STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
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Detailed Geology and Other Factors Related to the Suitability of Potential Cable Landing Sites in the Gold Beach Area, Southern Oregon Coast

2023

SP-54

Geologic Assessment of Potential Cable Landing Sites Along the Oregon Coast

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Plate 1

Introduction

The six panels on this plate illustrate geologic and geomorphic data that support our analysis of suitability of potential cable landing sites in the Gold Beach area on the southern Oregon Coast. The larger map scale of this plate portrays details of the geospatial data that are not visible in summary figures of the accompanying report. The oldest bedrock units of the Oregon Coast are exposed in the southern sector, as exemplified by the Gold Beach area (Panel 1) (McClaughry and others, 2013; J.D. McClaughry and T.J. Wiley, unpub. data, 2016; Franczyk and others, 2020). Diverse packages of Jurassic to Cretaceous volcanic, intrusive igneous, metamorphic, and sedimentary rocks are juxtaposed by a network of north-northwest trending fault zones. Discontinuous rocky seafloor outcrops are common near shore and scattered across the Oregon Territorial Sea, with shelf sand and mud present in the intervening area. (Panel 2). Along jet ski survey lines, many reefs correspond with previously mapped areas of rock substrate, although reefs are identified outside of previously known rocks, and other mapped areas of rocky seafloor lack continuous steep expression (Panel 2).

Rocky headlands capped by bluffs tens of meters (tens to hundreds of feet high) occur where resistant sandstone and chert crop out near the shoreline (Panels 1 and 3). Unconsolidated Quaternary surficial units occur along the coastal fringe as beach and marine terrace deposits and along the Rogue River valley (Panel 1). The thickness of Quaternary sediment is generally less than 45 m (150 ft) as shown by water wells constructed in the area (Panel 4). Landslides are common in steeper areas of the topography, with generally low mapped susceptibility along the coast where marine terraces are more extensive, and higher susceptibility along more rugged sections of the coastline (Panel 5). Consideration of all of the factors in our suitability analysis indicates that there are patches of the coastline in this map area that appear generally compatible with constructing cable landings, particularly in sectors of the coast where relatively sandy seafloor in the Territorial Sea lies offshore of marine terrace platforms (Panel 6).

Study Extent Location Map



Scale and Orientation

All panels are at the same scale and orientation as scale bar and north arrow below.

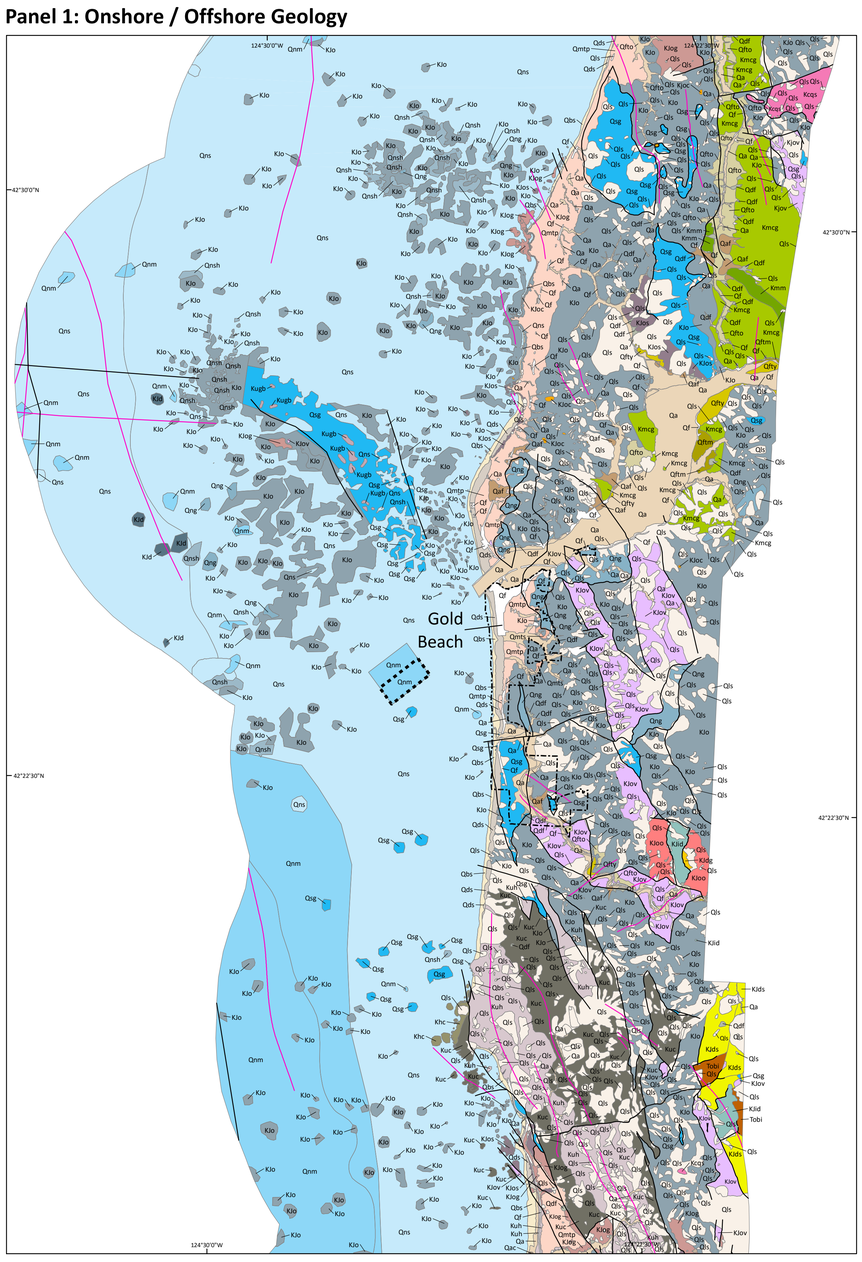
Scale = 1 : 63,360

N

0 1 2 Miles

0 1 2 Km

Panel 1: Onshore / Offshore Geology



City Limits
Ocean Disposal Site

Geologic Structures

Fault
Fold

List of Map Units

Quaternary Surficial Deposits

Qf — modern fill and construction material (upper Holocene)
Qac — stream channel deposits of gravel, sand, and silt (upper Holocene)
Qbs — active ocean beach deposits of sand, gravel, and shells (upper Holocene)
Qrf — rock fall and colluvium deposited beneath steep slopes (Holocene)
Qa — stream channel and flood plain deposits of gravel, sand, and silt (Holocene and upper Pleistocene[?])
Qaf — alluvial fan deposits of gravel, sand, silt, clay, and woody debris (Holocene and upper Pleistocene[?])
Qls — landslide deposits of rock and soil (Holocene and upper Pleistocene[?])
Qds — upland coastal dune deposits of well-sorted sand (Holocene[?] and upper Pleistocene[?])
Qdf — debris fan deposits of gravel, sand, silt, clay, and woody debris (Holocene and upper Pleistocene[?])
Qfty — younger fluvial terrace deposits of gravel and sand (Holocene and upper Pleistocene[?])
Qftm — middle fluvial terrace deposits of gravel and sand (Holocene and upper Pleistocene[?])
Qfto — older fluvial terrace deposits of gravel and sand (Holocene and upper Pleistocene[?])
Qmtp — Pioneer terrace deposits of gravel and sand (upper Pleistocene, ~105 ka)
Qmts — Silver Butte terrace deposits of gravel and sand (upper to middle Pleistocene, ~125 ka)

Quaternary Offshore Surficial Deposits

Qns — nearshore deposits of sand and mud (Quaternary)
Qng — nearshore deposits of gravel and mud (Quaternary)
Qnsh — nearshore shell deposits (Quaternary)
Qnm — nearshore mud deposits (Quaternary)
Qsg — shelf gravel deposits (Quaternary)

Gold Beach Terrane

Kmm — well-bedded shale and mudstone (Lower Cretaceous)
Kmcg — pebble conglomerate (Lower Cretaceous)

Cretaceous and Upper Jurassic Gold Beach Terrane

Kugb — sedimentary rocks, undivided, sandstone, conglomerate, and mudstone (Upper [?] Cretaceous)
Kuh — Hunters Cove Formation - siltstone and mudstone (Upper Cretaceous)
Kuhc — Humbug Mountain Conglomerate - boulder and cobble conglomerate (Upper Cretaceous)
Kuc — Cape Sebastian Sandstone, sandstone and conglomerate (Upper Cretaceous)
Khc — Housetanaden Creek Formation - mudstone, siltstone, sandstone, and conglomerate (Upper Cretaceous)
Klo — Otter Point Formation - volcaniclastic sandstone, mudstone, shale, and conglomerate (Lower Cretaceous and Upper Jurassic)
Klos — Otter Point Formation - sandstone and mudstone (Lower Cretaceous and Upper Jurassic)
Klog — Otter Point Formation, conglomerate (Lower Cretaceous and Upper Jurassic)
Kloc — Otter Point Formation, chert (Lower Cretaceous and Upper Jurassic)
Klov — Otter Point Formation, volcanic rocks (Lower Cretaceous and Upper Jurassic)
Kloo — Otter Point Formation, pillow lava (Lower Cretaceous and Upper Jurassic)

Lower Cretaceous and Upper Jurassic Pickett Peak Terrane

Kcqs — Colebrooke Schist, quartz-mica phyllite and quartz-mica schist (Upper Jurassic origin, Lower Cretaceous or later emplacement)

Lower Cretaceous [?] and/or Upper Jurassic [?] Western Klamath Terrane

Kjid — diorite (Lower Cretaceous [?] and/or Upper Jurassic [?])

Lower Cretaceous and Jurassic Yolla Bolly Terrane

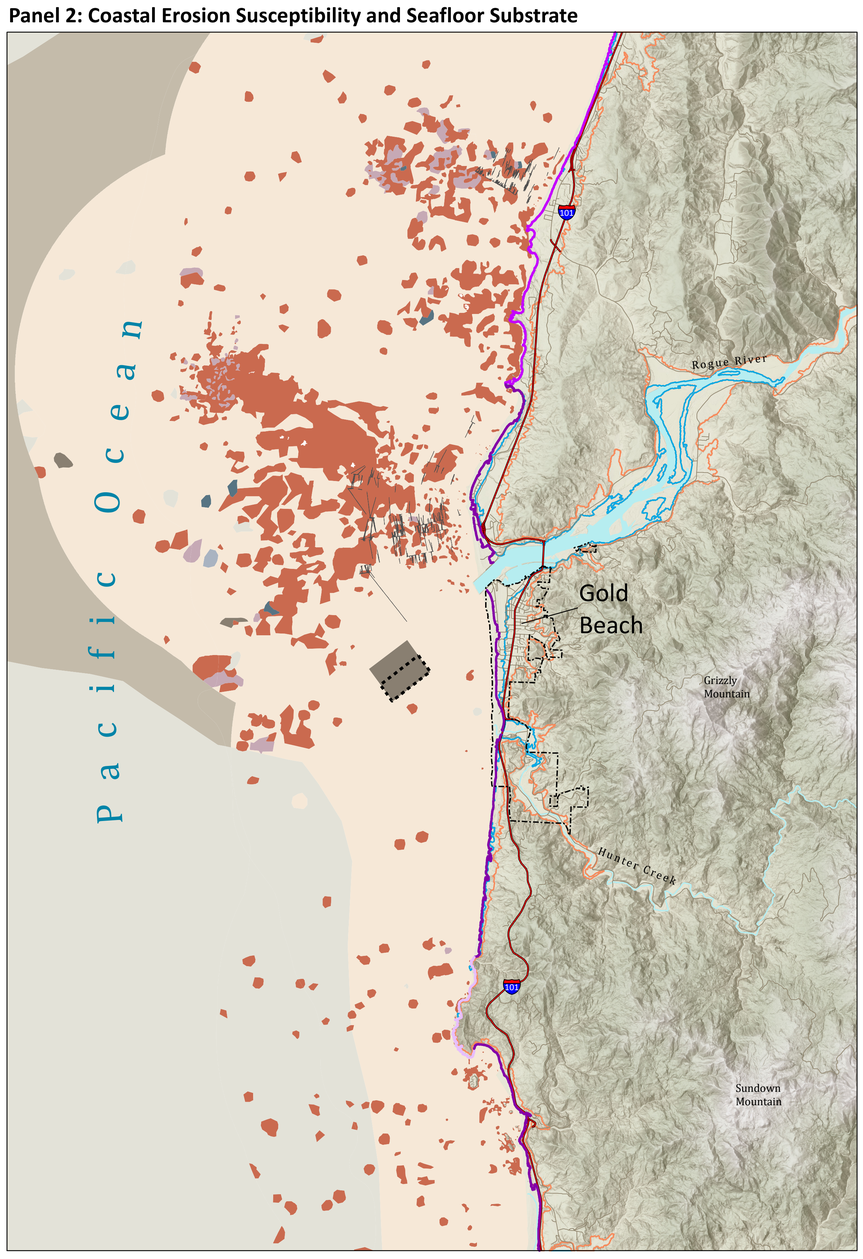
Kjd — Dothan Formation, sandstone and mudstone and less common volcanic rock and chert (Upper Cretaceous and Upper Jurassic)
Kjds — Dothan Formation, mudstone and sandstone (Upper Cretaceous and Upper Jurassic)
Kjdg — Dothan Formation, conglomerate (Upper Cretaceous and Upper Jurassic)

Other Rocks

Tobi — intrusive basalt (Oligocene)
Spu — serpentinized ultramafic rock (Cretaceous [?] and Upper Jurassic [?])

Data Sources:
Geology: This report, modified from: McClaughry and others, 2013; J.D. McClaughry and T.J. Wiley, unpub. data, 2016; and Franczyk and others, 2020
Ocean disposal sites: OCM, 2023a

Panel 2: Coastal Erosion Susceptibility and Seafloor Substrate



City Limits
Road
US Highway 101
Ocean Disposal Site
River
Reef

Coastal Erosion Score

Low
Medium
High

Tsunami Evacuation Zones

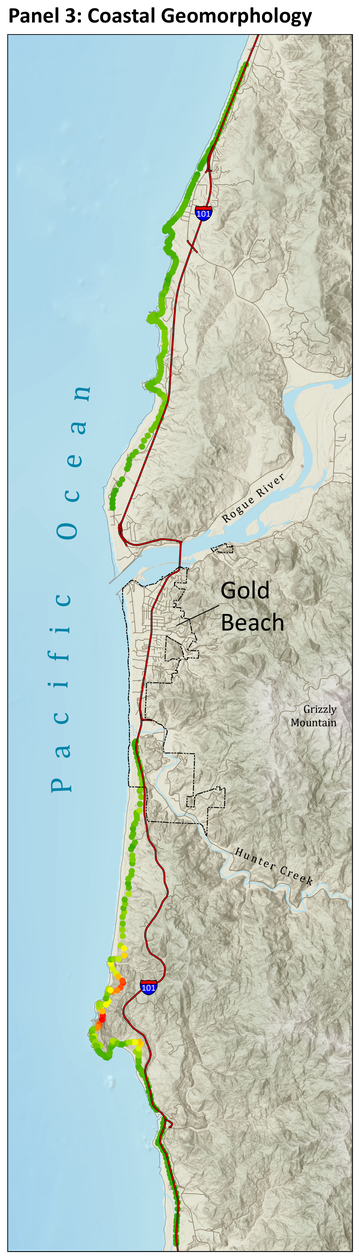
Distant Tsunami
Local Tsunami

Offshore Surficial Lithology

Shell
Cobble
Gravel
Sand
Rock
Mud
Sand Mud
Sandy Mud

Data Sources:
Coastal erosion: This report
Offshore surficial geology: Goldfinger and others, 2014
Rocky reefs: This report
Tsunami zones: DOGAMI, 2022
Marine reserves: ODFW, 2022
Disposal sites: OCM, 2023a

Panel 3: Coastal Geomorphology



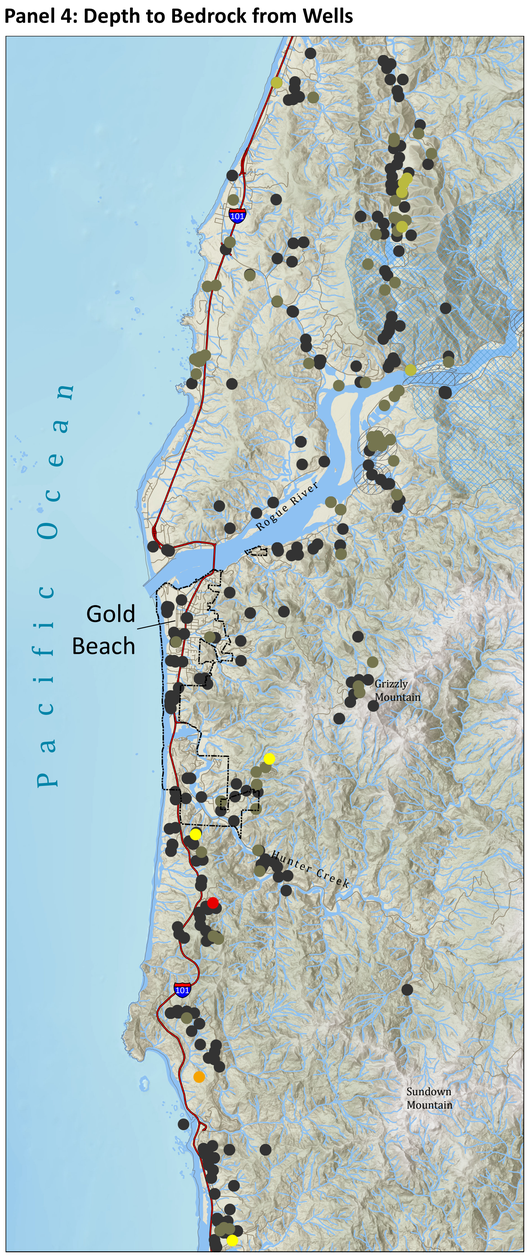
City Limits
Road
US Highway 101
Shoreline
Water

Bluff Elevations (meters, rounded to 10s)

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 170 180 190 200 210

Data Sources:
Bluff elevations: This report

Panel 4: Depth to Bedrock from Wells



City Limits
Road
US Highway 101
Shoreline
Water
Wetland

Drinking Water Source Areas

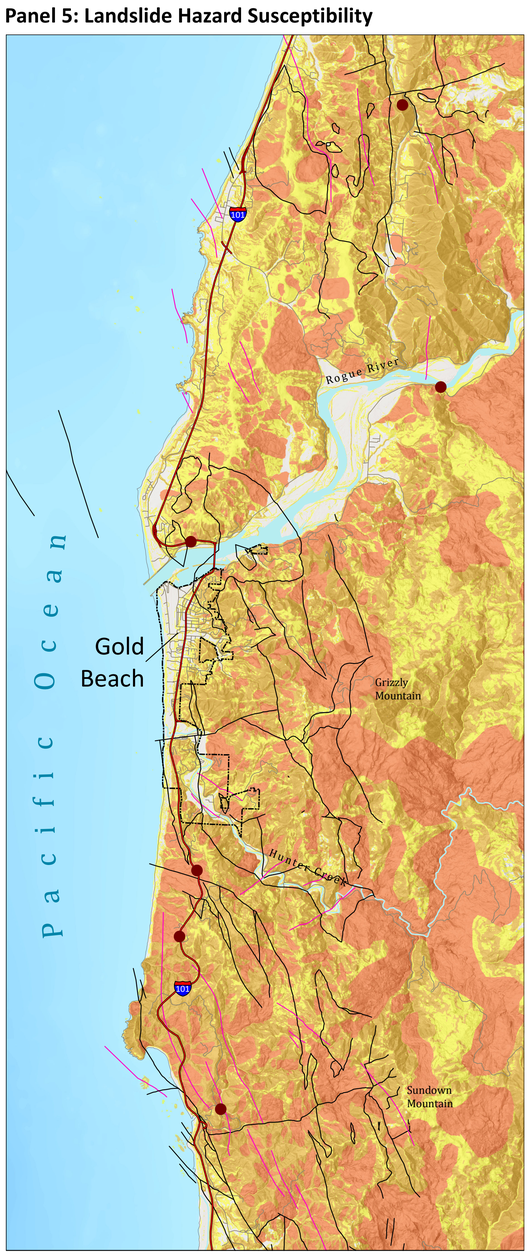
Ground Water
Surface Water

Sediment Depth (in ft)

0 - 50
50 - 100
100 - 150
150 - 200
200 - 250
250 - 300
300 +

Data Sources:
Bluff elevations: This report
Sediment depth: This report, modified from OWRD, 2023; McClaughry and others, 2013
Groundwater: ODHS, 2011
Surface Water: DEQ, 2019

Panel 5: Landslide Hazard Susceptibility



Historic Landslide
City Limits
Road
US Highway 101
Shoreline
Water

Geologic Structures

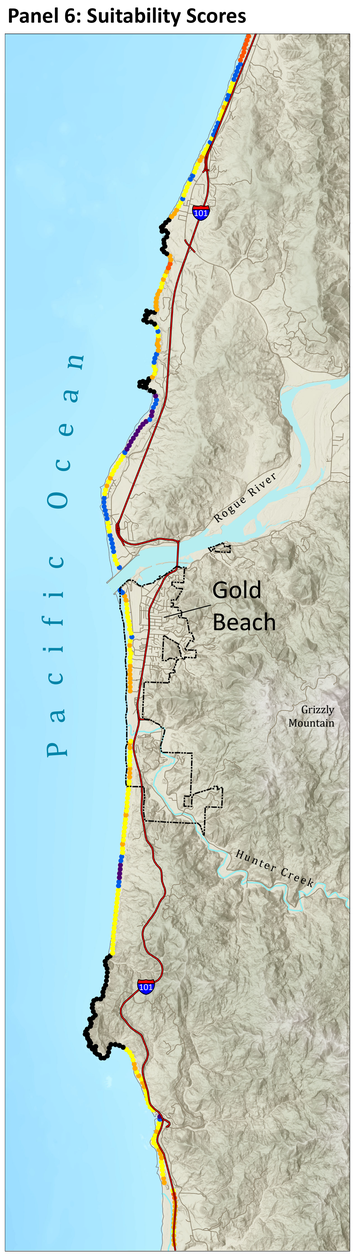
Fault
Fold

Landslide Susceptibility

Low
Moderate
High
Very High

Data Sources:
Landslide Susceptibility: This report, modified from Burns and others, 2016; Franczyk and others, 2021
Geologic structures: Franczyk and others, 2020

Panel 6: Suitability Scores



City Limits
Road
US Highway 101
Shoreline
Water

Suitability Scores

91% - 100%
81% - 90%
71% - 80%
61% - 70%
51% - 60%
11% - 50%
0% - 10%

Most Suitable
Unsuitable

Data Sources:
Suitability scores: This report

Source Data:
U.S. Geological Survey (USGS) National Elevation Dataset (NED) 10-meter digital elevation model. Water features from USGS National Hydrography Dataset (NHD) (2017). Road features from Oregon Department of Transportation (ODOT) (2018). City limits are from ODOT (2019).

Projection:
Oregon Statewide Lambert Conformal Conic, Unit: International Feet, Horizontal Datum: NAD 1983 HARN.

Software:
Esri® ArcMap® 10.7.1

Cartography:
Jon J. Franczyk

References:
Burns, W. J., Mickelson, K. A., and Madin, I. P., 2016, Landslide susceptibility overview map of Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-16-02, 48 p. https://www.oregongeology.org/pubs/ofr/p-O-16-02.htm.

DEQ, Oregon Department of Water Quality, 2019, Oregon Surface Water Drinking Water Source Areas, https://spatialdata.oregonexplorer.info/geoportal/details;id=bd6fd933a1834a4c8314af1fc4613cb7.

DOGAMI, Oregon Department of Geology and Mineral Industries, 2022, Oregon Statewide Tsunami Geodatabase Compilation 1.0 (OGTC-1), https://gis.dogami.oregon.gov/arcgis/rest/services/Public/OTGC1/MapServer/12.

Franczyk, J.J., Madin, I.P., Duda, C.J.M., and McClaughry, J.D., 2020, Oregon Geologic Data Compilation, release 7 (OGDC-7), Oregon Department of Geology and Mineral Industries (DOGAMI); geodatabase and pamphlet, 11 p.

Franczyk, J.J., Burns, W.J., and Calhoun, N.C., 2021, Statewide Landslide Information Database for Oregon, release 4 (SLIDO-4.4), Oregon Department of Geology and Mineral Industries, Digital Data Series. https://www.oregongeology.org/slido/index.htm

Goldfinger, C., Henkel, S.K., Romsos, C., Havron, A., Black, B., 2014, Benthic Habitat Characterization Offshore the Pacific Northwest Volume 1: Evaluation of Continental Shelf Geology, Report OCS BOEM 2014-662, Bureau of Ocean Energy Management, U.S. Department of the Interior, 161 p.

McClaughry, J.D., Ma, L., Jones, C.B., Mickelson, K.A., and Wiley, T.J., 2013, Geologic map of the southwestern Oregon coast between Crook Point and Port Orford, Curry County, Oregon; Oregon Department of Geology and Mineral Industries (DOGAMI), Open-File Report O-13-21; geodatabase, four plates (1:24,000 scale), and report, 55 p.

OCM, Office for Coastal Management, 2023a: Ocean Disposal Sites, https://www.fisheries.noaa.gov/inport/item/54193.

ODFW, Oregon Department of Fish and Wildlife, 2022, Oregon Marine Reserves and Marine Protected Areas, https://oregonmarinereserves.com/rules/.

ODHS, Oregon Department of Human Services, 2011, Groundwater Water Drinking Water Source Areas, https://spatialdata.oregonexplorer.info/geoportal/details;id=35221dd3e941439fa58a91357f4aa95d.

OWRD, Oregon Water Resources Department, 2023, Well Reports, https://apps.wrd.state.or.us/apps/gw/well_log/.

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