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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.

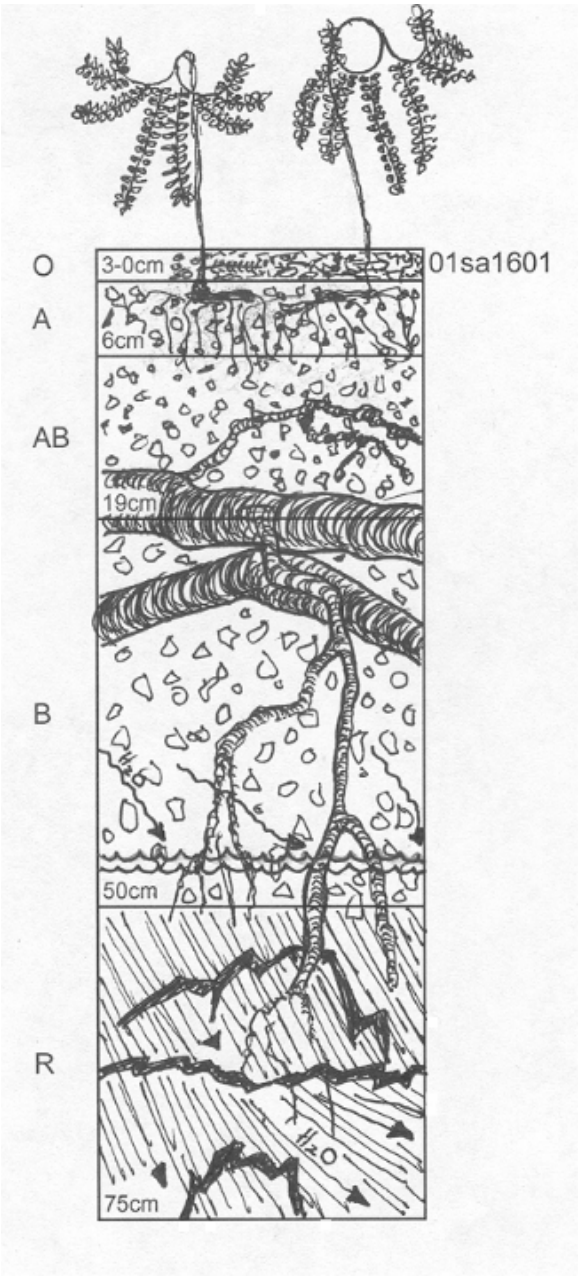
Valley cross sections showing ADPE
Loon creek
Boone creek
E Fork S Fork McKenzie #2
Bear creek
Lost creek S
Rough creek
Augusta creek #1

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%)

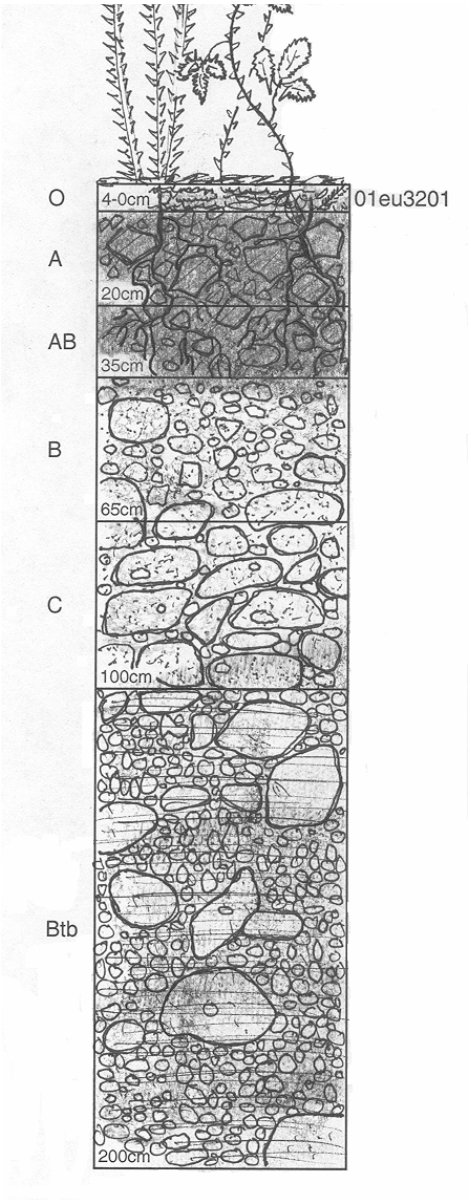
Non-natives: Exotic species were infrequent. Only two species, wall-lettuce and common St. John's-wort, were recorded on one plot each.

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%)

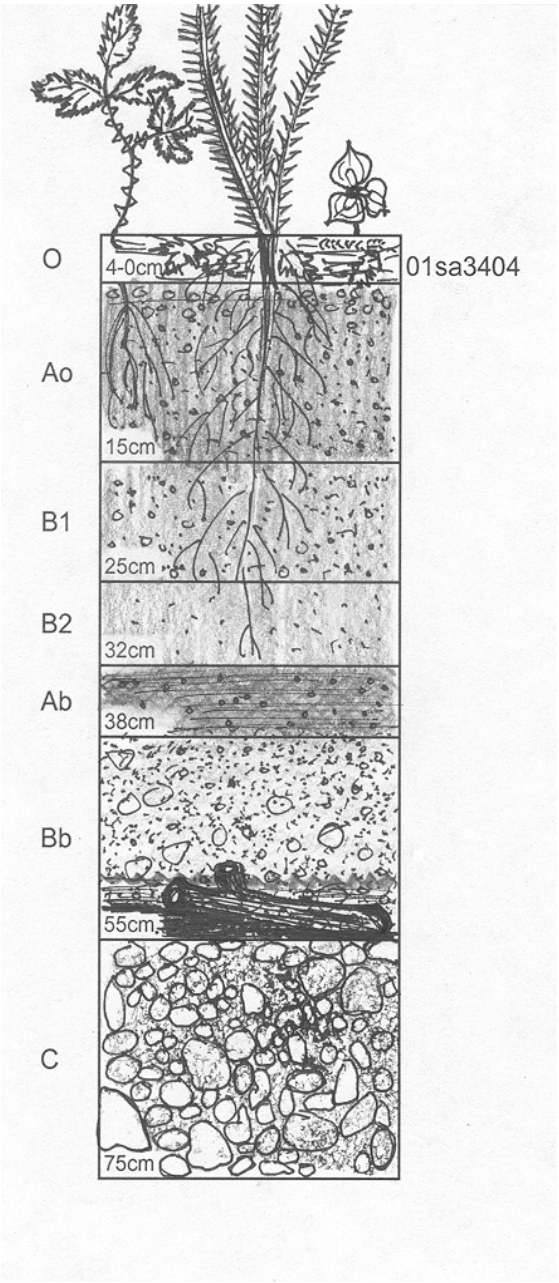
Non-natives: Wall-lettuce was the only exotic species recorded, on a single plot.

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:

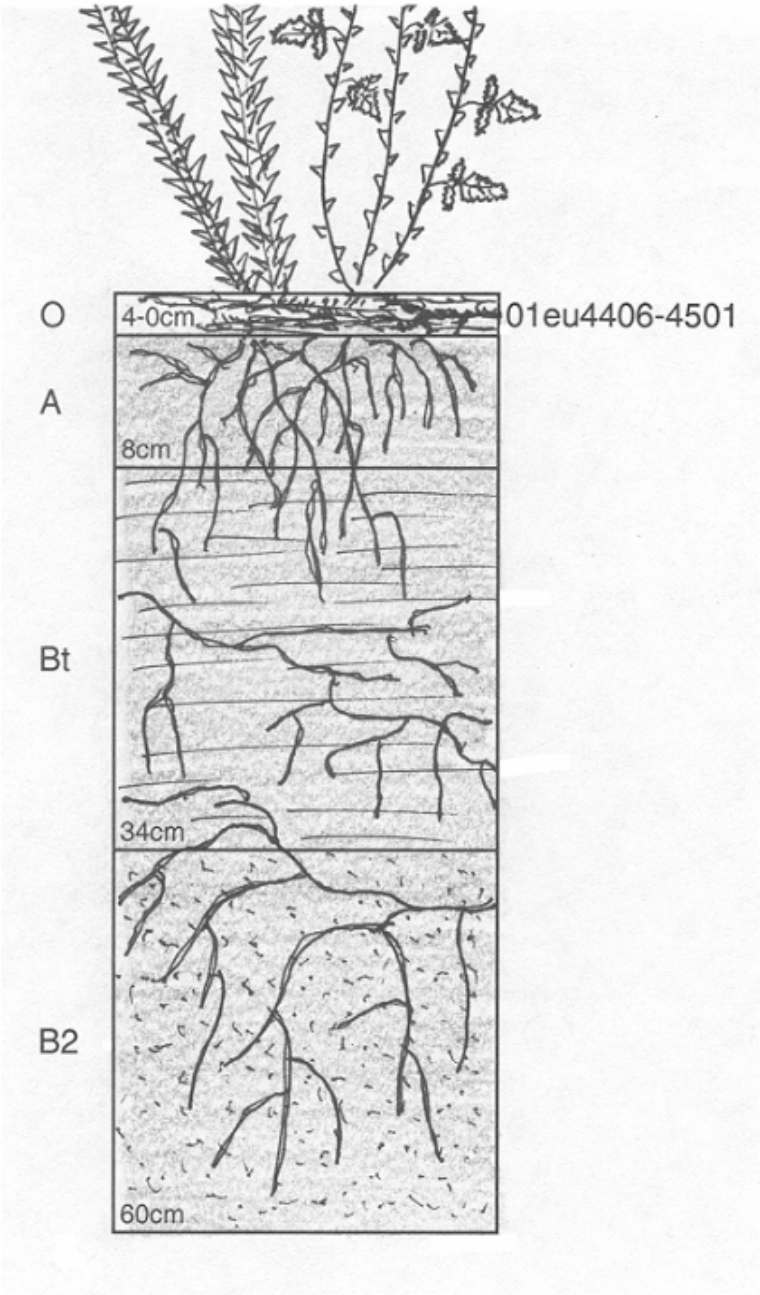
Community meets wetland test	Yes
Plots meeting wetland criteria	83%
Wetland indicators among dominant species	77% (range 50-100%)

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:

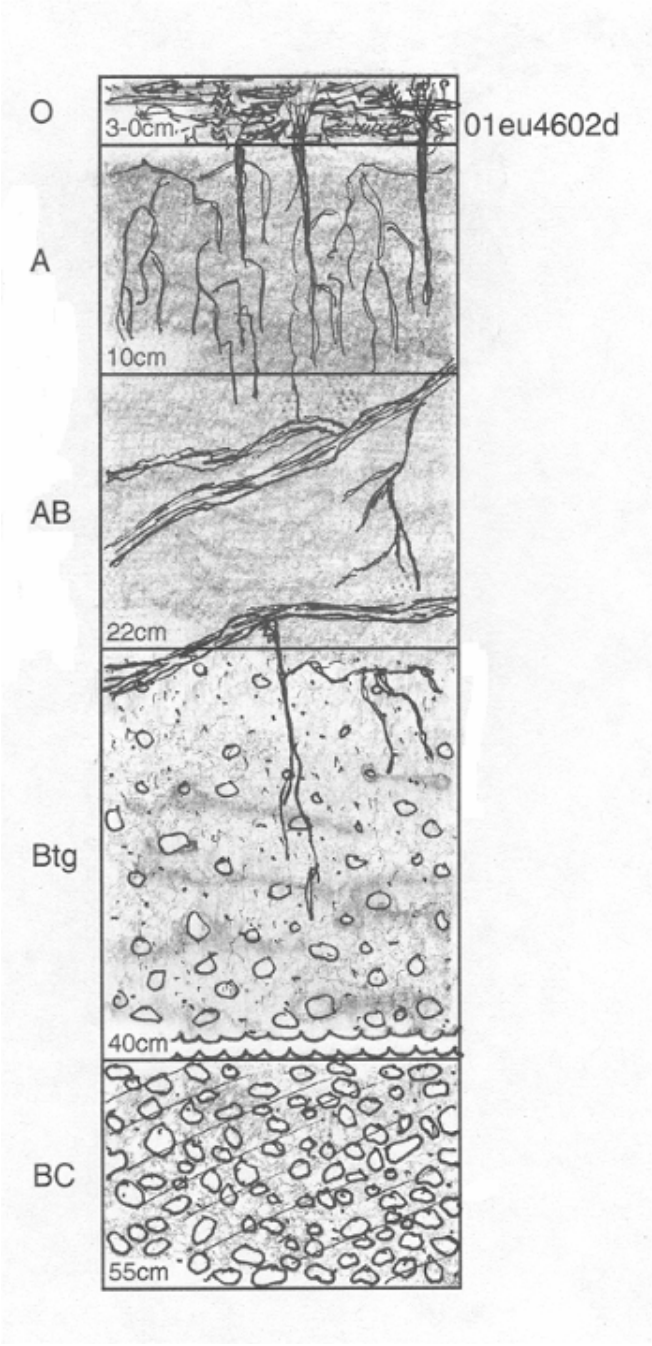
Community meets wetland test	Yes
Plots meeting wetland criteria	100%
Wetland indicators among dominant species	82% (range 71-100%)

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.