CADDISFLY (ORDER: TRICHOPTERA) SURVEYS ON NORTHWEST OREGON BLM LANDS IN THE WESTERN CASCADE FOOTHILLS OF OREGON

FINAL REPORT FROM THE XERCES SOCIETY FOR INVERTEBRATE CONSERVATION TO THE NORTHWEST OREGON BLM DISTRICT & THE INTERAGENCY SPECIAL STATUS/SENSITIVE SPECIES PROGRAM

COOPERATIVE AGREEMENT NO. L18AC00167

Surveying a stream in the Table Rock Wilderness, OR.

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ABSTRACT

Federal lands in western Oregon provide important habitat to a variety of caddisfly species, several of which are thought to be rare or at-risk. In 2018, Xerces worked with the Interagency Special Status/Sensitive Species Program (ISSSSP) to identify priority survey areas on BLM lands in the Cascades Resource Area, Northwest Oregon BLM District. Following that effort, Xerces Society biologists conducted surveys for seven species over a four month period from May through August 2019. In total, 598 caddisfly specimens (556 adults and 42 larvae of 24 different genera and at least 51 species) were collected and identified to the lowest possible taxonomic level (typically species); 94 of these have been submitted to LifeScanner for DNA barcoding to support future survey and identification efforts. Biologists surveyed 38 sites (approximately 0.26 acres of habitat [1,052 m^2]) across the Cascades Resource Area. These surveys resulted in newly documented populations of two of the target species, *Lepania cascada* and *Namamyia plutonis*. In addition, two other species of caddisflies (*Homoplectra schuhi* and *Rhyacophila viquaea*) that were previously listed as strategic (but not documented or suspected on the NW OR BLM District) were also collected. Several other species of interest, including variants of *Wormaldia anilla/clauseni*, several members of the *Sisko* species complex, and representatives of a soon-to-be described new species of *Rhyacophila* (Ruiter et al. *in prep*) were also collected. Prior to field surveys, biologists from the Xerces Society and Aquatic Biology Associates, Inc. also developed and presented an aquatic macroinvertebrates training workshop for agency staff (May 2019). Ten people from the NW Oregon BLM District and the Siuslaw National Forest (Hebo Ranger District) attended the training and received collection kits.

INTRODUCTION

Numerous survey efforts have documented caddisfly species richness in the Columbia River Gorge National Scenic Area (CRGNSA) and Mt. Hood National Forest (e.g. Fallon et al. 2016; Ikeda and Wanner 2016; Wisseman, *in prep*); however, comparatively few surveys have occurred on nearby BLM district lands in the Cascade Mountains foothills. In 2018, the Xerces Society worked with ISSSSP to identify potential areas for caddisfly surveys in the Cascades Resource Area of the Northwest Oregon BLM District, targeting known habitat associations of seven special status species that were suspected or documented on the district (Table 1; Fallon 2018). Survey work was funded in 2019 prior to the update of the ISSSSP Sensitive Species Lists (see BLM 2019, USFS 2019), which subsequently removed all species listed as strategic from the special status species list.

Table 1. Caddisfly species of conservation concern suspected or documented on the NW OR BLM District.

Species name	ISSSSP status (pre-2019)	NW Oregon BLM Status
Allomyia scotti	OR-SEN	Suspected
Lepania cascada	STR	Suspected
Moselyana comosa	STR	Suspected
Namamyia plutonis	OR-STR	Suspected
Oligophlebodes mostbento	OR-STR	Suspected
Rhyacophila haddocki	OR-SEN	Documented
Rhyacophila unipunctata	OR-STR	Suspected

METHODS

SURVEYS

SITE SELECTION

Site selection was completed as a separate project in 2018 and was based primarily on availability of habitat associated with the target species (see Fallon 2018 for a full description). Prior to 2019 surveys, most documented occurrences of the target species were located in other parts of the state, including the Columbia River Gorge National Scenic Area, the Oregon Coast Range, and other parts of the Cascades or southern Oregon mountain ranges. Efforts in 2019 were focused on BLM lands in the Cascade Resource Area of the Northwest Oregon BLM District, where surveys have not previously occurred but were likely to yield new records. In particular, surveyors focused on forested coldwater streams and springs in the western Cascades foothills, with an emphasis on areas with high quality, intact habitat that would be more likely to support species that are less tolerant of habitat disturbances and other threats. Elevations of survey sites ranged from 237 to 1,187 m (779 to 3,894 ft.).

In order to ground truth selected survey sites, Xerces biologists spent two extra days in the field (for a total of 5 days) at the beginning of the season in May 2019. An initial set of core sites was selected during this time, with several more sites added during the June trip.

SURVEY PERIOD

Surveys took place once a month over a four month period from May through August 2019. This was done to ensure that the full flight period of each target species would be sampled. With the exception of May, in which surveyors were in the field for five days, surveys took place over 3 days each month. Survey conditions during the 2019 field season were not ideal for adult caddisfly collections. Unlike most summers in the Pacific Northwest, which are typified by a dry Mediterranean climate, the 2019 season was uncharacteristically cold, wet, and overcast, with several areas of Oregon—including our survey areas—receiving above-normal precipitation, particularly in May and July. On several occasions, surveyors cut surveys short due to unseasonably cold temperatures and heavy rain.

SAMPLING METHODOLOGY

Since the target species are known to live in similar habitats and have overlapping flight periods, they could be surveyed for simultaneously, maximizing survey efforts. A core set of sites was visited each month, and other opportunistic sampling sites were added as time allowed. Surveyors used established caddisfly survey protocols (Foltz 2008) to sample for both adult and juvenile stages of the target species, including sweep netting and hand picking. An emphasis was placed on adult collections, as adult males are required for positive species identification for several of these taxa; however, mature nymphs were also collected from some sites to confirm the presence of target genera. Representative voucher specimens were collected for identification from each site. Stoneflies were incidentally collected from many sites, especially early in the season.

During each visit, surveyors collected information on weather, location, habitat and stream attributes, and other species of interest. Location coordinates were recorded using the S1 Mobile Mapper application on an Android phone. Habitat photos were taken at all sites but one (SP07), where no collections were made. Surveyors typically spent 20 minutes or more sweep netting streamside vegetation and water bodies, searching for adults. At many sites, the stream substrate was handpicked for juvenile caddisflies.

TRAINING WORKSHOP

A one-day training workshop was developed to teach BLM and USFS biologists how to survey for and identify macroinvertebrate species of interest, with an emphasis on caddisflies found in the NW OR BLM District. The workshop included both a morning classroom session and an afternoon field trip to a nearby survey site. It was scheduled for May, at the beginning of the survey season, at Horning Seed Orchard in Colton, Oregon.

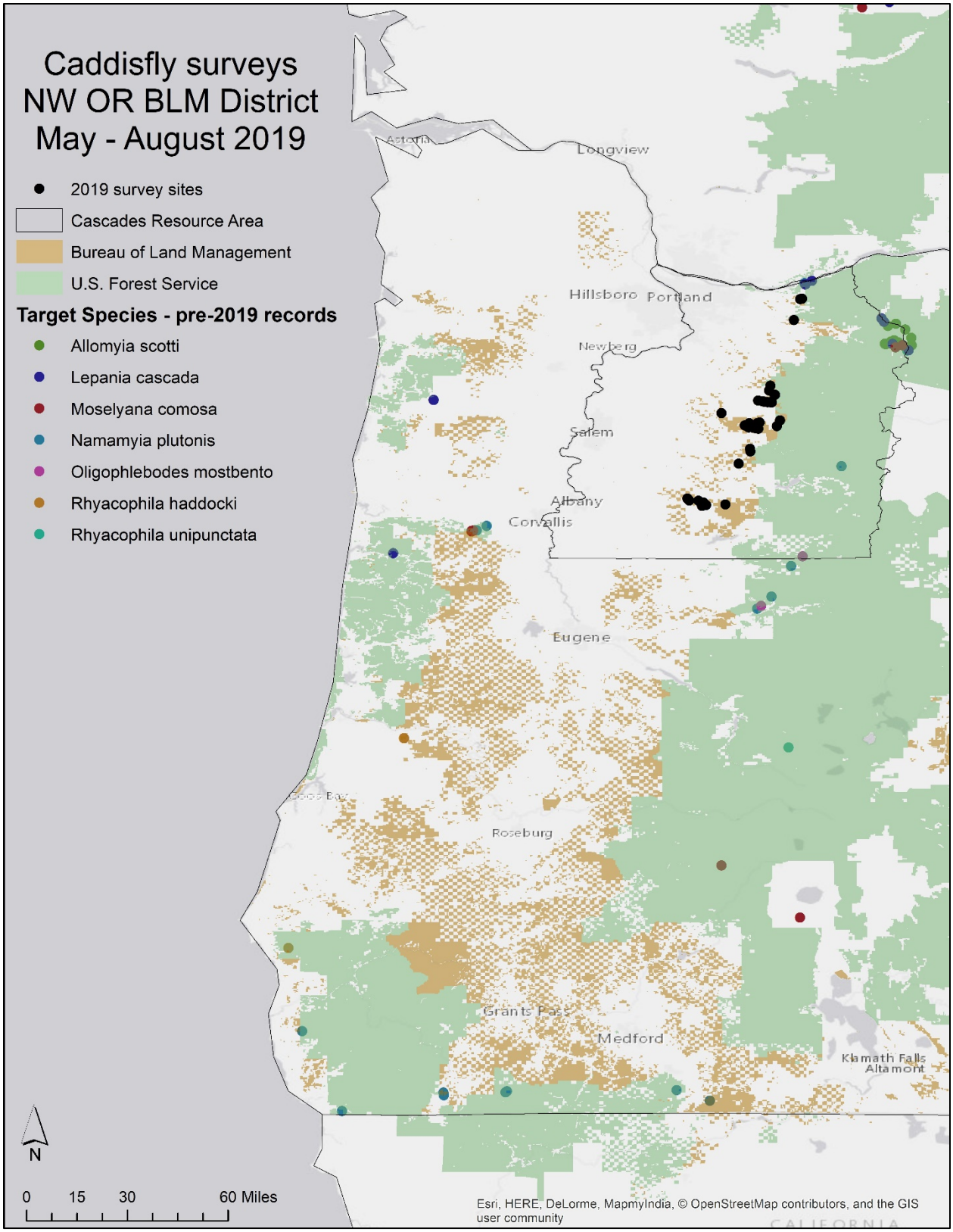
RESULTS

SURVEYS

In total, 598 caddisfly specimens were collected from 38 different sites (Appendices I and IV; Map 1). These were identified to the lowest possible taxonomic level (Appendix II), representing 24 genera, and at least 50 different species (Table 2).

Table 2: Summary of families and genera collected during 2019 surveys. Note that the number of species includes those identified as "sp."

Larval lifestyle	Family	Genus	No. of species
Portable-case-makers (Suborder Integripalpia)	Apataniidae	*Apatania*	1
	Brachycentridae	*Micrasema*	2
	Goeridae	*Goeracea*	1
		Lepania	1
	Lepidostomatidae	*Lepidostoma*	3
	Limnephilidae	*Allocosmoecus*	1
		Cryptochia	1
		Ecclisomyia	2
		Hydatophylax	1
		Philocasca	1
		Pseudostenophylax	1
	Odontoceridae	*Namamyia*	1
	Uenoidae	*Farula*	2
		Neophylax	1
Closed-cocoon-makers (Suborder Spicipalpia)	Glossosomatidae	*Anagapetus*	2
		Glossosoma	2
	Hydroptilidae	*Palaeagapetus*	1
	Rhyacophilidae	*Rhyacophila*	19
Fixed-retreat-makers (Suborder Annulipalpia)	Hydropsychidae	*Homoplectra*	2
	Philopotamidae	*Dolophilodes*	3
		Sisko	2
		Wormaldia	4
	Polycentropodidae	*Polycentropus*	2
	Psychomyiidae	*Psychomyia*	1



Map 1: 2019 survey sites and previously known records of target caddisfly species.

Ten species of potential conservation interest were collected during 2019 surveys, four of which were previously on the BLM strategic species list (Table 3). Two of these, *Lepania cascada* and *Namamyia plutonis*, were previously considered "suspected" on the NW Oregon BLM District. *L. cascada* was documented at six new sites (now totaling 12 on BLM and FS lands in OR) and *N. plutonis* was documented at one new site (now totaling 13 on BLM and FS lands in OR). The remaining two species, *Homoplectra schuhi* and *Rhyacophila viquaea*, were each collected from two new sites (now totaling 16 and 38 on BLM and FS lands in OR, respectively). Currently, *H. schuhi* and *R. viquaea* can only be identified from adult specimens; larval forms of these species are not yet described (Fallon et al. 2015; Blackburn and Huff 2017). In total, 34 specimens of caddisflies that were previously on the BLM strategic species list were collected from 9 different sites.

Table 3. Caddisfly species of conservation interest collected during 2019 surveys (NatureServe 2019; ORBIC 2019).

Species	Global rank	OR state rank	No. of sites	Notes
Apatania tavala	G3	S3	1	Oregon endemic.
Farula jewetti	G3	S3	1	Oregon endemic.
Homoplectra schuhi	G3Q	S3?	2	Previously on BLM STR list.
Lepania cascada	G3	S3	6	Previously on BLM STR list.
Namamyia plutonis	G3	S3	1	Previously on BLM STR list.
Rhyacophila fenderi	G3G4	S3?	3	
Rhyacophila jewetti	G2	SNR	1	Rare species known only from OR and, more recently, the northern CA Cascades.
Rhyacophila perplana	G3G4	SNR	1	Uncommon PNW species; number of occurrences unknown.
Rhyacophila viquaea	G1G2	S1	2	Previously on BLM STR list.
Rhyacophila willametta	G3G4	SNR	3	Known only from OR & WA.

Several other species of interest were also collected, including two male variants of *Wormaldia anilla/clauseni* (which have features of both species) and several specimens of the *Sisko* species complex, a group of species in the maritime Pacific Northwest whose taxonomy is unresolved (Wisseman 2019, pers. comm.). In addition, several representatives of a soon-to-be described new species of *Rhyacophila* were collected (Ruiter et al. *in prep*).

Incidental stonefly collections resulted in 172 specimens (160 adults and 12 larvae), many of which represented common western species (Appendix III). However, several species of conservation concern were also collected (Table 4), including two adult specimens of *Kathroperla takhoma*, a species previously only recorded from Washington and California (NatureServe 2019), but now known from multiple Oregon sites (Stark et al. 2015).

Table 4. Stonefly species of conservation interest collected during 2019 surveys (NatureServe 2019).

Species	Global rank	OR state rank	No. of sites	Notes
Chernokrilus misnomus	G2G3	SNR	2	Limited mostly to small spring-fed runs and headwater creeks.
Kathroperla takhoma	G2	N/A	2	Previously on BLM WA-STR list. Now known from multiple OR sites (Stark et al. 2015).
Pomoleuctra andersoni	G2	SNR	1	Found in small, perennial spring creeks.
Pteronarcella regularis	G3	SNR	3	

Surveyors also observed several different salamander species during survey efforts, including Cascade torrent salamander (*Rhyacotriton cascadae*) and coastal giant salamander (*Dicamptodon tenebrosus*). Site-specific observation details and photos for these salamanders are available in Appendix IV.

TRAINING WORKSHOP

Ten BLM and USFS biologists attended the Aquatic Macroinvertebrate Training (Figure 1) that was held at Horning Seed Orchard in Colton, OR, on May 30, 2019. Classroom topics included aquatic macroinvertebrate life history and ecology, conservation concerns and threats, management considerations, and a review of the local fauna. The field session, which took place in the Fish Creek Area along the Clackamas River in the Mt. Hood National Forest, included hands-on surveys at multiple sites, with survey technique demonstrations, a discussion of microhabitats, and collection of 15 different species of caddisflies, including a potentially new species, *Farula* near *reaperi* (Table 5). These individuals are morphologically similar but not identical to *F. reaperi*, indicating they may represent a new species. Confirmed, barcoded specimens of *F. reaperi* need to be collected and submitted for genetic comparison before this can be determined (confirmed, barcoded individuals are not currently available). *Farula reaperi*, which has a global rank of G3 and an Oregon state rank of S3, is known from only three collection localities in Oregon, including Tombstone Prairie in Linn County (NatureServe 2019). The type locality could be revisited to collect individuals for barcoding (Wisseman 2019, pers. comm.).

Table 5: Species list for the May 30, 2019, macroinvertebrate training on the Mt. Hood NF.

Species name	Global/OR State Rank
Anagapetus bernea	G4/SNR
Dolophilodes dorcus	G5/SNR
Farula near *reaperi*	Not applicable
Homoplectra sp.	Not applicable
Neophylax splendens	G5/SNR
Parapsyche elsis	G5/SNR
Pseudostenophylax edwardsi	G4G5/SNR
Rhyacophila ecosa	G4/SNR
Rhyacophila grandis	G5/SNR
Rhyacophila hyalinata	G5/SNR
Rhyacophila narvae	G5/SNR
Rhyacophila vaefes	G4/SNR
Tinodes sp.	Not applicable
Wormaldia anilla	G5/SNR
Wormaldia occidea	G4/SNR

Figure 1: Workshop participants review collections with caddisfly expert Bob Wisseman (center).

DISCUSSION

SURVEYS

Survey conditions during the 2019 field season were not ideal for adult caddisfly collections. Unlike most summers in the Pacific Northwest, which are typified by a dry Mediterranean climate, the 2019 season was uncharacteristically cold, wet, and overcast, with several areas of Oregon—including our survey areas—receiving above-normal precipitation, particularly in May and July. These conditions likely impacted survey success, and may have made sweep netting less effective since adult caddisflies may have been seeking shelter further down in vegetation and rocks, where they were difficult to capture despite intensive searching by surveyors. In addition,

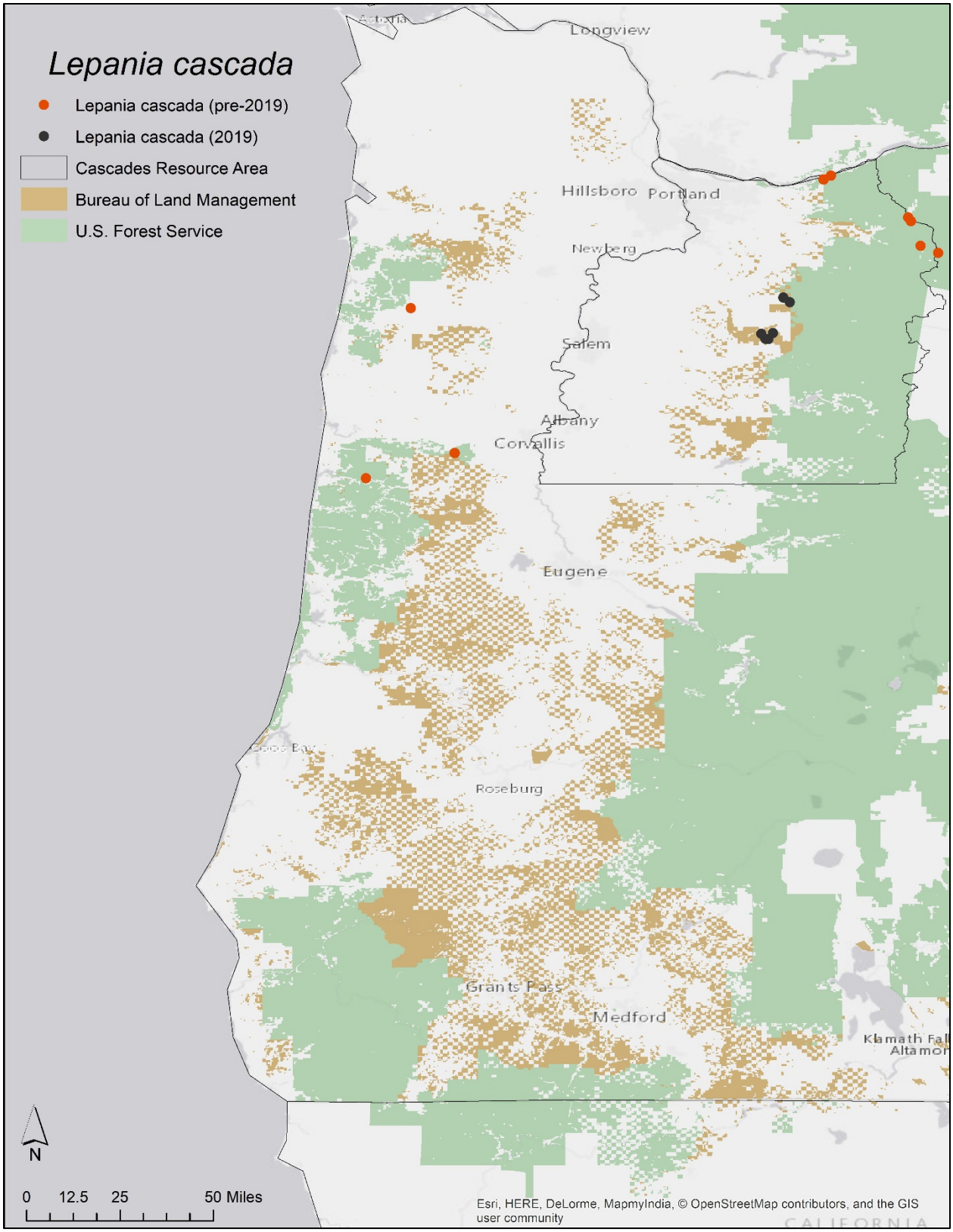
access to several of the target areas was extremely limited, with many locked gates making travel difficult between sections under BLM ownership. Early in the season, snow also impacted travel to sites at higher elevations.

Despite these difficulties, surveyors successfully collected specimens of two of the target species (*Lepania cascada* and *Namamyia plutonis*). Populations of the monotypic *L. cascada* are extremely localized and patchily distributed in seeps and springs of maritime mountain ranges (Wiggins 1973; Scheuering 2006a; Map 2). Wisseman (pers. comm., *in* Scheuering 2006a) suggested this species might be restricted primarily to springheads in old growth or mature forests. Documented occurrences in 2019 included several small streams and the headwaters of the North Fork Clackamas River. Wiggins (1977) describes the habitat of *N. plutonis* as gravel substrates of small, cool streams. The species has been found in creeks or streams of densely forested old growth or mature forest watersheds, and larvae in particular are found in areas of coarse gravel mixed with silt and organic sediments (Anderson 1976). It has a somewhat disjunct distribution, with records known from southern Oregon, the Willamette Valley, and the Cascades (Map 3). This species was documented at one site in 2019, near the Opal Creek Wilderness, in a small stream with an alder (*Alnus* sp.) and bigleaf maple (*Acer macrophyllum*) overstory and a substrate of mossy bedrock, downed logs, silt, gravel, and some cobble.

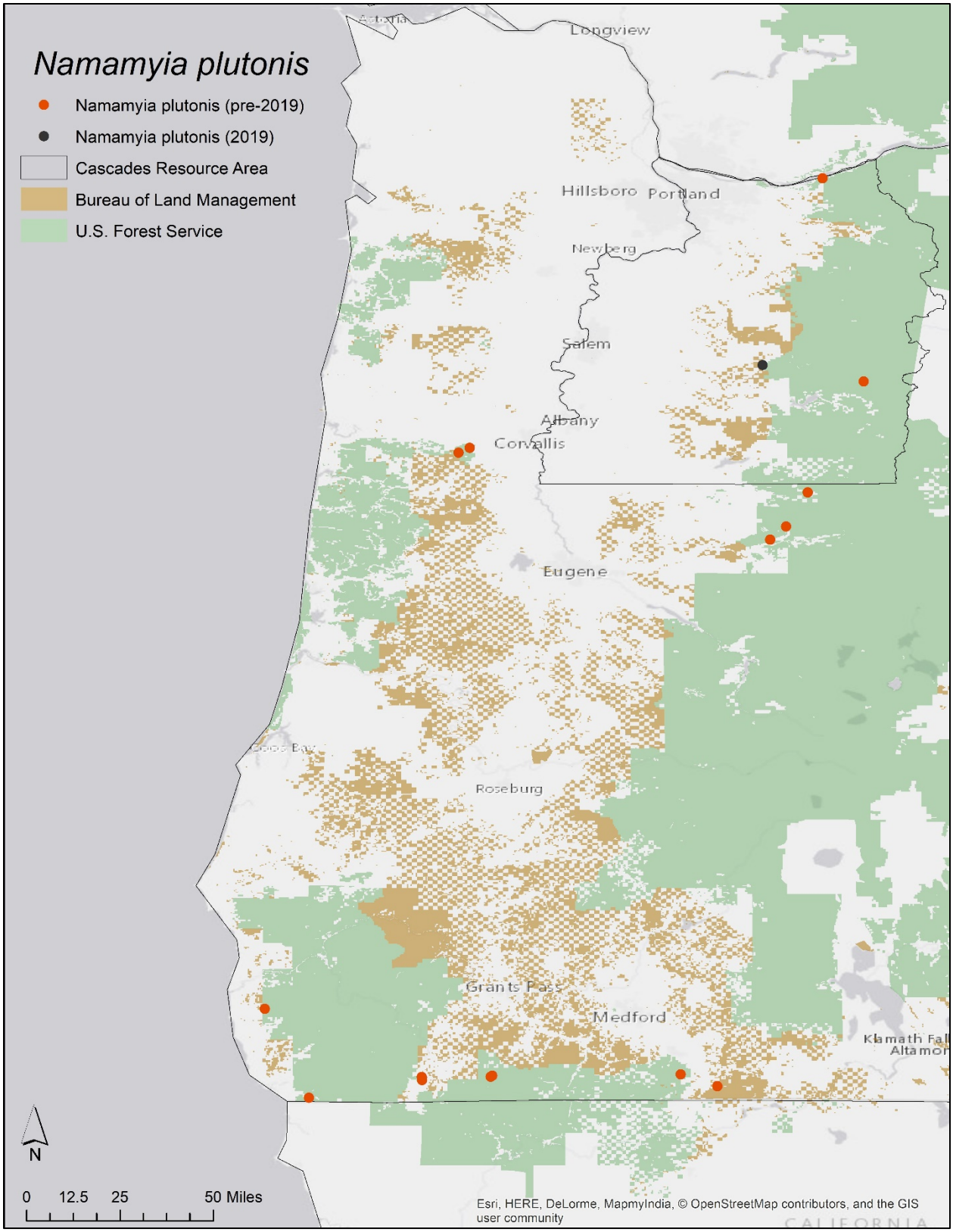
Although surveyors were targeting seven caddisfly species known or suspected to occur on the NW Oregon BLM District, two of these species (*Allomyia scotti* and *Rhyacophila haddocki*) were considered unlikely to be encountered because of documented habitat associations. *A. scotti* is a glacial relict known from high elevations (3,400 to 5,800 feet) around Mt. Hood. It has not been found anywhere else, despite a number of search efforts in recent years, and detection of this species in the Cascades foothills was unlikely. *R. haddocki* has been documented only in Oregon's Coast Range and is suspected to be endemic to that area. Detection of the other five species seemed more probable, although only two were encountered.

Of the remaining three target species, very little is known about specific habitat associations and distribution. *Oligophlebodes mostbento* has been found in small to mid-size cold water streams from sea level to alpine (Scheuering 2005). Only two populations of *Rhyacophila unipunctata* have been documented, both in the Oregon Cascades and located about 100 miles apart from each other on the Willamette and Mt. Hood National Forests (Scheuering 2006b). Adults of this species have been collected next to small streams, from minimum elevations of 3,700 feet (Scheuering 2006b). *Moselyana comosa* appears to be extremely localized in forested seeps, particularly in subalpine forests (Andrews and Scheuering 2010). However, it has a somewhat wide range in Oregon, extending from the Coast Range (where most of the known populations occur in old growth forests on Marys Peak) south to Crater Lake and east to Mt. Hood (Andrews and Scheuering 2010).

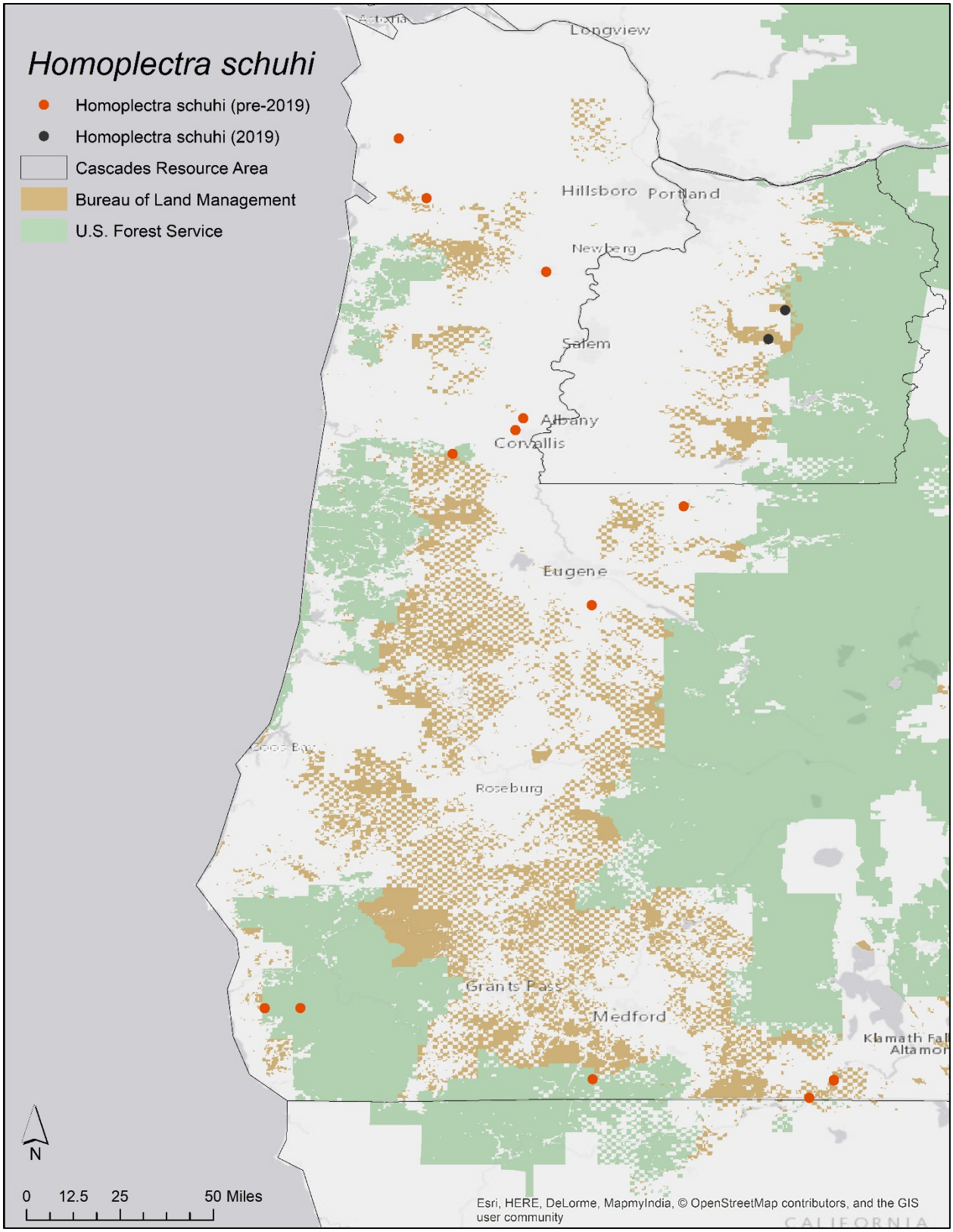
In addition to the two target species that were collected, two other species that were previously listed on the BLM-strategic list (but not suspected or documented from the NW OR BLM District) were also detected. *Homoplectra schuhi* was found in two forested hillside seeps along roadways, which is consistent with other occurrences, which are almost all known from spring seepage areas. New records of this species in recent years have shown it to be more widely distributed than previously suspected. The majority of known records are from the Coast Range, Willamette Valley, and southwest Oregon mountains, although there are a handful from the Cascades foothills as well (Map 4). *Rhyacophila viquaea* is a regional endemic found throughout forested montane areas of the maritime Pacific Northwest (Map 5); it is known from springs, seeps, and small streams (Blackburn and Huff 2017).



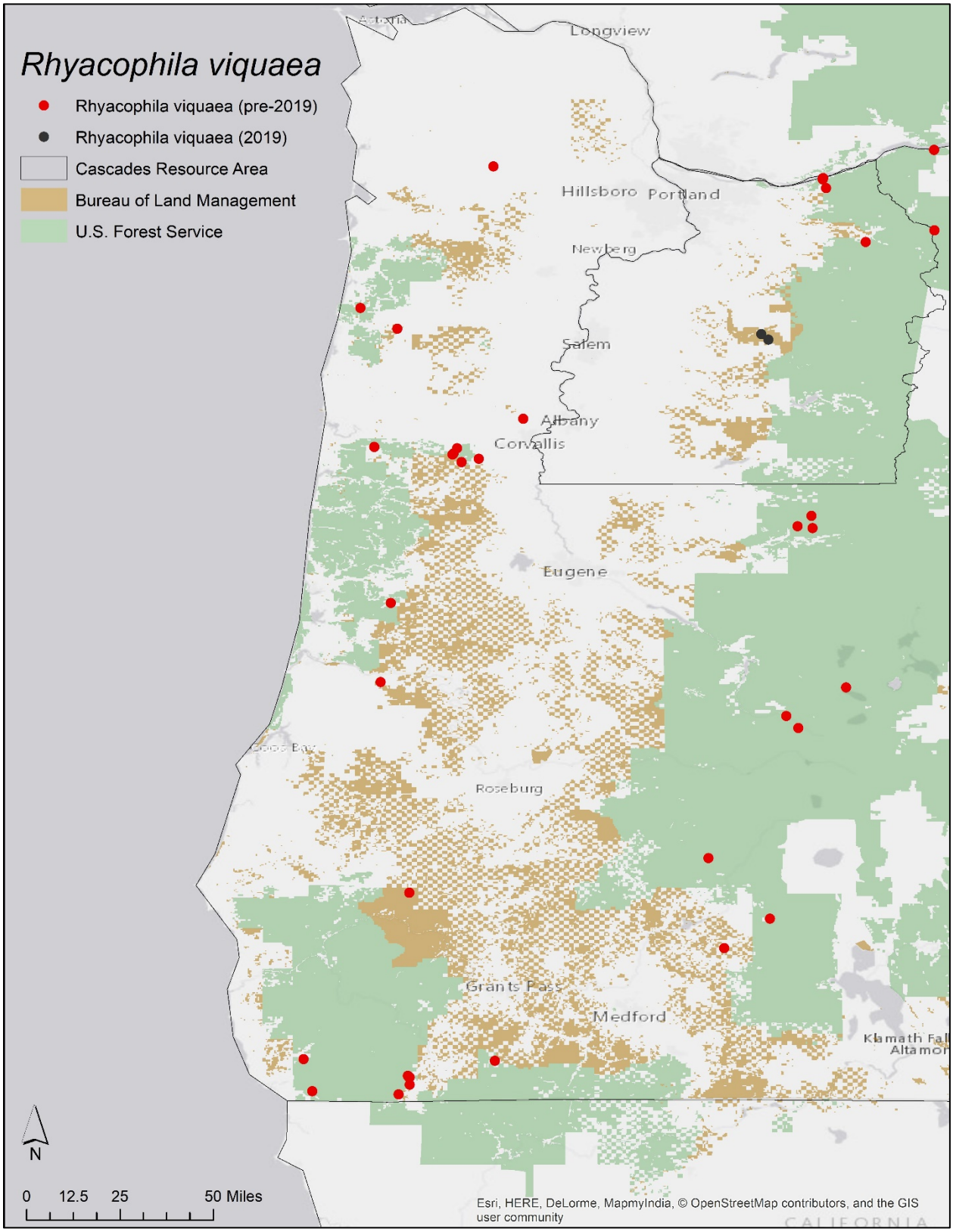
Map 2: *Lepania cascada* records in Oregon, relative to BLM and USFS lands.



Map 3: *Namamyia plutonis* records in Oregon, relative to BLM and USFS lands.



Map 4: *Homoplectra schuhi* records in Oregon, relative to BLM and USFS lands.



Map 5: *Rhyacophila viquaea* records in Oregon, relative to BLM and USFS lands.

BARCODING

Representative caddisfly specimens of interest (94 specimens total), including samples of the four species that were previously on the BLM strategic list, were sent to LifeScanner for DNA barcoding. Results should be available via BOLD (http://www.boldsystems.org/) in early 2020. These results will be shared with the Trichoptera Barcode of Life project (http://www.trichopterabol.org/index.php), which seeks to build a comprehensive COI barcode reference library for the global caddisfly fauna. The overarching goal of this project is to make species diagnoses for all caddisflies possible using DNA sequences. This will be especially useful for species that are difficult to identify in the larval stage, for identifying species via eDNA efforts, and for identifying species for which ID relies on male morphological features.

RECOMMENDATIONS

This survey effort was initiated to better understand the distribution of potentially rare or at-risk Oregon caddisfly species on Northwest BLM lands in the Cascade foothills, an area that appears to be relatively under-sampled for this taxa group. Our results show that several species of conservation concern may have a larger distribution than previously known. Because these species are associated with cool to cold water seeps, springs, or streams, protection of these sites will be important for their persistence.

Most caddisfly species have highly specific preferences with regard to water temperature, velocity, dissolved-oxygen levels, and substrate characteristics, and are therefore sensitive to a wide array of habitat alterations. All of the sites visited during 2019 survey efforts were adjacent to roads, and activities associated with recreation or timber harvest, road construction, or culvert repairs or replacements could have negative impacts on sensitive caddisfly species. The loss of trees through timber harvest poses significant threats, since all of these species occupy forested habitats, and trees provide shade that maintains appropriate stream temperatures for larval and pupal development, while intact understory provides habitat for adults. Many forested lands in Oregon's Cascade foothills are privately owned and have been intensively managed for logging. Loss of shading due to clear-cutting leads to exposure of stream and riparian habitats to direct solar radiation that may warm the water or change the composition and nature of riparian vegetation, while encouraging excess growth of algae. Roads through forested areas frequently parallel and cross stream segments, which may fragment habitat near streams and impact water quality and instream and terrestrial habitat. Given the checkerboard landscape in which these species occur, and the extensive network of logging roads bisecting or paralleling many creeks and streams in the region, maintenance of high quality, intact habitat on BLM lands will likely be important to their survival. To protect these species and their habitats, land managers can avoid activities that would increase water temperatures or degrade water quality or quantity. In areas of active management, riparian buffers would likely be beneficial. When working along roadside seeps, steps could be taken to minimize roadside dust and sedimentation to these fragile habitats.

Additional research on basic life history aspects, including phenology, microhabitat preferences, feeding habits, and characteristics of each life stage will be helpful in managing for rare caddisfly fauna. Although these surveys and others in Oregon provide additional details regarding species distributions, data on population trends and abundances are unavailable. Detailed monitoring of key sites could help land managers assess the health and status of Oregon's native caddisfly fauna. In particular, focusing on specialist microhabitats such as seeps and springs may be especially beneficial, since a number of endemic or rare freshwater invertebrate species are associated with these habitats. Continued inventories of cold water seeps and springs in high quality forested habitats will likely result in additional detections of specialist caddisfly species.

Future macroinvertebrate surveys could include a barcoding component, when time and funding allow. Trichoptera taxonomy is primarily based on male adult morphology, which often requires taxonomic experts for species level identification. Larval taxonomy is complicated and, for many species, larvae remain undescribed. By combining classical taxonomy by species experts with DNA barcoding, researchers can help pave the way toward more accurate species identifications. DNA barcoding was originally developed as a means to provide species-level identifications by associating DNA sequences from unknown specimens (which in the case of caddisflies, is often adult females or unassociated larvae) with those from curated reference specimens. More recently, this information is being used to develop environmental DNA (eDNA) techniques, which could allow for non-lethal sampling of stream invertebrates and, potentially, higher probability of detection of cryptic or patchily distributed species. Barcoding services such as LifeScanner offer a relatively inexpensive way for researchers to submit small samples for barcoding, and results can be published to widely used data storage and analysis systems such as the Barcode of Life Data System (BOLD). Coordination with species experts to determine which specimens would be most beneficial to submit for barcoding is recommended.

ACKNOWLEDGEMENTS

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APPENDIX I: LIST OF SITES SURVEYED IN 2019

Note: Number of species column indicates number of caddisfly species collected at each site (it does not include other taxa groups).

County	Site #	General area	Waterbody	Latitude	Longitude	May	Jun	Jul	Aug	No. of visits	No. of spp.
Clackamas	LS01	Little Sandy River	Unnamed trib	45.413970	-122.173490			x		1	4
Clackamas	SM01	Soosap Meadows	S. Fk. Clackamas R.	45.092860	-122.255020	x	x			2	3
Clackamas	SM02	Soosap Meadows	Helens Lake outlet	45.093980	-122.257220	x				1	0
Clackamas	SM03	Soosap Meadows	Unnamed trib	45.111160	-122.280340	x	x	x	x	4	11
Clackamas	SM04	Soosap Meadows	Unnamed trib	45.131520	-122.274510	x				1	3
Clackamas	SM05	Soosap Meadows	Unnamed trib	45.060400	-122.268520		x	x	x	3	11
Clackamas	SM06	Soosap Meadows	Seep	45.061190	-122.273280		x	x	x	3	15
Clackamas	SM07	Soosap Meadows	Unnamed trib	45.063270	-122.302240		x	x	x	3	18
Clackamas	SM08	Soosap Meadows	Unnamed trib	45.060790	-122.286540			x	x	2	7
Clackamas	SM09	Soosap Meadows	Seep	45.065250	-122.308270			x		1	1
Clackamas	SM10	Soosap Meadows	Unnamed trib	45.068200	-122.327370			x	x	2	6
Clackamas	SM11	Soosap Meadows	Seep	45.061170	-122.275400				x	1	4
Clackamas	TR01	Table Rock Wilderness	Scorpion Creek	44.946660	-122.327060	x	x			2	5
Clackamas	TR02	Table Rock Wilderness	Hay Barn Creek	44.950320	-122.338730	x	x	x	x	4	16
Clackamas	TR03	Table Rock Wilderness	Unnamed trib	44.951303	-122.340014	x				1	1
Clackamas	TR04	Table Rock Wilderness	Dungeon Creek	44.951500	-122.350010	x	x	x	x	4	8
Clackamas	TR05	Table Rock Wilderness	Avalanche Creek	44.952490	-122.368030	x	x			2	10
Clackamas	TR06	Table Rock Wilderness	Unnamed trib	44.973590	-122.320740	x	x		x	3	6
Clackamas	TR07	Table Rock Wilderness	Image Creek	44.970680	-122.331810	x				1	0
Clackamas	TR08	Table Rock Wilderness	Deetee Creek	44.970730	-122.366080	x	x	x	x	4	10
Clackamas	TR09	Table Rock Wilderness	Seep	44.949030	-122.338620		x	x		2	12
Clackamas	TR10	Table Rock Wilderness	Bull Creek	44.961520	-122.384710		x			1	10
Clackamas	TR11	Table Rock Wilderness	Unnamed trib	44.982850	-122.233100			x		1	7
Clackamas	TR12	Table Rock Wilderness	Unnamed trib	44.957900	-122.246710			x		1	1

County	Site #	General area	Waterbody	Latitude	Longitude	May	Jun	Jul	Aug	No. of visits	No. of spp.
Clackamas	TR13	Table Rock Wilderness	Shotgun Creek	45.013840	-122.485330				x	1	4
Linn	CC01	Crabtree Creek	Crabtree Creek	44.621370	-122.468930	x				1	0
Linn	SP01	Snow Peak	Bilyeu Creek	44.637320	-122.584230	x				1	0
Linn	SP02	Snow Peak	Unnamed trib	44.615140	-122.569290	x				1	0
Linn	SP03	Snow Peak	Unnamed trib	44.618680	-122.551890	x			x	2	4
Linn	SP04	Snow Peak	Unnamed trib	44.637920	-122.624530	x				1	1
Linn	SP05	Snow Peak	Roaring River	44.646750	-122.632230	x				1	2
Linn	SP06	Snow Peak	Unnamed trib	44.620080	-122.553650				x	1	5
Linn	SP07	Snow Peak	Unnamed trib	44.629310	-122.562550				x	1	0
Marion	OC01	Opal Creek	Moorehouse Creek	44.797170	-122.411530		x			1	5
Marion	OC02	Opal Creek	Unnamed creek	44.849370	-122.360650		x			1	5
Marion	OC03	Opal Creek	Unnamed creek	44.861030	-122.362730		x			1	1
Multnomah	LM01	Larch Mountain	Unnamed trib	45.504620	-122.146560			x		1	3
Multnomah	LM02	Larch Mountain	N. Fk. Gordon Creek	45.506180	-122.138340			x		1	6

APPENDIX II: LIST OF CADDISFLY SPECIES COLLECTED BY SITE

Species of conservation interest are in **bold**.

Species name	LS 01	SM 01	SM 02	SM 03	SM 04	SM 05	SM 06	SM 07	SM 08	SM 09	SM 10	SM 11	TR 01	TR 02	TR 03	TR 04	TR 05	TR 06	TR 07	TR 08	TR 09	TR 10	TR 11	TR 12	TR 13	CC 01	SP 01	SP 02	SP 03	SP 04	SP 05	SP 06	SP 07	OC 01	OC 02	OC 03	LM 01	LM 02	No. of sites
Allocosmoecus partitus								x																															1
Anagapetus bernea				x		x		x								x	x					x																	6
Anagapetus sp.		x														x				x			x											x					5
Apatania tavala		x																																					1
Cryptochia probably *pilosa*																	x																						1
Dolophilodes dorcus				x		x		x	x				x	x		x				x			x												x	x	x		12
Dolophilodes novusamericanus				x		x	x							x				x			x											x							7
Dolophilodes pallidipes	x			x		x	x				x					x		x											x			x							9
Ecclisomyia simulata																							x																1
Ecclisomyia sp.																																						x	1
Farula jewetti							x																																1
Farula sp.							x							x				x			x								x										5
Glossosoma penitum				x		x		x					x									x																	5
Glossosoma sp.																																						x	1
Goeracea genota				x	x								x	x				x																					5
Homoplectra* probably *schuhi							x														x																		2
Homoplectra schuhi							x														x																		2
Homoplectra sp.																						x																	1
Hydatophylax hesperus																									x														1
Lepania cascada		x		x										x		x		x		x																			6
Lepidostoma cascadense						x																x																x	3
Lepidostoma roafi								x			x																					x							3
Lepidostoma unicolor *group*																																						x	1
Micrasema bactro						x	x							x			x			x																			5
Micrasema sp.								x														x													x				3
Namamyia plutonis																																			x				1
Neophylax splendens	x									x							x					x	x											x					6

Species name	LS 01	SM 01	SM 02	SM 03	SM 04	SM 05	SM 06	SM 07	SM 08	SM 09	SM 10	SM 11	TR 01	TR 02	TR 03	TR 04	TR 05	TR 06	TR 07	TR 08	TR 09	TR 10	TR 11	TR 12	TR 13	CC 01	SP 01	SP 02	SP 03	SP 04	SP 05	SP 06	SP 07	OC 01	OC 02	OC 03	LM 01	LM 02	No. of sites
Palaeagapetus nearcticus							x	x			x	x		x															x			x						x	8
Philocasca sp.																					x																		1
Polycentropus sp.						x																																	1
Polycentropus variegatus								x																															1
Pseudostenophylax edwardsi					x		x									x					x																		4
Psychomyia lumina								x	x								x																	x					4
Rhyacophila angelita	x													x								x												x					4
Rhyacophila angelita group								x																															1
Rhyacophila ecosa					x		x							x	x					x										x	x				x				8
Rhyacophila fenderi							x					x									x																		3
Rhyacophila grandis							x							x						x	x	x												x					6
Rhyacophila hyalinata				x				x						x		x	x					x																	6
Rhyacophila hyalinata group													x																										1
Rhyacophila jewetti														x																									1
Rhyacophila leleia						x		x	x		x									x																			5
Rhyacophila narvae								x																															1
Rhyacophila oreta							x	x													x																		3
Rhyacophila perda				x				x																															2
Rhyacophila perplana								x																															1
Rhyacophila rotunda group									x					x																									2
Rhyacophila sp.											x		x				x	x							x														5
Rhyacophila valuma								x									x						x																3
Rhyacophila vao				x		x			x													x	x														x	x	7
Rhyacophila vedra																									x														1
Rhyacophila viquaea																				x	x																		2
Rhyacophila visor														x																									1
Rhyacophila willametta																	x			x	x																		3
Sisko probably *sisko*																													x										1
Sisko species complex														x						x																			2

Species name	LS 01	SM 01	SM 02	SM 03	SM 04	SM 05	SM 06	SM 07	SM 08	SM 09	SM 10	SM 11	TR 01	TR 02	TR 03	TR 04	TR 05	TR 06	TR 07	TR 08	TR 09	TR 10	TR 11	TR 12	TR 13	CC 01	SP 01	SP 02	SP 03	SP 04	SP 05	SP 06	SP 07	OC 01	OC 02	OC 03	LM 01	LM 02	No. of sites
Wormaldia anilla	x					x	x	x	x		x	x					x								x						x	x					x		12
Wormaldia anilla/clauseni														x																									1
Wormaldia occidea				x			x		x			x									x		x	x											x				8
Wormaldia sp.																x																							1
Total number of species	**4**	**3**	**0**	**11**	**3**	**11**	**15**	**18**	**7**	**1**	**6**	**4**	**5**	**16**	**1**	**8**	**10**	**6**	**0**	**10**	**12**	**10**	**7**	**1**	**4**	**0**	**0**	**0**	**4**	**1**	**2**	**5**	**0**	**5**	**5**	**1**	**3**	**6**	

APPENDIX III: LIST OF STONEFLY SPECIES COLLECTED BY SITE

Species of conservation interest are in **bold**. (Note: sites without stonefly collections are not included in this table.)

Species name	CC 01	OC 01	OC 02	OC 03	SM 01	SM 02	SM 03	SM 04	SM 05	SM 06	SM 07	SM 09	SM 10	SP 01	SP 02	SP 03	SP 04	SP 05	TR 01	TR 02	TR 03	TR 04	TR 05	TR 06	TR 07	TR 08	TR 09	TR 10	TR 11	TR 12	No. of sites
Alloperla fraterna			x						x											x								x			4
Capnia/Mesocapnia sp.					x		x																								2
Chernokrilus misnomus												x														x					2
Doroneuria sp.									x																						1
Eucapnopsis brevicauda														x											x						2
Isoperla fusca							x			x																					2
Kathroperla takhoma																						x				x					2
Malenka cornuta									x																						1
Malenka cornuta group		x					x		x	x								x		x		x	x			x				x	10
Moselia infuscata				x	x		x									x			x	x	x			x		x	x				10
Ostrocerca foersteri						x																		x			x				3
Paraleuctra forcipata	x													x																	2
Paraleuctra vershina														x											x						2
Pomoleuctra andersoni																											x				1
Pteronarcella regularis																						x	x					x			3
Setvena sp.																x															1
Soliperla sp.									x			x	x							x		x		x				x			7
Soyedina interrupta			x					x	x							x			x					x							6
Soyedina nevadensis																				x											1
Soyedina producta				x	x					x					x												x				5
Suwallia dubia																													x		1
Sweltsa borealis	x		x		x		x			x				x			x	x		x	x	x	x	x		x	x				15
Sweltsa fidelis					x												x	x									x				4
Sweltsa sp.										x																					1
Taenionema sp.																									x						1
Visoka cataractae					x																										1
Yoraperla marionae														x																	1
Yoraperla nigrisoma										x	x							x					x			x	x				6
Yoraperla sp.							x			x												x	x	x		x		x			7
Zapada cinctipes					x																										1
Zapada frigida	x				x																	x									3
Zapada oregonensis							x		x	x	x						x														5
Total no. of species	3	1	3	2	8	1	7	1	7	8	2	2	1	5	1	3	3	4	2	6	2	7	5	6	3	7	7	4	1	1	

APPENDIX IV: HABITAT PHOTOS

Photos of each site are provided below, in alphabetical order by area. For each site, we provide the survey date(s) and a list of caddisfly species collected. Species of interest (including those that were previously on the OR BLM strategic list) are in **bold font**. Elevations are estimated using the USGS TNM Elevation online tool (https://viewer.nationalmap.gov/theme/elevation/). Detailed site information is available from the Xerces Society and in ISSSSP database records.

CRABTREE CREEK

CRABTREE CREEK (CC01)

Survey date: May 21, 2019

Habitat type: Perennial stream

Elevation: 856 m (2,810 ft.)

Caddisfly species collected: None

Stonefly species collected: *Paraleuctra forcipata*, *Sweltsa borealis*, *Zapada frigidus*

Notes: Survey conditions not ideal—raining, overcast, 49° F. Caddisflies present in stream but no adults active. Fish observed in stream.

LARCH MOUNTAIN

UNNAMED TRIBUTARY (LM01)

Survey date: July 11, 2019

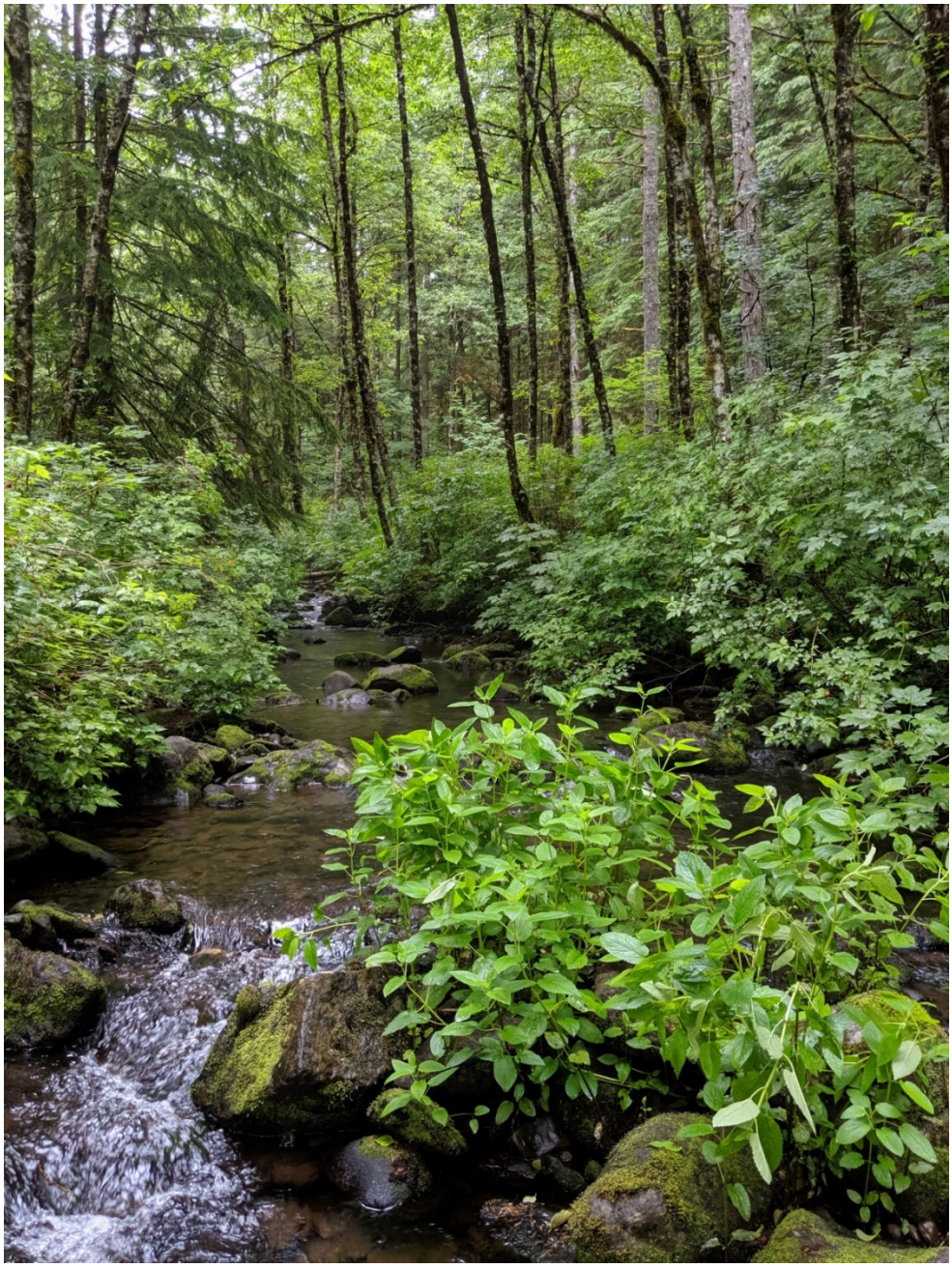
Habitat type:

Elevation: 517 m (1,695 ft.)

Caddisfly species collected: *Dolophilodes dorcus*, *Rhyacophila vao*, *Wormaldia anilla*. The mollusk ***Pristinicola hemphilli*** was also collected from this site.

Notes: Conditions were not ideal for adult caddisfly surveys – 100% cloud cover with soaked vegetation from recent heavy rainfall, which made sweep netting difficult.

NORTH FORK GORDON CREEK (LM02)



Survey date: July 11, 2019

Habitat type: Perennial stream

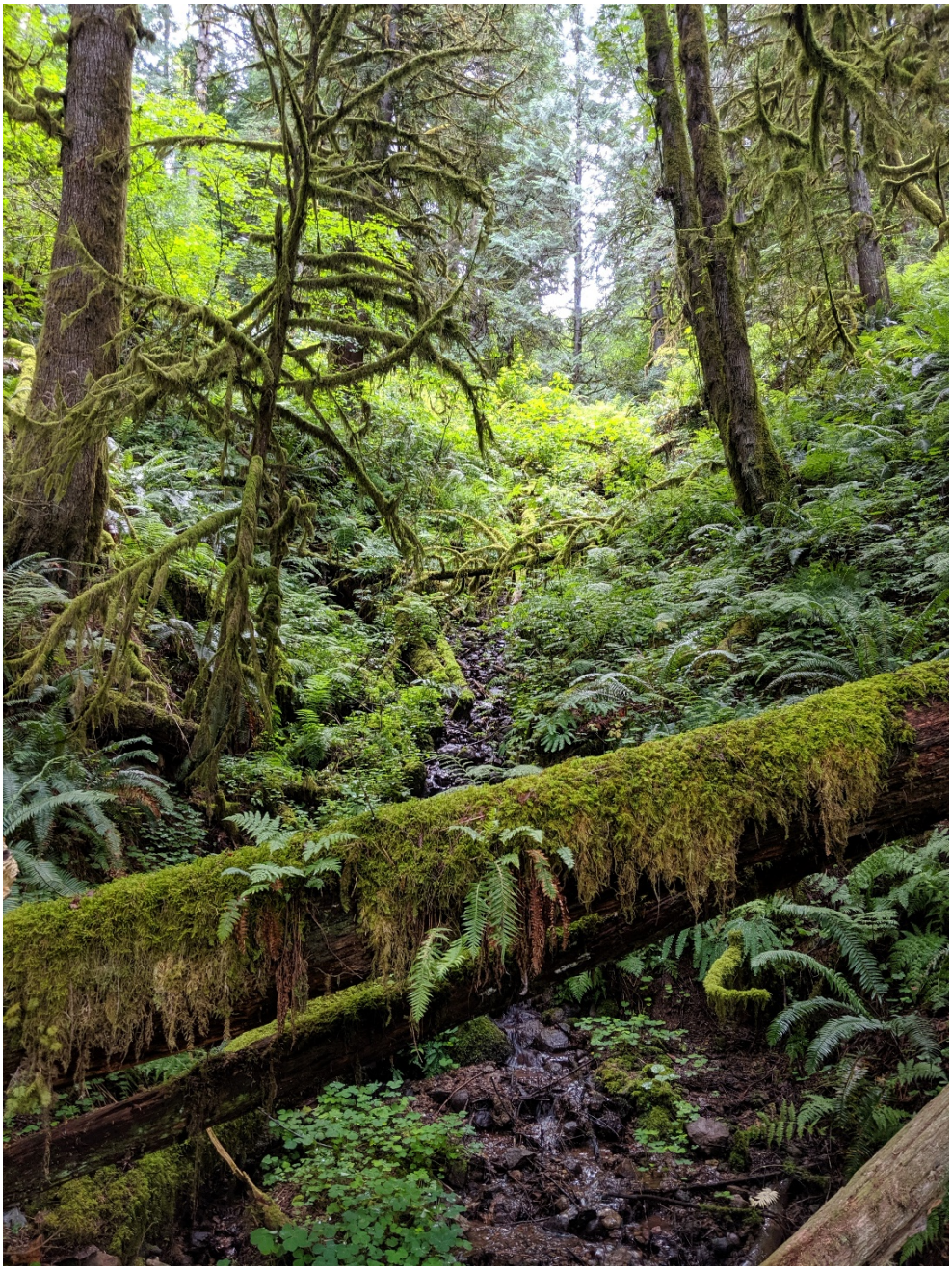
Elevation: 535 m (1,757 ft.)

Caddisfly species collected: *Ecclisomyia* sp., *Glossosoma* sp., *Lepidostoma cascadense*, *Lepidostoma* unicolor group, *Palaeagapetus nearcticus*, *Rhyacophila vao*

Note: Larger black caddisflies were observed diving from a log into the water and back again, possibly laying eggs.

LITTLE SANDY RIVER

UNNAMED TRIBUTARY TO THE LITTLE SANDY RIVER (LS01)



Survey date: July 11, 2019

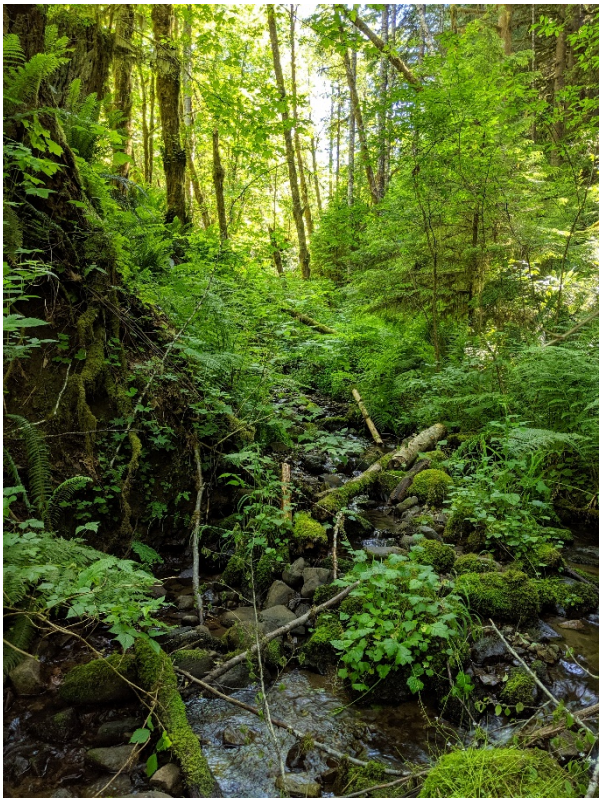
Habitat type: Intermittent stream

Elevation: 257 m (843 ft.)

Caddisfly species collected: *Dolophilodes pallidipes*, *Neophylax splendens*, *Rhyacophila angelita*, *Wormaldia anilla*

OPAL CREEK

MOOREHOUSE CREEK (OC01)



Survey date: June 10, 2019

Habitat type: Perennial stream

Elevation: 378 m (1,241 ft.)

Caddisfly species collected: *Anagapetus* sp. (probably *bernea*), *Neophylax splendens*, *Psychomyia lumina*, *Rhyacophila angelita*, *R. grandis*

Stonefly species collected: *Malenka cornuta* group

Notes: Dunn's salamander (*Plethodon dunni*) observed (see photo).

UNNAMED TRIBUTARY (OC02)

Survey date: June 10, 2019

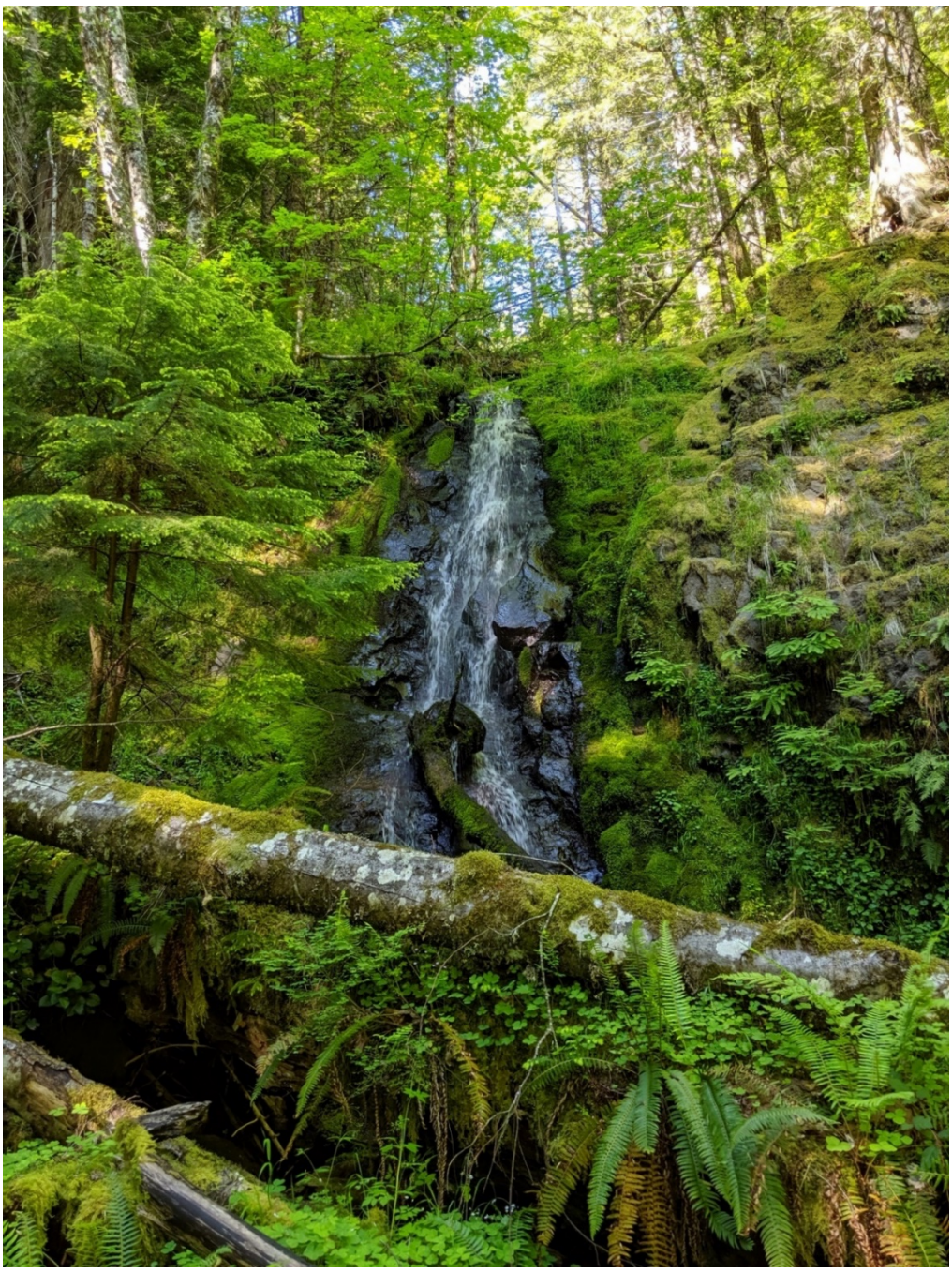
Habitat type: Intermittent stream

Elevation: 702 m (2,304 ft.)

Caddisfly species collected: *Dolophilodes dorcus*, *Micrasema* sp. (probably *bactro*), ***Namamyia plutonis***, *Rhyacophila ecosa*, *Wormaldia occidea*

Stonefly species collected: *Alloperla fraterna*, *Soyedina interrupta*, *Sweltsa borealis*

UNNAMED TRIBUTARY (OC03)



Survey date: June 10, 2019

Habitat type: Perennial stream

Elevation: 837 m (2,747 ft.)

Caddisfly species collected: *Dolophilodes dorcus*

Stonefly species collected: *Moselia infuscata*, *Soyedina producta*

SNOW PEAK

BILYEU CREEK (SP01)

Photo on right by Xerces Society/Emilie Blevins

Survey date: May 20, 2019

Habitat type: Perennial stream

Elevation: 913 m (2,997 ft.)

Caddisfly species collected: None

Stonefly species collected: *Eucapnopsis brevicauda*, *Paraleuctra forcipata*, *P. vershina*, *Sweltsa borealis*, *Yoraperla marionae*

Notes: Fish present in creek. Survey conditions not ideal (46° F, overcast, with snow drifts along road). Caddisflies present in stream but not collected. No adult activity.

UNNAMED TRIBUTARY (SP02)

Survey date: May 20, 2019

Habitat type: Perennial stream

Elevation: 1,064 m (3,492 ft.)

Caddisfly species collected: None

Stonefly species collected: *Soyedina producta*

Notes: Survey conditions not ideal (46° F, overcast). No adult activity observed.

SEEP (SP03)

Survey dates: May 20, 2019 and August 19, 2019

Habitat type: Intermittent stream/seep

Elevation: 969 m (3,180 ft.)

Caddisfly species collected: *Dolophilodes pallidipes*, *Farula* sp., *Palaeagapetus nearcticus*, *Sisko* probably *sisko*

Stonefly species collected: *Moselia infuscata*, *Setvena* sp., *Soyedina interrupta*

Note: No caddisflies collected on first visit (5/20/2019).

UNNAMED TRIBUTARY (SP04)

Survey date: May 20, 2019

Habitat type: Perennial stream

Elevation: 764 m (2,408 ft.)

Caddisfly species collected: *Rhyacophila ecosa*

Stonefly species collected: *Sweltsa borealis*, *S. fidelis*, *Zapada oregonensis*

ROARING RIVER (SP05)

Survey date: May 20, 2019

Habitat type: Intermittent stream

Elevation: 751 m (2,465 ft.)

Caddisfly species collected: *Rhyacophila ecosa*, *Wormaldia anilla*

Stonefly species collected: *Malenka cornuta* group, *Sweltsa borealis*, *S. fidelis*, *Yoraperla nigrisoma*

UNNAMED TRIBUTARY (SP06)

Survey date: August 19, 2019

Habitat type: Perennial stream

Elevation: 960 m (3,149 ft.)

Caddisfly species collected: *Dolophilodes novusamericanus*, *D. pallidipes*, *Lepidostoma roafi*, *Palaeagapetus nearcticus*, *Wormaldia anilla*, *W. occidea*

UNNAMED TRIBUTARY (SP07)

Survey date: August 19, 2019

Habitat type: Perennial stream

Elevation: 1,049 m (3,441 ft.)

Caddisfly species collected: None

Notes: No caddisflies observed. No photos taken of this site.

SOOSAP MEADOWS/LUKENS CREEK AREA

SOUTH FORK CLACKAMAS RIVER (SM01)

Survey dates: May 23, 2019 and July 12, 2019

Habitat type: Perennial stream

Elevation: 1,187 m (3,894 ft.)

Caddisfly species collected: *Anagapetus* sp. (probably *bernea*), ***Apatania tavala***, ***Lepania cascada***

Stonefly species collected: *Capnia/Mesocapnia* sp., *Moselia infuscata*, *Soyedina producta*, *Sweltsa borealis*, *S. fidelis*, *Visoka cataractae*, *Zapada cinctipes*, *Z. frigida*

Note: No caddisfly collections were made on May 23. Coastal giant salamander (*Dicamptodon tenebrosus*) was observed in the stream on May 23 (see photo).

HELENS LAKE OUTLET CREEK (SM02)

Survey date: May 23, 2019

Habitat type: Perennial swamp/marsh

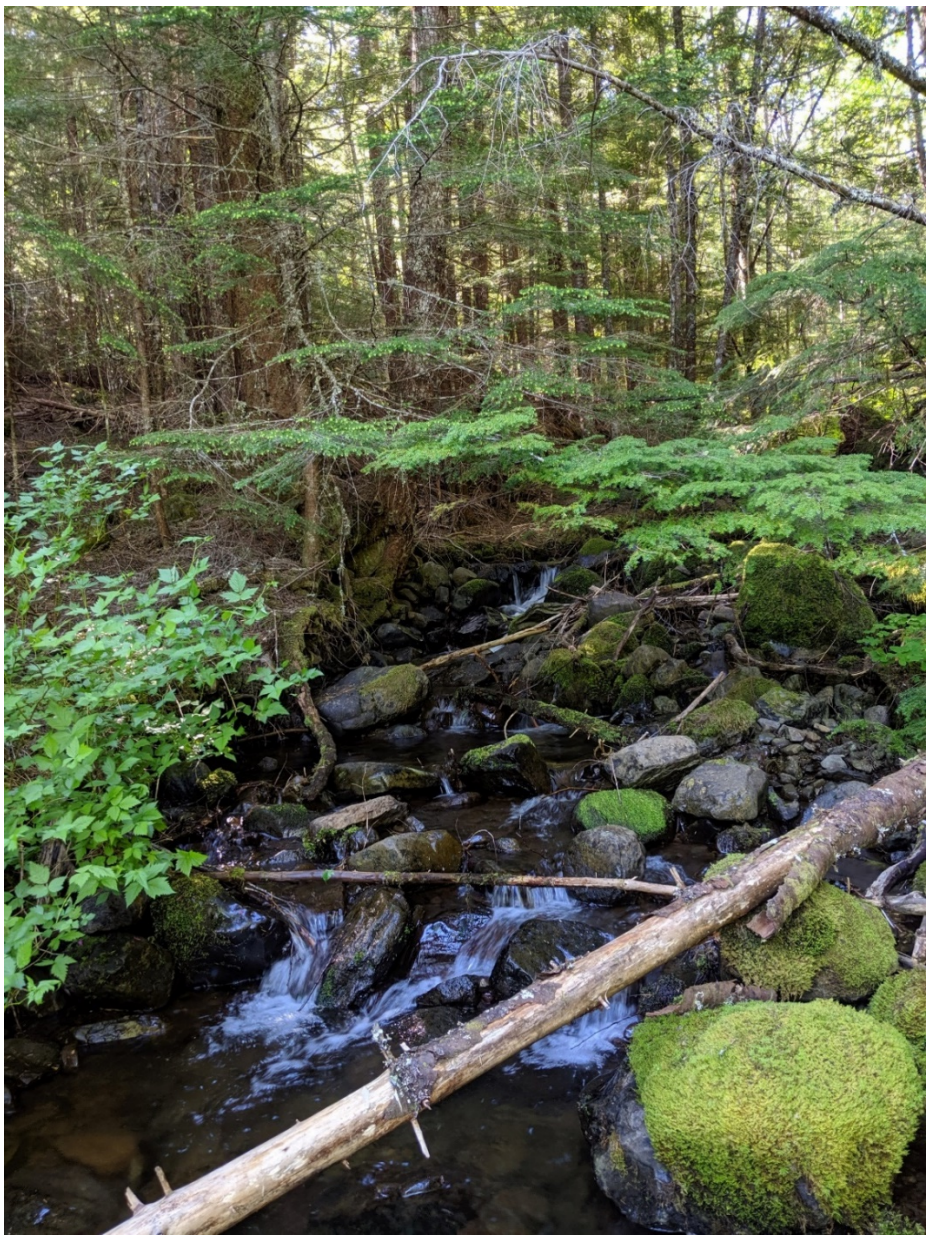
Elevation: 1,186 m (3,892 ft.)

Caddisfly species collected: None

Stonefly species collected: *Ostrocerca foersteri*

Notes: Very marshy, warm site. Does not look appropriate for sensitive caddisflies.

UNNAMED TRIBUTARY (SM03)



Survey dates: May 23, June 12, July 10, and August 20, 2019

Habitat type: Perennial stream

Elevation: 967 m (3,173 ft.)

Caddisfly species collected: *Anagapetus bernea*, *Dolophilodes dorcus*, *D. novusamericanus*, *D. pallidipes*, *Glossosoma penitum*, *Goeracea genota*, ***Lepania cascada***, *Rhyacophila hyalinata*, *R. perda*, *R. vao*, *Wormaldia occidea*

Stonefly species collected: *Capnia/Mesocapnia* sp., *Isoperla fusca*, *Malenka cornuta* group, *Moselia infuscata*, *Sweltsa borealis*, *Yoraperla* sp., *Zapada oregonensis*

UNNAMED TRIBUTARY (SM04)

Survey date: May 23, 2019

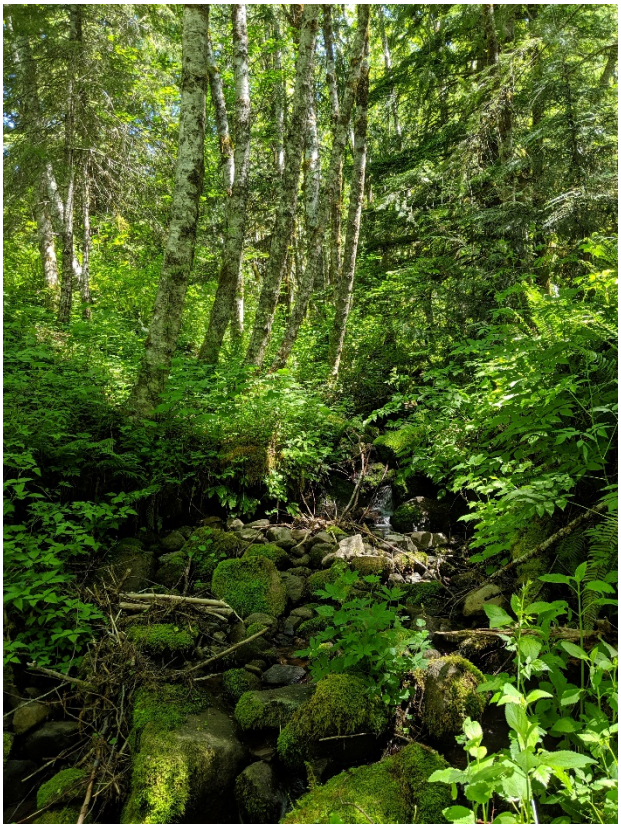
Habitat type: Perennial stream

Elevation: 946 m (3,104 ft.)

Caddisfly species collected: *Goeracea genota*, *Pseudostenophylax edwardsi*, *Rhyacophila ecosa*

Stonefly species collected: *Soyedina interrupta*

UNNAMED TRIBUTARY (SM05)



Survey dates: June 12, July 10, and August 20, 2019

Habitat type: Perennial stream

Elevation: 816 m (2,678 ft.)

Caddisfly species collected: *Anagapetus bernea*, *Dolophilodes dorcus*, *D. novusamericanus*, *D. pallidipes*, *Glossosoma penitum*, *Lepidostoma cascadense*, *Micrasema bactro*, *Polycentropus* sp., *Rhyacophila leleia*, *R. vao*, *Wormaldia anilla*

Stonefly species collected: *Alloperla fraterna*, *Doroneuria* sp., *Malenka cornuta*, *M. cornuta* group, *Soliperla* sp., *Soyedina interrupta*, *Zapada oregonensis*

Notes: Coastal giant salamander (*Dicamptodon tenebrosus*) observed on July 10, 2019 (see photo).

SEEP (SM06)

Survey dates: June 12, July 10, and August 20, 2019

Habitat type: Perennial stream/seep

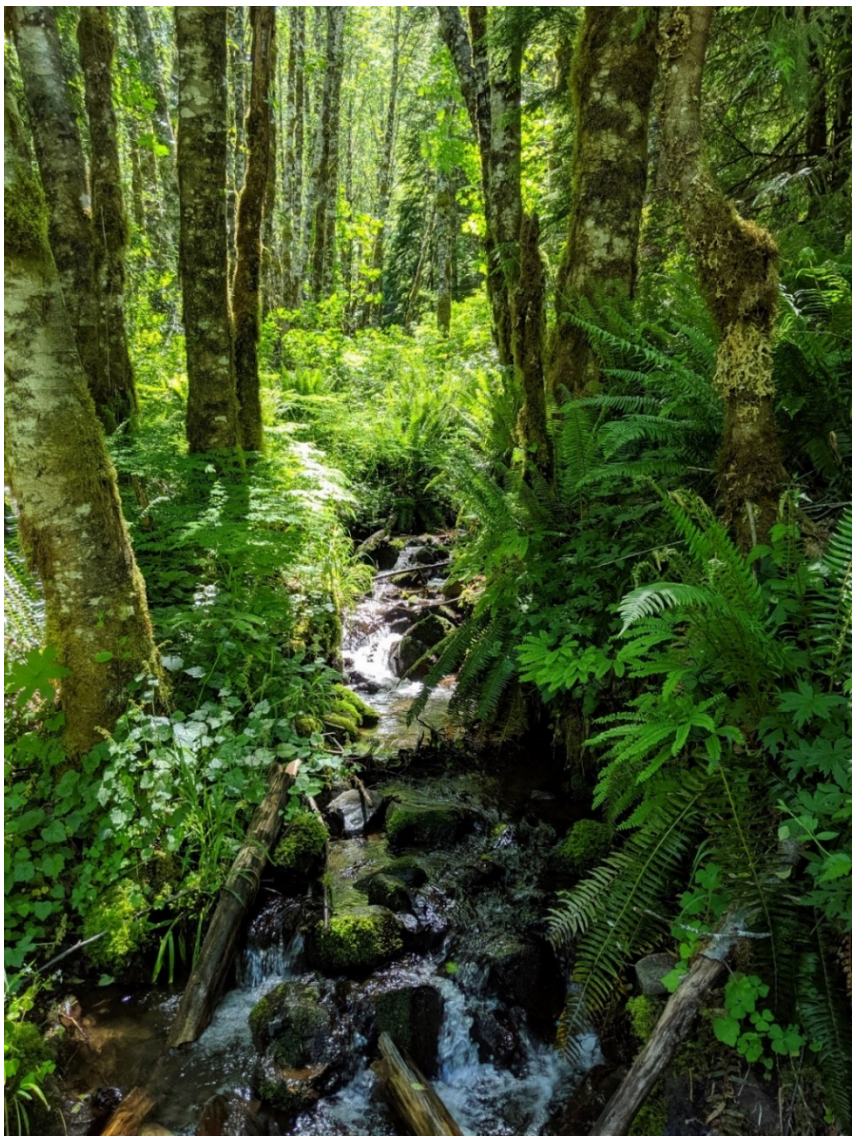
Elevation: 829 m (2,720 ft.)

Caddisfly species collected: *Dolophilodes novusamericanus*, *D. pallidipes*, ***Farula jewetti***, *Farula* sp., ***Homoplectra schuhi***, *Micrasema bactro*, *Palaeagapetus nearcticus*, *Pseudostenophylax edwardsi*, *Rhyacophila ecosa*, ***R. fenderi***, *R. grandis*, *R. oreta*, *Wormaldia anilla*, *W. occidea*

Stonefly species collected: *Isoperla fusca*, *Malenka cornuta* group, *Soyedina producta*, *Sweltsa borealis*, *Sweltsa* sp., *Yoraperla nigrisoma*, *Yoraperla* sp., *Zapada oregonensis*

Notes: Cascade torrent salamander (*Rhyacotriton cascadae*) and a giant salamander (*Dicamptodon* sp.) observed at this site (see photos) on June 12, 2019.

UNNAMED TRIBUTARY (SM07)



Survey dates: June 12, July 10, and August 20, 2019

Habitat type: Perennial stream

Elevation: 667 m (2,189 ft.)

Caddisfly species collected: *Allocosmoecus partitus*, *Anagapetus bernea*, *Dolophilodes dorcus*, *Glossosoma penitum*, *Lepidostoma roafi*, *Micrasema* sp., *Palaeagapetus nearcticus*, *Polycentropus variegatus*, *Psychomyia lumina*, *Rhyacophila* angelita group, *R. hyalinata*, *R. leleia*, *R. narvae*, *R. oreta*, *R. perda*, ***R. perplana***, *R. valuma*, *Wormaldia anilla*

Stonefly species collected: *Yoraperla nigrisoma*, *Zapada oregonensis*

Notes: Observed river otter (*Lontra canadensis*) on July 10, 2019 close to this site (at road crossing with Lukens Creek).

UNNAMED TRIBUTARY (SM08)

Survey dates: July 10 and August 20, 2019

Habitat type: Perennial stream

Elevation: 728 m (2,390 ft.)

Caddisfly species collected: *Dolophilodes dorcus*, *Psychomyia lumina*, *Rhyacophila leleia*, *Rhyacophila* rotunda group, *R. vao*, *Wormaldia anilla*, *W. occidea*

SEEP (SM09)

Survey date: July 10, 2019

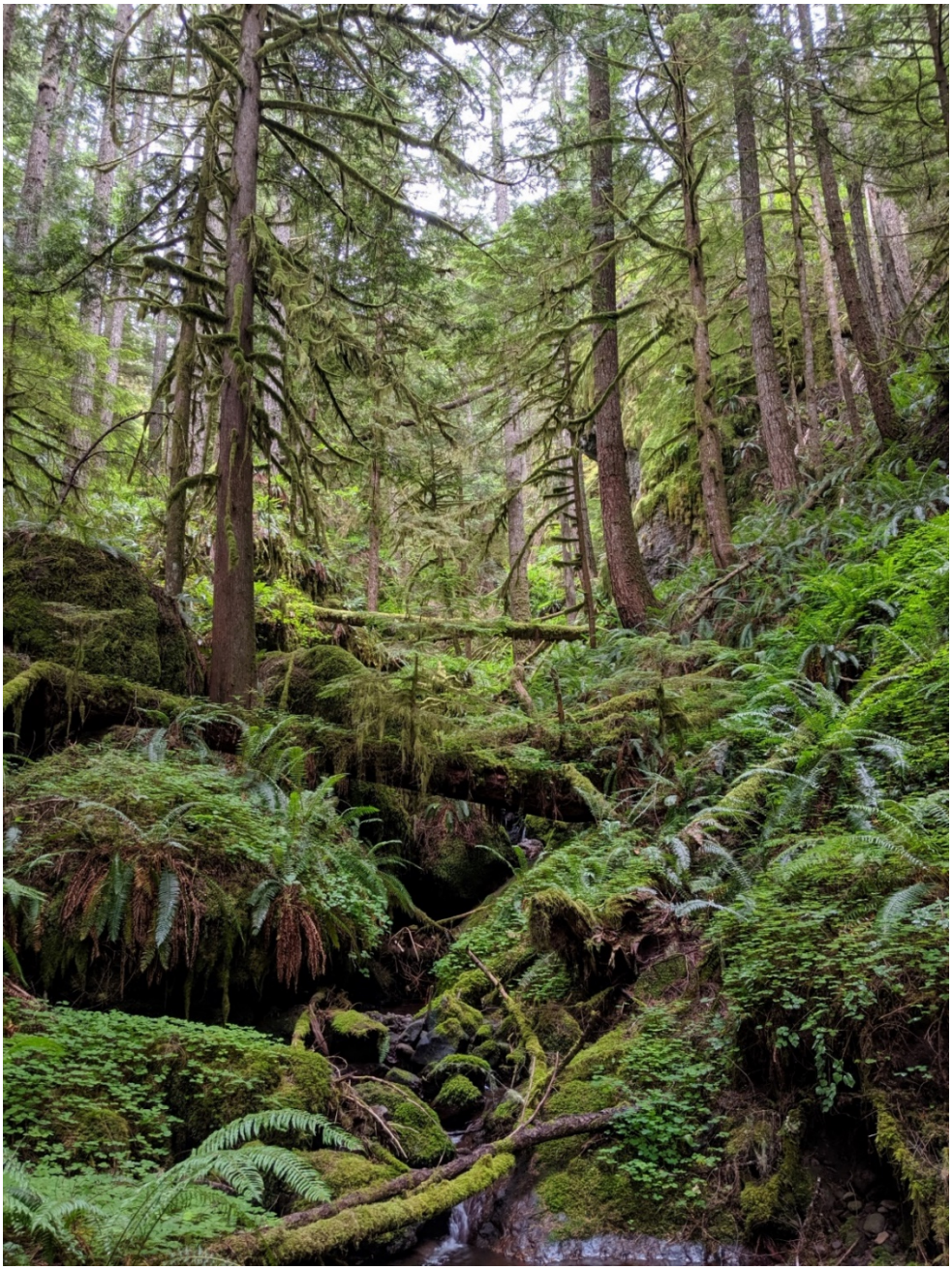
Habitat type: Intermittent stream/seep

Elevation: 646 m (2,120 ft.)

Caddisfly species collected: *Neophylax splendens*

Stonefly species collected: ***Chernokrilus misnomus***, *Soliperla* sp.

UNNAMED TRIBUTARY (SM10)



Survey dates: July 10 and August 20, 2019

Habitat type: Perennial stream

Elevation: 593 m (1,947 ft.)

Caddisfly species collected: *Dolophilodes pallidipes*, *Lepidostoma roafi*, *Palaeagapetus nearcticus*, *Rhyacophila leleia*, *Rhyacophila* sp., *Wormaldia anilla*

Stonefly species collected: *Soliperla* sp.

SEEP (SM11)

Survey date: August 20, 2019

Habitat type: Seep

Elevation: 810 m (2,658 ft.)

Caddisfly species collected: *Palaeagapetus nearcticus*, ***Rhyacophila fenderi***, *Wormaldia anilla*, *W. occidea*

TABLE ROCK WILDERNESS

SCORPION CREEK (TR01)

Survey dates: May 22 and June 11, 2019

Habitat type:

Elevation: 948 m (3,109 ft.)

Caddisfly species collected: *Dolophilodes dorcus*, *Glossosoma penitum*, *Goeracea genota*, *Rhyacophila* hyalinata group, *Rhyacophila* sp.

Stonefly species collected: *Moselia infuscata*, *Soyedina interrupta*

Notes: Millipedes (*Harpaphe haydeniana*) and banana slugs (*Ariolimax* spp.) were abundant at this site during June surveys.

HAY BARN CREEK (TR02)

Survey dates: May 22, June 11, July 9, and August 16, 2019

Habitat type: Perennial stream

Elevation: 916 m (3,004 ft.)

Caddisfly species collected: *Dolophilodes dorcus*, *D. novusamericanus*, *Farula* sp., *Goeracea genota*, ***Lepania cascada***, *Micrasema bactro*, *Palaeagapetus nearcticus*, *Rhyacophila angelita, R. ecosa, R. grandis, R. hyalinata*, ***R. jewetti***, *Rhyacophila* rotunda group, *R. visor,* ***Sisko*** **species complex**, ***Wormaldia anilla/clauseni***

Stonefly species collected: *Alloperla fraterna*, *Malenka cornuta* group, *Moselia infuscata*, *Soliperla* sp., *Soyedina nevadensis*, *Sweltsa borealis*

Notes: Dunn's salamander (*Plethodon dunni*) observed (see photo) on May 22, 2019.

UNNAMED TRIBUTARY (TR03)

Survey date: May 22, 2019

Habitat type: Perennial stream

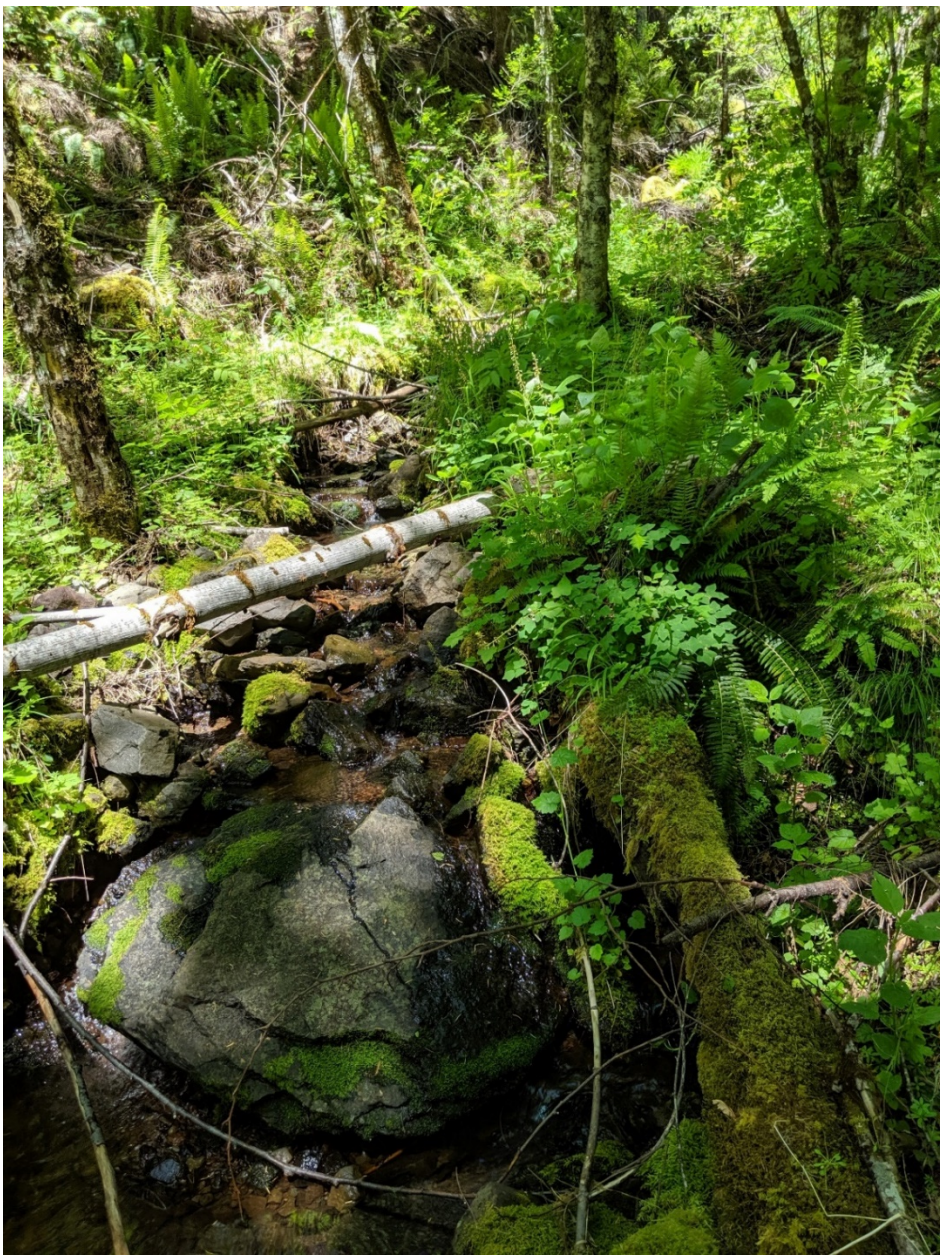
Elevation: 900 m (2,953 ft.)

Caddisfly species collected: *Rhyacophila ecosa*

Stonefly species collected: *Moselia infuscata*, *Sweltsa borealis*

Notes: Dunn's salamander (*Plethodon dunni*) observed (see photo).

DUNGEON CREEK (TR04)



Survey dates: May 22, June 11, July 9, and August 16, 2019

Habitat type: Perennial stream

Elevation: 830 m (2,722 ft.)

Caddisfly species collected: *Anagapetus bernea*, *Anagapetus* sp., *Dolophilodes dorcus*, *D. pallidipes*, ***Lepania cascada***, *Pseudostenophylax edwardsi*, *Rhyacophila hyalinata*, *Wormaldia* sp.

Stonefly species collected: ***Kathroperla takhoma***, *Malenka cornuta* group, ***Pteronarcella regularis***, *Soliperla* sp., *Sweltsa borealis*, *Yoraperla* sp., *Zapada frigida*

AVALANCHE CREEK (TR05)

Survey dates: May 22 and June 11, 2019

Habitat type: Perennial stream

Elevation: 606 m (1,989 ft.)

Caddisfly species collected: *Anagapetus bernea*, *Cryptochia* probably *pilosa*, *Micrasema bactro*, *Neophylax splendens*, *Psychomyia lumina*, *Rhyacophila hyalinata*, *Rhyacophila* sp., *R. valuma*, ***R. willametta***, *Wormaldia anilla*

Stonefly species collected: *Malenka cornuta* group, ***Pteronarcella regularis***, *Sweltsa borealis*, *Yoraperla nigrisoma*, *Yoraperla* sp.

Notes: Salamander and *Juga* sp. observed in the creek. Photos of salamander are of poor quality and only show the tail.

UNNAMED TRIBUTARY (TR06)

Survey dates: May 22, June 11, and August 16, 2019

Habitat type: Perennial stream

Elevation: 1,011 m (3,391 ft.)

Caddisfly species collected: *Dolophilodes novusamericanus*, *D. pallidipes*, *Farula* sp., *Goeracea genota*, ***Lepania cascada***, *Rhyacophila* sp.

Stonefly species collected: *Moselia infuscata*, *Ostrocerca foersteri*, *Soliperla* sp., *Soyedina interrupta*, *Sweltsa borealis*, *Yoraperla* sp.

IMAGE CREEK (TR07)

Survey date: May 22, 2019

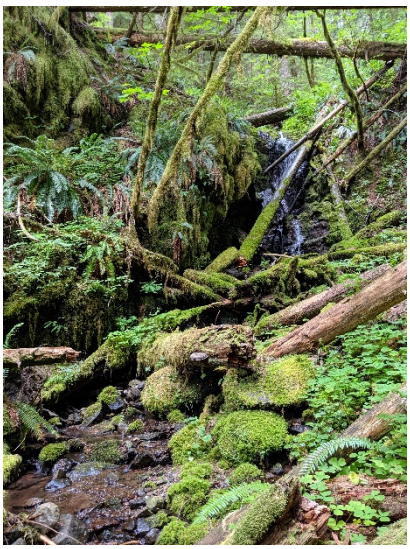
Habitat type: Perennial stream

Elevation: 843 m (2,766 ft.)

Caddisfly species collected: None

Stonefly species collected: *Eucapnopsis brevicauda*, *Paraleuctra vershina*, *Taenionema* sp.

DEETEE CREEK (TR08)



Survey dates: May 22, June 11, July 9, and August 16, 2019

Habitat type: Perennial stream

Elevation: 755 m (2,478 ft.)

Caddisfly species collected: *Anagapetus* sp. *Dolophilodes dorcus*, ***Lepania cascada***, *Micrasema bactro*, *Rhyacophila ecosa*, *R. grandis*, *R. leleia*, ***R. viquaea***, ***R. willametta***, ***Sisko*** **species complex**

Stonefly species collected: ***Chernokrilus misnomus***, ***Kathroperla takhoma***, *Malenka cornuta* group, *Moselia infuscata*, *Sweltsa borealis*, *Yoraperla nigrisoma*, *Yoraperla* sp.

Notes: Coastal giant salamander (*Dicamptodon tenebrosus*) observed (see photo) on July 9, 2019.

SEEP (TR09)

Survey dates: June 11 and July 9, 2019

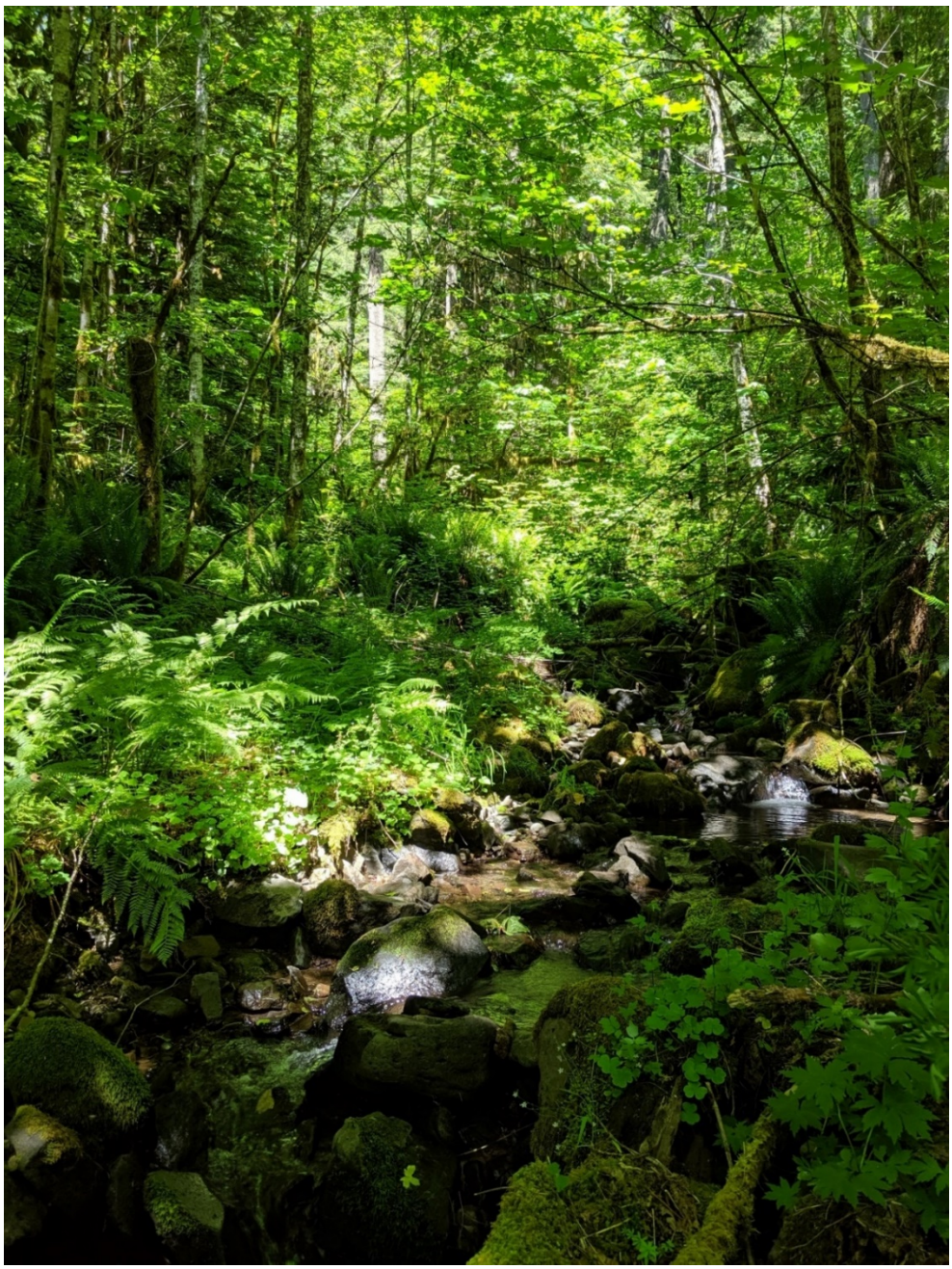
Habitat type: Seep

Elevation: 915 m (3,002 ft.)

Caddisfly species collected: *Dolophilodes novusamericanus*, *Farula* sp., ***Homoplectra schuhi***, *Philocasca* sp. (probably *rivularis*), *Pseudostenophylax edwardsi*, ***Rhyacophila fenderi****, R. grandis*, *R. oreta*, ***R. viquaea***, ***R. willametta***, *Wormaldia occidea*

Stonefly species collected: *Moselia infuscata*, *Ostrocerca foersteri*, ***Pomoleuctra andersoni***, *Soyedina producta*, *Sweltsa borealis*, *S. fidelis*, *Yoraperla nigrisoma*

BULL CREEK (TR10)



Survey date: June 11, 2019

Habitat type: Perennial stream

Elevation: 512 m (1,679 ft.)

Caddisfly species collected: *Anagapetus bernea*, *Glossosoma penitum*, ***Homoplectra*** sp. *Lepidostoma cascadense*, *Micrasema* sp., *Neophylax splendens*, *Rhyacophila angelita*, *R. grandis*, *R. hyalinata*, *R. vao*

Stonefly species collected: *Alloperla fraterna*, ***Pteronarcella regularis***, *Soliperla* sp., *Yoraperla* sp.

UNNAMED TRIBUTARY (TR11)

Survey date: July 9, 2019

Habitat type: Perennial stream

Elevation: 967 m (3,174 ft.)

Caddisfly species collected: *Anagapetus* sp. *Dolophilodes dorcus*, *Ecclisomyia simulata*, *Neophylax splendens*, *Rhyacophila valuma*, *R. vao*, *Wormaldia occidea*

Stonefly species collected: *Suwallia dubia*

UNNAMED TRIBUTARY (TR12)

Survey date: July 9, 2019

Habitat type: Perennial stream

Elevation: 1,157 m (3,797 ft.)

Caddisfly species collected: *Wormaldia occidea*

Stonefly species collected: *Malenka cornuta* group

SHOTGUN CREEK (TR13)

Survey date: August 16, 2019

Habitat type: Perennial stream

Elevation: 237 m (779 ft.)

Caddisfly species collected: *Hydatophylax hesperus*, *Rhyacophila* sp., *Rhyacophila vedra*, *Wormaldia anilla*

Notes: *Juga* sp. observed in creek.