City of St. Maries

Environmental Information Document
Phase 3 Sewer Line Replacement Project

Revised March 6, 2023

PROFESSIONAL ENGINEER
LICENSED
12502
3/6/23
STATE OF IDAHO
JESSE C. HERNDON

Prepared For:

City of St. Maries
602 College Avenue
St. Maries, Idaho 83861
(208) 245-2577

HMH engineering

Prepared By:

HMH Engineering
3882 N. Schreiber Way, Suite 104
Coeur d'Alene, Idaho 83835
(208) 635-5825

Table of Contents

1.0 Purpose and Need

This document will demonstrate that the proposed action will not cause adverse effects to the environment. All proposed wastewater collection system improvements include installing sewer mains and manholes in the same location as the mains and manholes they are replacing. All construction will be contained within the existing boundaries of the existing paved street rights-of-way and no excavation will occur outside of previously disturbed and developed areas.

HMH Engineering was hired by the City of St. Maries to develop the City's *Wastewater Collection System Facility Plan*. It lists several improvement projects including sewer line replacements, manhole replacements, and service hookup replacements to address deficiencies within the system. The City of St. Maries selected several of its priority upgrade projects to remain within compliance of IDEQ facility standards. The purpose of this document is to describe these upgrade projects, demonstrate their need, and show that they will not cause adverse effects to the community and its surrounding environment.

Based upon recommendations and observations within the *Wastewater Facility Plan*, the City has chosen to focus on deficiencies within its collection system. The combination of system age and material deterioration has resulted in significant infiltration and inflow (I/I) into the City's system. Left uncorrected, surcharging can potentially create sewer overflows that threaten human health and safety. Large volumes of I/I increase flows at the wastewater treatment plant, which can compromise treatment efficiency and the City's ability to meet NPDES permit limits. Inspections have revealed major deficiencies including significant cracks, protruding roots, and pipe dislocations causing inflow and infiltration.

In a continuing effort to maintain its system and fulfill requirements set forth in IDAPA 58.01.16 *Wastewater Rules Subsection 411 Facility and Design Standards for Municipal Wastewater Treatment or Disposal Facilities: Preliminary Engineering Reports*, the City of St. Maries has proposed replacing segments of clay sewer lines within its city limits. These pipe segments were deemed a priority by the City due to inflow and infiltration problems, condition, and age.

2.0 Project Information

The City of St. Maries is located at the intersection of State Highways 3 and 5, in Benewah County along the southern bank of the St. Joe River. The Proposed Project Planning Area (PPPA) is defined by area within the roadway right-of-way where the sewer lines will be replaced. The area of potential effects is the same as the PPPA. Figure 1 shows the project location, city limits, and locations of the proposed projects.

The City's primary water source is treated water from Rochet Creek with a secondary supply from the Riverdale Wells, which supply 2,300 gpm and 2,100 gpm respectively. The City has four storage reservoirs (Biersdorf, Capitol Hill, Cromwell, and Highway 3) which can hold 1,059,000 gallons. The current proposed projects will have no effect on the City's storage or source water.

The City owns its Wastewater Treatment Plant which consists of two pumping stations (2nd Street and 14th Street), two primary lagoons on the north side of the St. Joe River (23 million gallons each), a polishing pond (39 million gallons), and a chlorine contact tank (59,000 gallons). After treatment, the water is discharged into the St. Joe River or sprayed on land application sites outside the city limits. The proposed projects, while part of the wastewater collection system, will have no effect on the Wastewater Treatment System except for eliminating infiltration along the proposed pipes.

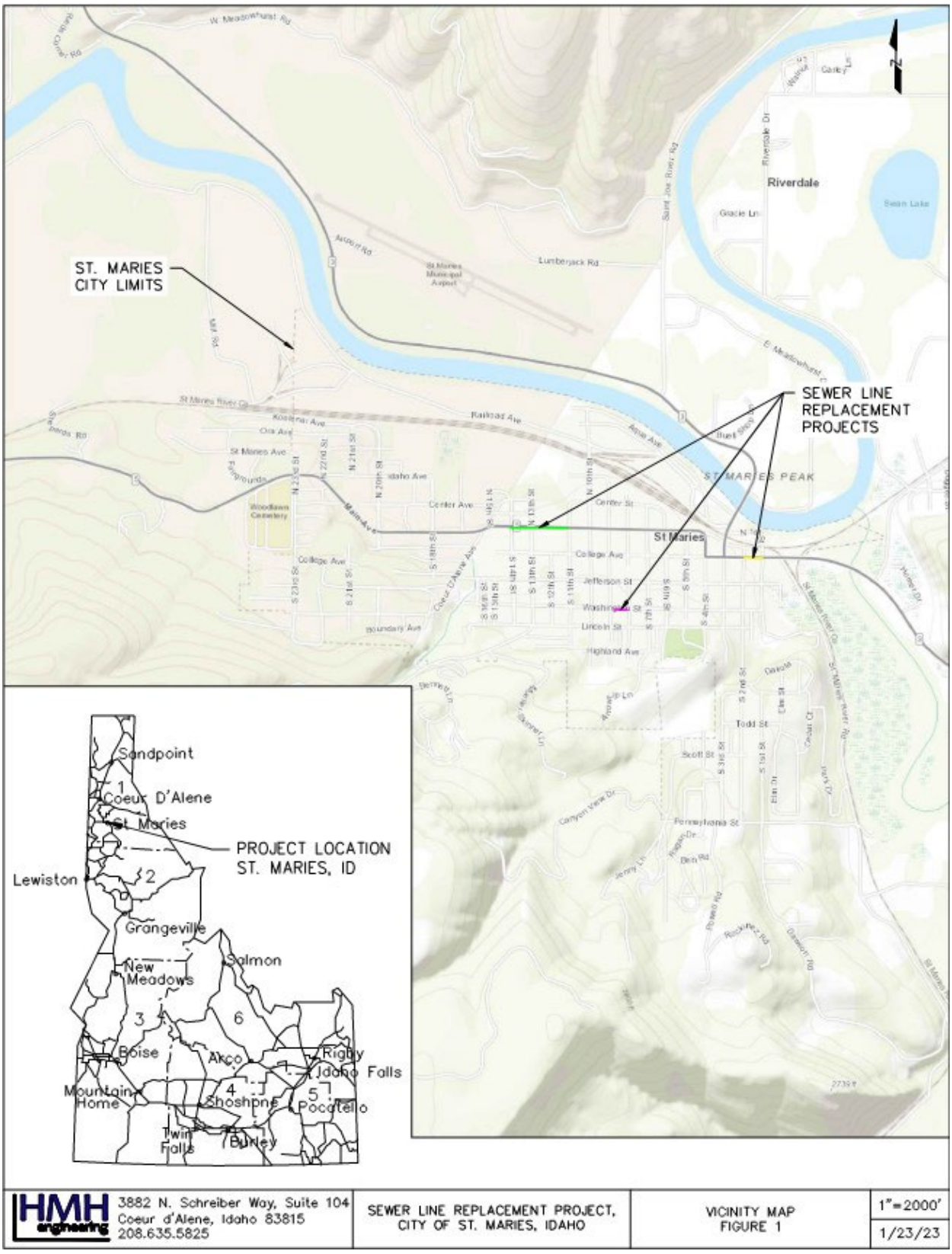


Figure 1: Vicinity Map

2.1 Project Description

The City chose the sewer line replacement projects from the City of St. Maries *Wastewater Facility Plan*. This alternative identifies priority sewer line replacement projects based on degrading condition, age, and the high I/I problems in the collection system. These projects will replace approximately 1,302 feet of existing clay sewer line with 8-inch, 10-inch, and 12-inch diameter SDR-35 PVC sewer line and replace 6 pre-cast concrete manholes. A map, shown in Figure 2, indicates the sewer line replacement locations within the City of St. Maries. The projects will be confined to the right of way on either side of the roadway in which they are located. These projects will include the excavation and removal of the old lines and manholes, replacement with new PVC lines and manholes, the update and reconnection of individual services, and backfill and restoration of the roadway surface. The replacement projects include:

- **College Avenue** (2nd St to 1st St): Replace 104 linear feet of 8-inch clay sewer line and 262 linear feet of 12-inch clay sewer line. Replace 1 manhole.
- **Main Avenue** (14th St to 11th St): Replace 480 linear feet of 8-inch clay sewer line and 330 linear feet of 10-inch clay sewer line. Replace 3 manholes.
- **Washington Avenue** (Alley to 8th St): Replace 126 linear feet of 6-inch clay sewer line. Replace 2 manholes.

2.2 Project Alternatives and Selection

Three different alternatives were evaluated for this project. The first was the no action alternative. The second alternative was to replace only the highest priority infrastructure. Alternative No. 3 was to replace all priority infrastructure.

The environmental impacts of the no action alternative were evaluated. By choosing this option, the system will continue to experience infiltration and inflow into the City's system. Left uncorrected, surcharging can potentially create sewer overflows that threaten human health and safety. The infiltration and inflow volumes increase flows at the wastewater treatment plant, which can compromise treatment efficiency and the City's ability to meet NPDES permit limits. The no action alternative had the greatest environmental impact of all the alternatives evaluated and is not preferred.

The second alternative was to replace pipe mains, service laterals and manholes with the condition rating of "D" and "F" based on the system prioritization process. All high and moderate priority items would be addressed as part of this alternative. This would help reduce some of the environmental impacts identified in the no action alternative, but would leave sections of the system still at risk of sewer overflows and I/I.

Alternative three included the replacement of all pipe mains, service laterals and manholes with the condition rating of "C", "D" and "F" based on the system prioritization process. All identified priority items were addressed as part of this alternative. This alternative included everything listed in alternative two and the construction associated with the condition rating "C" infrastructure. This alternative has the least amount of environmental impact, as all the potential impacts associated in the no action alternative have been addressed. This is the preferred and recommended alternative and was selected by The City.

Figure 2: Project Map

3.0 Affected Environment and Consequences

The following sections describes the existing affected environment (existing condition of resources) and evaluates potential environmental effects on those resources for each alternative.

3.0.1 Proposed Alternative: Alternative 3

The proposed construction work is within City limits along existing roadways in residential and commercial areas of the City. This project will not cause adverse effects to the environment. All proposed wastewater collection system improvements include installing sewer mains and manholes in the same location as the mains and manholes they are replacing. Implementation of the alternative would improve the wastewater collection system's operation and reduce I/I in the entire system.

3.0.2 No Action Alternative

The No Action Alternative would involve no construction or changes to the existing environment. The existing sewer lines would continue to add to the increased levels of I/I in the wastewater collection system. Inflow and infiltration makes wastewater more difficult to treat, because it dilutes the wastewater strength and reduces retention time in the treatment process.

3.1 Physical Aspects

Roadway elevations within City limits range from 2,140 to 2,230 feet. A topo map is shown in Figure 3. USDA classifies the area as having no prime farmland, a relatively deep-water table, and hydrologic soil groups of B and C as shown in Appendix A.

3.1.1 Proposed Alternative: Alternative 3

The proposed construction work is within City limits. Construction will occur along existing roadways and in existing right-of-way. Temporary construction disturbances will be minimal. No mitigation will be required.

3.1.2 No Action Alternative

The No Action Alternative would involve no construction and would not change any of the area's physical aspects.

3.2 Population, Socioeconomics, and Environmental Justice

The City of St. Maries is the county seat of Benewah County. According to the US Census Bureau, the population of St. Maries was 2,652 residents in the year 2000. Between 2000 and 2010, the population declined to 2,402 residents. While no new industry is anticipated in the area over the next 20 years, residential growth may occur in the area over the next 20 years. According to the Idaho Department of Commerce, the City had a population of 2,486 in 2021. This is an increase of 84 people over 11 years. Economic statistics from the American Community Survey (ACS) indicate that the median household income for the City of St. Maries is $35,125. The poverty rate is estimated at 13.7 percent.

The anticipated population growth does not exceed the 25% 20-year population growth rate expectations for the state. It is unlikely that a change in 500 residential units will occur over the life of the project.

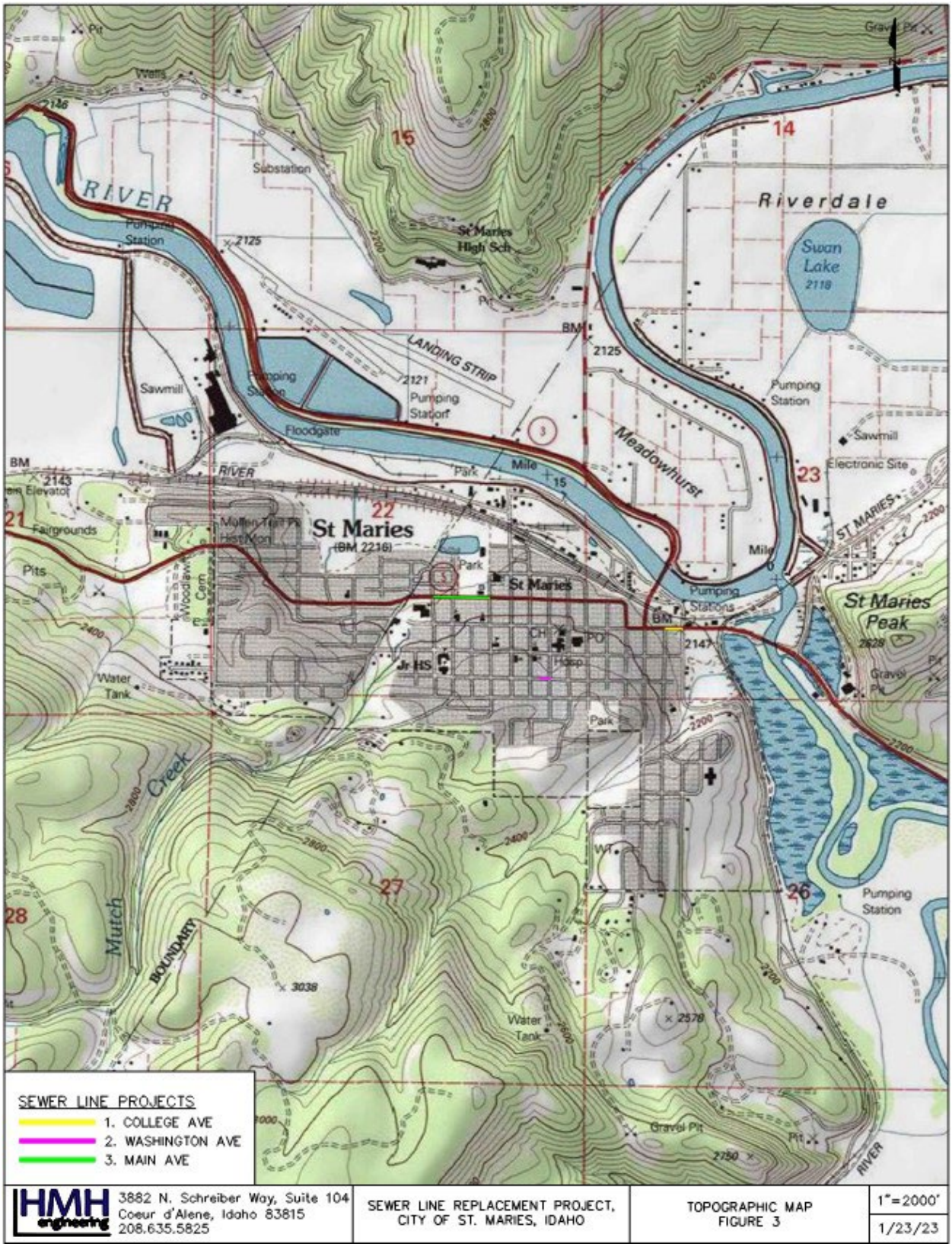


Figure 3: Topographic Map

3.2.1 Proposed Alternative: Alternative 3

The benefits from this project will not accrue in a discriminatory manner towards those below the poverty line or the minority groups within the community. Costs associated with the project will be allocated in a non-discriminatory manner and be equal among all residential housing. No mitigation required.

3.2.2 No Action Alternative

The No Action Alternative would not include any improvements to the system for anticipated population growth.

3.3 Floodplain

3.3.1 Proposed Alternative: Alternative 3

Benewah County participates in the National Flood Insurance Program. The proposed construction will occur in areas delineated as Zone X. No construction will occur within or affect the 100-year floodplain. Figure 4 shows FIRM map panels for the area. Construction will not occur within or affect the 100-year floodplain. No mitigation required.

3.2.2 No Action Alternative

The No Action Alternative would involve no construction therefore no areas within the floodplain would be affected.

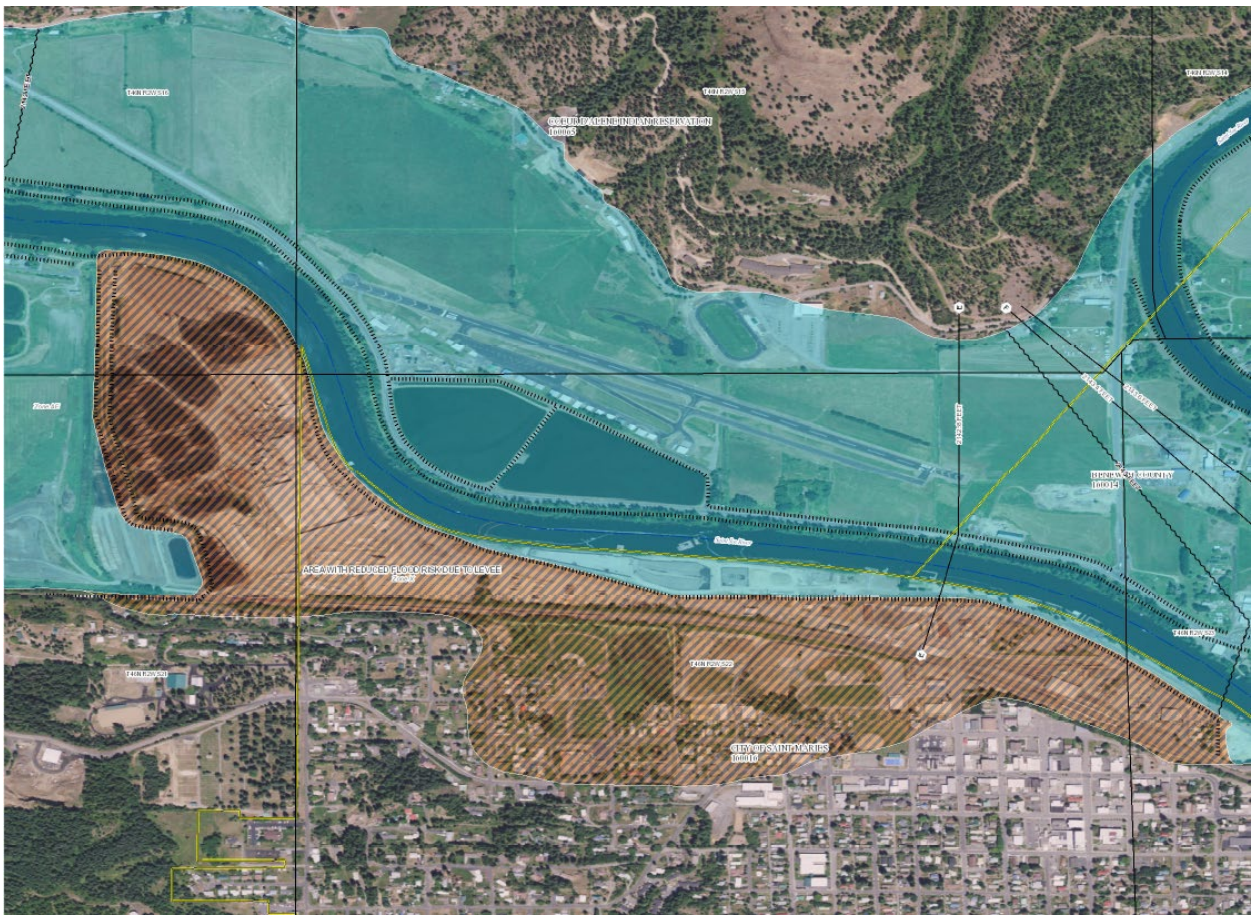


Figure 4: Floodplain Map

3.4 Wetlands

There are wetlands areas within the city limits. The United States Fish and Wildlife Service (USFWS) National Inventory Wetlands Map in Appendix B, shows two small seasonal Riverine wetlands within the City limits. The St. Joe River and freshwater emergent wetlands lie along its northern and eastern boundaries.

3.4.1 Proposed Alternative: Alternative 3

All proposed construction will occur within existing city infrastructure and more specifically within the right-of-way of already established roads. As such, no proposed construction will impact wetlands. Additionally, none of the projects are in the direct vicinity of these wetland areas. No mitigation is required.

3.4.2 No Action Alternative

The No Action Alternative would involve no construction therefore no areas within the wetlands would be affected.

3.5 Wild and Scenic Rivers

While the City of St. Maries is located along the banks of the St. Joe River. The St. Joe River is classified as a Wild and Scenic River as shown in Figure 5.

3.5.1 Proposed Alternative: Alternative 3

The proposed construction will not impact the St. Joe River. No mitigation is required.

3.5.2 No Action Alternative

The No Action Alternative would not repair or replace the existing sewer line. Left uncorrected, surcharging can potentially create sewer overflows that threaten human health and safety, and affect the St. Joe River.

3.6 Cultural Resources

Both the National Register of Historic Places and the Idaho State Historic Preservation Office list four historic sites within the City Limits as shown in Figure 6. The Benewah County Courthouse (#87001580) Kootenai Inn (#79000774), St. Maries Masonic Temple No. 63 (#11000699), and St. Maries 1910 Fire Memorial (#84001010)

3.6.1 Proposed Alternative: Alternative 3

While these sites are located within the vicinity of the proposed projects, none are on the same road section where the projects are located. If artifacts of significant historical significance are encountered while performing the work the proposed projects entail, work will stop until the site can be evaluated by qualified parties.

All work performed to accomplish proposed construction falls within the right of ways of existing roadways on streets not directly adjacent to the four historical sites located within the city limits. No historical sites will be impacted. In the event that cultural material is inadvertently encountered during implementation, work shall be halted in the vicinity of the finds until they can be inspected and assessed by the appropriate consulting parties. No mitigation is required.

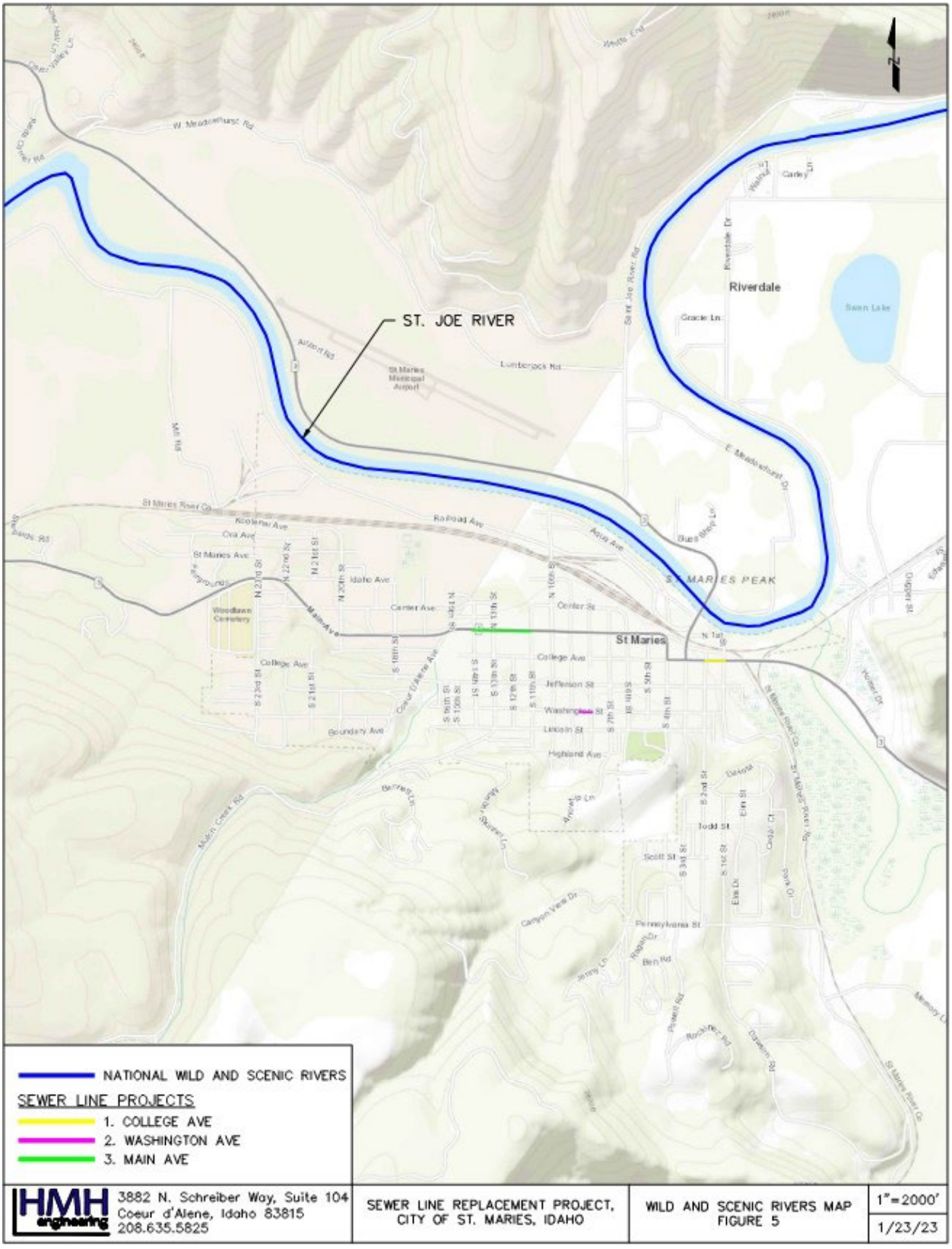


Figure 5: Wild and Scenic River Map

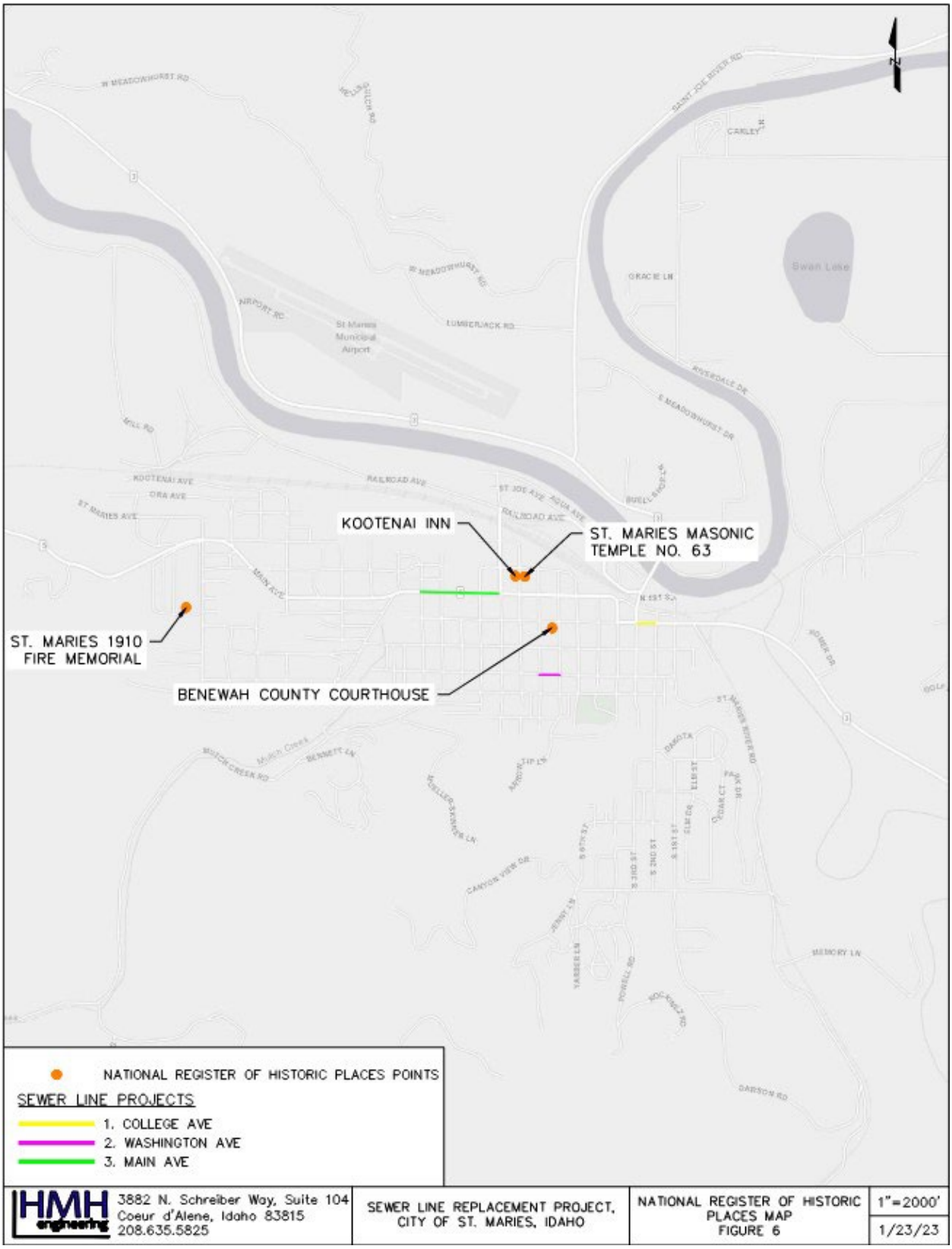


Figure 6: National Register of Historic Places Map

3.6.2 No Action

The No Action Alternative would involve no changes to the footprint of the wastewater collection system and therefore would continue to have no effects to the historic properties and/or resources.

3.7 Flora and Fauna

According to the USFWS Species by County Report Tool, Benewah County is home to several species of concern. The USFWS Information for Planning and Consulting is in Appendix C describes the following species:

- North American Wolverine (Gulo gulo luscus) – Proposed Threatened Species
- Grizzly Bear (Ursus arctos horribilis) – Proposed Threatened Species
- Bull Trout (Selvelinus confluentus) - Threatened Species
- Monarch Butterfly (Danaus plexippus) - Candidate
- Spalding's Catchfly (Silene spaldingii) – Threatened Species
- Whitebark Pine (Pinus albicaulis) – Threatened Species

3.7.1 Proposed Alternative: Alternative 3

The proposed construction activities are limited to areas of existing infrastructure within the city limits where there will be no adverse contact with any of these species. The proposed construction will have no anticipated impact on flora and fauna. No mitigation is required.

3.7.2 No Action Alternative

The No Action Alternative would involve no construction. Left uncorrected, surcharging can potentially create sewer overflows that could threaten flora and fauna.

3.8 Farmland

According to USDA, areas of Prime Farmland (if drained and if irrigated) are located within the City limits. The proposed construction will occur in residential and commercial areas classified as Not Prime Farmland. A farmland map is located in the USDA NRCS Soils Report (Appendix A).

3.8.1 Proposed Alternative: Alternative 3

The proposed construction will have no anticipated impact on farmland. No mitigation is required.

3.8.2 No Action Alternative

The No Action Alternative would involve no construction and no farmland areas would be affected.

3.9 Air Quality

Idaho has not classified the City as an area of air quality concern as shown on the map in Appendix D. The completed project will not cause odor or noise nuisance problems.

3.9.1 Proposed Alternative: Alternative 3

The proposed projects will have no long-term adverse effects on air quality. Temporary air pollutants can be controlled with BMP's such as dust abatement measures and inspecting equipment for adherence to emission standards. Disturbances due to elevated noise can be

mitigated by scheduling project work during normal hours of operation and adherence to noise ordinances. No mitigation is required.

3.9.2 No Action

The No Action Alternative would involve no construction therefore there would be no adverse impacts on the air quality.

3.10 Surface Water

The proposed construction will not cross any water bodies. Existing storm drain culverts may be temporarily bypassed during construction.

3.10.1 Proposed Alternative: Alternative 3

The proposed construction will have no anticipated impact on surface water. A Storm Water Pollution and Prevention Plan (SWPPP) will be developed, and BMP's will be implemented to mitigate sediment runoff during the construction process. No mitigation is required.

3.10.2 No Action Alternative

The No Action Alternative would involve no construction. Left uncorrected, surcharging can potentially create sewer overflows that could potentially affect surface water.

3.11 Ground Water

Well logs show water levels vary between 5 and 35 feet below the ground surface as shown in Appendix E. The complexity of sewer line installation may increase if groundwater is encountered during construction. However, this is not uncommon during subsurface utility construction.

3.11.1 Proposed Alternative: Alternative 3

The proposed construction will have no anticipated impact on ground water. No mitigation is required.

3.11.2 No Action Alternative

The No Action Alternative would involve no construction. Left uncorrected, surcharging can potentially create sewer overflows that could potentially affect ground water quality.

3.12 Safe Drinking Water Act

The City is located in the source area of the Rathdrum Prairie Aquifer as shown in Appendix F.

3.12.1 Proposed Alternative: Alternative 3

The proposed construction will not adversely affect the aquifer, the aquifer source area, or the aquifer recharge area. The proposed construction will not affect a source water area for a public drinking water system. The proposed construction will have no anticipated impact on the Safe Drinking Water Act. No mitigation is required.

3.12.2 No Action Alternative

The No Action Alternative would involve no construction. Left uncorrected, surcharging can potentially create sewer overflows that could affect the aquifer.

3.13 Reuse/Land Application or Subsurface Disposal System

3.12.1 Proposed Alternative: Alternative 3

The proposed construction will not use any unproven techniques, rapid infiltration basins, low-rate land applications, or subsurface sewage disposal. No mitigation is required.

3.12.2 No Action Alternative

The No Action Alternative will not add any improvements to the system therefore no impacts will be made to the surrounding areas.

4.0 References

"Benewah County Proposed Zoning Map." *St. Maries Gazette Record,* 3 April 2014. www.gazetterecord.com/

Federal Emergency Management Agency. Flood Insurance Rate Map of City of St. Maries, ID, Panel No. 16009-C0229D, 16009-C0233D, and 16009-C0241D. Web, 25 January 2023. https://msc.fema.gov/portal

Idaho Department of Environmental Quality, Office of Administrative Rules. IDAPA 58.08.01. Web, 25 January 2023. https://adminrules.idaho.gov/rules/current/58/index.html

Idaho Department of Environmental Quality, Water Quality. Sole Source Aquifers in EPA Region 10. Web, 25 January 2023. http://www.deq.idaho.gov/water-quality/ground-water/solesource-aquifers/

Idaho Department of Lands, Map & Land Records. *Digital Land Records Database Viewer.* Web, 25 January 2023. http://gis1.idl.idaho.gov/DLR/

Idaho Department of Water Resources, Featured Maps. *Idaho Flood Hazard Map.* Web, 25 January 2023. https://idwr.maps.arcgis.com/apps/

Idaho Department of Water Resources, Geographic Information Services. *General Mapping Tool.* Web, 25 January 2023. http://maps.idwr.idaho.gov/map/

Idaho Department of Water Resources, Well Construction and Drilling. *Wells and Groundwater Management Map.* Web, 25 January 2023. https://idwr.maps.arcgis.com/

Idaho Parks and Recreation, Find a Park. Web, 25 January 2023. https://parksandrecreation.idaho.gov/

Idaho State Department of Education, Where Are We Now. *Indian Reservation Map.* Web, 25 January 2023. https://sde.idaho.gov/indian-ed/files/general/Idaho-Reservation-Map.pdf

National Park Service, Find a Park. Web, 25 January 2023. https://www.nps.gov/state/id/index.htm

National Park Service. National Natural Landmarks by state. Web, 25 January 2023. http://www.nature.nps.gov/nnl/Registry/USA_Map/States/Idaho/idaho.cfm

National Park Service, National Register of Historic Places. *Historic Places Mapping Tool.* Web, 25 January 2023. https://www.nps.gov/maps/full.html

National Wild and Scenic Rivers System. Wild Scenic Rivers Online Map. Web, 25 January 2023. https://www.rivers.gov/idaho.php

United States Department of Agriculture. *Web Soil Survey.* Natural Resource Conservation Service. Web, 25 January 2023. http://websoilsurvey.nrcs.usda.gov/app/websoilsurvey.aspx

United States Fish and Wildlife Service, Idaho Fish and Wildlife Office. *Endangered Species Act List*. Web, 25 January 2023. https://ecos.fws.gov/ipac/

United States Fish and Wildlife Service, Species by County Report. Web, 25 January 2023. https://ecos.fws.gov

United States Fish and Wildlife Service, Wetlands Online Mapper. Web, 25 January 2023. https://www.fws.gov/wetlands

United States Census Bureau, Benewah County, Idaho. Web, 25 January 2023. https://www.census.gov/quickfacts/fact/table/benewahcountyidaho,US/PST045222

Idaho Department of Commerce, St. Maries, Idaho. Web, 25 January 2023. http://www.gemstateprospector.com/community-profile.html?primaryColor=00526a&secondaryColor=40c0be&icTool=community-profile&geoId=1671470&geoEntId=62d573cc-8ac4-4895-9712-3532c35bc036

Appendix A: USDA NRCS Soils Report

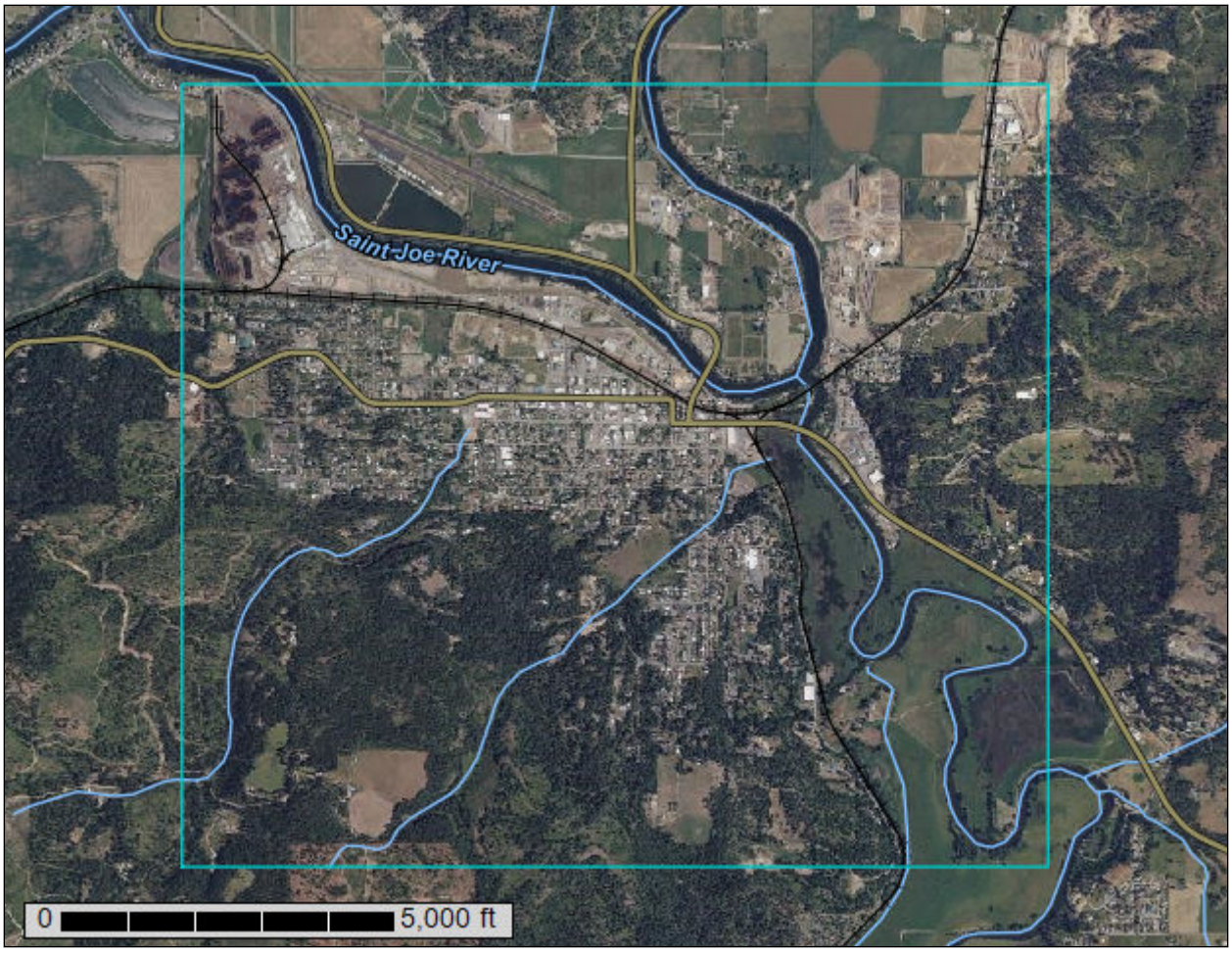
United States Department of Agriculture

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 Benewah County Area, Idaho, Western Part; and St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties



January 26, 2023

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.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

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

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.

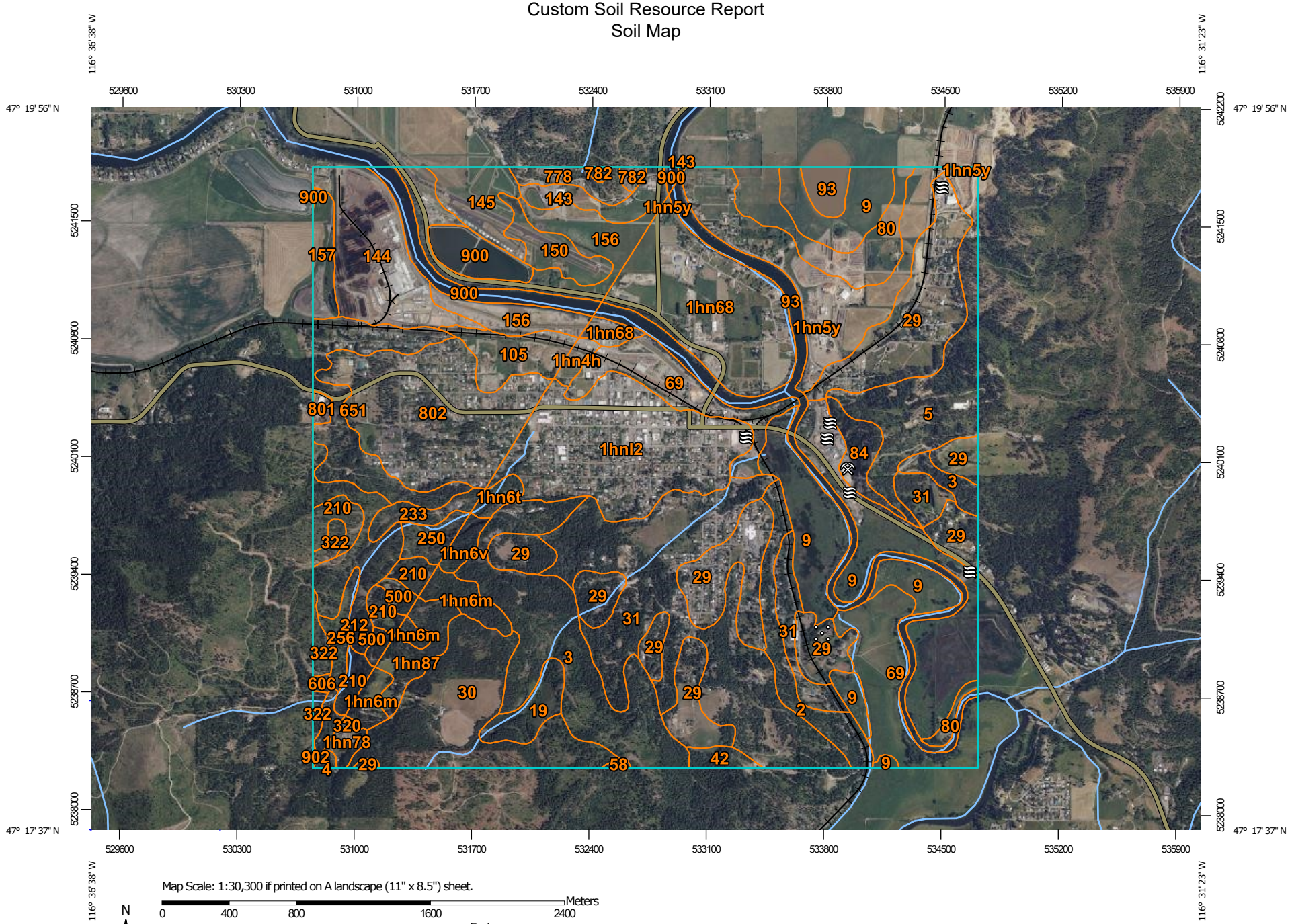
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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 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: Benewah County Area, Idaho, Western Part
Survey Area Data: Version 9, Sep 2, 2022

Soil Survey Area: St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties
Survey Area Data: Version 19, Sep 2, 2022

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: Apr 1, 2021—Oct 1, 2021

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
105	Aquic Udifluvents-Typic Fluvaquents complex, protected, 0 to 4 percent slopes	42.6	1.2%
143	Miesen ashy silt loam, protected, drained, 0 to 2 percent slopes	31.0	0.9%
144	Miesen-Ramsdell complex, protected, drained, 0 to 4 percent slopes	112.6	3.2%
145	Bellslake ashy silt loam, protected, drained, 0 to 1 percent slopes	44.3	1.3%
150	Pywell muck, protected, partially drained, 0 to 1 percent slopes	31.3	0.9%
156	Ramsdell ashy silt loam, protected, drained, 0 to 2 percent slopes	113.0	3.2%
157	Ramsdell-DeVoignes complex, protected, drained, 0 to 2 percent slopes	24.3	0.7%
210	Agatha ashy silt loam, 5 to 35 percent slopes, stony	46.8	1.3%
212	Agatha gravelly ashy silt loam, 35 to 65 percent slopes, stony	62.0	1.8%
233	Lacy-Bobbitt complex, 35 to 65 percent slopes, very stony	18.7	0.5%
250	Dorb cobbly ashy silt loam, warm, 35 to 70 percent slopes, stony	18.2	0.5%
256	Shayhill gravelly ashy silt loam, 35 to 65 percent slopes, stony	16.9	0.5%
320	Reggear ashy silt loam, 3 to 20 percent slopes	7.7	0.2%
322	Reggear, moist-Sly complex, 3 to 25 percent slopes	19.7	0.6%
500	Bussel-Threebear complex, 5 to 30 percent slopes	12.8	0.4%
606	Benewah-Rasser complex, 15 to 35 percent slopes	2.5	0.1%
651	Kingspeak-Shayhill, stony complex, 5 to 40 percent slopes	84.5	2.4%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
778	Cassyhill-Lotuspoint complex, 5 to 35 percent slopes	20.5	0.6%
782	Ardenvoir, dry-Cassyhill complex, 25 to 65 percent slopes	6.8	0.2%
801	Pits, gravel	4.7	0.1%
802	Kingspeak-Urban land complex, 5 to 35 percent slopes	189.3	5.4%
900	Water	72.4	2.1%
902	Ahrs gravelly ashy silt loam, 35 to 75 percent slopes	0.8	0.0%
Subtotals for Soil Survey Area		**983.2**	**28.0%**
Totals for Area of Interest		**3,516.8**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1hn4h	Aquic Udifluvents-Typic Fluvaquents complex, protected, 0 to 4 percent slopes	8.6	0.2%
1hn5y	Miesen ashy silt loam, protected, drained, 0 to 2 percent slopes	136.5	3.9%
1hn6m	Agatha ashy silt loam, 5 to 35 percent slopes, stony	41.0	1.2%
1hn6t	Lacy-Bobbitt complex, 35 to 65 percent slopes, very stony	10.7	0.3%
1hn6v	Dorb cobbly ashy silt loam, warm, 35 to 70 percent slopes, stony	11.8	0.3%
1hn68	Ramsdell ashy silt loam, protected, drained, 0 to 2 percent slopes	180.2	5.1%
1hn78	Reggear ashy silt loam, 3 to 20 percent slopes	10.7	0.3%
1hn87	Bussel-Threebear complex, 5 to 30 percent slopes	34.5	1.0%
1hnl2	Kingspeak-Urban land complex, 5 to 35 percent slopes	206.2	5.9%
2	Agatha cobbly loam, 35 to 65 percent slopes, stony	53.5	1.5%
3	Agatha-Bobbitt complex, 35 to 65 percent slopes, stony	192.5	5.5%
4	Ahrs gravelly ashy silt loam, 35 to 75 percent slopes	2.6	0.1%
5	Ahrs-Pinecreek association, 25 to 75 percent slopes	121.1	3.4%
9	Bellslake silt loam, 0 to 1 percent slopes	296.2	8.4%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
19	Dorb cobbly ashy silt loam, 35 to 65 percent slopes, stony	28.2	0.8%
29	Threebear silt loam, 3 to 20 percent slopes	325.5	9.3%
30	Threebear-Sly complex, 3 to 25 percent slopes	156.9	4.5%
31	Threebear-Sly silt loams, 25 to 40 percent slopes	333.2	9.5%
42	Honeyjones-Ahrs association, very rocky, 35 to 75 percent slopes	11.1	0.3%
58	Lacy-Bobbitt complex, 35 to 65 percent slopes, stony	1.6	0.0%
69	Miesen-Ramsdell silt loams, 0 to 4 percent slopes	157.7	4.5%
80	Ramsdell silt loam, 0 to 2 percent slopes	73.2	2.1%
84	Rock outcrop-Rubble land complex	26.0	0.7%
93	Water	113.9	3.2%
Subtotals for Soil Survey Area		**2,533.3**	**72.0%**
Totals for Area of Interest		**3,516.8**	**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 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.

Benewah County Area, Idaho, Western Part

105—Aquic Udifluvents-Typic Fluvaquents complex, protected, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 1hn4h
Elevation: 2,150 to 2,250 feet
Mean annual precipitation: 26 to 32 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Aquic udifluvents, protected, and similar soils: 45 percent
Typic fluvaquents, protected, and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aquic Udifluvents, Protected

Setting

Landform: Stream terraces, flood plains
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A - 0 to 8 inches: silt loam
Bw - 8 to 22 inches: gravelly silt loam
2C - 22 to 60 inches: extremely cobbly loamy coarse sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat 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 20 to 40 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: F043AY576ID - Warm-Frigid, Udic, Unglaciated, Loamy, High Water Table (western redcedar/moist herb) Western Redcedar / Bride's Bonnet - Wild Ginger
Other vegetative classification: western redcedar/queencup beadlily (CN530)
Hydric soil rating: No

Description of Typic Fluvaquents, Protected

Setting

Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave, linear
Parent material: Mixed alluvium

Typical profile

A - 0 to 9 inches: silt loam
C1 - 9 to 27 inches: silt loam
2C2 - 27 to 60 inches: extremely cobbly fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very 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 4 to 18 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: R043AY512ID - Warm-Frigid Aquic-Udic Loamy Flood Plains (Wet) (DECA/CAREX)
Hydric soil rating: Yes

Minor Components

Devoignes, protected, drained

Percent of map unit: 5 percent
Landform: Depressions, flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Ramsdell, protected

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

143—Miesen ashy silt loam, protected, drained, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1hn5y
Elevation: 2,120 to 2,150 feet
Mean annual precipitation: 26 to 30 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 120 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Miesen, protected, drained, and similar soils: 80 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Miesen, Protected, Drained

Setting

Landform: Flood plains
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Volcanic ash over silty alluvium

Typical profile

A - 0 to 12 inches: ashy silt loam
Bw1 - 12 to 32 inches: silt loam
Bw2 - 32 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat 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 24 to 40 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F043AY584ID - Warm-Frigid, Aquic-Udic, Flood Plains (POBAT/POTR/COSE)
Hydric soil rating: No

Minor Components

Ramsdell, protected, drained

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Bellslake, protected, drained

Percent of map unit: 5 percent
Landform: Depressions on flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

144—Miesen-Ramsdell complex, protected, drained, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 1hn5z
Elevation: 2,120 to 2,150 feet
Mean annual precipitation: 26 to 30 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Miesen, protected, drained, and similar soils: 50 percent
Ramsdell, protected, drained, and similar soils: 35 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Miesen, Protected, Drained

Setting

Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Volcanic ash over silty alluvium

Typical profile

A - 0 to 12 inches: ashy silt loam
Bw1 - 12 to 32 inches: silt loam
Bw2 - 32 to 60 inches: silt loam

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat 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 24 to 40 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F043AY584ID - Warm-Frigid, Aquic-Udic, Flood Plains (POBAT/POTR/COSE)
Hydric soil rating: No

Description of Ramsdell, Protected, Drained

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Volcanic ash over silty alluvium

Typical profile

Ap - 0 to 8 inches: ashy silt loam
Bg - 8 to 35 inches: silt loam
Cg - 35 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very 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 4 to 20 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F043AY584ID - Warm-Frigid, Aquic-Udic, Flood Plains (POBAT/POTR/COSE)
Hydric soil rating: Yes

Minor Components

Bellslake, protected, drained

Percent of map unit: 5 percent
Landform: Depressions on flood plains

Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

145—Bellslake ashy silt loam, protected, drained, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 1hn61
Elevation: 2,120 to 2,140 feet
Mean annual precipitation: 26 to 30 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Bellslake, protected, drained, and similar soils: 80 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bellslake, Protected, Drained

Setting

Landform: Depressions on flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Parent material: Volcanic ash over silty alluvium over herbaceous organic material

Typical profile

Ap - 0 to 5 inches: ashy silt loam
Ag - 5 to 11 inches: ashy silt loam
Bgb1 - 11 to 23 inches: silt loam
Bgb2 - 23 to 32 inches: silt loam
Agb - 32 to 40 inches: silt loam
Oa/Agb - 40 to 47 inches: stratified muck to silt loam
Oa1 - 47 to 55 inches: muck
Oa2 - 55 to 62 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very 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 0 to 12 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 13.4 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F043AY584ID - Warm-Frigid, Aquic-Udic, Flood Plains (POBAT/POTR/COSE)
Hydric soil rating: Yes

Minor Components

Ramsdell, protected, drained

Percent of map unit: 7 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: Yes

Pywell, protected, drained

Percent of map unit: 5 percent
Landform: Flood plains, depressions
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Devoignes, protected, drained

Percent of map unit: 5 percent
Landform: Depressions, flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

150—Pywell muck, protected, partially drained, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2x6t3
Elevation: 2,120 to 2,130 feet
Mean annual precipitation: 28 to 34 inches
Mean annual air temperature: 44 to 46 degrees F
Frost-free period: 105 to 125 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Pywell, protected, partially drained, and similar soils: 80 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pywell, Protected, Partially Drained

Setting

Landform: Depressions, flood plains
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Herbaceous organic material

Typical profile

Oa1 - 0 to 16 inches: muck
Oa2 - 16 to 65 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 7.09 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: RareNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 26.9 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: R043AY511ID - Frigid Aquic Organic Depressions and Seeps (CAREX/SPHAG)
Other vegetative classification: sedge plant associations (meadow series) - wetland (MW)
Hydric soil rating: Yes

Minor Components

Bellslake, protected, partially drained

Percent of map unit: 10 percent
Landform: Depressions, flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave, linear
Other vegetative classification: sedge plant associations (meadow series) - wetland (MW)
Hydric soil rating: Yes

Devoignes, protected, partialy drained, acid

Percent of map unit: 5 percent
Landform: Depressions, flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: beaked sedge h.t. (HP500)
Hydric soil rating: Yes

156—Ramsdell ashy silt loam, protected, drained, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1hn68
Elevation: 2,120 to 2,150 feet
Mean annual precipitation: 26 to 30 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Ramsdell, protected, drained, and similar soils: 80 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramsdell, Protected, Drained

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Volcanic ash over silty alluvium

Typical profile

Ap - 0 to 8 inches: ashy silt loam
Bg - 8 to 35 inches: silt loam
Cg - 35 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very 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 4 to 20 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F043AY584ID - Warm-Frigid, Aquic-Udic, Flood Plains (POBAT/POTR/COSE)
Hydric soil rating: Yes

Minor Components

Bellslake, protected, drained
Percent of map unit: 5 percent
Landform: Depressions on flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Devoignes, protected, drained
Percent of map unit: 3 percent
Landform: Depressions, flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Pywell, protected, drained
Percent of map unit: 2 percent
Landform: Depressions, flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

157—Ramsdell-DeVoignes complex, protected, drained, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: 1hn69
Elevation: 2,120 to 2,150 feet
Mean annual precipitation: 26 to 30 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Prime farmland if drained

Map Unit Composition
Ramsdell, protected, drained, and similar soils: 50 percent
Devoignes, protected, drained, and similar soils: 30 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramsdell, Protected, Drained

Setting
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear

Parent material: Volcanic ash over silty alluvium

Typical profile

Ap - 0 to 8 inches: ashy silt loam
Bg - 8 to 35 inches: silt loam
Cg - 35 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very 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 4 to 20 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F043AY584ID - Warm-Frigid, Aquic-Udic, Flood Plains (POBAT/POTR/COSE)
Hydric soil rating: Yes

Description of Devoignes, Protected, Drained

Setting

Landform: Depressions, flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Stratified herbaceous organic material over mixed alluvium

Typical profile

Ap - 0 to 9 inches: mucky silt loam
Oa/C - 9 to 20 inches: muck
Oa/C - 20 to 24 inches: silt loam
2Cg - 24 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 13.9 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B/D
Ecological site: R043AY511ID - Frigid Aquic Organic Depressions and Seeps (CAREX/SPHAG)

Hydric soil rating: Yes

Minor Components

Bellslake, protected, drained

Percent of map unit: 10 percent
Landform: Depressions on flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Ecological site: R043AY511ID - Frigid Aquic Organic Depressions and Seeps (CAREX/SPHAG)
Hydric soil rating: Yes

Pywell, protected, drained

Percent of map unit: 2 percent
Landform: Depressions, flood plains
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Ecological site: R043AY511ID - Frigid Aquic Organic Depressions and Seeps (CAREX/SPHAG)
Hydric soil rating: Yes

210—Agatha ashy silt loam, 5 to 35 percent slopes, stony

Map Unit Setting

National map unit symbol: 1hn6m
Elevation: 2,150 to 3,000 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 42 to 45 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Agatha, stony surface, and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Agatha, Stony Surface

Setting

Landform: Escarpments, structural benches
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash and loess over colluvium over bedrock derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 7 inches: ashy silt loam
BA - 7 to 11 inches: gravelly ashy silt loam
Bt1 - 11 to 20 inches: very gravelly silt loam
Bt2 - 20 to 32 inches: very gravelly loam
Bt3 - 32 to 38 inches: very cobbly loam
Bt4 - 38 to 43 inches: extremely cobbly clay loam
R - 43 to 53 inches: bedrock

Properties and qualities

Slope: 5 to 35 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
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 supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F043AY551ID - Warm-Frigid, Moist-Xeric, Unglaciated, Loamy, Canyons and Hills, Basalt, (grand fir/warm shrub) Grand fir/ mallow ninebark - common snowberry
Other vegetative classification: grand fir/ninebark (CN506)
Hydric soil rating: No

212—Agatha gravelly ashy silt loam, 35 to 65 percent slopes, stony

Map Unit Setting

National map unit symbol: 1hn6p
Elevation: 2,150 to 3,000 feet
Mean annual precipitation: 28 to 30 inches
Mean annual air temperature: 42 to 45 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Agatha, stony surface, and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Agatha, Stony Surface

Setting

Landform: Canyons, escarpments
Down-slope shape: Linear
Across-slope shape: Concave

Parent material: Volcanic ash and loess over colluvium over bedrock derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 7 inches: gravelly ashy silt loam
BA - 7 to 11 inches: gravelly ashy silt loam
Bt1 - 11 to 20 inches: very gravelly silt loam
Bt2 - 20 to 32 inches: very gravelly loam
Bt3 - 32 to 38 inches: very cobbly loam
Bt4 - 38 to 43 inches: extremely cobbly clay loam
R - 43 to 53 inches: bedrock

Properties and qualities

Slope: 35 to 65 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
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 supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F043AY551ID - Warm-Frigid, Moist-Xeric, Unglaciated, Loamy, Canyons and Hills, Basalt, (grand fir/warm shrub) Grand fir/ mallow ninebark - common snowberry
Other vegetative classification: grand fir/ninebark (CN506)
Hydric soil rating: No

233—Lacy-Bobbitt complex, 35 to 65 percent slopes, very stony

Map Unit Setting

National map unit symbol: 1hn6t
Elevation: 2,120 to 3,100 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 100 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Lacy, very stony surface, and similar soils: 55 percent
Bobbitt, very stony surface, and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lacy, Very Stony Surface

Setting

Landform: Canyons, escarpments
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over colluvium over bedrock derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 2 inches: stony loam
A2 - 2 to 4 inches: stony loam
AB - 4 to 8 inches: very stony loam
Bt1 - 8 to 16 inches: very stony loam
Bt2 - 16 to 19 inches: extremely stony clay loam
R - 19 to 29 inches: bedrock

Properties and qualities

Slope: 35 to 65 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
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 supply, 0 to 60 inches: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F043AY537ID - Mesic, Xeric, Unglaciated Hills and Canyons, Low Available Water (Ponderosa pine/Shrub) Ponderosa pine/common snowberry-ninebark
Other vegetative classification: ponderosa pine/common snowberry (CN170)
Hydric soil rating: No

Description of Bobbitt, Very Stony Surface

Setting

Landform: Canyons, escarpments
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash and loess over colluvium over residuum weathered from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: stony ashy loam
AB - 4 to 11 inches: stony ashy loam
Bt1 - 11 to 15 inches: very cobbly loam
Bt2 - 15 to 27 inches: very cobbly loam
Bt3 - 27 to 33 inches: extremely stony loam

R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 35 to 65 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
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 supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F043AY545ID - Warm-Frigid, Xeric, Unglaciated, Loamy, Basalt, Hills and Canyons (Douglas-fir/dry shrub) Douglas fir / mallow ninebark - common snowberry
Other vegetative classification: Douglas-fir/ninebark (CN260)
Hydric soil rating: No

250—Dorb cobbly ashy silt loam, warm, 35 to 70 percent slopes, stony

Map Unit Setting

National map unit symbol: 1hn6v
Elevation: 2,200 to 3,300 feet
Mean annual precipitation: 28 to 34 inches
Mean annual air temperature: 42 to 45 degrees F
Frost-free period: 85 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Dorb, warm, stony surface, and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dorb, Warm, Stony Surface

Setting

Landform: Canyons, escarpments
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash over colluvium over bedrock derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 3 inches: cobbly ashy silt loam
Bw1 - 3 to 20 inches: very cobbly ashy loam

2Bw2 - 20 to 32 inches: very cobbly loam
2BC - 32 to 48 inches: extremely cobbly loam
2R - 48 to 58 inches: bedrock

Properties and qualities

Slope: 35 to 70 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
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 supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: B
Ecological site: F043AY572ID - Warm-Frigid, Udic, Unglaciated, Loamy, Hills and Canyons, Basalt, Ashy surface (western redcedar) Western Redcedar / Bride's Bonnet - Wild Ginger
Other vegetative classification: western redcedar/queencup beadlily (CN530)
Hydric soil rating: No

256—Shayhill gravelly ashy silt loam, 35 to 65 percent slopes, stony

Map Unit Setting

National map unit symbol: 1hn6y
Elevation: 2,400 to 3,100 feet
Mean annual precipitation: 28 to 32 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Shayhill, stony surface, and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shayhill, Stony Surface

Setting

Landform: Canyons, escarpments
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash and loess over colluvium derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 3 inches: gravelly ashy silt loam

Bw1 - 3 to 10 inches: gravelly ashy silt loam
Bw2 - 10 to 19 inches: cobbly silt loam
Bw3 - 19 to 28 inches: very stony silt loam
Bt - 28 to 48 inches: extremely cobbly loam
BCt - 48 to 55 inches: extremely stony loam
C - 55 to 64 inches: extremely cobbly loam

Properties and qualities

Slope: 35 to 65 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F043AY573ID - Warm-Frigid, Udic, Unglaciated, Loamy, Hills and Canyons, Basalt, Mixed ash surface Western Redcedar / Bride's Bonnet - Wild Ginger
Other vegetative classification: western redcedar/queencup beadlily (CN530)
Hydric soil rating: No

320—Reggear ashy silt loam, 3 to 20 percent slopes

Map Unit Setting

National map unit symbol: 1hn78
Elevation: 2,530 to 3,200 feet
Mean annual precipitation: 30 to 33 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Farmland of statewide importance, if drained

Map Unit Composition

Reggear and similar soils: 80 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Reggear

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Volcanic ash over loess

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 5 inches: ashy silt loam
BE - 5 to 13 inches: ashy silt loam
Bt/E - 13 to 24 inches: silt loam
E/Btx - 24 to 28 inches: silt loam
Btxb - 28 to 60 inches: silty clay loam

Properties and qualities

Slope: 3 to 20 percent
Depth to restrictive feature: 20 to 40 inches to fragipan
Drainage class: Moderately 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: About 18 to 22 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C/D
Ecological site: F043AY561ID - Warm-Frigid, Dry-Udic, Unglaciated, Loamy, Hills, Fragipan (grand fir/moist herb) Grand Fir/Bride's Bonnet
Other vegetative classification: grand fir/queencup beadlily (CN520)
Hydric soil rating: No

Minor Components

Porrett

Percent of map unit: 1 percent
Landform: Drainageways
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R009XY018ID - MEADOW
Hydric soil rating: Yes

322—Reggear, moist-Sly complex, 3 to 25 percent slopes

Map Unit Setting

National map unit symbol: 1hn7b
Elevation: 2,700 to 3,100 feet
Mean annual precipitation: 30 to 33 inches
Mean annual air temperature: 42 to 45 degrees F
Frost-free period: 90 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Reggear, moist, and similar soils: 50 percent
Sly and similar soils: 30 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Reggear, Moist

Setting

Landform: Structural benches, hillslopes
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Volcanic ash over loess

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: ashy silt loam
BE - 5 to 9 inches: ashy silt loam
E - 9 to 14 inches: silt loam
E/Bt - 14 to 22 inches: silt loam
Btx/E - 22 to 39 inches: silt loam
Btxb - 39 to 60 inches: silt loam

Properties and qualities

Slope: 3 to 25 percent
Depth to restrictive feature: 20 to 40 inches to fragipan
Drainage class: Moderately 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: About 18 to 22 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C/D
Ecological site: F043AY569ID - Warm-Frigid, Udic, Unglaciated, Loamy, Hills, Fragipan, Mixed ash surface (western redcedar) Western Redcedar / Bride's Bonnet - Wild Ginger
Other vegetative classification: western redcedar/queencup beadlily (CN530)
Hydric soil rating: No

Description of Sly

Setting

Landform: Structural benches, hillslopes
Landform position (two-dimensional): Backslope, footslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave, convex
Parent material: Volcanic ash over loess over colluvium derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 5 inches: ashy silt loam
Bw - 5 to 9 inches: ashy silt loam
Bt1 - 9 to 29 inches: silt loam
Bt2 - 29 to 60 inches: gravelly silt loam

Properties and qualities

Slope: 10 to 25 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: High (about 11.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F043AY573ID - Warm-Frigid, Udic, Unglaciated, Loamy, Hills and Canyons, Basalt, Mixed ash surface Western Redcedar / Bride's Bonnet - Wild Ginger
Other vegetative classification: western redcedar/queencup beadlily (CN530)
Hydric soil rating: No

Minor Components

Porrett

Percent of map unit: 2 percent
Landform: Drainageways
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R009XY018ID - MEADOW
Hydric soil rating: Yes

500—Bussel-Threebear complex, 5 to 30 percent slopes

Map Unit Setting

National map unit symbol: 1hn87
Elevation: 2,800 to 3,500 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Bussel and similar soils: 50 percent
Threebear and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bussel

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Volcanic ash over alluvium and/or colluvium derived from metasedimentary rock

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 3 inches: ashy silt loam
Bw1 - 3 to 8 inches: ashy silt loam
Bw2 - 8 to 18 inches: ashy silt loam
2BEt - 18 to 22 inches: silt loam
2E/Bt - 22 to 30 inches: silt loam
2Bt/E - 30 to 44 inches: gravelly loam
2BCt - 44 to 60 inches: very gravelly loam

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately 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: About 14 to 22 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B/D
Ecological site: F043AY559ID - Frigid, Udic, Unglaciated, Loamy, Hills, Mountains and Valleys, Ashy surface (western hemlock/moist herb) Western hemlock/ Brides bonnet-wild ginger
Other vegetative classification: western hemlock/queencup beadlily (CN570)
Hydric soil rating: No

Description of Threebear

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Concave

Parent material: Volcanic ash over loess

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
Oe - 2 to 3 inches: moderately decomposed plant material
A - 3 to 4 inches: medial silt loam
Bw1 - 4 to 9 inches: medial silt loam
Bw2 - 9 to 20 inches: medial silt loam
2E/Bt - 20 to 24 inches: silt loam
2Btx/E - 24 to 34 inches: silt loam
2Btxb1 - 34 to 55 inches: silt loam
2Btxb2 - 55 to 60 inches: silty clay loam

Properties and qualities

Slope: 5 to 25 percent
Depth to restrictive feature: 23 to 40 inches to fragipan
Drainage class: Moderately 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: About 12 to 20 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C/D
Ecological site: F043AY556ID - Frigid, Udic, Unglaciated, Loamy, Hills, Fragipan (western hemlock/moist herb) Western hemlock/Brides bonnet-wild ginger
Other vegetative classification: western hemlock/queencup beadlily (CN570)
Hydric soil rating: No

606—Benewah-Rasser complex, 15 to 35 percent slopes

Map Unit Setting

National map unit symbol: 1hnc6
Elevation: 2,800 to 3,300 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 42 to 46 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Benewah and similar soils: 45 percent
Rasser and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Benewah

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Volcanic ash and loess over alluvium

Typical profile

Ap - 0 to 6 inches: ashy silt loam
BE - 6 to 15 inches: ashy silt loam
E - 15 to 18 inches: silt loam
Bt1 - 18 to 23 inches: silty clay loam
Bt2 - 23 to 34 inches: silty clay loam
Bt3 - 34 to 60 inches: silty clay loam

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately 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: About 15 to 20 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B/D
Ecological site: F043AY553ID - Warm-Frigid, Moist-Xeric, Unglaciated, Loamy, Hills and Mountains, Mixed Ash Surface, (grand fir/warm shrub) Grand fir/mallow ninebark- common snowberry
Other vegetative classification: grand fir/ninebark (CN506)
Hydric soil rating: No

Description of Rasser

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Volcanic ash and loess over alluvium and/or colluvium derived from metasedimentary rock

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: ashy silt loam
BA - 4 to 11 inches: ashy silt loam
Bt1 - 11 to 20 inches: very cobbly silt loam

Bt2 - 20 to 41 inches: very gravelly silty clay loam
Bt3 - 41 to 60 inches: very cobbly silty clay loam

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: F043AY553ID - Warm-Frigid, Moist-Xeric, Unglaciated, Loamy, Hills and Mountains, Mixed Ash Surface, (grand fir/warm shrub) Grand fir/mallow ninebark- common snowberry
Other vegetative classification: grand fir/ninebark (CN506)
Hydric soil rating: No

651—Kingspeak-Shayhill, stony complex, 5 to 40 percent slopes

Map Unit Setting

National map unit symbol: 1hndp
Elevation: 2,200 to 2,950 feet
Mean annual precipitation: 28 to 32 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Kingspeak and similar soils: 55 percent
Shayhill, stony surface, and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kingspeak

Setting

Landform: Structural benches
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Volcanic ash and loess over alluvium and/or lacustrine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 3 inches: ashy silt loam

Bw - 3 to 10 inches: ashy silt loam
E/Bt - 10 to 30 inches: silt loam
Bt/E - 30 to 60 inches: silt loam

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F043AY575ID - Warm-Frigid, Udic, Unglaciated, Loamy, Hills, Mountains and Valleys, Mixed ash surface (western redcedar/moist herb) Western Redcedar / Bride's Bonnet - Wild Ginger
Other vegetative classification: western redcedar/queencup beadlily (CN530)
Hydric soil rating: No

Description of Shayhill, Stony Surface

Setting

Landform: Escarpments, structural benches
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Volcanic ash and loess over colluvium derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 3 inches: ashy silt loam
Bw1 - 3 to 10 inches: ashy silt loam
Bw2 - 10 to 19 inches: cobbly silt loam
Bw3 - 19 to 28 inches: very stony silt loam
Bt - 28 to 48 inches: extremely cobbly loam
BCt - 48 to 55 inches: extremely stony loam
C - 55 to 64 inches: extremely cobbly loam

Properties and qualities

Slope: 15 to 40 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: F043AY573ID - Warm-Frigid, Udic, Unglaciated, Loamy, Hills and Canyons, Basalt, Mixed ash surface Western Redcedar / Bride's Bonnet - Wild Ginger
Other vegetative classification: western redcedar/queencup beadlily (CN530)
Hydric soil rating: No

778—Cassyhill-Lotuspoint complex, 5 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2v72v
Elevation: 2,120 to 4,840 feet
Mean annual precipitation: 21 to 37 inches
Mean annual air temperature: 46 to 46 degrees F
Frost-free period: 105 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Cassyhill and similar soils: 50 percent
Lotuspoint and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cassyhill

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash and loess over colluvium over bedrock derived from metasedimentary rock

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 7 inches: very gravelly ashy silt loam
A2 - 7 to 11 inches: very gravelly ashy loam
C - 11 to 14 inches: extremely channery loam
R - 14 to 59 inches: bedrock

Properties and qualities

Slope: 5 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
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 supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: F043AY537ID - Mesic, Xeric, Unglaciated Hills and Canyons, Low Available Water (Ponderosa pine/Shrub) Ponderosa pine/common snowberry-ninebark
Other vegetative classification: ponderosa pine/common snowberry (CN170)
Hydric soil rating: No

Description of Lotuspoint

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash over residuum weathered from quartzite

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: gravelly ashy silt loam
AB - 4 to 10 inches: very gravelly ashy silt loam
2Bw1 - 10 to 16 inches: extremely cobbly silt loam
2Bw2 - 16 to 26 inches: extremely cobbly silt loam
2R - 26 to 59 inches: bedrock

Properties and qualities

Slope: 5 to 35 percent
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
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 supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F043AY543ID - Warm-Frigid, Xeric, Unglaciated, Loamy, Metasedimentary, Hills and Mountains, Ashy surface (Douglas-fir/dry shrub) Douglas fir / mallow ninebark - common snowberry
Other vegetative classification: Douglas-fir/ninebark (CN260)
Hydric soil rating: No

782—Ardenvoir, dry-Cassyhill complex, 25 to 65 percent slopes

Map Unit Setting

National map unit symbol: 2v72p
Elevation: 2,210 to 3,590 feet
Mean annual precipitation: 23 to 41 inches
Mean annual air temperature: 45 to 47 degrees F
Frost-free period: 95 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Ardenvoir, dry, and similar soils: 45 percent
Cassyhill and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ardenvoir, Dry

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Volcanic ash and loess over residuum weathered from metasedimentary rock

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 3 inches: gravelly ashy silt loam
AB - 3 to 11 inches: gravelly ashy silt loam
Bw - 11 to 18 inches: very gravelly loam
C1 - 18 to 32 inches: extremely gravelly loam
C2 - 32 to 41 inches: extremely cobbly loam
C3 - 41 to 60 inches: extremely stony loam
Cr - 60 to 79 inches: bedrock

Properties and qualities

Slope: 25 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification; 39 to 79 inches to paralithic bedrock
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 supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F043AY544ID - Warm-Frigid, Xeric, Unglaciated, Loamy, Metasedimentary, Hills and Mountains, Mixed ash surface (Douglas-fir/dry shrub) Douglas fir / mallow ninebark - common snowberry
Other vegetative classification: Douglas-fir/ninebark (CN260)
Hydric soil rating: No

Description of Cassyhill

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash and/or loess over residuum weathered from metasedimentary rock

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 7 inches: very gravelly ashy silt loam
A2 - 7 to 11 inches: very gravelly ashy loam
C - 11 to 14 inches: extremely channery loam
R - 14 to 59 inches: bedrock

Properties and qualities

Slope: 25 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
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 supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Ecological site: F043AY537ID - Mesic, Xeric, Unglaciated Hills and Canyons, Low Available Water (Ponderosa pine/Shrub) Ponderosa pine/common snowberry-ninebark
Other vegetative classification: ponderosa pine/common snowberry (CN170)
Hydric soil rating: No

801—Pits, gravel

Map Unit Composition

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

Description of Pits, Gravel

Typical profile

C - 0 to 60 inches: gravel

Interpretive groups

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

802—Kingspeak-Urban land complex, 5 to 35 percent slopes

Map Unit Setting

National map unit symbol: 1hnl2
Elevation: 2,130 to 2,410 feet
Mean annual precipitation: 28 to 31 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Kingspeak and similar soils: 50 percent
Urban land: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kingspeak

Setting

Landform: Structural benches
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Volcanic ash and loess over alluvium and/or lacustrine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 3 inches: ashy silt loam
Bw - 3 to 10 inches: ashy silt loam
E/Bt - 10 to 30 inches: silt loam
Bt/E - 30 to 60 inches: silt loam

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F043AY575ID - Warm-Frigid, Udic, Unglaciated, Loamy, Hills, Mountains and Valleys, Mixed ash surface (western redcedar/moist herb) Western Redcedar / Bride's Bonnet - Wild Ginger
Other vegetative classification: western redcedar/queencup beadlily (CN530)
Hydric soil rating: No

Description of Urban Land

Interpretive groups

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

900—Water

Map Unit Composition

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

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: Unranked

902—Ahrs gravelly ashy silt loam, 35 to 75 percent slopes

Map Unit Setting

National map unit symbol: 1hn4j
Elevation: 2,820 to 4,850 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 42 to 46 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Ahrs and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ahrs

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Volcanic ash and loess over colluvium derived from quartzite

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 6 inches: gravelly ashy silt loam
Bw1 - 6 to 14 inches: very gravelly ashy silt loam
Bw2 - 14 to 23 inches: very gravelly ashy silt loam
2BC - 23 to 30 inches: very cobbly loam
2C1 - 30 to 41 inches: extremely cobbly loam
2C2 - 41 to 51 inches: extremely cobbly silt loam
2C3 - 51 to 60 inches: extremely cobbly loam

Properties and qualities

Slope: 35 to 75 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F043AY563ID - Warm-Frigid, Dry-Udic, Unglaciated, Loamy, Mountains, Metasedimentary, Ashy surface (grand fir) (grand fir) Grand Fir / Bride's Bonnet
Other vegetative classification: grand fir/queencup beadlily (CN520)
Hydric soil rating: No

St. Joe Area, Idaho, Parts of Benewah and Shoshone Counties

1hn4h—Aquic Udifluvents-Typic Fluvaquents complex, protected, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 1hn4h
Elevation: 2,150 to 2,250 feet
Mean annual precipitation: 26 to 32 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Aquic udifluvents, protected, and similar soils: 45 percent
Typic fluvaquents, protected, and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aquic Udifluvents, Protected

Setting

Landform: Stream terraces, flood plains
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A - 0 to 8 inches: silt loam
Bw - 8 to 22 inches: gravelly silt loam
2C - 22 to 60 inches: extremely cobbly loamy coarse sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat 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 20 to 40 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: F043AY576ID - Warm-Frigid, Udic, Unglaciated, Loamy, High Water Table (western redcedar/moist herb) Western Redcedar / Bride's Bonnet - Wild Ginger
Other vegetative classification: western redcedar/queencup beadlily (CN530)
Hydric soil rating: No

Description of Typic Fluvaquents, Protected

Setting

Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave, linear
Parent material: Mixed alluvium

Typical profile

A - 0 to 9 inches: silt loam
C1 - 9 to 27 inches: silt loam
2C2 - 27 to 60 inches: extremely cobbly fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very 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 4 to 18 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: R043AY512ID - Warm-Frigid Aquic-Udic Loamy Flood Plains (Wet) (DECA/CAREX)
Hydric soil rating: Yes

Minor Components

Devoignes, protected, drained

Percent of map unit: 5 percent
Landform: Depressions, flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Ramsdell, protected

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

1hn5y—Miesen ashy silt loam, protected, drained, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1hn5y
Elevation: 2,120 to 2,150 feet
Mean annual precipitation: 26 to 30 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 120 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Miesen, protected, drained, and similar soils: 80 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Miesen, Protected, Drained

Setting

Landform: Flood plains
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Volcanic ash over silty alluvium

Typical profile

A - 0 to 12 inches: ashy silt loam
Bw1 - 12 to 32 inches: silt loam
Bw2 - 32 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat 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 24 to 40 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F043AY584ID - Warm-Frigid, Aquic-Udic, Flood Plains (POBAT/POTR/COSE)
Hydric soil rating: No

Minor Components

Ramsdell, protected, drained
Percent of map unit: 10 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Bellslake, protected, drained
Percent of map unit: 5 percent
Landform: Depressions on flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

1hn6m—Agatha ashy silt loam, 5 to 35 percent slopes, stony

Map Unit Setting
National map unit symbol: 1hn6m
Elevation: 2,150 to 3,000 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 42 to 45 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition
Agatha, stony surface, and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Agatha, Stony Surface

Setting
Landform: Escarpments, structural benches
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash and loess over colluvium over bedrock derived from basalt

Typical profile
Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 7 inches: ashy silt loam
BA - 7 to 11 inches: gravelly ashy silt loam
Bt1 - 11 to 20 inches: very gravelly silt loam
Bt2 - 20 to 32 inches: very gravelly loam

Bt3 - 32 to 38 inches: very cobbly loam
Bt4 - 38 to 43 inches: extremely cobbly clay loam
R - 43 to 53 inches: bedrock

Properties and qualities

Slope: 5 to 35 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
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 supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F043AY551ID - Warm-Frigid, Moist-Xeric, Unglaciated, Loamy, Canyons and Hills, Basalt, (grand fir/warm shrub) Grand fir/ mallow ninebark - common snowberry
Other vegetative classification: grand fir/ninebark (CN506)
Hydric soil rating: No

1hn6t—Lacy-Bobbitt complex, 35 to 65 percent slopes, very stony

Map Unit Setting

National map unit symbol: 1hn6t
Elevation: 2,120 to 3,100 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 47 to 50 degrees F
Frost-free period: 100 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Lacy, very stony surface, and similar soils: 55 percent
Bobbitt, very stony surface, and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lacy, Very Stony Surface

Setting

Landform: Canyons, escarpments
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over colluvium over bedrock derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 2 inches: stony loam

A2 - 2 to 4 inches: stony loam
AB - 4 to 8 inches: very stony loam
Bt1 - 8 to 16 inches: very stony loam
Bt2 - 16 to 19 inches: extremely stony clay loam
R - 19 to 29 inches: bedrock

Properties and qualities

Slope: 35 to 65 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
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 supply, 0 to 60 inches: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F043AY537ID - Mesic, Xeric, Unglaciated Hills and Canyons, Low Available Water (Ponderosa pine/Shrub) Ponderosa pine/common snowberry-ninebark
Other vegetative classification: ponderosa pine/common snowberry (CN170)
Hydric soil rating: No

Description of Bobbitt, Very Stony Surface

Setting

Landform: Canyons, escarpments
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash and loess over colluvium over residuum weathered from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: stony ashy loam
AB - 4 to 11 inches: stony ashy loam
Bt1 - 11 to 15 inches: very cobbly loam
Bt2 - 15 to 27 inches: very cobbly loam
Bt3 - 27 to 33 inches: extremely stony loam
R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 35 to 65 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
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 supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F043AY545ID - Warm-Frigid, Xeric, Unglaciated, Loamy, Basalt, Hills and Canyons (Douglas-fir/dry shrub) Douglas fir / mallow ninebark - common snowberry
Other vegetative classification: Douglas-fir/ninebark (CN260)
Hydric soil rating: No

1hn6v—Dorb cobbly ashy silt loam, warm, 35 to 70 percent slopes, stony

Map Unit Setting

National map unit symbol: 1hn6v
Elevation: 2,200 to 3,300 feet
Mean annual precipitation: 28 to 34 inches
Mean annual air temperature: 42 to 45 degrees F
Frost-free period: 85 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Dorb, warm, stony surface, and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dorb, Warm, Stony Surface

Setting

Landform: Canyons, escarpments
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash over colluvium over bedrock derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 3 inches: cobbly ashy silt loam
Bw1 - 3 to 20 inches: very cobbly ashy loam
2Bw2 - 20 to 32 inches: very cobbly loam
2BC - 32 to 48 inches: extremely cobbly loam
2R - 48 to 58 inches: bedrock

Properties and qualities

Slope: 35 to 70 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
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 supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: B
Ecological site: F043AY572ID - Warm-Frigid, Udic, Unglaciated, Loamy, Hills and Canyons, Basalt, Ashy surface (western redcedar) Western Redcedar / Bride's Bonnet - Wild Ginger
Other vegetative classification: western redcedar/queencup beadlily (CN530)
Hydric soil rating: No

1hn68—Ramsdell ashy silt loam, protected, drained, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1hn68
Elevation: 2,120 to 2,150 feet
Mean annual precipitation: 26 to 30 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Ramsdell, protected, drained, and similar soils: 80 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramsdell, Protected, Drained

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Volcanic ash over silty alluvium

Typical profile

Ap - 0 to 8 inches: ashy silt loam
Bg - 8 to 35 inches: silt loam
Cg - 35 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very 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 4 to 20 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F043AY584ID - Warm-Frigid, Aquic-Udic, Flood Plains (POBAT/POTR/COSE)
Hydric soil rating: Yes

Minor Components

Bellslake, protected, drained

Percent of map unit: 5 percent
Landform: Depressions on flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Devoignes, protected, drained

Percent of map unit: 3 percent
Landform: Depressions, flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

Pywell, protected, drained

Percent of map unit: 2 percent
Landform: Depressions, flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

1hn78—Reggear ashy silt loam, 3 to 20 percent slopes

Map Unit Setting

National map unit symbol: 1hn78
Elevation: 2,530 to 3,200 feet
Mean annual precipitation: 30 to 33 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Reggear and similar soils: 80 percent

Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Reggear

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Volcanic ash over loess

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 5 inches: ashy silt loam
BE - 5 to 13 inches: ashy silt loam
Bt/E - 13 to 24 inches: silt loam
E/Btx - 24 to 28 inches: silt loam
Btxb - 28 to 60 inches: silty clay loam

Properties and qualities

Slope: 3 to 20 percent
Depth to restrictive feature: 20 to 40 inches to fragipan
Drainage class: Moderately 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: About 18 to 22 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C/D
Ecological site: F043AY561ID - Warm-Frigid, Dry-Udic, Unglaciated, Loamy, Hills, Fragipan (grand fir/moist herb) Grand Fir/Bride's Bonnet
Other vegetative classification: grand fir/queencup beadlily (CN520)
Hydric soil rating: No

Minor Components

Porrett

Percent of map unit: 1 percent
Landform: Drainageways
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R009XY018ID - MEADOW
Hydric soil rating: Yes

1hn87—Bussel-Threebear complex, 5 to 30 percent slopes

Map Unit Setting

National map unit symbol: 1hn87
Elevation: 2,800 to 3,500 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Bussel and similar soils: 50 percent
Threebear and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bussel

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Volcanic ash over alluvium and/or colluvium derived from metasedimentary rock

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 3 inches: ashy silt loam
Bw1 - 3 to 8 inches: ashy silt loam
Bw2 - 8 to 18 inches: ashy silt loam
2BEt - 18 to 22 inches: silt loam
2E/Bt - 22 to 30 inches: silt loam
2Bt/E - 30 to 44 inches: gravelly loam
2BCt - 44 to 60 inches: very gravelly loam

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately 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: About 14 to 22 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B/D
Ecological site: F043AY559ID - Frigid, Udic, Unglaciated, Loamy, Hills, Mountains and Valleys, Ashy surface (western hemlock/moist herb) Western hemlock/ Brides bonnet-wild ginger
Other vegetative classification: western hemlock/queencup beadlily (CN570)
Hydric soil rating: No

Description of Threebear

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Volcanic ash over loess

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
Oe - 2 to 3 inches: moderately decomposed plant material
A - 3 to 4 inches: medial silt loam
Bw1 - 4 to 9 inches: medial silt loam
Bw2 - 9 to 20 inches: medial silt loam
2E/Bt - 20 to 24 inches: silt loam
2Btx/E - 24 to 34 inches: silt loam
2Btxb1 - 34 to 55 inches: silt loam
2Btxb2 - 55 to 60 inches: silty clay loam

Properties and qualities

Slope: 5 to 25 percent
Depth to restrictive feature: 23 to 40 inches to fragipan
Drainage class: Moderately 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: About 12 to 20 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C/D
Ecological site: F043AY556ID - Frigid, Udic, Unglaciated, Loamy, Hills, Fragipan (western hemlock/moist herb) Western hemlock/Brides bonnet-wild ginger
Other vegetative classification: western hemlock/queencup beadlily (CN570)
Hydric soil rating: No

1hnl2—Kingspeak-Urban land complex, 5 to 35 percent slopes

Map Unit Setting

National map unit symbol: 1hnl2
Elevation: 2,130 to 2,410 feet
Mean annual precipitation: 28 to 31 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Kingspeak and similar soils: 50 percent
Urban land: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kingspeak

Setting

Landform: Structural benches
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Volcanic ash and loess over alluvium and/or lacustrine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 3 inches: ashy silt loam
Bw - 3 to 10 inches: ashy silt loam
E/Bt - 10 to 30 inches: silt loam
Bt/E - 30 to 60 inches: silt loam

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F043AY575ID - Warm-Frigid, Udic, Unglaciated, Loamy, Hills, Mountains and Valleys, Mixed ash surface (western redcedar/moist herb) Western Redcedar / Bride's Bonnet - Wild Ginger
Other vegetative classification: western redcedar/queencup beadlily (CN530)

Hydric soil rating: No

Description of Urban Land

Interpretive groups

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

2—Agatha cobbly loam, 35 to 65 percent slopes, stony

Map Unit Setting

National map unit symbol: 54nd
Elevation: 2,160 to 3,200 feet
Mean annual precipitation: 28 to 33 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Agatha, stony surface, and similar soils: 75 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Agatha, Stony Surface

Setting

Landform: Escarpments, canyons
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over colluvium over bedrock derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 7 inches: cobbly loam
Bt1 - 7 to 29 inches: very cobbly loam
Bt2 - 29 to 50 inches: extremely stony clay loam
R - 50 to 60 inches: bedrock

Properties and qualities

Slope: 35 to 65 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: 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 supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F043AY551ID - Warm-Frigid, Moist-Xeric, Unglaciated, Loamy, Canyons and Hills, Basalt, (grand fir/warm shrub) Grand fir/ mallow ninebark - common snowberry
Other vegetative classification: grand fir/ninebark (CN506)
Hydric soil rating: No

3—Agatha-Bobbitt complex, 35 to 65 percent slopes, stony

Map Unit Setting

National map unit symbol: 54nr
Elevation: 2,150 to 3,200 feet
Mean annual precipitation: 28 to 33 inches
Mean annual air temperature: 43 to 50 degrees F
Frost-free period: 90 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Agatha, stony surface, and similar soils: 45 percent
Bobbitt, stony surface, and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Agatha, Stony Surface

Setting

Landform: Escarpments, canyons
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over colluvium over bedrock derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 7 inches: cobbly loam
Bt1 - 7 to 29 inches: very cobbly loam
Bt2 - 29 to 50 inches: extremely stony clay loam
R - 50 to 60 inches: bedrock

Properties and qualities

Slope: 35 to 65 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: 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 supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F043AY551ID - Warm-Frigid, Moist-Xeric, Unglaciated, Loamy, Canyons and Hills, Basalt, (grand fir/warm shrub) Grand fir/ mallow ninebark - common snowberry
Other vegetative classification: grand fir/ninebark (CN506)
Hydric soil rating: No

Description of Bobbitt, Stony Surface

Setting

Landform: Escarpments, canyons
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash and/or loess over colluvium over bedrock derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 14 inches: stony loam
Bt - 14 to 34 inches: very cobbly clay loam
R - 34 to 44 inches: bedrock

Properties and qualities

Slope: 35 to 65 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: 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 supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F043AY545ID - Warm-Frigid, Xeric, Unglaciated, Loamy, Basalt, Hills and Canyons (Douglas-fir/dry shrub) Douglas fir / mallow ninebark - common snowberry
Other vegetative classification: Douglas-fir/common snowberry (CN310)
Hydric soil rating: No

4—Ahrs gravelly ashy silt loam, 35 to 75 percent slopes

Map Unit Setting

National map unit symbol: 1hn4j
Elevation: 2,820 to 4,850 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 42 to 46 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Ahrs and similar soils: 80 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ahrs

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Volcanic ash and loess over colluvium derived from quartzite

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 6 inches: gravelly ashy silt loam
Bw1 - 6 to 14 inches: very gravelly ashy silt loam
Bw2 - 14 to 23 inches: very gravelly ashy silt loam
2BC - 23 to 30 inches: very cobbly loam
2C1 - 30 to 41 inches: extremely cobbly loam
2C2 - 41 to 51 inches: extremely cobbly silt loam
2C3 - 51 to 60 inches: extremely cobbly loam

Properties and qualities

Slope: 35 to 75 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B

Ecological site: F043AY563ID - Warm-Frigid, Dry-Udic, Unglaciated, Loamy, Mountains, Metasedimentary, Ashy surface (grand fir) (grand fir) Grand Fir / Bride's Bonnet
Other vegetative classification: grand fir/queencup beadlily (CN520)
Hydric soil rating: No

5—Ahrs-Pinecreek association, 25 to 75 percent slopes

Map Unit Setting

National map unit symbol: 2v71h
Elevation: 2,440 to 4,610 feet
Mean annual precipitation: 27 to 57 inches
Mean annual air temperature: 42 to 46 degrees F
Frost-free period: 90 to 115 days
Farmland classification: Not prime farmland

Map Unit Composition

Ahrs and similar soils: 50 percent
Pinecreek and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ahrs

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Volcanic ash and loess over colluvium derived from quartzite

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 6 inches: gravelly ashy silt loam
Bw1 - 6 to 14 inches: very gravelly ashy silt loam
Bw2 - 14 to 23 inches: very gravelly ashy silt loam
2BC - 23 to 30 inches: very cobbly loam
2C1 - 30 to 41 inches: extremely cobbly loam
2C2 - 41 to 51 inches: extremely cobbly silt loam
2C3 - 51 to 59 inches: extremely cobbly loam

Properties and qualities

Slope: 25 to 75 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F043AY563ID - Warm-Frigid, Dry-Udic, Unglaciated, Loamy, Mountains, Metasedimentary, Ashy surface (grand fir) (grand fir) Grand Fir / Bride's Bonnet
Other vegetative classification: grand fir/queencup beadlily (CN520)
Hydric soil rating: No

Description of Pinecreek

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Volcanic ash over colluvium derived from quartzite

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A1 - 2 to 6 inches: gravelly ashy silt loam
A2 - 6 to 12 inches: gravelly ashy silt loam
Bw1 - 12 to 19 inches: gravelly ashy silt loam
Bw2 - 19 to 24 inches: gravelly ashy silt loam
2Bw3 - 24 to 30 inches: very gravelly loam
2C - 30 to 70 inches: extremely cobbly loam

Properties and qualities

Slope: 25 to 75 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F043AY543ID - Warm-Frigid, Xeric, Unglaciated, Loamy, Metasedimentary, Hills and Mountains, Ashy surface (Douglas-fir/dry shrub) Douglas fir / mallow ninebark - common snowberry
Other vegetative classification: Douglas-fir/ninebark (CN260)
Hydric soil rating: No

9—Bellslake silt loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 54qw
Elevation: 2,120 to 3,000 feet
Mean annual precipitation: 28 to 45 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 80 to 120 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Bellslake and similar soils: 85 percent
Minor components: 11 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bellslake

Setting

Landform: Depressions on flood plains
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Alluvium over herbaceous organic material

Typical profile

Ag - 0 to 9 inches: ashy silt loam
Agb - 9 to 38 inches: silt loam
Oa - 38 to 42 inches: muck
Oe - 42 to 60 inches: mucky peat

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very 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 0 inches
Frequency of flooding: NoneFrequent
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 13.3 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F043AY584ID - Warm-Frigid, Aquic-Udic, Flood Plains (POBAT/POTR/COSE)
Hydric soil rating: Yes

Minor Components

Mazie

Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Ramsdell

Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Aquandic humaquepts

Percent of map unit: 3 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

19—Dorb cobbly ashy silt loam, 35 to 65 percent slopes, stony

Map Unit Setting

National map unit symbol: 54n4
Elevation: 2,200 to 3,200 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Dorb, stony surface, and similar soils: 75 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dorb, Stony Surface

Setting

Landform: Escarpments, canyons
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash over colluvium over bedrock derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material

A - 2 to 5 inches: cobbly ashy silt loam
Bw1 - 5 to 15 inches: cobbly silt loam
Bw2 - 15 to 36 inches: extremely stony silt loam
C - 36 to 52 inches: extremely stony loam
R - 52 to 62 inches: bedrock

Properties and qualities

Slope: 35 to 65 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
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 supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F043AY559ID - Frigid, Udic, Unglaciated, Loamy, Hills, Mountains and Valleys, Ashy surface (western hemlock/moist herb) Western hemlock/ Brides bonnet-wild ginger
Other vegetative classification: western hemlock/queencup beadlily (CN570)
Hydric soil rating: No

29—Threebear silt loam, 3 to 20 percent slopes

Map Unit Setting

National map unit symbol: 54nq
Elevation: 2,140 to 3,800 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 70 to 110 days
Farmland classification: Farmland of statewide importance, if drained

Map Unit Composition

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

Description of Threebear

Setting

Landform: Structural benches
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash over loess and/or alluvium and/or colluvium

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 5 inches: medial silt loam
Bw1 - 5 to 17 inches: silt loam
2Bw2 - 17 to 20 inches: silt loam
2Btx/E - 20 to 40 inches: silt loam
2Btb - 40 to 62 inches: silt loam

Properties and qualities

Slope: 3 to 20 percent
Depth to restrictive feature: 14 to 20 inches to fragipan
Drainage class: Moderately well 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 supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: F043AY568ID - Warm-Frigid, Udic, Unglaciated, Loamy, Hills, Fragipan, Ashy surface (western redcedar/moist herb) Western Redcedar / Bride's Bonnet - Wild Ginger
Other vegetative classification: western hemlock/queencup beadlily (CN570)
Hydric soil rating: No

30—Threebear-Sly complex, 3 to 25 percent slopes

Map Unit Setting

National map unit symbol: 54ns
Elevation: 2,160 to 3,400 feet
Mean annual precipitation: 30 to 40 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 80 to 110 days
Farmland classification: Farmland of statewide importance, if drained

Map Unit Composition

Threebear and similar soils: 45 percent
Sly and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Threebear

Setting

Landform: Structural benches
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash over loess

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 5 inches: medial silt loam
Bw1 - 5 to 17 inches: silt loam
2Bw2 - 17 to 20 inches: silt loam
2Btx/E - 20 to 40 inches: silt loam
2Btb - 40 to 62 inches: silt loam

Properties and qualities

Slope: 3 to 25 percent
Depth to restrictive feature: 14 to 20 inches to fragipan
Drainage class: Moderately well 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 supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: F043AY556ID - Frigid, Udic, Unglaciated, Loamy, Hills, Fragipan (western hemlock/moist herb) Western hemlock/Brides bonnet-wild ginger
Other vegetative classification: western hemlock/queencup beadlily (CN570)
Hydric soil rating: No

Description of Sly

Setting

Landform: Structural benches
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess and volcanic ash over colluvium derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 5 inches: ashy silt loam
BA - 5 to 11 inches: silt loam
Bt1 - 11 to 38 inches: silt loam
Bt2 - 38 to 62 inches: silty clay loam

Properties and qualities

Slope: 3 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: 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 supply, 0 to 60 inches: Very high (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C

Ecological site: F043AY560ID - Frigid, Udic, Unglaciated, Loamy, Hills, Mountains and Valleys, Mixed ash surface (western hemlock) Western hemlock/Brides bonnet-wild ginger
Other vegetative classification: western hemlock/queencup beadlily (CN570)
Hydric soil rating: No

31—Threebear-Sly silt loams, 25 to 40 percent slopes

Map Unit Setting

National map unit symbol: 54nt
Elevation: 2,140 to 3,800 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 70 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Threebear and similar soils: 45 percent
Sly and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Threebear

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash over loess and/or alluvium and/or colluvium

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 5 inches: medial silt loam
Bw1 - 5 to 17 inches: silt loam
2Bw2 - 17 to 20 inches: silt loam
2Btx/E - 20 to 40 inches: silt loam
2Btb - 40 to 62 inches: silt loam

Properties and qualities

Slope: 25 to 40 percent
Depth to restrictive feature: 14 to 20 inches to fragipan
Drainage class: Moderately well 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 supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F043AY568ID - Warm-Frigid, Udic, Unglaciated, Loamy, Hills, Fragipan, Ashy surface (western redcedar/moist herb) Western Redcedar / Bride's Bonnet - Wild Ginger
Other vegetative classification: western hemlock/queencup beadlily (CN570)
Hydric soil rating: No

Description of Sly

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Volcanic ash over loess over colluvium derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 5 inches: ashy silt loam
BA - 5 to 11 inches: silt loam
Bt1 - 11 to 38 inches: silt loam
Bt2 - 38 to 62 inches: silty clay loam

Properties and qualities

Slope: 25 to 40 percent
Depth to restrictive feature: More than 80 inches
Drainage class: 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 supply, 0 to 60 inches: Very high (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F043AY560ID - Frigid, Udic, Unglaciated, Loamy, Hills, Mountains and Valleys, Mixed ash surface (western hemlock) Western hemlock/Brides bonnet-wild ginger
Other vegetative classification: western hemlock/queencup beadlily (CN570)
Hydric soil rating: No

42—Honeyjones-Ahrs association, very rocky, 35 to 75 percent slopes

Map Unit Setting

National map unit symbol: 54p6
Elevation: 2,200 to 4,800 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Honeyjones and similar soils: 45 percent
Ahrs and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Honeyjones

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Volcanic ash over colluvium derived from metasedimentary rock

Typical profile

Oi - 0 to 1 inches: moderately decomposed plant material
A - 1 to 4 inches: ashy silt loam
Bw1 - 4 to 28 inches: ashy silt loam
2Bw2 - 28 to 41 inches: very gravelly silt loam
2BC - 41 to 49 inches: extremely gravelly silt loam
2C - 49 to 62 inches: extremely gravelly silt loam

Properties and qualities

Slope: 35 to 75 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: B
Ecological site: F043AY558ID - Frigid, Udic, Unglaciated, Loamy, Hills and Mountains, Metasedimentary (western hemlock/moist herb) Western hemlock/ Brides bonnet-wild ginger

Other vegetative classification: western hemlock/queencup beadlily (CN570)
Hydric soil rating: No

Description of Ahrs

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash over colluvium derived from quartzite and/or argillite

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 8 inches: gravelly ashy silt loam
Bw1 - 8 to 20 inches: very cobbly ashy silt loam
2Bw2 - 20 to 32 inches: extremely cobbly loam
2C - 32 to 62 inches: extremely cobbly loam

Properties and qualities

Slope: 35 to 75 percent
Depth to restrictive feature: More than 80 inches
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 supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F043AY563ID - Warm-Frigid, Dry-Udic, Unglaciated, Loamy, Mountains, Metasedimentary, Ashy surface (grand fir) (grand fir) Grand Fir / Bride's Bonnet
Other vegetative classification: grand fir/queencup beadlily (CN520)
Hydric soil rating: No

58—Lacy-Bobbitt complex, 35 to 65 percent slopes, stony

Map Unit Setting

National map unit symbol: 54pr
Elevation: 1,500 to 3,200 feet
Mean annual precipitation: 25 to 33 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 100 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

Lacy, stony surface, and similar soils: 45 percent
Bobbitt, stony surface, and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lacy, Stony Surface

Setting

Landform: Escarpments, canyons
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess and/or colluvium over bedrock derived from basalt

Typical profile

A - 0 to 11 inches: stony loam
Bt - 11 to 18 inches: very cobbly clay loam
R - 18 to 28 inches: bedrock

Properties and qualities

Slope: 35 to 65 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: 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 supply, 0 to 60 inches: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F043AY537ID - Mesic, Xeric, Unglaciated Hills and Canyons, Low Available Water (Ponderosa pine/Shrub) Ponderosa pine/common snowberry-ninebark
Other vegetative classification: ponderosa pine/common snowberry (CN170)
Hydric soil rating: No

Description of Bobbitt, Stony Surface

Setting

Landform: Structural benches, escarpments
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash and/or loess over colluvium over bedrock derived from basalt

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 14 inches: stony loam
Bt - 14 to 34 inches: very cobbly clay loam
R - 34 to 44 inches: bedrock

Properties and qualities

Slope: 35 to 65 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: 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 supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F043AY545ID - Warm-Frigid, Xeric, Unglaciated, Loamy, Basalt, Hills and Canyons (Douglas-fir/dry shrub) Douglas fir / mallow ninebark - common snowberry
Other vegetative classification: Douglas-fir/common snowberry (CN310)
Hydric soil rating: No

69—Miesen-Ramsdell silt loams, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 54q4
Elevation: 2,120 to 3,000 feet
Mean annual precipitation: 28 to 45 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 80 to 120 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Miesen and similar soils: 45 percent
Ramsdell and similar soils: 40 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Miesen

Setting

Landform: Flood plains, stream terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A - 0 to 26 inches: ashy silt loam

Bw1 - 26 to 45 inches: silt loam
Bw2 - 45 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat 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 24 to 42 inches
Frequency of flooding: NoneOccasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F043AY584ID - Warm-Frigid, Aquic-Udic, Flood Plains (POBAT/POTR/COSE)
Hydric soil rating: No

Description of Ramsdell

Setting

Landform: Stream terraces, depressions, flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A - 0 to 6 inches: ashy silt loam
Bg - 6 to 36 inches: silt loam
Cg - 36 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very 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 0 to 18 inches
Frequency of flooding: NoneFrequent
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F043AY584ID - Warm-Frigid, Aquic-Udic, Flood Plains (POBAT/POTR/COSE)
Hydric soil rating: Yes

Minor Components

Bellslake

Percent of map unit: 4 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Mazie

Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Aquandic humaquepts

Percent of map unit: 4 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

80—Ramsdell silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 54qk
Elevation: 2,120 to 3,000 feet
Mean annual precipitation: 28 to 45 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 80 to 120 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Ramsdell and similar soils: 85 percent
Minor components: 11 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramsdell

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A - 0 to 6 inches: ashy silt loam
Bg - 6 to 36 inches: silt loam
Cg - 36 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very 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 0 to 18 inches
Frequency of flooding: NoneFrequent
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F043AY584ID - Warm-Frigid, Aquic-Udic, Flood Plains (POBAT/POTR/COSE)
Hydric soil rating: Yes

Minor Components

Bellslake

Percent of map unit: 4 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Mazie

Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Aquandic humaquepts

Percent of map unit: 3 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

84—Rock outcrop-Rubble land complex

Map Unit Composition

Rock outcrop: 55 percent
Rubble land: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Outcrop

Typical profile

R - 0 to 60 inches: bedrock

Properties and qualities

Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

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

Description of Rubble Land

Typical profile

C - 0 to 60 inches: stones, boulders

Interpretive groups

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

93—Water

Map Unit Composition

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

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

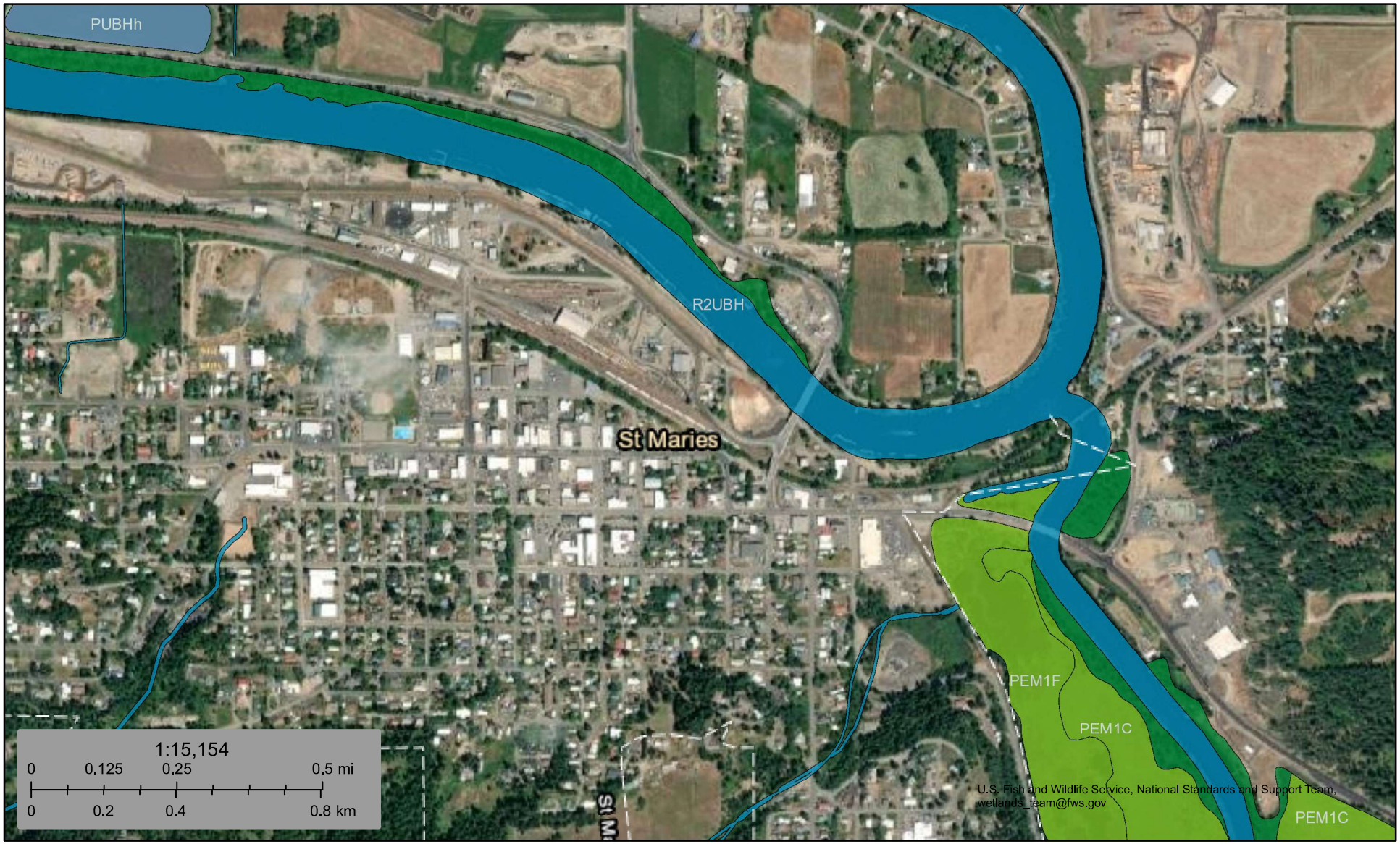
United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix B: USFWS Wetland Map

U.S. Fish and Wildlife Service
National Wetlands Inventory

City of St. Maries - Wetland Map



January 26, 2023

Wetlands

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

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

Appendix C: USFWS Information for Planning and Consultation

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

Benewah County, Idaho

Local office

Idaho Fish And Wildlife Office

(208) 378-5243
(208) 378-5262

1387 South Vinnell Way, Suite 368
Boise, ID 83709-1657

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 species[1] 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 Fisheries[2]).

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. IPaC only shows species that are regulated by USFWS (see FAQ).
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
Grizzly Bear Ursus arctos horribilis There is **proposed** critical habitat for this species. https://ecos.fws.gov/ecp/species/7642	Threatened
North American Wolverine Gulo gulo luscus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5123	Proposed Threatened

Fishes

NAME	STATUS
Bull Trout Salvelinus confluentus There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/8212	Threatened

Insects

NAME	STATUS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Spalding's Catchfly *Silene spaldingii* Wherever found There is **proposed** critical habitat for this species. https://ecos.fws.gov/ecp/species/3681	Threatened

Conifers and Cycads

NAME	STATUS
Whitebark Pine *Pinus albicaulis* Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1748	Threatened

Critical habitats

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

This location overlaps the critical habitat for the following species:

NAME	TYPE
Bull Trout *Salvelinus confluentus* https://ecos.fws.gov/ecp/species/8212#crithab	Final

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

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 https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.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

American White Pelican pelecanus erythrorhynchos This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/6886	Breeds Apr 1 to Aug 31
Bald Eagle Haliaeetus leucocephalus 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.	Breeds Jan 1 to Aug 31
Black Tern Chlidonias niger This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
Bobolink Dolichonyx oryzivorus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
California Gull Larus californicus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 1 to Jul 31
Cassin's Finch Carpodacus cassinii This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9462	Breeds May 15 to Jul 15
Clark's Grebe Aechmophorus clarkii This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jun 1 to Aug 31

Evening Grosbeak Coccothraustes vespertinus — Breeds May 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31

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/1680

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Lewis's Woodpecker Melanerpes lewis — Breeds Apr 20 to Sep 30

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9408

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Rufous Hummingbird selasphorus rufus — Breeds Apr 15 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8002

Western Grebe aechmophorus occidentalis

Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/6743

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.
3. 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.

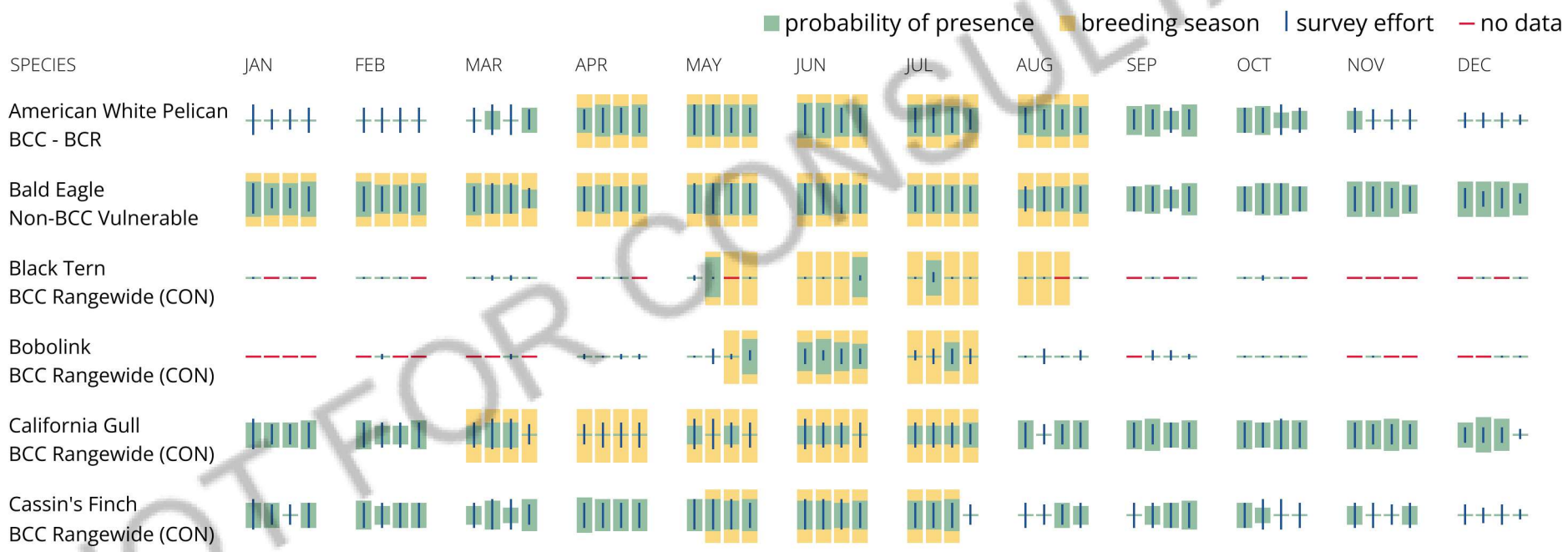
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

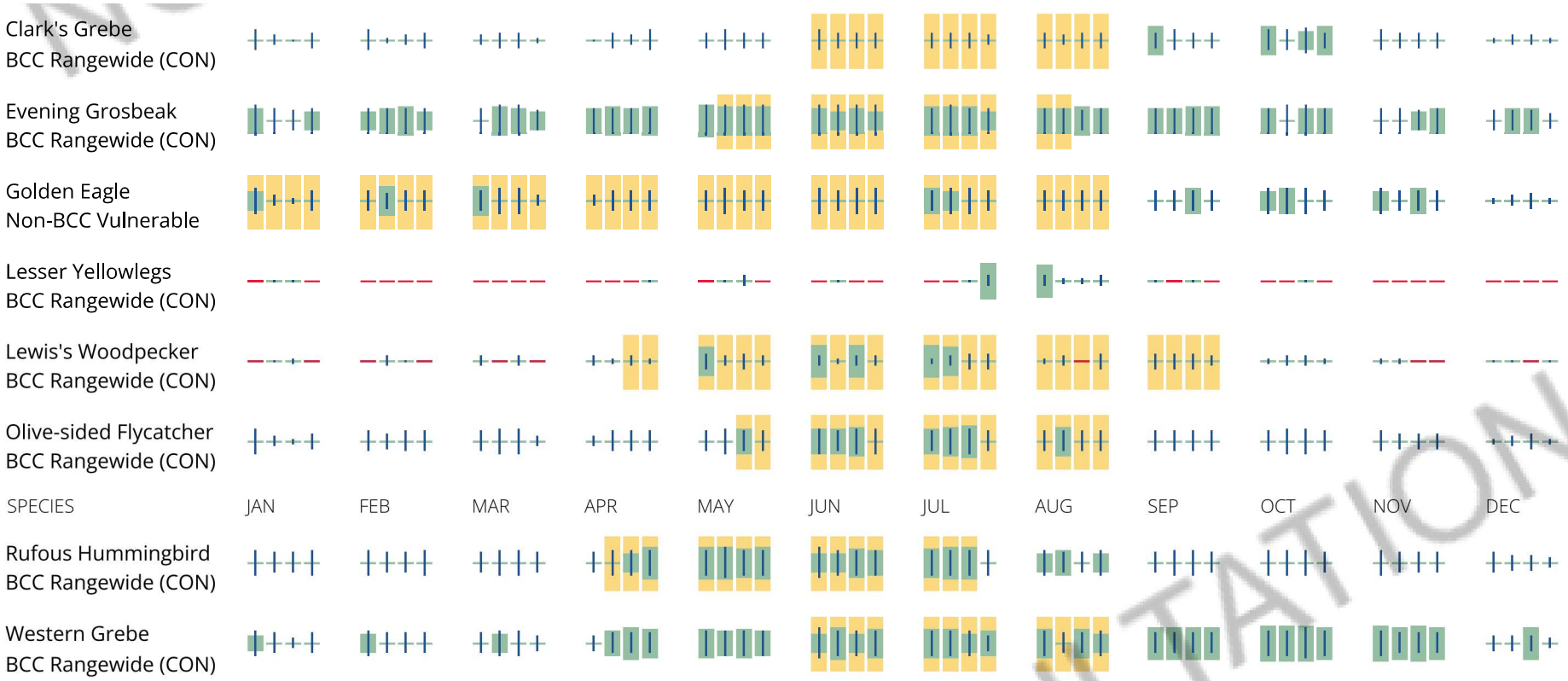
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

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.





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 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 list of migratory birds that potentially occur 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 Rapid Avian Information Locator (RAIL) 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 or migrating in my 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 query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. 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 (NWI)

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.

This location did not intersect any wetlands mapped by NWI.

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

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

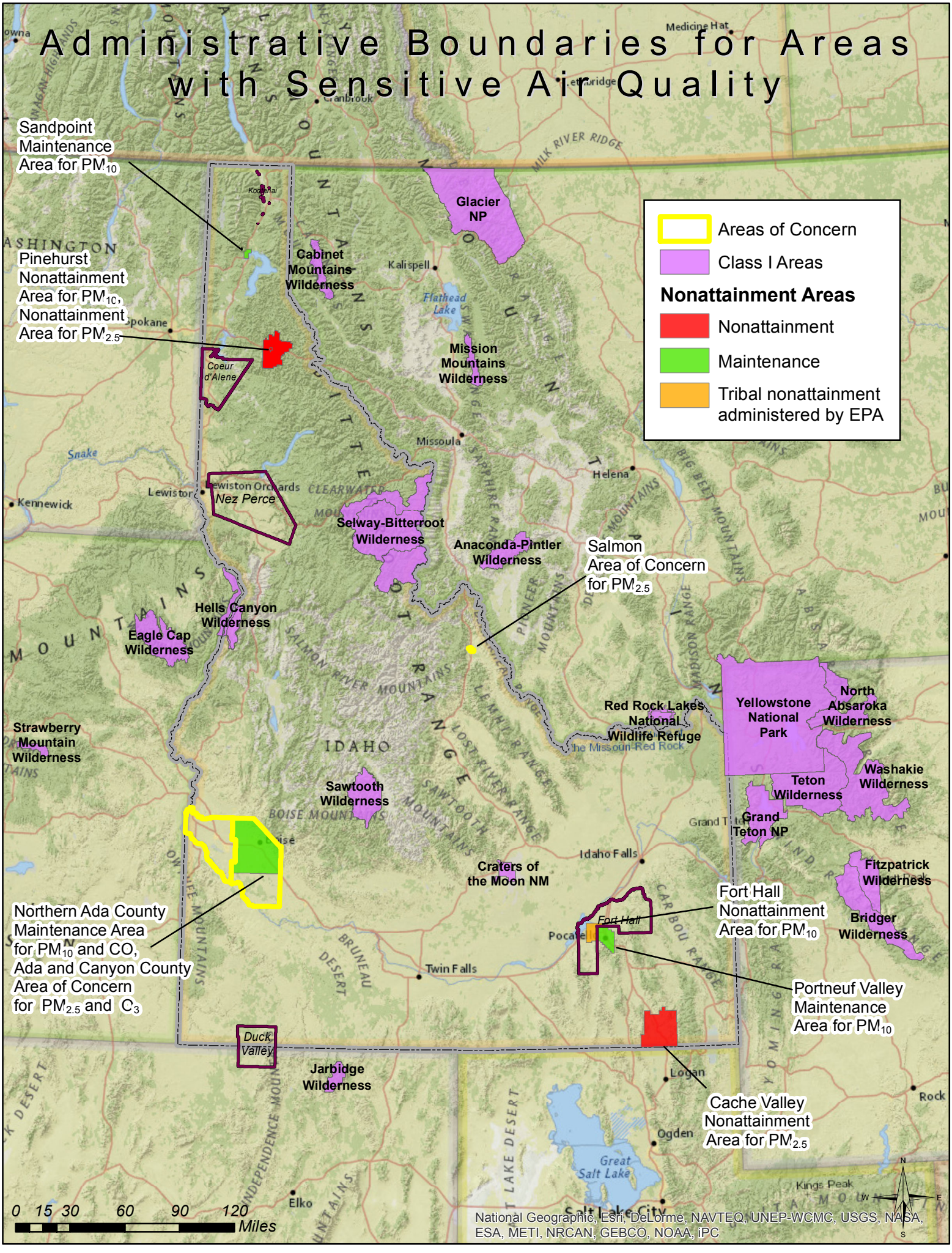
Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid 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.

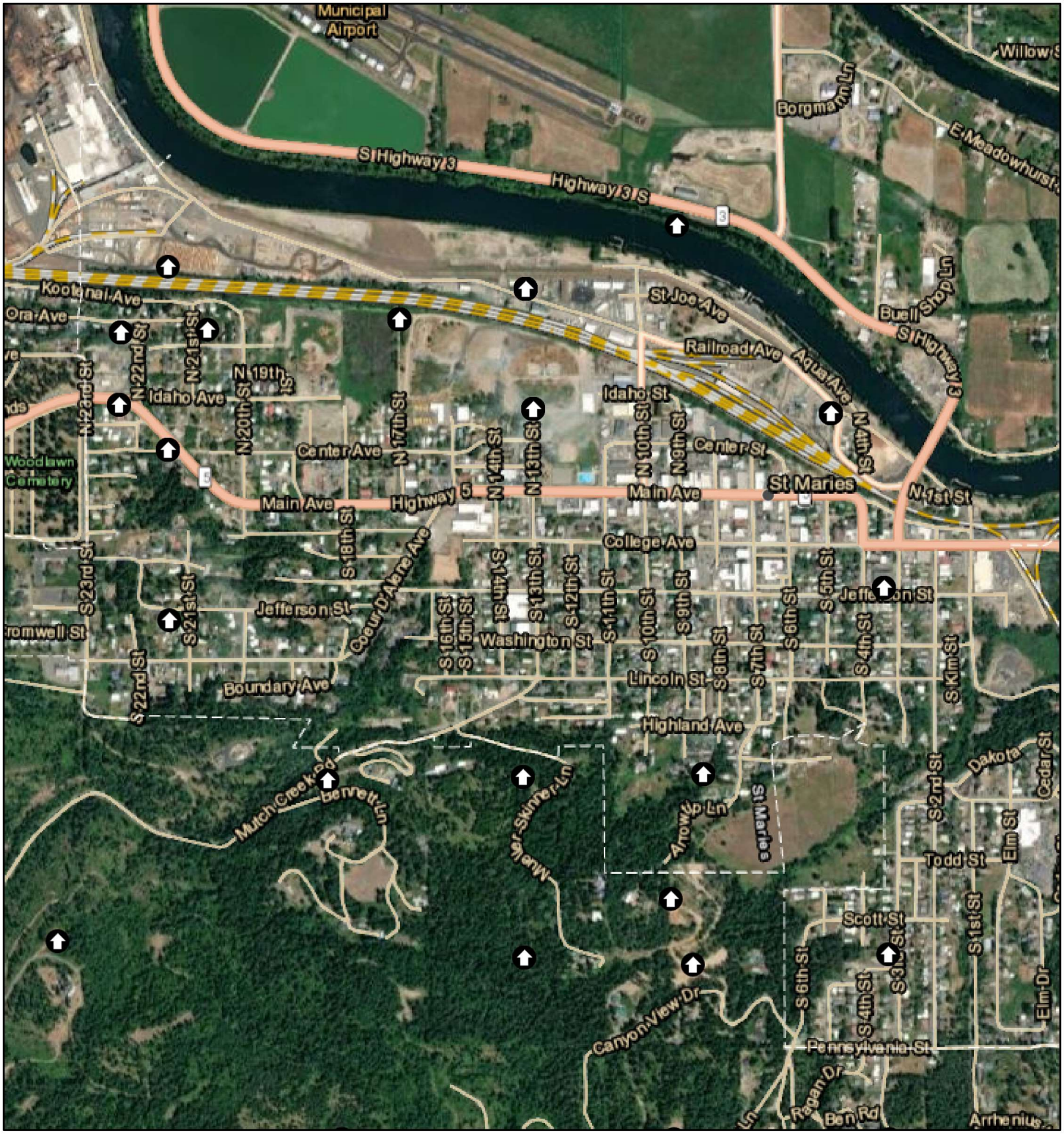
Appendix D: Idaho Air Quality Map

Administrative Boundaries for Areas with Sensitive Air Quality



Appendix E: Well Logs

City of St. Maries Well Sites



1/26/2023, 9:22:04 AM

Wells

1:18,056

0 0.1 0.2 0.4 mi

0 0.15 0.3 0.6 km

Esri, HERE, iPC, Esri, HERE, Garmin, iPC, Maxar

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Well ID No.
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0022618
DRILLING PERMIT NO. 781479
Water Right or Injection Well No.

2. OWNER:
Name Chanco Products Co LTD
Address 1369 Railroad Ave
City St. Maries State ID Zip 83861

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 46 North ☑ or South ☐
Rge. 02 East ☐ or West ☑
Sec. 22, SE 1/4 (10 acres) SE 1/4 (40 acres) NW 1/4 (160 acres)
Gov't Lot ____ County Benewah
Lat: : : Long: : :
Address of Well Site ____
(Give at least name of road + Distance to Road or Landmark) City ____
Lt. ____ Blk. ____ Sub. Name ____

4. USE:
☐ Domestic ☐ Municipal ☑ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other ____

5. TYPE OF WORK check all that apply (Replacement etc.)
☑ New Well ☐ Modify ☐ Abandonment ☐ Other ____

6. DRILL METHOD:
☐ Air Rotary ☐ Cable ☐ Mud Rotary ☑ Other SONIC

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
3/8 Bent chips	0	29	9 bags 450 lbs	tremie

Was drive shoe used? ☐ Y ☑ N Shoe Depth(s) ____
Was drive shoe seal tested? ☐ Y ☐ N How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
2"	0	30	sch 40	PVC	☐	☑	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe ____
Packer ☐ Y ☐ N Type ____

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method factory slotted
Screen Type & Method of Installation 010

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
30	35	010		2"	PVC	☐	☑
						☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
10/20 SAND	29	35	150 lb	tremie

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
____ ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices: ____

12. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
	None		

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments: ____
Depth first Water Encounter ____

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
6"	0	2	tan to gray rock ballast		☒
	2	10	dark gray silt	☑	
	10	16	dark gray silty sand		
	16	26	gray silty sand		
	26	29	dark gray silty sand		
	29	35	gray silty sand		

RECEIVED
AUG - 9 2002
Department of Water Resources

Completed Depth 35' (Measurable)
Date: Started 7/20/02 Completed 7/20/02

14. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Lang Exploratory Firm No. 438
Principal Driller ____ Date ____
and
Driller or Operator II Dale Osterberg Date 7/20/02
Operator I ____ Date ____

Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Well ID No.
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D D0029772 (PSB-1)
DRILLING PERMIT NO. 805658 845892 Abandonment
Water Right or Injection Well No. 899097

ENTERED

2. OWNER:
Name Bristol Environmental
Address 1380 Pantheon Way Ste 2580
City San Antonio State TX Zip 78232

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 46 North ☒ or South ☐
Rge. 2 East ☐ or West ☒
Sec. 21, SE 1/4 (10 acres) SE 1/4 (40 acres) NE 1/4 (160 acres)
Gov't Lot ____ County Benewah
Lat: 47 : 19 : 15 Long: 116 : 35 : 15
Address of Well Site ____
City St Maries, ID
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name ____

4. USE:
☐ Domestic ☐ Municipal ☒ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☒ Other Environmental

5. TYPE OF WORK check all that apply (Replacement etc.)
☐ New Well ☐ Modify ☒ Abandonment ☒ Other enviro Boring

6. DRILL METHOD:
☐ Air Rotary ☐ Cable ☐ Mud Rotary ☒ Other Direct push

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
Bentonite	0	22	60#	

Was drive shoe used? ☐ Y ☐ N Shoe Depth(s) ____
Was drive shoe seal tested? ☐ Y ☐ N How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe ____
Packer ☐ Y ☐ N Type ____

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method ____
Screen Type & Method of Installation ____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
____ft. below ground Artesian pressure ____lb.
Depth flow encountered ____ft. Describe access port or control devices: ____

12. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments: ____
Depth first Water Encountered 8.2'

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
25"	0	15	silty fine sand		
	15	22	clayey, sandy silt		

Borings abandoned by placing bentonite chips through open casing as casing was withdrawn. Chips were hydrated with portable water, maintaining several feet of water column during placement.

RECEIVED
MAR 22 2007
IDWR/North

RECEIVED
MAR 29 2007
IDWR/North

Completed Depth 22 (Measurable)
Date: Started 8/25/03 Completed 8/25/03

14. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Budinger & Assoc. Firm No. 509
Principal Driller S Bucknell Date 3/20/07
and
Driller or Operator II S Bucknell Date 3/20/07
Operator I ____ Date ____
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Well ID No.
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D D0028772 (PSB-4) WRII Id 4/6/06
DRILLING PERMIT NO. 805858 896041
Water Right or Injection Well No. 899100 Abnd 896042

2. OWNER:
Name Bristol Environmental
Address 1380 Pantheon Way Ste 280
City San Antonio State TX Zip 78232

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 4S North ☒ or South ☐
Rge. 2E East ☐ or West ☒
Sec. 22, SE 1/4 (10 acres) SW 1/4 (40 acres) NW 1/4 (160 acres)
Gov't Lot ____ County Benewah
Lat: 47 : 19 : 14 Long: 116 : 34 : 59
Address of Well Site ____
(Give at least name of road + Distance to Road or Landmark) City St. Maries
Lt. ____ Blk. ____ Sub. Name ____

4. USE:
☐ Domestic ☐ Municipal ☒ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☒ Other Environmental

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☒ Abandonment ☒ Other envir Borg

6. DRILL METHOD:
☐ Air Rotary ☐ Cable ☐ Mud Rotary ☒ Other direct push

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
Bentonite	0	21	60#	

Was drive shoe used? ☐ Y ☐ N Shoe Depth(s) ____
Was drive shoe seal tested? ☐ Y ☐ N How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe ____
Packer ☐ Y ☐ N Type ____

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method ____
Screen Type & Method of Installation ____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
____ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ft. Describe access port or control devices: ____

12. WELL TESTS:
ENTERED
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

gal./min.	Drawdown	Pumping Level	Time

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments: ____
Depth first Water Encounter 15

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
25"	0	9	Fill: Gravel & Cobbles		
	9	21	silty fine Sand		

Borings abandoned by placing bentonite chips through open casing as casing was withdrawn. Chips were hydrated with portable water, maintaining several feet of water column during placement.

RECEIVED
MAR 22 2007
IDWR/North

RECEIVED
MAR 29 2007
IDWR/North

Completed Depth 21 (Measurable)
Date: Started 8/26/03 Completed 8/26/03

14. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Buckley & Assoc. Firm No. 569
Principal Driller S Buckett Date 3/20/07
and
Driller or Operator II S Buckett Date 3/20/07
Operator I ____ Date ____
Principal Driller and Rig Operator *Required*.
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

ENTERED

Office Use Only
Well ID No.
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D D0028772 (PSB-6)
DRILLING PERMIT NO. 80565a 84647
Water Right or Injection Well No. 89910 Aband-84647
well Id 416110

2. OWNER:
Name Bristol Environmental
Address 1380 Pantheon Way Ste 200
City San Antonio State Tx Zip 78232

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 4S North ☒ or South ☐
Rge. 2 East ☐ or West ☒
Sec. 22, SW 1/4 (10 acres) SW 1/4 (40 acres) NW 1/4 (160 acres)
Gov't Lot ____ County Benewah
Lat: 47 : 19 : 15 **Long:** 116 : 35 : 6
Address of Well Site ____
(Give at least name of road + Distance to Road or Landmark) City St. Maries
Lt. ____ Blk. ____ Sub. Name ____

4. USE:
☐ Domestic ☐ Municipal ☒ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☒ Other Environmental

5. TYPE OF WORK check all that apply (Replacement etc.)
☐ New Well ☐ Modify ☒ Abandonment ☒ Other Enviro Borng

6. DRILL METHOD:
☐ Air Rotary ☐ Cable ☐ Mud Rotary ☒ Other Direct push

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
Bentonite	0	27	70#	

Was drive shoe used? ☐Y ☐N Shoe Depth(s) ____
Was drive shoe seal tested? ☐Y ☐N How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe ____
Packer ☐Y ☐N Type ____

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method ____
Screen Type & Method of Installation ____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
____ft. below ground Artesian pressure ____lb.
Depth flow encountered ____ft. Describe access port or control devices: ____

12. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments: ____
Depth first Water Encounter ____

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
15"			N/A		
			Sand, silt & clay		
			No samples		
			Borings abandoned by placing bentonite chips through open casing as casing was withdrawn. Chips were hydrated with portable water, maintaining several feet of water column during placement.		

RECEIVED
MAR 22 2007
IDWR/North

RECEIVED
MAR 29 2007
IDWR/North

Completed Depth 27 (Measurable)
Date: Started 8/27/03 Completed 8/27/03

14. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Budinger & Assa Firm No. 98
Principal Driller S Buchett Date 3/20/07
and
Driller or Operator II S Buchett Date 3/20/07
Operator I ____ Date ____
Principal Driller and Rig Operator *Required.*
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

ENTERED

Office Use Only
Well ID No.
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D D0028772 (SMSB3-3)
DRILLING PERMIT NO. ~~80050~~58 84605
Water Right or Injection Well No. 899104 Abnd. 84605
well ID 4/6112

2. OWNER:
Name Bristol Environmental
Address 1380 Pantheon Way Ste 200
City San Antonio State TX Zip 78232

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 46 North ☒ or South ☐
Rge. 2 East ☐ or West ☒
Sec. 22, NW 1/4 (10 acres) NW 1/4 (40 acres) SW 1/4 (160 acres)
Gov't Lot ____ County Benewah
Lat: 47 : 19 : 7 Long: 116 : 35 : 5
Address of Well Site ____
City St. Maries
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name ____

4. USE:
☐ Domestic ☐ Municipal ☒ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☒ Other Environmental

5. TYPE OF WORK check all that apply (Replacement etc.)
☐ New Well ☐ Modify ☒ Abandonment ☐ Other Envirn Bory

6. DRILL METHOD:
☐ Air Rotary ☐ Cable ☐ Mud Rotary ☒ Other direct push

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
Bentonite	0	22.5	60#	Poured

Was drive shoe used? ☐ Y ☐ N Shoe Depth(s) ____
Was drive shoe seal tested? ☐ Y ☐ N How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe ____
Packer ☐ Y ☐ N Type ____

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method ____
Screen Type & Method of Installation ____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
____ ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices: ____

12. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments: ____
Depth first Water Encounter ____

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
25"	0	9	silt		
	9	14	silty fine sand		
	14	15	sandy silt		
	15	17	sand		
	17	22.5	silt		

Borings abandoned by placing bentonite chips through open casing as casing was withdrawn. Chips were hydrated with portable water, maintaining several feet of water column during placement.

RECEIVED
MAR 22 2007
IDWR/North

RECEIVED
MAR 29 2007
IDWR/North

Completed Depth 22.5 (Measurable)
Date: Started 8/28/03 Completed 8/28/03

14. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Budinger & Assoc Firm No. 569
Principal Driller S Bucklett Date 3/20/07
and
Driller or Operator II S Bucklett Date 3/20/07
Operator I ____ Date ____
Principal Driller and Rig Operator *Required*.
Operator I must have signature of Driller/Operator II.

FORWARD WHITE COPY TO WATER RESOURCES

Form 238-7
6/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Well ID No.
Inspected by
Twp ____ Rge ____ Sec ____
____ 1/4 ____ 1/4 ____ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 0061002
DRILLING PERMIT NO. 363513
Water Right or Injection Well No.

2. OWNER:
Name LES SCHWAB
Address PO BOX 5350
City BEND State OR Zip 97708

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 16 North ☑ or South ☐
Rge. 12 East ☐ or West ☒
Sec. 22, SW 1/4 (10 acres) SW 1/4 (40 acres) SW 1/4 (160 acres)
Gov't Lot 5 County Bonneville
Lat: 47 : 18 : 59.08 **Long:** 116 : 34 : 12.65
Address of Well Site 930 MAIN AVENUE
City St. Maries
(Give at least name of road + Distance to Road or Landmark)
Lt. ____ Blk. ____ Sub. Name

4. USE:
☐ Domestic ☐ Municipal ☒ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other

6. DRILL METHOD:
☐ Air Rotary ☐ Cable ☐ Mud Rotary ☒ Other HSA

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
Bentonite	-1	-11	150 lbs	Pour

Was drive shoe used? ☐ Y ☒ N Shoe Depth(s) N/A
Was drive shoe seal tested? ☐ Y ☐ N How? N/A

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
2"	0	-12.5	40	PVC	☐	☐	☐	☑
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe Flush Length of Tailpipe N/A
Packer ☐ Y ☒ N Type N/A

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method MACHINE SLOT
Screen Type & Method of Installation

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
-12.5	22.5	.01		2"	PVC	☐	☑
						☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
10-20 Silica	22.5	11	350 lbs	Pour

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
14.2 ft. below ground Artesian pressure 0 lb.
Depth flow encountered N/A ft. Describe access port or control devices:

12. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. 50° Bottom hole temp. 50°
Water Quality test or comments: Below DEQ Rules
Depth first Water Encounter

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
2"	0	.5	Concrete		X
	.5	7	Fill, silty Sand, red-brown		X
	7	15	Alluvium, silty sand, brown		X
	15	16.5	Alluvium, silt, tan		X
	16.5	22.5	Alluvium, silty sand, brown	X	

RECEIVED
JUN 29 2012
IDWR / NORTH

Completed Depth 22.5 (Measurable)
Date: Started 5-29-12 Completed 5-29-12

14. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Underground Technologies Firm No. 1070
Principal Driller [signature] Date 6-26-12
and
Driller or Operator II ____ Date ____
Operator I ____ Date ____
Principal Driller and Rig Operator *Required*.
Operator I must have signature of Driller/Operator II.

46N 02W 22

FORWARD WHITE COPY TO WATER RESOURCES

USE TYPEWRITER OR BALL POINT PEN

State of Idaho
Department of Water Administration

WELL DRILLER'S REPORT

ENT'D

State law requires that this report be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name James Cunningham
Address St Maries IDAHO
Owner's Permit No. ~~92-72-N-5~~

2. NATURE OF WORK

92-72-N-5

☒ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test

☐ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

☐ Cable ☒ Rotory ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 6 inches Total depth 175 feet
Casing schedule: ☒ Steel ☐ Concrete

Thickness		Diameter		From		To	
.250	inches	6	inches	+1	feet	35	feet
.134	inches	5	inches	75	feet	175	feet
	inches		inches		feet		feet
	inches		inches		feet		feet
	inches		inches		feet		feet

Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☒ Yes ☐ No
How perforated? ☐ Factory ☐ Knife ☒ Torch
Size of perforation 12 inches by 1/4 inches

Number		From		To	
40	perforations	156	feet	176	feet
10	perforations	91	feet	96	feet
	perforations		feet		feet

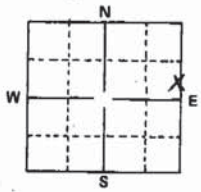
Well screen installed? ☐ Yes ☒ No
Manufacturer's name
Type Model No.
Diameter Slot size Set from feet to feet
Diameter Slot size Set from feet to feet

Gravel packed? ☐ Yes ☒ No Size of gravel
Placed from feet to feet

Surface seal? ☒ Yes ☐ No To what depth 19 feet
Material used in seal ☐ Cement grout ☒ Puddling clay

6. LOCATION OF WELL

Sketch map location must agree with written location.



7-2

County BENEWAH

SE ¼ NE ¼ Sec. 22, T. 46 N/☒ R. 2 ☒ W

7. WATER LEVEL

Static water level +1 feet below land surface
Flowing? ☒ Yes ☐ No G.P.M. flow 1 GPM
Temperature COLD F. Quality GOOD
Artesian closed-in pressure 3 p.s.i.
Controlled by ☐ Valve ☒ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☐ Bailer ☒ Other AIR

Discharge G.P.M.	Draw Down	Hours Pumped
6 GPM		

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
6	0	10	SANDY SMALL BOULDER'S		X
	10	25	BROKEN BASALT		X
6	25	92	BASALT	X	
	92	98	BROWN CLAY		X
	98	137	RED CLAY		X
	137	168	SANDSTONE GRAVEL		X
	168	175	BLUE SHALE	X	
			1 GPM 90-92		
			56 PM 166-170		

10.

Work started July 22 72 finished July 25 73

11. DRILLER'S CERTIFICATION

This well was drilled under my supervision and this report is true to the best of my knowledge.

Aqua Drilling & Development Inc 163
Driller's or Firm's Name Number
P.O. Box 1002 CDA IDAHO
Address
Signed By [signature] Oct 7 72
Date

USE ADDITIONAL SHEETS IF NECESSARY

FORWARD THE WHITE, BLUE, AND PINK COPIES TO THE DEPARTMENT

Form 238-7
4/95

RECEIVED
MAR 2 0 1996
NORTHERN REGION
IDWR

POSTED

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Use Typewriter or Ballpoint Pen

Office Use Only
Inspected by _____
Twp____ Rge____ Sec____
____1/4 ____1/4 ____1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. 92-95-N-0019-001
Other IDWR No. _____

2. OWNER:
Name ST Maries Oil Company
Address Box 218
City ST Maries State Id Zip 83861

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S — X

Twp. 46 North ☒ or South ☐
Rge. 2 East ☐ or West ☒
Sec. 22, ____ 1/4 NW 1/4 SW 1/4 (10 acres / 40 acres / 160 acres)
Gov't Lot ____ County Benewah
Lat: : : Long: : :
Address of Well Site 2242 Idaho Ave.
City ST Maries
(Give at least name of road + Distance to Road or Landmark)

Lt. _____ Blk. _____ Sub. Name _____

4. USE:
☐ Domestic ☐ Municipal ☒ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bentonite	0	29	155ks	Pour

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) Recovered Casing
Was drive shoe seal tested? ☐Y ☐N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
2	+.5	50	160	Pvc	☐	☒	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe _____ Length of Tailpipe _____

9. PERFORATIONS/SCREENS
☐ Perforations Method _____
☐ Screens Screen Type 2" 20 slot Screen

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
1.5 ft. below ground Artesian pressure _____ lb.
Depth flow encountered _____ ft. Describe access port or control devices: 2" Pvc Cap

NWSW 22 46N 2W

11. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. _____ Bottom hole temp. _____
Water Quality test or comments: _____
Depth first Water Encountered _____

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
6	0	17	Sand - Road Material, some Clay and Fill		
	17	39	Broken Basalt		
	39	40	Clay Seam		
	40	50	Broken Basalt		
			20 slot screen		
			From 34 to 50		
			screen covered		
			with colorado silica		
			Sand. Bentonite		
			from 0 to 34		
			Dry		
			4" cement pad		
			by 4'x4' covering		
			Pvc with Metal		
			Inspection Cap		
			Covering Pvc.		

Completed Depth 50 (Measurable)
Date: Started 8/1/95 Completed 8/7/95

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name All-Ways Drilling Inc Firm No. 510
Firm Official Stanley K Wolfe Date 3/15/96
and
Supervisor or Operator R. Dwight Date 3/15/96
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

RECEIVED
JAN 15 1997
NORTHERN REGION
IDWR

Form 238-7
3/95

POSTED

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Use Typewriter or Ballpoint Pen

097000

Office Use Only
Inspected by ______
Twp ____ Rge ____ Sec ____
____1/4 ____1/4 ____1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. 92-96-N-0016-303
Other IDWR No. ______

2. OWNER:
Name Andy Le Coulter
Address HCO 2, Box 112
City ST Maries State Id Zip 83861

3. LOCATION OF WELL by legal description:

Sketch map location must agree with written location.

Twp. 46 North ☒ or South ☐
Rge. 2 East ☐ or West ☒
Sec. 22 ____ 1/4 NW 1/4 SE 1/4
(10 acres, 40 acres, 160 acres)
Gov't Lot ____ County Benawah
Lat: : : Long: : :
Address of Well Site 15Th + Main
Bank of LaTah City ST. Maries
(Give at least name of road + Distance to Road or Landmark)

Lt. ____ Blk. ____ Sub. Name ____

4. USE:
☐ Domestic ☐ Municipal ☒ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other ____

5. TYPE OF WORK check all that apply (Replacement etc.)
☐ New Well ☐ Modify ☒ Abandonment ☐ Other ____

6. DRILL METHOD
☐ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other ____

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD

Was drive shoe used? ☐Y ☐N Shoe Depth(s) ____
Was drive shoe seal tested? ☐Y ☐N How? ____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe ____

9. PERFORATIONS/SCREENS
☐ Perforations Method ____
☐ Screens Screen Type ____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
____ ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices: ____

11. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments: ____
Depth first Water Encountered ____

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
			2" PVC CuToff		
			4' Below SurFace		
			Back Fill		
		4'			
			concreTe		
		7'			
			BenTaniTe 3/8 PelleTs		
		50			
			Baroid 3/8 PelleTs		
		80'			

Completed Depth 80' (Measurable)
Date: Started 1/7/97 Completed 1/9/97

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name All-Ways Drilling Firm No. 510
Firm Official [signature] Date 1/14/97
and
Supervisor or Operator R. [signature] Date 1/14/97
(Sign once if Firm Official & Operator)

NWSE 22 46N 2W

ORIGINAL WHITE COPY TO WATER RESOURCES

Form 238-7
3/95

POSTED

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Use Typewriter or Ballpoint Pen

097898

Office Use Only
Inspected by _____
Twp____ Rge____ Sec____
____1/4 ____1/4 ____1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. 92-97-N-1 -001
Other IDWR No. _____

2. OWNER:
Name Ernie Pendell
Address 1211 Lincoln Ave
City ST Maries State Id Zip 83861

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S — X

Twp. 46 North ☒ or South ☐
Rge. 2 East ☐ or West ☒
Sec. 23, ____ 10 acres 1/4 NW 40 acres 1/4 SW 160 acres 1/4
Gov't Lot ____ County Benewah
Lat: : : Long: : :
Address of Well Site Ed's R.R. Hwy 3 + Meadowhurst Drive City ST. Maries
(Give at least name of road + Distance to Road or Landmark)

Lt. _____ Blk. _____ Sub. Name _____

4. USE:
☐ Domestic ☐ Municipal ☒ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bentonite Hole Plug	-1'	8'	7	Pour

Was drive shoe used? ☐ Y ☒ N Shoe Depth(s) _____
Was drive shoe seal tested? ☐ Y ☒ N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
2	1	25		PVC	☒	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe _____ Length of Tailpipe _____

9. PERFORATIONS/SCREENS
☐ Perforations Method _____
☒ Screens Screen Type 2" 20 slot Screen

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
10	25	20		2	PVC	☐	☒
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
10 ft. below ground Artesian pressure _____ lb.
Depth flow encountered 12 ft. Describe access port or control devices: Locked Monitoring Caps

NWSW 23 46N 2W

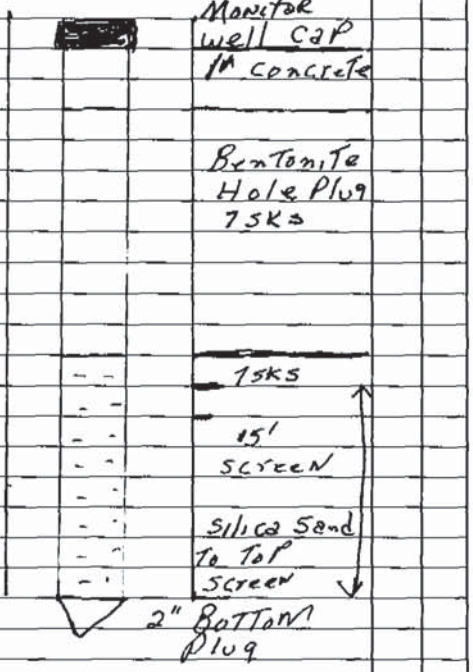
11. WELL TESTS:
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
2			

Water Temp. Cold Bottom hole temp. _____
Water Quality test or comments: Muddy - NO odor
Depth first Water Encountered _____

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
6	0	4"	Black Top		
	4"	13	Gravel	X	
	13	25	Brown Fine Silt		



Completed Depth 25 (Measurable)
Date: Started 2/5/97 Completed 2/5/97

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name All-Ways Drilling INC Firm No. 510
Firm Official Frank K Wolfe Date 2/14/97
and
Supervisor or Operator R. Dight Date 2/14/97
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Form 238
3/95

OCT 2 3 1997

POSTED

NORTHERN REGION
IDWR

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Use Typewriter or Ballpoint Pen

096598

Office Use Only
Inspected by TOK
Twp____ Rge____ Sec____
____1/4 ____1/4 ____1/4
Lat: : : Long: : :

1. DRILLING PERMIT NO. 92-97-N-20-001
Other IDWR No. D3406

2. OWNER:
Name ST Joe Sports Stop
Address 402 College Ave
City St Maries State Id Zip 83861

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S — X

Twp. 46 North ☒ or South ☐
Rge. 2 East ☒ or West ☐
Sec. 23, ____ 1/4 SW 1/4 SW 1/4
(10 acres / 40 acres / 160 acres)
Gov't Lot ____ County Benewah
Lat: : : Long: : :
Address of Well Site 4th Street and College Ave City St Maries
(Give at least name of road + Distance to Road or Landmark)

Lt.____ Blk.____ Sub. Name____

4. USE:
☐ Domestic ☐ Municipal ☒ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other____

6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other____

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bentonite	-2	20	400 lbs	Pour
Silica Sand	-20	40	400 lbs	Pour

Was drive shoe used? ☐ Y ☒ N Shoe Depth(s)____
Was drive shoe seal tested? ☐ Y ☐ N How?____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
2	-1	40			☐	☒	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe____ Length of Tailpipe____

9. PERFORATIONS/SCREENS
☐ Perforations Method____
☒ Screens Screen Type Slotted .010

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
25	40	.010		2"	PVC	☐	☒
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
____ft. below ground Artesian pressure ____lb.
Depth flow encountered ____ ft. Describe access port or control devices: Monitoring Cap (Locked)

SWSW 23 46N 2E

11. WELL TESTS:
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
2			½ hr.

Water Temp.____ Bottom hole temp.____
Water Quality test or comments: Muddy
Depth first Water Encountered 24

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
6	0	3"	Pavement		
	3"	4	Gravel (Fill)		
	4	10	Silty Gray Clay		
	10	24	Silty Brown Clay		
	24	40	Broken Basalt	X	
			Monitoring Cap		
			1' Concrete		
			3/8" Hole Plug From -2 To -20		
			25' of Riser Pipe		
			Silica Sand 20' TO 40'		
			15' Screen		

Completed Depth 40 (Measurable)
Date: Started 10/3/97 Completed 10/4/97

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name All-Way's Drilling Inc Firm No. 510
Firm Official Stanley K Wolfe Date 10/5/97
and
Supervisor or Operator R. Degitz Date 10/6/97
(Sign once if Firm Official & Operator)

WHITE COPY TO WATER RESOURCES

Form 238-7
11/97

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT 076449

Office Use Only
Inspected by TDK
Twp 46N Rge 2W Sec 21
1/4 SE 1/4 SE 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 000 5635 REVISED WELL REPORT
DRILLING PERMIT NO. ~~45-98-N-203~~
Other IDWR No. 92-98-N-27

2. OWNER:
Name BETTY ROSE FURTH
Address P.O BOX 147
City St. MARIES State Id Zip 83861

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

POSTED

N / W / E / S

Twp. 46 North X or South ☐
Rge. 4 East ☐ or West X
Sec. 20 NW 1/4 (10 acres) NW 1/4 (40 acres) 1/4 (160 acres)
Gov't Lot ___ County BENEWAH
Lat: TRACT # 5 Long: : :
Address of Well Site OFF HWY 5
CHERRY CREEK TRACT City St. Maries
(Give at least name of road + Distance to Road or Landmark)

Lt. ___ Blk. ___ Sub. Name parcel # RP-000800[illegible]3-A

4. USE:
X Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other ___

5. TYPE OF WORK check all that apply (Replacement etc.)
X New Well ☐ Modify ☐ Abandonment ☐ Other ___

6. DRILL METHOD
X Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other ___

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bentonite	0	29	2 sacks	poured

Was drive shoe used? X Y ☐ N Shoe Depth(s) 19
Was drive shoe seal tested? X Y ☐ N How? Air

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+1	19	250	Steel	X	☐	X	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ___ Length of Tailpipe ___

9. PERFORATIONS/SCREENS
X Perforations Method Drilled
X Screens Screen Type plastic

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
120	160	1/2		4"	plastic	☐	X
10	120	—		4"	plastic	☐	X
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
60 ft. below ground Artesian pressure ___ lb.
Depth flow encountered ___ ft. Describe access port or control devices: ___

11. WELL TESTS:
☐ Pump ☐ Bailer X Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
Est 15	GAL min.		

Water Temp. Cold Bottom hole temp. Cold
Water Quality test or comments: good
Depth first Water Encounter 150

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8	0	3	Top Soil		X
8	3	12	Brown Clay		X
8	12	19	Shale Rock		X
6	19	150	Shale Rock		X
6	150	160	Broken Shale	X	

RECEIVED
JAN 04 1999
IDWR/North

Completed Depth 160 ft. (Measurable)
Date: Started 11/1/98 Completed 11/6/98

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Precision Drilling Inc Firm No. 558
Firm Official [signature] Date 11/6/98
and
Driller or Operator John N. Camara Date 11/6/98
(Sign once if Firm Official & Operator)

46N 2W 21

FORWARD WHITE COPY TO WATER RESOURCES

RECEIVED

Form [illegible] AUG 19 1999
11/97

IDWR/North

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

076470

Office Use Only
Inspected by ______
Twp ___ Rge ___ Sec ___
___ 1/4 ___ 1/4 ___ 1/4
Lat: : : Long: : :

1. WELL TAG NO. D 10253
DRILLING PERMIT NO. 92-99-N-14-200
Other IDWR No. ______

2. OWNER:
Name Brents Electric
Address 185 1st. St. Milltown
City St. Maries State Id Zip 83861

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

(Sketch map grid: N, S, E, W; X marked in NE section)

Twp. 46 North ☑ or South ☐
Rge. 2 East ☐ or West ☑
Sec. 27, N/E 1/4 N/E 1/4 ___ 1/4 (10 acres, 40 acres, 160 acres)
Gov't Lot ___ County Benewah
Lat: : : Long: : :
Address of Well Site Old Kreider Prop. Carrow Heights, Capitol Hill City St. Maries
(Give at least name of road + Distance to Road or Landmark)

Lt. ______ Blk. ______ Sub. Name ______

POSTED

4. USE:
☑ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other ______

5. TYPE OF WORK check all that apply (Replacement etc.)
☑ New Well ☐ Modify ☐ Abandonment ☐ Other ______

6. DRILL METHOD
☑ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other ______

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
Bentonite	0	98	500#	Pour Dry

Was drive shoe used? ☑ Y ☐ N Shoe Depth(s) 98'
Was drive shoe seal tested? ☑ Y ☐ N How? Air

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+2	98	.250		☑	☐	☑	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe N/A Length of Tailpipe N/A

9. PERFORATIONS/SCREENS
Perforations Method N/A
Screens Screen Type N/A

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
N/A						☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
100 ft. below ground Artesian pressure N/A lb.
Depth flow encountered 98 ft. Describe access port or control devices: Well Cap

11. WELL TESTS:
☐ Pump ☐ Bailer ☑ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
60+			1hr

Water Temp. Cold Bottom hole temp. Cold
Water Quality test or comments: Clean
Depth first Water Encounter 98'

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8"	0	5	Overburden		✓
8"	5	11	Basalt broken		✓
8"	11	98	Clay brown		✓
8"	98	120	Basalt broken	✓	

Completed Depth 110' (Measurable)
Date: Started 7-9-99 Completed 7-9-99

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Allways Drilling Inc Firm No. 510
Firm Official [signature] Date 7-19-99
and
Driller or Operator [signature] Date 7-9-99
(Sign once if Firm Official & Operator)

46N 2W 27

FORWARD WHITE COPY TO WATER RESOURCES

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Inspected by _____
Twp_____ Rge_____ Sec_____
_____1/4 _____1/4 _____1/4
Lat: : : Long: : :

076453

1. WELL TAG NO. D 0003663 RECEIVED
DRILLING PERMIT NO. _____
Other IDWR No. 92-99-N-4-001 MAR 23 1999

POSTED IDWR/North

2. OWNER:
Name City of St. Maries
Address City Hall
City St. Maries State ID Zip 83861

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location:

N / W / E / S

Twp 46 North [x] or South [ ]
Rge. 2 East [ ] or West [x]
Sec. 22 10 ACRES 1/4 SW 40 ACRES 1/4 NE 160 ACRES 1/4
Gov't Lot _____ County Benewah
Lat: : : Long: : :
Address of Well Site Carney Pole Yard
City St. Maries
(Give at least name of road + Distance to Road or Landmark)

Lt. _____ Blk. _____ Sub. _____ Name _____

4. USE:
[ ] Domestic [ ] Municipal [ ] Monitor [ ] Irrigation
[ ] Thermal [ ] Injection [x] Other Piezometer

5. TYPE OF WORK check all that apply (Replacement etc.)
[x] New Well [ ] Modify [ ] Abandonment [ ] Other _____

6. DRILL METHOD
[ ] Air Rotary [ ] Cable [ ] Mud Rotary [x] Other Geo Probe

7. SEALING PROCEDUR

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0'	2'	1/4 Bag	Gravity
Sand 10-20	2'	30.0'		Natural

Was drive shoe used? [x] Y [ ] N Shoe Depth(s) 3" Probeat 30'
Was drive shoe seal tested? [ ] Y [ ] N How? N/A

8. CASING/LINER:

Diameter	From	To	Guage	Material	Casing	Liner	Welded	Threaded
1"	0'	20.0'	80	PVC	[x]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]

Length of Headpipe _____ Length of Tailpipe _____

9. PERFORATIONS/SCREENS
Perforation Method _____
Screens Screen Type Johnson

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
20.0'	30.0'	0.01	1	1"	PVC	[x]	[ ]
						[ ]	[ ]
						[ ]	[ ]

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
7 ft. Below ground Artesian pressure N/A lb.
Depth flow encountered N/A ft. Describe access port or control devices: _____

11. WELL TESTS:
[ ] Pump [ ] Bailer [ ] Air [ ] Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
N/A			

Water Temp. N/A Bottom hole temp. _____
Water Quality test or comments: _____
Depth first Water Encounter 7'

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
3"	0'	2.0'	Crushed rock		X
3"	2.0'	5.0'	Bark fill, etc.		X
3"	5'	7'	River silt, water at 7'	X	
3"	7'	30'	River Silt	X	

Completed Depth 30.0' (Measurable)
Date: Started 02/10/99 Completed 02/10/99

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Company Name Ruen Drilling, Inc. Firm No. 474
Firm Official _____ Date 22 MAR 99
and
Driller or Operator Kenneth R. Suttle Date 3/17/99
(Sign once if Firm Official & Operator)

46 N 2 W 22

FORWARD WHITE COPY TO WATER RESOURCES

rm 238-7
78

POSTED

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

N

1. WELL OWNER

Name ALLEN TOWNSEND

Address RT 1 Box 247B St. Maries, ID. 83861

Owner's Permit No. 92-80-N-20

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning) _____

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☒ Rotary ☒ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.250 inches	6 inches	+ 1 feet	94 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

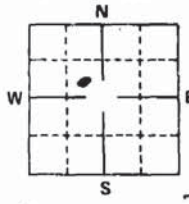
Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter ____ Slot size ____ Set from _____ feet to _____ feet
Diameter ____ Slot size ____ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth 30' Material used in seal: ☐ Cement grout ☒ Puddling clay ☒ Well cuttings
Sealing procedure used: ☐ Slurry pit ☒ Temp. surface casing ☐ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port _____

6. LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name _____
Lot No. _____ Block No. _____

County BENEWAH

SW ¼ NW ¼ Sec. 26, T. 46 (N)S, R. 2 E(W)

7. WATER LEVEL

Static water level 35' feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature 52 °F.. Quality GOOD

8. WELL TEST DATA

☐ Pump ☐ Bailer ☒ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped
- EST 15 GPM	AIR TEST -	

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
8"	0'	2'	TOP SOIL		X
"	2'	20'	LIGHT BROWN CLAY		X
6"	20'	32'	" " "		X
"	32'	35'	BROKEN BASALT		X
"	35'	97'	BROKEN BASALT + DARK BROWN CLAY INTER BEDS		X
"	97'	100'	BROKEN BASALT	X	

AUG 1980

10.

Work started 7-22-80 finished 7-23-80

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Agua Drilling Firm No. 356
Address P.O. 659 HAYDEN LAKE Date 7-23-80
Signed by (Firm Official) _____
and
(Operator) _____

USE ADDITIONAL SHEETS IF NECESSARY -- FORWARD THE WHITE COPY TO THE DEPARTMENT

Form 238-7
1/78

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name Allen Townsend

Address Rt 1 Box 247B St. Maries, Id. 83861

Owner's Permit No. _____

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning) _____

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☒ Rotary ☒ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.250 inches	6 inches	+ 1 feet	94 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

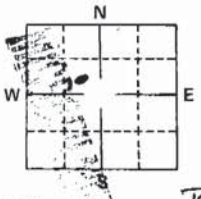
Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth 20' Material used in seal: ☐ Cement grout ☒ Puddling clay ☒ Well cuttings
Sealing procedure used: ☐ Slurry pit ☒ Temp. surface casing ☐ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port _____

6. LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name _____
Lot No. _____ Block No. _____
County Benewah
SW ¼ NW ¼ Sec. 26, T. 46 (N) S, R. 2 E (W)

7. WATER LEVEL

Static water level 35' feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature 52 °F.. Quality Good

8. WELL TEST DATA

☐ Pump ☐ Bailer ☒ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped
-Est 120	PM	Air Test

9. LITHOLOGIC LOG

106461

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
8"	0'	2'	Top Soil		X
"	2'	20'	Light Brown Clay		X
6"	20'	35'	" " "		X
"	32'	35'	Broken Basalt		X
"	35'	97'	Broken Basalt + Dark Brown Clay Inter Beds		X
"	97'	100'	Broken Basalt	X	

RECEIVED DR RECEIVED
AUG 12 1980
Department of Water Resources

10.

Work started 7-22-80 finished 7-23-80

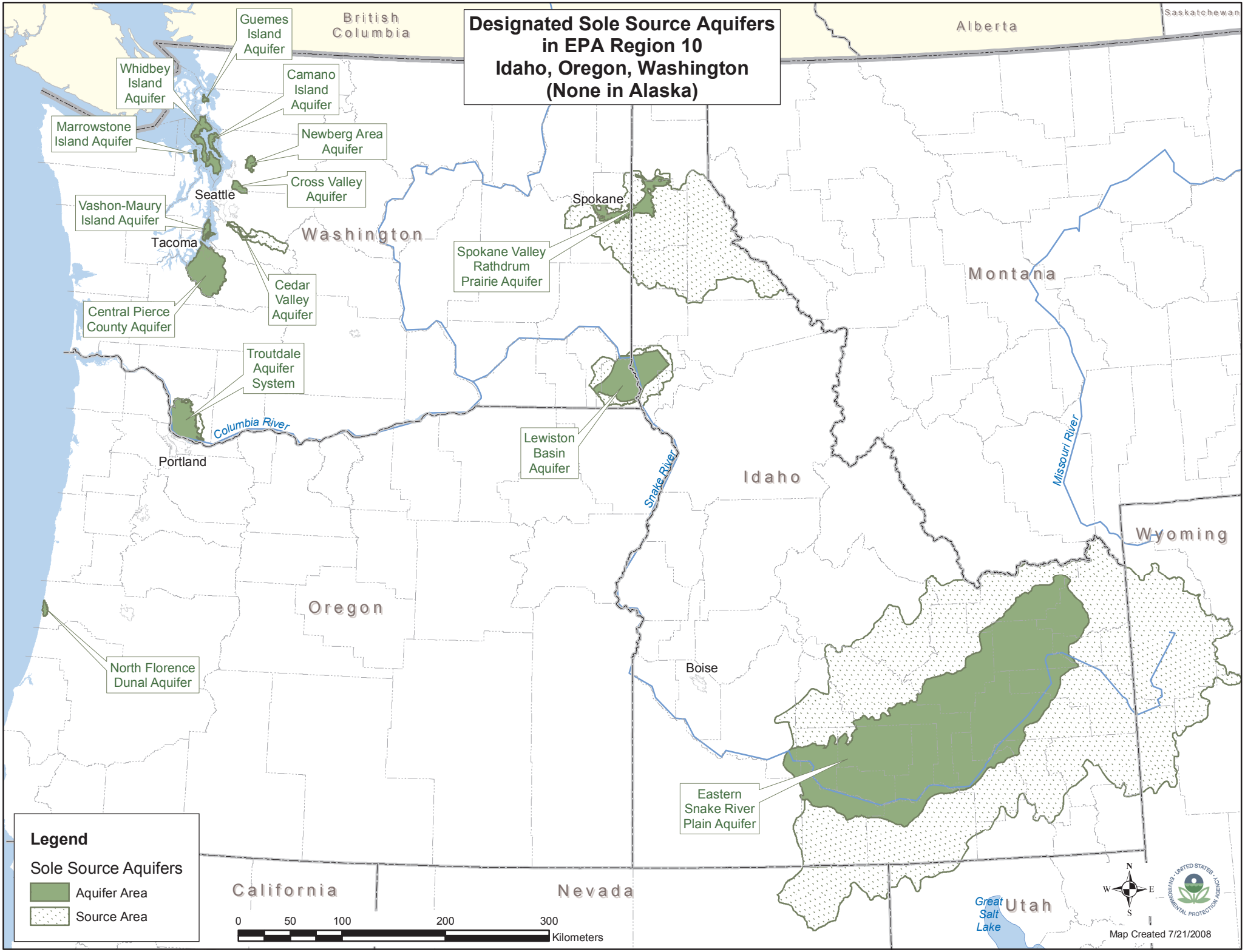
11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Aqua Drilling Firm No. 356
Address P.O. 659 Hayden Lake Date 7-23-80
Signed by (Firm Official) _____
and
(Operator) _____

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Appendix F: Sole Source Aquifer Map


Designated Sole Source Aquifers
in EPA Region 10
Idaho, Oregon, Washington
(None in Alaska)
Guemes Island Aquifer
Whidbey Island Aquifer
Camano Island Aquifer
Marrowstone Island Aquifer
Newberg Area Aquifer
Cross Valley Aquifer
Seattle
Vashon-Maury Island Aquifer
Tacoma
Cedar Valley Aquifer
Central Pierce County Aquifer
Troutdale Aquifer System
Portland
Columbia River
Spokane
Spokane Valley Rathdrum Prairie Aquifer
Lewiston Basin Aquifer
Snake River
Missouri River
North Florence Dunal Aquifer
Boise
Eastern Snake River Plain Aquifer
British Columbia
Alberta
Saskatchewan
Washington
Oregon
Idaho
Montana
Wyoming
California
Nevada
Utah
Great Salt Lake
Legend
Sole Source Aquifers
Aquifer Area
Source Area
0 50 100 200 300
Kilometers
N
W
E
S
Map Created 7/21/2008