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**Environmental Permitting and Sensitive
Areas Review**

YMCA Mineral Lake Property – Due Diligence
Phase
Lewis County, Washington

for
YMCA

March 8, 2021

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**Environmental Permitting and Sensitive Areas
Review**

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Phase
Lewis County, Washington**

File No. 6565-008-00, Task 300

March 8, 2021

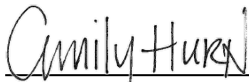
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EXECUTIVE SUMMARY

GeoEngineers completed an Environmental Permitting and Sensitive Areas Review in support of the YMCA Mineral Lake Property Due Diligence Assessment. Our work included background research and data review, a site reconnaissance to map approximate locations of potentially regulated environmental features, and a permitting assessment for the potential use of the property as a YMCA camp.

Our site reconnaissance identified regulated sensitive areas within the proposed development areas which include Mineral Lake and associated lake-fringe wetlands, streams and wetland features. Buffers associated with these features were estimated based on our understanding of the applicable regulatory code and approximated graphically on a site plan. This information was provided to Mithun, Inc. and the YMCA for conceptual-level planning to develop a proposed layout for the camp. Our findings are considered preliminary: regulatory buffers are subject to change based on a detailed site investigation and formal wetland delineation and rating results; there is also potential for additional features within proposed development areas that were not identified during the reconnaissance survey. Despite these data gaps, there appears to be sufficient space on the property to establish a camp layout that meets the needs of the YMCA. If proposed development features impact sensitive area features such as fill within streams, wetlands and associated buffers, Lewis County Code allows for buffer width averaging and mitigation to offset unavoidable impacts. We do not anticipate extensive permit coordination necessary for the currently proposed design at the state and federal levels. Based on our evaluation of environmentally sensitive areas and permitting requirements and current project understanding, we do not foresee an environmental permitting reason the YMCA would not be able to develop the property as currently proposed. If the property is acquired, we suggest the next step to be additional design and layout of site features, formally delineate sensitive areas in the vicinity of site development and initiate agency coordination for permitting, especially at the local level with Lewis County.

1.0 INTRODUCTION

This memorandum presents a summary of findings associated with Task 300 – Environmental Permitting and Sensitive Areas Review that GeoEngineers has completed in support of the YMCA Mineral Lake Property Due Diligence Assessment (Project). This includes results of background research and data review, a site reconnaissance to map approximate locations of potentially regulated environmental features, and a permitting assessment for the potential use of the property as a YMCA camp.

The intent of this memorandum is to provide information to the YMCA for use evaluating the feasibility of developing the subject property for the intended uses. Our primary goal is to address environmental permitting considerations for site development, which will help the team identify site constraints, avoid and minimize impacts to sensitive areas and evaluate suitability of the property to achieve the overall project vision.

The project area is located in north Lewis County just south of the boundary with Thurston County and to the east of Interstate-7, shown on Figure 1, Vicinity Map. The project area is located on the north end of Mineral Lake. The town of Mineral is located next to the lake along the southern shores. The project site exceeds 2,000 acres, located along the entire northern shoreline of the lake and extending north to a ridge (“Mineral Hill”). The eastern site boundary is adjacent to Mineral Creek and the western site boundary follows Mineral Hill Road. Due to the size of the project site, we separated the project area into three regions: western, central and eastern (Figure 2, Wetland and Stream Reconnaissance).

2.0 PROJECT UNDERSTANDING

Our understanding of this project is based on our communications with the YMCA, Hartland LLC and other members of the design team, as well as our previous and ongoing attendance at design team meetings. We reviewed the provided request for proposal (RFP) document, “YMCA Seattle Mineral Lake Site Due Diligence and Permitting Technical Services” obtained in an electronic mail dated October 30, 2019. We were also provided by the YMCA the “Mineral Lake Program, version 2” project summary, other background documents and prior application submittals for review while preparing this report.

We understand the overall project goal is to develop and operate a year-round youth and family camp on the property. Project development is still in the conceptual phase and preliminary design drawings have not yet been developed. As of the time of this report, the size of the proposed camp has not been determined; the camp could range in size from an approximate 500-acre portion of the property to the entire 2,118 acres. Property development is anticipated to occur in phases over a period up to 20 years. It is anticipated that the maximum area for improved portions of the camp will not exceed a total of about 100 acres; the remaining undeveloped portion of the property will be used for hiking and recreation and will either remain in forestry production or be placed into conservation easements. Currently envisioned site improvements may potentially include:

- Expansion of the existing access road from Mineral Hill Road for passenger vehicles, delivery trucks and emergency vehicles. A parking lot (or multiple lots) will also be developed to accommodate vehicle traffic.
- Development of a water supply system for the camp, including a water storage tank

- Wastewater conveyances and septic drainfields.
- Stormwater facilities to collect, treat, infiltrate and/or discharge stormwater.
- New building construction for a camp lodge, program shelters/classrooms, cabins, staff housing and utility/maintenance. Individual buildings are anticipated to be up to about 9,000 square feet and be supported by slab-on-grade and shallow foundation construction. Recreational camp features proposed include ball fields, waterfront facilities including docks, campfire area, eco classroom, climbing tower, and arts and crafts building.

3.0 DATA REVIEW

As a first step in our review, GeoEngineers researched existing information and maps identifying the occurrence, locations and/or extents of potentially regulated natural resources—such as wetlands, streams, other waterbodies and/or other sensitive fish and wildlife habitat types—within the project area vicinity. Our search for pertinent and applicable data and maps consisted of a review of the following information sources.

■ Public Databases:

- Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) database (WDFW 2020a);
- United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps (USFWS 2020a);
- USFWS IPaC Resource - List of Threatened and Endangered Species (USFWS 2020b);
- United States Department of Agriculture – National Resource Conservation Service (USDA-NRCS) Web Soil Survey (USDA-NRCS 2020);
- Washington State Department of Natural Resources (WDNR) Forest Practices Application Review System (FPARS) (WDNR 2020);
- WDFW SalmonScape Application (WDFW 2020b); and
- Lewis County Mapped Data

■ Prior Studies:

- Wetland, Stream and Lakeshore Delineation Sketch (The Watershed Company 2010)

Mapped data reports available from WDFW, USFWS, Lewis County and USDA-NRCS are included in Appendix A, Mapped Data Reports.

3.1. Aquatic Areas Data

Aquatic areas at the site include Mineral Lake, wetlands and streams. Mineral Lake is 277 acres and considered a “Shoreline of the State” and protected under the Shoreline Management Act regulations (Chapter 90.58 RCW). The USFWS NWI online mapper (USFWS 2020a) depicts one mapped wetland within the project area (Appendix A).

The WDNR FPARS map (WDNR 2020) identifies several streams throughout the project area. The largest stream is Mineral Creek, located within the eastern boundary of the project area. According to WDNR FPARS, Mineral Creek is a designated “Shoreline of the State” and is considered a Type S stream

(WDNR 2020). SalmonScape identifies documented fish use within Mineral Creek by resident coastal cutthroat trout (*Oncorhynchus clarki clarki*) and rainbow trout (*Oncorhynchus mykiss*) (WDFW 2020a, WDFW 2020b). No anadromous fish species were identified within Mineral Creek or Mineral Lake due to the presence of multiple total fish passage obstruction namely the Alder Dam downstream within the Nisqually River.

There are two unnamed streams that flow into Mineral Lake at the north and northwestern ends of the lake that are mapped as fish-bearing (Type F). There are several additional unnamed streams that are mapped as “unknown” flowing into the northeastern section of the lake (WDNR 2020). WDNR FPARS map identifying the streams within the project area is provided in Appendix A.

3.2. Fish and Wildlife Habitat Data

We also evaluated mapped data regarding fish and wildlife habitat, which are regulated under Lewis County Code (LCC) 17.38.400 Fish and Wildlife Habitat Conservation Areas (FWHCA). WDFW PHS maps the following priority habitats at the site (see Appendix A for details):

TABLE 1. WDFW PHS PRIORITY HABITATS MAPPED AT SITE

Common Name	Scientific Name	WDFW PHS Priority Area
Little brown bat	Myotis lucifugus	<ul style="list-style-type: none"> Breeding Area
Northern spotted owl	Strix occidentalis	<ul style="list-style-type: none"> Nesting Habitat Breeding Area Management Buffer
Rocky Mountain elk	Cervus elaphus nelsoni	<ul style="list-style-type: none"> Regular Concentration
Mule and black-tailed deer	Odocoileus hemionus	<ul style="list-style-type: none"> Regular Concentration
Freshwater Forested/Shrub Wetland*	--	<ul style="list-style-type: none"> Aquatic Habitat

Notes:

*This WDFW PHS wetland feature is also mapped by USFWS NWI Mapper

Within Mineral Lake, WDFW PHS maps the following priority habitats:

- Freshwater emergent wetland (located along the northeast shoreline of the lake);
- Resident coastal cutthroat trout (*Oncorhynchus clarki clarki*); and
- Rainbow trout (*Oncorhynchus mykiss*)

The USFWS maps the following species regulated under the Endangered Species Act (ESA) as potentially being affected by activities at the site:

- Gray wolf (*Canis lupus*);
- North American wolverine (*Gulo gulo luscus*);
- Marbled murrelet (*Brachyramphus marmoratus*);
- Northern spotted owl (*Strix occidentalis caurina*);
- Yellow-billed cuckoo (*Coccyzus americanus*); and

- Bull trout (*Salvelinus confluentus*)

Of these mapped species, the Northern spotted owl (NSO) and marbled murrelet are the two that may require impact evaluation as they are both classified as Threatened species under the ESA and there is potential for suitable habitat at this site, unlike the other terrestrial species. There is no designated critical habitat (DCH) for either species mapped at the site, but there is DCH for NSO approximately 4 miles to the west (Appendix A).

3.3. Soil Data

The USDA-NRCS Web Soil Survey indicates 28 soil types within the project area (USDA-NRCS 2020). Five of these soils are identified on the hydric soils list. See Appendix A for mapped soil types within the project area.

4.0 SITE RECONNAISSANCE FINDINGS

As a second step in our review, GeoEngineers completed a site reconnaissance of the property to identify the approximate locations and extents of potentially regulated sensitive areas and/or habitat types. Two GeoEngineers biologists completed this reconnaissance on March 18, 2020. Photographs from the site visit are provided in Appendix B, Site Photographs.

4.1. Methods and Limitations

Due to the size of the property and limitations on amount of time and effort allocated to this review, the site visit was generally considered to be “reconnaissance-level”; in other words, we were not able to examine the entire property in detail nor complete detailed boundary determinations for potentially regulated features. The reconnaissance was limited to identifying regulated features within parcels contained within “zones” A and C as depicted on the parcel map provided in Appendix C, YMCA Mineral Lake Vicinity Map and was focused more specifically on the “proposed development zones” shown on the map in Appendix D, YMCA Mineral Lake Conceptual Development Areas to provide planning level details. Figure 2 provides a graphical map summary of the regulated aquatic features and associated buffers identified during the reconnaissance, as well as a photo points for a subset of the site photographs collected during this effort. Non-aquatic habitat conditions potentially regulated for sensitive terrestrial wildlife (e.g., ESA-listed species) are described generally in the following sections according to the “regions” identified on this map.

Considering the extensive size and challenging terrain, a large portion of the site was observed from the road and by evaluating landscape patterns and topography as a means of identifying potential aquatic features such as wetlands and streams. The ordinary high water mark (OHWM), which is a jurisdictional boundary defining Waters of the U.S. (WOTUS), Waters of the State and Shorelines regulated under federal and state laws, was not surveyed for streams or along the shoreline of Mineral Lake. Wetlands were sketched and approximate extents and boundaries were identified based on indicators of hydrology and vegetation. Subsurface soil conditions were not examined, wetland boundaries were estimated and not formally delineated, and wetlands were not rated or classified based on Washington State guidance as part of this effort. Stream reaches were assessed and estimated to be fish-bearing (Type F) or non-fish-bearing (Type N) based on site characteristics and existing map resources (see Section 3.0 Data Review). Formal

determinations of stream type were not completed as part of this effort due to the size of the site and time limitations.

Due to the large size of the site and the dense forest, there may be additional wetlands and other small drainages that were not documented. A complete shoreline OHWM delineation was not completed, and additional lakeshore wetlands may exist in areas that were not directly observed. Therefore, the results presented below and shown on Figure 2, are considered preliminary. Findings within the development zones (Appendix D) have a higher level of detail and accuracy since the reconnaissance was focused within these areas. Additional detailed investigations are anticipated to be needed prior to submittal of development applications for specific improvements during development of the camp.

4.2. Wetlands and Streams

The preliminary wetland and stream findings are shown on Figure 2. Discussion of regulated features and habitat conditions is separated by western, central and eastern regions of the site as shown.

4.2.1. Western Region

The entrance to the property is located off Mineral Hill Road at the western boundary of the property. The western region of the site has been generally identified through conceptual design as the location for the Family Camp, YMCA operating buildings and staff housing. As a result, this area was identified as a potential development zone that was a significant focus of the survey. A large portion of this area has been recently clear-cut. A mosaic of wetland features were identified within this portion of the site as well as several streams both fish-bearing and non-fish-bearing. Previous wetland delineation flagging was observed within this area and our field observations generally confirmed previously mapped features (TWC 2010).

4.2.2. Central Region

The central region of the site includes the large wetland feature that was mapped by several data sources (WDFW 2020a, USFWS 2020a). Our observations confirmed the location of this wetland and also verified a WDNR FPARS identified unnamed stream at the western outlet, which flows generally west to south eventually connecting to Mineral Lake (WDNR 2020). Sections of this unnamed stream were directly observed during the survey and identified as fish-bearing with some tributaries to it as non-fish-bearing. Other stream sections were not directly observed but the stream location and surface flow was “assumed” to continue and was mapped based on topography. Several tributaries to this stream were identified as either fish-bearing or non-fish-bearing based on either field observations of size and gradient or gradient based on topography. Figure 2 illustrates the fish-bearing and non-fish-bearing stream sections within this drainage and identifies which reaches were field-verified versus assumed. Several other smaller wetland features were also documented within this central region.

4.2.3. Eastern Region

Observations within the eastern region of the site extended roughly from the northeastern end of Mineral Lake east to Mineral Creek. A focused field effort was performed in this area, which contains a larger potential development zone currently envisioned as a future Youth Camp.

On the east side of the region, topography slopes gently downward toward Mineral Creek. This area is characterized by an open meadow containing a large wetland. Two observed stream channels are

associated with this wetland, one flowing in from the west (non-fish-bearing) and one flowing out to the east and then into Mineral Creek, assumed to be fish-bearing.

Along the northeast shoreline of the lake, within the same eastern region, there were several wetland features and four small streams identified flowing into the lake. Three of these streams were characterized as non-fish-bearing based on observed size and gradient and one stream marginally meets the physical parameters to be characterized as fish-bearing. One wetland feature consisted of an open meadow that acts as a headwater to one of the small streams. The other wetlands in this area are lake-fringe vegetated shallows, confirming the lakeshore wetland mapped by WDFW PHS in this area. Additional lake-fringe wetlands were observed to the north and northwestern, as shown on Figure 2. Large woody material (LWM) was observed piled up and/or floating along the shoreline within this area; and it appears that the predominant wind direction comes from the west across the lake resulting in accumulation of logs and other woody debris in this area.

4.3. Fish and Wildlife Habitat Conservation Areas

Fish and Wildlife Habitat Conservation Areas (FWHCAs) within the assessment area were evaluated under the definition provided in LCC Chapter 17.38.420. Documented streams, wetlands and Mineral Lake are all considered FWHCAs under LCC 17.38.420, Table 17.38-6. WDFW maps the site as priority habitat for “regular concentration” by Rocky Mountain elk. According to LCC 17.38.420, Table 17.38-6, this site may also need to consider impacts to elk wintering habitat. No elk or evidence of elk concentrations were observed during site reconnaissance.

We did not complete a comprehensive assessment of potential nesting habitat for marbled murrelet or NSO. However, broad observations of the terrestrial habitat noted that many areas of the site have been previously logged with existing forests predominantly characterized by young second growth trees up to 12 inches diameter at breast height (dbh). Nesting platforms are the most important feature of murrelet nesting habitat and, in order to be suitable for nesting, trees need to have large branches at least 4 inches in diameter (USFWS 2012). Suitable nesting habitat for NSO includes trees that are a minimum of 20 inches dbh (Harke 2014). In general, forests within the property did not meet criteria to be considered suitable nesting habitat for either marbled murrelet or NSO. However, this review was not exhaustive and there may be some areas within the property that meet these criteria; therefore, additional focused terrestrial surveys may be necessary with future development proposals to identify if project activities could potentially impact nesting, roosting, foraging or dispersal habitat for these species.

4.4. Design Implications

Wetland and stream boundaries were approximated during the habitat survey and are shown on Figure 2. Buffers for these features are projected and subject to change based on formal delineation. Tables 2 and 3, below, provide summaries of these projected buffers.

4.4.1. Wetland Buffers

Wetland buffers are partially determined by the use intensity of the proposed action, as described in LCC 17.38.260 in Table 17.38-2. In order to estimate buffers for this due diligence level report, use intensity levels were based on current design features which include camp facilities (dining hall, cabins, staff housing, etc.), foot paths/hiking trails and open fields adjacent to wetland features. The numerical wetland buffer value is more accurately determined by the wetland category (based on *Washington State*

Wetland Rating System for Western Washington: 2014 Update), considering the impact level (Table 17.38-3). However, since wetlands were not rated as part of this due diligence level assessment, wetland habitat function values are approximated and based on general wetland observations. We estimated buffer values of 75, 110 and 150 based on low, moderate or high level of proposed impact, respectively (Table 2). These buffer values are consistent across a Category I, II or III wetland with a moderate level of function for habitat (Table 17.28-3).

TABLE 2. SUMMARY OF APPROXIMATED WETLAND BUFFERS

Critical Area	Approximated Buffer		
Wetland*	Low Impact	Moderate Impact	High Impact
	75	110	150

Notes:

*Wetlands were not rated and therefore these buffers may change depending on habitat score.

4.4.2. Stream Buffers

Streams are considered a designated FWHCA and an “aquatic priority habitat” (LCC 17.38.420). Stream buffers are based on WDNR stream typing. Stream types were estimated based on available data and field observations where directly observed and are subject to review and determination by a regulatory authority. Therefore, the stream buffers shown on Figure 2 are not definitive but rather are based on our best professional opinion based on the information currently available. Stream buffers extend from the OHWM of the stream, which were not delineated as part of this assessment. For the purposes of this effort, the stream buffers were based on the approximate centerline alignment of the stream as estimated during our reconnaissance. LCC Table 17.38-6 provides the buffers for Type N and Type F waters as 75 and 150 feet, respectively, and shown in Table 3 below.

TABLE 3. SUMMARY OF APPROXIMATED STREAM BUFFERS

DNR Stream Type	Regulated Buffer*
Type F waters	150
Type N waters	75

Notes:

* Stream buffers extend from the OHWM of stream, which were not delineated as part of this survey. Type F are fish bearing streams. Type N are non-fish bearing streams.

4.4.3. Shoreline Buffers

Lewis County’s Shoreline Master Plan (SMP) program implements and administers permits related to “Shorelines of the State” within Lewis County. Mineral Lake and associated wetlands and streams extending landward for 200 feet fall under the jurisdiction of the SMP. The shoreline environment designation for this site is “Rural Conservancy”. Currently the critical areas ordinance (CAO) has been updated within the main municipal code (LCC 17.38) but has not been integrated into the SMP. The CAO in the SMP will be updated as part of Lewis County’s periodic review which is scheduled for June 2021 (Brianna Uy, personal communication). Until that update occurs, critical areas within shoreline jurisdiction are required to comply with LCC 17.35A. As a consequence, there are two separate critical area codes for this project which results in two sets of buffers and mitigation regulations. But as a conservative planning strategy based on guidance from Tim McHarg with Van Ness Feldman and Lanzi Li with Heartland, we have

provided buffers on critical areas within shoreline jurisdiction to comply with LCC 17.38, as will be the case once the code is updated.

Proposed development features within shoreline jurisdiction include a dock and waterfront facilities for storage or potentially showers or restrooms. We have provided a table below that summarizes the potential shoreline buffers related to these features in Table 4. In addition, for buildings, there is an additional 15-foot setback from the edge of the buffer. Passive, water-oriented recreational uses such as access trails to water features are allowed within the buffer. The buffers listed in Table 4-1 in the SMP are subject to change and require coordination with Lewis County planning staff. LCC SMP Chapter 4.04.02C describes the requirements and process for buffer width averaging which allows applicants to reduce the width of a portion of the shoreline or critical areas buffer and increase the width of another portion. Water access is limited at this site due to steep terrain and therefore buffers may potentially be reduced through a shoreline variance.

TABLE 4. POTENTIAL SHORELINE BUFFERS FOR PROPOSED DEVELOPMENT FEATURES

Proposed Structures	Shoreline Buffer – Rural Conservancy*	
	Category Definitions**	Distance (feet)
Dock	Water-dependent structure/use	0
Waterfront facilities – boat storage, showers and bathrooms, etc.	Water-related and water enjoyment structure	75
Recreational Development – such as campsites, ball fields, arts and crafts facility and campfire pits	Non-water-oriented use	150
Recreational Development – Trails***	Passive water-related and water oriented recreational use	0

Notes:

*Shoreline buffers for “Rural Conservancy” are based of LCC SMP Chapter 4.04, Table 4-1

**Shoreline use definitions from Lewis County SMP Chapter 03.31.2020

***According to LCC SMP Chapter 4.04, Table 4-1, Note (6), “passive, water-oriented recreational uses are allowed within shoreline buffers”.

5.0 REGULATORY FRAMEWORK

The project will need to comply with local, state and federal regulations and associated permits. We have developed a regulatory permitting matrix which identifies potential permit pathways necessary to complete the proposed project based on environmentally sensitive areas present on the site and the proposed locations of desired camp features (Table 5). This matrix addresses local regulations, including shorelines and critical areas, as well as federal and state approvals, including but not necessarily limited to: Clean Water Act (CWA), ESA, State Environmental Policy Act (SEPA) and Hydraulic Code Rules (Hydraulic Project Approval [HPA]).

The sections below provide a summary of permit requirements and process; additional details are provided in the Table 5 below.

TABLE 5. ANTICIPATED PERMIT REQUIREMENTS

Permit	Agency	Project Elements Triggering Regulation	Application Requirements	Predecessor(s) for Submittal/ Approval	Estimated Timeline	Other Permitting Considerations
FEDERAL						
Clean Water Act (CWA) (Section 404)	USACE	Placing fill within "waters of the U.S."	JARPA Form and Figures Critical Areas Report Biological Assessment for ESA Compliance (see below) Cultural Resources Survey Report	30 Percent Design	6 to 12 months	This project may require a federal permit for construction of overwater structures within Mineral Lake and any wetlands. A Section 404 permit will be required if fill or excavation activities are proposed below the jurisdictional limits of a "water of the U.S." (OHWM of Mineral Lake) or fill within wetlands.
Section 7 ESA Compliance	USFWS and National Marine Fisheries Service (NMFS)	Consultation triggered by project actions that require a federal permit such as fill within wetlands, in-water work in streams (including culvert replacement) or work below the OHWM of Mineral Lake.	Biological Assessment (BA) reviewed during consultation with Services prior to National Environmental Policy Act (NEPA) approval.	30 Percent Design	6 to 12 months	ESA review is triggered by a federal nexus which includes projects that require a federal permit. ESA review would include evaluation of construction impacts to ESA species and habitat. The effects of habitat alteration, water quality and construction activities on listed species will need to be evaluated. We anticipate this project will not require substantial coordination with USFWS and NMFS as this site does not have documented use by ESA-listed species. However, a terrestrial survey may be required by USFWS for nesting or dispersal habitat for marbled murrelets or NSO.
STATE						

Permit	Agency	Project Elements Triggering Regulation	Application Requirements	Predecessor(s) for Submittal/ Approval	Estimated Timeline	Other Permitting Considerations
CWA Section 401 Water Quality Certification	Washington State Department of Ecology (Ecology)	CWA Section 401 Water Quality Certification (WQC) are required for projects receiving a Section 404 permit.	If needed, may be reviewed concurrently as part of a USACE Section 404 permit; otherwise submit Joint Aquatic Resources Permit Application (JARPA) independently to Ecology. A pre-filing notification may be required by Ecology.	30 Percent Design	6 to 12 months	Section 401 approval may be issued concurrently as part of a Section 404 permit if the project qualifies. If an individual permit is required to comply with Section 404, independent review of the Section 401 certification by Ecology would be required.
National Pollution Discharge Elimination System (NPDES) Construction Stormwater General permit (Federal Water Pollution Control Act)	Ecology	Project action exceeding minimum threshold for ground disturbance.	Notice of Intent (online application)	90 Percent Design Stormwater Pollution Prevention Plan (SWPPP) Temporary Erosion and Sedimentation Control (TESC) Plan	4 to 6 weeks	This permit requires development of SWPPP and TESC plans and then provide notice.
HPA	WDFW	Construction activity that changes or affects the natural flow of water. Construction activity within or over Waters of the State.	JARPA, as well as documentation of a SEPA decision.	30 Percent Design SEPA Approval	45 days	Proposed project design involves the construction of overwater structures both within the lake (dock) and streams (pedestrian bridges).

Permit	Agency	Project Elements Triggering Regulation	Application Requirements	Predecessor(s) for Submittal/ Approval	Estimated Timeline	Other Permitting Considerations
Forest Practices	WDNR	Construction of forest roads, clearing forest and/or conversion of forestry lands to non-timber land. This permit is also triggered when salvaging standing or down wood which may include existing clear-cut areas and removal of the large timbers floating along the lake shore.	Forest Practices Application/Notification (online application)	30 Percent Design	60 days	The current project proposes development features over and in typed water bodies (streams and Mineral Lake). Road work may require replacement of culverts which would also trigger a Forest Practices permit. There is a substantial amount of large woody debris along the northeast shoreline of Mineral Lake and removal of that material to provide camper access may also trigger this permit.
LOCAL						
SEPA	Lewis County	Required for any proposal that involves a government "action", which includes an agency decision.	SEPA Environmental Checklist	30 Percent Design	3 months	Since this project will require Lewis County review, SEPA is triggered and will be required. The SEPA determination is also a requirement of the HPA permit process. Assume SEPA determination will be Mitigated Determination of Non-Significance (MDNS).

Permit	Agency	Project Elements Triggering Regulation	Application Requirements	Predecessor(s) for Submittal/ Approval	Estimated Timeline	Other Permitting Considerations
Shoreline Substantial Development Permit (SSDP)	Lewis County	Development activities that are categorized as a permitted use in shoreline environments present in the project area and of which the total cost or fair market value exceeds \$5,000*, occur within 200 feet of designated shoreline.	Lewis County Shoreline Substantial Development Application Checklist which includes JARPA and Critical Areas Review (CAR)	30 Percent Design	3 to 6 months	SMP should be reviewed to ensure the proposed use is a permitted use. If not, a Conditional Use Permit or Variance may also be required.
Shoreline Conditional Use Permit	Lewis County	Uses identified as "Conditional" require a shoreline conditional use permit pursuant SMP Section 7.04.02. Any use not listed in SMP Table 5-1: Permitted Conditional and Prohibited Uses shall require a shoreline conditional use permit.	Shoreline Substantial Development Application which includes JARPA and CAR Lewis County Shoreline Conditional Use Permit	30 Percent Design	3 to 6 months	"Conditional uses," are shoreline uses that are not preferred or allowed outright as set forth in the SMP but may be permitted when specified conditions are met. A Shoreline Conditional Use Permit is necessary for projects that propose activities that are not authorized as "permitted uses" as set forth in the Lewis County SMP but can demonstrate consistency with requirements for conditional uses.

Permit	Agency	Project Elements Triggering Regulation	Application Requirements	Predecessor(s) for Submittal/ Approval	Estimated Timeline	Other Permitting Considerations
Shoreline Variance	Lewis County	Project element which requests a modification from those numerical standards (i.e. buffers) for their proposed development.	Shoreline Substantial Development Application which includes JARPA and CAR Lewis County Variance Application	30 Percent Design	3 to 6 months	Variances are issued by local governments (approved and denied), then sent to Ecology for further review and approval and disapproval.
Critical Areas and Mitigation Plan	Lewis County	Construction within or adjacent to critical areas as designated under local code (wetlands, FWHCAs, etc.)	Local Agency Application Form CAR Habitat Mitigation Plan Geologic Hazard Assessment	30 Percent Design	3 to 6 months	GeoEngineers has completed a reconnaissance level site visit and identified several critical areas across the site which include Mineral Lake, wetlands and streams (fish- and non-fish-bearing). Formal delineations of wetland and OHWM boundaries of streams and Mineral Lake shoreline will be required. Steep slopes/geologic hazards are addressed in a separate report (GeoEngineers 2020) but may also apply.
Other local permits (Clearing, Grading/Site, Building, etc)	Lewis County	Project action exceeding minimum thresholds for ground disturbance. Permits are also required to construct permanent buildings.	Local application materials/forms TESC Plan Construction Plans.	90 Percent Design	6 to 8 weeks	--

5.1. Federal Approval

5.1.1. Clean Water Act

A Section 404 CWA permit from the USACE is anticipated to be required for improvements to road stream crossings, development of over-water infrastructure such as docks, or other development falling under the jurisdiction of the CWA, such as filling of wetlands. In conjunction with the Section 404 permit, a Section 401 permit is also required for work within WOTUS, which includes streams and wetlands identified within the project corridor. For this project, it is anticipated that the Section 401 permit will be obtained through the NWP process, with potential review and comment from the Ecology.

The following USACE NWPs may be useful for the proposed improvements with application made through use of the JARPA form and accompanying drawings:

- NWP 42 - Recreational Facilities. NWP 42 covers development of playing fields, hiking trails, nature centers, horse and bike paths. Some small support structures are permissible under this NWP, which may allow for proposed structures for arts and crafts within WOTUS.
- NWP 14 - Linear Transportation. NWP 14 applies to projects that require construction, expansion, modification or improvement of linear transportation projects (e.g. roads, highways, railways, trails) in WOTUS. The discharge cannot cause the loss of greater than ½-acre of WOTUS.
- NWP C - Electric Utility Line and Telecommunications Activities. NWP C is also limited to ½-acre of WOTUS.

5.1.2. Section 7 ESA Compliance

Section 7 ESA consultation with USFWS and NMFS will be required for any project that requires a federal permit such as fill within wetlands, in-water work for stream crossings or in-water work within Mineral Lake for dock or other recreational structures. There are no mapped ESA-listed fish species within Mineral Lake and access to the lake from downstream Nisqually River is prevented by the Alder Dam. The nearest mapped critical habitat for marbled murrelet and NSO is approximately 4 miles to the west. This site was not surveyed for suitable habitat and therefore land clearing activities or in-air noise producing construction activities (i.e. pile driving) may require a terrestrial survey to assess terrestrial habitat for these species.

5.2. State Agencies/Approvals

5.2.1. Washington State Department of Ecology (Ecology)

Ecology has jurisdiction over proposed discharges to WOTUS under Section 401 of the CWA. As discussed above, the 401 permit is anticipated to be obtained through the NWP process, with potential review and comment from Ecology. Finally, Ecology issues NPDES permits to comply with the Water Pollution Control Act. Application for an NPDES Construction Stormwater permit requires filing a Notice of Intent with Ecology.

5.2.2. Washington State Department of Natural Resources (DNR)

DNR has jurisdiction over forest practices on private and state land. Projects activities that trigger a forest practices permit for this project are primarily removal of timber and conversion of forestry lands to non-timber land. If project development includes clearing existing timber, this permit will be triggered. This permit is also triggered when salvaging standing and down wood which may include existing clear-cut areas and large floating timbers along the lakeshore.

5.2.3. Washington Department of Fish and Wildlife (WDFW)

WDFW has jurisdiction over proposed activities that will use, divert, obstruct, or change the natural flow or bed of “Waters of the State”. A HPA permit will be required for the project actions that occur within jurisdictional waterbodies, such as Mineral Lake, and surrounding streams. WDFW specifies approved in-water work windows on a case-by-case basis for each HPA and will identify in-water work construction windows for project within waters of the state. SEPA compliance is required to finalize review of the HPA.

5.3. Lewis County Approvals

Lewis County has jurisdiction over actions occurring within Lewis County limits, which includes the entire project corridor. Lewis County will review the project in accordance with the following environmental regulations:

- **State Environmental Policy Act (SEPA).** It is anticipated that Lewis County will be the lead agency for SEPA compliance. SEPA review procedures are outlined in Revised Code of Washington (RCW) 43.21C and Washington Administrative Code (WAC) 197-11. A SEPA checklist and SEPA determination will be needed for SEPA compliance, which triggers the need for SEPA notice and appeal periods. The SEPA checklist will identify existing environmental conditions and likely impacts from the proposed project.
- **Shoreline Master Program (SMP).** Portions of the project site are within the jurisdiction of the SMP. Mineral Lake is considered a “Shoreline of the State”; therefore, development within 200 feet of its shoreline or associated wetlands is subject to SMP regulations. A Shoreline Substantial Development Permit will be required. Depending on the final design, proposed structures within the shoreline buffer may also require a Shoreline Conditional Use Permit. For project elements that require modification of the numerical standards (i.e. buffers), a Shoreline Variance Application will be necessary.
- **Critical Areas Ordinance (CAO).** Lewis County Code (LCC) Chapter 17.38 CAO addresses protection of environmentally critical areas, including streams, wetlands, steep slopes, landslide hazards, and associated protective buffers or setbacks. Application will require submittal of application form and associated project design plans and critical areas studies. We anticipate streams, wetlands and geologic hazards will need to be addressed for this project. A mitigation plan will also be required to quantify and compensate for impacts to critical areas.
- **Site Development/Grading/Building Permit.** A site development and/or grading permit may be required for upland grading or material stockpiling activities. Building permits are required for most new structures.

5.4. Permitting Schedule

Environmental permitting can play a significant role in the project schedule. Estimated agency timelines for applicable environmental permits are included in Table 5. Many permits cannot be applied for or approved until specific project design milestones or other permit approvals are obtained. These predecessors are also identified in Table 5. Local, state and federal permits are typically valid for up to 5 years after permit receipt, after which time the applicant may be required to update technical documentation and re-submit application materials if the project has not yet been completed.

6.0 CONCLUSIONS AND SUMMARY

Our reconnaissance level habitat survey identified several wetland and stream features within proposed area of development. These critical areas were not delineated and a formal delineation will be required prior to permit submittal. Critical area buffers are approximated and shown on Figure 2. There may also be additional critical area features located at the site that were not identified during this reconnaissance level assessment.

Based on our preliminary findings, we believe that the YMCA will be able to construct facilities within the proposed development areas as currently proposed. Proposed development is permissible with appropriate coordination with Lewis County and will require mitigation for any impacts to critical areas. A comprehensive mitigation plan will be required to ensure no net loss of ecological functions.

7.0 REFERENCES

Brianna Uy. Lewis County Community Development Associate Planner, Personal Communication Email. Dated October 27, 2020.

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The Watershed Company (TWC). 2010. Wetland, Stream, and Lakeshore Delineation Sketch. Unincorporated Lewis County near Mineral, Washington. Prepared for Matt Hough, CPH Consultants. May 6, 2010.

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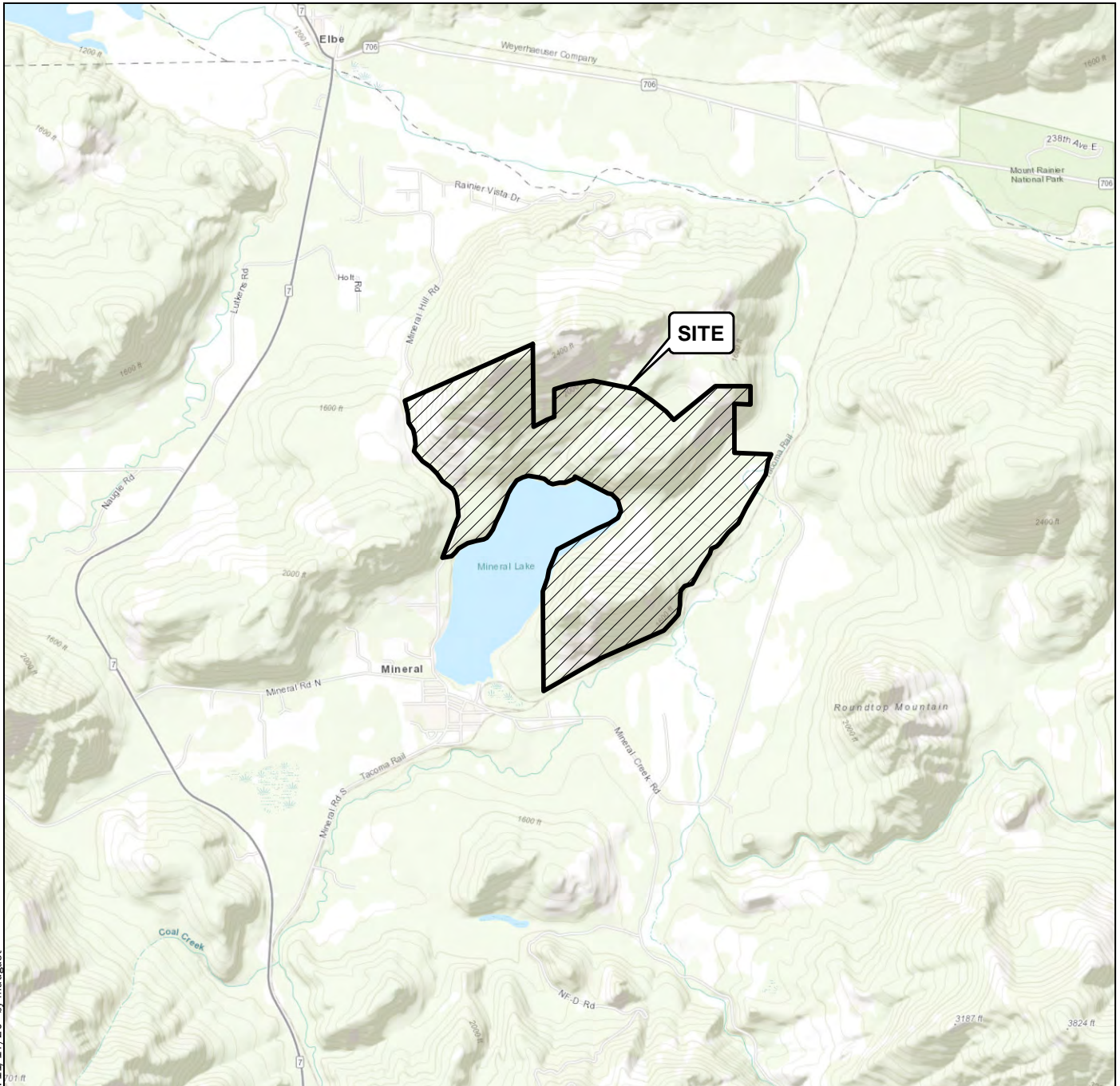
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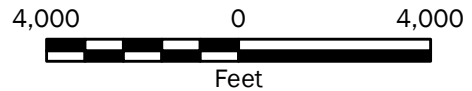
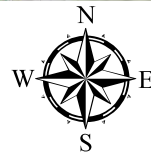
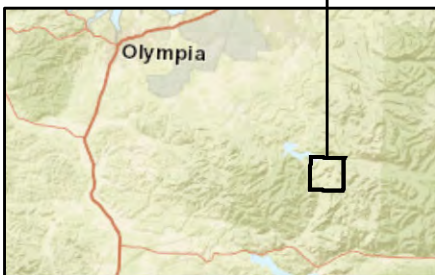
Washington Department of Fish and Wildlife (WDFW). 2020a. Priority Habitat and Species (PHS) Database. Available at: <https://wdfw.wa.gov/species-habitats/at-risk/phs/maps>

Washington Department of Fish and Wildlife (WDFW). 2020b. SalmonScape Application. Available at: <http://wdfw.wa.gov/mapping/salmonscape/>

Washington State Department of Natural Resources (WDNR). 2020. Forest Practices Application Review System Mapping Application. Available at: <https://fpamt.dnr.wa.gov/default.aspx>



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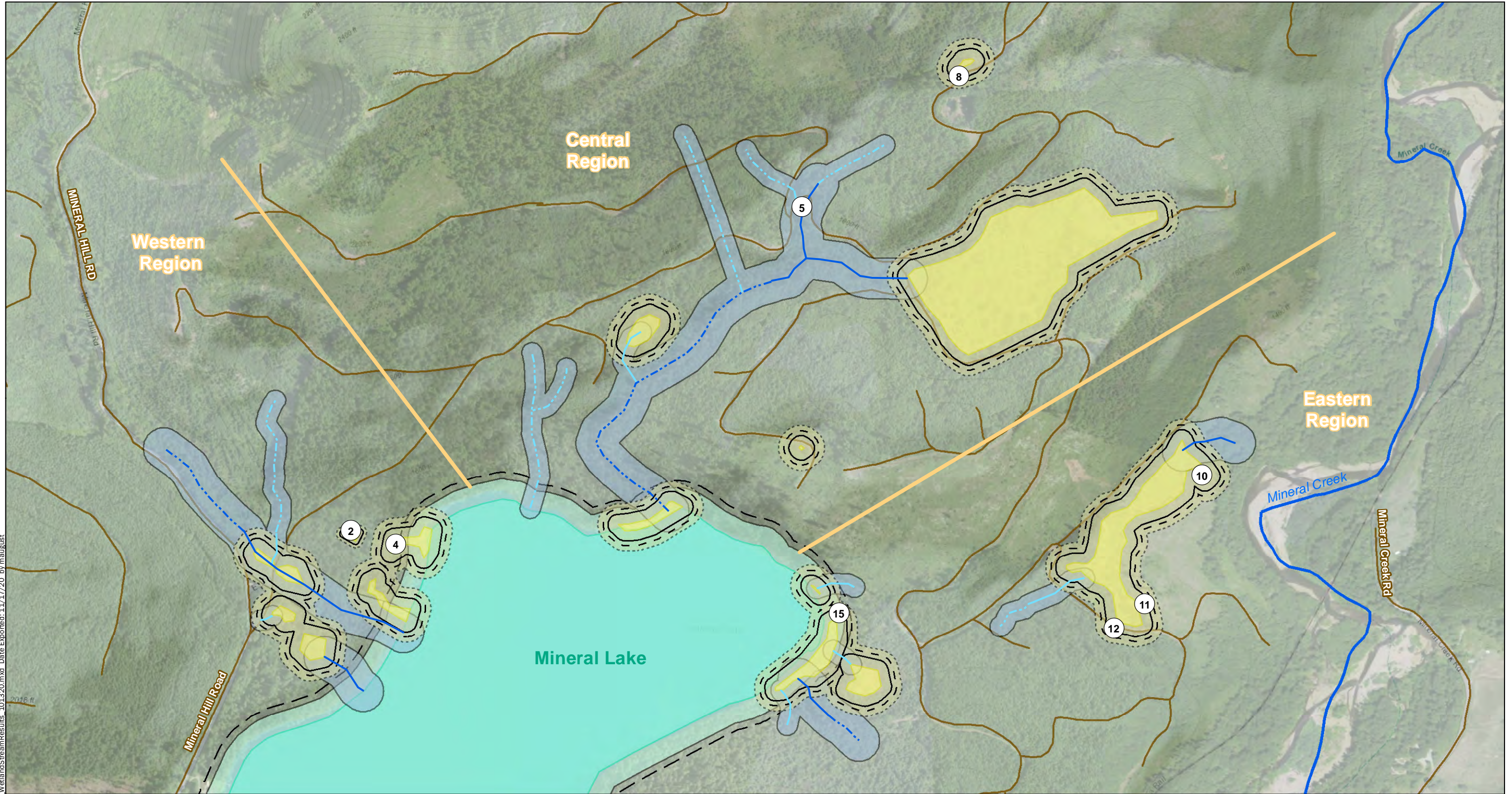
Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: ESRI Street Map, Wold Topographic Map

Projection: NAD 1983 UTM Zone 10N

Vicinity Map	
YMCA Mineral Lake Property - Due Diligence Phase Lewis County, Washington	
	Figure 1



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Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Note: Stream and wetland features shown are considered preliminary as they were not formally delineated during the survey. Buffers are estimated and subject to change pending a formal delineation.

Data Source: WA DNR

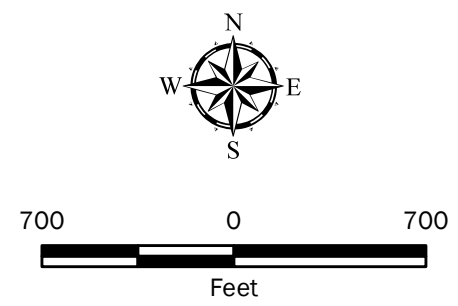
Projection: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Legend

- ② Photo Points
- Base Data**
- Roads (DNR)
- Topographic Contours (10-ft)
- Aquatic Critical Areas**
- Mineral Lake
- Wetlands

- Streams**
- Type-F (Field Verified)
- - - Type-F (Assumed)
- Type-N (Field Verified)
- - - Type-N (Assumed)
- Type S (Mineral Creek)

- Buffers**
- Shoreline Management Zone
- Shoreline Buffer (Non-Water-Related Uses)
- Stream Buffer
- Wetland Buffer (High Impact Development)
- Wetland Buffer (Moderate Impact Development)
- Wetland Buffer (Low Impact Development)



Wetland and Stream Reconnaissance	
YMCA Mineral Lake Property - Due Diligence Phase Lewis County, Washington	
	Figure 2

APPENDIX A

Mapped Data Reports



WASHINGTON DEPARTMENT OF FISH AND WILDLIFE PRIORITY HABITATS AND SPECIES REPORT

SOURCE DATASET: PHSPublic
REPORT DATE: 03/16/2020 7.52

Query ID: P200316075200

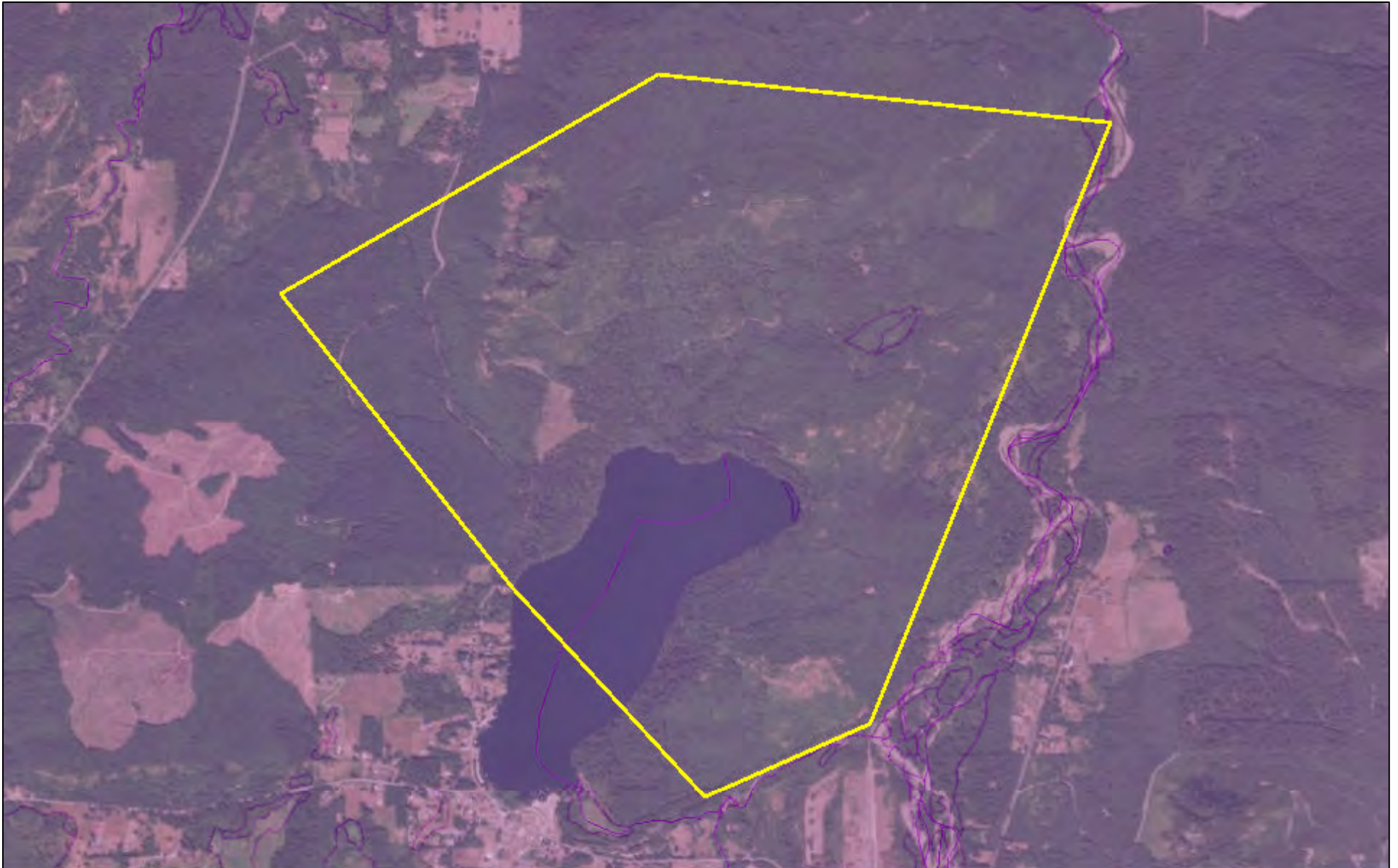
Common Name	Site Name	Priority Area	Accuracy	Federal Status	Sensitive Data	Source Entity
Scientific Name	Source Dataset	Occurrence Type		State Status	Resolution	Geometry Type
Notes	Source Record	More Information (URL)		PHS Listing Status		
	Source Date	Mgmt Recommendations				
Cutthroat Oncorhynchus clarki	Mineral Creek SASI 7420	Occurrence Occurrence http://wdfw.wa.gov/wlm/diversty/soc/soc.htm	NA	Not Warranted N/A PHS Listed	N AS MAPPED	WDFW Fish Program Lines
Cutthroat Oncorhynchus clarki	SASI 7420	Occurrence Occurrence http://wdfw.wa.gov/wlm/diversty/soc/soc.htm	NA	Not Warranted N/A PHS Listed	N AS MAPPED	WDFW Fish Program Lines
Freshwater Emergent	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Freshwater Forested/Shrub	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Little Brown Bat Myotis lucifugus	WS_OccurPoint 147331 June 27, 2018	Breeding Area Biotic detection http://wdfw.wa.gov/publications/pub.php?	GPS	N/A N/A PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points

Common Name	Site Name	Priority Area	Accuracy	Federal Status	Sensitive Data	Source Entity
Scientific Name	Source Dataset	Occurrence Type		State Status	Resolution	Geometry Type
Notes	Source Record	More Information (URL)		PHS Listing Status		
	Source Date	Mgmt Recommendations				
Mule and black-tailed deer Odocoileus hemionus	NISQUALLY DEER PHSREGION 905305	Regular Concentration Regular concentration http://wdfw.wa.gov/publications/pub.php?	General locality	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OccurPoint 103324 April 25, 1994	Breeding Area Nest http://wdfw.wa.gov/publications/pub.php?	Map 1:100,000 <=	Threatened Endangered PHS LISTED	Y TOWNSHIP	WA Dept. of Fish and Wildlife Points
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Northern Spotted Owl Strix occidentalis	WS_OwlStatus_Buf	Management Buffer Management buffer http://wdfw.wa.gov/publications/pub.php?	NA	Threatened Endangered PHS Listed	Y TOWNSHIP	WA Dept. of Fish and Wildlife Polygons
Rainbow Trout Oncorhynchus mykiss	Mineral Creek SWIFD 32342	Occurrence/Migration Occurrence/migration http://wdfw.wa.gov/wlm/diversty/soc/soc.htm	NA	N/A N/A PHS LISTED	N AS MAPPED	Lines








Common Name	Site Name	Priority Area	Accuracy	Federal Status	Sensitive Data	Source Entity
Scientific Name	Source Dataset	Occurrence Type		State Status	Resolution	Geometry Type
Notes	Source Record	More Information (URL)		PHS Listing Status		
	Source Date	Mgmt Recommendations				
Resident Coastal Cutthroat Oncorhynchus clarki	Mineral Creek SWIFD 32341	Occurrence/Migration Occurrence/migration http://wdfw.wa.gov/wlm/diversty/soc/soc.htm	NA	N/A N/A PHS LISTED	N AS MAPPED	Lines
Resident Coastal Cutthroat Oncorhynchus clarki	SWIFD 33861	Occurrence/Migration Occurrence/migration http://wdfw.wa.gov/wlm/diversty/soc/soc.htm	NA	N/A N/A PHS LISTED	N AS MAPPED	Lines
Riverine	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.gov	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Riverine	N/A NWIWetlands	Aquatic Habitat Aquatic habitat http://www.ecy.wa.gov	NA	N/A N/A PHS Listed	N AS MAPPED	US Fish and Wildlife Service Polygons
Rocky Mountain elk Cervus elaphus nelsoni	NISQUALLY ELK WINTERING PHSREGION 905391	Regular Concentration Regular concentration http://wdfw.wa.gov/publications/pub.php?	General locality	N/A N/A PHS LISTED	N AS MAPPED	WA Dept. of Fish and Wildlife Polygons

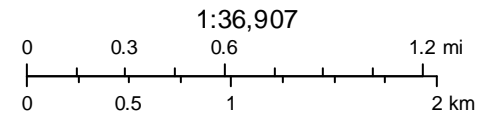
DISCLAIMER. This report includes information that the Washington Department of Fish and Wildlife (WDFW) maintains in a central computer database. It is not an attempt to provide you with an official agency response as to the impacts of your project on fish and wildlife. This information only documents the location of fish and wildlife resources to the best of our knowledge. It is not a complete inventory and it is important to note that fish and wildlife resources may occur in areas not currently known to WDFW biologists, or in areas for which comprehensive surveys have not been conducted. Site specific surveys are frequently necessary to rule out the presence of priority resources. Locations of fish and wildlife resources are subject to variation caused by disturbance, changes in season and weather, and other factors. WDFW does not recommend using reports more than six months old.

WDFW Test Map



March 16, 2020

- | | | |
|--|---|--|
|  PHS Report Clip Area | POLY |  QTR-TWP |
|  PT |  AS MAPPED |  TOWNSHIP |
|  LN |  SECTION | |



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Lewis County, Washington



Local office

Washington Fish And Wildlife Office

☎ (360) 753-9440

📅 (360) 753-9405

510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263

<http://www.fws.gov/wafwo/>

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.
2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME

STATUS

Gray Wolf *Canis lupus*

Endangered

U.S.A.: All of AL, AR, CA, CO, CT, DE, FL, GA, IA, IN, IL, KS, KY, LA, MA, MD, ME, MI, MO, MS, NC, ND, NE, NH, NJ, NV, NY, OH, OK, PA, RI, SC, SD, TN, TX, VA, VT, WI, and WV; and portions of AZ, NM, OR, UT, and WA. Mexico.

There is **final** critical habitat for this species. The location of the critical habitat is not available.

<https://ecos.fws.gov/ecp/species/4488>

Gray Wolf *Canis lupus*

Proposed Endangered

Western Distinct Population Segment

No critical habitat has been designated for this species.

North American Wolverine *Gulo gulo luscus*

Proposed Threatened

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/5123>

Birds

NAME

STATUS

Marbled Murrelet *Brachyramphus marmoratus*

Threatened

There is **final** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/4467>

Northern Spotted Owl *Strix occidentalis caurina*

Threatened

There is **final** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/1123>

Yellow-billed Cuckoo *Coccyzus americanus*

Threatened

There is **proposed** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/3911>

Fishes

NAME

STATUS

Bull Trout *Salvelinus confluentus*

Threatened

There is **final** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/8212>

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED,

WHICH IS A VERY LIBERAL
ESTIMATE OF THE DATES INSIDE
WHICH THE BIRD BREEDS
ACROSS ITS ENTIRE RANGE.
"BREEDS ELSEWHERE" INDICATES
THAT THE BIRD DOES NOT LIKELY
BREED IN YOUR PROJECT AREA.)

Bald Eagle *Haliaeetus leucocephalus*

Breeds Jan 1 to Sep 30

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1626>

Great Blue Heron *Ardea herodias fannini*

Breeds Mar 15 to Aug 15

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Western Screech-owl *Megascops kennicottii kennicottii*

Breeds Mar 1 to Jun 30

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any

week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.

- The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

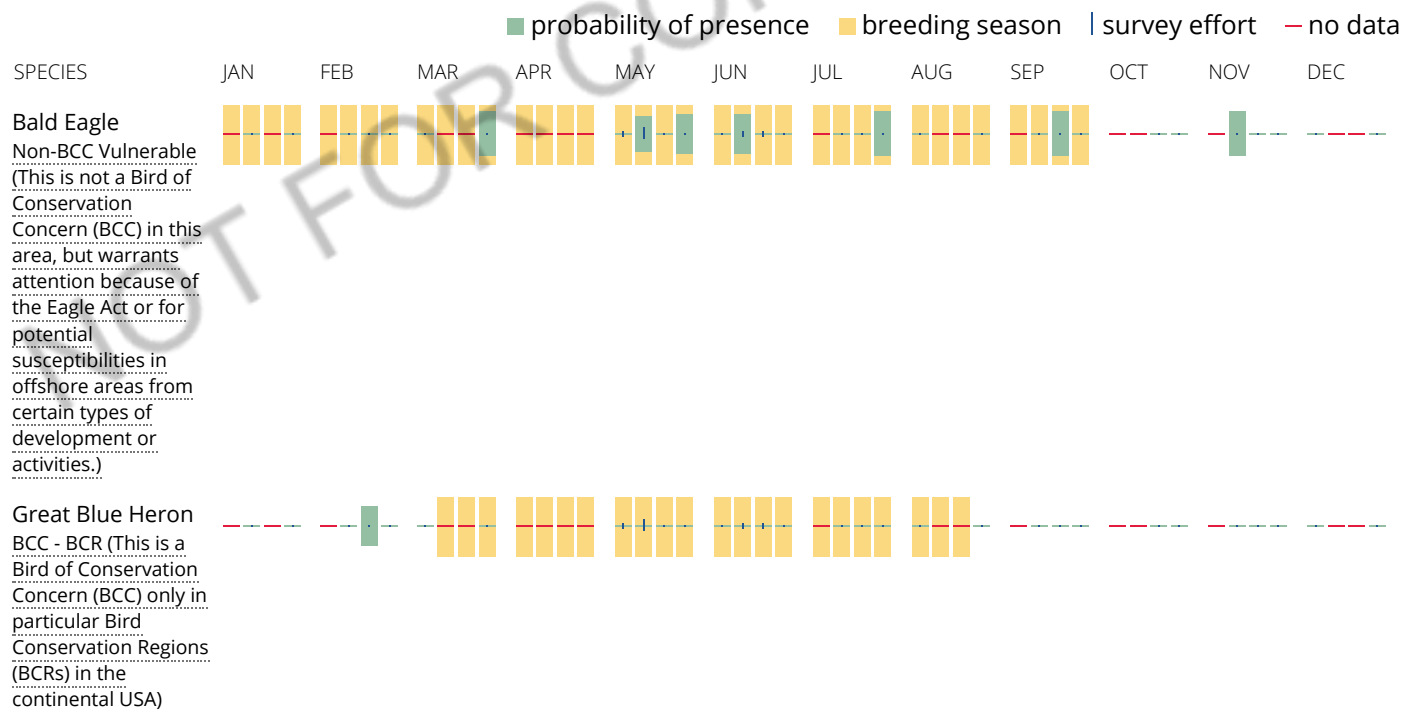
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (—)

A week is marked as having no data if there were no survey events for that week.

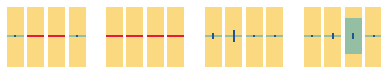
Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Western Screech-
owl

BCC - BCR (This is a
Bird of Conservation
Concern (BCC) only in
particular Bird
Conservation Regions
(BCRs) in the
continental USA)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

[Palustrine](#)

LAKE

[Lacustrine](#)

RIVERINE

[Riverine](#)

A full description for each wetland code can be found at the [National Wetlands Inventory website](#)

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

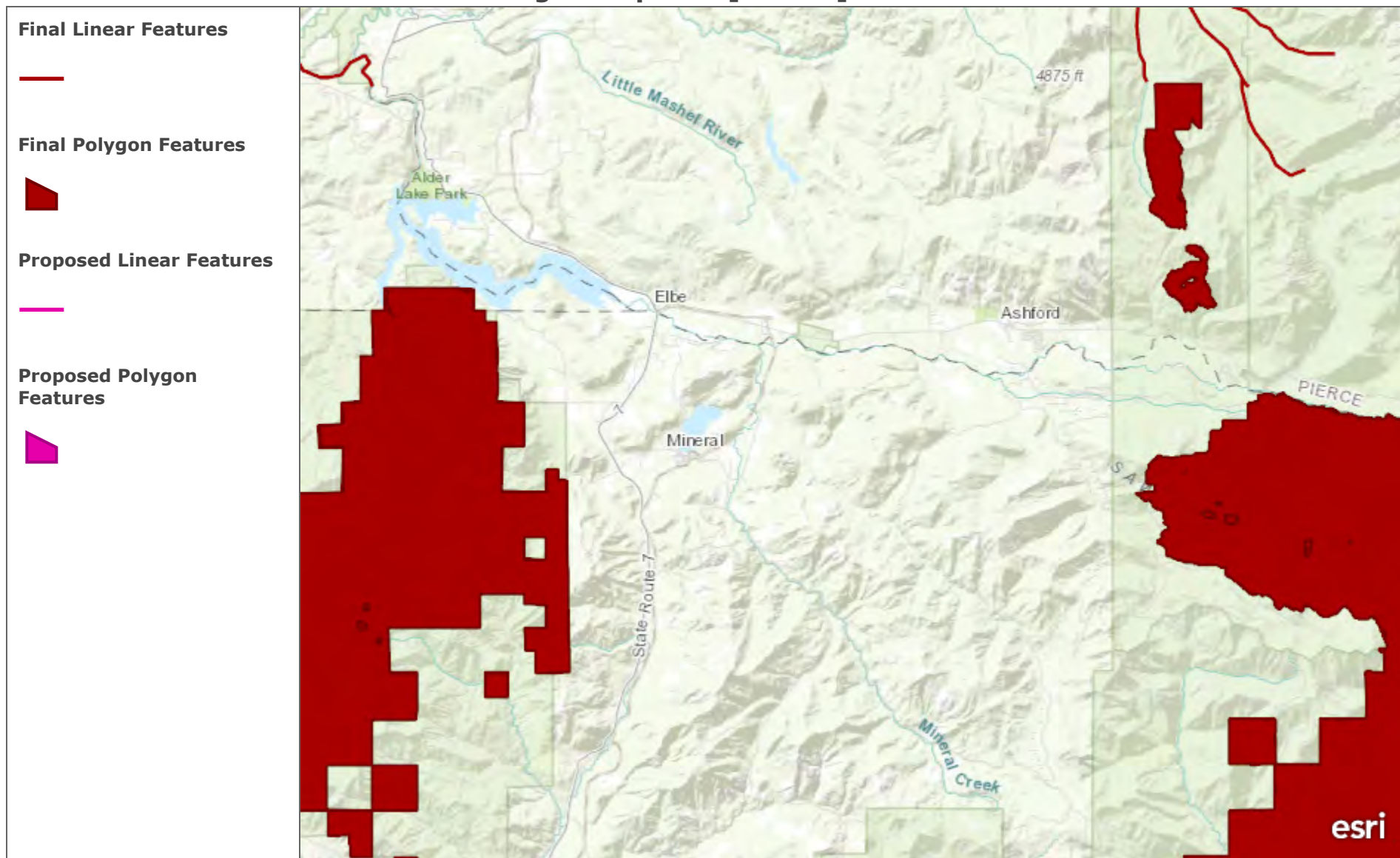
Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

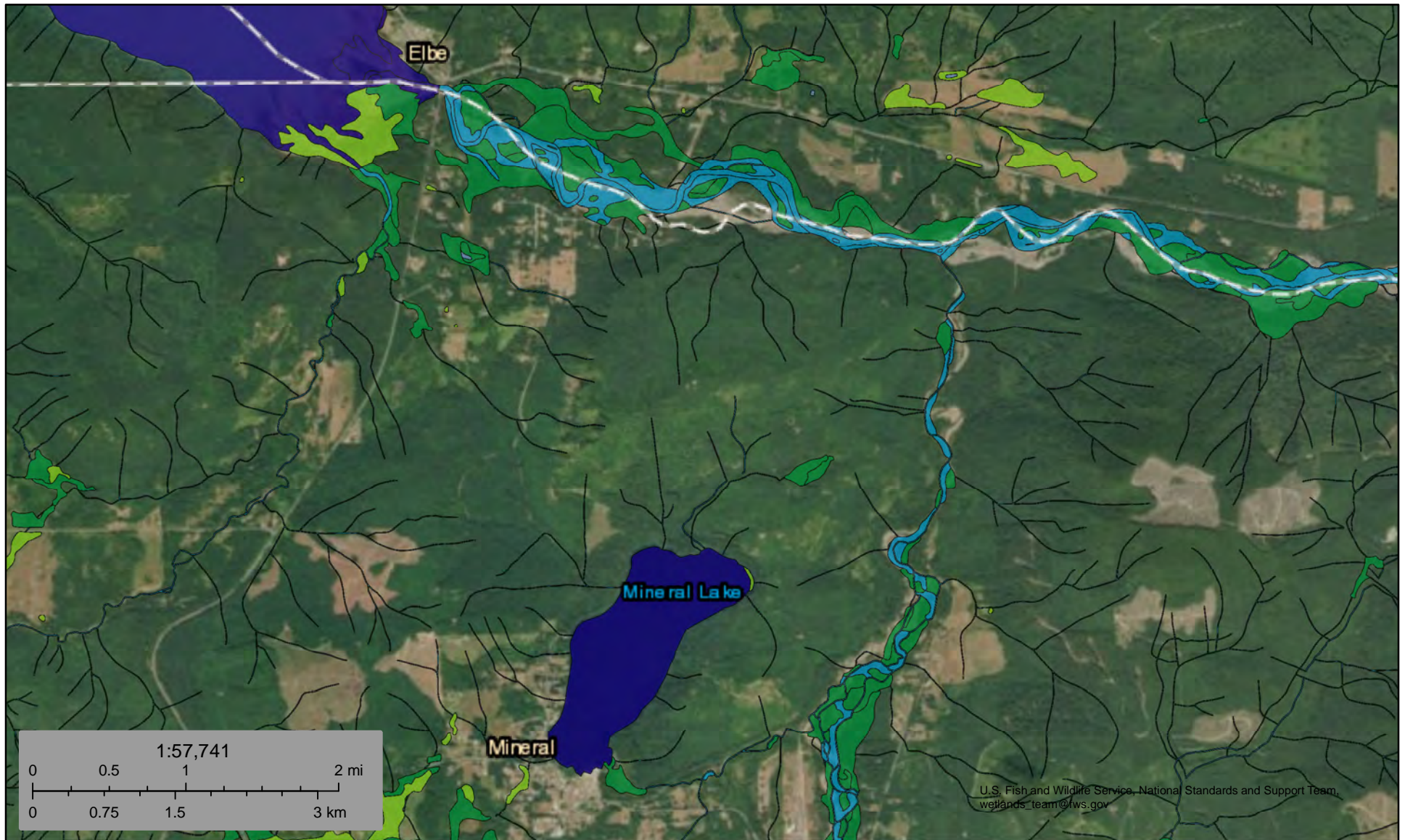
Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

Critical Habitat for Threatened & Endangered Species [USFWS]







A specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.



March 9, 2020

Wetlands

- | | | |
|--|---|--|
|  Estuarine and Marine Deepwater |  Freshwater Emergent Wetland |  Lake |
|  Estuarine and Marine Wetland |  Freshwater Forested/Shrub Wetland |  Other |
| |  Freshwater Pond |  Riverine |

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Lewis County, Washington Shoreline Master Program

Shoreline Environment Designations

Figure 6

Date: 08/10/2017

Shoreline Environment Designation

- Aquatic
- Natural
- Rural Conservancy
- Shoreline Residential
- High Intensity

SMA Rivers & Streams

SMA Lakes

Gifford Pinchot National Forest

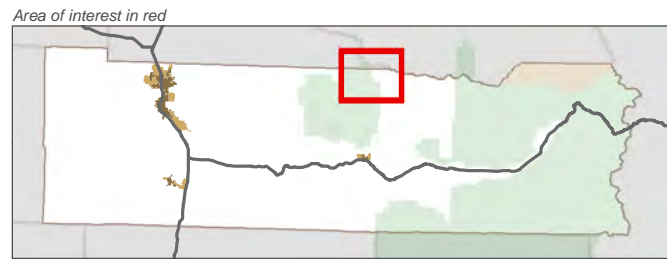
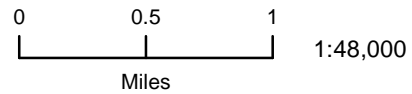
Mount Rainier National Park

Highways

LAMIRD

City

UGA



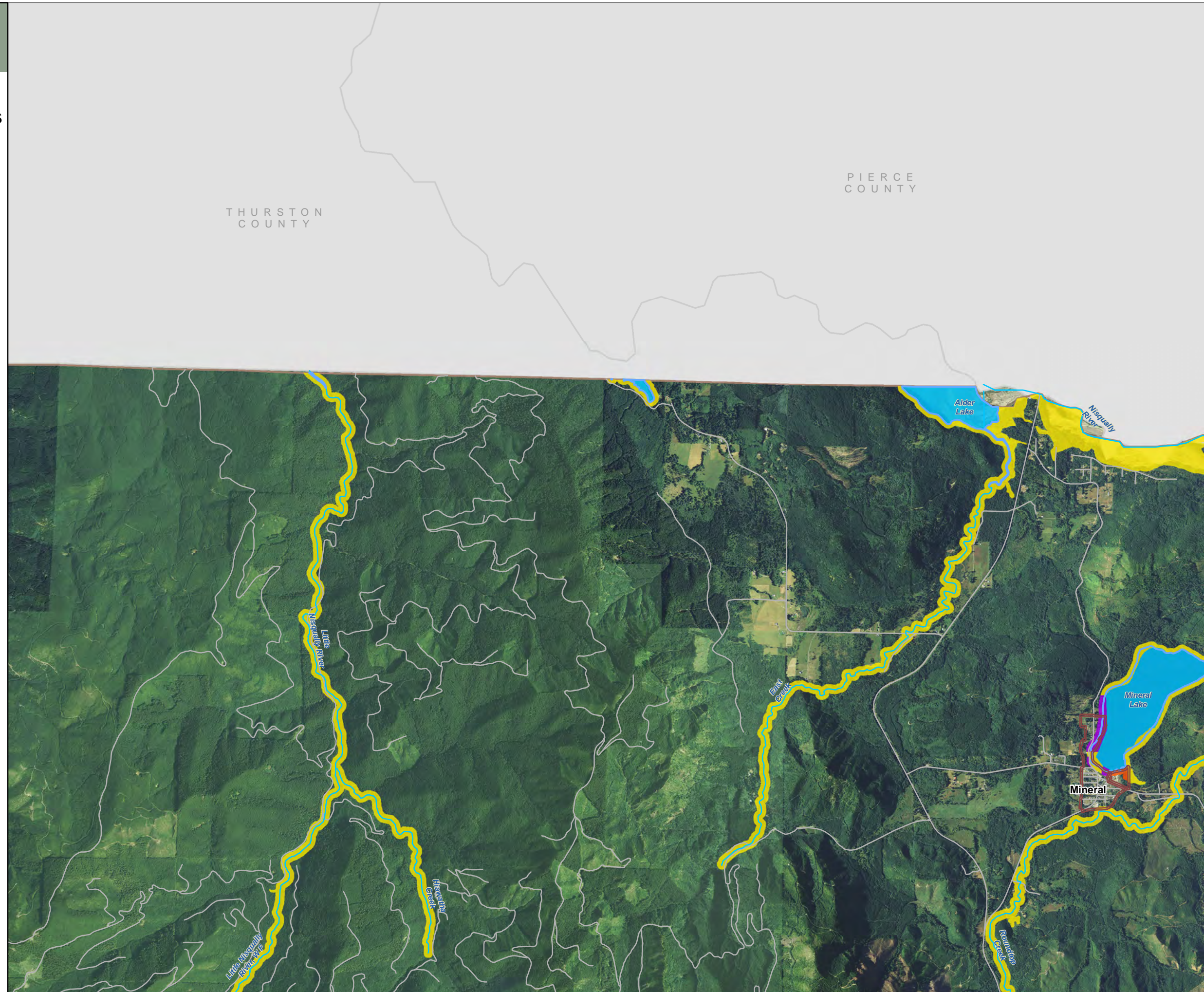
Data: Lewis County, USFWS NWI, FEMA, USFS, Ecology, WDNr, WSDOT, NRCS NAIP

Shoreline jurisdiction boundaries depicted on this map are approximate. They have not been formally delineated or surveyed and are intended for planning purposes only. Additional site-specific evaluation may be needed to confirm/verify information shown on this map.

Lewis County Coalition



City of Morton City of Winlock



Lewis County, Washington Shoreline Master Program

Shoreline Environment Designations

Figure 7

Date: 08/10/2017

Shoreline Environment Designation

- Aquatic
- Natural
- Rural Conservancy
- Shoreline Residential
- High Intensity

SMA Rivers & Streams

SMA Lakes

Gifford Pinchot National Forest

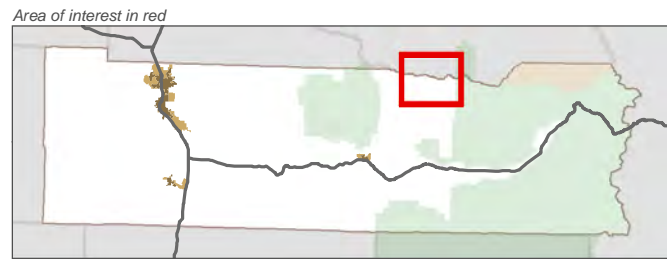
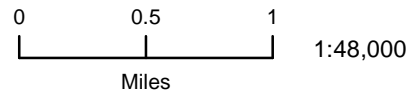
Mount Rainier National Park

Highways

LAMIRD

City

UGA



Data: Lewis County, USFWS NWI, FEMA, USFS, Ecology, WDNr, WSDOT, NRCS NAIP

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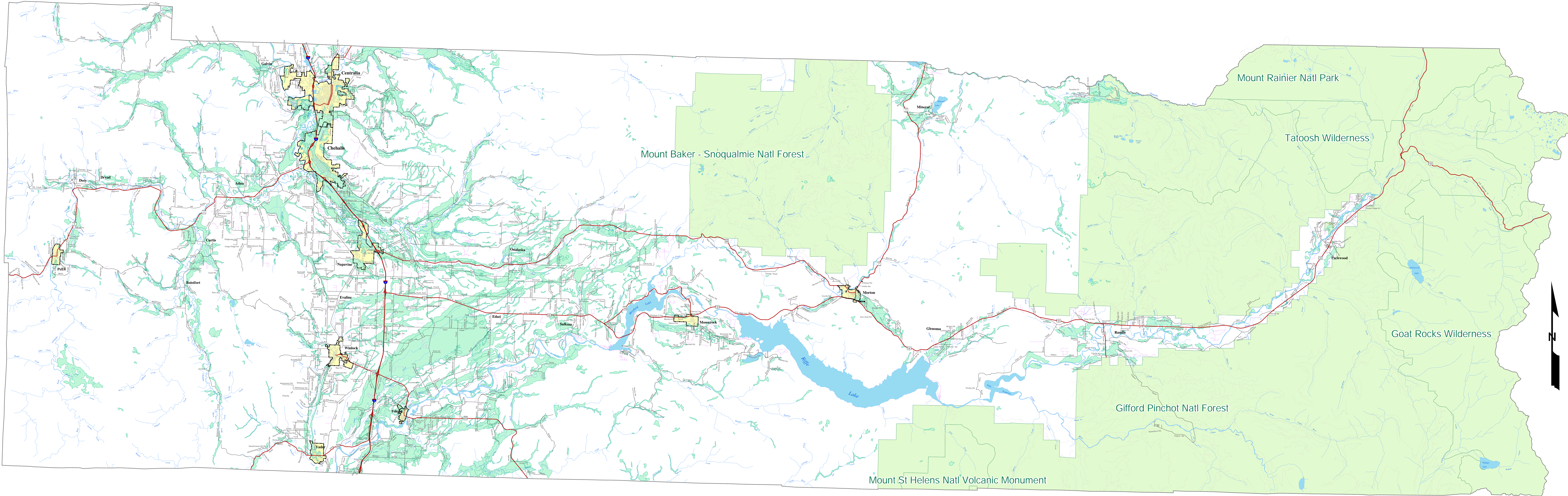
Lewis County Coalition



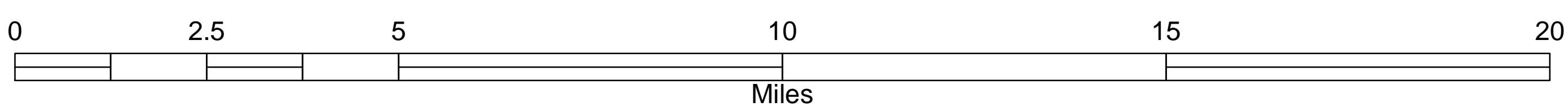
City of Morton City of Winlock



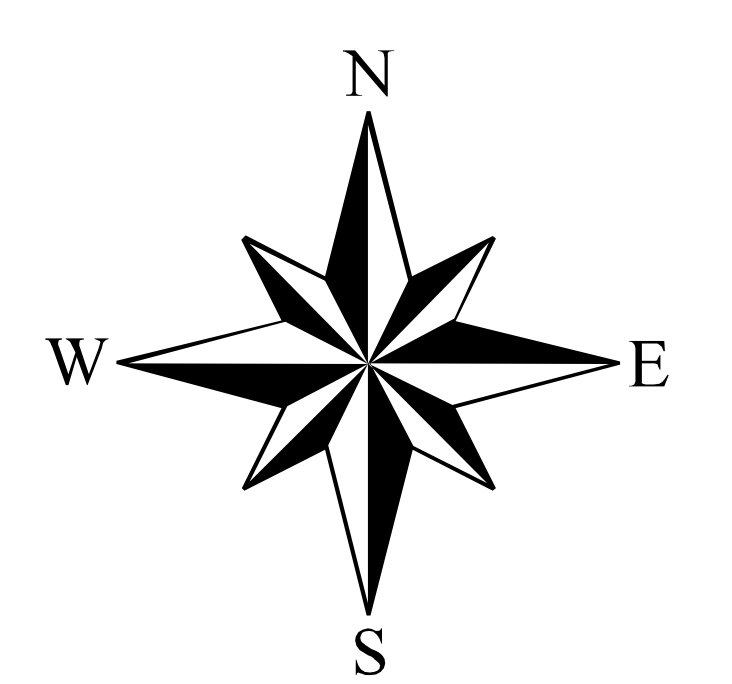
HYDRIC SOILS



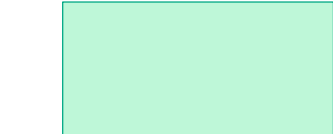
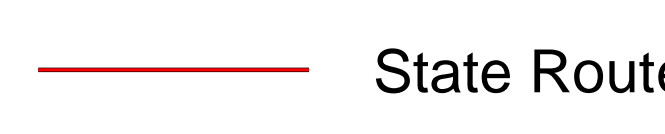




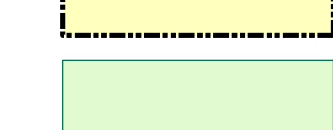

This map was compiled by Lewis County Geographic Information Services. The base map was developed by the Washington State Department of Natural Resources by scanning and digitizing United States Geological Survey 1:24,000 quadrangle maps. The accuracy of the map has not been verified, and it should be used for informational purposes only. Any possible discrepancies should be brought to the attention of Lewis County Geographic Information Services.



November 2010



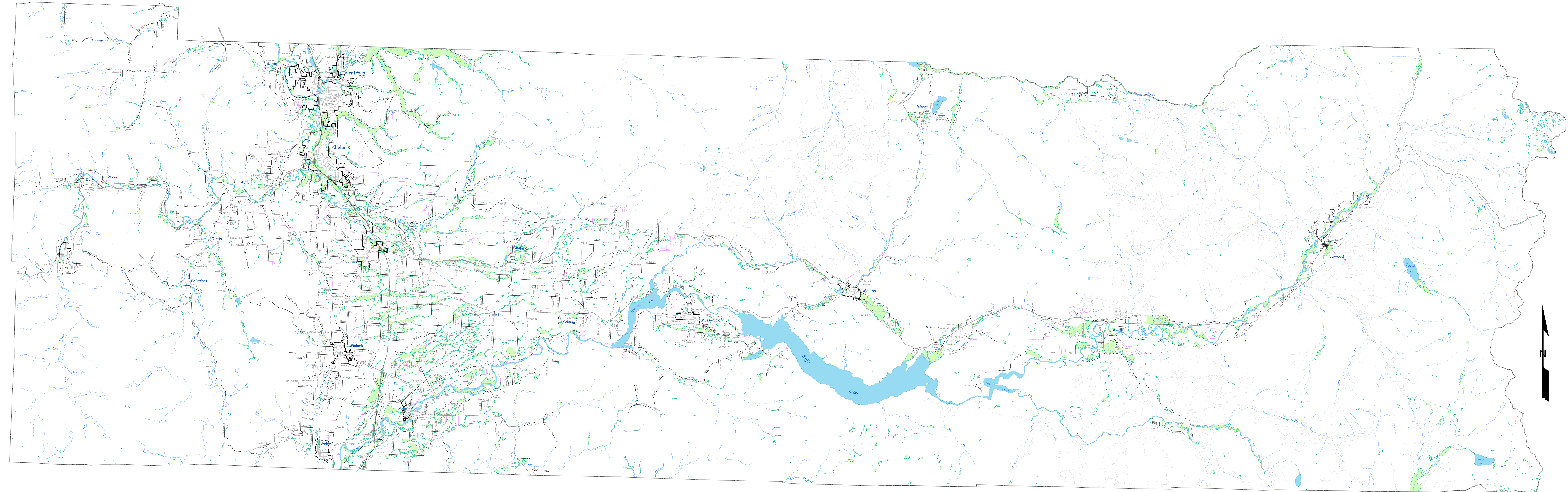
Legend

- | | | |
|--|---|--|
|  Hydric Soils |  State Route |  Private Road |
|  City Limits |  County Road |  Forest Road |
|  Federal Forest Lands |  City Street | |

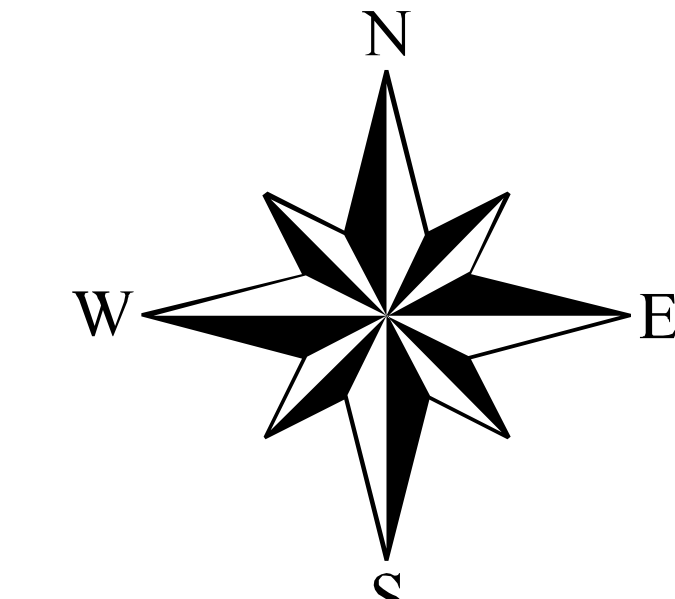
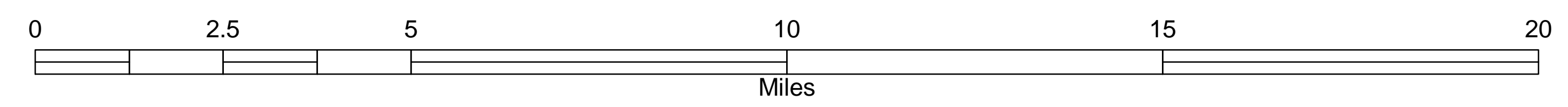
Projection: Lambert Conformal Conic
Datum: 1983 North American Datum
U.S.G.S. State Plane Zone 5626

Lewis County, Washington

NWI WETLANDS



This map was compiled by Lewis County Geographic Information Services. The base map was developed by the Washington State Department of Natural Resources by scanning and digitizing United States Geological Survey 1:24,000 quadrangle maps. The accuracy of the map has not been verified, and it should be used for informational purposes only. Any possible discrepancies should be brought to the attention of Lewis County Geographic Information Services.



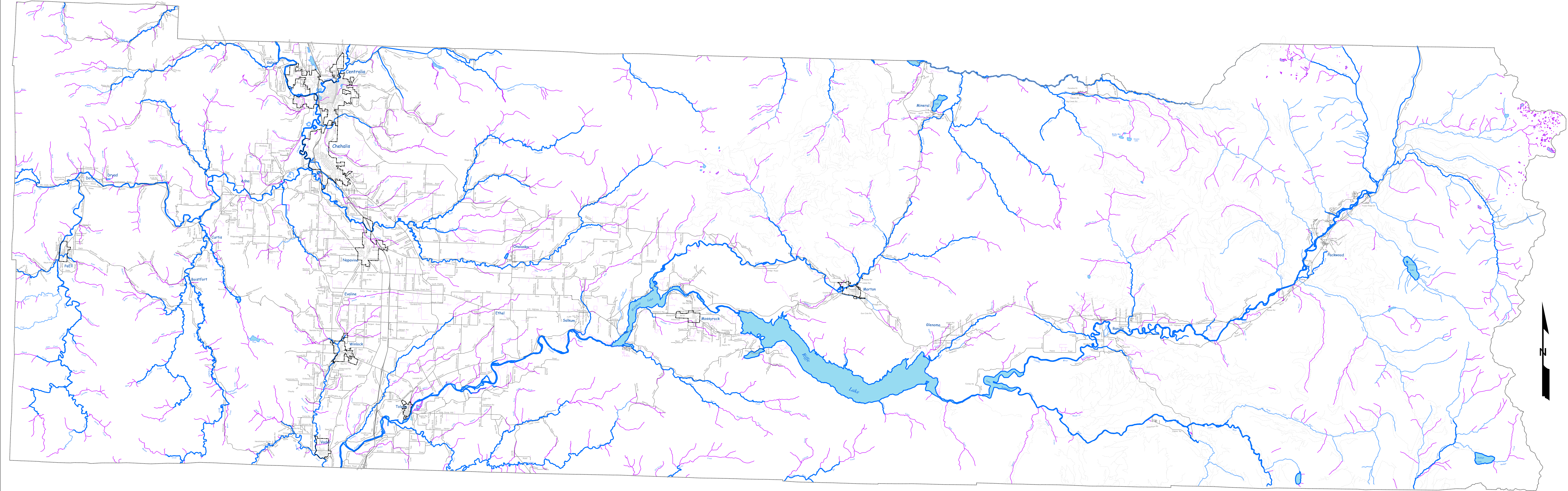
- NWI Wetlands
- City Limits
- State Route
- County Road
- City Street
- Private Road
- Forest Road

October 2009

Projection: Lambert Conformal Conic
Datum: 1983 North American Datum
U.S.G.S. State Plane Zone 5626

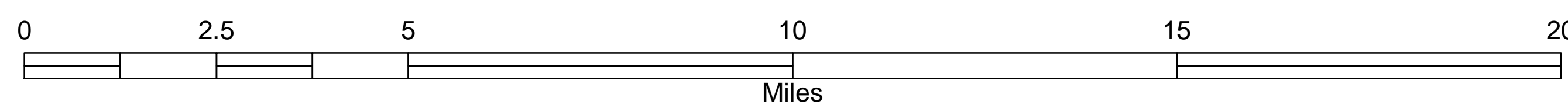
Lewis County, Washington

STREAM TYPES

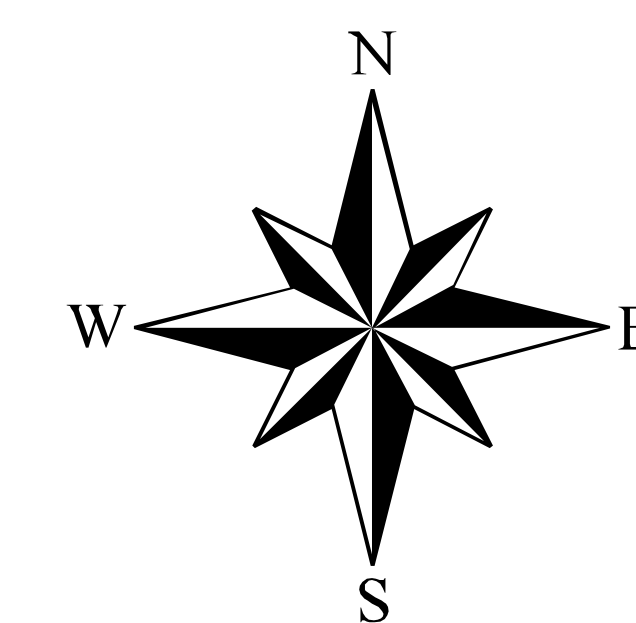


This map was compiled by Lewis County Geographic Information Services. The base map was developed by the Washington State Department of Natural Resources by scanning and digitizing United States Geological Survey 1:24,000 quadrangle maps. The accuracy of the map has not been verified, and it should be used for informational purposes only. Any possible discrepancies should be brought to the attention of Lewis County Geographic Information Services.

Projection: Lambert Conformal Conic
Datum: 1983 North American Datum
U.S.G.S. State Plane Zone 5626



October 2009



- | | |
|----------------|--------------|
| Stream Class 1 | State Route |
| Stream Class 2 | County Road |
| Stream Class 3 | City Street |
| Stream Class 4 | Private Road |
| Water Bodies | Forest Road |
| City Limits | |



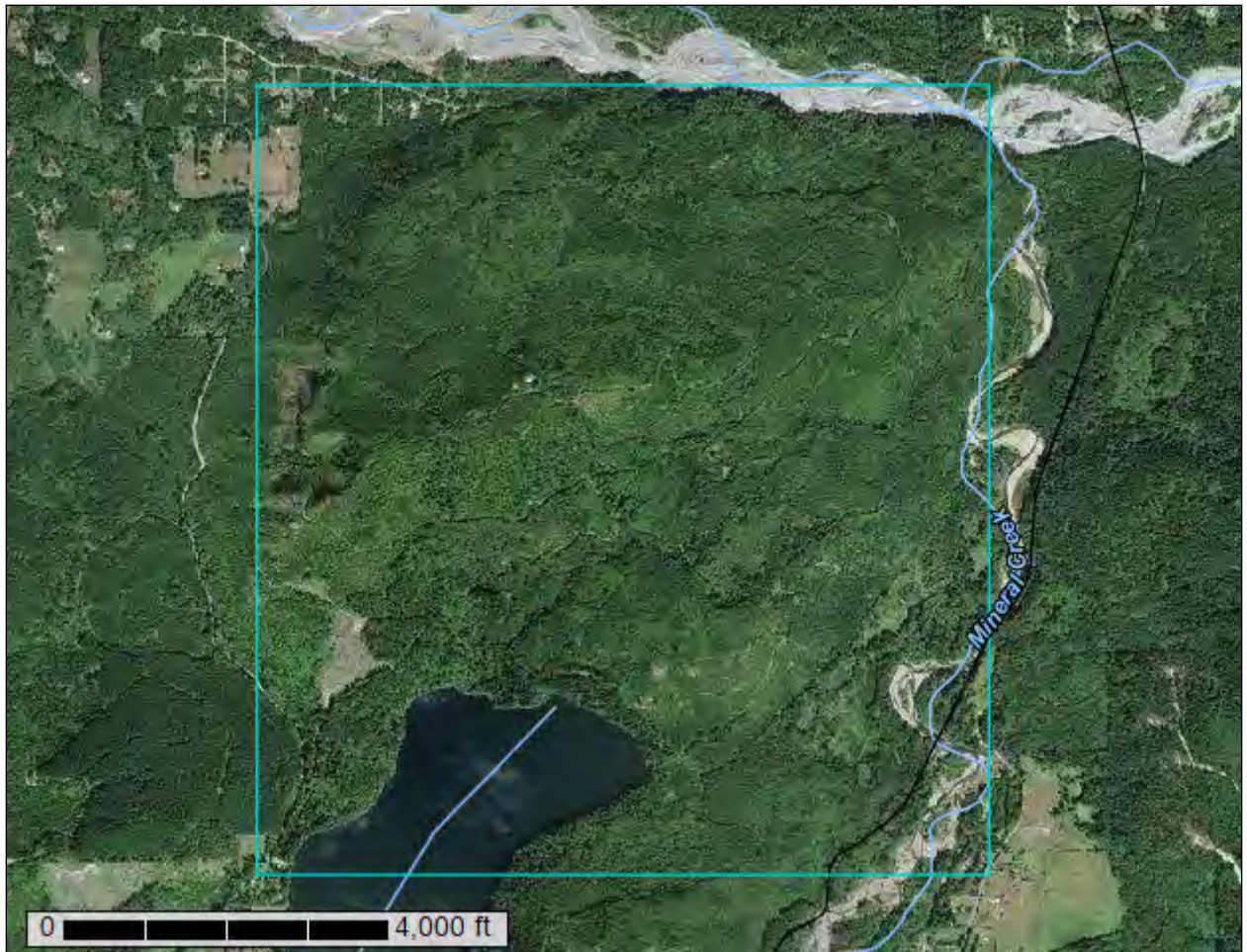
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Lewis County Area, Washington, and Snoqualmie Pass Area, Washington (Parts of King and Pierce Counties)



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

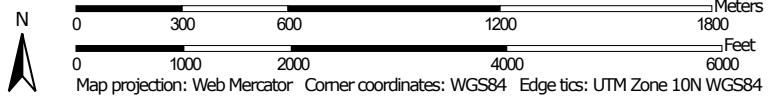
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:21,400 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lewis County Area, Washington
 Survey Area Data: Version 19, Sep 16, 2019

Soil Survey Area: Snoqualmie Pass Area, Washington (Parts of King and Pierce Counties)
 Survey Area Data: Version 21, Sep 16, 2019

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 5, 2014—Oct 10, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6	Baumgard loam, 8 to 30 percent slopes	12.3	0.6%
7	Baumgard loam, 30 to 65 percent slopes	278.3	13.7%
8	Baumgard loam, 65 to 90 percent slopes	29.8	1.5%
49	Cinebar silt loam, 0 to 8 percent slopes	47.4	2.3%
50	Cinebar silt loam, 8 to 15 percent slopes	23.0	1.1%
51	Cinebar silt loam, 15 to 30 percent slopes	138.6	6.8%
92	Greenwater loamy sand	149.3	7.3%
116	Klaber silt loam	7.5	0.4%
119	Lacamas silt loam, 3 to 8 percent slopes	0.2	0.0%
123	Ledow sand	10.6	0.5%
128	Mashel loam, 5 to 30 percent slopes	17.3	0.9%
145	Newaukum gravelly silt loam, 5 to 15 percent slopes	39.4	1.9%
146	Newaukum gravelly silt loam, 15 to 30 percent slopes	162.0	8.0%
147	Newaukum gravelly silt loam, 30 to 65 percent slopes	14.3	0.7%
163	Pheeny-Jonas complex, 30 to 65 percent slopes	129.2	6.4%
164	Pheeny-Rock outcrop complex, 30 to 65 percent slopes	119.9	5.9%
165	Pheeny-Rock outcrop complex, 65 to 90 percent slopes	78.2	3.8%
180	Riverwash	39.0	1.9%
187A	Pilchuck loamy fine sand, 0 to 3 percent slopes	0.1	0.0%
194	Scamman silty clay loam, 5 to 15 percent slopes	5.3	0.3%
196	Schneider very gravelly silt loam, 8 to 30 percent slopes	0.9	0.0%
198	Schneider very gravelly silt loam, 65 to 90 percent slopes	11.1	0.5%
200	Schneider-Baumgard complex, 30 to 65 percent slopes	47.4	2.3%

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Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
201	Schneider-Baumgard complex, 65 to 90 percent slopes	41.9	2.1%
203	Schneider-Rock outcrop complex, 65 to 90 percent slopes	61.9	3.0%
204	Schooley silt loam	0.7	0.0%
243	Winston gravelly loam, 0 to 8 percent slopes	3.1	0.2%
250	Zynbar gravelly silt loam, 8 to 30 percent slopes	401.5	19.8%
W	Water	144.1	7.1%
Subtotals for Soil Survey Area		2,014.3	99.2%
Totals for Area of Interest		2,031.3	100.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
187	Pilchuck loamy fine sand, 0 to 3 percent slopes	0.4	0.0%
215	Riverwash	7.9	0.4%
285	Water	8.8	0.4%
Subtotals for Soil Survey Area		17.1	0.8%
Totals for Area of Interest		2,031.3	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the

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scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Lewis County Area, Washington

6—Baumgard loam, 8 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2hgr

Elevation: 200 to 1,800 feet

Mean annual precipitation: 55 to 70 inches

Mean annual air temperature: 48 degrees F

Frost-free period: 150 to 225 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Baumgard and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Baumgard

Setting

Landform: Ridges, hillslopes

Parent material: Colluvium and residuum derived from igneous rock and volcanic ash

Typical profile

H1 - 0 to 15 inches: loam

H2 - 15 to 31 inches: clay loam

H3 - 31 to 46 inches: gravelly clay loam

H4 - 46 to 50 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 30 percent

Depth to restrictive feature: 40 to 60 inches to lithic bedrock

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Forage suitability group: Soils with Moderate Limitations (G003XF603WA)

Hydric soil rating: No

7—Baumgard loam, 30 to 65 percent slopes

Map Unit Setting

National map unit symbol: 2hh3

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Elevation: 200 to 1,800 feet
Mean annual precipitation: 55 to 70 inches
Mean annual air temperature: 48 degrees F
Frost-free period: 150 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Baumgard and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Baumgard

Setting

Landform: Hillslopes
Parent material: Colluvium and residuum derived from igneous rock and volcanic ash

Typical profile

H1 - 0 to 15 inches: loam
H2 - 15 to 31 inches: clay loam
H3 - 31 to 46 inches: gravelly clay loam
H4 - 46 to 50 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 65 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Hydric soil rating: No

8—Baumgard loam, 65 to 90 percent slopes

Map Unit Setting

National map unit symbol: 2hhh
Elevation: 200 to 1,800 feet
Mean annual precipitation: 55 to 70 inches
Mean annual air temperature: 48 degrees F
Frost-free period: 150 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Baumgard and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Baumgard

Setting

Landform: Hillslopes

Parent material: Colluvium and residuum derived from igneous rock and volcanic ash

Typical profile

H1 - 0 to 15 inches: loam

H2 - 15 to 31 inches: clay loam

H3 - 31 to 46 inches: gravelly clay loam

H4 - 46 to 50 inches: unweathered bedrock

Properties and qualities

Slope: 65 to 90 percent

Depth to restrictive feature: 40 to 60 inches to lithic bedrock

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: B

Hydric soil rating: No

49—Cinebar silt loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2hgc

Elevation: 50 to 2,000 feet

Mean annual precipitation: 50 to 75 inches

Mean annual air temperature: 48 to 52 degrees F

Frost-free period: 160 to 250 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Cinebar and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cinebar

Setting

Landform: Hillslopes, ridges, structural benches

Parent material: Loess and slope alluvium mixed with volcanic ash

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Typical profile

H1 - 0 to 12 inches: silt loam
H2 - 12 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 16.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Forage suitability group: Soils with Few Limitations (G002XF503WA)
Hydric soil rating: No

Minor Components

Klaber

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Lacamas

Percent of map unit: 5 percent
Landform: Terraces
Hydric soil rating: Yes

50—Cinebar silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2hgf
Elevation: 50 to 2,000 feet
Mean annual precipitation: 50 to 75 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 160 to 250 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cinebar and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cinebar

Setting

Landform: Structural benches, hillslopes, ridges

Parent material: Loess and slope alluvium mixed with volcanic ash

Typical profile

H1 - 0 to 12 inches: silt loam

H2 - 12 to 60 inches: silt loam

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very high (about 16.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Forage suitability group: Soils with Moderate Limitations (G003XF603WA)

Hydric soil rating: No

Minor Components

Klaber

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

Lacamas

Percent of map unit: 5 percent

Landform: Terraces

Hydric soil rating: Yes

Scamman

Percent of map unit: 5 percent

Landform: Terraces

Hydric soil rating: Yes

51—Cinebar silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2hgg

Elevation: 50 to 2,000 feet

Mean annual precipitation: 50 to 75 inches

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Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 160 to 250 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cinebar and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cinebar

Setting

Landform: Hillslopes, ridges
Parent material: Loess and slope alluvium mixed with volcanic ash

Typical profile

H1 - 0 to 12 inches: silt loam
H2 - 12 to 60 inches: silt loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 16.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Forage suitability group: Sloping to Steep Soils (G003XF703WA)
Hydric soil rating: No

Minor Components

Scamman

Percent of map unit: 5 percent
Landform: Terraces
Hydric soil rating: Yes

92—Greenwater loamy sand

Map Unit Setting

National map unit symbol: 2hhy
Elevation: 100 to 1,800 feet
Mean annual precipitation: 50 to 70 inches
Mean annual air temperature: 48 to 50 degrees F

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Frost-free period: 130 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Greenwater and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Greenwater

Setting

Landform: Flood plains, terraces
Parent material: Alluvium derived from andesite and pumice

Typical profile

H1 - 0 to 7 inches: loamy sand
H2 - 7 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Forage suitability group: Droughty Soils (G003XF403WA)
Hydric soil rating: No

Minor Components

Fluvaquentic humaquepts

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

116—Klaber silt loam

Map Unit Setting

National map unit symbol: 2h8j
Elevation: 100 to 1,000 feet
Mean annual precipitation: 40 to 70 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 125 to 200 days

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Farmland classification: Prime farmland if drained

Map Unit Composition

Klaber, drained, and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Klaber, Drained

Setting

Landform: Depressions

Typical profile

H1 - 0 to 8 inches: silt loam

H2 - 8 to 22 inches: silty clay loam

H3 - 22 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 18 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: C

Forage suitability group: Wet Soils (G002XV102WA)

Hydric soil rating: Yes

Minor Components

Lacamas

Percent of map unit: 10 percent

Landform: Terraces

Hydric soil rating: Yes

Klaber, undrained

Percent of map unit: 10 percent

Landform: Depressions

Hydric soil rating: Yes

Prather

Percent of map unit: 3 percent

Hydric soil rating: No

Scamman

Percent of map unit: 2 percent

Landform: Terraces

Hydric soil rating: Yes

119—Lacamas silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2h8m
Elevation: 250 to 1,200 feet
Mean annual precipitation: 40 to 70 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 125 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Lacamas, drained, and similar soils: 60 percent
Lacamas, undrained, and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lacamas, Drained

Setting

Landform: Terraces

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 17 inches: silt loam
H3 - 17 to 27 inches: silty clay
H4 - 27 to 60 inches: clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: About 12 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Forage suitability group: Seasonally Wet Soils (G002XV202WA)
Hydric soil rating: Yes

Description of Lacamas, Undrained

Setting

Landform: Terraces

Typical profile

H1 - 0 to 7 inches: silt loam

Custom Soil Resource Report

H2 - 7 to 17 inches: silt loam
H3 - 17 to 27 inches: silty clay
H4 - 27 to 60 inches: clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Forage suitability group: Seasonally Wet Soils (G002XV202WA)
Hydric soil rating: Yes

Minor Components

Klaber

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Prather

Percent of map unit: 3 percent
Hydric soil rating: No

Scamman

Percent of map unit: 2 percent
Landform: Terraces
Hydric soil rating: Yes

123—Ledow sand

Map Unit Setting

National map unit symbol: 2h8s
Elevation: 80 to 1,200 feet
Mean annual precipitation: 50 to 80 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 125 to 200 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Ledow and similar soils: 90 percent

Custom Soil Resource Report

Minor components: 6 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ledow

Setting

Landform: Terraces, flood plains

Typical profile

H1 - 0 to 8 inches: sand

H2 - 8 to 20 inches: fine sand

H3 - 20 to 24 inches: silt loam

H4 - 24 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: Frequent

Frequency of ponding: None

Available water storage in profile: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: B

Forage suitability group: Seasonally Wet Soils (G003XF203WA)

Hydric soil rating: No

Minor Components

Puget

Percent of map unit: 3 percent

Landform: Flood plains

Hydric soil rating: Yes

Riverwash

Percent of map unit: 3 percent

Landform: Flood plains

Hydric soil rating: Yes

128—Mashel loam, 5 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2h8y

Elevation: 1,180 to 1,870 feet

Mean annual precipitation: 50 to 60 inches

Mean annual air temperature: 48 degrees F

Frost-free period: 150 to 175 days

Custom Soil Resource Report

Farmland classification: Farmland of statewide importance

Map Unit Composition

Mashel and similar soils: 90 percent

Minor components: 3 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mashel

Setting

Landform: Hillslopes

Parent material: Glacial till

Typical profile

H1 - 0 to 7 inches: loam

H2 - 7 to 26 inches: loam

H3 - 26 to 59 inches: clay loam

H4 - 59 to 60 inches: loam

Properties and qualities

Slope: 5 to 30 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Forage suitability group: Soils with Moderate Limitations (G003XF603WA)

Hydric soil rating: No

Minor Components

Scamman

Percent of map unit: 3 percent

Landform: Terraces

Hydric soil rating: Yes

145—Newaukum gravelly silt loam, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2h9l

Elevation: 1,000 to 1,800 feet

Mean annual precipitation: 60 to 75 inches

Mean annual air temperature: 46 to 50 degrees F

Custom Soil Resource Report

Frost-free period: 140 to 180 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Newaukum and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newaukum

Setting

Landform: Terraces

Parent material: Colluvium or glaciofluvial deposits of volcanic mixed with volcanic ash

Typical profile

H1 - 0 to 9 inches: gravelly silt loam

H2 - 9 to 51 inches: gravelly silt loam

H3 - 51 to 60 inches: very cobbly silt loam

Properties and qualities

Slope: 5 to 15 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Forage suitability group: Soils with Moderate Limitations (G003XF603WA)

Hydric soil rating: No

Minor Components

Klaber

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

Lacamas

Percent of map unit: 5 percent

Landform: Terraces

Hydric soil rating: Yes

Scamman

Percent of map unit: 5 percent

Landform: Terraces

Hydric soil rating: Yes

146—Newaukum gravelly silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2h9m

Elevation: 1,000 to 1,800 feet

Mean annual precipitation: 60 to 75 inches

Mean annual air temperature: 46 to 50 degrees F

Frost-free period: 140 to 180 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Newaukum and similar soils: 95 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newaukum

Setting

Landform: Mountain slopes, ridges

Parent material: Colluvium or glaciofluvial deposits of volcanic mixed with volcanic ash

Typical profile

H1 - 0 to 9 inches: gravelly silt loam

H2 - 9 to 51 inches: gravelly silt loam

H3 - 51 to 60 inches: very cobbly silt loam

Properties and qualities

Slope: 15 to 30 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Forage suitability group: Sloping to Steep Soils (G003XF703WA)

Hydric soil rating: No

Minor Components

Scamman

Percent of map unit: 5 percent

Landform: Terraces

Hydric soil rating: Yes

147—Newaukum gravelly silt loam, 30 to 65 percent slopes

Map Unit Setting

National map unit symbol: 2h9n
Elevation: 1,000 to 1,800 feet
Mean annual precipitation: 60 to 75 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Newaukum and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Newaukum

Setting

Landform: Mountain slopes
Parent material: Colluvium or glaciofluvial deposits of volcanic mixed with volcanic ash

Typical profile

H1 - 0 to 9 inches: gravelly silt loam
H2 - 9 to 51 inches: gravelly silt loam
H3 - 51 to 60 inches: very cobbly silt loam

Properties and qualities

Slope: 30 to 65 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Hydric soil rating: No

163—Pheeneey-Jonas complex, 30 to 65 percent slopes

Map Unit Setting

National map unit symbol: 2hb7
Elevation: 1,500 to 2,800 feet
Mean annual precipitation: 55 to 90 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Pheeneey and similar soils: 60 percent
Jonas and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pheeneey

Setting

Landform: Mountain slopes
Parent material: Andesite and breccia colluvium mixed with volcanic ash

Typical profile

H1 - 0 to 4 inches: gravelly loam
H2 - 4 to 29 inches: extremely gravelly loam
H3 - 29 to 33 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Jonas

Setting

Landform: Mountain slopes
Parent material: Colluvium and residuum derived from igneous rock and volcanic ash

Typical profile

H1 - 0 to 5 inches: gravelly silt loam

Custom Soil Resource Report

H2 - 5 to 16 inches: very cobbly silt loam

H3 - 16 to 60 inches: cobbly clay loam

Properties and qualities

Slope: 30 to 65 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: B

Hydric soil rating: No

164—Pheeneey-Rock outcrop complex, 30 to 65 percent slopes

Map Unit Setting

National map unit symbol: 2hb8

Elevation: 1,500 to 2,800 feet

Mean annual precipitation: 55 to 85 inches

Mean annual air temperature: 43 to 45 degrees F

Frost-free period: 150 to 190 days

Farmland classification: Not prime farmland

Map Unit Composition

Pheeneey and similar soils: 65 percent

Rock outcrop: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pheeneey

Setting

Landform: Mountain slopes

Parent material: Andesite and breccia colluvium mixed with volcanic ash

Typical profile

H1 - 0 to 4 inches: gravelly loam

H2 - 4 to 29 inches: extremely gravelly loam

H3 - 29 to 33 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 65 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: C

Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Mountain slopes

Properties and qualities

Slope: 30 to 65 percent

Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: No

165—Pheeneey-Rock outcrop complex, 65 to 90 percent slopes

Map Unit Setting

National map unit symbol: 2hb9

Elevation: 1,500 to 2,800 feet

Mean annual precipitation: 55 to 85 inches

Mean annual air temperature: 43 to 45 degrees F

Frost-free period: 150 to 190 days

Farmland classification: Not prime farmland

Map Unit Composition

Pheeneey and similar soils: 65 percent

Rock outcrop: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pheeneey

Setting

Landform: Mountain slopes

Parent material: Andesite and breccia colluvium mixed with volcanic ash

Typical profile

H1 - 0 to 4 inches: gravelly loam

H2 - 4 to 29 inches: extremely gravelly loam

H3 - 29 to 33 inches: unweathered bedrock

Custom Soil Resource Report

Properties and qualities

Slope: 65 to 90 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Mountain slopes

Properties and qualities

Slope: 65 to 90 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

180—Riverwash

Map Unit Composition

Riverwash: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverwash

Setting

Landform: Flood plains, terraces

Typical profile

H1 - 0 to 60 inches: Error

Properties and qualities

Slope: 0 to 3 percent
Depth to water table: About 0 to 24 inches
Frequency of flooding: Frequent

Interpretive groups

Land capability classification (irrigated): None specified

Custom Soil Resource Report

Land capability classification (nonirrigated): 8
Hydric soil rating: Yes

187A—Pilchuck loamy fine sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 17s8x
Elevation: 1,150 to 1,640 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 160 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pilchuck and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pilchuck

Setting

Landform: Flood plains, terraces

Typical profile

H1 - 0 to 9 inches: loamy fine sand
H2 - 9 to 55 inches: loamy fine sand
H3 - 55 to 60 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 24 to 48 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Hydric soil rating: No

194—Scamman silty clay loam, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2hcb
Elevation: 150 to 2,000 feet

Custom Soil Resource Report

Mean annual precipitation: 40 to 70 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Scamman and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scamman

Setting

Landform: Terraces
Parent material: Residuum from outwash and sedimentary rocks

Typical profile

H1 - 0 to 6 inches: silty clay loam
H2 - 6 to 13 inches: silty clay loam
H3 - 13 to 23 inches: silty clay loam
H4 - 23 to 60 inches: silty clay

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: C/D
Forage suitability group: Seasonally Wet Soils (G002XV202WA)
Hydric soil rating: Yes

Minor Components

Lacamas

Percent of map unit: 5 percent
Landform: Terraces
Hydric soil rating: Yes

Prather

Percent of map unit: 5 percent
Hydric soil rating: No

196—Schneider very gravelly silt loam, 8 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2hcd

Elevation: 50 to 1,800 feet

Mean annual precipitation: 60 to 75 inches

Mean annual air temperature: 48 to 52 degrees F

Frost-free period: 150 to 200 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Schneider and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Schneider

Setting

Landform: Mountain slopes, ridges

Parent material: Colluvium from basic igneous rocks and volcanic ash

Typical profile

H1 - 0 to 6 inches: very gravelly silt loam

H2 - 6 to 30 inches: very cobbly silt loam

H3 - 30 to 45 inches: extremely cobbly silt loam

H4 - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 30 percent

Depth to restrictive feature: 40 to 60 inches to lithic bedrock

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Forage suitability group: Droughty Soils (G003XF403WA)

Hydric soil rating: No

198—Schneider very gravelly silt loam, 65 to 90 percent slopes

Map Unit Setting

National map unit symbol: 2hcg
Elevation: 50 to 1,800 feet
Mean annual precipitation: 60 to 75 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Schneider and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Schneider

Setting

Landform: Mountain slopes
Parent material: Colluvium from basic igneous rocks and volcanic ash

Typical profile

H1 - 0 to 6 inches: very gravelly silt loam
H2 - 6 to 30 inches: very cobbly silt loam
H3 - 30 to 45 inches: extremely cobbly silt loam
H4 - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 65 to 90 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Hydric soil rating: No

200—Schneider-Baumgard complex, 30 to 65 percent slopes

Map Unit Setting

National map unit symbol: 2hcl

Custom Soil Resource Report

Elevation: 50 to 1,800 feet
Mean annual precipitation: 55 to 75 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Schneider and similar soils: 60 percent
Baumgard and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Schneider

Setting

Landform: Hillslopes
Parent material: Colluvium from basic igneous rocks and volcanic ash

Typical profile

H1 - 0 to 6 inches: very gravelly silt loam
H2 - 6 to 30 inches: very cobbly silt loam
H3 - 30 to 45 inches: extremely cobbly silt loam
H4 - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 65 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Baumgard

Setting

Landform: Hillslopes
Parent material: Colluvium and residuum derived from igneous rock and volcanic ash

Typical profile

H1 - 0 to 15 inches: loam
H2 - 15 to 31 inches: clay loam
H3 - 31 to 46 inches: gravelly clay loam
H4 - 46 to 50 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 65 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: B

Hydric soil rating: No

201—Schneider-Baumgard complex, 65 to 90 percent slopes

Map Unit Setting

National map unit symbol: 2hcm

Elevation: 50 to 1,800 feet

Mean annual precipitation: 55 to 75 inches

Mean annual air temperature: 48 to 52 degrees F

Frost-free period: 150 to 225 days

Farmland classification: Not prime farmland

Map Unit Composition

Schneider and similar soils: 65 percent

Baumgard and similar soils: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Schneider

Setting

Landform: Hillslopes

Parent material: Colluvium from basic igneous rocks and volcanic ash

Typical profile

H1 - 0 to 6 inches: very gravelly silt loam

H2 - 6 to 30 inches: very cobbly silt loam

H3 - 30 to 45 inches: extremely cobbly silt loam

H4 - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 65 to 90 percent

Depth to restrictive feature: 40 to 60 inches to lithic bedrock

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Baumgard

Setting

Landform: Hillslopes
Parent material: Colluvium and residuum derived from igneous rock and volcanic ash

Typical profile

H1 - 0 to 15 inches: loam
H2 - 15 to 31 inches: clay loam
H3 - 31 to 46 inches: gravelly clay loam
H4 - 46 to 50 inches: unweathered bedrock

Properties and qualities

Slope: 65 to 90 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Hydric soil rating: No

203—Schneider-Rock outcrop complex, 65 to 90 percent slopes

Map Unit Setting

National map unit symbol: 2hcp
Elevation: 50 to 1,800 feet
Mean annual precipitation: 60 to 75 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Schneider and similar soils: 65 percent
Rock outcrop: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Schneider

Setting

Landform: Mountain slopes

Parent material: Colluvium from basic igneous rocks and volcanic ash

Typical profile

H1 - 0 to 6 inches: very gravelly silt loam

H2 - 6 to 30 inches: very cobbly silt loam

H3 - 30 to 45 inches: extremely cobbly silt loam

H4 - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 65 to 90 percent

Depth to restrictive feature: 40 to 60 inches to lithic bedrock

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: B

Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Mountain slopes

Properties and qualities

Slope: 65 to 90 percent

Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: No

204—Schooley silt loam

Map Unit Setting

National map unit symbol: 2hcq

Elevation: 800 to 1,200 feet

Mean annual precipitation: 50 to 70 inches

Mean annual air temperature: 48 to 52 degrees F

Frost-free period: 125 to 175 days

Custom Soil Resource Report

Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Schooley, drained, and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Schooley, Drained

Setting

Landform: Flood plains, terraces

Typical profile

H1 - 0 to 6 inches: silt loam

H2 - 6 to 21 inches: silt loam

H3 - 21 to 31 inches: sand

H4 - 31 to 40 inches: silt loam

H5 - 40 to 60 inches: muck

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: About 18 to 36 inches

Frequency of flooding: Frequent

Frequency of ponding: None

Available water storage in profile: Very high (about 15.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: C

Forage suitability group: Wet Soils (G003XF103WA)

Hydric soil rating: Yes

Minor Components

Semiahmoo

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

Newberg

Percent of map unit: 5 percent

Hydric soil rating: No

243—Winston gravelly loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2hf3
Elevation: 150 to 1,900 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 140 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Winston and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Winston

Setting

Landform: Terraces
Parent material: Loess and volcanic ash over glacial outwash or alluvium

Typical profile

H1 - 0 to 4 inches: gravelly loam
H2 - 4 to 35 inches: gravelly loam
H3 - 35 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Forage suitability group: Soils with Few Limitations (G002XV502WA)
Hydric soil rating: No

Minor Components

Klaber variant

Percent of map unit: 5 percent
Landform: Depressions

Hydric soil rating: Yes

250—Zynbar gravelly silt loam, 8 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2hfc
Elevation: 1,600 to 3,000 feet
Mean annual precipitation: 70 to 100 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Zynbar and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zynbar

Setting

Landform: Mountain slopes, ridges
Parent material: Volcanic ash and colluvium from igneous rocks and glacial till

Typical profile

H1 - 0 to 13 inches: gravelly silt loam
H2 - 13 to 45 inches: gravelly silt loam
H3 - 45 to 60 inches: silt loam

Properties and qualities

Slope: 8 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 15.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Forage suitability group: Soils with Moderate Limitations (G003XF603WA)
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Landform: Alluvial cones

Snoqualmie Pass Area, Washington (Parts of King and Pierce Counties)

187—Pilchuck loamy fine sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2gzs
Elevation: 0 to 2,070 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 160 to 210 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Pilchuck and similar soils: 85 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pilchuck

Setting

Landform: Flood plains
Parent material: Alluvium

Typical profile

H1 - 0 to 9 inches: loamy fine sand
H2 - 9 to 55 inches: loamy fine sand
H3 - 55 to 60 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 24 to 48 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Forage suitability group: Droughty Soils (G002XN402WA)
Hydric soil rating: No

Minor Components

Riverwash

Percent of map unit: 2 percent
Landform: Flood plains
Hydric soil rating: Yes

215—Riverwash

Map Unit Composition

Riverwash: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverwash

Setting

Landform: Flood plains

Parent material: Alluvium

Typical profile

H1 - 0 to 60 inches: Error

Properties and qualities

Slope: 0 to 2 percent

Depth to water table: About 0 to 24 inches

Frequency of flooding: Frequent

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: Yes

285—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Landform: Alluvial cones

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APPENDIX B
Site Photographs



Photograph 1. Western region of site where recent clear-cut activities have occurred. Mineral Lake shown in the background. (March 18, 2020)



Photograph 2. Western region of site where recent clear-cut activities have occurred. (March 18, 2020)

XXXX-XXX-XX Date Exported: 04/09/15

Site Photographs	
YMCA Mineral Lake Property – Due Diligence Phase Lewis County, Washington	
	Figure B-1



Photograph 3. Stream and associated wetlands within western region of site. (March 18, 2020)



Photograph 4. Stream and associated wetlands within western region of site. Mineral Lake shown in background through trees. (March 18, 2020)

XXXX-XXX-XX Date Exported: 04/09/15

Site Photographs	
YMCA Mineral Lake Property – Due Diligence Phase Lewis County, Washington	
	Figure B-2



Photograph 5. Example of documented stream that crosses under main road down towards Mineral Lake within central region of the site. (March 18, 2020)



Photograph 6. Roadside drainage and associated wetland drainage ditch within central region of the site. (March 18, 2020)

Site Photographs	
YMCA Mineral Lake Property – Due Diligence Phase Lewis County, Washington	
	Figure B-3



Photograph 7. Upland habitat from the road within the northern area of the central region (March 18, 2020)



Photograph 8. Young deciduous habitat within the northern area of the central region. (March 18, 2020)

Site Photographs	
YMCA Mineral Lake Property – Due Diligence Phase Lewis County, Washington	
	Figure B-4



Photograph 9. Northern boundary of wetland feature dominant with reed canary grass within eastern region of the site. (March 18, 2020)



Photograph 10. Northern boundary of wetland feature dominant with reed canary grass within eastern region of the site. (March 18, 2020)

XXXXX-XXX-XX Date Exported: 04/09/15

Site Photographs	
YMCA Mineral Lake Property – Due Diligence Phase Lewis County, Washington	
	Figure B-5



Photograph 11. Southern wetland boundary of wetland feature within eastern region of the site (March 18, 2020)



Photograph 12. Southern boundary of wetland feature within eastern region of the site. (March 18, 2020)

XXXXX-XXX-XX Date Exported: 04/09/15

Site Photographs	
YMCA Mineral Lake Property – Due Diligence Phase Lewis County, Washington	
	Figure B-6



Photograph 13. Northeastern shoreline of Mineral Lake with extensive large woody debris floating and shoreline wetland feature looking south. (March 18, 2020)



Photograph 14. Northeastern shoreline of Mineral Lake with extensive large woody debris floating and shoreline wetland feature looking west. (March 18, 2020)

XXXX-XX-XX Date Exported: 04/09/15

Site Photographs	
YMCA Mineral Lake Property – Due Diligence Phase Lewis County, Washington	
	Figure B-7



Photograph 15. Lake fringe wetland within western region of the site. (March 18, 2020)



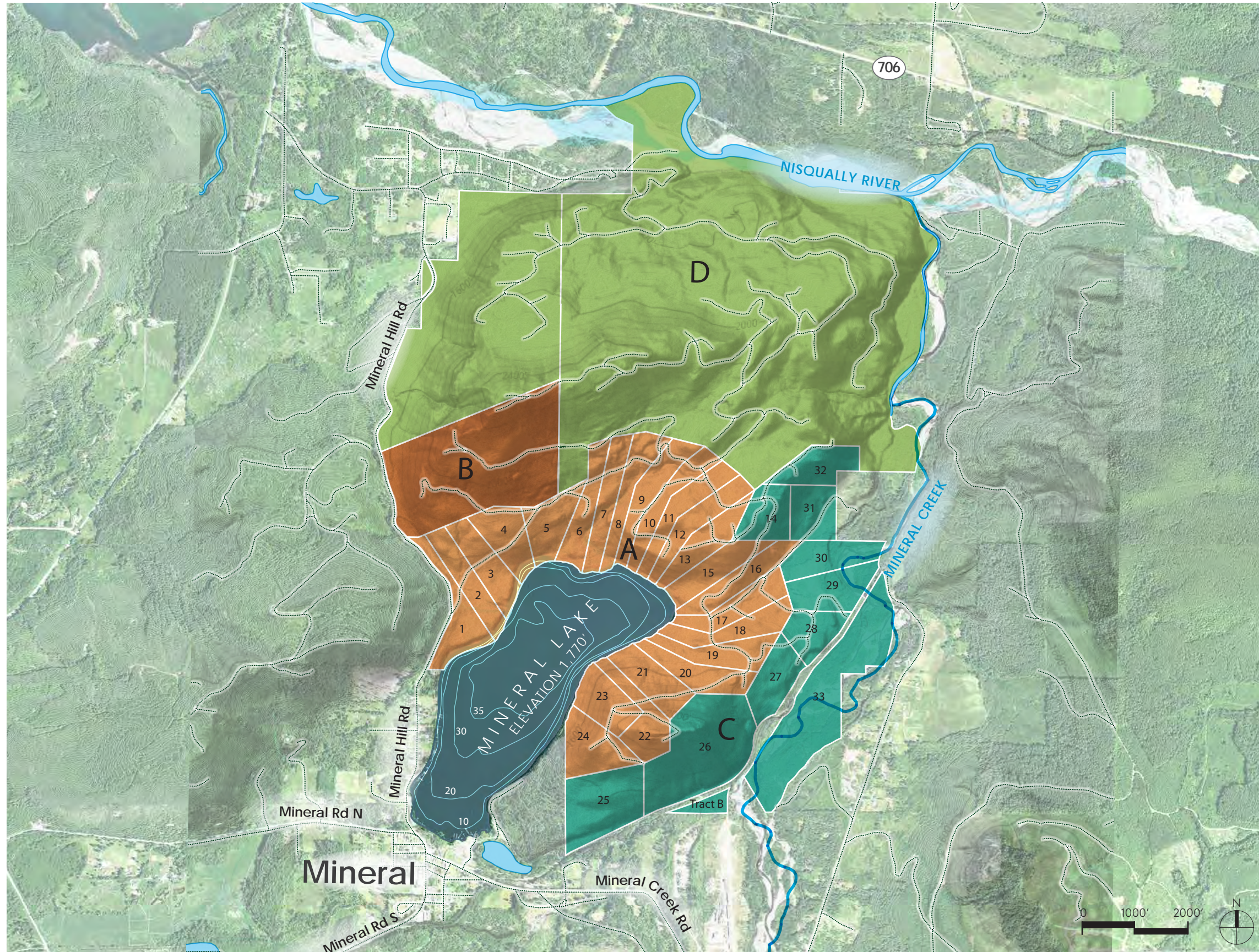
Photograph 16. Central portion of the site with steep slope down to Mineral Lake shoreline. (March 18, 2020)

XXXX-XXX-XX Date Exported: 04/09/15

Site Photographs	
YMCA Mineral Lake Property – Due Diligence Phase Lewis County, Washington	
	Figure B-8

APPENDIX C
YMCA Mineral Lake Vicinity Map

VICINITY MAP

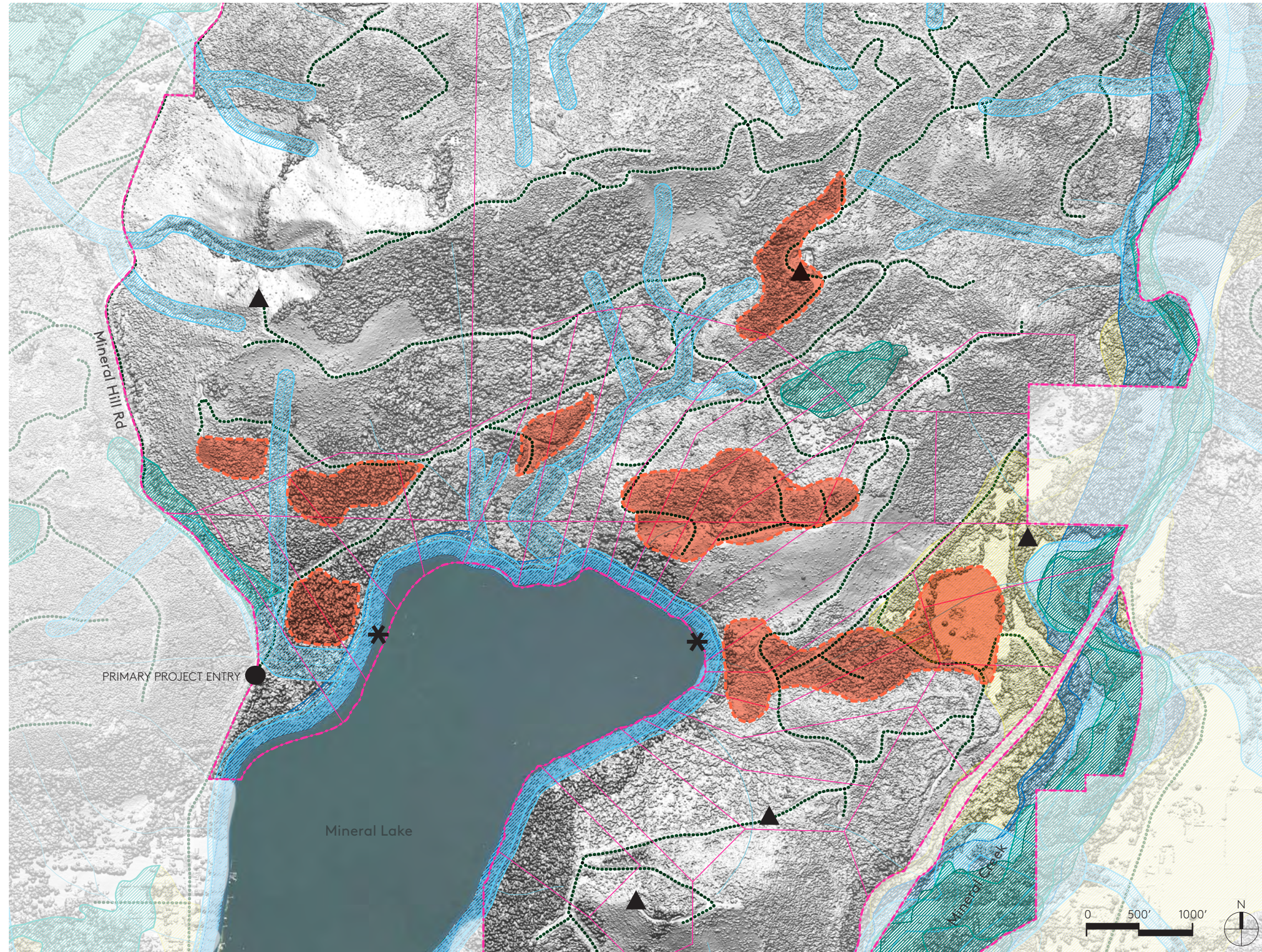


LEGEND

- A** PROPERTY Individual Lots (500 Acres)
- B** Forest Reserve (143 Acres)
- C** Remaining Individual Lots (371 Acres)
- D** Forest Reserve (1,104 Acres)
- Major Roads
- - - Forest Service Roads

APPENDIX D
YMCA Mineral Lake Conceptual Development Areas

SITE PLAN: CONCEPTUAL DEVELOPMENT AREAS



POTENTIAL DEVELOPMENT AREAS LEGEND

- EXISTING ROADS
- POTENTIAL DEVELOPMENT ZONE
- * POTENTIAL LAKE ACCESS
- ▲ POTENTIAL SATELLITE RECREATION AREA
- - - PROPERTY BOUNDARY
- PARCEL LINE
- EXISTING PROPERTY ENTRANCE

*The highest intensity development will be concentrated in the potential development zones with slopes less than or equal to 15%.

CRITICAL AREAS LEGEND

- 200' MINERAL LAKE BUFFER
- STREAM BUFFERS
- WETLANDS
- HYDRIC SOILS
- FEMA 100 & 500 YEAR FLOODPLAIN
- CRITICAL AQUIFER RECHARGE AREA

NOTES

Orange regions suggest potential developable zones, however, the area of potential developable zones exceeds the likely built program on the site. For scale reference:

- = SIZE OF A 360'*150' SOCCER FIELD
- = SIZE OF A 9000 SQUARE FOOT DINING HALL
- = SIZE OF A 2000 SQUARE FOOT PROGRAM SHELTER
- = SIZE OF (4) 600 SQUARE FOOT CABINS

