-P01	4/26/2018	Lomatium	Field sample	3	1.30	3.9	g
	SA02-SP06-S01	4/26/2018	Soil	Field sample	3	N/A	NA	NA
	SA02-SP07-P01	4/26/2018	Spring beauty/Indian potato	Field sample	9	0.24	2.2	g
	SA02-SP07-S01	4/26/2018	Soil	Field sample	9	N/A	NA	NA
August	SA02-AU01-P01	8/21/2018	Hazelnut	Field sample	--	--	21	nuts
	SA02-AU01-S01	8/21/2018	Soil	Field sample	--	--	N/A	NA
	SA02-AU02-P01	8/21/2018	Hazelnut	Field sample	--	--	31	nuts
	SA02-AU02-S01	8/21/2018	Soil	Field sample	--	--	N/A	NA
	SA02-AU03-P01	8/21/2018	Hazelnut	Field sample	--	--	21	nuts
	SA02-AU03-S01	8/21/2018	Soil	Field sample	--	--	N/A	NA
	SA02-AU04-P01	8/21/2018	Pondersosa pine	Field sample	--	--	15	cones
	SA02-AU04-S01	8/21/2018	Soil	Field sample	--	--	N/A	NA
	SA02-AU05-P01	8/21/2018	Pondersosa pine	Replicate sample	--	--	11	cones
	SA02-AU05-S01	8/21/2018	Soil	Replicate sample	--	--	N/A	NA
	SA02-AU06-P01	8/21/2018	Pondersosa pine	Field sample	--	--	10	cones
	SA02-AU06-S01	8/21/2018	Soil	Field sample	--	--	N/A	NA

Table 2-2. Plant Tissue and Soil Sample List

Sampling Event	Sample ID[a]	Sampling Date	Species or Soil	Study Element	Composite Unit Count	Average Composite Sample Measurement	Total Sample Measurement	Sample Measurement Units
SA03								
Spring	**SA03-SP01-P01**	4/26/2018	Kinnikinnick	Field sample	--	--	5.6	g
	SA03-SP01-S01	4/26/2018	Soil	Field sample	--	--	N/A	NA
	SA03-SP02-P01	4/26/2018	Kinnikinnick	Replicate sample	--	--	5.7	g
	SA03-SP02-S01	4/26/2018	Soil	Replicate sample	--	--	N/A	NA
	SA03-SP03-P01	4/26/2018	Camas	Field sample	3	2.03	6.1	g
	SA03-SP03-S01	4/26/2018	Soil	Field sample, EPA split	3	N/A	NA	NA
	SA03-SP04-P01	4/27/2018	Camas	Field sample	4	1.35	5.4	g
	SA03-SP04-S01	4/27/2018	Soil	Field sample	4	N/A	NA	NA
	SA03-SP05-P01	4/27/2018	Camas	Field sample	2	2.30	4.6	g
	SA03-SP05-S01	4/27/2018	Soil	Field sample	2	N/A	NA	NA
	SA03-SP06-P01	4/27/2018	Spring beauty/Indian potato	Field sample	3	1.50	4.5	g
	SA03-SP06-S01	4/27/2018	Soil	Field sample	3	N/A	NA	NA
	SA03-SP07-P01	4/27/2018	Spring beauty/Indian potato	Field sample	4	0.45	1.8	g
	SA03-SP07-S01	4/27/2018	Soil	Field sample	4	N/A	NA	NA
	SA03-SP08-P01	4/27/2018	Lomatium	Field sample	--	--	6.8	g
	SA03-SP08-S01	4/27/2018	Soil	Field sample	--	--	N/A	NA
	SA03-SP09-P01	4/27/2018	Lomatium	Field sample	6	0.80	4.8	g
	SA03-SP09-S01	4/27/2018	Soil	Field sample	6	N/A	NA	NA
	SA03-SP10-P01	4/27/2018	Kinnikinnick	Field sample	--	--	5.8	g
	SA03-SP10-S01	4/27/2018	Soil	Field sample,	--	--	N/A	NA
	SA03-SP11-P01	4/27/2018	Kinnikinnick	Field sample, potential EPA split	--	--	11.2	g
	SA03-SP11-S01	4/27/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA03-SP12-P01	4/27/2018	Lomatium	Field sample	9	0.77	6.9	g
	SA03-SP12-S01	4/27/2018	Soil	Field sample	9	N/A	NA	NA
June	**SA03-JU01-P01**	6/18/2018	Wild rose (stems and leaves)	Field sample	--	--	70	cm
	SA03-JU01-S01	6/18/2018	Soil	Field sample	--	--	N/A	NA
	SA03-JU02-P01	6/18/2018	Wild rose (stems and leaves)	Field sample	--	--	81	cm
	SA03-JU02-S01	6/18/2018	Soil	Field sample	--	--	N/A	NA
	SA03-JU03-P01	6/18/2018	Wild rose (stems and leaves)	Field sample	--	--	57	cm
	SA03-JU03-S01	6/18/2018	Soil	Field sample	--	--	N/A	NA
	SA03-JU04-P01	6/18/2018	Lomatium	Field sample	4	2.15	8.6	g
	SA03-JU04-S01	6/18/2018	Soil	Field sample	4	N/A	NA	NA
	SA03-JU05-P01	6/18/2018	Lomatium	Field sample	4	1.95	7.8	g
	SA03-JU05-S01	6/18/2018	Soil	Field sample	4	N/A	NA	NA
August	SA03-AU01-P01	8/21/2018	Hazelnut	Field sample	--	--	20	nuts
	SA03-AU01-S01	8/21/2018	Soil	Field sample	--	--	N/A	NA
	SA03-AU02-P01	8/21/2018	Hazelnut	Field sample	--	--	12	nuts
	SA03-AU02-S01	8/21/2018	Soil	Field sample	--	--	N/A	NA
	SA03-AU03-P01	8/21/2018	Hazelnut	Field sample	--	--	20	nuts
	SA03-AU03-S01	8/21/2018	Soil	Field sample	--	--	N/A	NA
	SA03-AU04-P01	8/21/2018	Hazelnut	Field sample, potential EPA split	--	--	57	nuts
	SA03-AU04-S01	8/21/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA03-AU05-P01	8/21/2018	Chokecherry	Field sample	--	--	177	g
	SA03-AU05-S01	8/21/2018	Soil	Field sample	--	--	N/A	NA

Table 2-2. Plant Tissue and Soil Sample List

Sampling Event	Sample ID[a]	Sampling Date	Species or Soil	Study Element	Composite Unit Count	Average Composite Sample Measurement	Total Sample Measurement	Sample Measurement Units
SA03 (continued)								
August (cont.)	SA03-AU06-P01	8/21/2018	Chokecherry	Field sample	--	--	188	g
	SA03-AU06-S01	8/21/2018	Soil	Field sample	--	--	N/A	NA
	SA03-AU07-P01	8/21/2018	Chokecherry	Field sample	--	--	86	g
	SA03-AU07-S01	8/21/2018	Soil	Field sample, EPA split	--	--	N/A	NA
	SA03-AU08-P01	8/21/2018	Sarvisberry	Field sample, potential EPA split	--	--	17	g
	SA03-AU08-S01	8/21/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA03-AU09-P01	8/21/2018	Pondersosa pine	Field sample	--	--	11	cones
	SA03-AU09-S01	8/21/2018	Soil	Field sample	--	--	N/A	NA
SA04								
Spring	**SA04-SP01-P01**	4/30/2018	Kinnikinnick	Field sample	--	--	5.8	g
	SA04-SP01-S01	4/30/2018	Soil	Field sample	--	--	N/A	NA
	SA04-SP02-P01	4/30/2018	Kinnikinnick	Replicate sample	--	--	6.1	g
	SA04-SP02-S01	4/30/2018	Soil	Replicate sample	--	--	N/A	NA
	SA04-SP03-P01	4/30/2018	Kinnikinnick	Field sample, potential EPA split	--	--	11.5	g
	SA04-SP03-S01	4/30/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA04-SP04-P01	4/30/2018	Kinnikinnick	Field sample	--	--	6.4	g
	SA04-SP04-S01	4/30/2018	Soil	Field sample	--	--	N/A	NA
	SA04-SP05-P01	5/1/2018	Kinnikinnick	Field sample	--	--	6	g
	SA04-SP05-S01	5/1/2018	Soil	Field sample	--	--	N/A	NA
	SA04-SP06-P01	5/1/2018	Kinnikinnick	Field sample	--	--	6	g
	SA04-SP06-S01	5/1/2018	Soil	Field sample	--	--	N/A	NA
	SA04-SP07-P01	5/1/2018	Spring beauty/Indian potato	Field sample	10	0.33	3.3	g
	SA04-SP07-S01	5/1/2018	Soil	Field sample	10	N/A	NA	NA
	SA04-SP08-P01	5/1/2018	Spring beauty/Indian potato	Field sample	6	0.68	4.1	g
	SA04-SP08-S01	5/1/2018	Soil	Field sample	6	N/A	NA	NA
June	**SA04-JU01-P01**	6/19/2018	Wild rose (stems and leaves)	Field sample, potential EPA split	--	--	150	cm
	SA04-JU01-S01	6/19/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA04-JU02-P01	6/19/2018	Wild rose (stems and leaves)	Field sample	--	--	70	cm
	SA04-JU02-S01	6/19/2018	Soil	Field sample	--	--	N/A	NA
	SA04-JU03-P01	6/19/2018	Wild rose (stems and leaves)	Replicate sample	--	--	82	cm
	SA04-JU03-S01	6/19/2018	Soil	Replicate sample	--	--	N/A	NA
	SA04-JU04-P01	6/19/2018	Wild rose (stems and leaves)	Field sample	--	--	91	cm
	SA04-JU04-S01	6/19/2018	Soil	Field sample	--	--	N/A	NA
	SA04-JU05-P01	6/19/2018	Huckleberry	Field sample	--	--	17	g
	SA04-JU05-S01	6/19/2018	Soil	Field sample	--	--	N/A	NA
	SA04-JU06-P01	6/19/2018	Huckleberry	Field sample	--	--	18	g
	SA04-JU06-S01	6/19/2018	Soil	Field sample	--	--	N/A	NA
	SA04-JU07-P01	6/19/2018	Huckleberry	Field sample	--	--	18	g
	SA04-JU07-S01	6/19/2018	Soil	Field sample	--	--	N/A	NA
	SA04-JU08-P01	6/20/2018	Huckleberry	Field sample	--	--	16	g
	SA04-JU08-S01	6/20/2018	Soil	Field sample	--	--	N/A	NA
	SA04-JU09-P01	6/20/2018	Huckleberry	Field sample	--	--	18	g
	SA04-JU09-S01	6/20/2018	Soil	Field sample	--	--	N/A	NA
	SA04-JU10-P01	6/20/2018	Huckleberry	Field sample	--	--	19	g
	SA04-JU10-S01	6/20/2018	Soil	Field sample, EPA split	--	--	N/A	NA

Table 2-2. Plant Tissue and Soil Sample List

Sampling Event	Sample ID[a]	Sampling Date	Species or Soil	Study Element	Composite Unit Count	Average Composite Sample Measurement	Total Sample Measurement	Sample Measurement Units
SA04 (continued)								
August	SA04-AU01-P01	8/23/2018	Hazelnut	Field sample	--	--	22	nuts
	SA04-AU01-S01	8/23/2018	Soil	Field sample	--	--	N/A	NA
	SA04-AU02-P01	8/23/2018	Hazelnut	Replicate sample	--	--	22	nuts
	SA04-AU02-S01	8/23/2018	Soil	Replicate sample	--	--	N/A	NA
	SA04-AU03-P01	8/23/2018	Hazelnut	Field sample	--	--	24	nuts
	SA04-AU03-S01	8/23/2018	Soil	Field sample	--	--	N/A	NA
	SA04-AU04-P01	8/23/2018	Pondersosa pine	Field sample	--	--	17	cones
	SA04-AU04-S01	8/23/2018	Soil	Field sample	--	--	N/A	NA
	SA04-AU05-P01	8/23/2018	Pondersosa pine	Field sample, potential EPA split	--	--	26	cones
	SA04-AU05-S01	8/23/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA04-AU06-P01	8/23/2018	Pondersosa pine	Field sample	--	--	16	cones
	SA04-AU06-S01	8/23/2018	Soil	Field sample	--	--	N/A	NA
SA05								
Spring	SA05-SP01-P01	4/30/2018	Lomatium	Field sample	4	1.18	4.7	g
	SA05-SP01-S01	4/30/2018	Soil	Field sample	4	N/A	NA	NA
	SA05-SP02-P01	4/30/2018	Lomatium	Field sample	--	--	7	g
	SA05-SP02-S01	4/30/2018	Soil	Field sample	--	--	N/A	NA
	SA05-SP03-P01	4/30/2018	Lomatium	Field sample	8	0.88	7	g
	SA05-SP03-S01	4/30/2018	Soil	Field sample	8	N/A	NA	NA
	SA05-SP04-P01	4/30/2018	Black tree lichen	Field sample	N/A[b]	N/A[b]	5.1	g
	SA05-SP04-S01	4/30/2018	Soil	Field sample	NA[c]	NA[c]	NA	NA
	SA05-SP05-P01	4/30/2018	Spring beauty/Indian potato	Field sample	3	1.63	4.9	g
	SA05-SP05-S01	4/30/2018	Soil	Field sample	3	N/A	NA	NA
	SA05-SP06-P01	4/30/2018	Spring beauty/Indian potato	Field sample	2	1.95	3.9	g
	SA05-SP06-S01	4/30/2018	Soil	Field sample	2	N/A	NA	NA
	SA05-SP07-P01	4/30/2018	Camas	Field sample	2	2.25	4.5	g
	SA05-SP07-S01	4/30/2018	Soil	Field sample	2	N/A	NA	NA
	SA05-SP08-P01	4/30/2018	Camas	Field sample	6	0.80	4.8	g
	SA05-SP08-S01	4/30/2018	Soil	Field sample	6	N/A	NA	NA
	SA05-SP09-P01	4/30/2018	Camas	Field sample, EPA split	6	0.92	5.5	g
	SA05-SP09-S01	4/30/2018	Soil	Field sample	6	N/A	NA	NA
	SA05-SP10-P01	4/30/2018	Black tree lichen	Field sample	N/A[b]	N/A[b]	4.1	g
	SA05-SP10-S01	4/30/2018	Soil	Field sample	NA[c]	NA[c]	NA	NA
SA06								
Spring	**SA06-SP01-P01**	5/1/2018	Kinnikinnick	Field sample	--	--	8.7	g
	SA06-SP01-S01	5/1/2018	Soil	Field sample	--	--	N/A	NA
	SA06-SP02-P01	5/1/2018	Kinnikinnick	Replicate sample	--	--	6.4	g
	SA06-SP02-S01	5/1/2018	Soil	Replicate sample	--	--	N/A	NA
June	**SA06-JU01-P01**	6/20/2018	Wild rose (stems and leaves)	Field sample, potential EPA split	--	--	218	cm
	SA06-JU01-S01	6/20/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA06-JU02-P01	6/20/2018	Wild rose (stems and leaves)	Field sample	--	--	115	cm
	SA06-JU02-S01	6/20/2018	Soil	Field sample	--	--	N/A	NA
	SA06-JU03-P01	6/20/2018	Wild rose (stems and leaves)	Replicate sample	--	--	149	cm
	SA06-JU03-S01	6/20/2018	Soil	Replicate sample	--	--	N/A	NA
	SA06-JU04-P01	6/20/2018	Wild rose (stems and leaves)	Field sample	--	--	116	cm
	SA06-JU04-S01	6/20/2018	Soil	Field sample	--	--	N/A	NA

Table 2-2. Plant Tissue and Soil Sample List

Sampling Event	Sample ID[a]	Sampling Date	Species or Soil	Study Element	Composite Unit Count	Average Composite Sample Measurement	Total Sample Measurement	Sample Measurement Units
SA06 (continued)								
August	SA06-AU01-P01	8/23/2018	Hazelnut	Field sample, potential EPA split	--	--	62	nuts
	SA06-AU01-S01	8/23/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA06-AU02-P01	8/23/2018	Hazelnut	Field sample	--	--	27	nuts
	SA06-AU02-S01	8/23/2018	Soil	Field sample	--	--	N/A	NA
	SA06-AU03-P01	8/23/2018	Hazelnut	Field sample	--	--	20	nuts
	SA06-AU03-S01	8/23/2018	Soil	Field sample	--	--	N/A	NA
	SA06-AU04-P01	8/23/2018	Wild rose (hips)	Field sample	2	2.7	5.4	g
	SA06-AU04-S01	8/23/2018	Soil	Field sample	2	N/A	NA	NA
	SA06-AU05-P01	8/23/2018	Wild rose (hips)	Field sample	--	--	7	g
	SA06-AU05-S01	8/23/2018	Soil	Field sample	--	--	N/A	NA
	SA06-AU06-P01	8/23/2018	Wild rose (hips)	Field sample	--	--	15	g
	SA06-AU06-S01	8/23/2018	Soil	Field sample	--	--	N/A	NA
	SA06-AU07-P01	8/23/2018	Wild rose (hips)	Field sample	--	--	9.5	g
	SA06-AU07-S01	8/23/2018	Soil	Field sample	--	--	N/A	NA
SA07								
Spring	SA07-SP01-P01	5/2/2018	Camas	Field sample	5	0.90	4.5	g
	SA07-SP01-S01	5/2/2018	Soil	Field sample	5	N/A	NA	NA
	SA07-SP02-P01	5/2/2018	Camas	Field sample	4	1.15	4.6	g
	SA07-SP02-S01	5/2/2018	Soil	Field sample	4	N/A	NA	NA
	SA07-SP03-P01	5/2/2018	Camas	Field sample	6	1.07	6.4	g
	SA07-SP03-S01	5/2/2018	Soil	Field sample	6	N/A	NA	NA
August	SA07-AU01-P01	8/24/2018	Chokecherry	Field sample	--	--	105	g
	SA07-AU01-S01	8/24/2018	Soil	Field sample	--	--	N/A	NA
	SA07-AU02-P01	8/24/2018	Chokecherry	Replicate sample	--	--	105	g
	SA07-AU02-S01	8/24/2018	Soil	Replicate sample	--	--	N/A	NA
	SA07-AU03-P01	8/24/2018	Chokecherry	Field sample	--	--	98	g
	SA07-AU03-S01	8/24/2018	Soil	Field sample	--	--	N/A	NA
	SA07-AU04-P01	8/24/2018	Sarvisberry	Field sample, potential EPA split	--	--	21.5	g
	SA07-AU04-S01	8/24/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA07-AU05-P01	8/24/2018	Sarvisberry	Field sample	--	--	22	g
	SA07-AU05-S01	8/24/2018	Soil	Field sample	--	--	N/A	NA
	SA07-AU06-P01	8/24/2018	Sarvisberry	Field sample	--	--	17	g
	SA07-AU06-S01	8/24/2018	Soil	Field sample	--	--	N/A	NA
	SA07-AU07-P01	8/24/2018	Sarvisberry	Replicate sample	--	--	17	g
	SA07-AU07-S01	8/24/2018	Soil	Replicate sample	--	--	N/A	NA
	SA07-AU08-P01	8/24/2018	Chokecherry	Field sample	--	--	85	g
	SA07-AU08-S01	8/24/2018	Soil	Field sample	--	--	N/A	NA

Table 2-2. Plant Tissue and Soil Sample List

Sampling Event	Sample ID[a]	Sampling Date	Species or Soil	Study Element	Composite Unit Count	Average Composite Sample Measurement	Total Sample Measurement	Sample Measurement Units
SA07 (continued)								
August (cont.)	SA07-AU09-P01	8/24/2018	Pondersosa pine	Field sample	--	--	13	cones
	SA07-AU09-S01	8/24/2018	Soil	Field sample, EPA split	--	--	N/A	NA
	SA07-AU10-P01	8/24/2018	Chokecherry	Field sample	--	--	100	g
	SA07-AU10-S01	8/24/2018	Soil	Field sample	--	--	N/A	NA
	SA07-AU11-P01	8/24/2018	Chokecherry	Field sample, potential EPA split	--	--	212	g
	SA07-AU11-S01	8/24/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA07-AU12-P01	8/24/2018	Pondersosa pine	Field sample	--	--	14	cones
	SA07-AU12-S01	8/24/2018	Soil	Field sample	--	--	N/A	NA
	SA07-AU13-P01	8/24/2018	Pondersosa pine	Field sample	--	--	12	cones
	SA07-AU13-S01	8/24/2018	Soil	Field sample	--	--	N/A	NA
SA08								
Spring	SA08-SP01-P01	5/2/2018	Lomatium	Field sample	3	2.97	8.9	g
	SA08-SP01-S01	5/2/2018	Soil	Field sample	3	N/A	NA	NA
	SA08-SP02-P01	5/2/2018	Lomatium	Field sample	6	1.38	8.3	g
	SA08-SP02-S01	5/2/2018	Soil	Field sample	6	N/A	NA	NA
	SA08-SP03-P01	5/2/2018	Lomatium	Field sample	4	2.45	9.8	g
	SA08-SP03-S01	5/2/2018	Soil	Field sample	4	N/A	NA	NA
	SA08-SP04-P01	5/2/2018	Black tree lichen	Field sample	N/A[b]	N/A[b]	5	g
	SA08-SP04-S01	5/2/2018	Soil	Field sample	NA[c]	NA[c]	NA	NA
	SA08-SP05-P01	5/2/2018	Black tree lichen	Field sample	N/A[b]	N/A[b]	4.1	g
	SA08-SP05-S01	5/2/2018	Soil	Field sample, EPA split	NA[c]	NA[c]	NA	NA
	SA08-SP06-P01	5/2/2018	Black tree lichen	Field sample	N/A[b]	N/A[b]	5.8	g
	SA08-SP06-S01	5/2/2018	Soil	Field sample	NA[c]	NA[c]	NA	NA
	SA08-SP07-P01	5/2/2018	Black tree lichen	Field sample	N/A[b]	N/A[b]	3.8	g
	SA08-SP07-S01	5/2/2018	Soil	Field sample	NA[c]	NA[c]	NA	NA
	SA08-SP09-P01	5/2/2018	Spring beauty/Indian potato	Field sample	9	0.46	4.1	g
	SA08-SP09-S01	5/2/2018	Soil	Field sample	9	N/A	NA	NA
	SA08-SP10-P01	5/2/2018	Spring beauty/Indian potato	Field sample	8	0.48	3.8	g
	SA08-SP10-S01	5/2/2018	Soil	Field sample	8	N/A	NA	NA
August	**SA08-AU01-P01**	8/27/2018	Sarvisberry	Field sample	--	--	25	g
	SA08-AU01-S01	8/27/2018	Soil	Field sample	--	--	N/A	NA
	SA08-AU02-P01	8/27/2018	Sarvisberry	Field sample	--	--	13	g
	SA08-AU02-S01	8/27/2018	Soil	Field sample	--	--	N/A	NA
SA09								
August	SA09-AU01-P01	8/25/2018	Hazelnut	Field sample	--	--	28	nuts
	SA09-AU01-S01	8/25/2018	Soil	Field sample, EPA split	--	--	N/A	NA
	SA09-AU02-P01	8/25/2018	Wild rose (hips)	Field sample	--	--	17	g
	SA09-AU02-S01	8/25/2018	Soil	Field sample	--	--	N/A	NA
	SA09-AU03-P01	8/25/2018	Wild rose (hips)	Replicate sample	--	--	16	g
	SA09-AU03-S01	8/25/2018	Soil	Replicate sample	--	--	N/A	NA
	SA09-AU04-P01	8/25/2018	Chokecherry	Field sample	--	--	89	g
	SA09-AU04-S01	8/25/2018	Soil	Field sample	--	--	N/A	NA

Table 2-2. Plant Tissue and Soil Sample List

Sampling Event	Sample ID[a]	Sampling Date	Species or Soil	Study Element	Composite Unit Count	Average Composite Sample Measurement	Total Sample Measurement	Sample Measurement Units
SA14								
August	**SA14-AU01-P01**	8/27/2018	Wild Mint	Field sample	--	--	11	g
	SA14-AU01-S01	8/27/2018	Soil	Field sample	--	--	N/A	NA
	SA14-AU02-P01	8/27/2018	Wild Mint	Field sample	--	--	10.5	g
	SA14-AU02-S01	8/27/2018	Soil	Field sample	--	--	N/A	NA
	SA14-AU03-P01	8/27/2018	Wild Mint	Field sample, potential EPA split	--	--	22	g
	SA14-AU03-S01	8/27/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA14-AU04-P01	8/27/2018	Wild Mint	Field sample	--	--	12	g
	SA14-AU04-S01	8/27/2018	Soil	Field sample	--	--	N/A	NA
	SA14-AU05-P01	8/27/2018	Wild Mint	Field sample, EPA split	--	--	11	g
	SA14-AU05-S01	8/27/2018	Soil	Field sample	--	--	N/A	NA
	SA14-AU06-P01	8/27/2018	Wild Mint	Replicate sample, EPA split	--	--	11	g
	SA14-AU06-S01	8/27/2018	Soil	Replicate sample	--	--	N/A	NA
	SA14-AU07-P01	8/27/2018	Wild Mint	Field sample	--	--	12	g
	SA14-AU07-S01	8/27/2018	Soil	Field sample	--	--	N/A	NA
	SA14-AU08-P01	8/27/2018	Tule	Field sample	--	--	269	cm
	SA14-AU08-S01	8/27/2018	Soil	Field sample	--	--	N/A	NA
	SA14-AU09-P01	8/27/2018	Tule	Field sample, EPA split	--	--	290	cm
	SA14-AU09-S01	8/27/2018	Soil	Field sample	--	--	N/A	NA
	SA14-AU10-P01	8/27/2018	Tule	Replicate sample, EPA split	--	--	260	cm
	SA14-AU10-S01	8/27/2018	Soil	Replicate sample	--	--	N/A	NA
	SA14-AU11-P01	8/27/2018	Tule	Field sample	--	--	233	cm
	SA14-AU11-S01	8/27/2018	Soil	Field sample	--	--	N/A	NA
	SA14-AU12-P01	8/27/2018	Tule	Field sample, potential EPA split	--	--	412	cm
	SA14-AU12-S01	8/27/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA14-AU13-P01	8/27/2018	Tule	Field sample	--	--	272	cm
	SA14-AU13-S01	8/27/2018	Soil	Field sample	--	--	N/A	NA
	SA14-AU14-P01	8/27/2018	Tule	Field sample	--	--	277	cm
	SA14-AU14-S01	8/27/2018	Soil	Field sample	--	--	N/A	NA
	SA14-AU15-P01	8/27/2018	Wild rose (hips)	Field sample	--	--	7.2	g
	SA14-AU15-S01	8/27/2018	Soil	Field sample	--	--	N/A	NA
	SA14-AU16-P01	8/27/2018	Sarvisberry	Field sample	--	--	8.15	g
	SA14-AU16-S01	8/27/2018	Soil	Field sample	--	--	N/A	NA
SA15								
August	**SA15-AU01-P01**	8/28/2018	Willow	Field sample, potential EPA split	--	--	411	cm
	SA15-AU01-S01	8/28/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA15-AU02-P01	8/28/2018	Willow	Field sample	--	--	190	cm
	SA15-AU02-S01	8/28/2018	Soil	Field sample	--	--	N/A	NA
	SA15-AU03-P01	8/28/2018	Willow	Field sample	--	--	202	cm
	SA15-AU03-S01	8/28/2018	Soil	Field sample	--	--	N/A	NA
	SA15-AU04-P01	8/28/2018	Willow	Replicate sample	--	--	233	cm

Table 2-2. Plant Tissue and Soil Sample List

Sampling Event	Sample ID[a]	Sampling Date	Species or Soil	Study Element	Composite Unit Count	Average Composite Sample Measurement	Total Sample Measurement	Sample Measurement Units
SA15 (continued)								
August (cont.)	**SA15-AU04-S01**	8/28/2018	Soil	Replicate sample	--	--	N/A	NA
	SA15-AU05-P01	8/28/2018	Willow	Field sample	--	--	218	cm
	SA15-AU05-S01	8/28/2018	Soil	Field sample	--	--	N/A	NA
	SA15-AU06-P01	8/28/2018	Willow	Field sample	--	--	203	cm
	SA15-AU06-S01	8/28/2018	Soil	Field sample	--	--	N/A	NA
	SA15-AU07-P01	8/28/2018	Willow	Field sample	--	--	208	cm
	SA15-AU07-S01	8/28/2018	Soil	Field sample	--	--	N/A	NA
SA16								
Spring	**SA16-SP01-P01**	5/1/2018	Willow	Field sample	--	--	190	cm
	SA16-SP01-S01	5/1/2018	Soil	Field sample	--	--	N/A	NA
	SA16-SP02-P01	5/1/2018	Willow	Replicate sample	--	--	190	cm
	SA16-SP02-S01	5/1/2018	Soil	Replicate sample	--	--	N/A	NA
	SA16-SP03-P01	5/1/2018	Willow	Field sample, potential EPA split	--	--	405	cm
	SA16-SP03-S01	5/1/2018	Soil	Field sample, potential EPA split	--	--	N/A	NA
	SA16-SP04-P01	5/1/2018	Willow	Field sample	--	--	205	cm
	SA16-SP04-S01	5/1/2018	Soil	Field sample	--	--	N/A	NA
	SA16-SP05-P01	5/1/2018	Willow	Field sample	--	--	215	cm
	SA16-SP05-S01	5/1/2018	Soil	Field sample	--	--	N/A	NA
	SA16-SP06-P01	5/1/2018	Willow	Field sample	--	--	217	cm
	SA16-SP06-S01	5/1/2018	Soil	Field sample	--	--	N/A	NA
	SA16-SP07-P01	5/1/2018	Willow	Field sample, EPA split	--	--	203	cm
	SA16-SP07-S01	5/1/2018	Soil	Field sample, EPA split	--	--	N/A	NA

Notes:

[a] Sample IDs in bold were tested for mercury in addition to other analytes

[b] Number of individual samples composited not counted/weighed due to large number needed to reach target sample mass.

[c] One soil sample was taken from the center of the circular plot where lichen was collected.

-- Not a composite sample.

N/A - not analyzed

NA - not applicable

SA - sampling area

Table 2-3. Analytical Methods and Sample Mass Requirements

Analyte	Sample Preparation		Quantitative Analysis		Holding Time[a]	Sample Mass Required for Analysis (g dw)	
	Protocol	Procedure	Protocol	Procedure		Soil/Sediment	Plant Tissue
Conventional Parameters - Plant Tissue							
Total Mass	NA	NA	NA	NA	NA	NA	8-12[b]
Total solids/percent moisture	ALS SOP MET-TISP	Freeze-dry	ALS SOP MET-TISP	Freeze-dry	1 year at -20°C	NA	NA[c]
TAL Metals/Metalloids - Plant Tissue							
TAL metals (except calcium, magnesium, potassium, and sodium)	ALS SOP MET-TDIG	Acid digestion	EPA 6020A MET-6020	ICP-MS	180 days at -20°C	NA	0.3[d]
Total mercury	ALS SOP MET 1631	Acid digestion	EPA 1631E	CVAFS	1 year at -20°C	NA	0.4[d]
Conventional Parameters - Soil/Sediment							
Total Solids	NA	NA	EPA 160.3	Gravimetric	1 year at -20°C	5	NA
TAL Metals/Metalloids - Soil/Sediment							
TAL metals (except calcium, magnesium, potassium, and sodium)	MET-3050B	Acid digestion	EPA 6020A MET-6020	ICP-MS	180 days at room temperature	2	NA
Total mercury	ALS SOP MET 1631	Acid digestion	EPA 1631E	CVAFS	1 year at < -15°C	NA[e]	NA

Notes:

Sample masses do not include additional mass for field splits, laboratory duplicates, or re-extraction.

[a] Holding time based on applicable standard operating procedure (SOP).

[b] Wet weight mass in grams.

[c] Percent moisture was analyzed with target analyte list (TAL) metals; no additional sample mass required.

[d] The target sample mass for analysis listed achieves the reporting limits listed in Table 2-4.

[e] The total target sample mass for TAL metals (except calcium, magnesium, potassium, and sodium) in soil/sediment was sufficient for additional analysis of mercury in soil/sediment.

ALS - ALS Environmental

CVAFS - cold vapor atomic fluorescence spectrometry

MET-TISP - tissue sample preparation

MET-TDIG - sample preparation of biological tissue for metals analysis by inductively-coupled plasma - optical emission spectrometry (ICP-OES) and inductively-coupled plasma - mass spectrometry (ICP-MS).

NA - not applicable

MET - metal

Table 2-4. Plant Tissue and Soil TAL Metals and ACGs

Analyte	Plant Tissue: Human Health RBCs (mg/kg dw)[a]	Plant Tissue: Laboratory (mg/kg dw) MRL[b]	Plant Tissue: Laboratory (mg/kg dw) MDL[b]	Plant Tissue: Laboratory (mg/kg dw) ACG[c]	Soil: Human Health RBCs (mg/kg dw)[a]	Soil: Laboratory (mg/kg dw) MRL[b]	Soil: Laboratory (mg/kg dw) MDL[b]	Soil: Laboratory (mg/kg dw) ACG[c]
Conventional Parameters								
Total mass	na	na	na	na	N/A	N/A	N/A	N/A
Moisture content	na	na	na	na	na	na	na	na
Metals/Metalloids								
Aluminum	28	2	0.6	28	5,000	2	0.6	5,000
Antimony	0.01	0.05	0.02	0.05	2	0.05	0.02	2
Arsenic	0.0004	0.5	0.2	0.5	0.29	0.5	0.2	0.5
Barium	5.6	0.05	0.02	5.6	1,000	0.05	0.02	1,000
Beryllium	0.06	0.02	0.005	0.06	10	0.02	0.005	10
Cadmium	0.03	0.02	0.009	0.03	5	0.02	0.009	5
Chromium	42	0.2	0.07	42	7,500	0.2	0.07	7,500
Cobalt	0.008	0.02	0.009	0.02	1.5	0.02	0.009	1.5
Copper	1.1	0.1	0.04	1.1	200	0.1	0.04	200
Iron	19	1	2	19	3,500	4	2	3,500
Lead	0.09	0.02	0.02	0.09	143	0.05	0.02	143
Manganese	3.9	0.05	0.02	3.9	120	0.05	0.02	120
Mercury	0.008	0.001	0.00009	0.008	1.5	0.001	0.00009	1.5
Nickel	0.56	0.2	0.04	0.56	100	0.2	0.04	100
Selenium	0.14	1	0.2	1	25	1	0.2	25
Silver	0.14	0.02	0.005	0.14	25	0.02	0.005	25
Thallium	0.0003	0.02	0.002	0.02	0.05	0.02	0.002	0.05
Vanadium	0.14	0.2	0.08	0.2	25	0.2	0.08	25
Zinc	8.3	0.5	0.2	8.3	1,500	0.5	0.2	1,500

Notes:

[a] Risk-based concentrations (RBCs) for human health are based on exposure assumptions and calculation methods specified in the 2016 Plant Tissue data quality objectives (DQOs) (USEPA 2016). The RBC shown represents the lower of the non-cancer child RBC or the cancer RBC based on a time-weighted average child and adult. RBC exposure assumptions are based on the Spokane Tribe and are not directly applicable to Confederated Tribes of the Colville Reservation (CCT) exposures. RBCs will be updated to reflect CCT exposure assumptions in the human health risk assessment.

[b] Method reporting limits (MRLs) and method detection limits (MDLs) for metals were obtained from ALS Environmental (ALS).

[c] Analytical concentration goals (ACGs) represent the RBC value for human health. If the RBC is lower than the MRL, the MRL was used as the ACG.

N/A - not analyzed

na - not available

Table 4-1. Summary of Qualifiers Applied to Equipment Blank Samples

		Number of	Number of	Count of	Count of Accepted Results Laboratory Flags					Count of Accepted Results Validator Flags				Laboratory Flags, % of Accepted Results					Validator Flags, % of Accepted Results			
Analyte	Number of Samples	Rejected Results	Accepted Results	Results with No Flags	No Flag	J	U	#	#J	No Flag	J	U	UJ	No Flag	J	U	#	#J	No Flag	J	U	UJ
Aluminum	38	0	38	9	9	29	0	0	0	9	29	0	0	24	76	0	0	0	24	76	0	0
Antimony	38	0	38	1	1	0	37	0	0	1	0	37	0	3	0	97	0	0	3	0	97	0
Arsenic	38	0	38	0	0	2	36	0	0	0	2	36	0	0	5	95	0	0	0	5	95	0
Barium	38	0	38	7	7	6	25	0	0	7	6	25	0	18	16	66	0	0	18	16	66	0
Beryllium	38	0	38	0	0	1	37	0	0	0	1	37	0	0	3	97	0	0	0	3	97	0
Cadmium	38	0	38	0	0	13	25	0	0	0	13	25	0	0	34	66	0	0	0	34	66	0
Chromium	38	0	38	6	6	22	10	0	0	6	22	10	0	16	58	26	0	0	16	58	26	0
Cobalt	38	0	38	0	0	7	31	0	0	0	7	31	0	0	18	82	0	0	0	18	82	0
Copper	38	0	38	27	27	7	4	0	0	27	7	4	0	71	18	11	0	0	71	18	11	0
Iron	38	0	38	17	17	18	3	0	0	17	18[a]	0	3	45	47	8	0	0	45	47	0	8
Lead	38	0	38	20	20	15	3	0	0	20	15	3	0	53	39	8	0	0	53	39	8	0
Manganese	38	0	38	4	4	18	16	0	0	4	18	16	0	11	47	42	0	0	11	47	42	0
Mercury	17	0	17	0	0	13	4	0	0	0	13	4	0	0	76	24	0	0	0	76	24	0
Nickel	38	0	38	17	17	7	14	0	0	17	7	14	0	45	18	37	0	0	45	18	37	0
Selenium	38	0	38	0	0	0	38	0	0	0	0	38	0	0	0	100	0	0	0	0	100	0
Silver	38	0	38	1	1	4	33	0	0	1	4	33	0	3	11	87	0	0	3	11	87	0
Thallium	38	0	38	5	5	13	20	0	0	5	13	20	0	13	34	53	0	0	13	34	53	0
Vanadium	38	0	38	0	0	0	38	0	0	0	0	38	0	0	0	100	0	0	0	0	100	0
Zinc	38	0	38	12	12	21	5	0	0	12	21	5	0	32	55	13	0	0	32	55	13	0

Notes:

[a] Three iron results were J- flagged (estimated, potential low bias) by the validator due to negative instrument bias. However, because the three results were also detected between the detection limit (DL) and the reporting limit (RL) with an unknown direction of bias, they were retained as J in the database.

Laboratory

J - The result is an estimated value that was detected between the DL and the RL.
U - The analyte was analyzed for, but was not detected at or above the method reporting limit/method detection limit (MRL/MDL).
- The control limit criteria is not applicable. See case narrative.
#J - The result is an estimated value and the control limit criteria is not applicable. See case narrative.

Validator

J - Quantitation is approximate due to limitations identified during the quality assurance (QA) review (data validation).
U - The analyte was not detected at or above the associated DL.
UJ - The result is not detected and the DL is considered approximate due to bias identified during data validation.

Table 4-2. Summary of Qualifiers Applied to Plant Tissue Data

					Count of Accepted Results Laboratory Flags			Count of Accepted Results Validator Flags						Laboratory Flags, % of Accepted Results			Validator Flags, % of Accepted Results					
Analyte	Number of Samples	Number of Rejected Results	Number of Accepted Results	Count of Results with No Flags	No Flag	J	U	No Flag	J	J-	U	UJ	U*	No Flag	J	U	No Flag	J	J-	U	UJ	U*
Conventional Parameters																						
All Plant Tissue																						
Solids	174	0	174	174	174	0	0	174	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Metals/Metalloids																						
All Plant Tissue																						
Aluminum	174	0	174	0	155	18	1	0	13	148	0	1	12	89	10	1	0	7	85	0	1	7
Antimony	174	0	174	58	58	62	54	58	59	0	54	0	3	33	36	31	33	34	0	31	0	2
Arsenic	174	0	174	41	41	87	46	41	87	0	46	0	0	24	50	26	24	50	0	26	0	0
Barium	174	0	174	174	174	0	0	174	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	174	0	174	14	14	21	139	14	21	0	139	0	0	8	12	80	8	12	0	80	0	0
Cadmium	174	0	174	151	151	22	1	151	22	0	1	0	0	87	13	1	87	13	0	1	0	0
Chromium	174	0	174	128	128	43	3	128	43	0	3	0	0	74	25	2	74	25	0	2	0	0
Cobalt	174	0	174	134	134	36	4	134	36	0	4	0	0	77	21	2	77	21	0	2	0	0
Copper	174	0	174	174	174	0	0	174	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	174	0	174	165	174	0	0	165	9	0	0	0	0	100	0	0	95	5	0	0	0	0
Lead	174	0	174	157	158	14	2	157	10	0	2	0	5	91	8	1	90	6	0	1	0	3
Manganese	174	0	174	174	174	0	0	174	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Mercury	63	0	63	44	62	1	0	44	1	18	0	0	0	98	2	0	70	2	29	0	0	0
Nickel	174	0	174	110	154	20	0	110	20	44	0	0	0	89	11	0	63	11	25	0	0	0
Selenium	174	0	174	0	0	83	91	0	83	0	91	0	0	0	48	52	0	48	0	52	0	0
Silver	174	0	174	66	66	74	34	66	49	0	34	0	25	38	43	20	38	28	0	20	0	14
Thallium	174	0	174	52	52	57	65	52	52	0	65	0	5	30	33	37	30	30	0	37	0	3
Vanadium	174	0	174	6	50	82	42	6	82	44	27	15	0	29	47	24	3	47	25	16	9	0
Zinc	174	0	174	174	174	0	0	174	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Black Tree Lichen - *Bryoria fremontii*																						
Aluminum	12	0	12	0	12	0	0	0	0	12	0	0	0	100	0	0	0	0	100	0	0	0
Antimony	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Arsenic	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Barium	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	12	0	12	0	0	5	7	0	5	0	7	0	0	0	42	58	0	42	0	58	0	0
Cadmium	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Chromium	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Cobalt	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Copper	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	12	0	12	8	12	0	0	8	4	0	0	0	0	100	0	0	67	33	0	0	0	0
Lead	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Manganese	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Nickel	12	0	12	8	12	0	0	8	0	4	0	0	0	100	0	0	67	0	33	0	0	0
Selenium	12	0	12	0	0	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0
Silver	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Thallium	12	0	12	8	8	4	0	8	4	0	0	0	0	67	33	0	67	33	0	0	0	0
Vanadium	12	0	12	0	12	0	0	0	0	12	0	0	0	100	0	0	0	0	100	0	0	0
Zinc	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Camas - *Camassia quamash*																						
Aluminum	12	0	12	0	12	0	0	0	0	12	0	0	0	100	0	0	0	0	100	0	0	0
Antimony	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Arsenic	12	0	12	9	9	3	0	9	3	0	0	0	0	75	25	0	75	25	0	0	0	0
Barium	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	12	0	12	3	3	9	0	3	9	0	0	0	0	25	75	0	25	75	0	0	0	0
Cadmium	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Chromium	12	0	12	10	10	2	0	10	2	0	0	0	0	83	17	0	83	17	0	0	0	0
Cobalt	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Copper	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Lead	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Manganese	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Nickel	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Selenium	12	0	12	0	0	8	4	0	8	0	4	0	0	0	67	33	0	67	0	33	0	0
Silver	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Thallium	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Vanadium	12	0	12	0	11	1	0	0	1	11	0	0	0	92	8	0	0	8	92	0	0	0
Zinc	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0

Table 4-2. Summary of Qualifiers Applied to Plant Tissue Data

Analyte	Number of Samples	Number of Rejected Results	Number of Accepted Results	Count of Results with No Flags	Count of Accepted Results Laboratory Flags			Count of Accepted Results Validator Flags						Laboratory Flags, % of Accepted Results			Validator Flags, % of Accepted Results					
					No Flag	J	U	No Flag	J	J-	U	UJ	U*	No Flag	J	U	No Flag	J	J-	U	UJ	U*
Metals/Metalloids (continued)																						
Chokecherry - *Prunus virginiana*																						
Aluminum	14	0	14	0	9	5	0	0	4	6	0	0	4	64	36	0	0	29	43	0	0	29
Antimony	14	0	14	0	0	3	11	0	2	0	11	0	1	0	21	79	0	14	0	79	0	7
Arsenic	14	0	14	0	0	1	13	0	1	0	13	0	0	0	7	93	0	7	0	93	0	0
Barium	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	14	0	14	0	0	0	14	0	0	0	14	0	0	0	0	100	0	0	0	100	0	0
Cadmium	14	0	14	0	0	13	1	0	13	0	1	0	0	0	93	7	0	93	0	7	0	0
Chromium	14	0	14	4	4	10	0	4	10	0	0	0	0	29	71	0	29	71	0	0	0	0
Cobalt	14	0	14	0	0	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0
Copper	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Lead	14	0	14	13	13	1	0	13	0	0	0	0	1	93	7	0	93	0	0	0	0	7
Manganese	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Nickel	14	0	14	10	14	0	0	10	0	4	0	0	0	100	0	0	71	0	29	0	0	0
Selenium	14	0	14	0	0	0	14	0	0	0	14	0	0	0	0	100	0	0	0	100	0	0
Silver	14	0	14	0	0	6	8	0	3	0	8	0	3	0	43	57	0	21	0	57	0	21
Thallium	14	0	14	0	0	8	6	0	7	0	6	0	1	0	57	43	0	50	0	43	0	7
Vanadium	14	0	14	0	0	1	13	0	1	0	9	4	0	0	7	93	0	7	0	64	29	0
Zinc	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Hazelnut - *Corylus cornuta*																						
Aluminum	14	0	14	0	0	13	1	0	9	0	0	1	4	0	93	7	0	64	0	0	7	29
Antimony	14	0	14	0	0	2	12	0	2	0	12	0	0	0	14	86	0	14	0	86	0	0
Arsenic	14	0	14	0	0	2	12	0	2	0	12	0	0	0	14	86	0	14	0	86	0	0
Barium	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	14	0	14	0	0	0	14	0	0	0	14	0	0	0	0	100	0	0	0	100	0	0
Cadmium	14	0	14	11	11	3	0	11	3	0	0	0	0	79	21	0	79	21	0	0	0	0
Chromium	14	0	14	7	7	6	1	7	6	0	1	0	0	50	43	7	50	43	0	7	0	0
Cobalt	14	0	14	10	10	4	0	10	4	0	0	0	0	71	29	0	71	29	0	0	0	0
Copper	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Lead	14	0	14	0	1	11	2	0	9	0	2	0	3	7	79	14	0	64	0	14	0	21
Manganese	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Nickel	14	0	14	6	14	0	0	6	0	8	0	0	0	100	0	0	43	0	57	0	0	0
Selenium	14	0	14	0	0	3	11	0	3	0	11	0	0	0	21	79	0	21	0	79	0	0
Silver	14	0	14	0	0	8	6	0	2	0	6	0	6	0	57	43	0	14	0	43	0	43
Thallium	14	0	14	0	0	1	13	0	1	0	13	0	0	0	7	93	0	7	0	93	0	0
Vanadium	14	0	14	0	0	3	11	0	3	0	11	0	0	0	21	79	0	21	0	79	0	0
Zinc	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Huckleberry - *Vaccinium cespitosum*																						
Aluminum	6	0	6	0	6	0	0	0	0	6	0	0	0	100	0	0	0	0	100	0	0	0
Antimony	6	0	6	0	0	3	3	0	3	0	3	0	0	0	50	50	0	50	0	50	0	0
Arsenic	6	0	6	0	0	3	3	0	3	0	3	0	0	0	50	50	0	50	0	50	0	0
Barium	6	0	6	6	6	0	0	6	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	6	0	6	0	0	0	6	0	0	0	6	0	0	0	0	100	0	0	0	100	0	0
Cadmium	6	0	6	6	6	0	0	6	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Chromium	6	0	6	0	0	4	2	0	4	0	2	0	0	0	67	33	0	67	0	33	0	0
Cobalt	6	0	6	1	1	1	4	1	1	0	4	0	0	17	17	67	17	17	0	67	0	0
Copper	6	0	6	6	6	0	0	6	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	6	0	6	6	6	0	0	6	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Lead	6	0	6	6	6	0	0	6	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Manganese	6	0	6	6	6	0	0	6	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Nickel	6	0	6	0	4	2	0	0	2	4	0	0	0	67	33	0	0	33	67	0	0	0
Selenium	6	0	6	0	0	0	6	0	0	0	6	0	0	0	0	100	0	0	0	100	0	0
Silver	6	0	6	0	0	4	2	0	4	0	2	0	0	0	67	33	0	67	0	33	0	0
Thallium	6	0	6	0	0	0	6	0	0	0	6	0	0	0	0	100	0	0	0	100	0	0
Vanadium	6	0	6	0	0	0	6	0	0	0	0	6	0	0	0	100	0	0	0	0	100	0
Zinc	6	0	6	6	6	0	0	6	0	0	0	0	0	100	0	0	100	0	0	0	0	0

Table 4-2. Summary of Qualifiers Applied to Plant Tissue Data

Analyte	Number of Samples	Number of Rejected Results	Number of Accepted Results	Count of Results with No Flags	Count of Accepted Results Laboratory Flags			Count of Accepted Results Validator Flags						Laboratory Flags, % of Accepted Results			Validator Flags, % of Accepted Results					
					No Flag	J	U	No Flag	J	J-	U	UJ	U*	No Flag	J	U	No Flag	J	J-	U	UJ	U*
Metals/Metalloids (continued)																						
Kinnikinnick - *Arctostaphylos uva-ursi*																						
Aluminum	16	0	16	0	16	0	0	0	0	16	0	0	0	100	0	0	0	0	100	0	0	0
Antimony	16	0	16	4	4	12	0	4	12	0	0	0	0	25	75	0	25	75	0	0	0	0
Arsenic	16	0	16	0	0	16	0	0	16	0	0	0	0	0	100	0	0	100	0	0	0	0
Barium	16	0	16	16	16	0	0	16	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	16	0	16	0	0	1	15	0	1	0	15	0	0	0	6	94	0	6	0	94	0	0
Cadmium	16	0	16	16	16	0	0	16	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Chromium	16	0	16	5	5	11	0	5	11	0	0	0	0	31	69	0	31	69	0	0	0	0
Cobalt	16	0	16	7	7	9	0	7	9	0	0	0	0	44	56	0	44	56	0	0	0	0
Copper	16	0	16	16	16	0	0	16	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	16	0	16	16	16	0	0	16	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Lead	16	0	16	16	16	0	0	16	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Manganese	16	0	16	16	16	0	0	16	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Mercury	16	0	16	2	15	1	0	2	1	13	0	0	0	94	6	0	13	6	81	0	0	0
Nickel	16	0	16	4	4	12	0	4	12	0	0	0	0	25	75	0	25	75	0	0	0	0
Selenium	16	0	16	0	0	3	13	0	3	0	13	0	0	0	19	81	0	19	0	81	0	0
Silver	16	0	16	10	10	6	0	10	6	0	0	0	0	63	38	0	63	38	0	0	0	0
Thallium	16	0	16	2	2	12	2	2	12	0	2	0	0	13	75	13	13	75	0	13	0	0
Vanadium	16	0	16	0	0	16	0	0	16	0	0	0	0	0	100	0	0	100	0	0	0	0
Zinc	16	0	16	16	16	0	0	16	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Lomatium - *Lomatium triternatum*																						
Aluminum	12	0	12	0	12	0	0	0	0	12	0	0	0	100	0	0	0	0	100	0	0	0
Antimony	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Arsenic	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Barium	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	12	0	12	10	10	1	1	10	1	0	1	0	0	83	8	8	83	8	0	8	0	0
Cadmium	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Chromium	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Cobalt	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Copper	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	12	0	12	9	12	0	0	9	3	0	0	0	0	100	0	0	75	25	0	0	0	0
Lead	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Manganese	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Nickel	12	0	12	7	12	0	0	7	0	5	0	0	0	100	0	0	58	0	42	0	0	0
Selenium	12	0	12	0	0	11	1	0	11	0	1	0	0	0	92	8	0	92	0	8	0	0
Silver	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Thallium	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Vanadium	12	0	12	0	12	0	0	0	0	12	0	0	0	100	0	0	0	0	100	0	0	0
Zinc	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Ponderosa Pine - *Pinus ponderosa*																						
Aluminum	13	0	13	0	13	0	0	0	0	13	0	0	0	100	0	0	0	0	100	0	0	0
Antimony	13	0	13	3	3	3	7	3	3	0	7	0	0	23	23	54	23	23	0	54	0	0
Arsenic	13	0	13	0	0	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0
Barium	13	0	13	13	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	13	0	13	0	0	0	13	0	0	0	13	0	0	0	0	100	0	0	0	100	0	0
Cadmium	13	0	13	13	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Chromium	13	0	13	12	12	1	0	12	1	0	0	0	0	92	8	0	92	8	0	0	0	0
Cobalt	13	0	13	13	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Copper	13	0	13	13	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	13	0	13	13	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Lead	13	0	13	11	11	2	0	11	1	0	0	0	1	85	15	0	85	8	0	0	0	8
Manganese	13	0	13	13	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Nickel	13	0	13	9	13	0	0	9	0	4	0	0	0	100	0	0	69	0	31	0	0	0
Selenium	13	0	13	0	0	0	13	0	0	0	13	0	0	0	0	100	0	0	0	100	0	0
Silver	13	0	13	2	2	5	6	2	0	0	6	0	5	15	38	46	15	0	0	46	0	38
Thallium	13	0	13	0	0	3	10	0	0	0	10	0	3	0	23	77	0	0	0	77	0	23
Vanadium	13	0	13	0	0	12	1	0	12	0	0	1	0	0	92	8	0	92	0	0	8	0
Zinc	13	0	13	13	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0	0

Table 4-2. Summary of Qualifiers Applied to Plant Tissue Data

Analyte	Number of Samples	Number of Rejected Results	Number of Accepted Results	Count of Results with No Flags	Count of Accepted Results Laboratory Flags			Count of Accepted Results Validator Flags						Laboratory Flags, % of Accepted Results			Validator Flags, % of Accepted Results					
					No Flag	J	U	No Flag	J	J-	U	UJ	U*	No Flag	J	U	No Flag	J	J-	U	UJ	U*
Metals/Metalloids (continued)																						
Sarvisberry - *Amelanchier alnifolia*																						
Aluminum	13	0	13	0	13	0	0	0	0	9	0	0	4	100	0	0	0	0	69	0	0	31
Antimony	13	0	13	1	1	7	5	1	5	0	5	0	2	8	54	38	8	38	0	38	0	15
Arsenic	13	0	13	0	0	8	5	0	8	0	5	0	0	0	62	38	0	62	0	38	0	0
Barium	13	0	13	13	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	13	0	13	0	0	0	13	0	0	0	13	0	0	0	0	100	0	0	0	100	0	0
Cadmium	13	0	13	13	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Chromium	13	0	13	8	8	5	0	8	5	0	0	0	0	62	38	0	62	38	0	0	0	0
Cobalt	13	0	13	13	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Copper	13	0	13	13	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	13	0	13	13	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Lead	13	0	13	13	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Manganese	13	0	13	13	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Mercury	3	0	3	3	3	0	0	3	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Nickel	13	0	13	12	13	0	0	12	0	1	0	0	0	100	0	0	92	0	8	0	0	0
Selenium	13	0	13	0	0	2	11	0	2	0	11	0	0	0	15	85	0	15	0	85	0	0
Silver	13	0	13	1	1	10	2	1	6	0	2	0	4	8	77	15	8	46	0	15	0	31
Thallium	13	0	13	0	0	0	13	0	0	0	13	0	0	0	0	100	0	0	0	100	0	0
Vanadium	13	0	13	0	0	5	8	0	5	0	4	4	0	0	38	62	0	38	0	31	31	0
Zinc	13	0	13	13	13	0	0	13	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Spring Beauty/Indian Potato - *Claytonia lanceolata*																						
Aluminum	12	0	12	0	12	0	0	0	0	12	0	0	0	100	0	0	0	0	100	0	0	0
Antimony	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Arsenic	12	0	12	8	8	4	0	8	4	0	0	0	0	67	33	0	67	33	0	0	0	0
Barium	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	12	0	12	1	1	4	7	1	4	0	7	0	0	8	33	58	8	33	0	58	0	0
Cadmium	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Chromium	12	0	12	10	10	2	0	10	2	0	0	0	0	83	17	0	83	17	0	0	0	0
Cobalt	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Copper	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	12	0	12	10	12	0	0	10	2	0	0	0	0	100	0	0	83	17	0	0	0	0
Lead	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Manganese	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Nickel	12	0	12	8	10	2	0	8	2	2	0	0	0	83	17	0	67	17	17	0	0	0
Selenium	12	0	12	0	0	7	5	0	7	0	5	0	0	0	58	42	0	58	0	42	0	0
Silver	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Thallium	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Vanadium	12	0	12	0	9	3	0	0	3	9	0	0	0	75	25	0	0	25	75	0	0	0
Zinc	12	0	12	12	12	0	0	12	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Tule - *Schoenoplectus acutus*																						
Aluminum	7	0	7	0	7	0	0	0	0	7	0	0	0	100	0	0	0	0	100	0	0	0
Antimony	7	0	7	0	0	3	4	0	3	0	4	0	0	0	43	57	0	43	0	57	0	0
Arsenic	7	0	7	0	0	4	3	0	4	0	3	0	0	0	57	43	0	57	0	43	0	0
Barium	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	7	0	7	0	0	0	7	0	0	0	7	0	0	0	0	100	0	0	0	100	0	0
Cadmium	7	0	7	2	2	5	0	2	5	0	0	0	0	29	71	0	29	71	0	0	0	0
Chromium	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Cobalt	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Copper	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Lead	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Manganese	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Mercury	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Nickel	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Selenium	7	0	7	0	0	6	1	0	6	0	1	0	0	0	86	14	0	86	0	14	0	0
Silver	7	0	7	0	0	2	5	0	2	0	5	0	0	0	29	71	0	29	0	71	0	0
Thallium	7	0	7	0	0	6	1	0	6	0	1	0	0	0	86	14	0	86	0	14	0	0
Vanadium	7	0	7	1	1	6	0	1	6	0	0	0	0	14	86	0	14	86	0	0	0	0
Zinc	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0

Table 4-2. Summary of Qualifiers Applied to Plant Tissue Data

Analyte	Number of Samples	Number of Rejected Results	Number of Accepted Results	Count of Results with No Flags	Count of Accepted Results Laboratory Flags			Count of Accepted Results Validator Flags						Laboratory Flags, % of Accepted Results			Validator Flags, % of Accepted Results					
					No Flag	J	U	No Flag	J	J-	U	UJ	U*	No Flag	J	U	No Flag	J	J-	U	UJ	U*
Metals/Metalloids (continued)																						
Wild Mint - *Mentha arvensis*																						
Aluminum	7	0	7	0	7	0	0	0	0	7	0	0	0	100	0	0	0	0	100	0	0	0
Antimony	7	0	7	1	1	6	0	1	6	0	0	0	0	14	86	0	14	86	0	0	0	0
Arsenic	7	0	7	0	0	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0
Barium	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	7	0	7	0	0	1	6	0	1	0	6	0	0	0	14	86	0	14	0	86	0	0
Cadmium	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Chromium	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Cobalt	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Copper	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Lead	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Manganese	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Mercury	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Nickel	7	0	7	6	6	1	0	6	1	0	0	0	0	86	14	0	86	14	0	0	0	0
Selenium	7	0	7	0	0	6	1	0	6	0	1	0	0	0	86	14	0	86	0	14	0	0
Silver	7	0	7	0	0	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0
Thallium	7	0	7	0	0	5	2	0	5	0	2	0	0	0	71	29	0	71	0	29	0	0
Vanadium	7	0	7	5	5	2	0	5	2	0	0	0	0	71	29	0	71	29	0	0	0	0
Zinc	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Wild Rose Hips - *Rosa* sp.																						
Aluminum	7	0	7	0	7	0	0	0	0	7	0	0	0	100	0	0	0	0	100	0	0	0
Antimony	7	0	7	0	0	3	4	0	3	0	4	0	0	0	43	57	0	43	0	57	0	0
Arsenic	7	0	7	0	0	1	6	0	1	0	6	0	0	0	14	86	0	14	0	86	0	0
Barium	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	7	0	7	0	0	0	7	0	0	0	7	0	0	0	0	100	0	0	0	100	0	0
Cadmium	7	0	7	6	6	1	0	6	1	0	0	0	0	86	14	0	86	14	0	0	0	0
Chromium	7	0	7	6	6	1	0	6	1	0	0	0	0	86	14	0	86	14	0	0	0	0
Cobalt	7	0	7	2	2	5	0	2	5	0	0	0	0	29	71	0	29	71	0	0	0	0
Copper	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Lead	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Manganese	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Mercury	1	0	1	1	1	0	0	1	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Nickel	7	0	7	3	5	2	0	3	2	2	0	0	0	71	29	0	43	29	29	0	0	0
Selenium	7	0	7	0	0	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0
Silver	7	0	7	0	0	2	5	0	2	0	5	0	0	0	29	71	0	29	0	71	0	0
Thallium	7	0	7	0	0	0	7	0	0	0	7	0	0	0	0	100	0	0	0	100	0	0
Vanadium	7	0	7	0	0	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0
Zinc	7	0	7	7	7	0	0	7	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Wild Rose Stems and Leaves - *Rosa* sp.																						
Aluminum	15	0	15	0	15	0	0	0	0	15	0	0	0	100	0	0	0	0	100	0	0	0
Antimony	15	0	15	1	1	13	1	1	13	0	1	0	0	7	87	7	7	87	0	7	0	0
Arsenic	15	0	15	0	0	15	0	0	15	0	0	0	0	0	100	0	0	100	0	0	0	0
Barium	15	0	15	15	15	0	0	15	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	15	0	15	0	0	0	15	0	0	0	15	0	0	0	0	100	0	0	0	100	0	0
Cadmium	15	0	15	15	15	0	0	15	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Chromium	15	0	15	15	15	0	0	15	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Cobalt	15	0	15	12	12	3	0	12	3	0	0	0	0	80	20	0	80	20	0	0	0	0
Copper	15	0	15	15	15	0	0	15	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	15	0	15	15	15	0	0	15	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Lead	15	0	15	15	15	0	0	15	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Manganese	15	0	15	15	15	0	0	15	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Mercury	15	0	15	15	15	0	0	15	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Nickel	15	0	15	4	14	1	0	4	1	10	0	0	0	93	7	0	27	7	67	0	0	0
Selenium	15	0	15	0	0	5	10	0	5	0	10	0	0	0	33	67	0	33	0	67	0	0
Silver	15	0	15	2	2	13	0	2	13	0	0	0	0	13	87	0	13	87	0	0	0	0
Thallium	15	0	15	0	0	12	3	0	12	0	3	0	0	0	80	20	0	80	0	20	0	0
Vanadium	15	0	15	0	0	15	0	0	15	0	0	0	0	0	100	0	0	100	0	0	0	0
Zinc	15	0	15	15	15	0	0	15	0	0	0	0	0	100	0	0	100	0	0	0	0	0

Table 4-2. Summary of Qualifiers Applied to Plant Tissue Data

Analyte	Number of Samples	Number of Rejected Results	Number of Accepted Results	Count of Results with No Flags	Count of Accepted Results Laboratory Flags			Count of Accepted Results Validator Flags						Laboratory Flags, % of Accepted Results			Validator Flags, % of Accepted Results					
					No Flag	J	U	No Flag	J	J-	U	UJ	U*	No Flag	J	U	No Flag	J	J-	U	UJ	U*
Metals/Metalloids (continued)																						
Willow - *Salix exigua*																						
Aluminum	14	0	14	0	14	0	0	0	0	14	0	0	0	100	0	0	0	0	100	0	0	0
Antimony	14	0	14	0	0	7	7	0	7	0	7	0	0	0	50	50	0	50	0	50	0	0
Arsenic	14	0	14	0	0	10	4	0	10	0	4	0	0	0	71	29	0	71	0	29	0	0
Barium	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Beryllium	14	0	14	0	0	0	14	0	0	0	14	0	0	0	0	100	0	0	0	100	0	0
Cadmium	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Chromium	14	0	14	13	13	1	0	13	1	0	0	0	0	93	7	0	93	7	0	0	0	0
Cobalt	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Copper	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Iron	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Lead	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Manganese	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Mercury	14	0	14	9	14	0	0	9	0	5	0	0	0	100	0	0	64	0	36	0	0	0
Nickel	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0
Selenium	14	0	14	0	0	13	1	0	13	0	1	0	0	0	93	7	0	93	0	7	0	0
Silver	14	0	14	3	3	11	0	3	4	0	0	0	7	21	79	0	21	29	0	0	0	50
Thallium	14	0	14	6	6	6	2	6	5	0	2	0	1	43	43	14	43	36	0	14	0	7
Vanadium	14	0	14	0	0	11	3	0	11	0	3	0	0	0	79	21	0	79	0	21	0	0
Zinc	14	0	14	14	14	0	0	14	0	0	0	0	0	100	0	0	100	0	0	0	0	0

Notes:

Laboratory

J - The result is an estimated value that was detected between the detection limit (DL) and the reporting limit (RL).

U - The analyte was analyzed for, but was not detected at or above the method reporting limit/method detection limit (MRL/MDL).

Validator

J - Quantitation is approximate due to limitations identified during the quality assurance (QA) review (data validation).

J- - The result is considered estimated and may be biased low.

U - The analyte was analyzed for, but was not detected at or above the MRL/MDL.

UJ - The result is not detected and the DL is considered approximate due to bias identified during data validation.

U* - The result is considered not detected because a similar concentration was detected in an associated blank sample.

Table 4-3. Summary of Qualifiers Applied to Soil Data

Analyte	Number of Samples	Number of Rejected Results	Number of Accepted Results	Count of Results with No Flags	Count of Accepted Results Laboratory Flags		Count of Accepted Results Validator Flags				Laboratory Flags, % of Accepted Results		Validator Flags, % of Accepted Results			
					No Flag	J	No Flag	J	J+	U*	No Flag	J	No Flag	J	J+	U*
Conventional Parameters																
Solids	174	0	174	174	174	0	174	0	0	0	100	0	100	0	0	0
Metals/Metalloids																
Aluminum	174	0	174	172	174	0	172	2	0	0	100	0	99	1	0	0
Antimony	174	0	174	0	174	0	0	174	0	0	100	0	0	100	0	0
Arsenic	174	0	174	172	174	0	172	2	0	0	100	0	99	1	0	0
Barium	174	0	174	163	174	0	163	11	0	0	100	0	94	6	0	0
Beryllium	174	0	174	143	174	0	143	31	0	0	100	0	82	18	0	0
Cadmium	174	0	174	141	174	0	141	33	0	0	100	0	81	19	0	0
Chromium	174	0	174	165	174	0	165	9	0	0	100	0	95	5	0	0
Cobalt	174	0	174	127	174	0	127	9	38	0	100	0	73	5	22	0
Copper	174	0	174	158	174	0	158	16	0	0	100	0	91	9	0	0
Iron	174	0	174	172	174	0	172	2	0	0	100	0	99	1	0	0
Lead	174	0	174	168	174	0	168	6	0	0	100	0	97	3	0	0
Manganese	174	0	174	172	174	0	172	2	0	0	100	0	99	1	0	0
Mercury	63	0	63	61	63	0	61	2	0	0	100	0	97	3	0	0
Nickel	174	0	174	149	174	0	149	25	0	0	100	0	86	14	0	0
Selenium	174	0	174	69	69	105	69	105	0	0	40	60	40	60	0	0
Silver	174	0	174	116	174	0	116	58	0	0	100	0	67	33	0	0
Thallium	174	0	174	127	174	0	127	31	0	16	100	0	73	18	0	9
Vanadium	174	0	174	174	174	0	174	0	0	0	100	0	100	0	0	0
Zinc	174	0	174	170	174	0	170	4	0	0	100	0	98	2	0	0

Notes:

Laboratory

J - The result is an estimated value that was detected between the detection limit (DL) and the reporting limit (RL).

Validator

J - The result is considered estimated due to limitations identified during the quality assurance (QA) review (data validation).

J+ - The result is considered estimated and may be biased high.

U* - The result is considered not detected because a similar concentration was detected in an associated blank sample.

Table 5-1a. Summary of Black Tree Lichen (*Bryoria fremontii*) and Co-Located Soil Samples

		Plant Tissue Samples					Co-Located Soil Samples				
Analyte	High or Lower Lead Area[a]	Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values	Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values
Conventional Parameters (percent)											
Solids	High	6	6	26.4	44.5	68.4	6	6	92.6	94.8	97.4
	Lower	6	6	87.1	89.5	91.2	6	6	95.6	96.2	96.9
Metals/Metalloids (mg/kg dw)											
Aluminum	High	6	6	214	310	415	6	6	13,300	18,500	27,800
	Lower	6	6	98.7	227	354	6	6	8,170	15,963	23,200
Antimony	High	6	6	1.37	1.67	1.86	6	6	3.84	16.2	32.7
	Lower	6	6	0.452	1.12	1.82	6	6	2.95	4.77	7.13
Arsenic	High	6	6	1.52	1.79	2.17	6	6	25.8	62.6	132
	Lower	6	6	0.93	1.39	1.85	6	6	25.0	31.7	39.4
Barium	High	6	6	6.55	9.99	13.5	6	6	242	308	422
	Lower	6	6	17.5	28.0	31.1	6	6	231	362	650
Beryllium	High	6	3	0.009	0.009	0.01	6	6	0.585	0.714	0.971
	Lower	6	2	0.009	0.010	0.011	6	6	0.471	0.63	0.824
Cadmium	High	6	6	2.79	3.00	3.31	6	6	9.17	24.3	40.0
	Lower	6	6	1.49	2.48	3.51	6	6	9.34	10.6	12.7
Chromium	High	6	6	0.57	1.07	1.58	6	6	14.9	17.6	19.8
	Lower	6	6	0.24	0.48	0.66	6	6	18.6	26.9	38.7
Cobalt	High	6	6	0.153	0.189	0.209	6	6	5.85	6.72	7.90
	Lower	6	6	0.093	0.141	0.174	6	6	7.58	9.96	12.7
Copper	High	6	6	4.91	5.57	6.35	6	6	31.6	68.0	111
	Lower	6	6	2.12	4.02	6.12	6	6	42.1	49.9	55.1
Iron	High	6	6	318	430	534	6	6	14,300	16,017	18,000
	Lower	6	6	139	298	418	6	6	11,500	16,313	19,100
Lead	High	6	6	60.3	69.8	78.6	6	6	297	1,121	2,140
	Lower	6	6	16.6	49.7	87.7	6	6	82.4	253	390
Manganese	High	6	6	27.7	35.7	40.0	6	6	494	733	1,050
	Lower	6	6	13.2	20.0	30.5	6	6	287	514	746
Nickel	High	6	6	0.3	0.523	1.18	6	6	12.3	13.8	15.6
	Lower	6	6	0.23	0.31	0.35	6	6	15.9	28.2	42.6
Selenium	High	6	6	0.39	0.4	0.4	6	6	0.46	1.10	1.93
	Lower	6	6	0.1	0.3	0.4	6	6	0.55	1.03	1.65
Silver	High	6	6	0.465	0.554	0.73	6	6	0.365	1.04	1.72
	Lower	6	6	0.141	0.349	0.574	6	6	0.544	0.807	1.01
Thallium	High	6	6	0.026	0.050	0.093	6	6	0.38	0.746	1.04
	Lower	6	6	0.012	0.027	0.045	6	6	0.353	0.388	0.434
Vanadium	High	6	6	0.77	0.950	1.11	6	6	30.2	34.3	36.7
	Lower	6	6	0.38	0.72	0.98	6	6	39.5	54.1	73.9
Zinc	High	6	6	266	284	310	6	6	353	943	1,670
	Lower	6	6	95.7	212	346	6	6	209	346	467

Notes:

[a] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[b] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

Table 5-1b. Summary of Camas (*Camassia quamash*) and Co-Located Soil Samples

Analyte	High or Lower Lead Area[a]	Plant Tissue Samples: Number of Samples[b]	Plant Tissue Samples: Number of Detected Values	Plant Tissue Samples: Minimum Detected Values	Plant Tissue Samples: Mean Detected Values	Plant Tissue Samples: Maximum Detected Values	Co-Located Soil Samples: Number of Samples[b]	Co-Located Soil Samples: Number of Detected Values	Co-Located Soil Samples: Minimum Detected Values	Co-Located Soil Samples: Mean Detected Values	Co-Located Soil Samples: Maximum Detected Values
Conventional Parameters (percent)											
Solids	High	6	6	11.8	20.6	26.4	6	6	93	93.9	94.7
	Lower	6	6	14.1	20.7	26.3	6	6	95.2	96.1	97.4
Metals/Metalloids (mg/kg dw)											
Aluminum	High	6	6	237	417	894	6	6	13,600	16,500	21,400
	Lower	6	6	371	485	644	6	6	5,840	15,600	21,200
Antimony	High	6	6	0.435	0.969	1.80	6	6	8.31	11.9	18.8
	Lower	6	6	0.384	1.01	1.77	6	6	5.97	8.15	13.6
Arsenic	High	6	6	0.48	0.778	1.57	6	6	42.3	55.3	95.3
	Lower	6	6	0.37	0.887	1.69	6	6	21.8	47.1	81.1
Barium	High	6	6	47.3	82.1	108	6	6	251	294	321
	Lower	6	6	44.6	103	208	6	6	165	237	278
Beryllium	High	6	6	0.008	0.017	0.035	6	6	0.644	0.713	0.764
	Lower	6	6	0.013	0.017	0.025	6	6	0.375	0.682	0.83
Cadmium	High	6	6	6.14	8.79	11.3	6	6	18.0	21.3	26.4
	Lower	6	6	4.88	8.30	16.7	6	6	10.3	13.3	18.6
Chromium	High	6	6	0.13	0.522	1.63	6	6	11.0	21.0	32.4
	Lower	6	6	0.36	0.52	0.74	6	6	17.0	19.2	20.4
Cobalt	High	6	6	0.111	0.222	0.391	6	6	5.11	7.90	10.8
	Lower	6	6	0.114	0.160	0.219	6	6	5.15	7.01	7.95
Copper	High	6	6	4.69	6.18	8.71	6	6	55.9	85.2	113
	Lower	6	6	5.06	6.41	7.11	6	6	35.6	51.1	80.3
Iron	High	6	6	125	385	1,020	6	6	11,800	15,200	17,300
	Lower	6	6	250	355	503	6	6	8,720	13,600	17,800
Lead	High	6	6	31.6	72.2	114	6	6	751	905	1,450
	Lower	6	6	15.1	45.3	93.6	6	6	206	478	768
Manganese	High	6	6	36.4	69.0	134	6	6	593	801	1,060
	Lower	6	6	31.1	49.3	78.5	6	6	278	467	629
Nickel	High	6	6	0.32	0.688	1.23	6	6	9.52	15.9	22.3
	Lower	6	6	0.35	0.44	0.6	6	6	11.6	15.0	16.5
Selenium	High	6	5	0.03	0.04	0.07	6	6	0.76	0.968	1.16
	Lower	6	3	0.04	0.05	0.07	6	6	0.51	0.690	1.02
Silver	High	6	6	0.06	0.0770	0.101	6	6	0.574	0.927	1.50
	Lower	6	6	0.037	0.0708	0.154	6	6	0.525	0.666	0.857
Thallium	High	6	6	0.048	0.172	0.368	6	6	0.505	0.606	0.749
	Lower	6	6	0.085	0.158	0.309	6	6	0.443	0.498	0.719
Vanadium	High	6	6	0.18	0.868	2.66	6	6	24.3	36.4	52.6
	Lower	6	6	0.52	0.737	1.13	6	6	28.8	35.7	40.2
Zinc	High	6	6	221	422	688	6	6	562	682	756
	Lower	6	6	263	602	1,610	6	6	212	389	617

Notes:

[a] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[b] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

Table 5-1c. Summary of Chokecherry (*Prunus virginiana*) and Co-Located Soil Samples

Analyte	High or Lower Lead Area[a]	Plant Tissue Samples: Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values	Co-Located Soil Samples: Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values
Conventional Parameters (percent)											
Solids	High	6	6	25.3	28.6	35.6	6	6	95.3	96.2	97.5
	Lower	6	6	23.3	26.8	36.7	6	6	96.3	97.6	99.5
Metals/Metalloids (mg/kg dw)											
Aluminum	High	6	6	1.30	2.53	3.70	6	6	12,700	17,200	24,300
	Lower	6	2	6.55	6.88	7.20	6	6	9,790	15,800	23,400
Antimony	High	6	2	0.005	0.006	0.007	6	6	2.99	7.95	10.6
	Lower	6	0	NA	NA	NA	6	6	0.598	2.73	5.36
Arsenic	High	6	1	0.03	0.03	0.03	6	6	23.3	31.5	37.6
	Lower	6	0	NA	NA	NA	6	6	5.90	21.0	33.9
Barium	High	6	6	5.79	10.2	17.0	6	6	196	306	381
	Lower	6	6	2.20	5.28	12.6	6	6	108	227	298
Beryllium	High	6	0	NA	NA	NA	6	6	0.458	0.633	0.84
	Lower	6	0	NA	NA	NA	6	6	0.4	0.572	0.692
Cadmium	High	6	6	0.003	0.005	0.008	6	6	10.8	19.9	25.6
	Lower	6	5	0.004	0.004	0.005	6	6	1.79	8.09	10.00
Chromium	High	6	6	0.05	0.15	0.29	6	6	10.4	14.2	21.1
	Lower	6	6	0.04	0.072	0.25	6	6	12.9	22.7	31.6
Cobalt	High	6	6	0.007	0.0097	0.012	6	6	4.38	6.49	9.25
	Lower	6	6	0.005	0.010	0.016	6	6	4.28	6.93	8.82
Copper	High	6	6	1.46	3.64	6.05	6	6	51.0	71.4	120
	Lower	6	6	2.46	3.33	4.70	6	6	11.5	34.0	42.4
Iron	High	6	6	10.2	11.1	13.5	6	6	11,900	14,900	19,200
	Lower	6	6	8.00	11.1	13.1	6	6	13,900	19,300	23,500
Lead	High	6	6	0.035	0.044	0.053	6	6	441	857	1,170
	Lower	6	5	0.037	0.056	0.15	6	6	75.6	331	466
Manganese	High	6	6	8.05	10.2	13.5	6	6	549	1,022	1,690
	Lower	6	6	4.18	6.77	8.72	6	6	282	798	1,120
Nickel	High	6	6	0.25	0.55	0.74	6	6	9.06	13.2	18.9
	Lower	6	6	0.26	0.559	1.19	6	6	9.60	15.4	20.1
Selenium	High	6	0	NA	NA	NA	6	6	0.4	0.7	0.9
	Lower	6	0	NA	NA	NA	6	6	0.2	0.5	0.6
Silver	High	6	0	NA	NA	NA	6	6	0.479	0.889	1.32
	Lower	6	2	0.003	0.004	0.004	6	6	0.124	0.519	1.32
Thallium	High	6	2	0.002	0.003	0.005	6	6	0.457	0.563	0.702
	Lower	6	4	0.002	0.002	0.003	6	6	0.24	0.351	0.536
Vanadium	High	6	0	NA	NA	NA	6	6	18.9	23.7	31.8
	Lower	6	1	0.02	0.02	0.02	6	6	22.6	33.0	41.7
Zinc	High	6	6	3.02	3.99	5.92	6	6	496	790	1,070
	Lower	6	6	2.66	3.72	6.93	6	6	116	398	513

Notes:

[a] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[b] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

NA - not applicable

Table 5-1d. Summary of Hazelnut (*Corylus cornuta*) and Co-Located Soil Samples

		Plant Tissue Samples					Co-Located Soil Samples				
Analyte	High or Lower Lead Area[a]	Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values	Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values
Conventional Parameters (percent)											
Solids	High	6	6	70.1	75.1	79.9	6	6	96.4	97.5	98.6
	Lower	6	6	66.2	71.9	73.9	6	6	95.3	97.4	98.7
Metals/Metalloids (mg/kg dw)											
Aluminum	High	6	5	0.4	0.792	1.20	6	6	12,600	17,783	25,900
	Lower	6	3	0.6	0.7	0.8	6	6	9,210	13,474	18,000
Antimony	High	6	1	0.008	0.008	0.008	6	6	2.59	4.76	12.9
	Lower	6	1	0.007	0.007	0.007	6	6	2.16	5.98	12.5
Arsenic	High	6	0	NA	NA	NA	6	6	21.0	29.6	40.7
	Lower	6	1	0.03	0.03	0.03	6	6	17.9	29.2	43.4
Barium	High	6	5	9.02	15.9	25.9	6	6	123	260	426
	Lower	6	6	9.54	15.9	28.6	6	6	78.7	205	324
Beryllium	High	6	0	NA	NA	NA	6	6	0.453	0.67	0.896
	Lower	6	0	NA	NA	NA	6	6	0.362	0.567	0.862
Cadmium	High	6	6	0.02	0.047	0.093	6	6	6.29	16.3	50.4
	Lower	6	6	0.017	0.0461	0.126	6	6	4.98	13.0	19.5
Chromium	High	6	6	0.05	1.80	3.84	6	6	15.4	23.4	28.8
	Lower	6	5	0.07	0.159	0.245	6	6	12.6	25.3	44.2
Cobalt	High	6	6	0.013	0.044	0.075	6	6	5.11	8.51	11.4
	Lower	6	6	0.012	0.026	0.046	6	6	3.59	7.53	12.0
Copper	High	6	6	10.1	13.1	14.9	6	6	21.5	69.5	195
	Lower	6	6	7.80	11.6	15.6	6	6	33.8	53.0	71.9
Iron	High	6	6	32.3	38.5	42.2	6	6	15,900	20,133	23,300
	Lower	6	6	21.8	30.7	40.9	6	6	12,650	19,625	29,300
Lead	High	6	4	0.006	0.0077	0.012	6	6	267	736	2,410
	Lower	6	4	0.003	0.005	0.01	6	6	228	637	1,125
Manganese	High	6	6	39.6	55.2	95.4	6	6	530	1,135	2,240
	Lower	6	6	34.3	99.2	236	6	6	367	863	1,250
Nickel	High	6	6	0.58	2.43	3.73	6	6	11.2	19.3	24.1
	Lower	6	6	0.62	1.26	2.11	6	6	8.98	17.6	29.5
Selenium	High	6	0	NA	NA	NA	6	6	0.3	0.608	1.05
	Lower	6	3	0.1	0.1	0.1	6	6	0.5	0.739	1.20
Silver	High	6	0	NA	NA	NA	6	6	0.285	0.759	2.46
	Lower	6	2	0.004	0.005	0.005	6	6	0.251	0.545	0.697
Thallium	High	6	0	NA	NA	NA	6	6	0.322	0.531	1.12
	Lower	6	1	0.011	0.011	0.011	6	6	0.329	0.531	0.797
Vanadium	High	6	2	0.03	0.03	0.03	6	6	28.3	33.6	39.0
	Lower	6	0	NA	NA	NA	6	6	20.1	32.4	47.3
Zinc	High	6	6	21.7	27.4	35.0	6	6	363	734	1,845
	Lower	6	6	16.0	24.3	36.2	6	6	283	564	812

Notes:

[a] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[b] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

NA - not applicable

Table 5-1e. Summary of Huckleberry (*Vaccinium cespitosum*) and Co-Located Soil Samples

		Plant Tissue Samples					Co-Located Soil Samples				
Analyte	High or Lower Lead Area[a]	Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values	Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values
Conventional Parameters (percent)											
Solids	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	20.7	27.2	36.6	6	6	96.3	97.2	97.8
Metals/Metalloids (mg/kg dw)											
Aluminum	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	17.1	21.1	28.1	6	6	11,600	14,017	15,600
Antimony	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	3	0.006	0.007	0.01	6	6	4.06	6.42	8.86
Arsenic	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	3	0.03	0.04	0.04	6	6	35.3	42.8	57.5
Barium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	5.74	7.80	9.29	6	6	104	151	200
Beryllium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	0	NA	NA	NA	6	6	0.336	0.447	0.503
Cadmium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.156	0.247	0.303	6	6	6.09	8.81	13.6
Chromium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	4	0.03	0.04	0.04	6	6	13.7	15.0	15.7
Cobalt	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	2	0.004	0.019	0.034	6	6	4.32	4.93	5.69
Copper	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	2.36	3.08	4.14	6	6	27.4	36.5	44.5
Iron	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	5.86	8.08	10.3	6	6	15,900	16,600	17,400
Lead	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.033	0.048	0.07	6	6	454	861	1,180
Manganese	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	19.3	27.3	45.0	6	6	228	481	809
Nickel	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.1	0.28	0.58	6	6	11.3	12.3	13.2
Selenium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	0	NA	NA	NA	6	6	0.5	0.6	0.7
Silver	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	4	0.003	0.004	0.005	6	6	0.292	0.497	0.726
Thallium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	0	NA	NA	NA	6	6	0.489	0.640	0.821
Vanadium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	0	NA	NA	NA	6	6	22.7	24.1	25.7
Zinc	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	3.87	5.32	7.37	6	6	271	421	646

Notes:

[a] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[b] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

NA - not applicable

Table 5-1f. Summary of Kinnikinnick (*Arctostaphylos uva-ursi*) and Co-Located Soil Samples

Analyte	High or Lower Lead Area[a]	Plant Tissue Samples: Number of Samples[b]	Plant Tissue Samples: Number of Detected Values	Plant Tissue Samples: Minimum Detected Values	Plant Tissue Samples: Mean Detected Values	Plant Tissue Samples: Maximum Detected Values	Co-Located Soil Samples: Number of Samples[b]	Co-Located Soil Samples: Number of Detected Values	Co-Located Soil Samples: Minimum Detected Values	Co-Located Soil Samples: Mean Detected Values	Co-Located Soil Samples: Maximum Detected Values
Conventional Parameters (percent)											
Solids	High	6	6	50.6	51.5	53.5	6	6	93.3	95.1	96.8
	Lower	6	6	47.5	49.9	53.4	6	6	97	97.9	98.4
Metals/Metalloids (mg/kg dw)											
Aluminum	High	6	6	15.5	33.1	68.2	6	6	11,100	16,825	23,800
	Lower	6	6	26.5	32.2	44.5	6	6	7,060	8,124	10,310
Antimony	High	6	6	0.013	0.034	0.059	6	6	2.73	8.94	17.4
	Lower	6	6	0.025	0.032	0.052	6	6	2.44	5.77	15.4
Arsenic	High	6	6	0.04	0.0792	0.155	6	6	37.8	46.0	60.1
	Lower	6	6	0.05	0.075	0.11	6	6	17.6	29.3	73.5
Barium	High	6	6	30.2	68.9	144	6	6	144	288	513
	Lower	6	6	38.9	58.4	74.2	6	6	118	168	270
Beryllium	High	6	1	0.018	0.018	0.018	6	6	0.607	0.838	1.08
	Lower	6	0	NA	NA	NA	6	6	0.402	0.549	0.637
Cadmium	High	6	6	0.038	0.108	0.188	6	6	5.88	15.4	36.7
	Lower	6	6	0.098	0.113	0.159	6	6	4.55	7.57	17.7
Chromium	High	6	6	0.13	0.238	0.46	6	6	15.9	27.3	37.6
	Lower	6	6	0.09	0.181	0.25	6	6	14.6	27.1	38.0
Cobalt	High	6	6	0.014	0.02	0.031	6	6	4.68	10.1	13.4
	Lower	6	6	0.015	0.019	0.024	6	6	4.39	7.54	10.1
Copper	High	6	6	2.28	2.70	3.65	6	6	35.8	72.0	142
	Lower	6	6	2.28	3.01	3.31	6	6	19.2	48.2	58.8
Iron	High	6	6	26.7	34.6	43.9	6	6	14,150	19,117	27,800
	Lower	6	6	28.1	42.4	48.4	6	6	8,220	12,106	14,300
Lead	High	6	6	0.563	1.31	2.36	6	6	160	678	1,730
	Lower	6	6	0.965	1.08	1.47	6	6	126	339	1,004
Manganese	High	6	6	10.9	23.5	51.5	6	6	222	855	1,260
	Lower	6	6	18.3	26.1	50.9	6	6	233	375	430
Mercury[c]	High	6	6	0.00192	0.00419	0.00852	6	6	0.0677	0.140	0.212
	Lower	6	6	0.000780	0.00162	0.00390	6	6	0.0410	0.0811	0.162
Nickel	High	6	6	0.15	0.21	0.3	6	6	11.5	20.5	26.7
	Lower	6	6	0.13	0.15	0.17	6	6	10.9	18.3	24.5
Selenium	High	6	1	0.03	0.03	0.03	6	6	0.56	0.903	1.37
	Lower	6	1	0.11	0.11	0.11	6	6	0.36	0.716	0.955
Silver	High	6	6	0.007	0.028	0.047	6	6	0.301	0.703	1.24
	Lower	6	6	0.018	0.023	0.033	6	6	0.206	0.360	0.741
Thallium	High	6	4	0.003	0.0085	0.021	6	6	0.293	0.600	0.838
	Lower	6	6	0.004	0.009	0.023	6	6	0.272	0.457	0.942
Vanadium	High	6	6	0.04	0.05	0.07	6	6	32.7	45.4	54.5
	Lower	6	6	0.03	0.1	0.1	6	6	25.6	34.4	40.4
Zinc	High	6	6	54.2	92.2	133	6	6	196	503	934
	Lower	6	6	78.4	102	159	6	6	148	210	396

Notes:

[a] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[b] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

[c] Mercury units were converted to mg/kg from ng/g values reported by ALS.

NA - not applicable

Table 5-1g. Summary of Lomatium (*Lomatium triternatum*) and Co-Located Soil Samples

		Plant Tissue Samples					Co-Located Soil Samples				
Analyte	High or Lower Lead Area[a]	Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values	Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values
Conventional Parameters (percent)											
Solids	High	6	6	25.7	27.0	33.3	6	6	91.9	94.5	95.6
	Lower	6	6	21.6	24.9	28.1	6	6	95.6	97.4	98.6
Metals/Metalloids (mg/kg dw)											
Aluminum	High	6	6	136	746	1,360	6	6	12,100	17,720	20,800
	Lower	6	6	1,120	1,365	2,040	6	6	11,600	16,550	22,600
Antimony	High	6	6	0.756	1.45	2.36	6	6	6.96	9.02	14.0
	Lower	6	6	0.494	0.941	1.49	6	6	2.36	4.56	6.44
Arsenic	High	6	6	0.52	1.17	1.80	6	6	42.7	61.7	76.5
	Lower	6	6	1.09	1.54	2.03	6	6	21.7	31.3	41.9
Barium	High	6	6	43.7	133	217	6	6	264	355	560
	Lower	6	6	162	209	294	6	6	189	246	287
Beryllium	High	6	5	0.016	0.030	0.046	6	6	0.672	0.926	1.08
	Lower	6	6	0.039	0.053	0.077	6	6	0.494	0.672	0.915
Cadmium	High	6	6	1.09	5.05	6.95	6	6	19.9	30.1	45.3
	Lower	6	6	1.77	3.89	4.98	6	6	6.18	8.83	12.5
Chromium	High	6	6	0.49	4.52	8.65	6	6	23.9	33.5	40.7
	Lower	6	6	1.52	7.60	18.1	6	6	19.3	31.1	43.5
Cobalt	High	6	6	0.087	0.419	0.536	6	6	10.6	12.4	13.4
	Lower	6	6	0.458	0.744	1.23	6	6	7.20	11.5	14.8
Copper	High	6	6	7.63	10.8	15.1	6	6	84.0	107	214
	Lower	6	6	10.3	13.0	16.5	6	6	42.1	48.3	61.1
Iron	High	6	6	118	617	883	6	6	13,500	19,990	23,600
	Lower	6	6	775	1,225	2,030	6	6	15,700	19,083	23,900
Lead	High	6	6	9.82	50.1	74.6	6	6	477	945	1,590
	Lower	6	6	7.71	43.0	81.5	6	6	110	278	468
Manganese	High	6	6	43.0	112	204	6	6	892	1,137	1,980
	Lower	6	6	48.0	69.5	88.3	6	6	331	508	786
Nickel	High	6	6	0.74	3.36	3.88	6	6	21.4	26.2	29.3
	Lower	6	6	2.82	7.29	13.7	6	6	15.2	27.8	40.7
Selenium	High	6	5	0.03	0.081	0.12	6	6	0.8	1.09	1.52
	Lower	6	6	0.05	0.2	0.5	6	6	0.57	0.807	1.18
Silver	High	6	6	0.02	0.139	0.199	6	6	0.889	1.06	1.59
	Lower	6	6	0.081	0.121	0.185	6	6	0.714	0.781	0.84
Thallium	High	6	6	0.06	0.121	0.174	6	6	0.517	0.870	1.05
	Lower	6	6	0.035	0.0883	0.165	6	6	0.357	0.428	0.487
Vanadium	High	6	6	0.39	1.26	1.91	6	6	35.4	49.7	59.7
	Lower	6	6	1.72	6.90	16.3	6	6	38.6	59.4	82.1
Zinc	High	6	6	115	247	306	6	6	446	992	2,120
	Lower	6	6	61.9	164	275	6	6	213	319	464

Notes:

[a] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[b] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

Table 5-1h. Summary of Ponderosa Pine (*Pinus ponderosa*) and Co-Located Soil Samples

		Plant Tissue Samples					Co-Located Soil Samples				
Analyte	High or Lower Lead Area[a]	Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values	Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values
Conventional Parameters (percent)											
Solids	High	6	6	67.7	88.2	94.1	6	6	95.1	96.5	97.9
	Lower	6	6	71.9	79.0	90.8	6	6	96.3	97.9	98.8
Metals/Metalloids (mg/kg dw)											
Aluminum	High	6	6	12.4	42.0	58.9	6	6	12,600	21,889	34,500
	Lower	6	6	7.60	17.9	44.8	6	6	11,200	15,750	23,200
Antimony	High	6	4	0.021	0.044	0.067	6	6	6.24	11.5	21.1
	Lower	6	1	0.026	0.026	0.026	6	6	2.83	6.49	8.83
Arsenic	High	6	6	0.04	0.1	0.1	6	6	33.5	84.8	142
	Lower	6	6	0.03	0.04	0.06	6	6	15.7	42.3	63.3
Barium	High	6	6	0.199	0.647	1.25	6	6	146	276	368
	Lower	6	6	0.169	0.542	0.884	6	6	106	150	208
Beryllium	High	6	0	NA	NA	NA	6	6	0.482	0.81	1.18
	Lower	6	0	NA	NA	NA	6	6	0.406	0.528	0.689
Cadmium	High	6	6	0.352	0.828	1.65	6	6	16.2	25.5	34.9
	Lower	6	6	0.233	0.720	1.21	6	6	5.00	10.3	18.8
Chromium	High	6	6	0.03	3.92	9.37	6	6	11.6	18.7	29.5
	Lower	6	6	5.28	8.57	15.0	6	6	12.5	13.8	15.1
Cobalt	High	6	6	0.023	0.0912	0.187	6	6	4.60	8.16	12.9
	Lower	6	6	0.089	0.143	0.246	6	6	4.06	4.77	6.07
Copper	High	6	6	6.51	8.48	15.1	6	6	39.6	81.2	112
	Lower	6	6	6.02	9.13	16.2	6	6	16.5	30.4	41.9
Iron	High	6	6	74.6	92.1	119	6	6	12,500	18,942	23,900
	Lower	6	6	66.4	102	138	6	6	13,000	14,817	17,000
Lead	High	6	6	0.051	0.845	2.23	6	6	509	920	1,515
	Lower	6	5	0.006	0.137	0.583	6	6	237	493	686
Manganese	High	6	6	27.2	50.5	73.2	6	6	689	1,218	1,890
	Lower	6	6	43.3	73.8	123	6	6	182	444	772
Nickel	High	6	6	0.98	3.00	5.73	6	6	8.87	16.0	25.9
	Lower	6	6	3.44	5.36	8.88	6	6	9.13	10.9	12.1
Selenium	High	6	0	NA	NA	NA	6	6	0.6	0.886	1.00
	Lower	6	0	NA	NA	NA	6	6	0.3	0.5	0.6
Silver	High	6	2	0.015	0.020	0.025	6	6	0.545	0.932	1.12
	Lower	6	0	NA	NA	NA	6	6	0.209	0.495	0.743
Thallium	High	6	0	NA	NA	NA	6	6	0.547	0.952	1.33
	Lower	6	0	NA	NA	NA	6	6	0.326	0.649	0.977
Vanadium	High	6	5	0.02	0.046	0.085	6	6	20.0	32.3	43.6
	Lower	6	6	0.03	0.1	0.1	6	6	20.3	23.8	26.9
Zinc	High	6	6	55.3	74.6	113	6	6	585	1,094	1,810
	Lower	6	6	55.1	81.5	102	6	6	263	463	920

Notes:

[a] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[b] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

NA - not applicable

Table 5-1i. Summary of Sarvisberry (*Amelanchier alnifolia*) and Co-Located Soil Samples

Analyte	High or Lower Lead Area[a]	Plant Tissue Samples: Number of Samples[b]	Plant Tissue Samples: Number of Detected Values	Plant Tissue Samples: Minimum Detected Values	Plant Tissue Samples: Mean Detected Values	Plant Tissue Samples: Maximum Detected Values	Co-Located Soil Samples: Number of Samples[b]	Co-Located Soil Samples: Number of Detected Values	Co-Located Soil Samples: Minimum Detected Values	Co-Located Soil Samples: Mean Detected Values	Co-Located Soil Samples: Maximum Detected Values
Conventional Parameters (percent)											
Solids	High	6	6	80.7	84.4	86.6	6	6	96.4	97.7	98.5
	Lower	6	6	65.5	78.9	88.4	6	6	96.8	98.5	99.0
Metals/Metalloids (mg/kg dw)											
Aluminum	High	6	6	4.30	8.86	12.3	6	6	11,000	17,610	20,400
	Lower	6	3	8.40	8.90	9.10	6	6	10,700	12,339	14,600
Antimony	High	6	5	0.006	0.015	0.051	6	6	1.89	4.93	10.9
	Lower	6	1	0.007	0.007	0.007	6	6	0.67	1.53	2.26
Arsenic	High	6	4	0.03	0.04	0.04	6	6	23.0	28.3	44.9
	Lower	6	3	0.02	0.03	0.04	6	6	7.00	13.6	22.4
Barium	High	6	6	39.1	47.6	57.0	6	6	175	238	282
	Lower	6	6	22.2	32.6	43.2	6	6	165	227	362
Beryllium	High	6	0	NA	NA	NA	6	6	0.41	0.645	0.754
	Lower	6	0	NA	NA	NA	6	6	0.381	0.426	0.499
Cadmium	High	6	6	0.068	0.142	0.279	6	6	6.24	12.0	25.7
	Lower	6	6	0.125	0.143	0.16	6	6	1.43	5.33	12.0
Chromium	High	6	6	0.19	0.55	0.85	6	6	10.5	20.4	29.1
	Lower	6	6	0.16	0.43	0.85	6	6	14.6	24.0	36.3
Cobalt	High	6	6	0.03	0.04	0.05	6	6	4.49	7.03	9.02
	Lower	6	6	0.022	0.041	0.065	6	6	4.22	7.80	12.0
Copper	High	6	6	6.01	58.4	372	6	6	42.0	47.1	60.3
	Lower	6	6	3.78	5.32	8.45	6	6	17.5	28.0	46.0
Iron	High	6	6	18.2	24.2	27.5	6	6	11,600	18,100	23,000
	Lower	6	6	17.3	23.5	27.4	6	6	12,700	17,900	24,200
Lead	High	6	6	0.109	2.42	14.9	6	6	245	474	896
	Lower	6	6	0.037	0.121	0.296	6	6	25.8	147	289
Manganese	High	6	6	32.3	39.8	76.4	6	6	599	652	757
	Lower	6	6	11.3	21.5	30.0	6	6	361	442	488
Mercury[c,d]	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	3	3	0.00144	0.00162	0.00205	3	3	0.0231	0.0414	0.0750
Nickel	High	6	6	0.59	0.924	1.08	6	6	8.56	15.0	20.4
	Lower	6	6	0.72	0.877	1.27	6	6	9.18	22.8	38.7
Selenium	High	6	0	NA	NA	NA	6	6	0.3	0.4	0.7
	Lower	6	2	0.06	0.11	0.16	6	6	0.2	0.489	1.00
Silver	High	6	1	0.045	0.045	0.045	6	6	0.361	0.555	1.02
	Lower	6	5	0.003	0.004	0.005	6	6	0.12	0.448	0.968
Thallium	High	6	0	NA	NA	NA	6	6	0.298	0.399	0.642
	Lower	6	0	NA	NA	NA	6	5	0.292	0.328	0.365
Vanadium	High	6	2	0.02	0.03	0.04	6	6	17.8	32.1	43.2
	Lower	6	3	0.02	0.03	0.03	6	6	20.1	37.8	76.7
Zinc	High	6	6	27.5	62.7	237	6	6	294	489	771
	Lower	6	6	16.7	23.6	27.3	6	6	104	253	433

Notes:

[a] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[b] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

[c] Mercury analysis was conducted although not specified in the QAPP (Ramboll 2018).

[d] Mercury units were converted to mg/kg from ng/g values reported by ALS.

NA - not applicable

Table 5-1j. Summary of Spring Beauty/Indian Potato (*Claytonia lanceolata*) and Co-Located Soil Samples

		Plant Tissue Samples					Co-Located Soil Samples				
Analyte	High or Lower Lead Area[a]	Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values	Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values
Conventional Parameters (percent)											
Solids	High	6	6	25.9	33.6	46.1	6	6	93.3	95.5	96.9
	Lower	6	6	16.4	34.0	50.0	6	6	95.7	97.35	98.5
Metals/Metalloids (mg/kg dw)											
Aluminum	High	6	6	51.6	770	3,370	6	6	11,700	17,200	26,600
	Lower	6	6	53.8	212	398	6	6	7,990	12,600	21,700
Antimony	High	6	6	0.136	1.02	3.70	6	6	6.82	10.1	13.8
	Lower	6	6	0.064	0.702	1.22	6	6	3.65	5.13	7.04
Arsenic	High	6	6	0.28	2.04	8.60	6	6	26.5	48.9	68.8
	Lower	6	6	0.15	0.870	1.44	6	6	22.8	31.4	43.4
Barium	High	6	6	6.81	19.4	43.3	6	6	171	277	449
	Lower	6	6	5.40	17.1	29.8	6	6	140	213	274
Beryllium	High	6	3	0.015	0.038	0.104	6	6	0.569	0.828	0.988
	Lower	6	2	0.012	0.014	0.016	6	6	0.407	0.650	1.16
Cadmium	High	6	6	1.80	9.78	28.2	6	6	18.0	23.9	35.1
	Lower	6	6	1.76	11.8	23.3	6	6	6.33	10.7	17.1
Chromium	High	6	6	0.16	1.42	5.40	6	6	16.0	28.9	42.0
	Lower	6	6	0.19	0.49	0.95	6	6	14.3	24.6	40.6
Cobalt	High	6	6	0.054	0.375	1.37	6	6	5.60	9.89	13.6
	Lower	6	6	0.026	0.164	0.415	6	6	4.47	7.74	10.3
Copper	High	6	6	2.59	6.70	17.8	6	6	56.4	87.3	181
	Lower	6	6	2.65	5.38	8.69	6	6	19.3	34.5	52.8
Iron	High	6	6	62.8	855	3,830	6	6	12,100	20,650	28,800
	Lower	6	6	47.7	212	475	6	6	9,680	14,300	19,100
Lead	High	6	6	7.16	87.3	397	6	6	595	1,030	1,500
	Lower	6	6	2.77	23.2	47.0	6	6	169	330	517
Manganese	High	6	6	16.1	76.9	193	6	6	524	956	1,410
	Lower	6	6	9.94	46.7	63.8	6	6	329	496	770
Nickel	High	6	6	0.15	1.08	3.74	6	6	12.0	20.3	26.4
	Lower	6	6	0.11	0.763	2.14	6	6	10.8	18.5	28.4
Selenium	High	6	3	0.03	0.1	0.3	6	6	0.75	1.12	1.79
	Lower	6	4	0.04	0.05	0.06	6	6	0.38	0.622	1.02
Silver	High	6	6	0.028	0.136	0.447	6	6	0.888	1.01	1.27
	Lower	6	6	0.037	0.116	0.229	6	6	0.178	0.397	0.726
Thallium	High	6	6	0.031	0.268	0.832	6	6	0.541	0.802	1.07
	Lower	6	6	0.055	0.32	0.6	6	6	0.394	0.606	1.39
Vanadium	High	6	6	0.13	1.59	7.21	6	6	29.4	46.5	63.0
	Lower	6	6	0.08	0.573	1.64	6	6	25.4	37.1	46.3
Zinc	High	6	6	64.1	196	535	6	6	466	856	1,520
	Lower	6	6	75.9	207	395	6	6	230	340	498

Notes:

[a] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[b] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

Table 5-1k. Summary of Tule (*Schoenoplectus acutus*) and Co-Located Soil Samples

Analyte	High or Lower Lead Area[a]	Plant Tissue Samples: Number of Samples[b]	Plant Tissue Samples: Number of Detected Values	Plant Tissue Samples: Minimum Detected Values	Plant Tissue Samples: Mean Detected Values	Plant Tissue Samples: Maximum Detected Values	Co-Located Soil Samples: Number of Samples[b]	Co-Located Soil Samples: Number of Detected Values	Co-Located Soil Samples: Minimum Detected Values	Co-Located Soil Samples: Mean Detected Values	Co-Located Soil Samples: Maximum Detected Values
Conventional Parameters (percent)											
Solids	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	19.0	24.3	27.8	6	6	92.6	94.8	96.6
Metals/Metalloids (mg/kg dw)											
Aluminum	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	5.20	26.4	85.2	6	6	4,220	6,398	9,400
Antimony	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	3	0.006	0.0090	0.014	6	6	0.78	1.06	1.64
Arsenic	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	4	0.03	0.1	0.07	6	6	2.30	2.88	4.20
Barium	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	28.1	48.2	65.5	6	6	194	252	273
Beryllium	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	0	NA	NA	NA	6	6	0.164	0.247	0.368
Cadmium	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.005	0.012	0.026	6	6	1.88	2.90	4.52
Chromium	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	2.56	3.96	5.15	6	6	6.31	8.89	12.5
Cobalt	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.044	0.073	0.094	6	6	2.59	2.91	3.43
Copper	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	1.08	1.74	2.27	6	6	24.2	35.0	60.3
Iron	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	42.5	58.0	97.9	6	6	4,680	5,731	7,320
Lead	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.033	0.12	0.29	6	6	21.9	36.7	61.8
Manganese	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	101	128	187	6	6	87.4	148	193
Mercury[c]	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.00273	0.00420	0.00584	6	6	0.0201	0.0330	0.0521
Nickel	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.98	1.70	2.20	6	6	7.76	9.66	14.0
Selenium	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	5	0.03	0.043	0.055	6	6	2.10	3.53	6.25
Silver	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	2	0.002	0.002	0.002	6	6	0.093	0.124	0.173
Thallium	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	5	0.002	0.004	0.006	6	0	NA	NA	NA
Vanadium	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.04	0.098	0.25	6	6	15.2	21.7	33.0
Zinc	High	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	5.80	7.56	9.62	6	6	116	138	159

Notes:

[a] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[b] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

[c] Mercury units were converted to mg/kg from ng/g values reported by ALS.

NA - not applicable

Table 5-1l. Summary of Wild Mint (*Mentha arvensis*) and Co-Located Soil Samples

Analyte	High or Lower Lead Area[a]	Plant Tissue Samples: Number of Samples[b]	Plant Tissue Samples: Number of Detected Values	Plant Tissue Samples: Minimum Detected Values	Plant Tissue Samples: Mean Detected Values	Plant Tissue Samples: Maximum Detected Values	Co-Located Soil Samples: Number of Samples[b]	Co-Located Soil Samples: Number of Detected Values	Co-Located Soil Samples: Minimum Detected Values	Co-Located Soil Samples: Mean Detected Values	Co-Located Soil Samples: Maximum Detected Values
Conventional Parameters (percent)											
Solids	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	12.5	14.0	16.2	6	6	93.7	95.5	97.3
Metals/Metalloids (mg/kg dw)											
Aluminum	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	63.3	139	373	6	6	4,910	6,863	9,490
Antimony	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.017	0.033	0.063	6	6	0.38	0.691	1.46
Arsenic	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.05	0.083	0.13	6	6	1.80	2.58	3.40
Barium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	76.3	87.9	110	6	6	235	283	350
Beryllium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	1	0.009	0.009	0.009	6	6	0.188	0.235	0.309
Cadmium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.025	0.0470	0.101	6	6	1.51	2.23	3.51
Chromium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.29	0.627	1.45	6	6	5.99	8.96	12.4
Cobalt	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.039	0.0757	0.176	6	6	2.76	3.49	4.54
Copper	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	4.75	9.44	13.2	6	6	19.8	29.3	45.9
Iron	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	109	166	344	6	6	4,560	5,711	6,400
Lead	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.315	0.654	1.58	6	6	18.4	37.4	61.5
Manganese	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	39.7	49.6	55.8	6	6	107	203	319
Mercury[c]	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.0163	0.0183	0.0207	6	6	0.0190	0.0320	0.0527
Nickel	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.17	0.39	0.82	6	6	6.72	9.44	11.4
Selenium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	5	0.03	0.1	0.1	6	6	1.20	2.45	4.80
Silver	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.004	0.007	0.009	6	6	0.103	0.136	0.186
Thallium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	5	0.002	0.004	0.007	6	0	NA	NA	NA
Vanadium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.17	0.36	0.87	6	6	10.3	14.8	22.5
Zinc	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	41.7	62.3	90.1	6	6	105	144	189

Notes:

[a] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[b] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

[c] Mercury units were converted to mg/kg from ng/g values reported by ALS.

NA - not applicable

Table 5-1m. Summary of Wild Rose Hips (*Rosa* sp.) and Co-Located Soil Samples

		Plant Tissue Samples					Co-Located Soil Samples				
Analyte	High or Lower Lead Area[a]	Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values	Number of Samples[b]	Number of Detected Values	Minimum Detected Values	Mean Detected Values	Maximum Detected Values
Conventional Parameters (percent)											
Solids	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	40.3	43.1	47.9	6	6	96.9	98.0	98.7
Metals/Metalloids (mg/kg dw)											
Aluminum	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	6.50	10.6	14.0	6	6	10,200	13,100	16,400
Antimony	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	3	0.006	0.008	0.01	6	6	0.645	2.63	4.59
Arsenic	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	1	0.03	0.03	0.03	6	6	6.28	19.7	36.8
Barium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	3.43	10.8	24.7	6	6	172	205	241
Beryllium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	0	NA	NA	NA	6	6	0.376	0.535	0.778
Cadmium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.005	0.028	0.055	6	6	1.01	6.76	15.0
Chromium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.18	1.41	2.89	6	6	25.0	30.1	39.7
Cobalt	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.009	0.031	0.062	6	6	7.37	9.01	11.0
Copper	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	1.81	2.61	3.19	6	6	16.9	35.0	62.1
Iron	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	20.4	28.6	37.3	6	6	19,800	22,200	26,700
Lead	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.058	0.088	0.159	6	6	30.1	326	695
Manganese	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	14.8	29.2	63.6	6	6	527	660	926
Mercury[c,d]	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	1	1	0.00104	0.00104	0.00104	1	1	0.0242	0.0242	0.0242
Nickel	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.16	0.963	1.55	6	6	16.3	22.4	26.9
Selenium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.045	0.13	0.23	6	6	0.4	0.6	0.9
Silver	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	2	0.002	0.003	0.003	6	6	0.142	0.357	0.762
Thallium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	0	NA	NA	NA	6	5	0.334	0.406	0.516
Vanadium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	0.02	0.04	0.06	6	6	30.3	35.8	41.3
Zinc	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	6	6	6.07	7.83	10.5	6	6	90.3	344	708

Notes:

[a] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[b] For samples with a field duplicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

[c] Mercury analysis was conducted although not specified in the quality assurance project plan (QAPP) (Ramboll 2018).

[d] Mercury units were converted to mg/kg from ng/g values reported by ALS.

NA - not applicable

Table 5-1n. Summary of Wild Rose Stems and Leaves (*Rosa* sp.) and Co-Located Soil Samples

Analyte	High or Lower Lead Area[a]	Plant Tissue Samples: Number of Samples[b]	Plant Tissue Samples: Number of Detected Values	Plant Tissue Samples: Minimum Detected Values	Plant Tissue Samples: Mean Detected Values	Plant Tissue Samples: Maximum Detected Values	Co-Located Soil Samples: Number of Samples[b]	Co-Located Soil Samples: Number of Detected Values	Co-Located Soil Samples: Minimum Detected Values	Co-Located Soil Samples: Mean Detected Values	Co-Located Soil Samples: Maximum Detected Values
Conventional Parameters (percent)											
Solids	High	6	6	38.2	42.3	46.9	6	6	90.1	92.9	94.7
	Lower	6	6	30.1	44.1	61.4	6	6	95.3	96.8	98.1
Metals/Metalloids (mg/kg dw)											
Aluminum	High	6	6	12.8	17.6	28.7	6	6	13,500	21,200	25,500
	Lower	6	6	18.2	26.3	36.1	6	6	12,900	14,500	16,000
Antimony	High	6	5	0.012	0.015	0.018	6	6	3.27	5.98	11.1
	Lower	6	6	0.014	0.029	0.048	6	6	1.57	6.19	19.1
Arsenic	High	6	6	0.03	0.064	0.095	6	6	25.3	36.4	55.5
	Lower	6	6	0.05	0.1	0.1	6	6	18.1	29.6	41.3
Barium	High	6	6	40.9	73.8	120	6	6	240	300	350
	Lower	6	6	19.2	64.4	123	6	6	150	172	210
Beryllium	High	6	0	NA	NA	NA	6	6	0.472	0.826	1.35
	Lower	6	0	NA	NA	NA	6	6	0.474	0.557	0.641
Cadmium	High	6	6	0.121	0.311	0.934	6	6	11.1	15.7	18.5
	Lower	6	6	0.147	0.485	0.932	6	6	5.40	14.9	21.6
Chromium	High	6	6	0.65	3.31	8.41	6	6	9.59	15.5	22.5
	Lower	6	6	1.84	2.64	3.84	6	6	14.7	24.3	34.1
Cobalt	High	6	6	0.014	0.026	0.049	6	6	4.40	7.38	10.7
	Lower	6	6	0.023	0.035	0.044	6	6	4.96	7.41	9.59
Copper	High	6	6	2.99	3.88	4.65	6	6	38.7	55.9	73.1
	Lower	6	6	4.43	4.74	4.99	6	6	20.6	44.3	68.8
Iron	High	6	6	34.4	61.2	95.0	6	6	11,500	16,700	21,700
	Lower	6	6	50.2	66.1	85.4	6	6	16,500	20,200	24,800
Lead	High	6	6	0.259	0.740	1.66	6	6	471	661	866
	Lower	6	6	0.953	1.97	4.68	6	6	248	853	1,800
Manganese	High	6	6	64.5	87.1	112	6	6	594	969	1,400
	Lower	6	6	60.3	127	199	6	6	481	681	875
Mercury[c]	High	6	6	0.00342	0.00560	0.00699	6	6	0.106	0.159	0.244
	Lower	6	6	0.00303	0.00674	0.00862	6	6	0.0712	0.150	0.319
Nickel	High	6	6	0.18	0.505	1.27	6	6	8.85	14.4	20.7
	Lower	6	6	0.345	0.512	0.71	6	6	12.0	17.7	22.5
Selenium	High	6	0	NA	NA	NA	6	6	0.6	0.95	1.6
	Lower	6	4	0.04	0.2	0.5	6	6	0.45	0.90	1.3
Silver	High	6	6	0.002	0.006	0.01	6	6	0.466	0.719	1.12
	Lower	6	6	0.007	0.013	0.021	6	6	0.21	0.51	0.88
Thallium	High	6	5	0.004	0.0085	0.013	6	6	0.39	0.698	1.35
	Lower	6	5	0.002	0.0090	0.016	6	6	0.361	0.696	1.25
Vanadium	High	6	6	0.03	0.1	0.08	6	6	16.6	25.3	34.3
	Lower	6	6	0.05	0.077	0.11	6	6	22.9	29.0	35.1
Zinc	High	6	6	11.0	25.7	50.4	6	6	481	632	916
	Lower	6	6	20.3	54.6	102	6	6	420	671	901

Notes:

[a] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[b] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

[c] Mercury units were converted to mg/kg from ng/g values reported by ALS.

NA - not applicable

Table 5-1o. Summary of Willow (*Salix exigua*) and Co-Located Soil Samples

Analyte	High or Lower Lead Area [a]	Plant Tissue Samples: Number of Samples[b]	Plant Tissue Samples: Number of Detected Values	Plant Tissue Samples: Minimum Detected Values	Plant Tissue Samples: Mean Detected Values	Plant Tissue Samples: Maximum Detected Values	Co-Located Soil Samples: Number of Samples[b]	Co-Located Soil Samples: Number of Detected Values	Co-Located Soil Samples: Minimum Detected Values	Co-Located Soil Samples: Mean Detected Values	Co-Located Soil Samples: Maximum Detected Values
Conventional Parameters (percent)											
Solids	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	12	43.8	65.5	90.8	12	12	99.6	99.8	99.9
Metals/Metalloids (mg/kg dw)											
Aluminum	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	12	6.55	20.7	34.1	12	12	2,880	4,358	6,530
Antimony	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	6	0.005	0.010	0.022	12	12	0.071	6.83	43.9
Arsenic	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	9	0.02	0.065	0.15	12	12	1.85	10.1	36.1
Barium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	12	14.7	23.6	36.7	12	12	37.7	135	287
Beryllium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	0	NA	NA	NA	12	12	0.158	0.225	0.335
Cadmium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	12	0.536	2.83	7.94	12	12	0.136	4.77	13.0
Chromium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	12	0.19	0.689	1.37	12	12	11.6	16.9	26.8
Cobalt	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	12	0.023	0.049	0.099	12	12	3.19	5.16	9.39
Copper	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	12	2.81	7.53	14.6	12	12	5.86	86.9	358
Iron	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	12	12.5	38.5	64.7	12	12	9,500	24,915	67,200
Lead	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	12	0.085	0.226	0.457	12	12	6.76	193	535
Manganese	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	12	4.34	25.6	83.2	12	12	95.6	255	696
Mercury[c]	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	12	0.001	0.002	0.003	12	12	0.001	0.197	0.855
Nickel	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	12	0.2	0.41	0.81	12	12	7.65	14.1	26.9
Selenium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	11	0.03	0.1	0.2	12	12	0.11	0.419	1.10
Silver	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	6	0.006	0.017	0.029	12	12	0.017	0.92	3.42
Thallium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	10	0.004	0.060	0.16	12	12	0.071	0.218	0.444
Vanadium	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	10	0.04	0.1	0.1	12	12	20.9	30.8	46.4
Zinc	High	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lower	12	12	34.1	140	337	12	12	34.7	993	2,720

Notes:

[a] SA01, SA02, and SA03 were designated "high lead" in the QAPP (Ramboll 2018) because the average soil concentrations reported in the 2014 residential soil study (CH2M Hill 2016) were above the time-critical removal action level of 700 mg/kg. The remaining sampling areas (SAs) were designated "lower lead" in the QAPP because the reported soil concentrations were below 700 mg/kg in the soil studies where these SAs were sampled.

[b] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

[c] Mercury units were converted to mg/kg from ng/g values reported by ALS.

NA - not applicable

Table 5-2. Plant Tissue Concentrations (mg/kg dw) by SA[a]

Sample Area	Aluminum		Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Cobalt		Copper	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Black Tree Lichen *(Bryoria fremontii)*																		
SA01	310	81.2	1.67	0.207	1.79	0.264	9.99	3.02	0.00667[b]	0.00294	3.00	0.208	1.07	0.343	0.189	0.0215	5.57	0.529
SA05	311	60.8	1.74	0.120	1.80	0.0707	29.8	1.84	0.01	0.00141	3.31	0.290	0.635	0.0354	0.173	0.00141	5.70	0.594
SA08	143	30.9	0.502	0.069	0.975	0.0480	26.2	5.83	0.004[b]	0	1.65	0.260	0.320	0.0566	0.110	0.0164	2.33	0.237
Camas *(Camassia quamash)*																		
SA01	321	101	1.25	0.578	0.637	0.199	66.8	18.8	0.0123	0.00586	9.71	2.50	0.183	0.0611	0.131	0.0241	6.68	2.01
SA03	513	331	0.688	0.240	0.920	0.569	97.4	10.9	0.0207	0.0124	7.88	1.68	0.860	0.680	0.313	0.106	5.68	0.740
SA05	561	106	1.40	0.391	1.27	0.517	132	65.8	0.02	0.005	10.9	5.00	0.473	0.147	0.188	0.0412	6.32	1.10
SA07	410	39.5	0.620	0.220	0.507	0.158	73.8	29.2	0.0133	0.000577	5.68	1.22	0.567	0.186	0.132	0.0259	6.51	0.512
Chokecherry *(Prunus virginiana)*																		
SA01	1.40	0.100	0.00492[b]	0.00238	0.0167[b]	0.0115	8.08	2.45	0.004[b]	0	0.0065	0.00218	0.172	0.103	0.0100	0.00100	4.84	1.08
SA03	3.67	0.0577	0.003[b]	6.72E-11	0.01[b]	0	12.3	5.80	0.004[b]	0	0.00433	0.00153	0.127	0.0802	0.00933	0.00252	2.44	0.866
SA07	2.33[b]	2.39	0.0025[b]	3.68E-11	0.01[b]	1.47E-10	8.35	3.69	0.004[b]	0	0.0039[b]	0.00143	0.104	0.0838	0.00970	0.00522	3.99	0.920
SA09	7.20	NA	0.003[b]	NA	0.01[b]	NA	2.20	NA	0.004[b]	NA	0.004	NA	0.04	NA	0.0110	NA	2.67	NA
Hazelnut *(Corylus cornuta)*																		
SA02	0.633[b]	0.404	0.00267[b]	0.00029	0.01[b]	0	15.8	8.93	0.00367[b]	0.000289	0.068	0.0255	0.167	0.153	0.0243	0.0147	13.1	2.59
SA03	0.733	0.416	0.00433[b]	0.00275	0.01[b]	0	16.1	3.22	0.00375[b]	0.000354	0.025	0.00624	3.44	0.354	0.0642	0.0108	13.1	1.19
SA04	0.225[b]	0.0354	0.00275[b]	0.00035	0.02[b]	0.0141	19.6	12.6	0.00375[b]	0.000354	0.098	0.0396	0.128[b]	0.166	0.0355	0.0106	11.7	5.48
SA06	0.533[b]	0.306	0.004[b]	0.00260	0.01[b]	0	11.2	1.85	0.004[b]	0	0.0223	0.00757	0.163	0.0751	0.0290	0.0157	12.5	0.569
SA09	0.600	NA	0.0025[b]	NA	0.01[b]	NA	17.0	NA	0.0035[b]	NA	0.018	NA	0.07	NA	0.0120	NA	10.6	NA
Huckleberry *(Vaccinium cespitosum)*																		
SA04	21.1	4.06	0.00492[b]	0.00302	0.0233[b]	0.0151	7.80	1.57	0.004[b]	0	0.247	0.0533	0.0283[b]	0.0147	0.00733	0.0131[b]	3.08	0.606
Kinnikinnick *(Arctostaphylos uva-ursi)*																		
SA02	42.6	26.4	0.0510	0.00755	0.115	0.0350	75.7	60.3	0.00867[b]	0.00808	0.161	0.0260	0.28	0.156	0.0235	0.00726	2.38	0.131
SA03	23.5	5.32	0.0160	0.00361	0.0433	0.00577	62.1	17.9	0.004[b]	0	0.0545	0.0163	0.197	0.0764	0.0155	0.00132	3.01	0.553
SA04	37.9	4.07	0.0397[b]	0.0104	0.100	0.0100	57.4	14.9	0.004[b]	0	0.129	0.0218	0.161[b]	0.0641	0.0191[b]	0.00329	2.71	0.310
SA06	26.5	NA	0.0250	NA	0.05	NA	59.4	NA	0.004[b]	NA	0.0980	NA	0.2	NA	0.0180	NA	3.31	NA
Lomatium *(Lomatium triternatum)*																		
SA02	737	NA	1.10	NA	1.21	NA	120	NA	0.0280	NA	6.95	NA	5.23	NA	0.476	NA	10.4	NA
SA03	756	532	1.81	0.655	1.13	0.558	146	68.5	0.0268[b]	0.0181	3.16	1.89	3.80	3.04	0.363	0.191	11.2	2.70
SA05	1,250	170	1.28	0.182	1.79	0.222	225	62.0	0.0473	0.00764	4.26	0.646	3.16	1.44	0.545	0.101	13.3	2.97
SA08	1,480	482	0.602	0.118	1.28	0.303	192	27.9	0.0580	0.0166	3.51	1.52	12.0	5.54	0.943	0.249	12.6	2.79
Ponderosa Pine *(Pinus ponderosa)*																		
SA01	29.1	19.6	0.024[b]	0.0372	0.0600	0.0346	0.470	0.380	0.004[b]	0	0.496	0.210	2.69	1.19	0.0637	0.00153	11.7	3.60
SA02	55.2	5.23	0.0428	0.0209	0.0675	0.0106	1.08	0.241	0.004[b]	0	1.40	0.343	9.03	0.470	0.187	0	6.93	0.605
SA03	41.7	NA	0.0210	NA	0.07	NA	0.390	NA	0.004[b]	NA	0.585	NA	0.03	NA	0.0230	NA	6.78	NA
SA04	24.7	18.1	0.0105[b]	0.0134	0.0433	0.0153	0.502	0.0829	0.00383[b]	0.000289	1.07	0.123	8.36	2.21	0.142	0.0295	9.92	5.49
SA07	11.1	3.60	0.0025[b]	0	0.0333	0.00577	0.582	0.370	0.004[b]	0	0.368	0.197	8.77	5.41	0.144	0.0884	8.34	1.89
Sarvisberry *(Amelanchier alnifolia)*																		
SA01	5.42	1.37	0.0189[b]	0	0.03[b]	0.0122	43.9	7.74	0.004[b]	0	0.216	0.0577	0.248	0.0482	0.0372	0.00804	111	148
SA03	12.3	NA	0.00600	NA	0.01[b]	NA	51.3	NA	0.0035[b]	NA	0.068	NA	0.850	NA	0.0500	NA	6.01	NA
SA07	2.33[b]	0.126	0.00267[b]	0	0.0167[b]	0.00577	37.2	5.56	0.004[b]	0	0.150	0.0123	0.202	0.0325	0.0555	0.0100	6.18	1.99
SA08	8.70	0.424	0.00475[b]	0	0.01[b]	0	38.6	0.354	0.004[b]	0	0.136	0.0148	0.240	0.113	0.0365	0.0205	4.43	0.912
SA14	9.10	NA	0.0025[b]	NA	0.04	NA	22.2	NA	0.004[b]	NA	0.143	NA	0.850	NA	0.0310	NA	5.37	NA
Spring Beauty/Indian Potato *(Claytonia lanceolata)*																		
SA01	257	192	0.361	0.125	0.46	0.0707	19.3	9.12	0.0095[b]	0.00778	4.44	2.05	0.36	0.283	0.186	0.168	4.46	1.46
SA02	1,960	1,990	2.49	1.72	5.36	4.59	30.9	17.5	0.0615	0.0601	22.9	7.50	3.21	3.10	0.842	0.747	12.8	7.10
SA03	93.3	59.0	0.207	0.100	0.3	0.0283	7.91	1.55	0.004[b]	0	2.01	0.29	0.68	0.679	0.0970	0.0608	2.85	0.368
SA04	304	48.1	1.04	0.0983	1.09	0.113	24.8	7.07	0.008[b]	0.00566	17.5	8.27	0.39	0.226	0.149	0.0431	6.80	2.67
SA05	98.4	63.1	0.642	0.817	0.44	0.410	15.8	14.6	0.004[b]	0	6.18	6.25	0.485	0.417	0.0760	0.0707	5.06	3.40
SA08	234	232	0.424	0.107	1.08	0.509	10.8	5.10	0.01[b]	0.00849	11.8	5.40	0.585	0.516	0.268	0.209	4.29	1.84
Tule *(Schoenoplectus acutus)*																		
SA14	26.4	31.7	0.00575[b]	0.00450	0.0383[b]	0.0256	48.2	15.8	0.004[b]	0	0.0124	0.00944	3.96	0.966	0.0733	0.0184	1.74	0.423
Wild Mint *(Mentha arvensis)*																		
SA14	139	116	0.0333	0.0166	0.0825	0.0279	87.9	12.4	0.00483[b]	0	0.0470	0.0272	0.627	0.417	0.0757	0.0500	9.44	3.23
Wild Rose *(hips - Rosa* sp.)																		
SA06	7.95	1.37	0.00638[b]	0.00309	0.015[b]	0.0100	18.6	5.87	0.004[b]	0	0.0495	0.00592	0.653	0.712	0.0165	0.00733	2.83	0.174
SA09	9.75	NA	0.003[b]	NA	0.01[b]	NA	10.4	NA	0.004[b]	NA	0.0295	NA	0.695	NA	0.0150	NA	3.19	NA
SA14	14.0	NA	0.0025[b]	NA	0.01[b]	NA	3.43	NA	0.004[b]	NA	0.005	NA	2.89	NA	0.0620	NA	1.81	NA
Wild Rose *(stems and leaves - Rosa* sp.)																		
SA01	13.1	0.301	0.0155	0.00218	0.075	0.0180	78.3	39.7	0.004[b]	0	0.419	0.448	2.62	1.81	0.759	1.48	3.87	0.329
SA03	22.1	6.02	0.0108[b]	0.00782	0.0533	0.0252	69.4	13.8	0.004[b]	0	0.203	0.0441	4.01	3.91	0.0347	0.0150	3.88	0.837
SA04	27.2	7.00	0.0388	0.0121	0.0817	0.0161	94.8	30.2	0.004[b]	0	0.727	0.221	2.50	0.584	0.0340	0.00964	4.79	0.310
SA06	25.3	9.51	0.0198	0.00629	0.0533	0.00577	34.0	12.8	0.004[b]	0	0.243	0.148	2.77	1.00	0.0365	0.00901	4.69	0.205
Willow *(Salix exigua)*																		
SA15	13.3	5.61	0.01367[b]	0.00712	0.0183[b]	0.00983	23.5	8.35	0.00392[b]	0.000204	2.82	1.70	0.387	0.186	0.0313	0.00579	10.8	4.87
SA16	28.0	6.38	0.00292[b]	0.00102	0.103	0.0339	23.7	4.82	0.004[b]	0	2.85	2.72	0.992	0.233	0.0667	0.0180	4.29	1.65

Sample Area	Iron		Lead		Manganese		Mercury[c]		Nickel		Selenium		Silver		Thallium		Vanadium		Zinc	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Black Tree Lichen *(Bryoria fremontii)*																				
SA01	430	90.0	69.8	6.25	35.7	4.63	N/A	N/A	0.523	0.327	0.397	0.00516	0.554	0.0917	0.05	0.0246	0.950	0.165	284	19.1
SA05	403	21.9	80.0	10.9	24.8	8.13	N/A	N/A	0.345	0.00707	0.365	0.0495	0.533	0.0580	0.0405	0.00636	0.925	0.0778	317	41.7
SA08	194	40.0	19.3	2.42	15.2	1.35	N/A	N/A	0.278	0.0427	0.170	0.0476	0.165	0.0251	0.0135	0.00173	0.523	0.104	108	22.1
Camas *(Camassia quamash)*																				
SA01	242	173	91.3	26.3	63.7	18.5	N/A	N/A	0.350	0.0265	0.0333[b]	0.00577	0.0733	0.0153	0.262	0.0991	0.387	0.291	550	143
SA03	528	428	53.1	24.1	74.3	52.3	N/A	N/A	1.03	0.176	0.05	0.0173	0.0807	0.0200	0.0827	0.0533	1.35	1.16	293	65.9
SA05	346	89.4	68.3	23.3	58.4	17.4	N/A	N/A	0.503	0.0907	0.0533	0.0153	0.0873	0.0580	0.201	0.0963	0.697	0.170	824	682
SA07	364	124	22.3	6.67	40.2	10.8	N/A	N/A	0.383	0.0493	0.015[b]	0	0.0543	0.0192	0.114	0.0300	0.777	0.316	379	102
Chokecherry *(Prunus virginiana)*																				
SA01	11.8	1.62	0.0437	0.00850	8.98	1.57	N/A	N/A	0.628	0.0884	0.015[b]	0	0.0015[b]	0.000866	0.0025[b]	0.00218	0.01[b]	0	4.73	1.52
SA03	10.4	0.153	0.0443	0.00757	11.4	2.53	N/A	N/A	0.477	0.247	0.015[b]	0	0.001[b]	0	0.00117[b]	0.000289	0.01[b]	0	3.24	0.246
SA07	10.4	1.83	0.0552[b]	0.0544	7.15	1.78	N/A	N/A	0.528	0.376	0.015[b]	0	0.002[b]	0.00141	0.002[b]	0.000707	0.01[b]	1.47E-10	4.78	1.46
SA09	11.8	NA	0.045	NA	6.39	NA	N/A	N/A	0.590	NA	0.015[b]	NA	0.001[b]	NA	0.001[b]	NA	0.02	NA	2.66	NA
Hazelnut *(Corylus cornuta)*																				
SA02	36.0	4.42	0.0033[b]	0.00318	62.3	29.3	N/A	N/A	1.33	1.07	0.015[b]	0	0.00117[b]	0.000289	0.001[b]	0	0.01[b]	0	31.5	3.08
SA03	41.0	0.993	0.00833	0.00321	48.0	8.29	N/A	N/A	3.53	0.255	0.015[b]	0	0.001[b]	0	0.001[b]	0	0.03[b]	0	23.2	1.36
SA04	36.4	6.33	0.007[b]	0.00212	221	20.9	N/A	N/A	1.94	0.247	0.015[b]	0	0.00125[b]	0.000354	0.006[b]	0.00707	0.01[b]	0	31.9	6.05
SA06	33.8	5.25	0.006	0.00361	41.9	6.62	N/A	N/A	1.23	0.205	0.100	0	0.00333[b]	0.00208	0.001[b]	0	0.01[b]	0	25.2	1.16
SA09	21.8	NA	0.004	NA	34.4	NA	N/A	N/A	0.620	NA	0.015[b]	NA	0.001[b]	NA	0.001[b]	NA	0.01[b]	NA	16.0	NA
Huckleberry *(Vaccinium cespitosum)*																				
SA04	8.08	1.86	0.0480	0.0158	27.3	11.9	N/A	N/A	0.275	0.181	0.015[b]	0	0.00267[b]	0.00151	0.001[b]	0	0.01[b]	0	5.32	1.41
Kinnikinnick *(Arctostaphylos uva-ursi)*																				
SA02	32.4	0.675	1.87	0.452	35.1	14.4	0.00419	0.00376	0.247	0.0503	0.02[b]	0.00866	0.0408	0.00530	0.0145	0.00563	0.0467	0.00577	122	10.5
SA03	36.9	9.02	0.757	0.323	12.0	1.3	0.00420	0.0000984	0.173	0.0404	0.015[b]	0	0.0143	0.00635	0.0015[b]	0.000866	0.0533	0.0153	62.2	13.4
SA04	38.0	7.84	1.17	0.244	30.7	12.7	0.00191	0.00120	0.150	0.0187	0.015[b]	0	0.0261[b]	0.00621	0.0140	0.00552	0.058	0.0268	126	29.7
SA06	46.9	NA	0.998	NA	21.5	NA	0.00134	NA	0.145	NA	0.110	NA	0.0195	NA	0.004	NA	0.09	NA	78.4	NA
Lomatium *(Lomatium triternatum)*																				
SA02	675	NA	64.2	NA	114	NA	N/A	N/A	3.88	NA	0.12	NA	0.199	NA	0.0960	NA	1.22	NA	306	NA
SA03	559	334	36.0	27.8	109	58.7	N/A	N/A	2.85	1.21	0.037[b]	0.0164	0.0796	0.0587	0.145	0.0479	1.30	0.698	189	74.3
SA05	882	96.8	76.9	4.02	82.0	5.64	N/A	N/A	3.53	1.10	0.0567	0.00577	0.0967	0.0214	0.131	0.0345	2.04	0.298	244	26.6
SA08	1,570	403	9.06	1.52	57.0	11.2	N/A	N/A	11.0	3.54	0.37	0.114	0.146	0.0551	0.0453	0.00907	11.8	4.16	83.5	19.9
Ponderosa Pine *(Pinus ponderosa)*																				
SA01	91.2	7.96	0.864	1.19	57.5	15.1	N/A	N/A	2.57	1.11	0.015[b]	0	0.009[b]	0.0139	0.001[b]	0	0.03[b]	0.0200	93.3	20.1
SA02	111	12.0	1.22	0.696	66.7	9.09	N/A	N/A	5.45	0.385	0.015[b]	0	0.00913[b]	0.00795	0.001[b]	0	0.0775	0.0106	75.3	11.0
SA03	74.6	NA	0.453	NA	27.2	NA	N/A	N/A	0.98	NA	0.015[b]	NA	0.003[b]	NA	0.001[b]	NA	0.02	NA	55.3	NA
SA04	104	17.9	0.251	0.287	89.3	32.0	N/A	N/A	5.43	0.807	0.015[b]	0	0.0015[b]	0.000866	0.00117[b]	0.000289	0.0567	0.00577	73.9	24.8
SA07	100	36.0	0.0173[b]	0.0188	58.3	15.0	N/A	N/A	5.29	3.11	0.015[b]	0	0.001[b]	0	0.001[b]	0	0.0567	0.0379	89.0	12.8
Sarvisberry *(Amelanchier alnifolia)*																				
SA01	20.9	3.25	4.72	5.85	47.3	17.5	N/A	N/A	0.888	0.186	0.015[b]	0	0.0129[b]	0	0.001[b]	0	0.012[b]	0.00447	97.9	80.6
SA03	27.5	NA	0.109	NA	32.3	NA	N/A	N/A	0.960	NA	0.015[b]	NA	0.001[b]	NA	0.001[b]	NA	0.04	NA	27.5	NA
SA07	20.0	2.38	0.224	0.0780	27.2	2.65	N/A	N/A	0.760	0.0608	0.015[b]	0	0.00367	0	0.001[b]	0	0.01[b]	0	25.2	1.87
SA08	23.0	0.990	0.101	0.0382	12.7	1.98	0.00180	0.000361	1.01	0.368	0.11	0	0.004	0	0.001[b]	0	0.03	0	19.4	3.75
SA14	27.4	NA	0.037	NA	24.5	NA	0.00144	NA	0.860	NA	0.015[b]	NA	0.001[b]	NA	0.001[b]	NA	0.02	NA	26.3	NA
Spring Beauty/Indian Potato *(Claytonia lanceolata)*																				
SA01	262	134	13.2	7.50	58.0	10.6	N/A	N/A	0.370	0.113	0.0225[b]	0.0106	0.0725	0.00778	0.168	0.0905	0.355	0.262	139	12.7
SA02	2,200	2,310	242	220	143	70.6	N/A	N/A	2.43	1.86	0.185	0.163	0.296	0.214	0.577	0.361	4.18	4.29	376	225
SA03	106	61.7	7.26	0.141	29.6	19.1	N/A	N/A	0.435	0.403	0.0150[b]	0	0.04	0.0170	0.0580	0.0382	0.250	0.170	72.8	12.2
SA04	251	64.3	35.7	3.46	53.8	0.283	N/A	N/A	0.735	0.290	0.05	0.0141	0.164	0.0339	0.445	0.219	0.540	0.311	288	152
SA05	103	78.0	24.9	31.3	24.6	20.7	N/A	N/A	0.230	0.170	0.0275[b]	0.0177	0.140	0.127	0.103	0.0672	0.230	0.212	179	146
SA08	283	272	9.06	3.17	61.9	2.76	N/A	N/A	1.33	1.15	0.0325[b]	0.0247	0.0435	0.00919	0.402	0.270	0.950	0.976	155	7.07
Tule *(Schoenoplectus acutus)*																				
SA14	58.0	21.7	0.121	0.104	128	35.2	0.00420	0.00121	1.70	0.474	0.0383[b]	0.0144	0.00133[b]	0.000516	0.00383[b]	0.00204	0.0975	0.0824	7.56	1.63
Wild Mint *(Mentha arvensis)*																				
SA14	166	88.1	0.654	0.460	49.6	6.55	0.0183	0.00166	0.388	0.229	0.0508[b]	0.0304	0.00683	0.00183	0.00367[b]	0.00242	0.356	0.256	62.3	19.0
Wild Rose *(hips - Rosa* sp.)																				
SA06	24.2	3.60	0.141	0.0209	48.1	14.6	N/A	N/A	0.398	0.363	0.125	0.0311	0.00175[b]	0.000957	0.001[b]	0	0.03	0.00816	9.70	0.588
SA09	24.4	NA	0.0635	NA	24.7	NA	N/A	N/A	0.940	NA	0.0450	NA	0.001[b]	NA	0.001[b]	NA	0.035	NA	7.74	NA
SA14	37.3	NA	0.058	NA	14.8	NA	0.00104	NA	1.55	NA	0.230	NA	0.001[b]	NA	0.001[b]	NA	0.06	NA	6.07	NA
Wild Rose *(stems and leaves - Rosa* sp.)																				
SA01	52.5	22.0	1.07	0.514	78.8	13.9	0.00558	0.00190	0.260	0.0693	0.0150[b]	0	0.00817	0.00202	0.0115	0.00260	0.0333	0.00577	32.5	16.1
SA03	69.8	23.8	0.411	0.146	95.4	24.5	0.00563	0.000891	0.750	0.454	0.0150[b]	0	0.00367	0.00208	0.004[b]	0.003	0.0733	0.0115	19.0	7.05
SA04	58.8	7.68	2.73	1.77	168	27.0	0.00807	0.000671	0.552	0.135	0.0233[b]	0.0144	0.0177	0.00416	0.0113	0.00503	0.0667	0.0153	86.5	19.7
SA06	73.4	10.4	1.22	0.294	85.0	22.1	0.00541	0.00208	0.472	0.207	0.335	0.185	0.00817	0.00247	0.00167[b]	0.000577	0.0867	0.0208	22.6	3.53
Willow *(Salix exigua)*																				
SA15	22.6	7.42	0.257	0.160	9.74	8.18	0.00206	0.000674	0.263	0.0736	0.131[b]	0.0846	0.00367[b]	0.00157	0.0669[b]	0.0655	0.0333[b]	0.0197	179	114
SA16	54.4	10.4	0.195	0.0306	41.4	22.7	0.00158	0.000194	0.567	0.142	0.0908	0.0461	0.0173	0.0110	0.0204	0.0167	0.0825	0.0172	102	86.6

Notes:

[a] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

[b] Contains nondetected results. Half the detection limit (DL) was used as the concentration in nondetected values.

[c] Mercury units were converted to mg/kg from ng/g values reported by ALS.

N/A - not analyzed

NA - not applicable (n=1)

SA - sampling area

SD - standard deviation

Table 5-3. Soil Concentrations (mg/kg dw) by SA[a]

	Aluminum		Antimony		Arsenic		Barium		Beryllium		Cadmium		Chromium		Cobalt		Copper		Iron	
Sample Area	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
SA01	17,288	5,803	11.0	6.16	45.9	25.2	256	69.9	0.653	0.176	20.2	6.98	13.5	3.18	5.68	1.001	58.7	19.9	14,212	2,103
SA02	18,477	4,969	9.31	6.07	61.4	38.1	208	68.8	0.782	0.225	16.7	9.26	25.1	9.77	8.15	3.18	56.1	22.9	20,282	4,619
SA03	18,279	4,329	7.62	4.10	42.9	11.6	362	72.6	0.811	0.155	22.9	11.7	26.1	5.70	10.7	1.74	101	45.0	19,277	3,339
SA04	11,791	2,953	7.48	4.07	39.7	12.7	151	42.0	0.459	0.0490	9.79	4.28	15.1	1.48	4.89	0.712	35.0	12.5	13,678	3,101
SA05	20,890	1,873	7.54	2.35	46.9	15.8	245	29.1	0.810	0.145	12.9	3.21	20.4	2.96	8.33	1.43	54.7	10.6	17,940	1,619
SA06	14,414	2,649	3.04	1.06	24.4	7.87	187	26.7	0.700	0.0873	10.1	5.46	36.9	4.10	10.2	1.059	50.1	8.34	24,077	3,989
SA07	14,166	5,454	4.05	2.56	24.9	13.7	183	50.6	0.540	0.149	8.74	4.62	15.2	2.44	5.33	1.10	28.4	10.8	13,822	2,580
SA08	11,249	2,589	3.02	0.643	24.1	2.27	335	135	0.516	0.0521	9.19	2.25	35.7	5.27	11.7	1.89	44.6	8.99	17,309	4,181
SA09	14,600	1,572	4.42	1.59	24.5	4.42	278	58.1	0.536	0.0607	13.5	5.24	27.8	3.32	8.07	0.73	50.9	18.3	21,283	1,966
SA14	7,205	2,281	0.84	0.391	3.29	1.56	258	42.9	0.261	0.0804	2.37	0.952	11.3	6.61	3.98	2.05	30.2	12.2	7,704	5,109
SA15	4,576	1,081	13.6	15.7	17.9	10.7	224	65.0	0.260	0.0426	9.25	2.77	19.3	4.63	6.73	1.68	167	140	38,250	17,002
SA16	4,140	997	0.0926	0.0198	2.31	0.402	46.8	7.78	0.189	0.0205	0.294	0.156	14.5	1.89	3.59	0.277	7.03	1.16	11,580	2,016
High Lead Sampling Areas[d]																				
Mean	17,903		9.34		47.5		290		0.740		20.7		20.7		8.13		75.2		17,351	
Minimum	11,000		1.89		21.0		123		0.410		5.88		9.59		4.38		21.5		11,500	
Maximum	34,500		32.7		142		560		1.35		50.4		42.0		13.6		214		28,800	
SD	5,047		5.54		24.5		93.2		0.190		9.63		8.40		2.91		38.7		4,129	
Lower Lead Sampling Areas[e]																				
Mean	11,814		4.82		25.3		208		0.486		8.33		20.6		6.70		45.2		16,522	
Minimum	2,880		0.0710		1.80		37.7		0.158		0.136		5.99		2.59		5.86		4,560	
Maximum	23,400		43.9		81.1		650		1.16		21.6		44.2		14.8		358		67,200	
SD	5,410		5.47		17.3		91.5		0.203		5.09		10.0		3.01		47.7		8,892	

	Lead		Manganese		Mercury[b]		Nickel		Selenium		Silver		Thallium		Vanadium		Zinc	
Sample Area	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
SA01	850	373	717	181	0.189	0.0642	11.1	2.04	0.864	0.408	0.907	0.297	0.616	0.172	26.1	7.10	761	297
SA02	831	476	757	301	0.175	0.0639	17.7	6.70	0.839	0.323	0.721	0.319	0.807	0.365	40.4	11.9	680	379
SA03	861	530	1283	397	0.117	0.0355	21.9	3.09	0.885	0.319	0.917	0.486	0.667	0.271	39.8	9.10	826	492
SA04	683	402	435	184	0.139	0.0777	11.9	1.35	0.597	0.221	0.442	0.199	0.641	0.228	25.0	2.94	381	170
SA05	500	128	646	103	N/A	N/A	16.8	1.50	0.728	0.168	0.733	0.0996	0.560	0.307	40.9	4.52	454	80.2
SA06	452	306	738	136	0.109	0.0498	24.7	2.80	0.911	0.154	0.478	0.150	0.457	0.145	38.5	4.62	487	226
SA07	316	139	459	166	N/A	N/A	11.3	2.08	0.407	0.144	0.487	0.301	0.418	0.152	25.7	5.00	352	214
SA08	148	49.1	387	55.4	0.0597	0.0217	36.1	6.02	1.09	0.341	0.782	0.293	0.405	0.0573	64.5	14.0	288	68.7
SA09	597	203	1,009	312	N/A	N/A	18.2	1.93	0.567	0.058	0.565	0.120	0.445	0.115	38.1	3.11	611	174
SA14	35.7	15.8	222	131	0.0312	0.0117	11.6	5.59	2.60	1.71	0.130	0.0314	0.046	0.00934[c]	19.8	7.29	134	30.7
SA15	367	139	382	157	0.388	0.272	18.8	5.31	0.708	0.233	1.82	1.13	0.290	0.111	35.5	6.88	1,915	569
SA16	18.5	11.5	127	16.3	0.00576	0.00460	9.46	1.24	0.129	0.0233	0.0254	0.00632	0.146	0.0879	26.0	4.58	71.0	38.2
High Lead Sampling Areas[d]																		
Mean	851		951		0.149		16.6		0.868		0.877		0.671		34.2		772	
Minimum	160		222		0.068		8.56		0.300		0.285		0.293		16.6		196	
Maximum	2,410		2,240		0.244		29.3		1.93		2.46		1.35		63.0		2,120	
SD	452		406		0.057		6.13		0.354		0.388		0.261		11.2		396	
Lower Lead Sampling Areas[e]																		
Mean	364		454		0.112		17.0		0.945		0.540		0.406		33.2		434	
Minimum	6.76		87.4		0.001		6.72		0.110		0.0170		0.0345		10.3		34.7	
Maximum	1,800		1,250		0.855		42.6		6.25		3.42		1.39		82.1		2,720	
SD	326		242		0.164		8.9		0.982		0.508		0.257		14.8		450	

Notes:

[a] For samples with a field replicate, summary statistics are based on the average of the field sample and replicate results at that sample location.

[b] Mercury units were converted to mg/kg from ng/g values reported by ALS.

[c] Contains nondetected results. Half the detection limit (DL) was used as the concentration in nondetected values.

[d] SA01, SA02, and SA03 as designated in QAPP (Ramboll 2018).

[e] SA04, SA05, SA06, SA07, SA08, SA09, SA14, SA15 and SA16 as designated in QAPP (Ramboll 2018).

N/A - not analyzed

SA - sampling area

SD - standard deviation

Table 5-4. Comparison of ACGs to MRLs for Nondetected Metals

Analyte	ACG (mg/kg dw)	Minimum MRL for Nondetected Results (mg/kg dw)	Maximum MRL for Nondetected Results (mg/kg dw)	Planned MRL for Nondetected Results (mg/kg dw)	No. of Nondetected Results	No. of Nondetected Results Exceeding ACG
Plant Tissue						
Antimony	0.05	0.042	0.05	0.05	57	0
Arsenic	0.5	0.42	0.5	0.5	46	0
Beryllium	0.06	0.017	0.02	0.02	139	0
Chromium	42	0.18	0.2	0.2	3	0
Cobalt	0.02	0.02	0.02	0.02	4	0
Selenium	1	0.84	1	1	91	0
Silver	0.14	0.017	0.02	0.02	59	0
Thallium	0.02	0.017	0.02	0.02	70	0
Vanadium	0.2	0.17	0.2	0.2	42	0
Soil						
Thallium	0.05	0.069	0.123	0.02	16	16

Notes:

Only the analytes with at least one nondetected result are shown.

Field replicates are included in the count for nondetected results.

ACG - analytical concentration goal

MRL - method reporting limit

Table 5-5. Summary of Replicate Plant Tissue Samples RPDs

	All Plant Tissue Duplicate Samples				Chokecherry (*Prunus virginiana*)				Hazelnut (*Corylus cornuta*)		Kinnikinnick (*Arctostaphylos uva-ursi*)				Ponderosa Pine (*Pinus ponderosa*)		Sarvisberry (*Amelanchier alnifolia*)		Tule (*Schoenoplectus acutus*)		Wild Mint (*Mentha arvensis*)		Wild Rose Hips (*Rosa* sp.)		Wild Rose Stems and Leaves (*Rosa* sp.)				Willow (*Salix exigua*)			
Analyte	N	Minimum RPD (%)	Mean RPD (%)	Maximum RPD (%)	N	Minimum RPD (%)	Mean RPD (%)	Maximum RPD (%)	N	RPD (%)	N	Minimum RPD (%)	Mean RPD (%)	Maximum RPD (%)	N	RPD (%)	N	RPD (%)	N	RPD (%)	N	RPD (%)	N	RPD (%)	N	Minimum RPD (%)	Mean RPD (%)	Maximum RPD (%)	N	Minimum RPD (%)	Mean RPD (%)	Maximum RPD (%)
Conventional Parameters																																
Solids	17	0	9.78	64.9	2	0.375	0.782	1.19	1	8.13	4	0.395	0.928	1.50	1	0.537	1	0	1	50.1	1	1.60	1	3.46	3	2.07	26.4	64.9	2	3.72	8.85	14.0
Metals/Metalloids																																
Aluminum	17	0	21.9	90.7	2	0	9.92	19.8	1	18.2	4	4.72	17.4	32.5	1	25.8	1	4.65	1	9.52	1	90.7	1	27.7	3	19.3	21.3	25.1	2	13.7	21.4	29.1
Antimony	17	0	31.6	131	2	0	65.5	131	1	18.2	4	3.08	16.1	32.0	1	19.1	1	0	1	0	1	48.6	1	18.2	3	18.2	62.6	117	2	0	25.0	50.0
Arsenic	17	0	16.1	100	2	0	0	0	1	0	4	0	9.84	20.0	1	13.3	1	100	1	0	1	15.4	1	0	3	13.3	35.3	52.6	2	0	0	0
Barium	17	0.310	13.3	36.9	2	5.18	15.2	25.3	1	6.65	4	2.32	19.6	36.9	1	22.1	1	0.310	1	0.81	1	12.1	1	19.3	3	6.22	11.4	18.9	2	3.81	10.7	17.7
Beryllium	17	0	1.57	13.3	2	0	0	0	1	13.3	4	0	0	0	1	0	1	0	1	0	1	0	1	13.3	3	0	0	0	2	0	0	0
Cadmium	17	3.92	29.8	80.0	2	66.7	73.3	80.0	1	34.3	4	3.92	26.5	42.9	1	17.6	1	20.6	1	15.4	1	39.0	1	16.9	3	9.92	28.7	54.7	2	5.33	12.1	18.8
Chromium	17	11.1	58.7	159	2	32.0	46.4	60.9	1	159	4	11.1	29.1	54.5	1	60.5	1	80.9	1	12.4	1	65.2	1	82.0	3	52.7	80.2	129	2	40.0	43.9	47.7
Cobalt	17	4.32	36.8	90.9	2	19.4	39.7	60.0	1	27.9	4	16.2	41.4	90.9	1	46.0	1	5.31	1	4.32	1	62.1	1	53.3	3	18.9	42.5	66.7	2	23.0	27.3	31.6
Copper	17	2.72	16.0	98.2	2	6.27	52.2	98.2	1	4.50	4	2.72	4.95	8.47	1	25.7	1	43.0	1	4.90	1	14.4	1	12.9	3	4.97	6.65	8.14	2	7.69	11.0	14.2
Iron	17	2.72	19.9	52.7	2	8.37	29.2	50.1	1	5.14	4	2.72	11.4	20.3	1	21.4	1	9.66	1	4.48	1	37.4	1	25.1	3	5.21	27.6	52.7	2	20.5	24.3	28.2
Lead	17	3.08	36.1	168	2	38.5	103	168	1	5.71	4	7.32	19.5	36.6	1	11.7	1	10.7	1	3.08	1	59.7	1	67.7	3	8.99	45.0	111	2	10.5	18.2	25.9
Manganese	17	1.21	16.9	43.1	2	11.5	15.1	18.8	1	4.36	4	1.64	22.9	43.1	1	29.4	1	1.21	1	6.51	1	3.34	1	16.6	3	9.58	20.6	37.7	2	15.1	21.1	27.0
Mercury	17	0.700	22.9	87.6	N/A	N/A	N/A	N/A	N/A	N/A	4	0.700	11.3	18.4	N/A	N/A	N/A	N/A	1	12.2	1	24.7	N/A	N/A	3	11.9	39.1	87.6	2	16.1	26.3	36.6
Nickel	17	2.90	30.2	119	2	5.13	35.3	65.5	1	32.2	4	6.90	22.1	40.0	1	42.1	1	14.5	1	15.9	1	17.6	1	119	3	2.90	16.6	40.0	2	16.0	31.3	46.6
Selenium	17	0	12.7	66.7	2	0	0	0	1	0	4	0	4.55	18.2	1	0	1	0	1	18.2	1	28.6	1	22.2	3	0	17.3	51.9	2	10.5	38.6	66.7
Silver	17	0	38.0	125	2	50	50.0	50.0	1	40.0	4	11.3	33.9	87.2	1	125	1	0	1	100	1	33.3	1	0	3	11.8	26.3	46.2	2	10.5	16.4	22.2
Thallium	17	0	30.0	100	2	0	33.3	66.7	1	0	4	14.3	32.6	50.0	1	40.0	1	0	1	0	1	100	1	0	3	11.8	48.4	100	2	0	14.3	28.6
Vanadium	17	0	16.7	82.4	2	0	0	0	1	0	4	0	5.56	22.2	1	35.3	1	0	1	22.2	1	82.4	1	28.6	3	0	19.0	28.6	2	0	17.6	35.3
Zinc	17	1.94	19.2	95.0	2	9.30	52.1	95.0	1	1.94	4	6.38	17.5	24.7	1	10.1	1	5.06	1	8.22	1	10.2	1	13.3	3	3.13	26.6	70.4	2	8.74	11.9	15.1

Notes:

A data quality indicator was not applied to plant tissue field replicate results because a set criterion is not biologically meaningful. Different portions of a plant draw nutrients from the roots that are closest to that portion of the plant, sap does not circulate throughout the plant. Different roots are likely to sample soil with differing chemical signatures, making it unlikely that different plant parts all contain the same concentration of analytes.

N/A - not analyzed

N - number of samples

RPD - relative percent difference

Table 5-6. Summary of Replicate Soil Sample RPDs

	Number of Samples	Number of RPDs ± 40%[a]	Minimum RPD (%)	Mean RPD (%)	Maximum RPD (%)
Conventional Parameters					
Solids	17	0	0	0.345	1.56
Metals/Metalloids					
Aluminum	17	1	1.48	11.3	42.5
Antimony	17	3	0.411	20.5	59.4
Arsenic	17	1	3.99	18.6	43.5
Barium	17	1	1.28	12.3	49.1
Beryllium	17	1	1.26	14.5	47.3
Cadmium	17	2	0.451	20.6	60.8
Chromium	17	0	0	8.93	24.4
Cobalt	17	0	0.787	12.0	33.3
Copper	17	0	0.407	12.4	34.5
Iron	17	1	0.531	11.7	45.1
Lead	17	3	0.192	29.1	82.8
Manganese	17	1	2.26	19.9	79.9
Mercury	11	1	0.976	26.0	127
Nickel	17	0	0	8.00	24.3
Selenium	17	3	0	17.1	66.7
Silver	17	1	1.14	18.2	40.5
Thallium	17	1	1.71	15.9	42.8
Vanadium	17	0	0.855	10.9	30.3
Zinc	17	2	0.985	21.0	60.1

Notes:

[a] 40% is a data quality indicator used to assess precision in the measurements between primary and duplicate discrete soil field samples. The relative percent difference (RPD) is calculated as the difference between the primary and duplicate sample results divided by the average of those results and expressed as a percentage. RPDs that fall within the range of -40% to +40% are considered to have met the RPD data quality indicator.

Appendix A

Field Summary Report

Sampling Area SA08

Field Summary Report

Upper Columbia River

Plant Tissue Study

Stevens and Ferry Counties, Washington

Project Number: 60570352

November 2018

Teck American Incorporated
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Field Summary Report

Upper Columbia River
Plant Tissue Study

Stevens and Ferry Counties, Washington

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November 2018

Executive Summary

The plant tissue study was conducted during three separate field sampling events in 2018: April 25 to May 4 (spring), June 18 to 21, and August 20 to 28. Sampling was conducted on portions of several Confederated Tribes of the Colville Reservation (CCT) tribal allotments and two publicly accessible areas where CCT members use wild plant resources. These sampling areas are located in mainly upland areas near the Upper Columbia River in Northeast Washington.

Survey and collection activities followed protocols and standard operating procedures provided in the Field Sampling Plan for the Plant Tissue Study (Appendix A of the Quality Assurance Project Plan [Ramboll 2018]).

The spring sampling event included six species collected in sufficient quantities to meet target sample masses. One species was found but not sampled due to lack of sufficient leaf growth. Spring 2018 plant tissue collection occurred on the three high lead sampling areas (SA01, SA02, and SA03) and six lower lead sampling areas (SA04, SA05, SA06, SA07, SA08, and SA16). SA09, SA11, SA12, and SA15 were also surveyed but either lacked target species for collection or were not needed to attain target sample masses. SA10 was not accessible due to a road washout. SA13 and SA14 were not surveyed in spring 2018.

The June sampling event included three species collected in sufficient quantities to meet target sample masses. Two additional target species were found in the SAs but did not have sufficient or mature fruit to meet target sample masses. June 2018 plant tissue collection occurred on two high lead SAs (SA01 and SA03) and two lower lead SAs (SA04 and SA06). SA02 and SA07 were also surveyed but either lacked target species for collection or were not needed to attain target sample masses. The following SAs were not sampled in June 2018: SA05, SA08, SA09, SA10, SA11, SA12, SA13, SA14, SA15, and SA16.

The August sampling event included seven species collected in sufficient quantities to meet target sample masses. August 2018 plant tissue collection occurred on three high lead SAs (SA01, SA02, and SA03) and seven lower lead SAs (SA04, SA06, SA07, SA08, SA09, SA14, and SA15). The following SAs were not sampled in August 2018: SA05, SA10, SA11, SA12, SA13 and SA16.

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Acronyms and Abbreviations

AECOM	AECOM Technical Services, Inc.
ALS	ALS Environmental
BIA	U.S. Bureau of Indian Affairs
CCT	Confederated Tribes of the Colville Reservation
COI	contaminant of interest
CRCP	Cultural Resources Coordination Plan
DGPS	differential global positioning system
DU	decision unit
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
GIS	geographic information system
GPS	global positioning system
ppm	parts per million
QAPP	Quality Assurance Project Plan
RI/FS	remedial investigation and feasibility study
SA	sampling area
SHSP	Site health and safety plan
SOP	Standard Operating Procedure
TA	tribal allotment
TAI	Teck American Incorporated
TCRA	time critical removal action
UCR	Upper Columbia River
U.S.	United States

1.0 Introduction

This Field Summary Report provides information for the Upper Columbia River site (UCR; hereafter, the Site[1]) (Figure 1) Plant Tissue Study (hereafter, "the Study") that was conducted by AECOM Technical Services, Inc. (AECOM) during three separate sampling events in 2018: April 25 to May 4 (spring), June 18 to 21, and August 20 to 28.

The Study will measure the concentration of metals and mercury in some of the plant species typically consumed or otherwise used by members of the Confederated Tribes of the Colville Reservation (CCT). The Study represents one of several tasks being completed as part of the remedial investigation and feasibility study (RI/FS) under a settlement agreement between Teck American Incorporated (TAI) and the U.S. Environmental Protection Agency (EPA). TAI is leading the Study under EPA oversight. The objective of the Study is to collect data to support the human health risk assessment. Specifically, the Study is focused on exposures to contaminants of interest (COIs) that members of the CCT may experience if they consume vegetation growing in the Study area. Traditional tribal activities, such as handling or mouthing of plants, may also result in potential exposures to COIs on or in plants.

1.1 Project Background

In June 2017, EPA directed TAI to "Conduct a study that will primarily be focused on collection of plant tissue from the three TAs [tribal allotments] sampled in the 2014 Residential Soil Study that had concentrations of lead in soil above the TCRA [time critical removal action] action level (700 ppm [parts per million]) plus a reference area" (USEPA 2017). Specifically, EPA's directive refers to three decision units (DUs) sampled from three CCT TAs as part of EPA's 2014 Residential Soil Study. For the plant tissue study, these DUs are referred to as "high lead sampling areas" (SAs).[2] At this time, plant tissue reference areas have not been determined. Therefore, in lieu of a reference area, the Study focused on surveying and collecting target plant tissues present at the high lead SAs and at one or more DUs with lower concentrations of lead in soils (hereafter, "lower lead SAs") that are located on TAs within the UCR Study Area (Figure 1). Potential lower lead SAs were identified using soil data from prior soil studies conducted as part of the UCR RI/FS (Ramboll Environ 2017; CH2M Hill 2016; Windward et al. 2015).

The CCT also identified willows as a plant of cultural significance. Willows were not present on the three high lead TAs or lower lead TAs surveyed during the August 2017 field reconnaissance phase of this Study (AECOM 2017). Two SAs were added to the Study after the August 2017 reconnaissance to incorporate willows; these are not located on TAs, but are in publicly-accessible areas that were sampled as part of the 2014 Upland Soil Study (Windward et al. 2015) and the 2010 Beach Sediment Study (Integral 2014).

[1] The Site, as defined within the June 2, 2006, Settlement Agreement, is the areal extent of hazardous substances contamination within the United States (U.S.) in or adjacent to the UCR, including Franklin D. Roosevelt Lake, from the U.S.-Canada border to the Grand Coulee Dam and those areas in proximity to the contamination that are suitable and necessary for implementation of response actions.
[2] For the plant tissue study, the residential soil study DUs where target plant species were present during the reconnaissance survey conducted in August 2017 (AECOM 2017) and were expected to have sufficient abundance for sampling are referred to as sampling areas.

1.2 Sampling Area Description

The Study area is on the west side of the Columbia River and extends southward from the United States–Canada border to Barnaby Island (south of Kettle Falls) (Figure 1). Sixteen potential SAs were identified in the Field Sampling Plan (FSP) in the Quality Assurance Project Plan (QAPP; Ramboll 2018).

1.3 Sampling Overview

Field sampling was conducted using techniques described in the FSP contained in Appendix A of the QAPP (Ramboll 2018). The results of the August 2017 field reconnaissance (AECOM 2017) were used to prioritize target species and outline a sampling pathway based on the likelihood of finding each species at the SAs. The following objectives were developed for the 2018 plant tissue sampling:

- For each targeted plant tissue, collect sufficient mass from six individual plants from across the high lead SAs to address the principal study question.
- For each targeted plant tissue, collect sufficient mass from six individual plants from across one or more lower lead SAs to address the secondary study question.

Co-located soil samples were collected along with each plant tissue sample in accordance with Standard Operating Procedure (SOP)-9A and SOP-9B of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]). In cases where individual plants and/or plant tissue mass were insufficient to meet the target objectives, plant tissues were still collected if at least three samples were available from each targeted tissue. In addition, where sample target mass could not be met from an individual plant, a composite sample of adjacent individual plants was collected. In this case, the co-located soil sample was also collected as a composite.

SAs are listed in Table A1 of the FSP, along with rationale for inclusion and average soil lead concentrations. Target plant species and tissues are listed by sampling event in Table A2 of the FSP, along with target and minimum sample masses. Target sample masses are generally two times the minimum mass expected to result in a 1-gram (dry weight) sample for analysis (Ramboll 2018).

1.4 Project Staffing

The staffing structure for the overall Study is provided in Section A4.2, Task Organization, of the QAPP and includes a description of the responsibilities of EPA, TAI, and key task personnel. This section describes field staff deployed for the 2018 sampling events.

AECOM plant tissue sampling team members and primary roles are listed in Table 1. The field supervisor was responsible for overseeing all sample collection and packaging as well as coordinating with TAI, maintaining the field logbook, and ensuring chain-of-custody procedures were met. The survey team was deployed ahead of the sampling team when appropriate in order to prioritize SAs to be visited by the sampling team. The survey team identified the availability of target plant tissues, flagged potential sample locations, identified potential access issues, and communicated results with the sampling team.

The sampling team was responsible for plant tissue and soil sample collection, including weighing, photographing, packaging, and labeling samples; filling out data forms and photo logbook; locating sample locations using handheld global positioning system (GPS) units; and decontaminating sampling equipment. The sampling team was assisted by the field supervisor, survey team, and cultural resources monitor when possible. An AECOM or CCT cultural resources monitor was present when any grounddisturbing activity occurred, including excavations for soil sample collection and collection of targeted bulbs, roots, or corms. The monitor observed the areas of excavation and bagged soil samples for artifacts or other cultural deposits. The monitor also acted as the primary Site safety officer and conducted morning safety briefings.

Table 1: Plant Tissue Sampling Team

Primary Team Roles	Name	Sampling Event		
		Spring	June	August
Field Supervisor	Dr. Jennifer Pretare – Project Manager	X	X	
	Jeff Walker – Botanist			X
Plant Survey	Jeff Walker – Botanist	X	X	X
	Paul Hamidi – Biologist	X		X
Plant Tissue Sampling	Linda Howard – Biologist	X	X	X
	Glen Mejia – Biologist	X	X	
	Josie Smith – Environmental Scientist			X
	Anders Utter – Environmental Scientist			X
Soil Sampling	Stuart Holmes – Geologist	X		X
	Dave Lewis – Geologist		X	
Cultural Resources	Michelle Stegner – Archaeologist	X	X	X

Additional support was provided by the following AECOM staff:

- Cultural Resources Coordinators – Sarah McDaniel, Mike Kelly
- Sample Transport – Josie Smith
- Spatial Data Management – Cary Kindberg
- Health and Safety – Fred Merrill

1.5 Health and Safety

A Site health and safety plan (SHSP) addendum to the general SHSP (TCAI 2009) was prepared for the plant tissue sampling events and included as Attachment A1 of the FSP (Ramboll 2018). The SHSP includes sections on driving and traffic safety, deer collision hazards, work in remote areas, wildfire hazards, outdoor heat exposure and weather-related hazards, air quality, biological hazards (contact with wildlife, bees/wasps, ticks, mosquitos, poison ivy, thorned plants), and exposure to high lead soils.

Health and safety protocols, expectations, and overview of the SHSP addendum were provided to 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.

1.6 Cultural Resources Monitoring

A Cultural Resources Coordination Plan (CRCP) was included in Appendix C 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. TAI coordinated with EPA to ensure all necessary consultation and coordination with CCT representatives occurred prior to sample collection on all of the SAs for this Study.

In accordance with the CRCP, a cultural resource monitor and/or tribal representative were present during implementation of the Study. Cultural resources monitoring for the Study was conducted by Pendleton Moses (CCT) and/or an AECOM archaeologist. The cultural resources monitor cleared the area surrounding the plant tissue and soil sampling locations prior to any collection activities and ensured avoidance of culturally sensitive areas.

1.7 Technical Oversight and Observers

EPA and its contractor (Jacobs/CH2M) provided technical oversight of the survey and sampling activities during each of the three sampling events. Technical oversight personnel were present with both the survey and sampling teams each day and were given the opportunity to observe all field tasks. AECOM personnel were available for discussions and to answer questions regarding field activities. TAI and Ramboll personnel were also present during the field sampling events to ensure consistency with the QAPP. A CCT member and/or contractor were present during portions of the field sampling. They provided information on harvesting and cultural uses of targeted plant species and, when necessary, directions for accessing SAs. Technical oversight personnel and observers are listed in Table 2.

Table 2: Technical Oversight Personnel and Observers

Affiliation	Personnel
EPA Region 10	Monica Tonel – Project Manager (Spring, June) Marc Stifelman – Human Health Risk Assessment Lead Mark Follansbee – Contractor, Syracuse Research Corporation, Inc. (Spring)
Jacobs/CH2M	Marilyn Gauthier (Spring) Kelly O’Neal (Spring, June) Jonathan Espinoza (Spring) Ellie Traudt (June, August) Anna Iverson (August)
TAI	Kris McCaig – Project Coordinator Denise Mills – Assistant Project Coordinator (Spring) Cristy Kessel – Analytical Chemistry Laboratory Coordinator (August)
Ramboll	Dina Johnson – Principal Investigator (Spring) Rosalind Schoof – Principal Investigator (June, August) Lis Castillo Nelis – Task Manager Julie Weicheld (Spring)
CCT	Pendleton Moses (Spring) Whitney Fraser – Contractor, Lodestone Environmental Consulting Kali Robson – Contractor (Spring)

2.0 Sampling Activities and Documentation

The following sections summarize the scope of work, training and preparation, sampling activities, and documentation associated with the Study.

2.1 Scope of Work

The scope of work for the 2018 sampling efforts was to survey and collect targeted plant tissues and co-located soil samples from three high lead SAs and up to 13 lower lead SAs. Sampling during each of three field events followed the appropriate sampling area selection flow chart in SOP-1 of the FSP. Some target plant tissues that could not be collected in sufficient quantities during the spring and June sampling events were targeted for supplemental sampling during the subsequent sampling events.

Tasks during each sampling event included the following:

- Safety tailgate briefing each morning with the entire group.
- Survey of SAs to identify availability of target plant tissues and flag potential sampling locations.
- Collection of plant tissue samples from targeted plant species. Where available, samples from 12 individual plants or composites were collected. Otherwise, samples from at least three individual plants or composites were collected.
- Collection of co-located soil samples.
- Communication and coordination with property owners or land managers to schedule sampling activities. TAI contacted property owners and land managers to obtain permission to access and conduct plant tissue sampling. TAI obtained a research permit from the CCT to conduct survey and sampling activities on TAs, and a limited use agreement from the U.S. Bureau of Indian Affairs (BIA), Colville Indian Agency, for accessing SAs on tribal trust lands. TAI also obtained permission from Washington State Department of Natural Resources to sample at Deadman's Eddy (SA15). Project permits are reproduced in Appendix B.
- Maintenance of field records including field logbooks, photographic documentation, and field data forms.
- Collection of position coordinates (x, y, and z) for each sampling location.
- Decontamination of sampling equipment in accordance with the QAPP.
- Sample labeling, storage, packaging, and transport to ALS Environmental (ALS) laboratory in Kelso, Washington, using defined chain-of-custody procedures. ALS was selected and contracted by TAI.
- Close coordination with TAI and ALS to ensure proper storage and transportation procedures were followed and chain of custody documented.
- Preparation and submittal of this field investigation summary report to document field activities, modifications (changes) to the QAPP, and associated justifications.

2.2 Training and Preparation

Prior to field work, AECOM biologists prepared for plant tissue sampling and identification. An internal AECOM project kick-off meeting was held on April 4 for the Study field team. Biologists read over the FSP and SOPs and reviewed the Field Reconnaissance Summary Report (AECOM 2017). They became familiar with data collection methods on subsequent sampling practice. A photographic plant identification guide and other field sampling aids were prepared for the Study and reviewed by the sampling team. Biologists also reviewed a presentation on cultural resources prepared for previous UCR RI/FS sampling efforts.

Photo 1: Spring 2018 field sampling kick-off meeting at SA02

At the beginning of the spring 2018 sampling event, a kick-off meeting was held at the Northport Community Center on April 25. The meeting was attended by representatives from TAI, EPA, CCT, Ramboll, AECOM, and Jacobs/CH2M. TAI, Ramboll, and AECOM representatives provided an overview of the Study purpose and methods, the health and safety plan, and the Study schedule. Members of the CCT shared information on their traditional cultural perspective on plants and plant collecting. After the meeting, attendees travelled to a nearby sampling area (SA02) to initiate sampling (Photo 1).

2.3 Sample Collection

Tables 3 and 4 summarize the combined results for the three sampling events. The SA locations are shown on Figures 2 to 13. Sample collection locations are identified on the figures by species name and sample number. Most of the sample collection locations are within the pre-determined SA boundaries. However, in a few instances, samples were collected just outside of the SA boundaries, but within the TA boundaries. Results by sampling event are presented in sections 2.3.1, 2.3.2, and 2.3.3.

Table 3: Sample Numbers by Plant Species and Location

		High Lead SAs				Lower Lead SAs									
Plant Species	Sampling Event	SA 01	SA 02	SA 03	Total	SA 04	SA 05	SA 06	SA 07	SA 08	SA 09	SA 14	SA 15	SA 16	Total
Black tree lichen (*Bryoria fremontii)*	Spring	6	-	-	**6**	-	2	-	-	4	-	-	-	-	**6**
Camas (*Camassia quamash*)	Spring	3	-	3	**6**	-	3	-	3	-	-	-	-	-	**6**
Chokecherry (*Prunus virginiana*)	August	3[a]	-	3	**6**	-	-	-	5[a,b]	-	1	-	-	-	**6**
Green willow (*Salix exigua*)	Spring	-	-	-	**0**	-	-	-	-	-	-	-	-	6[a,b]	**12**
Green willow (*Salix exigua*)	August	-	-	-	**0**	-	-		-	-	-	-	6[a,b,c]	-	
Hazelnut (*Corylus cornuta* var. *californica*)	August	-	3	3 [a,b]	**6**	2[a]	-	3[b]	-	-	1	-	-	-	**6**
Huckleberry (*Vaccinium cespitosum*)	June	-	-	-	**0**	6	-	-	-	-	-	-	-	-	**6**
Kinnikinnick (*Arctostaphylos uva-ursi*)	Spring	-	3[a,b]	3[a,b]	**6**	5[a,b]	-	1[a]	-	-	-	-	-	-	**6**
Lomatium (*Lomatium triternatum*)	Spring	-	1	3	**6**	-	3	-	-	3	-	-	-	-	**6**
Lomatium (*Lomatium triternatum*)	June	-	-	2		-	-	-	-	-	-	-	-	-	
Ponderosa pine (*Pinus ponderosa*)	August	3	2[a]	1	**6**	3[b]	-	-	3	-	-	-	-	-	**6**
Sarvisberry (*Amelanchier alnifolia)*	August	5	-	1[b]	**6**	-	-	-	3[a,b]	2	-	1	-	-	**6**
Spring beauty / Indian potato (*Claytonia lanceolata*)	Spring	2	2	2	**6**	2	2	-	-	2	-	-	-	-	**6**
Tule (*Schoenoplectus acutus*)	August	-	-	-	**0**	-	-	-	-	-	-	6[a,b]	-	-	**6**
Wild mint (*Mentha arvensis*)	August	-	-	-	**0**	-	-	-	-	-	-	6[a,b]	-	-	**6**
Wild rose (*Rosa nutkana, R. woodsii)* (stems and leaves)	June	3[a,b]	-	3	**6**	3[a,b]	-	3[a,b]	-	-	-	-	-	-	**6**
Wild rose (*Rosa nutkana, R. woodsia)* (hips)	August	-	-	-	**0**	-	-	4	-	-	1[a]	1	-	-	**6**
Total[c]					**60**										**96**
Frequency of Replicate Samples Collected					8.2%										12.5%
Frequency of Split Samples Collected					8.2%										11.5%

Notes:

[a] One replicate sample collected

[b] One split sample collected

[c] SA15 was not identified as a "high lead" sampling area in the QAPP because the average soil lead concentration at SA15 was 389 mg/kg, which is below the time-critical removal action level of 700 ppm.

Table 4: Target Plant Species not Collected

Plant Species	Reason not Collected
Bitterroot (*Lewisia rediviva*)	Lack of suitable habitat.
Indian carrot (*Perideridia gairdneri*)	Not found.
Morel (*Morchella esculenta*)	Observed outside of SAs.
Puffball (*Calvatia gigantea*)	Correct species not found.
Red willow / red-osier dogwood (*Cornus sericea*)	Found only on SA09, but not sampled.[a]
Shaggy mane (*Coprinus comatus*)	Not found.
Wild strawberry (*Fragaria vesca, F. virginiana*)	Insufficient fruit mass.

[a]CCT confirmed that this species is not mouthed (Lodestone 2018). It was removed from the list of targeted species after the spring event.

2.3.1 Spring Sampling

Samples were collected from April 25 to May 2, 2018. Samples were packaged on May 3 and transported to the lab on May 4. A total of 69 individual or composite plant tissue and co-located soil samples, including 5 field replicate samples, were collected from 9 SAs. Twenty-eight samples and 2 field replicate samples were collected from high lead SAs, and 36 samples and 3 field replicate samples were collected from lower lead SAs (Table 3). In addition to the successfully collected samples, there were two samples that were initiated but had to be abandoned due to either insufficient mass available for the sample (SA01-SP03-P01) or later identified as an incorrect species (SA08-SP08-P01).

Six of the 13 plant and fungi species targeted for spring collection were found in sufficient quantities to meet target sample masses. Seven species were not collected for various reasons, as indicated in Table 4. Species-by-species collection results are summarized in the following subsections.

Black Tree Lichen

Black tree lichen (*Bryoria fremontii*) was identified growing on several SAs. It was collected on one high lead and two lower lead SAs. It was most abundant on older ponderosa pine and western larch trees and several species of shrubs (sarvisberry, hawthorn, and chokecherry). A summary of sampling results for black tree lichen is provided in Table 5. The protocols for sampling black tree lichen for the Study are provided in SOP-4 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

The target sample mass was 2.3 grams, which required collection from multiple individuals growing on multiple trees or shrubs (Photos 2 and 3). A composite sample was collected from lichens growing within an approximately 20-meter-diameter circle. Lichens were removed from branches and twigs and often had small pieces of bark or other lichens attached to them. This extraneous material was removed as much as possible during sample collection. Additional mass was collected beyond the target mass to compensate for extraneous material that could not be removed as well as for lichens that appeared to contain excess moisture from rainfall. No field replicates and no split samples were collected for black tree lichen. A single soil sample was taken from the center of the circular sampling area. The GPS location was taken at the soil sample location.

Table 5: Black Tree Lichen Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Mass (grams)	Notes
SA01	April 28	SP05	2.3	Collected from ponderosa pine trees and a few surrounding shrubs. Samples include minor amounts of bark and other lichens. Sufficient mass for TAL metals analysis.
		SP07	16.0	
		SP08	9.0	
		SP10	6.1	
		SP11	5.3	
		SP12	10.3	
SA05	April 30	SP04	5.1	Collected from hawthorn trees and surrounding shrubs. Sufficient mass for TAL metals analysis.
		SP10	4.1	Collected from chokecherry shrubs. Sufficient mass for TAL metals analysis.
SA08	May 2	SP04	5.0	Collected from sarvisberry and hawthorn trees in gulch. Sufficient mass for TAL metals analysis.
		SP05	4.1	
		SP06	5.8	
		SP07	3.8	

Photo 2: Sample of black tree lichen being bagged

Photo 3: Black tree lichen at SA08

Camas

Camas (*Camassia quamash*) was growing on several SAs. It was collected on two high lead and two lower lead SAs. It was most abundant on flat grassy fields and the edge of open ponderosa pine forests (Photo 4). It is known to prefer soils that are very moist or saturated in the early part of the growing season but dry out by summer. A summary of sampling results for camas is provided in Table 6. The protocols for sampling camas for the Study are provided in SOP-4 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

This herbaceous species was only noted from one dried stalk with empty seed capsules during the August 2017 field reconnaissance. The fleshy leaves and flower heads generally dry out by mid-summer and are difficult to find in the grassy fields where they grow. Vegetative growth was apparent at the beginning of the spring 2018 survey. The lack of flowers required observation of the bulbs for a positive identification as there are other plants in the same family that have similar vegetative growth. These include *Brodiaea* species and *Toxicoscordion* (=*Zigadenus*) species (death camas), both of which were observed on some of the SAs. CCT members and their consultants made the positive identifications of camas on the SAs. Toward the end of the spring sampling event, flower heads began to emerge, which confirmed the identification (Photo 5).

The target plant tissue for camas was the bulb, which required destruction of the plants to collect samples. Sampling areas were selected where the species was generally abundant to avoid over-collection. The minimum number of bulbs were dug up to meet the target sample mass, which was 4.5 grams. The few bulbs that were dug up but not needed for a sample were reburied in place. The mass of the bulbs varied greatly between individuals and was not always discernable based on the vegetative growth of the plants. Individual bulbs weighed between 0.4 and 3.4 grams, with an average weight of 1.2 grams.

Table 6: Camas Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Mass (grams)	Number of Bulbs in Composite	Notes
SA01	April 27	SP01	4.9	3	Sufficient mass for TAL metals analysis.
		SP02	4.9	6	
		SP09	4.6	2	
SA03	April 26	SP03	6.1	3	Sufficient mass for TAL metals analysis.
	April 27	SP04	5.4	4	
		SP05	4.6	2	
SA05	April 30	SP07	4.5	2	Sufficient mass for TAL metals analysis.
		SP08	4.8	6	
		SP09	5.5	6	
SA07	May 2	SP01	4.5	5	Collected in flat, grassy field with scattered ponderosa pine. Sufficient mass for TAL metals analysis.
		SP02	4.6	4	
		SP03	6.4	6	

Photo 4: Camas patch at SA01

Photo 5: Camas in bloom at SA07

Between two and six camas bulbs were required for a composite sample to meet the target mass. Bulbs for the composite samples were collected within a short distance of each other.

Each bulb making up the composite sample was weighed individually and recorded on the data sheets. The proportion of the sample mass represented by each bulb was calculated. A co-located soil sample was taken next to each individual bulb. A representative proportion of soil near each bulb was then used to make a composite soil sample. A single GPS location was taken from the center of the sampling area, unless individual plants were more than 3 meters apart, in which case GPS locations were taken for each plant.

Kinnikinnick

Kinnikinnick (*Arctostaphylos uva-ursi*) was observed on all high lead SAs and several lower lead SAs. It was collected on two high lead and two lower lead SAs. This trailing evergreen shrub was most abundant in ponderosa pine forests under a wide range of canopy conditions. Samples were collected from large clumps with multiple branches (Photos 6 and 7). Individual kinnikinnick plants send out ground-trailing stems that can take root. Rooted branches within a large patch were assumed to be genetically identical for sampling. Distinct samples were taken from widely separated patches, at least 20 feet apart. A summary of sampling results for kinnikinnick is provided in Table 7. The protocols for sampling kinnikinnick for the Study are provided in SOP-4 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

The target plant tissue for kinnikinnick was the leaves. Samples were collected where patches of the plant were relatively abundant. The target sample mass for analysis was 5.3 grams, which required removing numerous leaves from multiple branches in the patch. Sample collection did not result in destruction of any plants. Leaves were abundant enough to take both a replicate sample and for a potential EPA split sample. Two replicate and two split samples were collected on high lead SAs. Two replicates and one split sample were collected on lower lead SAs. A single co-located soil sample and GPS location were collected from the center of the sampling area.

Lomatium

Lomatium was observed growing on several SAs. It was collected on two high lead and two lower lead SAs. It was most abundant on dry, rocky slopes and ridges (Photo 8). A summary of sampling results for lomatium is provided in Table 8. The protocols for sampling lomatium for the Study are provided in SOP-4 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

Table 7: Kinnikinnick Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Mass (grams)	Notes
SA02	April 26	SP02	6.5	Sufficient mass for both TAL metals and mercury analyses.
		SP03	5.9	**Replicate sample of SA02-SP02-P01**. Sufficient mass for both TAL metals and mercury analysis.
		SP04	11.4	Sufficient mass for **potential EPA split sample** for both TAL metals and mercury analysis.
		SP05	6.0	Sufficient mass for both TAL metals and mercury analysis.
SA03	April 27	SP01	5.6	Sufficient mass for both TAL metals and mercury analysis.
		SP02	5.7	**Replicate sample of SA03-SP01-P01**. Sufficient mass for both TAL metals and mercury analysis.
		SP10	5.8	Sufficient mass for both TAL metals and mercury analysis.
		SP11	11.2	Sufficient mass for **potential EPA split sample** for both TAL metals and mercury analysis.
SA04	April 30	SP01	5.8	Sufficient mass for both TAL metals and mercury analysis.
		SP02	6.1	**Replicate sample of SA04-SP01-P01**. Sufficient mass for both TAL metals and mercury analysis.
		SP03	11.5	Sufficient mass for **potential EPA split sample** for both TAL metals and mercury analysis.
		SP04	6.4	Sufficient mass for both TAL metals and mercury analysis.
	May 1	SP05	6.0	Sufficient mass for both TAL metals and mercury analysis.
		SP06	6.0	Sufficient mass for both TAL metals and mercury analysis.
SA06	May 1	SP01	8.7	Sufficient mass for both TAL metals and mercury analysis. Many leaves are discolored.
		SP02	6.4	**Replicate sample of SA06-SP01-P01**. Sufficient mass for both TAL metals and mercury analysis. Many leaves are discolored.

Photo 6: Kinnikinnick patch at SA04-SP06

Photo 7: Kinnikinnick patch at SA03-SP11

Table 8: Lomatium Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Mass (grams)	Number of Roots in Composite	Notes
SA02	April 26	SP06	3.9	3	Individual "c" collected 6.8 meters from other individuals. Sample mass is within 5% of minimum mass. Sufficient mass for TAL metals analysis.
SA03	April 27	SP08	6.8	1	Three roots from one plant. Not a composite sample. Sufficient mass for TAL metals analysis.
		SP09	4.8	6	Sufficient mass for TAL metals analysis.
		SP12	6.9	9	Sufficient mass for TAL metals analysis.
SA05	April 30	SP01	4.7	4	Sufficient mass for TAL metals analysis.
		SP02	7.0	1	Not a composite sample. Sufficient mass for TAL metals analysis.
		SP03	7.0	8	Individuals "f," "g," and "h" collected 121 meters from other individuals. Sufficient mass for TAL metals analysis.
SA08	May 2	SP01	8.9	3	Collected on open rocky slope near ridge. Sufficient mass for TAL metals analysis.
		SP02	8.3	6	
		SP03	9.8	4	Collected on open rocky slope. Sufficient mass for TAL metals analysis.

This herbaceous species was generally not identifiable during the August 2017 field reconnaissance. It blooms in spring and early summer and is otherwise difficult to locate. Several species of lomatium are used by the CCT. Only one species, nineleaf biscuitroot (*Lomatium triternatum*), was identified and collected on the SAs during the spring sampling event (Photo 9). It is possible that other species grow on the SAs but had not yet flowered.

The target plant tissue for lomatium was the root, which required destruction of the plants to collect samples. Sampling areas were selected where the species was generally abundant to avoid over-collection. The minimum number of roots were dug up to meet the target sample mass of 8.1 grams or the minimum sample mass of 4.1 grams. The few roots that were dug up but not needed for a sample were reburied in place. The mass of the roots varied greatly between individuals and was not always discernable based on the vegetative growth of the plants. Individual roots weighed between 0.1 and 7.0 grams and averaged 1.5 grams. Some plants had up to three roots. Between three and nine lomatium roots were required for a composite sample to meet the target or minimum mass. Roots for the composite samples were collected within a short distance of each other when possible.

Photo 8: Lomatium sampling location at SA08

Photo 9: Lomatium plant and root collected at SA08

Each root making up the composite samples was weighed individually and recorded on the data sheets. The proportion of the sample mass represented by each root was calculated. A co-located soil sample was collected next to each individual root. A representative proportion of soil near each bulb was then used to make a composite soil sample. A single GPS location was taken from the center of the sampling area, unless individual plants were more than 3 meters apart, in which case GPS locations were taken for each plant.

Spring Beauty/Indian Potato

Spring beauty/Indian potato (*Claytonia lanceolata*) was observed growing on several SAs. It was collected on three high lead and three lower lead SAs. It tended to grow in small patches beneath the canopy of ponderosa pine forests on level to gently sloping areas (Photo 10). This herbaceous species blooms in spring and early summer and was not observed during the August 2017 field reconnaissance. A summary of sampling results for this species is provided in Table 9. The protocols for sampling spring beauty for the Study are provided in SOP-4 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

Table 9: Spring Beauty/Indian Potato Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Mass (grams)	Number of Corms in Composite	Notes
SA01	April 28	SP04	4.6	9	Sufficient mass for TAL metals analysis.
		SP06	4.4	11	Sufficient mass for TAL metals analysis.
SA02	April 25	SP01	2.3	7	Sufficient mass for TAL metals analysis.
	April 26	SP07	2.2	9	Sufficient mass for TAL metals analysis.
SA03	April 27	SP06	4.5	3	Sufficient mass for TAL metals analysis.
		SP07	1.8	4	Sufficient mass for TAL metals analysis.
SA04	May 1	SP07	3.3	10	Collected in ponderosa pine forest Sufficient mass for TAL metals analysis.
		SP08	4.1	6	
SA05	April 30	SP05	4.9	3	Sufficient mass for TAL metals analysis.
		SP06	3.9	2	Sufficient mass for TAL metals analysis.
SA08	May 2	SP09	4.1	9	Sufficient mass for TAL metals analysis.
		SP10	3.8	8	Sufficient mass for TAL metals analysis.

Photo 10: Patch of spring beauty/Indian potato growing below ponderosa pine canopy

Photo 11: Spring beauty/Indian potato with corm collected at SA05

The target plant tissue for spring beauty was the corm, which required destruction of the plants to collect samples (Photo 11). Sampling areas were selected where the species was generally abundant to avoid over-collection. The minimum number of corms were dug up to meet the target sample mass of 3.8 grams or the minimum sample mass of 1.9 grams. The few corms that were dug up but not needed for a sample were reburied in place. The mass of the corms varied greatly between individuals and was not always discernable based on the vegetative growth of the plants. Individual corms weighed between 0.1 and 2.6 grams. Between 2 and 11 spring beauty corms were required for a composite sample to meet the target or minimum mass. Corms for the composite samples were collected within a short distance of each other when possible.

Each corm making up the composite samples was weighed individually and recorded on the data sheets. The proportion of the sample mass represented by each corm was calculated. A co-located soil sample was collected next to each individual corm or closely grouped corms. A representative proportion of soil near each corm or group was then used to make a composite soil sample. A single GPS location was taken from the center of the sampling area, unless individual plants or groups were more than 3 meters apart, in which case GPS locations were taken for each plant or group.

Green Willow

Green willow (*Salix exigua*) grows in riparian areas, gravel bars, and lake and pond margins. It was not identified on any of the original SAs during the August 2017 field reconnaissance, because these areas lacked appropriate habitat. Two additional SAs (SA15 and SA16) adjacent to the Columbia River were added for the spring 2018 sampling event to capture riparian habitats.

SA15 is located on a large gravel bar at Deadman's Eddy, northeast of Northport. This area was surveyed for willows during the spring 2018 sampling event, but none were observed. The predominant woody plants observed in the riparian areas were cottonwood saplings, which can look similar to willows when dormant.

SA16 is located on the Columbia River south of Kettle Falls and adjacent to Barnaby Island. Abundant green willows were observed in this area (Photo 12), sufficient for collection of all six samples. Samples were collected from robust individual shrubs of the appropriate length and diameter (Photo 13). Distinct samples were taken from widely separated plants across the SA. A summary of sampling results for green willow is provided in Table 10. The protocols for sampling green willow for the Study are provided in SOP-4 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

The target plant tissue for green willow was the inner bark of branches less than 0.5 inch in diameter. Branches were collected intact for later extraction of the inner bark at the laboratory. Each sample consisted of branches from a single plant. The target sample was based on branch length (189 centimeters) rather than mass. Sample collection did not result in destruction of any plants. Branches were abundant enough to take both a replicate sample and a potential EPA split sample. A co-located soil sample and GPS location were collected next to each sampled plant.

Table 10: Green Willow Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Length (centimeters)	Notes
SA16	May 1	SP01	190	Sufficient mass for both TAL metals and mercury analyses.
		SP02	190	**Replicate sample of SA16-SP01-P01**. Sufficient mass for both TAL metals and mercury analysis.
		SP03	405	Sufficient mass for **potential EPA split sample** for both TAL metals and mercury analysis.
		SP04	205	Sufficient mass for both TAL metals and mercury analysis.
		SP05	215	Sufficient mass for both TAL metals and mercury analysis.
		SP06	217	Sufficient mass for both TAL metals and mercury analysis.
		SP07	203	Sufficient mass for both TAL metals and mercury analysis.

Photo 12: Green willows in riparian area at SA16

Photo 13: Green willow stems collected at SA16

2.3.2 June Sampling

Samples were collected from June 18 to June 20, 2018. Samples were packaged on June 21 and transported to the lab on June 22. A total of 23 individual or composite plant tissue and co-located soil samples, including 3 field replicate samples, were collected from 4 SAs. Eight samples and 1 field replicate sample were collected from high lead SAs, and 12 samples and 2 field replicate samples were collected from lower lead SAs (Table 3).

Sarvisberry (*Amelanchier alnifolia*) and wild strawberry (*Fragaria* spp.) were initially targeted for June collection. Sarvisberry was prevalent across several SAs, but the fruit was green and, in consultation with a CCT representative, was deemed too immature for collection. The sampling team, in consultation with technical oversight personnel, decided to postpone collection of sarvisberry until the August sampling event.

Wild strawberry plants had been identified and mapped across several SAs during both the 2017 field reconnaissance and the spring 2018 sampling event; however, very few of these plants were in flower. During the June sampling event, very few fruits were found, and those fruits were insufficient to meet target sample size.

Indian carrot (*Perideridia gairdneri*) was originally targeted for collection during the spring sampling event. However, no plants were observed on any of the SAs. This was also the case during the June sampling event. As the plant blooms from July to September, sampling was postponed until the August sampling event when it might be more identifiable.

Ponderosa pine (*Pinus ponderosa*) nuts were targeted for sampling during the August event. To facilitate sampling in August, additional pine trees with either low-hanging pine cones, or abundant cones higher up, were identified and located with GPS. Some pine cones were collected from the forest floor to try to estimate the number of nuts per cone. Most of the nuts appeared to have been eaten by insects. New cones still on the trees were unripe and closed, so nuts could not be extracted.

One potential sampling area for green willow was observed by a member of the survey team along with EPA and CCT representatives. The site includes an island in the Columbia River that appeared to have cottonwoods and willows (likely green willow). A boat would be required to access the site. No samples were collected from this site in June, but this area was evaluated as a potential sampling area for the August event as discussed in Section 2.3.3.

Species-by-species collection results are summarized in the following subsections.

Wild Rose

Wild rose stems and leaves were originally targeted for the spring 2018 sampling event. Due to insufficient vegetative growth at that time, the sampling was postponed until June. Wild rose includes both Woods' rose (*Rosa woodsii)* and Nootka rose (*R. nutkana*). It was difficult to identify plants to species without fruits, which were not often present. Baldhip rose (*R. gymnocarpa*) was not observed. Wild rose was abundant on two high lead SAs and several lower lead SAs. It was collected on two high lead SAs and two lower lead SAs.

The target plant tissue for wild rose was tender stems with leaves. Samples were collected from individual shrubs of the appropriate length (Photo 14). Distinct samples were taken from widely separated plants across the SA. Plants with flowers were avoided to ensure that rose hips would be available for collection in August. A summary of sampling results for wild rose is provided in Table 11. The protocols for sampling wild rose for the Study are provided in SOP-4 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

The target sample was based on stem length (48.3 centimeters of stem with leaves) rather than mass. Sample collection did not result in destruction of any plants. Stems were abundant enough to take both replicate samples and potential EPA split samples. One replicate and one split sample were collected on high lead SAs. Two replicates and two split samples were collected on lower lead SAs. A co-located soil sample and GPS location were collected next to each sampled plant.

Table 11: Wild Rose Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Length (centimeters)	Notes
SA01	June 19	JU01	275	Sufficient mass for **potential EPA split sample** and both TAL metals and mercury analyses.
		JU02	98	Sufficient mass for **potential EPA split sample** for both TAL metals and mercury analysis.
		JU03	77	**Replicate sample of SA01-JU02-P01**. Sufficient mass for both TAL metals and mercury analysis.
		JU04	100	Sufficient mass for TAL metals and mercury analysis.
SA03	June 18	JU01	70	Sufficient mass for TAL metals and mercury analysis.
		JU02	81	Sufficient mass for TAL metals and mercury analysis.
		JU03	57	Sufficient mass for TAL metals and mercury analysis.
SA04	June 19	JU01	150	Sufficient mass for **potential EPA split sample** for both TAL metals and mercury analysis.
		JU02	70	Sufficient mass for both TAL metals and mercury analysis.
		JU03	82	**Replicate sample of SA04-JU02-P01**. Sufficient mass for both TAL metals and mercury analysis.
		JU04	91	Sufficient mass for both TAL metals and mercury analysis.
SA06	June 20	JU01	218	Sufficient mass for **potential EPA split sample** for both TAL metals and mercury analysis.
		JU02	115	Sufficient mass for both TAL metals and mercury analysis.
		JU03	149	**Replicate sample of SA06-JU02-P01**. Sufficient mass for both TAL metals and mercury analysis.
		JU04	116	Sufficient mass for both TAL metals and mercury analysis.

Photo 14: Wild rose stems with leaves collected at SA03

Huckleberry

Huckleberry was originally targeted for the August 2018 sampling event. During a plant survey of SA04, fruits of dwarf huckleberry (*Vaccinium cespitosum*) were observed to be ripe and in sufficient quantity to meet target sample mass. The sampling team, in consultation with technical oversight personnel, decided to collect samples in June rather than waiting until August, when fruits may be past their prime or consumed by wildlife. Dwarf huckleberry was the only huckleberry species observed, and it was only observed in one sampling area (SA04).

Berries were collected from patches (Photo 15). One soil sample and GPS location were collected from the center of the patch. Discrete samples were taken from widely separated patches across the SA. Heavily berried plants were selected where possible. A summary of sampling results for huckleberry is provided in Table 12. The protocols for sampling huckleberry for the Study are provided in SOP-4 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

The target and minimum sample masses were 31 grams and 16 grams, respectively. An initial sample of 10 berries was weighed to estimate the number of berries required to meet each mass. The minimum sample mass required approximately 114 berries. It was decided that the huckleberry patches would not likely sustain enough berries to meet the target sample mass, so the minimum sample mass was collected (Photo 16).

Table 12: Huckleberry Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Mass (grams)	Notes
SA04	June 19	JU05	17.0	Sufficient mass for TAL metals analysis.
		JU06	18.0	Sufficient mass for TAL metals analysis.
		JU07	18.0	Sufficient mass for TAL metals analysis.
	June 20	JU08	16.0	Sufficient mass for TAL metals analysis.
		JU09	18.0	Sufficient mass for TAL metals analysis.
		JU10	19.0	Sufficient mass for TAL metals analysis.

Photo 15: Dwarf huckleberry patch sampled at SA04

Photo 16: Huckleberries sampled at SA04

Lomatium

Lomatium roots were sampled during the spring 2018 event. See Section 2.3.1 for sampling details and photographs. Two additional samples were collected in June from SA03 to meet the study objectives of collecting six individual samples from high lead SAs. Each sample was a composite of four nearby individuals. A summary of sampling results is provided in Table 13.

Table 13: Lomatium Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Mass (grams)	Number of Roots in Composite	Notes
SA03	June 18	JU04	8.6	4	Sufficient mass for TAL metals analysis.
		JU05	7.8	4	Sufficient mass for TAL metals analysis.

2.3.3 August Sampling

Samples were collected from August 21 to August 28, 2018. Samples were packaged on August 29 and transported to the lab on August 30. A total of 82 individual or composite plant tissue and co-located soil samples, including 10 field replicate samples, were collected from 10 SAs. Twenty-four samples and 3 field replicate samples were collected from high lead SAs, and 48 samples and 7 field replicate samples were collected from lower lead SAs (Table 3).

Wild strawberry was originally targeted for collection during the June sampling event. However, very few fruits were found, and those fruits were insufficient to meet the target sample size. No fruits were found during the August sampling event.

Indian carrot was originally targeted for collection during the spring sampling event. However, no plants were observed in any of the SAs during the spring sampling event or during the June sampling event. The plant blooms from July to September; however, no plants were observed in any of the SAs during the August sampling event.

Species-by-species collection results are summarized in the following subsections.

Chokecherry

Chokecherry (*Prunus virginiana*) was observed on all high lead SAs and several lower lead SAs. It was collected on two high lead and two lower lead SAs. This plant spreads by suckering and can form dense colonies of multi-branched shrubs or small trees. Branches visibly connected above ground to a central stem or radiating outward from below ground around the central stem were assumed to be genetically identical for sampling. Samples were taken from plants with visibly distinct central stems (Photo 17). A summary of sampling results for chokecherry is provided in Table 14. The protocols for sampling chokecherry for the Study are provided in SOP-4 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

The target plant tissue for chokeberry was the fruit. The target sample mass was 60 grams. Fruit was abundant enough to collect two replicate samples and one potential EPA split sample. One replicate was collected on high lead SAs. One replicate and one split sample were collected on lower lead SAs. A single co-located soil sample and GPS location were taken below the crown of each sampled plant.

Table 14: Chokecherry Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Mass (grams)	Notes
SA01	August 22	AU01	76.5	Sufficient mass for TAL metals analysis.
		AU02	82.0	Sufficient mass for TAL metals analysis.
		AU03	112.0	**Replicate sample of SA01-AU02-P01**. Sufficient mass for TAL metals analysis.
		AU04	79.0	Sufficient mass for TAL metals analysis.
SA03	August 21	AU05	177.0	Sufficient mass for TAL metals analysis.
		AU06	188.0	Sufficient mass for TAL metals analysis.
		AU07	86.0	Sufficient mass for TAL metals analysis.
SA07	August 24	AU01	105.0	Sufficient mass for TAL metals analysis.
		AU02	105.0	**Replicate sample of SA07-AU01-P01**. Sufficient mass for TAL metals analysis.
		AU03	98.0	Sufficient mass for TAL metals analysis.
		AU08	85.0	Sufficient mass for TAL metals analysis.
		AU10	100.0	Sufficient mass for TAL metals analysis.
		AU11	212.0	Sufficient mass for **potential EPA split** sample for TAL metals**.**
SA09	August 25	AU04	89.0	Sufficient mass for TAL metals analysis.

Photo 17: Chokecherries sampled at SA03

Hazelnut

Hazelnut (*Corylus cornuta* var. *californica*) was observed on two high lead SAs and several lower lead SAs (Photo 18). It was collected on two high lead and three lower lead SAs. A summary of sampling results for hazelnut is provided in Table 15. The protocols for sampling hazelnut for the Study are provided in SOP-4 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

The protocol for sampling hazelnut in SOP-4 called for spreading a cloth on the ground under the plant and gently shaking the branches to collect ripe nuts. However, during the first day of sampling it was determined that picking the nuts off the tree was more successful. Additionally, the protocol called for putting the hazelnuts into a cup or bowl of deionized water and discarding those that float, with the assumption that nuts that float are empty or have insect damage not visible on the outside of the shell. The field team tried the float test on the first sample of hazelnuts collected and found that almost every hazelnut floated. Several hazelnuts that floated were cracked open to determine the condition of the nut, and it was found that these were not necessarily empty or damaged, and that the float test was not predictive of sample integrity. Therefore, the float test was not used. Additional nuts above the target amount were collected to account for the potential that empty or damaged nuts were collected along with whole nuts.

The target sample was six nuts. Hazelnuts were abundant enough to collect more than the target quantity and to collect replicate samples and potential EPA split samples. One replicate sample and one split sample were collected at high lead SAs and one replicate sample and one split sample were collected at lower lead SAs. A single co-located soil sample and GPS location were taken below the crown of each sampled plant.

Table 15: Hazelnut Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Units (nuts)	Notes
SA02	August 21	AU01	21	Sufficient mass for TAL metals analysis.
		AU02	31	Sufficient mass for TAL metals analysis.
		AU03	21	Sufficient mass for TAL metals analysis.
SA03	August 21	AU01	20	Sufficient mass for TAL metals analysis.
		AU02	12	Sufficient mass for TAL metals analysis.
		AU03	20	**Replicate sample of SA03-AU02-P01** Sufficient mass for TAL metals analysis.
		AU04	57	Sufficient mass for **potential EPA split** sample for TAL metals.
SA04	August 23	AU01	22	Sufficient mass for TAL metals analysis.
		AU02	22	**Replicate sample of SA04-AU01-P01**. Sufficient mass for TAL metals analysis.
		AU03	24	Sufficient mass for TAL metals analysis.
SA06	August 23	AU01	62	Sufficient mass for **potential EPA split** sample for TAL metals.
		AU02	27	Sufficient mass for TAL metals analysis.
		AU03	20	Sufficient mass for TAL metals analysis.
SA09	August 25	AU01	28	Sufficient mass for TAL metals analysis.

Photo 18: Hazelnuts sampled at SA02

Ponderosa Pine

Ponderosa pine was observed on all high lead SAs and several lower lead SAs. The target plant tissue for Ponderosa pine were pine nuts harvested from cones. Pine cones were collected on three high lead SAs and two lower lead SAs. A summary of sampling results for ponderosa pine is provided in Table 16. The protocol for sampling ponderosa pine tissue for the Study are provided in SOP-4 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

Table 16: Ponderosa Pine Cone Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Units (cones)	Notes
SA01	August 22	AU10	12	Cones collected with extendable lopper. Sufficient mass for TAL metals analysis.
		AU11	11	Cones collected by hand from ground. Sufficient mass for TAL metals analysis.
		AU12	10	Majority of cones collected with extendable lopper; some cones collected by hand from ground. Sufficient mass for TAL metals analysis.
SA02	August 21	AU04	15	Cones collected by hand from ground. Sufficient mass for TAL metals analysis.
		AU05	11	**Replicate sample of SA02-AU04-P01**. Cones collected by hand from ground. Sufficient mass for TAL metals analysis.
		AU06	10	Cones collected by hand from ground. Sufficient mass for TAL metals analysis.
SA03	August 21	AU09	11	Cones collected by hand from ground. Sufficient mass for TAL metals analysis.
SA04	August 23	AU04	17	Cones collected by hand from ground. Sufficient mass for TAL metals analysis.
		AU05	26	Sufficient mass for **potential EPA split sample**. Cones collected by hand from ground. Sufficient mass for TAL metals analysis.
		AU06	16	Cones collected by hand from ground. Sufficient mass for TAL metals analysis.
SA07	August 24	AU09	13	Cones collected with extendable lopper. Sufficient mass for TAL metals analysis.
		AU12	14	Cones collected with extendable lopper. Sufficient mass for TAL metals analysis.
		AU13	12	Cones collected with extendable lopper. Sufficient mass for TAL metals analysis.

The target plant tissue for lab testing was the nut, but the target for field collection was the pine cone. The initial target and minimum samples for ponderosa pine were 20 cones and 10 cones, respectively; however, a field test was conducted on August 20 to estimate how many nuts might be present in cones found on the ground. From that test, it was determined that 6 to 10 cones would make an adequate sample. Pine cones were collected both directly from trees and from the ground. Cones collected from the tree were picked using an extendable lopper (Photo 19). A short section of branch that had a cone on it was cut from the tree, the branch was retrieved from the ground, and the cone was then cut from the branch (Photo 20). One replicate sample and one potential EPA split sample were collected for ponderosa pine nut analyses. A single co-located soil sample and GPS location were taken below the crown of each sampled tree.

Photo 19: Ponderosa pine cones collected from tree using extendable lopper at SA04

Photo 20: Ponderosa pine cones collected at SA04

Sarvisberry

Sarvisberry was observed on all high lead SAs and all lower lead SAs. The target plant tissue for sarvisberry was the fruit. During the August 2017 field reconnaissance phase of this Study (AECOM 2017), the majority of fruit observed still on the plants was dried out. So, for the field sampling phase of this Study, sarvisberry was originally targeted for collection during the June sampling event. However, in June the fruit was green and deemed too immature for collection. Collection was postponed until the August sampling event, and a target mass for dry fruit was established based on dry fruit samples collected during the August 2017 field reconnaissance. The target sample mass was 31.0 grams for plump fruit and 3.1 grams for dry fruit. Fruit collected during the August sampling event was dried out, so the target sample mass for dry fruit was used.

Sarvisberry was collected from two high lead and three lower lead SAs (Photo 21). Fruit was abundant enough to collect two potential EPA split samples and one replicate sample. One split sample was collected on a high lead SA. One replicate and one split sample were collected on lower lead SAs. A single co-located soil sample and GPS location were taken below the crown of each sampled plant. A summary of sampling results for sarvisberry is provided in Table 17. The protocols for sampling sarvisberry for the Study are provided in SOP-4 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

Table 17: Sarvisberry Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Mass (grams)	Notes
SA01	August 22	AU05	8.9	Sufficient mass for TAL metals analysis.
		AU06	10	Sufficient mass for TAL metals analysis.
		AU07	6.2	Sufficient mass for TAL metals analysis.
		AU08	7.5	Sufficient mass for TAL metals analysis.
		AU09	6	Sufficient mass for TAL metals analysis.
SA03	August 21	AU08	17	Sufficient mass for **potential EPA split sample.** Sufficient mass for TAL metals analysis.
SA07	August 24	AU04	21.5	Sufficient mass for **potential EPA split sample.** Sufficient mass for TAL metals analysis.
		AU05	22	Sufficient mass for TAL metals analysis.
		AU06	17	Sufficient mass for TAL metals analysis.
		AU07	17	**Replicate sample of SA07-AU06-P01**. Sufficient mass for TAL metals analysis.
SA08	August 27	AU01	25	Sufficient mass for TAL metals analysis.
		AU02	13	Sufficient mass for TAL metals analysis.
SA14	August 27	AU16	8.15	Sufficient mass for TAL metals analysis.

Photo 21: Sarvisberries sampled at SA07

Tule

Tule (*Schoenoplectus acutus*) was observed growing in only one sampling area (SA14; Photo 22). Tule grows in large patches propagated by rhizomes, making it difficult to identify genetically distinct individuals. One large patch of tule was identified in SA14. Discrete samples were collected from individual tule as widely spaced as possible within the patch. A summary of sampling results for tule is provided in Table 18. The protocols for sampling tule for the Study are provided in SOP-4 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

The target sample for tule was based on culm length (90 centimeters) rather than mass. Culms were cut as close to the base of the plant as possible, and the reproductive part of the plant was removed and discarded near the mature plants. After being measured, culms were cut to fit into sample bags. Sample collection did not result in the destruction of any plants. Culms were abundant enough to collect both a replicate sample and a potential EPA split sample. A co-located soil sample and GPS location were collected next to each sampled plant.

Table 18: Tule Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Length (centimeters)	Notes
SA14	August 27	AU08	269	Sufficient mass for both TAL metals and mercury analyses.
		AU09	290	Sufficient mass for both TAL metals and mercury analysis.
		AU10	260	**Replicate sample of SA14-AU09-P01.** Sufficient mass for both TAL metals and mercury analysis.
		AU11	233	Sufficient mass for both TAL metals and mercury analysis.
		AU12	412	Sufficient mass for **potential EPA split sample** for both TAL metals and mercury analysis.
		AU13	272	Sufficient mass for both TAL metals and mercury analysis.
		AU14	277	Sufficient mass for both TAL metals and mercury analysis.

Photo 22: Tule sampled at SA14

Wild Mint

Wild mint (*Mentha arvensis*) was observed growing in only one sampling area (SA14). Wild mint grows in large patches propagated by rhizomes, making it difficult to identify genetically distinct individuals. One large patch of wild mint was identified in SA14 (Photo 23). Discrete samples were collected from individual clumps of mint (considered to be genetically the same individual) as widely spaced as possible within the patch. A summary of sampling results for mint is provided in Table 19. The protocols for sampling wild mint for the Study are provided in SOP-4 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

The target plant tissue for wild mint was leaves. The target sample mass for analysis was 4.0 grams, which required collecting leaves from multiple closely spaced plants. Sample collection did not result in destruction of any plants. Leaves were abundant enough to take both a replicate sample and a potential EPA split sample. A single co-located soil sample and GPS location were collected adjacent to each discrete plant sample.

Table 19: Wild Mint Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Mass (grams)	Notes
SA14	August 27	AU01	11	Sufficient mass for both TAL metals and mercury analysis.
		AU02	10.5	Sufficient mass for both TAL metals and mercury analysis.
		AU03	22	Sufficient mass for **potential EPA split sample** for both TAL metals and mercury analysis.
		AU04	12	Sufficient mass for both TAL metals and mercury analysis.
		AU05	11	Sufficient mass for both TAL metals and mercury analysis.
		AU06	11	**Replicate sample for SA14-AU05-P01.** Sufficient mass for both TAL metals and mercury analysis.
		AU07	12	Sufficient mass for both TAL metals and mercury analysis.

Photo 23: Wild mint sampled at SA14

Wild Rose

Wild rose was observed on two high lead SAs and several lower lead SAs (Photo 24). The target plant tissue for wild rose during the August sampling event was the hips. Wild rose with hips were not found in large enough numbers to collect on any of the high lead SAs. Wild rose hips were collected on three lower lead SAs (SA06, SA09, and SA14) but were sufficiently abundant to collect a replicate sample, but there was not enough mass for a potential EPA split sample. One replicate sample was collected on SA09. A summary of sampling results for wild rose is provided in Table 20. The protocols for sampling wild rose for the Study are provided in SOP-4 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

Table 20: Wild Rose Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Mass (grams)	Number of Hips in Composite	Notes
SA06	August 23	AU04	5.4	2	Sufficient mass for TAL metals analysis.
		AU05	7.0		Not a composite. Sufficient mass for TAL metals analysis.
		AU06	15		Not a composite. Sufficient mass for TAL metals analysis.
		AU07	9.5		Not a composite. Sufficient mass for TAL metals analysis.
SA09	August 25	AU02	17		Not a composite. Sufficient mass for TAL metals analysis.
		AU03	16		**Replicate sample of SA09-AU02-P01.** Not a composite. Sufficient mass for TAL metals analysis.
SA14	August 27	AU15	7.2		Not a composite. Sufficient mass for TAL metals analysis.

Photo 24: Wild rose sampled at SA06

The target and minimum sample masses were 8.7 grams and 4.4 grams, respectively. Hips were not sufficiently abundant on individual plants to meet the target mass for all samples. The target mass was collected for three discrete samples and one discrete replicate. The minimum sample mass was collected for two discrete samples and one composite sample.

Green Willow

Green willow was sampled at one sampling area (SA16) during the spring 2018 event. See Section 2.3.1 for sampling details and photographs. SA15 was originally surveyed for willows during the spring 2018 sampling event, but none were identified. The sampling area was revisited during the August 2018 sampling event. Green willow was identified growing at SA15 and was determined to be sufficiently abundant for the collection of all six samples (Photo 25). Six additional samples, one replicate sample, and one potential EPA split sample were collected in August from SA15. A single co-located soil sample and GPS location were taken directly next to the plant sample. Soil was tan to black, very fine to medium sand and gravel.

A summary of sampling results for green willow is provided in Table 21.

Table 21: Green Willow Sampling Summary

Sampling Area	Sampling Date	Sample Number	Sample Length (centimeters)	Notes
SA15	August 28	AU01	411	Sufficient mass for **potential EPA split sample** for both TAL metals and mercury analysis.
		AU02	190	Sufficient mass for both TAL metals and mercury analysis.
		AU03	202	Sufficient mass for both TAL metals and mercury analysis.
		AU04	233	**Replicate sample of SA15-AU03-P01**. Sufficient mass for both TAL metals and mercury.
		AU05	218	Sufficient mass for both TAL metals and mercury analysis.
		AU06	203	Sufficient mass for both TAL metals and mercury analysis.
		AU07	208	Sufficient mass for both TAL metals and mercury analysis.

Photo 25: Green willow in riparian area at SA15

2.4 Recording Plant Tissue Collection Locations

All sampling area and TA boundaries were loaded onto handheld differential GPS (DGPS) units that were carried by the survey and sampling teams. The units were used to ensure that survey and sampling activities occurred within the designated SAs and TAs. They were also used to record sample collection locations. The protocols for recording plant tissue and soil collection locations for the Study are provided in SOP-2 of Attachment A2 of the FSP (Appendix A of the QAPP [Ramboll 2018]).

Two DGPS systems were used. The sampling team used a Trimble R1 Global Navigation Satellite System receiver and a tablet running ESRI ArcPad 10.2 collection software. The survey team used a Trimble GeoExplorer XH 6000 running Trimble TerraSync 5.3 collection software. Both used satellite-based augmentation by accessing the Wide Area Augmentation System to get a real-time correction signal in the field, which improved accuracies to less than 1 meter. As specified in the QAPP, the standard projection method that was used during field activities was the horizontal datum of World Geodetic System of 1984. GPS features collected were exported to a folder on OneDrive that was synced each night. The geographic information system (GIS)/GPS manager then imported the data to a local server.

2.5 Sample Holding and Transport

Tissue and soil samples were stored on wet ice immediately after being weighed, measured, and packaged in the field. At the end of each day, samples were transferred to a chest freezer located in a locked storage area in Kettle Falls. A maximum/minimum thermometer was kept inside the freezer and checked daily to ensure the freezers were functioning properly.

In the spring and August, samples were packaged for transport in coolers with dry ice. In June, the samples were transported in a portable freezer. All samples were driven to the analytical laboratory (ALS) in Kelso, Washington, and transferred using defined chain-of-custody procedures. Samples were stored at -20 degrees Celsius during transport.

2.6 Project Documentation

Field sampling methods and associated field data collection were completed in accordance with the QAPP and are not repeated in this report. Field documentation and records are provided in the appendices. Following is a brief description of what is contained in each appendix.

- Appendix A Daily Tailgate Task Hazard Assessment Forms
- Appendix B Project Permits
- Appendix C Protocol Modification Forms
- Appendix D Chain-of-Custody Forms
- Appendix E ALS Confirmation of Sample Receipt Forms
- Appendix F Plant Tissue and Soil/Sediment Data Forms
- Appendix G Daily Logbook Entries
- Appendix H Sample Information Sheets (electronic copy only)
- Appendix I Field Sampling Data

2.6.1 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 crews and visitors.

2.6.2 Appendix B – Project Permits

The following permits and/or approvals for the Study can be found in Appendix A:

- CCT Research Permit No. 2018-07 for UCR Plant Tissue Study
- BIA – Colville Indian Agency Limited Use Agreement for access to tribal trust lands in the UCR area
- Washington State Department of Natural Resources permission to sample at SA15, Deadman's Eddy (email from Arne Johnson on April 23, 2018).

2.6.3 Appendix C – Protocol Modification Forms

Detailed descriptions of all modifications to the QAPP and the circumstances that necessitated such changes were recorded in the logbooks and protocol modification forms. These changes were reviewed for compliance with data quality objectives. Modifications to the QAPP, documented as protocol modifications, were processed for the Study (Table 22).

2.6.4 Appendix D – Chain-of-Custody Forms

Final chain-of-custody forms, including several with revisions, are included in Appendix D.

2.6.5 Appendix E – ALS Confirmation of Sample Receipt Forms

Final sample receipt forms from ALS laboratory are included in Appendix E.

2.6.6 Appendix F – Plant Tissue and Soil/Sediment Data Forms

Sample data forms are included in Appendix F. There is one data form for each of the plant tissue samples (including replicates). Two abandoned samples (SA01-SP03-P01 and SA08-SP08-P01) are also included.

2.6.7 Appendix G – Daily Logbook Entries

Appendix G contains a full copy of the spring, June, and August 2018 logbook entries, from April 25 to May 4, June 18 to 21, and August 20 to 28, respectively.

2.6.8 Appendix H – Sample Information Sheets (electronic copy only)

Appendix H is a compact disc containing photos and summary data for each sample collected during the spring, June 2018, and August 2018 events.

2.6.9 Appendix I – Field Sampling Data

Appendix I contains a list of all field samples collected in 2018 during the spring, June, and August sampling events.

Table 22: Summary of Modifications

No.	Sample	QAPP Procedure	Applicable Sample Identification Nos.	Description of Modification	Reason for Modification	Comments
1	Multiple	SOP-6	Multiple, in Spring 2018	Photo board labelling	Inadvertent mislabeling of sample identification numbers in photo board in project photos	Discrepancies identified during field data QA.
2	Multiple	SOP-7	All June 2018 Samples	Sample transportation to ALS Kelso done with a portable freezer plugged into vehicle power instead of a cooler with dry ice	No dry ice available in Colville at time of shipment	Samples remained frozen throughout drive from Colville, WA, to ALS in Kelso, WA. Samples logged in as frozen by ALS.
3	Multiple	SOP-4	All August 2018 Hazelnut Samples	Discard float test; discard blanket/ shaking method of collection	Float test was determined not to be predictive of sample integrity; hand picking was determined to be more effective than shaking the shrub to collect nuts	Float test tested in field; shaking method was not.

3.0 References

AECOM. 2017. Field Reconnaissance Summary Report. Upper Columbia River, Plant Tissue Study. Prepared for Teck American Incorporated. December 2017.

CH2M HILL. 2016. Final UCR Residential Soil Study Field Sampling and Data Summary Report. February.

Lodestone. 2018. Personal communication (e-mail from Whitney Fraser, Lodestone Environmental Consulting, to Monica Tonel, EPA, regarding the use of red-osier dogwood by CCT. April 8.

Ramboll. 2018. FINAL Quality Assurance Project Plan for the Plant Tissue Study. Upper Columbia River, Plant Tissue Study. Prepared for Teck American Incorporated.

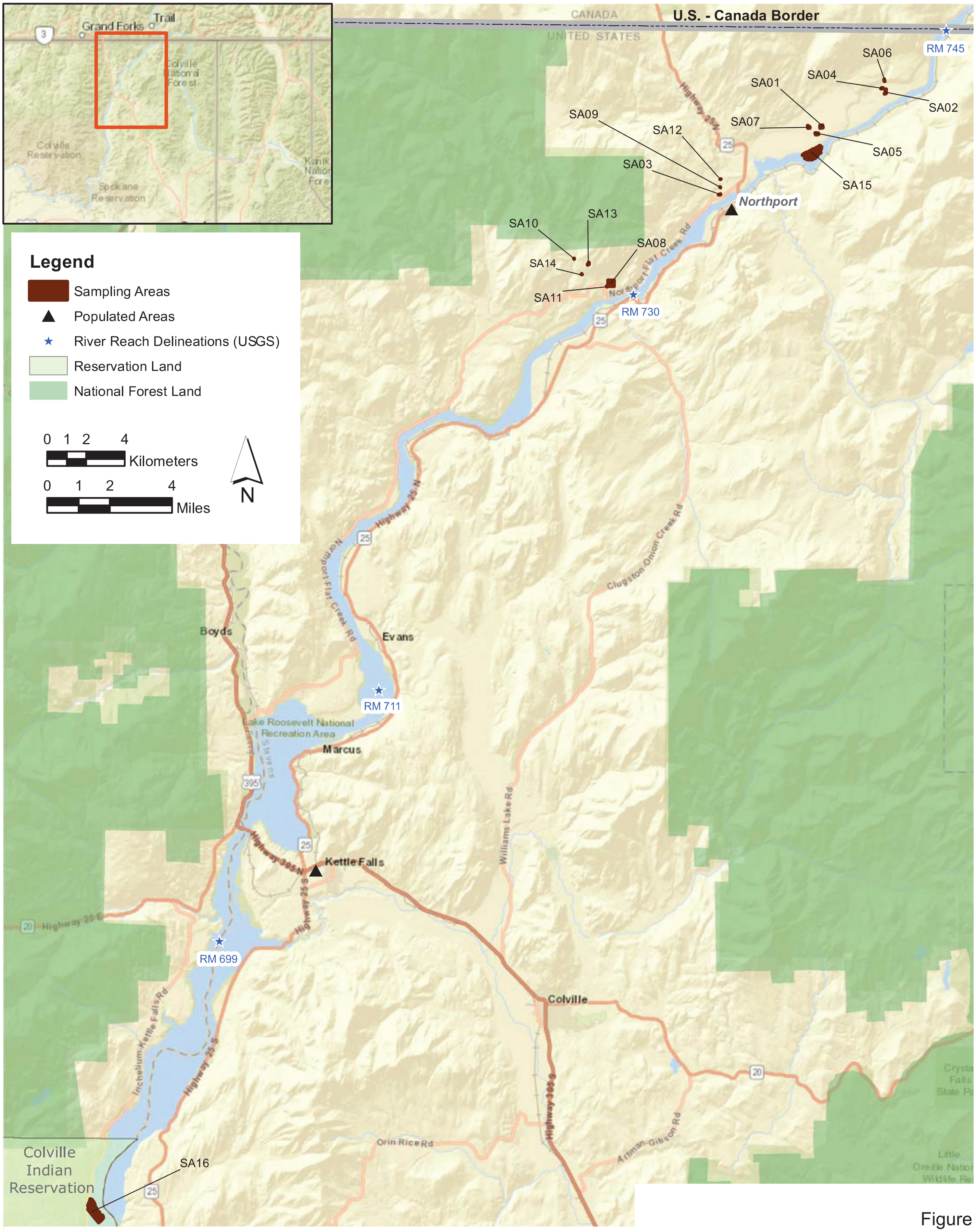
Ramboll Environ. 2017. FINAL Residential Soil Study Data Summary Report. Prepared for Teck American Incorporated in association and consultation with Exponent, Parametrix, Inc., and Windward LLC. October.

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 (U.S. Environmental Protection Agency). 2017. Letter from Laura C. Buelow, EPA Project Coordinator, to Kris McCaig, TAI Project Coordinator, detailing resolution of informal disputes regarding terrestrial plant sampling and Level of Effort (LOE) for estimation of Upland Soils (background study). EPA Region 10 Hanford/INL Project Office. Richland, WA. June 14, 2017.

Windward et al. 2015. Upper Columbia River, Final Soil Study Data Summary Report. Prepared by Windward Environmental LLC in association and consultation with Exponent, Parametrix, Inc., and Ramboll Environ. October.

Figures



Source: Source: Ramboll 2018, Field Sampling Plan for the Plant Tissue Study.

Figure 1

Sampling Areas

Upper Columbia River, WA

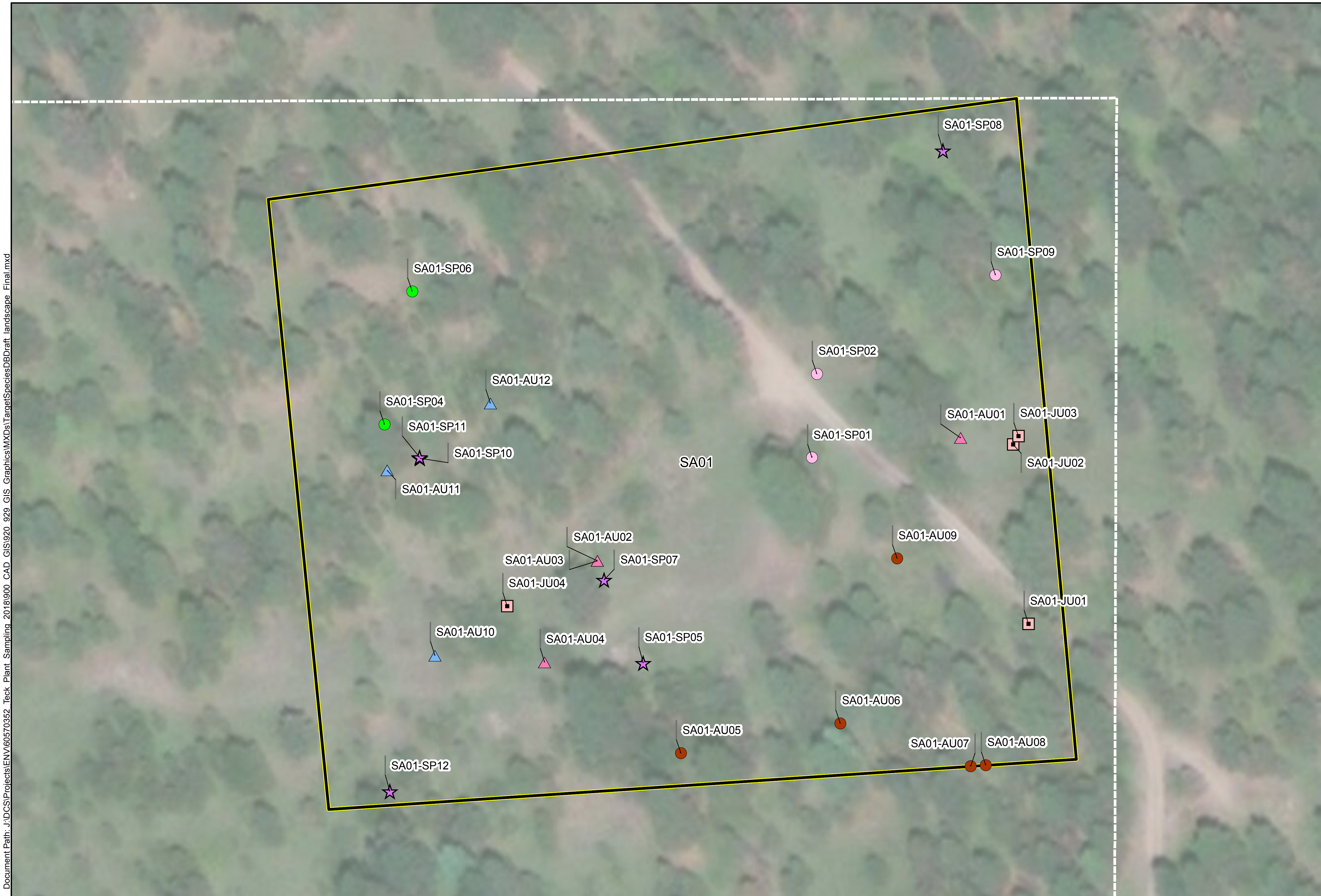
AECOM

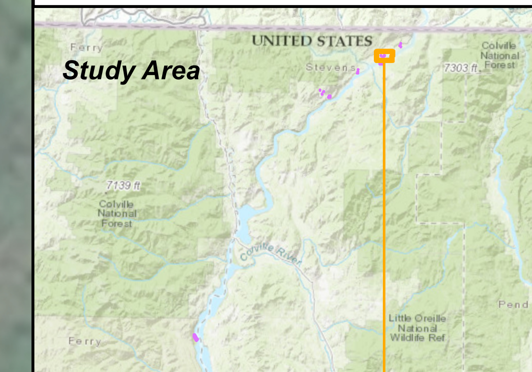
J:\DCS\Projects\ENV\60570352_Teck_Plant_Sampling_2018\900_CAD_GIS\920_929_GIS_Graphics\60570352 GRFX\60570352_01.ai

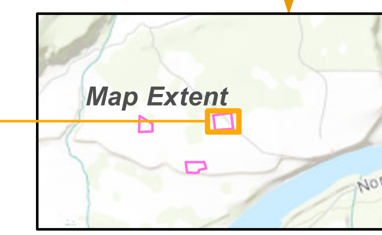
Figure 2.
SA01 Results

Location Code:2014R-258-xxx
Sample Area: SA01
Tribal Allotment: 151-H-193
Upper Columbia River, WA

High Lead DU







Legend

- Amelanchier alnifolia (Sarvisberry)
- Bryoria fremontii (Black tree lichen)
- Camassia quamash (Camas)
- Claytonia lanceolata (Spring beauty/Indian Potato)
- Pinus ponderosa (Ponderosa Pine)
- Prunus virginiana (Chokecherry)
- Rosa sp. (Wild rose (stems and leaves))
- Sampling Area
- Prior Soil Study Boundary
- Tribal Allotment

0 5 10 20 Meters
0 25 50 100 Feet

N

SA Acreage: 4.73

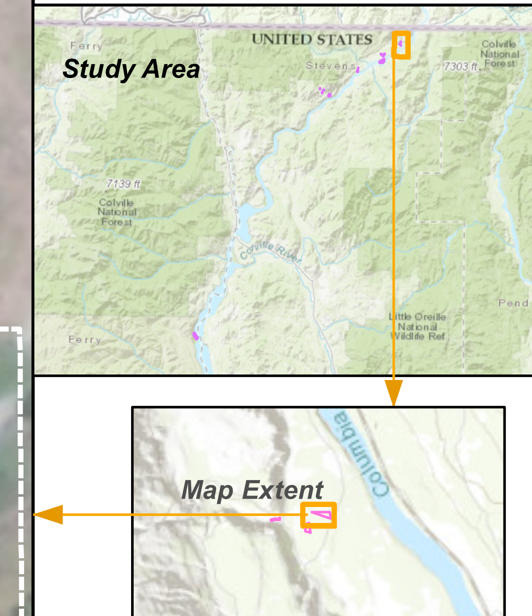
AECOM

Document Path: J:\DCS\Projects\ENV\60570352 Teck Plant Sampling 2018\900 CAD GIS\920 929 GIS Graphics\MXDs\TargetSpeciesDB\Draft landscape Final.mxd

Figure 3.
SA02 Results

Location Code:2014R-401-xxx
Sample Area: SA02
Tribal Allotment: 151-H-196
Upper Columbia River, WA

High Lead DU



Legend

- Arctostaphylos uva-ursi (Kinnikinnick)
- Claytonia lanceolata (Spring beauty/Indian Potato)
- Corylus cornuta (Hazelnut)
- Lomatium triternatum (Lomatium)
- Pinus ponderosa (Ponderosa Pine)
- Sampling Area
- Prior Soil Study Boundary
- Tribal Allotment

0 10 20 40 Meters

0 25 50 100 150 Feet

N

SA Acreage: 2.31

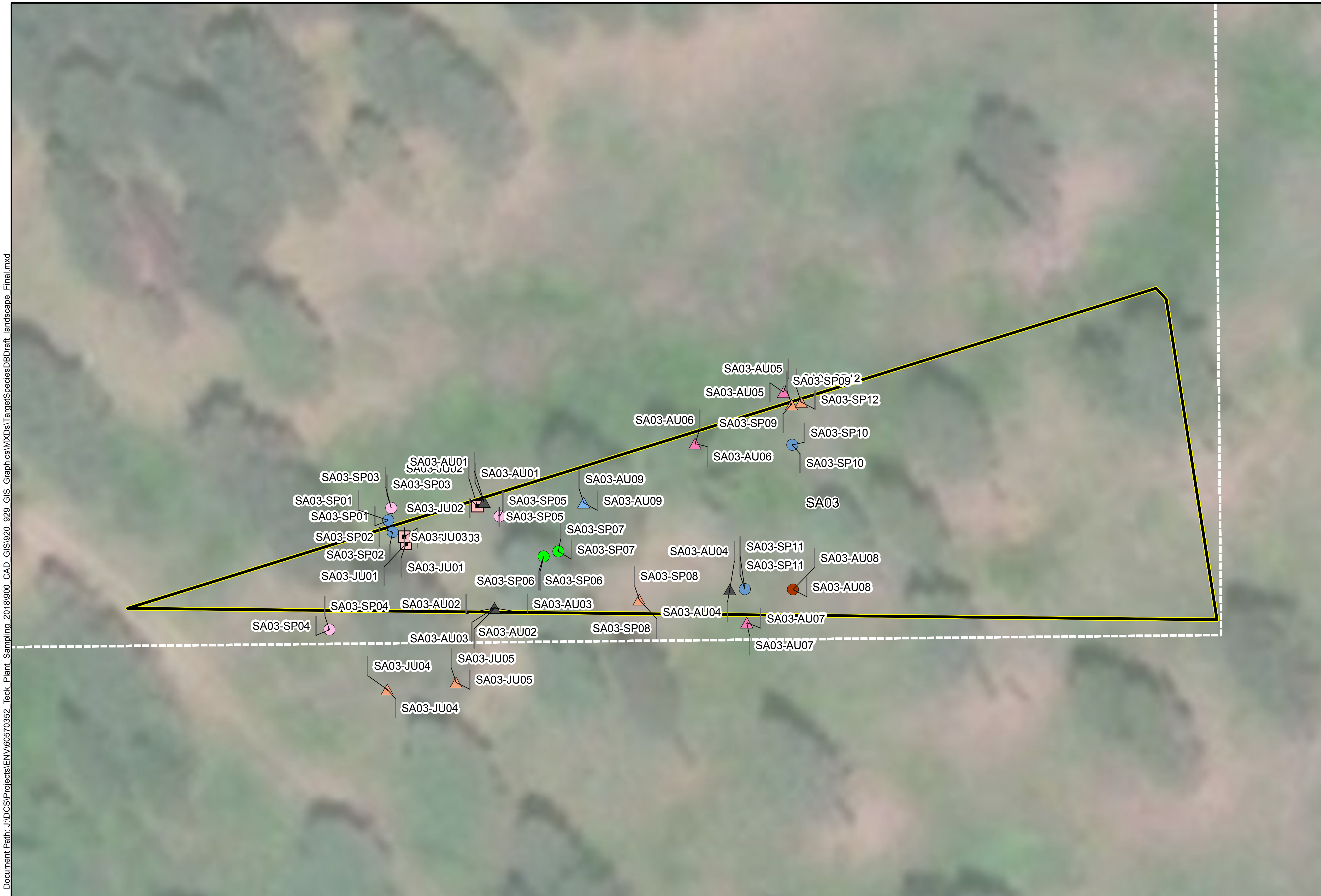
AECOM

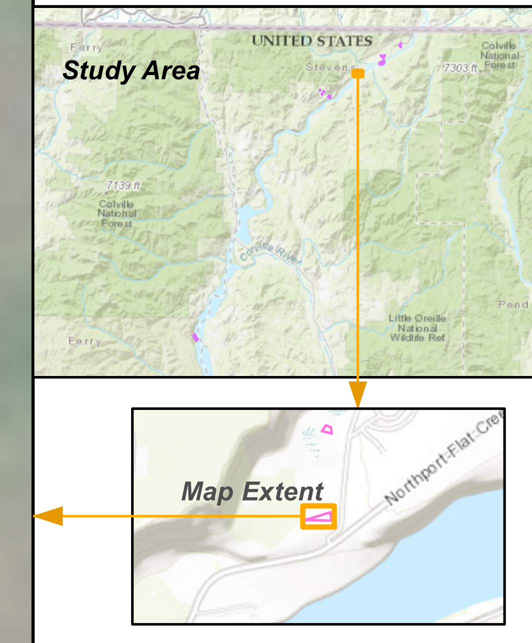
Document Path: J:\DCS\Projects\ENV\60570352 Teck Plant Sampling 2018\900 CAD GIS\920 929 GIS Graphics\MXDs\TargetSpeciesDB\Draft landscape Final.mxd

Figure 4.
SA03 Results

Location Code:2014R-441-xxx
Sample Area: SA03
Tribal Allotment: 151-H-197
Upper Columbia River, WA

High Lead DU





Legend

- Amelanchier alnifolia (Sarvisberry)
- Arctostaphylos uva-ursi (Kinnikinnick)
- Camassia quamash (Camas)
- Claytonia lanceolata (Spring beauty/Indian Potato)
- Corylus cornuta (Hazelnut)
- Lomatium triternatum (Lomatium)
- Pinus ponderosa (Ponderosa Pine)
- Prunus virginiana (Chokecherry)
- Rosa sp. (Wild rose (stems and leaves))
- Sampling Area
- Prior Soil Study Boundary
- Tribal Allotment

0 5 10 Meters
0 25 50 Feet

N

SA Acreage: 0.45

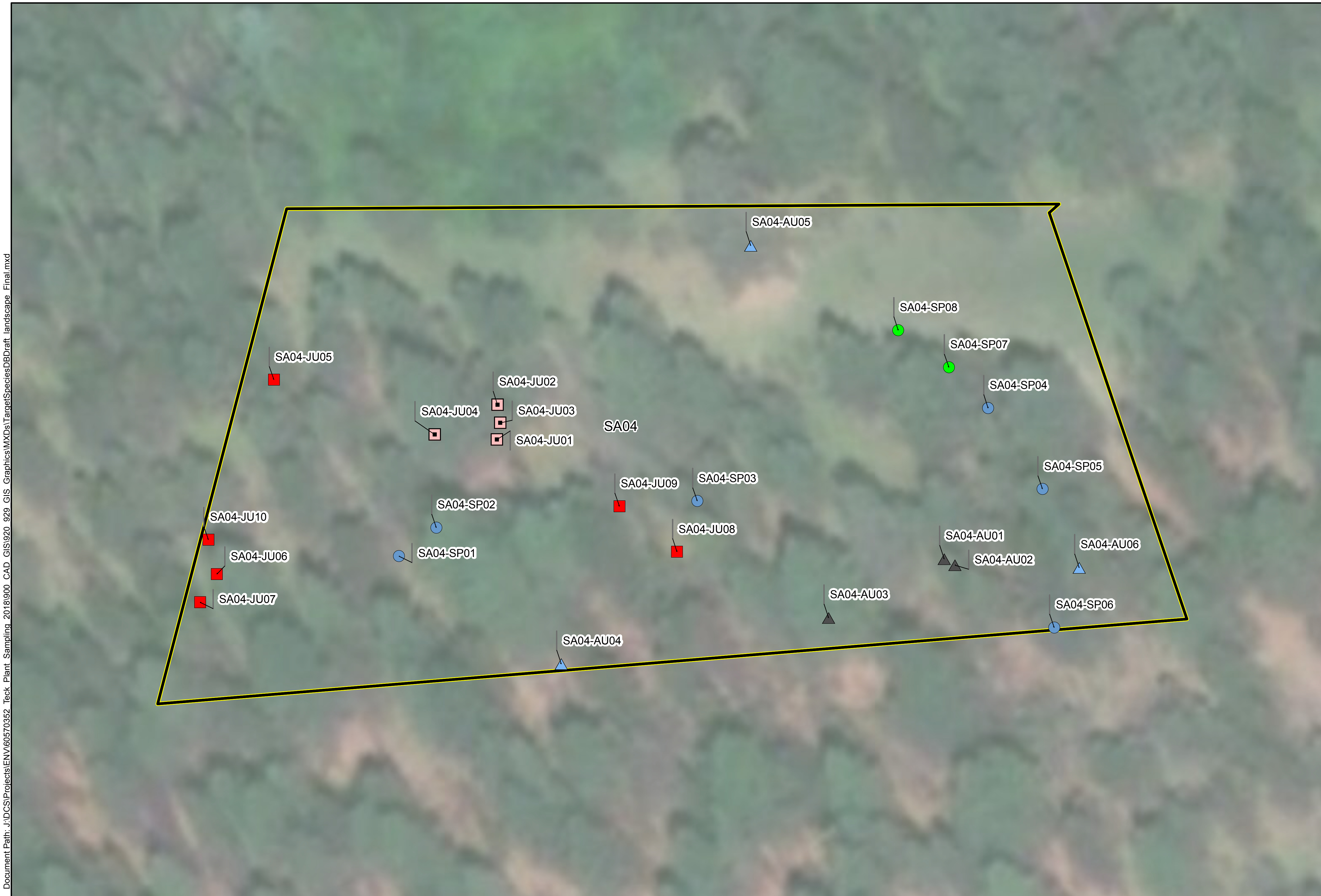
AECOM

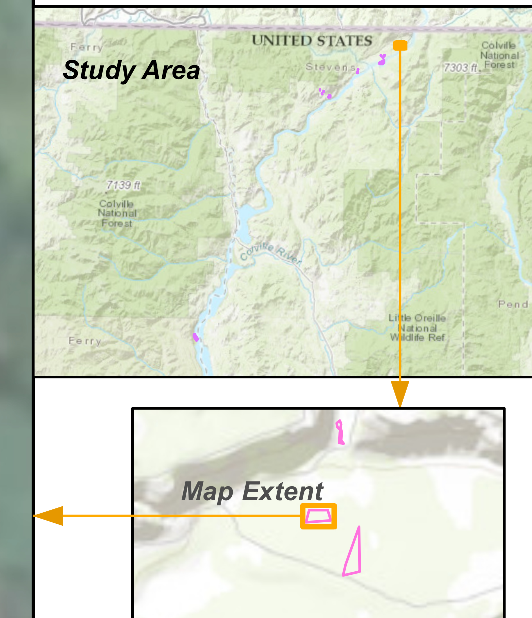
Document Path: J:\DCS\Projects\ENV\60570352_Teck_Plant_Sampling_2018\900_CAD_GIS\920_929_GIS_Graphics\MXDs\TargetSpeciesDBDraft_landscape_Final.mxd

Figure 5.
SA04 Results

Location Code:2014R-402-xxx
Sample Area: SA04
Tribal Allotment: 151-H-196
Upper Columbia River, WA

Lower Lead DU - Priority Group 2





Legend

- Arctostaphylos uva-ursi (Kinnikinnick)
- Claytonia lanceolata (Spring beauty/Indian Potato)
- Corylus cornuta (Hazelnut)
- Pinus ponderosa (Ponderosa Pine)
- Rosa sp. (Wild rose (stems and leaves))
- Vaccinium cespitosum (Huckleberry)
- Sampling Area Boundary
- Prior Soil Study Boundary

0 5 10 20 Meters
0 25 50 Feet
N

SA Acreage: **1.37**

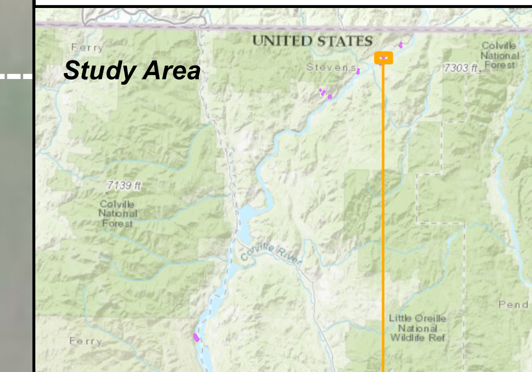
AECOM

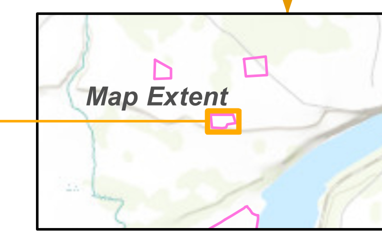
Document Path: J:\DCS\Projects\ENV\60570352_Teck_Plant_Sampling_2018\900_CAD_GIS\920_929_GIS_Graphics\MXDs\TargetSpeciesDBDraft_landscape_Final.mxd

Figure 6.
SA05 Results

Location Code:2014R-410-xxx
Sample Area: SA05
Tribal Allotment: 151-H-195
Upper Columbia River, WA

Lower Lead DU - Priority Group 2





Legend

- Bryoria fremontii (Black tree lichen)
- Camassia quamash (Camas)
- Claytonia lanceolata (Spring beauty/Indian Potato)
- Lomatium triternatum (Lomatium)
- Sampling Area
- Prior Soil Study Boundary
- Tribal Allotment

0 5 10 20 Meters
0 25 50 100 Feet
N

SA Acreage: 3.21

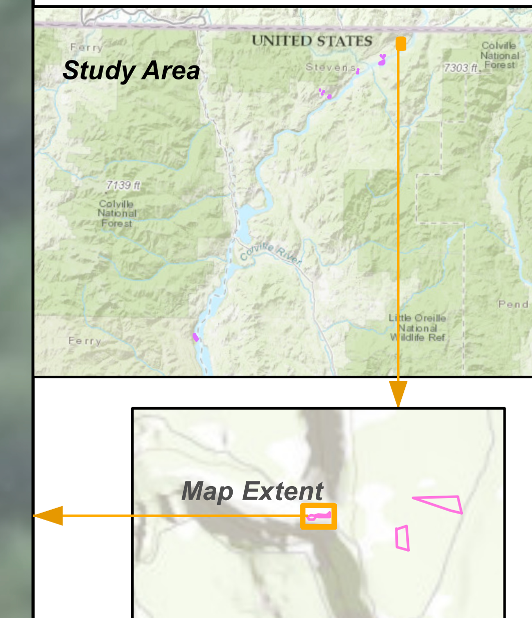
AECOM

Document Path: J:\DCS\Projects\ENV\60570352 Teck Plant Sampling 2018\900 CAD GIS\920 929 GIS Graphics\MXDs\TargetSpeciesDBDraft landscape Final.mxd

Figure 7.
SA06 Results

Location Code:2014R-403-xxx
Sample Area: SA06
Tribal Allotment: 195-H-196
Upper Columbia River, WA

Lower Lead DU - Priority Group 2



Legend

- Arctostaphylos uva-ursi (Kinnikinnick)
- Corylus cornuta (Hazelnut)
- Rosa sp. (Wild rose (hips))
- Rosa sp. (Wild rose (stems and leaves))
- Sampling Area
- Prior Soil Study Boundary
- Tribal Allotment

0 5 10 20 Meters
0 25 50 Feet

N

SA Acreage: 0.34

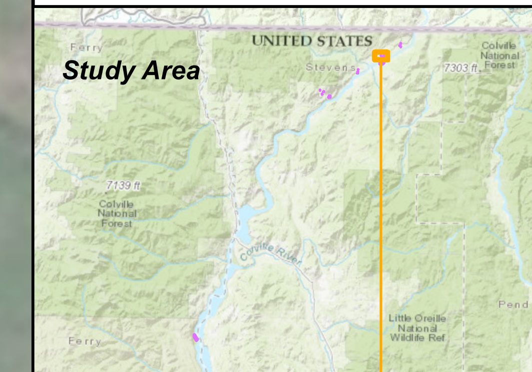
AECOM

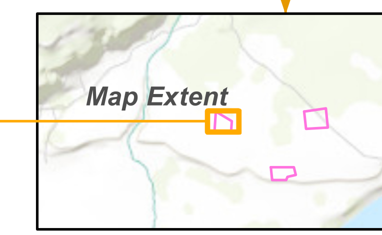
Document Path: J:\DCS\Projects\ENV\60570352_Teck_Plant_Sampling_2018\900_CAD_GIS\920_929_GIS_Graphics\MXDs\TargetSpeciesDB\Draft_landscape_Final.mxd

Figure 8.
SA07 Results

Location Code:2014R-259-xxx
Sample Area: SA07
Tribal Allotment: 151-H-193
Upper Columbia River, WA

Lower Lead DU - Priority Group 2





Legend

- Amelanchier alnifolia (Sarvisberry)
- Camassia quamash (Camas)
- Pinus ponderosa (Ponderosa Pine)
- Prunus virginiana (Chokecherry)
- Sampling Area
- Prior Soil Study Boundary
- Tribal Allotment

0 5 10 20 Meters
0 25 50 100 Feet
N

SA Acreage: 2.83

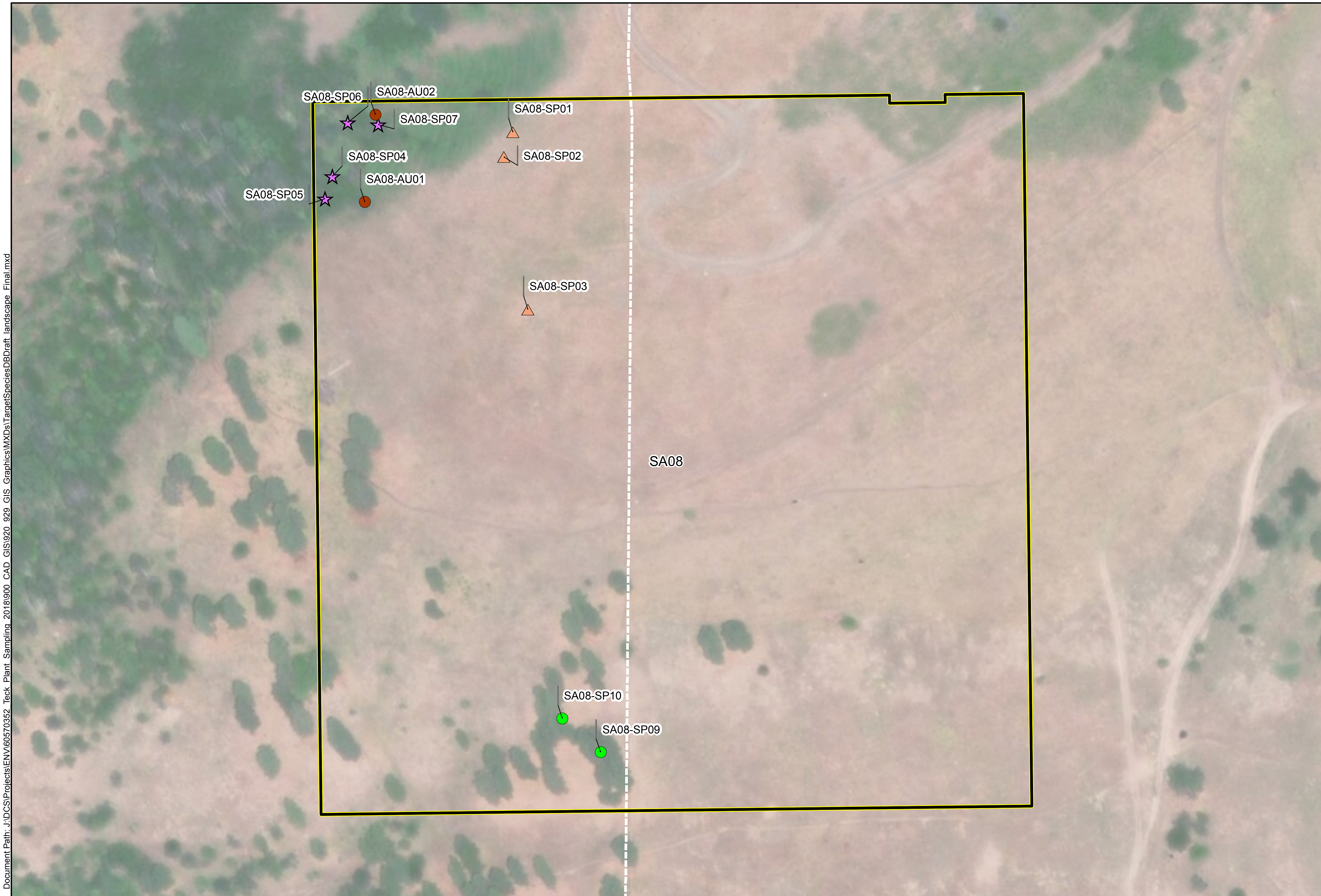
AECOM

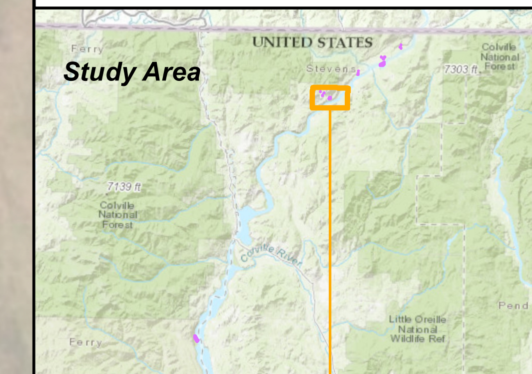
Document Path: J:\DCS\Projects\ENV\60570352_Teck_Plant_Sampling_2018\900_CAD_GIS\920_929_GIS_Graphics\MXDs\TargetSpeciesDB\Draft_landscape_Final.mxd

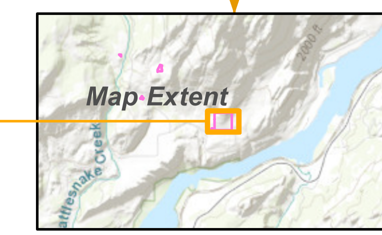
Figure 9.
SA08 Results

Location Code:2014U-ADA-023
Sample Area: SA08
Tribal Allotment: 804
Upper Columbia River, WA

Lower Lead DU - Priority Group 2







Legend

- Amelanchier alnifolia (Sarvisberry)
- Bryoria fremontii (Black tree lichen)
- Claytonia lanceolata (Spring beauty/Indian Potato)
- Lomatium triternatum (Lomatium)
- Sampling Area
- Prior Soil Study Boundary
- Tribal Allotment

0 15 30 60 Meters

0 50 100 200 300 Feet

N

SA Acreage: 25.12

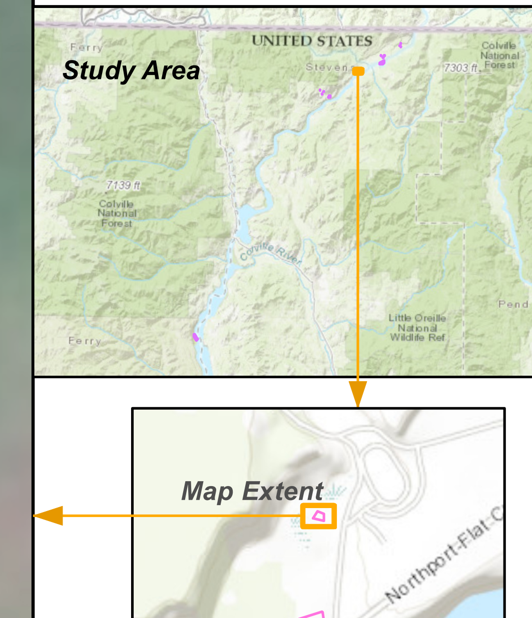
AECOM

Document Path: J:\DCS\Projects\ENV\60570352 Teck Plant Sampling 2018\900 CAD GIS\920 929 GIS Graphics\MXDs\TargetSpeciesDBDraft landscape Final.mxd

Figure 10.
SA09 Results

Location Code:2014R-442-xxx
Sample Area: SA09
Tribal Allotment: 151-H-197
Upper Columbia River, WA

Lower Lead DU - Priority Group 2



Legend

- Corylus cornuta (Hazelnut)
- Prunus virginiana (Chokecherry)
- Rosa sp. (Wild rose (hips))
- Sampling Area
- Prior Soil Study Boundary
- Tribal Allotment

0 5 10 Meters

0 25 50 Feet

N

SA Acreage: 0.22

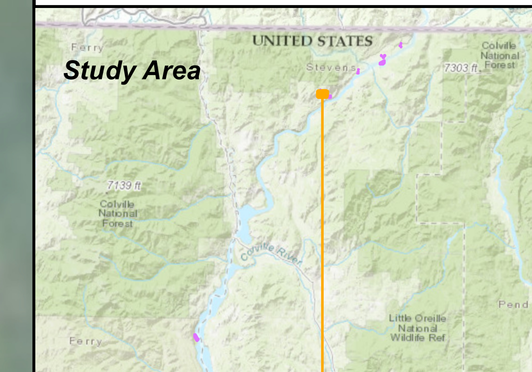
AECOM

Document Path: J:\DCS\Projects\ENV\60570352 Teck Plant Sampling 2018\900 CAD GIS\920 929 GIS Graphics\MXDs\TargetSpeciesDB\Draft landscape Final.mxd

Figure 11.
SA14 Results

Location Code:2016R-805-xO2
Sample Area: SA14
Tribal Allotment: 805
Upper Columbia River, WA

Lower Lead DU - Priority Group 1



Legend

- Amelanchier alnifolia (Sarvisberry)
- Mentha arvensis (Wild Mint)
- Rosa sp. (Wild rose (hips))
- Schoenoplectus acutus (Tule)
- Sampling Area Boundary
- Prior Soil Study Boundary

0 5 10 Meters
0 25 50 Feet

N

SA Acreage: 0.39

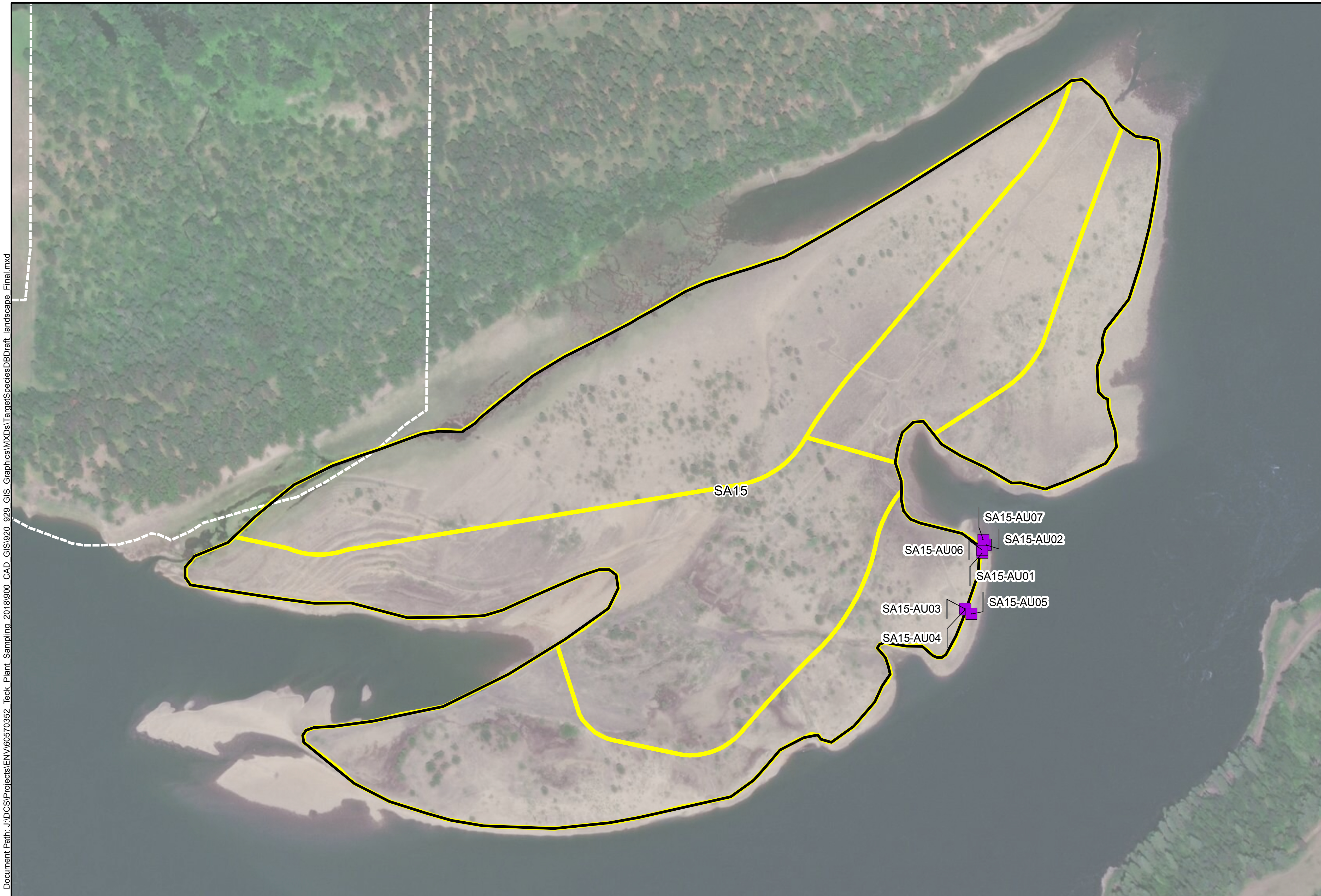
AECOM

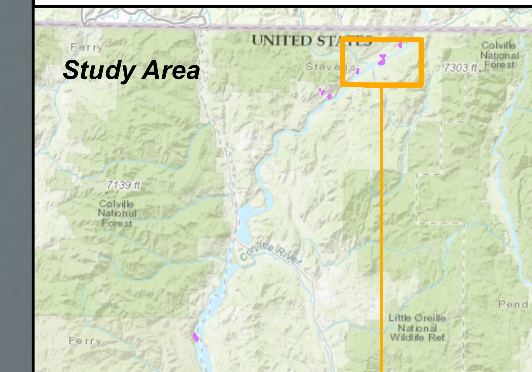
Document Path: J:\DCS\Projects\ENV\60570352 Teck Plant Sampling 2018\900 CAD GIS\920 929 GIS Graphics\MXDs\TargetSpeciesDB\Draft landscape Final.mxd

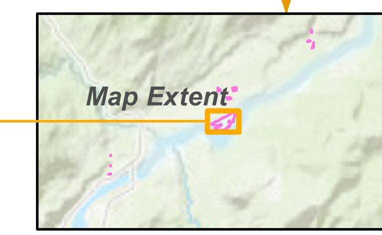
Figure 12.
SA15 Results

Location Code:Deadman's Eddy
Sample Area: SA15
WA Dept. of Natural Resources
Upper Columbia River, WA

Lower Lead DU - Priority Group 2







Legend

- Salix exigua (Green willow)
- Sampling Area
- Prior Soil Study Boundary
- Tribal Allotment

0 40 80 160 Meters

0 100 200 400 600 Feet

N

SA Acreage: 82.25

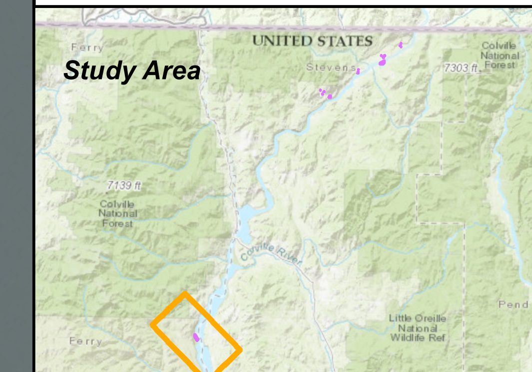
AECOM

Document Path: J:\DCS\Projects\ENV\60570352 Teck Plant Sampling 2018\900 CAD GIS\920 929 GIS Graphics\MXDs\TargetSpeciesDB\Draft landscape Final.mxd

Figure 13.
SA16 Results

Location Code:Barnaby Island Campground
Sample Area: SA16
National Park Service
Upper Columbia River, WA

Lower Lead DU - Priority Group 2



Legend

- Salix exigua (Green willow)
- Sampling Area
- Prior Soil Study Boundary

0 40 80 160 Meters

0 100 200 400 600 Feet

SA Acreage: 91.38

Document Path: J:\DCS\Projects\ENV\60570352 Teck Plant Sampling 2018\900 CAD GIS\920 929 GIS Graphics\MXDs\TargetSpeciesDB\Draft landscape Final.mxd

AECOM

Appendix A

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: Fred Merrill
Phone Number: 206.719.1105
Meeting Leader:

Date: 4/25/2018 | **Project Name/Location:** Upper Columbia River Plant Tissue Study | **Project Number:** 60570350

Today's Scope of Work:
Project Kick-off meeting in Northport, WA
driving, plant & soil sampling at SA02

Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
Field Vehicle	Field Vehicle/Backpack	Field Vehicle	Field Vehicle

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, hazards, controls, procedures, requirements, etc.)
- [x] Pre-Job Hazard Assessments (JHA/JSAs) available and understood
- [x] Task Hazard Assessments (THAs) are to be 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
- [x] Work area set up and demarcation/ barricades in place to protect workers, site staff, and the public
- [x] Required checklists/records available, understood (describe):
- [ ] Lessons Learned / SH&E improvements (describe):

2. Discuss if Applicable to Today's Work

Check ☑ as reviewed or mark ■ as not applicable

Reviewed	N/A	Topic
✓		Biological/ Chemical / Electrical Hazards
✓		Ergonomics - Lifting, Body Position
	✓	Lock Out/ Tag Out
	✓	Short Service Employees - visual identifier and mentor/ oversight assignment
✓		Simultaneous/ Neighbouring Operations
✓		Slip/ Trip/ Fall Hazards
✓		Specialized PPE Needs
✓		Traffic Control
✓		Waste Management/ Decontamination
✓		Weather Hazards / Heat Stress / Cold Stress
	✓	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 Jenny Pretare / Michelle Stegner (safety) **Signature** [signature] **Date** 4/25/2018 **Time** (at end of day / shift) 6:30pm

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
See Project Kickoff Meeting Sheet for Staff + Signatures		In & Fit 10am – 6pm	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		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

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: Fred Merrill
Phone Number: 206.719.1105

Meeting Leader: Jenny Pretare / Michelle Stegner

Date: 4/26/2018 | **Project Name/Location:** Upper Columbia River Plant Tissue Study | **Project Number:** 60570350

Today's Scope of Work:
driving to Northport, WA boat launch, to Sample Area 2 and 3, plant + soil sampling

Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
Field Vehicle	Field Vehicle/Backpack	Field Vehicle	Field Vehicle

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, hazards, controls, procedures, requirements, etc.)
- [x] Pre-Job Hazard Assessments (JHA/JSAs) available and understood
- [x] Task Hazard Assessments (THAs) are to be 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
- [x] 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 ☑ as reviewed or mark ■ as not applicable

Reviewed	N/A	Topic
☑	☐	Biological/ Chemical / Electrical Hazards
☑	☐	Ergonomics - Lifting, Body Position
☐	☑	Lock Out/ Tag Out
		Short Service Employees - visual identifier and mentor/ oversight assignment
☐	☑	Simultaneous/ Neighbouring Operations
☑	☑	Slip/ Trip/ Fall Hazards
☑	☐	Specialized PPE Needs
☐	☑	Traffic Control
☑	☑	Waste Management/ Decontamination
☑	☐	Weather Hazards / Heat Stress / Cold Stress
☐	☑	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)
Jenny Pretare / Michelle Stegner (Safety)	[signature]	Date 4/26/2018; Time 6:30pm

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
See THA for staff & signatures		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		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

Americas

Task Hazard Assessment

S3AM-209-FM6

Date: 4/26/2018	**Project Name / Location:** Upper Columbia River Plant Tissue Study, Northport, WA
Permit / Job Number:	**Project Number:** 60570352
Description of Task: Plant Tissue Sampling	

Do you have a pre-job hazard assessment (JHA) specific to this task in your hands?

- ⊙ **Yes** – review the steps, hazards, and precautions. Attach and reference JHA in the form below. Add any additional steps, hazards, and precautions to this form otherwise unidentified on JHA.
- ○ **No** – list all steps, hazards, and precautions associated with the task in the form below.

Basic Task Steps (explain in order how the task will be carried out)	Hazards (identify all hazards & potential hazards of each step)	Risk (before)	Control Measures / Precautions (describe how that hazard will be controlled)	Risk (after)	Revised? (yes – record time)
driving	falling tree limbs	5	be aware of haz. above	1	
Walking	dust during drive		Wash windshield		
			Stay distance on dusty road		
	awareness during site walk	5	look up and around to	1	
			Check for wildlife.		
	radio communication				
	Coordinate team members		16 people in am; 14 in afternoon		
			5 vehicles		

Highest Risk Index

The Task Hazard Assessment is to be completed at the worksite by the individual(s) who is intended to conduct the task immediately prior to initiating the associated task. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document. Originator to also sign Worker acknowledgement section.

Risk Matrix on Reverse

	Print Name	Signature
Originator	Michelle Stegner	[signature]
Supervisor		

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

WORKER SIGN ON

NAME (Please Print) | TIME | SIGNATURE

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

NAME	TIME	SIGNATURE
Michelle Stegner	8:30am	[signature]
Paul Hamidi	8:23am	[signature]
Stu Holmes	8:30am	[signature]
Glen Mejia	8:30	[signature]
Lis Nelis	8:30	[signature]
Kris McCaig	8:30	[signature]
Denise Mills	8:30	[signature]
Jeff Waller	8:30	[signature]
Dena Johnson	8:30	[signature]
Monica Tonel	8:30A	Monica Tonel

Task Hazard Assessment Follow-Up/Review

Initials/Time	Initials/Time	Initials/Time
Jenny Rzetarz	[signature]	
Linda Howard	[signature]	

Instructions:
Identify basic steps of the task and associated hazards. Calculate the initial risk rating. Identify control measure to eliminate or reduce the hazard's risk and calculate the residual risk rating. If the risk rating (after controls are implemented) cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin.

Employees shall monitor the activities for compliance with this document. Workers should **STOP WORK** on a task if conditions change from the planned and agreed approach to the work.

This document should be updated to reflect new conditions or changes in task methods.

VISITOR SIGN ON

I have read and understand the content of this Task Hazard Assessment.

NAME	TIME	SIGNATURE
Whitney Fraser	8:30A	[signature]
Marc Stifelman	830	[signature]
Kelly O'Neal	8:30	[signature]
Pendleton Moses	8:30	[signature]

Emergency Meeting / Assembly Area
Field Vehicle

Emergency Contact #
917

Method of Communication
Cell or 2-way Radios

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 & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E 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

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: Fred Merrill
Phone Number: 206.719.1105
Meeting Leader: Jenny Pretare / Michelle Stegner

Date: 4/27/2018 **Project Name/Location:** Upper Columbia River Plant Tissue Study **Project Number:** 60570350

Today's Scope of Work: Sample Area 3 – driving to and sampling soil and plants

Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
Field Vehicle	Field Vehicle/Backpack	Field Vehicle	Field Vehicle

1. Required Topics

- [✓] Fitness for Duty requirements, all sign in / sign out
- [✓] Required training (incl. task specific) completed and current
- [✓] SH&E Plan onsite - understood, reviewed, signed by all (incl. scope, hazards, controls, procedures, requirements, etc.)
- [✓] Pre-Job Hazard Assessments (JHA/JSAs) available and understood
- [✓] Task Hazard Assessments (THAs) are to be completed for each task immediately prior to conducting
- [✓] STOP WORK Right & Responsibility- all task changes/changed conditions re-assess with THA
- [✓] Requirement to report to supervisor any injury, illness, damage, near miss, unsafe act / condition
- [✓] Emergency Response Plan – including muster point, first aid kit, fire extinguisher, clinic/hospital location
- [✓] Personal Protective Equipment (PPE) - Required items per hazard assessments in good condition / in use by all
- [N] 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
- [✓] Required checklists/records available, understood (describe):
- [✓] Lessons Learned / SH&E improvements (describe):

2. Discuss if Applicable to Today's Work

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

Reviewed	N/A	Topic
✓		Biological/ Chemical / Electrical Hazards
✓		Ergonomics - Lifting, Body Position
	✓	Lock Out/ Tag Out
		Short Service Employees - visual identifier and mentor/ oversight assignment
	✓	Simultaneous/ Neighbouring Operations
✓		Slip/ Trip/ Fall Hazards
✓		Specialized PPE Needs
	✓	Traffic Control
✓		Waste Management/ Decontamination
✓		Weather Hazards / Heat Stress / Cold Stress
	✓	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: tick checks throughout day and evening

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

Site Supervisor Name Jenny Pretare / Michelle Stegner **Signature** [signature] **Date** 4/27/2018 **Time** (at end of day / shift) 6:30pm

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).
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* 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
See daily THA for Staff Signatures		In & Fit 9am – 6pm	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		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

AECOM

Americas

Task Hazard Assessment

S3AM-209-FM6

Date: 4/27/2018	**Project Name / Location:** Upper Columbia River Plant Tissue Study, Northport, WA
Permit / Job Number:	**Project Number:** 60570352
Description of Task: Plant Tissue Sampling	

Do you have a pre-job hazard assessment (JHA) specific to this task in your hands?

⊙ **Yes** – review the steps, hazards, and precautions. Attach and reference JHA in the form below. Add any additional steps, hazards, and precautions to this form otherwise unidentified on JHA.

○ **No** – list all steps, hazards, and precautions associated with the task in the form below.

Basic Task Steps (explain in order how the task will be carried out)	Hazards (identify all hazards & potential hazards of each step)	Risk (before)	Control Measures / Precautions (describe how that hazard will be controlled)	Risk (after)	Revised? (yes – record time)
driving to/from sampling areas	vehicle check	5	walk around, check tires, fluids	1	
walking and sampling soil and plants	insects, bees, flys, other bugs	5	use bug spray avoid hives	1	
			Highest Risk Index		

The Task Hazard Assessment is to be completed at the worksite by the individual(s) who is intended to conduct the task immediately prior to initiating the associated task. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document. Originator to also sign Worker acknowledgement section.

	Print Name	Signature
Originator	Michelle Stegner	[signature]
Supervisor		

Risk Matrix on Reverse

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

WORKER SIGN ON

NAME (Please Print)	TIME	SIGNATURE
Michelle Stegner	8 am	[signature]
[illegible]	8 am	[signature]
Jeff Walker	8 am	[signature]
Paul Hamidi	8 am	[signature]
Whitney Fraser	8 am	[signature]
Marc Stifelman	8	[signature]
Monica Tonel	8 am	[signature]
[illegible] Holmes	8 am	[signature]
Glen Mejia	8 am	[signature]

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

Task Hazard Assessment Follow-Up/Review

Initials/Time	Initials/Time	Initials/Time

Instructions:
Identify basic steps of the task and associated hazards. Calculate the initial risk rating. Identify control measure to eliminate or reduce the hazard's risk and calculate the residual risk rating. If the risk rating (after controls are implemented) cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin.

Employees shall monitor the activities for compliance with this document. Workers should **STOP WORK** on a task if conditions change from the planned and agreed approach to the work.

This document should be updated to reflect new conditions or changes in task methods.

VISITOR SIGN ON

I have read and understand the content of this Task Hazard Assessment.

Name	Time	Signature
Kelly O'Neil	8 am	[signature]
Denise Mills	8:07	[signature]
Lis Nelis	8:07	[signature]
Pendleton Model	8:07	Pendleton Model

Emergency Meeting / Assembly Area

Field Vehicle / Northport Boat Launch

Emergency Contact #

911

Method of Communication

Cell or 2-way Radios

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
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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 & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E 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

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: Fred Merrill
Phone Number: 206.719.1105

Meeting Leader: Jenny Pretare / Michelle Stegner

Date: 4/28/2018 | **Project Name/Location:** Upper Columbia River Plant Tissue Study | **Project Number:** 60570350

Today's Scope of Work: driving to and plant and soil sampling in Sample Area (SA) 1

Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
Field Vehicle	Field Vehicle/Backpack	Field Vehicle	Field Vehicle

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, hazards, controls, procedures, requirements, etc.)
- [x] Pre-Job Hazard Assessments (JHA/JSAs) available and understood
- [x] Task Hazard Assessments (THAs) are to be 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
- [x] 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 ☑ as reviewed or mark ■ as not applicable

Reviewed	Not applicable	Topic
☑	☐	Biological/ Chemical / Electrical Hazards
☑	☐	Ergonomics - Lifting, Body Position
☐	☑	Lock Out/ Tag Out
		Short Service Employees - visual identifier and mentor/ oversight assignment
☐	☑	Simultaneous/ Neighbouring Operations
☑	☐	Slip/ Trip/ Fall Hazards
☐	☑	Specialized PPE Needs
☐	☑	Traffic Control
☐	☑	Waste Management/ Decontamination
☑	☐	Weather Hazards / Heat Stress / Cold Stress
☐	☑	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: Keep vehicle keys w/ vehicle

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

Site Supervisor Name Jenny Pretare / Michelle Stegner **Signature** [signature]

Date 4/28/2018
Time (at end of day / shift) 6:30pm

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
See THA for Staff		In & Fit 8am – 6pm	Out & Fit
and Signatures		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		In & Fit	Out & Fit
		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

AECOM

Americas

Task Hazard Assessment

S3AM-209-FM6

Date: 4/20/2018	Project Name / Location: Upper Columbia River Plant Tissue Study, Northport, WA	
Permit / Job Number:		Project Number: 60570352
Description of Task: Plant Tissue Sampling		

Do you have a pre-job hazard assessment (JHA) specific to this task in your hands?

⊙ **Yes** – review the steps, hazards, and precautions. Attach and reference JHA in the form below. Add any additional steps, hazards, and precautions to this form otherwise unidentified on JHA.

○ **No** – list all steps, hazards, and precautions associated with the task in the form below.

Basic Task Steps (explain in order how the task will be carried out)	Hazards (identify all hazards & potential hazards of each step)	Risk (before)	Control Measures / Precautions (describe how that hazard will be controlled)	Risk (after)	Revised? (yes – record time)
driving to from sample area	Mud, slippery unpaved surfaces	5	slow on unpaved roads	1	
sampling - walking in forest	observed ticks yesterday	5	do tick check (multiple times a day)	1	
	Walking on uneven surfaces	5	let people know if you are behind them when working on slopes to be aware of rockfall	1	
			take care w/ slippery/muddy areas	✓	
			Highest Risk Index		

The Task Hazard Assessment is to be completed at the worksite by the individual(s) who is intended to conduct the task immediately prior to initiating the associated task. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document. Originator to also sign Worker acknowledgement section.

Risk Matrix on Reverse

	Print Name	Signature
Originator	Michelle Stegner	[signature]
Supervisor		

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

WORKER SIGN ON

NAME (Please Print)	TIME	SIGNATURE	Initials/Time	Initials/Time	Initials/Time
I participated in the development and understand the content of this Task Hazard Assessment.					
Michelle Stegner	8:00 am	[signature]			
Glen Mejia	8:00	[signature]			
Jeff Walker	8:00	[signature]			
Linda Howard	8:00	[signature]			
Stu Holmes	8:00	[signature]			
Paul Hamidi	8:00	[signature]			
Marc Stifelman	8:00	[signature]			
Monica Tonel	8:00	Monica Tonel			
Jennifer Preston	8:00	[signature]			

Task Hazard Assessment Follow-Up/Review

Instructions:
Identify basic steps of the task and associated hazards. Calculate the initial risk rating. Identify control measure to eliminate or reduce the hazard's risk and calculate the residual risk rating. If the risk rating (after controls are implemented) cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin.

Employees shall monitor the activities for compliance with this document. Workers should **STOP WORK** on a task if conditions change from the planned and agreed approach to the work.

This document should be updated to reflect new conditions or changes in task methods.

VISITOR SIGN ON

I have read and understand the content of this Task Hazard Assessment.

NAME	TIME	SIGNATURE	Initials/Time	Initials/Time	Initials/Time
Kelly O'Neal	8:00	[signature]			
Lis Nelis	8:00	[signature]			

Emergency Meeting / Assembly Area

Field Vehicle

Emergency Contact #

911

Method of Communication

Cell or 2-way Radios

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 & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E 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

AECOM

Americas

Task Hazard Assessment

S3AM-209-FM6

Date: 4/30/2018	Project Name / Location: Upper Columbia River Plant Tissue Study, Northport, WA
Permit / Job Number:	Project Number: 60570352
Description of Task: Plant Tissue Sampling	

Do you have a pre-job hazard assessment (JHA) specific to this task in your hands?

⊙ **Yes** – review the steps, hazards, and precautions. Attach and reference JHA in the form below. Add any additional steps, hazards, and precautions to this form otherwise unidentified on JHA.

O **No** – list all steps, hazards, and precautions associated with the task in the form below.

Basic Task Steps (explain in order how the task will be carried out)	Hazards (identify all hazards & potential hazards of each step)	Risk (before)	Control Measures / Precautions (describe how that hazard will be controlled)	Risk (after)	Revised? (yes – record time)
driving	deer, turkey trucks	6	passenger aware of surroundings	3	
sampling	tripping hazards wood, branches logs,	6	watch each step, don't walk while talking on phone, using gps	3	
			Highest Risk Index		

The Task Hazard Assessment is to be completed at the worksite by the individual(s) who is intended to conduct the task immediately prior to initiating the associated task. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document. Originator to also sign Worker acknowledgement section.

Risk Matrix on Reverse

Originator: Michelle Stegner (Print Name) [signature] (Signature)

Supervisor: ______ (Print Name) ______ (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

WORKER SIGN ON

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

NAME (Please Print)	TIME	SIGNATURE	Initials/Time	Initials/Time	Initials/Time
Michelle Stegner	8:00am				
Linda Howard	8a	Linda M Howard			
Stu Holmes	8 am				
Paul Hamidi	8a	Paul Hamidi			
Glen Mejia	8 a				
Jeff Walker	8am				
Monica Tonel	8 am	Monica Tonel			
Marc Stitelman	8				
Jenny Pretare	8:00				

Task Hazard Assessment Follow-Up/Review

Instructions:
Identify basic steps of the task and associated hazards. Calculate the initial risk rating. Identify control measure to eliminate or reduce the hazard's risk and calculate the residual risk rating. If the risk rating (after controls are implemented) cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin.

Employees shall monitor the activities for compliance with this document. Workers should **STOP WORK** on a task if conditions change from the planned and agreed approach to the work.

This document should be updated to reflect new conditions or changes in task methods.

VISITOR SIGN ON

I have read and understand the content of this Task Hazard Assessment.

Name	Time	Signature	Initials/Time	Initials/Time	Initials/Time
Kelly O'Neal	8am				
Jonathan Espinoza	8 am				
Julie Weichold	8am				
Luis Nelis	8am				

Emergency Meeting / Assembly Area

Field Vehicle

Emergency Contact #

911

Method of Communication

Cell or 2-way Radios

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 & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E 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

AECOM

Americas

Task Hazard Assessment

S3AM-209-FM6

Date: AjB 5/1/2018	**Project Name / Location:** Upper Columbia River Plant Tissue Study, Northport, WA
Permit / Job Number:	**Project Number:** 60570352
Description of Task: Plant Tissue Sampling	

Do you have a pre-job hazard assessment (JHA) specific to this task in your hands?

- ⊙ **Yes** – review the steps, hazards, and precautions. Attach and reference JHA in the form below. Add any additional steps, hazards, and precautions to this form otherwise unidentified on JHA.
- ○ **No** – list all steps, hazards, and precautions associated with the task in the form below.

Basic Task Steps (explain in order how the task will be carried out)	Hazards (identify all hazards & potential hazards of each step)	Risk (before)	Control Measures / Precautions (describe how that hazard will be controlled)	Risk (after)	Revised? (yes – record time)
driving	Sun, rain, weather	6	Clean windshield of dust, dirt	3	
walking	bees,	6	let others know if you see the	3	
Sampling	use caution while digging w/ sharp tools	6	wear gloves, glasses	3	
			Highest Risk Index		

The Task Hazard Assessment is to be completed at the worksite by the individual(s) who is intended to conduct the task immediately prior to initiating the associated task. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document. Originator to also sign Worker acknowledgement section.

Risk Matrix on Reverse

	Print Name	Signature
Originator	Michelle Stegner	[signature]
Supervisor		

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

WORKER SIGN ON

NAME (Please Print)	TIME	SIGNATURE
Michelle Stegner	8 am	[signature]
Jeff Walker	8 am	[signature]
Stu Holmes	8 am	[signature]
Paul Hamidi	8 am	[signature]
Glen Mejia	8 am	[signature]
Jenny Pretare	8 a	[signature]
Linda Howard	8 a	[signature]

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

Task Hazard Assessment Follow-Up/Review

Initials/Time	Initials/Time	Initials/Time

Instructions:
Identify basic steps of the task and associated hazards. Calculate the initial risk rating. Identify control measure to eliminate or reduce the hazard's risk and calculate the residual risk rating. If the risk rating (after controls are implemented) cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin.

Employees shall monitor the activities for compliance with this document. Workers should **STOP WORK** on a task if conditions change from the planned and agreed approach to the work.

This document should be updated to reflect new conditions or changes in task methods.

VISITOR SIGN ON

I have read and understand the content of this Task Hazard Assessment.

Name	Time	Signature
Denise Mills	8am	[signature]
Monica Tonel	8 am	Monica Tonel
Jonathan Espinoza	800	[signature]
Julie Weichfeld	8 am	[signature]

Emergency Meeting / Assembly Area

Field Vehicle

Emergency Contact #

911

Method of Communication

Cell or 2-way Radios

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 & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E 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

AECOM

Americas

Task Hazard Assessment

S3AM-209-FM6

Date: 5/2/2018	**Project Name / Location:** Upper Columbia River Plant Tissue Study, Northport, WA	
Permit / Job Number:		**Project Number:** 60570352
Description of Task: Plant Tissue Sampling		

Do you have a pre-job hazard assessment (JHA) specific to this task in your hands?

⊙ **Yes** – review the steps, hazards, and precautions. Attach and reference JHA in the form below. Add any additional steps, hazards, and precautions to this form otherwise unidentified on JHA.

○ **No** – list all steps, hazards, and precautions associated with the task in the form below.

Basic Task Steps (explain in order how the task will be carried out)	Hazards (identify all hazards & potential hazards of each step)	Risk (before)	Control Measures / Precautions (describe how that hazard will be controlled)	Risk (after)	Revised? (yes – record time)
driving (to [illegible] campground)	critters, pedestrians saw motor with stroller on highway	6	passenger lookout	3	
sample collection	slip-trip falls MIST sampler pinch point	6	move slowly careful watch for pinch points	3	
			Highest Risk Index		

The Task Hazard Assessment is to be completed at the worksite by the individual(s) who is intended to conduct the task immediately prior to initiating the associated task. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document. Originator to also sign Worker acknowledgement section.

Risk Matrix on Reverse

Originator Michelle Stogner (Print Name) [signature] (Signature)

Supervisor (Print Name) (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

WORKER SIGN ON

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

NAME (Please Print)	TIME	SIGNATURE
Michelle Stegner	8:5am	[signature]
Paul Hamidi	8:15am	[signature]
Stu Holmes	8:15am	[signature]
Marc Stifelman	8:15	[signature]
Monica Tonel	8:15 AM	[signature]
Julie Weichold	8:15 AM	[signature]
Jonathan Espinoza	8:15Am	[signature]
Jenny Pretak	8:15	[signature]
Linda Howard	8:18	[signature]

Task Hazard Assessment Follow-Up/Review

Initials/Time	Initials/Time	Initials/Time

Instructions:
Identify basic steps of the task and associated hazards. Calculate the initial risk rating. Identify control measure to eliminate or reduce the hazard's risk and calculate the residual risk rating. If the risk rating (after controls are implemented) cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin.

Employees shall monitor the activities for compliance with this document. Workers should **STOP WORK** on a task if conditions change from the planned and agreed approach to the work.

This document should be updated to reflect new conditions or changes in task methods.

VISITOR SIGN ON

I have read and understand the content of this Task Hazard Assessment.

NAME	TIME	SIGNATURE
Jeff Walker	8:15	[signature]
Glen Mejia	8:15	[signature]

Emergency Meeting / Assembly Area

Field Vehicle

Emergency Contact #

911

Method of Communication

Cell or 2-way Radios

Risk Rating Matrix

Probability	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 & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E 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

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.

Signed the Safety acknowledgement form.

Emergency Meeting / Assembly Area

Northport Boat Launch

Emergency Contact #

911

Emergency Radio Channel

+ Mt. Carmel hospital, Colville

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 Teck American	Permit No.
Location Northport, WA	Job No. 60570352
Description of Task Plant + Soil Sampling	Date June 18, 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	Other vehicles		No cell phone use,		
	Distractions				
Walking through SA	Slips, trips, falls				
	Wildlife - bear, rattlesnakes				
Plant sampling	Insects - ticks, bees				
	Sun + heat				
Soil Sampling	overhead work - muscle strain				
	- falling pine cones				
			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) [signature] (Signature)

Supervisor Jenny Pretare (Print Name) [signature] (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

Upper Columbia River Plant Tissue Study June 18, 2018

13. Personnel Acknowledgement

By signing below, the undersigned acknowledges that he/she has reviewed the AECOM Health and Safety Plan for the ~~[site-name]~~ site. 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
Jenny Pretare	[signature]	AECOM	6-18-18
Kris McCaig	Kris McCaig	Teck American	6-18-18
Linda Howard	Linda M Howard	AECOM	6-18-18
DAVE LEWIS	Dave Lewis	AECOM	6-18-18
Jeff Walker	[signature]	AECOM	6-18-18
Joe Wichman	[signature]	CCL	6-18-18
MONICA TONEL	Monica Tonel	USEPA R10	6/18/2018
Kelly O'Neal	[signature]	Jacobs	6/18/2018
Whitney Freser	Whitney Fraser	Codestone Env. Consulting	6/18/2018
Ellie Traudt	Elizabeth Traudt	Jacobs	6/18/18
Marc Stifelman	[signature]	epa	6/18/18
Michelle Stegner	[signature]	AECOM	6/18/18
GWEN MEJIA	[signature]	AECOM	6/18/18
Lis Nelis	[signature]	Ramboll	6/18/18

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
Michelle Stogner	[signature]
Lis Nelis	[signature]
Dave Lewis	[signature]
Monica Tonel	[signature]
Kelly O'Neal	[signature]
Ellie Traudt	[signature]
Marc Stitelman	[signature]
Whitney Fraser	[signature]
Kris McCarty	[signature]
Jeff Walker	[signature]
Linda Howard	[signature]
GLEN MEJIA	[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) Jennifer Pretare

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

TASK HAZARD ASSESSMENT

AECOM

Customer	Teck UCR Plant Tissue Study	**Permit No.**	
Location	Northport, WA	**Job No.**	
Description of Task		**Date**	6/19/2018

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 from yesterday (6-18-18)					
driving	slow traffic, passing		avoid passing when necessary better to go slower with rest of traffic than take risk.		
Walking	Steep slippery slopes		make sure to secure footing and identify safest path forward before walking		
Sampling	hand tools, clippers		Keep fingers out of way		
			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 Jennifer Pretare Print Name [signature] 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
Michelle Steiner	[signature]
Monica Tonel	[signature] 6/20/18
Marc Stifelman	[signature]
Ellie Traudt	[signature]
Glen Mejia	[signature]
Dave Lewis	[signature]
Kelly O'Neal	[signature]
Linda Howard	[signature]
Jeff Walker	[signature]
Whitney Fraser	Whitney Fraser
Jenny Pretare	[signature]

Emergency Meeting / Assembly Area

Northport Boat Launch Park

Emergency Contact #

911

Emergency Radio Channel

Mt. Carmel Hospital, Colville

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) Jenny Pretare

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 UCR Plant Tissue Study	**Permit No.**
Location Northport, WA	**Job No.**
Description of Task Sampling plants / collection	**Date** 6/20/2018

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**
Same as yesterday					
driving	sun in eyes	4	Clean windshield wear sunglasses	1	
walking	dense brush, poison ivy	4	walk carefully avoid & point out hazards to others	1	
				1	
Sampling	Carrying sampling items	4	Keep one hand free walk slowly & carefully		
			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 Michelle Stegner — Print Name — Signature: [signature]

Supervisor Jenny Pretare — Print Name — Signature: [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.	
Jeff Walker	[signature]
DAVE LEWIS	[signature]
Linda Howard	[signature]
Michelle Stegner	[signature]
GLEN MEJAK	[signature]
Cristy Kessel	Cristy Kessel
Josie Smith	[signature]

Emergency Meeting / Assembly Area

Warehouse - Kettle Falls

Emergency Contact #

911 Mt Carmel Hospital

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) Jenny Pretare

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 Kettle Falls WA	**Job No.**
Description of Task Demobilization	**Date** June 21, 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	~~JMP~~ Accidents		JMP – Melanie Young as		
	Distraction		contact		
Sampl~~age~~e packing	Dry Ice		Gloves, Not sealed package		
	Heavy coolers		Fresh air in car		
			lift w/ a buddy		
Heavy bin packing	muscle strain		good ergonomics		
			use buddy ~~ste~~ system		
Paperwork					
Trip to Teck Storage					
			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 Jenny Pretare Print Name [signature] Signature

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

Americas

Task Hazard Assessment

S3AM-209-FM6

Date: 8/20/2018	Project Name / Location: Upper Columbia River Plant Tissue Study, Northport, WA	
Permit / Job Number:		Project Number: 60570352
Description of Task: Plant Tissue Sampling		

Do you have a pre-job hazard assessment (JHA) specific to this task in your hands?

- ⦿ **Yes** – review the steps, hazards, and precautions. Attach and reference JHA in the form below. Add any additional steps, hazards, and precautions to this form otherwise unidentified on JHA.
- ○ **No** – list all steps, hazards, and precautions associated with the task in the form below.

Basic Task Steps (explain in order how the task will be carried out)	Hazards (identify all hazards & potential hazards of each step)	Risk (before)	Control Measures / Precautions (describe how that hazard will be controlled)	Risk (after)	Revised? (yes – record time)
driving	ergonomics	5	adjust seat, etc		1
			review video online		
	smoke, animals	5	drive w/ lights on		
			spotter for wildlife		1
sampling / monitoring	new fieldstaff		buddy system		
	wildfires		extinguisher outside vehicle		
			water down veg		
			contact DNR re: status		
			keep vehicles fueled up		
			identify 2 exits in field		1
	smoke	5	wear N95 masks @ 150		
			stop work @ hazardous 300+		
			communication plan = daily text messages		
			CB radio to monitor 911/emergency		
			Highest Risk Index		

The Task Hazard Assessment is to be completed at the worksite by the individual(s) who is intended to conduct the task immediately prior to initiating the associated task. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document. Originator to also sign Worker acknowledgement section.

Risk Matrix on Reverse

	Print Name	Signature
Originator	Michelle Stegner	[signature]
Supervisor		

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

Cell #

WORKER SIGN ON

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

Task Hazard Assessment Follow-Up/Review

NAME (Please Print)	TIME	SIGNATURE	Initials/Time	Initials/Time	Initials/Time
Michelle Stegner	12:30	[signature]	207-671-2345		
Ellie Traudt	12:45	[signature]	720-839-7869		
Marc Stifelman	12:45	[signature]	206	250	8675
Whitney Fraser	12:45	[signature]	206	853	1203
Lis Nelis	12:45	[signature]	773-	209	9818
Anders Utter	12:45	[signature]	206	265	3017
Josie Smith	12:49	[signature]	206	755 473	9578
Stu Holmes	12:30	[signature]	614	395	5411
Paul Hamidi	12:30	[signature]	760	445	7592
~~Jeff~~ W					

Instructions:
Identify basic steps of the task and associated hazards. Calculate the initial risk rating. Identify control measure to eliminate or reduce the hazard's risk and calculate the residual risk rating. If the risk rating (after controls are implemented) cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin.

Employees shall monitor the activities for compliance with this document. Workers should **STOP WORK** on a task if conditions change from the planned and agreed approach to the work.

This document should be updated to reflect new conditions or changes in task methods.

VISITOR SIGN ON

I have read and understand the content of this Task Hazard Assessment.

Name	Time	Signature			
Jeff Walker	12:30	[signature]	206	498	8647
Linda Howard	12:30	[signature]	425	457	3268

Emergency Meeting / Assembly Area

Field Vehicle

Emergency Contact #

911

Method of Communication

Cell or 2-way Radios

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 & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E 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

AECOM

Americas

Task Hazard Assessment

S3AM-209-FM6

Date: 8/21/2018	Project Name / Location: Upper Columbia River Plant Tissue Study, Northport, WA
Permit / Job Number:	Project Number: 60570352
Description of Task: Plant Tissue Sampling	

Do you have a pre-job hazard assessment (JHA) specific to this task in your hands?

- ⦿ **Yes** – review the steps, hazards, and precautions. Attach and reference JHA in the form below. Add any additional steps, hazards, and precautions to this form otherwise unidentified on JHA.
- ○ **No** – list all steps, hazards, and precautions associated with the task in the form below.

Basic Task Steps (explain in order how the task will be carried out)	Hazards (identify all hazards & potential hazards of each step)	Risk (before)	Control Measures / Precautions (describe how that hazard will be controlled)	Risk (after)	Revised? (yes – record time)
driving	fire vehicles on road	5	yeild, pull over completely		1
	fire	5	fire extinguisher, water down		1
			don't idle on vegetation		
Sampling / observation SA03, SA02	Smoke	5	no hurry		1
			wear masks @ 150		
			use buddy system		
			stay hydrated		
			Highest Risk Index		

The Task Hazard Assessment is to be completed at the worksite by the individual(s) who is intended to conduct the task immediately prior to initiating the associated task. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document. Originator to also sign Worker acknowledgement section.

Risk Matrix on Reverse

Originator Michelle Stegner (Print Name) [signature] (Signature)

Supervisor ______ (Print Name) ______ (Signature)

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

WORKER SIGN ON

NAME (Please Print)	TIME	SIGNATURE
I participated in the development and understand the content of this Task Hazard Assessment.		
Michelle Stegner	7:00 am	[signature]
Cristy Kessel	7:00 AM	[signature]
Lis Nelis	7:00 AM	[signature]
Josie Smith	7:00AM	[signature]
Ellie Traudt	7:00am	[signature]
Wade Branham	7:00Am	[signature]
Paul Hamidi	7:00	[signature]
Marc Stifelman	7:00	[signature]
Whitney Fraser	7:00	[signature]

~~VISITOR SIGN ON~~

I have read and understand the content of this Task Hazard Assessment.

NAME	TIME	SIGNATURE
Jeff Walker	7:00	[signature]
Anders Utter	7:00	[signature]
Linda Howard	7:00	[signature]
Stu Holmes	0700	[signature]

Task Hazard Assessment Follow-Up/Review

Initials/Time	Initials/Time	Initials/Time

Instructions:
Identify basic steps of the task and associated hazards. Calculate the initial risk rating. Identify control measure to eliminate or reduce the hazard's risk and calculate the residual risk rating. If the risk rating (after controls are implemented) cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin.

Employees shall monitor the activities for compliance with this document. Workers should **STOP WORK** on a task if conditions change from the planned and agreed approach to the work.

This document should be updated to reflect new conditions or changes in task methods.

Emergency Meeting / Assembly Area

Field Vehicle

Emergency Contact #

911

Method of Communication

Cell or 2-way Radios

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 & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E 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

AECOM

Americas

Task Hazard Assessment

S3AM-209-FM6

Date: 8/22/2018	**Project Name / Location:** Upper Columbia River Plant Tissue Study, Northport, WA
Permit / Job Number:	**Project Number:** 60570352
Description of Task: Plant Tissue Sampling	

Do you have a pre-job hazard assessment (JHA) specific to this task in your hands?

⦿ **Yes** – review the steps, hazards, and precautions. Attach and reference JHA in the form below. Add any additional steps, hazards, and precautions to this form otherwise unidentified on JHA.

○ **No** – list all steps, hazards, and precautions associated with the task in the form below.

Basic Task Steps (explain in order how the task will be carried out)	**Hazards** (identify all hazards & potential hazards of each step)	**Risk** (before)	**Control Measures / Precautions** (describe how that hazard will be controlled)	**Risk** (after)	**Revised?** (yes – record time)
driving	dust, visibility	5	lights on, watch vehicle ahead	1	
Sampling / monitoring	dehydration	5	Keep water with you	1	
	dust		Keep vents closed		
	long work hours fatigue		account for travel time		
			Highest Risk Index		

The Task Hazard Assessment is to be completed at the worksite by the individual(s) who is intended to conduct the task immediately prior to initiating the associated task. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document. Originator to also sign Worker acknowledgement section.

Risk Matrix on Reverse

Originator Michelle Stegner — Print Name; [signature] — Signature

Supervisor ________ Print Name; ________ Signature

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

WORKER SIGN ON

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

NAME (Please Print)	TIME	SIGNATURE	Initials/Time	Initials/Time	Initials/Time
Michelle Stegner	7:00 am	[signature]			
Linda Howard	7:00	[signature]			
Josie Smith	0700	[signature]			
St Holmes	0700	[signature]			
Jeff Walker	0700	[signature]			
Cristy Kessel	7:00	[signature]			
Whitney Fraser	7:00	[signature]			
WADE BRUNHAM	7:00	[signature]			
Paul Hamidi	7:00	[signature]			

Task Hazard Assessment Follow-Up/Review

Instructions:
Identify basic steps of the task and associated hazards. Calculate the initial risk rating. Identify control measure to eliminate or reduce the hazard's risk and calculate the residual risk rating. If the risk rating (after controls are implemented) cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin.

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This document should be updated to reflect new conditions or changes in task methods.

VISITOR SIGN ON

I have read and understand the content of this Task Hazard Assessment.

NAME	TIME	SIGNATURE	Initials/Time	Initials/Time	Initials/Time
Marc Stifelman	7:00	[signature]			
Elise Teaudt	7:00	[signature]			
Anders Utter	700	[signature]			
Lis Nelis	700	[signature]			

Emergency Meeting / Assembly Area

Field Vehicle

Emergency Contact #

911

Method of Communication

Cell or 2-way Radios

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
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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 & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E 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

AECOM

Americas

Task Hazard Assessment

S3AM-209-FM6

Date: 8/23/2018	**Project Name / Location:** Upper Columbia River Plant Tissue Study, Northport, WA
Permit / Job Number:	**Project Number:** 60570352
Description of Task: Plant Tissue Sampling	

Do you have a pre-job hazard assessment (JHA) specific to this task in your hands?

- ⦿ **Yes** – review the steps, hazards, and precautions. Attach and reference JHA in the form below. Add any additional steps, hazards, and precautions to this form otherwise unidentified on JHA.
- ○ **No** – list all steps, hazards, and precautions associated with the task in the form below.

Basic Task Steps (explain in order how the task will be carried out)	**Hazards** (identify all hazards & potential hazards of each step)	**Risk** (before)	**Control Measures / Precautions** (describe how that hazard will be controlled)	**Risk** (after)	**Revised?** (yes – record time)
driving	slow vehicles	5	take time/no rush, contact team re: time		
sampling/	air quality	5	- masks @ 150, currently at 117 - Check		
monitoring	heat	5	throughout day		
	dehydration	5	- if we need a break from mask due to heat, we can sit in truck w/ air cond.		
			- stay hydrated! Since extra ...		
			-		
				Highest Risk Index	

The Task Hazard Assessment is to be completed at the worksite by the individual(s) who is intended to conduct the task immediately prior to initiating the associated task. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document. Originator to also sign Worker acknowledgement section.

Risk Matrix on Reverse

	Print Name	Signature
Originator	Michelle Stegner	[signature]
Supervisor		

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

WORKER SIGN ON

NAME (Please Print) I participated in the development and understand the content of this Task Hazard Assessment.	TIME	SIGNATURE	Initials/Time	Initials/Time	Initials/Time
Michelle Stegner	7:15	[signature]			
Stu Holmes	0715	[signature]			
Paul Hamidi	0715	[signature]			
Anders Vter	7:15	[signature]			
Jeff Walker	7:15	[signature]			
Whitney Fraser	7:15	[signature]			
Linda Howard	7:15	[signature]			

Task Hazard Assessment Follow-Up/Review

Instructions:
Identify basic steps of the task and associated hazards. Calculate the initial risk rating. Identify control measure to eliminate or reduce the hazard's risk and calculate the residual risk rating. If the risk rating (after controls are implemented) cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin.

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This document should be updated to reflect new conditions or changes in task methods.

VISITOR SIGN ON

I have read and understand the content of this Task Hazard Assessment.

Marc Stifelman	7:15	[signature]			
Ellie Traudt	7:15	[signature]			

Emergency Meeting / Assembly Area

Field Vehicle

Emergency Contact #

911

Method of Communication

Cell or 2-way Radios

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
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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 & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E 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

AECOM

Americas

Task Hazard Assessment

S3AM-209-FM6

Date: 8/24/2018	**Project Name / Location:** Upper Columbia River Plant Tissue Study, Northport, WA
Permit / Job Number:	**Project Number:** 60570352
Description of Task: Plant Tissue Sampling	

Do you have a pre-job hazard assessment (JHA) specific to this task in your hands?

⦿ **Yes** – review the steps, hazards, and precautions. Attach and reference JHA in the form below. Add any additional steps, hazards, and precautions to this form otherwise unidentified on JHA.

○ **No** – list all steps, hazards, and precautions associated with the task in the form below.

Basic Task Steps (explain in order how the task will be carried out)	Hazards (identify all hazards & potential hazards of each step)	Risk (before)	Control Measures / Precautions (describe how that hazard will be controlled)	Risk (after)	Revised? (yes – record time)
driving	new staff new environ.	5	keep lights on, give space in between vehicles, recycle air feature, watch for other team members		1
Sampling/monitoring	branches, slips/trips visibility w/ masks	5	give space around while walking if branches break or swing back Secure footing, observe step space before moving forward		1
	air quality	5	@ 151 today - wear masks take breaks as needed we will monitor throughout day		1
			Highest Risk Index		

The Task Hazard Assessment is to be completed at the worksite by the individual(s) who is intended to conduct the task immediately prior to initiating the associated task. Number and attach additional pages if necessary.

Worker/Visitor acknowledgement and review of this content on back of this document. Originator to also sign Worker acknowledgement section.

Originator Michelle Stogner (Print Name) — [signature] (Signature)

Supervisor ______ (Print Name) — ______ (Signature)

Risk Matrix on Reverse

THIS FORM IS TO BE KEPT ON JOB SITE.

AECOM

WORKER SIGN ON

NAME (Please Print)	TIME	SIGNATURE
Michelle Stegner	8:15am	[signature]
Anders Utter	8:15	[signature]
Stu Holmes	0815	[signature]
Josie Smith	0815	[signature]
Linda M. Howard	0815	[signature]
Jeff Walker	815	[signature]
Paul Hamidi	8:15	[signature]

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

Task Hazard Assessment Follow-Up/Review

Initials/Time	Initials/Time	Initials/Time

Instructions:
Identify basic steps of the task and associated hazards. Calculate the initial risk rating. Identify control measure to eliminate or reduce the hazard's risk and calculate the residual risk rating. If the risk rating (after controls are implemented) cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin.

Employees shall monitor the activities for compliance with this document. Workers should **STOP WORK** on a task if conditions change from the planned and agreed approach to the work.

This document should be updated to reflect new conditions or changes in task methods.

VISITOR SIGN ON

I have read and understand the content of this Task Hazard Assessment.

Name	Time	Signature
Ellie Trauder	0815	[signature]
Anna Iverson	0815	[signature]
Marc Stifelman	815	[signature]

Emergency Meeting / Assembly Area

Field Vehicle

Emergency Contact #

911

Method of Communication

Cell or 2-way Radios

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 & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E 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

AECOM

TASK HAZARD ASSESSMENT

Customer Teck UCR Plant Sampling Project	**Permit No.**
Location Northport, WA	**Job No.**
Description of Task	**Date** 8/25/2018

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	emergency vehicl on road	5	pull over, alert crew in other vehicle, seek alt route if needed	1	MP
Sampling / monitoring	air quality = @ 170 today	5	monitor air quality wear masks @ 150+ stop work @ 300+	1	MS
			monitor staff for dizziness, nauseau, etc	1	MS
			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 Michelle Stegner (Print Name) — [signature] (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
Michelle Stegner	Mich Stegner
Anders Utter	[signature]
Jeff Walker	[signature]
Linda Howard	Linda Howard
Paul Hamidi	Paul Hamidi
Stu Holmes	Stu Holmes

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
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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

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME
Anna Iverson	[signature]	7:15

Emergency Meeting / Assembly Area

Northport Boat Launch

Emergency Contact #

911

Emergency Radio Channel

Cell or 2-way radio Channel 11

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

Supervisor (print name) Michelle Stegner

Signature [signature]

Task Hazard Assessment Follow-Up/Review.

First Break Initial

Lunch Break Initial

Second Break Initial

AECOM

TASK HAZARD ASSESSMENT

Customer Teck UCR Plant Sampling	**Permit No.**
Location Northport, WA	**Job No.**
Description of Task	**Date** 8/27/2018

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**
driving	weather - raining - skids	5	lower speeds around corners	1	
			Side step rail may be slippery		
Sampling/	wet conditions,	5			
monitoring	lower temps		bring raingear, watch	1	
	slips trips falls		for shivering, warm up		
			in truck, ~~[illegible]~~ stop		
			work for lightening		
			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 Michelle Stegner (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
Michelle Stegner	[signature]
Anders Utter	[signature]
Linda Howard	[signature]
Josie Smith	[signature]
Stu Holmes	[signature]
Paul Hamilton	[signature]
Jeff Walker	[signature]

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME
Anna Iverson	[signature]	715

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
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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
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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 #

911

Emergency Radio Channel

Cell or 2-way radio Channel 11

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

Supervisor (print name) Michelle Stegner

Signature [signature]

Task Hazard Assessment Follow-Up/Review.

First Break — Initial

Lunch Break — Initial

Second Break — Initial

AECOM

TASK HAZARD ASSESSMENT

Customer	Teck UCR Plant Tissue Sampling	**Permit No.**	
Location	Northport, WA	**Job No.**	
Description of Task		**Date**	8/28/2018

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	dust days complacency	8	use spotter, stay alert	1	
Sampling / monitoring	boat - water hazards	5	extensive safety overview by the Columbia Navigation Eric Weatherman	1	
			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 Michelle Stegner (Print Name) [signature] (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
Michelle Stegner	[signature]
Linda Howard	[signature]
Anders Utter	[signature]
Paul Hamidi	[signature]
Stu Holmes	[signature]
Jeff Walker	[signature]
Josie Smith	[signature]

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

Emergency Meeting / Assembly Area

Northport Boat Launch

Emergency Contact #

911

Emergency Radio Channel

11

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
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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
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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

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

Supervisor (print name) Michelle Stegner

Signature [signature]

VISITOR SIGN ON

NAME (Please Print)	SIGNATURE	TIME
Anna Iverson	[signature]	8:30

Task Hazard Assessment Follow-Up/Review.

First Break — Initial

Lunch Break — Initial

Second Break — Initial

Appendix B

Confederated Tribes of the Colville Reservation

Research Permit

Permit No. **2018-07** Approved by Resolution N/A

This permit authorizes the following study, survey, or research project:

UCR Plant Tissue Study: Kris McCaig, Researcher

This permit is valid from: **April 1, 2018 to September 1, 2018**

In accordance with Colville Tribal Law, as well as the written research agreement entered into by the holder of this permit, the permittee recognizes and acknowledges that:

1) This Research Permit is conditional and may be canceled at any time if the study, survey, or research project is deviating or has deviated from the study design approved in the granting of the Research Permit, or from any provisions of the required underlying agreement upon which issuance of the permit is based.
2) All information and data gathered are the property of the Tribes, and the permittee may only publish or disseminate the data gathered, or any conclusions based on that data, under the conditions of the agreement underlying this permit, and with permission of the Tribes. Any unauthorized use of the data by the permittee or any third-party is strictly prohibited. All information and data gathered in the course of this project will be returned to the CCT Archives and Records Center at the conclusion of the project.
3) During the course of the study, survey, or research project the Office of the Tribal Chairman and the Archives and Records Center for the Tribes shall receive at least one copy of all interim and/or progress reports, and the final report resulting from the study, survey, or research project.
4) As a condition of receiving this Research Permit the research must comply with:
    a. the National Research Service Award Act, Pub. L. No. 93-348, 88 Stat. 342, as amended and as implemented by 45 C.F.R. pt. 46;
    b. all laws, ordinances, and codes of the Tribes regarding the protection of human subjects involved in the research, development and related activities; and
    c. any other laws, regulations, policies, or procedures applying to the study, survey, or research project.
5) Failing to comply with the conditions of this permit, the underlying agreement, or any other applicable law will subject the permittee to any and all civil or criminal penalties available to the Tribes pursuant to the Tribes' Law and Order Code and any other applicable law, including but not limited to exclusion from Tribal property and criminal trespass.
6) As a condition of accepting this permit, the permittee consents to the jurisdiction of Colville Tribal Courts for all civil and criminal matters arising out of this research, and accepts the Colville Tribal Court as the appropriate venue for any such actions.
7) The permittee shall carry a copy of this permit at all times while conducting research on the Colville Reservation.

[signature] 4/12/18

Mike Marchand, Chairman, Colville Tribes or Karen Condon, Designee — Date

Kris McCaig c/o Teck American Incorporated 4/12/2018

Kris McCaig, Permittee — Date

Research Agreement

Research Permit #: 2018-07 **Approved by Resolution: N/A**

SECTION 1. TITLE

This agreement shall be known as the **UCR Plant Tissue Study** Research Agreement ("Research Agreement" or "Agreement").

SECTION 2. PURPOSE

This is an agreement between the Confederated Tribes of the Colville Reservation ("Colville Tribes" or "Tribes") and **Kris McCaig** ("Researcher"), whose names and addresses are listed in Appendix A to this agreement.

The purpose of the Research Agreement is to set forth the manner in which the Researcher may perform the **UCR Plant Tissue Study** research project ("Project"). This Research Agreement governs the collection, sharing, and dissemination of data and conclusions created in the course of the Project. As used throughout this agreement "data" includes any physical or digital writing or recording of any form. Specifically, the purpose of this agreement is to:

1. Clarify the rights and responsibilities of the Tribes and the Researcher;
2. Ensure that the Researcher: (a) recognizes the rights of the Tribes and the people being studied, including the rights not to be studied, to privacy, to anonymity, to confidentiality, and to fully informed consent; (b) recognizes the primary right of informants and suppliers of data and materials to the knowledge and use of that information and material, including the right of the Tribes to have information and data returned at the conclusion of the Project; (c) respects traditional copyrights; (d) respects local customs and values, and carries out research in a manner consistent with this Agreement; (e) contributes to the interests of the community in whatever ways possible so as to maximize the return to the community for its cooperation in the research work; and (f) recognizes their continuing obligations to the local community after the completion of the fieldwork, including providing support and continuing concern for the well-being of the local community.
3. Protect the Colville Tribal community from unauthorized data sharing from this research and ensure that the Researcher recognizes Colville Tribes' ownership and control of data;
4. Reduce potential adverse effects of the Project data products on the Colville Tribal community;
5. Establish and provide Project data sharing expectations and responsibilities; and
6. Ensure that the Researcher can proceed with an effective, culturally-sensitive approach to researching on the Colville Reservation.

SECTION 3. PROJECT OVERVIEW

3.1. **Project Details Incorporated.** The attached research project proposal (Appendix A) contains a description of: 1) the purpose of the Project, 2) all final and intermediate products produced by or in the course of the Project, 3) the benefit to the Tribes of allowing the Project, 4) and a timeframe for all research and products. The proposal is hereby incorporated into this agreement, and the Researcher affirms that the information contained therein is true and complete.

3.2 **Updates.** The Tribes shall receive updates on the Project

- ☐ Monthly
- ☐ Quarterly
- ☐ Annually
- ☑ Other: In the field and w/ Data Summary Reports
- ☐ N/A

3.3. **Bond.**

- ☑ No Bond is required
- ☐ A Bond in the amount of $_____ must be posted

3.4. **Profit Sharing.**

- ☑ Not applicable.
- ☐ Profit Sharing as described in Appendix C.

3.5. **Fee.** The Researcher agrees to pay a fee in the amount of $ 0 prior to issuance of the research permit.

3.6. **Tribal Representative.** The Tribal Chairman shall select a designee to represent the Tribes in the Project. The designee shall ensure that the Tribes' rights are protected and enforced, and the Tribes fulfills its responsibilities with regards to the contract. The Tribal Representative is identified in Appendix A.

SECTION 4. RIGHTS AND RESPONSIBILITIES OF THE TRIBES.

4.1. **Final Authority.** The Colville Tribes, as a sovereign, retains ultimate discretionary and final authority and responsibility for the research conducted under this agreement.

4.2. **Data Ownership.** The Colville Tribes is the owner of the data, data products, and information generated by this study from and about the Colville Tribes and its members. The Colville Tribes will receive all data and information collected and assembled in the course of the Project at the conclusion of the Project in a form and manner agreed to by the parties. In the event that the parties do not make an agreement about this return of information and data, the return shall occur as soon as reasonably possible. The Tribes shall have the right to inspect and review the information and data at any time upon a request sent to the Researcher.

4.3. **Limitation on Dissemination.** Except as described in Appendix A, no information or data gathered in the course of this Project, nor any conclusions based on that information or data, shall be released or disseminated in any form without the express prior consent of the Tribes.

4.4. **Right to Comment.** The Tribes has the right to have official comments made by or on behalf of the Tribes included in any final or intermediate published or released products. In addition, any final published work shall include a reference to the Colville Tribal Resolution approving this agreement and the corresponding permit.

4.5. **Right to Anonymity.** The Tribes reserves the right to have its identity protected by using a generalized term of its choice (e.g. "A tribe in Washington State") to refer to the Tribes in whatever final or intermediate products are produced as a result of this Project.

4.6. **Research Assistance.** The Tribes will assist the Researcher in identifying and contacting members of the community who may be of assistance in the research, as well as identifying other sources of useful information or data. The Tribes will also assist in developing culturally competent plans of research and data collection.

SECTION 5. RIGHTS AND RESPONSIBILITIES OF RESEARCHER.

5.1. **Confidentiality.** The Researcher will keep all data and information collected in the course of the Project strictly confidential, except for the purposes described in Appendix A. All agents and employees of the Researcher will similarly maintain strict confidentiality. Without the full informed consent of the individual, no individually identifying information will be released in any form. This includes information which could reasonably be traced to an individual or a small number of individuals. In the event of a breach, the Researcher will act immediately to correct the breach and notify the Tribes of the breach.

5.2. **Data Protection.** All information and data collected by the Researcher in the course of the Project will be stored securely. In the event of a security breach, the Researcher will act immediately to correct the breach and notify the Tribes of the breach.

5.3. **Data Return.** All information and data collected by the Researcher during the course of the Project will be returned to the Tribes at the conclusion of the Project. The data will be returned to the Archives and Records Center for the Tribes.

5.4. **Informed Consent.** Before collecting information or data in any form from any individual, the Researcher will fully disclose the purpose of the Project, the nature of any documents or other products that will be produced as a result of the Project, how the information or data collected from the individual will be used, and whether it will be traceable or attributable to that individual.

5.5. **Cultural Sensitivity.** The Researcher will work with the Tribes to develop culturally sensitive methods of data collection.

5.6. **Native Preference.** Any contractors, subcontractors, or employees retained by the Researcher for the purposes of the Project must follow the Tribes' Native Preference policies described in Title 10 of the Colville Tribal Code and any other Colville Tribal regulations. The Researcher will contact the Tribes' Tribal Employment Rights Office before hiring contractors, subcontractors, or employees.

5.7. **Compliance With Other Laws.** The Researcher must comply with all other laws and regulations, including:

- the National Research Service Award Act, Pub. L. No. 93-348, 88 Stat. 342, as amended and as implemented by 45 C.F.R. pt. 46;
- all laws, ordinances, and codes of the Tribes regarding the protection of human subjects involved in the research, development and related activities; and
- any other laws, regulations, policies, or procedures applying to the study, survey, or research project.

5.8. **Right to Collect Data.** The Researcher has the right to enter the Colville Reservation to collect information and data in accordance with this Agreement.

5.9. **Right to Intellectual Property.** The Researcher has the right to the intellectual property rights in the final product, subject to this Agreement, and may choose when and how to publish the products produced as a result of the Project, in accordance with this Agreement. Researcher also has the right to profits as a result of such publication, subject to any profit-sharing provision of this Agreement.

5.10. **Permit Carrying**. The Researcher shall carry a copy of the research permit that corresponds to this agreement at all times while conducting research on the Colville Reservation.

5.11. Right to Assistance. The Researcher has the right to call upon the Tribes for reasonable assistance in identifying and contacting tribal members who may be able to provide information or data, creating culturally sensitive methods of data collection, and locating other resources that may provide useful information or data.

5.12. Fiduciary Relationship. The Researcher shall act as a fiduciary for the Tribes at all times during the course of the Project.

5.13. Contracting and Subcontracting. If any contractors or subcontractors are hired in the course of the Project by the Researcher or any of the Researcher's employees or contractors, the Researcher will ensure that those contracts contain the same provisions as this Agreement with respect to Sections 4 through 10.

SECTION 6. LIMITED TO THE PURPOSES OF THE PROJECT.

6.1. Data Uses Restricted. The information and data collected for the purposes of this Project, as well as any conclusions drawn from the information or data, shall not be used by the Researcher or any other person for any purposes except those specified in this agreement.

6.2. Third-Parties. Any third-party that wishes to access the data or information gathered in the course of the Project must apply for a permit with the Tribes, and will not have access to any information or data until a research agreement has been executed and a permit has been issued.

6.3. Secondary Use. Any use of the information or data other than that specifically listed in Appendix A is not permitted. Any such use will require the explicit permission of the tribe, and an additional agreement specifying the nature of the new use.

6.4. Modification. Any other modifications to this Agreement must be approved by both the Tribes and the Researcher, and memorialized in a written agreement.

SECTION 7. BREACH.

7.1. What Constitutes Breach. A Breach is the failure of the Researcher to comply with any of the terms of this agreement, including a breach of confidentiality or the security of information or data.

7.2. Remedies. In the event of a Breach, the Tribes will be entitled to pursue any or all remedies under Tribal or other law, including:

a. Termination of this Agreement;

b. Forfeiture of any research bond provided by the Researcher;

c. Civil or criminal liability under Tribal or other applicable law; and

d. Exclusion from the Reservation and criminal trespass.

SECTION 8. CONSENT TO TRIBAL JURISDICTION.

8.1. Consent to Tribal Jurisdiction. The Researcher consents to civil and criminal jurisdiction in the Colville Tribal Courts for any matters arising out of or in connection with this Agreement in any way.

8.2. Venue. The Colville Tribal Courts shall be the exclusive forum for any disputes arising out of this agreement or in the course of the Project.

8.3. Governing Law. In all matters or disputes arising out of or in connection with this Agreement in any way, the governing law shall be the law of the Colville Tribes.

SECTION 9. TERMINATION.

9.1. Conclusion of the Project. At the conclusion of the Project, on the date specified in Appendix A, the Researcher will discontinue collecting information and data, and will return all collected information and data to the Tribes.

9.2. Early Termination. The Project may be terminated at any time and without notice in the event of a Breach, or with 30 days' notice by either party to the other. In the event of early termination, all information and data will be returned to the Tribes by the effective termination date. No products may be produced after the termination date without the express permission of the Tribes.

9.3. Survivability. Regardless of how the Project terminates, this Agreement will continue in force, including the limitations on use of the data, consent to tribal jurisdiction, and profit-sharing.

SECTION 10. SEVERABILITY

The provisions of the Agreement are severable. In the event that any portion of this Agreement is found to be unenforceable or invalid, that shall not affect the enforceability or validity of any other portion.

Signed,

[signature]

Michael E. Marchand, Chairman or Karen Condon, Designee 4/12/18 **Date**

Kris McCaig of Teck American Incorporated

Kris McCaig, Researcher 4/12/2018 **Date**

APPENDIX B

Tribal Chairman

Michael E. Marchand
Confederated Tribes of the Colville Reservation
Colville Business Council
PO Box 150
Nespelem, WA 99155-0150
(509)634-2200
Michael.marchand.cbc@colvilletribes.com

Tribal Representative

Confederated Tribes of the Colville Reservation
Archives & Records Center
PO Box 150
Nespelem, WA 99155-0150
(509)634-2148

Researcher

Kris McCaig
Teck American Incorporated
501 N. Riverpoint Blvd, Suite 300
Spokane, WA 99202
(509)6234501
kris.mccaig@teck.com

BUREAU OF INDIAN AFFAIRS
Colville Indian Agency
Post Office Box 111
Nespelem, Washington 99155-0111
Toll Free 1-888-881-7684

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
-Right of Way-

April 20, 2018

Colville Tribes Environmental Trust/Teck American Incorporated
PO BOX 150
Nespelem, WA 99155
ATTN: Cindy Marchand

SUBJECT: Upper Columbia River Plant Tissue Study

CINDY MARCHAND:

The Colville Indian Agency, Bureau of Indian Affairs (BIA) Real Estate Services has enclosed the signed Limited Use Agreement for going over and across tribal trust lands in the Upper Columbia River area for the Plant Tissue Study.

If you have any questions regarding this approved Limited Use Agreement please refer them to Christine Buckminster, Property Title Specialist Right-of-Way, at the above address, or call (509) 634-2341.

Sincerely,

Justin Boyd
Property Acquisition Manager

ENCLOSURE
CC: Superintendent
FILE-101-RIE0391818
CHRONO

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
Colville Indian Agency
Post Office Box 111
Nespelem, Washington 99155-0111
Toll Free 1-888-881-7684

LIMITED USE AGREEMENT

Colville Tribes Environmental Trust, PO Box 150, Nespelem, WA 99155, residing in the Nespelem District Area, working in conjunction with **Teck American Incorporated** requests duration 8 months and 12 days: beginning, April 19, 2018 to December 31st 2018. This Limited Use Agreement will allow Colville Tribes Environmental Trust to obtain sampling of plant tissue and co-located soil/sediment samples collected from three high lead sampling areas and up to 13 additional lower lead sampling areas. The scope of this study to collect data to characterize the levels of lead, arsenic, and other metals in wild plant tissues within the study area that are consumed, mouthed or otherwise utilized from the Site by CCT members. Data collected during this study will be used to help inform the Upper Columbia River (UCR) Remedial Investigation and Feasibility Study (RI/FS) being conducted under the oversight of U.S. Environmental Protection Agency (EPA). See attached description of proposed plant tissue for more details. There will be no harm to the Tribal Tract and Bureau of Indian Affairs Roads will work within designated areas 151-H 165, 151-H176, 151-H179, 151-H195, 151-H196, 151-H197, 2373500, 2375900, 2376600 por as described:

PARCEL NO 151-H165: LOT 7 (SOUTHEAST-QUARTER SOUTHEAST-QUARTER) OF SECTION 8 AND LOT 7 (EAST-HALF NORTHEAST-QUARTER) OF SECTION 17, TOWNSHIP 39 NORTH, RANGE 39 EAST, WILLAMETTE MERIANDIAN, STEVENS COUNTY, WASHINGTON, CONTAINING 79.80 ACRES, MORE OR LESS
PARCEL NO 151-H176 LOT 11 (SOUTHEAST-QUARTER SOUTHEAST-QUARTER) OF SECTION 7; LOT 9 (SOUTHWEST-QUARTER SOUTHWEST-QUARTER) OF SECTION 8; LOT 9 (NORTHWEST-QUARTER NORTHWEST-QUARTER) OF SECTION 17 AND LOT 13 (NORTHEST-QUARTER NORTHEAST-QUARTER) OF SECTION 18, TOWNSHIP 39 NORTH, RANGE 39 EAST, WILLAMETTE MERIDIAN, STEVENS COUNTY, WASHINGTON, CONTAINING 80.00 ACRES, MORE OR LESS.
PARCEL NO 151-H179; LOT 9 (NORTHEAST-QUARTER SOUTHEAST-QUARTER) OF SECTION 7 AND LOT 5 (NORTHWEST-QUARTER SOUTHWEST-QUARTER) OF SECTION 8, TOWNSHIP 39 NORTH, RANGE 39 EAST, WILLAMETTE MERIDIAN, STEVENS COUNTY, WASHINGTON, CONTAINING 80.00 ACRES, MORE OR LESS.
PARCEL NO 151-H195: LOT 11 (N SE) OF SECTION 21 AND LOT 7 (SW SW SW) OF SECTION 22, TOWNSHIP 40 NORTH, RANGE 40 EAST, WILLAMETTE MERIDIAN, STEVENS COUNTY, WASHINGTON, CONTAINING 73.40 ACRES, MORE OR LESS.
PARCEL NO 151-H196 LOT 5 (W SE) OF SECTION 11 AND LOT 8 (NW NE) OF SECTION 14, TOWNSHIP 40 NORTH, RANGE 40 EAST, WILLAMETTE MERIDIAN, STEVENS COUNTY, WASHINGTON, CONTAINING 80.00 ACRES, MORE OR LESS.
PARCEL NO 151-H197 LOT 10 (S SW) OF SECTION 25 AND LOT 6 (NW) OF SECTION 36, TOWNSHIP 40 NORTH, RANGE 39 EAST, WILLAMETTE MERIDAN, STEVENS COUNTY, WASHINGTON, CONTAINING 80.00 ACRES, MORE OR LESS.

FEE PROPERTY
PARCEL NO: 2373500 PROPERTY ID: 43516 PARCEL# /GEO ID: 2373500 TAX AREA: 054-211 TAX AREA 211 LAND USE CODE: 91 OPEN SPACE: N DFL: N HISTORIC PROPERTY: N REMODEL PROPERTY: N MULTI_FAMILY DEVELOPMENT: N TOWNSHIP: 39 RANGE: 39 SECTION: 08
PARCEL NO: 2375900 Per US Bureau of Indian Affairs email communication received March 3, 2018: This parcel is fee land that land belongs to non-members. LEGAL DESCRIPTION: GOV. LOT 7, SECTION 16 & 17, TOWNSHIP 39 NORTH, RANGE 39 EAST. TOTAL ACRES: 157.9300
PARCEL NO: 237660 Per US Bureau of Indian Affairs email communication received March 3, 2018: This parcel is fee land that land belongs to non-members. LEGAL DESCRIPTION: GOV. LOT 7, SECTION 16 & 17, TOWNSHIP 39 NORTH, RANGE 39 EAST. TOTAL ACRES: 76.6800

RENT: *-Waived-* **Administrative Fee:** *-Waived-*

Superintendent granting the within Limited Use Agreement is hereby approved pursuant to 209 DM 8, 230 MD 1, 3 IAM 4, 4A. **Colville Tribal Resolution 2009-190/1981-721.**

Date Approved: 4-20-18 Approving Official: [signature]

Myra Clark, Acting BIA Superintendent
Colville Indian Agency

2009-190

RESOLUTION

WHEREAS, it is the recommendation of the Natural Resources Committee approves the attached temporary access agreement allowing Teck American Incorporated to perform RI/FS work along the Columbia River pursuant to a settlement agreement between Teck Cominco and the U.S. Environmental Protection Agency, and authorizing the Chairman or her designee to sign. No tribal funds required.

THEREFORE, BE IT RESOLVED, that we, the Colville Business Council, meeting in a **Special SESSION** this **19th, day of March, 2009** acting for and in behalf of the Colville Confederated Tribes, Nespelem Washington, do hereby approve the above recommendation of the Natural Resources Committee.

The foregoing was duly enacted by the Colville Business Council by a vote of **11 FOR 2 AGAINST 0 ABSTAINED,** under authority contained in Article V, Section 1(a) of the Constitution of the Confederated Tribes of the Colville Reservation, ratified by the Colville Indians February 26, 1938, and approved by the Commissioner of Indian Affairs on April 19, 1938.

ATTEST:

Jeanne A. Jerred, Chairperson
Colville Business Council

cc: M. Finley, Committee Chair
Ciciley M. Yellowwolf, CBC Recording Secretary
BIA Superintendent
Reservation Attorney
Dept. or Program: Melissa Campobasso, ORA

THE CONFEDERATED TRIBES OF THE COLVILLE RESERVATION 1872

1981-721

RESOLUTION

WHEREAS, a proposed Ordinance to regulate studies, surveys, research and service delivery projects on the Colville Reservation in order to preserve and protect the rights of the Colville Indian Tribes and their tribal members, their privacy and integrity, and their interests in the results and products of the such studies, surveys, research and service delivery projects, has been submitted to HEW Committee for review, and

WHEREAS, it is the recommendation, of the HEW Committee of the Business Council, to approve the attached Ordinance to regulate research on the Colville Indian Reservation.

THEREFORE, BE IT RESOLVED, that we, the Colville Business Council, meeting in SPECIAL Session, this 21st day of SEPTEMBER, 1981, at the Colville Indian Agency, Nespelem, Washington, acting for and in behalf of the Colville Confederated Tribes, do hereby approve the recommendation of the HEW Committee of the Business Council.

The foregoing was duly enacted by the Colville Busines Council by a vote of 10 FOR 0 AGAINST, under authority contained in Article V, Section 1(a) of the Constitution of the Confederated Tribes of the Colville Reservation, ratified by the Colville Indians on February 26, 1938, and approved by the Commissioner of Indian Affairs on April 19, 1938.

ATTEST:

Al Aubertin, Chairman
Colville Business Council

CC: TKnapton
DWilder
AFredin
GDavis
PChamberlain
EFry
MRomo
GMcClung

Colville Tribe, Nespelem, WA

CATEGORICAL EXCLUSION EXCEPTION REVIEW (CEER) CHECKLIST

Project: Colville Indian Agency- Trust to Trust Process for FY 2018	Date: 11/8/17
Exclusion Category and Number: (BIA-516 DM 10.5; DOI-CFR 46-210) Letter and Text of category (BIA - 516 DM 10.5 ; DOI - 43 CFR46-210) 516 DM 10, 10.5 Categorical Exclusion: 1. Land Conveyance and Other Transfers. Approvals or grants of conveyances and other transfers of interest in land where no change in land use is planned.	

Evaluation of Extraordinary Circumstances (43 CFR 46.215):

1. This action would have significant impacts on public health or safety.	NO X	YES
2. This action would have significant impacts on: natural resources & unique geographical features as historic or cultural resources; park, recreation or refuge lands; wilderness areas; wild & scenic rivers; national natural landmarks; sole or prime drinking water aquifers; prime farmlands wetlands; floodplains; national monuments; migratory birds; and other ecologically significant areas.	NO X	YES
3. This action would have highly controversial environmental effects or unresolved conflicts concerning alternate uses of available resources.	NO X	YES
4. This action would have highly uncertain environmental effects or involve unique or unknown environmental risk.	NO X	YES
5. This action will establish a precedent for future actions.	NO X	YES
6. This action is related to other actions with individually insignificant but cumulatively significant environmental effects.	NO X	YES
7. This action will have significant impacts on properties listed or eligible for listing in the National Register of Historic Places.	NO X	YES
8. This action will have significant impacts on a species listed or proposed to be listed as endangered or threatened, or Critical Habitat of these.	NO X	YES
9. This action violates federal, state, local, or tribal law or requirements imposed for protection of the environment.	NO X	YES
10. This action will have a disproportionately high and adverse effect on low income or minority populations.	NO X	YES
11. This action will limit access to, and ceremonial use of, Indian sacred sites on federal lands, by Indian religious practitioners, and/or adversely affect the physical integrity of such sites.	NO X	YES
12. This action will contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area, or may promote the introduction, growth, or expansion of the range of such species.	NO X	YES

A "yes" to any of the above exceptions will require that an environmental assessment be prepared.

Colville Tribe, Nespelem, WA

NEPA Action: CE __X__ EA ______

Anita McKinney, Assistant IRMP Coordinator
Name and Title of person preparing this checklist

Concur: ______________________ **Date:** 11-08-2017
Regional Archeologist

Concur: ______________________ **Date:** 11-8-17
Other Environmental Professional
(Fish or Wildlife Biologist)

Concur: ______________________ **Date:** 11-8-17
Regional/Agency/OFMC NEPA Reviewer

Approve: ______________________ **Date:** 11-8-17
Regional Director/Agency Superintendent/
OFMC Official

NOTES: The purpose of this categorical exclusion is to provide NEPA compliance for BIA Colville Indian Agency trust to trust conveyances for FY2018. It is inclusive of all trust to trust conveyances where there is a change in title only and no ground disturbance. This categorical exclusion is applicable to all tribes within the jurisdiction of the BIA Colville Indian Agency.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

April 4, 2018

VIA ELECTRONIC MAIL ONLY

Denise Mills
Program Manager, Upper Columbia River
Teck American Incorporated
501 North Riverpoint Boulevard, Suite 300
Spokane, Washington 99202

Re: Draft Final Quality Assurance Project Plan for the Plant Tissue Study – Upper Columbia River Site RI/FS

Dear Ms. Mills:

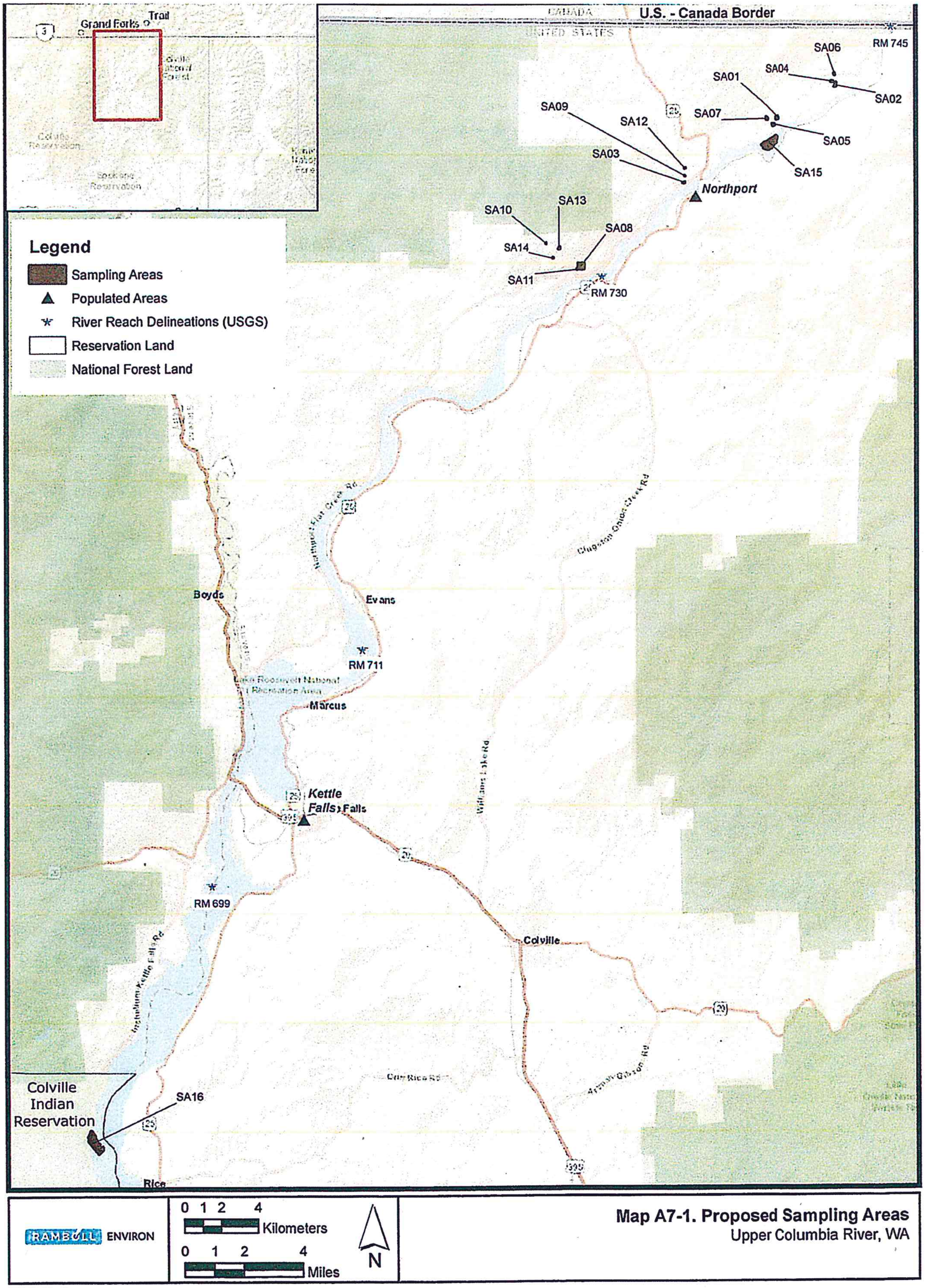
Based on our April 3, 2018 conference call with representatives of EPA, TAI and the Colville Confederated Tribes, please proceed with preparing the final quality assurance project plan (QAPP) for the plant tissue study to reflect the RLSO changes (submitted to EPA for review on March 22,2018) and to also include mercury analyses for kinnikinnick leaves, wild rose leaves and stems, wild mint, willows, and tules, and co-located soil or sediment where these plant samples are collected. As discussed on the April 3 call, please include in the QAPP a decision process for TAI's field team to follow during the pre-sampling survey of each sampling area (SA) to determine whether sufficient plant material is present at that SA with sufficient mass to sample for mercury analysis. EPA understands that where plant material is expected to be insufficient to support analysis of TAL metals (except calcium, magnesium, sodium, and potassium) and mercury, allocation of available material for analysis of TAL metals will be prioritized, and a decision to collect samples only for metals analyses would be documented in the field log book and form for sign-off by TAI, EPA, and CCT field team representatives. In addition, the updated analytical tables (submitted to EPA for review on April 3, 2018) can be incorporated into the final qapp with the following reflected: please switch the RL and MDL in Table A7-5 (the MDL should be smaller than the MRL). Also, please include a copy of ALS Environmental's method SOP for the mercury analysis.

Thank you and should you have any questions, please feel free to contact me at (206) 553-0323.

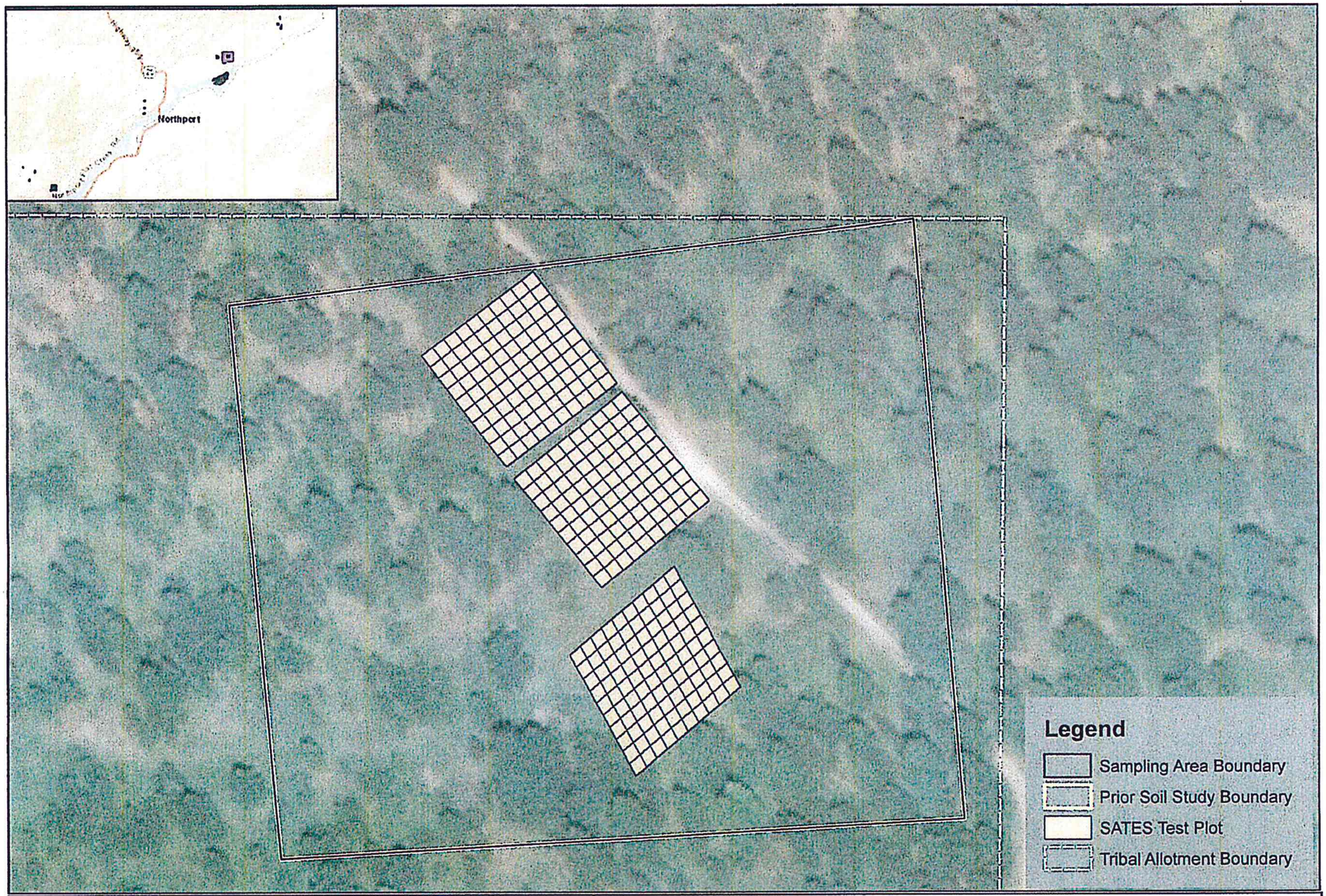
Sincerely,

Monica Tonel

Monica Tonel
Project Manager



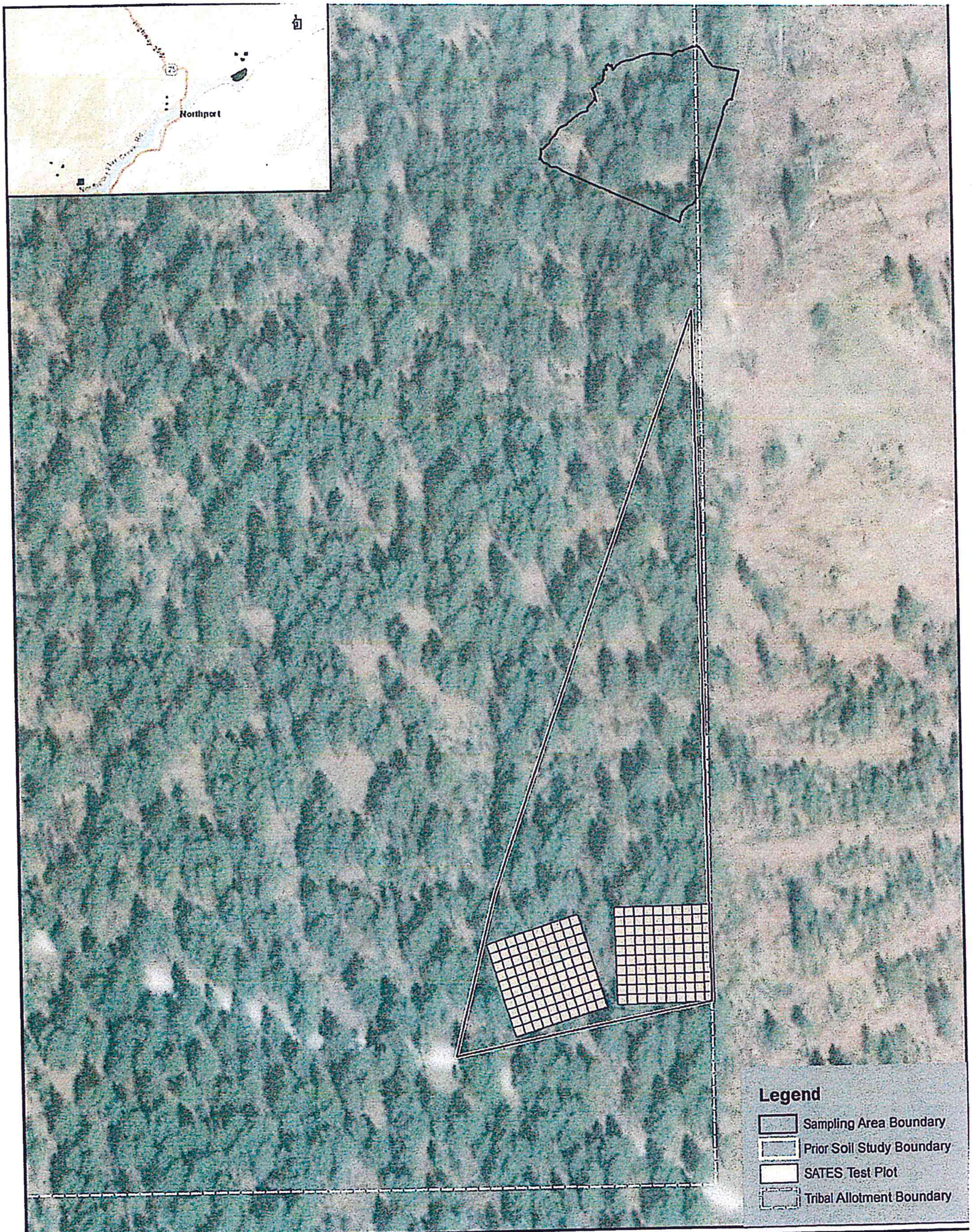
Map A7-1. Proposed Sampling Areas
Upper Columbia River, WA



RAMBOLL ENVIRON

0 10 20 40 Meters
0 50 100 200 Feet
N

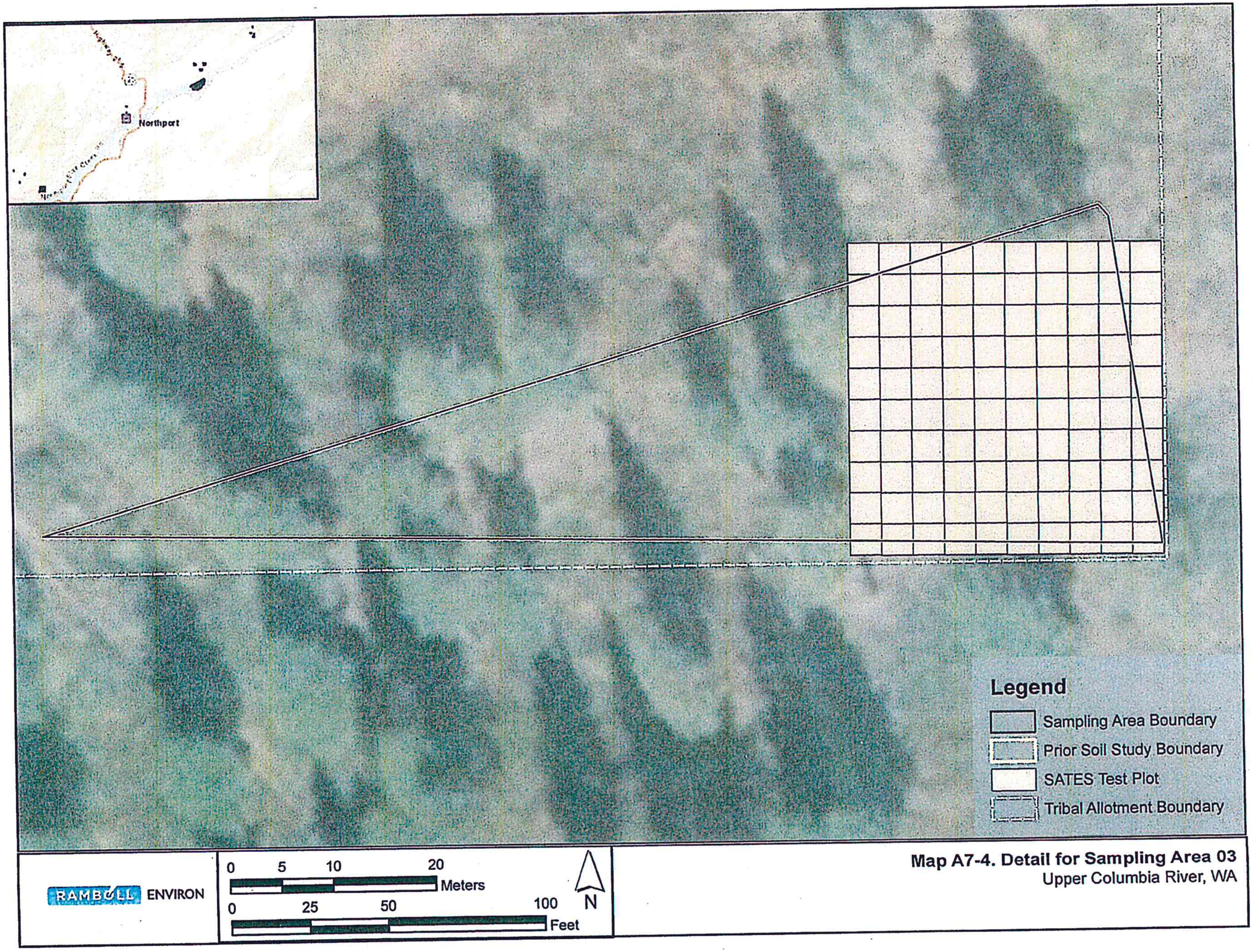
Map A7-2. Detail for Sampling Area 01
Upper Columbia River, WA



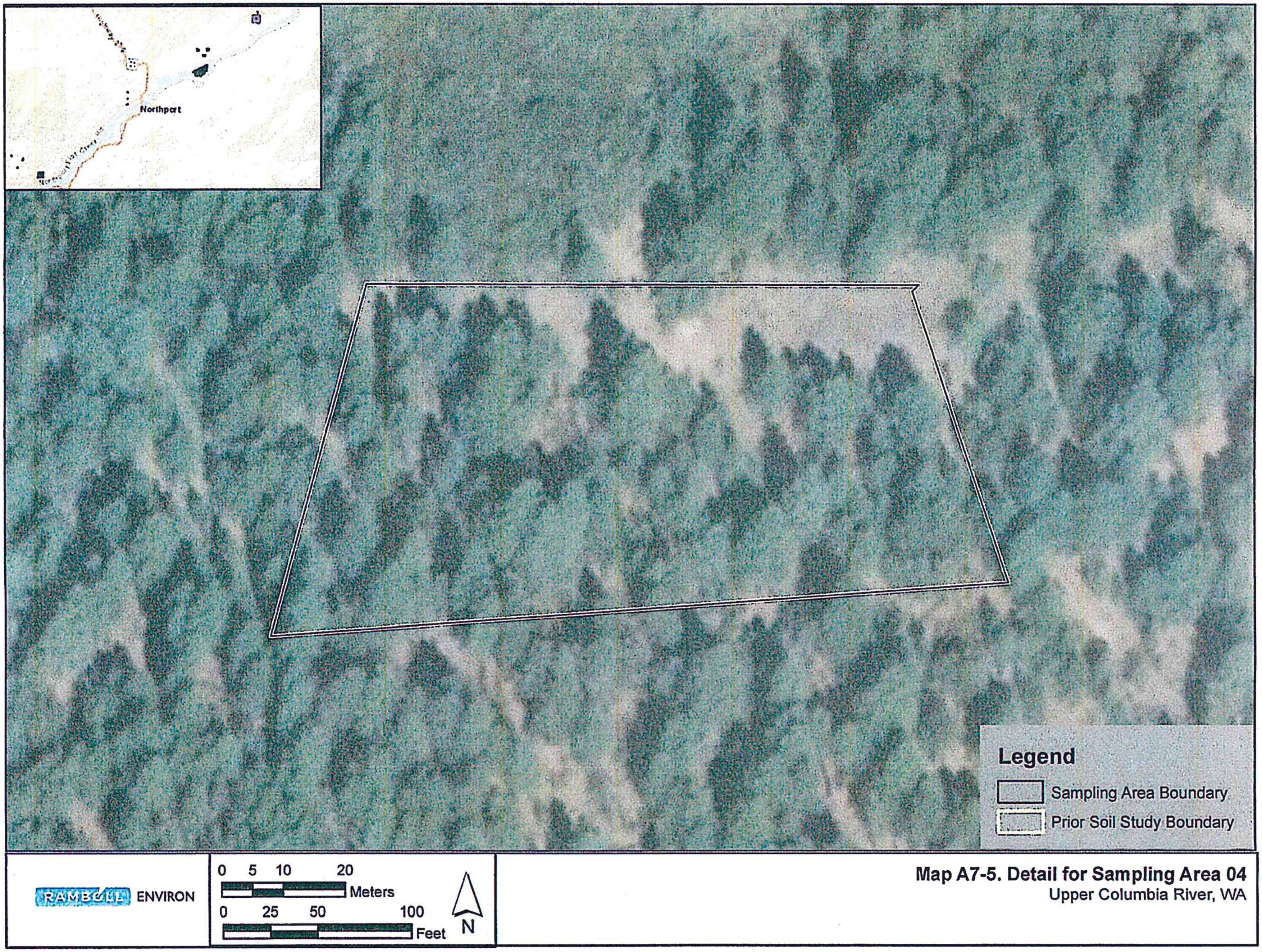
RAMBOLL ENVIRON

0 10 20 40 Meters
0 50 100 200 Feet
N

Map A7-3. Detail for Sampling Area 02
Upper Columbia River, WA



Map A7-4. Detail for Sampling Area 03
Upper Columbia River, WA



Map A7-5. Detail for Sampling Area 04
Upper Columbia River, WA

RAMBOLL ENVIRON

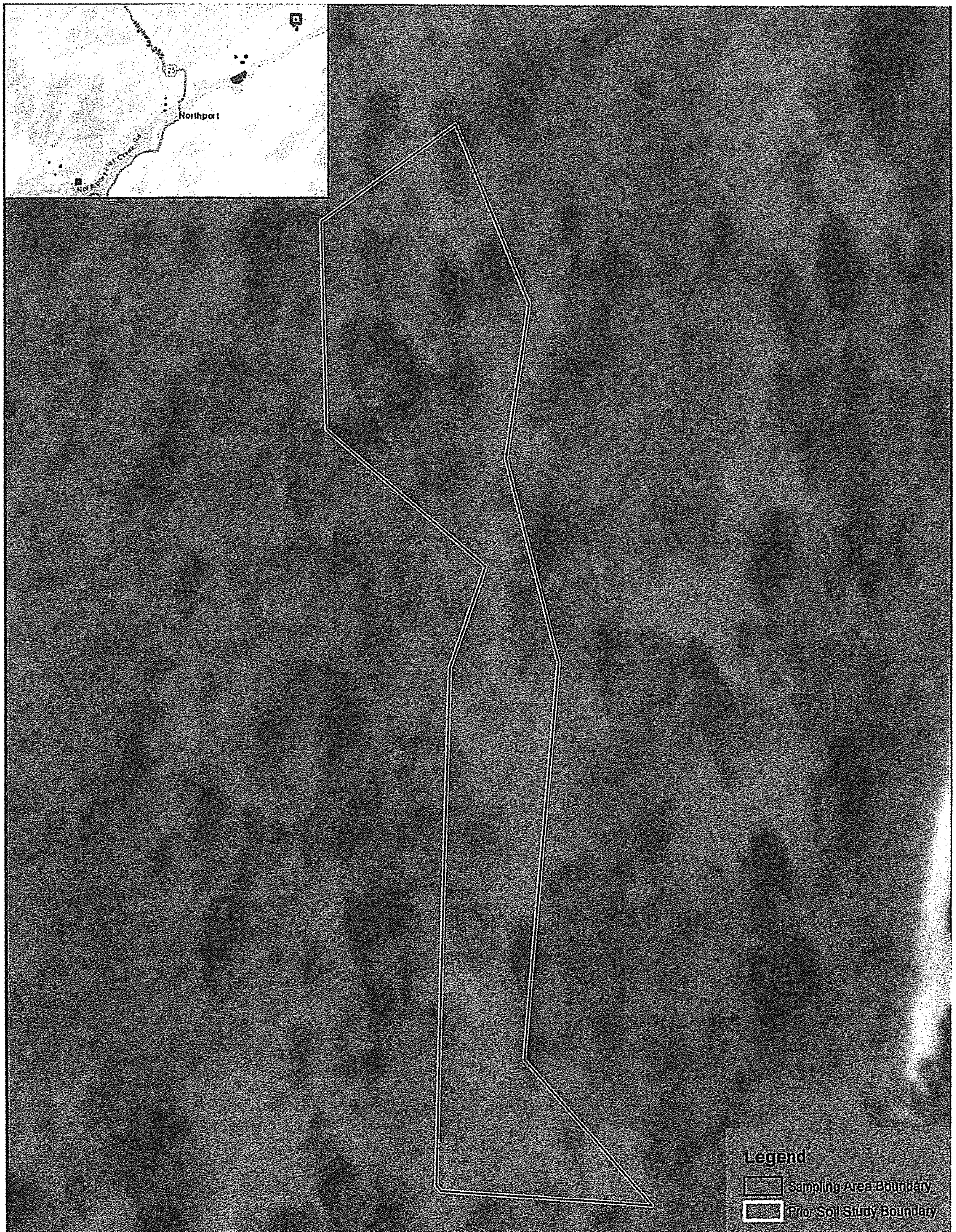
0 5 10 20 Meters

0 25 50 100 Feet

N

Map A7-6. Detail for Sampling Area 05

Upper Columbia River, WA



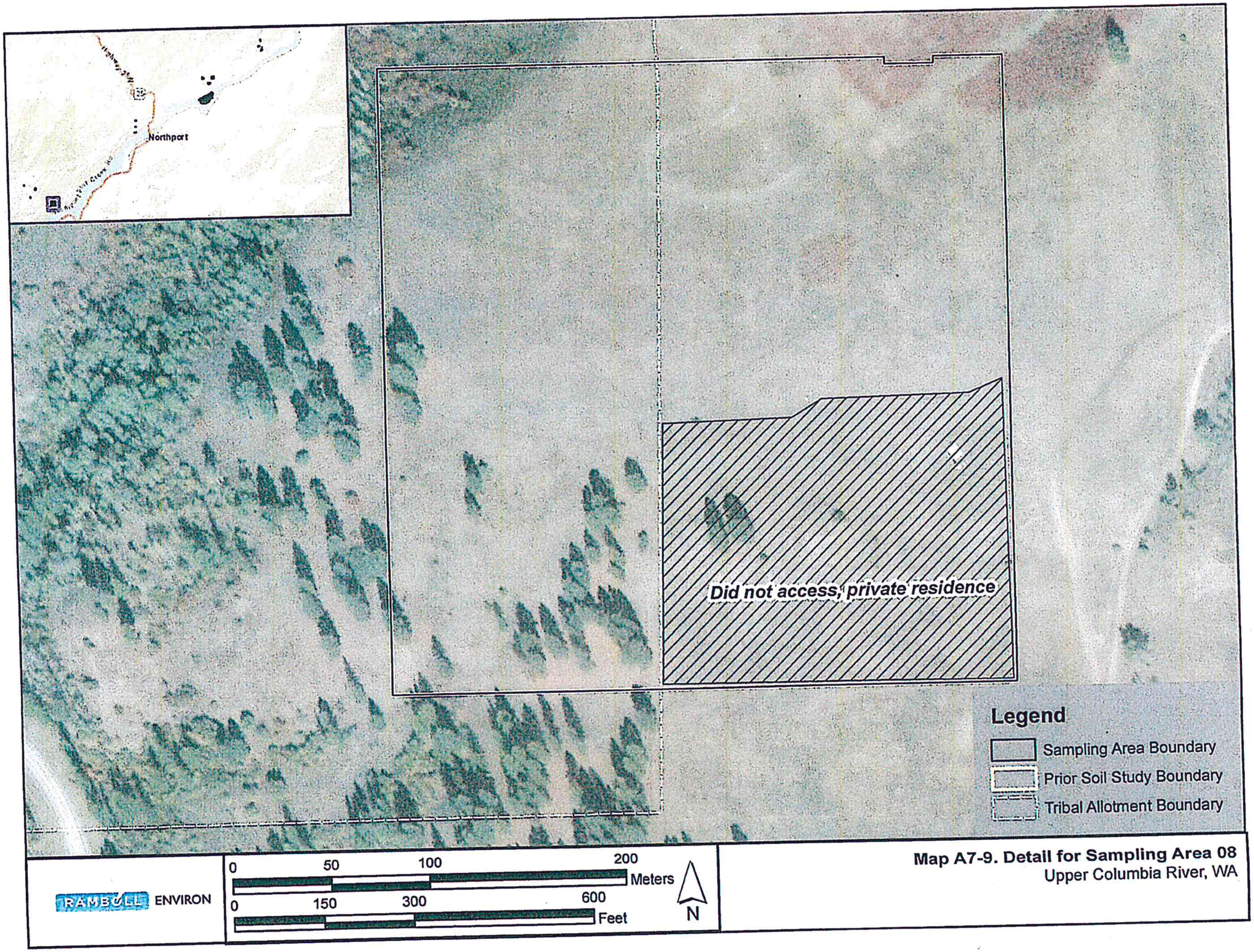
RAMBOLL ENVIRON

0 5 10 20 Meters
0 25 50 100 Feet
N

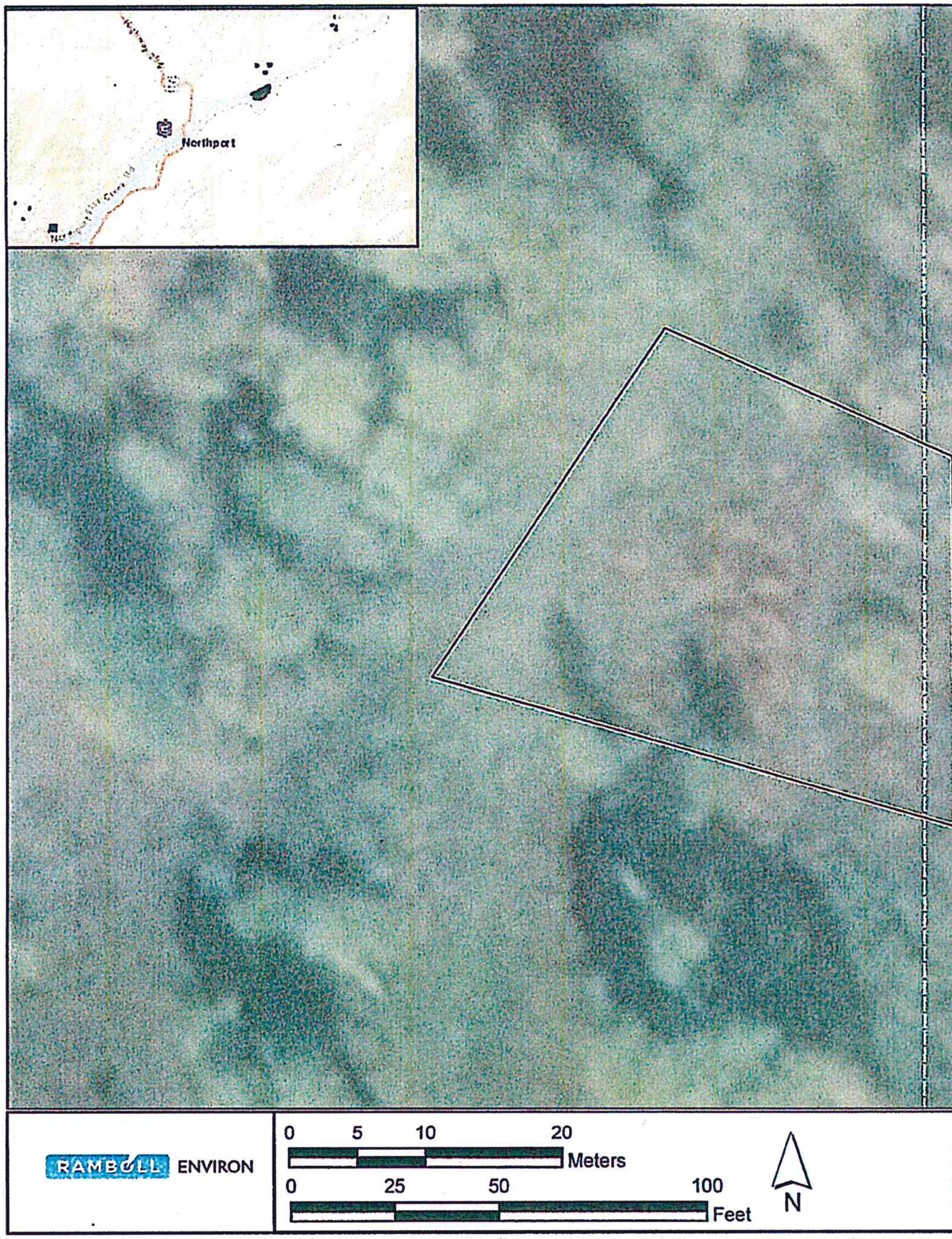
Map A7-7. Detail for Sampling Area 06
Upper Columbia River, WA

RAMBOLL ENVIRON

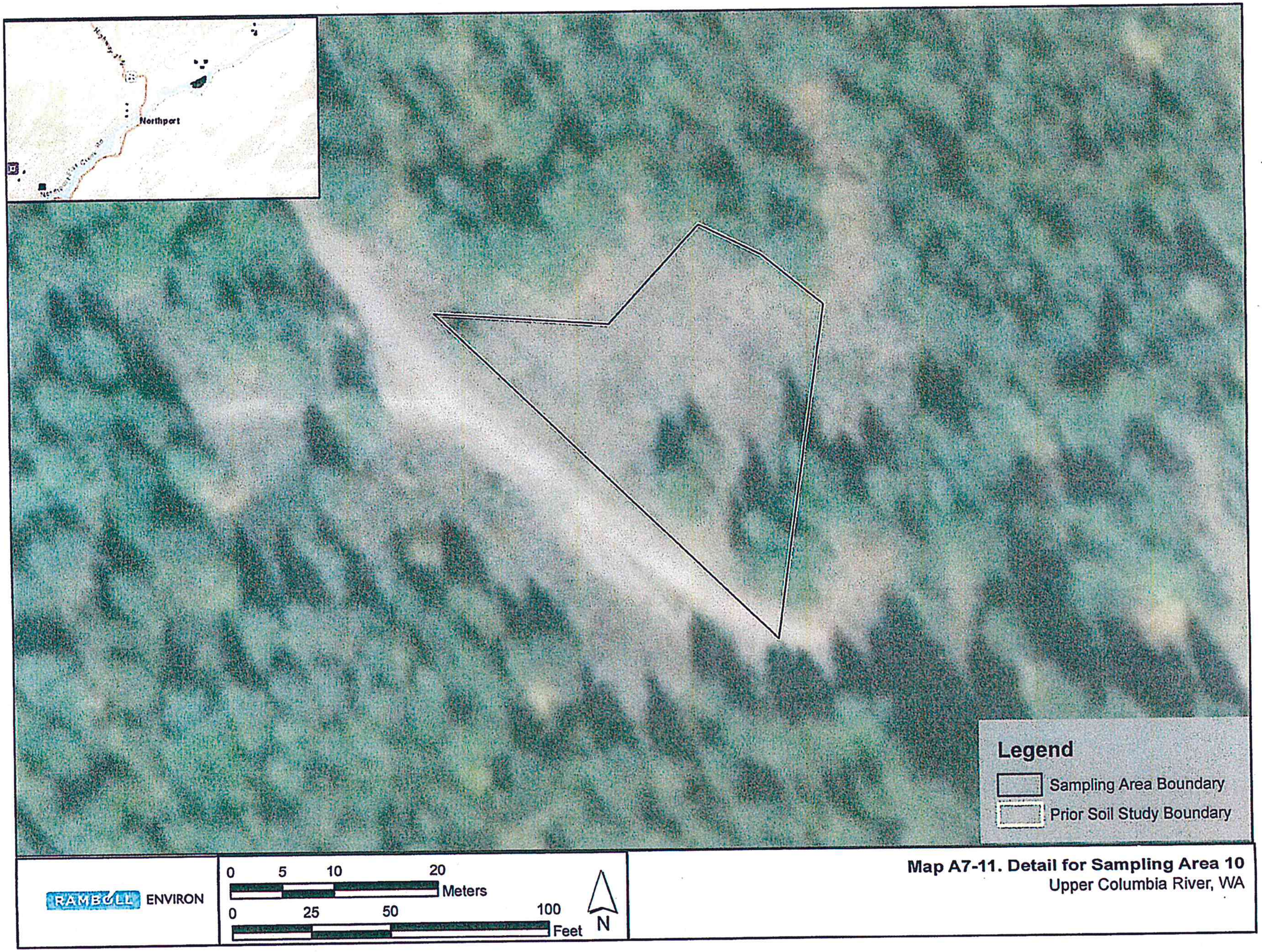
Map A7-8. Detail for Sampling Area 07
Upper Columbia River, WA



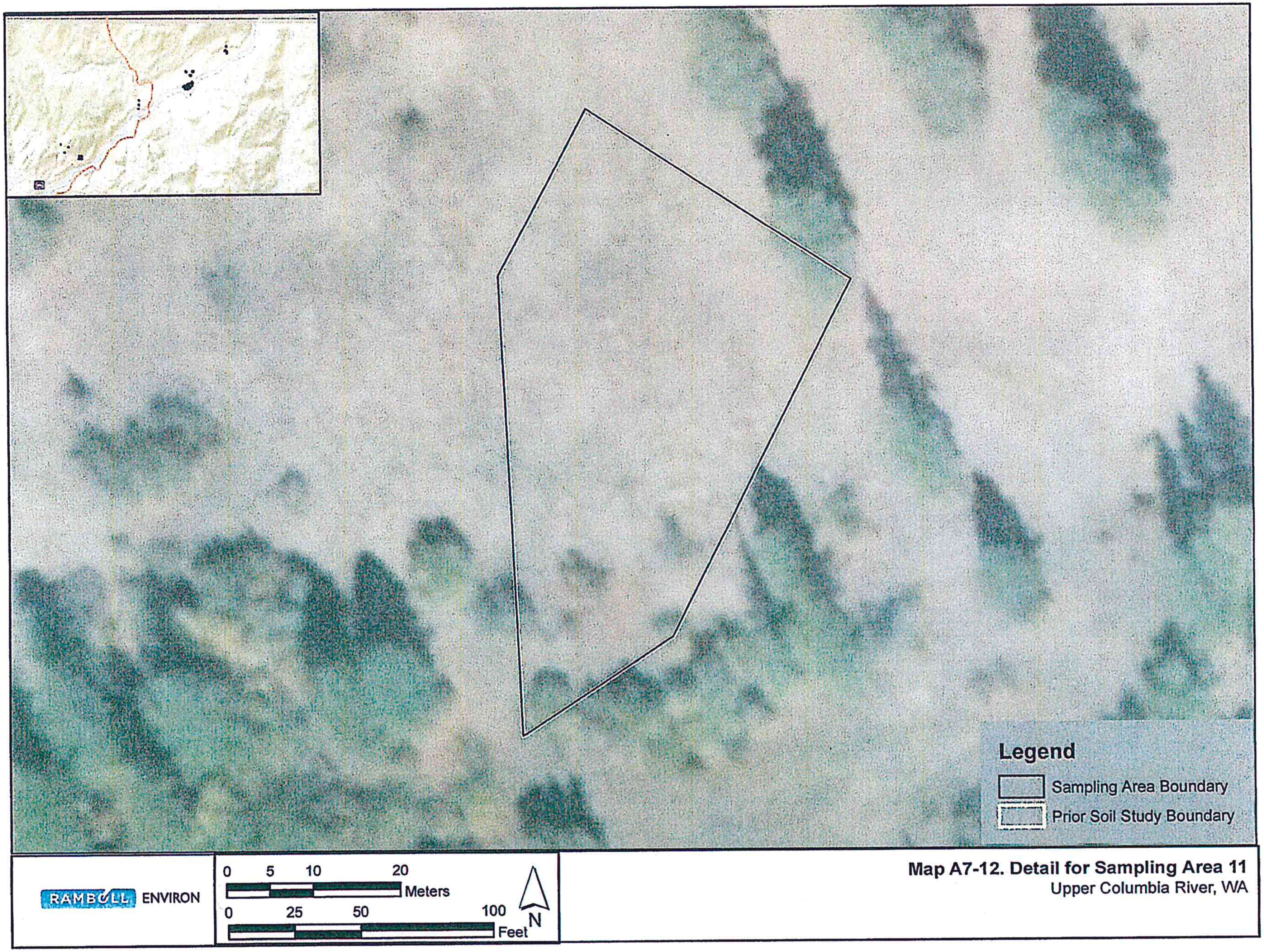
Map A7-9. Detail for Sampling Area 08
Upper Columbia River, WA



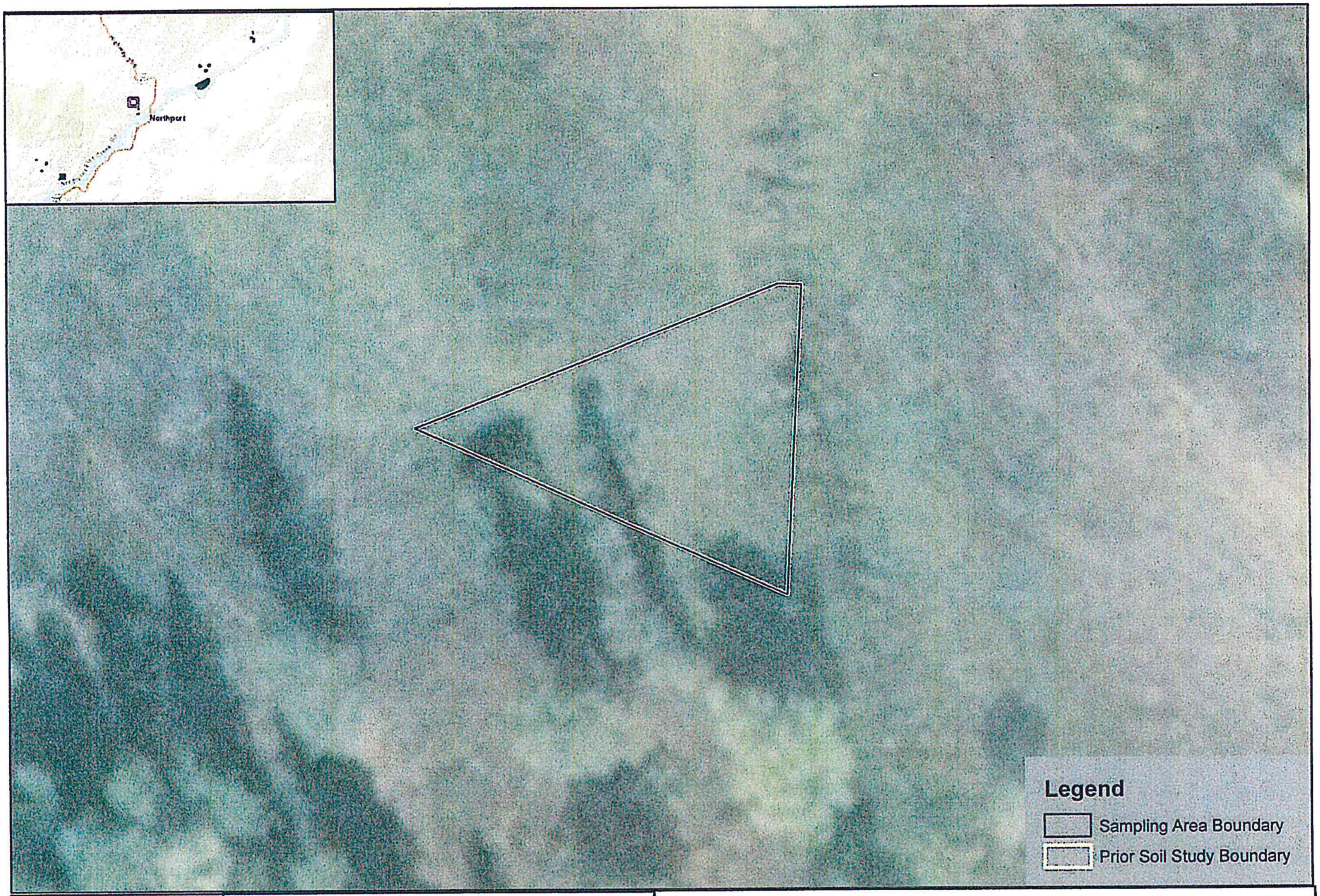
Map A7-10. Detail for Sampling Area 09
Upper Columbia River, WA



Map A7-11. Detail for Sampling Area 10
Upper Columbia River, WA

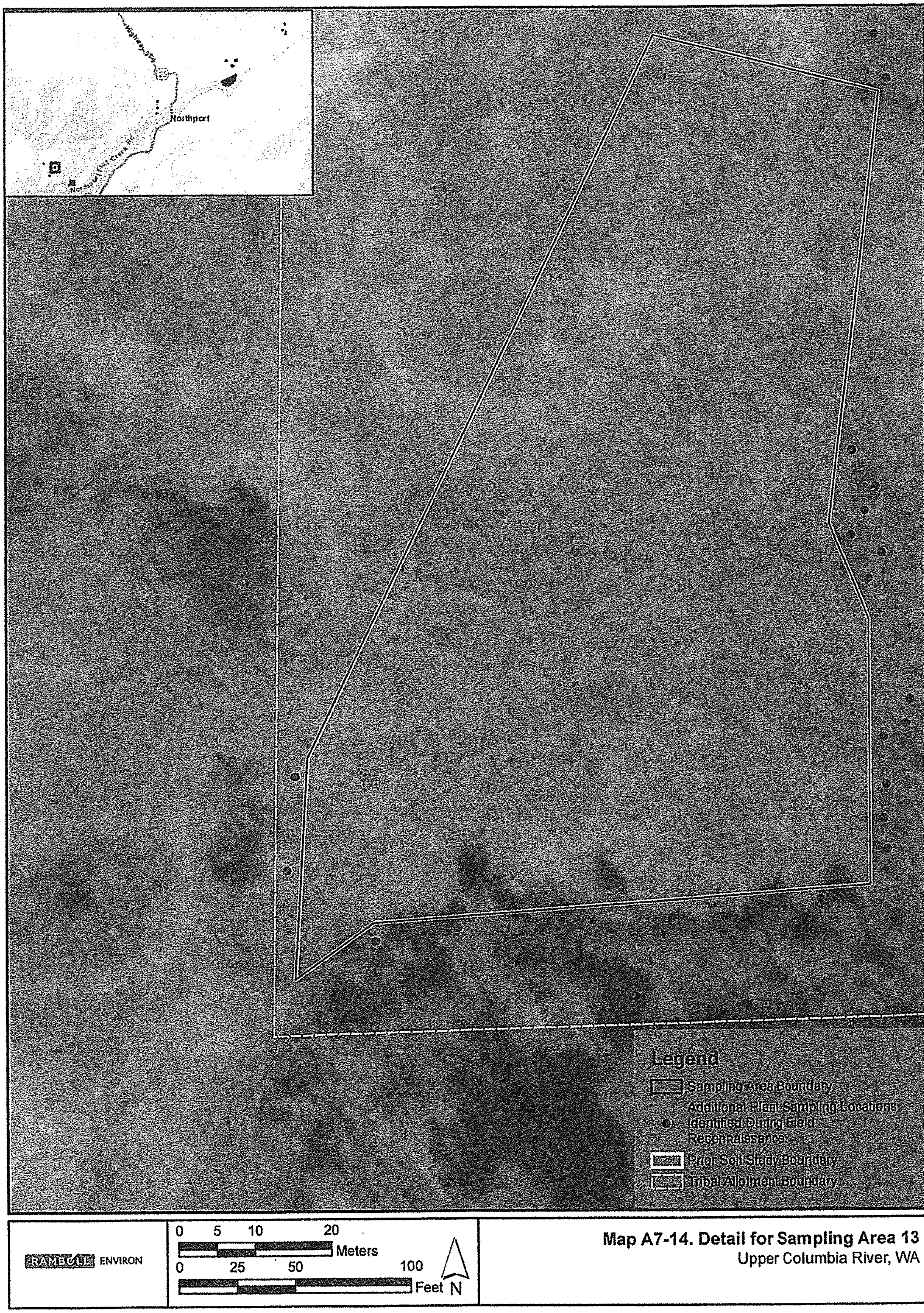


Map A7-12. Detail for Sampling Area 11
Upper Columbia River, WA

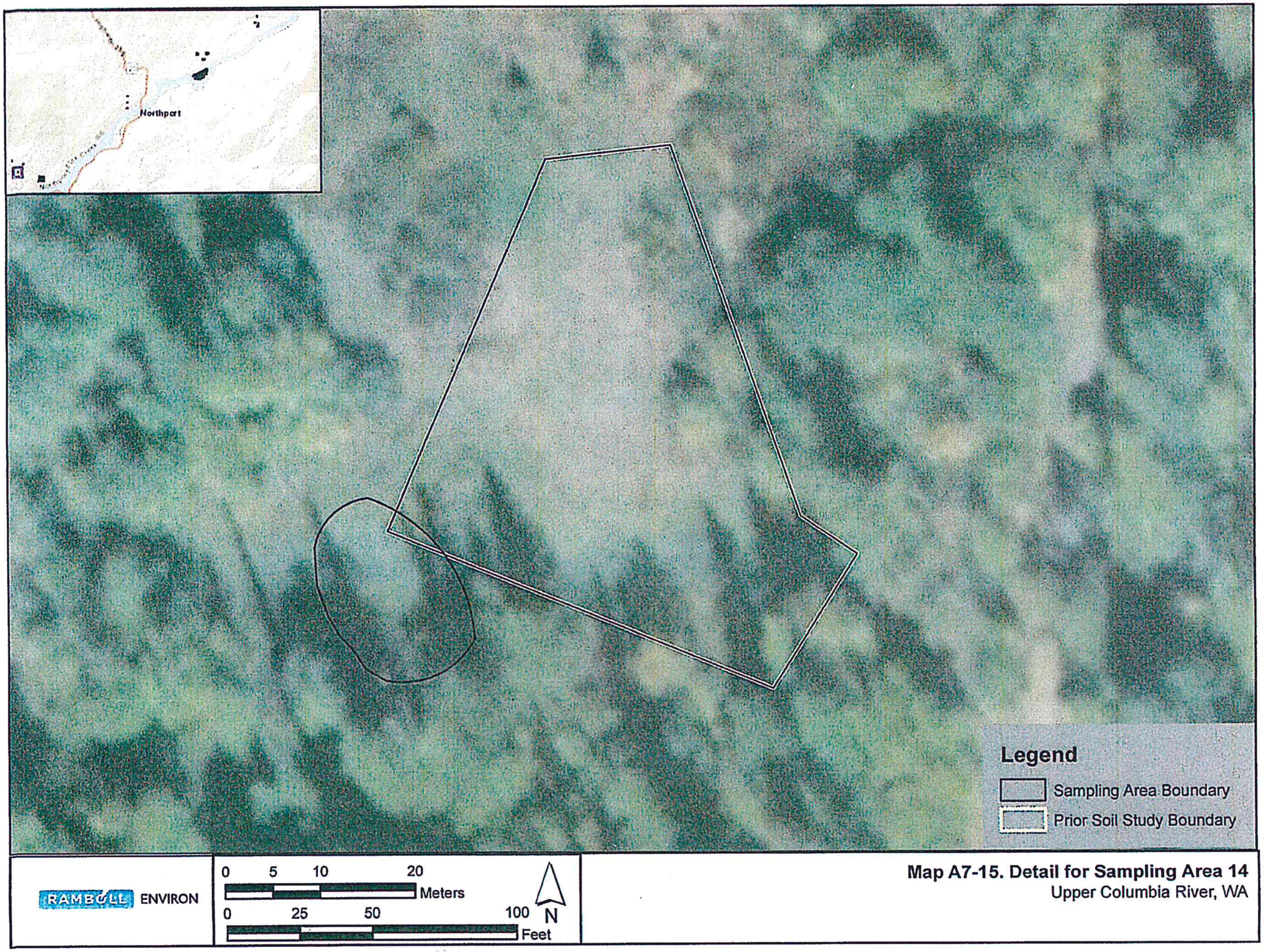


RAMBOLL ENVIRON

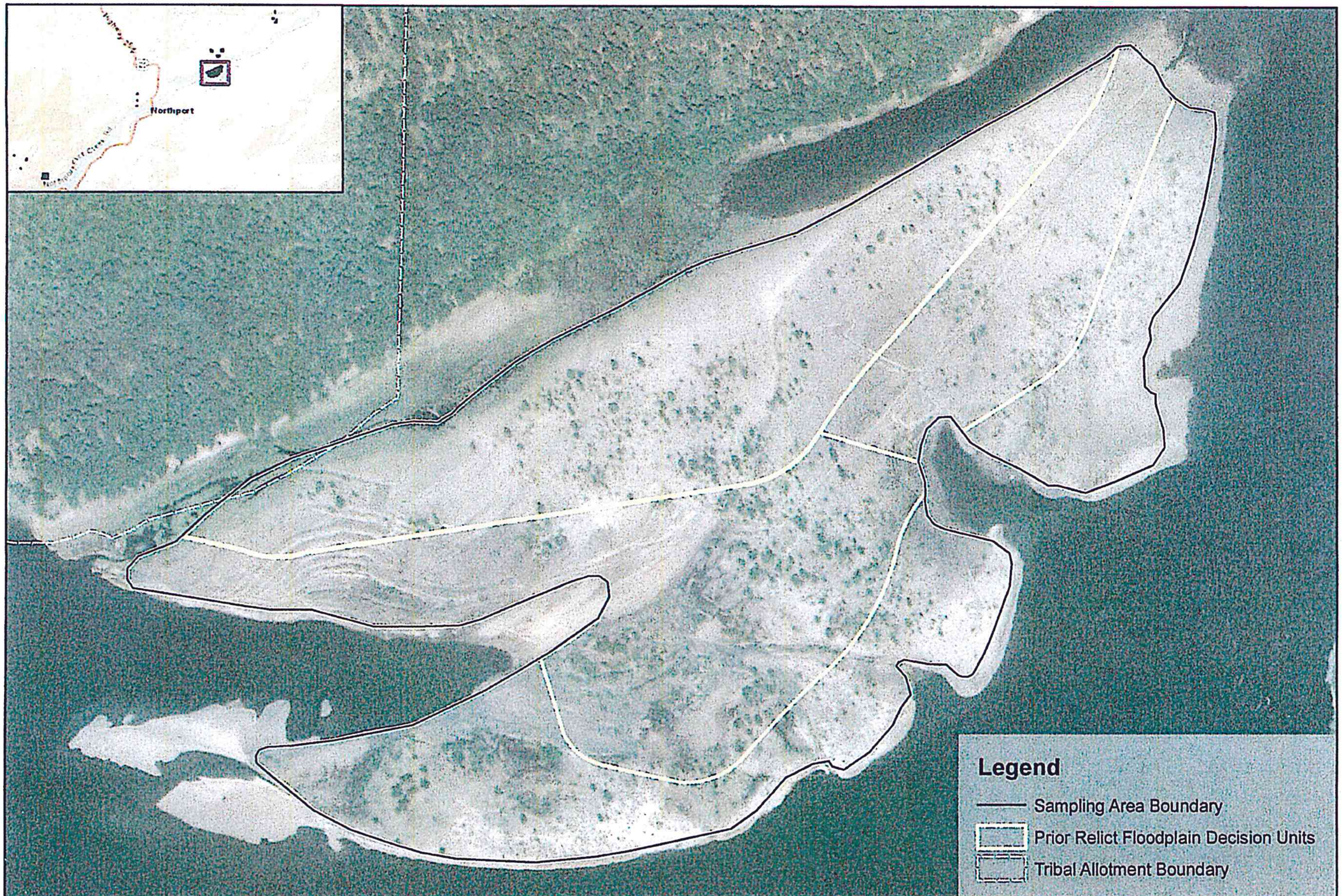
Map A7-13. Detail for Sampling Area 12
Upper Columbia River, WA



Map A7-14. Detail for Sampling Area 13
Upper Columbia River, WA



Map A7-15. Detail for Sampling Area 14
Upper Columbia River, WA



RAMBOLL ENVIRON

0 50 100 200 Meters

0 150 300 600 Feet

N

Map A7-16. Detail for Sampling Area 15
Upper Columbia River, WA

RAMBOLL ENVIRON

Map A7-17. Detail for Sampling Area 16
Upper Columbia River, WA

Appendix C

PROTOCOL MODIFICATION FORM

Project Name: Upper Columbia River Plant Tissue Study, 2018

Field Modification Number: 1

Material to be Sampled: Plant tissue, soil/sediment.

Standard Procedure for Field Collection and Laboratory Analysis (cite reference):

QAPP Attachment 2, SOP-6 (Digital Camera Use and Documentation Procedures).

Reason for Change in Field Procedure or Analysis Variation:

Inadvertent mislabeling on white board included in sample photo.

Variation from Field or Analytical Procedure:

Inadvertent mislabeling in photos for samples SA01-SP09-P01, SA02-SP01-P01, SA03-SP09-P01, SA03-SP12-P01, SA04-SP01-P01, SA04-SP02-P01, SA05-SP02-P01, SA08-SP08-P01, SA16-SP06-P01, SA16-SP07-P01, SA01-SP01-S01, SA02-SP01-P01, SA02-SP01-S01, SA03-SP06-S01, SA04-SP01-S01, SA05-SP02-S01, SA05-SP04-S01, SA07-SP03-S01, SA16-SP06-S01, SA16-SP07-S01.

Special Equipment, Materials or Personnel Required:

N/A

Initiator Name: Stuart Holmes	Date: 6/1/2018
Project Manager: Jennifer Pretare	Date: 6-1-18
QA Manager:	Date:

PROTOCOL MODIFCATION FORM
Upper Columbia River Plant Tissue Study, 2018

Page: 1 of 1 | Field Modification No: ____

Material to be Sampled: Plant Tissue

Standard Procedure for Field Collection and Laboratory Analysis (cite reference):
SOP-7

Reason for Change in Field Procedure or Analysis Variation:
Oxarc in Colville, WA is out of dry ice. Next closest source of dry ice is Spokane, which is a 4 hour round trip drive.

Variation from Field or Analytical Procedure:
Instead of using a cooler with dry ice to transport plant tissue, an electric cooler is being used.

Special Equipment, Materials or Personnel Required:
Electric cooler, vehicle electrical inverter plugged into minivan cigarette lighter. Thermometer in cooler to monitor temperatures.

APPROVAL

Initiated by ____ Date: ____

Project Manager: Jennifer Pretare Date: 6-21-18

QA Project Manager: ____ Date: ____

PROTOCOL MODIFICATION FORM

Project Name: UCR Plant Tissue Study (August 2018) **Field Modification Number:** 3

Material to be Sampled: Hazelnuts

Standard Procedure for Field Collection and Laboratory Analysis (cite reference):

Field Sampling Plan, SOP 4, Page 13, steps under Hazelnut subsection:

2.Spread a cloth along the ground under the plant of interest and gently shake the branches to collect ripe nuts.

4.Put remaining nuts into a cup or bowl of deionized water and discard those that float (float test; nuts that float are empty or have insect damage that is not visible on the shell).

5.Dry off remaining nuts and put them into the sample bag.

Reason for Change in Field Procedure or Analysis Variation:

During first day of collection of hazelnuts it was found that nuts were more successful collected by picking them.

In addition, the float test was tried in the field. The field crew found that nuts that floated were not necessarily empty or damaged. Therefore the water test was not predictive of sample integrity.

Variation from Field or Analytical Procedure:

Skipping hazelnut collection steps 2, 4, and 5. Picked nuts directly from branches, rather than shaking the plants. Rather than employing the float test, collected additional nuts over the target amount to account for empty or damaged nuts.

Special Equipment, Materials or Personnel Required:

None.

Initiator Name: Jeff Walker Date: 8-21-18

Project Manager: Jennifer Pretare Date: 9-20-18

QA Manager: Date:

Appendix D

K1804201

CHAIN OF CUSTODY

ALS-Environmental-Kelso
1317-S-13th-Ave
Kelso, WA 98626
Ph: 360-577-7222 Fax: 360-636-1068

Client Contact	Project Contact: Dina Johuson	Site Contact: Jennifer Pretare 510-681-6401	Date: May 4, 2018	COC No: 2
Teck American Incorporated	Tel: +1 206 336-1662	Laboratory Contact: Mark Harris	Carrier: AECOM driver Josie Smith	____ of ____ COCs
	Analysis Turnaround Time			
	Calendar (C) or Work Days (W)			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com				
Project Name: UCR 2018 Plant Tissue Study	[x] 21 days			
	[ ] Other ________			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA -02 -SP-01 P 01	4/25/2018	16:34	Plant Tissue			1	x		Claytonia lanceolata
SA -02 -SP-02 P 01	4/26/2018	9:54	Plant Tissue			1	x	x	Arctostaphylos uva-ursi
SA -02 -SP-03 P 01	4/26/2018	9:59	Plant Tissue			1	x	x	Arctostaphylos uva-ursi
SA -02 -SP-04 P 01	4/26/2018	10:57	Plant Tissue			1	x	x	Arctostaphylos uva-ursi
SA -02 -SP-05 P 01	4/26/2018	11:29	Plant Tissue			1	x	x	Arctostaphylos uva-ursi
SA -02 -SP-06 P 01	4/26/2018	12:16	Plant Tissue			1	x		Lomatium sp.
SA -02 -SP-07 P 01	4/26/2018	13:56	plant Tissue			1	x		Claytonia lanceolata

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag

Preservation: -20°C

Sample Disposal

[ ] Return To Client [ ] Disposal By Lab [X] Archive unitl disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	5-4-18 1032	Josie Smith [signature]	AECOM	5-4-18 1032
Josie Smith [signature]	AECOM	5-5-18 1310	[signature]	ALS K	5-5-18 1310

K1804201

CHAIN OF CUSTODY

ALS-Environmental-Kelso
1317-S-13th-Ave
Kelso, WA 98626
Ph: 360-577-7222 Fax: 360-636-1068

Client Contact	Project Contact: Dina Johnson	Site Contact: Jennifer Pretare 510-681-6401	Date: May 4, 2018	COC No:
Teck American Incorporated	Tel: +1 206 336-1662	Laboratory Contact: Mark Harris	Carrier: AECOM driver Josie Smith	____ of ____ COCs
	Analysis Turnaround Time			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com	Calendar (C) or Work Days (W)			
Project Name: UCR 2018 Plant Tissue Study	[x] 21 days			
	[ ] Other ____			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA -16 -SP-01 P 01	5/1/2018	9:27	Plant Tissue			1	x	x	Salix exigia
SA -16 -SP-02 P 01	5/1/2018	9:42	Plant Tissue			1	x	x	Salix exigia
SA -16 -SP-03 P 01	5/1/2018	10:12	Plant Tissue			1	x	x	Salix exigia
SA -16 -SP-04 P 01	5/1/2018	10:32	Plant Tissue			1	x	x	Salix exigia
SA -16 -SP-05 P 01	5/1/2018	10:54	Plant Tissue			1	x	x	Salix exigia
SA -16 -SP-06 P 01	5/1/2018	11:05	Plant Tissue			1	x	x	Salix exigia
SA -16 -SP-07 P 01	5/1/2018	11:18	plant Tissue			1	x	x	Salix exigia

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag

Preservation: -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	5.4.18 1032	[signature]	AECOM	5-4-18 1032
[signature]	AECOM	5-5-18 1310	[signature]	ALS-K	5-5-18 1310

K1804201

ALS-Environmental-Kelso	CHAIN OF CUSTODY
1317-S-13th-Ave	
Kelso, WA 98626	
Ph: 360-577-7222 Fax: 360-636-1068	

Client Contact	Project Contact: Dina Johnson	Site Contact: Jennifer Pretare 510-681-6401	Date: May 4, 2018	COC No: 1
Teck American Incorporated	Tel: +1 206 336-1662	Laboratory Contact: Mark Harris	Carrier: AECOM driver Josie Smith	____ of ____ COCs
	Analysis Turnaround Time			
	Calendar (C) or Work Days (W)			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com	[x] 21 days			
Project Name: UCR 2018 Plant Tissue Study	[ ] Other ____________			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA -01 -SP-01 P 01	4/27/2018	15:55	Plant Tissue			1	x		Camassia quamash
SA -01 -SP-02 P 01	4/27/2018	16:23	Plant Tissue			1	x		Camassia quamash
SA -01 -SP-04 P 01	4/28/2018	10:34	Plant Tissue			1	x		Claytonia lanceolata
SA -01 -SP-05 P 01	4/28/2018	10:39	Plant Tissue			1	x		Bryoria fremontii
SA -01 -SP-06 P 01	4/28/2018	11:37	Plant Tissue			1	x		Claytonia lanceolata
SA -01 -SP-07 P 01	4/28/2018	11:57	Plant Tissue			1	x		Bryoria fremontii
SA -01 -SP-08 P 01	4/28/2018	13:45	Plant Tissue			1	x		Bryoria fremontii
SA -01 -SP-09 P 01	4/28/2018	13:25	Plant Tissue			1	x		Camassia quamash
SA -01 -SP-10 P 01	4/28/2018	14:40	Plant Tissue			1	x		Bryoria fremontii
SA -01 -SP-11 P 01	4/28/2018	15:05	Plant Tissue			1	x		Bryoria fremontii
SA -01 -SP-12 P 01	4/28/2018	15:43	Plant Tissue			1	x		Bryoria fremontii

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag

Preservation: -20°C

Sample Disposal

[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by: (signature)	Company: AECOM	Date/Time: 5-4-18 1032	Received by: (signature)	Company: AECOM	Date/Time: 5-4-18 1032
Relinquished by: (signature)	Company: AECOM	Date/Time: 5-5-18 1310	Received by: (signature)	Company: ALS K	Date/Time: 5-5-18 1310
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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Client Contact	Project Contact: Dina Johnson	Site Contact: Jennifer Pretare 510-681-6401	Date: May 4, 2018	COC No:
Teck American Incorporated	Tel: +1 206 336-1662	Laboratory Contact: Mark Harris	Carrier: AECOM driver Josie Smith	____ of ____ COCs
	Analysis Turnaround Time			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com	Calendar (C) or Work Days (W) ____			
Project Name: UCR 2018 Plant Tissue Study	[x] 21 days			
	[ ] Other ____			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA -06 -SP-01 P 01	5/1/2018	16:55	Plant Tissue			1	x	x	Arctostaphylus uva-ursi
SA -06 -SP-02 P 01	5/1/2018	16:57	Plant Tissue			1	x	x	Arctostaphylus uva-ursi
SA -07 -SP-01 P 01	5/2/2018	15:40	Plant Tissue			1	x		Camassia quamash
SA -07 -SP-02 P 01	5/2/2018	16:00	Plant Tissue			1	x		Camassia quamash
SA -07 -SP-03 P 01	5/2/2018	16:18	plant Tissue			1	x		Camassia quamash

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag

Preservation: -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	5.4.18 1032	[signature]	AECOM	5-4-18 1032
[signature]	AECOM	5-5-18 1310	[signature]	ALS K	5-5-18 1310

ALS cooler 1

ALS-Environmental-Kelso
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Kelso, WA 98626
Ph: 360-577-7222 Fax: 360-636-1068

CHAIN OF CUSTODY

Client Contact	Project Contact: Dina Johnson	Site Contact: Jennifer Pretare 510-681-6401	Date: May 4, 2018	COC No: 2
Teck American Incorporated	Tel: +1 206 336-1662	Laboratory Contact: Mark Harris	Carrier: AECOM driver Josh Smith	of COCs
	Analysis Turnaround Time			
	Calendar (C) or Work Days (W)			
Cristy Kassel 509.496.1160 Cristy.Kassel@teck.com	[X] 21 days			
Project Name: UCR 2018 Plant Tissue Study	[ ] Other ______			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
A -08 -SP-01 P 01	5/2/2018	9:37	Plant Tissue			1	X		Lomatium sp
A -08 -SP-02 P 01	5/2/2018	10:10	Plant Tissue			1	X		Lomatium sp
A -08 -SP-03 P 01	5/2/2018	10:45	Plant Tissue			1	X		Lomatium sp
A -08 -SP-04 P 01	5/2/2018	11:07	Plant Tissue			1	X		Bryoria fremontii
A -08 -SP-05 P 01	5/2/2018	11:28	Plant Tissue			1	X		Bryoria fremontii
A -08 -SP-06 P 01	5/2/2018	11:41	Plant Tissue			1	X		Bryoria fremontii
A -08 -SP-07 P 01	5/2/2018	12:46	Plant Tissue			1	X		Bryoria fremontii
A -08 -SP-09 P 01	5/2/2018	13:37	Plant Tissue			1	X		Claytonia lanceolata
A -08 -SP-10 P 01	5/2/2018	14:15	Plant Tissue			1	X		Claytonia lanceolata

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag
Preservation: -20°C

Sample Disposal: [ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

-7.7 C

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Jenny A Boog	AECOM	5-4-18 1032	[signature]	AECOM	5-4-18 1032
[signature]	AECOM	5-5-18 1310	[signature] Daniel [illegible]	ALS K	5-5-18 1310

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Kelso, WA 98626
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Client Contact	Project Contact: Dina Johnson	Site Contact: Jennifer Pretare 510-681-6401	Date: May 4, 2018	COC No: 3
Teck American Incorporated	Tel: +1 206 336-1662	Laboratory Contact: Mark Harris	Carrier: AECOM driver Josie Smith	____ of ____ COCs
	Analysis Turnaround Time			
	Calendar (C) or Work Days (W) ____			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com				
Project Name: UCR 2018 Plant Tissue Study	[X] 21 days			
	[ ] Other ________			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA -03 -SP-01 P 01	4/26/2018	15:47	Plant Tissue			1	x	x	Arctostaphylos uva-ursi
SA -03 -SP-02 P 01	4/26/2018	15:52	Plant Tissue			1	x	x	Arctostaphylos uva-ursi
SA -03 -SP-03 P 01	4/26/2018	16:34	Plant Tissue			1	x		Camassia quamash
SA -03 -SP-04 P 01	4/27/2018	9:07	Plant Tissue			1	x		Camassia quamash
SA -03 -SP-05 P 01	4/27/2018	9:41	Plant Tissue			1	x		Camassia quamash
SA -03 -SP-06 P 01	4/27/2018	10:09	Plant Tissue			1	x		Claytonia lanceolata
SA -03 -SP-07 P 01	4/27/2018	10:35	Plant Tissue			1	x		Claytonia lanceolata
SA -03 -SP-08 P 01	4/27/2018	11:26	Plant Tissue			1	x		Lomatium sp
SA -03 -SP-09 P 01	4/27/2018	13:04	Plant Tissue			1	x		Lomatium sp
SA -03 -SP-10 P 01	4/27/2018	13:43	Plant Tissue			1	x	x	Arctostaphylos uva-ursi
SA -03 -SP-11 P 01	4/27/2018	13:57	Plant Tissue			1	x	x	Arctostaphylos uva-ursi
SA -03 -SP-12 P 01	4/27/2018	14:33	Plant Tissue			1	x		Lomatium sp
Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag									
Preservation:							-20°C		

Sample Disposal
[ ] *Return To Client* [ ] *Disposal By Lab* [X] *Archive until disposal permitted by EPA*

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Jennifer a Pr[signature]	AECOM	5.4.18 1032	Josie Smith [signature]	AECOM	5-4-18 1032
Josie Smith [signature]	AECOM	5-5-18 1318	[signature] David Durdan	ALSK	5-5-18 1310

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Ph: 360-577-7222 Fax: 360-636-1068

CHAIN OF CUSTODY

Client Contact	Project Contact: Dina Johnson	Site Contact: Jennifer Pretare 510-681-6401	Date: May 4, 2018	COC No:
Teck American Incorporated	Tel: +1 206 336-1662	Laboratory Contact: Mark Harris	Carrier: AECOM driver Josie Smith	____ of ____ COCs
	Analysis Turnaround Time			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com	Calendar (C) or Work Days (W) ____			
Project Name: UCR 2018 Plant Tissue Study	[x] 21 days			
	[ ] Other ____			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA -04 -SP-01 P 01	4/30/2018	15:29	Plant Tissue			1	x	x	Arctostaphylus uva-ursi
SA -04 -SP-02 P 01	4/30/2018	15:30	Plant Tissue			1	x	x	Arctostaphylus uva-ursi
SA -04 -SP-03 P 01	4/30/2018	16:02	Plant Tissue			1	x	x	Arctostaphylus uva-ursi
SA -04 -SP-04 P 01	4/30/2018	16:19	Plant Tissue			1	x	x	Arctostaphylus uva-ursi
SA -04 -SP-05 P 01	5/1/2018	14:36	Plant Tissue			1	x	x	Arctostaphylus uva-ursi
SA -04 -SP-06 P 01	5/1/2018	14:54	Plant Tissue			1	x	x	Arctostaphylus uva-ursi
SA -04 -SP-07 P 01	5/1/2018	15:25	Plant Tissue			1	x		Claytonia lanceolata
SA -04 -SP-08 P 01	5/1/2018	15:34	Plant Tissue			1	x		Claytonia lanceolata

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag

Preservation: -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive unitl disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	5-4-18 1032	[signature]	AECOM	5-4-18 1032
[signature]	AECOM	5-5-18 1310	[signature]	ALSK	5-5-18 1310

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CHAIN OF COUSTODY

Client Contact	Project Contact: Dina Johnson	Site Contact: Jennifer Pretare 510-681-6401	Date: May 4, 2018	COC No: 7
Teck American Incorporated	Tel: +1 206 336-1662	Laboratory Contact: Mark Harris	Carrier: AECOM driver Josie Smith	___ of ___ COCs
	Analysis Turnaround Time			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com	Calendar (C) or Work Days (W)			
Project Name: UCR 2018 Plant Tissue Study	[x] 21 days			
Lab Quote #: 44121	[ ] Other ______			

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA -05 -SP-01 P 01	4/30/2018	9:06	Plant Tissue			1	x		Lomatium sp.
SA -05 -SP-02 P 01	4/30/2018	9:23	Plant Tissue			1	x		Lomatium sp.
SA -05 -SP-03 P 01	4/30/2018	9:49	Plant Tissue			1	x		Lomatium sp.
SA -05 -SP-04 P 01	4/30/2018	11:09	Plant Tissue			1	x		Bryoria fremontii
SA -05 -SP-05 P 01	4/30/2018	11:30	Plant Tissue			1	x		Claytonia lanceolata
SA -05 -SP-06 P 01	4/30/2018	11:47	Plant Tissue			1	x		Claytonia lanceolata
SA -05 -SP-07 P 01	4/30/2018	12:48	Plant Tissue			1	x		Camassia quamash
SA -05 -SP-08 P 01	4/30/2018	13:05	Plant Tissue			1	x		Camassia quamash
SA -05 -SP-09 P 01	4/30/2018	13:43	Plant Tissue			1	x		Camassia quamash
SA -05 -SP-10 P 01	4/30/2018	14:15	Plant Tissue			1	x		Bryoria fremontii

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag

Preservation: -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Jenny a Pr[illegible]	AECOM	5.4.18 1032	Josie Smith	AECOM	5-4-18 1032
Josie Smith	AECOM	5-5-18 1310	David Durbin	ALS-K	5-5-18 1310

ALS cooler 2

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Kelso, WA 98626
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CHAIN OF COUSTODY

CHAIN OF CUSTODY

Client Contact	Project Contact: Dina Johnson	Site Contact: Jennifer Pretare 510-681-6401	Date: May 4, 2018	COC No: 5
Teck American Incorporated	Tel: +1 206 336-1662	Laboratory Contact: Mark Harris	Carrier: AECOM driver Josie Smith	___ of ___ COCs
	Analysis Turnaround Time			
	Calendar (C) or Work Days (W)			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com				
Project Name: UCR 2018 Plant Tissue Study	[x] 21 days			
	[ ] Other ________			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA -02 -SP-01 S 01	4/25/2018	16:34	Soil/Sediment			1	x		
SA -02 -SP-02 S 01	4/26/2018	10:16	Soil/Sediment			1	x	x	
SA -02 -SP-03 S 01	4/26/2018	10:23	Soil/Sediment			1	x	x	
SA -02 -SP-04 S 01	4/26/2018	11:00	Soil/Sediment			2	x	x	
SA -02 -SP-05 S 01	4/26/2018	11:35	Soil/Sediment			1	x	x	
SA -02 -SP-06 S 01	4/26/2018	12:27	Soil/Sediment			1	x		
SA -02 -SP-07 S 01	4/26/2018	14:19	Soil/Sediment			1	x		

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag

Preservation: -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

-0.9C

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	5-4-18 1032	[signature]	AECOM	5-4-18 1032
[signature]	AECOM	5-5-18 1310	[signature] David ...	ALS K	5-5-18 1310

ALS Cooler 2

ALS-Environmental-Kelso
1317-S-13th-Ave
Kelso, WA 98626
Ph: 360-577-7222 Fax: 360-636-1068

CHAIN OF COUSTODY

Client Contact	Project Contact: Dina Johnson	Site Contact: Jennifer Pretare 510-681-6401	Date: May 4, 2018	COC No: 5
Teck American Incorporated	Tel: +1 206 336-1662	Laboratory Contact: Mark Harris	Carrier: AECOM driver Josie Smith	of COCs
	Analysis Turnaround Time			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com	Calendar (C) or Work Days (W)			
Project Name: UCR 2018 Plant Tissue Study	[x] 21 days			
Lab Quote #: 44121	[ ] Other			

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA -01 -SP-01 S 01	4/27/2018	16:03	Soil/Sediment				x		
SA -01 -SP-02 S 01	4/27/2018	16:26	Soil/Sediment				x		
SA -01 -SP-04 S 01	4/28/2018	10:40	Soil/Sediment				x		
SA -01 -SP-05 S 01	4/28/2018	11:05	Soil/Sediment				x		
SA -01 -SP-06 S 01	4/28/2018	11:58	Soil/Sediment				x		
SA -01 -SP-07 S 01	4/28/2018	13:05	Soil/Sediment				x		
SA -01 -SP-08 S 01	4/28/2018	13:55	Soil/Sediment				x		
SA -01 -SP-09 S 01	4/28/2018	13:30	Soil/Sediment				x		
SA -01 -SP-10 S 01	4/28/2018	14:50	Soil/Sediment				x		
SA -01 -SP-11 S 01	4/28/2018	15:10	Soil/Sediment				x		
SA -01 -SP-12 S 01	4/28/2018	15:44	Soil/Sediment				x		

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag

Preservation: -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

-0.9C

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	5.4.18 1032	[signature]	AECOM	5-4-18 1032
[signature]	AECOM	5-5-18 1310	[signature]	ALS K	5-5-18 1310

ALS Cooler 3

ALS-Environmental-Kelso
1317-S-13th-Ave
Kelso, WA 98626
Ph: 360-577-7222 Fax: 360-636-1068

CHAIN OF CUSTODY

Client Contact: Teck American Incorporated
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study
Lab Quote #: 44121

Project Contact: Dina Johnson
Tel: +1 206 336-1662
Analysis Turnaround Time
Calendar (C) or Work Days (W)
[X] 21 days
[ ] Other ____________

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: May 4, 2018
Carrier: AECOM driver Josie Smith
COC No: 3
_____ of _____ COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA -03 -SP-01 S 01	4/26/2018	15:54	Soil/Sediment			1	x	x	Arctostaphylos uva-ursi
SA -03 -SP-02 S 01	4/26/2018	16:04	Soil/Sediment			1	x	x	Arctostaphylos uva-ursi
SA -03 -SP-03 S 01	4/26/2018	16:40	Soil/Sediment			1	x		Camassia quamash
SA -03 -SP-04 S 01	4/27/2018	9:20	Soil/Sediment			1	x		Camassia quamash
SA -03 -SP-05 S 01	4/27/2018	9:49	Soil/Sediment			1	x		Camassia quamash
SA -03 -SP-06 S 01	4/27/2018	10:20	Soil/Sediment			1	x		Claytonia lanceolata
SA -03 -SP-07 S 01	4/27/2018	10:51	Soil/Sediment			1	x		Claytonia lanceolata
SA -03 -SP-08 S 01	4/27/2018	11:29	Soil/Sediment			1	x		Lomatium sp
SA -03 -SP-09 S 01	4/27/2018	13:20	Soil/Sediment			1	x		Lomatium sp
SA -03 -SP-10 S 01	4/27/2018	13:46	Soil/Sediment			1	x	x	Arctostaphylos uva-ursi
SA -03 -SP-11 S 01	4/27/2018	14:09	Soil/Sediment			2	x	x	Arctostaphylos uva-ursi
SA -03 -SP-12 S 01	4/27/2018	14:49	Soil/Sediment			1	x		Lomatium sp
Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag									
Preservation:							-20°C		

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

~~0.4~~ 0.4C
5-5-18

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	~~5-3~~ 5.4.18 1032	[signature]	AECOM	5-4-18 1030
[signature]	AECOM	5-5-18 1310	[signature] David Redton	ALS-K	5-5-18 1310
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

ALS cooler 3

ALS-Environmental-Kelso
317-S-13th-Ave
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CHAIN OF CUSTODY

Client Contact	Project Contact: Dina Johnson	Site Contact: Jennifer Pretare 510-681-6401	Date: May 4, 2018	COC No: 3
Teck American Incorporated	Tel: +1 206 336-1662	Laboratory Contact: Mark Harris	Carrier: AECOM driver Josie Smith	___ of ___ COCs

Analysis Turnaround Time
Calendar (C) or Work Days (W)

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study
Lab Quote #: 44121

[X] 21 days
[ ] Other ______

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA -04 -SP-01 S 01	4/30/2018	15:33	Soil/Sediment			1	x	x	
SA -04 -SP-02 S 01	4/30/2018	15:36	Soil/Sediment			1	x	x	
SA -04 -SP-03 S 01	4/30/2018	16:05	Soil/Sediment			1	x	x	
SA -04 -SP-04 S 01	4/30/2018	16:23	Soil/Sediment			1	x	x	
SA -04 -SP-05 S 01	5/1/2018	14:42	Soil/Sediment			1	x	x	
SA -04 -SP-06 S 01	5/1/2018	14:57	Soil/Sediment			1	x	x	
SA -04 -SP-07 S 01	5/1/2018	15:53	Soil/Sediment			1	x		
SA -04 -SP-08 S 01	5/1/2018	16:10	Soil/Sediment			1	x		

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag
Preservation: -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

0.4C

Relinquished by: Jenya R[illegible]	Company: AECOM	Date/Time: 5.4.18 1032	Received by: Josie Smith	Company: AECOM	Date/Time: 5-4-18 1032
Relinquished by: Josie A Smith	Company: AECOM	Date/Time: 5.5.18 1310	Received by: Daniel [illegible]	Company: ALS K	Date/Time: 5-5-18 1310
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

ALS Cooler 4

ALS-Environmental-Kelso
1317-S-13th-Ave
Kelso, WA 98626
Ph: 360-577-7222 Fax: 360-636-1068

CHAIN OF CUSTODY

Client Contact	Project Contact: Dina Johnson	Site Contact: Jennifer Pretare 510-681-6401	Date: May 4, 2018	COC No:
Teck American Incorporated	Tel: +1 206 336-1662	Laboratory Contact: Mark Harris	Carrier: AECOM driver Josie Smith	___ of ___ COCs
	Analysis Turnaround Time			
	Calendar (C) or Work Days (W)			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com				
Project Name: UCR 2018 Plant Tissue Study	[X] 21 days			
	[ ] Other ______			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA -16 -SP-01 S 01	5/1/2018	9:51	Soil/Sediment			1	x	x	
SA -16 -SP-02 S 01	5/1/2018	9:59	Soil/Sediment			1	x	x	
SA -16 -SP-03 S 01	5/1/2018	10:20	Soil/Sediment			2	x	x	
SA -16 -SP-04 S 01	5/1/2018	10:37	Soil/Sediment			1	x	x	
SA -16 -SP-05 S 01	5/1/2018	10:57	Soil/Sediment			1	x	x	
SA -16 -SP-06 S 01	5/1/2018	11:09	Soil/Sediment			1	x	x	
SA -16 -SP-07 S 01	5/1/2018	11:22	Soil/Sediment			1	x	x	

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag

Preservation: -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

-0.4C

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	5-4-18 1032	[signature]	AECOM	5-4-18 1032
[signature]	AECOM	5-5-18 1310	[signature] Dania Pulman	ALS K	5-5-18 1310

K1804674
ALS Cooler 4

ALS-Environmental-Kelso
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Kelso, WA 98626
Ph: 360-577-7222 Fax: 360-636-1068

CHAIN OF CUSTODY

Client Contact: Teck American Incorporated
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study
Lab Quote #: 64121

Project Contact: Dina Johnson
Tel: +1 306 336-1662
Analysis Turnaround Time
Calendar (C) or Work Days (W)
[X] 21 days
[ ] Other ________

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: May 4, 2018
Carrier: AECOM driver Josie Smith
COC No: ______ of ______ COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes
SA -08 -SP-01 S 01	5/2/2018	9:45	Soil/Sediment			1	X		
SA -08 -SP-02 S 01	5/2/2018	10:18	Soil/Sediment			1	X		
SA -08 -SP-03 S 01	5/2/2018	10:55	Soil/Sediment			1	X		
SA -08 -SP-04 S 01	5/2/2018	11:13	Soil/Sediment			1	X		
SA -08 -SP-05 S 01	5/2/2018	11:32	Soil/Sediment			1	X		
SA -08 -SP-06 S 01	5/2/2018	11:45	Soil/Sediment			1	X		
SA -08 -SP-07 S 01	5/2/2018	12:55	Soil/Sediment			1	X		
SA -08 -SP-09 S 01	5/2/2018	13:51	Soil/Sediment			1	X		
SA -08 -SP-10 S 01	5/2/2018	14:25	Soil/Sediment			1	X		

5-5-18

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag
Preservation: -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

-0.4C

Relinquished by	Company	Date/Time	Received by	Company	Date/Time
[signature]	AECOM	5-4-18 1032	[signature]	AECOM	5-4-18 1032
[signature]	AECOM	5-5-18 1310	[signature] Daniel Ruston	ALS-K	5-5-18 1310

ALS cooler 5

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CHAIN OF CUSTODY

Client Contact
Teck American Incorporated

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study

Lab Quote #: 44121

Project Contact: Dina Johnson
Tel: +1 206 336-1662
Analysis Turnaround Time
Calendar (C) or Work Days (W) ______

[x] 21 days

[ ] Other ______

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: May 4, 2018
Carrier: AECOM driver Josie Smith
COC No:
______ of ______ COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA -06 -SP-01 S 01	5/1/2018	17:00	Soil/Sediment			1	x	x	
SA -06 -SP-02 S 01	5/1/2018	17:03	Soil/Sediment			1	x	x	
SA -07 -SP-01 S 01	5/2/2018	15:55	Soil/Sediment			1	x		
SA -07 -SP-02 S 01	5/2/2018	16:08	Soil/Sediment			1	x		
SA -07 -SP-03 S 01	5/2/2018	16:26	Soil/Sediment			1	x		

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag
Preservation: -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

-0.1

Relinquished by: [signature]	Company: AECOM	Date/Time: 5.4.18 1032	Received by: [signature]	Company: AECOM	Date/Time: 5-4-18 1032
Relinquished by: [signature]	Company: AECOM	Date/Time: 5-5-18 1310	Received by: [signature] Daniel Pukapow	Company: ALS-K	Date/Time: 5-5-18 1310
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

ALS Cooler 5

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CHAIN OF CUSTODY

JHS

Client Contact	Project Contact: Dina Johnson	Site Contact: Jennifer Pretare 510-681-6401	Date: May 4, 2018	COC No: 7
Teck American Incorporated	Tel: +1 206 336-1662	Laboratory Contact: Mark Harris	Carrier: AECOM driver Josie Smith	___ of ___ COCs
	Analysis Turnaround Time			
	Calendar (C) or Work Days (W)			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com				
Project Name: UCR 2018 Plant Tissue Study	[X] 21 days			
	[ ] Other ___			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA -05 -SP-01 S 01	4/30/2018	9:25	Soil/Sediment			1	x		Lomatium sp.
SA -05 -SP-02 S 01	4/30/2018	9:26	Soil/Sediment			1	x		Lomatium sp.
SA -05 -SP-03 S 01	4/30/2018	10:15	Soil/Sediment			1	x		Lomatium sp.
SA -05 -SP-04 S 01	4/30/2018	11:16	Soil/Sediment			1	x		Bryoria fremontii
SA -05 -SP-05 S 01	4/30/2018	11:32	Soil/Sediment			1	x		Claytonia lanceolata
SA -05 -SP-06 S 01	4/30/2018	11:51	Soil/Sediment			1	x		Claytonia lanceolata
SA -05 -SP-07 S 01	4/30/2018	12:50	Soil/Sediment			1	x		Camassia quamash
SA -05 -SP-08 S 01	4/30/2018	13:17	Soil/Sediment			1	x		Camassia quamash
SA -05 -SP-09 S 01	4/30/2018	13:45	Soil/Sediment			1	x		Camassia quamash
SA -05 -SP-10 S 01	4/30/2018	14:17	Soil/Sediment			1	x		Bryoria fremontii

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag

Preservation: -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

-0.1

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Jennifer Pr[signature]	AECOM	5-4-18 1032	Josie A Smith	AECOM	5-4-18 1032
Josie A Smith	AECOM	5-5-18 1310	[signature] Daniel Alcaraz	ALS-K	5-5-18 1310

Cooler 1 of: 4.0°C
Temp Blank 1.3°C

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Kelso, WA 98626
Ph: 360-577-7222 Fax: 360-636-1068

CHAIN OF CUSTODY

Client Contact
Teck American Incorporated

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study

Lab Quote #: 44121

Project Contact: Lis Nelis
Tel: 206-366-1659
Analysis Turnaround Time
Calendar (C) or Business Days (B) B
[x] 21 days
[ ] Other ________

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: 6/21/2018
Carrier: Josie Smith AECOM
COC No: 1 of 2 COCs

Sample Identification						Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA	04	-JU	01	-S	01	6/19/2018	1243	Soil		DL	2	X	X	Rosa sp
SA	04	-JU	02	-S	01	6/19/2018	1308	Soil		DL	1	X	X	Rosa sp
SA	04	-JU	03	-S	01	6/19/2018	1314	Soil		DL	1	X	X	Rosa sp
SA	04	-JU	04	-S	01	6/19/2018	1335	Soil		DL	1	X	X	Rosa sp
SA	04	-JU	05	-S	01	6/19/2018	1411	Soil		DL	1	X		Vaccinium cespitosum
SA	04	-JU	06	-S	01	6/19/2018	1438	Soil		DL	1	X		Vaccinium cespitosum
SA	04	-JU	07	-S	01	6/19/2018	1501	Soil		DL	1	X		Vaccinium cespitosum
SA	04	-JU	08	-S	01	6/20/2018	0832	Soil		DL	1	X		Vaccinium cespitosum
SA	04	-JU	09	-S	01	6/20/2018	0858	Soil		DL	1	X		Vaccinium cespitosum
SA	04	-JU	10	-S	01	6/20/2018	0924	Soil		DL	1	X		Vaccinium cespitosum
Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag												WMG	WMG	
Preservation:												0-4°C	0-4°C	

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	6-21-18 1130	[signature]	AECOM	6-21-18 1130
[signature]	AECOM	6-22-18 1150	Cody [signature]	ALS	6/22/18 1150

Cooler 1 of 3
4.0 C
Temp Blank 1.3°C

ALS-Environmental-Kelso
1317-S-13th-Ave
Kelso, WA 98626
Ph: 360-577-7222 Fax: 360-636-1068

CHAIN OF CUSTODY

Client Contact
Teck American Incorporated

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study

Lab Quote #: 44121

Project Contact: Lis Nelis
Tel: 206-366-1659
Analysis Turnaround Time
Calendar (C) or Business Days (B) B
[x] 21 days
[ ] Other ______

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: 6/21/2018
Carrier: Josie Smith AECOM
COC No. 2 of 2 COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA 06 -JU 01 -S 01	6/20/2018	1031	Soil/Sediment		DL	2	X	X	Rosa sp.
SA 06 -JU 02 -S 01	6/20/2018	1051	Soil/Sediment		DL	1	X	X	Rosa sp.
SA 06 -JU 03 -S 01	6/20/2018	1054	Soil/Sediment		DL	1	X	X	Rosa sp.
SA 06 -JU 04 -S 01	6/20/2018	1118	Soil/Sediment		DL	1	X	X	Rosa sp

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag — TAL Metals: WMG; Mercury: WMG
Preservation: — TAL Metals: 0-6°C; Mercury: 0-6°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	6-21-18 1132	Josie Smith	AECOM	6-21-18 1132
Josie Smith	AECOM	6-22-18 1152	Cody [signature]	ALS	6/22/18 1150

Cooler 2 of 3
3.1°C
Temp Blank 1.6°C

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CHAIN OF CUSTODY

Client Contact
Teck American Incorporated

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study

Lab Quote #: 44121

Project Contact: Lis Nelis
Tel: 206-366-1659
Analysis Turnaround Time
Calendar (C) or Business Days (B) B

[x] 21 days
[ ] Other ________

LH 6/21/18

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: 6/21/2018
Carrier: Josie Smith AECOM
COC No: 1 of 1 COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA 01 -JU 01 -S 01	6/19/2018	0819	Soil/Sediment		GM	~~1~~ 2	X	X	Rosa sp.
SA 01 -JU 02 -S 01	6/19/2018	0852	Soil/Sediment		GM	1	X	X	Rosa sp.
SA 01 -JU 03 -S 01	6/19/2018	0858	Soil/Sediment		GM	1	X	X	Rosa sp.
SA 01 -JU 04 -S 01	6/19/2018	0926	Soil/Sediment		GM	1	X	X	Rosa sp.
SA 03 -JU 01 -S 01	6/18/2018	1432	Soil/Sediment		GM	1	X	X	Rosa sp.
SA 03 -JU 02 -S 01	6/18/2018	1454	Soil/Sediment		GM	1	X	X	Rosa sp.
SA 03 -JU 03 -S 01	6/18/2018	1513	Soil/Sediment		GM	1	X	X	Rosa sp.
SA 03 -JU 04 -S 01	6/18/2018	1604	Soil/Sediment		GM	1	X		Lomatium triternatum
SA 03 -JU 05 -S 01	6/18/2018	1641	Soil/Sediment		GM	1	X		Lomatium triternatum

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag — TAL Metals: WMG; Mercury: WMG
Preservation: — TAL Metals: 0-4°C; Mercury: 0-4°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Jenny a Bo	AECOM	6-21-18 11:30	Josie A Smith	AECOM	6-21-18 1130
Josie A Smith	AECOM	6-22-18 1150	Cody Graves	ALS	6/22/18 1150

-10°C
Cooler 3 of 3

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1317-S-13th-Ave
Kelso, WA 98626
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CHAIN OF CUSTODY

Client Contact: Teck American Incorporated
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study
Lab Quote #: 44121

Project Contact: Lis Nelis
Tel: 206-366-1659
Analysis Turnaround Time
Calendar (C) or Business Days (B) B
[x] 21 days
[ ] Other ________

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: 6/21/2018
Carrier: Josie Smith AECOM
COC No: 1 of 3 COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA 01 -JU 01 -P 01	6/19/2018	0814	Plant Tissue		GM	1	X	X	Rosa sp.
SA 01 -JU 02 -P 01	6/19/2018	0839	Plant Tissue		GM	1	X	X	Rosa sp.
SA 01 -JU 03 -P 01	6/19/2018	0845	Plant Tissue		GM	1	X	X	Rosa sp.
SA 01 -JU 04 -P 01	6/19/2018	0922	Plant Tissue		GM	1	X	X	Rosa sp.
SA 03 -JU 01 -P 01	6/18/2018	1418	Plant Tissue		GM	1	X	X	Rosa sp.
SA 03 -JU 02 -P 01	6/18/2018	1449	Plant Tissue		GM	1	X	X	Rosa sp.
SA 03 -JU 03 -P 01	6/18/2018	1507	Plant Tissue		GM	1	X	X	Rosa sp.
SA 03 -JU 04 -P 01	6/18/2018	1551	Plant Tissue		GM	1	X		Lomatium triternatum
SA 03 -JU 05 -P 01	6/18/2018	1628	Plant Tissue		GM	1	X		Lomatium triternatum
Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag							P	P	
Preservation:							-20°C	-20°C	

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive unitl disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Jenny a P[signature]	AECOM	6-21-18 1130	Josie Smith [signature]	AECOM	6-21-18 1130
Josie Smith [signature]	AECOM	6-22-18 1150	Cody Graves [signature]	ALS	6/22/18 1150

-10°C
cooler
3 of 3

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Kelso, WA 98626
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CHAIN OF CUSTODY

Client Contact
Teck American Incorporated

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study

Lab Quote #: 44121

Project Contact: Lis Nelis
Tel: 206-366-1659
Analysis Turnaround Time
Calendar (C) or Business Days (B) B
[x] 21 days
[ ] Other ________

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: 6/21/2018
Carrier: Josie Smith AECOM
COC No: 2 of 3 COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA 04 -JU 01 -P 01	6/19/2018	1237	Plant Tissue		GM	1	X	X	Rosa sp.
SA 04 -JU 02 -P 01	6/19/2018	1302	Plant Tissue		GM	1	X	X	Rosa sp.
SA 04 -JU 03 -P 01	6/19/2018	1304	Plant Tissue		GM	1	X	X	Rosa sp.
SA 04 -JU 04 -P 01	6/19/2018	1329	Plant Tissue		GM	1	X	X	Rosa sp
SA 04 -JU 05 -P 01	6/19/2018	1406	Plant Tissue		GM	1	X		Vaccinium cespitosum
SA 04 -JU 06 -P 01	6/19/2018	1431	Plant Tissue		GM	1	X		Vaccinium cespitosum
SA 04 -JU 07 -P 01	6/19/2018	1456	Plant Tissue		GM	1	X		Vaccinium cespitosum
SA 04 -JU 08 -P 01	6/20/2018	0825	Plant Tissue		GM	1	X		Vaccinium cespitosum
SA 04 -JU 09 -P 01	6/20/2018	0842	Plant Tissue		GM	1	X		Vaccinium cespitosum
SA 04 -JU 10 -P 01	6/20/2018	0912	Plant Tissue		GM	1	X		Vaccinium cespitosum
Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag							P	P	
Preservation:							-20°C	-20°C	

Sample Disposal
[ ] *Return To Client* [ ] *Disposal By Lab* [X] *Archive unitl disposal permitted by EPA*

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Jenny a R[illegible]	AECOM	6.21.18 1130	Josie Smith	AECOM	6-21-18 1130
Josie Smith	AECOM	6-22-18 1150	Cody Counell	ALS	6/22/18 1150

-10°C
Cooler 3 of 3

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1317-S-13th-Ave
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CHAIN OF CUSTODY

Client Contact	**Project Contact: Lis Nelis**	**Site Contact: Jennifer Pretare 510-681-6401**	**Date: 6/21/2018**
Teck American Incorporated	**Tel: 206-366-1659**	**Laboratory Contact: Mark Harris**	**Carrier: Josie Smith AECOM**
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com	**Analysis Turnaround Time**		COC No: 1
Project Name: UCR 2018 Plant Tissue Study	Calendar (C) or Business Days (B) B		3 of 3 COCs
Lab Quote #: 44121	[X] 21 days [ ] Other ______		

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA 06 -JU 01 -P 01	6/20/2018	1022	Plant Tissue		GM	1	X	X	Rosa sp.
SA 06 -JU 02 -P 01	6/20/2018	1046	Plant Tissue		GM	1	X	X	Rosa sp.
SA 06 -JU 03 -P 01	6/20/2018	1047	Plant Tissue		GM	1	X	X	Rosa sp.
SA 06 -JU 04 -P 01	6/20/2018	1116	Plant Tissue		GM	1	X	X	Rosa sp.
Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag							P	P	
Preservation:							-20°C	-20°C	

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by: [signature]	Company: AECOM	Date/Time: 6-21-18 1132	Received by: [signature]	Company: AECOM	Date/Time: 6-21-18 1132
Relinquished by: [signature]	Company: AECOM	Date/Time: 6-22-18 1150	Received by: [signature]	Company: ALS	Date/Time: 6/22/18 1150
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

ALS-Environmental-Kelso
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Ph: 360-577-7222 Fax: 360-636-1068

CHAIN OF COUNTY

Client Contact: Teck American Incorporated

Project Contact: Lis Nelis
Tel: 206-366-1659

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris

Date: 8/23/2018
Carrier: Josie Smith AECOM

COC No: ____ of ____ COCs

Analysis Turnaround Time
Calendar (C) or Business Days (B) B

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study

[X] 21 days
[ ] Other ____

Lab Quote #: 44121

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Sample Specific Notes:
SA 01 - AU 01 -P01	8/22/2018	0818	Plant Tissue		LH	1	X	Prunus virginiana
SA 01 - AU 02 -P01	8/22/2018	0851	Plant Tissue		LH	1	X	Prunus virginiana
SA 01 - AU 03 -P01	8/22/2018	0858	Plant Tissue		LH	1	X	Prunus virginiana
SA 01 - AU 04 -P01	8/22/2018	0923	Plant Tissue		LH	1	X	Prunus virginiana
SA 01 - AU 05 -P01	8/22/2018	0941	Plant Tissue		LH	1	X	Amelanchier alnifolia
SA 01 - AU 06 -P01	8/22/2018	1006	Plant Tissue		PH	1	X	Amelanchier alnifolia
SA 01 - AU 07 -P01	8/22/2018	1030	Plant Tissue		LH	1	X	Amelanchier alnifolia
SA 01 - AU 08 -P01	8/22/2018	1053	Plant Tissue		LH	1	X	Amelanchier alnifolia
SA 01 - AU 09 -P01	8/22/2018	1113	Plant Tissue		AU	1	X	Amelanchier alnifolia
SA 01 - AU 10 -P01	8/22/2018	1230	Plant Tissue		LH	1	X	Pinus ponderosa
SA 01 - AU 11 -P01	8/22/2018	1318	Plant Tissue		PH	1	X	Pinus ponderosa
SA 01 - AU 12 -P01	8/22/2018	1345	Plant Tissue		AU	1	X	Pinus ponderosa
Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag							P	
Preservation:							-20°C	

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8-29-18 1231	[signature]	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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1317-S-13th-Ave
Kelso, WA 98626
Ph: 360-577-7222 Fax: 360-636-1068

CHAIN OF CUSTODY

Client Contact	Project Contact: Lis Nelis	Site Contact: Jennifer Pretare 510-681-6401	Date: 8/16/2018	COC No:
Teck American Incorporated	Tel: 206-366-1659	Laboratory Contact: Mark Harris	Carrier: Josie Smith AECOM	___ of ___ COCs
	Analysis Turnaround Time			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com	Calendar (C) or Business Days (B) B			
Project Name: UCR 2018 Plant Tissue Study	[X] 21 days			
Lab Quote # 44121	[ ] Other ______			

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Sample Specific Notes:
SA 02 - AU 01 -P01	8/21/2018	1407	Plant Tissue		AU	1	X	Corylus cornuta
SA 02 - AU 02 -P01	8/21/2018	1420	Plant Tissue		PH	1	X	Corylus cornuta
SA 02 - AU 03 -P01	8/21/2018	1436	Plant Tissue		PH	1	X	Corylus cornuta
SA 02 - AU 04 -P01	8/21/2018	1500	Plant Tissue		AU	1	X	Pinus ponderosa
SA 02 - AU 05 -P01	8/21/2018	1510	Plant Tissue		PH	1	X	Pinus ponderosa
SA 02 - AU 06 -P01	8/21/2018	1534	Plant Tissue		LH	1	X	Pinus ponderosa

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag — P

Preservation: — -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8-29-18 1231	[signature]	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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CHAIN OF CUSTODY

Client Contact
Teck American Incorporated

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study

Lab Quote # 44121

Project Contact: Lis Nelis
Tel: 206-366-1659
Analysis Turnaround Time
Calendar (C) or Business Days (B) B

[X] 21 days

[ ] Other ____________

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: 8/23/2018
Carrier: Josie Smith AECOM
COC No:
____ of ____ COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Sample Specific Notes:
SA 03 - AU 01 -P01	8/21/2018	0847	Plant Tissue		LH	1	X	Corylus cornuta
SA 03 - AU 02 -P01	8/21/2018	0918	Plant Tissue		PH	1	X	Corylus cornuta
SA 03 - AU 03 -P01	8/21/2018	0927	Plant Tissue		PH	1	X	Corylus cornuta
SA 03 - AU 04 -P01	8/21/2018	0959	Plant Tissue		PH	1	X	Corylus cornuta
SA 03 - AU 05 -P01	8/21/2018	1032	Plant Tissue		LH	1	X	Prunus virginiana
SA 03 - AU 06 -P01	8/21/2018	1055	Plant Tissue		LH	1	X	Prunus virginiana
SA 03 - AU 07 -P01	8/21/2018	1212	Plant Tissue		PH	1	X	Prunus virginiana
SA 03 - AU 08 -P01	8/21/2018	1233	Plant Tissue		AU	1	X	Amelanchier alnifolia
SA 03 - AU 09 -P01	8/21/2018	1259	Plant Tissue		PH	1	X	Pinus ponderosa
Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag							P	
Preservation:							-20°C	

Sample Disposal
[ ] *Return To Client* [ ] *Disposal By Lab* [X] *Archive until disposal permitted by EPA*

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Josie Smith	AECOM	8-29-18 1231	C. [illegible]	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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CHAIN OF CUSTODY

Client Contact
Teck American Incorporated

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study

Lab Quote #: 44121

Project Contact: Lis Nelis
Tel: 206-366-1659

Analysis Turnaround Time
Calendar (C) or Business Days (B) B

[x] 21 days
[ ] Other ________

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: 8/23/2018
Carrier: Josie Smith AECOM

COC No: ______ of ______ COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Sample Specific Notes:
SA 04 - AU 01 -P01	8/23/2018	0835	Plant Tissue		LH	1	X	Corylus cornuta
SA 04 - AU 02 -P01	8/23/2018	0839	Plant Tissue		LH	1	X	Corylus cornuta
SA 04 - AU 03 -P01	8/23/2018	0856	Plant Tissue		LH	1	X	Corylus cornuta
SA 04 - AU 04 -P01	8/23/2018	0913	Plant Tissue		LH	1	X	Pinus ponderosa
SA 04 - AU 05 -P01	8/23/2018	0930	Plant Tissue		PH	1	X	Pinus ponderosa
SA 04 - AU 06 -P01	8/23/2018	0959	Plant Tissue		LH	1	X	Pinus ponderosa

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag — P
Preservation: — -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8-29-18 1231	[signature]	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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CHAIN OF CUSTODY

Client Contact	Project Contact: Lis Nelis	Site Contact: Jennifer Pretare 510-681-6401	Date: 8/23/2018	COC No:
Teck American Incorporated	Tel: 206-366-1659	Laboratory Contact: Mark Harris	Carrier: Josie Smith AECOM	___ of ___ COCs
	Analysis Turnaround Time			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com	Calendar (C) or Business Days (B) B			
Project Name: UCR 2018 Plant Tissue Study	[X] 21 days			
	[ ] Other ______			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Sample Specific Notes:
SA 06 - AU 01 -P01	8/23/2018	1043	Plant Tissue		MS	1	X	Corylus cornuta
SA 06 - AU 02 -P01	8/23/2018	1105	Plant Tissue		SH	1	X	Corylus cornuta
SA 06 - AU 03 -P01	8/23/2018	1153	Plant Tissue		LH	1	X	Corylus cornuta
SA 06 - AU 04 -P01	8/23/2018	1210	Plant Tissue		JW	1	X	Rosa sp
SA 06 - AU 05 -P01	8/23/2018	1225	Plant Tissue		JW	1	X	Rosa sp
SA 06 - AU 06 -P01	8/23/2018	1246	Plant Tissue		JW	1	X	Rosa sp
SA 06 - AU 07 -P01	8/23/2018	1300	Plant Tissue		JW	1	X	Rosa sp

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag — P

Preservation: — -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive unitl disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8-29-18 1231	[signature]	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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CHAIN OF CUSTODY

Client Contact	Project Contact: Lis Nelis	Site Contact: Jennifer Pretare 510-681-6401	Date: 8/24/2018	COC No:
Teck American Incorporated	Tel: 206-366-1659	Laboratory Contact: Mark Harris	Carrier: Josie Smith AECOM	___ of ___ COCs
	Analysis Turnaround Time			
	Calendar (C) or Business Days (B) B			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com	[X] 21 days			
Project Name: UCR 2018 Plant Tissue Study	[ ] Other ______			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA 07 - AU 01 -P01	8/24/2018	0922	Plant Tissue		LH	1	X		Prunus virginiana
SA 07 - AU 02 -P02 1	8/24/2018	0932	Plant Tissue		LH	1	X		Prunus virginiana
SA 07 - AU 03 -P03 1	8/24/2018	0946	Plant Tissue		LH	1	X		Prunus virginiana
SA 07 - AU 04 -P04 1	8/24/2018	1004	Plant Tissue		LH	1	X		Amelanchier alnifolia
SA 07 - AU 05 -P05 1	8/24/2018	1020	Plant Tissue		PH	1	X		Amelanchier alnifolia
SA 07 - AU 06 -P06 1	8/24/2018	1040	Plant Tissue		LH	1	X		Amelanchier alnifolia
SA 07 - AU 07 -P07 1	8/24/2018	1050	Plant Tissue		PH	1	X		Amelanchier alnifolia
SA 07 - AU 08 -P08 1	8/24/2018	1110	Plant Tissue		PH	1	X		Prunus virginiana
SA 07 - AU 09 -P09 1	8/24/2018	1231	Plant Tissue		PH	1	X		Pinus ponderosa
SA 07 - AU 10 -P10 01	8/24/2018	1249	Plant Tissue		PH	1	X		Prunus virginiana
SA 07 - AU 11 -P11 01	8/24/2018	1306	Plant Tissue		PH	1	X		Prunus virginiana
SA 07 - AU 12 -P12 01	8/24/2018	1324	Plant Tissue		PH	1	X		Pinus ponderosa
SA 07 - AU 13 -P13 01	8/24/2018	1342	Plant Tissue		PH	1	X		Pinus ponderosa

LH 8-28-18

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag — P

Preservation: — -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8-29-18 1231	[signature]	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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CHAIN OF CUSTODY

Client Contact	Project Contact: Lis Nelis	Site Contact: Jennifer Pretare 510-681-6401	Date: 8/27/2018	COC No:
Teck American Incorporated	Tel: 206-366-1659	Laboratory Contact: Mark Harris	Carrier: Josie Smith AECOM	____ of ____ COCs
	Analysis Turnaround Time			
	Calendar (C) or Business Days (B) B			
Cristy Kessel 509 496.1160 Cristy.Kessel@teck.com				
Project Name: UCR 2018 Plant Tissue Study	[X] 21 days			
	[ ] Other ________			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA 08 - AU 01 -P01	8/27/2018	1355	Plant Tissue		JW	1	X	X	Amelanchier alnifolia
SA 08 - AU 02 -P01	8/27/2018	1410	Plant Tissue		SH	1	X	X	Amelanchier alnifolia

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag — P

Preservation: — -20°C

Sample Disposal

[ ] Return To Client [ ] Disposal By Lab [X] Archive unitl disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8-29-18 1231	C Cammer	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

CHAIN OF CUSTODY

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Kelso, WA 98626
Ph: 360-577-7222 Fax: 360-636-1068

Client Contact	**Project Contact: Lis Nelis**	**Site Contact: Jennifer Pretare 510-681-6401**	**Date: 8/23/2018**	COC No:
Teck American Incorporated	**Tel: 206-366-1659**	**Laboratory Contact: Mark Harris**	**Carrier: Josie Smith AECOM**	____ of ____ COCs
	Analysis Turnaround Time			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com	Calendar (C) or Business Days (B) B			
Project Name: UCR 2018 Plant Tissue Study	[X] 21 days			
	[ ] Other ________			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Sample Specific Notes:
SA 09 - AU 01 -P01	8/25/2018	0859	Plant Tissue		LH	1	X	Corylus cornuta
SA 09 - AU 02 -P01	8/25/2018	0910	Plant Tissue		LH	1	X	Rosa sp
SA 09 - AU 03 -P01	8/25/2018	0916	Plant Tissue		LH	1	X	Rosa sp
SA 09 - AU 04 -P01	8/25/2018	0932	Plant Tissue		LH	1	X	Prunus virginiana

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag — P
Preservation: — -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8/24/18 1231	[signature]	ALS	8/24/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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Kelso, WA 98626
Ph: 360-577-7222 Fax: 360-636-1068

CHAIN OF CUSTODY

Client Contact	Project Contact: Lis Nelis	Site Contact: Jennifer Pretare 510-681-6401	Date: 8/27/2018	COC No:
Teck American Incorporated	Tel: 206-366-1659	Laboratory Contact: Mark Harris	Carrier: Josie Smith AECOM	___ of ___ COCs
	Analysis Turnaround Time			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com	Calendar (C) or Business Days (B) B			
Project Name: UCR 2018 Plant Tissue Study	[X] 21 days			
Lab Quote #: 44121	[ ] Other ______			

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA 14 - AU 01 -P01	8/27/2018	0903	Plant Tissue		LH	1	X	X	Mentha aruensis
SA 14 - AU 02 -P01	8/27/2018	0915	Plant Tissue		LH	1	X	X	Mentha aruensis
SA 14 - AU 03 -P01	8/27/2018	0932	Plant Tissue		LH	~~1~~ VP 2 1	X	X	Mentha aruensis
SA 14 - AU 04 -P01	8/27/2018	0947	Plant Tissue		LH	9-5-18 1	X	X	Mentha aruensis
SA 14 - AU 05 -P01	8/27/2018	1008	Plant Tissue		PH	1	X	X	Mentha aruensis
SA 14 - AU 06 -P01	8/27/2018	1010	Plant Tissue		PH	1	X	X	Mentha aruensis
SA 14 - AU 07 -P01	8/27/2018	1027	Plant Tissue		LH	1	X	X	Mentha aruensis
SA 14 - AU 08 -P01	8/27/2018	1050	Plant Tissue		LH	1	X	X	Mentha aruensis
SA 14 - AU 09 -P01	8/27/2018	1100	Plant Tissue		LH	1	X	X	Schoenoplectus acutus
SA 14 - AU 10 -P01	8/27/2018	1105	Plant Tissue		LH	1	X	X	Schoenoplectus acutus
SA 14 - AU 11 -P01	8/27/2018	1118	Plant Tissue		LH	1	X	X	Schoenoplectus acutus
SA 14 - AU 12 -P01	8/27/2018	1200	Plant Tissue		PH	~~1~~ VP 2 1 9-5-18	X	X	Schoenoplectus acutus
Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag							P		
Preservation:							-20°C		

Sample Disposal
[ ] *Return To Client* [ ] *Disposal By Lab* [X] *Archive unitl disposal permitted by EPA*

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8-29-18 1231	[signature]	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

CHAIN OF CUSTODY

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1317-S-13th-Ave
Kelso, WA 98626
Ph: 360-577-7222 Fax: 360-636-1068

Client Contact	Project Contact: Lis Nelis	Site Contact: Jennifer Pretare 510-681-6401	Date: 8/27/2018
Teck American Incorporated	Tel: 206-366-1659	Laboratory Contact: Mark Harris	Carrier: Josie Smith AECOM
Cristy Kessel 509 496 1160 Cristy.Kessel@teck.com	Analysis Turnaround Time		
Project Name: UCR 2018 Plant Tissue Study	Calendar (C) or Business Days (B) B		
Lab Quote #: 44121	[X] 21 days [ ] Other ______		

COC No: ______ of ______ COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA 14 - AU 13 -P01	8/27/2018	1215	Plant Tissue		PH	1	X	X	Schoenoplectus acutus
SA 14 - AU 14 -P01	8/27/2018	1223	Plant Tissue		PH	1	X	X	Schoenoplectus acutus
SA 14 - AU 15 -P01	8/27/2018	1237	Plant Tissue		LH	1	X	X	Rosa sp.
SA 14 - AU 16 -P01	8/27/2018	1250	Plant Tissue		AU	1	X	X	Amelanchier alnifolia

delete 9-18-18 Jem

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag — P

Preservation: — -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
(signature)	AECOM	8-29-18 1231	(signature)	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

ALS-Environmental-Kelso
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Ph: 360-577-7222 Fax: 360-636-1068

CHAIN OF CUSTODY

Client Contact
Teck American Incorporated

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study

Lab Quote #: 44121

Project Contact: Lis Nelis
Tel: 206-366-1659
Analysis Turnaround Time
Calendar (C) or Business Days (B) B

[X] 21 days
[ ] Other ____

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: 8/28/2018
Carrier: Josie Smith AECOM
COC No: ____ of ____ COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA 15 - AU 01 -P01	8/28/2018	945	~~Soil~~ plant		PH	1	X	X	Salix exigna
SA 15 - AU 02 -P01	8/28/2018	955	~~Soil~~ plant		PH	1	X	X	Salix exigna
SA 15 - AU 03 -P01	8/28/2018	1013	~~Soil~~ plant		PH	1	X	X	Salix exigna
SA 15 - AU 04 -P01	8/28/2018	1020	~~Soil~~ plant		PH	1	X	X	Salix exigna
SA 15 - AU 05 -P01	8/28/2018	1036	~~Soil~~ plant		PH	1	X	X	Salix exigna
SA 15 - AU 06 -P01	8/28/2018	1055	~~Soil~~ plant		PH	1	X	X	Salix exigna
SA 15 - AU 07 -P01	8/28/2018	1105	~~Soil~~ plant		PH	1	X	X	Salix exigna

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag — P
Preservation: — -20°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8-29-18 1231	[signature]	ALS	8/29/18 1231

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Ph: 360-577-7222 Fax: 360-636-1068

CHAIN OF CUSTODY

Client Contact
Teck American Incorporated

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study
Lab Quote #: 44121

Project Contact: Lis Nelis
Tel: 206-366-1659
Analysis Turnaround Time
Calendar (C) or Business Days (B) B
[X] 21 days
[ ] Other ______

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: 8/23/2018
Carrier: Josie Smith AECOM
COC No: ____ of ____ COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Sample Specific Notes:
SA 01 - AU 01 -S01	8/22/2018	0822	Soil		SH	1	X	
SA 01 - AU 02 -S01	8/22/2018	0903	Soil		SH	1	X	
SA 01 - AU 03 -S01	8/22/2018	0907	Soil		SH	1	X	
SA 01 - AU 04 -S01	8/22/2018	0927	Soil		SH	1	X	
SA 01 - AU 05 -S01	8/22/2018	0950	Soil		SH	1	X	
SA 01 - AU 06 -S01	8/22/2018	1015	Soil		SH	1	X	
SA 01 - AU 07 -S01	8/22/2018	1038	Soil		SH	1	X	
SA 01 - AU 08 -S01	8/22/2018	1059	Soil		SH	1	X	
SA 01 - AU 09 -S01	8/22/2018	1123	Soil		SH	1	X	
SA 01 - AU 10 -S01	8/22/2018	1240	Soil		SH	1	X	
SA 01 - AU 11 -S01	8/22/2018	1325	Soil		SH	1	X	
SA 01 - AU 12 -S01	8/22/2018	1355	Soil		SH	1	X	
Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag							WMG	
Preservation:							0-6C	

Sample Disposal
[ ] *Return To Client* [ ] *Disposal By Lab* [X] *Archive until disposal permitted by EPA*

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8-29-18 1231	[signature]	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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Kelso, WA 98626
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CHAIN OF CUSTODY

Client Contact
Teck American Incorporated

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study

Lab Quote #: 44121

Project Contact: Lis Nelis
Tel: 206-366-1659
Analysis Turnaround Time
Calendar (C) or Business Days (B) B

[X] 21 days

[ ] Other ______

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: 8/16/2018
Carrier: Josie Smith AECOM
COC No:
____ of ____ COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Sample Specific Notes:
SA 02 - AU 01 -S01	8/21/2018	1410	Soil		SH	1	X	
SA 02 - AU 02 -S01	8/21/2018	1423	Soil		SH	1	X	
SA 02 - AU 03 -S01	8/21/2018	1440	Soil		SH	1	X	
SA 02 - AU 04 -S01	8/21/2018	1508	Soil		SH	1	X	
SA 02 - AU 05 -S01	8/21/2018	1509	Soil		SH	1	X	
SA 02 - AU 06 -S01	8/21/2018	1536	Soil		SH	1	X	

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag — WMG
Preservation: — 0-6C

Sample Disposal
[ ] *Return To Client* [ ] *Disposal By Lab* [X] *Archive until disposal permitted by EPA*

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8-29-18 1231	[signature]	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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CHAIN OF COUSTODY

Client Contact	Project Contact: Lis Nelis	Site Contact: Jennifer Pretare 510-681-6401	Date: 8/23/2018	COC No:
Teck American Incorporated	Tel: 206-366-1659	Laboratory Contact: Mark Harris	Carrier: Josie Smith AECOM	___ of ___ COCs
	Analysis Turnaround Time			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com	Calendar (C) or Business Days (B) B			
Project Name: UCR 2018 Plant Tissue Study	[X] 21 days			
Lab Quote #: 44121	[ ] Other ______			

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Sample Specific Notes:
SA 03 - AU 01 -S01	8/21/2018	0850	Soil		SH	1	X	
SA 03 - AU 02 -S01	8/21/2018	0929	Soil		SH	1	X	
SA 03 - AU 03 -S01	8/21/2018	0932	Soil		SH	1	X	
SA 03 - AU 04 -S01	8/21/2018	1001	Soil		SH	2	X	
SA 03 - AU 05 -S01	8/21/2018	1038	Soil		SH	1	X	
SA 03 - AU 06 -S01	8/21/2018	1100	Soil		SH	1	X	
SA 03 - AU 07 -S01	8/21/2018	1215	Soil		SH	1	X	
SA 03 - AU 08 -S01	8/21/2018	1238	Soil		SH	2	X	
SA 03 - AU 09 -S01	8/21/2018	1302	Soil		SH	1	X	
Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag							WMG	
Preservation:							0-6C	

Sample Disposal
[ ] *Return To Client* [ ] *Disposal By Lab* [X] *Archive unitl disposal permitted by EPA*

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8-29-18 1231	C Cames [signature]	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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CHAIN OF CUSTODY

Client Contact
Teck American Incorporated

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study

Lab Quote #: 44121

Project Contact: Lis Nelis
Tel: 206-366-1659
Analysis Turnaround Time
Calendar (C) or Business Days (B) B
[X] 21 days
[ ] Other ________

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: 8/23/2018
Carrier: Josie Smith AECOM
COC No:
____ of ____ COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Sample Specific Notes:
SA 04 - AU 01 -S01	8/23/2018	0845	Soil		SH	1	X	
SA 04 - AU 02 -S01	8/23/2018	0846	Soil		SH	1	X	
SA 04 - AU 03 -S01	8/23/2018	0901	Soil		SH	1	X	
SA 04 - AU 04 -S01	8/23/2018	0914	Soil		SH	1	X	
SA 04 - AU 05 -S01	8/23/2018	0941	Soil		SH	2	X	
SA 04 - AU 06 -S01	8/23/2018	1005	Soil		SH	1	X	

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag — WMG
Preservation: — 0-6°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive unill disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Josie Smith	AECOM	8-29-18 1231	[signature]	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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CHAIN OF CUSTODY

Client Contact	Project Contact: Lis Nelis	Site Contact: Jennifer Pretare 510-681-6401	Date: 8/23/2018	COC No:
Teck American Incorporated	Tel: 206-366-1659	Laboratory Contact: Mark Harris	Carrier: Josie Smith AECOM	___ of ___ COCs
	Analysis Turnaround Time			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com	Calendar (C) or Business Days (B) B			
Project Name: UCR 2018 Plant Tissue Study	[X] 21 days			
	[ ] Other ______			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Sample Specific Notes:
SA 06 - AU 01 -S01	8/23/2018	1050	Soil		SH	2	X	
SA 06 - AU 02 -S01	8/23/2018	1110	Soil		SH	1	X	
SA 06 - AU 03 -S01	8/23/2018	1200	Soil		SH	1	X	
SA 06 - AU 04 -S01	8/23/2018	1215	Soil		SH	1	X	
SA 06 - AU 05 -S01	8/23/2018	1234	Soil		SH	1	X	
SA 06 - AU 06 -S01	8/23/2018	1253	Soil		SH	1	X	
SA 06 - AU 07 -S01	8/23/2018	1311	Soil		SH	1	X	

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag — WMG
Preservation: — 0-6°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8-24-18 1231	[signature]	ALS	8/24/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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CHAIN OF CUSTODY

Client Contact	Project Contact: Lis Nelis	Site Contact: Jennifer Pretare 510-681-6401	Date: 8/24/2018	COC No:
Teck American Incorporated	Tel: 206-366-1659	Laboratory Contact: Mark Harris	Carrier: Josie Smith AECOM	1 of 1 COCs
	Analysis Turnaround Time			
	Calendar (C) or Business Days (B) B			
Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com				
Project Name: UCR 2018 Plant Tissue Study	[X] 21 days			
	[ ] Other ____			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA 07 - AU 01 -S01	8/24/2018	935	Soil		SH	1	X		
SA 07 - AU 02 -S01	8/24/2018	936	Soil		SH	1	X		
SA 07 - AU 03 -S01	8/24/2018	952	Soil		SH	1	X		
SA 07 - AU 04 -S01	8/24/2018	1012	Soil		SH	2	X		
SA 07 - AU 05 -S01	8/24/2018	1032	Soil		SH	1	X		
SA 07 - AU 06 -S01	8/24/2018	1100	Soil		SH	1	X		
SA 07 - AU 07 -S01	8/24/2018	1104	Soil		SH	1	X		
SA 07 - AU 08 -S01	8/24/2018	1115	Soil		SH	1	X		
SA 07 - AU 09 -S01	8/24/2018	1237	Soil		SH	1	X		
SA 07 - AU 10 -S01	8/24/2018	1257	Soil		SH	1	X		
SA 07 - AU 11 -S01	8/24/2018	1315	Soil		SH	2	X		
SA 07 - AU 12 -S01	8/24/2018	1335	Soil		SH	1	X		
SA 07 - AU 13 -S01	8/24/2018	1345	Soil		SH	1	X		
Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag							WMG		
Preservation:							0-6°C		

Sample Disposal
[ ] *Return To Client* [ ] *Disposal By Lab* [X] *Archive until disposal permitted by EPA*

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by: [signature]	Company: AECOM	Date/Time: 8-29-18 1231	Received by: [signature]	Company: ALS	Date/Time: 8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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CHAIN OF CUSTODY

Client Contact
Teck American Incorporated

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com

Project Name: UCR 2018 Plant Tissue Study

Lab Quote #: 44121

Project Contact: Lis Nelis
Tel: 206-366-1659
Analysis Turnaround Time
Calendar (C) or Business Days (B) B

[X] 21 days
[ ] Other ________

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: 8/27/2018
Carrier: Josie Smith AECOM
COC No: ______ of ______ COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA 08 - AU 01 -S01	8/27/2018	1358	Soil		SH	1	X	X	
SA 08 - AU 02 -S01	8/27/2018	1419	Soil		SH	1	X	X	
Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag							WMG		
Preservation:							0-6°C		

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive unitl disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8-29-18 10:31	[signature]	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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CHAIN OF CUSTODY

Client Contact
Teck American Incorporated

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study

Lab Quote #: 44121

Project Contact: Lis Nelis
Tel: 206-366-1659
Analysis Turnaround Time
Calendar (C) or Business Days (B) B

[X] 21 days
[ ] Other ______

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: 8/23/2018
Carrier: Josie Smith AECOM
COC No:
____ of ____ COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Sample Specific Notes:
SA 09 - AU 01 -S01	8/25/2018	0905	Soil		SH	1	X	
SA 09 - AU 02 -S01	8/25/2018	0921	Soil		SH	1	X	
SA 09 - AU 03 -S01	8/25/2018	0922	Soil		SH	1	X	
SA 09 - AU 04 -S01	8/25/2018	0937	Soil		SH	1	X	

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag — WMG
Preservation: — 0-6°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA
W

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8-29-18 1231	[signature]	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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CHAIN OF CUSTODY

Client Contact
Teck American Incorporated

Cristy Kessel 509 496 1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study

Lab Quote #: 44121

Project Contact: Lis Nelis
Tel: 206-366-1659
Analysis Turnaround Time
Calendar (C) or Business Days (B) B

[x] 21 days
[ ] Other ______

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: 8/27/2018
Carrier: Josie Smith AECOM
COC No:
____ of ____ COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA 14 - AU 01 -S01	8/27/2018	0909	Soil		SH	1	X	X	
SA 14 - AU 02 -S01	8/27/2018	0923	Soil		SH	1	X	X	
SA 14 - AU 03 -S01	8/27/2018	0940	Soil		SH	2	X	X	
SA 14 - AU 04 -S01	8/27/2018	0953	Soil		SH	1	X	X	
SA 14 - AU 05 -S01	8/27/2018	1020	Soil		SH	1	X	X	
SA 14 - AU 06 -S01	8/27/2018	1022	Soil		SH	1	X	X	
SA 14 - AU 07 -S01	8/27/2018	1035	Soil		SH	1	X	X	
SA 14 - AU 08 -S01	8/27/2018	1055	Soil		SH	1	X	X	
SA 14 - AU 09 -S01	8/27/2018	1110	Soil		SH	1	X	X	
SA 14 - AU 10 -S01	8/27/2018	1115	Soil		SH	1	X	X	
SA 14 - AU 11 -S01	8/27/2018	1120	Soil		SH	1	X	X	
SA 14 - AU 12 -S01	8/27/2018	1205	Soil		SH	2	X	X	
Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag							WMG		
Preservation:							0-6°C		

Sample Disposal
[ ] *Return To Client* [ ] *Disposal By Lab* [X] *Archive until disposal permitted by EPA*

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	AECOM	8-27-18 1231	[signature]	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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CHAIN OF CUSTODY

Client Contact	Project Contact: Lis Nelis	Site Contact: Jennifer Pretare 510-681-6401	Date: 8/27/2018	COC No:
Teck American Incorporated	Tel: 206-366-1659	Laboratory Contact: Mark Harris	Carrier: Josie Smith AECOM	____ of ____ COCs
	Analysis Turnaround Time			
	Calendar (C) or Business Days (B) B			
Cristy Kessel 509 496.1160 Cristy.Kessel@teck.com				
Project Name: UCR 2018 Plant Tissue Study	[X] 21 days			
	[ ] Other ______			
Lab Quote #: 44121				

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA 14 - AU 13 -P01	8/27/2018	1215	Plant Tissue		PH	1	X	X	Schoenoplectus acutus
SA 14 - AU 14 -P01	8/27/2018	1223	Plant Tissue		PH	1	X	X	Schoenoplectus acutus
SA 14 - AU 15 -P01	8/27/2018	1237	Plant Tissue		LH	1	X	X	Rosa sp.
SA 14 - AU 16 -P01	8/27/2018	1250	Plant Tissue		AU	1	X	X	Amelanchier alnifolia
Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag							P		
Preservation:							-20°C		

Sample Disposal
[ ] *Return To Client* [ ] *Disposal By Lab* [X] *Archive until disposal permitted by EPA*

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Josie a Smith	AECOM	8-29-18 1231	C Cameron	ALS	8/29/18 1231
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

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CHAIN OF COUSTODY

Client Contact
Teck American Incorporated

Cristy Kessel 509.496.1160 Cristy.Kessel@teck.com
Project Name: UCR 2018 Plant Tissue Study

Lab Quote #: 44121

Project Contact: Lis Nelis
Tel: 206-366-1659
Analysis Turnaround Time
Calendar (C) or Business Days (B) B

[X] 21 days
[ ] Other ______

Site Contact: Jennifer Pretare 510-681-6401
Laboratory Contact: Mark Harris
Date: 8/27/2018
Carrier: Josie Smith AECOM
COC No:
1 of 1 COCs

Sample Identification	Sample Date	Sample Time	Matrix	QC Sample	Sampler's Initials	Total No. of Cont.	TAL Metals	Mercury	Sample Specific Notes:
SA 15 - AU 01 -S01	8/28/2018	0950	Soil		SH	2	X	X	
SA 15 - AU 02 -S01	8/28/2018	0957	Soil		SH	1	X	X	
SA 15 - AU 03 -S01	8/28/2018	1022	Soil		SH	1	X	X	
SA 15 - AU 04 -S01	8/28/2018	1023	Soil		SH	1	X	X	
SA 15 - AU 05 -S01	8/28/2018	1041	Soil		SH	1	X	X	
SA 15 - AU 06 -S01	8/28/2018	1059	Soil		SH	1	X	X	
SA 15 - AU 07 -S01	8/28/2018	1108	Soil		SH	1	X	X	

Container Type: WMG=Wide Mouth Glass Jar, P=Poly Bag — WMG
Preservation: — 0-6°C

Sample Disposal
[ ] Return To Client [ ] Disposal By Lab [X] Archive until disposal permitted by EPA

Special Instructions/QC Requirements & Comments:

Relinquished by	Company	Date/Time	Received by	Company	Date/Time
[signature]	AECOM	8-29-18 1231	[signature]	ALS	8/29/18 1231