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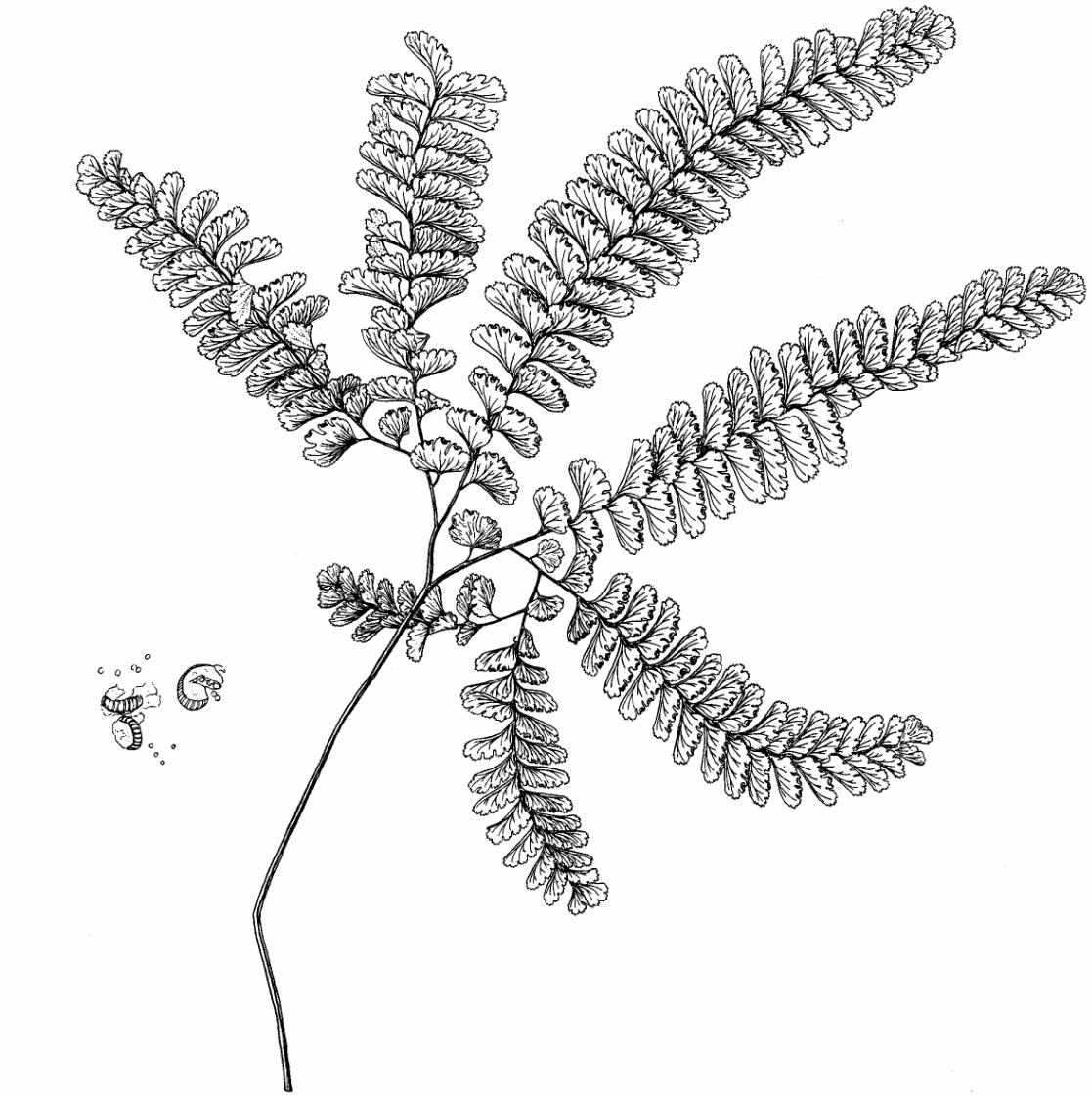
Riparian Plant Communities of Northwest Oregon: Streamside Plant Communities

September 2004



Adiantum pedatum

Riparian Plant Communities of Northwest Oregon: Streamside Plant Communities

Mt. Hood N.F., Siuslaw N.F., and Willamette N.F.
Eugene District, BLM, and Salem District, BLM

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United States Department of Agriculture
Forest Service
Pacific Northwest Region

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Dedicated to **Art McKee**

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Special thanks go to all the field crews, but especially to Wendy Boyd, David Alley, Peter Stocking, and Rachel Schwindt.

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Transect sketches: Peter Stocking
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Introduction

Purpose

This classification describes common streamside plant communities and the typical riparian settings in which they are found. The purpose of the guide is to allow an observer to interpret site factors from the vegetation, or to project potential plant community development from key site factors. It should be useful in describing and inventorying native riparian vegetation and in choosing appropriate species for restoration projects.

Classification

Communities can indicate environmental conditions because the suite of species present integrates biophysical limits on establishment and survival. Where certain conditions repeat over the landscape, assemblages of species repeat with them.

Major environmental variables are temperature, moisture, light, nutrients, drainage, and disturbance regime. Precipitation, elevation, aspect, slope position, soil type, and steepness control vegetation patterns everywhere. Along creeks and rivers, though, there are other complicating factors.

Streams are dynamic. They change seasonally. Water levels move up and down dramatically. Floods carve new channels and fill in old ones. Landslides, debris flows, and log jams erase or create surfaces overnight. Erosion and deposition redefine the roles small landforms play in the riparian area. All these processes occur at different rates, at different times, overlap, and interact. The result is that the riparian area is a mosaic of small patches of plant communities.

The communities in this classification form parts of repeating patterns among all these changeable factors. The classification is mainly floristic, that is it relies on plant species composition and abundance to sort samples into groups. The analysis then explores what conditions the samples have in common. The major descriptors for these conditions are broad bioregional area, elevation, geomorphic surface, soil texture, soil depth, and substrate type. The broad bioregional area (Westside Cascades, Coast Range, Willamette Valley) determines large climatic environments: temperature, precipitation/fog. Elevation also controls temperature and precipitation but at a finer scale. Geomorphic surfaces are related to frequency and intensity of flooding, or, for steep sites, to stability. Geomorphic surfaces also are related to soil depth, soil texture, moisture and nutrient holding capacity. Sites subject to frequent high energy floods lose fine textured soil and organic matter. Higher surfaces with longer periods between disturbances can accumulate rich, deep soils capable of supporting upland species.

Scope/study area

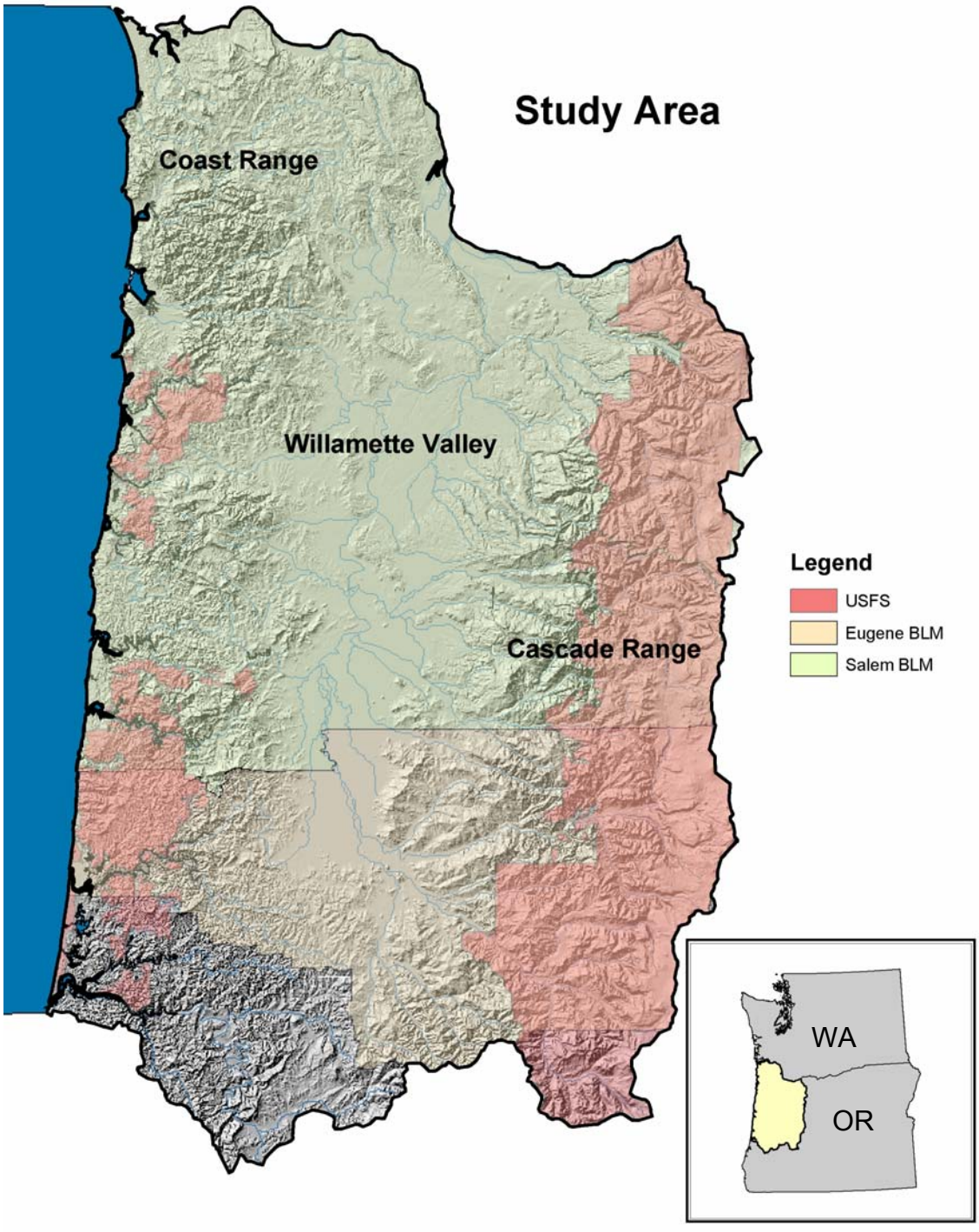
This guide is divided into the three major regions in Northwest Oregon. For the Westside Cascades and Coast Range, the community descriptions are organized along a geomorphic gradient: stream level, floodplain, terrace, to valley wall. The Willamette Valley section is not divided by geomorphic surfaces.

This guide describes the most common native communities in the riparian zones in Northwest Oregon. Not all of these meet the official wetland definition related to dominance of hydrophytic species (US Army Corps of Engineers 1987). Many of the types in this volume are dominated by upland or facultative wetland species (see Appendix I). However, locally the overall combination of species occurs primarily in association with creeks and rivers, and is considered here to be riparian. The strictly wetland communities are discussed separately in the wetland volume, though they are often found in the streamside mosaic on geomorphic surfaces where drainage is particularly restricted.

Sites were selected to represent relatively unmanaged reaches, though clearly overall watershed condition affected channel conditions and disturbance events. Sites with adjacent clearcuts or in stream buffers were not sampled.

Plots were excluded where communities were dominated by non-native species. Finding such relatively pristine conditions was most challenging for the Willamette Valley. It is clear that the samples from the Valley represent the rare exceptional remnants, and that the majority of similar geomorphic settings there support more altered, invaded communities. Given the nature of some of the non-native invasive species such as reed canarygrass, it may be difficult, if not impossible, to restore native communities on many sites.

Note that sample sites were “unmanaged”, not undisturbed. Riparian areas are constantly disturbed, and any event higher in the watershed can propagate effects into “unmanaged” areas below. The process section of the introduction (below) describes combinations some implications of multiple and continued disturbances on riparian plant communities.


Study Area
Coast Range
Willamette Valley
Cascade Range
Legend
USFS
Eugene BLM
Salem BLM
WA
OR

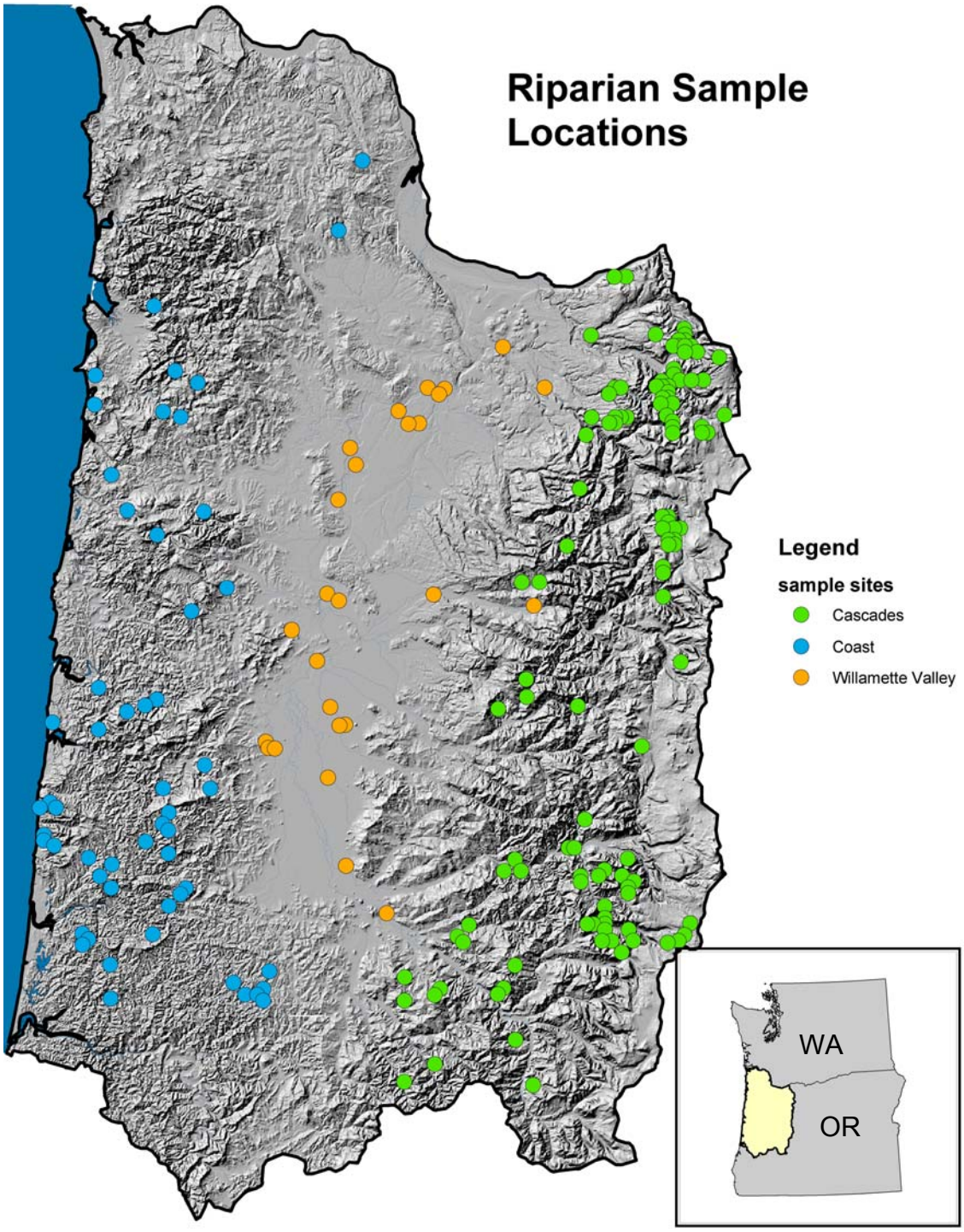
Methods

Data from several different though similar protocols have been integrated for this classification. Of the 680 plots assigned to plant communities, 441 were in the Cascades, 146 in the Coast, and 93 in the Willamette Valley. Information on some variables is incomplete, and is summarized in narrative descriptions in community descriptions. This is particularly true for soil data.

Two main sampling protocols were used. The first consisted of locating a cluster of plots at a site; each plot was located to represent a different community/geomorphic surface combination. A more complete description of the protocol used on the Mt. Hood is available in Riparian Ecological Types: Gifford Pinchot and Mt. Hood National Forests, Columbia River Gorge National Scenic Area (Diaz and Mellen 1996) where many of these communities were first described. The second protocol used a transect design with vegetation plots along the transect again representing different community/geomorphic surface combinations.

Mt. Hood data were collected in conjunction with the USFS regional fisheries program stream surveys. This concentrates sampling on a few streams but captures the elevation gradients affecting the vegetation. Because of the foucus on fish-bearing streams, there is a bias toward larger perennial streams. Few samples from high elevation sites were included. Samples from the Willamette Valley are often concentrated on a few sites such as state parks or wildlife refuges which have preserved native communities from development or agricultural conversion. Data from the Willamette NF include a large number of transects installed during the watershed analysis process for the South Fork McKenzie drainage. Plot clusters were also located on creeks across the whole Forest. Data from first order or intermittent streams in the Cascades are mostly from the South Fork McKenzie drainage transects. The Siuslaw NF, Eugene BLM, and Salem BLM have samples scattered across those ownerships to represent the range of unmanaged conditions present. However, in the Coast Range especially ownership patterns on these units largely concentrated samples on the steeper, smaller forested streams and excluded wide productive valley floors which are generally in private hands. First order or intermittent streams in these ownerships were not sampled. Estuaries were excluded from this project.

Map of ownership for the Oregon Coast and Willamette Provinces.



It should be noted that elevation ranges for many communities are poorly defined for two reasons. Many parts of the study area are undersampled; not all combinations of elevation and precipitation bands are represented. Also, sample sizes are small. Where relatively few plots are included, the elevations given can not be interpreted as indicating the upper and lower elevation bounds for the type. Mt. Hood data were collected in conjunction with the USFS regional fisheries program stream surveys. This concentrates sampling on a few streams but captures the elevation gradients affecting the vegetation. Because of the focus on fish-bearing streams, there is a bias toward larger, perennial streams. Few samples are from high elevations sites.

Plot methods

Variable plot sizes were used to fit geomorphic and community boundaries. Forested plots were generally 200 to 500 square meters. Steep bank plots could be as small as 5 to 10 square meters. For USFS and BLM plots, data included location, environmental factors (elevation, aspect, slope, etc.), geomorphic surface, substrate, and vegetation composition and abundance. Tree sizes and ages were collected for a sub-sample of trees rooted in the plot. No tree measurements were collected in the South Fork McKenzie transects. Valley cross-sections averaging 250 feet on each side of the creek are plotted for transect plots. Willamette Valley plots include floristics, but little information on geomorphic setting or soil condition.

Data analysis

Two-way indicator-species analysis (TWINSPAN) (Hill 1979) was the primary method in classifying the communities. Because the environmental variables were so inconsistent among the datasets, environmental factors were evaluated qualitatively in refining communities and interpreting relationships between the plant communities and physical settings.

Some species were excluded from the analysis: the epiphyte *Polypodium glychirrizae* (licorice fern), and plants identified in the field to group only (eg willow, grass, carex, composite, etc.) Also, a species was dropped from a plot if it was noted as occurring in that plot only on stumps or logs. Some datasets had limited information on whether tree cover was from trees rooted in the community or simply overhanging it. Where plot information showed that recorded tree cover for a plot was most likely coming from outside the community, the species was dropped from that plot.

Some communities were fairly rare in the sample because they aren't common under undisturbed canopies. Willow types are underrepresented in the guide for this reason, and also because they were sometimes identified only to genus

when they were found on plots. However, several more willow types are described in the accompanying wetland guide.

Community descriptions

Each community description contains:

- table of the most common and abundant species
- plot elevation ranges
- short narrative on plant community
- description of the geomorphic environment and soils
- wetland rating
- description of similar types if applicable
- list of non-native species if any were found in the sample.

Each community description is titled with scientific name, common name, and PLANTS code from the USDA National Resource Conservation Service PLANTS database (USDA-NRCS 1999). Common names are from local references, especially from Pojar and MacKinnon (1994). Scientific names follow taxonomy consistent with the Oregon Flora Project unofficial 2003 working list, though taxonomy for that project will be finalized with publication of the *Flora of Oregon* (Dr. Scott Sundberg, personal communication, November 18, 2002). For forested communities where the overstory may be either or both of two species, the two species are listed in parentheses. For example (Red alder-big leaf maple) indicates that red alder and/or big leaf maple are found in the community. Sample size and plot origin are noted.
Each community description features a table summarizing the most common species present. The community tables are sorted by layer: overstory trees (>12' tall), tree seedlings (<12 feet tall), shrubs, and herbs. Within each layer, species are sorted by constancy (% of plots within the community which had the species), and then by abundance (typical cover--average cover for the species on those plots where the species occurred). In the Willamette Valley section, trees of all sizes are treated as a single layer. Note that names of exotic species included in the community tables are italicized. A more complete constancy table that includes less frequent species is included in Appendix II. Geomorphic setting, soils, and evidence for disturbance regime are discussed.

Geomorphic surfaces

Several geomorphic surface names are used to describe major physical settings. The table below has the most common terms used in the guide. Note that floristics and soils were more closely related than floristics and surface. However, since the soil and substrate are directly related to the geomorphic surfaces and their typical disturbances, the surface proves to be very important in understanding where and how the communities develop.

Substrate

Silt, sand, gravel, cobble, boulder, and bedrock are common terms in description of soil or substrate. Silts are fine texture, high in moisture and nutrient holding capacity. Sands are gritty, dry, and poor in fertility. Gravels, cobbles, and boulders make up bars and banks. High proportions of such coarse sediments generally indicate excessive drainage and poor moisture conditions during the dry season. Sites with bedrock near the surface often have very poor drainage.

GEOMORPHIC SURFACE	CHARACTERISTICS
Sand/gravel bars	Deposits of sands or gravels, often over coarser materials—generally within normal high water line
Cobble bar	Cobble surface generally within or adjacent to stream, on island or bank—under water during normal high flow; generally with shallow sandy soils
Boulder bar	Boulder dominated deposit—at least partially flooded annually; generally with shallow sandy soils, though some old glacial Cascades sites are exceptions
Active/annual floodplain	Flattish surface at or near water level even at low flow—under water during normal high flow
Floodplain	Flat to gently sloping surface subject to fairly frequent floods—soils generally enriched with fines; generally shallow water table
Lower terrace	Flat to gently sloping surface subject to infrequent floods-alluvial or colluvial origin; soils variable
Upper terrace	Elevated flat to gently sloping surface subject to catastrophic flooding only; often present at tributary junctions; generally deep well-drained soils
Steep bank/cutbank	Over-steepened slope with lower margin near active fluvial zone; sometimes slide scars; often unstable;
Valley wall	Generally steep slopes from valley floor to hillside slope break (inner gorge wall)
Toeslope	Gentle to steep slope at base of hillside, often well-watered
Overflow channel/old channel	Side channels active during high flow; often with obvious sub-surface flow

Substrate size classes

Cobble and boulder size rock in riparian areas often reveal their history in their shapes. Sharp, angular rocks are often colluvial, coming into the valley bottoms from the hillslopes in landslides or debris torrents. Rocks that have been tumbled in the stream channel long enough to smooth their outlines into the typical rounded river rock shape are alluvial. They are present due to fluvial processes. Many riparian areas show complex combinations of colluvial and alluvial effects.

Sand	<2 mm	Grainy
Fine gravel	2-24 mm	Pea to marble size
Coarse gravel	24-64 mm	Marble to tennis ball
Cobble	64-256 mm	Tennis ball to basketball
Boulder	256-1096 mm	Basketball and larger
Bedrock	> 1096 mm	Large solid surface

* Most substrate descriptions in this guide combine fine and coarse gravel.

Wetland status

An overall wetland status is assigned to the community. Data from each plot were compared to criteria for determining wetlands based on dominance of hydrophytic vegetation (US Army Corps of Engineers 1987). Hydrophytic character used in the analysis are listed in the following table.

INDICATOR	INTERPRETATION
OBL	Wetland obligates
FACW	Facultative wetland species, strongly associated with wetlands
FAC+	Facultative wetland species with a greater estimated probability of occurring in wetlands than FAC species
FAC	Facultative species found in wetland settings about as often as found in upland settings
FAC-	Facultative wetland species with a lower estimated probability of occurring in wetlands than FAC species
FACU	Facultative wetland species, strongly associated with uplands
UPL	Species strongly associated with uplands, seldom found in wetlands
UNK	Wetland indicator status not available; if identified to genus only, more than one species present in Oregon with conflicting wetland status

The key rule is that more than 50% of the dominant species are OBL, FACW, or FAC on lists of plant species that occur in wetlands. Dominant species are determined by the following method:

> "The '50-20" rule is the recommended method for selecting dominant species from a plant community where quantitative data are available. The rule states that for each stratum in the plant community, dominant species are the most abundant plant species (when ranked in descending order of abundance and cumulatively totaled) that immediately exceed 50% of the total dominance measure for the stratum. The list of dominant species is then combined across strata (HQUSACE, 6 Mar 92)."

For the analysis, trees were considered a single stratum. Results for each plant community report percentage of plots which meet the wetland criteria, as well as the average and range of % of indicator species (FAC+, FACW, or OBL). Species' wetland indicator status was taken from the PLANTS database (USDA-NRCS 1999) where available. John Christy, author of the companion wetland volume (Christy 2004), supplied information for species not ranked in the PLANTS list.

More plots would have been labeled as wetland if the sorrel were reliably identified to species. Most of the sorrel in the riparian samples was probably *Oxalis trillifolia,* which is rated FAC+. Unfortunately, because often the sorrel was not distinguished from *Oxalis oregano* (UPL), in many plots the dominant sorrel was not credited to the positively wetland list.

Many community descriptions include references to similar communities, either in this volume or from other sources.

Exotic species recorded in the community are listed.

About keys

Keys are at the beginning of each section (Cascades, Coast, and Willamette Valley).

Keys are guidelines, not rules. If we could classify each and every possible condition in nature, we might be able to construct foolproof keys which would unerringly lead to identification of the correct community. However, in the real world, we work with a limited number of samples. Small constellations of species usually, but not always, occur in combinations and amounts that lend themselves to keys. Invariably, there are exceptions.

Use the key, then look at the description for the community. Does it have the right combination of major species? Does the environment (elevation, geomorphic surface, soil description) seem to fit? Ignore the trees for a moment. Does it have indicators such as coltsfoot, maidenhair, skunk cabbage? Does it have shrubs or not? Does it have salmonberry or stink currant? Both? Which saxifrages (piggyback plant, foamflower, coast boykinia, oval-leaved mitrewort)? More lady fern or more sword fern? What about sorrel? Follow the major leads to get to some reasonable choices.

If the plant-oriented key doesn't seem to lead to the right place, use the geomorphic surface as a guide. Look through the community descriptions that fit the physical setting for the community. Is it within the normal high water line (within channel)? On cobble bars or channel margins? On terraces or steep banks?

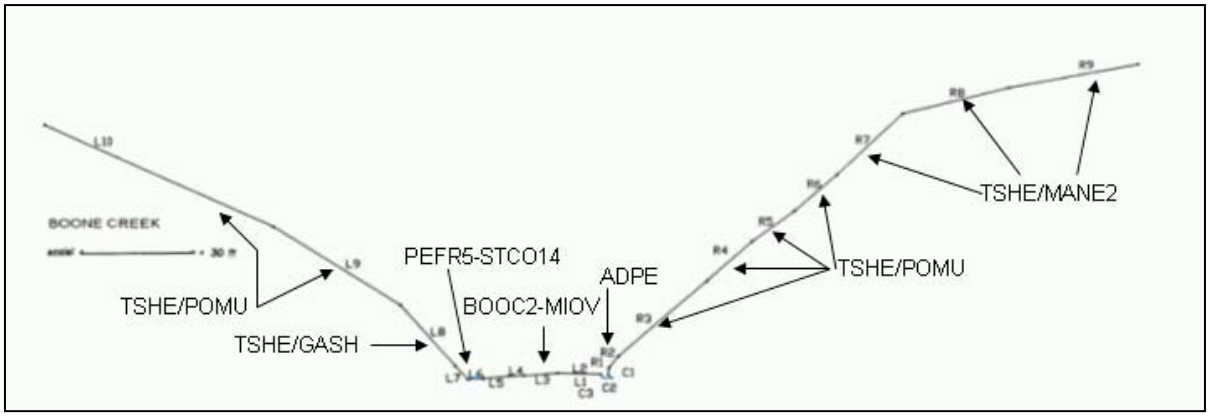
There can be groups of species which co-occur as indicators. The key may have a lead that says, " if the sum of Species A, B, and C is greater than species X…". In the field, you may have one or two of A, B, and C, and they may be about the same is species X. This sort of variability can be expected. If the rest of the community description fits your site, then this choice is reasonable.

The tree component seems particularly variable. Where tree names are included in the community name, it shows that most plots had the tree species. However, they also may be absent. The community name should be interpreted as indicating that the community has the potential to include mature trees. Note that with rather small sample sizes, not all of the trees that might occur were recorded. For example, it is very likely that some communities labeled as red alder types or big leaf maple types could easily support the other species. Where communities are named as hardwood types, conifers can occur, but are not consistent. If your site has conifers as well as hardwoods, it can still be included in the hardwood type.

Many riparian sites also include patches of wetlands where drainage is very poor. Most distinctively wetland communities are identified and described only in the Christy (2004) classification: Native Freshwater Wetland Plant Associations of Northwestern Oregon. Such wetland communities which commonly occur on floodplains are included in the streamside keys, with leads to the wetland association name and page number in the wetland guide.

Plant community distribution and valley cross-sections

Transect data supplied information for the short chapter on valley cross-sections and vegetation community distribution (following community descriptions). Patterns in conifer and hardwood basal area across the riparian zone for Coast and Cascades are compared. Valley cross-section illustrations are included for selected creeks from the Willamette NF's South Fork McKenzie River drainage, the Siuslaw NF (1995 samples), Eugene BLM, and Salem BLM. Riparian communities present along the transect are identified and the distribution of the upland communities along the transect is discussed. Sketches from the BLM transects are added. For some sites, conifer and hardwood basal areas along the transect are included in a table.



Valley cross-section of Boone Creek, in S. Fork McKenzie River watershed. Further information on this creek can be found in the "Plant community distribution: valley cross-sections" chapter of this guide.

Processes

Lessons from Lookout Creek 1996

Young red alders trapped debris during the flood. Note newly deposited gravels have buried the original surface and plant community behind the alder barrier.

Riparian communities are subject to the same natural processes as other plant communities. Pacific Northwest riparian areas experience competition, invasion, succession, insect and disease outbreaks, wind storms, and wildfire. What sets them apart, though, are fluvial—flood—processes. There's nothing like walking down a big creek after a major flood to illustrate how fast water spilling out of the channel and rushing down the drainage affects the landforms along the creek and the vegetation growing there. (*See Johnson and others (2000) for further discussion on the 1996 flood in Lookout Creek.*)

Fluvial processes interact with plant communities

Floods are high energy flows that entrain particles as they sweep downstream. The bigger the flood, the higher the energy, and the bigger the particles the flood picks up. When water flows onto the floodplains or terraces, fast-moving water

can strip off organic matter and soil, and sometimes erode underlying gravel and cobble substrates. Logs and boulders swept into the stream can batter away standing shrubs and trees. Undercut banks can collapse, dumping more trees, rock, and soil into the channel and rerouting flow.

When water slows down, sediments drop out of the flow. Heaviest particles drop out first, then as the flow slows even more, the fines are deposited. Flow can slow as the flood subsides, but also wherever quieter backwater conditions occur. Such conditions can be found behind natural barriers, bedrock outcrops, log jams, or on surfaces where standing vegetation creates enough roughness to bring down the speed of the current.

Erosion and deposition during a flood have direct effects on substrates controlling rooting conditions for the plant communities. Height above flow, drainage, nutrient and moisture holding capacity, fertility—all these critical site characteristics can be substantially altered after a flood.

The surface that today supports a floodplain community may become a well-drained upper terrace if the channel cuts down and the water table drops

Gravels and fine sediments from a tributary were deposited on an older floodplain. The new surface is a complex of coarse cobbles, shallow fine sediments and deeper fine sediments on the levee to the right. Each variation can be associated with different riparian communities.

significantly. Likewise, the forested terrace that is experiencing succession from hardwoods to conifers may be transformed into a floodplain when a debris flow just downstream blocks the creek and raises the whole valley floor level.

Floods also have direct effects on the vegetation, as it is scoured, battered, or buried. Flood effects are also extremely variable. Portions of a pre-flood geomorphic surface can receive different kinds and degrees of impact. The same is true of different components of the plant community; overstory trees may be stripped away on one patch, while only the understory may be scoured off or buried on another beneath an intact tree canopy.

Huge logs swept downstream to mow down the red alder on this boulder bar, but left the understory nearly intact. (Macrae Creek, Lookout Creek drainage)

New individuals may be added to the site. Tangles of vegetation may raft in, bringing in several species at once. These include willow, coltsfoot, and oxalis. Single individuals may surf in and land alone. Fresh, unoccupied seedbeds may be created, which can favor species such as black cottonwood, red alder, and other weedy species, native or not. Each combination of effects will create new competitive environments which control composition of plant communities.

Larger landscape conditions also affect what happens after a flood. Previous disturbances (fire, wind, flood, timber harvest, roading, agricultural or residential

development) in the watershed will determine which species are available to colonize a reach. Landscape conditions can increase incidence of land slides or debris flows during major storms, which contribute large wood and sediments to the flood waters.

Debris deposit comes alive as species adapted to dispersal by floods sprout where they rafterd to shore.

Burial/survival:

At the site scale, the interval since the last major disturbance will influence vegetation conditions two major ways. The first is the species composition resulting from succession, as pioneer species are overtaken by competitors. This can be replacement of herb communities by shrub communities, shrub communities by tree communities, or deciduous communities by mixed/coniferous communities, depending on the environment. The stage of community succession will control the “survivor” species pool as well as the “invader” species poised on site to capture the growing space. The second influence is the interplay of floods and stand structure. The size and density of the woody plants, controlled by time since disturbance, in turn interact with flood waters. Live trees can act as barriers or fences, catching drifting wood.

Willows present before the flood pop through newly deposited cobbles.

This can protect the community from further battering, slow waters, decrease erosion, and promote deposition. However, larger trees can be undercut and topple. Bank collapse can accelerate further erosion. Once in the torrent, the trees can become battering rams, form jams, or wash up on another floodplain to become armor for some downstream community. Larger trees can anchor a new geomorphic surface, or cause another to unravel.

Conditions at the geormorphic surface, reach, and landscape scales not only affect flood water movement and energy, but also affect vegetation interactions during the flood. They also affect vegetative response after the event. All of these factors, mixed with pure chance, make for a lot of variability in the riparian area.

Plant community successional status

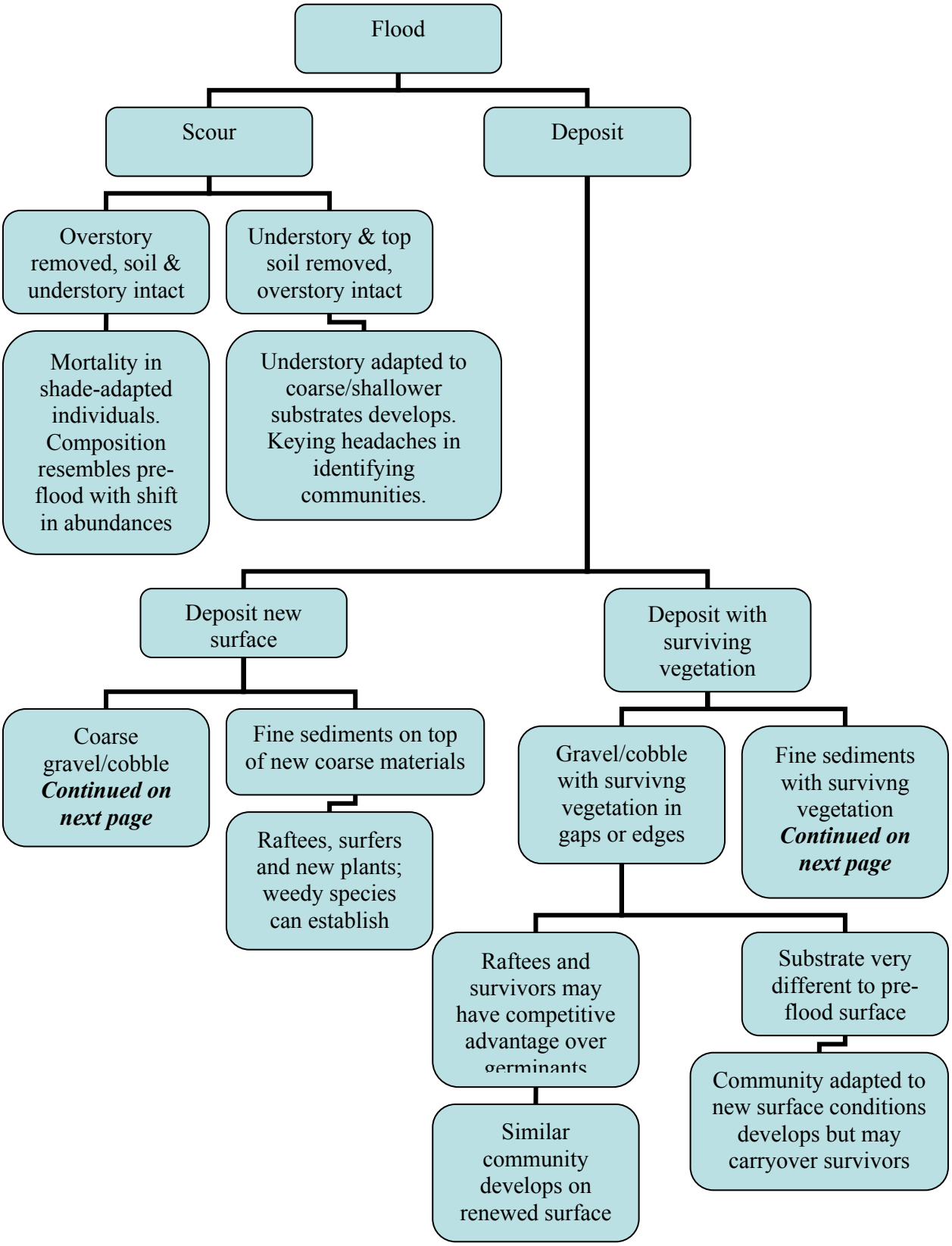
Successional status has not been emphasized in this guide. In upland communities, successional status goes from pioneer community to mature/old growth composition and structure. It is used to predict what a particular location can be expected to look like over time. The assumption is that the site stays the same, but the vegetation changes. That doesn't seem to apply well in the riparian context. Floods can change not only the vegetation, but the site itself.

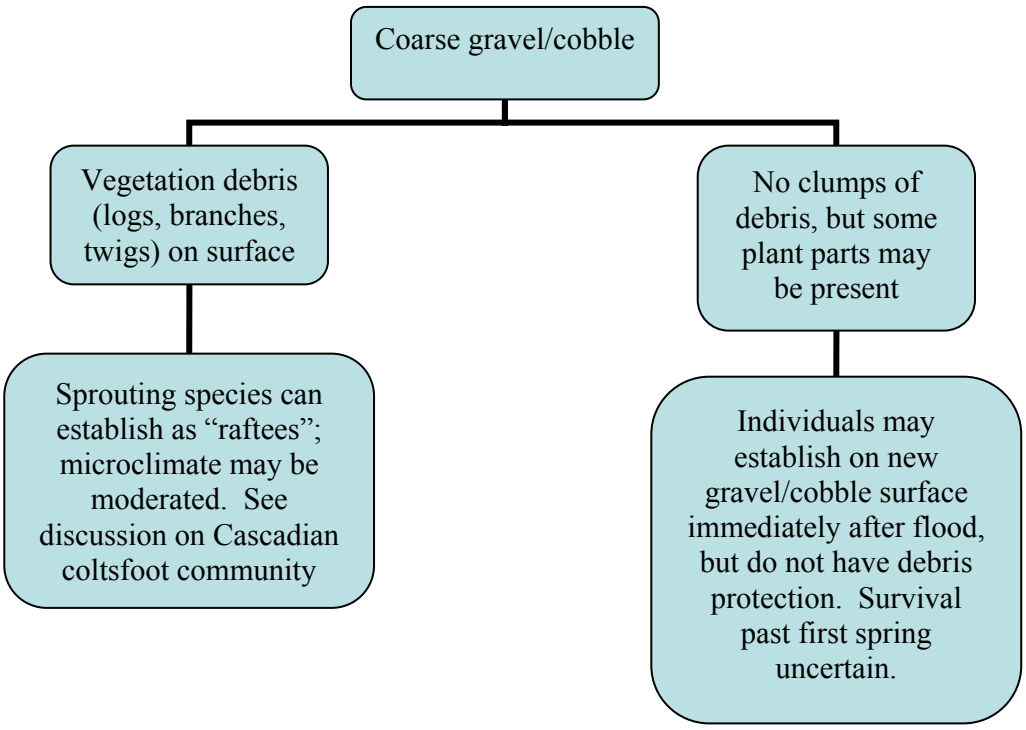
During the flood, red alder accumulated a shield made of roots and branches. Sorrel survived at the base of the trees.

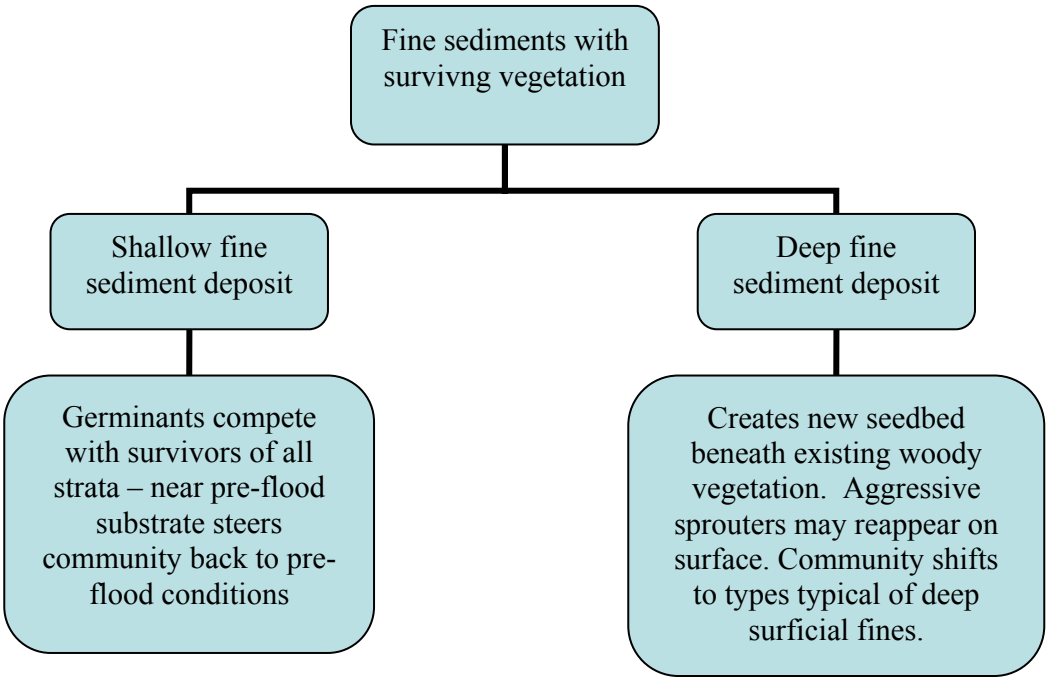
Succession can certainly be observed in riparian settings. Where overall conditions (geomorphic surface, substrate, flooding regime) are unchanged after a flood, the community recovers through resprouting or colonization. The gentle drama of competition reestablishes the same basic community type, adapted to growing conditions characterizing that geomorphic surface. But what happens when the surface itself is redefined during the flood?

Levee from a tributary creates a temporary pond on the floodplain. Coltsfoot has staked a claim to the water margins.

The following chart, developed in the Cascades after a 100 year flood in 1996, presents some possible relationships.


Flood
Scour
Deposit
Overstory removed, soil & understory intact
Understory & top soil removed, overstory intact
Mortality in shade-adapted individuals. Composition resembles pre-flood with shift in abundances
Understory adapted to coarse/shallower substrates develops. Keying headaches in identifying communities.
Deposit new surface
Deposit with surviving vegetation
Coarse gravel/cobble ***Continued on next page***
Fine sediments on top of new coarse materials
Raftees, surfers and new plants; weedy species can establish
Gravel/cobble with survivng vegetation in gaps or edges
Fine sediments with survivng vegetation ***Continued on next page***
Raftees and survivors may have competitive advantage over germinants
Substrate very different to pre-flood surface
Similar community develops on renewed surface
Community adapted to new surface conditions develops but may carryover survivors


Coarse gravel/cobble
Vegetation debris (logs, branches, twigs) on surface
No clumps of debris, but some plant parts may be present
Sprouting species can establish as "raftees"; microclimate may be moderated. See discussion on Cascadian coltsfoot community
Individuals may establish on new gravel/cobble surface immediately after flood, but do not have debris protection. Survival past first spring uncertain.

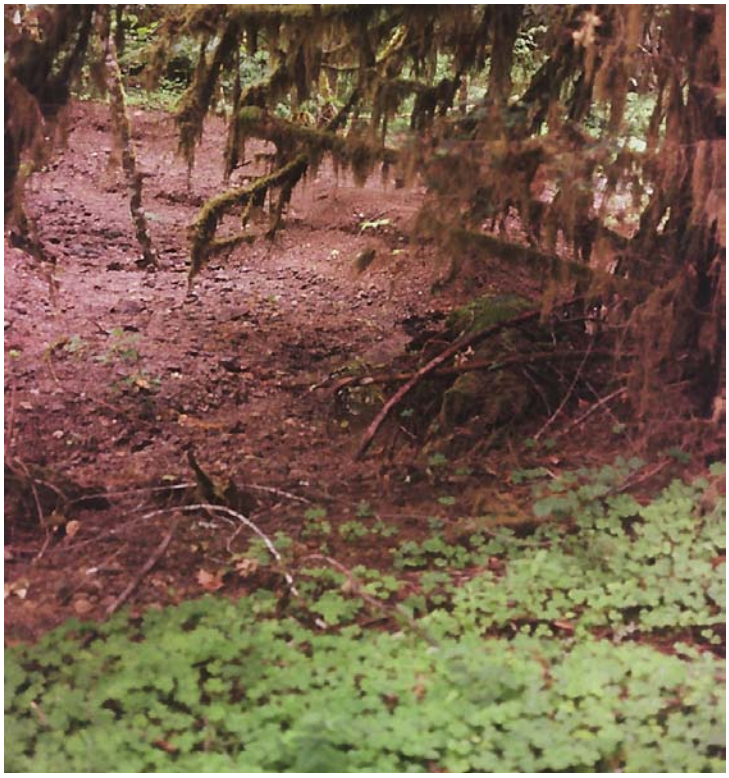

Fine sediments with survivng vegetation
Shallow fine sediment deposit
Deep fine sediment deposit
Germinants compete with survivors of all strata – near pre-flood substrate steers community back to pre-flood conditions
Creates new seedbed beneath existing woody vegetation. Aggressive sprouters may reappear on surface. Community shifts to types typical of deep surficial fines.

Weedy pioneers occupy new seedbed created by deep deposit of gravels and fine sediments.

Thin layer of fine sediment is only an inconvenience to the pre-flood community

Will big trees grow here?

A major question for riparian managers is potential for a site to support large trees, especially conifers. Growing large trees in riparian areas is an objective in watershed projects to increase levels of large wood in streams as critical channel features for aquatic habitats. Which sites are suitable for planting trees? In northwest Oregon's upland forests, red alder is often a member of early successional communities that can eventually become conifer stands. However, in riparian settings, a stand of red alder often flourishes where conifers such as Douglas fir or western hemlock won't do well. Possibly drainage is poor and/or inundation frequent. A key point is to determine whether a hardwood stand is successional or not. Is the geomorphic setting a site that most likely will allow conifers to establish, outcompete the hardwoods, and survive to maturity?



Red alder is the most likely tree species to colonize this alluvial fan. Does it have the potential to support large conifers?

One use for this guide is to determine whether the plant community on the site is often associated with conifers. But in the field, the best clue is evidence of conifers on the geomorphic surface. In some cases, presence of mature trees may be misleading, since pre-flood trees can persist on a geomorphic surface even when overall growing conditions have changed dramatically. Also, on many surfaces, upland conifers establish on nurse logs or small hummocks which create well drained microsites. These situations create an illusion that the geomorphic surfaces are suitable for conifers which require well-drained soils.

Western hemlock seedling survived in a protected pocket. Most conifers on active floodplains do not reach maturity. This can be due to limited rooting depths or to flood frequency.

Knowledge of indicator plants and communities, as well as an eye for geomorphic surfaces and likely disturbance regimes, will prove useful for selecting appropriate conifer restoration sites. When in doubt, though, digging to find out substrate, drainage, and soil depth may be most informative.

Coast Range and Cascades: major patterns by geomorphic group

There are many similarities between riparian communities in the NW Oregon Coast Range and in the westside Cascades. The following discussion follows the geomorphic structure of the guide to bring out some major patterns. Main geomorphic groups include in-channel (within the normal highwater line), channel margins, cobble bars/active floodplains, and terraces/steep banks. This progression goes from the geomorphic surfaces with the most frequent flood effects, least developed soil, and herb dominated communities through shrub dominated communities with shallow soils subject to periodic flooding, to tree dominated terraces or steep slopes seldom directly affected by floodwaters.

The Cascades are mainly volcanic basalts and andesites, and bear the imprint of glaciation. Pleistocene terraces can be identified in many drainages, and boulders from ice age torrents are features of streams now too gentle to be able to carry them. Most drainages are dominated by boulders and cobbles. High elevation snowpacks moderate water levels during the winter, and release water longer into the spring. Lower elevation basins respond more directly to rain patterns and may peak during the winter, with high flow more confined to high precipitation months than creeks with high elevation headwaters.

The Coast Range is dominantly sandstone and escaped major glaciation. Rock weathers more quickly than in the Cascades. Boulders are scarce; bedrock channels are common. Persistent snow pack is nearly absent. Coast Range streams tend to respond quickly to rainfall, and peak during winter months. Extremely high rainfall on the coastal side of the mountains means that very large volumes of water pass through lower sideslopes and toeslopes. Such moist conditions blur the distinction between riparian and upland communities in the transition zone between creek and upslope. Salmonberry, generally confined to near-creek environments in the Cascades and foothills, is a dominant upland understory shrub following disturbance in much of the Coast Range. Rainshadow effects in the eastern Coast Range confine salmonberry to near-Cascadian patterns near the Willamette Valley. (For another approach to geomorphology and riparian understory vegetation distribution in the Coast Range, see Pabst and Spies 1998).

In-channel

Communities in this group are found on surfaces that are flooded much of the rainy season. These can be in pockets of sand or soil tucked into crevices of boulders or cobbles, or on sandy gravel/cobble depositional bars or islands.

Watercarpet is adapted to in-channel bars or channel margins.

Community members are generally 1) species that are tolerant of intermittent flooding or temporary standing water (water-parsley, watercarpet, willow), 2) opportunistic species that can take advantage of the site after the water level drops in the spring such as grasses and a host of weeds (native and exotic), and 3) species that adapted to dispersal by flood and sprout readily from pieces deposited on cobble bars (willow, coltsfoot, trillium-leaved sorrel, horsetail).

Some specially adapted species such as cold-water corydalis which seem to require cold temperature water may be found on these surfaces in spring-fed creeks from the High Cascades.

Cobble/boulder communities (Streambank springbeauty, Yellow monkeyflower) are more common in the Cascades, while in-channel communities in the Coast Range most often represent the semi-submerged grassy, weedy sandy gravel/cobble bar types. Coltsfoot dominates somewhat similar gravel/cobble bars in the Cascades. Coltsfoot appears to be much more common in the Cascades than the Coast Range.

Channel margin

Coltsfoot on the channel margin

Channel margins include surfaces that are affected by annual high water, with little soil development, and shallow water table. Communities are mainly herbaceous, but shrubs may be present though not abundant. These geomorphic surfaces are similar to in-channel surfaces, but they are inundated less and tend to have slightly more fines available for rooting. In the Cascades, Coltsfoot-Cooley's betony is very common. Sorrel and piggyback plant begin to appear, though at low cover. Those two species become more important in floodplains or moist terraces and mark deeper accumulation of organic matter and fines. Saxifrages (*Boykinia, Mitella, Tolmeia, Tiarella*) are major components of channel margin as well as active floodplain communities.

Water-parsley occurs on frequently inundated surfaces.

In the Coast Range, Stink currant-salmonberry/watercarpet is the first of the shrubby stink currant-salmonberry communities so typical of shallow soils over cobbles. In this community, the watercarpet and water-parsley indicate that these channel margins are frequently inundated into the growing season. In the Cascades, Stink currant/coltsfoot plays a parallel role as the transition to the next set of geomorphic surfaces: cobble bars/active floodplains.

Cobble bars/active floodplains

These geomorphic surfaces are subject to the larger annual high water events. These sites generally have deeper accumulation of fines and organic matter, though still are shallow over coarse substrate. Water tables are fairly near the surface. Shrub communities dominate. In low- to mid-elevations, Stink currant-salmonberry communities are most common in coarser, shallower soil and lower surfaces. Salmonberry occuring without much stink currant often signals deeper fines and higher organic matter, and more distance from the stream. Piggyback plant, trillium-leaved sorrel, and lady fern are typically dominants. Sword fern is present though at low cover on surfaces transitioning to elevated floodplains/terraces. Higher proportion of sorrel compared to piggyback plant tends to indicate higher silt content in upper horizons.

Stink currant with young alder

In the Cascades higher elevation riparian areas, these surfaces may support Sitka alder or Oval-leaved huckleberry communities with a suite of species largely absent in the generally lower elevation Coast Range drainages.

Salmonberry and stink currant communities are comparable in the two mountain ranges. However, the Coast Range communities consistently show 10-20% higher salmonberry cover for similar types, though stink currant cover is generally equivalent. The Coast Range also tends to have more abundant sorrel and sword fern than in parallel types in the Cascades. Perhaps the most similar communities are the Cascadian Stink currant-salmonberry/foamflower-oval-leaved mitrewort and the Coastal

Salmonberry-stink currant/foamflower communities. However, the Cascades type has lower salmonberry cover and higher foamflower constancy. The Coast type has soils which tend to be finer and deeper, with more silt and less sand. This difference in soils is fairly typical for most Cascades/Coast Range shrub community comparisons.

Terraces/steep slopes

Terraces, steep banks and lower valley walls are only subject to re-set by floods during infrequent major events. Most communities are tree-dominated, reflecting lower flood frequency and deeper, better drained soils. Trees often show multiple age cohorts which suggest repeated flooding that doesn't necessarily remove all of the existing stand. Conifers are markedly more common on terraces and steep banks than on geomorphic surfaces closer to channels. In the understory, saxifrages and lady fern become less constant and abundant than on floodplains. Trees tend to be denser and older on terraces than in the same communities present on steeper surfaces.

The Cascadian Salmonberry/sorrel group is floristically similar to the Coastal Salmonberry/sword fern community, but is considerably less shrubby. The Coastal community has higher salmonberry cover, more shrub species overall, and lower lady fern. The Cascadian group also tends to occur somewhat lower and closer to the channel. In the wetter Coast Range environment, this type goes from terraces to valley walls. It seems transitional to the upland rather than hugging the creek. Coastal examples typically are on deeper loams, while the equivalent Cascadian community has shallower, coarser soils.

Distinctive environments in the northeastern Cascade foothills, southwestern Coast Range, and southern Willamette Valley margins create variants on terrace/steep bank communities. Red alder/common snowberry-salmonberry is a minor community from Mt. Hood NF samples that seems to be transitional environmentally to some Willamette Valley common snowberry communities. In the southwestern Coastal Mapleton area, near-coastal evergreen huckleberry

Dense salmonberry is typical of riparian areas in the wetter zones in the Coast Range.

forms a unique combination with warm indicator California hazel and moist indicator salmonberry in the Big leaf maple/California hazel-salmonberry community. The California hazel-vine maple/sorrel community from the South Valley Resource Area in the Coast Range has some similarities to the warm, low elevation Cascadian Forested California hazel/sword fern group. Salmonberry is not a member of this community. Salmonberry is very restricted in that part of the Coast Range rain shadow, though it would be expected on similar surfaces in higher precipitation zones nearby.

Consistently high salmonberry cover in Coast Range communities discourages conifer regeneration. Salmonberry and red alder competition may largely account for low natural conifer density in riparian areas. Seedlings planted for riparian restoration projects are also subject to significant wildlife damage. This may be related to the major wildlife browse noted in many of the communities targeted for restoration plantations.

High terraces/elevated floodplains

Patterns for the two mountain ranges pull apart in this geomorphic group. The geology and landforms diverge, with glaciation as the driving factor. Glaciers in the Cascades created wide U shaped valleys in the upper elevations. Major rivers work their way back and forth across big valleys filled with glacial material. Old Ice Age floodplains have become high terraces that no longer interact with their streams. In many streams, moving channel boulders is beyond the capacity of modern stream flow. Boulder bars and high islands in some streams are functionally upland in character, soil, and community.

In the Coast Range, meanders of many major rivers are incised deeply into bedrock. Channel migration and renewal of fluvial landforms is restricted in the largest systems. The wide elevated valleys have largely been turned to agriculture since settlement from the 1800's to early 1900's, and none were included in the sample.

One further complication for the major rivers draining the western Cascades is the effect of dams on the flood regimes and geomorphic surfaces downstream. Flood levels since the 1960's are lower and less frequent; summer flows are maintained above historical levels. Scour and deposit patterns may be altered. This affects the structure of communities on floodplains and terraces for the larger dammed rivers: the Middle Fork Willamette, McKenzie, North Santiam, South Santiam, Clackamas, and Sandy. Shrubs and trees are likely to survive and grow longer than common under the old flood regime. In such communities, this may be particularly evident in the sizes and ages of conifers such as Douglas fir, grand fir, and incense cedar. Changed competitive relationships among species that can establish and mature under post-flood conditions may result in compositional shifts over time. The same may be expected for the forested communities from the Willamette Valley sampling.

Non-natives

Reed canarygrass displaced the native community in this Coast Range riparian area.

Riparian areas are vulnerable to invasion by non-natives (Planty-Tabacchi and others 1996), and often show some of the highest numbers of exotic species among neighboring vegetation types. Weeds present in the watershed arrive in riparian areas with water or wind. The exotics may have started in the watershed along roads, homesteads, agricultural fields, or logging units. Many spread from garden debris dumped

at a convenient pull-out. Propagules enter stream systems at road crossings, or wash down from ditches. Wildlife using riparian areas can move weeds upstream or downstream. Up-canyon day winds move wind-dispersed seed easily through the open riparian canopy. Down-canyon airflow moves in the late afternoon and evening. Frequent disturbances maintain open niches for the weeds, ready to colonize new sites.

The sample used in the classification was intended to represent unmanaged native communities. Sites dominated by exotics were largely excluded. This was most strictly applied in the Willamette Valley where native communities are rare. Reed canarygrass and the Japanese/giant knotweeds were generally so dominant that most plots with those species were dropped from the analysis. Even with a systematic bias against non-native species, the proportions of plots with exotics were high: Coast Range 35%, Cascades 35%, and Willamette Valley 13%.

Open, sunny sand bar provides a fresh seedbed for many non-natives.

Another factor reducing the number and amount of non-native species recorded is that sampling extended from 1990 to 2001. A number of species (e.g. Japanese knotweed, giant knotweed, common foxglove) are known to be extending their range. Older data may not represent current distribution. As existing non-natives expand and new species are introduced, the impact of exotics in riparian communities throughout Northwest Oregon can be expected to increase.

The following table lists the most common non-native species and the number of plots they were found in by region. Since these sites were chosen to represent native communities, the distribution and abundance of non-native species in the overall managed landscape is underestimated. Wall lettuce is present in 29% of the Cascades plots. Common foxglove was found on 20% of Coast plots and 3% of Cascades plots. Creeping buttercup was far more widespread in the Coastal sample, while common St. John's-wort was more important in the Cascades plots. Rough bluegrass and common velvet-grass were common in the Coast, but minor in the Cascades.

EXOTIC	COMMON NAME	Coast (147 plots)	Cascades (425 plots)	Willamette Valley (95 plots)
Digitalis purpurea	*Common foxglove*	30	14	0
Holcus lanatus	*Common velvet-grass*	13	2	0
Hypericum perforatum	*Common St.John's-wort*	0	10	0
Lactuca muralis	*Wall lettuce*	6	122	0
Poa trivialis	*Rough bluegrass*	14	5	3
Ranunculus repens var. repens	*Creeping buttercup*	13	0	2
Rumex obtusifolius	*Bitter dock*	7	1	0
Senecio jacobaea	*Tansy ragwort*	8	2	0

The giant invasive knotweeds in the Pacific Northwest include Japanese knotweed (*Polygonum cuspidatum*), giant knotweed (*P. sachalinense*), and Himalayan knotweed (*P. polystachyum*), as well as hybrids.

Although minor patches were present in local stream systems before the 1996 flood, the rapid spread after the floods has alarmed many land managers and watershed councils. The giant knotweeds out-compete local dominants such as salmonberry to form near monocultures. Even aggressive non-natives such as Himalayan blackberry can be displaced by the tenacious knotweed.

Japanese knotweed canes grow to 12 feet height. They die back during the winter, exposing surfaces to erosion.
Photo: courtesy of The Nature Conservancy

Beaver-cutting of the invasive knotweed sprouts where it lodges on a gravel bar downstream.
Photo: courtesy of The Nature Conservancy

Invasive knotweed occupies both banks of the Nehalem River (2003).
Photo: courtesy of The Nature Conservancy

Northwest Oregon westside Cascades

Cascades key

A. Herbaceous community, coltsfoot not dominant herb; rocky substrate within channel

1. Streambank springbeauty dominant; small patches on bedrock or boulders ..... **Streambank springbeauty** p. 43

2. Coldwater corydalis dominant; narrow gravel deposits beside cold water channels..... **Coldwater corydalis** p. 46

3. Yellow monkeyflower dominant; in cobbles or on boulders .....**Yellow monkeyflower** p. 44

B. Coltsfoot dominant or codominant herb

1. Sitka willow an important shrub; point bars or cobble bars within highwater line .....**Coltsfoot-*Sitka willow phase*** p. 50

2. Common horsetail present..... **Coltsfoot-*common horsetail phase*** p. 53

3. Stink currant a dominant shrub; channel margins .....**Stink currant/coltsfoot** p. 68

4. Stink currant and Sitka willow absent or minor; sandy cobble or boulder bars/active channel shelves ..... **Coltsfoot-Cooley's betony** p. 56

C. Oval-leaved mitrewort and coastal boykinia both present; channel margins .....**Coastal boykinia-oval-leaved mitrewort** p. 61

D. Foamflower dominant herb, shrubs absent or trace; channel margins .....**Foamflower** p. 66

E. Sorrel dominant, with Pacific waterleaf; sword fern and lady fern often abundant; red alder overstory may be present; moderate to steep banks ..... **Sorrel-Pacific waterleaf** p. 116

F. Maidenhair an important herb;seeps, often steep, rocky banks .....**Maidenhair** p. 150

G. Arrowleaf groundsel and broad-leaved marsh-marigold and/or large boykinia present; shrubs nearly absent; fine soils, water tables near the surface, moderate to high elevations .....**Arrowleaf groundsel-broad-leaved marsh-marigold** p. 154
See related communities in herbaceous wetlands key (Christy pp. 18-20), especially *Calamagrostis canadensis* Association (Christy p. 73), *Caltha*

leptosepala ssp. howellii Association (Christy p. 76), and *Caltha leptosepala ssp. howellii-Carex obnupta* Association (Christy p. 77)

H. Arrowleaf groundsel, with cow –parsnip, great northern aster, and/or Columbian monkshood; shrubs varied; flat to gently sloping cobble bars or active floodplains at mid- to high elevations
..... **Arrowleaf groundsel-great northern aster** p. 72

See related communities in herbaceous wetlands key (Christy pp. 18-20), especially *Senecio triangularis* Association (Christy p. 143)

For more herb-dominated communities (aquatic beds, emergent marshes, marshes, fens/peatlands, or wet prairies), see herbaceous wetlands key (Christy pp.18-20).

I. Red alder/herb communities

1. Blue wildrye dominant under red alder; cobbly floodplains or islands
..... **Red alder/blue wildrye** p. 74

2. Siberian miners lettuce and piggyback plant dominant under red alder; active floodplains/cobble bars
..... **Red alder/piggyback plant-Siberian miners lettuce** p. 78

3. Sorrel dominant, with Pacific waterleaf. Sword fern and lady fern often abundant. Red alder overstory may be present; Moderate to steep banks
..... **Sorrel-Pacific waterleaf** p. 116

4. Sorrel and sword fern co-dominant under variety of tree species; vine maple often important, other shrubs minor or absent; steep banks, terraces ..... **Red alder~big leaf maple/sorrel** p. 119

5. Red alder/skunk cabbage swamps

a. Slough sedge >=5%, dominant or co-dominant with skunk cabbage.....
Alnus rubra/Carex obnupta-Lysichiton americanus Association (Christy p. 22)

b. Slough sedge <5%, lady fern may be co-dominant with skunk cabbage.
Alnus rubra/Athyrium filix-femina-Lysichiton americanus Association (Christy p. 21)

J. Shrub communities (may have tree overstories)—not dominated by salmonberry and/or stink currant

1. Oval-leaved huckleberry/Alaska huckleberry dominant or co-dominant

a. Two or more members of the moderate to high elevation suite of herbs (vanilla leaf, dogwood bunchberry, twinflower, coolwort foamflower, queencub beadlily) represented; active floodplains,banks, cobble bars, moderate to higher elevations.....**Oval-leaved huckleberry** p. 110

b. Salmonberry an important shrub, mature conifer cover <20%, skunk cabbage present; poorly drained sites at moderate to higher elevations ..... **Oval-leaved huckleberry-salmonberry/skunk cabbage** p. 170

c. Mature conifer cover >20% and silver fir present >5%; wetland indicators (marsh marigold, skunk cabbage, or marsh violet) present; silver fir zone; alternating hummocks and swales .....**Silver fir/oval-leaved huckleberry wetland** p. 176

2. Big huckleberry dominant, under Engelmann spruce in mountain hemlock zone ..... **Engelmann spruce/big huckleberry** p. 168

3. Sitka alder dominant, often with oval leaved huckleberry and black gooseberry, with members of the moderate to high elevation suite of herbs (vanilla leaf, dogwood bunchberry, twinflower, coolwort foamflower, queencup beadlily) represented; cobble bars and active floodplains in mid- to upper elevations.....**Sitka alder** p. 108

4. Thimbleberry among several shrubs with members of the moderate to high elevation suite of herbs (vanilla leaf, dogwood bunchberry, twinflower, coolwort foamflower, queencub beadlily) represented, salmonberry minor or absent; low terraces or narrow flats behind cobble levees .....**Thimbleberry/vanilla leaf** p. 76

5. Common snowberry dominant, salmonberry >=5%; terraces/steep banks .....**Red alder/common snowberry-salmonberry** p. 134

6. California hazel>5%, often large floodplains and terraces of major rivers .....**Forested California hazel/sword fern group** p. 139

a. Sword fern>sorrel .....**California hazel/sword fern-*hardwood phase*** p. 141

b. Vine maple dominant or co-dominant

1) Sorrel>sword fern; western hemlock often in tree layer..... **California hazel/sword fern-*western hemlock/vine maple-sorrel phase*** p. 143

2) Sorrel absent, sword fern <5%, big leaf maple and Douglas-fir frequently in tree layer..... **California hazel/sword fern-*big leaf maple/vine maple phase*** p. 146

7. California hazel =<5%, foamflower >=2%; several tree species in overstory including big leaf maple, western redcedar, western hemlock; wide terrace/elevated floodplains of large river valleys .....**(Big leaf maple-red alder)/vine maple/foamflower** p. 137

8. Red osier dogwood dominant shrub, herb layer >10% skunk cabbage .....*Cornus sericea/Lysichiton americanus* Association (Christy p. 40)

9. Douglas spiraea thicket.....*Spiraea douglassii* Association (Christy p. 58)

10. Willow communities

a. Pacific willow co-dominant with Sitka willow, skunk cabbage swamp..... *Salix lucida ssp. lasiandra/Salix sitchensis/Lysichiton americanus* Association (Christy p. 56)

b. Sitka willow minor or absent, Sitka willow dominant, with skunk cabbage and/or aquatic sedge the dominant herbs .....*Salix sitchensis* complex (Christy p. 57)

11. Western redcedar dominant overstory tree, skunk cabbage dominant herb, sorrel <5% .....*Thuja plicata/Lysichiton americanus* Association (Christy p. 34)

K. Shrub layers dominated by salmonberry, stink currant and/or devil's club

1. Devil's club dominant or co-dominant with salmonberry and/or stink currant..... **Devil's club-salmonberry group** p. 156

a. Western redcedar overstory
..... **Devil's club-salmonberry-*western redcedar phase*** p 165

b. Red alder and/or western hemlock dominant tree overstory (western redcedar minor or absent)
.....**Devil's club-salmonberry-*red alder phase*** p. 161

c. Tree overstory absent.. **Devils club-salmonberry-*shrub phase*** p. 158

2. Stink currant dominant or co-dominant

a. Stink currant dominant or co-dominant with salmonberry, coltsfoot or Cooley's betony the dominant herb; cobble bars/banks, active floodplains.....**Stink currant/coltsfoot** p. 68

b. Thimbleberry among several shrubs with members of the moderate to high elevation suite of herbs (vanilla leaf, dogwood bunchberry, twinflower, coolwort foamflower, queencub beadlily) represented, salmonberry minor or absent
.....**Thimbleberry/vanilla leaf** p. 76

c. Sorrel <3%, piggyback plant >2%; red alder and/or big leaf maple often present.....
(Red alder-big leaf maple)/stink currant-salmonberry/piggyback p. 80

d. Sorrel >3%

1) Sorrel, foamflower and oval-leaved mitrewort each >3% .....
Stink currant-salmonberry/foamflower-oval-leaved mitrewort p. 94

2) Oval-leaved mitrewort absent
..... **Stink currant-salmonberry/sorrel group** p. 99

a) Tree overstory present, generally red alder and/or western redcedar
.....**Stink currant-salmonberry/sorrel-*red alder phase*** p. 105

b) Tree overstory absent or minor
..... **Stink currant-salmonberry/sorrel *shrub phase*** p. 102

3. Salmonberry dominant shrub; stink currant absent or minor

a. Skunk cabbage swamps

1) Salmonberry and oval-leaved huckleberry generally co-dominant shrubs. Other cool, moist indicator shrubs (black gooseberry, mountain alder, highbush-cranberry) often present, mature conifer cover <20%, skunk cabbage present
.... **Oval-leaved huckleberry-salmonberry/skunk cabbage** p. 170

2) Western redcedar in overstory; sorrel >=5%; stink currant can be present
.... **Western redcedar/salmonberry/skunk cabbage-sorrel** p. 173

b. Common snowberry dominant or co-dominant, salmonberry >=5%; terraces/steep banks
..... **Red alder/common snowberry-salmonberry** p. 134

c. Piggyback plant important herb
.....**Salmonberry/piggyback plant group** p. 83

1) Piggyback plant>sorrel; thimbleberry often important; trees absent or minor ..... **Salmonberry/piggyback plant-*shrub phase*** p. 86

2) Red alder and/or big leaf maple in overstory, piggyback plant dominant or codominant with sorrel
..... **Salmonberry/piggyback plant-*red alder phase*** p. 90

d. Sorrel dominant herb, piggyback plant minor or absent; terrace, banks, floodplains..... **Salmonberry/sorrel group** p. 123

1) Western redcedar in overstory
..... **Salmonberry/sorrel-*western redcedar phase*** p. 131

2) Red alder in overstory
.....**Salmonberry/sorrel-*red alder phase*** p. 129

3) Overstory trees minor or absent
.....**Salmonberry/sorrel-*shrub phase*** p. 126

For more shrub-dominated communities (shrub swamps), see shrubland wetlands key (Christy p. 15).

For more tree-dominated communities (forested swamps), see forest and woodlands wetlands key (Christy p. 13).

In channel plant communities

Montia parvifolia
Streambank springbeauty
MOPA2

N=4 (MHNF 4)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Shrubs			
Rubus spectabilis	Salmonberry	50	2
Herbs			
Montia parvifolia	Streambank springbeauty	100	14
Mimulus guttatus	Yellow monkeyflower	75	3
Oxalis	Sorrel	75	1
Tolmiea menziesii	Piggyback plant	50	2
Claytonia sibirica	Siberian miner's lettuce	50	2
Galium triflorum	Sweetscented bedstraw	50	1
Polystichum munitum	Sword fern	50	1
Circaea alpina	Enchanter's-nightshade	50	1

Elevations: 800 to 2500 feet (average 1550 feet).

Community: The Streambank springbeauty community is found in small patches on bedrock or boulders in or adjacent to the channel. It is herb dominated; streambank springbeauty with minor amounts of yellow monkeyflower and sorrel are typical.

Geomorphic environment: Sites were generally small patches of vegetation growing in pockets of soil on bedrock or large boulders.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	75%
Wetland indicators among dominant species	80% (range 50-100%)

Non-natives: Exotic species were found on 50% of the sample.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Lactuca muralis	*Wall-lettuce*	25	1	1
Ranunculus repens	*Creeping buttercup*	25	1	5

Mimulus guttatus
Yellow monkeyflower
MIGU

N=9 (MHNF 8, WNF 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Herbs			
Mimulus guttatus	Yellow monkeyflower	100	22
Epilobium sp.	Willowherb	100	8
Cardamine cordifolia	Heartleaf bittercress	44	2
Glyceria striata	Tall mannagrass	33	8
Athyrium filix-femina	Lady fern	33	3
Montia parvifolia	Streambank springbeauty	33	3
Luzula parviflora	Small-flowered wood-rush	33	2

Elevations: 240 to 3800 feet (average 2685 feet).

Yellow monkeyflower in the channel.

Community: The Yellow monkeyflower community is an herbaceous type found on boulders, cobbles at or within the high water line. Yellow monkeyflower is the dominant herb, though fireweeds are also present. Grasses are almost always present (89% constancy), averaging 7% cover. Graminoids are present in 56% of the plots, averaging 5% cover. The surrounding plant series include western hemlock and silver fir.

Geomorphic environment: Patches of the Yellow monkeyflower community are in the active channel area, where cobbles, logs, or boulders have accumulated pockets of sands or silt.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	67%
Wetland indicators among dominant species	78% (range 40-100%)

Non-natives: Exotics were found on 33% of the plots. These included an unusually varied list of non-native species.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Rumex crispus	*Curled dock*	22	2	1
Poa trivialis	*Rough bluegrass*	11	1	15
Lactuca muralis	*Wall-lettuce*	11	1	8
Geranium columbinum	*Longstalk cranesbill*	11	1	5
Hypericum perforatum	*Common St.John's-wort*	11	1	2
Digitalis purpurea	*Common foxglove*	11	1	1
Ranunculus repens	*Creeping buttercup*	11	1	1
Sagina procumbens	*Bird-eye pearlwort*	11	1	1
Senecio vulgaris	*Common groundsel*	11	1	1
Stellaria media	*Chickweed*	11	1	1

Other studies: This community has previously been described for the Mt. Hood NF in Diaz and Mellen (1996) as the MIGU Plant Association (Ecoclass FW4224). The *Mimulus guttatus* clan, described for the mid-Willamette NF in Campbell and Franklin (1979), is also similar.

Corydalis aquae-gelidae
Cold-water cordyalis
COAQ

N=3 (MHNF 3)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Herbs			
Corydalis aquae-gelidae	Cold-water corydalis	100	67
Senecio pseudaureus	False-gold groundsel	67	5
Senecio triangularis	Arrow-leaved groundsel	67	2
Aconitum columbianum	Columbian monkshood	67	1
Aster modestus	Great northern aster	67	1
Delphinium glareosum	Olympic larkspur	67	1

Elevations: 3140 feet to 3170 feet (average 3155 feet).

Community: Cold-water corydalis is an herbaceous community of mid- to upper elevations. It found on the Mt. Hood NF. It is dominated by cold-water corydalis, which dominates the narrow gravel deposits beside cold water channels. Common associates include streambank groundsel, arrowleaf groundsel, monkshood, great northern aster, and larkspur. Mountain alder and ninebark may be present in trace amounts. Adjacent upland plant associations are in the silver fir and western hemlock plant series.

The cold-water corydalis is a Sensitive Plant Species for Oregon and Washington. The community is fairly uncommon. All three plots in this sample are from Stone Creek, Bear Springs Ranger District, Mt. Hood NF.

Geomorphic environment: Geomorphic surfaces are gravel/cobble bars on islands or banks, with 0 to 2 cm of sands or silts over the coarser fragments. The community occurs from 0 to one foot above high water line. Plot notes from one site measured in mid-July noted that the corydalis was growing in the stream, though the site might be above water level during summer low flow.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	100%
Wetland indicators among dominant species	100%

Non-natives: Exotic species were recorded on 33% of the plots.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Hypericum perforatum	*Common St.John's-wort*	33	1	2
Phalaris arundinacea	*Reed canarygrass*	33	1	1

Other studies: This community has previously been described for the Mt. Hood NF in Diaz and Mellen (1996) as the COAQ Plant Community (Ecoclass FW4321).

***Petasites frigidus* group**
Coltsfoot group
PEFR5 group

Group description followed by descriptions of two phases: *Petasites frigidus-Salix sitchensis* phase and *Petasites frigidus-Equisetum arvense* phase

N=11 (MHNF 11)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-seedlings			
Alnus rubra	Red alder	64	2
Shrubs			
Salix sitchensis	Sitka willow	82	23
Rubus spectabilis	Salmonberry	27	3
Herbs			
Petasites frigidus	Coltsfoot	91	25
Mimulus guttatus	Yellow monkeyflower	82	2
Equisetum arvense	Common horsetail	73	15
Stachys cooleyae	Cooley's betony	73	3
Grass (unknown)	Grass (unknown)	55	1
Athyrium filix-femina	Lady fern	45	2
Aster modestus	Great northern aster	45	1
Tolmiea menziesii	Piggyback plant	45	1
Oxalis	Sorrel	45	1
Montia parvifolia	Streambank springbeauty	45	1
Cinna latifolia	Wood reedgrass	36	1

Elevations: 220 to 2280 feet (average 1650 feet).

Community: The Coltsfoot group is a lower elevation early seral community found on cobbly bars and banks within the active channel. Typically it is dominated by Sitka willow, with coltsfoot and common horsetail. Yellow monkey flower and Cooley's betony are also important associated species. Red alder seedlings are present on almost two-thirds of the plots.

Geomorphic environment: Geomorphic surfaces were cobble or boulder bars or banks at or below the normal high water line.

Substrates are sands or gravelly sands in a cobble or boulder matrix. These sites do not have developed soils, and have very little accumulations of fine sediments or organic material. The surfaces are subject to seasonal high energy flow. They are wet much of the year, but have little moisture or nutrient holding capacity.

Willow, coltsfoot, common horsetail, and trillium-leaved sorrel are common pioneer species on freshly scoured or deposited cobble bars. They are among the riparian species that can be delivered to a site by flood waters and root in an in- or near-channel surface. This appeared most common where large debris was deposited on the cobbly surface.

Similar types: The Sitka alder/coltsfoot and Coltsfoot-common horsetail phases are similar to the Coltsfoot-Cooley's betony plant community. The Coltsfoot-Cooley's betony type tends to have more active floodplain species (stink currant, Cooley's betony, lady fern, trillium-leaved sorrel), and less yellow monkeyflower, a very wet indicator.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	100%
Wetland indicators among dominant species	98% (range 80-100%)

Non-natives: Exotics were present on 45% of the plots. Eleven species were recorded.

EXOTIC	COMMON NAME	PLOTS	CONSTANCY %	TYPICAL COVER %
Lactuca muralis	*Wall-lettuce*	2	18	1
Lotus corniculatus	*Bird's-foot trefoil*	1	9	3
Rumex crispus	*Curled dock*	1	9	2
Cirsium vulgare	*Bull thistle*	1	9	1
Polygonum hydropiper	*Marshpepper smartweed*	1	9	1
Dactylis glomerata	*Orchard grass*	1	9	1
Digitalis purpurea	*Foxglove*	1	9	1
Hypericum perforatum	*Common St.John's-wort*	1	9	1
Hypochaeris	*Cat's-ear*	1	9	1
Leucanthemum vulgare	*Oxeye daisy*	1	9	1
Senecio vulgaris	*Common groundsel*	1	9	1

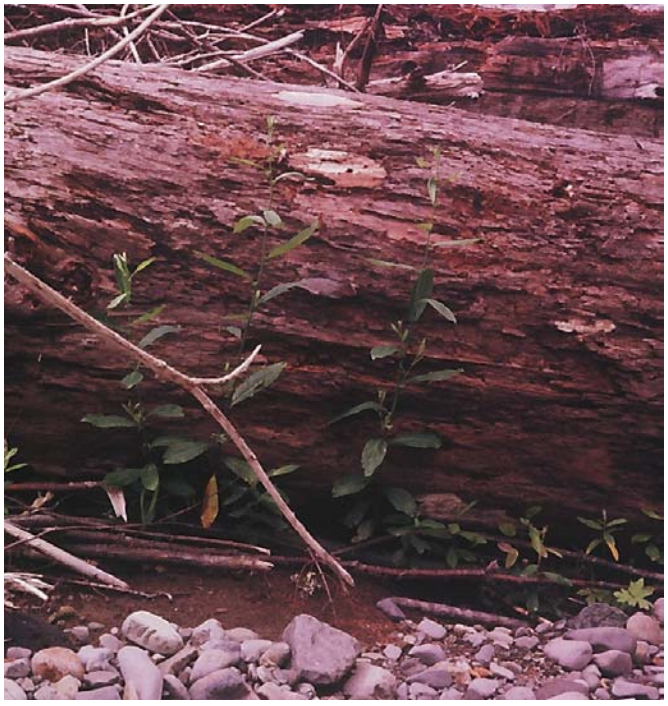
Other studies: This group is similar to the *Petasites frigidus* community described for the mid-Willamette NF in Campbell and Franklin (1979).

***Petasites frigidus-Salix sitchensis* phase**
Coltsfoot-*Sitka willow phase*
PEFR5-*SASI2 phase*

N=6 (MHNF 6)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-seedlings			
Alnus rubra	Red alder	50	2
Shrubs			
Salix sitchensis	Sitka willow	100	32
Rubus spectabilis	Salmonberry	33	4
Herbs			
Petasites frigidus	Coltsfoot	83	10
Stachys cooleyae	Cooley's betony	67	5
Mimulus guttatus	Yellow monkeyflower	67	3
Equisetum arvense	Common horsetail	50	1
Oxalis	Sorrel	50	1
Montia parvifolia	Streambank springbeauty	50	1
Tolmiea menziesii	Piggyback plant	50	1

Elevations: 220 to 2100 feet (average 1550 feet).



Community: Coltsfoot-*Sitka willow phase* is a community of cobbly bars and lower banks at or within the normal high water line. Young red alder and minor amounts of salmonberry are sometimes found. Sitka willow dominates the community. The most common and abundant herb species are coltsfoot, Cooley's betony, and yellow monkeyflower.

Sitka willow and coltsfoot sprout beneath flood-deposited log.

Coltsfoot-*Sitka willow phase* community: coltsfoot is flowering.

Geomorphic environment: Geomorphic surfaces were cobbly bars or lower banks, often point bars, within the normal high water line.

Substrates are sands or gravelly sands in a cobble or boulder matrix. One plot was on bedrock "with some pockets of cobbles, sands, and gravels". No litter or decomposing organic layers were found.

These sites are inundated annually, and have not accumulated fine sediments. They are generally wet for much of the year, but have little moisture or nutrient holding capacity. Willow, coltsfoot, and trillium-leaved sorrel are among the riparian species that can be delivered to a site by flood waters and root in an in- or near-channel surface. This appeared most common where large debris was deposited on the cobbly surface.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	100%
Wetland indicators among dominant species	97% (range 80-100%)

Non-natives: Fifty percent of the plots had exotic species. Wall-lettuce was the only species found on more than one plot.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Lactuca muralis	*Wall-lettuce*	33	2	1
Lotus corniculatus	*Bird's-foot trefoil*	17	1	3
Rumex crispus	*Curled dock*	17	1	2
Cirsium vulgare	*Bull thistle*	17	1	1
Dactylis glomerata	*Orchard grass*	17	1	1
Digitalis purpurea	*Foxglove*	17	1	1
Leucanthemum vulgare	*Oxeye daisy*	17	1	1
Polygonum hydropiper	*Marshpepper smartweed*	17	1	1
Senecio vulgaris	*Common groundsel*	17	1	1

Other studies: This community is similar to the type described for the Mt. Hood NF in Diaz and Mellen (1996) as the SASI2/PEFR2 Plant Community (Ecoclass SW1132). It is also somewhat similar to the Sitka alder/common horsetail community (SASI/EQAR) described for the Olympic Experimental State Forest in Chappell (1999).

***Petasites frigidus- Equisetum arvense* phase**
Coltsfoot-*common horsetail phase*
PEFR5-*EQAR phase*

N=5 (MHNF 5)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-seedlings			
Alnus rubra	Red alder	80	3
Shrubs			
Salix sitchensis	Sitka willow	60	6
Herbs			
Petasites frigidus	Coltsfoot	100	37
Equisetum arvense	Common horsetail	100	22
Mimulus guttatus	Yellow monkeyflower	100	2
Stachys cooleyae	Cooley's betony	80	3
Unknown grass	Grass	80	1
Athyrium filix-femina	Lady fern	60	2
Aster modestus	Great northern aster	60	1
Epilobium glaberrimum	Smooth willowherb	40	8
Circaea alpina	Enchanter's-nightshade	40	1
Tolmiea menziesii	Piggyback plant	40	1
Angelica arguta	Sharptooth angelica	40	1
Cinna latifolia	Wood reedgrass	40	1
Montia parvifolia	Streambank springbeauty	40	1
Juncus ensifolius	Dagger-leaved rush	40	Tr
Oxalis	Sorrel	40	Tr

Elevations: 1480 to 2280 feet (average 1510 feet).

Community: The Coltsfoot-*common horsetail phase* is an herb community that occurs on cobble bars, especially point bars within the normal high water line. Minor amounts of red alder seedlings and Sitka willow frequently occur. The dominant species are coltsfoot, common horsetail, and yellow monkeyflower. Other associated species include Cooley's betony, lady fern, and great northern aster. Sedges and rushes are generally present (80% constancy), summed cover averaging 4%. The yellow monkeyflower particularly indicates that these sites are very wet much of the year.

Geomorphic environment: Geomorphic surfaces are cobble bars at or below normal high water line.

Coltsfoot-*common horsetail phase*: on cobble bar in channel.

Plot notes typically describe substrate as “rocks with sand in between them”, or “very cobbly with some sand deposits”. These sites do not have developed soils, and have very little accumulations of fine sediments or organic material. The surfaces are subject to seasonal high energy flow. They are wet much of the year, but have little moisture or nutrient holding capacity.

Field observations immediately after a major flood note that coltsfoot and common horsetail are common pioneer species on freshly scoured or deposited cobble bars. Coltsfoot and sorrel often root from pieces deposited during the flood.

Wetland rating:

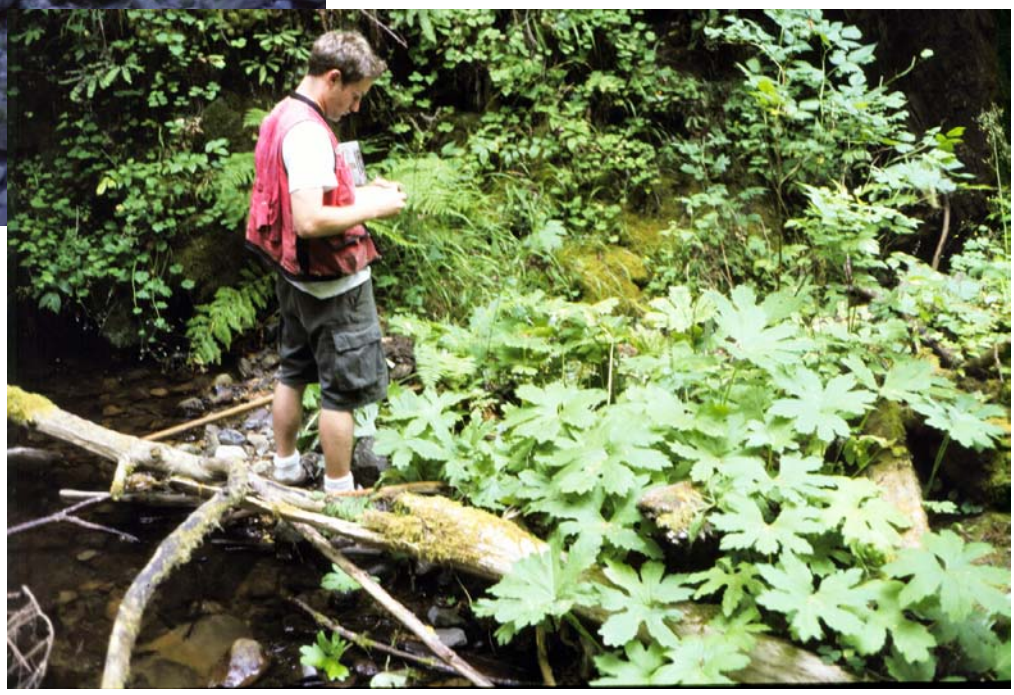
Community meets wetland test	Yes
Plots meeting wetland criteria	100%
Wetland indicators among dominant species	100%

Non-natives: Exotic species were recorded on 40% of the plots.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Hypericum perforatum	*Common St.John's-wort*	20	1	1
Hypochaeris	*Cat's-ear*	20	1	1

Other studies: This community is somewhat similar to the Sitka alder/common horsetail community (SASI/EQAR) described for the Olympic Experimental State Forest in Chappell (1999).

Channel margins-cobble bars/banks



Petasites frigidus-Stachys cooleyae
Coltsfoot-Cooley's betony
PEFR5-STCO14

N=45 (MHNF 27, WNF 16, EBLM 2)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-seedlings			
Alnus rubra	Red alder	51	13
Thuja plicata	Western redcedar	27	3
Shrubs			
Acer circinatum	Vine maple	40	19
Rubus spectabilis	Salmonberry	33	2
Ribes bracteosum	Stink currant	31	2
Herbs			
Petasites frigidus	Coltsfoot	87	20
Galium triflorum	Sweetscented bedstraw	78	2
Stachys cooleyae	Cooley's betony	64	10
Claytonia sibirica	Siberian miner's lettuce	58	1
Athyrium filix-femina	Lady fern	56	6
Tolmiea menziesii	Piggyback plant	56	4
Oxalis	Sorrel	42	5
Mimulus guttatus	Yellow monkeyflower	36	2
Lactuca muralis	*Wall-lettuce*	33	1
Montia parvifolia	Streambank springbeauty	31	1

Elevations: 920 to 3520 feet (average 2,370 feet).

Community: Coltsfoot-Cooley's betony is the most common streamside community in the sample, although none was found in Salem BLM plots. This is an herb dominated community which can support very young red alder or western redcedar. There is often an overhanging vine maple canopy, but the shrub layer is generally sparse. Coltsfoot and Cooley's betony are the dominant herb species, with sweetscented bedstraw, Siberian miner's lettuce, lady fern, and piggyback plant also common.

Geomorphic environment: Most plots were on sandy cobble bars, boulder bars, and active channel shelves, sometimes within normal high water line.

Soils are undeveloped thin layers of coarse sand over gravels, cobbles, and boulders. Average plot height above normal high water was <1 foot. Water table depths of 3-40 cm were recorded, but most sites were not deep enough to reach water table because of the coarse alluvium. Two plots included notes that thin

silty sand horizons had developed due to presence of large wood trapping the finer sediments. Another plot record noted, “A very young soil… Dense rooting of many top plants has prevented the soil from washing away. Organic deposits

<u>Coltsfoot-Cooley’s betony</u> community: betony is flowering. Note proximity to channel.

show that plants are in residence that will not wash away, but there has still not been enough time to build a distinct illuvial horizon.”

This community is on surfaces that are under water during winter high flows. They can support stands of red alder seedlings, but seldom saplings. Moisture and nutrient retention are poor, due to limited accumulation of fine sediments and organic matter.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	69%
Wetland indicators among dominant species	70% (range 25-100%)

Similar types: The Coltsfoot-Cooley's betony community is similar to the Coltsfoot group (Sitka alder/coltsfoot and Coltsfoot-common horsetail) which is largely found within the highwater line. The Coltsfoot-Cooley's betony type has a wider range of species that can occur on floodplains. It appears to bridge the in-channel and channel margin/active floodplain transition.

Click on a creek name in the table below to see the valley cross sections that show where PEFR5-STCO14 occurs in relation to other plant associations.

Valley cross sections showing PEFR5-STCO14
Walker creek
Loon creek
S Fork McKenzie #1
Boone creek
E Fork S Fork McKenzie #2

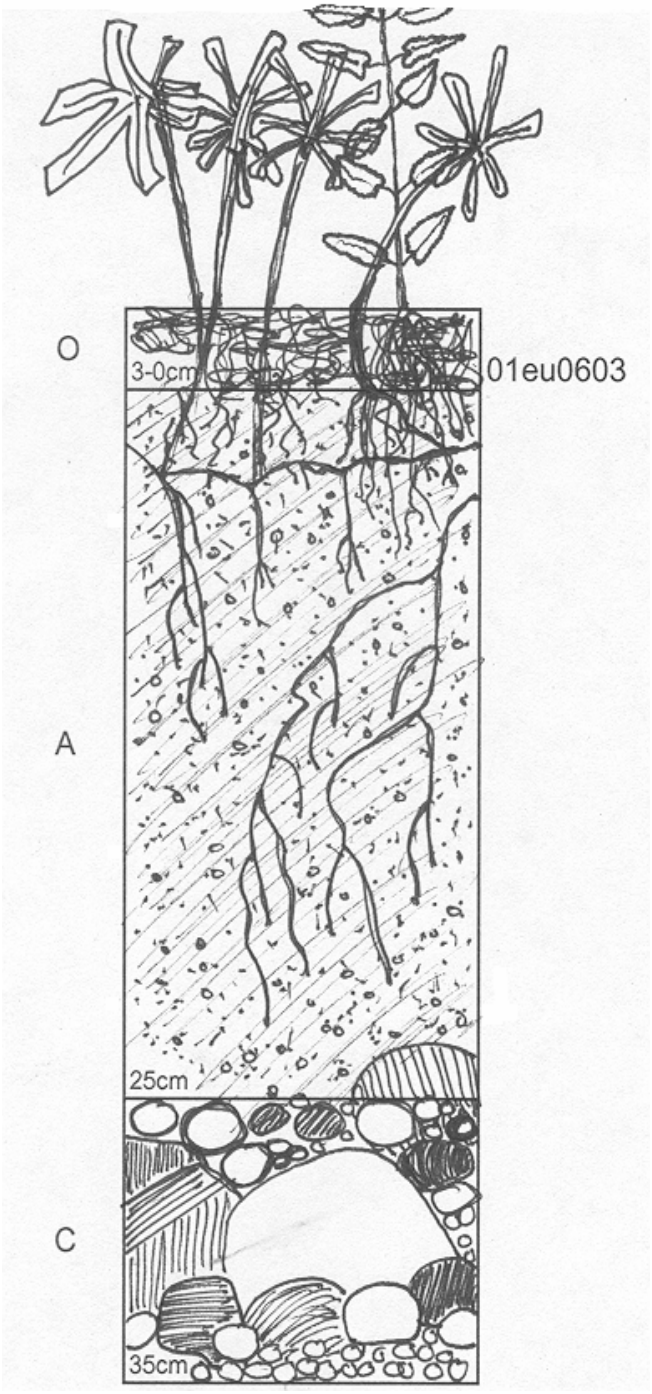
Non-natives: Thirteen exotic species were found in plots (38% of the sample). Wall-lettuce was most common, occurring in a third of plots.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Lactuca muralis	*Wall-lettuce*	33	15	1
Leucanthemum vulgare	*Oxeye daisy*	4	2	1
Rumex crispus	*Curled dock*	4	2	Tr
Hypochaeris radicata	*Hairy cat's ear*	4	2	Tr
Digitalis purpurea	*Foxglove*	2	1	10
Ranunculus repens	*Creeping buttercup*	2	1	7
Agrostis capillaris	*Colonial bentgrass*	2	1	3
Poa palustris	*Fowl bluegrass*	2	1	1
Cirsium vulgare	*Bull thistle*	2	1	1
Geranium columbinum	*Longstalk cranesbill*	2	1	1
Senecio jacobaea	*Tansy ragwort*	2	1	1
Cirsium arvense	*Canada thistle*	2	1	Tr
Cerastium fontanum ssp. vulgare	*Big chickweed*	2	1	Tr

Soil illustration:PEFR5-STCO14

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	3					20	30
A	25	7.5YR2.5/3	LS	gravel	15	15	15
C			R	cobble	70	10	3

Total Depth: 35cm. Depth Limit: ~35cm.



A 3cm-shallow O horizon appears to be mostly last years sticks, leaves and dead moss. This plot may not be flooded every year, but not less than every five years. The A horizon is deep but very young, of course. The reason there is “25cm of loamy sand” is simply because there has not been enough time for illuviation to stratify the profile into more than one horizon. Fairly dense rooting of perennial / rhizhomatous herb species gives some chance of retaining the A horizon in mild flooding, but a good wet winter could easily wax the whole plot. The C horizon is simply cobble and gravel, an old part of the streambed. Mostly basalt and sandstone with assorted others.

<u>Coltsfoot-Cooley's betony</u>: herbaceous cobble community inundated yearly

Other studies: This community is somewhat similar to two types previously been described for the Mt. Hood NF in Diaz and Mellen (1996): the PEFR2 Plant Community (Ecoclass FW4226) and the STCO4-MIGU Plant Association (Ecoclass FW4230).

Boykinia occidentalis-Mitella ovalis
Coast boykinia-oval-leaved mitrewort
BOOC2-MIOV

N=22 (WNF 13, EBLM 5, SBLM 4)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	18	37
Trees-seedlings			
Alnus rubra	Red alder	27	22
Tsuga heterophylla	Western hemlock	27	12
Thuja plicata	Western redcedar	18	3
Herbs			
Mitella ovalis	Oval-leaved mitrewort	100	4
Boykinia occidentalis	Coastal boykinia	95	14
Galium triflorum	Sweetscented bedstraw	91	3
Athyrium filix-femina	Lady fern	64	6
Tolmiea menziesii	Piggyback plant	55	15
Oxalis	Sorrel species	50	12
Stachys	Betony species	50	11
Carex deweyana	Dewey's sedge	50	11
Adiantum pedatum	Maidenhair fern	50	4
Petasites frigidus	Coltsfoot	45	7
Lactuca muralis	*Wall-lettuce*	45	5
Tiarella trifoliata	Coolwort foamflower	45	4
Polystichum munitum	Sword fern	41	4
Bromus vulgaris	Colombian brome	41	4
Claytonia sibirica	Siberian miner's lettuce	41	1

Elevations: 920-3085 feet (average 2,170 feet).

Community: Coast boykinia-oval-leaved mitrewort is an herb dominated community of low to moderate elevations. Stands of red alder saplings occur in some samples. The shrub layer is sparse; salmonberry, red huckleberry, vine maple, and trailing blackberry occur in 24-28% of the plots, but are not abundant. The herb layer is marked by dominance of saxifrages, grasses, and graminoids. Most prominent are coast boykinia, oval-leaved mitrewort, piggyback plant, Columbia brome and Dewey's sedge. Lady fern, maidenhair fern, and sword fern are typically present but low cover. Important forbs include sweetscented bedstraw, sorrel, and coltsfoot. Grasses are almost always present (95% constancy), summed cover averaging 21%. Graminoids (sedges or wood-rushes) are present in 81% of the plots, averaging 17% cover.

Coast boykinia-oval leaved mitrewort community: dominance by saxifrages, low cover of ferns is typical.

All Cascades samples were south of the North Santiam River. One plot was from Salem BLM's Warnicke Creek in the coastal Valley of the Giants area. That area has plant communities that are more similar to Cascades upland associations than most parts of the North Coast Range. Another plot from the same Warnicke Creek cluster represents a coastal variant of the Cascadian Oval-leaved huckleberry community.

Geomorphic environment: The Coastal boykinia-oval-leaved mitrewort community is found on cobble and boulder bars and islands, alluvial fans, and lower banks.

Soils are relatively shallow (average 37 cm), very gravelly horizons over gravels, cobbles and boulders. A horizons are loamy (silt loam, silty clay loams, sandy clay loams, or loamy sand). B horizons are often sandy clay loams or loamy sands.

Tree ages, geomorphic surfaces, and coarse, gravelly, shallow soils indicate that this community is frequently reset by floods and does not support mature conifers or older hardwoods. Note that the Stink currant-salmonberry/piggyback plant-oval-leaved mitrewort community has a similar distribution and gravelly substrate, but the shrub-dominated type is typically on active floodplains and low terraces.

Detailed soil descriptions show that the shrub type has more buried soils than gravel/cobble/boulder bars with the Coast boykinia-oval-leaved mitrewort community.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	45%
Wetland indicators among dominant species	53% (range 20-100%)

Non-natives: Exotics occurred in 54% of the plots. Of the six species found, wall-lettuce is the most common species.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Lactuca muralis	*Wall-lettuce*	45	10	5
Veronica officinalis	*Common gypsyweed*	9	2	3
Agrostis stolonifera	*Creeping bentgrass*	5	1	3
Senecio jacobaea	*Tansy ragwort*	5	1	3
Agrostis stolonifera	*Creeping bentgrass*	5	1	2
Cirsium arvense	*Canada thistle*	5	1	1

Other studies: This community is similar to the *Boykinia elata* Plant Community, described for the mid-Willamette NF in Campbell and Franklin (1979).

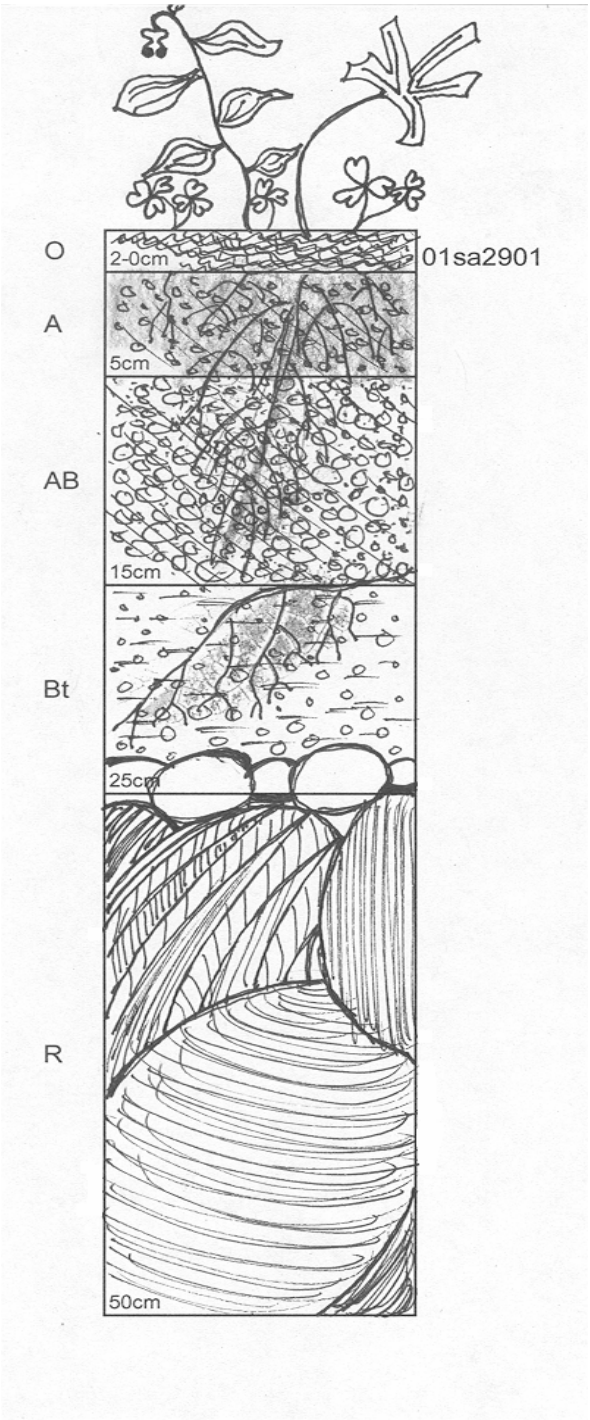
Click on a creek name in the table below to see the valley cross sections that show where BOOC2-MIOV occurs in relation to other plant associations.

Valley cross sections showing BOOC2-MIOV
Loon creek
Boone creek
Lost creek S

Soil illustration A: BOOC2-MIOV

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	2						
A	5	7.5YR2.5/1	SiL	gravel	20	10	10
AB	10	10YR2/2	SL	gravel	35	10	8
Bt	10	10YR2/2	SCL	gravel	15	8	8
R			R				

Total Depth: 25cm. Depth Limit: 25cm to R.

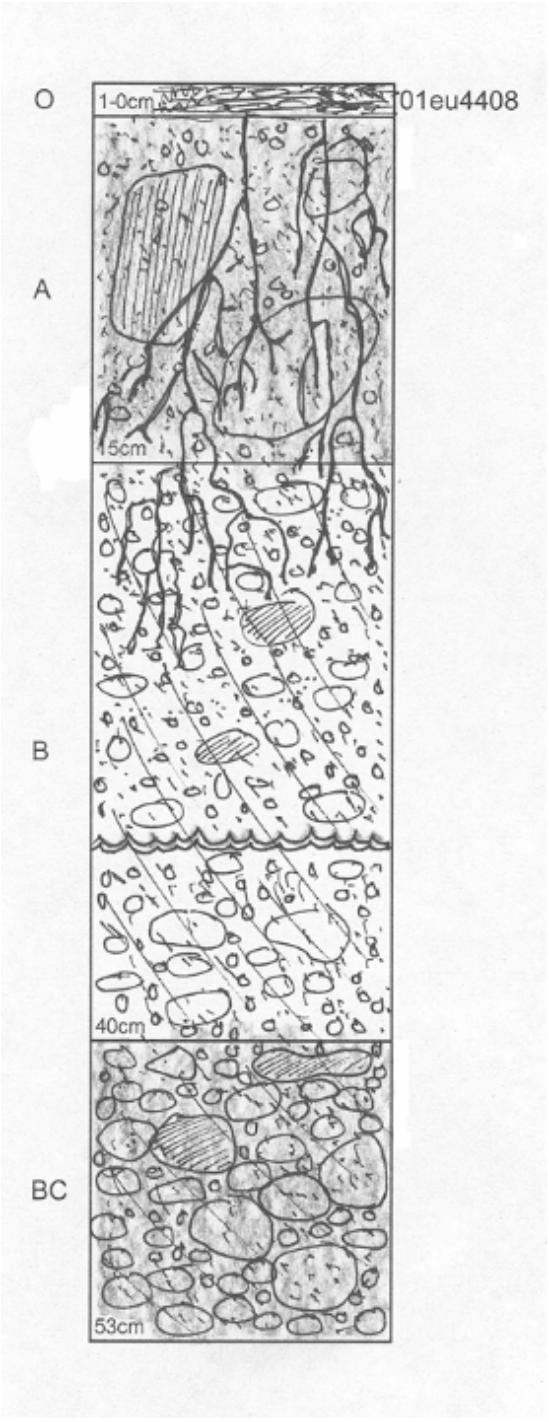


Top horizons appear to be alluvial. This site is on a shallow, dry alluvial fan with organic based A Horizon and more gravelly composition in the AB. Gravity is the main anchor now and the stream doesn't ordinarily reach this high. Clay skins and sandier texture suggest age in the Bt horizon. This Bt may have been an earlier A horizon, peacefully resting beside the stream. Alluvial / colluvial sediments settled on top and sands, fines illuviated to the Bt. Bedrock here is the same basic basalt-greenstone complex that we've seen all day, but this is the more gradual side of the stream. The way to the site today went high upslope to get around a 10-story waterfall. Even that high above the creek, alluvial cobbles and boulders exposed at the surface of the slope suggest that the creek has cut the mountain largely from the southwest (left-bank side).

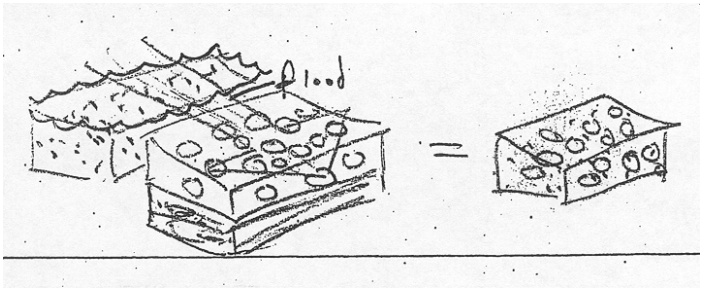
Soil illustration B: BOOC2-MIOV

O	1			cobble	30	15	
A	15	7.5YR3/1	LS	cobble / gravel	20 / 20	10	20
B	25	7.5YR3/2	CS	cobble / sm gravel	10 / 40	8	15
BC	13	7.5YR3/2	CS	cobble / gravel	30 / 30	5	

Total Depth: 50cm. Depth Limit: 50cm+. Water Table: 30cm.



Pretty large cobbles in the A horizon, about 10cm wide sometimes. Very sandy. The 3D drawing helps to show how these cobbles appear to be "suspended" in the sand. Really they were simply inundated by it. The transition to a B horizon was based on the size of the sand grains really, and a color change and addition of some clay. But mostly the size of the sand grains above vs. below the cobbles. About 7cm below the water table, the BC horizon begins (37-50cm). Basically I just stuck my hand down through the muck to find the depth at which the cobble begins again. They are pretty firmly in the muck down there. It makes me wonder if the cemented-cobble matrix I described from the last plot has liquefied here. If so, it may be possible for the cobbles to settle to the bottom forming the BC and the stream bottom.



Tiarella trifoliata
Foamflower
TITR

N=3 (WNF 2, MHNF 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-seedlings			
Tsuga heterophylla	Western hemlock	100	5
Shrubs			
Rubus spectabilis	Salmonberry	67	1
Herbs			
Tiarella trifoliata	Foamflower	100	13
Galium aparine	Cleaver	100	7
Athyrium filix-femina	Lady fern	100	2
Claytonia sibirica	Siberian miner's lettuce	100	Tr
Anemone deltoidea	Three-leaved anemone	67	8
Polystichum munitum	Sword fern	67	6
Circaea alpina	Enchanter's-nightshade	67	5
Tolmiea menziesii	Piggyback plant	67	3
Mitella ovalis	Oval-leaved mitrewort	67	2
Galium triflorum	Sweetscented bedstraw	67	1
Montia parvifolia	Streambank springbeauty	67	Tr

Elevations: 2740 to 3400 feet (average 3,165 feet).

Community: Foamflower is an herb dominated community of cooler, moderate elevation sites. Western hemlock seedlings were recorded on all plots, but no older trees were present. The shrub layer is nearly absent, though salmonberry may be in trace amounts. The herb layer is marked by dominance of saxifrages and ferns. Most prominent are foamflower, piggyback plant, oval-leaved mitrewort, lady fern and sword fern. Cleaver and Siberian miner's lettuce are constant associates. Important forbs include cleaver, three-leaved anemone, enchanters nightshade, sweetscented bedstraw and streambank spring-beauty.

Geomorphic environment: This community is found in small patches on cobble bars, islands and lower banks. Two samples were within the silver fir zone. All samples were north of the North Santiam River.

Soil data are nearly lacking, though one plot had coarse sands in a matrix of cobbles.

Geomorphic surfaces, lack of larger trees, and coarse sands in cobbles indicate that this community is frequently reset by floods and does not support mature conifers or older hardwoods.

Foamflower community: note shrub cover is absent. Foamflower dominates the community.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	75%
Wetland indicators among dominant species	24% (range 13-40%)

Similar types: This community is very similar to the Coast boykinia-oval-leaved mitrewort type. The Foamflower type is cooler and more northerly than the lower, warmer coast boykinia-dominated community that was sampled only south of the North Santiam River.

Valley cross sections showing TITR
Augusta creek #1
Augusta creek #5

Click on a creek name in the table to the left to see valley cross sections that show where TITR occurs in relation to other plant associations.

Non-natives: Wall-lettuce was the only exotic species recorded, on a single plot

Ribes bracteosum/Petasites frigidus
Stink currant/coltsfoot
RIBR/PEFR5

N=16 (MHNF 12, WNF 3, SBLM 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red Alder	19	53
Trees-seedlings			
Alnus rubra	Red Alder	25	8
Thuja plicata	Western Redcedar	25	2
Shrubs			
Ribes bracteosum	Stink Currant	100	31
Rubus spectabilis	Salmonberry	75	8
Herbs			
Petasites frigidus	Coltsfoot	94	20
Athyrium filix-femina	Lady Fern	75	3
Galium triflorum	Sweetscented Bedstraw	75	1
Stachys cooleyae	Cooley's Betony	63	10
Tolmiea menziesii	Piggyback Plant	56	7
Circaea alpina	Enchanter's-Nightshade	56	2
Oxalis	Sorrel	50	5
Claytonia sibirica	Siberian Miner's Lettuce	44	2
Bromus vulgaris	Columbia Brome	38	7
Lactuca muralis	*Wall-lettuce*	31	4

Elevations: 1390 to 3000 feet (average 2360 feet).

Community: Stink currant/coltsfoot is a shrub and herb dominated community of moderate elevations in the Cascades. The canopy is very open, tree cover averaging only 16%. Red alder occurred in the overstory, but in only 19% of the plots (canopy heights average 55 feet). Three cohorts of alders were aged on one Willamette NF plot (16 years, 20 years, 47 years), suggesting repeated floods. Stink currant is the dominant shrub. Coltsfoot and Cooley's betony are the most abundant herbs, with lady fern, sweetscented bedstraw, piggyback plant, enchanter's nightshade, and sorrel also present on the majority of the samples. Grasses are present in 75% of the plots, averaging 4% cover. Graminoids occur on 56% of the plots, slightly more abundant at 9% cover.

Geomorphic environment: Plots were on cobble bars and banks, islands, inactive channels, and active floodplains.

Soils are shallow (ave.19cm) sand, gravelly sand, or cobbly sand over gravels and cobbles. Comments on some plots note: “small cobbles with sand and gravel between”, “pockets of gravelly sand around cobbles”. Several plots noted recent disturbance. Most plots showed <1 cm litter and no organic layer.

The Stink currant/coltsfoot community is near-channel level, by the stream or on overflow channels. The lack of litter and organic matter accumulation suggest winter flooding, though the presence of shrubs and some alder indicate that the surfaces have some stability and are not reset annually. Note the low salmonberry and sorrel cover compared to cobble substrates with more developed soils, and the dominance of the coltsfoot and Cooley’s betony typical of herb dominated channel margin types.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	85%
Wetland indicators among dominant species	82% (range 50-100%)

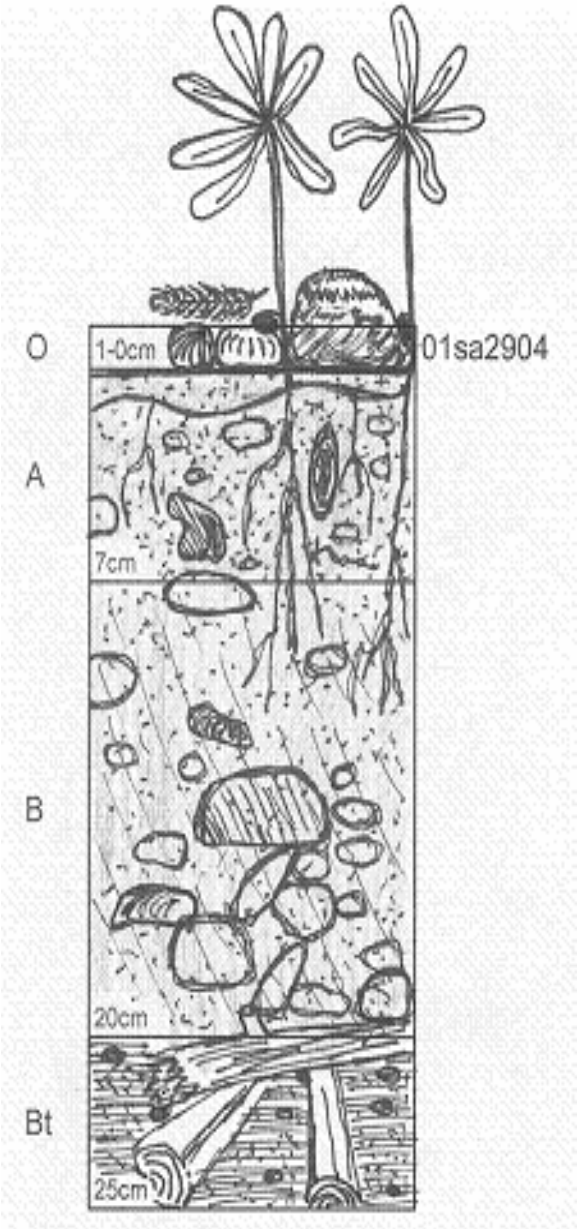
Non-natives: Wall-lettuce is the only recorded exotic species, on 31% of the plots at 4% average cover.

Other studies: This community is somewhat similar to two types previously been described for the Mt. Hood NF in Diaz and Mellen (1996): the ALRU/PEFR2 Plant Community (Ecoclass HAF223) and the RIBR-RUSP/PEFR2 Plant Association (Ecoclass SW5122).

Soil illustration: 01SA2904: RIBR/PEFR5

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	1			gravel / cobble	40 / 10	15	3
A	7	7.5YR3/1	S	gravel / cobble	25 / 30	10	8
B	13	7.5YR3/1	LS	gravel / cobble	25 / 25	8	5
Bt	5	7.5YR3/1	SC	gravel / cobble	10 / 10	3	3

Total Depth: 25cm. Depth Limit: 25cm to LWD. Water Table: ~30cm.



A horizon is very sandy and sand only with plenty of cobbles. Rhizomotous growth of colt's foot is aided by easily displaced soil. The hard candy shell of the A horizon is from sand and fines being washed out of the cracks in the cobble armor.

The B horizon is a switch from the clean-washed sand in the A to a sand which has accumulated enough OM to feel loamy. There was not enough clay to designate a Bt and the possibility of it being a buried A this close to the stream is slim. No stratification is obvious to split it further. Cobble distribution is about the same as in the A horizon.

Large woody debris resting on the previous stream bank was the impetus for this cobble bar formation and is the limiting factor in digging any deeper (50% of the horizon). We are not quite to the watertable, but we are below the stream. Decomposition and illuviation have clayed up the horizon. Few cobbles.

Cobble bars and low floodplains

Senecio triangularis-Aster modestus
Arrowleaf groundsel-great northern aster
SETR-ASMO3

N=9 (MHNF 8, WNF 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Picea engelmannii	Engelmann's spruce	22	10
Trees-seedlings			
Tsuga heterophylla	Western hemlock	56	2
Picea engelmannii	Engelmann's spruce	44	2
Shrubs			
Spiraea douglasii	Douglas spiraea	67	2
Alnus incana	Mountain alder	56	8
Physocarpus capitatus	Ninebark	56	6
Rubus parviflorus	Thimbleberry	33	6
Rosa gymnocarpa	Baldhip rose	33	3
Vaccinium ovalifolium	Oval-leaf huckleberry	33	3
Ribes lacustre	Black gooseberry	33	2
Herbs			
Senecio triangularis	Arrowleaf groundsel	89	9
Heracleum lanatum	Cow-parsnip	89	4
Aster modestus	Great northern aster	78	8
Aconitum columbianum	Columbian monkshood	78	6
Vancouveria hexandra	Insideout flower	78	4
Stachys cooleyae	Cooley's betony	78	3
Galium triflorum	Sweetscented bedstraw	78	2
Mertensia paniculata	Tall bluebells	78	2
Senecio pseudoaureus	Streambank groundsel	67	10
Trautvetteria caroliniensis	False bugbane	56	5
Athyrium filix-femina	Lady fern	56	5
Achlys triphylla	Vanilla leaf	56	2
Tiarella trifoliata var. unifoliata	Coolwort foamflower	56	1
Valeriana sitchensis	Sitka valerian	56	1
Viola glabella	Stream violet	44	3
Cornus unalaschkensis	Dogwood bunchberry	44	1
Delphinium glareosum	Olympic larkspur	33	4
Hypericum perforatum	*Common St.John's-wort*	33	2
Platanthera stricta	Slender bog-orchid	33	1
Streptopus amplexifolius	Clasping twistedstalk	33	1

Elevations: 3120 to 4810 feet (average 3,360 feet).

Community: Arrowleaf groundsel-great northern aster is an herb-rich community of flat cobbly surfaces in cool, higher elevations. Engelmann spruce can occasionally be found in the overstory. Shrubs are generally present. Douglas spiraea is the most common, but mountain alder and ninebark are generally present. Other shrubs associated with the community include thimbleberry, rose, oval-leaved huckleberry and black gooseberry. The most constant herbs are arrowleaf groundsel and cow-parsnip. Other important herbs include great northern aster, Columbian monkshood, insideout flower, Cooley's betony, sweetscented bedstraw, tall bluebells and streambank groundsel.

Most of the samples came from Stone Creek on the Mt. Hood NF, near Timothy Lake. The Willamette sample came from the Mink Lake Basin in Three Sisters Wilderness. Adjacent upland plant associations ranged from mountain hemlock types, through silver fir associations, to cool western hemlock associations in cold air drainage environments.

Geomorphic environment: Geomorphic surfaces were active floodplains, cobble bars, and inactive channels. Slopes were extremely gentle, from 0 to 7%. Soils were generally shallow silts, sandy silts or mucks over gravels and cobbles. Water tables were generally within 30cm of the surface. The community is typically adjacent to the channel, with plots 0 to 2 feet above the stream.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	88%
Wetland indicators among dominant species	66% (range 40-86%)

Non-natives: Exotic species were minor in this community. Common St. John's-wort was found on 3 plots, one of which also had reed canarygrass at very low cover.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Hypericum perforatum	*Common St.John's-wort*	33	3	2
Phalaris arundinacea	*Reed canarygrass*	11	1	1

Other studies: This community has previously been described for the Mt. Hood NF in Diaz and Mellen (1996) as the SETR-ASMO Plant Community (Ecoclass FW4228). It is somewhat similar to the Engelmann spruce/Arrowleaf groundsel association described for eastern Oregon in Crowe, Kovalchik, and Kerr (2004).

Alnus rubra/Elymus glaucus
Red alder/blue wildrye
ALRU2/ELGL

N=9 (MH 7, WNF 2)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	100	58
Trees-seedlings			
Pseudotsuga menziesii	Douglas fir	56	4
Acer macrophyllum	Big leaf maple	56	1
Alnus rubra	Red alder	44	36
Thuja plicata	Western redcedar	44	1
Shrubs			
Rubus ursinus	Trailing blackberry	67	6
Rubus spectabilis	Salmonberry	67	3
Herbs			
Elymus glaucus	Blue wildrye	100	29
Polystichum munitum	Sword fern	89	3
Lactuca muralis	*Wall-lettuce*	78	3
Claytonia sibirica	Siberian miner's lettuce	67	11
Tolmiea menziesii	Piggyback plant	67	5
Athyrium filix-femina	Lady fern	56	1
Equisetum arvense	Common horsetail	44	2
Digitalis purpurea	*Common foxglove*	44	2
Stachys cooleyae	Cooley's betony	44	1
Galium triflorum	Sweetscented bedstraw	44	1
Maianthemum stellatum	Starry false Solomon's-seal	44	1

Elevations: 1090 feet to 2220 feet (average 1765 feet).

Community: Red alder/blue wildrye is a grassy mid-elevation forested floodplain community of the larger creeks and rivers in Cascades. The tree overstory is red alder, less than 25 years old in the sample. Black cottonwood, Oregon ash, and Douglas fir can also occur. Tree regeneration is often a dense stand of young red alder, but generally includes Douglas fir and big leaf maple, or western redcedar. The shrub layer is sparse, with trailing blackberry and salmonberry generally present. The herb layer is dominated by blue wildrye. Siberian miner's lettuce is also abundant. Sword fern, wall-lettuce, piggyback plant, and lady fern are common associates. Total grass cover in Red alder/blue wildrye is the highest among all streamside communities in this guide.

Geomorphic environment: Geomorphic surfaces are cobbly floodplains or islands 0-6 feet above normal high waterline (average 2.5 feet). Soils are 5 to 45 cm of gravelly sands, very fine sand, or silty sands over gravel and/or cobbles. Plot comments note that litter is often washed away by winter flow, and little organic material accumulates on these sites.

Geomorphic surface, substrate, lack of soil development, and stand ages indicate that this community is frequently flooded, and is reset every few decades.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	33%
Wetland indicators among dominant species	53% (range 29-75%)

Similar types: Red alder/blue wildrye is similar to red alder/salmonberry, but has lower, less constant salmonberry and fewer ferns. It may occur on drier, coarser substrates, perhaps farther away from the water table during the summer.

Non-natives: Exotics were common. Fourteen species were found, though only wall-lettuce and common foxglove occurred on more than one plot.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Lactuca muralis	*Wall-lettuce*	78	7	3
Digitalis purpurea	*Foxglove*	44	4	1
Poa palustris	*Fowl bluegrass*	11	1	2
Holcus lanatus	*Common velve-grass*	11	1	1
Cytisus scoparius	*Scotch broom*	11	1	1
Dactylis glomerata	*Orchard grass*	11	1	1
Mentha spicata	*Spearmint*	11	1	1
Hypericum perforatum	*Common St.John's-wort*	11	1	1
Rubus armeniacus	*Himalayan blackberry*	11	1	1
Rumex crispus	*Curled dock*	11	1	Tr
Hypochaeris radicata	*Hairy cat's ear*	11	1	Tr
Rumex obtusifolius	*Bitter dock*	11	1	Tr
Leucanthemum vulgare	*Oxeye daisy*	11	1	Tr
Plantago lanceolata	*Ribwort*	11	1	Tr

Other studies: This community has previously been described for the Mt. Hood NF in Diaz and Mellen (1996) as the ALRU/ELGL plant community (Ecoclass HAF211). The Red alder/Trailing Blackberry/Blue Wildrye Forest Community, described for the Olympic Experimental State Forest, is very similar, though within the coastal Sitka spruce zone (Chappell (1996)).

Rubus parviflorus/Achlys triphylla
Thimbleberry/Vanilla-leaf
RUPA/ACTR

N=10 (MHNF 10)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-seedlings			
Taxus brevifolia	Pacific yew	60	17
Tsuga heterophylla	Western hemlock	60	13
Thuja plicata	Western redcedar	50	7
Shrubs			
Rubus parviflorus	Thimbleberry	100	8
Acer glabrum var. douglasii	Douglas maple	70	12
Ribes lacustre	Black gooseberry	60	12
Berberis nervosa	Oregon grape	60	3
Acer circinatum	Vine maple	50	15
Ribes bracteosum	Stink currant	50	10
Rosa pisocarpa	Clustered wild rose	40	5
Paxistima myrsinites	Oregon boxwood	30	3
Herbs			
Achlys triphylla	Vanilla leaf	90	4
Linnaea borealis	Twinflower	50	21
Cornus unalaschkensis	Dogwood bunchberry	50	5
Galium triflorum	Sweetscented bedstraw	50	2
Tiarella trifoliata var. unifoliata	Foamflower	40	3
Trillium ovatum	Western trillium	40	1
Polystichum munitum	Sword fern	30	1
Luzula parviflora	Small-flowered wood-rush	30	1
Epilobium	Willowherb	30	1
Anemone lyallii	Lyall's anemone	30	1
Lactuca muralis	*Wall-lettuce*	30	1

Elevations: 2400 feet to 3680 feet (average 3150 feet).

Community: Thimbleberry/vanilla-leaf is a shrub community of mid- to higher elevations, sampled in the Mt. Hood NF. Conifer regeneration (Pacific yew, western hemlock, western redcedar) is plentiful (average 27% cover). Few seedlings appear to reach maturity. Mature trees occur on only 20% of plots. The important shrub species include a mix of upland and riparian species: thimbleberry, Douglas maple, black gooseberry, Oregon grape, vine maple, and stink currant. Twinflower is often dominant, and bunchberry dogwood, another dwarf shrub, is frequently present. Vanilla-leaf is the most constant herb species. Sweetscented bedstraw is usually found.

Adjacent upland plant associations were in the western hemlock series; most often Western hemlock/rhododendron/Oregon grape. The most common herb species in the Thimbleberry/vanilla leaf community occur in the Western hemlock/rhododendron/Oregon grape plant association.

Geomorphic environment: Geomorphic surfaces are low terraces or narrow flats, often behind cobbly levees. The surfaces typically are between steep conifer dominated valley walls or toeslopes on one side, and the channel, usually 0 to 3 feet above normal high water line. Little soil development is evident; most plots show shallow silts or sands in a matrix of cobbles. This community is likely subject to disturbances which are mild enough or far enough apart to allow tree regeneration, and the near dominance of upland or facultative upland species. However, the geomorphic surfaces, cobble substrate, and lack of mature trees indicate that these sites are subject to fairly frequent floods of sufficient severity to reset the tree component.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	20%
Wetland indicators among dominant species	41% (range 14-67%)

Non-natives: Wall-lettuce was the only exotic species recorded in the sample (30% of the plots).

Alnus rubra/Tolmeia menziesii-Claytonia siberica
Red alder/piggyback plant-Siberian miner's lettuce
ALRU2/TOME-CLSI2

N=11 (MHNF 9, WNF 2)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	100	69
Acer macrophyllum	Big leaf maple	27	28
Trees-seedlings			
Pseudotsuga menziesii	Douglas fir	45	3
Tsuga heterophylla	Western hemlock	45	1
Thuja plicata	Western redcedar	36	21
Acer macrophyllum	Big leaf maple	36	17
Shrubs			
Rubus spectabilis	Salmonberry	64	4
Rubus parviflorus	Thimbleberry	36	28
Herbs			
Claytonia sibirica	Siberian miner's lettuce	100	13
Tolmiea menziesii	Piggyback plant	91	23
Stachys cooleyae	Cooley's betony	82	3
Lactuca muralis	*Wall-lettuce*	73	3
Petasites frigidus	Coltsfoot	73	2
Galium triflorum	Sweetscented bedstraw	73	2
Oxalis	Sorrel	56	3
Athyrium filix-femina	Lady fern	45	9
Dicentra formosa	Bleeding heart	45	1
Polystichum munitum	Sword fern	36	11
Circaea alpina	Enchanter's-nightshade	36	5
Hydrophyllum tenuipes	Pacific waterleaf	36	Tr
Epilobium glaberrimum	Smooth willowherb	36	Tr

Elevations: 1390 to 2500 feet (average 1960 feet).

Community: Red alder/piggyback plant-Siberian miner's lettuce is an herb-dominated community which occurs under a dense young red alder canopy in moderately low elevations. Big leaf maple sometimes is present. Salmonberry is frequent but not abundant. Thimbleberry occurs on a third of the plots. Piggyback plant and Siberian miner's lettuce are the dominant herb species.

Stands are often sapling and pole size (<9" dbh) red alders. Ages recorded on the plots were <25 years. Seedlings from several tree species are common,

especially western red cedar, Douglas fir, western hemlock, and big leaf maple. The conifers are not found as overstory trees with this community.

Geomorphic environment: Geomorphic surfaces are cobble or boulder bars, active floodplains, banks, and islands.

Soils are thin (2-35cm) layers of sands or gravelly sands over sandy cobbles, gravels, and boulders. Note that one site, dominated by 100 year old big leaf maple, was anomalous, with a deep loamy soil over gravels and sands.

Shallow sands, high ground cover of exposed surface boulders, frequently flooded geomorphic surfaces, and very young red alder stands suggest that this community develops with frequent, fairly high energy flooding. Salmonberry-stink currant communities or similar salmonberry types might develop if these surfaces receive silt deposits and accumulate organic matter in the upper horizons.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	73%
Wetland indicators among dominant species	64% (range 25-80%)

Non-natives: Wall-lettuce is the most common exotic, present in almost three quarters of the plots. Common foxglove and longstalk cranesbill were also found on one plot each.

Other studies: This community has previously been described for the Mt. Hood NF in Diaz and Mellen (1996) as the ALRU/TOME-MOSI Plant Community (Ecoclass HAF225).

(*Alnus rubra-Acer macrophyllum)/Ribes bracteosum-Rubus spectabilis/Tolmiea menziesii*
(Red alder-big leaf maple)/stink currant-salmonberry/piggyback plant (ALRU2-ACMA3)/RIBR-RUSP/TOME

N=14 (MHNF 9, WNF 5)

SPECIES	Common name	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	64	41
Thuja plicata	Western redcedar	29	26
Acer macrophyllum	Big leaf maple	21	52
Trees-seedlings			
Tsuga heterophylla	Western hemlock	43	2
Acer macrophyllum	Big leaf maple	36	4
Shrubs			
Ribes bracteosum	Stink currant	100	24
Rubus spectabilis	Salmonberry	79	17
Acer circinatum	Vine maple	36	16
Herbs			
Tolmiea menziesii	Piggyback plant	100	11
Athyrium filix-femina	Lady fern	79	10
Galium triflorum	Sweetscented bedstraw	79	2
Stachys cooleyae	Cooley's betony	79	2
Claytonia sibirica	Siberian miner's lettuce	79	2
Oxalis	Sorrel	71	2
Polystichum munitum	Sword fern	57	2
Lactuca muralis	*Wall-lettuce*	43	1
Hydrophyllum tenuipes	Pacific waterleaf	36	7
Circaea alpina	Enchanter's-nightshade	36	6
Montia parvifolia	Streambank springbeauty	36	4
Petasites frigidus	Coltsfoot	36	1

Elevations: 800 to 3000 feet (average 2225 feet).

Community: (Red alder-big leaf maple)/stink currant-salmonberry/piggyback plant is a moderate elevation community. The canopy is most commonly found dominated by red alder, but the same understory occurs under big leaf maple, especially on the Willamette NF. In the North Fork Clackamas drainage, western redcedar can be found in the overstory with the red alder. One plot had no overstory trees. Overall, overstory trees averaged 30% canopy cover. Canopy height averaged 62 feet. This type has slightly lower shrub and herb covers than the other two Cascades stink currant-salmonberry communities. Stink currant

and salmonberry are the dominant shrubs, with stink currant typically more abundant. Vine maple is found on a third of the plots. Piggyback plant and lady fern are the dominant herbs. Other ferns, including sword fern, are minor in this type.

(Red alder-big leaf maple)/stink currant-salmonberry/piggyback plant: exposed cobbles, shallow sandy soil, and young red alder are typical for this type.

Geomorphic environment: Plots were on cobble bars, boulder bars, and active floodplains. Plots averaged 1.6 feet above average high water line and 15 feet away from the water line.

Soils are generally sands to gravelly sands (average 30 cm) over sand in a matrix of cobbles and/or boulders. Note that the similar red alder/stink currant-salmonberry/sorrel community generally has soils with more silt in the top horizons.

Near-channel geomorphic surfaces, coarse soil texture, and low cover of sword fern and sorrel suggest that this community is reset more frequently than the Stink currant-salmonberry/sorrel-*red alder phase*.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	64%
Wetland indicators among dominant species	65% (range 29-100%)

Non-natives: Wall-lettuce was the only exotic species, and was present on 43% of the plots.

Other studies: This community is similar to two types previously been described for the Mt. Hood NF in Diaz and Mellen (1996): the ALRU/RUSP/TOME Plant Community (Ecoclass HAS113) and the RIBR-RUSP/TOME Plant Association (Ecoclass SW5123).

Click on a creek name in the table below to see the valley cross sections that show where (ALRU2-ACMA3)/RIBR-RUSP/TOME occurs in relation to other plant associations.

Valley cross sections showing (ALRU2-ACMA3)/RIBR-RUSP/TOME
Walker creek
E Fork S Fork McKenzie #2

Rubus spectabilis/Tolmiea menziesii group
Salmonberry/piggyback plant group
RUSP/TOME group

Group description followed by descriptions of two phases: *Rubus spectabilis/Tolmiea menziesii* –shrub phase, and *Rubus spectabilis/Tolmiea menziesii-Alnus rubra* phase

N=25 (MHNF 16, EBLM 5, WNF 2, SBLM 2)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	76	47
Acer macrophyllum	Big leaf maple	28	29
Trees-seedlings			
Acer macrophyllum	Big leaf maple	40	5
Alnus rubra	Red alder	36	12
Tsuga heterophylla	Western hemlock	20	7
Thuja plicata	Western redcedar	20	2
Shrubs			
Rubus spectabilis	Salmonberry	100	24
Rubus parviflorus	Thimbleberry	44	12
Herbs			
Tolmiea menziesii	Piggyback plant	92	13
Galium triflorum	Sweetscented bedstraw	76	4
Claytonia sibirica	Siberian miner's lettuce	68	7
Athyrium filix-femina	Lady fern	64	17
Stachys cooleyae	Cooley's betony	64	7
Oxalis	Sorrel	60	8
Polystichum munitum	Sword fern	56	5
Lactuca muralis	*Wall-lettuce*	56	3
Petasites frigidus	Coltsfoot	44	27
Circaea alpina	Enchanter's-nightshade	44	9

Elevations: 220 to 4120 feet (average 1875 feet).

Community: The Salmonberry/piggyback plant group is a common community that occurs from low to moderately high elevations. It is found most frequently with stands of young red alder and/or young bigleaf maples. It can occur without trees in the overstory, with very similar composition. Salmonberry is the dominant shrub, but thimbleberry is also common. Herb cover is fairly high, dominated by piggyback plant and lady fern. Sweetscented bedstraw, Siberian miner's lettuce, Cooley's betony, and sorrel are important associated species.

Piggyback plant, Cooley's betony and coltsfoot are common members of active floodplain/stream bank communities, and are often dominants in the most frequently disturbed herb types. Sword fern and sorrel tend to have lower cover where stink currant is dominant, as in the closely related stink currant type: (Red alder-big leaf maple)/stink currant-salmonberry/piggyback plant. Note that sword fern and sorrel cover are lower in this group overall than in the somewhat similar steep bank or terrace Salmonberry/sorrel group. Low sorrel and sword fern covers generally are associated with slightly coarser soil textures or shallower soil depths.

Geomorphic environment: Plots were on cobble bars, banks, islands, and annual floodplains.

Mt. Hood soil data for salmonberry dominated phases show most plots had a thin top layer of sand or silty sand over sands in a gravel/cobble/boulder matrix. Deeper soils seem to be associated with tributary junctions and active alluvial fans.

Soil data from BLM sites show loamy sands in the A horizon (average thickness 8 cm) over B horizons (average thickness 18cm) of sands mixed with gravel or gravel/cobble. C horizons are also sands with gravels or gravels mixed with cobbles and boulders. Half the pits show buried soils which are exploited by roots. Development of O horizon 2 to 3 cm thick, as well as the A horizon suggest that although disturbance may be relatively frequent, there is enough time for some soil building processes.

Plots in the Salmonberry/piggyback plant group averaged 4 feet above average high water line, and 21 feet from the average high water line. The similar (Red alder-big leaf maple/stink currant-salmonberry/piggyback plant plots averaged only 1.6 feet above average high water line and 6 feet closer to the water line than the group without stink currant.

This community often supports dense stands of red alder that can reestablish in the loamy sands on top of the gravel/cobble substrate. Often the trees can tap into buried O and A layers. The surfaces typical of this community are subject to periodic flooding which can reset the stand.

Wetland rating:

Community meets wetland test	Yes-both phases
Wetland indicators among dominant species	71% (range 38 -100%)

Non-natives: Almost two thirds of the plots (64%) had exotic species. Wall-lettuce was the most common (56% of plots).

EXOTIC	COMMON NAME	PLOTS	CONSTANCY %	TYPICAL COVER %
Lactuca muralis	*Wall-lettuce*	14	56	3
Digitalis purpurea	*Foxglove*	4	16	1
Rubus armeniacus	*Himalayan blackberry*	1	4	10
Glechoma hederacea	*Ground-ivy*	1	4	6
Veronica officinalis	*Common gypsyweed*	1	4	1
Poa trivialis	*Rough bluegrass*	1	4	1
Rumex crispus	*Curled dock*	1	4	1
Leucanthemum vulgare	*Oxeye daisy*	1	4	Tr

Click on a creek name in the table below to see the valley cross sections that show where RUSP/TOME occurs in relation to other plant associations.

Valley cross sections showing RUSP/TOME
Starr creek
Nimrod creek

***Rubus spectabilis/Tolmeia menziesii*-shrub phase**
Salmonberry/piggyback plant–*shrub phase*
RUSP/TOME-*shrub phase*

N=5 (EBLM 2, SBLM 1, MHNF 1, WNF 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Shrubs			
Rubus spectabilis	Salmonberry	100	27
Rubus parviflorus	Thimbleberry	60	12
Acer circinatum	Vine maple	40	8
Herbs			
Athyrium filix-femina	Lady fern	100	29
Galium triflorum	Sweetscented bedstraw	100	6
Tiarella trifoliata	Foamflower	80	9
Circaea alpina	Enchanter's-nightshade	60	19
Tolmiea menziesii	Piggyback plant	60	18
Boykinia occidentalis	Coast boykinia	60	16
Petasites frigidus	Coltsfoot	60	12
Bromus sitchensis	Alaska brome	60	7
Lactuca muralis	*Wall-lettuce*	60	6
Claytonia sibirica	Siberian miner's lettuce	60	5
Bromus vulgaris	Columbia brome	40	9
Oxalis	Sorrel	40	8
Mitella ovalis	Oval-leaved mitrewort	40	7
Adiantum pedatum	Maidenhair fern	40	6
Carex deweyana	Dewey's sedge	40	5
Stellaria crispa	Crisp sandwort	40	3
Equisetum arvense	Common horsetail	40	2
Montia parvifolia	Streambank springbeauty	40	2
Anaphalis margaritacea	Pearly everlasting	40	1

Elevations: 1050 to 4120 feet (average 2,250 feet).

Community: Salmonberry/piggybank plant-*shrub phase* is an herb-dominated community with a strong salmonberry and thimbleberry component. Lady fern, sweetscented bedstraw, foamflower, enchanter's-nightshade, piggyback plant, coast boykinia and coltsfoot are generally present and abundant. Alaska brome, wall-lettuce, and Siberian miner's lettuce are also important associated species.

Grasses are typically abundant (11% average summed cover and 80% constancy).

Geomorphic environment: Plots are on cobble/boulder bars, islands, and annual floodplains.

Salmonberry/piggyback plant-*shrub phase*: dense salmonberry over piggyback plant. Note small boulder exposed at lower right.

Soil data from BLM sites show loam or loamy sands in the A horizon (average thickness 5 cm) over B horizons (average thickness 22 cm) of loamy sand or sand mixed with gravel or gravel/cobble. C horizons are also sands with gravels or gravels mixed with cobbles and boulders. Some pits show buried soils which are exploited by roots. Development of O horizon 1 to 4 cm thick, as well as the A horizon suggest that although disturbance may be relatively frequent, there is enough time for some soil building processes.

Salmonberry/piggyback plant-*shrub phase* has very limited moisture or nutrient holding capacity. It is frequently disturbed. Young alder establishing on these surfaces may mature to move the site into the Salmonberry/piggyback plant *red alder phase*. It may also be that the red alder phase may move back toward the Salmonberry/piggyback plant-*shrub phase* after a flood removes the overstory alder.

Sword fern and sorrel, markers of deeper, finer substrates and less frequent disturbance, are minor or absent from most of this community.

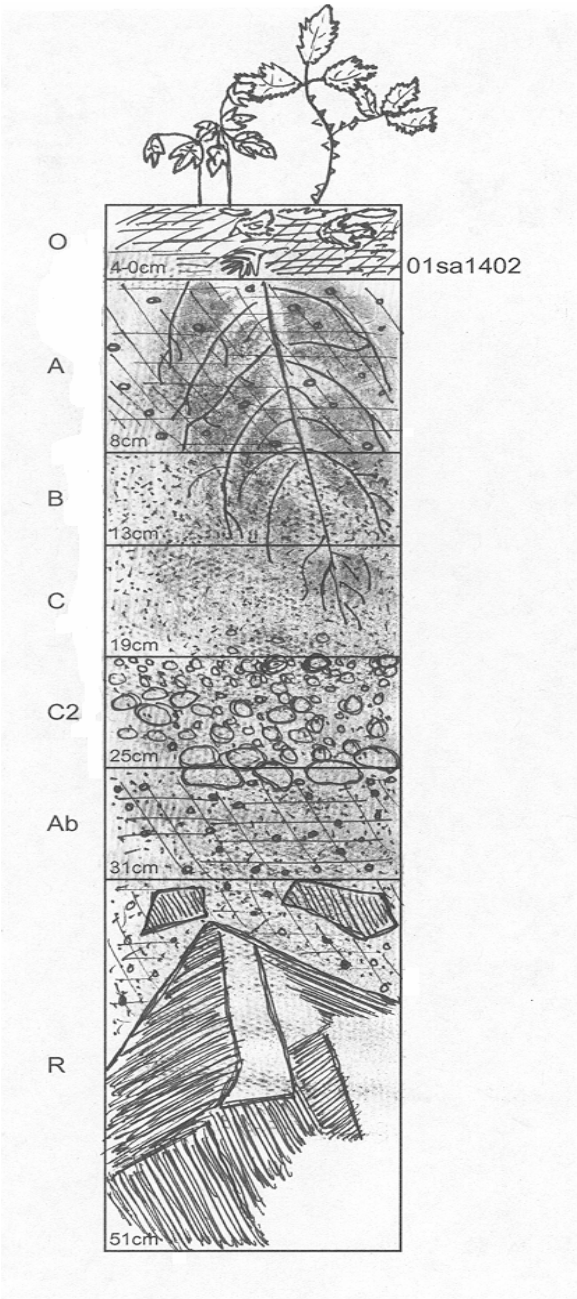
Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	100%
Wetland indicators among dominant species	82% (range 71-100%)

Non-natives: Wall-lettuce was the only exotic species recorded on three plots (60% constancy).

Soil illustration: RUSP/TOME

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	4						
A	8	10YR2/2	L	gravel <1cm	15	10	12
B	5	10YR2/2	LS	gravel	0	10	5
C	6	10YR3/1	S	sm gravel / lg gravel >2cm	15 / 20	10	5
C2	6	10YR2/2	S	gravel <.5cm	15	10	5
Ab	6	5YR2.5/2	SL	gravel <.25cm	5	3	5
R			R				



Total Depth: 35cm. Depth Limit: 35cm.

All very dark horizons with textural differences only. Pieces of wood are found throughout. Loamy textured A horizon with minimal concentration of tiny gravel accumulates first sand, then more gravel with depth to end of “recent” alluvial sediments. Below this, the previous organic horizon was washed away and replaced with sand. And below this (29cm+) is a buried A horizon of loam-influenced sand and a C horizon of colluvial origin.

Rubus spectabilis/Tolmeia menziesii-Alnus rubra phase
Salmonberry/piggyback plant-*red alder phase*
RUSP/TOME-*ALRU2 phase*

N=20 (MHNF 15, EBLM 3, SBLM 1, WNF 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	95	51
Acer macrophyllum	Big leaf maple	35	29
Trees-seedlings			
Acer macrophyllum	Big leaf maple	50	6
Alnus rubra	Red alder	40	13
Shrubs			
Rubus spectabilis	Salmonberry	100	25
Rubus parviflorus	Thimbleberry	40	11
Rubus ursinus	Trailing blackberry	35	11
Herbs			
Tolmiea menziesii	Piggyback plant	100	13
Claytonia sibirica	Siberian miner's lettuce	70	8
Galium triflorum	Sweetscented bedstraw	70	3
Oxalis	Sorrel	65	8
Polystichum munitum	Sword fern	65	6
Athyrium filix-femina	Lady fern	55	15
Stachys cooleyae	Cooley's betony	55	4
Lactuca muralis	*Wall-lettuce*	55	3
Petasites frigidus	Coltsfoot	40	24
Circaea alpina	Enchanter's-nightshade	40	7

Elevations: 220 to 2780 feet (average 1,780 feet).

Community: The Salmonberry/piggybank plant-*red alder phase* is a low to moderate elevation community of cobble/boulder deposits, islands, and active floodplains. The overstory is dominated by red alder, sometimes with big leaf maple. Seedlings of those species are also common. The shrub layer is dominated by salmonberry. Thimbleberry and trailing blackberry are common associated shrubs. The characteristic herb layer has piggyback plant, Siberian miner's lettuce, sweetscented bedstraw, sorrel, and sword fern. Lady fern, Cooley's betony, and wall-lettuce are also generally present.

Note that sword fern is more constant than lady fern. Lady fern also occurs at lower cover in this phase than in the Salmonberry/piggyback plant-*shrub phase*.

Salmonberry/piggyback plant-*red alder phase*: note location in relation to the Coltsfoot-Cooley's betony community on the lower cobble surface.

Graminoids (sedges, rushes, woodrush) are common and abundant, occurring on 70% of the plots and averaging 14% summed cover. True grasses occur on on 60% of the plots, averaging 24% summed cover.

Geomorphic environment: Geomorphic surfaces include cobble/boulder bars and islands, and active floodplains.

Mt. Hood soil data show most plots had a thin top layer of sand or silty sand over sands in a gravel/cobble/boulder matrix. Deeper soils seem to be associated with tributary junctions and active alluvial fans.

Soil data from BLM sites show loamy sands in the A horizon (average thickness 9 cm) over B horizons (average thickness 17cm) of sands mixed with gravel or gravel/cobble. C horizons are also sands with gravels or gravels mixed with cobbles and boulders. Half the pits show buried soils which are exploited by roots. Development of O horizon 2 to 5 cm thick, as well as the A horizon suggest that although disturbance may be relatively frequent, there is enough time for some soil building processes.

Red alder ages ranged from 12-79 years, averaging around 25 years. One surface had alders 47, 65, and 79 years old. That suggests the disturbance interval for the plot had been less than 20 years.

This community often supports dense stands of red alder that can reestablish in the loamy sands on top of the gravel/cobble substrate. Often the trees can tap into buried O and A layers. The surfaces typical of this community are subject to periodic flooding which can reset the stand. Conifers saplings were not observed in the sample, probably due to substrate limitations and disturbance frequency.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	75%
Wetland indicators among dominant species	68% (range 38-100%)

Non-natives: Exotics are common in this type, occurring on over half the plots. Eight species were found in the sample. Wall-lettuce is the dominant exotic species (55% constancy), and foxglove also occurs on 20% of the plots.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Lactuca muralis	*Wall-lettuce*	55	11	3
Digitalis purpurea	*Foxglove*	20	4	1
Rubus armeniacus	*Himalayan blackberry*	5	1	10
Glechoma hederacea	*Ground-ivy*	5	1	6
Veronica officinalis	*Common gypsyweed*	5	1	1
Poa trivialis	*Rough bluegrass*	5	1	1
Rumex crispus	*Curled dock*	5	1	1
Leucanthemum vulgare	*Oxeye daisy*	5	1	Tr

Other studies: This community as well as the (Red alder-big leaf maple)/stink currant-salmonberry/piggyback plant community are somewhat similar to the ALRU/RUSP/TOME Plant Community (Ecoclass HAS113), previously been described for the Mt. Hood NF in Diaz and Mellen (1996).

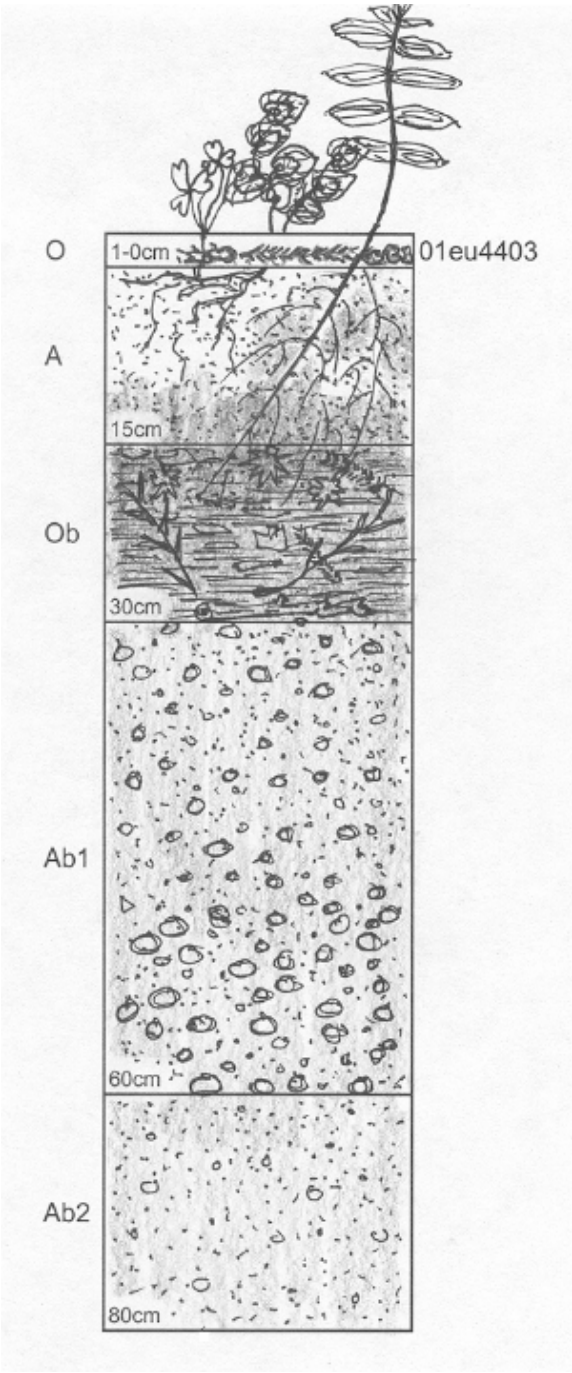
Valley cross sections showing RUSP/TOME-*ALRU2 phase*
Bear creek
Lost creek S

Click on a creek name in the table to the left to see valley cross sections that show where RUSP/TOME-ALRU2 phase occurs in relation to other plant associations.

Soil illustration: RUSP/TOME-*ALRU2 phase*

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	1					60	
A	15	7.5YR2.5/3	LS	gravel	0	10	8
Ob	15	7.5YR2.5/1		gravel	0	20	5
Ab1	30	7.5YR3/2	S	gravel	25	10	5
Ab2	20	10YR3/2	LS	gravel	8	80	5

Total Depth: 80cm. Depth Limit: 100cm+.



A couple of the plots around here are probably situated on a buried channel, mostly because of depths to stream cobble. The auger went in very deep without hitting cobbles, yet cobble is only a couple feet deep at other spots. A major disturbance may have filled in this channel and gouged another out in a short time.

At this plot, spotty organic matter and early seral-stage vegetation reveal the age of an unformed A horizon. The A has just enough organic texture to qualify as a loamy sand. It turns out most of this texture is illuviating from below: The second horizon is a buried O consisting of leaves, sticks, needles - everything you would expect to find, but underneath 15cm of sand. Water during the '96 floods was diverted over the downstream point of the island, pretty well scouring away the surface horizons of plots 2 and 4, but leaving sand piled up around the high-water mark. Though the litter buried at plot 2 is definitely from the forest, the remainder of the profile below the Ob is strictly alluvial. Deep sands with none too much gravel continue to a depth of 80cm.

Ribes bracteosum-Rubus spectabilis/Tiarella trifoliata-Mitella ovalis
Stink currant-salmonberry/foamflower-oval leaved mitrewort
RIBR-RUSP/TITR-MIOV

N=17 (EBLM 8, SBLM 8, WNF 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Acer macrophyllum	Big leaf maple	12	24
Trees-seedlings			
Tsuga heterophylla	Western hemlock	18	5
Shrubs			
Ribes bracteosum	Stink currant	100	24
Rubus spectabilis	Salmonberry	88	27
Vaccinium parvifolium	Red huckleberry	47	4
Herbs			
Athyrium filix-femina	Lady fern	100	16
Tiarella trifoliata	Foamflower	94	12
Polystichum munitum	Sword fern	88	19
Mitella ovalis	Oval-leaved mitrewort	88	8
Oxalis	Sorrel	82	29
Tolmiea menziesii	Piggyback plant	76	13
Galium triflorum	Sweetscented bedstraw	76	4
Adiantum pedatum	Maidenhair fern	71	7
Carex deweyana	Dewey's sedge	71	2
Blechnum spicant	Deer fern	59	8
Boykinia occidentalis	Coastal boykinia	53	6
Petasites frigidus	Coltsfoot	53	5
Circaea alpina	Enchanter's-nightshade	47	4
Bromus	Brome	41	4
Stellaria crispa	Crisp sandwort	41	2

Elevations: 920 to 3400 feet (average 1600 feet).

Community: Stink currant-salmonberry/foamflower-oval leaved mitrewort is a shrub-dominated community mainly of the lower elevations in the Cascades or Cascades foothills. Very few overstory trees were recorded in this community (24% of plots). Overstory red alder and western red cedar were present on only one plot each, while big leaf maples >12' were present on 2 plots. Few tree seedlings in this community appear to survive to maturity. Stink currant and salmonberry are codominant shrubs. Red huckleberry occurs most often on nurse logs. Indian plum, vine maple, and thimbleberry also occur on 30% of the plots. The rich herb layer is dominated by ferns and several saxifrages. The herb layer has the highest average cover (81%) among the many Cascades

salmonberry types. Lady fern and sword fern are the most abundant ferns, though maidenhair fern

Stink currant-salmonberry/foamflower-oval leaved mitrewort community: note understory dominated by ferns including lady fern, sword fern, and maidenhair fern.

and deer fern are also present on the majority of plots. The principal saxifrages include foamflower, oval leaved mitrewort, piggyback plant, coast Boykinia, and leafy mitrewort. Sorrel (principally *O. trilliifolia)* is the dominant non-saxifrage forb and Dewey's sedge is the dominant graminoid, occuring on more than 70% of the samples. Grasses are almost always present (94% constancy), summed cover averaging 7%. Graminoids (sedges and wood-rush) occur on 76% of the plots, averaging 13% summed cover.

Geomorphic environment: Plots were on bars, banks, islands, and floodplains.

Soils developed over alluvial deposits, with gravels or gravels with cobbles in the A horizon, gravels/cobbles in the B horizon, over cobbles and boulders (sometime on bedrock). A horizons average 11 cm, and are most commonly loamy sands or sandy loams. C, BC, or R horizons generally were found at 33 cm. A horizon coarse fragment content was variable, but B horizons averaged 38%. Banks, active floodplains, islands, and cobble or boulder bars are the most common geomorphic surfaces for this community.

Substrate and geomorphic surfaces suggest that this community is flooded and reset periodically, generally preventing establishment of large trees. Buried soils were noted in 3 soil pits. Salmonberry, sorrel, and ferns reflect the soil development (organic matter and A horizons) along the sequence of cobble/boulder bar communities.

Note that almost all of the BLM Stink currant-salmonberry group plots are in this community. Diagnostic species for the low elevation Cascades/Cascades foothills include Coast boykinia, oval-leaved mitrewort, and Dewey's sedge. Stink currant generally indicates that the community is cobbly and thin soiled, but the soils have enough fines to support the sorrel. The complement of saxifrages appears to tolerate frequent flooding, as well.

Similar types: This community appears to be a lower-elevation analogue of the Stink currant-salmonberry/sorrel group.

Valley cross sections showing RIBR-RUSP/TITR-MIOV
Bear creek
Lost creek S
Nimrod creek
Rough creek

Click on a creek name in the table to the left to see valley cross sections that show where RIBR-RUSP/TITR-MIOV occurs in relation to other plant associations.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	71%
Wetland indicators among dominant species	58% (range 22-100%)

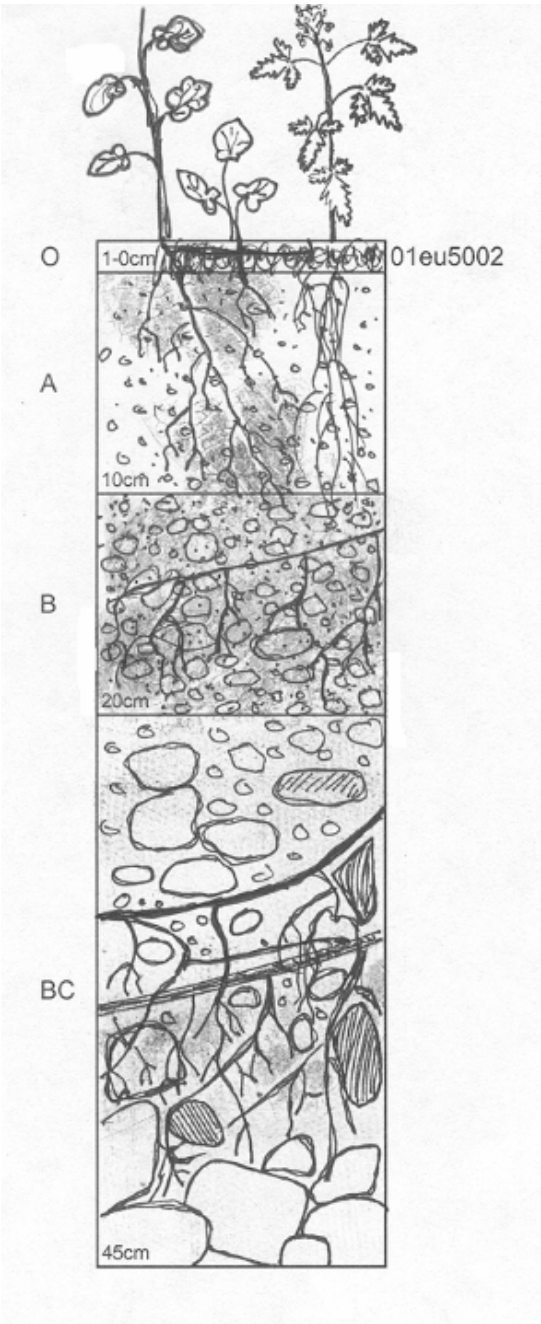
Non-natives: Wall-lettuce is the most common exotic species (29% of plots). Common gypsyweed occurred on 2 plots. Krajina hard fescue was recorded on 1 plot.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Lactuca muralis	*Wall-lettuce*	29	5	2
Veronica officinalis	*Common gypsyweed*	12	2	2
Festuca trachyphylla	*Krajina hard fescue*	6	1	1

Soil illustration A: RIBR-RUSP/TITR-MIOV

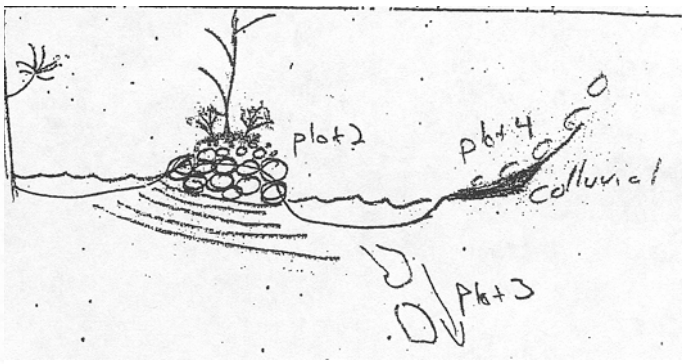
HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	1					20	5
A	10	7.5YR3/2	SCL	gravel	15	15	15
B	10	7.5YR3/1	LS	gravel / cobble	30 / 20	10	18
BC		7.5YR3/1	SiCL	gravel / cobble	12 / 30	5	25

Total Depth: 25cm. Depth Limit: ~25cm. Water Table: ~100cm to creek.



Topsoil with some good quality is not surprising to find on this island. Trees, forbs, wet and dry shrubs all coexist here in their own space. Currant on dead wood, sword fern presumably higher and drier, and this pit right between the two. The plot is basically a raised boulder bar, with a larger, high-side stream to the southeast, and a low-side stream to the northwest. The island is steeply down-cut on its northwest side. The hyporheic zone goes beneath the island from the higher channel to the lower, but the island itself is rarely submerged. This profile is deeper than the water level in the main channel.

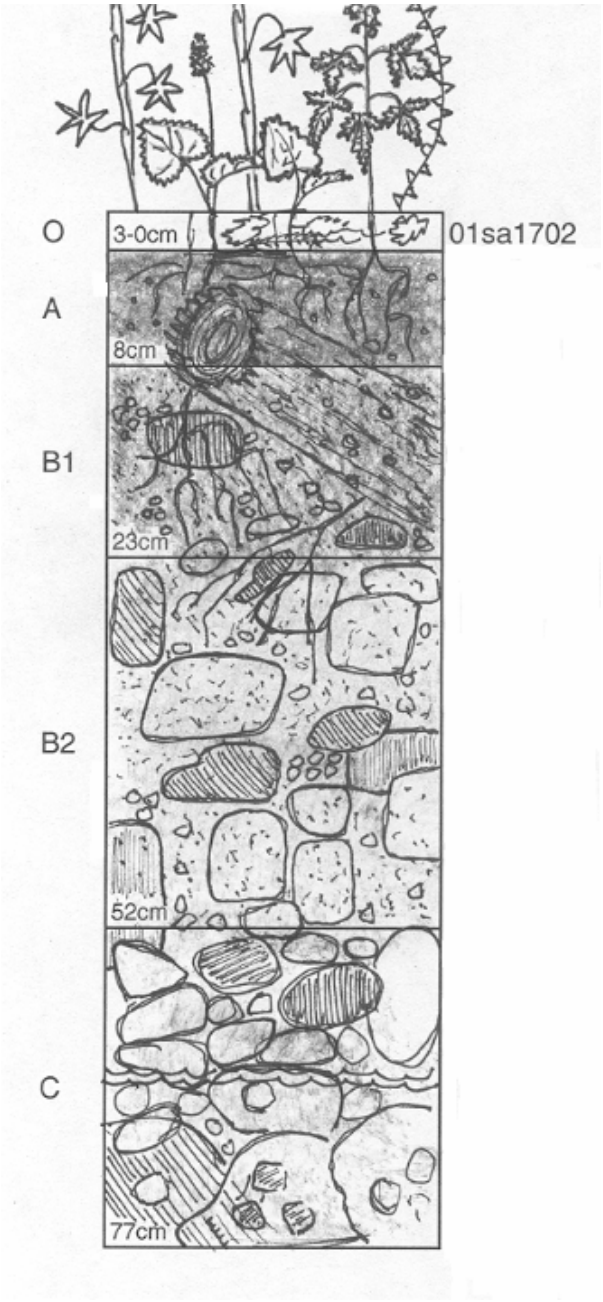
The BC horizon actually appears as though it were an original, buried A. The loamy textures are there, and fines may have illuviated to the B horizon to give it some of its texture and color. The roots at this depth are confined by 50% rock concentration, but they are able to use every cu. inch for nutrients



Soil illustration B: RIBR-RUSP/TITR-MIOV

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	3					25	5
A	8	10YR2/2	L	gravel	5	15	15
B1	15	7.5YR2.5/2	SL	gravel / cobble	10 / 20	15	10
B2	29	10YR3/3	SL	cobble	40	10	5
C		10YR3/2	C	cobble / gravel	60 / 10		

Total Depth: 63cm. Depth Limit: 63cm. Stream: 60cm.



Floodplain-fresh A horizon is about 20cm of surprisingly organic (loam) soil. Where this washed in isn't clear, maybe just from the channel banks, but it came from a single event. The channel is downcut enough that a fast current may stay contained during smaller floods. The plants on the floodplain are probably well-rooted enough not to be carried away.

The B and B2 horizons are progressively sandier and more filled with gravel and small cobble. The B2 is the most recent "old" streambed, over which a major flood laid down the foundation of the current floodplain. Smaller floods left their marks as well, adding their sediments more gently, and leaving time and depth for a real nice A horizon. The C horizon is a soaked brown clay with slow percolation. Sand and gravel are surprisingly lacking from this matrix that surrounds the parent cobbles and boulders.

***Ribes bracteosum-Rubus spectabilis/Oxalis* group**
Stink currant-salmonberry/sorrel group
RIBR-RUSP/OXALI group

Group description followed by constancy tables only for two phases: *Ribes bracteosum-Rubus spectabilis/Oxali- shrub phase* and *Ribes bracteosum-Rubus spectabilis/Oxalis-Alnus rubra phase*

N= 35 (MHNF 31, WNF 1, SBLM 2, EBLM 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	60	29
Thuja plicata	Western redcedar	26	16
Trees-seedlings			
Alnus rubra	Red alder	40	7
Tsuga heterophylla	Western hemlock	26	2
Shrubs			
Ribes bracteosum	Stink currant	100	23
Rubus spectabilis	Salmonberry	89	21
Herbs			
Oxalis	Sorrel	100	20
Athyrium filix-femina	Lady fern	83	7
Tolmiea menziesii	Piggyback plant	71	5
Polystichum munitum	Sword fern	63	5
Stachys cooleyae	Cooley's betony	54	2
Galium triflorum	Sweetscented bedstraw	49	2
Claytonia sibirica	Siberian miner's lettuce	46	1
Circaea alpina	Enchanter's-nightshade	43	2
unknown grass	Grass	40	3

Elevations: 800-3040 feet (average 2080 feet).

Community: The Stink currant-salmonberry/sorrel group most often occurs as a red alder-dominated community (Stink currant-salmonberry/sorrel-*red alder phase*). In the North Fork Clackamas drainage, western redcedar also is commonly found in the overstory. Where no mature trees are present (Stink currant-salmonberry/sorrel-*shrub phase*), high shrub cover remained constant, but low shrub cover doubled, and herb cover increased 130%, though understory species composition is the same. Alder canopy is moderate (average 33% cover; average plot canopy height 46'). The community has the dense shrub layer typical of salmonberry types. Stink currant and salmonberry are codominant shrubs. Vine maple and thimbleberry are also present on about a third of the plots. The herb layer is moderate, with sorrel the most abundant species. Lady

fern, piggy back plant, Cooley's betony, sword fern, and sweetscented bedstraw are also present in more than half the samples.

Stink currant-salmonberry/sorrel group: sorrel and lady fern are shown under a tangle of salmonberry.

Plot notes showed that logs often act as substrate for upland species not typically rooted in the community.

Geomorphic environment: Plots were on bars, banks, islands, and floodplains.

The majority of sites are on poorly developed soils over coarse alluvial deposits. Soils are gravelly, on or in cobbles or boulders. Top horizons are frequently silty sands or sandy silts to about 30cm, over horizons of extremely cobbly or gravelly sand. Some pits had water tables within 35-50cm, but most were at least 1 meter above the water table during summer low flow.

The plot with the highest western redcedar component (40% western redcedar, 40% red alder) was the only plot where a gley layer was found in the first meter of a pit of silt/sandy silt over gleyed clay above bedrock.

Substrate and geomorphic surfaces suggest that this community is flooded and reset periodically, generally preventing establishment of large conifers. This is also supported by the 7 plots with only immature trees as well as 6 plots without any tree regeneration. Presence of trees, salmonberry, sorrel, and sword fern

reflect the soil development (organic matter and silt) along the sequence of cobble/boulder bar communities. Note that this community has much less sword fern and lady fern that the Salmonberry/sorrel group, which has more loams, deeper top horizons, and more organic matter and which often has older, larger trees.

Wetland rating:

Community meets wetland test	Yes-both phases
Wetland indicators among dominant species	65% (range 17-100%)

Non-natives: Exotic species were minor in the sample. The most common non-native is wall-lettuce. Only four other non-natives were found in the community.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Lactuca muralis	*Wall-lettuce*	26	9	3
Cerastium fontanum ssp. vulgare	*Big chickweed*	3	1	Tr
Luzula multiflora	*Many-flowered wood-rush*	3	1	1
Rumex crispus	*Curled dock*	3	1	1
Taraxacum officinale	*Common dandelion*	3	1	1

Stink currant-salmonberry/sorrel group: sorrel, sword fern, and stink currant dominate lower surface. Note Maidenhair fern on seepy cutbank (center right).

Ribes bracteosum-Rubus spectabilis/Oxalis-shrub phase
Stink currant-salmonberry/sorrel-*shrub phase*
RIBR-RUSP/OXALI-*shrub phase*

N=13 (MHNF 11, EBLM 1, SBLM 1)

SPECIES	Common name	CONSTANCY %	TYPICAL COVER %
Shrubs			
Ribes bracteosum	Stink currant	100	30
Rubus spectabilis	Salmonberry	92	26
Herbs			
Oxalis	Sorrel	100	27
Athyrium filix-femina	Lady fern	92	9
Tolmiea menziesii	Piggyback plant	69	4
Stachys cooleyae	Cooley's betony	69	3
Tiarella trifoliata	Foamflower	62	3
Polystichum munitum	Sword fern	54	7
Grass (unknown)	Grass (unknown)	54	5
Galium triflorum	Sweetscented bedstraw	54	3
Corydalis scouleri	Scouler's corydalis	46	10
Adiantum pedatum	Maidenhair fern	46	2
Claytonia sibirica	Siberian miner's lettuce	46	1
Circaea alpina	Enchanter's-nightshade	38	2

Only the constancy table is included for this phase, which is extremely similar in occurrence and composition to the red alder dominated phase of the Stink-currant-salmonberry/sorrel group. It seems likely that red alder phase can develop from the shrub-dominated phase, in intervals between stand-resetting floods.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	77%
Wetland indicators among dominant species	64% (range 43-80%)

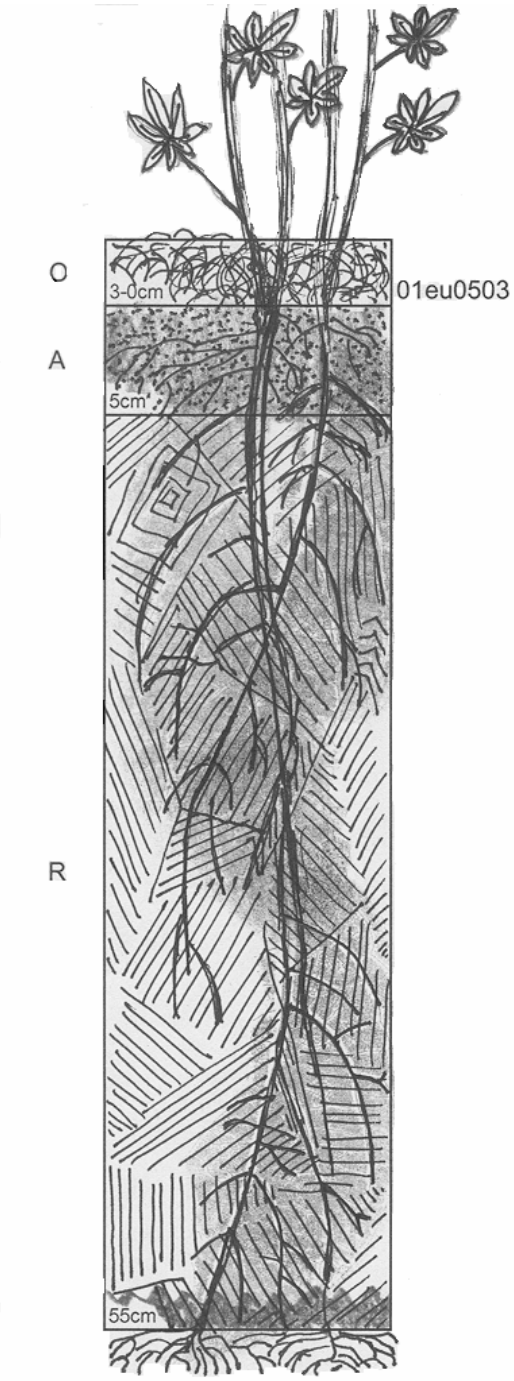
Refer to the Stink currant-salmonberry/sorrel group section (above) for a fuller description of the community.

Other studies: This community as is similar to the RIBR-RUSP/OXALIS Plant Association (Ecoclass SW5121), previously been described for the Mt. Hood NF in Diaz and Mellen (1996).

Soil illustration A: RIBR-RUSP/OXALI

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	3					40	20
A	5	10YR2/2	SL	gravel	0	30	15
R	50			boulder	100	0	0

Total Depth: 8cm. Depth Limit: 8cm.

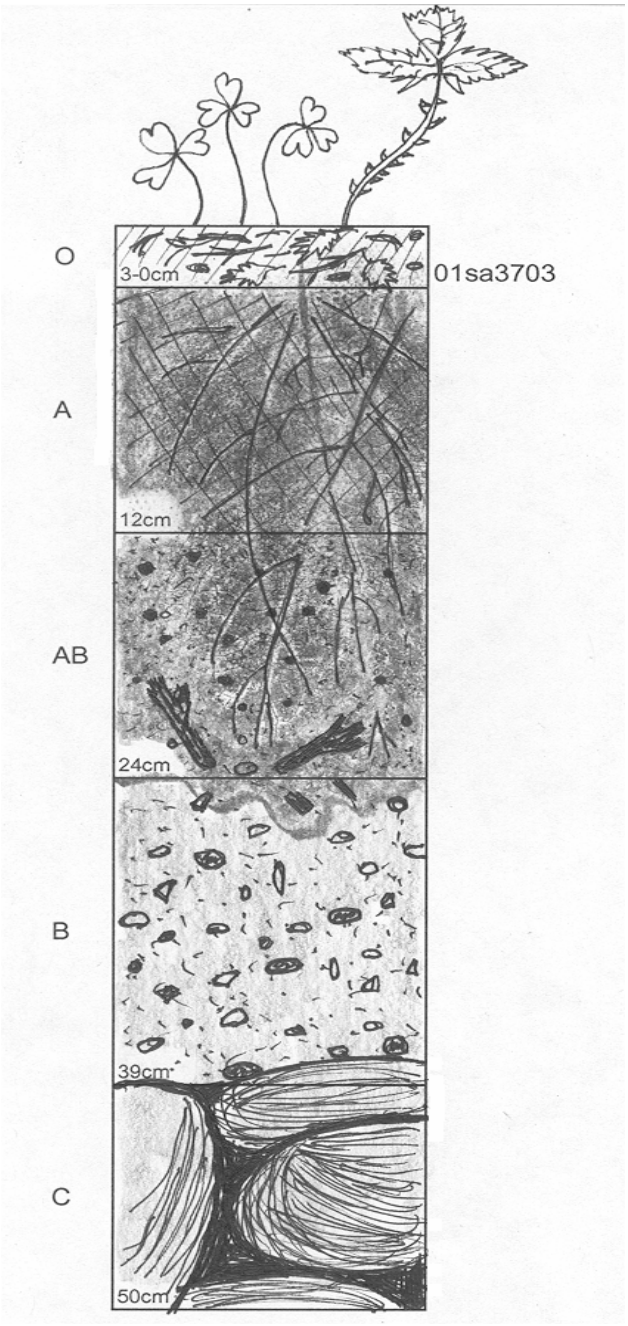


This boulder is one of the few places on the plot that has any measurable soil depth. Mostly, the stink currant which dominates the site simply grows in the saturated mud between cobbles. O horizon is a thin mat of needles, leaves, dead moss and tree twigs in various states of decomposition. Very organic A horizon is formed entirely from OM and the sand from the rock. It is literally held to the surfaces of the boulder by moss and the roots of the stink currant. A trowel easily peeled the entire layer to rock. The rock itself was probably colluvial in origin and underwent a long period of stream action. It is now out of reach of most flood events.

Soil illustration B: RIBR-RUSP/OXALI

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	3					20	5
A	12	7.5YR2.5/1	SiCL	gravel <1cm	10	15	20
AB	12	7.5YR3/1	SCL	gravel <1cm	15	10	15
B	15	7.5YR3/2	LS	gravel <2cm	20	10	8
C		7.5YR3/1	SC	gravel <2cm / boulder	20 / 60	3	1

Total Depth: 50cm. Depth Limit: 50cm.



The parent substrate of this plot is several kinds of rock, large boulders and small gravel with sand for the most of it, but with muddy textures in the nooks as well. Above this C horizon is a B horizon of poorly sorted sands and gravel. The initial rough-water alluvial deposition of the B horizon formed a sandy old streambed, but in places where the B horizon mingles with the AB and C strata, we see that successive floods may have mixed things around a bit.

In the AB, we see some intermediate timeline events. Woody debris and charcoal are both here and could have been deposited by a mudflow after a fire. Such would bury the previous bank and could even redirect the stream. The A horizon has a little too much clay to call it a silt loam, but less clay than in the AB horizon. OM is a strong factor, especially under the salmonberry.

***Ribes bracteosum-Rubus spectabilis/Oxali-Alnus rubra* phase**
Stink currant-salmonberry/sorrel-*red alder phase*
RIBR-RUSP/OXALI-*ALRU2 phase*

N=22 (MHNF 19, WNF 2, SBLM 1)

SPECIES	Common name	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	95	29
Thuja plicata	Western redcedar	41	16
Trees-seedlings			
Alnus rubra	Red alder	45	4
Shrubs			
Ribes bracteosum	Stink currant	100	20
Rubus spectabilis	Salmonberry	86	18
Acer circinatum	Vine maple	36	9
Herbs			
Oxalis	Sorrel	100	16
Athyrium filix-femina	Lady fern	77	6
Tolmiea menziesii	Piggyback plant	73	5
Polystichum munitum	Sword fern	68	3
Stachys cooleyae	Cooley's betony	45	2
Hydrophyllum tenuipes	Pacific waterleaf	45	2
Galium triflorum	Sweetscented bedstraw	45	2
Circaea alpina	Enchanter's-nightshade	45	1
Claytonia sibirica	Siberian miner's lettuce	45	1
Petasites frigidus	Coltsfoot	36	5

Only the constancy table is included for this phase, which is extremely similar in occurrence and composition to the shrub-dominated phase of the Stink-currant-salmonberry/sorrel group. It seems likely that red alder phase can develop from the shrub-dominated phase, in intervals between stand-resetting floods.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	82%
Wetland indicators among dominant species	66% (range 17-100%)

Refer to the Stink currant-salmonberry/sorrel group section (above) for a fuller description of the community.

Other studies: This community as well as the Salmonberry/sorrel-*red alder phase* are somewhat similar to the ALRU/RUSP/OXALIS Plant Community

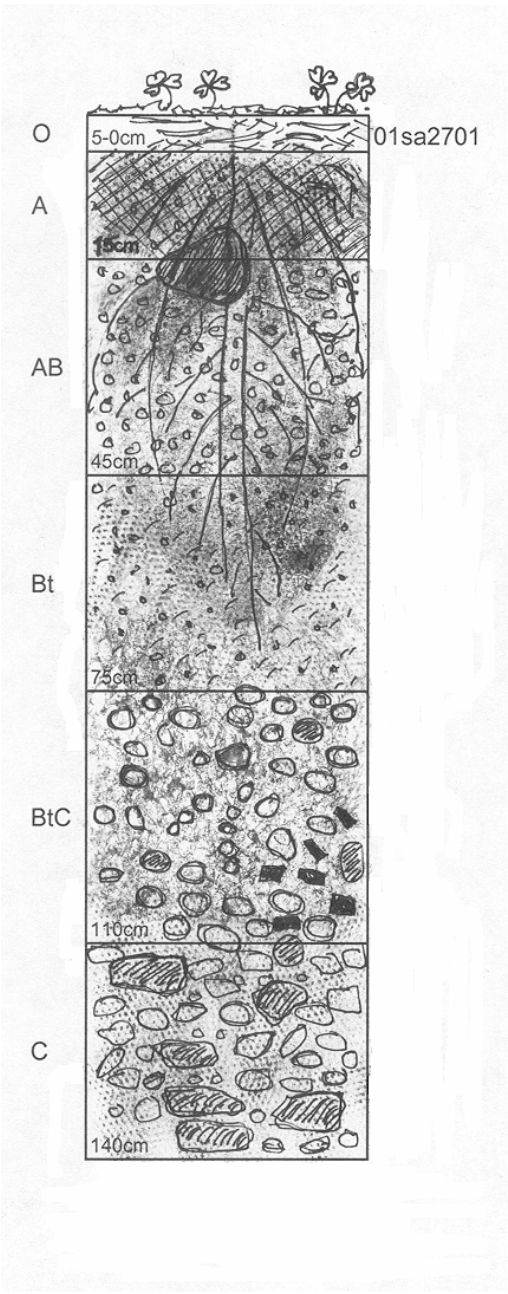
(Ecoclass HAS112), previously been described for the Mt. Hood NF in Diaz and Mellen (1996).

Valley cross sections showing RIBR-RUSP/OXALI-*ALRU2 phase*
E Fork S Fork McKenzie #2

Click on a creek name in the table to the left to see valley cross sections that show where RIBR-RUSP/OXALI-*ALRU2 phase* occurs in relation to other plant associations.

Soil illustration: RIBR-RUSP/OXALI-*ALRU2 phase*

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	5					20	15
A	15	10YR2/2	SiCL	gravel	20	15	30
AB	30	10YR3/2	SCL	gravel	45	15	25
Bt	30	10YR3/2	SiCL	gravel <1cm	20	12	20
BtC	35	10YR3/3	SiC	gravel <1cm / gravel >4cm	30 / 30	8	15
C	25		SC	gravel / cobble	70		



Total Depth: 130cm. Depth Limit: 150cm+.

Deep, rooty (15cm, 30%) A horizon goes to really deep, really rooty (30cm, 25%) AB horizon with a shift in color and gravel content. The whole profile is weakly structured, but especially the Bt horizon, which is super loose and not rocky and may just collapse. BtC and C horizons are much more solid. Firm would be the word for the 60% rocky, sub-angular blocky BtC. It also has a lot of charcoal. A large mid-1800's fire may have triggered landslides capable of burying the creek and cementing sandy soils. Clays have since illuviated into restrictive horizons, further solidifying the matrix. At places downstream, stratified, cemented, cobble-filled walls of alluvium are exposed up to 30 feet deep.

Alnus viridis
Sitka alder
ALVI5

N=14 (MHNF 13, WNF 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-seedlings			
Tsuga heterophylla	Western hemlock	43	12
Shrubs			
Alnus viridis	Sitka alder	100	18
Vaccinium ovalifolium	Oval-leaved huckleberry	79	14
Ribes lacustre	Black gooseberry	64	6
Viburnum edule	Highbush-cranberry	57	11
Rubus spectabilis	Salmonberry	57	4
Ribes bracteosum	Stink currant	43	6
Rubus parviflorus	Thimbleberry	43	4
Menziesia ferruginea	Fool's huckleberry	36	6
Gaultheria ovatifolia	Oregon wintergreen	36	2
Herbs			
Achlys triphylla	Vanilla leaf	79	6
Tiarella trifoliata var. unifoliata	Foamflower	71	2
Cornus unalaschkensis	Dogwood bunchberry	64	7
Linnaea borealis	Twinflower	57	12
Athyrium filix-femina	Lady fern	57	7
Streptopus amplexifolius	Clasping twistedstalk	43	1
Orthilia secunda	Sidebells pyrola	36	2
Clintonia uniflora	Queencup beadlily	36	2
Mitella breweri	Brewer's mitrewort	36	1
Senecio triangularis	Arrow-leaved groundsel	36	Tr

Elevations: 3270 to 4720 feet (average 3,784 feet).

Community: The Sitka alder community is a shrubby mid- to upper-elevation community. It occurs in the upper range of the western hemlock zone, in the silver fir zone, and into the mountain hemlock zone. Cold air drainage effects can be seen in this community. For example, mountain hemlock seedlings are found where silver fir associations form the adjacent upland associations. Sitka alder is the dominant species in the shrub layer. Other important shrubs include oval-leaved huckleberry, black gooseberry, highbush cranberry, and salmonberry. The herb layer typically has vanilla leaf, foamflower, dogwood bunchberry, twin flower, and lady fern. Mature conifers are seldom present, but western hemlock and silver fir occurred on 14% of the plots. Mature hardwood trees were not recorded in the sample, though red alder seedlings occurred on 28% of the plots.

Sitka alder

Geomorphic environment: Geormorphic surfaces are flat to very gently sloping cobble bars, cobbly islands, or active floodplains. Soils are shallow layers (generally <20cm) of silt, sand, or silty sand over cobbles or within a cobble matrix. Two plots with deeper (36-52 cm) soils added rhododendron to the shrub layer.

Geomorphic surfaces, poorly developed soils, cobble substrate, and lack of mature trees indicate that these sites are subject to fairly frequent floods of sufficient severity to reset the tree component. The flood regime also limits deposition and accumulation of fine sediments and organic matter.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	29%
Wetland indicators among dominant species	39% (range 10-67%)

Similar types: Note that the Oval-leaved huckleberry community is very similar in composition and distribution to the Sitka alder type and could be considered a phase of the same basic community. The Oval-leaved huckleberry community can occur on a wider range of geomorphic surfaces, and occasionally on deeper, poorly drained soils. The Sitka alder community is more restricted to cobble bars and islands very close to or within the normal high water line.

Non-natives: No exotic species were recorded in the sample.

Other studies: This community has previously been described for the Mt. Hood NF in Diaz and Mellen (1996) as the ALSI Plant Association (Ecoclass SW2132).

Vaccinium ovalifolium
Oval-leaved huckleberry
VAOV

N=18 (MHNF 14, WNF 2, SBLM 2)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-seedlings			
Tsuga heterophylla	Western hemlock	56	7
Abies amabilis	Silver fir	39	7
Taxus brevifolia	Pacific yew	33	8
Shrubs			
Vaccinium ovalifolium/V. alaskaense	Oval-Leaved Huckleberry/Alaska huckleberry	100	18
Ribes lacustre	Black gooseberry	72	3
Rubus spectabilis	Salmonberry	67	11
Menziesia ferruginea	Fool's huckleberry	39	10
Sorbus sitchensis	Sitka mountain-ash	39	4
Ribes bracteosum	Stink currant	33	5
Viburnum edule	Highbush-cranberry	33	3
Herbs			
Achlys triphylla	Vanilla leaf	94	6
Cornus unalaschkensis	Dogwood bunchberry	89	7
Linnaea borealis	Twinflower	56	6
Tiarella trifoliata var. unifoliata	Foamflower	56	5
Clintonia uniflora	Queencup beadlily	56	4
Streptopus amplexifolius	Clasping twistedstalk	44	1
Athyrium filix-femina	Lady fern	33	9
Boykinia major	Large boykinia	33	6
Gymnocarpium dryopteris	Oak fern	33	5
Streptopus lanceolatus var. curvipes	Rosy twistedstalk	33	2

Elevations: 3000 to 4340 feet (average 3,705 feet).

Community: The Oval-leaved huckleberry community occurs at higher elevations than similar salmonberry dominated types. It is generally found in the silver fir zone, but is also found in the upper western hemlock zone. The distribution extends into the mountain hemlock zone. Cold air drainage effects are often evident in this community where silver fir seedlings are present though western hemlock plant associations form the upland context, or mountain hemlock seedlings are found where silver fir associations form the adjacent upland associations. It is a shrub-dominated community, with a moderate herb layer. Tree regeneration is plentiful (average 14% cover). Few tree seedlings

appear to reach maturity, although a mature western hemlock and a silver fir occurred on one plot each. Oval-leaved huckleberry is the most common and abundant shrub, though black gooseberry and salmonberry are also typically present. Fools huckleberry and mountain ash are found in more than 40% of the samples. The most common herb species include vanilla leaf, dogwood bunchberry, foamflower, twinflower, and large boykinia.

Oval leaved huckleberry community: dense oval leaved huckleberry dominates shrub layer under the western hemlock overstory. Note minor salmonberry (center, bottom).

Geomorphic environment: Plots are on active floodplains, banks, and cobble bars. Most plots had relatively shallow top horizons of silts or silty sands (average 24 cm) in a matrix of cobbles. Exposed bedrock or large boulders were also noted. This community also occurs on deep (>80cm) but poorly drained soils, with silt or silts over sands, and mottling at 25 cm. The latter sites may be related to the somewhat similar Silver fir/Oval-leaved huckleberry community, where mature trees are found on well-drained microsites provided by hummocks.

This community may be disturbed mildly enough or far enough apart to allow tree regeneration, and the near dominance of upland or facultative upland species. However, the geomorphic surfaces, cobble substrate, and lack of mature trees indicate that these sites are subject to fairly frequent floods of sufficient severity to reset the tree component. This community seems to be the higher elevation analogue for the salmonberry/sorrel types, considering soils, geomorphic surfaces, and stand structure.

Similar types: Note that the Sitka alder community is very similar in composition and distribution to the Oval-leaved huckleberry type, and could be considered a phase of the same basic community. The Sitka alder type occurs exclusively adjacent to the channel on shallow silty sands or sands on cobble bars, cobbly floodplains or islands. It does not occur with deeper poorly drained soils.

One Salem BLM coastal plot from Warnicke Creek in the Valley of the Giants area represents a coastal variant of the Oval-leaved huckleberry community. It was not included in the description of the Cascadian community. This same cluster of plots also provided a coastal member of the Cascadian type, Coastal boykina-oval-leaved mitrewort.

Valley cross sections showing VAOV
Lamb creek

Click on a creek name in the table left to see valley cross sections that show where VAOV occurs in relation to other plant associations.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	6%
Wetland indicators among dominant species	32% (13-57%)

Non-natives: No exotics were recorded in the sample.

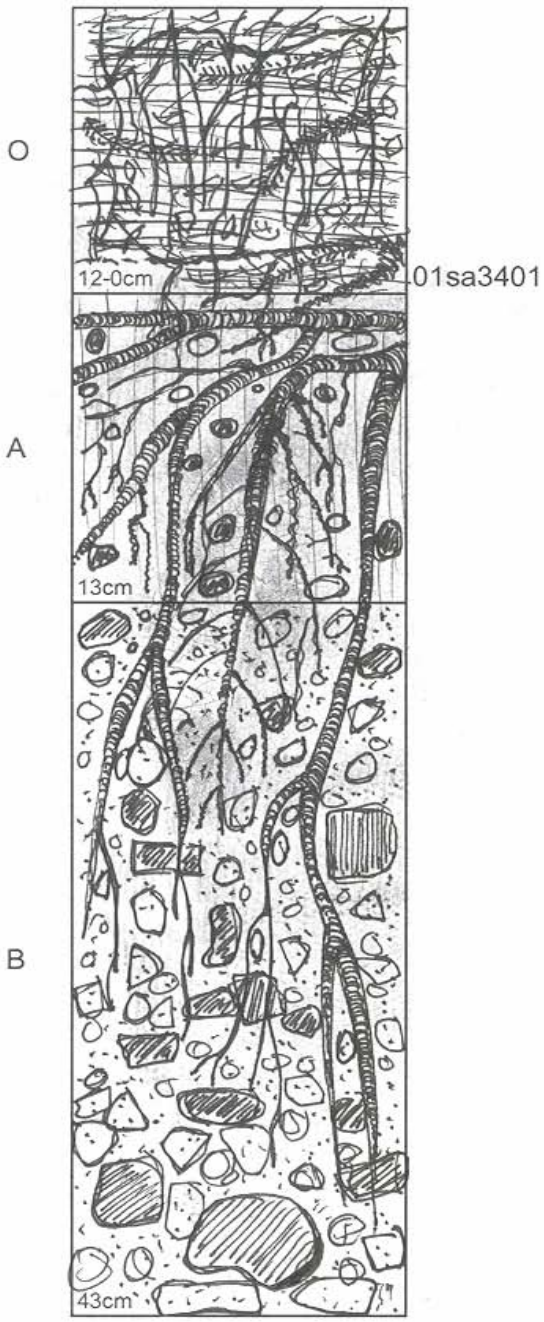
Other studies: This community is somewhat similar to the VAAL-VAOV Plant Association (Ecoclass SW4132), previously been described for the Mt. Hood NF in Diaz and Mellen (1996).

<u>Oval-leaved huckleberry</u> community with typical herb layer: vanilla leaf, foamflower, dogwood buncherry, large boykinia, and ferns.

Soil illustration: VAOV

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	12					15	25
A	13	7.5YR2.5/2	SiL	gravel	8	10	25
B	40	7.5YR3/1	SCL	gravel	20	8	15

Total Depth: 55cm. Depth Limit: ? cobble, roots impede.



Another great 12cm, rooty O horizon. There is so much competition for root space in this A horizon it's crazy. Dense, large roots begin just below the O horizon and continue into the B until its gets especially rocky. Judging from an exposed upstream cut bank (see picture), the B horizon may go down several meters changing only slightly. From this pit, it is about ten feet to creek level. Some of these rocks seem colluvial, but they have all probably been affected by water at some time. Although there is a rise in topography here, with upland vegetation, it is a little hard to believe this could be the last remnant of a spur ridge for example.

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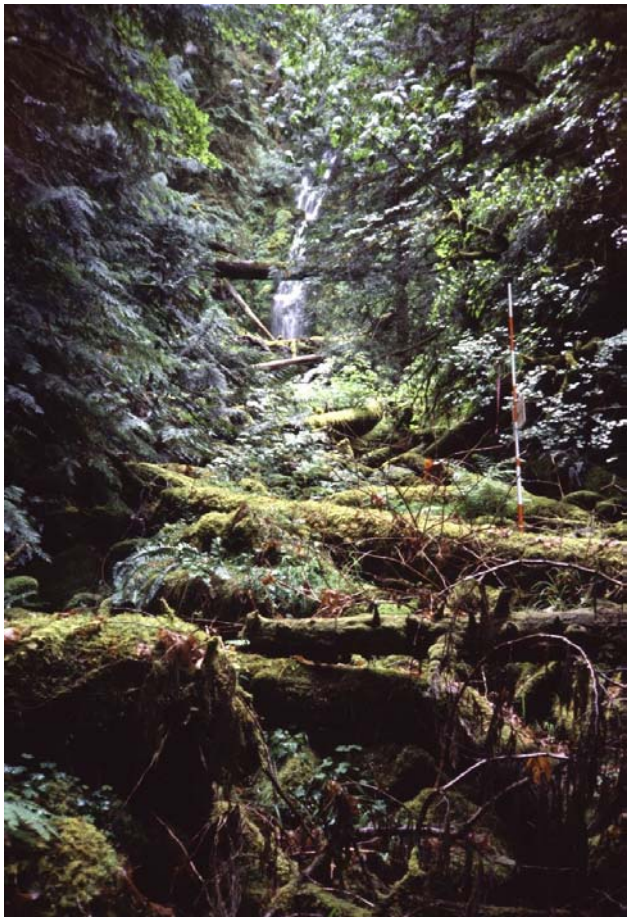
Steep banks/terraces



Oxalis-Hydrophyllum tenuipes
Sorrel-Pacific waterleaf
OXALI-HYTE

N=7 (WNF 4, MHNF 1, EBLM 1, SBLM 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	14	60
Herbs			
Oxalis (O. trillifolia)	Trillium-leaved sorrel	100	36
Hydrophyllum tenuipes	Pacific waterleaf	100	5
Galium triflorum	Sweetscented bedstraw	86	2
Polystichum munitum	Sword fern	71	17
Athyrium filix-femina	Lady fern	71	15
Tolmiea menziesii	Piggyback plant	71	1
Stachys cooleyae	Cooley's betony	43	14
Adiantum pedatum	Maidenhair fern	43	5
Claytonia sibirica	Siberian miner's lettuce	43	1
Prosartes hookeri	Hooker's fairybells	43	1

Elevations: 1150 feet to 2600 feet (average 2142 feet).

Community: Sorrel-Pacific waterleaf is a low to moderate elevation herbaceous community. Red alder and big leaf maple seedlings and saplings are occasionally present. On one plot, a large western hemlock and a Douglas fir had survived a slide deposit which reset the geomorphic surface and plant community. Overhanging conifer cover can be dense. The shrub layer is generally minor, though a thick vine maple canopy was recorded on two plots. Sorrel (identified as trillium-leaved sorrel) is the dominant herb, but Pacific waterleaf is always present. Sword fern, lady fern, and Cooley's betony can be abundant. Sweetscented bedstraw and piggyback plant are usually present.

Geomorphic environment: Geomorphic surfaces are generally moderate to steep banks, occasionally adjacent to an active channel shelf/active floodplain. Soils ranged from sands mixed with gravels and cobbles, to deeper soils with silty clay loam to silty clay textures in a gravel/cobble matrix. Two soil descriptions noted colluvial materials in the substrates.

This is a moist bank community, but generally not one subject to yearly scour or deposition. The geomorphic surfaces tend to be steep and above average winter flow.

Sorrel-Pacific waterleaf community: note wall lettuce (yellow flowers), the most common non-native in the Cascades riparian sampling.

Similar types: The Sorrel-Pacific waterleaf community is similar to the (Red alder-big leaf maple)/sorrel type, but without a tree component. Riparian indicators more common or abundant in the Sorrel-Pacific waterleaf community include lady fern and Cooley's betony. The herbaceous type may represent similar bank environments, but slightly wetter and/or younger than (Red alder-big leaf maple)/sorrel.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	75%
Wetland indicators among dominant species	46% (range 14-80%)

Non-natives: Wall-lettuce was the only exotic species recorded in the sample. It occurred on two plots.

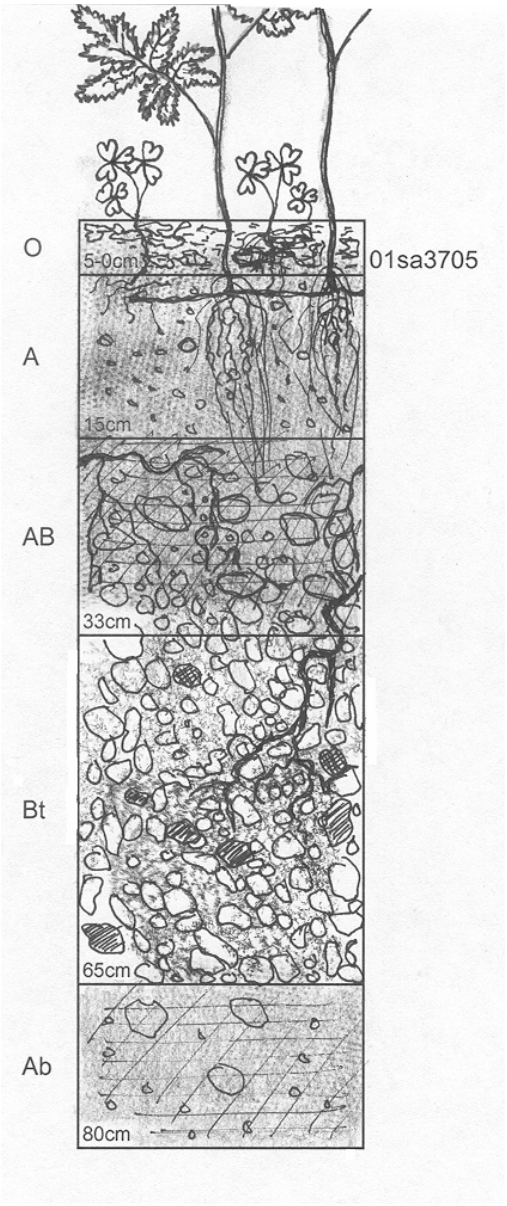
Other studies: This community is somewhat similar to the *Stachys cooleyae* community and *Hydrophyllum tenuipes* community, described for the mid-Willamette NF in Campbell (1979).

Valley cross sections showing OXALI-HYTE
Walker creek
E Fork S Fork McKenzie #2
Beacon creek

Click on a creek name in the table to the left to see the valley cross sections that show where OXALI-HYTE occurs in relation to other plant associations.

Soil illustration: OXALI-HYTE

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	5					25	5
A	15	7.5YR2.5/1	SiCL	gravel	20	15	10
AB	18	7.5YR2.5/1	CL	gravel / cobble	40 / 10	10	8
Bt	32	10YR3/1	SiC	gravel / cobble	50 / 15	6	12
Ab	15	10YR2/2	SiC	gravel	20	4	8



Total Depth: 80cm. Depth Limit: ~80 cm to roots.

Description of this hole requires a timeline of sorts. The entire profile is a nice dark color, especially the A horizon. At least 30 or 40 years of undisturbed time would be necessary for this color to come about, and another 20 for the AB horizon to accumulate the influence. Adding another 40 years to allow for the colluvial accumulation and settling of the horizons to begin with brings the total age of this profile to around 100 years. Gophers do not tend towards the immediate area that I can tell, but the hill is hummocked as a whole. Our theory is that our site tree at this site may have escaped destruction by a slide about a hundred years ago when the tree was 50. If you still don't believe, consider the second A horizon buried under 65cm of the profile. A **major** force landslide definitely dumped about 60cm of relatively dense, poorly sorted gravelly soil over it. And the rest is history.

(*Alnus rubra-Acer macrophyllum)/Oxalis*
(Red alder-big leaf maple)/Sorrel
(ALRU2-ACMA3)/OXALI

N=16 (MHNF 8, WNF 5, EBLM 3)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	56	50
Acer macrophyllum	Big leaf maple	38	47
Tsuga heterophylla	Western hemlock	38	35
Thuja plicata	Western redcedar	31	28
Trees-seedlings			
Tsuga heterophylla	Western hemlock	38	3
Shrubs			
Acer circinatum	Vine maple	63	20
Rubus ursinus	Trailing blackberry	50	2
Oemleria cerasiformis	Indian plum	38	2
Herbs			
Oxalis	Sorrel	100	27
Polystichum munitum	Sword fern	88	21
Galium triflorum	Sweetscented bedstraw	81	1
Athyrium filix-femina	Lady fern	63	5
Lactuca muralis	*Wall-lettuce*	56	1
Adiantum pedatum	Maidenhair fern	50	2
Tolmiea menziesii	Piggyback plant	44	3
Claytonia sibirica	Siberian miner's lettuce	44	1
Corydalis scouleri	Scouler's corydalis	38	31
Bromus vulgaris	Columbia brome	38	6
Vancouveria hexandra	Insideout flower	38	4
Petasites frigidus	Coltsfoot	38	1

Elevations: 920 to 2580 feet (average 1734 feet).

Community: The (Red alder-big leaf maple)/sorrel community can occur under a variety of tree species, most commonly red alder, big leaf maple, western hemlock, and western redcedar. Hardwood or mixed hardwood-conifer canopies are most common. Only two plots had purely conifer overstories. Typical shrub cover is low, with vine maple often the abundant species. Trailing blackberry is also frequently present. The herb layer is dominated by sorrel and sword fern, with sweetscented bedstraw, lady fern, and maidenhair fern also present in most plots.

(Red alder-big leaf maple)/sorrel community: sorrel and sword fern dominate the herb layer. Western hemlock seedling is visible in foreground.

Scouler's corydalis is an important associated species in this community in the Mt. Hood NF. Plots with Scouler's corydalis tended to have less western redcedar, and more lady fern, piggyback plant and coltsfoot. More southerly plots without the corydalis overall had more maidenhair fern and Cooley's betony. The community extends beyond the range of the Scouler's corydalis, and is too consistent in composition and environment to separate into phases.

Geomorphic environments: The community occurs on two main types of geomorphic conditions: steep cobbly or bouldery banks (12-45% slope), or on terraces.

Soils on the steep banks are shallow loams or silty sands in a matrix of cobbles or boulders. Terrace plots had loamy clay, silty clay or silts in the top horizons, above clays or sandy clays over cobbles. Deep organic layers were noted on some plots. Soil depths for these surfaces were 45 to 60 cm. Anaerobic conditions were noted for one plot where gleying occurred within the top 20 cm.

Terrace plots had older trees (western red cedar 154 to 275 years old, bigleaf maple 140 years). Tree ages and geomorphic surfaces suggest that this environment is not reset often by floods. Bank plots supported younger stands (9-70 years). One plot had only seedling sized red alder. Some stands had multiple ages which suggest successive non-stand replacement floods. For example, one plot had red alders aged 9, 22, and 55 years.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	13%
Wetland indicators among dominant species	37% (range 16-67%)

The Sorrel-Pacific waterleaf community is very similar to the (Red alder-big leaf maple)/sorrel type, but without the tree component. The herbaceous type may represent similar bank environments, but slightly wetter and/or younger.

Non-natives: Two exotic species were recorded in the sample. Wall-lettuce occurred in over half the plots, while common foxglove was recorded in only one plot.

Other studies: The (Red alder-big leaf maple)/sorrel community is similar to the ALRU/OXALIS Plant Community described in Diaz and Mellen (1996) (Ecoclass HAF222).

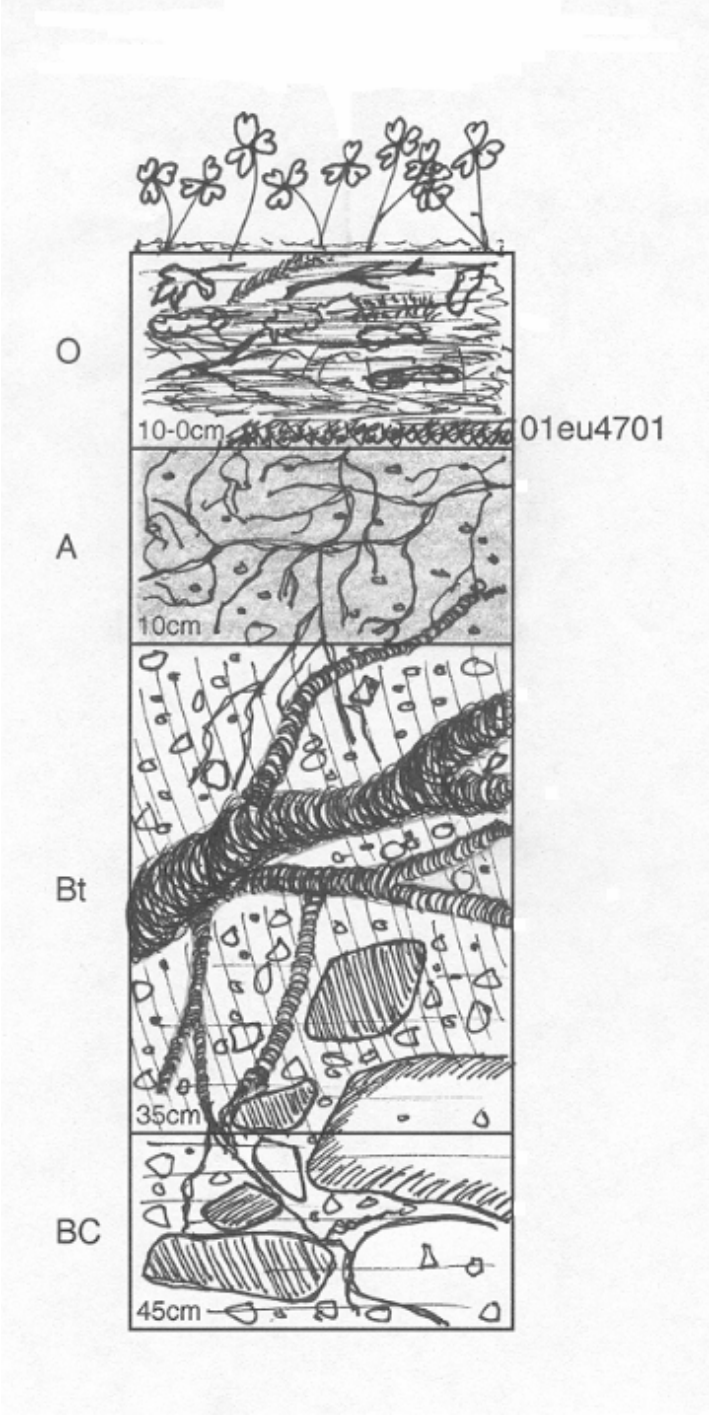
Click on a creek name in the table below to see the valley cross sections that show where (ALRU2-ACMA3)/OXALI occurs in relation to other plant associations.

Valley cross sections showing (ALRU2-ACMA3)/OXALI
E Fork S Fork McKenzie #2

Soil illustration: (ALRU2-ACMA3)/OXALI

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	10					20	8
A	10	7.5YR3/1	SiC	gravel	5	10	20
Bt	25	10YR4/2	C	gravel	20	5	15
BC	10	10YR4/2	C	gravel / cobble	20 / 20	3	7

Total Depth: 45cm. Depth Limit: 45cm.



This O horizon is 10cm deep. Composed of rotted wood and humus at the bottom, fragmented needles and sticks in the middle, and moist needles, leaves and moss at the top, it is the best horizon in the profile. Very stable over time, this part of the toe slope is slipping off, but is well above the summer stream width.

Despite the abundance of ready organic inputs, the A horizon keeps only a silty clay texture with hardly any loam. At least the transition to the Bt horizon is visually and texturally distinct, so we know the organic components are having some impact. Roots are abundant in the A and B horizons. The B textures give way to more cobbles and boulders and roots as it transforms into the BC horizon. Fragments here are both alluvial and colluvial, sandstone and light colored minerals.

***Rubus spectabilis/Oxalis* group**
Salmonberry/Sorrel group
RUSP/OXALI group

Group description followed by descriptions of three phases: *Rubus spectabilis/Oxalis*–shrub phase, *Rubus spectabilis/Oxalis-Alnus rubra* phase, and *Rubus spectabilis/Oxalis-Thuja plicata* phase

N=28 (MHNF 15, EBLM 7, SBLM 4, WNF 2)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red Alder	50	43
Thuja plicata	Western Redcedar	21	48
Shrubs			
Rubus spectabilis	Salmonberry	100	21
Vaccinium parvifolium	Red Huckleberry	43	6
Ribes bracteosum	Stink Currant	32	2
Herbs			
Oxalis	Sorrel	100	29
Polystichum munitum	Sword Fern	89	25
Athyrium filix-femina	Lady Fern	64	14
Galium triflorum	Sweetscented Bedstraw	54	3
Claytonia sibirica	Siberian Miner's Lettuce	50	3
Adiantum pedatum	Maidenhair Fern	43	6
Tolmiea menziesii	Piggyback Plant	43	4
Stachys cooleyae	Cooley's Betony	43	3
Tiarella trifoliata	Foamflower	36	6
Circaea alpina	Enchanter's-Nightshade	36	3
Bromus vulgaris	Columbia Brome	32	4

Elevations: 800 to 2740 feet (average 1667feet).

Community: Salmonberry/sorrel is a moderate elevation community that occurs with red alder (Salmonberry/sorrel-*red alder phase*) and/or western redcedar (Salmonberry/sorrel-*western redcedar phase*), but frequently occurs without trees in the overstory (Salmonberry/sorrel-*shrub phase*). Composition in all three groups is very similar. Salmonberry is the dominant shrub. The herb layer is lush, with sorrel, sword fern, and lady fern the most common and abundant species.

Geomorphic environment: Plots occurred on terraces, banks, and floodplains. Mt. Hood soil data show most plots had a top layer (average 11cm) of silty sand,

sandy silty, sand or silty clay loam over sands in a cobble matrix. Some had deeper silty layers in the upper profile.

Salmonberry/sorrel group: typical species shown here include salmonberry, sorrel, vine maple and lady fern.

Soil data from BLM sites showed that loams (silt loam, loam, silty clay loam, sandy clay loam) formed the A and AB layer (ave 18cm.) The B layer (aver 41 cm) was most commonly loamy, but ranged from sand to sandy clay. Gravels made up a larger part of the coarse fragments in the A and B horizons than cobbles, though all soil pits showed cobbles and/or boulders in the R layer.

Among salmonberry communities, Salmonberry/sorrel occurs on soils with deeper organic layers and finer size fractions, smaller coarse fragments, and deeper soils. The sites are more fertile and with higher moisture availability.

Alder ages ranged from 19 to 62 years (average 38 years). Two western redcedars were both aged at 110 years, and two western hemlocks were recorded as 83 and 143 years.

Older tree ages as well as smaller coarse fragment sizes and finer soil textures suggest that these sites have less frequent disturbance and slower water during floods. Multiple tree ages on some sites may indicate flooding which does not necessarily remove existing trees. One plot note speculated that western

redcedar on the site may have acted to protect and stabilize the surface and community during flood.

Valley cross sections showing RUSP/OXALI
Bear Creek

Click on a creek name in the table to the left to see valley cross sections that show where RUSP/OXALI occurs in relation to other plant associations.

Wetland rating:

Community meets wetland test	Only 1 phase: Red alder/salmonberry/sorrel
Wetland indicators among dominant species	54% (range 25-100%)

Non-natives: Wall-lettuce was the most common exotic species (21% of plots) with 2% average cover. Smooth brome, a non-native grass, occurred on one plot.

***Rubus spectabilis/Oxali*-shrub phase**
Salmonberry/Sorrel-*shrub phase*
RUSP/OXALI-*shrub phase*

N=11 (MHNF 4, SBLM 3, EBLM 3, WNF 2)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Tsuga heterophylla	Western hemlock	18	15
Trees-seedlings			
Tsuga heterophylla	Western hemlock	18	5
Shrubs			
Rubus spectabilis	Salmonberry	100	18
Vaccinium parvifolium	Red huckleberry	45	5
Acer circinatum	Vine maple	36	18
Herbs			
Oxalis	Sorrel	100	32
Polystichum munitum	Sword fern	100	24
Athyrium filix-femina	Lady fern	82	12
Adiantum pedatum	Maidenhair fern	73	5
Galium triflorum	Sweetscented bedstraw	64	2
Claytonia sibirica	Siberian miner's lettuce	55	2
Tiarella trifoliata	Foamflower	36	7
Blechnum spicant	Deer fern	36	6
Bromus vulgaris	Columbia brome	36	5
Tolmiea menziesii	Piggyback plant	36	3
Montia parvifolia	Streambank springbeauty	36	2

Only the constancy table is included for this phase, which is extremely similar in occurrence and composition to the red alder dominated phase of the salmonberry/sorrel group. It seems likely that red alder phase can develop from the shrub-dominated phase, in intervals between stand-resetting floods.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	45%
Wetland indicators among dominant species	54% (range 25-100%)

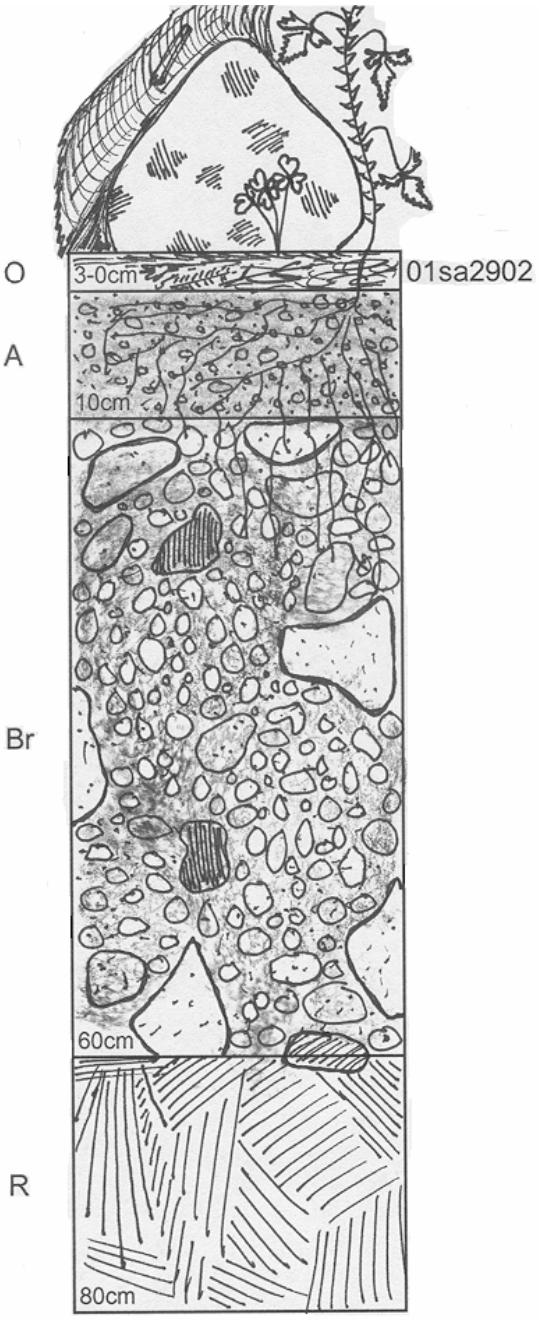
Refer to the Salmonberry/sorrel group section (above) for a fuller description of the community.

Other studies: This community is somewhat similar to the RIBR-RUSP/OXALIS Plant Association (Ecoclass SW5122), previously been described for the Mt. Hood NF in Diaz and Mellen (1996), though stink currant is minor or absent.

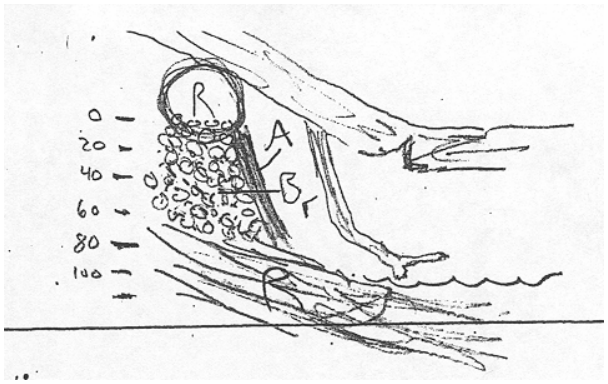
Soil illustration A: RUSP/OXALI

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	3					20	10
A	10	10YR3/1	SCL	gravel	20	12	13
Br	50	10YR3/2	SCL	gravel / cobble	30 / 50	3	10
R			R				

Total Depth: 60cm. Depth Limit: ~60cm.



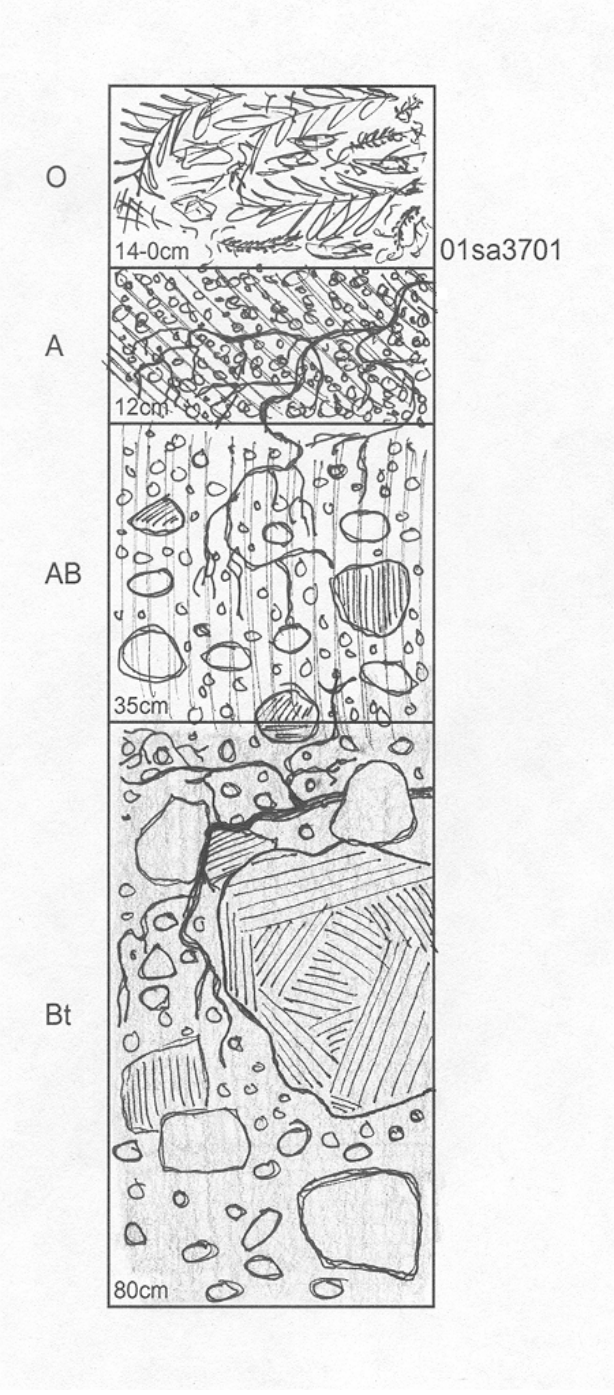
The A horizon is locally colluvial topsoil. It acts as an organic blanket between the O horizon and subsurface materials that aren't very conducive to rooting or life support. The B horizon is unique along this creek. A fortunate placement of a huge boulder and overtopping LWD preserve the former streambank composition. It is the only cemented section seen on this reach of the stream and probably would have washed away in a big flood were it not so well and curiously protected. This same LWD has a lot to do with catching finer sediments and holding them until they become a part of the fertile A horizon. The 50cm Br horizon is surprisingly uniform in rock fragment composition. The underlying bedrock is the contiguous basalt-greenstone.



Soil illustration B: RUSP/OXALI

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	14						
A	12	7.5YR2.5/1	SiCL	gravel <1cm / gravel 1-3cm	20 / 51	15	15
AB	23	7.5YR3/1	SiCL	gravel / cobble	20 / 15	8	10
Bt	45	10YR2/2	SiC	gravel / cobble / boulder	20 / 15 / 20	8	8

Total Depth: 80cm. Depth Limit: ~80cm.



Positively colluvial. Dark and rooty on top, transforming to lighter and rocky at the bottom. Couldn't quite get to a definite C horizon, but digging is nearly impossible anyway. A sword fern root system was uncovered that was long and slanted downhill. The growth pattern obviously showed that the fern is fairly old, but that it has actually been moving down the hill. Slow, continuous slumping or sliding of the soil seems the only way to explain why this fern wouldn't stay put like the ferns at other sites. An O horizon with a 14cm depth and well developed A and AB horizons remind that things are not moving too quickly though.

***Rubus spectabilis/Oxalis-Alnus rubra* phase**
Salmonberry/sorrel-*red alder phase*
RUSP/OXALI-*ALRU2 phase*

N=11 (MHNF 7, EBLM 4)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	100	53
Trees-seedlings			
Acer macrophyllum	Big leaf maple	45	3
Thuja plicata	Western redcedar	36	2
Tsuga heterophylla	Western hemlock	36	1
Shrubs			
Rubus spectabilis	Salmonberry	100	22
Vaccinium parvifolium	Red huckleberry	36	8
Ribes bracteosum	Stink currant	36	3
Herbs			
Oxalis	Sorrel	100	27
Polystichum munitum	Sword fern	73	21
Tolmiea menziesii	Piggyback plant	55	6
Galium triflorum	Sweetscented bedstraw	55	3
Stachys cooleyae	Cooley's betony	55	3
Athyrium filix-femina	Lady fern	45	18
Bromus vulgaris	Columbia brome	45	4
Adiantum pedatum	Maidenhair fern	36	7
Tiarella trifoliata	Foamflower	36	6
Claytonia sibirica	Siberian miner's lettuce	36	5
Maianthemum stellatum	Starry false Solomon's-seal	36	4
Circaea alpina	Enchanter's-nightshade	36	4

Only the constancy table is included for this phase, which is extremely similar in occurrence and composition to the shrub dominated phase of the Salmonberry/ sorrel group. It seems likely that red alder phase can develop from the shrub-dominated phase, in intervals between stand-resetting floods.

Grasses are generally present (73% constancy), averaging 5% cover. Graminoids occur on 55% of the plots, averaging 6% cover. Refer to the Salmonberry/sorrel group section (above) for a fuller description of the community.

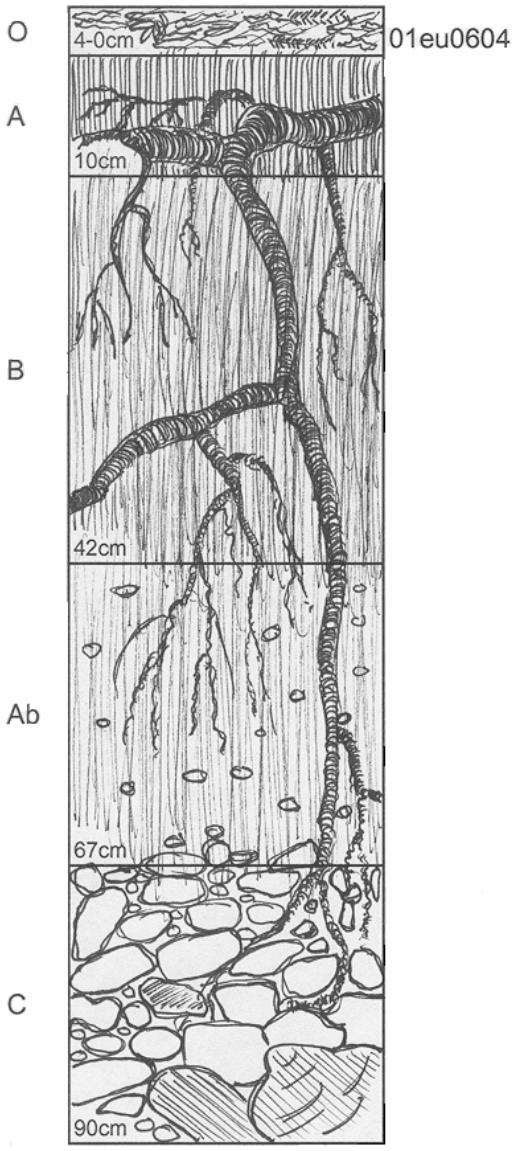
Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	55%
Wetland indicators among dominant species	55% (range 29-83%)

Other studies: This community as well as the Stink currant-salmonberry/sorrel-*red alder phase* are somewhat similar to the ALRU/RUSP/OXALIS Plant Community (Ecoclass HAS112), previously been described for the Mt. Hood NF in Diaz and Mellen (1996).

Soil illustration: RUSP/OXALI-*ALRU2 phase*

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	4					15	12
A	10	10YR3/1	SiL			10	25
B	32	10YR3/2	L			10	15
Ab	25	10YR3/3	L	sm gravel	6	10	15
C			R	cobble	50	5	3



Total Depth: 70cm. Depth Limit: 70cm.

This profile was difficult to dig and describe because of some big old roots that won't budge and are not to be cut. Three horizons are distinctly varied in color when you look at the profile, but in the bright sun, they turned out to be only one chroma value different apiece, and the bottom horizon didn't have a color match at all. This happens. All three horizons are of alluvial origin, but pedogenic processes have sharpened the distinctions between them.

The A horizon supports dense rooting and OM incorporation has darkened the color. "Illuviation" is the key word in designating the B horizon between 10-40cm. In fact, the zone of maximum illuvial influence defines a B horizon. An Ab horizon is a little harder to pin down, but that is what exists between 40-70cm. This horizon is the original alluvial sediment load that created this floodplain and stayed put. Its most distinctive attribute is the gravel that keeps it from being lumped with other later sediment deposits. The C horizon consists of sandstone and basalt stream cobbles.

***Rubus spectabilis/Oxalis-Thuja plicata* phase**
Salmonberry/sorrel-*western redcedar phase*
RUSP/OXALI-*THPL phase*

N=6 (MHNF 4, EBLM 1, SBLM 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Thuja plicata	Western redcedar	100	48
Alnus rubra	Red alder	33	32
Trees-seedlings			
Tsuga heterophylla	Western hemlock	33	1
Shrubs			
Rubus spectabilis	Salmonberry	100	24
Vaccinium parvifolium	Red huckleberry	50	7
Ribes bracteosum	Stink currant	50	2
Oplopanax horridum	Devil's club	33	1
Herbs			
Oxalis	Sorrel	100	26
Polystichum munitum	Sword fern	100	23
Athyrium filix-femina	Lady fern	67	18
Claytonia sibirica	Siberian miner's lettuce	67	2
Blechnum spicant	Deer fern	50	13
Dicentra formosa	Bleeding heart	50	10
Circaea alpina	Enchanter's-nightshade	50	4
Stachys cooleyae	Cooley's betony	50	1
Trillium ovatum	Western trillium	50	Tr
Viola glabella	Stream violet	33	25
Corydalis scouleri	Scouler's corydalis	33	23
Hydrophyllum tenuipes	Pacific waterleaf	33	20
Tiarella trifoliata	Foamflower	33	9
Galium triflorum	Sweetscented bedstraw	33	5
Maianthemum dilatatum	False lily-of-the-valley	33	4

Elevations: 1060 to 2200 feet (average 1750 feet).

Community: The Salmonberry/sorrel-*western redcedar phase* has a well developed overstory of western redcedar, sometimes with red alder. Salmonberry is the dominant shrub. The main species in the herb layer are sorrel and sword fern and lady fern. Siberian miner's lettuce, deer fern, and bleeding heart also occur on more than half the plots. Canopy height averaged 85 feet. The 94 foot western redcedar (without heart rot) that could be aged was 110 years old. One plot had 68 year old red alder and 103 year old big leaf maple associated with the western redcedar.

Geomorphic environment: Plots were on terraces or islands elevated above normal high water level. Soils were generally deeper and had finer texture than most salmonberry communities. Top horizons were loams (sandy loam, silt loam) over sandy clay loams to silty clays. Two detailed profile descriptions recorded buried soils, one clearly associated with charcoal and coarse woody material. One pit showed poor drainage: mottling at 25cm and gleying at 55 cm, with water at 70 cm. Another pit had water level at 90 cm. Surface organic layers were shallow to extremely thick (2-40 cm).

Elevated geomorphic surface, finer soil textures, clay illuviation, and larger tree sizes suggest that these sites, though periodically flooded, have a relatively long interval between major events which reset the stands. One plot note speculated that the western redcedar appeared to stabilize the surface, though it was still subject to flooding.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	33%
Wetland indicators among dominant species	51% (range 29-86%)

Non-natives: No exotic species were found in the sample.

Other studies: This community is somewhat similar to the THPL/RUSP/OXALIS Plant Community (Ecoclass CCS110), previously been described for the Mt. Hood NF in Diaz and Mellen (1996).

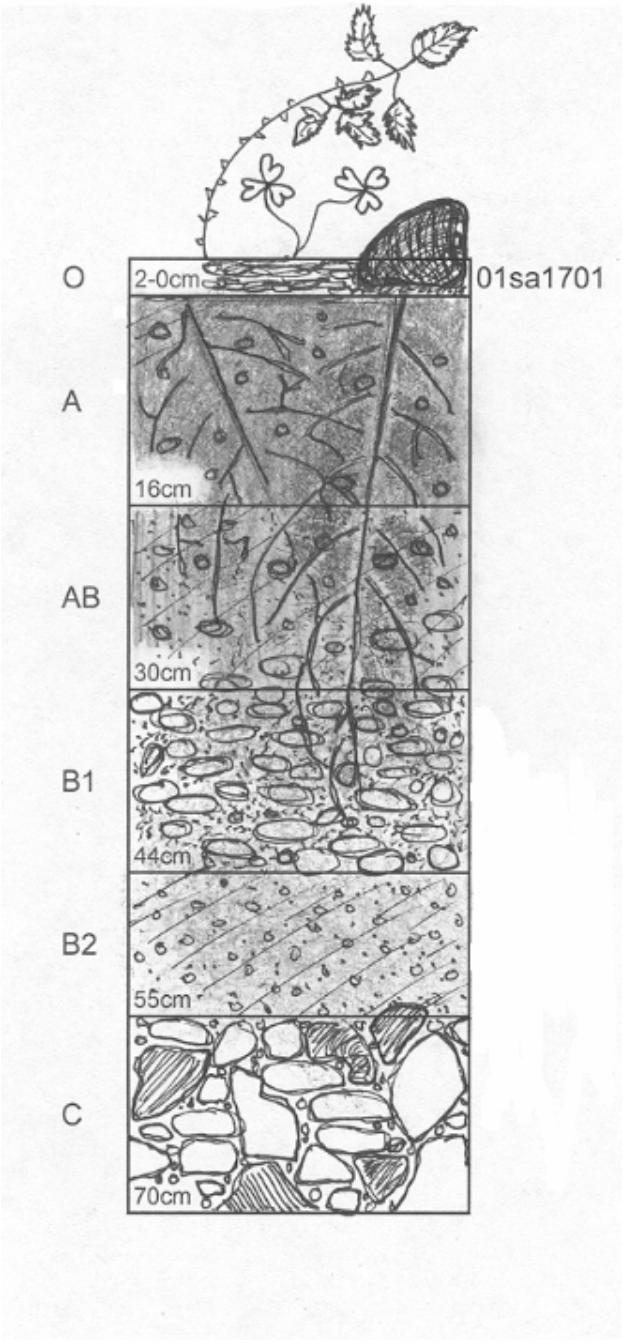
Valley cross sections showing RUSP/OXALI-*THPL phase*
Rough creek

Click on a creek name in the table below to see valley cross sections that show where RUSP/OXALI-*THPL phase* occurs in relation to other plant associations.

Soil illustration: RUSP/OXALI-*THPL phase*

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	2						
A	16	10YR2/1	SiL	md gravel	10	15	15
AB	14	10YR3/2	SCL	gravel	20	10	10
B1	14	10YR3/4	S	gravel	50	7	7
B2	11	10YR3/4	SL	gravel <.5cm	10	5	8
C	15		R	cobble / boulder	75	2	

Total Depth: 70cm. Depth Limit: 70cm. Mottle: 44cm.



Deep organic A horizon (16cm) has formed about 8 vertical feet and 12 horizontal feet from the main channel. Both sides of the creek are gradual slopes with no possibility of recent colluvial activity. This profile has the color, structure and stratification typical of a long, undisturbed formation. The AB horizon is a transition of color and gravel composition. The B1 horizon has even more tightly spaced gravel of uniform size. These horizons replaced the old A horizon in a major flood that set the "current clock" for this terrace 100 years or more in the past.

The B2 horizon is composed of very fine sediments and has a great texture for this depth. No woody debris is present, but a loamy texture means it could have organic influence. 100 years ago, this may have been a first floodplain down next to the year-round active stream channel. The B2 and C horizons remind me of the sand deposits seen up and down the current channel.

Alnus rubra/Symphoricarpos albus-Rubus spectabilis
Red alder/common snowberry-salmonberry
ALRU2/SYAL-RUSP

n=2 (MH 2)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	100	43
Trees-seedlings			
Alnus rubra	Red alder	100	1
Acer macrophyllum	Big leaf maple	50	8
Shrubs			
Symphoricarpos albus	Common snowberry	100	43
Rubus spectabilis	Salmonberry	100	10
Rubus parviflorus	Thimbleberry	100	5
Acer circinatum	Vine maple	50	12
Rosa pisocarpa	Clustered wild rose	50	10
Salix sitchensis	Sitka willow	50	8
Corylus cornuta	California hazel	50	7
Salix scouleriana	Scouler's willow	50	7
Ribes bracteosum	Stink currant	50	2
Herbs			
Pteridium aquilinum	Bracken fern	100	13
Stachys cooleyae	Cooley's betony	100	4
unknown grass	Grass	100	3
Corydalis scouleri	Scouler's corydalis	50	8
Scirpus microcarpus	Small-flowered bulrush	50	8
Oxalis	Sorrel	50	3
Heracleum lanatum	Cow-parsnip	50	2
Polystichum munitum	Sword fern	50	2

Elevations: 1600 feet.

Community: The two plots included in the Red alder/common snowberry-salmonberry sample are located on the Mt. Hood NF. Alder canopy is moderate (15-70%, 30-50' canopy height). The community has one of the densest shrub layers among the Cascades types. Snowberry is the most abundant shrub, with salmonberry and thimbleberry present on both plots. Vine maple and California hazel may be present. The herb layer is sparse, with bracken fern, Cooley's betony and grasses.

Geomorphic environment: Both plots are on upper banks on the Salmon River, on deep very gravelly to cobbly sands. The ground surface was 60-65% litter

covered bare ground. Plots were two feet above normal high waterline, and 4 to 10 feet from the waterline. Exposed surface rock (gravel, cobbles, boulders, bedrock) was very low (12% cover) for riparian shrub types.

The adjacent plant association in the sample was Western hemlock/Oregon Oxalis-NWO Cascades.

Wetland rating:

Community meets wetland test	Yes
Wetland indicators among dominant species	60% (range 57-63%)

Non-natives: Bull thistle was the only exotic species, present on a single plot.

This community has a very small sample size, with plots located very close together. This description should not be viewed as capturing the range of variability associated with such habitats. More intensive sampling along the transition between the Willamette Valley/foothills and the Cascades could provide more data on this community which seems to blend the Willamette Valley Common snowberry-California hazel type with the Cascades salmonberry groups.

High terraces/major floodplains

(*Acer macrophyllum-Alnus rubra)/Acer circinatum/Tiarella trifoliata* (Big leaf maple-red alder)/vine maple/foamflower (ACMA3-ALRU2)/ACCI/TITR

N=9 (WNF 9)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Acer macrophyllum	Big leaf maple	67	36
Thuja plicata	Western redcedar	56	36
Tsuga heterophylla	Western hemlock	56	15
Alnus rubra	Red alder	44	64
Pseudotsuga menziesii	Douglas fir	33	16
Trees-seedlings			
Thuja plicata	Western redcedar	78	1
Abies grandis	Grand fir	67	5
Tsuga heterophylla	Western hemlock	56	3
Acer macrophyllum	Big leaf maple	56	3
Shrubs			
Acer circinatum	Vine maple	100	40
Rubus ursinus	Trailing blackberry	89	3
Oemleria cerasiformis	Indian plum	67	8
Herbs			
Polystichum munitum	Sword fern	89	9
Tiarella trifoliata	Foamflower	89	7
Claytonia sibirica	Siberian miner's lettuce	89	1
Athyrium filix-femina	Lady fern	78	10
Tolmiea menziesii	Piggyback plant	78	7
Galium triflorum	Sweetscented bedstraw	78	2
Hydrophyllum tenuipes	Pacific waterleaf	78	2
Asarum caudatum	Wild ginger	78	2
Maianthemum stellatum	Starry false Solomon's-seal	78	1
Circaea alpina	Enchanter's-nightshade	67	3
Adiantum pedatum	Maidenhair fern	67	3
Bromus vulgaris	Columbia brome	67	1

Elevations: 2140 to 4220 feet (average 2,520 feet).

Community: (Big leaf maple-red alder)/vine maple/foamflower is a forested floodplain community of the mid-elevation Cascades. The overstory generally has big leaf maple and/or red alder, with a mixture of conifers including western redcedar, western hemlock, Douglas fir, or grand fir. The shrub layer is dominated by vine maple. Trailing blackberry and Indian plum are the most common associates, while cascara buckthorn occurs on 44% of the plots. The

most abundant species in the herb layer are typically ferns (sword fern, lady fern, and oak fern), with saxifrages foamflower and piggyback plant the next most abundant. Other common species include Siberian miner's lettuce, sweetscented bedstraw, Pacific waterleaf, wild ginger, and starry false Solomon's-seal. Grasses are almost always present (89% constancy), averaging 4% cover.

Valley cross sections showing (ACMA3-ALRU2)/ACCI/TITR
S Fork McKenzie #1
Augusta #5

Click on a creek name in the table to the left to see the valley cross sections that show where (ACMA3-ALRU2)/ACCI/TITR occurs in relation to other plant associations.

Geomorphic environment: All samples are from the South Fork McKenzie drainage in the central Willamette NF. Most plots were on high terraces or wide, elevated floodplains, generally adjacent to or associated with overflow channels. This suggests subsurface flow through the underlying cobble valley fill that affects the environment for this community. One plot is from an intermittent channel in the same area which also suggests seasonal subsurface flow. No soil data are available. However, the community composition indicates deep loamy well drained soils capable of supporting trees and thick vine maple.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	11%
Wetland indicators among dominant species	35% (range 17-57%)

Non-natives: Wall-lettuce was the only exotic species in the sample, occurring on 44% of the plots.

Forested *Corylus cornuta/Polystichum munitum* group
Forested California hazel/sword fern group
Forested COCO6/POMU group

Group description followed by descriptions of three phases: Forested *Corylus cornuta/Polystichum munitum*-hardwood phase, Forested *Corylus cornuta/Polystichum munitum-Tsuga heterophylla/Acer circinatum /Oxali* phase, and Forested *Corylus cornuta/Polystichum munitum-Acer macrophyllum/Acer circinatum* phase

N=20 (WNF 18, EBLM 1, Willamette Valley 1)

This constancy table is for the entire group combined. The individual phases are then presented separately.

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Acer macrophyllum	Big leaf maple	42	31
Alnus rubra	Red alder	33	42
Pseudotsuga menziesii	Douglas fir	33	25
Calocedrus decurrens	Incense cedar	33	12
Trees-seedlings			
Acer macrophyllum	Big leaf maple	50	3
Shrubs			
Corylus cornuta	California hazel	100	25
Acer circinatum	Vine maple	92	24
Rubus ursinus	Trailing blackberry	92	4
Vaccinium parvifolium	Red huckleberry	67	3
Oemleria cerasiformis	Indian plum	58	3
Symphoricarpos albus	Common snowberry	42	5
Herbs			
Polystichum munitum	Sword fern	92	27
Oxalis	Sorrel	83	19
Vancouveria hexandra	Insideout flower	75	5
Galium triflorum	Sweetscented bedstraw	75	1
Athyrium filix-femina	Lady fern	58	3
Adiantum pedatum	Maidenhair fern	58	2
Adenocaulon bicolor	Pathfinder	50	Tr
Maianthemum stellatum	Starry false Solomon's-seal	50	Tr
Bromus vulgaris	Columbia brome	42	1
Thalictrum occidentale	Western meadowrue	42	Tr
Stachys cooleyae	Cooley's betony	42	Tr
Claytonia sibirica	Siberian miner's lettuce	42	Tr

Elevations: 1050 to 2380 feet (average 1444 feet).

<u>Forested California hazel/sword fern group</u>: big leaf maple is the hardwood dominating this plot.

Community: This group may be considered a single community, with a variety of tree species over an understory dominated by vine maple and California hazel, with the herb layer made up primarily by sword fern and sorrel. Samples come from the low elevation central Willamette NF and Eugene BLM McKenzie Resource Area. It may be considered as two variants: one present on upper banks and toeslopes; the other in wide river valleys on old terraces of large rivers below dams. The second may be highly influenced by changed flood regimes below dams, and represent successional stages not typical for these surfaces and communities. It could be argued that in the absence of large flows, the terrace variant could eventually develop a western hemlock-Douglas fir overstory, similar to the other bank/toe slope variant.

Wetland rating:

Community meets wetland test	No-none meet test
Wetland indicators among dominant species	23% (range 10-44%)

Forested *Corylus cornuta/Polystichum munitum*-hardwood phase
Forested California hazel/sword fern-hardwood phase
Forested COCO6/POMU-hardwood phase

N=6 (WNF 6, from 2 sites)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Calocedrus decurrens	Incense cedar	67	12
Alnus rubra	Red alder	50	48
Acer macrophyllum	Big leaf maple	33	40
Pseudotsuga menziesii	Douglas fir	33	19
Populus trichocarpa	Black cottonwood	33	15
Fraxinus latifolia	Oregon ash	17	40
Abies grandis	Grand fir	17	12
Thuja plicata	Western redcedar	17	3
Trees-seedlings			
Acer macrophyllum	Big leaf maple	50	4
Thuja plicata	Western redcedar	33	4
Fraxinus latifolia	Oregon ash	33	1
Shrubs			
Corylus cornuta	California hazel	100	30
Rubus ursinus	Trailing blackberry	100	6
Acer circinatum	Vine maple	83	22
Symphoricarpos albus	Common snowberry	83	5
Oemleria cerasiformis	Indian plum	83	4
Herbs			
Polystichum munitum	Sword fern	100	33
Oxalis	Sorrel	83	10
Bromus vulgaris	Columbia brome	83	1
Vancouveria hexandra	Insideout flower	67	4
Galium triflorum	Sweetscented bedstraw	67	1
Thalictrum occidentale	Western meadowrue	67	1
Festuca subulata	Bearded fescue	67	Tr
Carex deweyana	Dewey's sedge	50	4
Prunella vulgaris	Self-heal	50	Tr
Stachys cooleyae	Cooley's betony	50	Tr

Elevations: 1090 to 1210 feet (average 1150 feet).

Community: Forested California hazel/sword fern-*hardwood phase* is a low elevation Cascades forested floodplain community sampled on large terraces along the South Fork McKenzie River. The overstory is typically hardwood dominated, with red alder, big leaf maple, black cottonwood, or Oregon ash.

Incense cedar is common in the sample, with minor amounts of grand fir and western redcedar possible. California hazel and vine maple dominate the shrub layer, with trailing blackberry, common snowberry, and Indian plum common associates but at low cover. Sword fern is the dominant herb species, averaging 33% cover. Sorrel is the second important species. Grasses are almost always present (83% constancy), averaging 5% cover. Columbia brome and bearded fescue are the most common grasses. Inside out flower, sweetscented bedstraw and western meadowrue are other typical associated species.

Geomorphic environment: Soils data are not available. Geomorphic surfaces were large flat or gently sloping terraces or abandoned channels in wide river valleys. Underlying substrates are generally cobbly.

Note these six plots are from the below Cougar Dam on the South Fork McKenzie River or Delta Creek. The stand structure in these communities may be affected by the dam. The same is probably true of similar types, such as the drier big leaf maple/vine maple-California hazel community, on the old floodplains and terraces along the McKenzie River. This is probably representative of all of the larger dammed rivers including the Willamette River. These are altered communities. More fine sediments may be deposited, and less scour occur, during floods moderated by the dams. The soils may be gradually changing with addition of organic matter over longer intervals between major floods. Shrubs and trees are likely to survive and grow longer than common under the old flood regime. In this community, this may be evident in the sizes and ages of conifers present in the sample.

The Forested California hazel/sword fern-*hardwood phase* indicates moister conditions than the *Big leaf maple/vine maple phase*, but is drier than the *Western hemlock/vine maple /sorrel phase* within the group.

Similar types: This community is similar to the Willamette Valley Common snowberry/nettle-*Oregon ash/red elderberry-California hazel phase*.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	17%
Wetland indicators among dominant species	42% (range 20-60%)

Non-natives: There were four exotic species recorded on one plot apiece: wall-lettuce, common foxglove, common St.John's-wort, and common velvet-grass.

Forested *Corylus cornuta/Polystichum munitum-Tsuga heterophylla/Acer circinatum/Oxalis* phase
Forested California hazel/sword fern-*western hemlock/vine maple/sorrel phase*
Forested COCO6/POMU-*TSHE/ACCI/OXALI phase*

N=6 (WNF 5, EBLM 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Tsuga heterophylla	Western hemlock	50	38
Acer macrophyllum	Big leaf maple	50	15
Pseudotsuga menziesii	Douglas fir	33	35
Trees-seedlings			
Tsuga heterophylla	Western hemlock	67	5
Alnus rubra	Red alder	50	7
Acer macrophyllum	Big leaf maple	50	1
Shrubs			
Acer circinatum	Vine maple	100	27
Corylus cornuta	California hazel	100	15
Vaccinium parvifolium	Red huckleberry	100	3
Rubus ursinus	Trailing blackberry	83	1
Berberis nervosa	Oregon grape	50	3
Rubus parviflorus	Thimbleberry	50	1
Herbs			
Oxalis	Sorrel	83	36
Polystichum munitum	Sword fern	83	15
Vancouveria hexandra	Insideout flower	83	8
Athyrium filix-femina	Lady fern	83	4
Adiantum pedatum	Maidenhair fern	83	3
Galium triflorum	Sweetscented bedstraw	83	1
Maianthemum stellatum	Starry false Solomon's-seal	83	Tr
Tiarella trifoliata	Foamflower	67	5
Achlys triphylla	Vanilla leaf	67	1
Adenocaulon bicolor	Pathfinder	67	Tr
Trillium ovatum	Western trillium	67	Tr
Blechnum spicant	Deer fern	50	2
Linnaea borealis	Twinflower	50	2
Prosartes	Fairybells	50	1
Claytonia sibirica	Siberian miner's lettuce	50	Tr
Anemone deltoidea	Three-leaved anemone	50	Tr
Lactuca muralis	*Wall-lettuce*	50	Tr

Elevations: 1050 feet to 2380 feet (average 1745 feet).

Community: Forested California hazel/sword fern-*western hemlock/vine maple/sorrel phase* is a forested riparian community of the lower elevation Cascades. The overstory has western hemlock and/or red alder or Douglas fir, often with big leaf maple. The shrub layer is dominated by vine maple and California hazel. Red huckleberry and trailing blackberry are often present but minor. Sorrel and sword fern dominate the herb layer. Inside out flower, lady fern, maidenhair fern, sweetscented bedstraw and starry false-Solomon's seal are associated species.

Geomorphic environment: Geomorphic surfaces include toeslopes, upper banks, and terraces. Several plots had a well developed conifer overstory, often with mature (41-320 year old) western hemlocks or extremely large Douglas fir. These sites can be gentle to steep. One soil description from a steep valley wall showed a deep soil with silty loam to silty clay texture.

Similar types: This community is similar to the upland Western hemlock/Oregon Oxalis-NWO Cascades plant association, but the riparian character is marked by the presence of red alder, lady fern, maidenhair fern, and deer fern. Trillium-leaved sorrel, also a riparian indicator, was noted on several plots.

The Forested California hazel/sword fern-*western hemlock/vine maple/sorrel phase* indicates the moistest environments in the group.

Valley cross sections showing TSHE/ACCI-COCO6/OXALI
Nimrod creek

Click on a creek name in the table to the left to see valley cross sections that show where COCO6/POMU-*TSHE/ACCI/OXALI phase* occurs in relation to other plant associations.

Wetland rating:

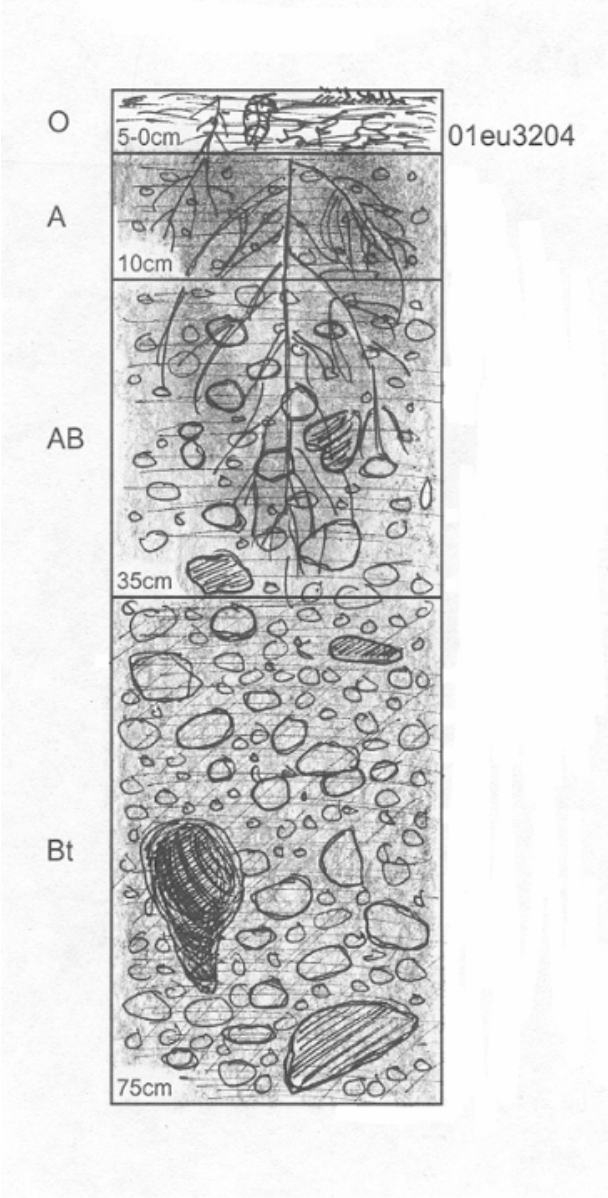
Community meets wetland test	No
Plots meeting wetland criteria	0%
Wetland indicators among dominant species	25% (range 17-29%)

Non-natives: Wall-lettuce was the only exotic species in the sample. It occurred on half the plots.

Soil illustration: TSHE/ACCI-COCO6/OXALI

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	5					20	10
A	10	7.5YR3/1	SiCL	gravel	15	10	15
AB	25	7.5YR3/1	SiCL	gravel / cobble	15 / 15	8	10
Bt	40	10YR3/1	SiC	gravel / cobble	20 / 20	5	5

Total Depth: 75cm. Depth Limit: 75cm+.



Deep colluvial deposition has resulted in an extended AB transition horizon in this profile. For purposes of defining the primary rooting zone, I have called the top 10cm the A horizon. Roots in this horizon are receiving the direct inputs of organic nutrients from 5cm of O horizon. There is also a minimal amount of gravel in the horizon, a sign that additions of OM through decomposition have probably outpaced colluvial deposition in recent history. Gravel and Cobble percentages increase with depth. Loam textures are lost in the Bt horizon and the addition of clay helps to change the color of the soil by adding yellow hue.

Forested *Corylus cornuta/Polystichum munitum-Acer macrophyllum/Acer circinatum* phase
Forested California hazel/sword fern-*big leaf maple/vine maple phase*
Forested COCO6/POMU-*ACMA3/ACCI phase*

N=8 (WNF 7, Willamette Valley 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Acer macrophyllum	Big leaf maple	75	39
Pseudotsuga menziesii	Douglas fir	63	45
Abies grandis	Grand fir	25	25
Fraxinus latifolia	Oregon ash	25	4
Trees-seedlings			
Acer macrophyllum	Big leaf maple	63	2
Tsuga heterophylla	Western hemlock	63	1
Fraxinus latifolia	Oregon ash	38	1
Shrubs			
Rubus ursinus	Trailing blackberry	100	4
Acer circinatum	Vine maple	88	45
Corylus cornuta	California hazel	88	17
Oemleria cerasiformis	Indian plum	50	4
Symphoricarpos albus	Common snowberry	50	2
Rubus parviflorus	Thimbleberry	50	2
Herbs			
Galium triflorum	Sweetscented bedstraw	100	2
Polystichum munitum	Sword fern	88	2
Bromus vulgaris	Columbia brome	75	8
Fragaria vesca	Woodland strawberry	63	1
unknown grass	Grass	50	11
Synthyris reniformis	Snowqueen	50	3
Hypericum perforatum	*Common St. John's-wort*	50	2
Maianthemum stellatum	Starry false Solomon's-seal	50	2
Anemone deltoidea	Three-leaved anemone	50	1

Elevations: 255 feet to 2350 feet (average 1675 feet).

Community: Forested California hazel/sword fern-*big leaf maple/vine maple phase* is a dry shrubby forested community that occurs on terraces, elevated floodplains or islands of large streams and rivers at low to moderate elevations. Big leaf maple and Douglas fir often co-dominate, though grand fir and Oregon ash can also occur. The shrub layer dominants are vine maple and California hazel. Trailing blackberry is always present. Indian plum, common snowberry, and thimbleberry are typical associated species, present in half the plots. Yerba

Buena, a dry site indicator, occurs in 38% of the sample. The herb layer is dominated by grasses. The sum of grass species' cover averaged 15% (constancy 88%). Columbia brome is the most abundant species. Sweetscented bedstraw is always present. Sword fern and woodland strawberry are also common minor associated species.

Geomorphic environment: No soils data are available for these samples. Most of the geomorphic surfaces appear to be old cobbly floodplains, often in wide river valleys with major side channels or overflow channels. Flooding would occur only during major flood events. Because of the cobble substrate, the sites are probably very well drained, with relatively poor water holding capacity.

Many of the species present indicate warm dry environments (yerba buena, snow queen, woodland strawberry, common snowberry). In contrast, the adjacent upland plant associations often indicate more mesic conditions. Willamette NF plots are all from the South Fork McKenzie River drainage, and are within the western hemlock plant series. This is a reversal from the common pattern in forested riparian communities, where the streamside vegetation indicates moister conditions than on the adjacent hillsides.

This community is "riparian" for two main reasons. First, the cobbly substrate is fluvial. Second, this community is subject to major floods which can reset a mature stand, erode or deposit the surface, or reroute channels to transform the community's geomorphic and moisture environment.

Note that three of these plots are from the below Cougar Dam on the South Fork McKenzie River. The stand structure in these communities may be affected by the dam. The same is probably true of other phases of Forested California hazel/sword fern group on the old floodplains and terraces along the McKenzie River, and probably all of the larger dammed rivers. The same can be expected for the forested communities from the Willamette Valley, especially the similar common snowberry and/or California hazel types. These are altered communities. More fine sediments may be deposited, and less scour occur, during floods moderated by the dams. The soils may be gradually changing with addition of organic matter over longer intervals between major floods. Shrubs and trees are likely to survive and grow longer than common under the old flood regime. In this community, this may be evident in the sizes and ages of Douglas fir, grand fir, and incense cedar present in the sample.

Forested California hazel/sword fern-*big leaf maple/vine maple phase* is the driest community in the Forested California hazel/sword fern group.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	0%
Wetland indicators among dominant species	18% (range 10-29%)

Non-natives: There were two exotic species recorded in the sample. Wall-lettuce was in 50% of the plots. Common St.John's-wort was in 38% of the plots.

Others (seeps, swamps, wetlands, other)

Adiatum pedatum
Maidenhair fern
ADPE

N=23 (WNF 10, MHNF 7, EBLM 5, SBLM 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-seedlings			
Tsuga heterophylla	Western hemlock	35	5
Shrubs			
Rubus spectabilis	Salmonberry	39	4
Herbs			
Adiantum pedatum	Maidenhair fern	100	23
Polystichum munitum	Sword fern	78	12
Oxalis	Sorrel	65	20
Athyrium filix-femina	Lady fern	65	14
Galium triflorum	Sweetscented bedstraw	61	4
Mitella ovalis	Oval-leaved mitrewort	43	5
Vancouveria hexandra	Insideout flower	43	5
Tiarella trifoliata	Foamflower	39	5
Claytonia sibirica	Siberian miner's lettuce	39	1
Trillium ovatum	Common trillium	39	1
Blechnum spicant	Deer fern	35	15
Aruncus dioicus	Goat'sbeard	35	9

Elevations: 240 to 4620 feet (average 2,030 feet).

Community: Maidenhair fern is an herb-dominated community on steep cutbanks, cliffs, bedrock, and seeps. Western hemlock seedlings are present in over a third of the plots, and red alder saplings are occasionally found. Salmonberry is the most important shrub, occurring in almost 40% of the sample. The herb layer is dominated by ferns and sorrel. Maidenhair fern is the community indicator. Sword fern, sorrel, and lady fern are in two thirds of the sample. The other common associated forb is sweetscented bedstraw.

Geomorphic environment: The Maidenhair fern community is closely associated with steep cutbanks and cliffs, averaging over 100% slope, or gentler mossy bedrock surfaces bathed by groundwater or waterfall spray. Several sites described 2 to 5 cm of silt, sand, or clay over bedrock, with soil held together by fern roots and protected by the thick organic layer largely composed of old fern fronds. Other soils were deeper (30 to 100 cm), with saturated layers at 50 to 70 cm, generally over bedrock. Water often is described as flowing over bedrock contact or through cracks or between layers in the rock. Slides are the most

likely major disturbance for these surfaces. Steep, shallow soils with saturated horizons and/or bedrock relatively near the surface limit development of the tree component.

Maidenhair fern community: steep seepy banks are the common setting for this beautiful community.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	39%
Wetland indicators among dominant species	56% (range 17-100%)

Non-natives: Wall-lettuce was the most common exotic in the sample, occurring on 3 plots. Spinyfruit buttercup was recorded on one plot.

Other studies: This community is described for the Mt. Hood NF in Diaz & Mellen (1996) as the Rocky Slope Ecotype of the ADPE Plant Association (Ecoclass FW4221). Campbell (1979) described a similar community in the mid-Willamette NF as the ADPE/precipice community, and considered it a topographic climax community.

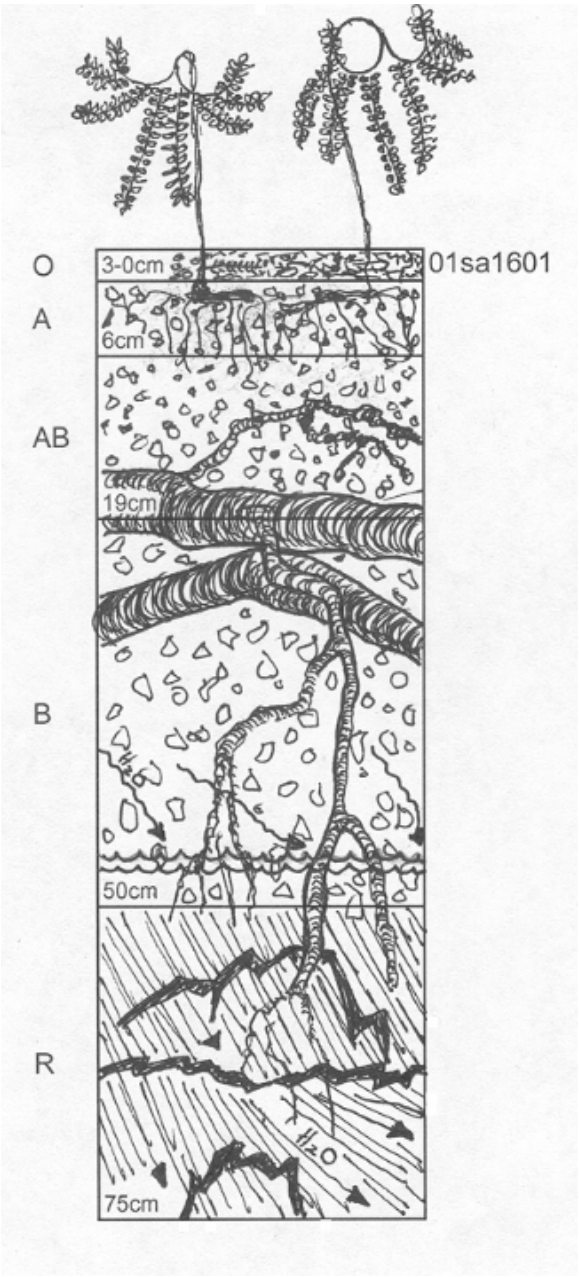
Valley cross sections showing ADPE
Loon creek
Boone creek
E Fork S Fork McKenzie #2
Bear creek
Lost creek S
Rough creek
Augusta creek #1

Click on a creek name in the table to the left to see the valley cross sections that show where ADPE occurs in relation to other plant associations.

Soil illustration: ADPE

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	3					25	
A	6	2.5YR2.5/2	SiC	gravel <1cm	20	15	15
AB	13	5YR3/3	SiC	gravel <1cm / gravel >1cm	20 / 15	10	50
B	31	2.5YR3/4	SiC	gravel <1cm / gravel >1cm	20 / 20	8	20
R	25			boulder	100		

Total Depth: 85cm. Depth Limit: 50cm to R. Water Table: 44cm.



The A and AB horizons are basically the same color. The A horizon is a bit of a colluvial jumble, but the Munsell color describes the organic soil only. The AB lacks the organic influence of the A, but is still darker than the B horizon. This is a result of direct organic inputs (bark) from the massive root going through the stratum.

The B horizon is one of the reddest, wettest soils yet. Lack of gleying and dense rooting suggest that water and air still move freely. The soil is actually saturated starting about 10cm above bedrock at 50cm. Most of the red color is from the red parent rock. Most gravel is colluvial, not residual, or the bedrock would be appear much more cracked and weathered than this.

Soil is only 50cm deep, but I cleaned the bedrock to 100cm for a better look. I'm not exactly sure what this is. Bright, brick red matrix with sort of an outer crust of breccia or some sort of solidified mudflow. Water flows through the breccia and it tends to turn to mud in the stream, whereas the red stone is smooth and water resistant. Roots do not breach the bedrock.

Senecio triangularis-Caltha leptosepala
Arrowleaf groundsel-broad-leaved marsh-marigold
SETR-CALE4

N=7 (MHNF 4, WNF 2, SBLM 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Shrubs			
Vaccinium ovalifolium	Oval-leaf huckleberry	29	5
Herbs			
Senecio triangularis	Arrowleaf groundsel	100	19
Caltha leptosepala	Broad-leaved marsh-marigold	57	18
Mimulus guttatus	Yellow monkeyflower	57	2
Boykinia major	Large boykinia	43	7
Calamagrostis canadensis	Bluejoint	43	7
Pleuropogon refractus	Nodding semaphore grass	43	5
Veratrum viride	False hellebore	43	5
Epilobium anagallidifolium	Alpine willowherb	43	5
Stachys cooleyae	Cooley's betony	43	2
Epilobium glaberrimum	Smooth willowherb	43	1
Saxifraga odontoloma	Stream saxifrage	29	37
Epilobium ciliatum ssp. watsonii	Purple-leaved willowherb	29	19
Trautvetteria caroliniensis	False bugbane	29	4
Carex luzulina	Woodrush sedge	29	2
Castilleja	Indian paintbrush species	29	1
Platanthera stricta	Slender bog-orchid	29	1

Elevations: 3120 to 4420 feet (average 3,720 feet).

Community: Arrowleaf groundsel-broad-leaved marsh-marigold is an herbaceous community of moderate to high elevations, mainly in the silver fir and mountain hemlock zones. Oval-leaf huckleberry is present in over a quarter of the plots, but at very low cover. Douglas spiraea can be abundant. Arrowleaf groundsel, with broad-leaved marsh-marigold and/or large boykinia are typical. Yellow monkeyflower is present in the majority of samples. Stream saxifrage and purple-leaved willowherb can be abundant.

Geomorphic environment: Plots are located on a variety of geomorphic surfaces, but always in fine textured soil with water very near the surface. Two plots were on steep muck covered bedrock or cobbles by waterfalls or cascades. Two others were in silts over rock by channel margins, while two were in wetlands.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	100%
Wetland indicators among dominant species	77% (range 67-100%)

Non-natives: No exotic species were recorded in the sample.

Other studies: Some plots in this community were previously classified for the Mt. Hood NF in Diaz and Mellen (1996) as the SAAR4-SETR Plant Community (Ecoclass FW4227). This community is also somewhat similar to the Brook saxifrage Association and the Arrowleaf groundsel Association described for eastern Oregon in Crowe, Kovalchik, and Kerr (2004).

Broadleaved marsh-marigold

Oplopanax horridum-Rubus spectabilis group
Devils club-salmonberry group
OPHO-RUSP group

Group description followed by descriptions of three phases: *Oplopanax horridum-Rubus spectabilis*-shrub phase, *Oplopanax horridum-Rubus spectabilis-Alnus rubra* phase, and *Oplopanax horridum-Rubus spectabilis-Thuja plicata* phase

N=31 (MHNF 23, WNF 4, EBLM 2, SBLM2)

This constancy table is for the entire group combined.

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	42	24
Thuja plicata	Western redcedar	23	27
Trees-seedlings			
Tsuga heterophylla	Western hemlock	23	1
Shrubs			
Oplopanax horridum	Devil's club	100	31
Rubus spectabilis	Salmonberry	77	23
Ribes bracteosum	Stink currant	71	14
Herbs			
Oxalis	Sorrel	87	22
Athyrium filix-femina	Lady fern	84	13
Tolmiea menziesii	Piggyback plant	68	8
Polystichum munitum	Sword fern	55	7
Galium triflorum	Sweetscented bedstraw	45	2
Maianthemum stellatum	Starry false Solomon's-seal	42	2
Claytonia sibirica	Siberian miner's lettuce	42	1
Hydrophyllum tenuipes	Pacific waterleaf	39	10

Elevations: 920 to 4120 feet (average 2370 feet).

Community: The Devil's club-salmonberry group crosses a wide elevational range in the Cascades. Red alder and/or western redcedar make up the tree layer where present. The shrub layer is dominated by devil's club. Salmonberry and stink currant are generally present and abundant. The herb layer is dominated by sorrel and lady fern, with piggyback plant and sword fern as the most common associated herb species.

Geomorphic environment: Plots were on two general types of sites: gentle (0-20% slope) cobbly floodplains and stream banks on steep (80-100% slope) seepy cliffs and upper banks. However, the western redcedar phase can occupy

Devil's club-salmonberry group: this example is from the gentle cobble floodplains and streambank environment.

other environments which suggest sub-surface flow including wetland perched on a terrace and an adjacent area with subsurface flow, abandoned beaver sites, a muddy overflow channel, and a mostly saturated mid-channel island. Substrates vary, from shallow silty sands over cobbles to deeper soils (silt, silty sands, loams, sandy silts) with cobbly matrix. The finer textured top horizons and deeper soils are more common in the red alder and western redcedar phases. The group seems strongly associated with wet well-aerated rooting zones.

Similar types: The Devil's club-salmonberry group is similar to the Stink currant-salmonberry/sorrel group.

Click on a creek name in the table to the right to see valley cross sections that show where OPHO-RUSP occurs in relation to other plant associations.

Valley cross sections showing OPHO-RUSP
Starr creek
Lamb creek
Nimrod creek
Loon creek

Wetland rating:

Community meets wetland test	Yes-all 3 phases
Wetland indicators among dominant species	66% (range 25-100%)

Non-natives: Exotic species were minor in the sample. Wall-lettuce was present in one plot in each phase, while St. John's-wort only occurred a single plot.

***Oplopanax horridum-Rubus spectabilis*-shrub phase**
Devils club-salmonberry-*shrub phase*
OPHO-RUSP-*shrub phase*

N=14 (MHNF 11, WNF 2, EBLM 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Shrubs			
Oplopanax horridum	Devil's club	100	34
Rubus spectabilis	Salmonberry	71	20
Ribes bracteosum	Stink currant	64	10
Herbs			
Oxalis	Sorrel	86	21
Athyrium filix-femina	Lady fern	79	10
Tolmiea menziesii	Piggyback plant	71	4
Polystichum munitum	Sword fern	57	8
Gymnocarpium dryopteris	Oak fern	50	7
Galium triflorum	Sweetscented bedstraw	50	4
Maianthemum stellatum	Starry false Solomon's-seal	36	2
Claytonia sibirica	Siberian miner's lettuce	36	1

Elevations: 800 to 4120 feet (average 2354 feet).

Community: Devil's club-salmonberry-*shrub phase* is a shrub and herb dominated community found across a wide elevation range. Devil's club and salmonberry are the dominant shrubs; stink currant is also commonly present but at lower cover. The herb layer is typically dominated by sorrel, with lady fern, piggyback plant, and sword fern present but not abundant. Red alder and western redcedar are the most common tree species, but are discussed below in the Devil's club-salmonberry-*red alder phase* and Devil's club-salmonberry western-*redcedar phase*.

Geomorphic environment: Plots were on two general types of sites: gentle (0-20% slope) cobbly floodplains and stream banks or on steep (80-100% slope) seepy cliffs and upper banks. Substrates vary, from shallow silty sands over cobbles to deeper soils with a cobbly matrix; one site was a rock cliff. The community seems strongly associated with wet well-aerated rooting zones.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	50%
Wetland indicators among dominant species	63% (range 25-100%)

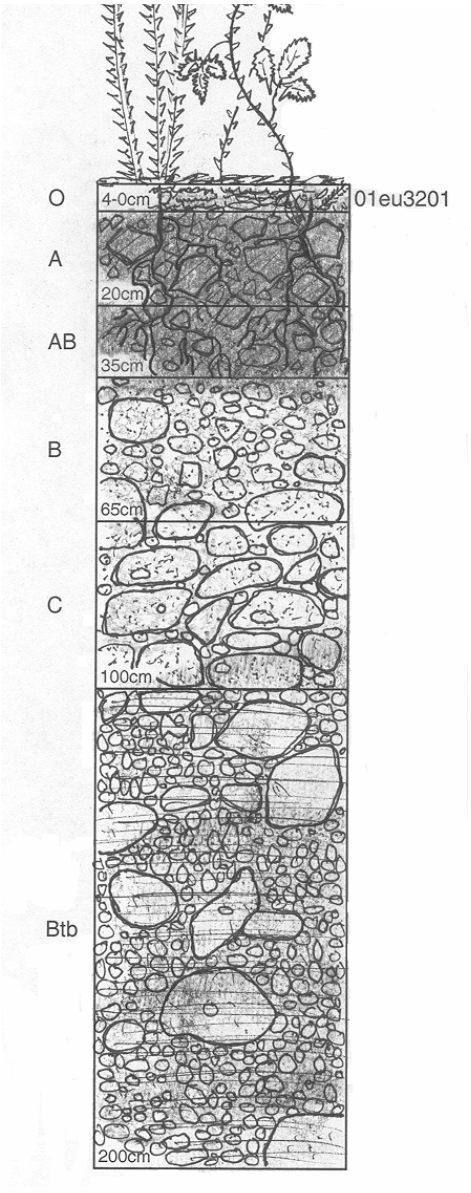
Non-natives: Exotic species were infrequent. Only two species, wall-lettuce and common St. John's-wort, were recorded on one plot each.

Other studies: This community is somewhat similar to the OPHO Plant Association (Ecoclass SW7113), previously been described for the Mt. Hood NF in Diaz and Mellen (1996).

Soil illustration: OPHO-RUSP

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	4					20	10
A	20	7.5YR2.5/1	SCL	cobble / gravel	25 / 25	15	10
AB	15	7.5YR3/1	LS	cobble / gravel	25 / 25	10	10
B	30	10YR3/3	S	cobble / gravel	20 / 40	10	5
C	35	10YR3/4	S	cobble / gravel / boulder	20 / 10 / 20	8	5
Btb	90	7.5YR4/3	SC	cobble / gravel	50 / 25	4	0

Total Depth: 200cm. Depth Limit: 200cm.



This plot was a huge cut bank terrace containing way too much geologic history to get a handle on. I describe it as only two major eras with two historic stream channels. The upper half of the profile includes A, AB, B and C horizons. The A horizon is actually largely colluvial with organic composition. There has been very little, if any, hydrologic work expended on these fragments. In the AB horizon (20-45cm), the line between colluvium and sandy alluvial sediments becomes blurred. Poorly sorted gravel and cobble composition rises in the B horizon, and the sediments lose their loamy texture. This horizon was certainly the top of a streambed in history; the C horizon, of less poorly sorted cobble and boulder, is clearly a deeper portion of the same streambed.

Beneath the C horizon is **either** the beginning of an even more ancient colluvial profile, **or** the long lost answer to my question "what really lies beneath the big cobble in a stream channel?" In the field, I considered this very packed and somewhat well sorted horizon to be a buried Bt. I think it is entirely possible though, that it could be a C2 horizon of mass-colluvial origin. If this were the case, the stream would have had excavated the C1 horizon from the matrix of gravel and sandy clay from the top down. Entirely possible. Entirely speculation.

O*plopanax horridum-Rubus spectabilis-Alnus rubra* phase
Devil's club-salmonberry-*red alder phase*
OPHO-RUSP-*ALRU2 phase*

N=11 (MHNF 9, SBLM 2)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	73	24
Tsuga heterophylla	Western hemlock	36	20
Shrubs			
Oplopanax horridum	Devil's club	100	32
Rubus spectabilis	Salmonberry	82	25
Ribes bracteosum	Stink currant	82	19
Vaccinium ovalifolium/V.alaskaense	Oval-leaved huckleberry/Alaska huckleberry	45	11
Herbs			
Oxalis	Sorrel	91	20
Athyrium filix-femina	Lady fern	82	13
Hydrophyllum tenuipes	Pacific waterleaf	64	6
Tolmiea menziesii	Piggyback plant	55	9
Polystichum munitum	Sword fern	55	7
Streptopus amplexifolius	Clasping twistedstalk	45	2
Maianthemum stellatum	Starry false Solomon's-seal	45	2
Dicentra formosa	Bleeding heart	45	2
Claytonia sibirica	Siberian miner's lettuce	45	1
Stachys cooleyae	Cooley's betony	36	5
Galium triflorum	Sweetscented bedstraw	36	1
Trillium ovatum	Western trillium	36	1

Elevations: 1420 to 3190 feet (average 2400').

Community: Devil's club-salmonberry-*red alder phase* is a community with a fairly open overstory of red alder and/or western hemlock over a thick shrub layer dominated by devil's club, salmonberry, and stink currant. The herb layer is somewhat sparser than similar devil's club phases, with moderate cover of sorrel and lady fern, commonly with Pacific waterleaf, piggyback plant and sword fern at lower cover.

Young alder stands were most common, but western hemlock up to 110 years were recorded. One low elevation site had a 153 year old grand fir present. This suggests that these communities are subject to periodic flooding that can be powerful enough to eliminate the overstory trees. However, for some sites,

Devil's club-salmonberry-*red alder phase*: both salmonberry and devil's club are well armed with thorns.

intervals between flooding may be long enough for conifer establishment and growth to sizes which may allow the trees to survive less severe flood events.

Geomorphic environment: Geomorphic and soil conditions are very similar to other Devil's club-salmonberry group communities. Plots were on two general types of sites: gentle (2-19% slope) cobbly floodplains and stream banks or on steep (60-100% slope) seepy cliffs and cut banks.

Substrates vary, from shallow silty sands over cobbles to deeper soils (silt, silty sands, loams, sandy silts) with a cobbly matrix. The finer textured top horizons are somewhat deeper than the Devil's club-salmonberry-*shrub phase*. The community seems strongly associated with wet well-aerated rooting zones.

Similar types: This community could be considered a phase of the Stink currant-salmonberry/sorrel group, but it occurs with species combinations common in higher elevation communities, including oval-leaved huckleberry, starry false Solomon's- seal and clasping twistedstalk.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	82%
Wetland indicators among dominant species	64% (range 33-100%)

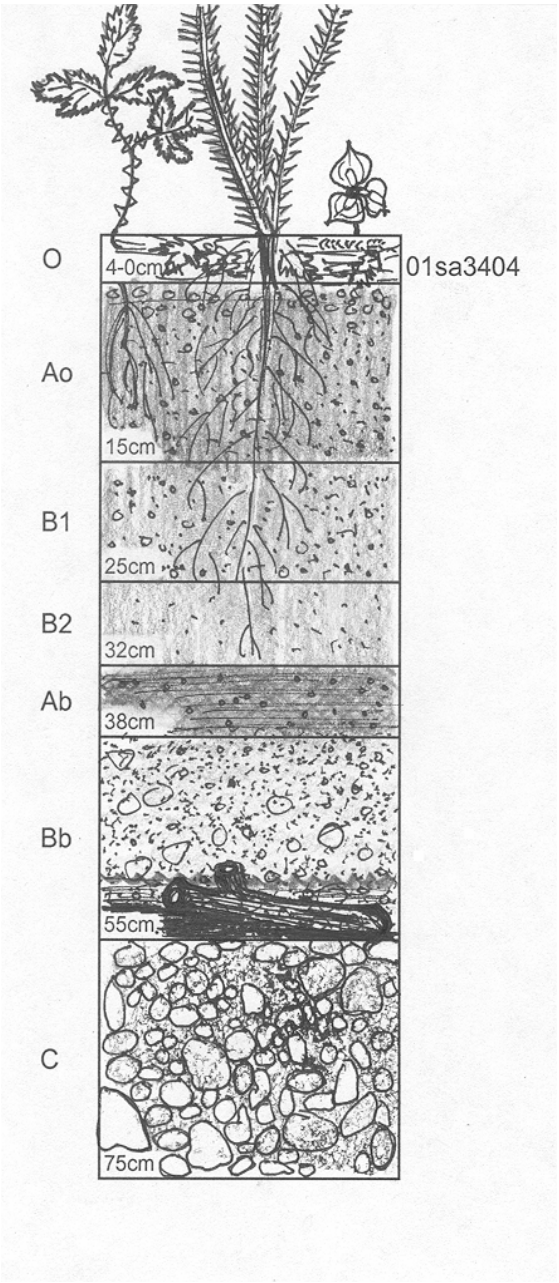
Non-natives: Wall-lettuce was the only exotic species recorded, on a single plot.

Other studies: This community is somewhat similar to the ALRU/OPHO Plant Community (Ecoclass HAS411), previously been described for the Mt. Hood NF in Diaz and Mellen (1996).

Soil illustration: OPHO-RUSP-*ALRU2 phase*

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	4						
Ao	15	7.5YR2.5/1	SL	gravel	5	5	8
B1	10	7.5YR3/1	LS	gravel	3	3	6
B2	7	7.5YR3/1	SL	gravel	0	2	3
Ab	6	7.5YR2.5/1	L	gravel	5	3	
Bb	17	7.5YR3/1	S	gravel	15		
C			R	gravel / cobble	70 / 10		

Total Depth: 55cm by auger. Depth Limit ~55cm. Water Table: 38cm.



This entire profile is saturated. Wetness leads to fast recycling of OM. The deep A horizon is a little gravelly in places on top, but is solidly organic. There are some areas of lighter color, signaling possible eluviation of organic matter. (It doesn't appear to be mottling.)

The B1 and B2 horizons are nearly identical in color and are from the **same** sediment source. This is the sort of thing associated with differential surges during a single flood event. Say this area was already being flooded with fine sediments. Suddenly some wood jam upstream blows out sending an even larger surge through the area which deposits essentially the same mud, but with coarser fragments. In an area such as this, with beaver influence in the vicinity, this could be entirely plausible.

A buried profile is tipped off by a transition from the sandy, "recent" B horizons to an older, organic A horizon that is narrowing over time (32-38cm). Furthermore, there is OM deposited and then buried by sediments, beneath and separate from the Ab. The water table at 38cm is different than most in that it visibly runs on a NNW gradient nearly parallel to the stream. Aeration and drainage are sufficient to preclude mottling and gleying.

Oplopanax horridum-Rubus spectabilis-Thuja plicata phase
Devil's club-salmonberry-*western redcedar phase*
OPHO-RUSP-*THPL phase*

N=6 (MHNF 3, WNF 2, EBLM 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Thuja plicata	Western redcedar	100	35
Alnus rubra	Red alder	67	27
Acer macrophyllum	Big leaf maple	33	48
Taxus brevifolia	Pacific yew	33	8
Trees-seedlings			
Thuja plicata	Western redcedar	50	3
Shrubs			
Oplopanax horridum	Devil's club	100	26
Rubus spectabilis	Salmonberry	83	21
Ribes bracteosum	Stink currant	67	13
Sambucus racemosa	Red elderberry	50	6
Herbs			
Athyrium filix-femina	Lady fern	100	18
Tolmiea menziesii	Piggyback plant	83	14
Oxalis	Sorrel	83	29
Polystichum munitum	Sword fern	50	8
Hydrophyllum tenuipes	Pacific waterleaf	50	3
Maianthemum stellatum	Starry false Solomon's-seal	50	3
Galium triflorum	Sweetscented bedstraw	50	2
Claytonia sibirica	Siberian miner's lettuce	50	Tr

Elevations: 920 to 2600 feet (average 2035 feet).

Community: Devil's club-salmonberry-*western redcedar phase* is a community with an overstory of western redcedar and red alder or big leaf maple. The thick shrub layer is dominated by devil's club and salmonberry. Stink currant and red elderberry are also common. Lady fern, sorrel, and piggyback plant are the dominant herbs.

Western redcedar stands were older than most trees sampled in salmonberry communities, and averaged 32" dbh (range14-45"). Red alder mixed in one stand were over 100 years.

Geomorphic environment: Surfaces included a wetland perched on a terrace and an adjacent area with subsurface flow, around abandoned beaver sites, a muddy overflow channel, and a mostly saturated mid-channel island.

Soils were relatively deep with organic matter accumulating at the surface. Textures were silt loams or silty clay loams over clay, sandy clay or sand. The two sites associated with old beaver activity showed high organic matter mixed with sand in the top horizons over cobbles.

Soil textures and tree ages suggest that severe flooding may be relatively infrequent. Soils stay wet most of the year.

Similar types: Western redcedar/devil's club-salmonberry has more devil's club, stink currant, and piggyback plant than Western redcedar/salmonberry/sorrel. It also has less sword fern. Together, these suggest that the devil's club community is somewhat wetter.

Valley cross sections showing OPHO-RUSP-*THPL phase*
E Fork S Fork McKenzie #2

Click on a creek name in the table to the left to see the valley cross sections that show where OPHO-RUSP-THPL phase occurs in relation to other plant associations.

Wetland rating:

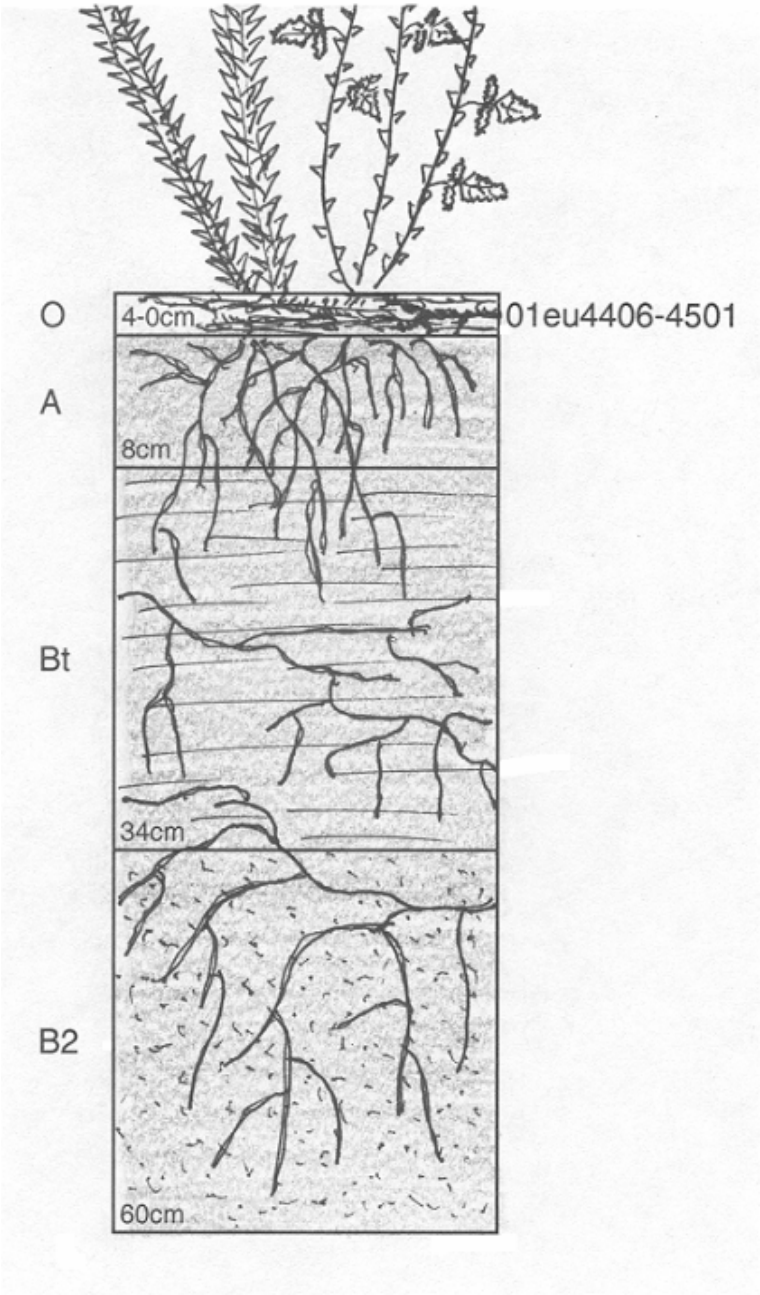
Community meets wetland test	Yes
Plots meeting wetland criteria	83%
Wetland indicators among dominant species	77% (range 50-100%)

Non-natives: Wall-lettuce was the only exotic species recorded, on a single plot.

Soil illustration: OPHO-RUSP-*THPL phase*

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	4						
A	8	7.5YR2.5/2	SiL			15	12
Bt	26	7.5YR2.5/2	SiCL			10	15
B2	26	7.5YR3/2	SSiL			10	15

Total Depth: 60cm. Depth Limit: 60cm+.



Deep dark loamy soils right smack in the center of the wide island. Any kind of plant would love this rooting medium. I chose to profile the rich big leaf maple and salmonberry community substrate and was not disappointed. Not a rock or impervious root in the profile, just lots of feeder roots, woody debris, and room to expand. Textural boundaries were the most deciding factor, as determined by the old gouge-and-scratch resistance routine.

The A horizon has good blocky structure, but is robbed of some of the depth I feel it is entitled to. At 8cm, there are barely perceptible but unmistakable clay skins, which obligate the naming of a Bt horizon from 8-34cm. Otherwise, all aspects of the A and Bt horizon are identical. At 34cm, the clay texture disappears again, and sandy silt loam best describes the B2 horizon.

Picea engelmannii/Vaccinium membranaceum
Engelmann spruce/big huckleberry
PIEN/VAME

N=3 (WNF 3)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Picea engelmannii	Engelmann spruce	100	20
Tsuga mertensiana	Mountain hemlock	67	8
Abies lasiocarpa	Subalpine fir	67	4
Trees-seedlings			
Abies lasiocarpa	Subalpine fir	100	3
Tsuga mertensiana	Mountain hemlock	67	1
Shrubs			
Vaccinium membranaceum	Big huckleberry	100	18
Ribes	Currant	100	9
Rubus pedatus	Creeping raspberry	67	3
Herbs			
Achlys triphylla	Vanilla leaf	100	5
Clintonia uniflora	Queencup beadlily	100	4
Valeriana sitchensis	Sitka valerian	100	2
Orthilia secunda	Sidebells pyrola	100	1
Trillium ovatum	Western trillium	100	Tr
Tiarella trifoliata	Foamflower	67	3
Mitella breweri	Brewer's mitrewort	67	3
Athyrium filix-femina	Lady fern	67	3
Viola glabella	Stream violet	67	2
Viola	Violet	67	2
Senecio triangularis	Arrow-leaved groundsel	67	1
Trisetum cernuum	Nodding trisetum	67	1
Xerophyllum tenax	Beargrass	67	1
Anemone deltoidea	Three-leaved anemone	67	1

Elevations: 4720 to 4880 feet (average 4805 feet).

Community: Engelmann spruce/big huckleberry is a community sampled in the high elevation Mink Lake Basin in the Willamette NF's Three Sisters Wilderness area. Adjacent stands for all three sites are in the Mountain hemlock/big huckleberry/beargrass plant association. The creeks are narrow (4-14 foot), often intermittent channels on the plateau. One site was a connecting creek between a marsh and a lake. The tree canopy is dominated by Engelmann spruce, with mountain hemlock and subalpine fir as common associates. Trees may be rooted in the plots or may overhang the banks and bars. The shrub layer is fairly sparse.

Big huckleberry is most abundant, with minor cover of gooseberry and creeping raspberry. The herb layer has species common to the mesic upland community, Mountain hemlock/big leaf huckleberry/queencup beadlily, including vanilla leaf, queencup beadlily, Sitka valerian, and sidebells pyrola. However, it also includes low cover of more riparian species such as Brewer's mitrewort and lady fern, as well as Engelmann spruce.

Geomorphic environment: Geomorphic surfaces along the intermittent channels included banks, cobble/boulder bars, and overflow channels. No soils data are available for these sites. Trees noted on one plot were saplings and poles. These surfaces may be flooded during high winter flow.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	0%
Wetland indicators among dominant species	32% (range 20-38%)

Non-natives: No exotic species were recorded in the sample.

Other studies: This community is somewhat analogous to the *Picea engelmanii/Clintonia uniflora* Association (Ecoclass CEM222), previously described for eastern Oregon in Kovalchik (1987). However, in the eastern Oregon community, grouse whortleberry (*Vaccinium scoparium*) is present instead of big huckleberry (*Vaccinium membranaceum*), perhaps associated with lower precipitation to the east of the Cascades.

Valley cross sections showing PIEN/VAME
Gnat-Goose creek

Click on a creek name in the table to the left to see valley cross sections that show where PIEN/VAME occurs in relation to other plant associations.

Vaccinium ovalifolium-Rubus spectabilis/Lysichiton americanum
Oval-leaved huckleberry-salmonberry/skunk cabbage
VAOV-RUSP/LYAM3

N=9 (MHNF 9)

Species	Common name	Constancy %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	33	48
Trees-seedlings			
Alnus rubra	Red alder	33	9
Abies amabilis	Silver fir	33	2
Shrubs			
Rubus spectabilis	Salmonberry	100	10
Vaccinium ovalifolium	Oval-leaved huckleberry	89	20
Ribes bracteosum	Stink currant	56	12
Ribes lacustre	Black gooseberry	44	3
Alnus incana	Mountain alder	33	27
Viburnum edule	Highbush-cranberry	33	7
Menziesia ferruginea	Fool's huckleberry	33	5
Lonicera involucrata	Black twinberry	33	4
Herbs			
Lysichiton americanum	Skunk cabbage	100	8
Tiarella trifoliata var. unifoliata	Foamflower	67	3
Gymnocarpium dryopteris	Oak fern	56	7
Achlys triphylla	Vanilla leaf	56	4
Athyrium filix-femina	Lady fern	56	4
Streptopus lanceolatus var. curvipes	Rosy twistedstalk	56	4
Streptopus amplexifolius	Clasping twistedstalk	56	3
Boykinia major	Large boykinia	44	12
Cornus unalaschkensis	Dogwood bunchberry	44	4

Elevations: 3000 to 4130 feet (average 3725 feet).

Community: Oval-leaved huckleberry-salmonberry/skunk cabbage is a higher elevation forested swamp community generally found in the silver fir zone. It is a shrub dominated type that can occur under a red alder canopy (average 19 foot canopy height). Salmonberry and oval-leaved huckleberry/Alaska huckleberry are the dominant shrubs, though stink currant and black gooseberry are also common. Mountain alder can be abundant. The herb layer is marked by skunk cabbage. Foamflower, oak fern, vanilla leaf, lady fern, rosy twistedstalk, and clasping twistedstalk are often present at low cover.

Oval-leaved huckleberry-salmonberry/skunk cabbage community: skunk cabbage indicates swampy environments.

Red alder stands ranged from seedlings/sapling stages to older patches with ages up to115 years old. One site had Engelmann spruce in the overstory.

Geomorphic environments: Plots were on poorly drained geomorphic surfaces such as inactive side channels or other sites where subsurface flow was noted. One site was in a wetland associated with a lake. Plots averaged less than 5% slope. Most samples are on Lowe Creek, Clackamas Ranger District, Mt. Hood NF.

Water tables were encountered in all soil pits at depths from 2-65 cm (average 36 cm). Mottles at 10-30 cm were found in a third of the pits. Several sites had muck layers over sandy horizons. Most were relatively deep soils (average 78 cm), with silty sands, sands, or silts over gravels or cobbles. Sandy horizons often overlay horizons of silt or sandy silt.

These sites are too poorly drained for many conifer species. Many of the surfaces are clearly subject to frequent flooding as well.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	56%
Wetland indicators among dominant species	62% (range 33-100%)

Non-natives: No exotic species were found in the sample.

Thuja plicata/Rubus spectabilis/Lysichiton americanum/Oxalis
Western red cedar/salmonberry/skunk cabbage-sorrel
THPL/RUSP/LYAM3-OXALI

N=6 (MHNF 4, SBLM 1, EBLM 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Thuja plicata	Western redcedar	67	18
Alnus rubra	Red alder	50	18
Shrubs			
Rubus spectabilis	Salmonberry	83	16
Ribes bracteosum	Stink currant	67	46
Oplopanax horridum	Devil's club	67	2
Sambucus racemosa	Red elderberry	50	1
Herbs			
Oxalis	Sorrel	100	19
Lysichiton americanum	Skunk cabbage	100	13
Athyrium filix-femina	Lady fern	100	9
Mitella ovalis	Oval-leaved mitrewort	50	8
Dryopteris carthusiana	Shield fern	50	4
Polystichum munitum	Sword fern	50	2

Elevations: 1460 to 3600 feet (average 2507 feet).

Community: Western redcedar/salmonberry/skunk cabbage/sorrel is a forested wetland community in moderate elevations. Overstory trees averaged 33%, though some may have been overhanging this community (84 feet average canopy height). Western redcedar was present or adjacent to all plots, and red alder was also found on the majority of plots. Salmonberry and stink currant are the dominant shrubs. Devils club and elderberry are often present but at low cover. The herb layer averaged 60% cover, with sorrel, skunk cabbage, and lady fern the dominant species.

Trees on plots in this community were larger than for most other salmonberry types. Site trees ranged from 61 to 96 years old. One plot had western redcedars with diameters up to 43".

Geomorphic environments: Plots were on surfaces with subsurface flow adjacent to creeks, old stream channels, stream bank seeps, or in a fen.

Soils are poorly drained. Mottling or gleying were found at an average of 25 cm. Summer water table was at 15-19 cm. Top horizons were generally silt loams or silty clay loams over silty clays or sandy clays. Few sites had exposed surface coarse fragments. Several sites had mucky top layers.

Poorly drained soils limit this community to species which can be successful with high water tables and occasional flooding, such as western redcedar and skunk cabbage.

Wetland rating:

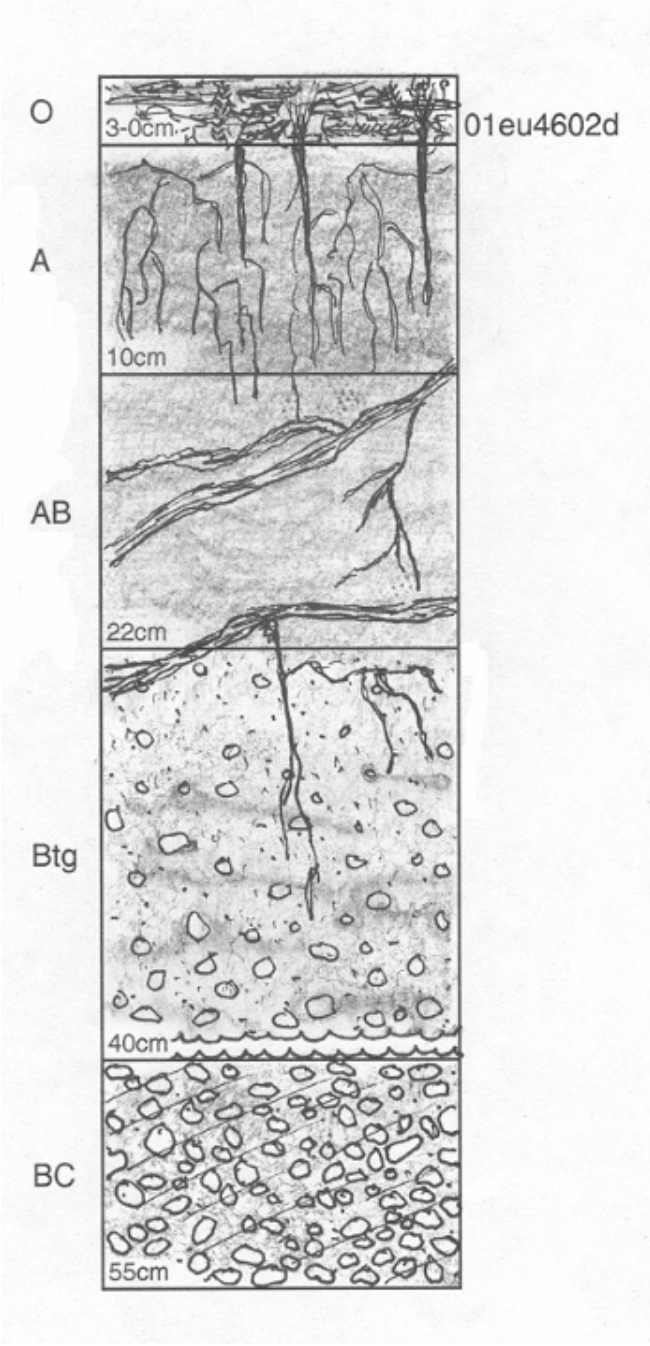
Community meets wetland test	Yes
Plots meeting wetland criteria	100%
Wetland indicators among dominant species	82% (range 71-100%)

Non-natives: No exotic species were recorded in the sample.

Soil illustration: THPL/RUSP/LYAM3-OXALI

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	3						
A	10	7.5YR3/1	SiCL	gravel	0	12	15
AB	12	7.5YR2.5/2	CL	gravel	0	8	8
Btg	18	7.5YR3/1	SC	gravel	15	5	5
BC		10YR4/2	SC	gravel	35	10	0

Total Depth: 45cm. Depth Limit: 45cm+. Water Table: 39cm. Gley: 22cm.



A chunky appearance of the loose, crumby A horizon is a sign of good formation without disturbance. The chunkiness will also show up a lot in shrink-swell clay soils. The island is steeply downcut and inside the curve of the stream. Feeder roots are common in the A horizon, but structural roots only are in the AB. The AB horizon is less porous and extremely sticky but has good blocky structure. Gravel and sand begin in the Btg horizon. Water table may come up this high in winter, but is around 40cm today. The BC horizon is below the water table but has no gleying, only yellow colors.

Abies amabilisVaccinium ovalifolium
Silver fir/oval-leaved huckleberry
ABAM/VAOV

N=4 (MHNF 4)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Abies amabilis	Silver fir	100	18
Chamaecyparis nootkatensis	Alaska yellow cedar	75	9
Tsuga heterophylla	Western hemlock	75	7
Picea engelmannii	Engelmann spruce	50	10
Alnus rubra	Red alder	50	9
Trees-seedlings			
Abies amabilis	Silver fir	100	5
Tsuga heterophylla	Western hemlock	100	2
Chamaecyparis nootkatensis	Alaska yellow cedar	75	5
Alnus rubra	Red alder	50	7
Picea engelmannii	Engelmann spruce	50	1
Shrubs			
Vaccinium ovalifolium	Oval-leaved huckleberry	100	32
Rhododendron albiflorum	Cascades azalea	75	11
Ribes lacustre	Black gooseberry	75	2
Rubus spectabilis	Salmonberry	75	1
Viburnum edule	Highbush-cranberry	75	Tr
Sorbus sitchensis	Sitka mountain-ash	50	2
Gaultheria ovatifolia	Oregon wintergreen	50	2
Vaccinium membranaceum	Big huckleberry	50	1
Spiraea douglasii	Douglas spiraea	50	Tr
Herbs			
Cornus unalaschkensis	Dogwood bunchberry	100	13
Clintonia uniflora	Queencup beadlily	100	1
Tiarella trifoliata var. unifoliata	Foamflower	75	6
Athyrium filix-femina	Lady fern	75	6
Achlys triphylla	Vanilla leaf	75	6
Caltha leptosepala	Marsh marigold	50	8
Carex echinata	Star sedge	50	5
Trautvetteria caroliniensis	False bugbane	50	3
Lysichiton americanum	Skunk cabbage	50	2
Valeriana sitchensis	Sitka valerian	50	2
Viola glabella	Stream violet	50	1
Streptopus amplexifolius	Clasping twistedstalk	50	1
Viola palustris	Marsh violet	50	1

Elevations: 3040 to 4520 feet (average 4000 feet).

Community: Silver fir/oval-leaved huckleberry is a wet forested community found in the silver fir zone. This type is a diverse mixed community or communities of alternating hummocks and swales. Mature trees occur on slightly raised hummocks, often of rooted wood. These are typically found in wetlands along perennial or intermittent channels.

Tree canopies are moderate (average 45% cover), with a variety of species in both the overstory and understory including silver fir, Alaska yellow cedar and western hemlock. Red alder and Engelmann spruce are often present. Oval-leaved huckleberry and Cascades azalea are the dominant shrub species. Black gooseberry, salmonberry, and highbush-cranberry are also frequent, but at low cover. The herb layer is varied. Dogwood bunchberry is the dominant species, generally occurring with queencup beadlilly, foamflower, lady fern, and vanilla leaf. In the swales, wetland herbs such as marsh-marigold, star sedge, skunk cabbage, and marsh violet are common.

Sampled site trees on each plot spanned a wide range of ages. Overall site trees were from 76 to 237 years old. The difference between the oldest and youngest site trees on a site averaged 98 years. In these communities, tree establishment appears to be gradual, occurring either in response to small intermediate disturbances or singly. Major disturbance intervals in this community may be fairly long.

Geomorphic environment: Sites were flat with forested hummocks.

Soil pits displayed deep muck/peat accumulations, with evidence of buried soils. Soils are generally wet, with the water table from 0 to 35 cm.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	25%
Wetland indicators among dominant species	40% (range 25-63%)

This community fails the wetland test, with only 25% of the plots meeting wetland determination criteria. Average proportion of wetland indicators among dominant species was 40% (range 25-63%).

Non-natives: No exotic species were recorded in the sample.

Northwest Oregon Coast Range

Salmonberry and red elderberry over a carpet of piggyback plant.

Coast Range key

A. Herbaceous community within channel-immersion tolerant species present, often grassy and weedy

1. Water-carpet >=5% ..... **Water-carpet** p.188

2. Horsetail present, horsetail>waterparsley .....**Horsetail** p.185
   See *Equisetum arvense* Association for wetland phase (Christy p.117)
3. Waterparsley present, waterparsley>horsetail .....**Waterparsley** p.192
   See *Oenanthe sarmentosa* Association for wetland phase (Christy p. 133)

B. Herbaceous community at channel margin or mid-channel bar, immersion tolerant species (water-carpet, waterparsley, yellow monkeyflower) absent. Sorrel, lady fern, and piggyback plant codominant, salmonberry and stink currant absent..... **Sorrel-piggyback plant** p.196

For more herb-dominated communities (aquatic beds, emergent marshes, marshes, fens/peatlands, or wet prairies), see herbaceous wetlands key (Christy pp. 18-20).

C. Shrub communities; trees may be present (See also D, E and F for special tree communities.)

1. California hazel dominant

a. Salmonberry important shrub.....
.....**Big leaf maple/California hazel-salmonberry** p. 242

b. Salmonberry absent, vine maple important shrub
.....**California hazel-vine maple/sorrel** p. 231

2. Salmonberry and/or stink currant >5% or dominant shrubs

a. Stink currant an important shrub

1) Devil's club dominant or co-dominant, salmonberry minor or absent
..... **Devil's club-stink currant** p. 214

2) Immersion tolerant species water-carpet and/or waterparsley present, at channel margin
.....**Salmonberry-stink currant/water-carpet** p. 200

3) Immersion tolerant species absent
..... **Salmonberry-stink currant group** p. 205

a) Foamflower > sum of betony, Siberian miner's lettuce and toothleaved monkeyflower, or sum of the 3 <5%
.....**Salmonberry-stink currant-*foamflower phase*** p. 211

b) Sum of betony, Siberian miner's lettuce and toothleaved monkeyflower >5%
..... **Salmonberry-stink currant-*betony phase*** p. 207

b. Salmonberry>5%, stink currant minor or absent

1) Alaska huckleberry dominant
.....**Alaska huckleberry-salmonberry** p. 239

2) California hazel cominant or codominant with salmonberry
.....**Big leaf maple/California hazel-salmonberry** p. 242

3) Sum of lady fern and piggyback plant>sword fern
.....**Salmonberry/piggyback plant-sorrel group** p. 218

a) Lady fern>sword fern or oval-leaved mitrewort>2% ..... **Salmonberry/piggyback plant-sorrel-*oval-leaved mitrewort phase*** p. 221

b) Sword fern>lady fern, or oval-leaved mitrewort absent ..... **Salmonberry/piggyback plant-sorrel-*sword fern phase*** p. 225

4) Sword fern>sum of lady fern and piggyback plant..... salmonberry communities on terraces, steep banks, and slides, transitional to upland

a) Steep bank/slides, moist indicators (betony, piggyback plant) absent or very minor ..... **Salmonberry-vine maple** p. 244

b) Betony and/or piggyback plant always present .....**Salmonberry/sword fern** p. 234

3. Douglas spiraea thicket, see *Spiraea douglassii* Association (Christy p. 58)

D. Red alder/skunk cabbage swamps

1. Slough sedge >=5%, dominant or co-dominant with skunk cabbage..... *Alnus rubra/Carex obnupta-Lysichiton americanus* Association (Christy p. 22)

2. Slough sedge <5%, lady fern may be co-dominant with skunk cabbage, *Alnus rubra/Athyrium filix-femina-Lysichiton americanus* Association (Christy p. 21)

E. Sitka spruce swamps

1. Slough sedge dominant herb, with skunk cabbage and waterparsley in wet hollows cabbage ..... *Picea sitchensis/Carex obnupta-Lysichiton americanus* Association (Christy p. 28)

2. Skunk cabbage swamp, slough sedge minor or absent, red osier dogwood dominant shrub ..... *Picea sitchensis/Cornus sericea/Lysichiton americanus* Association (Christy p. 29)

F. Willow communities

1. Pacific willow co-dominant with Sitka willow, skunk cabbage swamp..... *Salix lucida ssp. lasiandra/Salix sitchensis/Lysichiton americanus* Association (Christy p. 56)

2. Sitka willow minor or absent, Sitka willow dominant, with skunk cabbage and/or aquatic sedge the dominant herbs .....*Salix sitchensis* complex (Christy p. 57)

For more shrub-dominated communities (shrub swamps), see shrubland wetlands key (Christy p. 15-17).

For more tree-dominated communities (forested swamps), see forest and woodlands wetlands key (Christy p. 13-14).

Lady fern is one of the most reliable riparian indicators.

The Coast Range's most typical riparian species: salmonberry, trillium-leaved oxalis and piggyback plant.

Bedrock reach on the North Fork Smith River.

Flood deposits can reroute creeks in the valley floor. The 1995 photo of the Siuslaw NF's Big Creek (left) shows a major channel. During the 1996 floods, the site was transformed into a smaller side channel (1997 photo, right). The coarse gravel bar could develop a Water-carpet, Waterparsley, or Horsetail community over time.

Horsetail community: 2 years after the flood that filled in the old channel with this new sandy gravel deposit.

In channel:

Equisetum
Horsetail
EQUIS

N=7 (SNF 6, EBLM 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-seedlings			
Alnus rubra	Red alder	29	Tr
Shrubs			
Rubus spectabilis	Salmonberry	71	1
Herbs			
Equisetum	Horsetail species	100	28
Athyrium filix-femina	Lady fern	86	4
Stachys mexicana	Mexican betony	86	2
Oxalis trilliifolia	Trillium-leaved sorrel	71	9
Digitalis purpurea	*Common foxglove*	71	4
Tolmiea menziesii	Piggyback plant	71	3
Oenanthe sarmentosa	Waterparsley	71	3
Galium triflorum	Sweetscented bedstraw	71	1
Holcus lanatus	*Common velvet-grass*	57	5
Glyceria striata	Tall mannagrass	57	4
Mimulus moschatus	Musk-flower	57	3
Senecio jacobaea	*Tansy ragwort*	57	2
Mimulus dentatus	Tooth-leaved monkeyflower	57	2
Veronica americana	American brooklime	57	2
Cirsium arvense	*Canada thistle*	57	1
Viola glabella	Stream violet	57	Tr
Carex deweyana	Dewey's sedge	43	4
Stellaria media	*Chickweed*	43	3
Petasites frigidus	Coltsfoot	43	2
Rumex obtusifolius	*Bitter dock*	43	2
Scirpus microcarpus	Small-flowered bullrush	43	2
Claytonia sibirica	Siberian miner's lettuce	43	1
Prunella vulgaris	Selfheal	43	1
Bromus vulgaris	Colombian brome	43	1
Stellaria crispa	Crisp sandwort	43	1
Cirsium	*Thistle species*	43	Tr
Juncus	Rush species	43	Tr
Chrysosplenium glechomifolium	Water-carpet	43	Tr
Polystichum munitum	Sword fern	43	Tr
Cardamine occidentalis	Western bittercress	43	Tr

Elevations: 30 to 600 feet (average 280 feet).

Horsetail community: grassy open gravelly cobble bar.

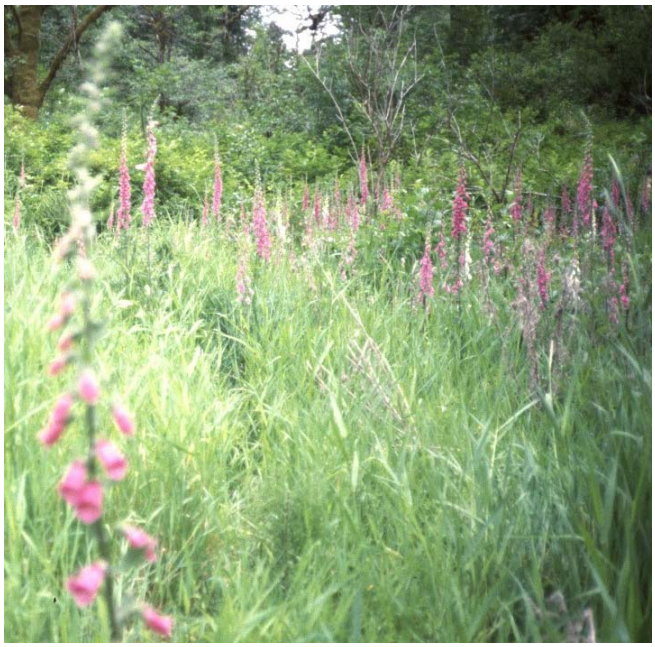
Community: The Horsetail community is a weedy, grassy community with almost no shrub layer. Red alder seedlings may be present, but no mature trees are found. This type occurs with the lowest overhanging tree cover of the coastal streamside communities. Horsetail is the most constant and abundant species. Lady fern, Mexican betony, trillium-leaved sorrel, common foxglove, piggyback plant, and waterparsley are the most prominent associated species. Grasses average 27% summed cover; graminoids average 4%. Weeds such as reed canarygrass can completely dominate this open, frequently disturbed community.

Geomorphic environment: This community is found in wide valleys (valley width >100m). Two types of geomorphic settings are common. Gently sloping sandy gravel/cobble bars within annual flood zone are the most frequent. These have pockets or thin layers of sand overlaying coarser alluvium. Summer low flow is generally within 20 cm. These sites are flooded much of the winter. The Horsetail community also occurs in association with beaver dams. Such sites can have fairly deep poorly drained soil. One pit showed the water table within 10 cm of the surface and mottling at 36cm, soil textures silt over silt loam. Another site showed coarse sand deposited over fine sand, overlying clayey sand, sandy clay, and clay.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	43%
Wetland indicators among dominant species	61% (range 40-100%)

Both settings provide good seedbeds for opportunistic weedy species and species tolerant of flooding.



Beautiful in flower, foxglove is a common non-native invader in the Horsetail community.

Non-natives: Exotic species were found on all plots in the sample.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Digitalis purpurea	*Common foxglove*	71	5	4
Holcus lanatus	*Common velvet-grass*	57	4	5
Senecio jacobaea	*Tansy ragwort*	57	4	2
Cirsium arvense	*Canada thistle*	57	4	1
Stellaria media	*Chickweed*	43	3	3
Rumex obtusifolius	*Bitter dock*	43	3	2
Cirsium	*Thistle species*	43	3	Tr
Phalaris arundinacea	*Reed canarygrass*	29	2	44
Agrostis stolonifera	*Creeping bentgrass*	29	2	6
Senecio vulgaris	*Common groundsel*	29	2	2
Leucanthemum vulgare	*Oxeye daisy*	29	2	1
Cerastium glomeratum	*Sticky chickweed*	29	2	Tr
Cirsium vulgare	*Bull thistle*	29	2	Tr
Erechtites minima	*Coastal burnweed*	14	1	5
Agrostis stolonifera	*Creeping bentgrass*	14	1	1

Chrysosplenium glechomaefolium
Water-carpet
CHGL5

N=7 (SNF 5, SBLM 2)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Shrubs			
Rubus spectabilis	Salmonberry	86	16
Sambucus racemosa	Red elderberry	57	16
Herbs			
Chrysosplenium glechomifolium	Water-carpet	100	25
Athyrium filix-femina	Lady fern	100	7
Oxalis	Sorrel	86	18
Tolmiea menziesii	Piggyback plant	86	13
Oenanthe sarmentosa	Waterparsley	71	9
Stachys mexicana	Mexican betony	71	4
Mitella ovalis	Oval-leaved mitrewort	57	11
Claytonia sibirica	Siberian miner's lettuce	57	10
Poa trivialis	*Rough bluegrass*	43	54
Urtica dioica ssp. gracilis	Nettle	43	9
Polystichum munitum	Sword fern	43	6
Mitella caulescens	Leafy mitrewort	43	3
Glyceria striata	Tall mannagrass	43	3
Blechnum spicant	Deer fern	43	2
Equisetum	Horsetail species	43	2
Bromus vulgaris	Colombian brome	43	2
Stellaria crispa	Crisp sandwort	43	2
Mimulus dentatus	Tooth-leaved monkeyflower	43	1
Digitalis purpurea	*Common foxglove*	43	Tr

Elevations: 30 to 1440 feet (average 315 feet).

Community: Water-carpet is an herbaceous community occurring on surfaces that are inundated much of the year. Flood tolerant indicators for this type include water-carpet, water-parsley, and creeping buttercup. Salmonberry and red elderberry can occur in this community, but often provide overhanging cover only. Water-carpet, lady fern, sorrel, and piggyback plant are the most common species, but waterparsley, Mexican betony, oval-leaved mitrewort, and Siberian miner's lettuce are important associated species. This open, frequently disturbed community has the highest typical cover in grasses of all streamside types in northwest Oregon. It can also be extremely weedy. Rough bluegrass and

creeping buttercup can be dominants on some plots. Giant knotweeds can also invade this community.

Valley cross sections showing CHGL5
Cedar creek

Click on a creek name in the table to the left to see valley cross sections that show where CHGL5 occurs in relation to other plant associations.

Geomorphic environment: Geomorphic surfaces are most often directly adjacent to the channel, though some sites were in overflow channels, and one was in a swamp. Most sites are on gravel or cobble substrates, often with shallow sands over coarse alluvium. Rooting depth is limited by anaerobic conditions. Most sites are at or just above summer low flow. In one pit, located 30 cm above summer low flow, the water table was 63cm below the surface, 33 cm below the creek level. Two detailed soil descriptions are available. The pits show sandy loams over sands, or sandy clay loams over sandy clays. One pit showed mottling at 34 cm and gley at 63 cm, with summer water table at 73 cm. A plot in an overflow channel receives water from a seepy valley wall even during the dry season.

Water-carpet community: 1995 photo (left) shows community in overflow channel. On right, the 1997 photo shows impact of 1996 flood.

These sites are too frequently disturbed and under water too long to develop a stable tree and shrub component.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	100%
Wetland indicators among dominant species	81% (range 60-100%)

Creeping buttercup is a common non-native in the water-carpet and waterparsley communities.

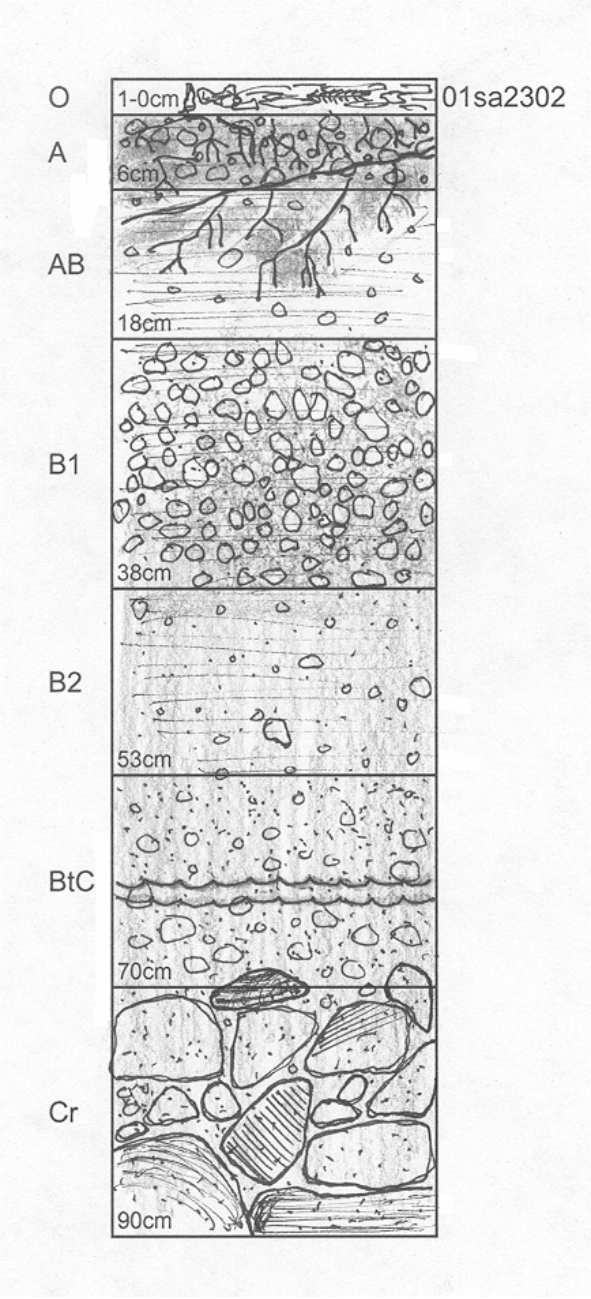
Non-natives: Exotic species were recorded on 43% of the sample.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Poa trivialis	*Rough bluegrass*	43	3	54
Digitalis purpurea	*Common foxglove*	43	3	Tr
Ranunculus repens var. repens	*Creeping buttercup*	29	2	22
Polygonum sachalinense	*Giant knotweed*	14	1	2
Cirsium arvense	*Canada thistle*	14	1	1
Senecio jacobaea	*Tansy ragwort*	14	1	1
Anthoxanthum odoratum	*Sweet vernalgrass*	14	1	Tr
Holcus lanatus	*Common velvet-grass*	14	1	Tr

Soil illustration: CHGL5

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	1					25	
A	6	10YR2/1	SL	gravel	15	15	20
AB	12	10YR2/2	SiL	gravel	5	10	10
B1	20	7.5YR2.5/2	LS	gravel >1cm	40	15	5
B2	15	7.5YR2.5/2	LS	gravel	3	10	
BtC	17	7.5YR2.5/2	S	gravel	10		
Cr			R	cobble	65		

Total Depth: 70cm. Depth Limit: 70cm. Water Table: 63cm.



This sandbar has a well drained and breathable soil, with loamy horizons and overall decency as a rooting medium. It is a little surprising larger shrubs and herbs don't take advantage, but the surface is reset often, and herbivory is an issue. The organic deposition is minimal – just last year's needles. This plot is representative of sandbar plots 3 and 4 except that large woody debris has fallen over the latter plots leading to deep scouring. In effect, the surface horizon of plots 3 and 4 is the B1 horizon of plot 2. It is quite obvious that the 40% gravel composition of this horizon is imperative to retaining any soil at all. The vegetation on plot 4 in particular is hardy enough to anchor the soil further with roots.

An interesting feature here is that the water table is about 30cm below the level of water in the stream. Perhaps subsurface flow is moving fast enough not to necessitate a higher water table. Likewise, the water already in the stream is entering the channel further upstream, but may be experiencing a net loss of water to the hyporheic zone along this particular section. A similar theory could help explain the unusual water dynamics beneath site 01SA22.

Oenanthe sarmentosa
Waterparsley
OESA

N=5 (SNF 5)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	20	25
Trees-seedlings			
Alnus rubra	Red alder	40	Tr
Shrubs			
Rubus spectabilis	Salmonberry	80	2
Sambucus racemosa	Red elderberry	80	2
Ribes bracteosum	Stink currant	40	1
Herbs			
Oenanthe sarmentosa	Waterparsley	100	17
Athyrium filix-femina	Lady fern	100	3
Tolmiea menziesii	Piggyback plant	80	17
Ranunculus repens var. repens	*Creeping buttercup*	80	16
Oxalis trilliifolia	Trillium-leaved sorrel	60	5
Urtica dioica ssp. gracilis	Nettle	60	5
Rumex obtusifolius	*Bitter dock*	60	4
Galium triflorum	Sweetscented bedstraw	60	1
Digitalis purpurea	*Common foxglove*	60	Tr
Claytonia sibirica	Siberian miner's lettuce	60	Tr
Agrostis exarata	Spike bentgrass	40	48
Heracleum lanatum	Cow-parsnip	40	38
Scirpus microcarpus	Small-flowered bullrush	40	13
Glyceria striata	Tall mannagrass	40	5
Mitella ovalis	Oval-leaved mitrewort	40	3
Festuca subulata	Bearded fescue	40	3
Carex deweyana	Dewey's sedge	40	2
Holcus lanatus	*Common velvet-grass*	40	1
Prunella vulgaris	Selfheal	40	1
Stachys mexicana	Mexican betony	40	1
Stellaria crispa	Crisp sandwort	40	Tr

Elevations: 30 to 420 feet (average 225 feet).

Community: Waterparsley is an herb dominated community, though salmonberry and red elderberry are frequently present at very low cover. Only one plot had a mature red alder present. The most common herb species are waterparsley, lady fern, piggyback plant, creeping buttercup, trillium-leaved

sorrel, nettle, and bitter dock. Many of the common species, such as waterparsley and creeping buttercup, are adapted to temporarily flooded conditions. Grasses, graminoids, and exotic species are prominent in this open, frequently disturbed type. Grasses average 38% summed cover. Important grass species include spike bentgrass, tall mannagrass, and bearded fescue. Graminoids (sedges, bulrushes) average 18% summed cover. Exotic species are present on every plot, from 2 -91% summed cover, average 38%.

Valley cross sections showing OESA
Porter creek
Elk creek

Click on a creek name in the table to the left to see valley cross sections that show where OESA occurs in relation to other plant associations.

Waterparsley community: grassy open bar, frequently flooded.

Geomorphic environments: Geomorphic surfaces include annually flooded sandy bars and islands, or bedrock channel margins. Some sites are within the bankfull zone. The Waterparsley community can be adjacent to the channel, or it can occur above the Horsetail or Water-carpet types.

Soil descriptions are from two pits. Both sites were fluvial deposits of sands in cobbles and boulders, with summer water tables within 45 to 60 cm of the surface. Soils textures were sands to loamy sands or silt loams. Neither had developed A and B horizons. Both showed saturated, anaerobic conditions in the lower profile. One had developed over bedrock.

These surfaces are flooded much of the winter. Moisture holding capacity in the upper horizons is poor, but conditions can be anaerobic in the lower profile. Disturbance and rooting conditions prevent succession to stable conifer stands. Risk of invasion by aggressive exotic species is high.

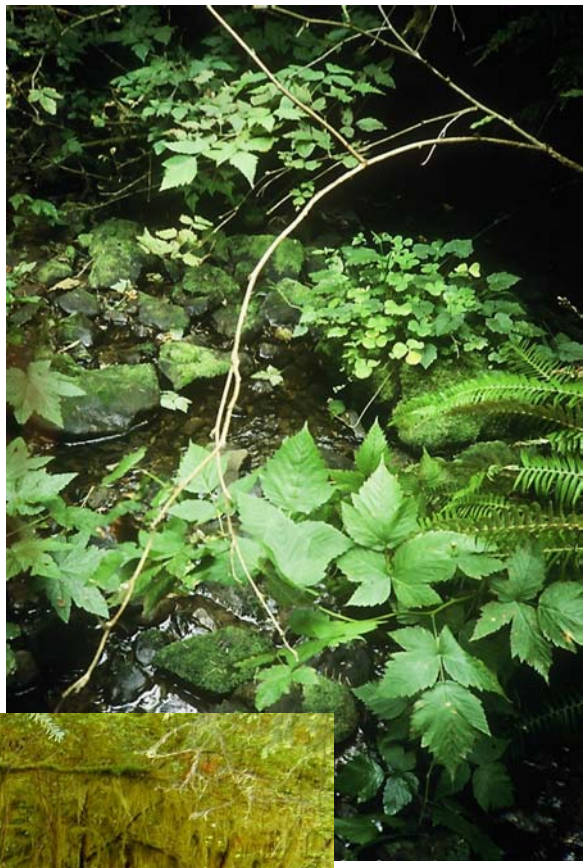
Wetland rating:

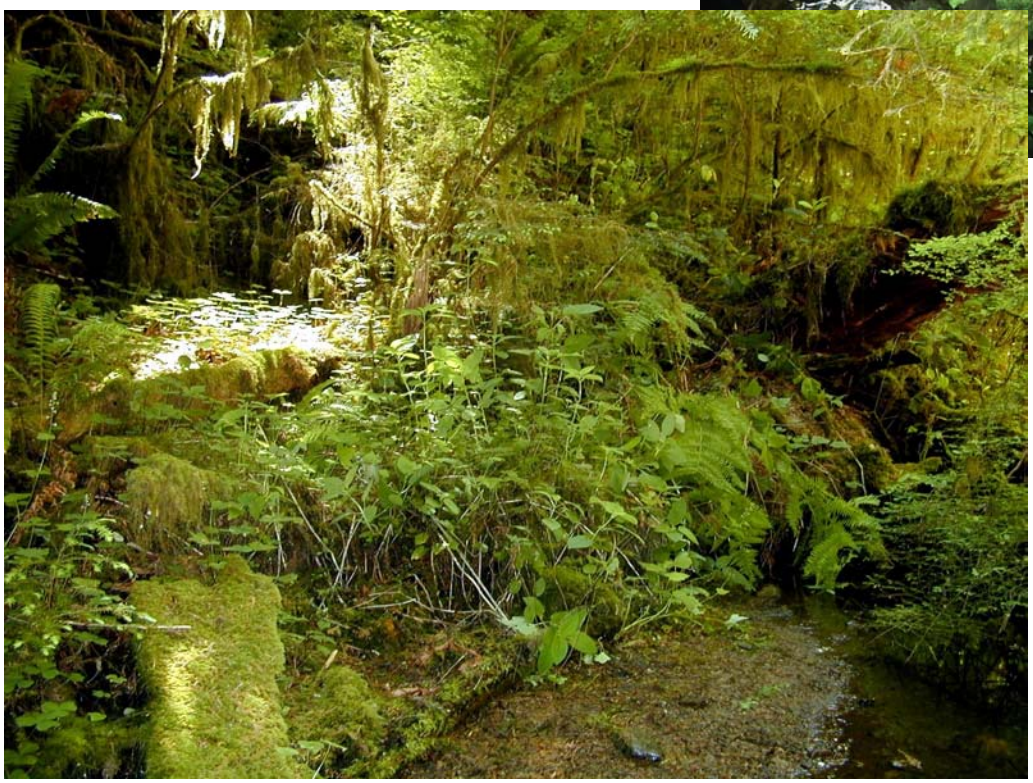
Community meets wetland test	Yes
Plots meeting wetland criteria	100%
Wetland indicators among dominant species	70% (range 57-83%)

Non-natives: Exotic species were present on all plots in the sample.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Ranunculus repens var. repens	*Creeping buttercup*	80	4	16
Rumex obtusifolius	*Bitter dock*	60	3	4
Digitalis purpurea	*Common foxglove*	60	3	Tr
Holcus lanatus	*Common velvet-grass*	40	2	1
Phalaris arundinacea	*Reed canarygrass*	20	1	50
Mentha Xpiperita	*Peppermint*	20	1	35
Poa trivialis	*Rough bluegrass*	20	1	15
Senecio jacobaea	*Tansy ragwort*	20	1	10
Polygonum sachalinense	*Giant knotweed*	20	1	1
Solanum dulcamara	*Bittersweet*	20	1	1
Anthoxanthum odoratum	*Sweet vernalgrass*	20	1	Tr

Mid-channel bars or channel margin:





Oxalis-Tolmeia menziesii
Sorrel-piggyback plant
OXALI-TOME

N=13 (EBLM 6, SBLM 4, SNF 3)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Shrubs			
Vaccinium parvifolium	Red huckleberry	46	9
Herbs			
Oxalis	Sorrel	100	32
Athyrium filix-femina	Lady fern	100	17
Tolmiea menziesii	Piggyback plant	100	16
Polystichum munitum	Sword fern	77	14
Stachys	Betony species	62	14
Mitella ovalis	Oval-leaved mitrewort	54	13
Adiantum pedatum	Maidenhair fern	54	7
Galium triflorum	Sweetscented bedstraw	54	4
Stellaria crispa	Crisp sandwort	54	2
Claytonia sibirica	Siberian miner's lettuce	46	4
Tiarella trifoliata	Foamflower	38	12
unknown grass	Grass species	38	8
Circaea alpina	Enchanter's-nightshade	38	5

Elevations: 100 to 915 feet (average 650 feet).

Community: Sorrel-piggyback plant is an herbaceous community of low to moderate elevations across the Coast Range. Overhanging deciduous tree canopy is common, although only one plot had a red alder seedling (15 years old). The shrub layer is generally minor. Red huckleberry is often present, but roots readily on coarse woody debris. California hazel, vine maple, and thimbleberry canopies were also important on some plots, though cover may be from adjacent communities. The herb layer is dominated by sorrel, lady fern, and piggyback plant. Other associated species include sword fern, betony, oval-leaved mitrewort, maidenhair fern, and crisp sandwort.

This community lacks the species such as water-parsley or water-carpet which are well adapted to depositional bars frequently under prolonged flooding. The community also had a much lower percentage of grasses and weeds than the in-channel herbaceous communities.

Valley cross sections showing OXALI-TOME
Beacon creek
Whittaker creek

Click on a creek name in the table to the left to see valley cross sections that show where OXALI-TOME occurs in relation to other plant associations.

Geomorphic environment: Geomorphic surfaces include narrow active annual floodplains and steep stream banks.

Sorrel-piggyback plant community: photo illustrates herbaceous dominants, with lady fern gracefully overhanging sorrel and piggyback plant.

Soils are generally fairly shallow, with mottling and/or gleying within 50 cm. Water tables are often within 50 cm. O layers are well developed. A horizons are silt loams or sandy loams. B horizons are sandy clay loams, silty clay loams, or silty sands. Gleyed horizons can be perched above bedrock or cobble/gravel creekbed material. Multiple B horizons in some soil pits are evidence of repeated floods resetting the surfaces.

These active floodplains have well developed soils, but rooting conditions are affected by the shallow water table. The geomorphic surfaces are flooded annually.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	23%
Wetland indicators among dominant species	45% (range 22-100%)

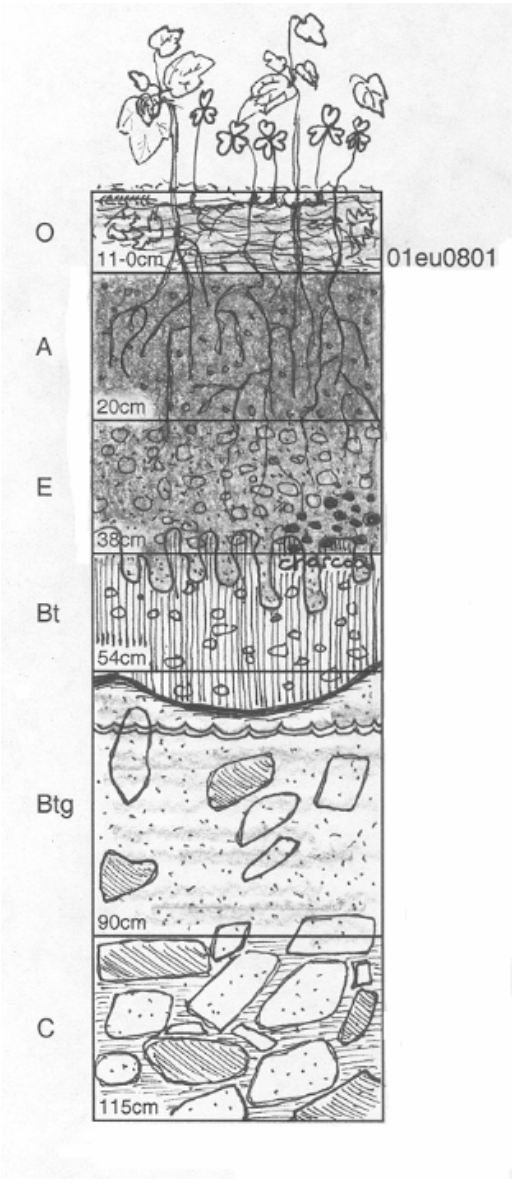
Non-natives: Exotic species were recorded on 31% of the plots.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Lactuca muralis	*Wall-lettuce*	23	3	6
Digitalis purpurea	*Common foxglove*	8	1	4
Hypochaeris radicata	*Hairy cat's ear*	8	1	2

Soil illustration: OXALI-TOME

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	11						
A	20	10YR2/2	SiL	gravel	10	20	20
E	18	10YR3/2	LS	gravel	30	15	5
Bt	16	5YR4/6	LC	gravel	8	15	2
Btg	36	10YR4/2	SCL	cobble	30	5	0
C				cobble	70	3	0

Total Depth: 90cm. Depth Limit: ~90cm. Gley: 55cm. Mottle: 38cm.



Extremely loose, poorly structured and wet, the A horizon is being held steady by roots of small plants; there is no way a tree can hold on for long – many have tried and all have died. An E horizon is a zone of maximum eluviation, meaning clays are exiting, and organic matter that enters isn't retained. These horizons are typically light colored and sandy, sometimes mottled or gleyed in places. This one has lots of gravel, generally rounded and smaller than 2cm. A light brown color suggests aeration but minimal organic deposition. This horizon is about even with plot 3 across the creek, and I doubt it continues very far upslope.

Dark reds in the Bt horizon show the high level of the water table in winter. Oxides left behind demonstrate aeration. Between the Bt and Btg horizons is a 2cm thick band of highly organic material. I believe downward illuviation is stalled because OM tends to "float" above saturated horizons. Despite the apparent inability of this soil to hold trees upright, the subsoil is well developed and stable. The water table is effectively 54cm in the summer and trees may not put roots below it.

The Btg horizon is questionably gleyed. It has a reddish hue to it (10YR4/2), but is gleyed in comparison to the Bt and is definitely saturated all the time. Rocks and soil in the Btg are nearly dripping with moisture, but water does not accumulate in the pit. This means not a huge amount of water is moving down the slope, but it is moving quickly and freely.

Rubus spectabilis-Ribes bracteosum/Chrysosplenium glechomifoloium
Salmonberry-stink currant/water-carpet
RUSP-RIBR/CHGL5

N=19 (SNF 14, SBLM 4, EBLM 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	26	69
Shrubs			
Rubus spectabilis	Salmonberry	100	22
Ribes bracteosum	Stink currant	84	17
Herbs			
Athyrium filix-femina	Lady fern	95	17
Tolmiea menziesii	Piggyback plant	95	13
Chrysosplenium glechomifolium	Water-carpet	89	10
Oxalis	Sorrel species	86	25
Polystichum munitum	Sword fern	74	11
Galium triflorum	Sweetscented bedstraw	68	3
Stachys mexicana	Mexican betony	68	2
Oenanthe sarmentosa	Waterparsley	63	5
Viola glabella	Stream violet	63	1
Claytonia sibirica	Siberian miner's lettuce	53	2
Mimulus dentatus	Tooth-leaved monkeyflower	47	5
Mitella ovalis	Oval-leaved mitrewort	47	3
Mimulus guttatus	Yellow monkeyflower	47	2
Equisetum	Horsetail species	47	1
Blechnum spicant	Deer fern	42	3
Stellaria crispa	Crisp sandwort	42	1
Carex	Sedge species	37	2
Tiarella trifoliata	Coolwort foamflower	37	2
Glyceria striata	Tall mannagrass	37	1
Carex deweyana	Dewey's sedge	37	1
Bromus vulgaris	Colombian brome	37	1
Cardamine angulata	Angled bittercress	37	tr

Elevations: 50 to 1440 (average 560 feet).

Community: The Salmonberry-stink currant/water-carpet community is a mid-channel bar or channel-margin type. This community is dominated by salmonberry, with stink currant a frequent co-dominant. Overstory red alder, big leaf maple, and spruce, 5 to 45 years old, are found on a few plots in this community. Dominant species in the herb layer are trillium-leaved sorrel, lady

Salmonberrry-stink currant/water-carpet: water is never far away from this community.

fern, and piggyback plant. Some members of a suite of flood-tolerant indicators are always present. These include water-carpet, waterparsley, yellow monkeyflower, and small-flowered bulrush. Mexican betony, nettle, horsetail, sedges and grasses are also important associates. Where trees are present, shrub covers are higher and sword fern more common. Where trees are absent, coltsfoot tends to occur more often.

Geomorphic environments: Geomorphic surfaces are most often mid-channel bars, though annual floodplains and stream banks also are found with this community. These sites are flooded much of the winter. Some surfaces were bisected by active or overflow channels. Substrates ranged from seepy silt-covered bedrock to gravel bars and cobble bars, to sand trapped between mossy boulders. Soils varied. The community generally occurs where water is within 70 cm. Annual floodplain plots had sandy loams or loamy sands with mottles or gleying within 60 cm overlaying coarse alluvium or bedrock. Gravel and cobble bars were within annual high water line. Plots notes from these sites showed shallow sand layers over cobbles. The Salmonberry-stink currant/water-carpet community is most often directly adjacent to the channel. However, occasionally the Horsetail or Water-carpet communities can be found between the channel and the Salmonberry-stink currant/water-carpet community.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	89%
Wetland indicators among dominant species	81% (range 50-100%)

Non-natives: Exotic species were recorded on 50% of the plots.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Poa trivialis	*Rough bluegrass*	26	5	10
Digitalis purpurea	*Common foxglove*	16	3	2
Agrostis stolonifera	*Creeping bentgrass*	11	2	2
Ranunculus repens var. repens	*Creeping buttercup*	11	2	2
Senecio jacobaea	*Tansy ragwort*	11	2	tr
Cirsium vulgare	*Bull thistle*	11	2	tr
Phalaris arundinacea	*Reed canarygrass*	5	1	6
Leucanthemum vulgare	*Oxeye daisy*	5	1	3
Hypochaeris radicata	*Hairy cat's ear*	5	1	2
Lotus corniculatus	*Bird's-foot trefoil*	5	1	2
Solanum dulcamara	*Bittersweet*	5	1	2
Agrostis capillaris	*Colonial bentgrass*	5	1	1
Rumex obtusifolius	*Bitter dock*	5	1	tr
Holcus lanatus	*Common velvet-grass*	5	1	tr
Stellaria media	*Chickweed*	5	1	tr

Other studies: This community is somewhat similar to the Red alder/Salmonberry/Pacific Golden-saxifrage Forest Community (ALRU/RUSP/CHGL), previously described for the Olympic Experimental State Forest in Chappell (1999).

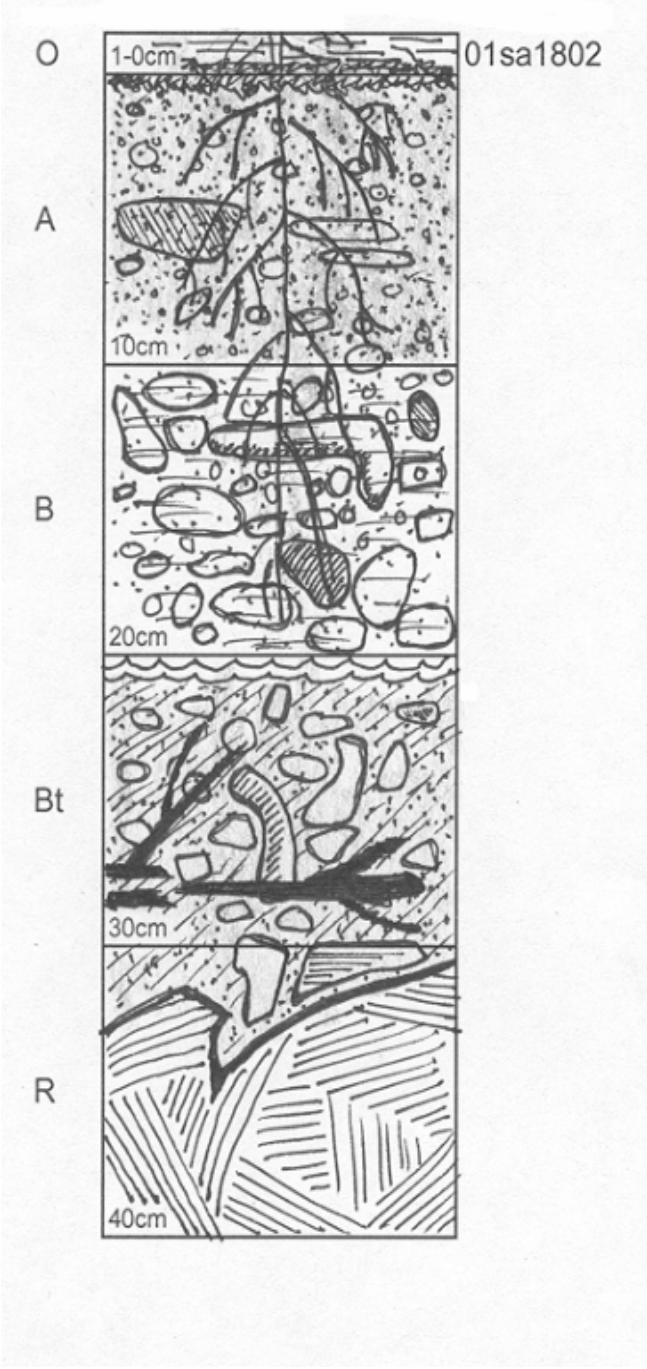
Valley cross sections showing RUSP-RIBR/CHGL5
N Fork Smith #2
Trib W Fork Deadwood creek
Elk creek
Whittaker creek

Click on a creek name in the table to the left to see valley cross sections that show where RUSP-RIBR/CHGL5 occurs in relation to other plant associations.

Soil illustration: RUSP-RIBR/CHGL5

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	1						
A	10	10YR3/4	S	gravel / gravel < .2cm	30 / 10	20	10
B	10	10YR4/2	LS	gravel / cobble	20 / 25	8	5
Bt	10	10YR3/3	SCL	gravel / cobble	20 / 10	5	0
R			R	bedrock	100	0	0

Total Depth: 30cm. Depth Limit: 30cm to R. Water Table: 20cm.



There is very little O horizon because the pit was directly under a fallen tree. The humus that is here was likely deposited this past winter. A horizon has very coarse gravel (up to 5 cm), but no cobbles yet. Under this log, not much organic matter has accumulated in the A, but this appears typical. Entirely alluvial sediments with stratification.

B horizon transitions to a Bt just below the water table at 20cm. Clay skins noticeable. Saturated, but not discolored, except by woody debris that is so decomposed it is just slick mush. The reason to dig under this log is for undisturbed alluvial deposits damned by another log. The digging ended at what appears to be a solid piece of mudstone bedrock that goes all the way across the creek and under the opposite bank.

Active channel shelf/active floodplain/first floodplains

Rubus spectabilis-Ribes bracteosum group
Salmonberry-stink currant group
RUSP-RIBR group

Group description followed by descriptions of two phases: Rubus spectabilis-Ribes bracteosum-*Stachys phase* and *Rubus spectabilis-Ribes bracteosum-Tiarella trifoliata* phase.

N=28 (SBLM 14, EBLM 8, SNF 6)

This constancy table is for the entire group combined. The individual phases are then presented separately.

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	36	40
Shrubs			
Ribes bracteosum	Stink currant	100	23
Rubus spectabilis	Salmonberry	96	48
Acer circinatum	Vine maple	39	15
Sambucus racemosa	Red elderberry	36	15
Herbs			
Oxalis	Sorrel	89	22
Athyrium filix-femina	Lady fern	89	10
Tolmiea menziesii	Piggyback plant	86	18
Polystichum munitum	Sword fern	79	15
Galium triflorum	Sweetscented bedstraw	61	5
Stachys	Betony species	57	17
Stellaria crispa	Crisp sandwort	46	1
Mimulus dentatus	Tooth-leaved monkeyflower	43	5
Adiantum pedatum	Maidenhair fern	43	3
Claytonia sibirica	Siberian miner's lettuce	43	3
Tiarella trifoliata	Foamflower	36	12
Mitella caulescens	Leafy mitrewort	36	9
Circaea alpina	Enchanter's-nightshade	36	5

Community: The Salmonberry-stink currant group is very common on active floodplains and banks in the Coast Range. Red alder or big leaf maple can establish and survive moderate disturbances on these surfaces. The shrub layer is dense, dominated by salmonberry and stink currant, often with vine maple and red elderberry. Shrub competition may reduce tree regeneration. The most important associated herb species are sorrel, lady fern, piggyback plant, and sword fern. Betony and sweetscented bedstraw are usually present.

Geomorphic environment: Geomorphic surfaces are generally active annual floodplains and cutbanks. Surfaces are relatively stable, and have well developed A and B horizons under organic layers 3 to 10 cm deep. However, buried soils recorded in several soil descriptions show that these sites experience major erosion/deposition events. A horizons are loams averaging 15 cm depth. B horizons are most often sandy loams averaging 19 cm, but can be loamy sands to sands. Coarse fragments are minor in the upper horizons, though C horizons are in cobbles or boulders. Summer water tables are below 50 cm.

These sites are frequently flooded, but not often subject to high energy flows that would remove organic material and fines from the surface. Many sites had accumulations of logs which could also slow flood waters and protect vegetation.

Conifer regeneration may be limited by shrub competition and winter inundation.

Two subtle phases are described below though they are difficult to distinguish in the field. The Salmonberry-stink currant-*betony phase* has more consistent betony, Siberian miner's lettuce, and tooth-leaved monkeyflower. The soils on this phase tend to be somewhat coarser and shallower, with more sandy loams and sands in the top horizons. A horizons average 11 cm, and B horizons average 14 cm. The Salmonberry-stink currant-*foamflower phase* appears to have deeper, more organic-rich and finer textured soils. A horizons in this group are loams and silt loams, averaging 20 cm depth. B horizons are sandy loams or silt loams, and average 25 cm depth. Salmonberry cover is very high in the foamflower phase, averaging 59%.

Wetland rating:

Community meets wetland test	Yes-both phases
Wetland indicators among dominant species	67% (range 25-100%)

Non-natives: Exotic species were recorded in 20% of the plots.

EXOTIC	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Digitalis purpurea	*Common foxglove*	14	1
Lactuca muralis	*Wall-lettuce*	4	Tr

Rubus spectabilis-Ribes bracteosum-Stachys phase
Salmonberry-stink currant-*betony phase*
RUSP-RIBR-*STACH phase*

N=9 (SBLM 6, EBLM 3)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	56	27
Shrubs			
Rubus spectabilis	Salmonberry	100	27
Ribes bracteosum	Stink currant	100	20
Sambucus racemosa	Red elderberry	44	12
Oplopanax horridum	Devil's club	33	19
Herbs			
Athyrium filix-femina	Lady fern	100	7
Tolmiea menziesii	Piggyback plant	89	25
Oxalis	Sorrel species	89	23
Stachys	Betony species	89	11
Galium triflorum	Sweetscented bedstraw	89	6
Polystichum munitum	Sword fern	78	15
Mimulus dentatus	Tooth-leaved monkeyflower	78	6
Claytonia sibirica	Siberian miner's lettuce	78	4
Circaea alpina	Enchanter's-nightshade	67	6
Stellaria crispa	Crisp sandwort	67	3
Stachys	Betony species	56	10
Bromus	Brome species	56	8
Carex deweyana	Dewey's sedge	56	7
Adiantum pedatum	Maidenhair fern	56	3
Mitella caulescens	Leafy mitrewort	44	11
Blechnum spicant	Deer fern	44	5
Digitalis purpurea	*Common foxglove*	44	1
Montia parvifolia	Streambank springbeauty	33	10
Chrysosplenium glechomifolium	Water-carpet	33	7
Hydrophyllum	Pacific waterleaf	33	3
Ranunculus uncinatus	Little buttercup	33	2
unknown grass	Grass species	33	2
Cardamine angulata	Angled bittercress	33	1
Dicentra formosa	Pacific bleedingheart	33	1

Elevations: 320 to 1390feet (average 780 feet).

Community: Salmonberry-stink currant-betony phase is shrub dominated, with salmonberry and stink currant the most abundant shrubs. Red elderberry and devil's club are frequently present. Piggyback plant, sorrel, betony, and sword fern are the most abundant species in the rich herb layer. Lady fern is always present, but at lower cover than in related types.

Salmonberry-stink curran-*betony phase*: stink currant overhangs the channel. Note herb layer growing on active channel margin.

Within the Salmonberry-stink currant group, the Salmonberry-stink currant-*betony phase* has more consistent betony, Siberian miner's lettuce, and tooth-leaved monkeyflower. Average salmonberry cover in the betony phase is less than half the average cover in the foamflower phase.

Red alder and big leaf maple can establish and persist in this community. Deciduous tree ages ranged from 10 to 105 years. No overstory conifers were recorded.

Geomorphic environment: Geomorphic surfaces are most often bars, islands, or active floodplains within normal high water line. Some plots were on steep cutbanks with shallow soils. The soils on this phase tend to be somewhat coarser and shallower than the average for the group, with more sandy loams and sands in the top horizons. A horizons average 11 cm, and B horizons average 14 cm.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	90%
Wetland indicators among dominant species	66% (range 33-100%)

Non-natives: Common foxglove was the only exotic species recorded in this sample. It was present on 4 plots (44% constancy), averaging 1% cover.

Other studies: This community is somewhat similar to the Red alder/Salmonberry Forest Community (ALRU/RUSP), previously described for the Olympic Experimental State Forest in Chappell (1999).

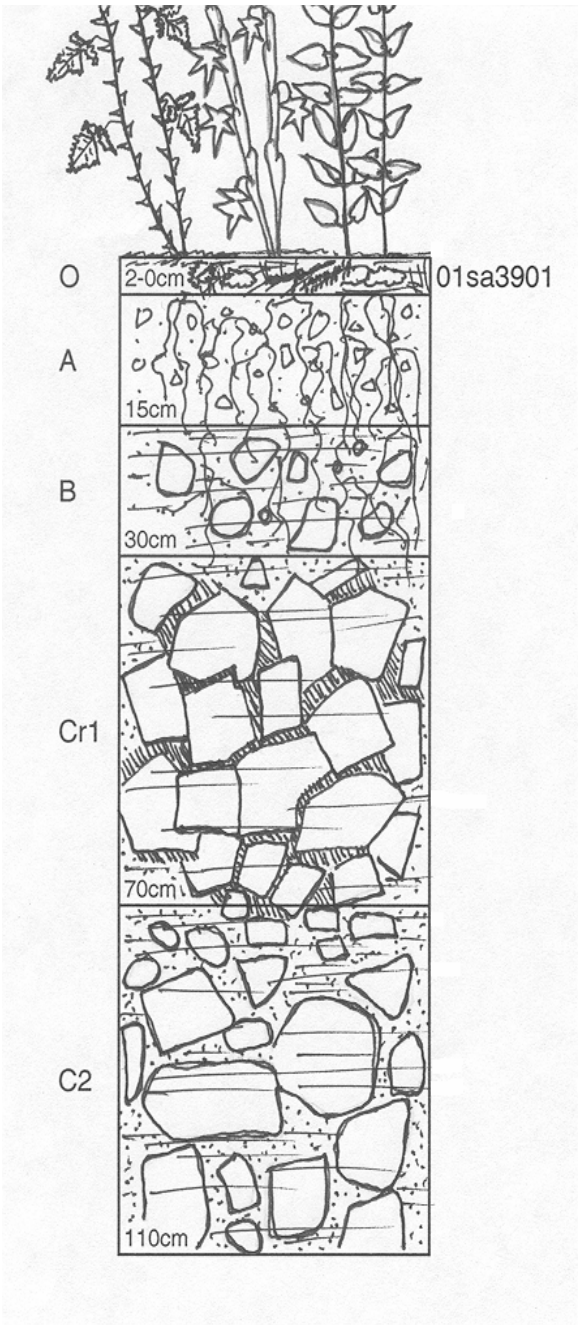
Valley cross sections showing RUSP-RIBR/STACH
Elk creek

Click on a creek name in the table to the left to see the valley cross sections that show where RUSP-RIBR-*STACH phase* occurs in relation to other plant associations.

Soil illustration: RUSP-RIBR-*STACH phase*

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	2					20	10
A	15	7.5YR3/2	SCL	gravel	15	15	8
B	15	7.5YR2.5/2	SC	gravel	25	10	5
Cr1	40	7.5YR2.5/1	SC	gravel / cobble	75 / 10	5	2
C2	40	7.5YR3/4	SC	gravel / cobble / boulder	15 / 30 / 35	8	2

Total Depth: 110cm. Depth Limit: ~110cm. Water Table: 110cm.



(If this pit was measured perpendicular to the slope, rock would be about 40cm beneath the surface, and water would be at about 70cm.) This footslope seems fairly straightforward from a geologic standpoint. There is a stair-stepped pattern to the crumbling residual layers of sandstone under the soil. Each “step” has accumulated a good size pile of colluvial cobbles and boulders, and a looser blanket of colluvial soil and gravel overtops the entire hill.

The A and B horizons are pretty typical, each about 15cm thick with sand and clay texture. There seems to be a little more clay in the topsoil than at other coastal sites, possibly an indication of more frequent colluvial mixing. There is a distinct boundary between the topsoil blanket and underlying horizons. The Cr1 (30-70cm) is a really dark, crumbling, blackish substrate with clay skins forming in “ribbons” along old root channels. Between the Cr1 and C2 horizons is a zone of transition that takes on a lot of clay and redder color (7.5YR3/4), but has the same structure and rock construction as the Cr1. The C2 horizon is made up of neatly configured large cobbles and small boulders. Even though this horizon is described below the Cr1, it seems to be a colluvial horizon that has come to rest above the true bedrock. The Cr1 is the main material that forms the mountain of stairsteps.

***Rubus spectabilis-Ribes bracteosum-Tiarella trifoliata* phase**
Salmonberry-stink currant-*foamflower phase*
RUSP-RIBR-*TITR phase*

N=18 (SBLM 7, SNF 6, EBLM 5)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	28	52
Shrubs			
Ribes bracteosum	Stink currant	100	25
Rubus spectabilis	Salmonberry	94	63
Acer circinatum	Vine maple	50	16
Sambucus racemosa	Red elderberry	33	16
Vaccinium parvifolium	Red huckleberry	33	3
Herbs			
Oxalis	Sorrel	89	20
Polystichum munitum	Sword fern	83	15
Tolmiea menziesii	Piggyback plant	83	13
Athyrium filix-femina	Lady fern	83	11
Tiarella trifoliata	Coolwort foamflower	50	12
Galium triflorum	Sweetscented bedstraw	44	2
Stachys	Betony species	39	4
Adiantum pedatum	Maidenhair fern	39	3
Stellaria crispa	Crisp sandwort	39	tr
Hydrophyllum tenuipes	Pacific waterleaf	33	5

Elevations: 320 to 1540 feet (average 710 feet).

Community: Salmonberry-stink curran-*foamflower phase* has extremely dense shrub cover, dominated by salmonberry and stink currant. Vine maple is also generally present. The rich herb layer is composed of sorrel, sword fern, piggyback plant and lady fern. Foamflower, Pacific waterleaf, and sweetscented bedstraw and betony are also important associated species. Red alder can establish and persist in this type. Competition from dense salmonberry may reduce tree survival.

Valley cross sections showing RUSP-RIBR-*TITR phase*
N Trib to Ryder creek
Whittaker creek

Click on a creek name in the table to the left to see valley cross sections that show where RUSP-RIBR-*TITR phase* occurs in relation to other plant associations.

Geomorphic environment: Geomorphic surfaces of the foamflower phase are most often active annual floodplains adjacent to the channel, sometimes within normal high water line. However, this type also occurs in more atypical settings, such as on a large raised alluvial fan at a tributary junction and on steep slopes on very narrow second order streams without a developed valley floor.

The Salmonberry-stink currant-*foamflower phase* appears to have deeper, more organic rich, and finer textured soils than the betony phase. A horizons in the foamflower phase are loams and silt loams, averaging 20 cm depth. B horizons are sandy loams or silt loams, and average 25 cm depth. Salmonberry cover is very high average 59%) in the foamflower phase, approximately twice the average in the betony phase.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	72%
Wetland indicators among dominant species	67% (range 60-85%)

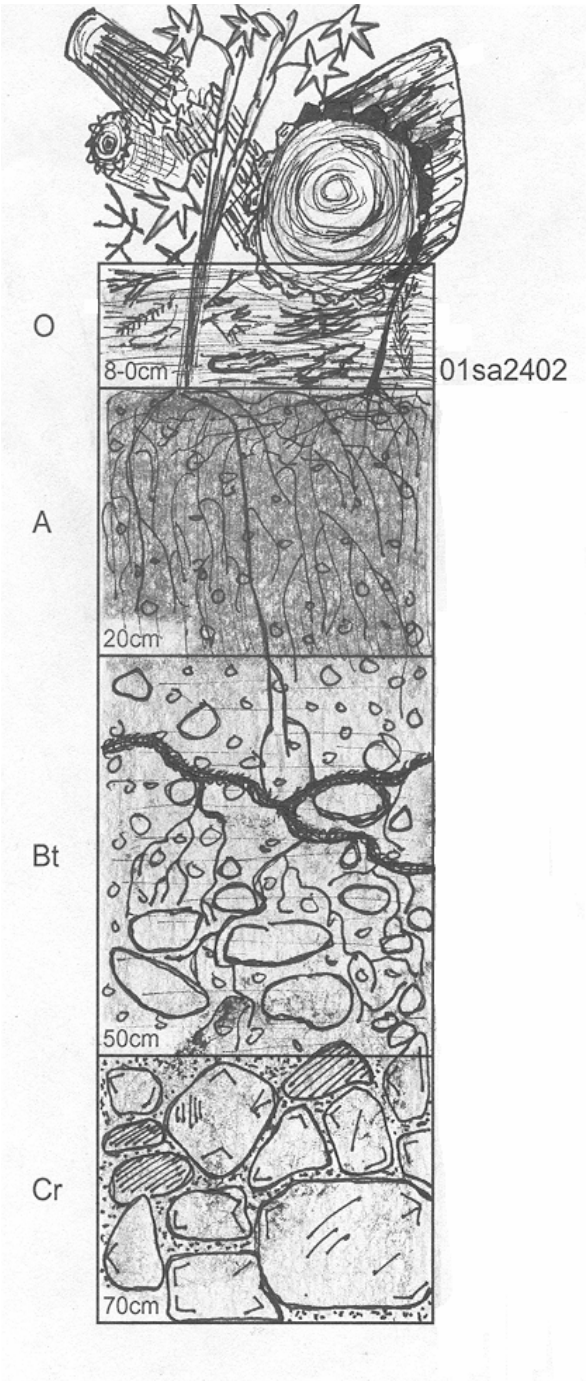
Non-natives: Wall-lettuce was the only exotic species recorded in the sample. It was found on one plot, at less than 1% cover.

Salmonberry-stink currant-*foamflower phase*: thick salmonberry makes streamside travel difficult in the Coast Range.

Soil illustration: RUSP-RIBR-*TITR phase*

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	8					20	
A	20	7.5YR3/1	SiL	gravel	15	15	15
Bt	30	10YR2/2	SiCL	gravel / sm cobble	25 / 10	10	20
Cr			R	cobble / boulder	70	10	15

Total Depth: 50cm. Depth Limit: ~50cm.



At plot 2, just about everything lies below a massive buildup of LWD. Logs criss-cross all over because this stream never has the flash flood energy to clear the debris. Additionally, there are severely steep slopes dumping impossible loads of additional soil and wood on top of this poor tiny watershed stream.

The soil beneath the logjam is in a state of arrested development. An O horizon 8cm thick rests on top of 20cm partly-alluvial A horizon. Lack of disturbance is evident, and salmonberry continues to incorporate the rich organic matter. Under this horizon is a rocky transition to a B, and then to a solidly packed C horizon. The rocks are nearly all colluvial save a minor amount of gravel. However, the stream channel has widened around the debris jam leaving this plot on high ground.

Oplopanax horridum-Ribes bracteosum
Devil's club-stink currant
OPHO-RIBR

N=3 (SBLM 3)

Species	Common name	Constancy %	Typical cover %
Trees-seedlings			
Tsuga heterophylla	Western hemlock	33	8
Abies grandis	Grand fir	33	Tr
Shrubs			
Oplopanax horridum	Devil's club	100	57
Ribes bracteosum	Stink currant	100	42
Herbs			
Oxalis	Sorrel	100	50
Athyrium filix-femina	Lady fern	100	25
Adiantum pedatum	Maidenhair fern	100	7
Tiarella trifoliata	Foamflower	100	7
Galium triflorum	Sweetscented bedstraw	67	3
Tolmiea menziesii	Piggyback plant	67	3
Maianthemum dilatatum	False lily of the valley	33	30
Bromus	Brome species	33	20
Blechnum spicant	Deer fern	33	10
Carex deweyana	Dewey's sedge	33	10
Stachys mexicana	Mexican betony	33	7
Viola glabella	Stream violet	33	5
unknown grass	Grass species	33	5
Chrysosplenium glechomifolium	Water-carpet	33	3
Oenanthe sarmentosa	Waterparsley	33	2
Streptopus amplexifolius	Clasping twistedstalk	33	2
Thalictrum occidentale	Western meadowrue	33	2
Mimulus dentatus	Tooth-leaved monkeyflower	33	Tr
Mitella caulescens	Leafy mitrewort	33	Tr

Elevations: 1120 to 1540 feet (average 1300 feet).

Community: Devil's club-stink currant is a shrub dominated community. In this small sample, it occurred at moderate elevations on Salem BLM Coast Range lands. The herb layer is predominantly sorrel, with plentiful lady fern. Maiden hair fern and foamflower are always present. Sweetscented bedstraw and piggyback plant are frequently present. False lily of the valley, bromes, deer fern, and Dewey's sedge can also be abundant.

<u>Devil's club-stink currant –</u>community: Devil's club and stink currant dominate the shrub layer. Note the typical sorrel and maidenhair fern in the herb layer.

Geomorphic environments: Geomorphic surfaces included annual floodplains and a steep stream bank. Organic layers averaged 3 cm, much less than in the Salmonberry-stink currant group. A layers were silty clay loams or loamy sands (average 12 cm), over sandy clay loam or silty clay loam B horizons (average 18 cm). C horizons were sandy clays or sands in cobbles or gravels. Gley layers, indicating anaerobic conditions, were noted in two of the three soils at an average depth of 28 cm. In those two soils, summer water table was found at an average depth of 60 cm.

Small sample size limits confidence in the full description of this community. Note that salmonberry did not occur in these plots. However, salmonberry was present on other plots on all three locations. Devil's club can indicate well aerated saturated conditions. Maidenhair fern, always present in these plots, also frequently indicates water flowing through the soil profile for much of the year.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	100%
Wetland indicators among dominant species	87% (range 60-100%)

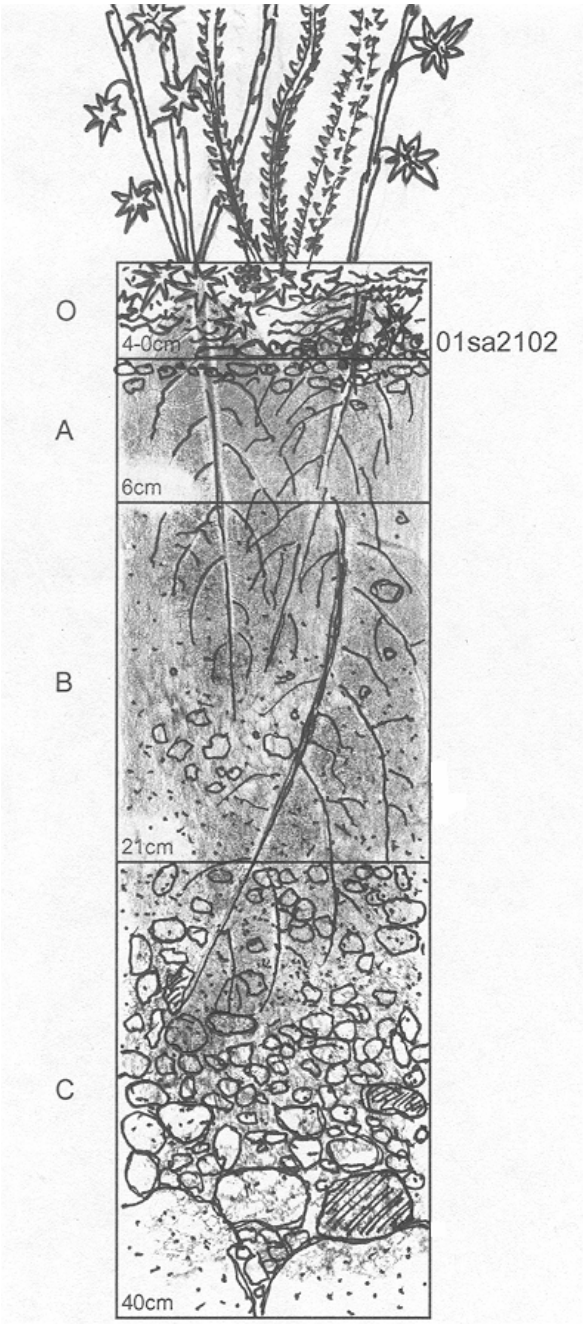
Non-natives: No exotic species were recorded in the sample.

Other studies: This community is somewhat similar to the Devils Club Shrubland Community (OPHO), previously described for the Olympic Experimental State Forest in Chappell (1999), though the Olympic's type has more salmonberry and less lady fern.

Soil illustration: OPHO-RIBR

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	4					20	10
A	6	10YR2/2	SiCL	gravel	12	15	20
B	15	10YR2/2	SCL	gravel	15		15
C	19	7.5YR2.5/2	SC	gravel >1cm / cobble >10 cm	40 / 40	5	12

Total Depth: 40cm. Depth Limit: 40cm.



Fairly common textural transitions here: from A to B to C, the SiCL goes to SCL and then loses the loam to become just SC, which of course then permeates the C horizon as well, as deep as it may go. The C horizon here is actually the **current** streambed that has been covered with relatively shallow alluvial horizons. The side slopes are pretty gradual, meaning perhaps slow erosion of the stream channel, little down-cutting of banks, and not a huge winter flow rate. Very mild flooding that only removes a little OM and soil at a time may also have something to do with there being more gravel on the surface of the plot than within the profile.

***Rubus spectabilis/Tolmeia menziesii-Oxalis* group**
Salmonberry/piggyback plant-sorrel group
RUSP/TOME-OXALI group

Group description followed by descriptions of two phases*: Rubus spectabilis/Tolmeia menziesii-Oxalis-Polystichum munitum* phase and *Rubus spectabilis/Tolmeia menziesii-Oxalis-Mitella ovalis* phase
N=24 (SNF 15, SBLM 5, EBLM 4)

This constancy table is for the entire group combined. The individual phases are then presented separately.

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	38	54
Shrubs			
Rubus spectabilis	Salmonberry	100	32
Acer circinatum	Vine maple	42	31
Sambucus racemosa	Red elderberry	42	26
Vaccinium parvifolium	Red huckleberry	42	1
Herbs			
Tolmiea menziesii	Piggyback plant	100	20
Athyrium filix-femina	Lady fern	100	14
Stachys	Betony species	92	9
Oxalis	Sorrel	88	35
Polystichum munitum	Sword fern	83	15
Galium triflorum	Sweetscented bedstraw	63	3
Stellaria crispa	Crisp sandwort	63	3
Claytonia sibirica	Siberian miner's lettuce	54	2
Tiarella trifoliata	Foamflower	46	8
Mitella ovalis	Oval-leaved mitrewort	42	17
Carex deweyana	Dewey's sedge	42	8
Blechnum spicant	Deer fern	38	6
Adiantum pedatum	Maidenhair fern	38	3
Marah oreganus	Manroot	38	2
Viola glabella	Stream violet	38	1

Elevations: 30 to 1390 feet (average 430 feet).

Community: Salmonberry/piggyback plant-sorrel group is a widespread stream bank/floodplain type dominated by salmonberry. Red alder form an overstory in a third of the plots. Sitka spruce co-occurred with the alder on 3 plots; big leaf maple was found on 3 plots. Red elderberry and vine maple are important associated shrub species. The thick herb layer is dominated by sorrel, ferns and

<u>Salmonberry/piggyback plant-sorrel group</u>: sorrel and sword fern appear through thick salmonberry.

saxifrages. The most common species are piggyback plant, lady fern, betony, sorrel, and sword fern. Oval leaved mitrewort, foamflower, and Dewey's sedge can also be abundant. Other common ferns are deer fern and maidenhair fern.

This group shows extremely heavy wildlife use. Elk browse was noted on many plots to affect cover of salmonberry, sword fern, lady fern, and grasses significantly.

Geomorphic environments: Geomorphic surfaces include active floodplains, stream banks, and low terraces.

Water tables are relatively near the surface. Anaerobic conditions are evident in soil profiles. Gleying is noted in the majority of soil descriptions, at an average 43 cm depth. Depth to water table was 40-94 cm. Several sites showed buried soil; one pit description recorded 5 distinct A horizons. The surface organic horizon averaged 4 cm. A horizon textures are generally silt loams, but can be clay loam or sand. Coarse fragments in the A horizon are very low. B horizons are silt loams, clay loams, sandy clay loams, or loamy sands. B horizon coarse fragments are also generally low (<20 %). Bedrock or cobble streambed is within 1 meter of the surface.

Two phases are described. The Salmonberry/piggyback plant-sorrel-*oval-leaved mitrewort phase* is generally on floodplains and lower banks that are inundated during winter floods. The Salmonberry/piggyback plant-sorrel-*sword fern phase* is found on steep banks/valley walls and low terraces.

Wetland rating:

Community meets wetland test	Yes-both phases
Wetland indicators among dominant species	61% (range 25-100%)

Non-natives: Exotics were recorded in 46% of the plots.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Digitalis purpurea	*Common foxglove*	25	6	1
Holcus lanatus	*Common velvet-grass*	17	4	2
Poa trivialis	*Rough bluegrass*	13	3	1
Stellaria media	*Chickweed*	8	2	1
Ranunculus repens var. repens	*Creeping buttercup*	8	2	Tr
Cirsium arvense	*Canada thistle*	4	1	Tr

***Rubus spectabilis/Tolmeia menziesii-Oxalis-Mitella ovalis* phase**
Salmonberry/piggyback plant-sorrel-*oval-leaved mitrewort phase*
RUSP/TOME-OXALI-*MIOV phase*

N=8 (EBLM 4, SNF 3, SBLM 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	25	50
Shrubs			
Rubus spectabilis	Salmonberry	100	32
Vaccinium parvifolium	Red huckleberry	50	1
Acer circinatum	Vine maple	38	25
Herbs			
Athyrium filix-femina	Lady fern	100	26
Tolmiea menziesii	Piggyback plant	100	7
Oxalis	Sorrel	88	38
Polystichum munitum	Sword fern	88	6
Stachys	Betony species	88	5
Mitella ovalis	Oval-leaved mitrewort	75	23
Tiarella trifoliata	Foamflower	75	9
Stellaria crispa	Crisp sandwort	63	1
Blechnum spicant	Deer fern	50	5
Galium triflorum	Sweetscented bedstraw	50	5
Adiantum pedatum	Maidenhair fern	50	3
Carex deweyana	Dewey's sedge	38	11
Circaea alpina	Enchanter's-nightshade	38	4
Galium aparine	Cleaver	38	4
Hydrophyllum tenuipes	Pacific waterleaf	38	1

Elevations: 100 to 915 feet (average 550 feet).

Community: Salmonberry/piggyback plant-sorrel-*oval-leaved mitrewort phase* is a frequently flooded community of floodplains and low banks. No trees were found within this phase, though overhanging tree canopies can be dense. Salmonberry is the dominant shrub. Vine maple is often abundant. The herb layer is dominated by lady fern, sorrel, and oval-leaved mitrewort. Piggyback plant is always present, but at low cover. Sword fern, foamflower, and betony are important associated species. Dewey's sedge can be abundant. Lady fern cover is almost always higher than sword fern cover, which marks this phase as slightly wetter than the Salmonberry/piggyback plant-sorrel-*sword fern phase*.

Valley cross sections showing RUSP/TOME-MIOV
Beacon creek

Click on a creek name in the table to the left to see valley cross sections that show where RUSP/TOME-OXALI-*MIOV phase* occurs in relation to other plant associations.

Geomorphic environment: The oval-leaved mitrewort phase is on geomorphic surfaces that are flooded annually. They are fairly shallow, averaging 63 cm to bedrock or cobble streambed. Soil textures are fine, generally silt loam A horizons, and silt loam, loamy sand, or sandy clay loam B horizons. Gley layers are common in soil descriptions, at less than 50 cm depth. Summer water tables are within 42-94 cm of the surface. Several pits showed buried soils which are tapped by roots.

The Salmonberry/piggyback plant-sorrel-*oval-leaved mitrewort phase* appears to be too shallow, poorly drained, and too frequently disturbed to support a tree component. However, soil organic material and moisture holding capacity are high.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	75%
Wetland indicators among dominant species	70% (range 50-75%)

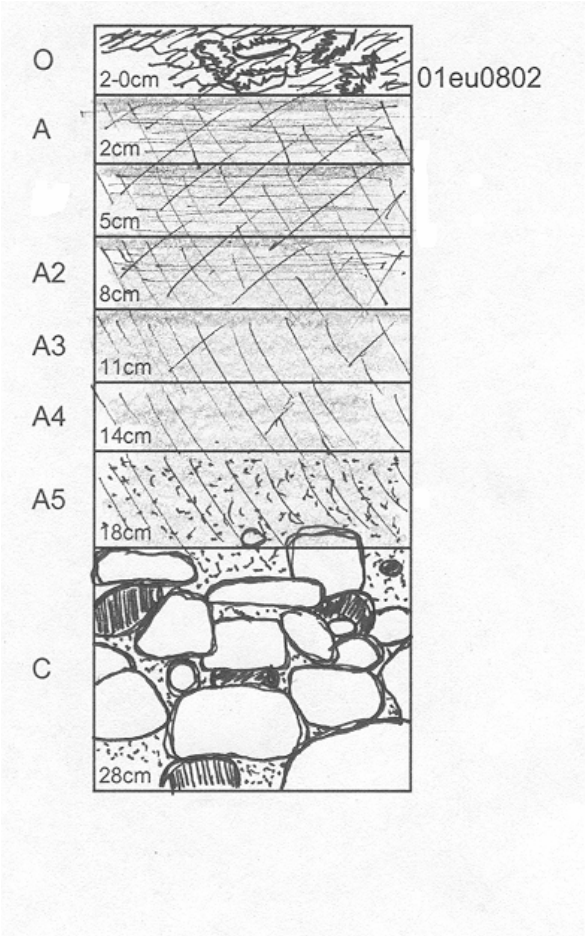
Non-natives: Exotic species were recorded on 25% of the plots.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Digitalis purpurea	*Common foxglove*	13	1	1
Cirsium arvense	*Canada thistle*	13	1	Tr

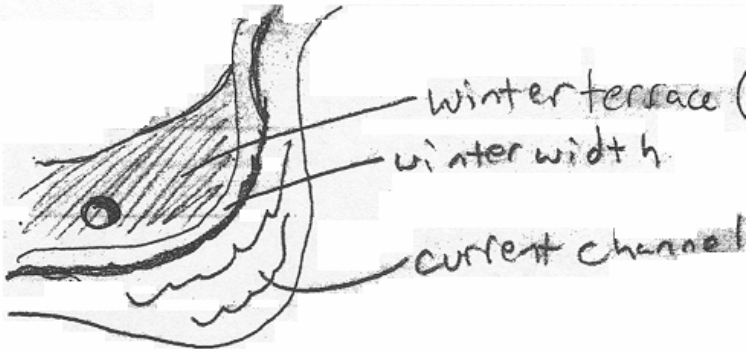
Soil illustration A: RUSP/TOME-OXALI-*MIOV phase*

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O							
A1	2	7.5YR3/2	SiL	gravel	0	15	10
A2	3	7.5YR3/2	SiL	gravel	0	10	10
A3	3	7.5YR3/2	L	gravel	0	10	10
A4	3	7.5YR3/2	L	gravel	0	10	10
A5	4	10YR3/4	LS	gravel	0	10	10
C			R	cobble	70		2

Total Depth: 28cm. Depth Limit: ~28cm.



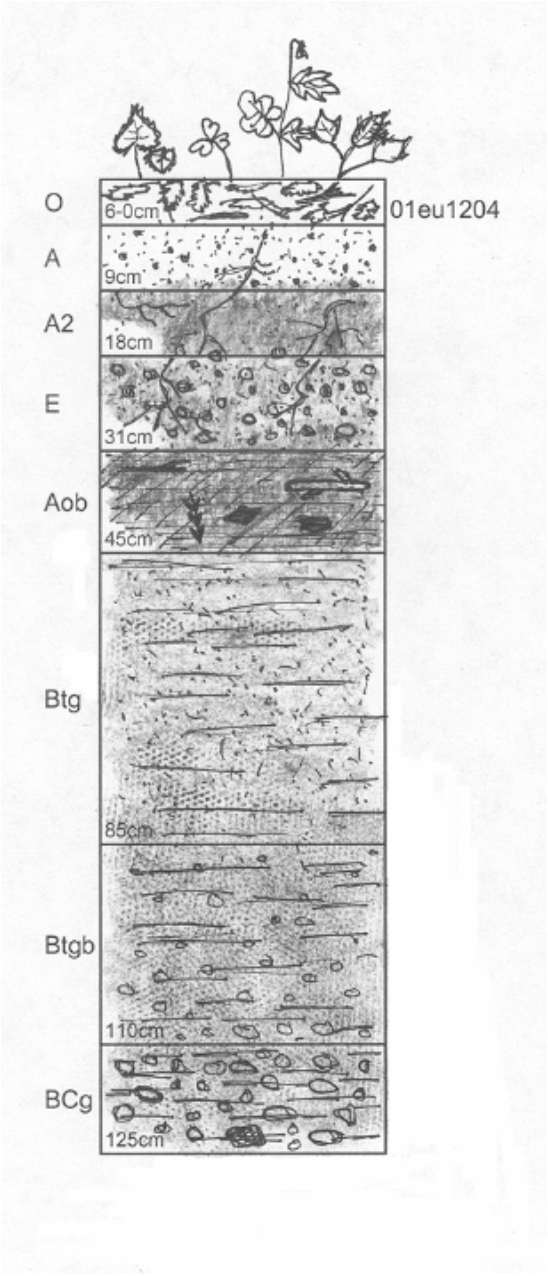
Repeated flood events in recent history have layered at least five discernible A horizons on top of the original streambed. Not enough time has passed for an illuvial B horizon or even an organic A to form. There is a textural transition from silt loam to loam to sandy loam with depth. This is because each individual A horizon is about 3cm thick, and from flood to flood, the textures of old and new sediment deposits intermingle somewhat. None of the layers contain gravel size particles. Color variations depend mainly on the elapsed time between floods; more time elapsed means more organic matter has built up to be washed away and deposited with new fine sediments. The C horizon is obviously an old cobble streambed. The A5 horizon is considerably sandier than other A horizons because of the influence of the C material.



Soil illustration B: RUSP/TOME-OXALI-*MIOV phase*

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	6					20	25
A	9	2.5Y3/2	LS	gravel <.25cm	5	20	8
A2	9	10YR3/1	SiL	gravel	0	15	8
E	13	10YR3/1	LS	md gravel	12	10	5
Aob	14	2.5Y2.5/1	SiCL	gravel	0	8	3
Btg	30	2.5Y3/1	SCL	gravel	0	3	0
Btgb	25	2.5Y3/1	SiCL	gravel	8	0	0
BCg	15	gley2 3/10	SCL	gravel	20	0	0

Total Depth: 115cm. Depth Limit: 115cm. Water Table: 94cm. Gley: 30cm.



(This is an auger hole, so porosity and root density are hard to estimate.) Two A horizons start this profile. The upper is a sandy, light colored, relatively fresh alluvial deposit. The A2 horizon was what would have been the surface if we had sampled some years ago. It is organic and more loamy than sandy and has no clay. An E horizon rounds out the surface strata. It too is a loamy sand with light color, and has some rocks, but overall, nutrients and colored oxides are eluviating from the E horizon into the Aob.

The Aob is a welcome change of pace at this site. Some charcoal and woody debris can be found, organic coloration, and the stinky smell of anaerobic decomposition. These traits, coupled with the obvious overtopping by alluvial gravels in the E horizon, earn this horizon the Aob title. There is no illuvial clay composition, which may have led to a Bt designation. Below the Aob are Btg and BCg horizons. They have variable amounts of gravel, color and stinky anaerobic odors.

***Rubus spectabilis/Tolmeia menziesii-Oxalis-Polystichum munitum* phase**
Salmonberry/piggyback plant-sorrel-*sword fern phase*
RUSP/TOME-OXALI-*POMU phase*

N=16 (SNF 12, SBLM 4)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	44	55
Acer macrophyllum	Big leaf maple	19	37
Picea sitchensis	Sitka spruce	19	28
Trees-seedlings			
Picea sitchensis	Sitka spruce	19	1
Shrubs			
Rubus spectabilis	Salmonberry	100	33
Sambucus racemosa	Red elderberry	56	24
Acer circinatum	Vine maple	44	34
Ribes bracteosum	Stink currant	38	1
Vaccinium parvifolium	Red huckleberry	38	Tr
Herbs			
Tolmiea menziesii	Piggyback plant	100	29
Athyrium filix-femina	Lady fern	100	5
Stachys	Betony species	94	12
Oxalis	Sorrel	88	27
Polystichum munitum	Sword fern	81	22
Claytonia sibirica	Siberian miner's lettuce	75	3
Galium triflorum	Sweetscented bedstraw	69	2
Stellaria crispa	Crisp sandwort	63	4
Marah oreganus	Manroot	50	2
Viola glabella	Stream violet	50	1
Carex deweyana	Dewey's sedge	44	6
Mimulus dentatus	Tooth-leaved monkeyflower	38	2
Mimulus guttatus	Yellow monkeyflower	38	Tr

Elevations: 30 to 1390 feet (average 370 feet).

Community: Salmonberry/piggyback plant-sorrel-*sword fern phase* is dominated by salmonberry, and often red elderberry. Red alder, big leaf maple, and Sitka spruce can establish and survive on these sites. More trees are found in this phase of the Salmonberry/piggyback plant-sorrel group than in the oval-leaved mitrewort phase. The herb layer is dominated by piggyback plant, betony, sorrel and sword fern. Lady fern is always present but at lower cover than sword fern, which is not true for the oval-leaved mitrewort phase of this group.

Wildlife use of this phase can be extreme. Elk browse on some plots was noted to significantly affect cover of salmonberry, sword fern, lady fern, and grasses.

Valley cross sections showing RUSP/TOME-OXALI-POMU
Porter creek
Elk creek

Click on a creek name in the table to the left to see valley cross sections that show where RUSP/TOME-OXALI-POMU occurs in relation to other plant associations.

Salmonberry/piggyback plant-sorrel-*sword fern phase*: moss-draped salmonberry canes shown in foreground, over thick herb layer dominated by piggyback plant. Note red alder bole (center) and western hemlock (upper

Geomorphic environment: Geomorphic surfaces include steep banks and low terraces. Soils are moderately deep (60 to 90 cm), with most profiles above summer water table level. A horizons are silt loams or clay loams 12-20 cm deep over silty clay loams, clay loams or loamy clay B horizons 48 to 55 cm deep. Some profiles showed buried soils. One profile had gleying at 75 cm. Note that the oval-leaved mitrewort phase of the Salmonberry/piggyback plant-sorrel group had shallower depths to anaerobic conditions and/or bedrock, and consistently higher water table.

Higher geomorphic surfaces, predominance of sword fern, and occasional larger trees mark the Salmonberry/piggyback plant-sorrel-*sword fern phase* as somewhat better drained, and less frequently disturbed than the companion oval-leaved mitrewort phase. Salmonberry competition for tree regeneration should be severe. Low constancy of trees, dominance of piggyback plant, presence of betony, trillium-leaved sorrel and tooth-leaved monkeyflower, and locations within periodic high flow zones indicate that this phase can be viewed as a representative of the general Coast Range floodplain type, though at the dry end of the group.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	56%
Wetland indicators among dominant species	56% (range 25-100%)

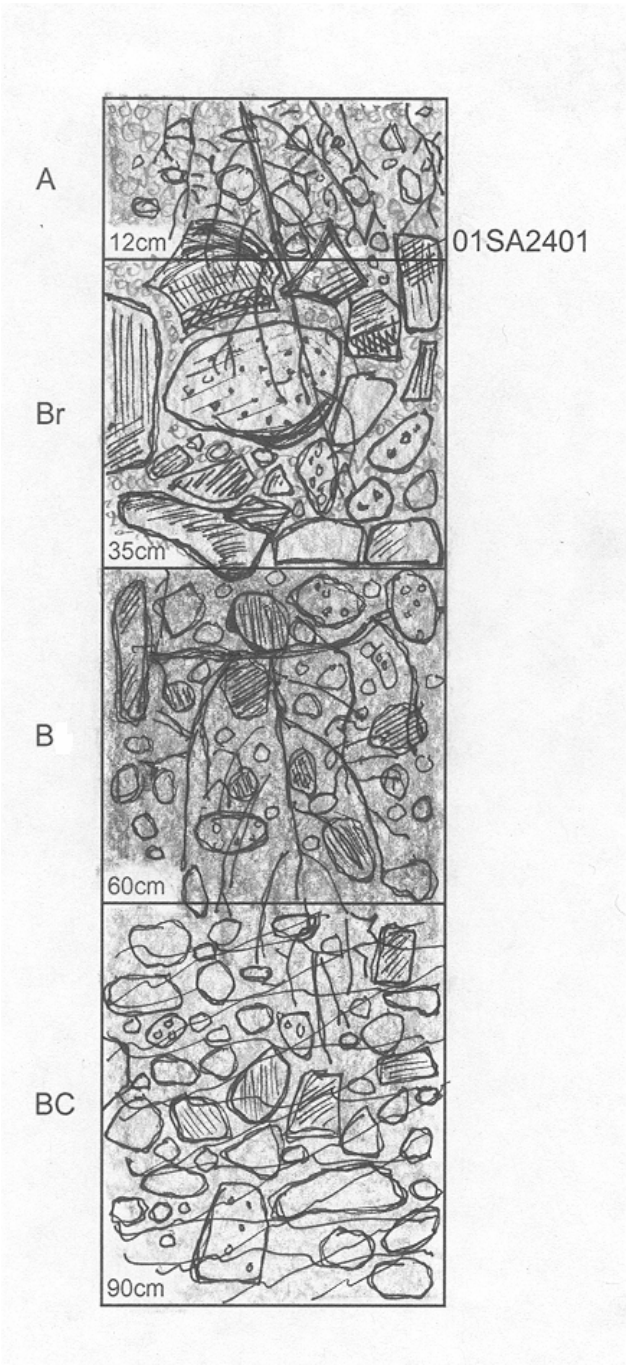
Non-natives: Exotic species were recorded on 56% of the plots.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Digitalis purpurea	*Common foxglove*	31	5	Tr
Holcus lanatus	*Common velvet-grass*	25	4	2
Poa trivialis	*Rough bluegrass*	19	3	1
Ranunculus repens var. repens	*Creeping buttercup*	13	2	Tr
Stellaria media	*Chickweed*	13	2	1

Soil illustration A: RUSP/TOME-OXALI-*POMU phase*

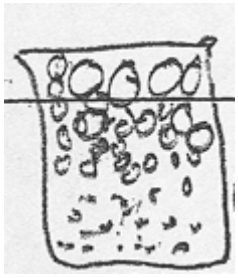
HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
A	12	7.5YR2.5/1	SiCL	gravel	20	25	15
Br	23	7.5YR2.5/1	R	lg cobble / gravel	55 / 15	5	5
B	55	7.5YR3/1	SiCL	sm cobble / md cobble	40 / 15	11	15
BC		7.5YR2.5/2	SiC	gravel / cobble	60	5	5

Total Depth: 100cm. Depth Limit: ~100cm.



Always wondered how those big boulders get down to the stream bank? Welcome to the place those boulders are born. Much like large marbles will eventually jiggle their way to the top of a sifted beaker, so do large colluvial rocks stomp their way faster to the bottom of a steep slope. (100% at this place.) It is a very loose, unstable, thoroughly mixed stack of rocky horizons; almost an inverted profile with rocks on the top and fines on the bottom. Boomer action accentuates the mixing, especially with regard to blurred color shifts and homogenous crumb structure of the A and B horizons.

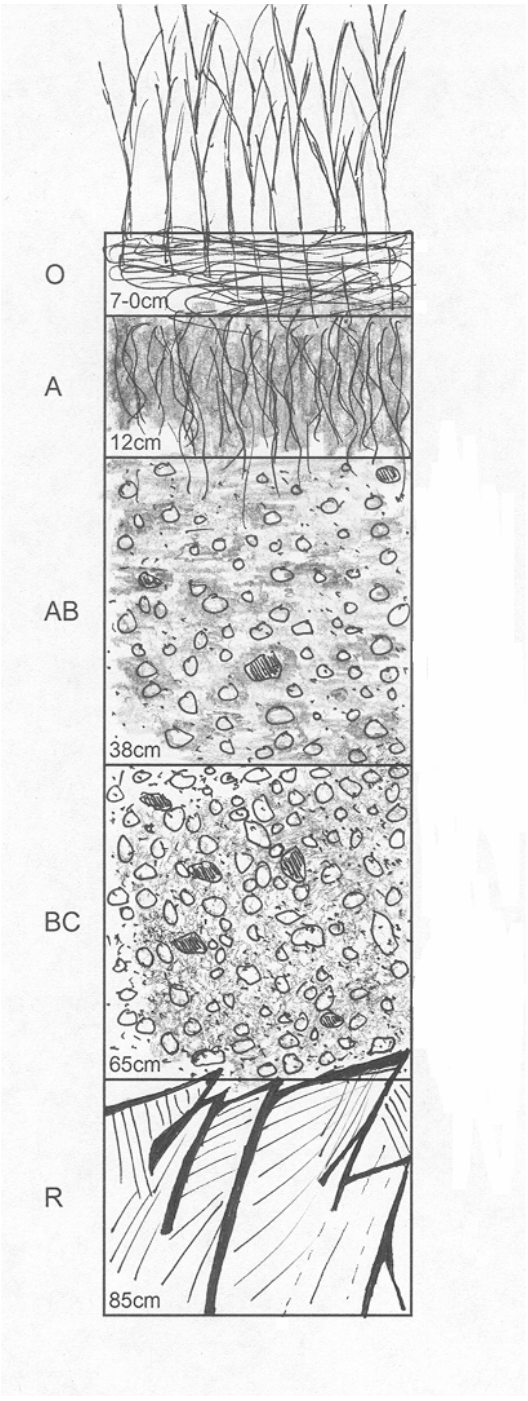
If this theory is correct, the valley will widen, slopes will lessen, rocks will be washed clean, and soils will become more structured and add clay subsurface horizons as the stream channel perpetually seeks stability.



Soil illustration B: RUSP/TOME-OXALI-*POMU phase*

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	7						
A	12	10YR3/3	SiL	gravel	5	10	30
AB	26	10YR4/2	LS	gravel	50	8	20
BC	27	10YR3/1	SC	Gravel	65		
R			R	Rock	100		

Total Depth: 65cm. Depth Limit: 65cm to R. Water Table: 55cm.



Really dense rooting of grass (30%) provides bank stability and organic inputs to the A horizon. 12cm is super deep for a floodplain A horizon, especially above a bedrock channel. Floods here are likely slow moving and involve more deposition than removal, but we can't discount the grass influence or the grazing influence anywhere along this stream. The subsurface flow of water must also be considered – it is variable from plot to plot.

The wet matrix of the AB horizon (12-38cm) is less aerated than the upper soil. Mineral oxidation on the surface of degrading alluvial sandstone gives the horizon a mottled appearance. As gravel composition goes to 65% between 38-65cm, water percolates quickly, leaching out clay and nutrients and leaving "clean" sand behind. No roots are to be found. The sandstone bedrock channel is found at 65cm this time.

Terraces/steep toeslopes

Steep slide areas

Corylus cornuta-Acer circinatum/Oxalis
California hazel-vine maple/sorrel
COCO6-ACCI/OXALI

N=2 (EBLM 2)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Acer macrophyllum	Big leaf maple	50	80
Tsuga heterophylla	Western hemlock	50	40
Shrubs			
Corylus cornuta	California hazel	100	28
Acer circinatum	Vine maple	100	18
Gaultheria shallon	Salal	50	Tr
Herbs			
Oxalis	Sorrel	100	55
Polystichum munitum	Sword fern	100	15
Athyrium filix-femina	Lady fern	100	13
Bromus vulgaris	Colombian brome	100	3
Adenocaulon bicolor	Pathfinder	100	2
Circaea alpina	Enchanter's-nightshade	100	2
Blechnum spicant	Deer fern	50	15
Galium triflorum	Sweetscented bedstraw	50	5
Tiarella trifoliata	Foamflower	50	5
Hydrophyllum tenuipes	Pacific waterleaf	50	3
Equisetum	Horsetail species	50	2
unknown grass	Grass species	50	2
Adiantum pedatum	Maidenhair fern	50	Tr
Asarum caudatum	Wild ginger	50	Tr
Bromus sitchensis	Alaska brome	50	Tr
Streptopus lanceolatus var. curvipes	Rosy twistedstalk	50	Tr
Trillium ovatum	Pacific trillium	50	Tr
Viola	Violet species	50	Tr

Elevations: 840 to 915 feet.

Community: California hazel-vine maple/sorrel occurs under heavy big leaf maple or western hemlock overstories. California hazel is more abundant than vine maple in the small sample. The herb layer is a rich sward of sorrel, sword fern, and lady fern. California brome, pathfinder, and enchanter's nightshade are present at low cover. Deer fern can be abundant.

Substantial deer or elk browse was noted on both plots.

Both plots are from Eugene BLM's South Valley Resource Area, and represent southeasterly samples from the Coast Range. In this low precipitation zone of the Coast Range, salmonberry distribution is much more confined in the riparian areas.

Similar types: This community seems to have some similarity to the Cascades Forested California hazel/sword fern group, though the Coast type lacks most of the warm and dry indicator species present in the Cascades type.

Valley cross sections showing COCO6-ACCI/OXALI
Beacon creek

Click on a creek name in the table to the left to see valley cross sections that show where COCO6-ACCI/OXALI occurs in relation to other plant associations.

Geomorphic environment: Geomorphic surfaces are gently sloping floodplains or terraces. Soils are fairly shallow (54 to 59 cm depth). A horizons are silt loams 5 to 10 cm thick. B horizons are loam or sandy loam 18 to 41 cm deep, over sand/sandstone C layers. One site had mottling (evidence of fluctuating anaerobic conditions) at 46 cm and summer water table at 64 cm. Rooting depth was 50 to 60 cm. The geomorphic surfaces, moderately deep soil, and tree ages (western hemlock 38 years old, big leaf maple 108 years old) suggest that these sites are not frequently reset, though still subject to flood effects.

It is possible that in areas with higher precipitation in the Coast Range, similar geomorphic surfaces and soils would support a salmonberry community, possibly a member of the Salmonberry/piggyback plant-sorrel group.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	0%
Wetland indicators among dominant species	0% (range 50-100%)

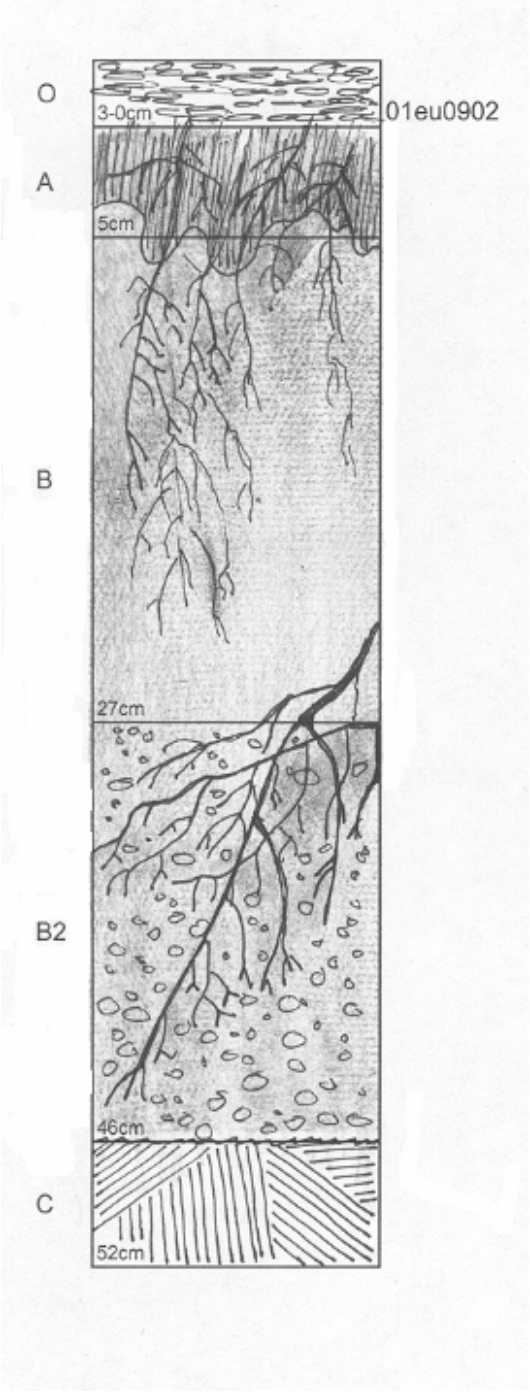
Average proportion of wetland indicators among dominant species was 0%, since the sorrel could not be assigned to species.

Non-natives: No exotics were recorded in the sample.

Soil illustration: COCO6-ACCI/OXALI

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	3					15	10
A	5	10YR3/4	SSiL	gravel	0	10	15
B	22	10YR3/6	SL	gravel	0	10	10
B	19	10YR3/3	SL	sm gravel	10	10	20
B	8		SL	gravel	0	0	0
C			R	bedrock	90	0	0

Total Depth: 75cm. Depth Limit: 75cm. Water Table: 64cm. Mottle: 46cm.



This soil is part of an alluvial floodplain beside a meandering creek. The nature of the creek in this valley is to worm back and forth, across and through the floodplains over time. The history of this particular profile involves a series of large flood events, followed by another string of lower floods that deposited mostly fine materials. Floods in the recent past have mostly affected the opposite bank.

The layer of organic matter here is young and quickly recycled. Very fine sediments tell of marshy conditions in the winter, or of slow moving water that probably flows through the profile as much as over it. The A horizon used to be a sandy loam, but the incorporation of OM has changed it to a “sandy silt loam,” which technically isn’t a word. Nevertheless, sandy silt loams are very common in the Coast mountains.

Two 20cm-deep B horizons are deeper in the profile. They are true sandy loams, and may have been A horizons themselves at one time. Burrowing animals have mixed OM into the B2 horizon, deepening its color. The B2 also contains charcoal and the only gravel in the profile. These are consequences of being the first alluvial horizon piled on top of the rocky C horizon.

Rubus spectabilis/Polystichum munitum
Salmonberry/sword fern
RUSP/POMU

N=25 (SNF 18, EBLM 4, SBLM 3)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	48	46
Acer macrophyllum	Big leaf maple	20	43
Shrubs			
Rubus spectabilis	Salmonberry	100	56
Acer circinatum	Vine maple	68	19
Sambucus racemosa	Red elderberry	60	14
Ribes bracteosum	Stink currant	56	2
Vaccinium parvifolium	Red huckleberry	48	1
Herbs			
Polystichum munitum	Sword fern	100	23
Oxalis	Sorrel	92	21
Stachys	Betony species	84	6
Athyrium filix-femina	Lady fern	84	4
Tolmiea menziesii	Piggyback plant	72	4
Claytonia sibirica	Siberian miner's lettuce	64	1
Galium triflorum	Sweetscented bedstraw	60	2
Stellaria crispa	Crisp sandwort	56	1
Luzula parviflora	Small-flowered wood-rush	44	Tr
Blechnum spicant	Deer fern	40	3
Maianthemum dilatatum	False lily of the valley	40	2
Marah oreganus	Manroot	36	1
Viola glabella	Stream violet	36	Tr

Elevations: 100 to 870 feet (average 450 feet).

Community: The Salmonberry/sword fern community is a common terrace/valley wall type in the Coast Range. Mature red alder are recorded in almost half the plots. Big leaf maple was present in 20%. Conifers, including western hemlock, Sitka spruce, or Douglas fir, were present on 24% of the plots. The group is dominated by extremely dense salmonberry. Vine maple, red elderberry are abundant associated shrubs; stink currant is also present on more than half the sample. Sword fern and sorrel are the dominant herb species. Betony, lady fern, piggyback plant, Siberian miner's lettuce, sweetscented bedstraw and crisp sandwort are common associated species. Saxifrages and lady fern are at very low cover compared to most of the communities closer to the stream channel.

Salmonberry/sword fern community: heavy tree canopy, dense salmonberry, and thick sword fern are typical. Note deep shade even on a sunny summer day.

This community is transitional to upland forested plant associations such as Western

hemlock/salmonberry or Sitka spruce/salmonberry. However, high constancy of such riparian species as stink currant, betony, and lady fern mark it as a streamside type.

Significant elk or deer browse was frequently observed in this community.

Valley cross sections showing RUSP/POMU
N Fork Smith #2
Porter creek
N Trib to Ryder creek
Trib W Fork Deadwood creek
Whittaker creek

Click on a creek name in the table to the left to see valley cross sections that show where RUSP/POMU occurs in relation to other plant associations

Geomorphic environment: Geomorphic surfaces fell into two groups: gentle terraces or steep banks and valley walls. Soils are deep (average 77 cm) well drained loams (silt loams, silty clay loams, sandy loams, and loams), though some had clays in the C horizons. Coarse fragments content was low to moderate, but variable. No anaerobic conditions or high water tables were recorded. These sites had deep, organic rich substrates; rooting conditions are excellent. Most of the geomorphic surfaces are above the zone subject to frequent flooding.

Terraces were most likely to have overstory trees rooted in the plots. Three quarters of the plots with gentle slopes (=<20%) had mature trees. Less than half the steep slopes (>20%) had trees. Tree ages ranged from 21 to 135 years. Mountain beaver burrows were noted on several of the steep plots.

Salmonberry competition can be expected to be severe for any tree regeneration. Light limitation from red alder canopy as well as the salmonberry may also limit conifer establishment and survival.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	48%
Wetland indicators among dominant species	50% (range 17-83%)

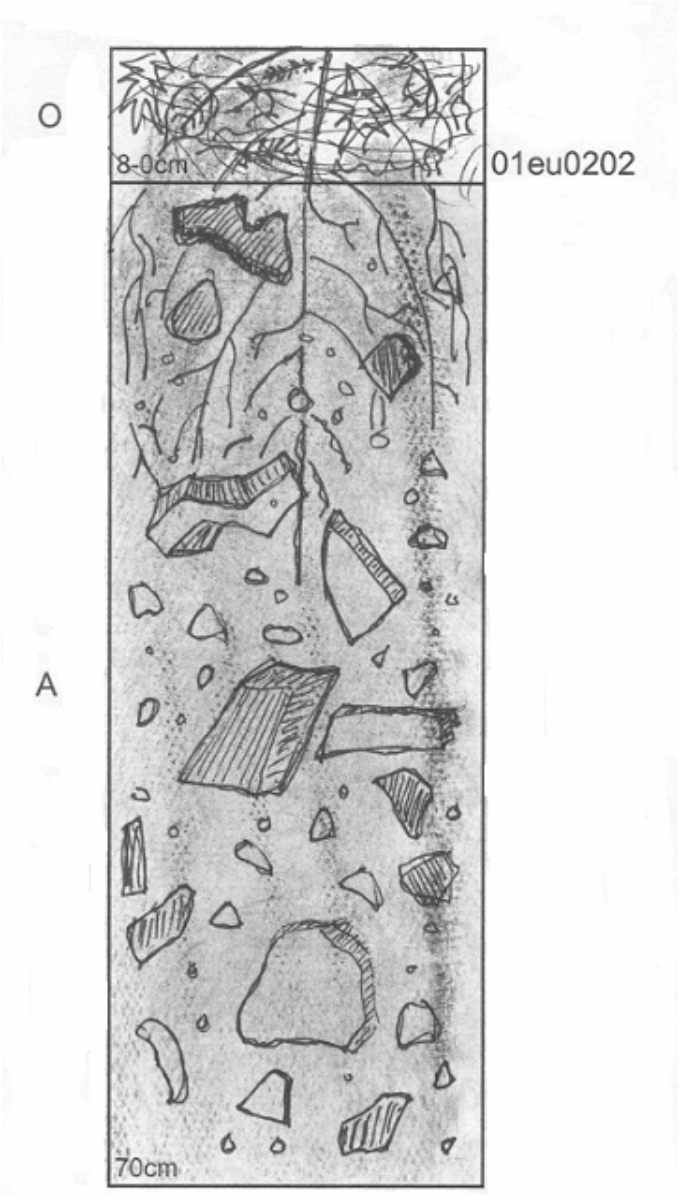
Non-natives: Exotic species were recorded in 7 plots, 28% of the sample. Six grasses or grasslike species were included in the 10 exotic species present.

EXOTIC	COMMON NAME	CONSTANCY %	PLOTS	TYPICAL COVER %
Digitalis purpurea	*Common foxglove*	16	4	1
Phalaris arundinacea	*Reed canarygrass*	8	2	1
Ranunculus repens var. repens	*Creeping buttercup*	8	2	Tr
Lactuca muralis	*Wall-lettuce*	8	2	Tr
Holcus lanatus	*Common velvet-grass*	4	1	12
Agrostis stolonifera	*Creeping bentgrass*	4	1	1
Erechtites minima	*Coastal burnweed*	4	1	Tr
Poa trivialis	*Rough bluegrass*	4	1	Tr
Poa palustris	*Fowl bluegrass*	4	1	Tr
Luzula multiflora ssp. multifl	*Many-flowered wood-rush*	4	1	Tr

Soil illustration A: RUSP/POMU

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	8						15
A	70	10YR3/2	SL	gravel / cobble	20		

Total Depth: 70cm. Depth Limit: ~70cm.

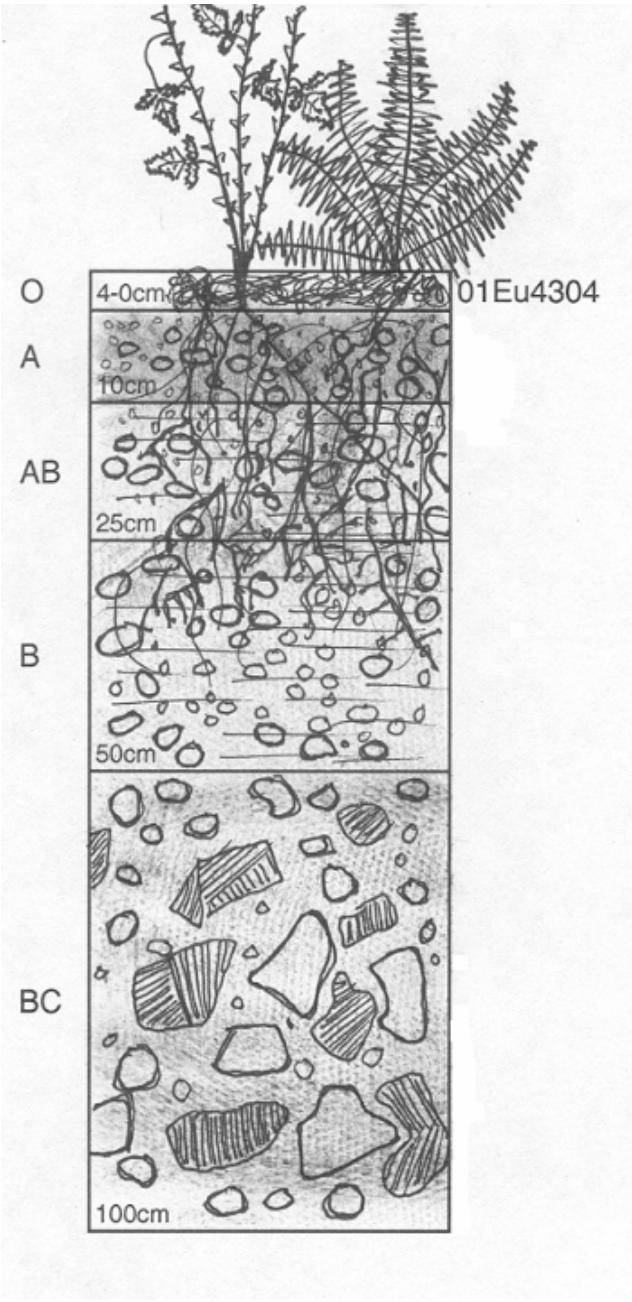


Interesting in its uniformity, this entire 70cm profile is one big horizon put into place by a major landslide. Deep, loose, non-weathered, poorly sorted rocks of all shapes and sizes fit together in an A horizon matrix of 10YR3/2 sandy loam. With an auger, and without all the rocks, it would be nice to keep drilling in the bottom of this pit just to see how deep it really is. It would not be at all surprising to dig right through this toeslope and discover the terrace of Plot 1 buried below. Perhaps after such a massive colluvial input of soil, this slope will be free from mass wasting for a while. The 8cm of organic material currently overtop the site will provide a good start.

Soil illustration B: RUSP/POMU

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	4					15	15
A	10	7.5YR3/1	SiCL	gravel	20	15	20
AB	15	7.5YR4/2	SiC	gravel	15	15	15
B	25	7.5YR3/2	SiC	gravel	20	8	10
BC	50	7.5YR4/2	SiC	gravel / cobble	20 / 40	8	8

Total Depth: 100cm. Depth Limit: ~100cm.



Plot 4 is at the bottom of a 95% south-aspect footslope. Despite the steepness, the formation of clay skins and assorted versions of nice blocky structure throughout the profile show that this soil has been undisturbed for quite some time. A gravelly, red topsoil is commonly found in the Coast. 20% gravel concentration does not seem to impede the roots from being extremely competitive. Roots occupy 20% of the A horizon, 15% of the AB and 10% of the B and BC. (It is common to find about 5% less density in each horizon.) The BC horizon shows its tendency towards sandstone residuum, though 80cm is not nearly deep enough to reach bedrock in this hole. All fragments at this point can still be broken by hand.

Vaccinium alaskaense-Rubus spectabilis
Alaska huckleberry-salmonberry
VAAL-RUSP

N=1 (SBLM 1)

SPECIES	COMMON NAME	TYPICAL COVER %
Shrubs		
Vaccinium alaskaense/Vaccinium ovalifolium	Alaska huckleberry/Oval-leaf huckleberry	85
Rubus spectabilis	Salmonberry	30
Vaccinium parvifolium	Red huckleberry	10
Menziesia ferruginea	Fool's huckleberry	8
Herbs		
Polystichum munitum	Sword fern	65
Blechnum spicant	Deer fern	10
Scoliopus hallii	Slink lily	9
Oxalis trilliifolia	Trillium-leaved sorrel	8
Athyrium filix-femina	Lady fern	7
Boykinia occidentalis	Coastal boykinia	3
Prosartes hookeri	Hooker's fairybells	2
Streptopus amplexifolius	Clasping twistedstalk	2

Elevation: 1200 feet.

Community: This is a single plot which represents a coastal variant of the Cascadian Oval-leaved huckleberry type. The plot is from Salem BLM's Warnicke Creek in the Valley of the Giants area. This area has plant associations that indicate cool, moist environments more similar to some Cascadian conditions than most of the Coast Range (eg Western hemlock/Alaska huckleberry/oxalis-NWO Coast, and Western hemlock/oxalis-vanilla leaf). One other plot from the Warnicke Creek cluster is incorporated in the Cascadian Coastal boykinia-oval-leaved mitrewort description.

The plot occurred under a dense overhanging canopy of western hemlock. The shrubby plot is dominated by Alaska huckleberry. Salmonberry, red huckleberry and fool's huckleberry are also abundant. The lush herb layer is fern dominated, composed mainly of sword fern and deer fern, though lady fern is also present. The most abundant forbs are trillium-leaved sorrel and slink lily.

Geomorphic environment: The plot is on a steep toeslope position. The soil description shows a fairly deep (100cm+) colluvial soil. There is a deep (20cm) O

layer. The A layer is a clay loam, the BA layer is loamy clay, and the Bt horizon

Alaska huckleberry-salmonberry: dense shrubs mark steep bank community. Note that the Coast boykinia-oval leaved mitrewort community is found on the adjacent mossy bedrock surface.

Wetland rating:

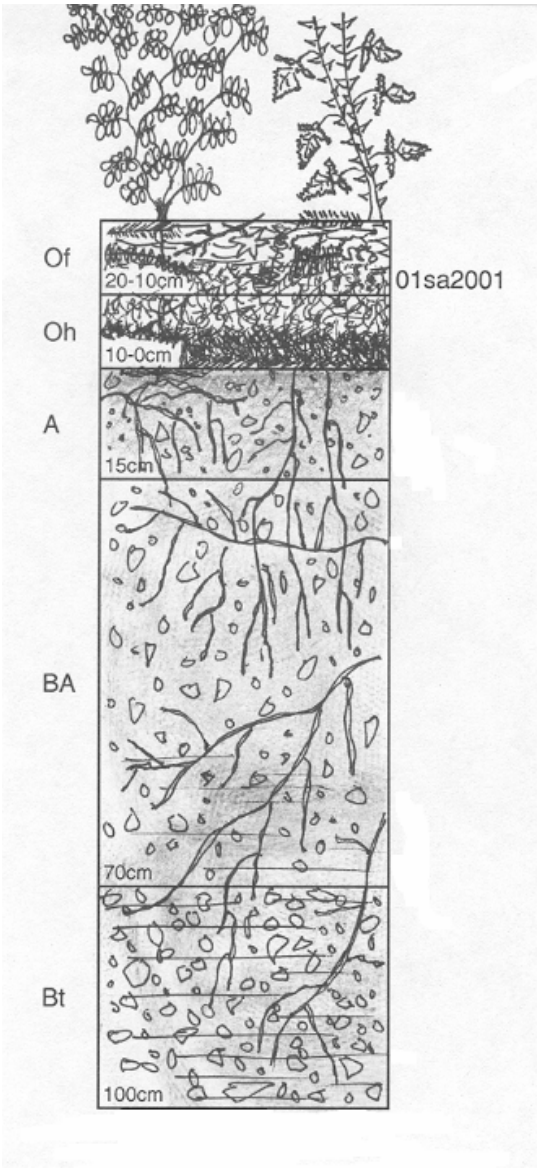
Community meets wetland test	No
Wetland indicators among dominant species	33%

Non-natives: No exotic species were present in the sample.

A single sample can't be used to characterize a community. Instead, it suggests that an undescribed community is likely, and that more samples from similar environments could provide data for a new type.

Soil illustrationVAAL-RUSP

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
Of	10		Fragmented			25	15
Oh	20	7.5YR2.5/2	Humus			25	25
A	15	7.5YR2.5/3	CL	gravel	10	10	20
BA	55	7.5YR2.5/3	LC	gravel	15	8	20
Bt	30	7.5YR3/3	C	Gravel	25	5	10



Total Depth: 100cm. Depth Limit: ?

The O horizon here is pretty remarkable in that it has stratified into litter, fragmented, and humus components. To see pure organic material 20cm deep is certainly uncommon for this field season, and then to see the full spectrum of decomposition as well is just extra cool. To call something an A horizon requires that it be mineral soil. There is such a layer here, and it is a nice, crumby clay loam 15cm thick. Between 15 and 70cm, the soil is in transition to a Bt horizon. It is hard to determine exactly where A → BA → Bt except by noting the textural changes and the greater plasticity of the clay horizons. The color is nearly the same throughout. Gravel increases slightly with depth.

Acer macrophyllum/Corylus cornuta-Rubus spectabilis
Big leaf maple/California hazel-salmonberry
ACMA3/COCO6-RUSP

N=3 (SNF 3)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Acer macrophyllum	Big leaf maple	100	67
Pseudotsuga menziesii	Douglas-fir	67	35
Thuja plicata	Western redcedar	33	35
Rhamnus purshiana	Cascara buckthorn	33	25
Trees-seedlings			
Acer macrophyllum	Big leaf maple	33	5
Thuja plicata	Western redcedar	33	4
Shrubs			
Corylus cornuta	California hazel	100	25
Rubus spectabilis	Salmonberry	100	13
Rhamnus purshiana	Cascara buckthorn	100	1
Vaccinium ovatum	Evergreen huckleberry	67	13
Acer circinatum	Vine maple	67	3
Gaultheria shallon	Salal	67	1
Sambucus racemosa	Red elderberry	67	1
Herbs			
Polystichum munitum	Sword fern	100	65
Galium triflorum	Sweetscented bedstraw	100	Tr
Stachys mexicana	Mexican betony	67	3
Athyrium filix-femina	Lady fern	67	1
Claytonia sibirica	Siberian miner's lettuce	67	1
Marah oreganus	Manroot	67	1
Tellima grandiflora	Fringecup	67	1
Blechnum spicant	Deer fern	67	Tr
Oxalis	Sorrel	67	Tr
Tolmiea menziesii	Piggyback plant	67	Tr

Elevations: 150 to 270 feet (average 230 feet).

Community: Big leaf maple/California hazel-salmonberry is a warm, well drained forested community sampled in the Mapleton Ranger District of the Siuslaw NF. Big leaf maple is the dominant tree species, but Douglas fir and western redcedar can also be present. Cascara buckthorn is sometimes part of the tree canopy. The shrub layer is dominated by California hazel. Salmonberry and red huckleberry are always present. Evergreen huckleberry, vine maple, salal, and red elderberry are common associated shrubs. The herb layer is mainly thick

swordfern. Lady fern and betony are the only other species averaging more than a trace presence. Trees were 28 to 160 years old, though on one site giant maples were too rotten to age. The youngest trees had grown up in a clearing created by a fallen tree.

Valley cross sections showing ACMA3/COCO6-RUSP
N Fork Smith #2
Porter creek

Click on a creek name in the table to the left to see valley cross sections that show where ACMA3/COCO6-RUSP occurs in relation to other plant associations.

Geomorphic environment: Geomorphic surfaces are very steep valley walls/toeslopes or elevated terraces. Soils are silt loams to loams. These sites are either on raised terraces immune to most floods or on steep colluvial valley walls. The main processes controlling vegetation in this community are not fluvial. Salmonberry cover is relatively minor, and other riparian species such as lady fern, piggyback plant, or betony are present but in low abundance. This community is a transitional type, moister than the upslope plant associations but dominated by upland species. Succession to conifers occurs over time, though extremely steep slopes may limit stability.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	0%
Wetland indicators among dominant species	26% (range 20-33%)

Non-natives: Common foxglove was the only exotic species recorded in the sample, at trace cover on only 1 plot.

Rubus spectabilis-Acer circinatum
Salmonberry-vine maple
RUSP-ACCI

N=8 (EBLM 4, SNF 3,, SBLM 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Alnus rubra	Red alder	25	23
Pseudotsuga menziesii	Douglas-fir	25	18
Shrubs			
Rubus spectabilis	Salmonberry	100	51
Acer circinatum	Vine maple	88	43
Vaccinium parvifolium	Red huckleberry	75	5
Sambucus racemosa	Red elderberry	38	7
Rhamnus purshiana	Cascara buckthorn	38	6
Herbs			
Polystichum munitum	Sword fern	100	34
Oxalis	Sorrel	100	15
Athyrium filix-femina	Lady fern	88	11
Adiantum pedatum	Maidenhair fern	50	3
Claytonia sibirica	Siberian miner's lettuce	50	1
Galium triflorum	Sweetscented bedstraw	50	1
Blechnum spicant	Deer fern	38	12
Stachys mexicana	Mexican betony	38	4
Dicentra formosa	Pacific bleedingheart	38	3
Tiarella trifoliata	Foamflower	38	2
Stellaria crispa	Crisp sandwort	38	1

Elevations: 75 to 1230 feet (average 600 feet).

Community: Salmonberry-vine maple is a shrub dominated community found on steep valley walls and toeslopes. Red alder and Douglas-fir occur on only 25% of the plots. Salmonberry and vine maple are co-dominant shrubs. Red huckleberry is common but at low cover. Sword fern is always present and abundant. Lady fern and sorrel are important associated species. Deer fern can be prominent in this type. Note that wet site riparian indicators such as piggyback plant are minor or absent in this community.

Valley cross sections showing RUSP-ACCI
Trib W Fork Deadwood creek
Whittaker creek

Click on a creek name in the table to the left to see valley cross sections that show where RUSP-ACCI occurs in relation to other plant associations.

Geomorphic environment: Geomorphic surfaces are very steep valley walls and cutbanks, averaging 91% slope. Soils are deep and well drained. A horizons are silt loams, silty clay loams, or sandy silts averaging 22 cm thick. AB horizons are sandy loams, silt loams, silty clay loams or clay loams averaging 27 cm. B horizons are silty clays, silt loams, sandy silts or sandy loams, averaging 35 cm. C horizons are found at an average depth of 104 cm. Only one profile showed anaerobic conditions, with mottling at a meter. Coarse fragments above the C horizon in the profile were generally colluvial, rather than alluvial, in origin.

Salmonberry-vine maple: view from across the creek toward steep valley wall. Note person (red vest, lower left) for scale.

Salmonberry competition and slope instability may limit long-term conifer development in this community. On one plot, observers noted that tree regeneration followed creation of an opening from a log falling onto the site. Such events may allow scattered conifers to establish. Some of the largest, oldest conifers in the sample occurred in this community.

Fluvial processes are most likely to affect this community indirectly, if channel changes undercut the over-steepened slopes to cause slides.

Wetland rating:

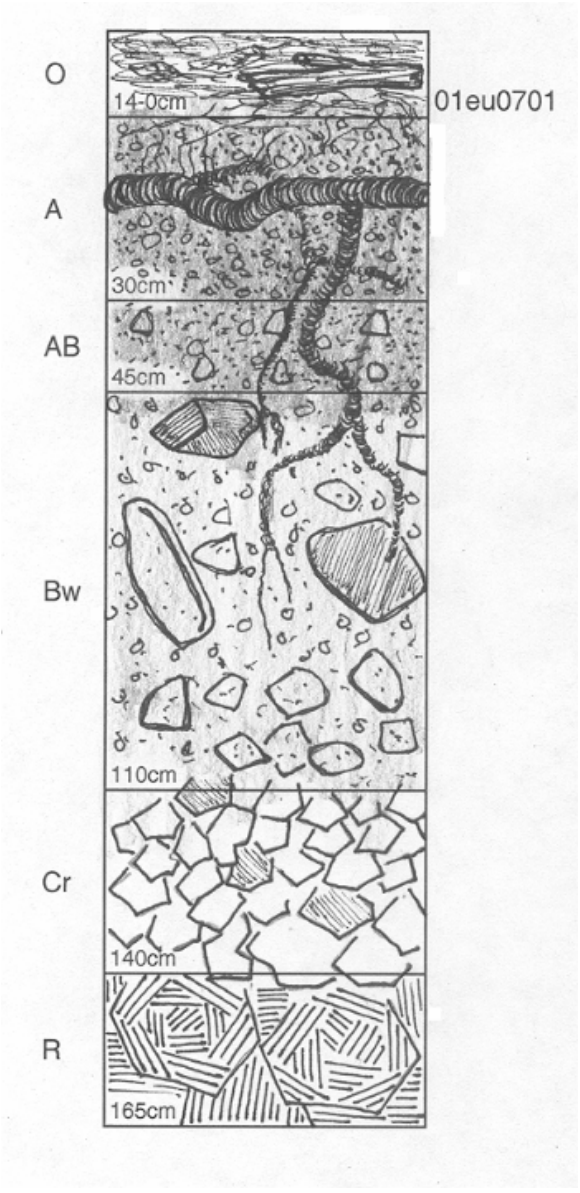
Community meets wetland test	No
Plots meeting wetland criteria	13%
Wetland indicators among dominant species	38% (range 28-67%)

Non-natives: No exotic species were recorded in the sample.

Soil illustration A: RUSP-ACCI

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	14					20	15
A	20	7.5YR3/2	SSi	sm gravel	10	10	10
AB	40	10YR3/2	SL	sm gravel	8	50	2
Bw	40	10YR4/3	SSi	gravel, cobble	50	1	0
Cr	30	10YR4/6	SiCL	cobble	50	1	0
R			R	bedrock	95	0	0

Total Depth: 140cm. Depth Limit: 140cm. Mottle (false): 60cm.



In this region of the south valley, northern aspect slopes erode faster and more steeply than south slopes based on geology (reference section topo map). A comparison of colluvial stability at plots 1 (north aspect) and 4 (south aspect) at this site seems to reinforce this idea.

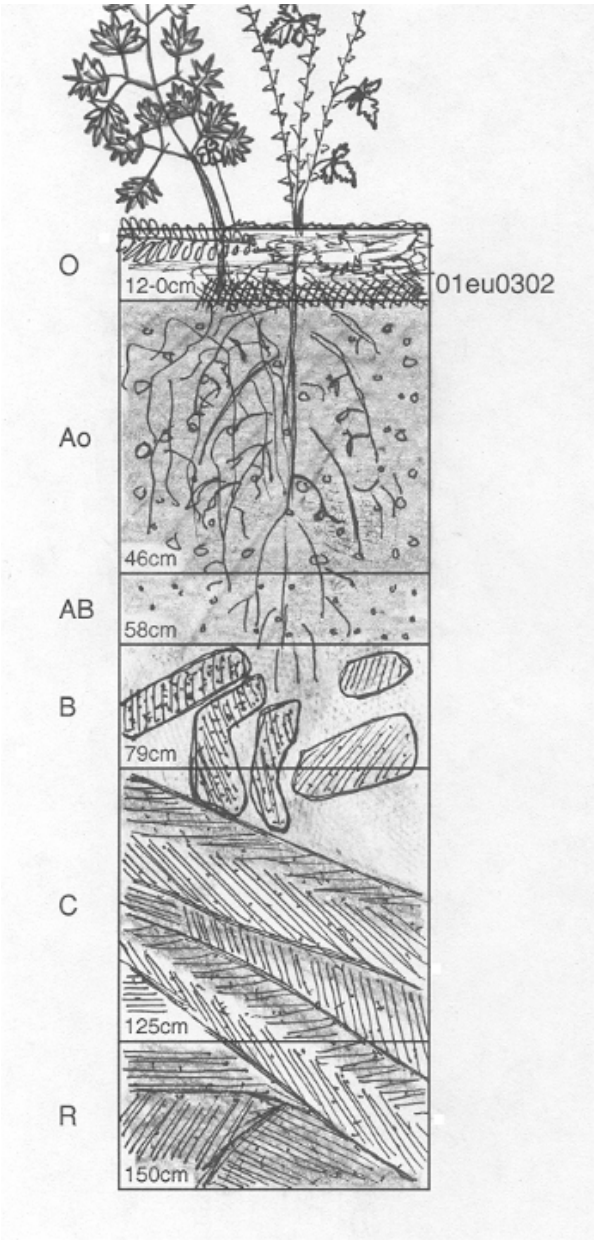
Mass wasting has been the primary profile builder at this plot as evidenced by some pretty big chunky rocks through the profile. Darkening of the A horizon from incorporation of OM does show that colluvial influence has not been particularly recent. Brownish yellow colors of the subsoil is a signal of good aeration despite localized areas of false mottling around sandstone fragments of likely residual nature.

Starting at about 100cm, sandstone residuum is evidently intact. It is very red from iron oxide, and is flecked with mica and siliceous minerals. The material breaks into distinct cubes suggesting largely homogenous stratification.

Soil illustration B: RUSP-ACCI

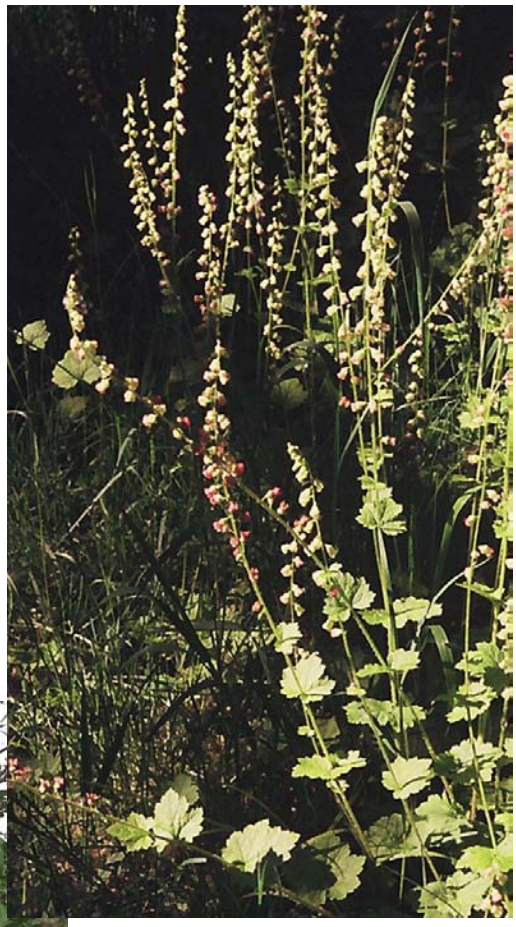
HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	12			gravel	3		
Ao	46	7.5YR2.5/3	SiL	md gravel	10	15	10
AB	12	10YR3/6	SiCL	sm gravel	3	5	10
B	21	10YR3/4	SiCL	md cobble	50		3
C	46		R	boulder	90		1
R			R	bedrock	100		

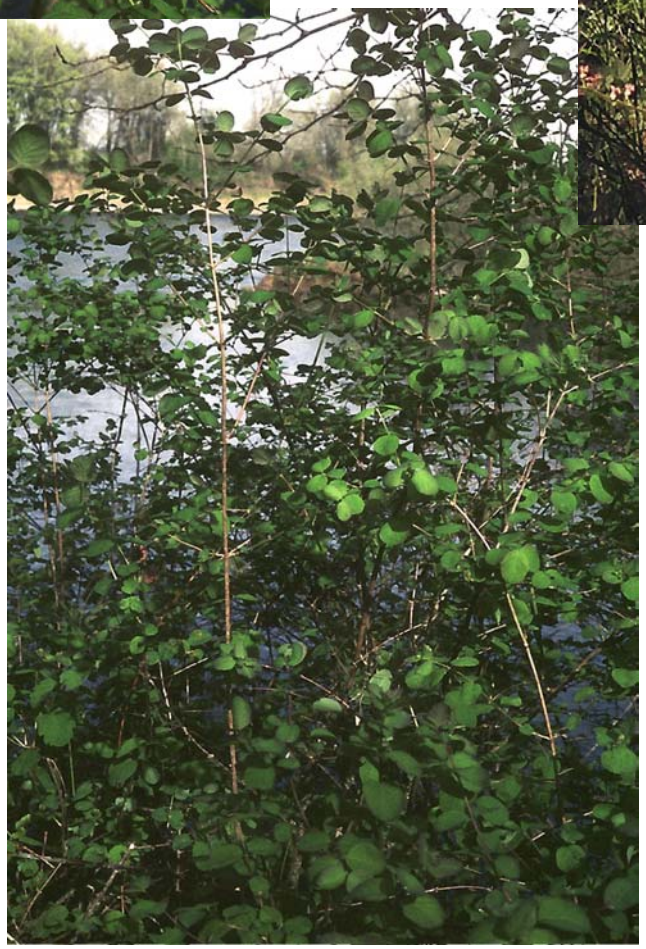
Total Depth: 125cm. Depth Limit: 125cm.



The soil is moist and loose, partly owing to its north aspect and 80% slope. The O horizon is 12cm deep and is much like a red humus layer in many places. Decomposers have blurred the line between the O horizon and mineral soil, and have helped in the formation of an A horizon that is 46cm deep. The A and AB horizons have rich silt loam textures with very little gravel and strong crumb structure. The AB horizon is mostly the same as the A horizon but clays from the B horizon start to mix in, probably helped by minor soil slides and burrowing animals. Silty clay becomes the texture of the B horizon as soil becomes more closely associated with cracks in the sandstone. Baseball size cobbles become common while voids and root concentrations dwindle near 80cm. Below 80cm, the sandstone parent material becomes obvious. Residual cobbles and boulders have not yet been disturbed by colluvial events, and the “strike and dip” of the bedrock is very apparent.

Willamette Valley





Top left: Indian plum
Top right: fringecup
Lower center: common snowberry
Willamette River in background.

Willamette Valley key

A. Scouring rush the dominant herb under black cottonwood overstory
..... **Black cottonwood/scouring-rush** p. 256

B. Starry false Solomon's seal the dominant herb

1. Common snowberry the dominant shrub under hardwood overstory
.....**Forested common snowberry/starry false Solomon' seal** p. 281

2. Snowberry absent or minor, western redcedar dominant overstory species
.....**Western redcedar/starry false Solomon's seal** p. 285

C. Salmonberry dominant or co-dominant shrub under hardwood overstory

1. Common snowberry present (>trace).....
(Black cottonwood-Oregon ash)/salmonberry-common snowberry
p. 271

2. Common snowberry absent
..... **Hardwood/salmonberry/Pacific waterleaf** p. 269

D. Common snowberry the dominant shrub, salmonberry absent or minor; under hardwood overstory

1. Starry false Solomon's seal the dominant herb
.....**Forested common snowberry/starry false Solomon' seal** p. 281

2. Common camas the dominant herb under Oregon ash overstory
..... **Oregon ash/common snowberry/common camas** p. 283

3. Nettle and/or Pacific waterleaf together>5%
.....**Common snowberry/nettle group** p. 259

a. Indian plum>5% .....
Common snowberry-nettle*-(Big leaf maple-black cottonwood)/ Indian plum phase* p. 265

b. Oregon ash an overstory dominant, red elderberry dominant or co-dominant shrub .....
Common snowberry-nettle-*Oregon ash/red elderberry-California hazel phase* p. 261

c. Common snowberry the dominant shrub, or co-dominant with California hazel .....
Common snowberry-nettle*-(Big leaf maple-black cottonwood)/ California hazel phase* p. 263

4. Nettle and Pacific waterleaf absent, herb layer sparse, trailing blackberry generally present

a. Oregon ash or Oregon white oak overstory, slough sedge absent or minor....**(Oregon ash-Oregon white oak)/common snowberry** p. 274

b. Big leaf maple and/or black cottonwood overstory .....**Big leaf maple/common snowberry** p. 279

5. Nettle and Pacific waterleaf absent, slough sedge >20% under Oregon ash overstory
.....*Fraxinus latifolia/Symphoricarpus albus* Association (Christy p. 27)

E. California hazel dominant shrub under hardwood overstory

1. Common snowberry>5% .....
Common snowberry-nettle*-(Big leaf maple-black cottonwood)/ California hazel phase* p. 263

2. Common snowberry <5% .....
(Oregon ash-black cottonwood)/California hazel/Pacific waterleaf p. 257

F. Red elderberry dominant shrub, common snowberry also important shrub species, Oregon ash an overstory dominant, nettle and/or Pacific waterleaf >5% .....
Common snowberry-nettle-*Oregon ash/red elderberry-California hazel phase* p. 261

G. Shrubs absent or trace, nettle >50, big leaf maple and/or alder overstory ..... **(Big leaf maple-alder)/nettle** p. 254

H. Douglas spiraea >10%, and dominant shrub

1. Douglas spiraea the dominant shrub under Oregon ash .....*Fraxinus latifolia/Spiraea douglasii* Association (Christy p. 26)

2. Douglas spiraea thicket without tree canopy .....*Spiraea douglasii* Association (Christy p. 58)

I. Red osier dogwood dominant shrub under black cottonwood overstory, jewelweed often dominant herb .....
Populus balsamifera ssp. *trichocarpa/Cornus sericea, Impatiens capensis* Association (Christy p. 32)

J. Willow shrub swamp

1. Hooker willow shrub swamp, slough sedge often important herb .....*Salix hookeriana-(Salix sitchensis)* Association (Christy p. 53)

2. Pacific willow shrub swamp.....
Salix lucida ssp. *lasiandra/ Urtica dioica* ssp. *gracilis* Association (Christy p. 55)

3. Sitka willow dominant, with skunk cabbage and/or aquatic sedge the dominant herbs .....*Salix sitchensis* complex (Christy p. 57)

K. Oregon ash overstory above sedge dominated herb layer

1. Douglas spiraea <=10% but most abundant shrub, aquatic sedge >=20% and dominant herb under Oregon ash overstory
   ...*Fraxinus latifolia/Carex aquatilis var. aquatilis* Association (Christy p. 23)

2. Dewey sedge and/or spreading rush dominant herbs under Oregon ash overstory, trailing blackberry and Douglas spiraea may be present.....
   Fraxinus latifolia/Carex deweyana-Urtica dioica ssp. gracilis Association (Christy p. 24)

3. Slough sedge >=20% and dominant herb under Oregon ash overstory, trailing blackberry, Douglas spiraea, and common snowberry may be present..... *Fraxinus latifolia/Carex obnupta* Association (Christy p. 25)

For more herb-dominated communities (aquatic beds, emergent marshes, marshes, fens/peatlands, or wet prairies), see herbaceous wetlands key (Christy pp. 18-20).

For more shrub-dominated communities (shrub swamps), see shrubland wetlands key (Christy p. 15-17).

For more tree-dominated communities (forested swamps), see forest and woodlands wetlands key (Christy p. 13-14).

Willamette Valley

A note on alder: Both white alder (*Alnus rhombifolia*) and red alder (*Alnus rubra*) are present in riparian areas of low elevations of the central and southern Willamette Valley. The two species have similar appearance, and can grow right next to each other. Red alder is found at slightly higher elevations along the valley margin and in the NW Oregon Cascades and Coast Range. No white alder was recorded in the Willamette Valley plots; only 6 of the sites sampled had alder. Unfortunately, it is not possible to tell if the two alder species were not distinguished in the field. Field visits in 2004 to the three most northerly alder sites showed only red alder present. Whether the same is true in the more southerly Willamette Valley riparian zones is uncertain. Therefore, most references in the Willamette Valley section have been generalized to *Alnus*/Alder.

(***Acer macrophyllum-Alnus)/Urtica dioica***
(Big leaf maple-alder)/nettle
(ACMA3-ALNUS)/URDI

N=6 (Willamette Valley 6)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees			
Acer macrophyllum	Big leaf maple	50	100
Alnus	Alder	50	62
Shrubs			
Sambucus racemosa	Red elderberry	50	1
Herbs			
Urtica dioica ssp. gracilis	Nettle	100	76
Hydrophyllum tenuipes	Pacific waterleaf	100	44
Carex deweyana	Dewey's sedge	83	7
Tellima grandiflora	Fringecup	67	9
Galium aparine	Cleaver	67	8
Claytonia sibirica	Siberian miner's lettuce	33	5
Equisetum arvense	Common horsetail	33	4
Stellaria calycantha	Northern starwort	33	Tr

Elevations: less than 600 feet.

Community: (Big leaf maple- alder)/nettle is a deciduous forested floodplain community of the Willamette Valley. The overstory can be either big leaf maple or alder. Black cottonwood and Oregon ash can also occur. With Oregon ash, the forb component has more wet indicator species. The shrub layer is sparse; red elderberry is the most typical species, though at trace amounts, and in only half the plots. The understory is a thick herbaceous layer dominated by nettle and Pacific waterleaf. Dewey's sedge, fringecup, and cleaver are common associated species.

Pacific waterleaf and nettle in early spring.

Geomorphic environment: Environmental data for this type are minimal. Sites were classed as floodplain forests. Two plots are from Clackamas County (Willamette and Clackamas Rivers), two plots from Marion

County (Mill Creek), and two from Polk County (Luckiamute River). The plots ranged from 0 to 15 feet above summer flow (average 6 feet), and from 0 to 200 feet from the main channel (average 52 feet).

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	33%
Wetland indicators among dominant species	44% (range 10-75%)

Non-natives: Orchard grass was the only exotic species found on one plot in the sample.

Populus trichocarpa/Equisetum hyemale
Black cottonwood/scouring-rush
POBAT/EQHY

N=5 (Willamette Valley 5)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees			
Populus trichocarpa	Black cottonwood	80	66
Alnus	Alder	40	42
Acer macrophyllum	Big leaf maple	40	33
Shrubs			
Symphoricarpos albus	Common snowberry	40	5
Acer circinatum	Vine maple	40	4
Rubus ursinus	Trailing blackberry	40	1
Herbs			
Equisetum hyemale	Scouring-rush	100	64
Polystichum munitum	Sword fern	80	13
Urtica dioica ssp. gracilis	Nettle	40	2

Elevations: average 480 feet.

Community: Black cottonwood/scouring-rush is a forested floodplain community of the Willamette Valley. The overstory is most often black cottonwood and/or alder or big leaf maple, but alder can be the only tree species present. Grand fir and Douglas fir were also recorded on one plot. The shrub layer is generally sparse, with common snowberry, vine maple, and trailing blackberry present at low cover on 40% of the samples. The herb layer is a dense sward of scouring-rush with sword fern. Nettle is also present on 40% of the plots.

Geomorphic environment: One site was in Yamhill County (Willamette River), and 4 sites were in Marion County (North Santiam River-Geren Island). The sampling ecologist noted locations as temporarily flooded higher terraces near the large rivers, such as the Willamette and North Santiam. Plots averaged 20 feet above the main channel, and were from 200-500 feet from the main channel. No soils data are available.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	20%
Wetland indicators among dominant species	49% (range 40-75%)

Non-natives: No exotic species were recorded in the sample.

(***Fraxinus latifolia-Populus trichocarpa)/Corylus cornuta/Hydrophyllum tenuipes***
(Oregon ash-black cottonwood)/California hazel/Pacific waterleaf (FRLA-POBAT)/COCO6/HYTE

N=5 (Willamette Valley 5)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees			
Fraxinus latifolia	Oregon ash	40	83
Populus trichocarpa	Black cottonwood	40	70
Acer macrophyllum	Big leaf maple	20	25
Shrubs			
Corylus cornuta	California hazel	100	50
Oemleria cerasiformis	Indian plum	60	8
Rubus spectabilis	Salmonberry	60	1
Symphoricarpos albus	Common snowberry	40	2
Sambucus racemosa	Red elderberry	40	1
Acer circinatum	Vine maple	40	1
Herbs			
Hydrophyllum tenuipes	Pacific waterleaf	100	75
Galium aparine	Cleaver	60	Tr
Carex deweyana	Dewey's sedge	60	Tr
Urtica dioica ssp. gracilis	Nettle	40	5
Stachys cooleyae	Cooley's betony	40	3
Athyrium filix-femina	Lady fern	40	1
Claytonia sibirica	Siberian miner's lettuce	40	1
Tellima grandiflora	Fringecup	40	Tr

Elevations: less than 600 feet.

Community: (Oregon ash-black cottonwood)/California hazel/Pacific waterleaf is generally a forested floodplain community of the Willamette Valley. The overstory is dominated by Oregon ash, black cottonwood, or sometimes big leaf maple. One plot did not have a tree overstory. California hazel is the dominant shrub, though Indian plum and salmonberry are common associated species. Common snowberry, red elderberry, and vine maple occur in 40% of the plots, at low cover. Ninebark can be abundant. The herb layer is a carpet of Pacific waterleaf, with cleaver and Dewey's sedge as common associates. Nettle and Cooley's betony are also often present.

Similar types: This type seems somewhat wetter than the strongly related Common snowberry/nettle group: (*Oregon ash/red elderberry-California hazel phase* and *(Big leaf maple-black cottonwood)/California hazel phase*). (Oregon

ash-black cottonwood)/California hazel/Pacific waterleaf has less trailing blackberry, red elderberry, common snowberry and nettle, and more California hazel, Indian plum, and Pacific waterleaf.

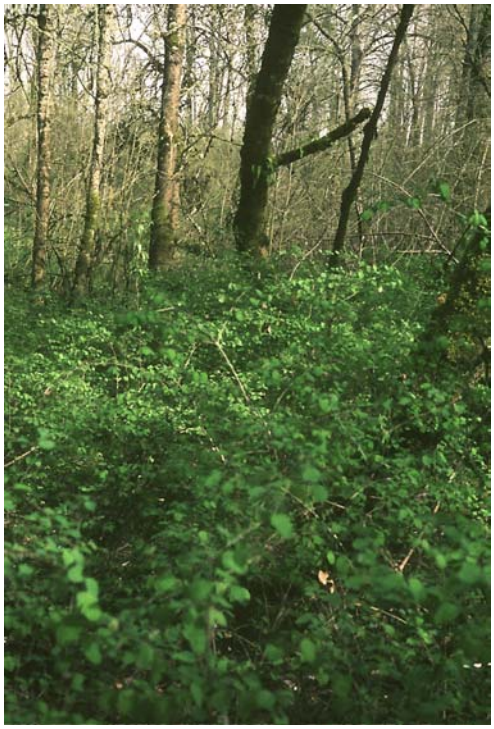
Geomorphic environment: Environmental data for this type are minimal. Sites were classed as floodplain forests, slough or shrub. Three plots are from Clackamas County (Willamette River, Pudding River, Eagle Creek), two plots from Marion County (Willamette River).The plots ranged from 3 to 21 feet above summer flow (average 13 feet), and from 9 to 500 feet from the main channel (average 232 feet).

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	0%
Wetland indicators among dominant species	31% (range 17-50%)

Non-natives: Reed canary grass was the only exotic recorded in the sample. It was present in trace amounts on one plot. Field notes suggest that similar habitats often contain more reed canarygrass, but were purposely excluded from the sample.

Forested *Symphoricarpos albus/Urtica dioica* group
Forested common snowberry/nettle group
Forested SYAL/URDI group



Group constancy table followed by descriptions for three phases: *Symphoricarpos albus/Urtica dioica-Fraxinus latifolia/Sambucus racemosa-Corylus cornuta* phase, *Symphoricarpos albus/Urtica dioica-(Acer macrophyllum-Populus trichocarpa)/Sambucus racemosa-Corylus cornuta* phase and *Symphoricarpos albus/Urtica dioica-(Acer macrophyllum-Populus trichocarpa)/Sambucus racemosa-Oemlaria cerasiformis* phase

N=34 (Willamette Valley 34)

Oregon ash, big leaf maple, and black cottonwood over common snowberry. Willamette River.

Constancy table for the group as a whole:

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees			
Acer macrophyllum	Big leaf maple	65	70
Populus trichocarpa	Black cottonwood	38	58
Fraxinus latifolia	Oregon ash	26	46
Shrubs			
Symphoricarpos albus	Common snowberry	91	37
Sambucus racemosa	Red elderberry	50	9
Corylus cornuta	California hazel	41	15
Rubus ursinus	Trailing blackberry	38	12
Herbs			
Oemleria cerasiformis	Indian plum	38	8
Urtica dioica ssp. gracilis	Nettle	88	39
Hydrophyllum tenuipes	Pacific waterleaf	85	32
Galium aparine	Cleaver	50	1
Carex deweyana	Dewey's sedge	47	3
Claytonia sibirica	Siberian miner's lettuce	44	14

Community: The Common snowberry/nettle group is the most commonly sampled type in the communities from the Willamette Valley.

Wetland rating:

Community meets wetland test?	No-none of the 3 phases

Nettle with stringlike flowers along Willamette River trail. Stinging nettle is a menace for summer adventurers on the floodplain.

Himalayan blackberry has invaded this Oregon ash-big leaf maple/common snow-berry community. This is typical of many sites on floodplains in the Willamette Valley.

***Symphoricarpos albus/Urtica dioica-Fraxinus latifolia/Sambucus racemosa-Corylus cornuta* phase**
Common snowberry/nettle-*Oregon ash/red elderberry-California hazel phase*
SYAL/URDI-*FRLA/SARA2-COCO6 phase*

N=7 (Willamette Valley 7)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees			
Fraxinus latifolia	Oregon ash	100	44
Alnus	Alder	29	60
Shrubs			
Sambucus racemosa	Red elderberry	100	15
Corylus cornuta	California hazel	57	16
Symphoricarpos albus	Common snowberry	57	13
Rubus ursinus	Trailing blackberry	43	31
Acer circinatum	Vine maple	29	42
Crataegus douglasii	Black hawthorn	29	30
Rubus spectabilis	Salmonberry	29	2
Herbs			
Urtica dioica ssp. gracilis	Nettle	100	51
Hydrophyllum tenuipes	Pacific waterleaf	71	53
Tellima grandiflora	Fringecup	57	14
Carex deweyana	Dewey's sedge	57	8
Athyrium filix-femina	Lady fern	29	2
Claytonia sibirica	Siberian miner's lettuce	29	1
Tolmiea menziesii	Piggyback plant	29	1
Marah oreganus	Manroot	29	1
Cardamine oligosperma	Little western bitter-cress	29	Tr
Polystichum munitum	Sword fern	29	Tr

Elevations: less than 600 feet.

Community: Common snowberry/nettle-*Oregon ash/red elderberry-California hazel phase* is a forested floodplain community of the Willamette Valley. The overstory is Oregon ash, often with alder and occasionally Oregon white oak. The shrub layer is dominated by red elderberry, with California hazel, common snowberry, and trailing blackberry as the most common associated species. Trailing blackberry can be abundant. The herb layer generally has nettles and Pacific waterleaf in high abundance. Fringecup and Dewey's sedge also occur in over half the plots.

Geomorphic environment: Environmental data for this type are minimal. Sites were classes as floodplain forests (79%) or sloughs (21%). Half the samples were from the mainstem Willamette River. Surface clay deposits were noted on 2 plots. Four plots are from Marion County, two plots each from Benton, Clackamas, Polk, and Yamhill Counties, and 1 plot from Linn County. The plots ranged from 1 to 21 feet above summer flow (average 12 feet), and from 0 to 500 feet from the channel (average 117 feet).

Similar types: This phase of the Common snowberry/nettle group has lower and less constant snowberry cover than the Big leaf maple-black cottonwood phase. With the overstory of Oregon ash and alder, it indicates a slightly wetter environment.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	14%
Wetland indicators among dominant species	41% (range 20-80%)

Non-natives: The only exotic species recorded was creeping buttercup, present on one plot.

Elderberry blossoms on the floodplain of the Willamette River.

***Symphoricarpos albus/Urtica dioica -(Acer macrophyllum-Populus trichocarpa)/Corylus cornuta* phase**
Common snowberry/nettle-*(Big leaf maple-black cottonwood)/California hazel phase*
SYAL/URDI-*(ACMA3-POBAT)/COCO6 phase*

N=13 (Willamette Valley 13)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees			
Acer macrophyllum	Big leaf maple	69	75
Populus trichocarpa	Black cottonwood	54	64
Shrubs			
Symphoricarpos albus	Common snowberry	100	42
Corylus cornuta	California hazel	62	16
Rubus ursinus	Trailing blackberry	62	7
Sambucus racemosa	Red elderberry	62	5
Rubus spectabilis	Salmonberry	38	3
Herbs			
Urtica dioica ssp. gracilis	Nettle	92	41
Hydrophyllum tenuipes	Pacific waterleaf	85	33
Carex deweyana	Dewey's sedge	38	1
Galium triflorum	Sweetscented bedstraw	31	11
Claytonia sibirica	Siberian miner's lettuce	31	Tr

Elevations: less than 600 feet.

Community: Common snowberry/nettle-*(Big leaf maple-black cottonwood) California hazel phase* is a forested floodplain community of the Willamette Valley. The overstory is big leaf maple and/or black cottonwood. The shrub layer is dominated by common snowberry, with California hazel, trailing blackberry, and red elderberry as the most common associated species. Nettles and Pacific waterleaf are both very abundant.

Geomorphic environment: Environmental data for this type are minimal. Sites were classes as floodplain forests (79%) or sloughs (21%). Half the samples were from the mainstem Willamette River. Surface clay deposits were noted on 2 plots. Four plots are from Marion County, two plots each from Benton, Clackamas, Polk, and Yamhill Counties, and 1 plot from Linn County. The plots ranged from 1 to 21 feet above summer flow (average 12 feet), and from 0 to 500 feet from the channel (average 117 feet).

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	8%
Wetland indicators among dominant species	35% (range 20-60%)

Non-natives: No exotic species were recorded in the sample.

***Symphoricarpus albus/Urtica dioica-(Acer macrophyllum-Populus trichocarpa)/ Oemleria cerasiformis* phase**
Common snowberry/nettle-*(Big leaf maple-black cottonwood)/Indian plum phase*
SYAL/URDI-*(ACMA3-POBAT)/OECE phase*

N=14 (Willamette Valley 14)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees			
Acer macrophyllum	Big leaf maple	86	65
Populus trichocarpa	Black cottonwood	36	57
Shrubs			
Symphoricarpos albus	Common snowberry	100	40
Oemleria cerasiformis	Indian plum	71	11
Herbs			
Hydrophyllum tenuipes	Pacific waterleaf	93	23
Galium aparine	Cleaver	93	1
Urtica dioica ssp. gracilis	Nettle	79	29
Claytonia sibirica	Siberian miner's lettuce	64	23
Carex deweyana	Dewey's sedge	50	1
Dicentra formosa	Bleeding heart	43	7
Tellima grandiflora	Fringecup	36	20
Polystichum munitum	Sword fern	36	2

Elevations: less than 600 feet.

Community: Common snowberry/nettle-*(Big leaf maple-black cottonwood)/ Indian plum phase* is a forested floodplain community of the Willamette Valley. The overstory is big leaf maple and/or black cottonwood. Common snowberry dominates the shrub layer, with Indian plum as an important associated species. The lush understory is typically composed of Pacific waterleaf, cleaver, nettle, Siberian miner's lettuce, and Dewey's sedge.

Geomorphic environment: Environmental data for this type are minimal. Sites were classes as floodplain forests (86%) or sloughs (14%). Five of the samples were from the mainstem Willamette River; five were from the mainstem Clackmas River; three were from the Luckiamute River; one from Ankeny Slough (USFWS). Five plots are from Clackamas County, four plots from Marion County, three plots from Polk County, and two plots from Lane County. The plots ranged from 1 to 18 feet above summer flow (average 8 feet), and from 0 to 200 feet from the main channel (average 72 feet).

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	7%
Wetland indicators among dominant species	30% (range 17-67%)

Non-natives: No exotic species were recorded in the sample.

Big leaf maple flowers in April, on the floodplain of the Willamette River.

Fraxinus latifolia/Acer circinatum/Hydrophyllum tenuipes-Urtica dioicaSymphoricarpos albus/Urtica dioica
Oregon ash/vine maple/Pacific waterleaf-nettle
FRLA/ACCI/HYTE-URDI

N=8 (Willamette Valley 8)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees			
Fraxinus latifolia	Oregon ash	75	69
Acer macrophyllum	Big leaf maple	25	63
Alnus	Alder	25	45
Shrubs			
Acer circinatum	Vine maple	100	59
Corylus cornuta	California hazel	25	9
Oemlaria cerasiformis	Indian plum	25	5
Herbs			
Hydrophyllum tenuipes	Pacific waterleaf	88	52
Urtica dioica ssp. gracilis	Nettle	75	21
Tellima grandiflora	Fringecup	63	2
Carex deweyana	Dewey's sedge	63	1
Dicentra formosa	Pacific bleedingheart	50	5
Claytonia sibirica	Siberian miner's lettuce	50	4
Galium aparine	Cleaver	50	2
Polystichum munitum	Sword fern	38	3

Elevations: less than 600 feet.

Community: Oregon ash/vine maple/Pacific waterleaf/nettle is a forested floodplain community of the Willamette Valley. The overstory is Oregon ash, often with big leaf maple or alder. The alder species present in these plots was red alder (*Alnus rubra*). The shrub layer is dominated by vine maple, with California hazel and Indian plum as the most common associated species. The herb layer generally has abundant Pacific waterleaf, with nettle a co-dominant. Fringecup and Dewey's sedge also occur in over half the plots.

Geomorphic environment: Environmental data for this type are minimal. Sites were classed as floodplain forests (7 plots) or sloughs (1 plot). Five plots are from Clackamas County (four from Milo McIver State Park), and one plot each from Linn, Marion, and Polk Counties. Sites ranged from small creeks (Senecal, Marion County) to the Clackmas River. The plots ranged from 0 to 15 feet above summer flow (average 5 feet), and from 0 to 100 feet from the channel (average 19 feet).

Similar types: This community shares many species with the Common snowberry/nettle-Oregon ash/red elderberry-California hazel phase, but with the vine maple in the place of the common snowberry.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	13%
Wetland indicators among dominant species	33% (range 17-57%)

Non-natives: No exotic species were recorded in the sample.

Hardwood/Salmonberry/Pacific waterleaf
Hardwood/*Rubus spectabilis/Hydrophyllum tenuipes*
Hardwood/RUSP/HYTE

N=5 (Willamette Valley 5)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees			
Alnus	Alder	40	80
Populus trichocarpa	Black cottonwood	40	55
Fraxinus latifolia	Oregon ash	20	100
Acer macrophyllum	Big leaf maple	20	90
Shrubs			
Rubus spectabilis	Salmonberry	100	50
Corylus cornuta	California hazel	60	10
Sambucus racemosa	Red elderberry	40	8
Herbs			
Hydrophyllum tenuipes	Pacific waterleaf	100	38
Carex deweyana	Dewey's sedge	80	3
Urtica dioica ssp. gracilis	Nettle	60	28
Galium aparine	Cleaver	60	25
Claytonia sibirica	Siberian miner's lettuce	60	11
Dicentra formosa	Bleeding heart	40	9
Athyrium filix-femina	Lady fern	40	2
Polystichum munitum	Sword fern	40	1
Stachys cooleyae	Cooley's betony	40	1

Community: Hardwood/salmonberry/Pacific waterleaf is a Willamette Valley forested floodplain community. It can occur under a range of overstory tree species, including alder, black cottonwood, Oregon ash, and big leaf maple. Salmonberry is the dominant shrub, though California hazel and red elderberry commonly occur. The herb layer is dominated by Pacific waterleaf and nettle, almost always with Dewey sedge present. Cleaver and Siberian miner's lettuce are also common and abundant. Red alder was confirmed at the Clackamas County sites.

Geomorphic environment: Soil, substrate and geomorphic surface data are unavailable. Plots were 2 to 12 feet above river level (average 7 feet), and from 1 foot to 200 feet from the main creek channel. Plots were located in Benton (Camp Adair) and Clackamas (Milo McIver State Park, Molalla River State Park) counties.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	17%
Wetland indicators among dominant species	42% (range 20-60%)

Non-natives: No exotic species were included in the sample.

(***Populus trichocarpa-Fraxinus latifolia)/Rubus spectabilis-Symphoricarpos albus***
(Black cottonwood-Oregon ash)/salmonberry-snowberry (POBAT-FRLA)/RUSP-SYAL

n=7 (WV 7)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees			
Populus trichocarpa	Black cottonwood	86	65
Fraxinus latifolia	Oregon ash	43	73
Acer macrophyllum	Big leaf maple	14	10
Shrubs			
Rubus spectabilis	Salmonberry	100	76
Symphoricarpos albus	Common snowberry	86	10
Sambucus racemosa	Red elderberry	86	5
Rubus ursinus	Trailing blackberry	43	6
Cornus sericea	Red-osier dogwood	43	5
Herbs			
Urtica dioica ssp. gracilis	Nettle	71	21
Hydrophyllum tenuipes	Pacific waterleaf	71	1
Impatiens capensis	Jewelweed	57	Tr

Community: (Black cottonwood-Oregon ash)/salmonberry-snowberry is a shrubby Willamette Valley forested floodplain community. Tree canopy is fairly dense black cottonwood and/or Oregon ash. The thick shrub layer is dominated by salmonberry with snowberry and red elderberry. The herb layer is very sparse. The most common and abundant herb is stinging nettle, though Pacific waterleaf and jewelweed are usually present.

Jewelweed blooming in June.

Geomorphic environment: One Molalla River State Park site was visited in 2004. The community there is on the main floodplain of the Willamette River, near the confluence with the Molalla River. The plot is on a gentle, slightly convex surface. Silt deposited on tree boles in the plot showed evidence of flood waters from 8 to 9 feet deep. The soil pit was in a deep silt deposit, probably resulting from the last major flood. John Christy noted that he had noted silt deposited on that floodplain from 1 to 3 feet thick in the spring following the 1996

flood. In a concavity at one end of the surface, the community transitioned into an Oregon ash-black cottonwood dominated slough sedge wetland.

Soil, substrate and geomorphic surface data are unavailable for the other sites. Plots were 9 to 21 feet above river level (average 14 feet), and from 115-500 feet from the channel.

Plots were located in Clackamas (Molalla SP), Marion (Minto, Wilsonville), Polk (Luckiamute) and Yamhill (Grand Island) counties.

Wetland rating:

Community meets wetland test	Yes
Plots meeting wetland criteria	86%
Wetland indicators among dominant species	71% (range 50-80%)

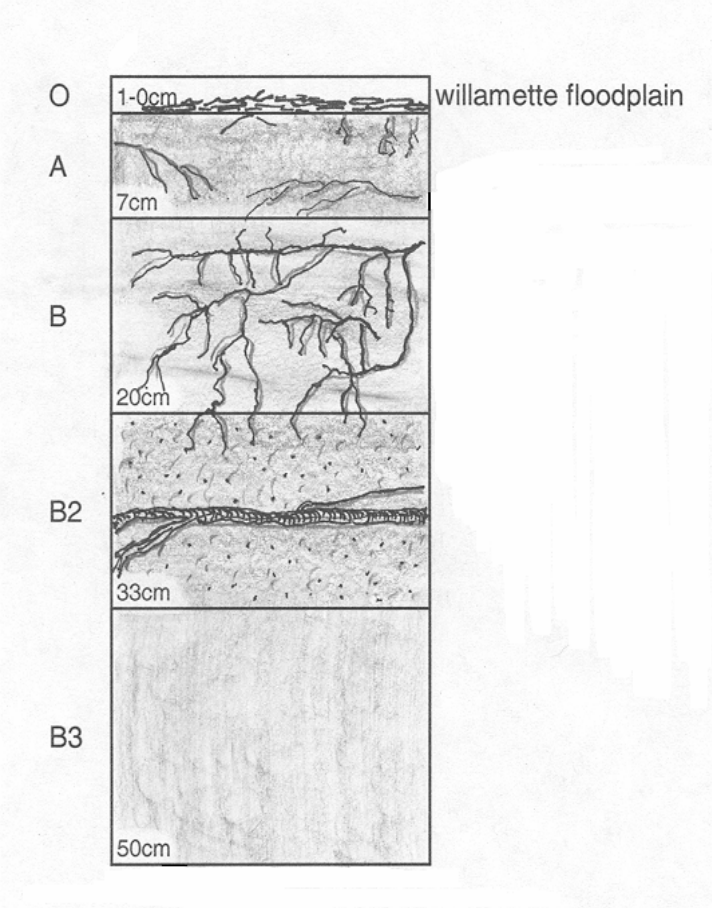
Non-natives: No exotic species were recorded in the sample.

Thick salmonberry and common snowberry dominate the shrub layer beneath an Oregon ash-black cottonwood canopy. (Molalla River State Park)

Soil illustration: Molalla River State Park - (POBAT-FRLA)/RUSP-SYAL

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	1						
A	7	Medium brown	SiL	gravel	0	lesser	5
B	13	Lighter brown	SiL	gravel	0	more	12
B2	13	Darker by a shade	SL	gravel	0	most	5
B3	17	Lighter brown	SiL	gravel	0	lesser	0

Total Depth: 50cm. Depth Limit: unknown. Water Table: unknown.



The O horizon is very thin on this profile. Leaves and twigs are silty and matted together, suggesting a routine presence of standing water in the winter. Forbs are scarce – may standing water rot the seeds? Silt lines from the February 1996 floods are up to eight feet high on cottonwood trunks nearby.

The A horizon is moderate crumby silt loam and just slightly darkened by organic input. It has few roots and is noticeably drier than other horizons.

Organic influence fades at the B horizon at 7cm. There is the slightest amount of clay texture in the soil, causing stronger crumb texture and plasticity than in the A horizon. The highest concentration of roots in the profile – 12% - and potentially greater water availability may be attributed to clay textures in this narrow horizon.

Subsequent alluvial horizons are tough to name since they are likely all from the same flood event. The B2 (or Ab) is poorly structured sandy loam. There is a distinct drop in fine root density from the B horizon that may be a response to water availability. Structural roots are present. The B3 horizon reverts to a fine silt loam with zero sand or clay. It has the texture of loess or packed cornstarch, but lacks structure or cohesiveness.

(*Fraxinus latifolia-Quercus garryana)/Symphoricarpos albus* (Oregon ash-Oregon white oak)/common snowberry (FRLA-QUGA4)/SYAL

N=11 (Willamette Valley 11)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees			
Fraxinus latifolia	Oregon ash	82	62
Quercus garryana	Oregon white oak	64	62
Shrubs			
Symphoricarpos albus	Common snowberry	100	70
Rubus ursinus	Trailing blackberry	82	3
Oemleria cerasiformis	Indian plum	36	10
Herbs			
Polystichum munitum	Sword fern	45	6
Galium aparine	Cleaver	45	2
Carex deweyana	Dewey's sedge	36	4
Torilis	*Hedgeparsley*	36	Tr

Elevations: less than 600 feet.

Community: (Oregon ash-Oregon white oak)/common snowberry is a floodplain forest community in the Willamette Valley. It has an ash and/or oak overstory over a thick shrub layer dominated by common snowberry. Trailing blackberry is the most common associated species. Indian plum is often present. The herb layer is relatively sparse. Sword fern and cleavers are the most typical species, though Dewey's sedge and hedgeparsley often occur.

Geomorphic environment:

Environmental data for this type are minimal. Four plots were from Linn County (Butte, Little Muddy, and N. Santiam drainages), three plots from Clackamas County (Camassia Creek, Milo McIver State Park-Clackamas River), three plots from Benton County (William L. Finley National Wildlife Refuge-Muddy Creek), and one from Polk County (Soap Creek). Muddy Creek in the Finley Wildlife Refuge was visited in 2004. The community there is on the floodplains of a tightly meandering low gradient creek that is deeply incised with rectangular cross section. The Muddy Creek floodplain is wide, while terraces are barely in evidence. The creek occupies the floodplains yearly. Silt lines in this community on both sides of the creek are about two feet higher than bankfull.

Soil, substrate and geomorphic surface data are unavailable for the other sites. The plots ranged from 1 to 18 feet above summer flow (average 8 feet), and from 3 to 500 feet from the channel (average 41 feet).

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	18%
Wetland indicators among dominant species	29% (range 14-60%)

Oregon ash-Oregon white oak/common snowberry community on the banks of Muddy Creek, Finley National Wildlife Refuge, Benton County.

Non-natives: Exotic species occurred on 55% of the plots. Three plots had 5 or more exotics.

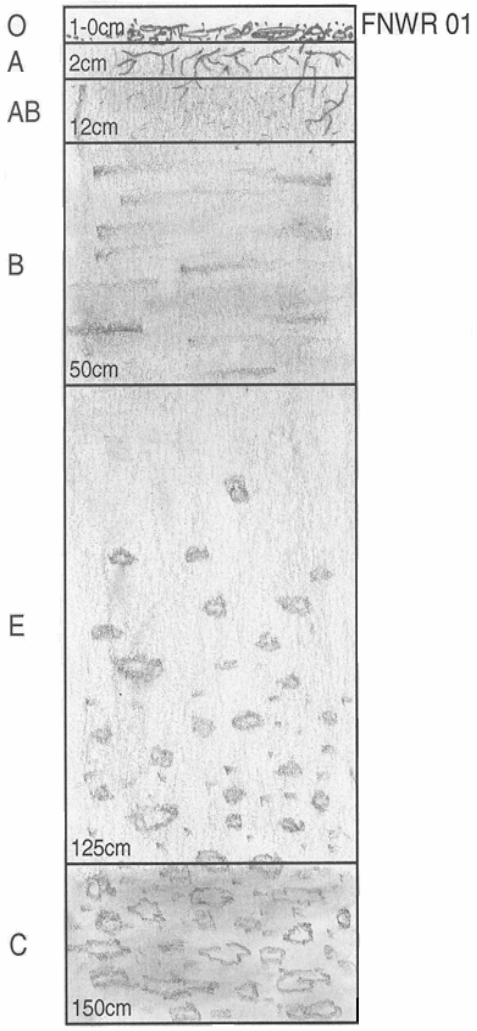
EXOTIC	COMMON NAME	PLOTS	TYPICAL COVER %
Torilis	*Hedgeparsley*	4	Tr
Vicia sativa	*Garden vetch*	2	Tr
Hedera helix	*English ivy*	1	4
Rosa eglanteria	*Sweetbriar rose*	1	3
Phalaris arundinacea	*Reed canarygrass*	1	2
Lactuca serriola	*Prickly lettuce*	1	Tr
Lapsana communis	*Common nipplewort*	1	Tr
Lolium arundinaceum	*Tall fescue*	1	Tr
Solanum dulcamara	*Bittersweet*	1	Tr
Stellaria media	*Chickweed*	1	Tr
Bromus inermis	*Smooth brome*	1	Tr
Bromus rigidus	*Ripgut brome*	1	Tr
Ranunculus repens	*Creeping buttercup*	1	Tr
Rumex crispus	*Curled dock*	1	Tr

Invasive weed reed canarygrass establishes in the Oregon ash-Oregon white oak/common snowberry along Muddy Creek, William L. Finley National Wildlife Refuge.

Soil illustration 1: William L. Finley National Wildlife Refuge / Muddy Creek (1): (FRLA-QUGA4)/SYAL

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O	1				0		
A	2	2.5Y3/2	SL		0	10	15
AB	10	2.5Y4/3	SiCL		0	8	5
B	38	2.5Y4/3	SiC		0	8	0
E	30	2.5Y6/2	SiC		0	10	0
C		2.5Y3/2	C		0	3	3

Total Depth: 125cm. Depth Limit: 125+cm.



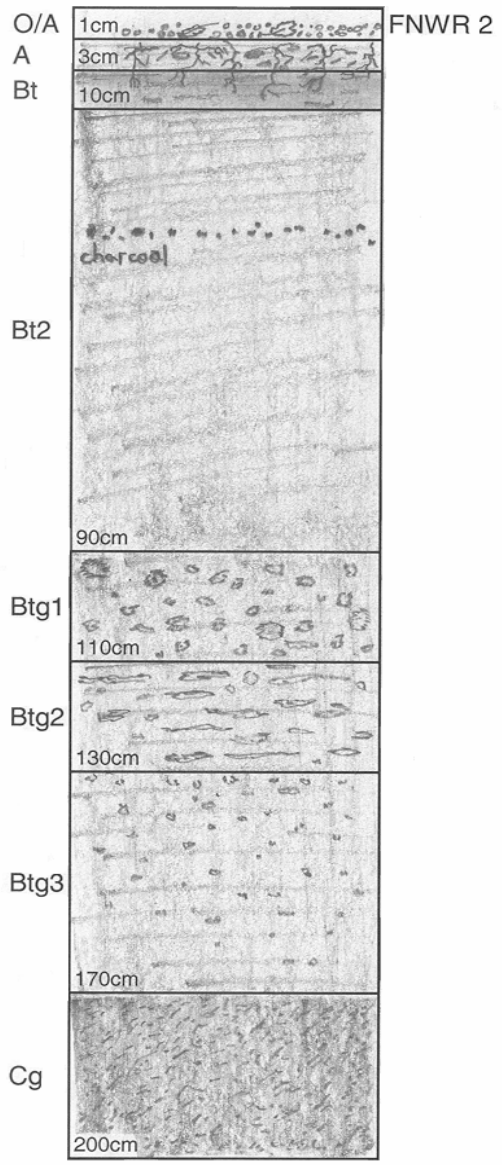
Majority of litter on this bank is from ash and snowberry. Ground vegetation is sparse. The A horizon is 2cm thick sandy loam crust, unusually yellow, and high in ¼ to 1mm thick fine roots. A silty textured transition horizon changes to a clay loam B horizon between 12 and 50cm. The A, AB, and B horizons have weak to moderate crumb structure and low moisture. Moisture and structure increase in the E horizon at 50cm. This horizon has a pale, somewhat chalky appearance common with E horizons. Perhaps longer residence time of soils between flood events on the outside curve allows greater downward leaching than on the east bank.

There is a clear transition to a clay C horizon at 125cm. Mottles are small and close together. Moisture is elevated. The clay is extremely plastic, but well structured and not compacted at the center of the core. Individual peds have nearly rounded, inch-diameter blocky structure. Aeration and bulk density at this depth would probably be a good structural rooting medium, but make it tough to auger.

Soil illustration 2: William L. Finley National Wildlife Refuge / Muddy Creek (2): (FRLA-QUGA4)/SYAL

HORIZON	THICKCM	MUNSELL	TEXTURE	CFRAG	CFRAGPCT	VOIDS	ROOTS
O/A	1		C			60	
A	3	2.5Y4/1	SiC		0	20	10
Bt	7	2.5Y4/1	C		0	20	5
Bt2	80	2.5Y6/2	C		0	10	3
Btg1	20	10YR5/1	LC		0	10	0
Btg2	20	10YR4/1	C		0	3	0
Btg3	40	10YR4/1	SiC		0	3	0
Cg	30+	Gley1 4/N	SCL		0	8	0

Total Depth: 200cm. Depth Limit: 200+cm. Gley: 90cm.



This surface has a distinctively smeared appearance from directional flow over the annual floodplain. The A horizon is a hardened 2cm crust containing 15% embedded OM and seeds. Loose debris and ground vegetation are very sparse. Rounded clay pellets1-8mm in diameter uniformly cover the surface.

There are very few fine roots. The A and Bt horizons and the crumbled clay on the surface are similar in composition and may have a common origin.

The Bt2 horizon is a textbook Willamette Valley Clay that is so uniformly fine-grained that it feels like loam. It is compacted, but well aerated. There are some coarse roots, and many fine roots, but zero coarse fragments. At 30cm, there is a charcoal layer approximately 1cm thick. At 90cm, the first of three Btg horizons is defined and mottling is distinct. The shape and color of mottling also shift noticeably at the Btg boundaries. At 170cm, a gleyed coarse sandy clay loam takes over. The Cg may have been a surface horizon long ago, and it contains 2-3% greasy black organic residue. The profile is increasingly moist from 90-200cm (the depth of the auger), but no obvious water table was found.

Acer macrophyllyum/Symphoricarpos albus
Big leaf maple/common snowberry
ACMA3/SYAL

N=2 (Willamette Valley 2)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees			
Acer macrophyllum	Big leaf maple	100	55
Populus trichocarpa	Black cottonwood	50	75
Shrubs			
Symphoricarpos albus	Common snowberry	100	88
Rubus ursinus	Trailing blackberry	100	6
Oemleria cerasiformis	Indian plum	50	2
Rubus spectabilis	Salmonberry	50	2
Herbs			
Carex deweyana	Dewey's sedge	100	Tr
Hydrophyllum tenuipes	Pacific waterleaf	100	Tr
Heracleum lanatum	Cow-parsnip	50	3
Galium triflorum	Sweetscented bedstraw	50	1

Sample size is extremely limited for this community.

Elevations: less than 600 feet.

Community: Big leaf maple/common snowberry is a floodplain forest of the Willamette Valley. It occurs with an overstory of big leaf maple and often black cottonwood. Common snowberry dominates the understory. Trailing blackberry is the other typical associated shrub species. The herb layer is very sparse under the dense shrub layer, with Dewey's sedge and Pacific waterleaf present in trace amounts. Cow parsnip and sweetscented bedstraw are also common.

Geomorphic environments: Environmental data for this type are minimal. Both plots are from the main Willamette River, one site from a slough in Linn County, the other from a floodplain forest plot near Wilsonville in Marion County. The plots ranged from 12 to 21 feet above summer flow, and from 30 to 200 feet from the channel.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	0%
Wetland indicators among dominant species	23% (range 20-25%)

Non-natives: No exotics were recorded in the sample.

This early spring photo is from the Coast Range foothills (McDonald-Dunn Forest, Corvallis). The overstory here is big leaf maple, with more red alder and less black cottonwood than would be expected on the Willamette Valley floor.

Forested *Symphoricarpos albus/Maianthemm stellatum*
Forested common snowberry/starry false Solomon's seal
Forested SYAL/MAST4

N=4 (Willamette Valley 4)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Fraxinus latifolia	Oregon ash	50	80
Acer macrophyllum	Big leaf maple	50	29
Pseudotsuga menziesii	Douglas fir	25	90
Populus trichocarpa	Black cottonwood	25	50
Alnus	Alder	25	20
Thuja plicata	Western redcedar	25	15
Taxus brevifolia	Pacific yew	25	5
Shrubs			
Symphoricarpos albus	Common snowberry	100	56
Oemleria cerasiformis	Indian plum	50	18
Acer circinatum	Vine maple	50	12
Corylus cornuta	California hazel	50	4
Rubus ursinus	Trailing blackberry	50	Tr
Herbs			
Maianthemum stellatum	Starry false Solomon's-seal	100	43
Galium aparine	Cleaver	75	Tr
Equisetum hyemale	Scouring-rush	50	10
Vancouveria hexandra	Insideout flower	50	1
Impatiens capensis	Jewelweed	50	1
Thalictrum occidentale	Western meadowrue	50	Tr

Elevations: less than 600 feet.

Community: Forested common snowberry/false Solomon's-seal is a floodplain community of the Willamette Valley. It can occur under dense canopies of Oregon white ash, black cottonwood-big leaf maple, or Douglas fir. A thick shrub layer is dominated by common snowberry. Indian plum and vine maple are often abundant, while California hazel and trailing blackberry are also frequently present. Starry false Solomon's-seal is the dominant herb. Cleaver, scouring rush, inside-out flower, jewelweed and western meadowrue are common associates.

Geomorphic environment: Environmental data for this type are minimal. Two plots were from the Clackamas River (Clackamas County), one from the Middle Fork Willamette River (Lane County), and one from the Willamette River (Marion County). The plots ranged from 2 to 8 feet above summer flow, and from 0 to 30

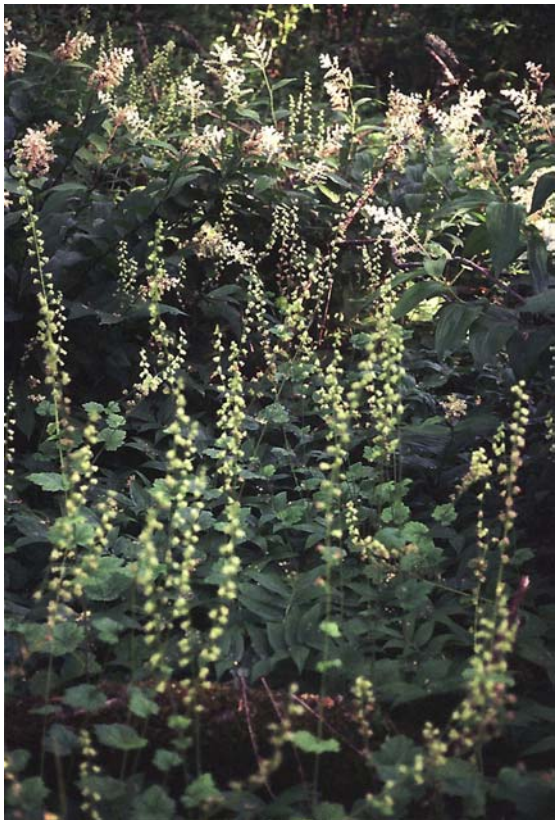
feet from the channel. Remarks on one plot sheet record that clay covered 90% of the plot.

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	28%
Wetland indicators among dominant species	28% (range 20-40%)

Non-natives: No exotic species were recorded in the sample.

Common snowberry and starry false Solomon's seal beneath an Oregon ash canopy on the floodplain of the Willamette River.



Starry false Solomon's seal, fringecup, and false Solomon's seal bloom under big leaf maple and Oregon ash. Rich forbs can occur in gentle concave slopes. This site was the first major slope break off the high valley terrace above the Willamette River.

Fraxinus latifolia/Symphoricarpos albus/Camasia quamash
Oregon ash/common snowberry/common camas
FRLA/SYAL/CAQU2

N=3 (Willamette Valley 3)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees			
Fraxinus latifolia	Oregon ash	100	52
Quercus garryana	Oregon white oak	67	80
Shrubs			
Symphoricarpos albus	Common snowberry	100	59
Spiraea douglasii	Douglas spiraea	67	1
Rosa eglanteria	Sweetbriar rose	67	1
Herbs			
Camassia quamash	Common camas	100	32
Ranunculus uncinatus	Little buttercup	67	3
Rumex crispus	*Curled dock*	67	Tr
Galium aparine	Cleaver	67	Tr

Common camas is an ephemeral species, and similar habitats sampled late in the summer might not show the presence of this species. Such a small sample size does not present strong evidence on typical composition or abundance.

Elevations: less than 600 feet.

Community: Oregon ash/common snowberry/common camas was sampled only at Finley Wildlife Refuge (Muddy Creek) in Benton County. It is a forested floodplain community of the Willamette Valley. The overstory is Oregon ash, usually with Oregon white oak. The shrub layer is dominated by common snowberry, with Douglas spirea (hardhack) and the exotic sweetbriar rose as commonly associated species. Common camas is the herb layer dominant. Little buttercup, the exotic curled dock, and cleavers are often present but at low cover.

Geomorphic environment: Environmental data for this type are minimal. Sites were classed as floodplain forests. All three plots are from Benton County (Muddy Creek). Water table depth was at the surface. The plots ranged from 5 to 8 feet above summer flow (average 6 feet), and from 15 to 50 feet from the main channel (average 30 feet).

Wetland rating:

Community meets wetland test	No
Plots meeting wetland criteria	0%
Wetland indicators among dominant species	47% (range 40-50%)

Non-natives: Exotics in the sample include sweetbriar rose and curled dock, occurring on 2 of the 3 plots.

Western redcedar/Starry false Solomon's-seal
THPL/MAST4

N=5 (WNF 4, Willamette Valley 1)

SPECIES	COMMON NAME	CONSTANCY %	TYPICAL COVER %
Trees-overstory			
Thuja plicata	Western redcedar	100	68
Acer macrophyllum	Big leaf maple	60	41
Taxus brevifolia	Pacific yew	60	29
Pseudotsuga menziesii	Douglas fir	40	19
Alnus	Alder	40	8
Trees-seedlings			
Thuja plicata	Western redcedar	60	3
Acer macrophyllum	Big leaf maple	40	11
Tsuga heterophylla	Western hemlock	40	7
Shrubs			
Oemleria cerasiformis	Indian plum	80	1
Rubus ursinus	Trailing blackberry	80	1
Acer circinatum	Vine maple	60	38
Oplopanax horridum	Devil's club	40	2
Herbs			
Maianthemum stellatum	Starry false Solomon's-seal	100	30
Polystichum munitum	Sword fern	80	8
Galium triflorum	Sweetscented bedstraw	80	1
Anemone deltoidea	Three-leaved anemone	80	1
Trillium ovatum	Western trillium	80	Tr
Athyrium filix-femina	Lady fern	60	4
Vancouveria hexandra	Insideout flower	60	2
Osmorhiza berteroi	Sweet cecily	60	1
Tiarella trifoliata	Foamflower	60	1
Petasites frigidus	Coltsfoot	40	3
Aruncus dioicus	Goat'sbeard	40	2
Prosartes hookeri	Hooker's fairybells	40	1
Adiantum pedatum	Maidenhair fern	40	1
Hydrophyllum tenuipes	Pacific waterleaf	40	1
Bromus vulgaris	Columbia brome	40	Tr

Elevations: less than 600 to 2390 feet.

Community: The Western redcedar/starry false Solomon's-seal community occurs under dense western redcedar canopy, often with big leaf maple and Pacific yew. Douglas-fir and alder may also be present. Vine maple is the most abundant shrub and is present in almost two-thirds of the plots. Indian plum and

trailing blackberry are typically present in trace amounts. The understory of this shady forested type is dominated by starry false Solomon's seal, with sword fern the second important species.

Valley cross sections showing THPL/MAST4
E Fork S Fork McKenzie #2

Click on a creek name in the table below to see the valley cross sections that show where THPL/MAST4 occurs in relation to other plant associations.

Geomorphic environment: The Willamette Valley site was on the lower Clackamas River. Notes from the Willamette Valley study observed that this type was not found on the Valley floor, but only on the edges of the Valley. Willamette NF samples were from the South Fork McKenzie watershed. Little environmental data for this community are available. This community was found on unconstrained reaches of relatively large 4th to 6th order streams. Geomorphic surfaces are often low terraces or elevated islands. Soils data from one plot indicated a loamy top horizon which had increasing gravel content with depth. No surface coarse fragments were recorded from that site. Trees on that plot included 46 and 66 year old big leaf maples, 77 year old red alder, 132 year old Pacific yew, and 128 and 346 year old western redcedars.

Geormophic surfaces, height and distance from normal high water line, and age of trees suggest that these communities are infrequently reset, though flooding may allow establishment of species like red alder without removing the existing overstory. Presence of wet-indicator species, such as Devil's club, lady fern and coltsfoot as well as the western redcedar overstory mark this community as riparian.

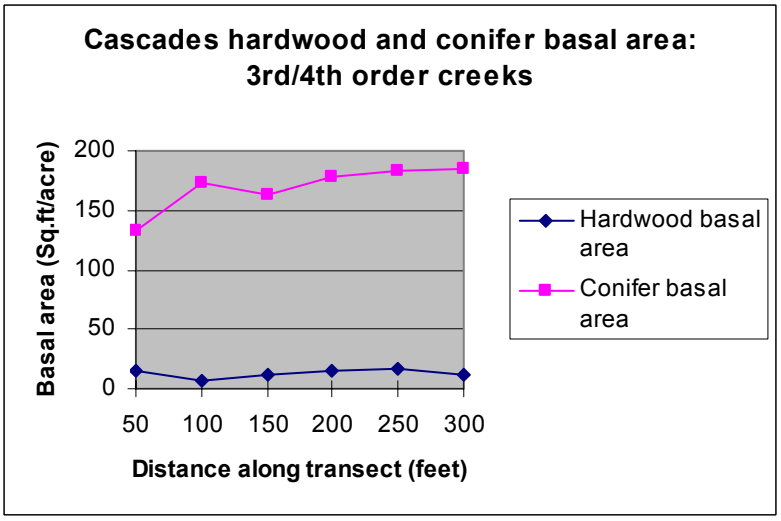
Wetland rating:

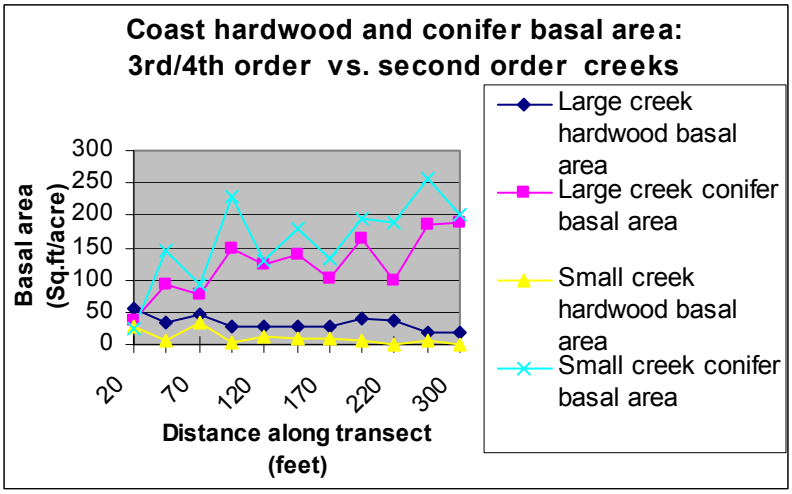
Community meets wetland test	No
Plots meeting wetland criteria	0%
Wetland indicators among dominant species	29% (range 14-36%)

Non-natives: No exotic species were recorded in the sample.

Plant community distribution: valley cross-sections

One of the objectives of the transect protocol was to examine the extent of riparian vegetation along different types of streams. Another was to look at the distribution of the riparian communities. A third was to look at the arrangement of plant communities, including upland plant associations, within riparian reserves ("Northwest Forest Plan" 1994). How distinctive was the suite of upland associations close to the riparian zone? What is the distribution of hardwoods across the riparian zone?





Basal area along the transects: Hardwood and conifer basal area data are available from transects across 50 creeks. Cascades creeks' elevations averaged 1575 feet (920-3190 feet), while the Coast Range creeks' elevations averaged 775 feet (140-1700 feet). Data for 44 third and fourth order streams in both the Cascades and the Coast Range can be compared. Six smaller second order creeks from the Coast Range are summarized separately. Overall, the 23 Cascades creeks had less hardwood basal area near the creeks, but distribution along the valley cross-section was more even. Conifer basal area was lower near the creek, but climbed to a fairly constant level about 100 feet from the channel.

The 21 third and fourth order Coast Range creeks showed more near-channel hardwoods than either similar Cascades creeks or smaller Coast Range creeks, with hardwood basal area generally decreasing with distance from creek. Coastal conifer basal area was very low closest to the creek regardless of size class.

Coastal conifer basal area climbs at a slower rate before leveling out than in the Cascades.

Cascades 3rd/4th order creeks		Sq.ft/acre		Sq.ft/acre	
Distance along transect (ft)	n	Hardwood mean basal area	std error	Conifer mean basal area	std error
50	46	15	4	133	11
100	46	7	2	172	9
150	41	11	4	163	10
200	38	15	5	178	14
250	36	16	4	183	14
300	33	11	4	185	18
Coast 3rd/4th order creeks					
Distance along transect (ft)	n	Hardwood mean basal area	std error	Conifer mean basal area	std error
20	12	57	20	38	14
50	39	35	6	92	10
70	12	47	12	78	23
100	38	29	5	147	12
120	12	27	15	125	28
150	38	29	6	139	12
170	12	28	15	102	17
200	29	39	9	163	17
220	10	36	21	100	27
250	26	20	7	185	21
300	27	18	5	187	14
Coast 2nd order creeks					
Distance along transect (ft)	n	Hardwood mean basal area	std error	Conifer mean basal area	std error
20	5	28	10	24	10
50	6	7	4	147	27
70	6	33	18	93	48
100	6	3	3	230	33
120	6	13	10	130	51
150	6	10	10	180	35
170	6	10	10	133	46
200	3	7	7	193	47
220	6	0	0	190	40
250	4	5	5	258	9
300	3	0	0	200	31

Valley cross sections

This section presents a number of valley cross-section diagrams with short descriptions. For sites from the BLM sample, field sketches are included. Classified riparian communities as well as upland associations are indicated where they occurred along the transects. Where data are available, a small table reports basal area of conifers and hardwoods along the transect.

For all stream orders, the shape of the valley and the way groundwater moves from the hillslopes clearly dictates the upland plant communities' distribution. Convex topography is drier than concave topography, all other things being equal. More moisture is available to generally concave valley floor sites, and often the riparian zone lies within moister upland types than are found upslope. However, microtopography can trump macrotopography. As the valley cross-sections clearly show, a steep convex site even next to a large perennial stream will support drier plant associations.

A creek does not necessarily lie within a "moist" upland context. There may not be sufficient precipitation or enough soil moisture available to the site. Topography may not define a moister or cooler microclimate near the riparian zone.

The South Fork McKenzie River sampling also addressed intermittent streams in the central Cascades. How riparian is the riparian zone of an intermittent stream? Several of the cross-sections from this group are included. Unfortunately, similar headwater creeks in the Coast Range were not sampled. The valley cross-sections of intermittents were perpendicular to the intermittent streams, but generally lay more or less along the contour of the larger valleys in which they were located. This should be kept in mind when interpreting topographic relationships across these tiny creeks. Actual slopes tend to be steeper than shown in the diagrams, and the true aspect of a surface is not represented.

Valley cross sections

Stream	Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
CASCADES						
Walker Creek	S. Fork McKenzie River	4	2600	48	158	518
Starr Creek	S. Fork McKenzie River	2	4120	15	216	376
Loon Creek	S. Fork McKenzie River	3	2950	20	262	627
S. Fork McKenzie River #1	S. Fork McKenzie River	6	2380	71	142	671
Boone Creek	S. Fork McKenzie River	3	2655	3	295	342
Lamb Creek	S. Fork McKenzie River	2	4340	12	140	320
E. Fork S. Fork McKenzie River	S. Fork McKenzie River	5	2390	68	90	861
Bear Creek (McKenzie RA)	McKenzie River	3	940	25	280	625
S. Fork Lost Creek	Middle Fork Willamette River	3	1600	12	45	612
Nimrod Creek	McKenzie River	3	1050	15	10	613
Rough Creek	McKenzie River	3	1060	22	180	606
Intermittents:	**S. Fork Mckenzie River watershed**					
Augusta Class IV #1	Augusta Creek		4620	9	100	349
Augusta Class IV #4	Augusta Creek		2800	2	325	342
Augusta Class IV #5	Augusta Creek		4220	2	215	342
Augusta Class IV #6	Augusta Creek		3040	3	190	343
Augusta Class IV #7	Augusta Creek		2950	1	85	341
Rush Creek Trib. Class IV	Rush Creek		2280	1	340	341
Gnat-Goose Class IV	Mink Lake Basin		4880	12	130	352
S. Fork McKenzie River #5 Class IV	S. Fork McKenzie		4540	22	flat	620
Slipper-Junction Class IV	Mink Lake Basin		4990	4	200	343

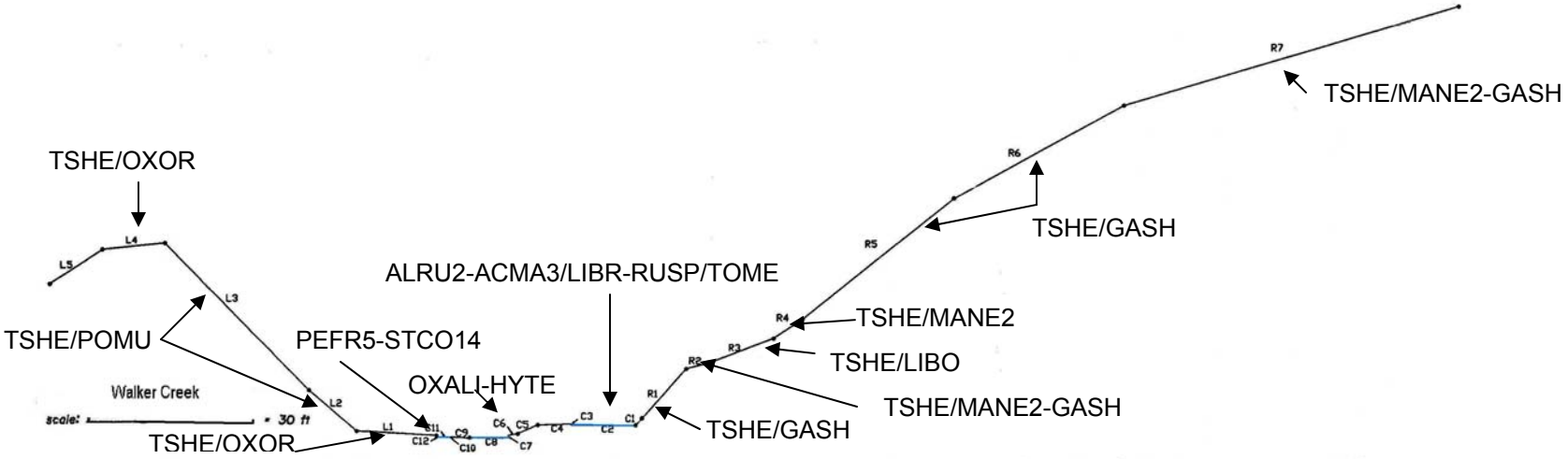
Valley cross sections

Stream	Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
COAST						
N. Fork Smith River #2	N. Fork Smith River	4	270	77	248	869
Porter Creek	N. Fork Siuslaw River	1	270	17	128	571
Cedar Creek (Waldport)	Drift Creek (to Alsea River)	1	80	3	165	464
Ryder Creek (North tributary)	Maple Creek (to Siltcoos Lake)	1	600	3	250	461
W. Fork Deadwood Creek Tributary	Lower Siuslaw River	2	420	8	210	560
Beacon Creek (Roseburg BLM)	Upper Smith River	3	915	7	300	607
Elk Creek (Tillamook)	Upper Nestucca River	3	1390	18	140	318
Whittaker Creek	Siuslaw River	3	680	17	30	614

Valley cross sections

Cascades:
Walker Creek –Willamette NF

Watershed	Stream order	Elevation (	Bankfull width	Stream aspect	Transect length (slope distance)
S. Fork McKenzie River	4	2600’	48’	158	518’



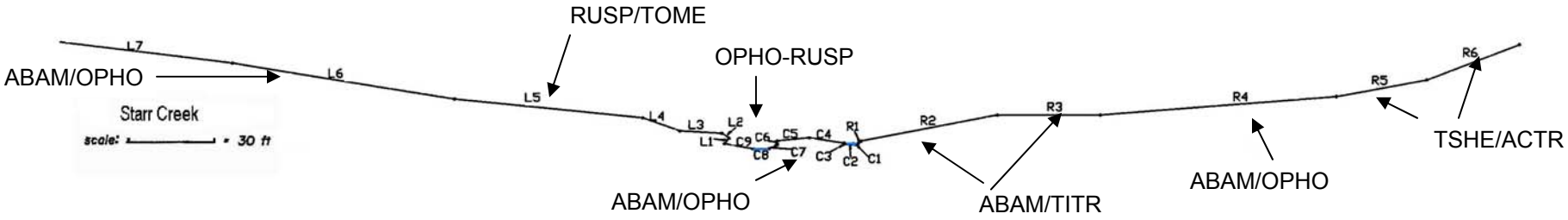
Riparian: There are two major channels, one with a cobble bar exposed during summer low flow, which supports the Coltsfoot-betony community. The island between the channels has the cobble bar/low floodplain community (Red alder-big leaf maple)/Stink currant-salmonberry/piggyback plant. In this old growth site, western redcedar dominates the canopy. Young big leaf maple, western hemlock, and Douglas-fir are present. The Sorrel-Pacific waterleaf community occupies the bank of the island.

Upland: The right limb of the transect shows typical moderate elevation warm, well-drained western hemlock plant associations. Western hemlock/salal (TSHE/GASH-NWO Cascades) on steeper slopes indicates slightly drier growing conditions than Western hemlock/dwarf Oregon grape (TSHE/MANE2-NWO Cascades). A tributary to Walker Creek (just beyond the left end of the transect) may be responsible for the increased moisture reflected in Western hemlock/Oxalis (TSHE/OXOR-NWO Cascades) and Western hemlock/sword fern (TSHE/POMU-NWO Cascades) on the left side (L1-5).

Valley cross sections

Starr Creek-Willamette NF

Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
S. Fork McKenzie River	2	4120’	15’	216	376’



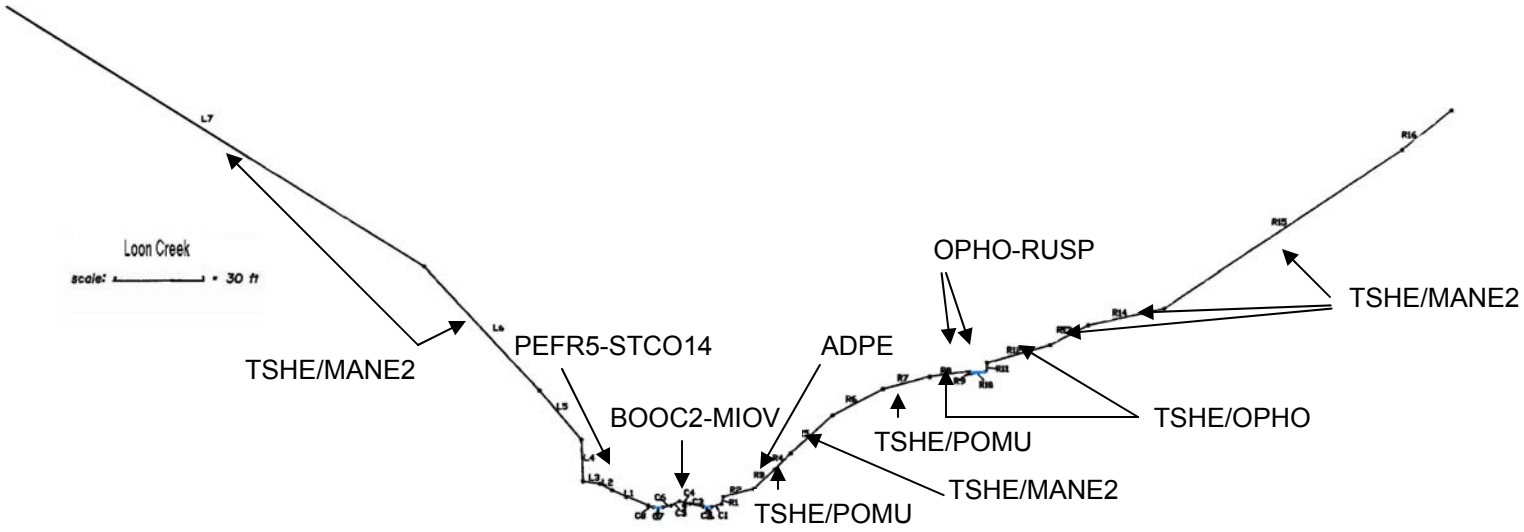
Riparian: Starr Creek begins here in a cool cirque basin. The gentle bowl supplies enough moisture for the sub-irrigated Silver fir-devil’s club (ABAM/OPHO) upland plant association. The creek is in two channels, with Devil’s club-salmonberry on the active floodplain of the left channel. The cirque basin is so wet that Salmonberry/piggyback plant occupies an unusually wide opening (L5) far from the small headwater stream. This community is typically found on active floodplains and cobble bars. Devil’s club-salmonberry is found in the active floodplain of the island between the two channels.

Upland: The upland communities in the bowl of the cirque basin include Silver fir/devil’s club and the moist silver fir type, Silver fir/coolwort foamflower (ABAM/TITR). Cold air drainage may account for the occurrence of the cooler silver fir plant associations toward the basin center, while warmer western hemlock types such as Western hemlock/vanilla leaf (TSHE/ACTR) can be found on the basin walls (segments R5-6).

Valley cross sections

Loon Creek
Willamette NF

Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
S. Fork McKenzie River	3	2950’	20’	262	627’



Riparian: Loon Creek is a perennial creek that becomes spatially intermittent just upstream of the transect. The main channel emerges from beneath a large boulder pile. The transect shows a fairly steep valley. The Coast boykinia-oval-leaved mitrewort community occupies a depositional bar in the main channel. Coltsfoot-Cooley’s betony occupies the left bank. On the right, the Maidenhair fern community is found to the steep transition between riparian and upland types.

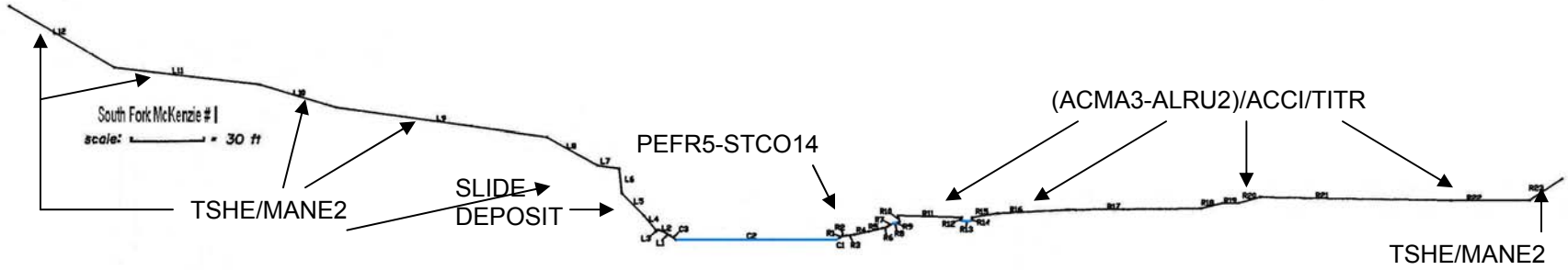
Upland: A small tributary on the right has devil’s club, with Western hemlock/Devil’s club (TSHE/OPHO) on both sides. The wet Western hemlock/devil’s club type gives way to the moist Western hemlock/sword fern (TSHE/POMU- NWO Cascades) association. Western hemlock/dwarf Oregon grape (TSHE/MANE2-NWO Cascades) is the matrix upland plant association on the fairly steep hillslope.

Field notes record that over a dozen Pacific giant salamanders (1.5-5” long) were observed in the channel at this site.

Valley cross sections

South Fork McKenzie River #1
Willamette NF

Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
S. Fork McKenzie River	6	2380’	71’	142	671’



The South Fork McKenzie River here is a single main channel, with small mucky side channels on the broad floodplain on the right. The left side of the transect shows slide scarp and slide deposit grading from a western hemlock overstory to big leaf maple, with young red alder by the left bank.

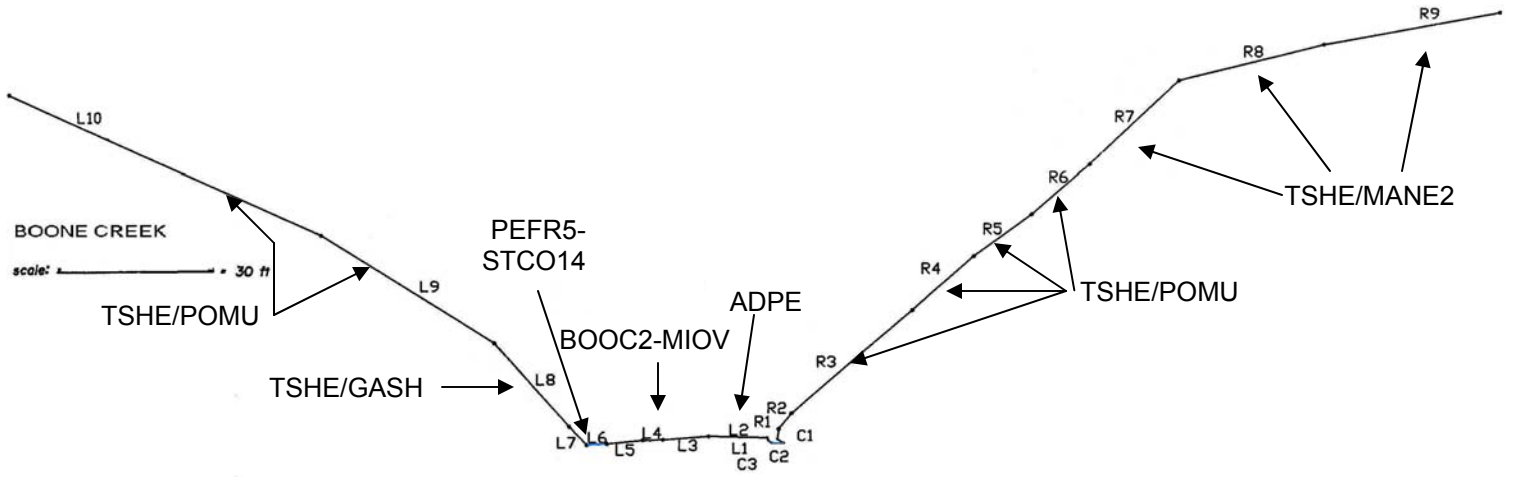
Riparian: On the right, Coltsfoot-Cooley’s betony with red alder is at the channel margin. The main floodplain is dominantly (Big leaf maple-red alder)/vine maple/foamflower, but the composition of the tree layer shifts with distance from the channel. Red alder (R11-16) gives say to the big leaf maple with some western redcedar (R17).

Upland: With the final rise to the most elevated terrace, the canopy is big leaf maple with young grand fir beneath. At the far right transect to the toeslope, big leaf maple, western redcedar and Douglas-fir co-dominate. Western hemlock/dwarf Oregon grape (TSHE/MANE2- NWO Cascades) is the upland plant association of the lower hillslope on both sides of the valley.

Valley cross sections

Boone Creek-Willamette NF

Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
S. Fork McKenzie River	3	2655’	3’	295	342’

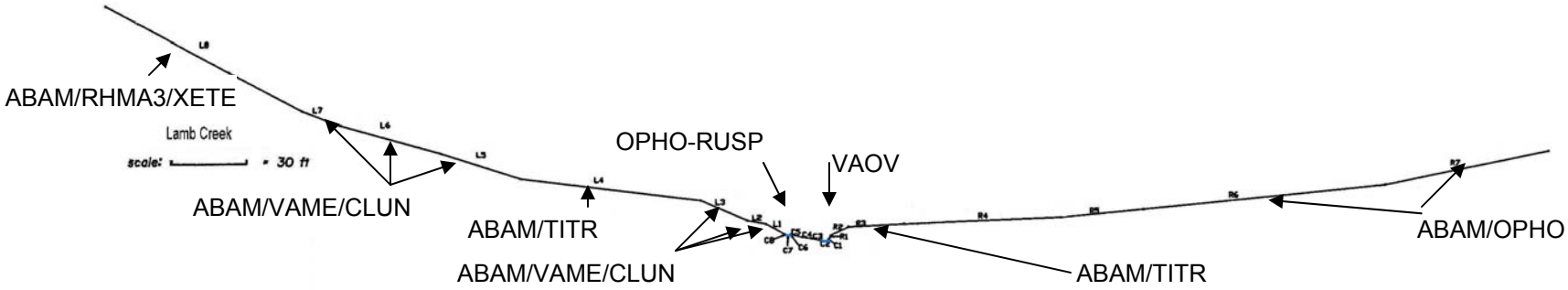


Riparian: Boone Creek’s riparian vegetation echoes the pattern from Loon Creek, though Boone is found on more unstable earthflow topography. The Maidenhair fern community is on the nearly vertical right bank. The narrow valley floor is noted as swampy. Coltsfoot-Cooley’s betony is found on the side channel on the let, but Coast boykinia-oval-leaved mitrewort community spans most of the valley floor. Tree regeneration (Douglas-fir, western hemlock, western redcedar, red alder) is fairly dense near the main channel, but only red alder is found in the overstory. No trees are found on the muckier side (L4-5). However, mature western redcedar dominates the gentler segments on the left transect (L7, 9-10).

Valley cross sections

Lamb Creek
Willamette NF

Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
S. Fork McKenzie River	2	4340’	12’	140	320’

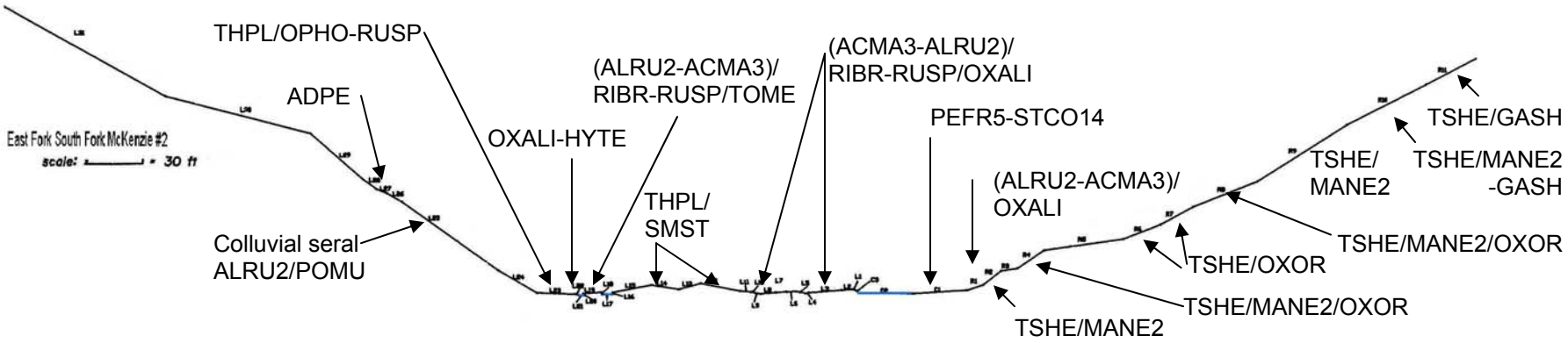


Riparian: This is another example of a headwater creek originating in a cool cirque basin, somewhat like Starr Creek. The Devil’s club-salmonberry community is in the island between the two channels, though Oval-leaved huckleberry community occupies the right bank and low, gentle surface (R4) which receives much of the cirque basin moisture.

Upland: The cool Silver fir/Devil’s club (ABAM/OPHO) association is often sub-irrigated. It occurs around openings in the cirque basin’s wetter, flatter segments (R6-7), though here the steep slopes go from the dry frosty Silver fir/rhododendron/bear grass (ABAM/RHMA3/XETE) association through the cool but well drained Silver fir/big huckleberry/queencup beadlily (ABAM/VAME/CLUN) to the moister Silver fir/coolwort foamflower (ABAM/TITIR) associations.

East Fork South Fork McKenzie River #2
Willamette NF

Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
S. Fork McKenzie River	5	2390’	68’	90	861’



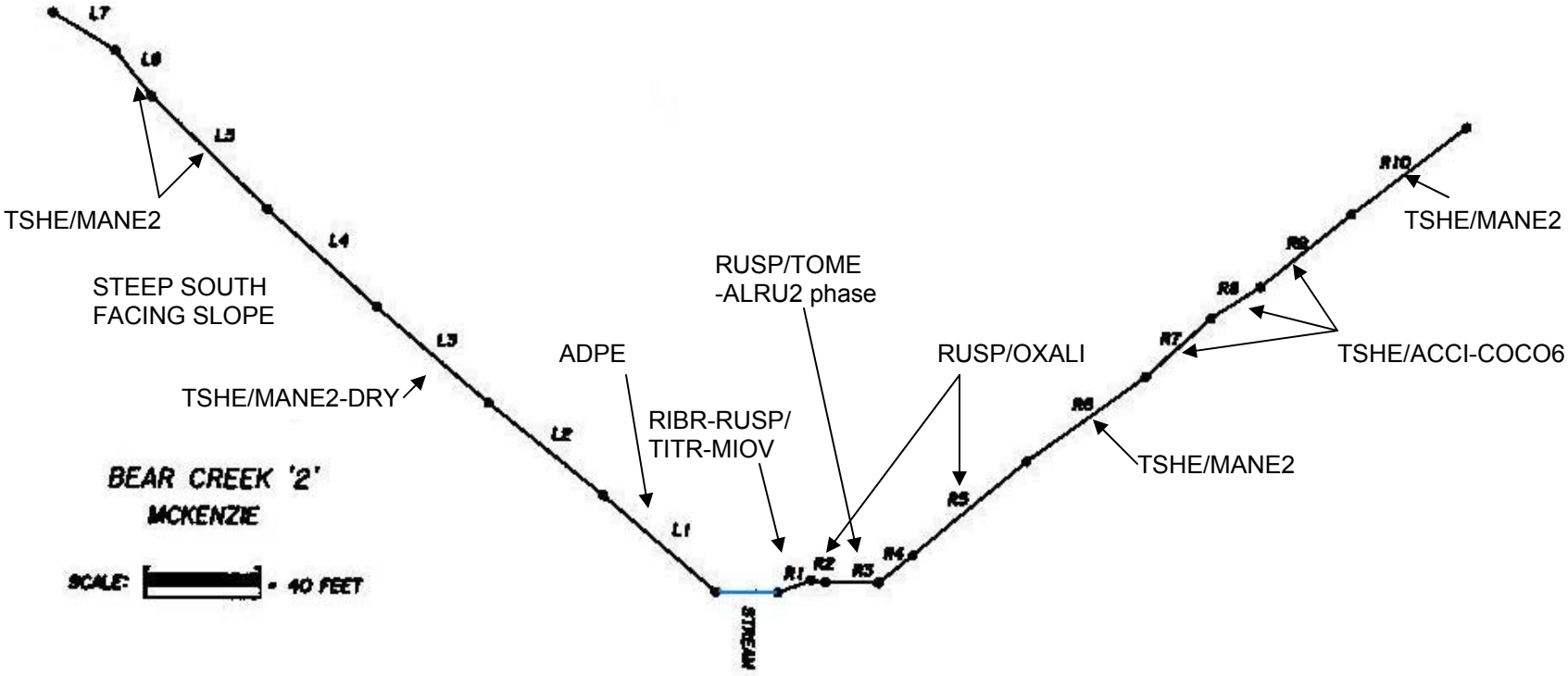
Riparian: This transect can be compared to the South Fork McKenzie River #1. This site has a broader lower floodplain and a wider variety of riparian communities. The main channel’s right margin is Coltsfoot-Cooley’s betony. The narrow right bank has the steep bank (Red alder-big leaf maple)/sorrel community. The left side of the valley floor is more complex. Stink currant-salmonberry/sorrel-*red alder phase* and (Red alder-big leaf maple)/stink currant-salmonberry/piggyback plant are the major communities of the lower floodplain (L3) and are also adjacent to a small dry side channel (L9). The steep bank community Sorrel-Pacific waterleaf is found on the left side of the dry channel. Western redcedar/starry false Solomon’s seal is on the highest topography of the valley floor (L12-14). The left-most channel (L17) repeats the Sorrel-Pacific waterleaf and (Red alder-big leaf maple)/stink currant-salmonberry/ piggyback plant pattern. Western redcedar/devil’s club-salmonberry is on the far left terrace. The left hillslope shows the Maidenhair fern community at a midslope seep (L26), with a red alder dominated early seral colluvial community (L25) below.

Upland: The upland associations show the influence of steepness on site moisture: the direr Western hemlock/salal (TSHE/GASH-NWO Cascades) and Western hemlock/dwarf Oregon grape-salal (TSHE/MANE2-GASH-NWO Cascades) give way to the moister Western hemlock/dwarf Oregon grape/oxalis (TSHE/MANE2/OXOR) or Western hemlock/oxalis (TSHE/OXOR-NWO Cascades) associations when topography flattens.

Valley cross sections

Bear Creek #2-Eugene BLM

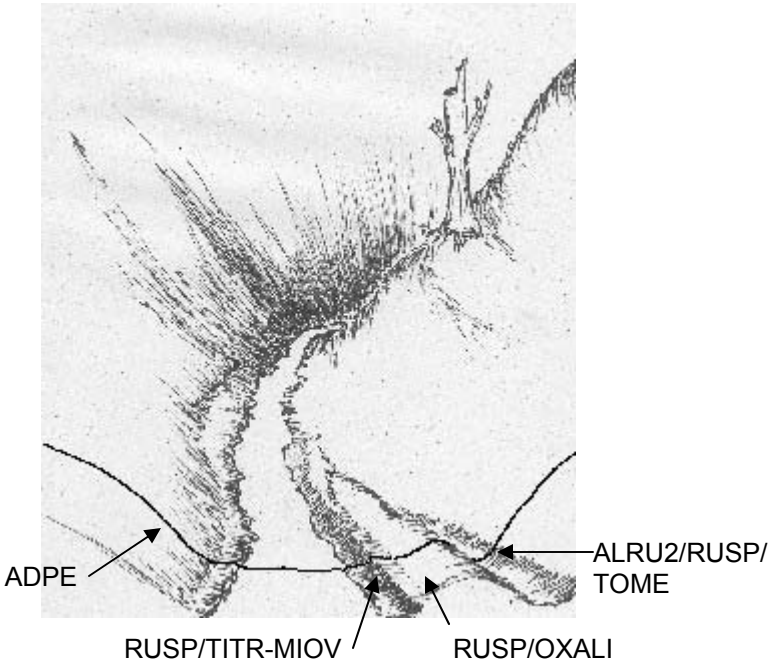
Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
McKenzie River	3	940’	25’	280	625’



Riparian: The Maidenhair fern community is found on a very steep valley wall. The cobble bar type Stink currant-salmonberry/foamflower-oval-leaved mitrewort is adjacent to the main channel. Salmonberry/sorrel is found on a terrace (R2) and on the steep right bank. Salmonberry/piggyback plant-*red alder phase* appears in an old overflow channel (R3) which may function as an active floodplain even during average years.

Valley cross sections

Upland: The south-facing left limb of the transect has Western hemlock/dwarf Oregon grape (TSHE/MANE2-NWO Cascades) upslope of a warm California hazel phase of the moist Western hemlock/sword fern (TSHE/POMU-NWO Cascades). On the right side, convex segments have Western hemlock/dwarf Oregon grape, while the concave segments also support the California hazel phase of Western hemlock/sword fern.

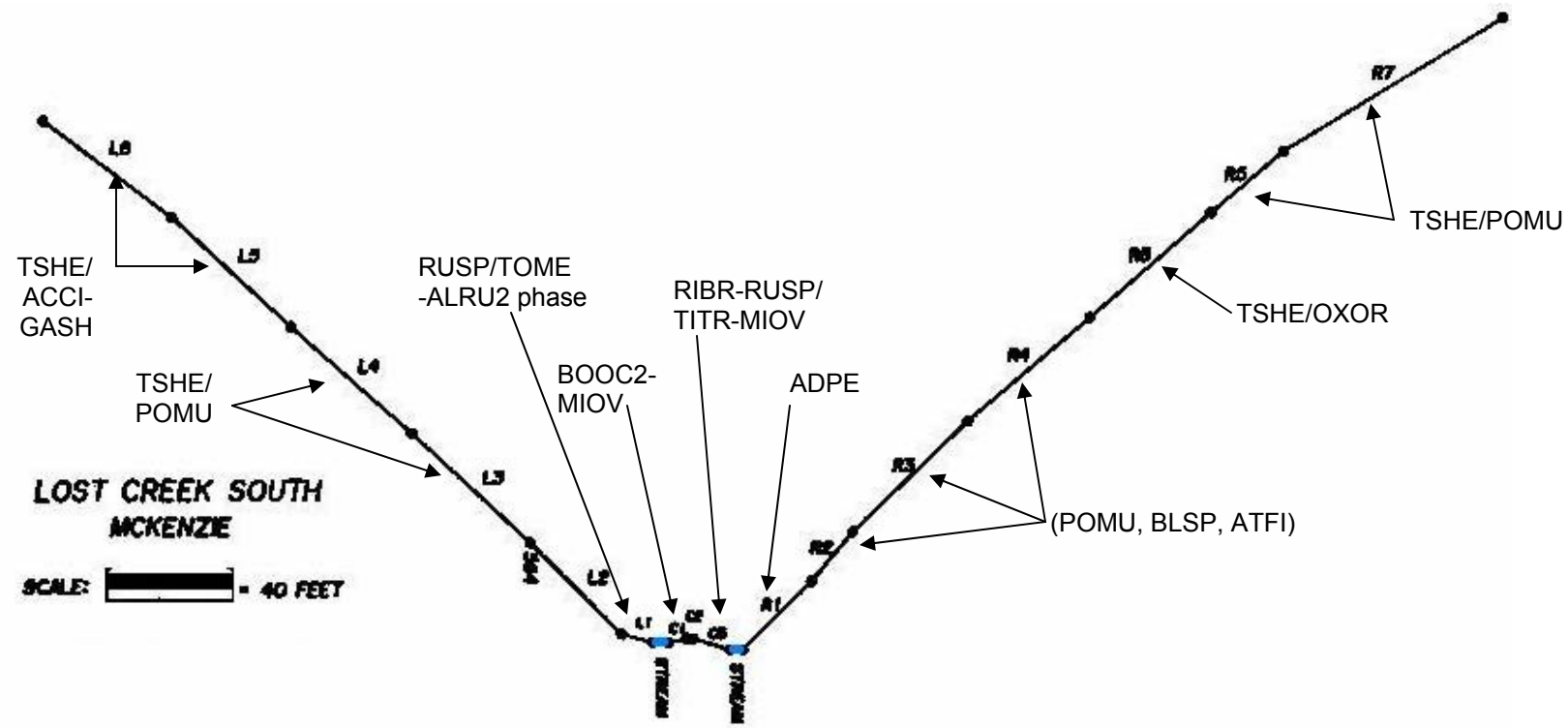


Slope distance from creek (feet)	250	200	150	100	50	0	50	100	150	200	250	300
Conifer basal area (sq.ft/acre)	100	160	180	140	100		100	160	180	200	180	160
Hardwood basal area (sq.ft/acre)	0	20	20	20	20		20	20	0	0	20	40

Valley cross sections

South Fork Lost Creek-Eugene BLM

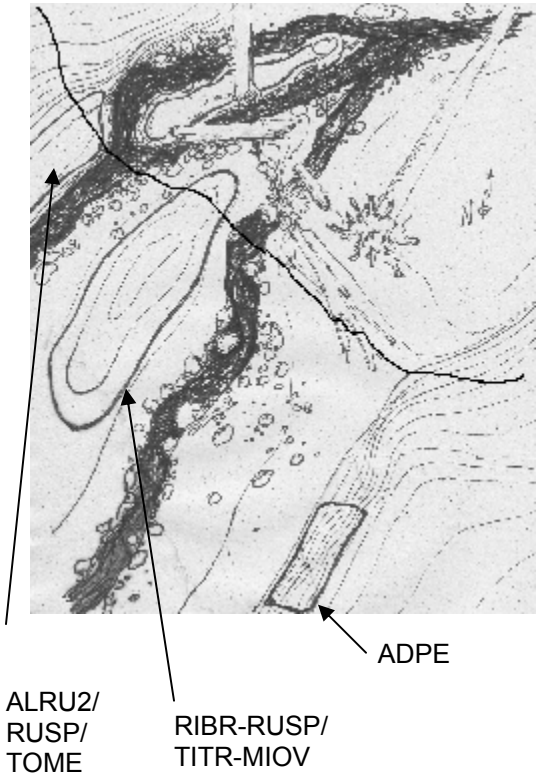
Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
Middle Fork Willamette River	3	1600’	12’	45	612’



Riparian: This transect is similar to Bear Creek #2. The Maidenhair fern community is adjacent to the creek on a seepy steep valley wall. The cobble bar/active floodplain community Stink currant-salmonberry/foamflower-oval-leaved mitrewort is on a cobble island between two channels, while the channel margin community Coast boykinia-oval-leaved mitrewort is barely above normal high water line. Salmonberry/piggyback plant-*red alder phase* is on active floodplain on the left bank.

Valley cross sections

Upland: The moist upland association Western hemlock/oxalis (TSHE/OXOR-NWO Cascades) is found mid-slope of the right limb of the transect, with the slightly drier Western hemlock/sword fern (TSHE/POMU-NWO Cascades) on the convex segment upslope. The left limb has a warm south west aspect. There, Western hemlock/sword fern is mid-slope. Western hemlock/vine maple-salal (TSHE/ACCI-GASH) is in the convex higher slope position.

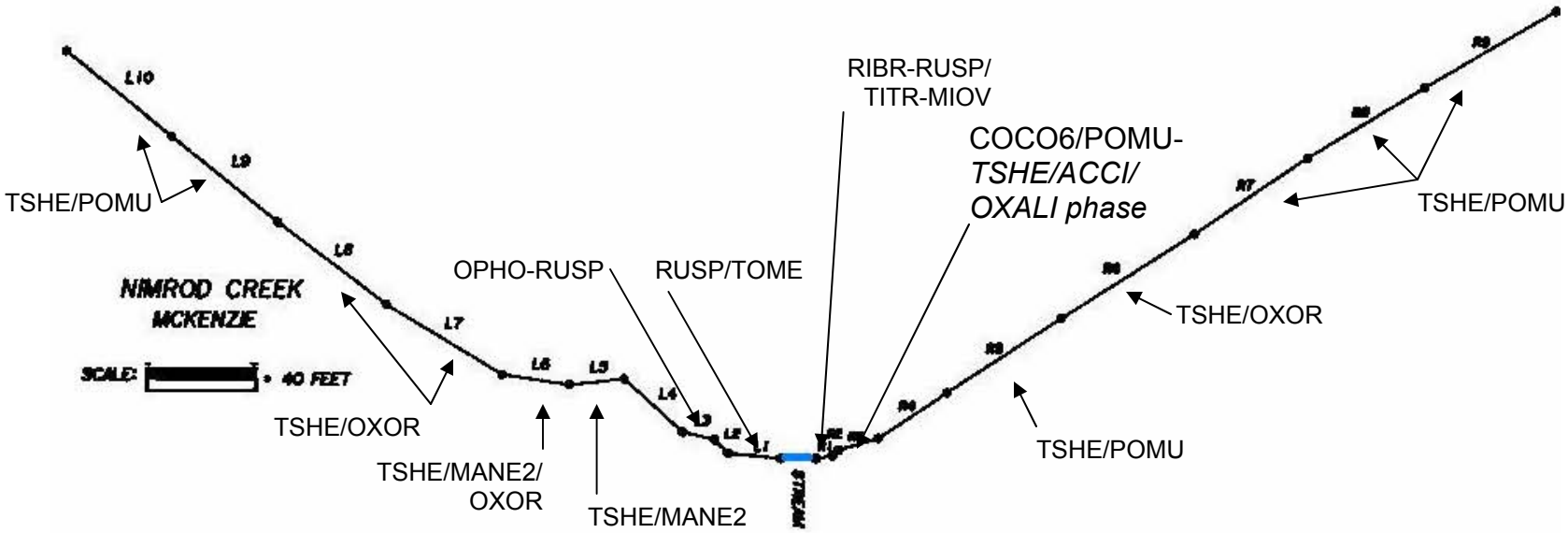


Slope distance from creek (feet)	250	200	150	100	50	0	50	100	150	200	250	300
Conifer basal area (sq.ft/acre)	120	120	80	60	20		160	100	80	140	180	140
Hardwood basal area (sq.ft/acre)	20	20	60	20	0		0	0	0	0	0	20

Valley cross sections

Nimrod Creek (Eugene BLM)

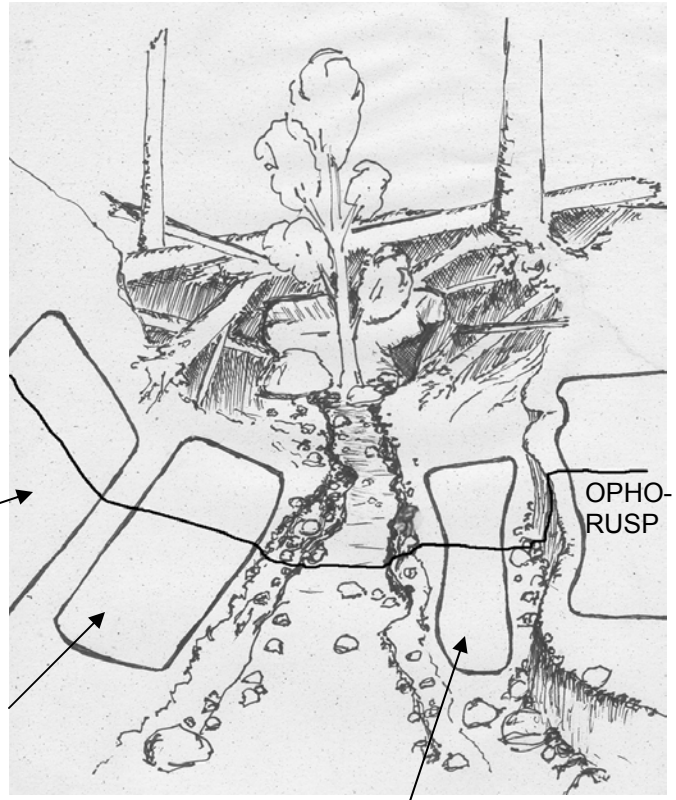
Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
McKenzie River	3	1050’	15’	10	613’



Riparian: The site is below a massive debris jam. The single channel has active floodplain communities Stink currant-salmonberry/foamflower-oval-leaved mitrewort on the right and Salmonberry/piggyback plant on the left. A low terrace (R3) supports the Forested California hazel/sword fern-*western hemlock/vine maple/sorrel phase*. Devil’s club-salmonberry is on a higher terrace (L3). Devil’s club’s presence on L3-4 suggests that the concave segment may be sub-irrigated.

Valley cross sections

Uplands: Moist Western hemlock/oxalis (TSHE/OXOR-NWO Cascades) and Western hemlock/sword fern (TSHE/POMU-NWO Cascades) dominate the uplands. Western hemlock/oxalis is associated with concave segments (L7-8). The more well drained Western hemlock/dwarf Oregon grape (TSHE/MANE2-NWO Cascades) is located on the single convex segment (L5).

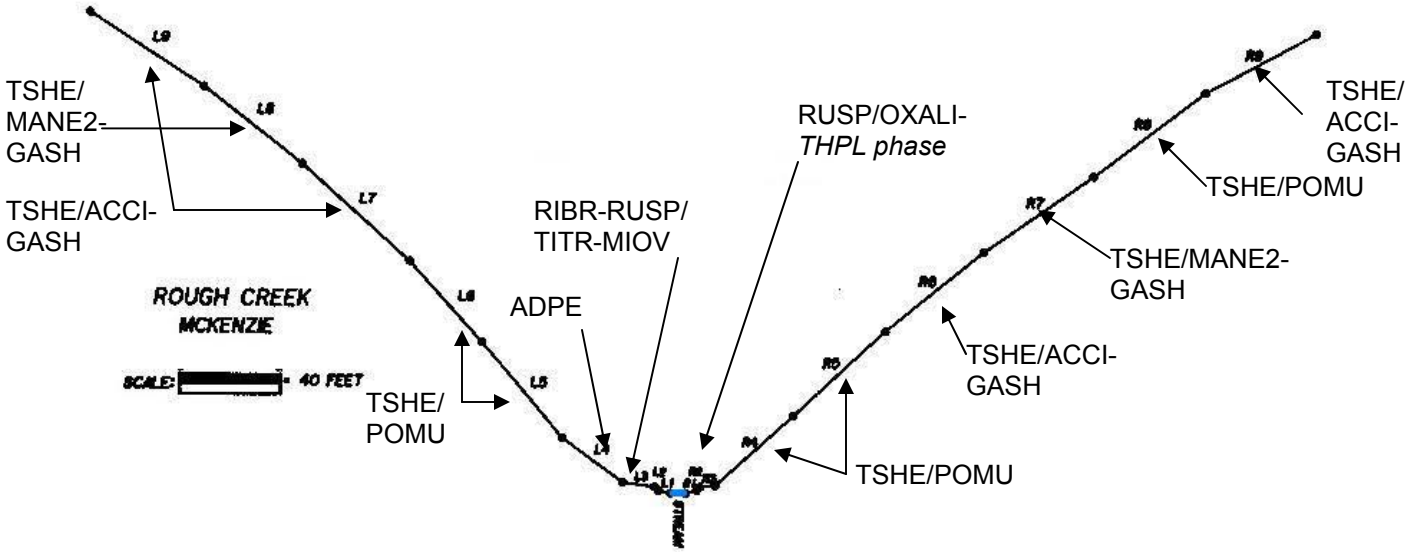


Slope distance from creek (feet)	300	250	200	150	100	50	0	50	100	150	200	250	300
Conifer basal area (sq.ft/acre)	140	160	180	60	160	100		120	200	120	100	140	140
Hardwood basal area (sq.ft/acre)	0	0	20	40	0	0		20	0	40	40	0	0

Valley cross sections

Rough Creek (Eugene BLM)

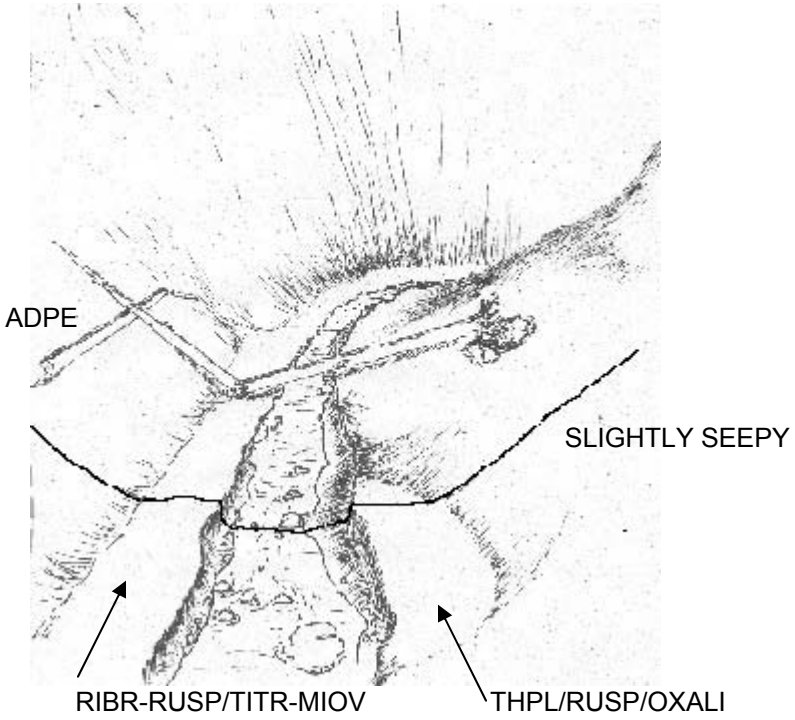
Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
McKenzie River	3	1060’	22’	180	606’



Riparian: This transect resembles Bear Creek #2 and South Fork Lost Creek, with the Maidenhair fern community on a seepy valley wall, and Stink currant-salmonberry/foamflower-oval-leaved mitrewort on the floodplain. It is included because it supports Salmonberry/sorrel-*western redcedar phase* on a slightly elevated floodplain below a somewhat seepy valley wall.

Upland: Upland plant associations are typical of the low to moderate elevations. This valley has relatively flat slopes, and the role of slope position is emphasized. The moist Western hemlock/sword fern (TSHE/POMU-NWO Cascades) is on the lower slope, Western

hemlock/dwarf Oregon grape-salal (TSHE/MANE2-GASH-NWO Cascades) on the mid slope, and Western hemlock/vine maple-salal (TSHE/ACCI-GASH) on convex mid-slope segments and toward the upper slope. Compare Rough Creek to nearby Nimrod Creek. Both transects run east-west. It appears that steeper slopes on Rough Creek may be related to dominance of slightly drier upland plant associations.



Slope distance from creek (feet)	250	200	150	100	50	0	50	100	150	200	250
Conifer basal area (Sq. ft/acre)	200	220	180	80	20		160	160	100	200	160
Hardwood basal area (Sq. ft/acre)	40	40	20	0	0		0	0	0	0	0

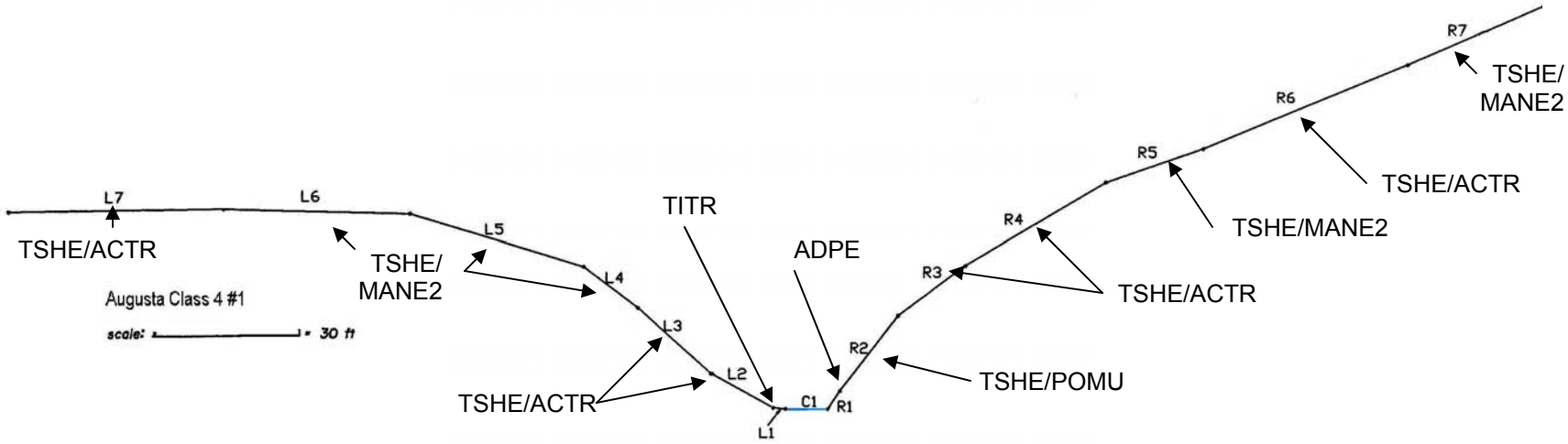
Intermittent streams (Class IVs)-Willamette NF

One of the objectives of the transect sampling in the Sough Fork McKenzie River drainage was to examine the extent of riparian vegetation along different types of streams. For all sizes and orders of stream, the shape of the valley and the way groundwater moves from the hillslopes clearly dictates the upland plant communities' distributions. Convex topography is drier than concave topography, all other things being equal. More moisture is available to generally concave valley floor sites. The riparian zone often lies between upland types that are moisture than those found farther upslope. However, micro-topography can trump macro-topography. As the valley cross-sections reveal, a steep convex site even next to a large perennial stream will support drier plant associations.
A creek does not necessarily lie within a "moist" upland context. There may not be sufficient precipitation or enough soil moisture available to the site, or topography may not define a moister or cooler microclimate near the riparian zone. The larger topographic setting clearly dominates the extent of the riparian influence along intermittent streams.

How riparian is the riparian zone of an intermittent stream? The valley cross-sections of intermittents were put in perpendicular to the intermittent stream. Generally the transects went more or less on the contour of the larger valley of the major creek to which the intermittent was a tributary. This should be kept in mind when interpreting possible topographic relationships across these tiny streams. Actual slopes tend to be steeper than shown. Generally, steep intermittent streams appear to have extremely restricted riparian vegetation. In very gentle settings such as marshy lake basins or cirques, more extensive riparian zones can be found.

Augusta Creek Class IV #1

S. Fork Mckenzie River watershed	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
Augusta Creek	4620’	9’	100	349’

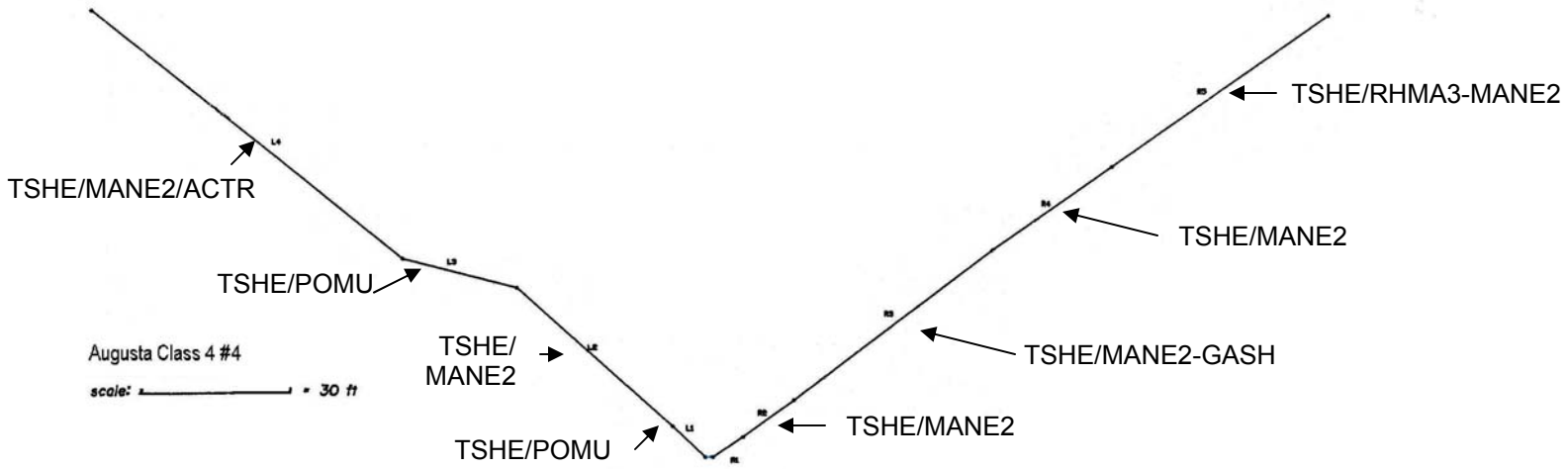


Riparian: This is a warm slope at the transition between western hemlock and silver fir zones. Field notes show this was in an old growth stand. The riparian communities extend 2 to 4 feet slope distance from the gravelly channel. The left bank has the channel margin Foamflower community, while the steep right bank has the Maidenhair fern community.

Upland: Upland plant associations vary between Western hemlock/dwarf Oregon grape (TSHE/MANE2-NWO Cascades) on the convex segments to Western hemlock/vanilla leaf (TSHE/ACTR) on the gentler or concave segments. The moist Western hemlock/sword fern (TSHE/POMU-NWO Cascades) association along the right bank shows the influence of the water available in the intermittent drainage. Field notes indicate the transect was on a flat section and that the channel was wider than typical for the intermittent.

Augusta Creek Class IV #4

S. Fork Mckenzie River watershed	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
Augusta Creek	2800’	2’	325	342’

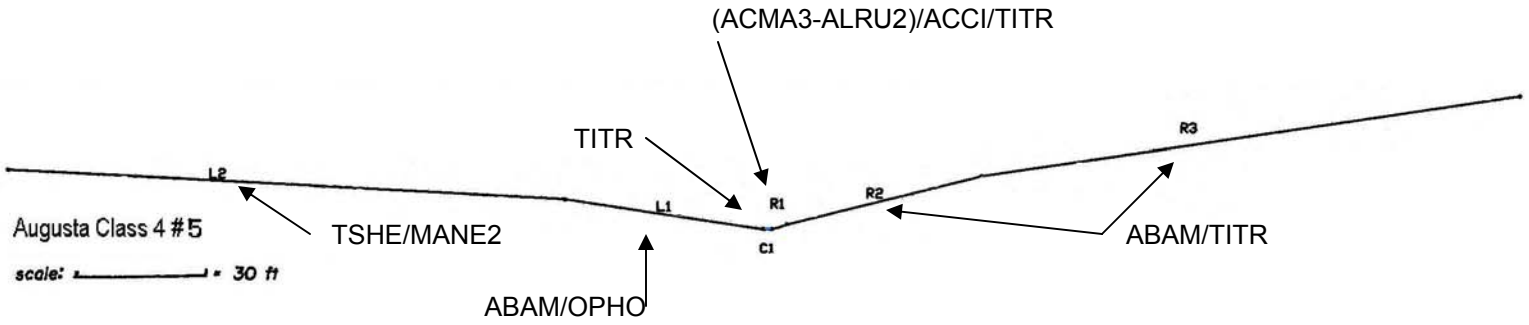


This intermittent is on a steep slope in the western hemlock zone. Field notes refer to the left side (L3) as a cliff. The channel and banks had only upland species. The Western hemlock/sword fern (TSHE/POMU-NWO Cascades) association, a relatively moist upland plant association, occurs on a bench (L3) above the cliff and adjacent to the dry channel (L1).

Valley cross sections

Augusta Creek Class IV #5

S. Fork Mckenzie River watershed	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
Augusta Creek	4220’	2’	215	342’

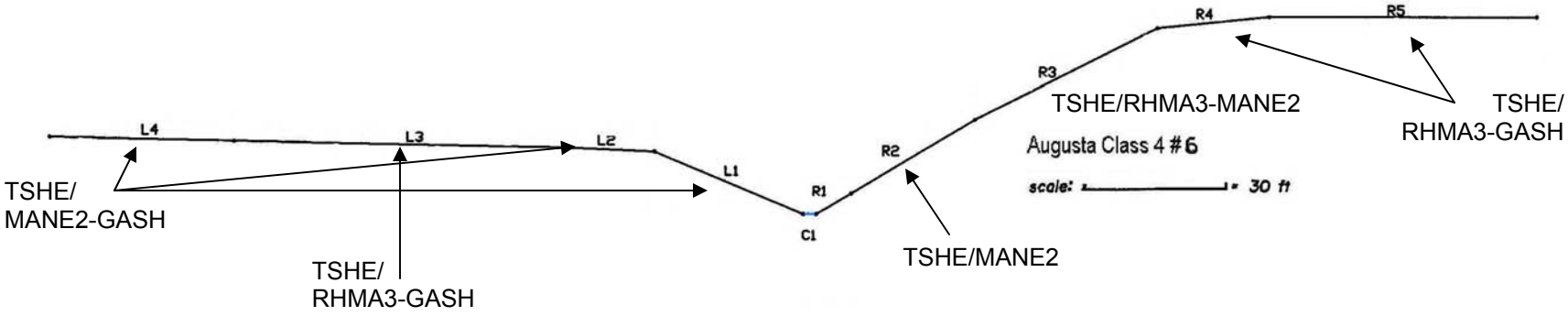


This dry tributary is set in a moist Silver fir/coolwort foamflower (ABAM/TITR) upland matrix. The sub-irrigated Silver fir/devil’s club (ABAM/OPHO) upland plant association is present on the left transect. The vegetated channel itself is the Foamflower riparian plant community. The right bank is a western hemlock-dominated (Big leaf maple-red alder)/vine maple/foamflower community. Note that the upland Silver fir/coolswort foamflower to Silver fir/devil’s club pattern can also been see in the Starr Creek cirque basin.

Valley cross sections

Augusta Creek Class IV #6

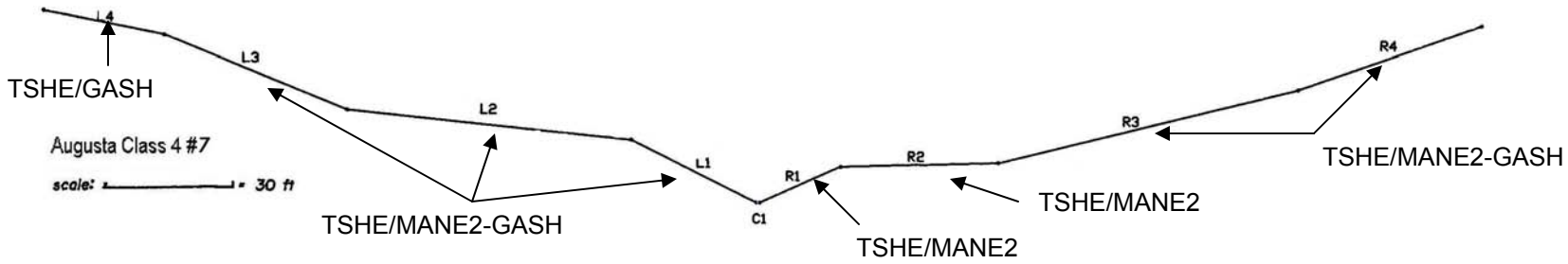
S. Fork Mckenzie River watershed	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
Augusta Creek	3040’	3’	190	343’



No riparian species were recorded on the transect. In the channel, only salal was present (at 1% cover) under a dense western hemlock-western redcedar canopy. In the upland, well drained Western hemlock/dwarf Oregon grape (TSHE/MANE2-NWO Cascades) and Western hemlock/dwarf Oregon grape-salal (TSHE/MANE2-GASH-NWO Cascades) are the moistest members of the plant associations present, and are found adjacent to the channel.

Augusta Creek Class IV #7

S. Fork Mckenzie River watershed	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
Augusta Creek	2950’	1’	85	341’

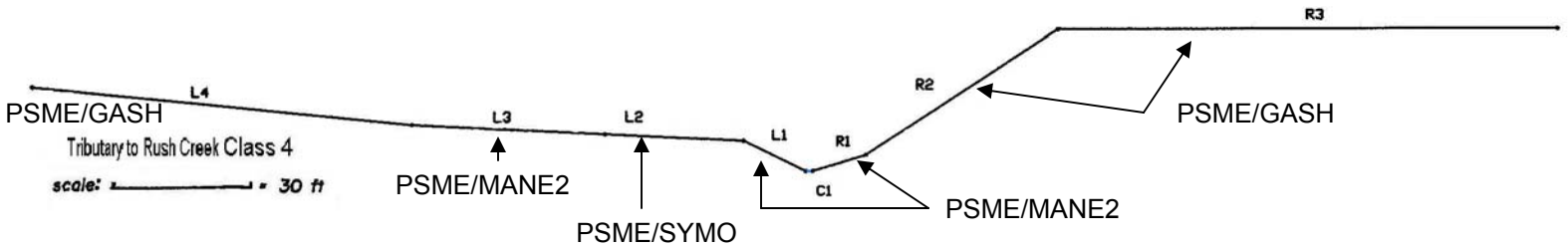


Field interpretation put this site on the border between ephemeral and intermittent. The channel itself had upland species: salal, dwarf Oregon grape, and vanilla leaf, under overhanging western hemlock and western redcedar. The cross-section illustrates the effect of slope and slope position on the upland plant associations (from drier to moister): Western hemlock/salal to Western hemlock/dwarf Oregon grape-salal to Western hemlock/dwarf Oregon grape. The Western hemlock /dwarf Oregon grape occurs on the flattest segment (R2).

Valley cross sections

Rush Creek tributary Class IV

S. Fork Mckenzie River watershed	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
Rush Creek	2280’	1’	340	341’

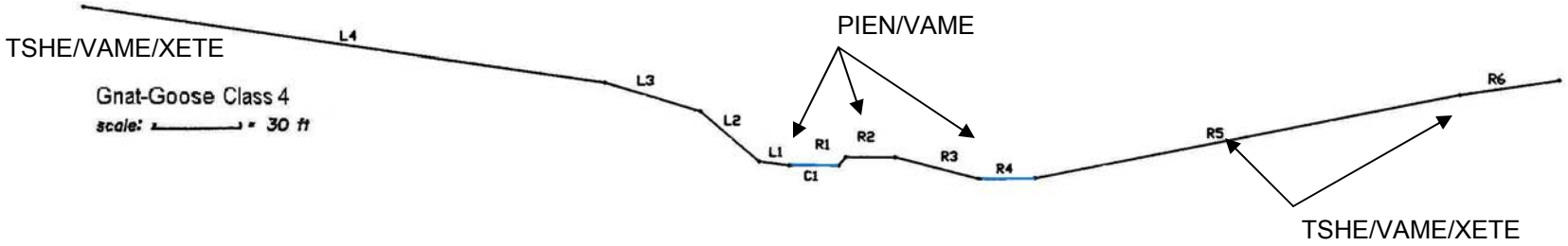


This intermittent is on a steep hot south slope in the Douglas-fir series, which is the warmest and driest forested series in northwest Oregon. The stream gradient is about 9-% at this site. No riparian species occurred on the transect. The channel itself had upland species such as salal, common snowberry, bald hip rose, and dwarf Oregon grape. Poison oak was found on the left segment closest ot the channel. The upland plant associations were the moistest in the Douglas-series, and may be influenced by the drainage.

Valley cross sections

Gnat-Goose Class IV

S. Fork Mckenzie River watershed	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
Mink Lake Basin	4880’	12’	130	352’

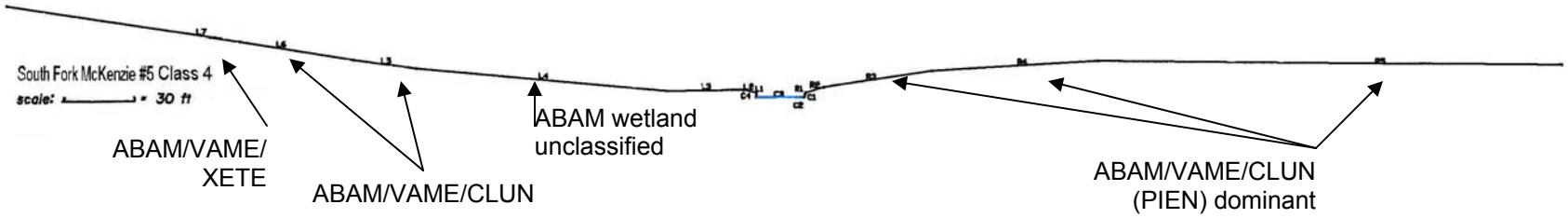


This intermittent is from the Mink Lake Basin on the High Cascades Plateau. It is in the high elevation mountain hemlock zone. Field notes: “It’s a big creek when active.” The cobble/boulder bar (R1-3) between the overflow channel (R4) and the main channel appears to be under water during high flow. The Englemann spruce/bigleaf huckleberry community occupies the left bank and cobble/boulder bar within a Mountain hemlock/big leaf huckleberry/beargrass plant association matrix.

Valley cross sections

South Fork McKenzie River #5 Class IV

S. Fork Mckenzie River watershed	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
S. Fork McKenzie	4540’	22’	flat	620’

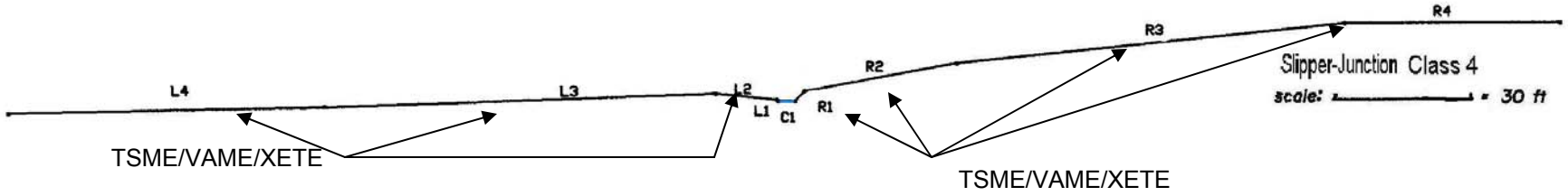


This is a single channel in an open, marshy setting in the upper silver fir zone. Note that Silver fir/big huckleberry/queencup beadlily (ABAM/VAME/CLUN) upland plant association is in the concave or flat segments, while the drier Silver fir/big huckleberry/beargrass (ABAM/VAME/XETE) is found on the steeper limb of the transect. Engelmann spruce dominates the upland on the right transect. Mountain alder and spiraea line the left bank.

Valley cross sections

Slipper-Junction Class IV

S. Fork Mckenzie River watershed	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
Mink Lake Basin	4990’	4’	200	343’

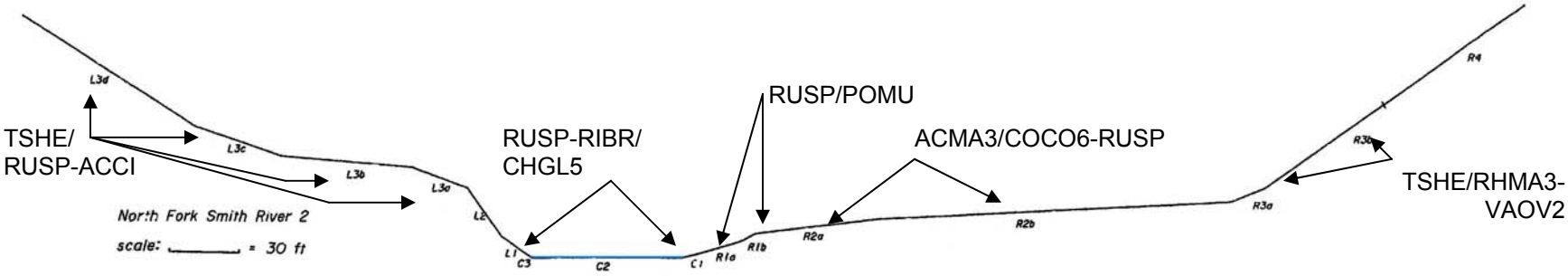


This is another Mink Lake Basin intermittent, in a gently slope surface at nearly 5000 feet in the mountain hemlock zone. This creek has only a third of the channel width of the other Mink Lake Basin example, Gnat-Goose, and it has a much more restricted riparian influence zone. A trace of nodding trisetum (*T. cernuum*) ws the only species recorded in the channel. No other riparian species are recorded. The riparian area itself seems poorly defined. The upland plant association Mountain hemlock/big huckleberry/beargrass (TSME/VAME/XETE) is adjacent to the channel on both sides.

COAST RANGE

North Fork Smith River #2 (Siuslaw NF)

Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
N. Fork Smith River	4	270’	77’	248	869’



Riparian: This bedrock channel is bounded on both sides by the Salmonberry-stink currant/water-carpet community. The terrace/steep toeslope type Salmonberry/sword fern transitions into Big leaf maple/California hazel-salmonberry community at the slope break to the broad valley floor.

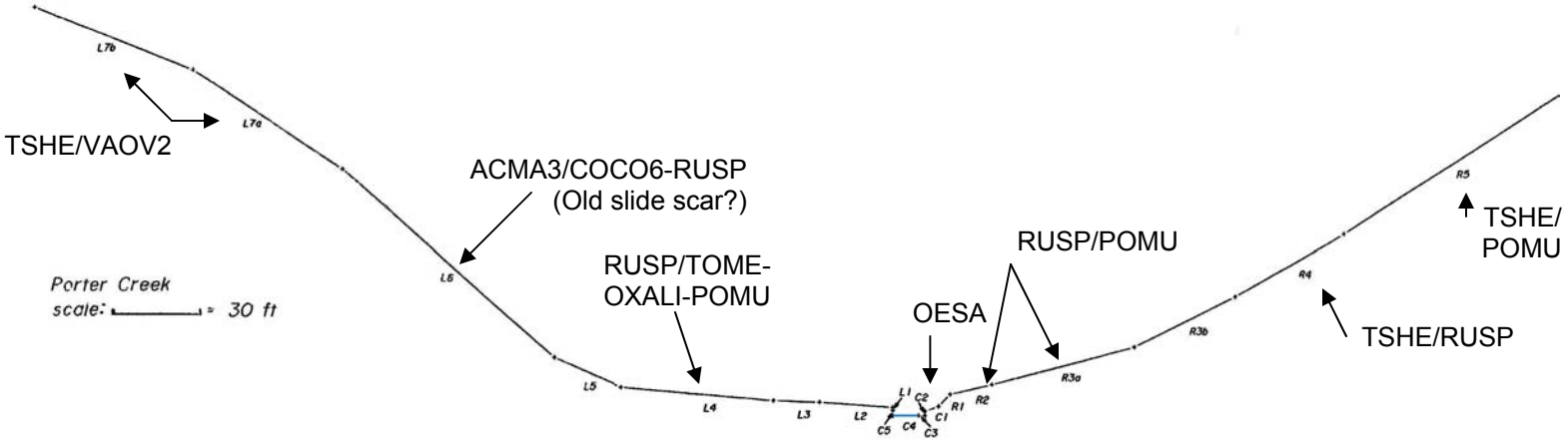
Upland: Western hemlock/salmonberry-vine maple (TSHE/RUSP-ACCI) is relatively moist. Western hemlock/rhododendron-evergreen huckleberry (TSHE/RHMA3-VAOV2) is well-drained. These two associations are common in the southwestern Siuslaw NF.

Slope distance from creek (feet)	220	170	120	70	20	0	20	70	120	170	220
Conifer basal area (Sq. ft/acre)	80	140	80	0	0		0	60	180	100	180
Hardwood basal area (Sq. ft/acre)	0	20	0	60	220		100	60	0	20	0

Valley cross sections

Porter Creek (Siuslaw NF)

Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
N. Fork Siuslaw River	1	270’	17’	128	571’



Riparian: Porter Creek has exposed bedrock during summer low flow. Salmonberry-piggyback plant-sorrel-*sword fern phase* is found on the wide floodplain (L4). Just below is the within-channel Waterparsley community. The Salmonberry-sword fern community occupies the right bank elevated terrace. On the left, Big leaf maple/California hazel-salmonberry is on an old slide scar on the steep valley wall.

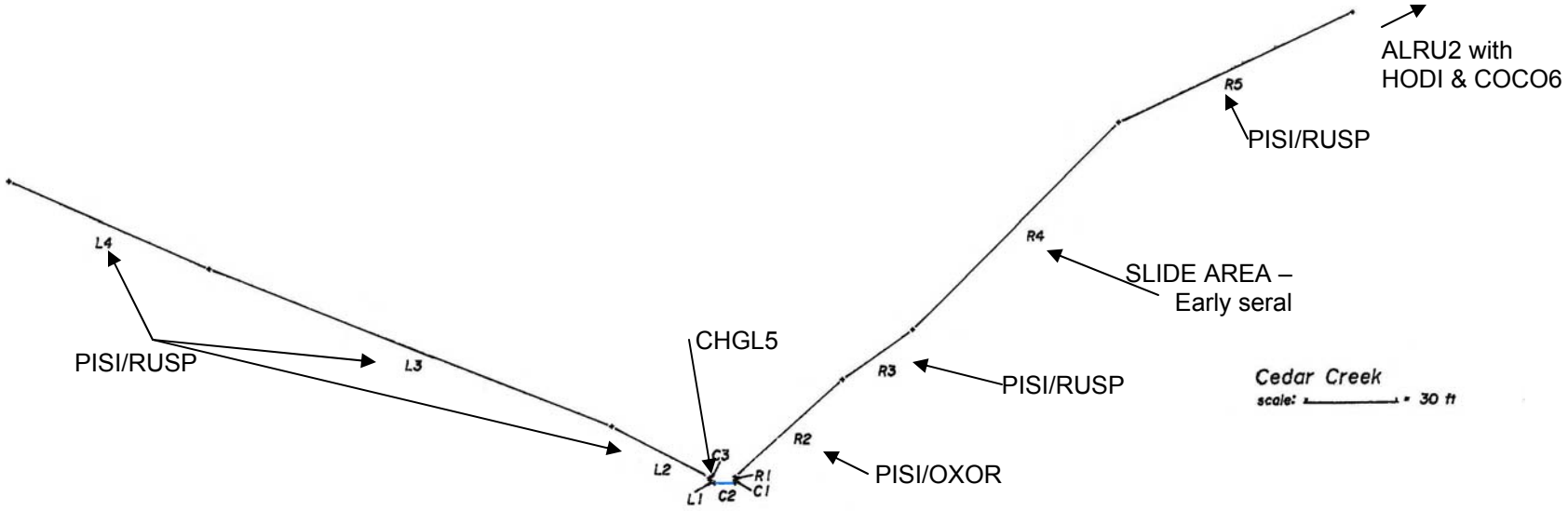
Upland: The right side of the transect shows a typical transition from the moist Western hemlock/sword fern (TSHE/POMU-NWO Coast) in the mid-slope to the wetter Western hemlock/salmonberry (TSHE/RUSP) association on the lower slope. Note that the well-drained coastal Western hemlock/evergreen huckleberry (TSHE/VAOV2) occupies the convex upper position on the left side of the transect.

Slope distance from creek (feet)	220	170	120	70	20	0	20	70	120	170	220
Conifer basal area (Sq. ft/acre)	120	0	0	0	0		0	20	20	60	140
Hardwood basal area (Sq. ft/acre)	0	60	60	120	20		60	20	0	0	0

Valley cross sections

Cedar Creek
(Siuslaw NF-Waldport)

Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
Drift Creek (to Alsea River)	1	80’	3’	165	464’

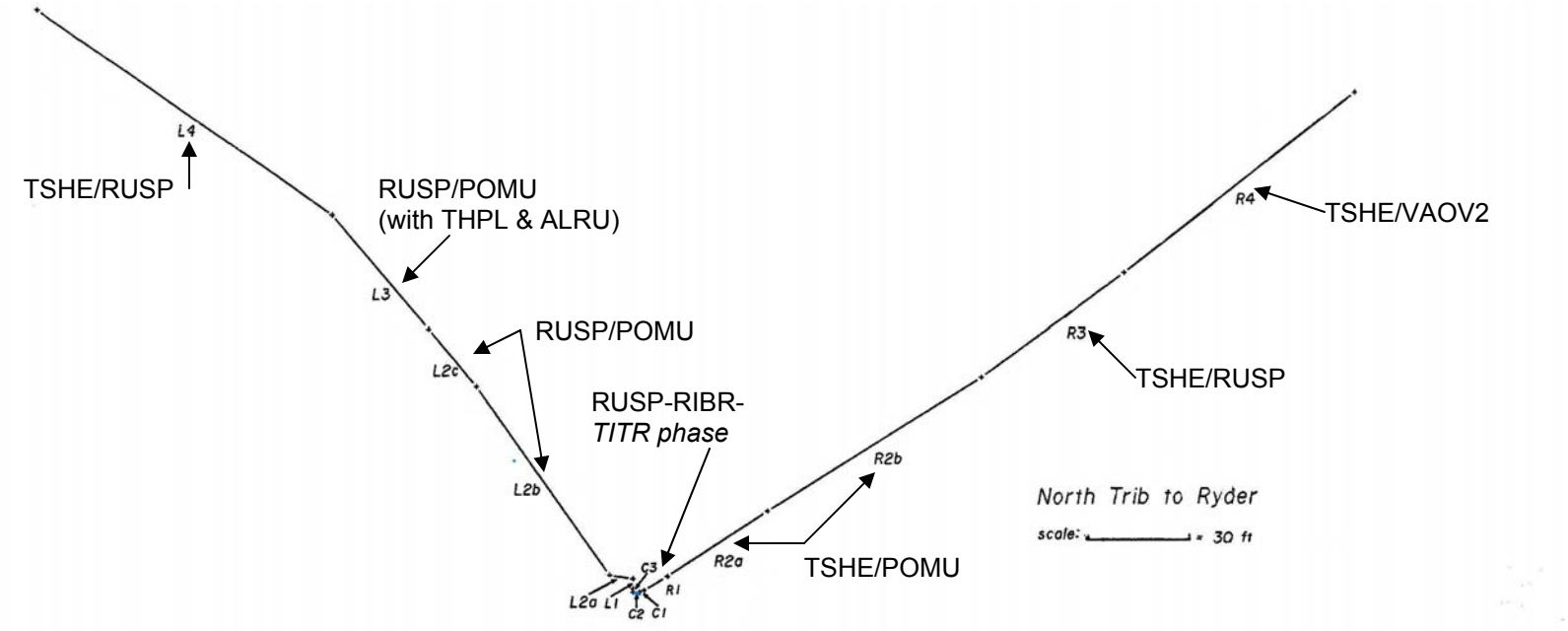


The riparian types for this small tributary to Drift Creek include only the Water-carpet community adjacent to the narrow creek. It is in the high precipitation fog belt Sitka spruce zone. Note that the wettest association in the Sitka spruce series, Sitka spruce/salmonberry (PISI/RUSP) is found on gentle to moderate slopes near the creek, but that the slightly drier Sitka spruce/oxalis (PISI/OXOR) association is found on a steeper segment (R2). An early seral seepy slide (R4) is found on the right side. At the top of the transect, warm site indicators oceanspray and California hazel mark a transition in moisture and/or microclimate.

Valley cross sections

North tributary to Ryder Creek (Siuslaw NF)

Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
Maple Crk (Siltcoos Lake)	1	600’	3’	250	461’



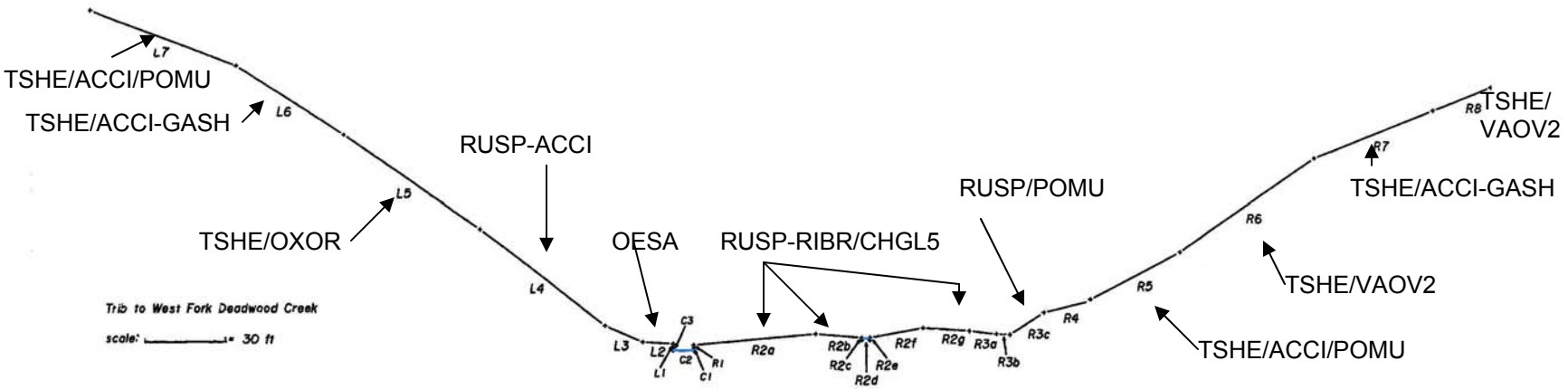
Riparian: Western redcedars are present from the creek to the ridge. The very steep left slope has red alder dominated Salmonberry/sword fern community (L3) and shrubby Salmonberry/sword fern (L2b) which may be early seral slide scar vegetation in this context. Near channel riparian communities are confined to the Salmonberry-stink currant-*foamflower phase* on the right bank (R1).

Upland: As in Porter Creek, Western hemlock/evergreen huckleberry (TSHE/VAOV2) occupies the upslope position (R4). However, here the moist Western hemlock/sword fern (TSHE/POMU-NWO Coast) (R2) appears below the wetter Western hemlock/salmonberry (TSHE/RUSP) (R3). Perhaps segment R3 is more concave than is suggested by the vertical profile.

Valley cross sections

Tributary-West Fork Deadwood Creek (Siuslaw NF)

Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
Lower Siuslaw River	2	420’	8’	210	560’



Riparian: The wider valley floor and gentler hillslope provide a contrast to the North tributary to Ryder Creek. This transect is more similar to Porter Creek. The main channel is on the left side of the valley, with two overflow channels. Red alder and the Salmonberry-stink currant/water-carpet community occupy the bars between the channels. The Waterparsley community is found on the low shelf adjacent to the main channel (L2). The steep valley wall supports the Salmonberry-vine maple community.

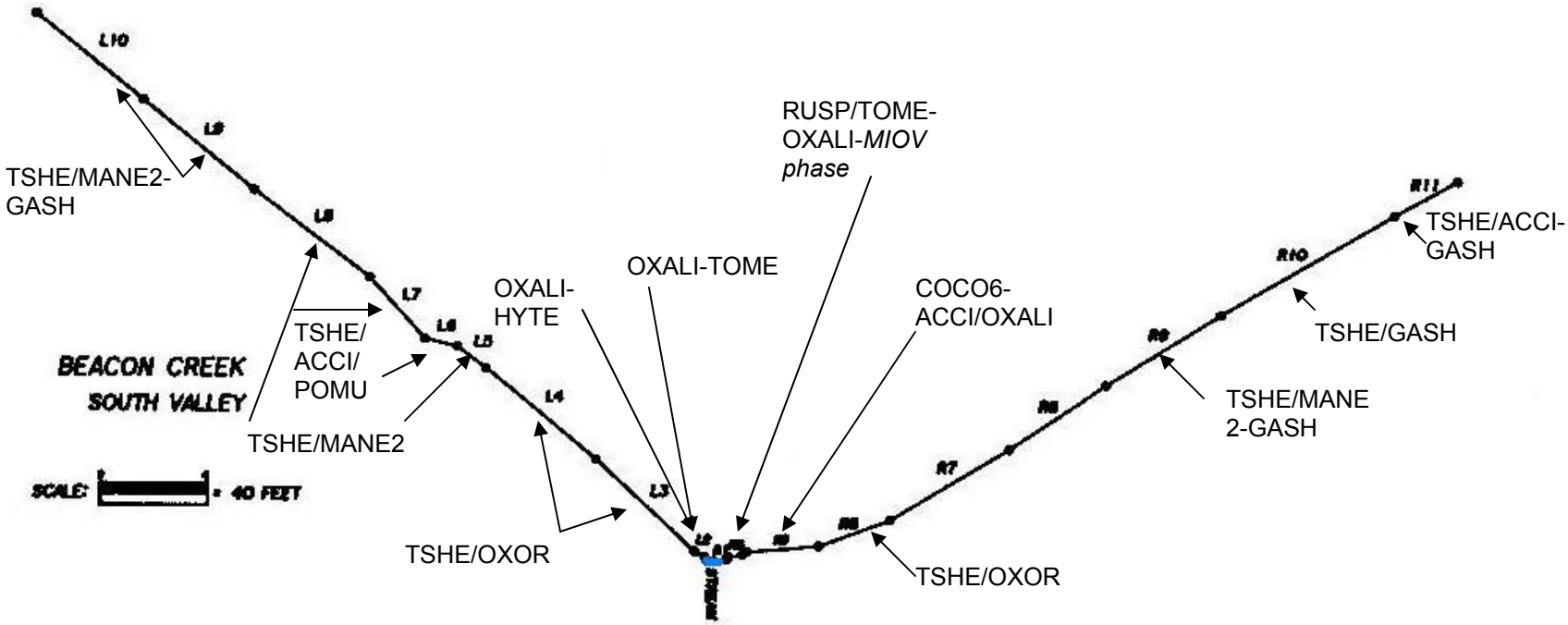
Upland: Well-drained Western hemlock/vine maple-salal (TSHE/ACCI-GASH-NWO Coast) and Western hemlock/evergreen huckleberry (TSHE/VAOV2) are on steep or convex segments, while the moist Western hemlock/vine maple/sword fern (TSHE/ACCI/POMU) and Western hemlock/oxalis (TSHE/OXOR-NWO Coast) dominate the flatter segments and lower slope positions.

Slope distance from creek (feet)	220	170	120	70	20	0	20	70	120	170	220
Conifer basal area (Sq. ft/acre)	60	60	140	60	40			0	60	160	260
Hardwood basal area (Sq. ft/acre)	0	0	20	20	20			40	0	0	0

Valley cross sections

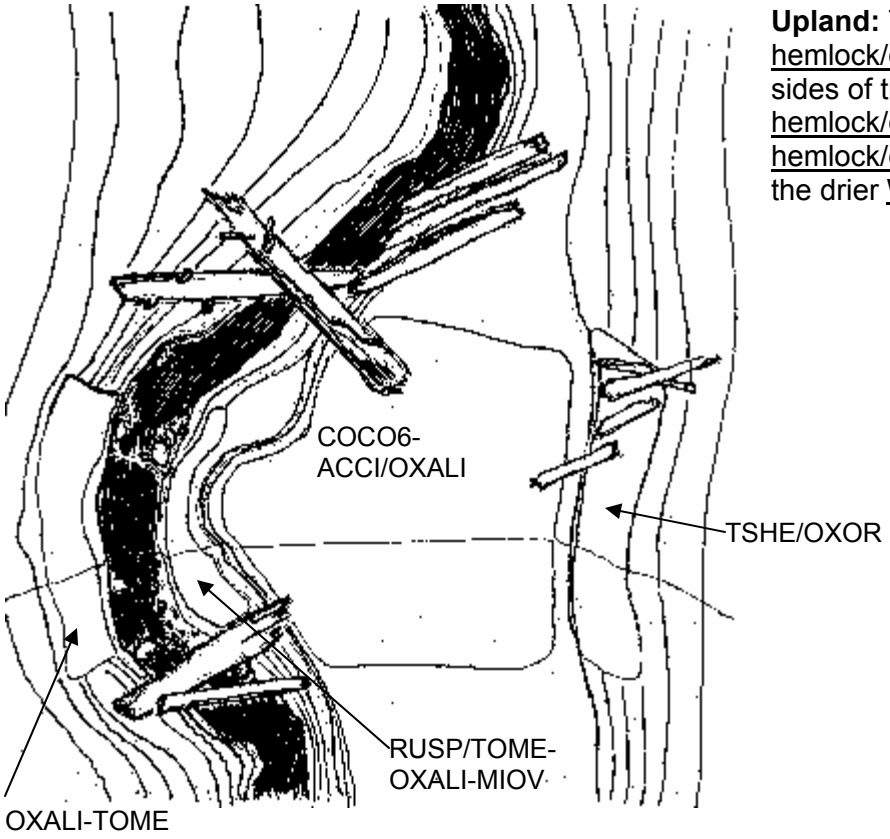
Beacon Creek (Roseburg BLM)

Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
Upper Smith River	3	915’	7’	300	607’



Riparian: Beacon Creek illustrates the riparian vegetation patterns in the drier southeastern Cost Range of the upper Smith and upper Siuslaw River drainages. Here, salmonberry is confined to the active floodplain (R3) in the Salmonberry/piggyback plant-*oval-leaved mitrewort phase*. On the left bank the channel margin type is Sorrel-piggyback plant. A major terrace (R5) supports California hazel-vine maple/sorrel. The influence of precipitation zone is suggested in comparing the distribution of salmonberry across the valley floor and hillslope in Porter Creek to Beacon Creek.

Valley cross sections



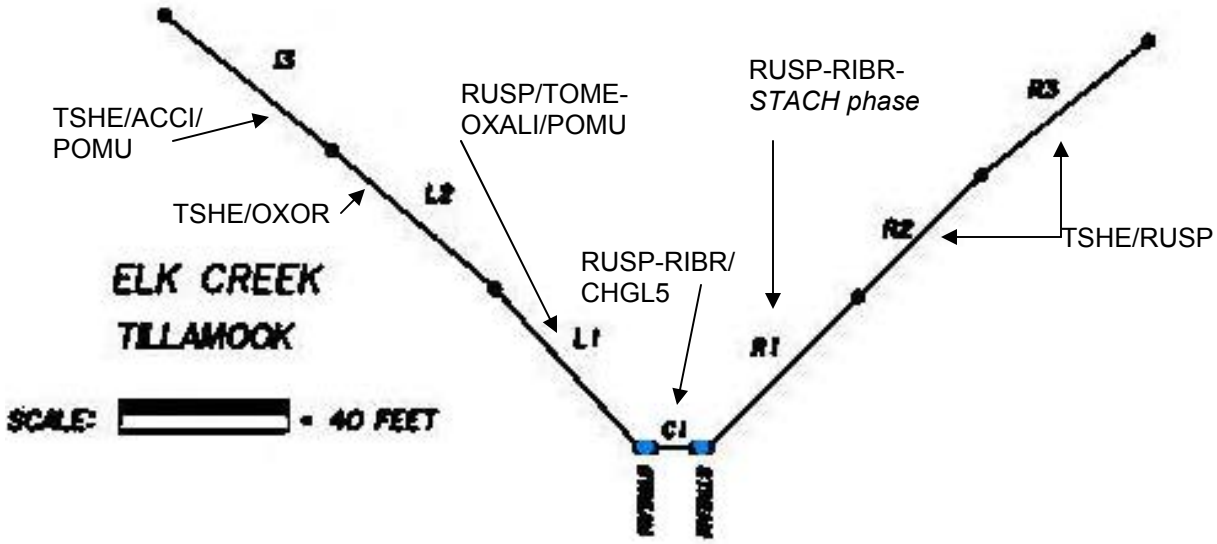
Upland: The gentle toeslope (R6) supports the upland Western hemlock/oxalis (TSHE/OXOR-NWO Coast). Away from the creek, both sides of the transect transition from the oxalis type through Western hemlock/dwarf Oregon grape (TSHE/MANE2-NWO Coast) and Western hemlock/dwarf Oregon grape-salal (TSHE/MANE2-GASH-NWO Coast) to the drier Western hemlock/salal (TSHE/GASH-NWO Coast).

Slope distance from creek (feet)	300	250	200	150	100	50	0	50	100	150	200	250	300
Conifer basal area (Sq. ft/acre)	90	150	160	100	90	70		120	200	180	160	240	190
Hardwood basal area (Sq. ft/acre)	20	10	10	0	20	50		40	20	0	20	20	10

Valley cross sections

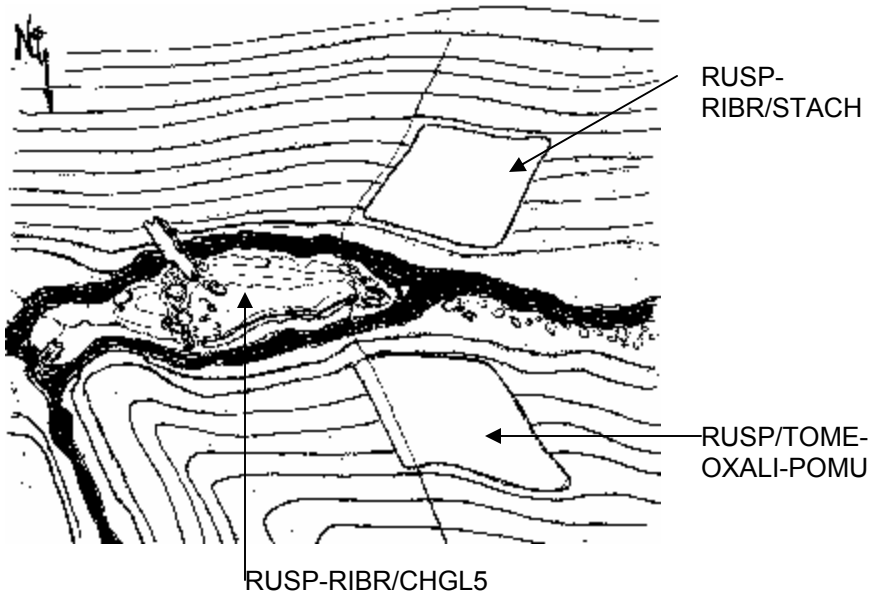
Elk Creek (Salem BLM-Tillamook)

Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
Upper Nestucca River	3	1390’	18’	140	318’



Riparian: Salmonberry-stink currant/water-carpet is found on the mid-channel bar. The Salmonberry-stink currant-*betony phase* borders the creek on the right (R1), while the Salmonberry/piggyback plant-sorrel-*sword fern phase* is on the steep bank of the alluvial fan adjacent to the channel on the left side (L1). These two types are most commonly found on floodplains. One explanation is the steep banks may have water tables unusually close to the surface that supply enough moisture to support riparian species. Another possibility is that annual flows are high enough to influence the lower portions of these segments.

Valley cross sections

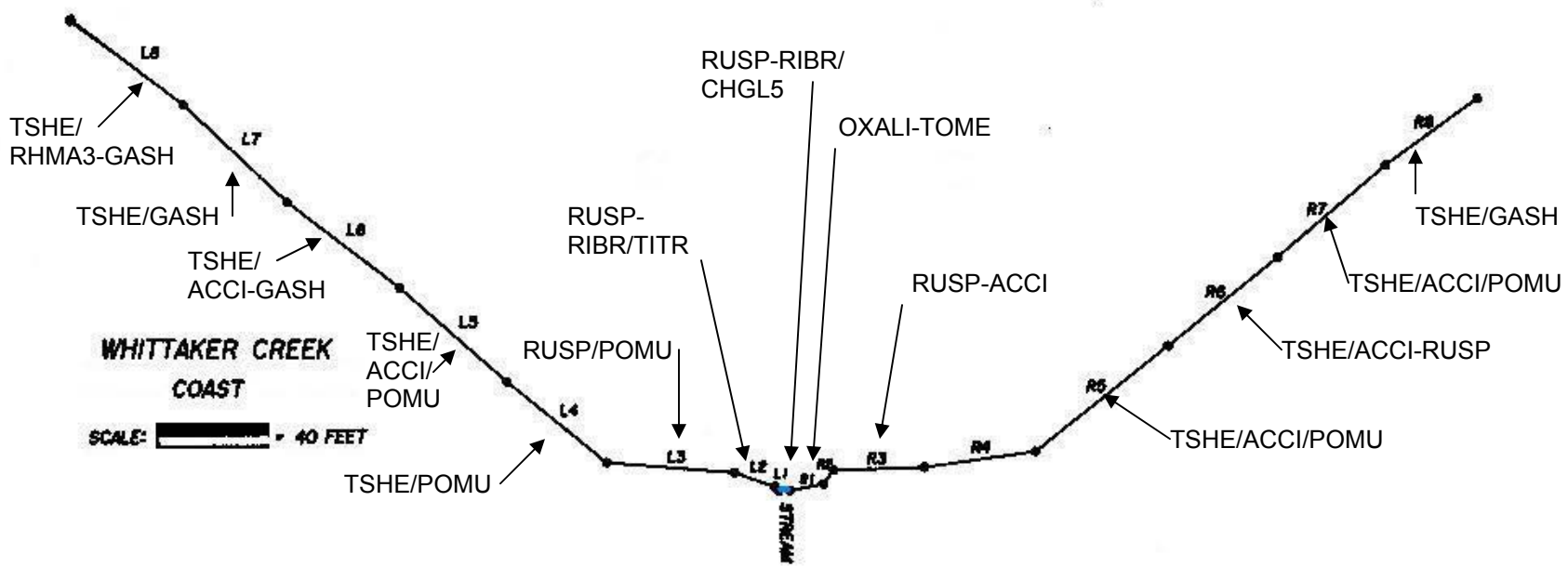


Slope distance from creek (feet)	150	50	0	50	150	50
Conifer basal area (Sq. ft/acre)	100	80		20	200	240
Hardwood basal area (Sq. ft/acre)	20	20		0	80	80

Valley cross sections

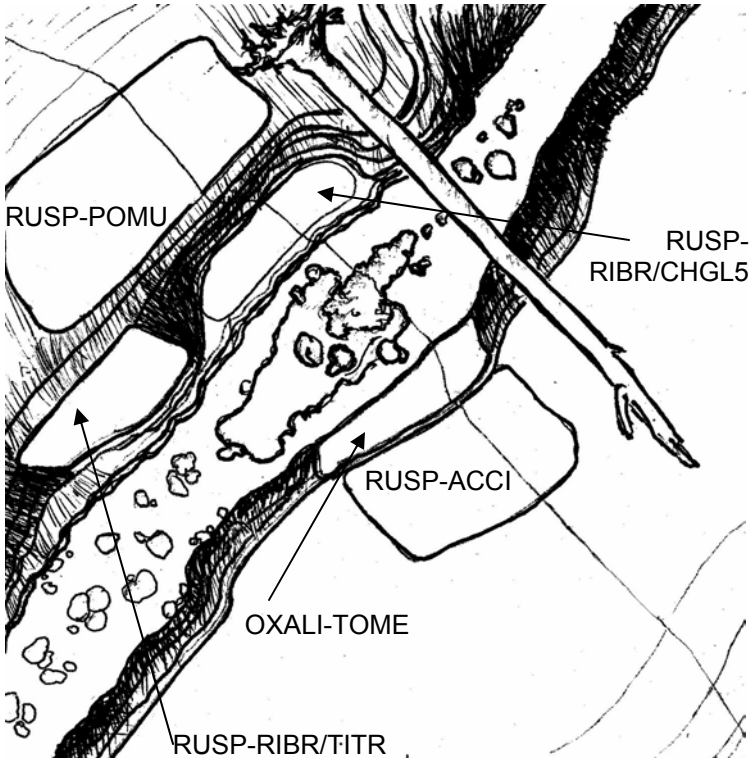
Whittaker Creek (Eugene BLM)

Watershed	Stream order	Elevation	Bankfull width	Stream aspect	Transect length (slope distance)
Siuslaw River	3	680’	17’	30	614’



Riparian: This is a tributary to the Siuslaw River, about 15 miles south of the West Fork Deadwood Creek site. It shows a similar array of communities although the Whittaker Creek is a simply one channel system at this site. This transect illustrates the community/geomorphic surface relationships typical of Coast Range streams in moderate to high precipitation zones. The Salmonberry-stink currant/water-carpet community is found at the channel margin. Above that level, the Salmonberry-stink currant-*foamflower phase* occurs on the active floodplain (L2). Salmonberry/sword fern occupies a broad terrace (L3). On the right, Sorrel-piggyback plant occupies the channel margin. The Salmonberry-vine maple community is on the elevated terrace (R3).

Valley cross sections



Upland: The upland associations on the left limb of the transect range form the moist Western hemlock/sword fern (TSHE/POMU-NWO Coast) at the toeslope through the well-drained Western hemlock/vine maple-salal (TSHE/ACCI-GASH-NWO Coast) or Western hemlock/salal (TSHE/GASH-NWO Coast) to Western hemlock/rhododendron-salal (TSHE/RHMA3-GASH-NWO Coast), typical of upper slopes in the southern portion of the Coast Range. On the right transect, wet Western hemlock/vine maple-salmonberry (TSHE/ACCI-RUSP) gives way to mid-slope moist Western hemlock/vine maple/sword fern (TSHE/ACCI/POMU). Well-drained Western hemlock/vine maple-salal (TSHE/ACCI-GASH-NWO Coast) is in the upper slope position.

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Slope distance from creek (feet)	300	250	200	150	100	50	0	50	100	150	200	250	300
Conifer basal area (Sq. ft/acre)	220	220	140	120	140	80		180	220	80	40	80	220
Hardwood basal area (Sq. ft/acre)	20	0	0	0	20	30		0	0	20	40	0	0

Appendix I: Species list from streamside plots

(non-native species in italics)

Scientific name	Common name	Wetland	Origin	PLANTS code
Abies	True fir species	UNK	native	ABIES
Abies amabilis	Silver fir	FACU	native	ABAM
Abies grandis	Grand fir	FACU	native	ABGR
Abies lasiocarpa	Subalpine fir	FACU	native	ABLA
Abies procera	Noble fir	UPL	native	ABPR
Acer circinatum	Vine maple	FAC-	native	ACCI
Acer glabrum var. douglasii	Rocky Mountain maple	FAC	native	ACGLD4
Acer macrophyllum	Big leaf maple	FACU	native	ACMA3
Achillea millefolium	Yarrow	FACU	native	ACMI2
Achlys triphylla	Vanilla leaf	UPL	native	ACTR
Aconitum columbianum	Columbian monkshood	FACW	native	ACCO4
Aconitum columbianum ssp. columbianum	Columbian monkshood	FACW	native	ACCOC2
Aconitum columbianum ssp. viviparum	Columbian monkshood	FACW	native	ACCOV2
Actaea rubra	Red baneberry	UPL	native	ACRU2
Adenocaulon bicolor	Pathfinder	UPL	native	ADBI
Adiantum pedatum	Maidenhair fern	FAC	native	ADPE
Ageratina occidentalis	Western snakeroot	UPL	native	AGOC2
Agoseris	Agoseris species	UNK	native	AGOSE
Agoseris elata	Tall agoseris	FAC	native	AGEL
Agrostis	Bentgrass species	UNK	unknown	AGROS2
Agrostis capillaris	*Colonial bentgrass*	FACU	exotic	AGCA5
Agrostis exarata	Spike bentgrass	FACW	native	AGEX
Agrostis humilis	Alpine bentgrass	FACW	native	AGHU
Agrostis oregonensis	Oregon bentgrass	FAC	native	AGOR
Agrostis pallens	Dune bentgrass	FACU	native	AGPA8
Agrostis stolonifera	*Creeping bentgrass*	FAC	exotic	AGST2
Agrostis stolonifera	*Creeping bentgrass*	FAC+	exotic	AGST2
Alnus incana	Mountain alder	FACW	native	ALIN2
Alnus rubra	Red alder	FAC	native	ALRU2
Alnus viridis	Sitka alder	FACW	native	ALVI5
Amaranthus	Pigweed species	UNK	unknown	AMARA
Amelanchier alnifolia	Saskatoon serviceberry	FACU	native	AMAL2
Anaphalis margaritacea	Pearly everlasting	UPL	native	ANMA
Anemone	Anemone species	UNK	native	ANEMO
Anemone deltoidea	Three-leaved anemone	UPL	native	ANDE3
Anemone lyallii	Lyall's anemone	UPL	native	ANLY
Anemone oregana	Blue windflower	FACU	native	ANOR
Angelica	Angelica species	FACW	native	ANGEL
Angelica arguta	Sharptooth angelica	FACW	native	ANAR3
Angelica arguta	Sharptooth angelica	FACW	native	ANAR3
Angelica genuflexa	Kneeling angelica	FACW	native	ANGE2
Antennaria argentea	Silver pussytoes	FACU	native	ANAR5
Anthoxanthum odoratum	*Sweet vernalgrass*	FACU	exotic	ANOD

Aquilegia	Columbine speices	FAC	native	AQUIL
Aquilegia formosa	Sitka columbine	FAC	native	AQFO
Aralia californica	California spikenard	FAC+	native	ARCA2
Arenaria	Sandwort species	UNK	unknown	ARENA
Arnica	Arnica species	UNK	native	ARNIC
Arnica amplexicaulis	Streambank arnica	FACW	native	ARAM2
Arnica latifolia	Broadleaf arnica	FAC-	native	ARLA8
Artemisia douglasiana	Douglas' sagewort	FACW	native	ARDO3
Aruncus dioicus	Nettle	FACU	native	ARDI8
Asarum caudatum	Wild ginger	FACU	native	ASCA2
Aster alpigenus	Alpine aster	FAC	native	ASAL2
Aster modestus	Great northern aster	FACW	native	ASMO3
Athyrium filix-femina	Lady fern	FAC+	native	ATFI
Berberis aquifolium	Tall Oregon grape	UPL	native	BEAQ
Berberis nervosa	Dwarf Oregon grape	UPL	native	BENE2
Blechnum spicant	Deer fern	FAC+	native	BLSP
Borago	Borage species	UNK	unknown	BORAG
Botrychium multifidum	Leathery grapefern	FAC	native	BOMU
Boykinia major	Large boykinia	FACW	native	BOMA3
Boykinia occidentalis	Coastal boykinia	FACW	native	BOOC2
Bromus	Brome species	UNK	unknown	BROMU
Bromus inermis	*Smooth brome*	FAC	exotic	BRIN2
Bromus pacificus	Pacific brome	UPL	native	BRPA3
Bromus rigidus	*Ripgut brome*	UPL	exotic	BRDI3
Bromus sitchensis	Alaska brome	FACU	native	BRSI
Bromus vulgaris	Colombian brome	UPL	native	BRVU
Calamagrostis	Reedgrass species	UNK	native	CALAM
Calamagrostis canadensis	Bluejoint	FACW	native	CACA4
Calocedrus decurrens	Incense cedar	UPL	native	CADE27
Caltha leptosepala	Broad-leaved marsh-marigold	OBL	native	CALE4
Camassia quamash	Common camas	FACW	native	CAQU2
Campanula	Campanula species	UNK	unknown	CAMPA
Campanula scouleri	Scouler's bluebell	UPL	native	CASC7
Cardamine	Bittercress species	UNK	unknown	CARDA
Cardamine angulata	Angled bittercress	FACW	native	CAAN5
Cardamine breweri	Brewer's bittercress	FACW	native	CABR6
Cardamine cordifolia	Heartleaf bittercress	FACW	native	CACO6
Cardamine occidentalis	Western bittercress	FACW	native	CAOC
Cardamine oligosperma	Few-sided bittercress	FAC	native	CAOL
Carex	Sedge species	UNK	unknown	CAREX
Carex aquatilis	Water sedge	OBL	native	CAAQ
Carex aquatilis var. dives	Sitka sedge	OBL	native	CAAQD
Carex aquatilis var. dives	Sitka sedge	OBL	native	CAAQD
Carex athrostachya	Slenderbeak sedge	FACW	native	CAAT3
Carex deweyana	Dewey's sedge	FACU	native	CADE9
Carex echinata	Prickly sedge	FACW	native	CAEC
Carex hendersonii	Henderson's sedge	FAC	native	CAHE7
Carex integra	Smoothbeak sedge	FACU	native	CAIN10

Carex interrupta	Greenfruit sedge	OBL	native	CAIN17
Carex laeviculmis	Smoothstem sedge	FACW	native	CALA13
Carex lenticularis	Tufted sedge	FACW	native	CALE8
Carex luzulina	Woodrush sedge	OBL	native	CALU7
Carex mertensii	Merten's sedge	FAC	native	CAME6
Carex multicostata	Manyrib sedge	FACU	native	CAMU6
Carex obnupta	Slough sedge	OBL	native	CAOB3
Carex pachystachya	Thick-headed sedge	FAC	native	CAPA14
Carex saxatilis	Russet sedge	FACW	native	CASA10
Carex spectabilis	Showy sedge	FACW	native	CASP5
Castilleja	Indian paintbrush species	UNK	native	CASTI2
Castilleja miniata	Common red paintbrush	FAC	native	CAMI12
Ceanothus velutinus	Snowbrush ceanothus	UPL	native	CEVE
Cerastium	Chickweed species	UNK	unknown	CERAS
Cerastium fontanum ssp. vulgare	*Big chickweed*	FACU	exotic	CEFOV2
Cerastium glomeratum	*Sticky chickweed*	UPL	exotic	CEGL2
Chamaecyparis nootkatensis	Alaska yellow-cedar	FAC	native	CHNO
Chamaecyparis nootkatensis	Alaska-cedar	FAC	native	CHNO
Chamerion angustifolium var. canescens	Fireweed	FACU	native	EPAN2
Chimaphila umbellata	Prince's pine	UPL	native	CHUM
Chrysolepis chrysophylla	Chinquapin	UPL	native	CHCH7
Chrysosplenium glechomifolium	Water-carpet	OBL	native	CHGL5
Cicuta douglasii	Douglas' water-hemlock	OBL	native	CIDO
Cimicifuga laciniata	Mount Hood bugbane	FACW	native	CILA
Cinna latifolia	Wood reedgrass	FACW	native	CILA2
Circaea alpina	Enchanter's-nightshade	FAC	native	CIAL
Cirsium	Thistle species	UNK	unknown	CIRSI
Cirsium arvense	*Canada thistle*	FAC-	exotic	CIAR4
Cirsium vulgare	*Bull thistle*	FACU	exotic	CIVU
Claytonia cordifolia	Heart-leaved springbeauty	FACW	native	CLCO3
Claytonia perfoliata	Miner's lettuce	FAC	native	CLPE
Claytonia sibirica	Siberian miner's lettuce	FAC	native	CLSI2
Clintonia uniflora	Queencup beadlily	UPL	native	CLUN2
Collinsia parviflora	Small-flowered blue-eyed Mary	UPL	native	COPA3
Collomia heterophylla	Varied leaf collomia	FACU	native	COHE2
Coptis	Goldthread species	UNK	native	COPTI
Coptis laciniata	Gold thread	FAC	native	COLA3
Corallorhiza	Coralroot species	UNK	native	CORAL
Corallorhiza maculata	Western coral root	UPL	native	COMA4
Cornus nuttallii	Pacific dogwood	UPL	native	CONU4
Cornus sericea	Red osier dogwood	FACW	native	COSE16
Cornus unalaschkensis	Dogwood bunchberry	FAC-	native	COUN
Corydalis	Corydalis species	UNK	unknown	CORYD
Corydalis aquae-gelidae	Cold-water corydalis	OBL	native	COAQ
Corydalis scouleri	Scouler's corydalis	FAC+	native	COSC4
Corylus cornuta	California hazel	FACU	native	COCO6
Crataegus douglasii	Black hawthorn	FAC	native	CRDO2

Cynoglossum	Hound's-tongue species	UNK	unknown	CYNOG
Cytisus scoparius	*Scotch broom*	UPL	exotic	CYSC4
Dactylis glomerata	*Orchard grass*	FACU	exotic	DAGL
Delphinium glareosum	Olumpic larkspur	UPL	native	DEGL
Delphinium nuttallianum	Two-lobe larkspur	FAC	native	DENU2
Delphinium occidentale	*Western larkspur*	FACU	exotic	DEOC
Delphinium trolliifolium	Trollius-leaved larkspur	UPL	native	DETR2
Deschampsia cespitosa	Tufted hairgrass	FACW	native	DECE
Deschampsia elongata	Slender hairgrass	FACW	native	DEEL
Dicentra formosa	Pacific bleedingheart	UPL	native	DIFO
Digitalis purpurea	*Common foxglove*	FACU	exotic	DIPU
Distichlis spicata	Seashore saltgrass	FACW	native	DISP
Dodecatheon dentatum	Dentate shooting star	FACW	native	DODE
Dryopteris carthusiana	Wood fern	FAC+	native	DRCA11
Eleocharis	Spike-rush species	UNK	unknown	ELEOC
Eleocharis palustris	Creeping spike-rush	OBL	native	ELPA3
Elymus	Wildrye species	UNK	unknown	ELYMU
Elymus glaucus	Blue wildrye	FACU	native	ELGL
Enemion hallii	Willamette false rue anemone	UPL	native	ENHA
Epilobium	Willowherb species	UNK	unknown	EPILO
Epilobium anagallidifolium	Alpine willowherb	FACW	native	EPAN4
Epilobium ciliatum ssp. glandulosum	Purple-leaved willowherb	FACW	native	EPCIG
Epilobium ciliatum ssp. watsonii	Purple-leaved willowherb	FACW	native	EPCIW
Epilobium glaberrimum	Smooth willowherb	FACW	native	EPGL
Epilobium luteum	Yellow willowherb	FACW	native	EPLU
Epilobium minutum	Small-flowered willowherb	UPL	native	EPMI
Equisetum	Horsetail species	UNK	native	EQUIS
Equisetum arvense	Common horsetail	FAC	native	EQAR
Equisetum hyemale	Scouring-rush	FACW	native	EQHY
Equisetum telmateia	Giant horsetail	FACW	native	EQTE
Erechtites minima	*Coastal burnweed*	FACU	exotic	ERMI6
Erigeron peregrinus	Subalpine daisy	UPL	native	ERPE3
Festuca	Fescue species	UNK	unknown	FESTU
Festuca idahoensis	Idaho fescue	FACU	native	FEID
Festuca occidentalis	Western fescue	UPL	native	FEOC
Festuca subulata	Bearded fescue	FACU	native	FESU
Festuca trachyphylla	*Krajina hard fescue*	UPL	exotic	FEOV
Fragaria	Strawberry species	FACU	native	FRAGA
Fragaria vesca	Woodland strawberry	FACU	native	FRVE
Fragaria virginiana	Wild strawberry	FACU	native	FRVI
Fraxinus latifolia	Oregon ash	FACW	native	FRLA
Fritillaria	Fritillaria species	UNK	native	FRITI
Galium	Bedstraw species	UNK	unknown	GALIU
Galium aparine	Cleaver	FACU	native	GAAP2
Galium oreganum	Oregon bedstraw	FACU	native	GAOR
Galium trifidum	Small bedstraw	FACW	native	GATR2
Galium triflorum	Sweetscented bedstraw	FACU	native	GATR3
Gaultheria ovatifolia	Oregon wintergreen	FAC	native	GAOV2

Gaultheria shallon	Salal	FACU	native	GASH
Geranium columbinum	*Longstalk cranesbill*	UPL	exotic	GECO
Geum macrophyllum	Large-leaved avens	FAC+	native	GEMA4
Glechoma hederacea	*Ground-ivy*	FACU	exotic	GLHE2
Glyceria grandis	Reed mannagrass	OBL	native	GLGR
Glyceria striata	Tall mannagrass	FACW	native	GLST
Goodyera oblongifolia	Rattlesnake plantain	FACU	native	GOOB2
Gymnocarpium dryopteris	Western oakfern	FAC	native	GYDR
Hedera helix	*English ivy*	UPL	exotic	HEHE
Heracleum lanatum	Cow-parsnip	FAC	native	HELA4
Heuchera cylindrica var. glabella	Beautiful alumroot	UPL	native	HECYG
Heuchera micrantha	Small-flowered alumroot	UPL	native	HEMI7
Hieracium	Hawkweed species	UNK	unknown	HIERA
Hieracium albiflorum	White hawkweed	UPL	native	HIAL2
Hieracium gracile	Slender hawkweed	UPL	native	HIGR
Hieracium scouleri	Woolly-weed	UPL	native	HISC2
Holcus lanatus	*Common velvet-grass*	FAC	exotic	HOLA
Holodiscus discolor	Oceanspray	UPL	native	HODI
Huperzia chinensis	Star mustard	FACU	native	HUCH
Hydrophyllum	Pacific waterleaf	UNK	native	HYTE
Hydrophyllum	Waterleaf species	UNK	native	HYDRO4
Hydrophyllum tenuipes	Pacific waterleaf	FACU	native	HYTE
Hypericum anagalloides	Bog St.John's-wort	OBL	native	HYAN2
Hypericum formosum	Western St. John's-wort	FAC	native	HYFO4
Hypericum perforatum	*Common St.John's-wort*	UPL	exotic	HYPE
Hypochaeris	*Cat's-ear*	UNK	exotic	HYPOC
Hypochaeris radicata	*Hairy cat's ear*	FACU	exotic	HYRA3
Impatiens capensis	Jewelweed	FACW	native	IMCA
Juncus	Rush species	UNK	unknown	JUNCU
Juncus arcticus var. balticus	Arctic rush	FACW	native	JUBA
Juncus bufonius	Toad rush	FACW	native	JUBU
Juncus covillei	Coville's rush	FACW	native	JUCO5
Juncus effusus	Common rush	FACW	native	JUEF
Juncus ensifolius	Dagger-leaved rush	FACW	native	JUEN
Juncus parryi	Parry's rush	FAC+	native	JUPA
Juncus patens	Spreading rush	FACW	native	JUPA2
Juncus regelii	Regel's rush	FACW	native	JURE
Lactuca	Lettuce species	UNK	unknown	LACTU
Lactuca biennis	Tall blue lettuce	FAC	native	LABI
Lactuca muralis	*Wall-lettuce*	UPL	exotic	MYMU
Lactuca serriola	*Prickly lettuce*	FACU	exotic	LASE
Lapsana communis	*Common nipplewort*	UPL	exotic	LACO3
Lathyrus	Peavine species	UNK	unknown	LATHY
Lathyrus nevadensis	Purple peavine	UPL	native	LANEP
Leucanthemum vulgare	*Oxeye daisy*	UPL	exotic	LEVU
Ligusticum grayi	Gray's lovage	UPL	native	LIGR
Lilium	Lily species	UNK	native	LILIU
Lilium columbianum	Columbian lily	FAC	native	LICO

Linnaea borealis	Twinflower	FACU	native	LIBO3
Listera	Listera species	FAC	native	LISTE
Listera borealis	Northern twayblade	FACW	native	LIBO4
Listera caurina	Northwestern twayblade	FACU	native	LICA10
Listera convallarioides	Broad-leaved twayblade	FAC	native	LICO5
Listera cordata	Heartleaf twayblade	FAC	native	LICO6
Lolium arundinaceum	*Tall fescue*	FAC-	exotic	LOAR10
Lonicera	Honeysuckle species	UNK	unknown	LONIC
Lonicera ciliosa	Orange honeysuckle	UPL	native	LOCI3
Lonicera involucrata	Black twinberry	FAC+	native	LOIN5
Lotus corniculatus	*Bird's-foot trefoil*	FAC	exotic	LOCO6
Lotus crassifolius	Big deervetch	UPL	native	LOCR
Lotus denticulatus	Meadow birds-foot trefoil	UPL	native	LODE
Lupinus	Lupine species	UNK	unknown	LUPIN
Luzula	Woodrush	UNK	unknown	LUZUL
Luzula multiflora	*Many-flowered wood-rush*	FACU	exotic	LUCA2
Luzula multiflora ssp. multiflora	*Many-flowered wood-rush*	FACU	exotic	LUCAM3
Luzula parviflora	Small-flowered wood-rush	FAC-	native	LUPA4
Luzula parviflora	Small-flowered wood-rush	FAC-	native	LUPA4
Lysichiton americanum	Skunk cabbage	OBL	native	LYAM3
Maianthemum dilatatum	False lily of the valley	FAC	native	MADI
Maianthemum racemosum	False Solomon's-seal	FAC-	native	MARA7
Maianthemum stellatum	Starry false Solomon's-seal	FAC-	native	MAST4
Marah oreganus	Manroot	UPL	native	MAOR3
Melica subulata	Alaska oniongrass	UPL	native	MESU
Mentha spicata	*Spearmint*	OBL	exotic	MESP3
Mentha Xpiperita	*Peppermint*	FACW	exotic	MEPI
Menziesia ferruginea	Fool's huckleberry	FACU	native	MEFE
Mertensia ciliata	Ciliate bluebells	FACW	native	MECI3
Mertensia paniculata	Tall bluebells	FACW	native	MEPA
Mimulus	Monkeyflower species	UNK	native	MIMUL
Mimulus alsinoides	Chickweed monkey-flower	OBL	native	MIAL3
Mimulus dentatus	Tooth-leaved monkeyflower	OBL	native	MIDE3
Mimulus guttatus	Yellow monkeyflower	OBL	native	MIGU
Mimulus lewisii	Pink monkeyflower	FACW	native	MILE2
Mimulus moschatus	Musk-flower	FACW	native	MIMO3
Mitella	Mitrewort species	UNK	native	MITEL
Mitella breweri	Brewer's miterwort	FAC	native	MIBR6
Mitella caulescens	Leafy mitrewort	UPL	native	MICA5
Mitella ovalis	Oval-leaved mitrewort	OBL	native	MIOV
Mitella pentandra	Five=stamen mitrewort	FAC	native	MIPE
Moehringia macrophylla	Big-leaved sandwort	UPL	native	MOMA3
Montia linearis	Narrow-leaved Montia	UPL	native	MOLI4
Montia parvifolia	Streambank springbeauty	FACW	native	MOPA2
Muhlenbergia filiformis	Slender muhlenbergia	FACW	native	MUFI2
Myosotis laxa	Small-flowered forget-me-not	OBL	native	MYLA
Nemophila	Baby blue-eyes species	UNK	unknown	NEMOP
Nemophila parviflora	Smallflower nemophila	UPL	native	NEPA

Nothochelone nemorosa	Woodland penstemon	UPL	native	NONE3
Oemleria cerasiformis	Indian plum	FACU	native	OECE
Oenanthe sarmentosa	Waterparsley	OBL	native	OESA
Oplopanax horridum	Devil's club	FAC+	native	OPHO
Orthilia secunda	Sidebells wintergreen	FACU	native	ORSE
Osmorhiza	Sweetcecily species	UNK	native	OSMOR
Osmorhiza berteroi	Sweet cecily	FAC	native	OSBE
Oxalis	Sorrel species	UNK	native	OXALI
Oxalis oregana	Oregon oxalis	UPL	native	OXOR
Oxalis suksdorfii	Suksdorf woodsorrel	UPL	native	OXSU
Oxalis trilliifolia	Trillium-leaved sorrel	FAC+	native	OXTR
Parnassia californica	California grass-of-Parnassus	OBL	native	PACA18
Parnassia fimbriata	Fringed grass-of-Parnassus	OBL	native	PAFI3
Paxistima myrsinites	Oregon boxwood	UPL	native	PAMY
Pedicularis bracteosa	Bracted lousewort	UPL	native	PEBR
Penstemon serrulatus	Coast penstemon	FACU	native	PESE5
Perideridia montana	Common yampah	FAC	native	PEMO7
Petasites frigidus	Coltsfoot	FACW	native	PEFR5
Phacelia hastata	Silverleaf phacelia	UPL	native	PHHA
Phacelia nemoralis	Shade phacelia	UPL	native	PHNE2
Phalaris arundinacea	*Reed canarygrass*	FACW	exotic	PHAR3
Phlox gracilis	Pink phlox	FACU	native	PHGRG
Physocarpus capitatus	Ninebark	FACW	native	PHCA11
Picea engelmannii	Engelmann's spruce	FAC	native	PIEN
Picea sitchensis	Sitka spruce	FAC	native	PISI
Pinus contorta	Lodgepole pine	FAC	native	PICO
Pinus monticola	Western white pine	FACU	native	PIMO3
Plantago lanceolata	*Ribwort*	FACU	exotic	PLLA
Platanthera	Bog orchid species	UNK	native	HABEN
Platanthera stricta	Slender bog-orchid	FACW	native	PLST4
Pleuropogon refractus	Nodding semaphore grass	OBL	native	PLRE2
Poa	Grass species	UNK	unknown	POA
Poa laxiflora	Lax-flowered bluegrass	OBL	native	POLA3
Poa palustris	*Fowl bluegrass*	FAC	exotic	POPA2
Poa trivialis	*Rough bluegrass*	FACW	exotic	POTR2
Polemonium carneum	Great Jacob's-ladder	OBL	native	POCA4
Polemonium occidentale	Western polemonium	FACW	native	POOC2
Polygonum	Knotweed species	UNK	unknown	POLYG4
Polygonum bistortoides	American bistort	FACW	native	POBI6
Polygonum hydropiper	*Marshpepper smartweed*	OBL	exotic	POHY
Polygonum punctatum	Dotted smartweed	OBL	native	POPU5
Polygonum sachalinense	*Giant knotweed*	FACU	exotic	POSA4
Polypodium glycyrrhiza	Licorice fern	OBL	native	POGL8
Polystichum munitum	Sword fern	FACU	native	POMU
Populus trichocarpa	Black cottonwood	FAC	native	POBAT
Prosartes	Fairbells species	UNK	native	DISPO
Prosartes hookeri	Hooker's fairybells	OBL	native	PRHO2
Prosartes smithii	Smith's fairybells	OBL	native	DISM2

Prunella vulgaris	Selfheal	FACU	native	PRVU
Pseudotsuga menziesii	Douglas-fir	FACU	native	PSME
Pteridium aquilinum	Western brackenfern	FACU	native	PTAQ
Pyrola asarifolia	Pink wintergreen	FACU	native	PYAS
Pyrrocoma uniflora	Plantain goldenweed	FAC+	native	PYUN2
Quercus garryana	Oregon white oak	UPL	native	QUGA4
Ranunculus	Buttercup species	UNK	unknown	RANUN
Ranunculus flammula	Lesser spearwort	OBL	native	RAFL2
Ranunculus muricatus	*Spinyfruit buttercup*	FACW	exotic	RAMU2
Ranunculus repens	*Creeping buttercup*	FACW	exotic	RARE3
Ranunculus repens var. repens	*Creeping buttercup*	FACW	exotic	RARER
Ranunculus uncinatus	Little buttercup	FAC	native	RAUN
Rhamnus purshiana	Cascara buckthorn	FACU	native	FRPU7
Rhododendron albiflorum	Cascade azalea	FACU	native	RHAL2
Rhododendron macrophyllum	Pacific rhododendron	UPL	native	RHMA3
Ribes	Gooseberry species	UNK	unknown	RIBES
Ribes bracteosum	Stink currant	FAC	native	RIBR
Ribes divaricatum	Wild gooseberry	FAC	native	RIDI
Ribes lacustre	Black gooseberry	FAC+	native	RILA
Ribes sanguineum	Red-flowering currant	UPL	native	RISA
Rosa	Rose species	UNK	unknown	ROSA5
Rosa eglanteria	*Sweetbriar rose*	FACW	exotic	ROEG
Rosa gymnocarpa	Baldhip rose	FACU	native	ROGY
Rosa nutkana	Nootka rose	FAC-	native	RONU
Rosa pisocarpa	Clustered wild rose	FAC	native	ROPI2
Rubus	Rubus species	UNK	unknown	RUBUS
Rubus armeniacus	*Himalayan blackberry*	FACU	exotic	RUDI2
Rubus lasiococcus	Dwarf bramble	UPL	native	RULA2
Rubus leucodermis	Black raspberry	UPL	native	RULE
Rubus parviflorus	Thimbleberry	FAC-	native	RUPA
Rubus pedatus	Five-leaved bramble	FACU	native	RUPE
Rubus spectabilis	Salmonberry	FAC+	native	RUSP
Rubus ursinus	Trailing blackberry	FACU	native	RUUR
Rudbeckia occidentalis	Western coneflower	FAC-	native	RUOC2
Rumex	Dock species	UNK	unknown	RUMEX
Rumex crispus	*Curled dock*	FAC+	exotic	RUCR
Rumex obtusifolius	*Bitter dock*	FAC	exotic	RUOB
Rumex salicifolius	Willow dock	FACW	native	RUSA
Sagina procumbens	*Bird-eye pearlwort*	FAC	exotic	SAPR
Salix	Willow species	UNK	unknown	SALIX
Salix lucida	Pacific willow	FACW	native	SALUL
Salix scouleriana	Scouler's willow	FAC	native	SASC
Salix sitchensis	Sitka willow	FACW	native	SASI2
Sambucus	Elderberry species	FACU	native	SAMBU
Sambucus mexicana	Blue elderberry	FACU	native	SAMEC2
Sambucus racemosa	Red elderberry	FACU	native	SARA2
Satureja douglasii	Yerba buena	UPL	native	SADO5
Saxifraga	Saxifrage species	UNK	unknown	SAXIF

Saxifraga mertensiana	Wood saxifrage	FACW	native	SAME7
Saxifraga nuttallii	Nuttall's saxifrage	OBL	native	SANU3
Saxifraga odontoloma	Stream saxifrage	FAC+	native	SAOD2
Saxifraga odontoloma	Stream saxifrage	FACW	native	SAOD2
Saxifraga oregana	Oregon saxifrage	FACW	native	SAOR2
Scirpus	Bullrush species	UNK	unknown	SCIRP
Scirpus congdonii	Congdon's bulrush	FACW	native	SCCO
Scirpus microcarpus	Small-flowered bullrush	OBL	native	SCMI2
Scoliopus hallii	Slink lily	FACU	native	SCHA2
Scrophularia californica	California figwort	FACW	native	SCCA2
Sedum	Sedum species	UNK	unknown	SEDUM
Senecio	Ragwort species	UNK	unknown	SENEC
Senecio jacobaea	*Tansy ragwort*	FACU	exotic	SEJA
Senecio pseudaureus	Streambank groundsel	FACW	native	SEPS2
Senecio triangularis	Arrowleaf groundsel	FACW	native	SETR
Senecio vulgaris	*Common groundsel*	FACU	exotic	SEVU
Solanum dulcamara	*Bittersweet*	FAC+	exotic	SODU
Sorbus scopulina	Western mountain-ash	FACU	native	SOSC2
Sorbus sitchensis	Sitka mountain ash	UPL	native	SOSI2
Spiraea	Spiraea species	UNK	unknown	SPIRA
Spiraea douglasii	Douglas spiraea	FACW	native	SPDO
Stachys	Betony species	FACW	native	STACH
Stachys cooleyae	Cooley's betony	FACW	native	STCO14
Stachys mexicana	Mexican betony	FACW	native	STAJR
Stellaria	Starwort species	UNK	unknown	STELL
Stellaria calycantha	Northern starwort	FACW	native	STCA
Stellaria crispa	Crisp sandwort	FAC+	native	STCR2
Stellaria media	*Chickweed*	FACU	exotic	STME2
Stellaria umbellata	Umbellate starwort	FACW	native	STUM
Stenanthium occidentale	Mountainbells	FAC	native	STOC
Streptopus	Twistedstalk species	UNK	native	STREP3
Streptopus amplexifolius	Clasping twistedstalk	FAC-	native	STAM2
Streptopus lanceolatus var. curvipes	Rosy twistedstalk	UPL	native	STLAC
Streptopus streptopoides	Small twistedstalk	UPL	native	STST3
Symphoricarpos albus	Common snowberry	FACU	native	SYAL
Symphoricarpos mollis	Trailing snowberry	FACU	native	SYHE
Synthyris reniformis	Snowqueen	UPL	native	SYRE
Taraxacum officinale	*Common dandelion*	FACU	exotic	TAOF
Taxus brevifolia	Pacific yew	FACU	native	TABR2
Tellima grandiflora	Fringecup	UPL	native	TEGR2
Thalictrum	Meadowrue species	UNK	native	THALI2
Thalictrum occidentale	Western meadowrue	FACU	native	THOC
Thalictrum polycarpum	Tall western meadowrue	UPL	native	THFEP2
Thuja plicata	Western redcedar	FAC	native	THPL
Tiarella trifoliata	Coolwort foamflower	FAC-	native	TITR
Tiarella trifoliata var. trifoliata	Coolwort foamflower	FAC-	native	TITR
Tiarella trifoliata var. unifoliata	Coolwort foamflower	UPL	native	TITRU
Tolmiea menziesii	Piggyback plant	FAC	native	TOME

Torilis	*Hedgeparsley*	UNK	exotic	TORIL
Torreyochloa pallida var. pauciflora	Weak alkali grass	OBL	native	TOPAP3
Toxicodendron diversilobum	Poison oak	UPL	native	TODI
Trautvetteria caroliniensis	False bugbane	FAC	native	TRCA
Trientalis	Starflower species	UNK	native	TRIEN
Trientalis arctica	Northern starflower	OBL	native	TREUA2
Trientalis latifolia	Western starflower	FAC-	native	TRLA6
Trifolium	Clover species	UNK	unknown	TRIFO
Trifolium howellii	Howell's clover	FACW	native	TRHO
Trifolium longipes	Long-stalked clover	FAC-	native	TRLO
Trillium ovatum	Pacific trillium	FACU	native	TROV2
Trisetum canescens	Tall trisetum	FACU	native	TRCEC
Trisetum cernuum	Nodding trisetum	FACU	native	TRCE2
Tsuga heterophylla	Western hemlock	FACU	native	TSHE
Tsuga mertensiana	Mountain hemlock	FACU	native	TSME
Urtica dioica ssp. gracilis	Nettle	FAC+	native	URDI
Vaccinium alaskaense	Oval-leaf huckleberry	FACU	native	VAOV
Vaccinium deliciosum	Blueleaf huckleberry	UPL	native	VADE
Vaccinium membranaceum	Big huckleberry	FACU	native	VAME
Vaccinium ovalifolium	Oval-leaf huckleberry	UPL	native	VAOV
Vaccinium ovatum	Evergreen huckleberry	UPL	native	VAOV2
Vaccinium parvifolium	Red huckleberry	FACU	native	VAPA
Vaccinium scoparium	Grouse whortleberry	FACU	native	VASC
Valeriana	Valerian species	UNK	native	VALER
Valeriana occidentalis	Western valerian	FAC	native	VAOC2
Valeriana scouleri	Scouler's valerian	FAC	native	VASC2
Valeriana sitchensis	Sitka valerian	FAC	native	VASI
Vancouveria hexandra	Insideout flower	UPL	native	VAHE
Veratrum californicum	California false hellebore	FACW	native	VECA2
Veratrum viride	False hellebore	FACW	native	VEVI
Veronica	Brooklime species	UNK	unknown	VERON
Veronica americana	American brooklime	OBL	native	VEAM2
Veronica officinalis	*Common gypsyweed*	UPL	exotic	VEOF2
Viburnum edule	High-bush cranberry	FACW	native	VIED
Viburnum ellipticum	Oval-leaved viburnum	FACU	native	VIEL
Vicia	Vetch species	UNK	unknown	VICIA
Vicia americana	American vetch	FAC	native	VIAM
Vicia sativa	*Garden vetch*	UPL	exotic	VISA
Vinca	Periwinkle	UNK	unknown	VINCA
Viola	Violet species	UNK	unknown	VIOLA
Viola canadensis	Canada violet	UPL	native	VICA4
Viola glabella	Stream violet	FAC	native	VIGL
Viola orbiculata	Round-leaved violet	UPL	native	VIOR
Viola palustris	Marsh violet	OBL	native	VIPA4
Viola sempervirens	Evergreen violet	UPL	native	VISE3
Whipplea modesta	Whipple vine	UPL	native	WHMO
Xerophyllum tenax	Beargrass	FACU	native	XETE

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