

WHEELER SOIL AND WATER CONSERVATION DISTRICT

WHEELER WEED WARRIORS



TREE-OF-HEAVEN

FIVE-YEAR (2024 - 2028)

TREATMENT AND RESTORATION PLAN

Tree-of-heaven (*Ailanthus altissima*)

ODA rating: B (*A weed of economic importance which is regionally abundant, but may have limited distribution in some counties*)

Tree-of-heaven is a rapidly growing deciduous tree native to both northeast and central China, as well as Taiwan. It was first introduced into the United States in the Philadelphia, PA area in the late 1700s. Immigrants later introduced tree-of-heaven to the West Coast in the 1850s.

The tree was initially valued as a unique, fast-growing ornamental shade tree with the ability to grow under a wide range of site conditions, tolerating poor soils and air quality. It was widely planted from New York City to Washington, D.C. By the early 1900s the tree began losing popularity due to its "weedy" nature, prolific root sprouting, and foul odor. Tree-of-heaven has spread and become a common invasive plant in urban, agricultural, and forested areas (*Jackson, David R, et al. "Tree-of-Heaven." Penn State Extension, extension.psu.edu/tree-of-heaven. Accessed 20 Nov. 2023.*).

This plan serves as the Wheeler SWCD's recommendation for eradication of Tree-of-heaven from Wheeler County and post-treatment site restoration.

DESCRIPTION

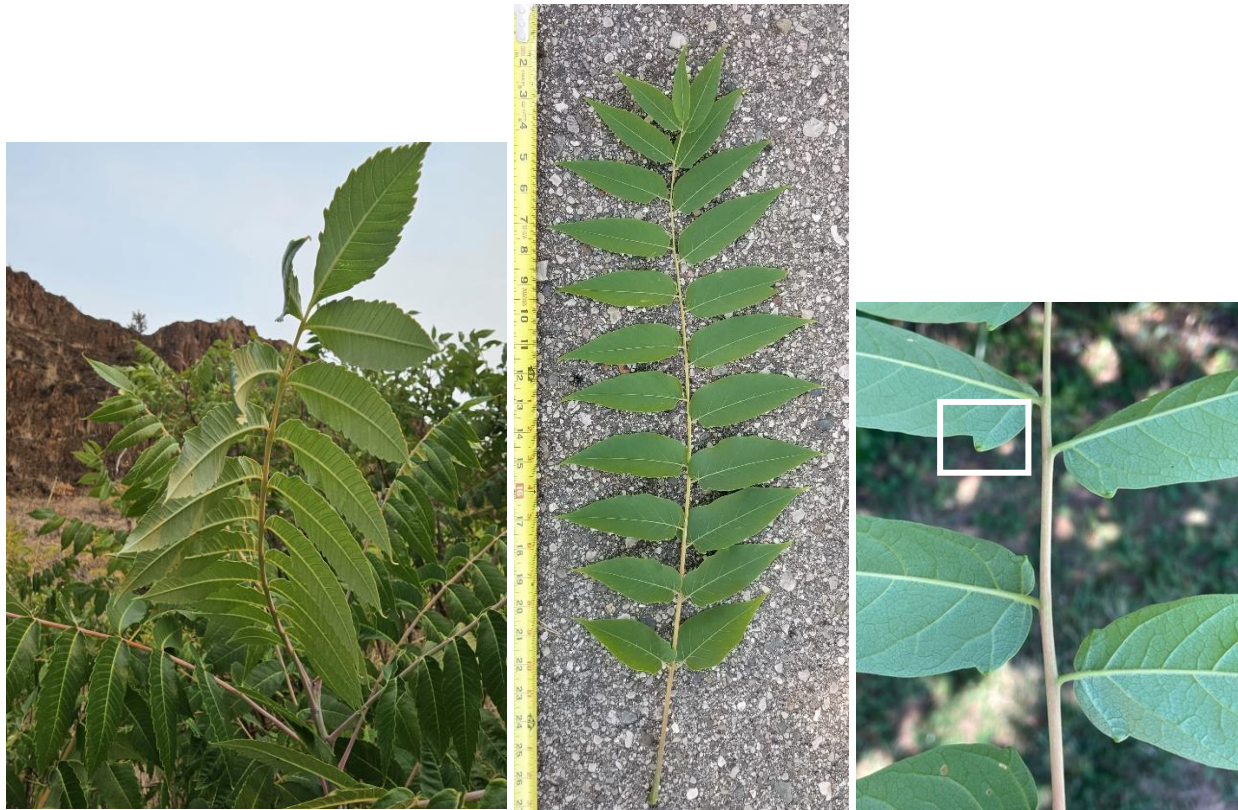
Tree-of-heaven is a fast-growing deciduous tree. It grows as a single tree (left) or as many stems (right).



Tree-of-heaven has an extensive root system, including shallow roots. The shallow ones produce many shoots that emerge far from the trunk of the established tree.



Leaves have a large central stem with leaflets arranged alternate each other along the stem. A single leaf is 1–3 feet long. Tree-of-heaven's leaves have a notched base on each leaflet as highlighted by the white box in the far-right photo.



Mature trees grow as a single trunk up to 100 feet tall. The bark of younger trees is smooth and brownish-green (right photo). Bark is textured with shallow, diamond-shaped fissures and colored shades of brown and gray as trees age (left photo). It is often compared to cantaloupe skin.



Established female trees produce hundreds of thousands of seeds each year. The seed forms inside clusters of samaras and remains on the tree through winter.



ECOLOGY

Tree-of-heaven is an extremely competitive, fast-growing tree with young sprouts growing as much as 10 to 15 feet in a year. Once established, it can overrun native vegetation by developing dense thickets of cloned trees. It can dominate colonized sites indefinitely through resprouting and root suckering. Coupled with its size and structural weakness, the rapid rate of spread and growth of tree-of-heaven makes it an acute hazard along roadsides. In urban areas, tree-of-heaven roots can damage sewer lines and structures.



Tree-of-heaven is a prolific seed producer; and its seed may be dispersed via wind, water, birds, and farm or road equipment. However, the majority of new plants within an area are usually from root sprouts. If the top is removed or the stump is cut, new sprouts from shallow, lateral roots may occur 50 to 90 feet from the parent tree.

Tree-of-heaven is highly adaptable and can grow under limiting or harsh conditions such as soils that are saline, nutrient poor, or highly compacted. It will also grow in areas affected by heat, drought, or pollution. Allelopathic chemicals in leaves, bark, roots, and seed inhibit growth and germination of surrounding plants

TREATMENT

Control efforts for tree-of-heaven should focus first on preventing establishment in new areas. Next, small infestations should be treated; mature female trees located on otherwise healthy sites should especially be targeted to reduce the seed production. Finally, large infestations should be removed or at least controlled. Management efforts should focus on treatments that stress the root system and lead to a reduction in seed production. For example, a treatment regime should be started early in the summer when root reserves are at their lowest and repeated as necessary to keep root reserves low.

Complete control for tree-of-heaven will likely require 1 to 5 years of continuous planning and integrated management. The following actions should be considered:

- Maintain healthy plant communities to limit tree-of- heaven establishment. Minimize disturbance and/or promptly revegetate disturbed or bare ground areas with desirable native species.
- Conduct surveys, map known infestations, and monitor for tree-of-heaven, especially on roadsides, fence lines, trails, waterways, parking lots, etc. Keep annual records of reported infestations.
- Combine mechanical, cultural, and chemical methods for most effective control of tree-of-heaven.
- Implement a monitoring and follow-up treatment plan in areas where control practices have been made to further suppress root sprouts and seedlings.

Below tables show management options for controlling tree-of-heaven under various situations. Choice of individual control method(s) for tree-of-heaven depends on the density and degree of the infestation, current land use, and site conditions (accessibility, terrain, microclimate, other flora and fauna present, etc.). Other important considerations include treatment effectiveness, overall cost, and number of years needed to achieve control. More than one control method may be needed for a particular site.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Bud Break												
Flowering and Seed Ripening												
Foliar or Stem Treatment												
Cutting after Treatment												

Treatment	Timing	Herbicide	Product Rate	Comments
Foliar Application	July 1 to onset of fall color	Glyphosate, plus Garlon 3A Triclopyr 3lb/gal or Vastlan Triclopyr 4lb/gal	3 quarts/acre, plus 2 quarts/acre or 1.5 quarts/acre	The combination of glyphosate and triclopyr provides a broad-spectrum treatment that is effective against tree-of-heaven and other woody species that should also be targeted during the operation. This is a nonselective mixture, but it has little soil activity and poses little risk to nontarget organisms through root uptake. Garlon 3A and Vastlan are both triclopyr formulations but have different active ingredient concentrations. A surfactant (e.g., Alligare 90) needs to be added. If using a different glyphosate product, be sure to check the product label to see if a surfactant is needed (some come premixed).
Basal Bark	July 1 to onset of fall color	Pathfinder II or Garlon 4 Ultra Triclopyr	Ready to use or 20% 1:4 in basal oil	Pathfinder II is a ready-to-use oil-based formulation of triclopyr used for basal bark applications. Treat stems up to 6 inches in basal diameter by wetting the entire circumference of the lower 12 to 18 inches, without runoff; apply a shorter band to small-diameter stems. This technique is best suited for treating small infestations or as a follow-up to treat surviving stems after a foliar application. If stems are larger than 6 inches in basal diameter use hack-and-squirt.
Hack and Squirt	July 1 to onset of fall color	Glyphosate or Garlon 3A Triclopyr 3lb/gal or Vastlan Triclopyr 4lb/gal	Use either product undiluted or 1:1 with water	Glyphosate or triclopyr in water are effective for hack-and-squirt treatments. It is essential to space the cuts, leaving intact bark between them. If the stem is completely girdled, the herbicide cannot translocate to roots. A simple guideline for the number of hacks is one per inch of diameter, with a minimum of two. Spray herbicide solution into hacks immediately using a squirt bottle, filling the cuts. This treatment is best suited for low stem numbers and stems at least 1 inch in diameter.
Cut Stump	N/A	N/A	N/A	If cutting tree-of-heaven for immediate safety reasons, do so and treat the stump. However, cut stump herbicide applications are not recommended because they do not provide effective control of roots. Stump treatments will keep the stump free of sprouts, but they will not prevent root suckering. When tree removal is necessary, it is best to treat with one of the above-mentioned herbicide applications first, wait for symptoms to develop (generally 30 days), and then cut.

WHEELER SWCD FIVE-YEAR STRATEGY

Wheeler SWCD aspires to eradicate all tree-of-heaven from Wheeler County and implement restoration efforts at eradicated sites. To do so, SWCD staff will seek funding assistance from applicable agencies with mutual missions.

Wheeler SWCD understands that the process to eradicate tree-of-heaven and restoration of sites require a long-term, multi-phase effort. Additionally, Wheeler SWCD recognizes that locations of known infestations are wide spread requiring significant miles to be travelled between sites.

Approach

Wheeler SWCD will solicit assistance from multiple contractors/volunteers, who will conduct treatment and restoration based on a zone approach:

Zone 1 includes infestations along Hwy 19 (primarily near the John Day River with one site along Service Creek) and within the town of Spray.

Zone 2 includes infestations along Hwy 207S, along Hwy 26 east of Mitchell and within the town of Mitchell.

Zone 3 includes infestations in the Twickenham area (along Rowe Creek Rd., Girds Creek Rd., and the Sutton Mtn Cutoff Rd.)

Zone 4 includes an infestation near the BLM Locus Grove Campground on Burnt Ranch Rd.

Density of infestations will be determined on a scale developed by Wheeler SWCD staff. The primary purpose of this scale is to determine contractor/applicator needs and timeline for successful treatment of each infestation site.

Density	Description	Treatment Needs
1	Minimal (1-10) number of trees/sprouts present and/or sparsely dispersed throughout the site.	Anticipated to be completed with 2-person crew. (i.e. 1 applicator and 1 sawyer). <ul style="list-style-type: none"> • Treated in year one • Cut in year two • Monitored in subsequent years • Minimal potential restoration needed
2	Multiple infestations across adjacent properties and/or heavily infested but very small area.	Anticipated to potentially be completed with a 2 to 4-person crew. <ul style="list-style-type: none"> • Treated in year one • Cut in year two • Monitored in subsequent years • Some potential restoration needed
3	Heavily infested site with minimal access between trees/sprouts and/or large area of infestation.	Anticipated to need a crew of at least 6-persons with a high-level restoration need requiring additional crews/expertise. <ul style="list-style-type: none"> • Treatment will require 2-3 years • Extensive restoration to be needed

Year One (2024)

The first year of this plan, Wheeler SWCD is applying for funding assistance through an ODA Noxious Weed Grant application and will allocate funding from an existing BLM Agreement.

All sites will be treated in zones 1, 2, and 4.

One third (1/3) of each site will be treated in zone 3.

Year Two (2025)

Wheeler SWCD will apply for funding assistance through an ODA Noxious Weed Grant application and will allocate funding from an existing BLM Agreement. Additional funding sources will continually be pursued.

All sites will be monitored and retreated, if necessary, in zones 1, 2, and 4.

The year one treated sections of each site will be monitored and retreated, if necessary, in zone 3. Another one third (1/3) of each site will be treated.

Year Three (2026)

Wheeler SWCD will apply for additional funding assistance through an ODA Noxious Weed Grant application and will seek renewal of an agreement with BLM. Additional funding sources will continually be pursued.

All sites will be monitored and retreated, if necessary, in zones 1, 2, and 4.

The years one and two sections of each site will be monitored and retreated, if necessary, in zone 3. The last one third (1/3) of each site will be treated.

Year Four (2027)

Wheeler SWCD will apply for additional funding assistance through an ODA Noxious Weed Grant application and will seek renewal of an agreement with BLM. Restoration funding assistance will be sought. Additional funding sources will continually be pursued.

All sites will be monitored and retreated, if necessary, in zones 1, 2, and 4. Implementation of restoration will begin on all sites.

Each site will be monitored and retreated, if necessary, in zone 3. Implementation of restoration will begin on areas treated in year one (2024).

Year Five (2028)

Wheeler SWCD will apply for additional funding assistance through an ODA Noxious Weed Grant application and will seek renewal of an agreement with BLM. Additional funding sources will continually be pursued.

All sites will be monitored and retreated, if necessary, in zones 1, 2, and 4. Restoration of all sites will continue, if necessary.

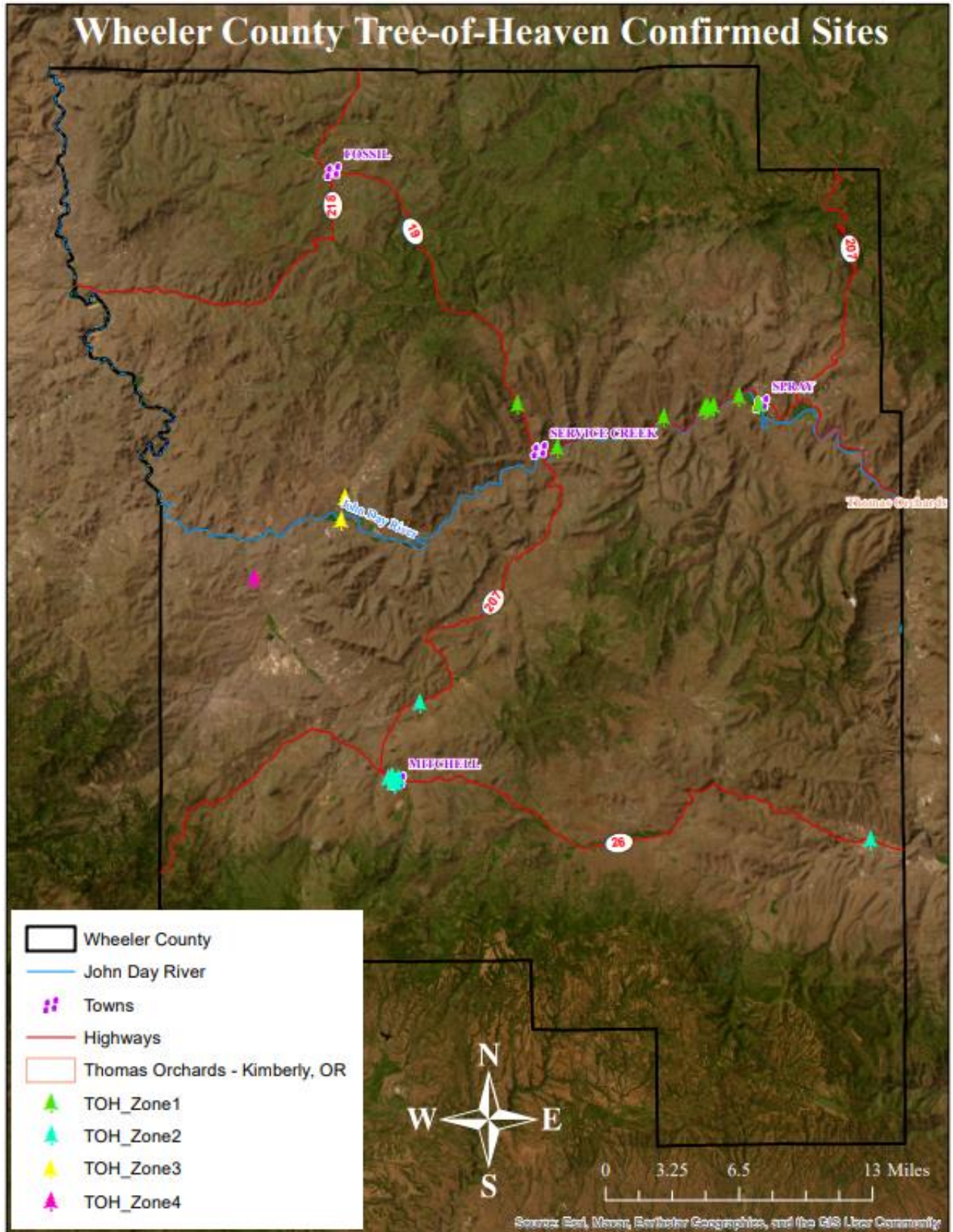
Each site will be monitored and retreated, if necessary, in zone 3. Restoration will continue on the year one sections and begin on the year two (2025) treated sections.

Subsequent Years

The need for additional years of treatment will be determined through adaptive management and declared through revisions to this plan.

Year		Age	Treatment Method	Treatment Time	Capacity
1	Eradication	Young <1" DBH	Foliar	End of August / September	Contracted and/or in-house applicator
1	Eradication	Young 1-6" DBH	Hack/Squirt	End of August / September	Contracted/volunteer sawyer, contracted and/or in-house applicator
1	Eradication	Old >6" DBH	Hack/Squirt	End of August / September	Contracted/volunteer sawyer, contracted and/or in-house applicator
2	Eradication	Young <1" DBH	Foliar	End of August / September	Contracted and/or in-house applicator
2	Eradication	Young 1-6" DBH	Hack/Squirt	End of August / September	Contracted/volunteer sawyer, contracted and/or in-house applicator
2	Eradication	Old >6" DBH	Hack/Squirt	End of August / September	Contracted/volunteer sawyer, contracted and/or in-house applicator
2	Eradication	Prior Year Treated	Cut/Burn	Onset of winter weather	Contracted/volunteer sawyer
3	Eradication	Young <1" DBH	Foliar	End of August / September	Contracted and/or in-house applicator
3	Eradication	Young 1-6" DBH	Hack/Squirt	End of August / September	Contracted/volunteer sawyer, contracted and/or in-house applicator
3	Eradication	Old >6" DBH	Hack/Squirt	End of August / September	Contracted/volunteer sawyer, contracted and/or in-house applicator
3	Eradication	Prior Year Treated	Cut/Burn	Onset of winter weather	Contracted/volunteer sawyer
4	Eradication	Young <1" DBH	Foliar	End of August / September	Contracted and/or in-house applicator
4	Eradication	Young 1-6" DBH	Hack/Squirt	End of August / September	Contracted/volunteer sawyer, contracted and/or in-house applicator
4	Eradication	Old >6" DBH	Hack/Squirt	End of August / September	Contracted/volunteer sawyer, contracted and/or in-house applicator
4	Eradication	Prior Year Treated	Cut/Burn	Onset of winter weather	Contracted/volunteer sawyer
4	Restoration	Planting of native vegetation, species/mixes to be planned by conservation staff and landowner			
5	Eradication	Young <1" DBH	Foliar	End of August / September	Contracted and/or in-house applicator
5	Eradication	Young 1-6" DBH	Hack/Squirt	End of August / September	Contracted/volunteer sawyer, contracted and/or in-house applicator
5	Eradication	Old >6" DBH	Hack/Squirt	End of August / September	Contracted/volunteer sawyer, contracted and/or in-house applicator
5	Eradication	Prior Year Treated	Cut/Burn	Onset of winter weather	Contracted/volunteer sawyer
5	Restoration	Planting of native vegetation, species/mixes to be planned by conservation staff and landowner			

WHEELER COUNTY CONFIRMED TREE-OF-HEAVEN SITES (as of November 2023)



Site	Zone	Landowner	Location	Gross Ac.	Density
1	1	Potter	44.83096957, -120.03177015	0.483160	2
2	1	Webber-Myers	44.79975000, -119.99246000	0.017392	1
3	1	Bader-BLM	44.82106008, -119.88687852	1.245505	1
4	1	Mulvaney	44.82607144, -119.84635871	3.339836	2
5	1	Gray	44.82736979, -119.84365966	2.251056	2
6	1	Johnson	44.82796113, -119.83767379	0.167021	1
7	1	Buck	44.83547975, -119.81229366	1.35453	2
8	1	Barnett	44.82926953, -119.79337476	0.056375	1
9	3	Durham	44.76516222, -120.20357463	5.314441	3
10	3	Meisner	44.74870802, -120.20702214	4.132474	3
11	4	BLM	44.70803886, -120.29306723	2.081295	3
12	2	Lewchuk	44.56775487, -120.15765210	0.144641	1
13	2	Tripp-ODOT	44.56798051, -120.15690798	0.143961	1
14	2	Koontz-Folston	44.56493634, -120.15494366	0.190978	1
15	2	Dawson-Reddish-Oelrich	44.56410545, -120.15496917	1.276843	2
16	2	Verbovanec	44.56671775, -120.16138497	0.05162	2
17	2	Boehlke	44.56700128, -120.15127651	0.301577	2
18	2	BLM	44.62093904, -120.12947015	1.042695	2
19	2	Vanier	44.52178000, -119.68576000	0.833221	1

24.42862



Area Photo

Zone 1
Site 1
44.83096957
-120.03177015



Single Tree Photo



Bark Photo



Leaf Photo



Area Photo

Zone 1
Site 2
44.82106008
-119.88687852



Single Tree Photo



Flower-Seed Photo



Bark Photo



Leaf Photo

Zone 1
Site 3
44.79975
-119.99246

Site 3 has not been photographed yet.



Area Photo

Zone 1
Site 4
44.82607144
-119.84635871



Flower-Seed Photo



Single Tree Photo



Bark Photo



Leaf Photo



Zone 1
Site 5
44.82736979
-119.84365966

Area Photo



Single Tree Photo



Bark Photo



Flower-Seed Photo



Leaf Photo

Zone 1
Site 6
44.82796113
-119.83767379



Area Photo



Zoomed Photo

Photos taken from property across the river due to being 10+ miles on rough road to reach this site, unless accessing by raft.



Area Photo

Zone 1
Site 7
44.83547975
-119.81229366



Single Tree Photo



Bark Photo



Leaf Photo



Area Photo

Zone 1
Site 8
44.82926953
-119.79337476



Single Tree Photo



Flower-Seed Photo



Bark Photo



Leaf Photo

Zone 3
Site 9
44.82926953
-119.79337476



Area Photo



Single Tree Photo



Flower-Seed Photo



Bark Photo



Leaf Photo



Area Photo

Zone 3
Site 10
44.74870802
-120.20702214



Single Tree Photo



Flower-Seed Photo



Bark Photo



Leaf Photo



Area Photo

Zone 4
Site 11
44.70803886
-120.29306723



Single Tree Photo



Flower-Seed Photo



Bark Photo



Leaf Photo



Area Photo

Zone 2
Site 12
44.56775487
-120.15765210



Single Tree Photo



Flower-Seed Photo



Bark Photo



Leaf Photo



Area Photo



Single Tree Photo

Zone 2
Site 13
44.56798051
-120.15690798



Bark Photo



Leaf Photo



Area Photo

Zone 2
Site 14
44.56493634
-120.15494366



Single Tree Photo



Flower-Seed Photo



Bark Photo



Leaf Photo

Zone 2
Site 15
44.56410545
-120.1596917



Area Photo



Single Tree Photo



Flower-Seed Photo



Bark Photo



Leaf Photo

Zone 2
Site 16
44.56671775
-120.16138497



Area Photo



Single Tree Photo



Bark Photo



Leaf Photo



Area Photo

Zone 2
Site 17
44.56671775
-120.16138497



Single Tree Photo



Flower-Seed Photo



Bark Photo



Leaf Photo



Zone 2
Site 18
44.62093904
-120.12947015

Area Photo



Single Tree Photo



Bark Photo



Leaf Photo

Zone 2
Site 19
44.52178
-119.68576

Site 19 has not been photographed yet.