JC Wilson Engineering & Consulting, LLC
Innovative - Practical - Strategic

LETTER

DATE: AUGUST 6, 2021

Reference: 2011

Mr. Steve Dayton
Oregon Dunes KOA Campground
68632 U.S. Hwy 101
North Bend, OR 97459

Subject: **Beach & Dune Area Suitability Analysis for the proposed Dunes KOA Campground expansion Section 11c, Township 24S, Range 13W, TL 501 in Coos County, Oregon.**

Greetings Steve:

At your request, I am addressing the suitability of a proposed expansion of the KOA RV Park in the SW ¼ of Section 11, T24S, R13W, Tax Lot 501, Coos County Oregon, regarding areas within Coos County's current Dunes, Ocean and Coastal Lake Shorelands Policy as stipulated in Appendix 1, Section 5.10. This policy requires suitability findings for development including addressing potential adverse impacts to surrounding properties and natural features.

I have included Coos County hazard maps in **Attachment 1.** and am also including USDA Soil Report in **Attachment 2**. to verify soils within TL 501.

The Coos County Soil Survey lists 1 soil formation on the project site: 1B Bandon sandy loam. In general, the Dune Land is clean fine sands. The Bandon is typically a pedon of silty fine sands, and a cemented sand at 40+ inches in depth. It is primarily fine sands and have essentially the same erosion potential when exposed, as the cemented sands tend to weather to clean fine sands. The Bandon soils are typically found in older stabilized dune formations.

Based upon the Coos County's Plan Implementation Strategies, the site was to be evaluated for the following:

4.11.129 Beaches and Dunes (Policy 5.10)
(a) Limited Suitability
(i) Coos County shall permit development within areas designated as "Beach and Dune Areas with Limited Development Suitability" only upon the establishment of findings that consider at least:

(a) The type of use proposed and the adverse effects it might have on the site and adjacent areas;

The proposal is to construct RV Spaces, parking and yard area, limited access, and utilities on current site.

The issue to be addressed is movement of the sandy soils which exist and destabilization of adjoining properties and/or movement of sandy soils onto other properties.

The proposed development is within a stabilized dune formation, identified on the Coos County Beaches and Dunes map (accessed via Coastal Atlas) as a combination of Suitable for Most Uses (eastern side) and Limited Suitability (western side). See Attachment 1 for Coos County Beaches and Dunes map.

Likely impacts to the adjoining lands are both temporal and are to be limited through application of erosion control measures required by the Oregon Dept. of Environmental Quality (DEQ) and the Clean Water Act.

Proposed stabilization will include limiting constructed slopes to not steeper than 2H:1V and stabilizing these slopes with primarily erosion control fabrics and seeding of natural grasses (drought tolerant) and shrubs. Some replanting of natural forest species is also anticipated.

Existing forest is in a commercial sense, poor. Due to harsh exposure conditions the forest established on this dune formation is slow growing, limited in preferred market species, and typically poor-quality wood due to exposure conditions causing twist, rot and breakage of the tree species. It does however provide some habitat for wildlife and stabilization of soils.

The impacts anticipated therefore are temporal in relation to the potential for dune movement, controlled by planned erosion control measures, and do not reduce viable commercial forest.

b) The need for temporary and permanent stabilization programs and the planned maintenance of new and existing vegetation.

It is anticipated that the expansion portion of the property will be primarily cleared, which includes areas of graveled (prior private campground) area, area which has been cleared of primarily blackberry species by and excavator, and areas disturbed by ATV use. Planting of new vegetation is proposed to be native plant materials, which have been utilized successfully for short- and long-term stabilization on surrounding developments. Maintenance of the vegetation is required by DEQ and federal erosion control requirements for a minimum of 5 years, or until established ground cover is dense enough to emulate natural vegetation densities.

c) The need for methods for protecting the surrounding area from any adverse effects of the development; and

The planned and DEQ-required erosion control measures are anticipated to be sufficient to protect surrounding area from potential adverse effect of the development.

The disturbed area, which is not covered by an aggregate paving or a structure, will be vegetated with native grasses, trees, or shrubs, as well as volunteer native vegetation.

In addition, surrounding properties are separated by U.S. Hwy 101 (east), the lake (south and west), and approximately 350-400 feet of undisturbed dune area vegetated with trees and shrubs (north and west), and developed campground (south).

d) Hazards to life, public and private property, and the natural environment which may be caused by the proposed use.

Expected hazards due to soil disturbance are minimal, based upon the assumption that construction will comply with required erosion control measures and building codes requirements.

4.11.129 Beaches and Dunes (Policy 5.10)
(a) Limited Suitability

(ii) Further, Coos County shall cooperate with affected local, state and federal agencies to protect the groundwater from drawdown, which would lead to loss of stabilizing vegetation, loss of water quality, or intrusion of saltwater into water supplies. Coos County shall cooperate with state and federal agencies in regulating the following actions in the beach and dune areas with limited development potential:

This site investigation report shows that the development is unlikely to cause:

a) Destruction of desirable vegetation (including inadvertent destruction by moisture loss or root damage);

Care in grading and drainage will be taken with the development to provide filter vegetation and maintain large woody vegetation for a wind buffer.

b) The exposure of stable and conditionally stable areas to erosion;

Vegetation removal is either replaced by other soil stabilizing materials (i.e., aggregate surfacing) or as required by Oregon DEQ to be stabilized with replacement vegetation after disturbance. Temporal and controlled exposure will occur during construction.

c) Construction of shore structures which modify current air wave patterns leading to beach erosion; and

Riparian buffers are to remain. Subject property is approximately 1.8 miles east of the ocean and significant dune forms exist between.

d) Any other development actions with potential adverse impacts.

The proposed development is well shielded from the NW winds, is leaving significant vegetation around the development, and has no abnormal potential for adverse impact.

The installation of this new development of this site has no adverse long-term impacts, or short-term impacts expected to exist for a maximum of two years in any large-scale areas until vegetation is well established on site. It is my opinion that this project will have limited, short term detrimental effects on all the concerns listed in Coos County's Dunes and Coastal

Shorelands plan implementation strategies as the proposed development includes mitigation plans for erosion and habitat impacts.

Please feel free to contact JCW at 208.553.6742 if you have any questions.

JC Wilson Engineering & Consulting, LLC

Justin C. Wilson, PE
Principal Engineer

JCW:jcw

Attachments: 1. Coos County Hazard Maps
2. USDA Soils Report

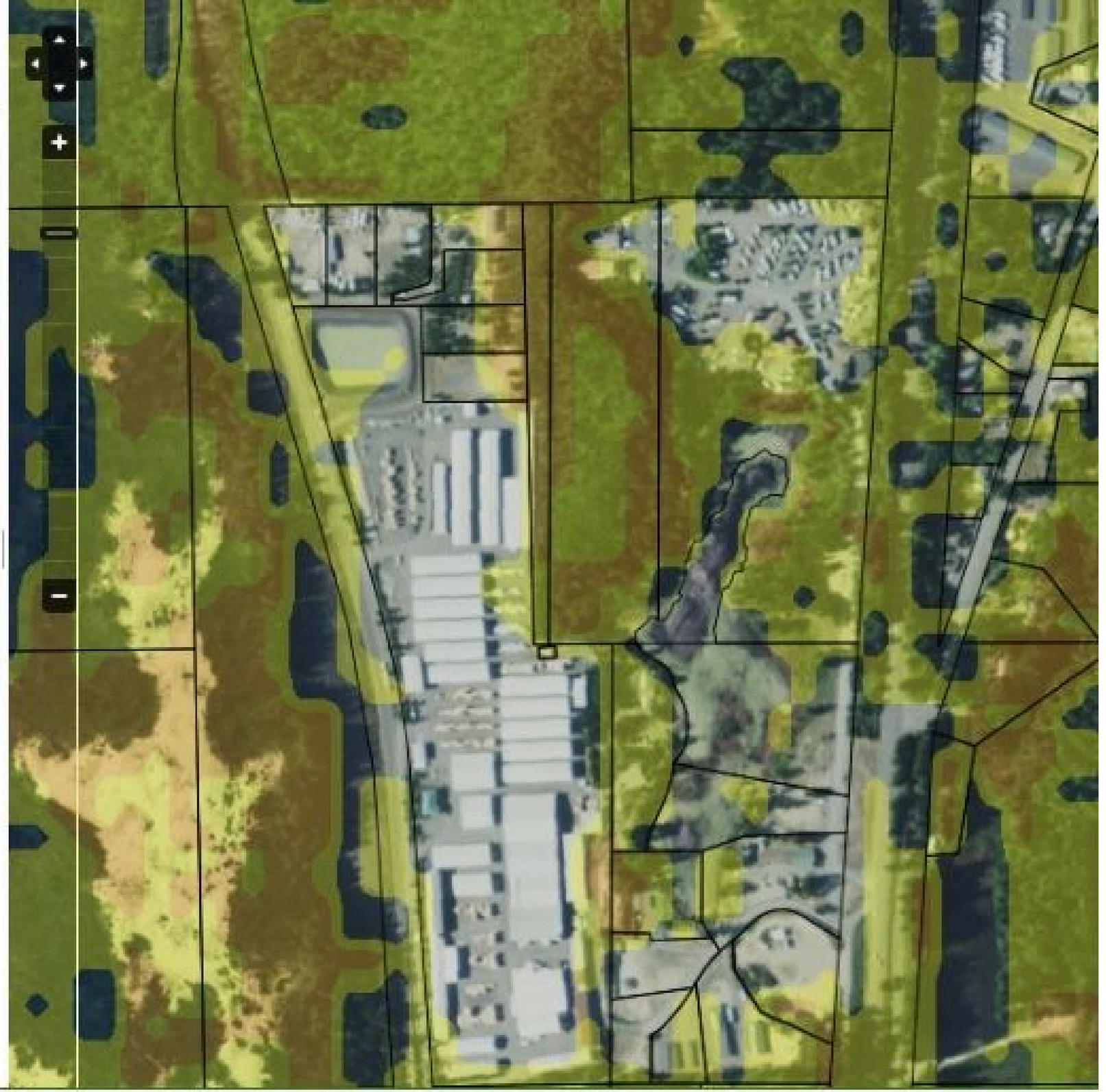
Coos County Hazard Maps 1


500
24S13W11
501
800
1100
24S13W11CB

Jump To:

Catalog

- Map Extras
- Coastal Inventory Data
  - Beachfront Protective Structures Inventory, OPRD, 2015
  - Goal 18 Eligibility Inventory, OCMP, 2015
  - Dune Classifications, USDA, 1975
- Beaches and Dunes - Goal 18
  - Coos County
- Natural Hazards
  - Flood
  - Sea Level Rise
  - Tsunami
  - Landslide
    - [x] Landslide Susceptibility, DOGAMI, 2013
      - Low - Landsliding Unlikely
      - Moderate - Landsliding Possible
      - High - Landsliding Likely
      - Very High - Existing Landslide
  - Liquefaction
    - [ ] Liquefaction Susceptibility, DOGAMI
- Active Earthquake Faults
  - [ ] Active Earthquake Faults, USGS, 2003
- Estuary Maps
  - [ ] Estuary Mgmt Units, 1987
  - [ ] Coos Coastal Shorelands Boundary
  - [ ] Coos County LWI, 2014
  - National Wetland Inventory
  - Soils
- Administrative Boundaries
  - [ ] Statutory Vegetation Line, OPRD, 1967
  - [x] Coos Tax lots



GeoMOOSE 2.9.3

X,Y: -13829030, 5388229 Lat, Lon: 43.499, -124.228 USNG: 10T

Jump To:

Catalog

- Map Extras
- Coastal Inventory Data
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  - Goal 18 Eligibility Inventory, OCMP, 2015
  - Dune Classifications, USDA, 1975
- Beaches and Dunes - Goal 18
  - Coos County
- Natural Hazards
  - Flood
  - Sea Level Rise
  - Tsunami
  - Landslide
    - Landslide Susceptibility, DOGAMI, 2013
  - Liquefaction
    - Liquefaction Susceptibility, DOGAMI

None
Very Low
Low
Moderate
High
Very High

  - Active Earthquake Faults
    - Active Earthquake Faults, USGS, 2003
- Estuary Maps
  - Estuary Mgmt Units, 1987
  - Coos Coastal Shorelands Boundary
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- Map Extras
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    - Beachfront Protective Structures
  - [ ] Goal 18 Eligibility Inventory, OCMP, 2015
  - [ ] Dune Classifications, USDA, 1975
- Beaches and Dunes - Goal 18
  - Coos County
    - [ ] Development Suitability
- Natural Hazards
  - Flood
  - Sea Level Rise
  - Tsunami
  - Landslide
    - [ ] Landslide Susceptibility, DOGAMI, 2013
  - Liquefaction
    - [ ] Liquefaction Susceptibility, DOGAMI
  - Active Earthquake Faults
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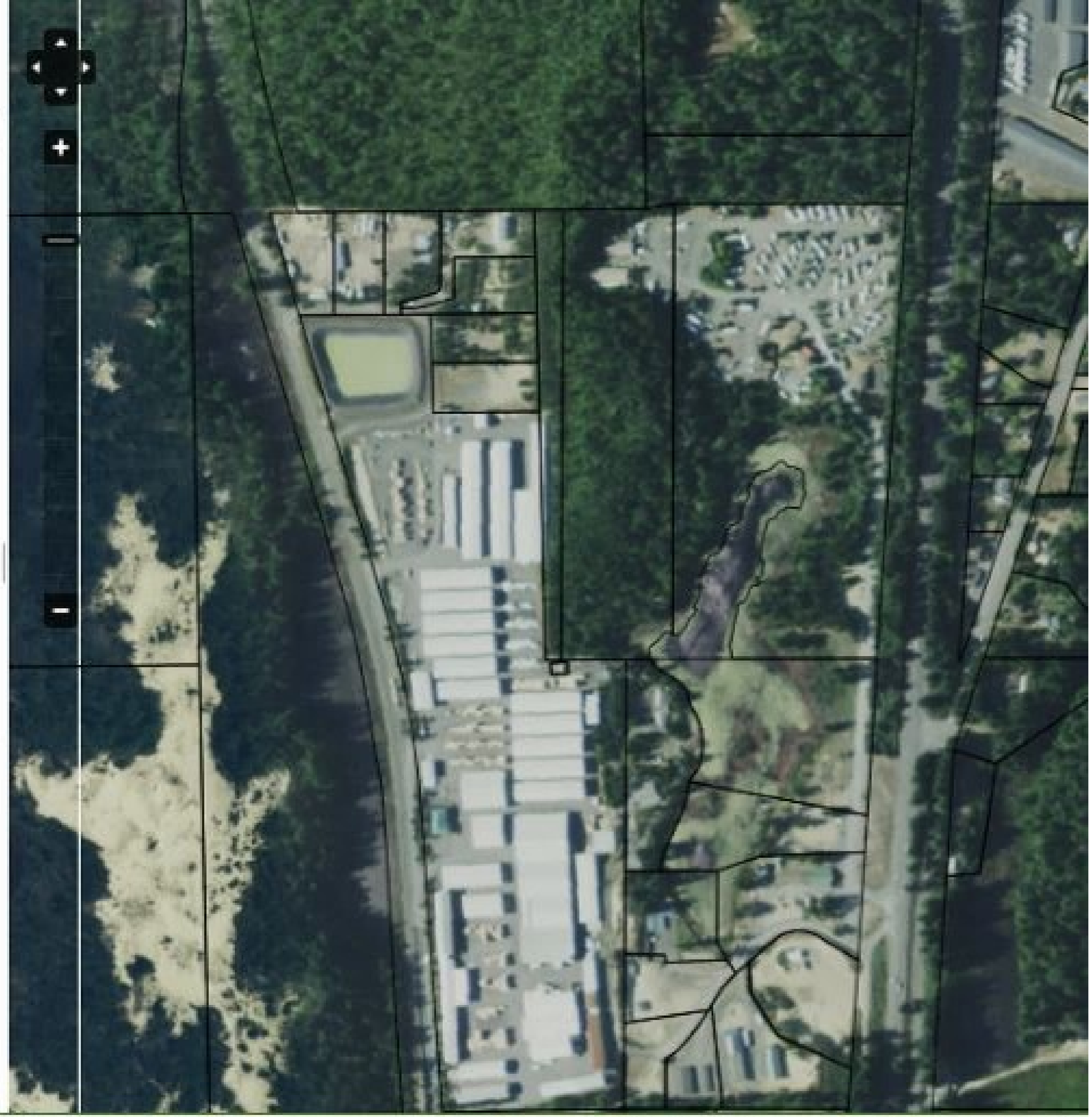
  - [ ] Statutory Vegetation Line, OPRD, 1967
  - [x] Coos Tax lots
  - [ ] City Limits
  - [ ] Urban Growth Boundaries



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Jump To:

Catalog

- Map Extras
- Coastal Inventory Data
  - Beachfront Protective Structures Inventory, OPRD, 2015
  - Goal 18 Eligibility Inventory, OCMP, 2015
  - Dune Classifications, USDA, 1975
- Beaches and Dunes - Goal 18
  - Coos County
    - Development Suitability
      - Limited Suitability
      - Not Suitable
      - Suitable For Most Uses
- Natural Hazards
  - Flood
  - Sea Level Rise
  - Tsunami
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  - Statutory Vegetation Line, OPRD, 1967
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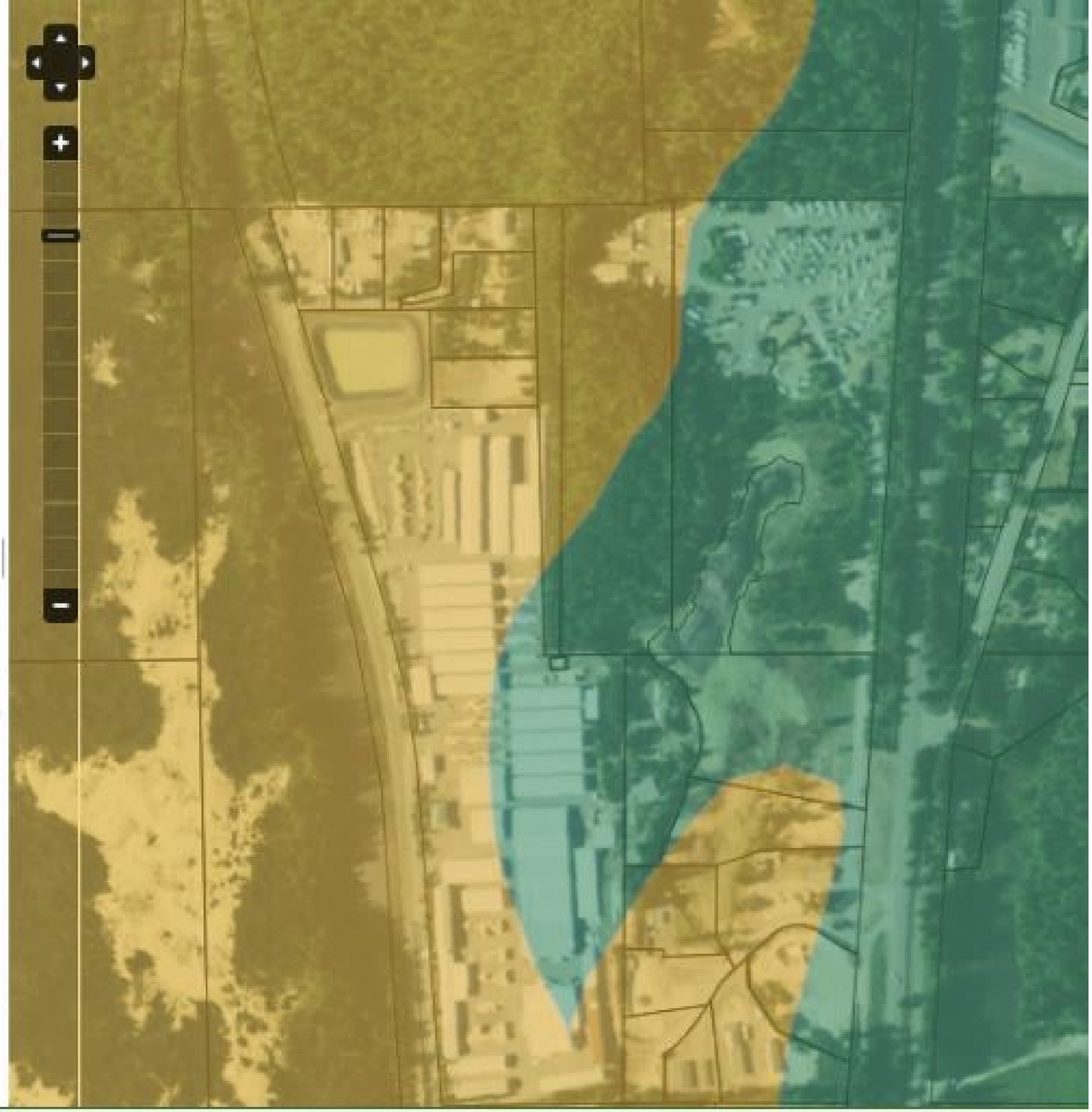

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Catalog

- Liquefaction Susceptibility, DOGAMI
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  - Active Earthquake Faults, USGS, 2003
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  - Estuary Mgmt Units, 1987
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  - Statutory Vegetation Line, OPRD, 1967
  - Coos Tax lots
  - City Limits
  - Urban Growth Boundaries
  - County Boundaries
  - State Parks
  - Coos County Zoning, 2019
- Base Maps and Photos
  - Printable Base Maps
    - Modern Ortho Photos
      - NAIP Color Aerials 2016
      - NAIP Color Aerials 2014
      - NAIP Color Aerials 2011
      - None
    - Lidar Hillshades
  - Non-Printable Base Maps
    - ESRI World Imagery
    - ESRI World Topographic Map
    - USGS Topographic Maps
    - OpenStreetMap - Color
    - Carto Light Grey Base
    - None

GeoMOOSE 2.9.3

X,Y: -13828180, 5388382 Lat, Lon: 43.500, -124.221 USNG: 10T DP 01316 17059

USDA Soils Report 2

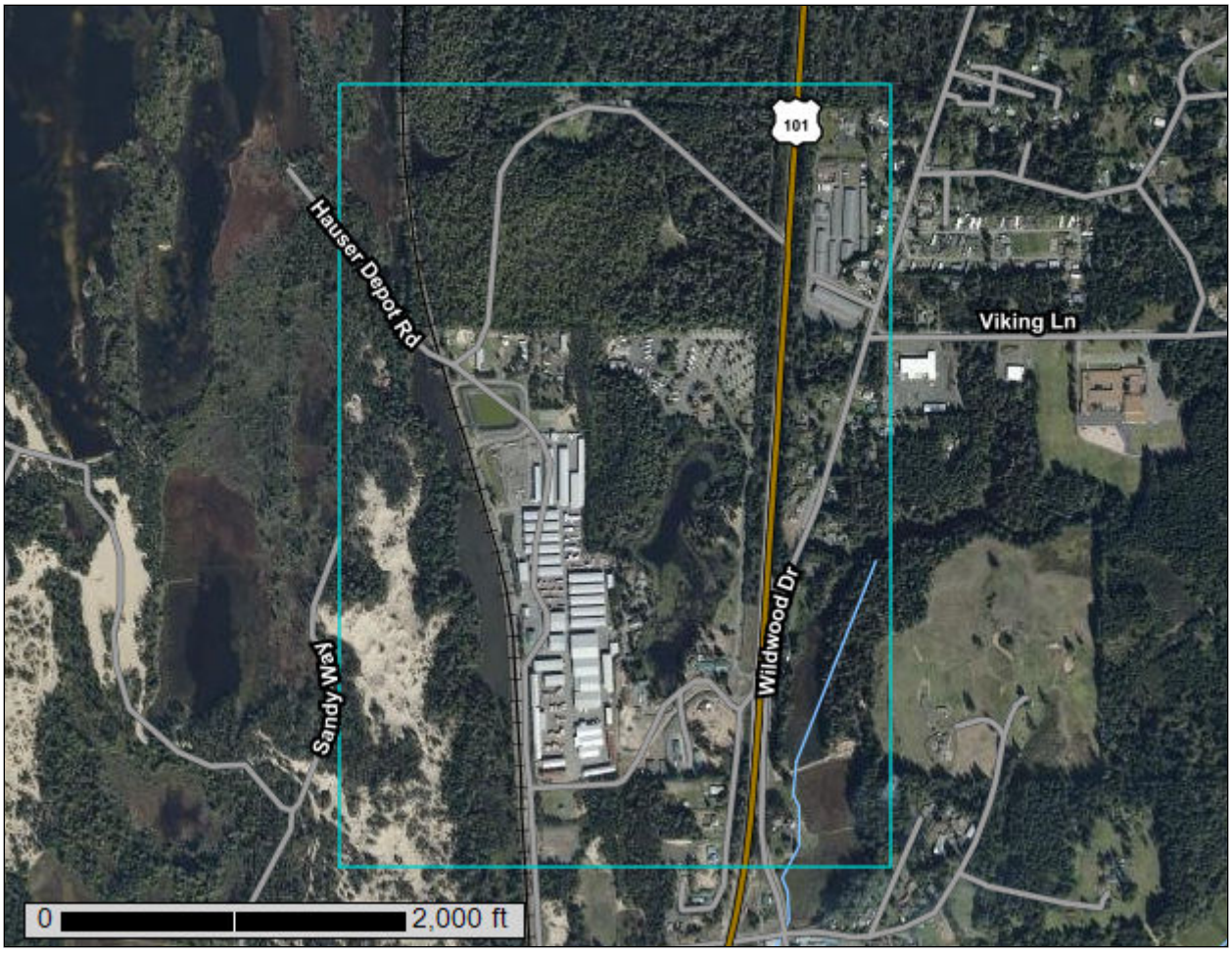
United States Department of Agriculture

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 Coos County, Oregon



July 23, 2021

Preface

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

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

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

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

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

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

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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.

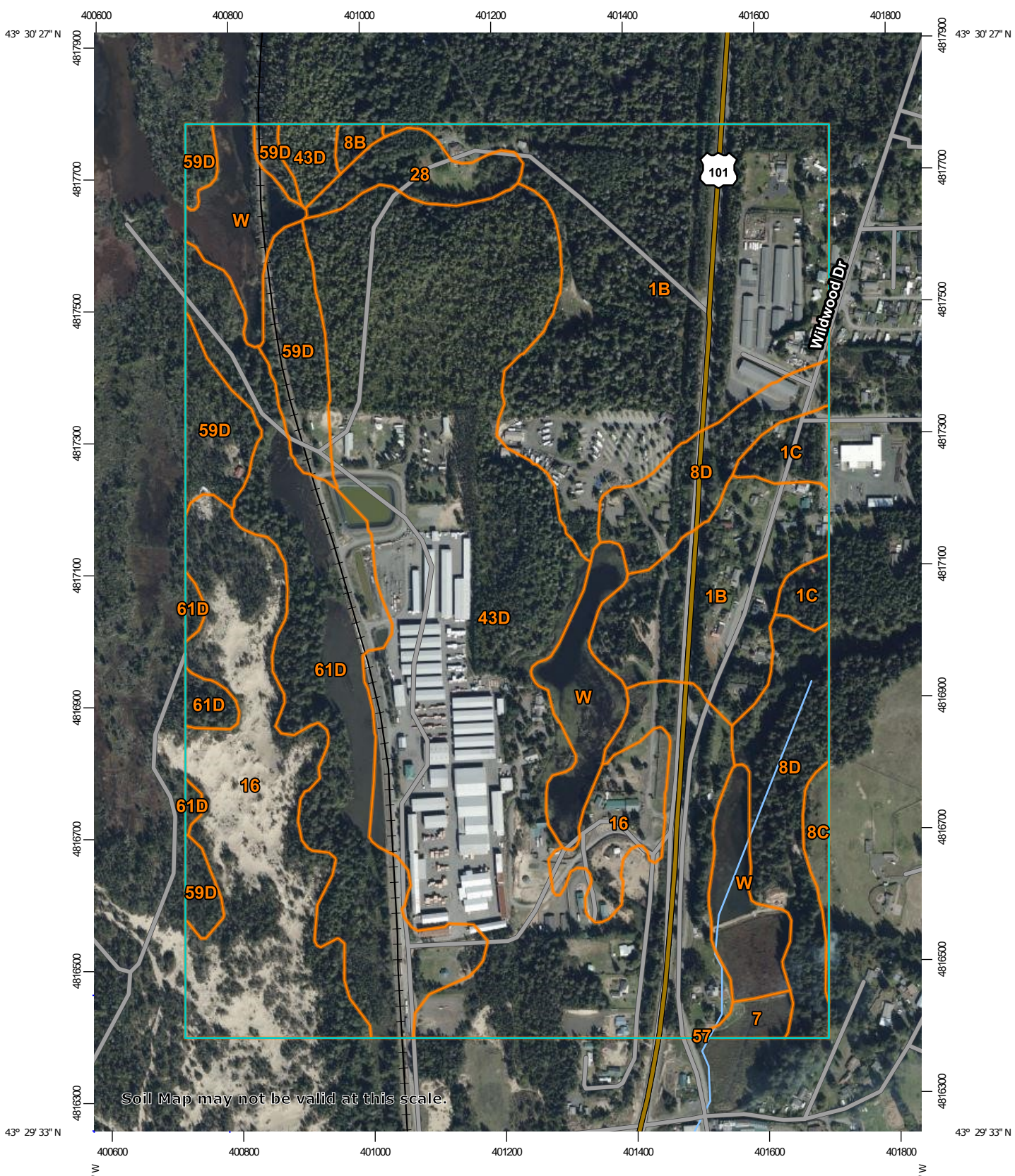
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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 (Hauser KOA)



Map Scale: 1:8,110 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 100 200 400 600

Feet
0 350 700 1400 2100

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Coos County, Oregon
Survey Area Data: Version 15, Jun 11, 2020

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

Date(s) aerial images were photographed: Oct 5, 2019—Oct 10, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Hauser KOA)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1B	Bandon sandy loam, 0 to 7 percent slopes	75.3	22.4%
1C	Bandon sandy loam, 7 to 12 percent slopes	4.5	1.3%
7	Brallier mucky peat	1.6	0.5%
8B	Bullards sandy loam, 0 to 7 percent slopes	0.8	0.2%
8C	Bullards sandy loam, 7 to 12 percent slopes	1.8	0.5%
8D	Bullards sandy loam, 12 to 30 percent slopes	22.6	6.7%
16	Dune land	39.7	11.8%
28	Heceta fine sand	5.5	1.6%
43D	Netarts loamy fine sand, 2 to 30 percent slopes	111.7	33.2%
57	Udorthents, level	0.0	0.0%
59D	Waldport fine sand, 0 to 30 percent slopes	15.7	4.7%
61D	Waldport-Heceta fine sands, 0 to 30 percent slopes	36.5	10.9%
W	Water	20.6	6.1%
Totals for Area of Interest		**336.4**	**100.0%**

Map Unit Descriptions (Hauser KOA)

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.

Coos County, Oregon

1B—Bandon sandy loam, 0 to 7 percent slopes

Map Unit Setting

National map unit symbol: 21mr
Elevation: 30 to 350 feet
Mean annual precipitation: 55 to 75 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Bandon

Setting

Landform: Marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
H1 - 1 to 6 inches: sandy loam
H2 - 6 to 31 inches: loam
H3 - 31 to 44 inches: cemented
H4 - 44 to 61 inches: loam

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: 20 to 36 inches to ortstein
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 capacity: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Forage suitability group: Well Drained <15% Slopes (G004AY014OR)
Other vegetative classification: Well Drained <15% Slopes (G004AY014OR)
Hydric soil rating: No

Minor Components

Blacklock

Percent of map unit: 10 percent

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

1C—Bandon sandy loam, 7 to 12 percent slopes

Map Unit Setting

National map unit symbol: 21ms
Elevation: 30 to 350 feet
Mean annual precipitation: 55 to 75 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Bandon

Setting

Landform: Marine terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
H1 - 1 to 6 inches: sandy loam
H2 - 6 to 31 inches: loam
H3 - 31 to 44 inches: cemented
H4 - 44 to 61 inches: loam

Properties and qualities

Slope: 7 to 12 percent
Depth to restrictive feature: 20 to 36 inches to ortstein
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 capacity: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C
Forage suitability group: Well Drained <15% Slopes (G004AY014OR)
Other vegetative classification: Well Drained <15% Slopes (G004AY014OR)
Hydric soil rating: No

Minor Components

Blacklock
Percent of map unit: 10 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

7—Brallier mucky peat

Map Unit Setting
National map unit symbol: 21qx
Elevation: 0 to 40 feet
Mean annual precipitation: 50 to 100 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 180 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition
Brallier and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brallier

Setting
Landform: Flood plains, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Organic residue from water tolerant plants

Typical profile
Oe1 - 0 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: FrequentNone
Frequency of ponding: Frequent

Available water capacity: Very high (about 20.9 inches)

Interpretive groups

Land capability classification (irrigated): 5w
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Brallier, nonflooded

Percent of map unit: 6 percent
Landform: Marine terraces
Hydric soil rating: Yes

Coquille

Percent of map unit: 6 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Very Poorly Drained (G004AY019OR)
Hydric soil rating: Yes

Histosols, mineral soil substratum

Percent of map unit: 6 percent
Landform: Flood plains
Hydric soil rating: Yes

Chetco

Percent of map unit: 6 percent
Landform: Flood plains, deltas
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Very Poorly Drained (G004AY019OR)
Hydric soil rating: Yes

Langlois

Percent of map unit: 6 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Very Poorly Drained (G004AY019OR)
Hydric soil rating: Yes

8B—Bullards sandy loam, 0 to 7 percent slopes

Map Unit Setting

National map unit symbol: 21rc
Elevation: 30 to 600 feet

Mean annual precipitation: 55 to 75 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Bullards and similar soils: 75 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bullards

Setting

Landform: Marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed eolian and marine deposits

Typical profile

Oi - 0 to 3 inches: slightly decomposed plant material
H1 - 3 to 10 inches: sandy loam
H2 - 10 to 44 inches: gravelly sandy loam
H3 - 44 to 63 inches: sand

Properties and qualities

Slope: 0 to 7 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 capacity: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Forage suitability group: Well Drained <15% Slopes (G004AY014OR)
Other vegetative classification: Well Drained <15% Slopes (G004AY014OR)
Hydric soil rating: No

Minor Components

Blacklock

Percent of map unit: 9 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

8C—Bullards sandy loam, 7 to 12 percent slopes

Map Unit Setting

National map unit symbol: 21rd
Elevation: 30 to 600 feet
Mean annual precipitation: 55 to 75 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Bullards and similar soils: 75 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bullards

Setting

Landform: Marine terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed eolian and marine deposits

Typical profile

Oi - 0 to 3 inches: slightly decomposed plant material
H1 - 3 to 10 inches: sandy loam
H2 - 10 to 44 inches: gravelly sandy loam
H3 - 44 to 63 inches: sand

Properties and qualities

Slope: 7 to 12 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 capacity: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Forage suitability group: Well Drained <15% Slopes (G004AY014OR)
Other vegetative classification: Well Drained <15% Slopes (G004AY014OR)
Hydric soil rating: No

Minor Components

Blacklock

Percent of map unit: 8 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

8D—Bullards sandy loam, 12 to 30 percent slopes

Map Unit Setting

National map unit symbol: 21rf
Elevation: 30 to 600 feet
Mean annual precipitation: 55 to 75 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Bullards and similar soils: 75 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bullards

Setting

Landform: Marine terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed eolian and marine deposits

Typical profile

Oi - 0 to 3 inches: slightly decomposed plant material
H1 - 3 to 10 inches: sandy loam
H2 - 10 to 44 inches: gravelly sandy loam
H3 - 44 to 63 inches: sand

Properties and qualities

Slope: 12 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 capacity: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Forage suitability group: Well Drained >15% Slopes (G004AY013OR)
Other vegetative classification: Well Drained >15% Slopes (G004AY013OR)
Hydric soil rating: No

Minor Components

Blacklock

Percent of map unit: 8 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

16—Dune land

Map Unit Setting

National map unit symbol: 21mm
Elevation: 0 to 100 feet
Mean annual precipitation: 50 to 70 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Dune land: 80 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dune Land

Setting

Landform: Dunes on marine terraces
Parent material: Eolian sands

Typical profile

C - 0 to 60 inches: fine sand

Interpretive groups

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

Minor Components

Heceta

Percent of map unit: 10 percent

Landform: Deflation basins on dunes
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

28—Heceta fine sand

Map Unit Setting

National map unit symbol: 21n8
Elevation: 0 to 80 feet
Mean annual precipitation: 50 to 70 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Heceta

Setting

Landform: Deflation basins on dunes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits

Typical profile

H1 - 0 to 4 inches: fine sand
H2 - 4 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water capacity: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Poorly Drained (G004AY018OR)
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

43D—Netarts loamy fine sand, 2 to 30 percent slopes

Map Unit Setting

National map unit symbol: 21p3
Elevation: 0 to 200 feet
Mean annual precipitation: 50 to 70 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Netarts and similar soils: 75 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Netarts

Setting

Landform: Dunes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 5 inches: loamy fine sand
H2 - 5 to 31 inches: fine sand
H3 - 31 to 61 inches: fine sand

Properties and qualities

Slope: 2 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): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Heceta

Percent of map unit: 6 percent
Landform: Deflation basins on dunes
Down-slope shape: Linear

Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

57—Udorthents, level

Map Unit Setting

National map unit symbol: 21q6
Elevation: 0 to 460 feet
Mean annual precipitation: 58 to 65 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 255 to 290 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Udorthents

Setting

Landform: Tidal flats, marshes, flood plains
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium, dredging spoil, dune sand, and wood chips

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

59D—Waldport fine sand, 0 to 30 percent slopes

Map Unit Setting

National map unit symbol: 21q8
Elevation: 0 to 120 feet
Mean annual precipitation: 50 to 70 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Waldport and similar soils: 75 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Waldport

Setting

Landform: Dunes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian sands

Typical profile

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

Properties and qualities

Slope: 0 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.6 inches)

Interpretive groups

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

Minor Components

Heceta

Percent of map unit: 9 percent
Landform: Deflation basins on dunes
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

61D—Waldport-Heceta fine sands, 0 to 30 percent slopes

Map Unit Setting

National map unit symbol: 21qf
Elevation: 0 to 80 feet
Mean annual precipitation: 50 to 70 inches

Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Waldport and similar soils: 50 percent
Heceta and similar soils: 30 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Waldport

Setting

Landform: Dunes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian sands

Typical profile

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

Properties and qualities

Slope: 0 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.6 inches)

Interpretive groups

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

Description of Heceta

Setting

Landform: Interdunes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits

Typical profile

H1 - 0 to 4 inches: fine sand
H2 - 4 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches

Frequency of flooding: None
Frequency of ponding: Frequent
Available water capacity: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Poorly Drained (G004AY018OR)
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

Minor Components

Yaquina

Percent of map unit: 7 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Somewhat Poorly Drained (G004AY017OR)
Hydric soil rating: Yes

W—Water

Map Unit Composition

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

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