

BIOLOGICAL ASSESSMENT

COQUILLE SPIT, COOS COUNTY, OREGON



Report to Michael Keiser

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October 2007

Acknowledgements

The author is grateful to Janet Rogers for her able assistance in the field and extensive knowledge about the natural history of the Bandon area. Dave Pitkin (USFWS) and Reg Pullen (BLM) provided important background and historical information. Eleanor Gaines, Eric Scheueuring, and Claudine Tobalske (ORNHIC) provided help with wildlife data.



Sand flats with European beachgrass (map unit 2) and pocket of deflation plain in middle background (map unit 8). Near south end of Keiser property, looking southeast with Coquille River and Bandon in distance.

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Executive Summary

The Keiser property on Coquille Spit covers about 100 acres of stabilized sand flats, low dunes, deflation plain, river beach, old dredge spoils, and tidelands. Most features are less than 15 feet above sea level. It is surrounded by Bullards Beach State Park and restored tidal marsh owned by the Port of Bandon, and fronts on the Coquille River. Bandon Marsh National Wildlife Refuge is on the opposite shore of the river. Current land use includes off-road vehicle riding, fishing along the river, cutting of driftwood, hiking, and wildlife viewing. About 18 acres of upland have been lost to erosion by the Coquille River since 1857. Eleven habitat map units are identified on the site. About 60 percent of the property is moderately disturbed upland sand dunes and about 40 percent high-quality wetland with habitat for rare species. Primary rare elements are coho salmon, steelhead, silvery phacelia, and salt marsh plant associations. The lower Coquille River is the most important area for wintering waterfowl on the coast of Oregon, and the adjacent National Wildlife Refuge is an Important Bird Area renowned for its concentrations of thousands of migrating birds, including rarely-seen species. The property has great value as a conservation site because it provides a significant opportunity for connecting lands already in conservation ownership.

Introduction

Janet Rogers, representing owner Michael Keiser, engaged the author to conduct a site assessment of property on Coquille Spit, Coos County, Oregon. Objectives of the assessment were to (1) identify existing land use, (2) identify the composition and condition of existing habitats on the site, (3) locate species or plant associations of conservation concern, (4) identify potential management problems, and (5) assess the potential for habitat restoration.

Target area

The Keiser property is situated on the Coquille River Spit in Coos County, Oregon, just north of the city of Bandon at the outlet of the Coquille River. It covers about 100 acres in Township 28 South, Ranges 14 and 15 West (T. 14 W—tax lot 300 in Section 18 and lot 1000 in Section 19; T. 15 W—lot 100 in Section 24) (Figure 1).

The property includes stabilized sand flats, deflation plain, river beach, old dredge spoils, and tidelands. Three areas of deflation plain are interspersed among the sandy flats and are connected to the Coquille River by tidal channels. Two of these channels contain small areas of salt marsh subject to daily tidal flows. All three areas of deflation plain contain vegetation indicative of brackish conditions and are subject to flooding at extreme high tides and during storm surges, and portions contain extensive deposits of driftwood. Seven or eight mounds of old dredge spoils are located along the edge of the Coquille River, each ranging from three to six feet in height.

The property is screened from the Pacific Ocean by a continuous foredune 20 to 30 feet tall that parallels the beach to the west. Bullards Beach State Park, immediately north and west of the tract, is composed of foredune and lower stabilized dunes. Much of the park north of the target property is covered with dense shore pine and Sitka spruce woodland. The primary views from the tract are to the east and south. They encompass the Coquille River, protected tidelands in Bandon Marsh National Wildlife Refuge, wooded bluffs, the Highway 101 bridge crossing the river, and foothills of the Klamath Mountains in the distance.

1. Geomorphology. The property ranges in elevation from 0-15 feet above sea level, is part of the Coquille River floodplain, and is entirely within the coastal tsunami hazard zone (Priest 1995). The spit is composed of alluvial sand, gravels, and cobbles deposited by the Coquille River, overlain by sand deposited by coastal winds and ocean currents. These sediments filled in the ancient river mouth that was created when sea level was 300-500 feet lower during Pleistocene glaciations. Today's landform, known as a "drowned river mouth," is common to most rivers on the coast of Oregon (Christy et al.

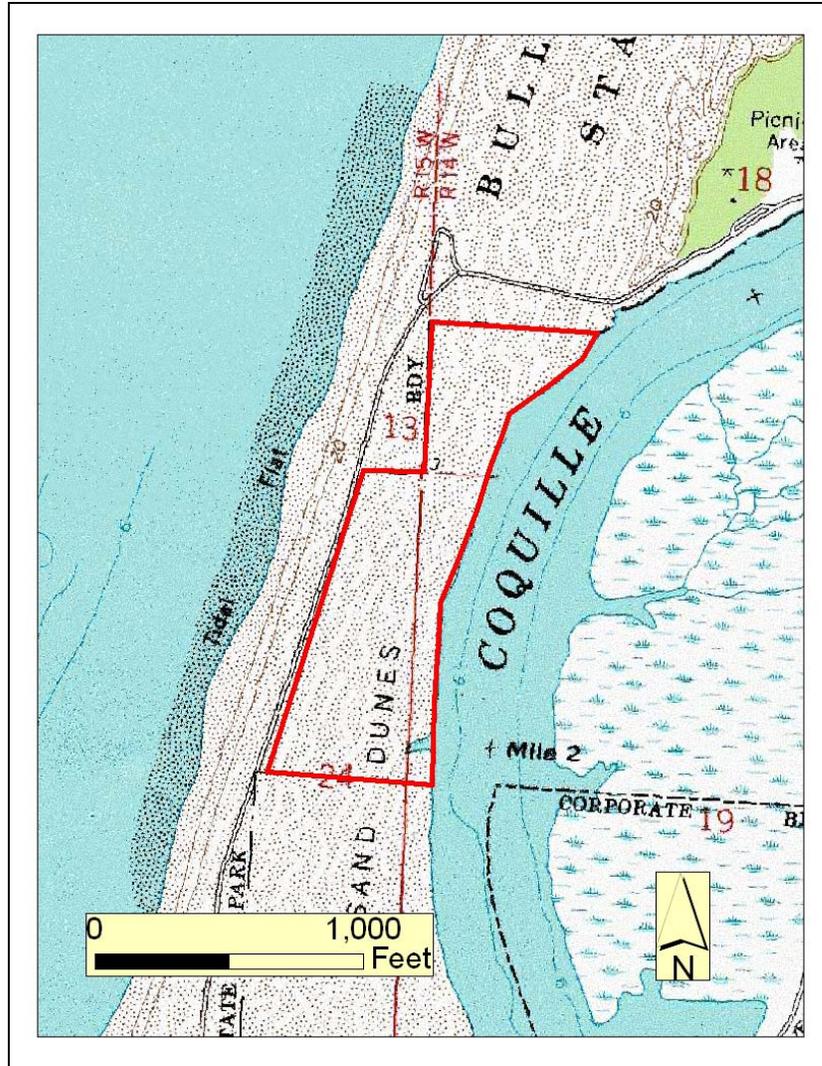


Figure 1. Keiser ownership on Coquille Spit. Red line is approximate property boundary.

1998). Prevailing winds and currents from the north formed the sand spit and deflected the Coquille River to the south. The river mouth used to shift seasonally and was not navigable because of obstruction by sand and rocks. Jetties built between 1881 and 1955 not only stabilized the river mouth but increased sand deposition and widened the spit (Dicken et al. 1961; Kreag 1979). North and south of the Coquille River an ancient marine terrace forms a level surface extending 4-6 miles inland. The marine terrace is ideal for growing cranberries and the Bandon area is the epicenter of cranberry cultivation on the Pacific Coast of North America. The terrace is bounded on the east by the foothills of the Klamath Mountains.

2. Adjacent Ownership. The target property owned by Michael Keiser is bounded on the north and west by Bullards Beach State Park, on the south by Port of Bandon land, and on the east by the Coquille River. Salt marsh on the opposite side of the river is part of

Bandon Marsh National Wildlife Refuge, owned by the United States and managed by the U.S. Fish and Wildlife Service (USFWS).

3. Land Use. The target property on Coquille Spit is unfenced and unsigned, and most users probably assume it is publicly owned. Current use is mostly recreational and includes off-road vehicle (ORV) riding, fishing along the river, cutting of driftwood, hiking, and wildlife viewing. Spoils dredged from the Coquille River between 1910 and 1939 were deposited along both sides of the riverbank and are visible today as low mounds of sand, gravel, cobbles, and shells. At that time a shipping channel was maintained as far upriver as Coquille (Dicken et al. 1961; Kreag 1979; Pullen 2007).

Land use surrounding the target property is also primarily recreational. Facilities at Bullards Beach State Park to the north and west includes a campground, restrooms, hiking trails, and a paved road providing access to the beach and the Coquille Lighthouse at the mouth of the river. Beach access along the road includes parking lots and turnouts, restrooms, and trails to the foredune and beach. Visitors also use this area for viewing wildlife in the dune and deflation plain. Port of Bandon property to the south provides wildlife viewing and was the focus of an estuarine restoration project funded by the Oregon Department of Fish and Wildlife's (ODFW) Restoration and Enhancement Program in 1999-2000 (Port of Bandon 2001).

The Bandon area is destined to change from agricultural, forestry, and rural residential use to suburban land use as the Oregon coast continues to attract settlement and development. Most of the area on the marine terrace south of the Coquille River bridge will infill with residential development and commercial cranberry bogs. The north end of the bridge is flanked by State Park and USFWS ownership and will remain undeveloped.

Methods

Background information on natural features and biota of the target property was obtained from the Oregon Natural Heritage Information Center (ORNHIC), whose resources include the Biotics database, historical Geographic Manual Files, its listing of rare species (ORNHIC 2007), and information developed by ORNHIC for ODFW's Oregon Comprehensive Wildlife Conservation Strategy (Oregon Department of Fish and Wildlife 2005). Information on historical vegetation was obtained from Hawes et al. (2004). The tract was assessed by a combination of site visits and remote sensing using available data from ORNHIC. Site work was conducted with Janet Rogers on 17 May 2007 and with Ashton Christy on 2 July 2007.

Historical Habitats

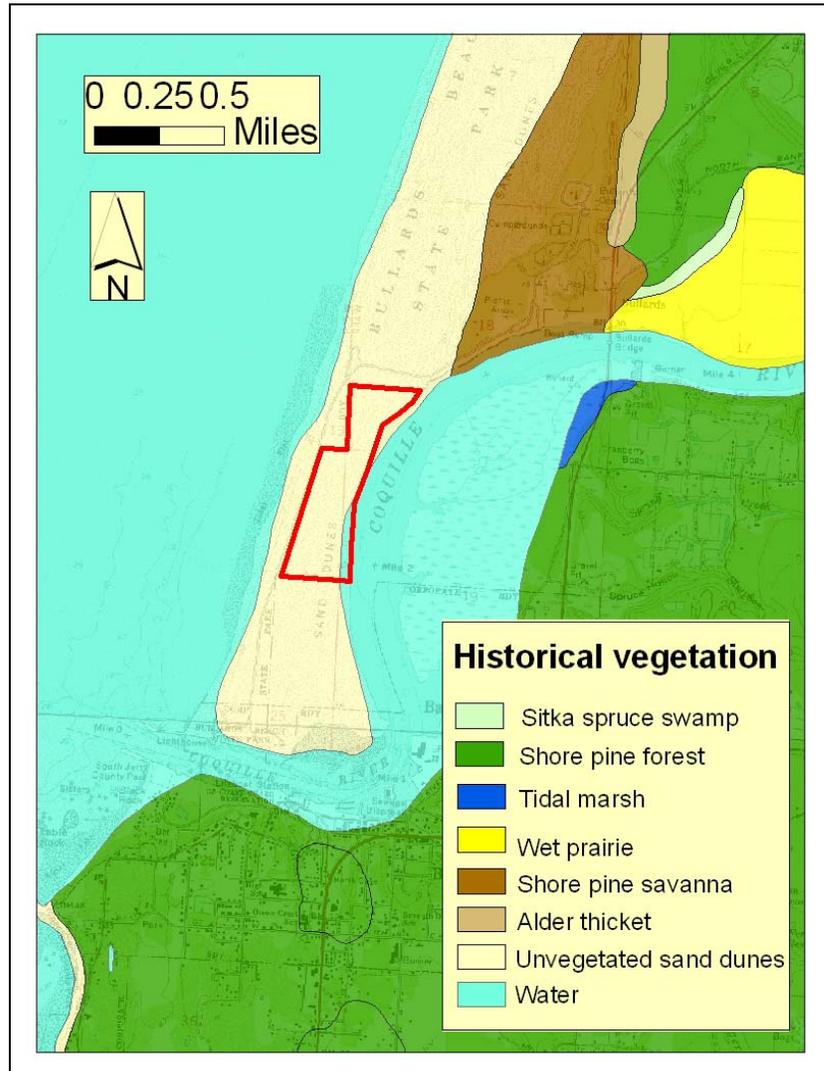


Figure 2. Historical vegetation of Coquille Spit target area, 1857. Target property is in red.
Source: Hawes et al. 2004.

Historical vegetation for Coquille Spit was mapped by Hawes et al. (2004) using the earliest land survey notes as a point of reference (Figure 2). The pattern of vegetation in Figure 2 is very similar to that shown on the 1887 Coast Survey map for the Coquille Spit (Dicken et al. 1961). The target area was surveyed by Daniel and Mathew Murphy in May and August 1857. They described the Coquille Spit as "poor sandy barrens" and "rolling sandy barrens," but covered with "very fine grass" in sections 25 and 36. A few spruce trees up to 8 inches in diameter were scattered in the dunes. They described the tidally-influenced deflation plain near the south end of the target property as "low flat tidal land." The nearest woody vegetation was shore pine savanna, woodland, and forest located to the northeast in what is now Bullards Beach State Park and on the bluffs across the river at Bandon.

Today's tall foredune and adjacent deflation plain are largely an artifact of European beachgrass and did not exist in their present form when the area was first surveyed (Christy et al. 1998). European beachgrass has grown to dominate most of the spit and it is difficult to know which native grass the surveyors were referring to in 1857. Because they were charged with identifying natural features useful to potential settlers, the term "good grass" implies good livestock forage, which in turn implies something more substantial than the sparsely-stocked stands of native beach fescue and seashore bluegrass that we see today as our best remaining native dune vegetation. The "good grass" of 1857 may have been a sod of beach fescue and tufted hairgrass on stabilized dunes. John Hamblock, the first settler to file a claim on the spit in 1857, described the area as "open prairie, the grass everywhere knee-high." By 1877, livestock grazing reportedly had destroyed the prairie and reinitiated movement of sand as also happened on the Clatsop Plains near Astoria (Dicken et al. 1961). No remnant stands of this kind of coastal prairie are known to exist, and attempts at restoration have not been successful. Since the 1857 survey about 18 acres of upland have been lost to erosion by the Coquille River.

Existing Habitats and Species Assessment

Existing habitats

Eleven habitat map units were identified at the target site (Figures 3 and 4). These units are included in ODFW's strategy habitats for coastal dunes and estuaries (Oregon Department of Fish and Wildlife 2005).

1. River beach (8 ac). This unit includes beach along the Coquille River that was once upland when it was surveyed in the 1800s but since then has been eroded by a shifting river channel. The channel was forced westward by the expanding salt marsh on the east side of the river, where siltation increased markedly after 1895 because of settlement and logging activity upstream (Johannessen 1964). This map unit is of primary importance because of its proximity to the Coquille River and its status as wetland.
2. Sand flats and low dunes with European beachgrass and an expanding tree and shrub component (53 ac; cover photo, inside cover photo, Figures 9 and 14)—may include shore pine, Sitka spruce, chaparral broom, Scots broom, salal, waxmyrtle, little hairgrass, false dandelion, beach fescue, seashore bluegrass, coast strawberry, salt rush, beach knotweed, sea-pink, sand mat, and silver burweed. This unit is typical European beachgrass habitat on flats and low dunes surrounding areas that are periodically flooded by brackish water. This map unit is of secondary importance because portions of the unit are moderately disturbed and much of it is dominated by invasive European beachgrass.

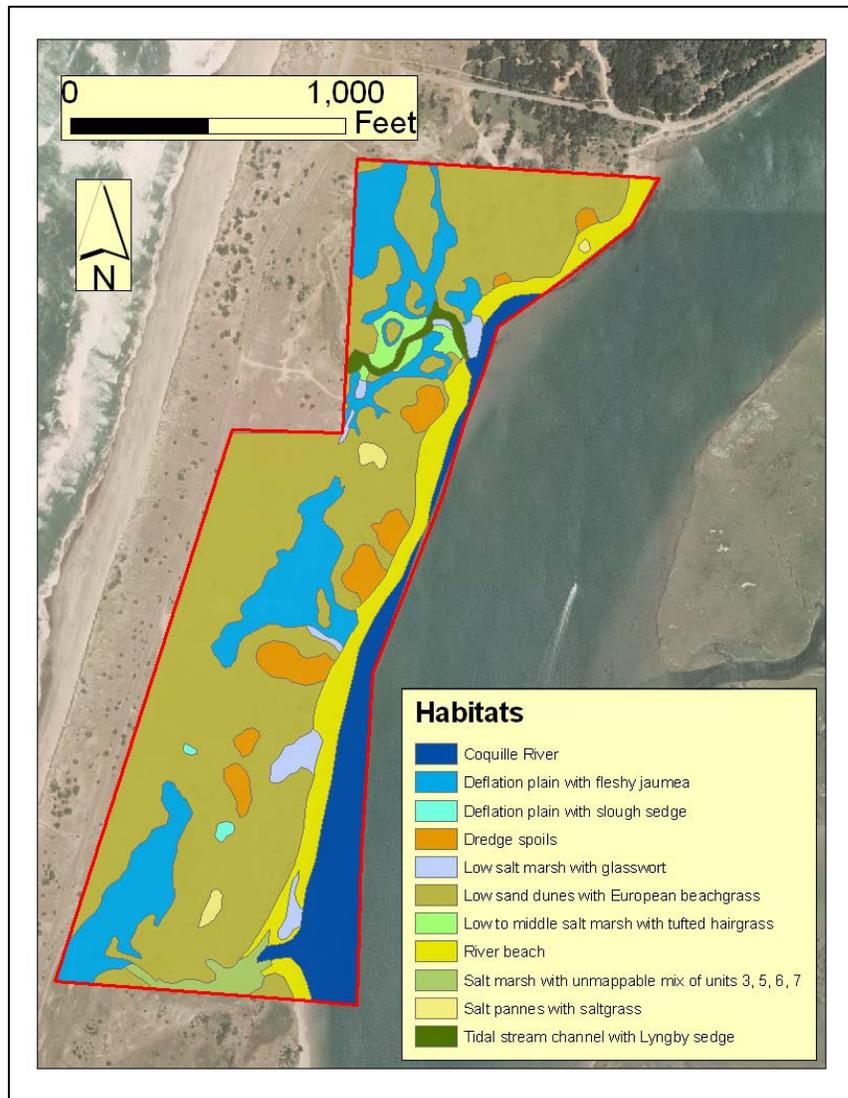


Figure 3. Habitats on Coquille Spit target property. 2005 NAIP imagery.

3. Low salt marsh with glasswort (2 ac)—may include paintbrush orthocarpus, salt-marsh dodder, seaside plantain, and brass buttons. This unit occurs as small pockets along tidal channels and receives regular to frequent tidal inundation. This map unit is of primary importance because of its wetland status and good to excellent condition.

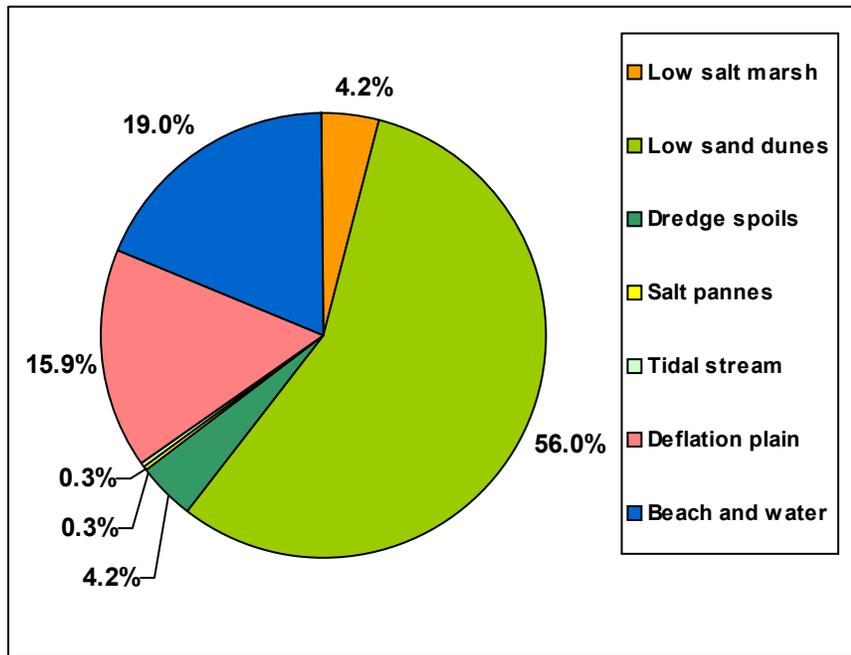


Figure 4. Percentage of acreage in habitat map units, Coquille Spit target property

4. Dredge spoil mounds with cobble, gravel, and sand (4 ac; Figures 12, 17, and 18)—may include cream cups, triphysaria, beach fescue, seashore bluegrass, beach evening-primrose, sand mat, silvery phacelia, silver burweed, and beach wormwood. Most of the mounds are moderately to well covered with herbaceous vegetation except in vehicle tracks or where the soil is gravelly or stony. The surfaces of the mounds sometimes have a scattering of much smaller mounds 1-2 feet tall and up to 3 feet in diameter that trap windblown sand. These provide dune-like microhabitat for silvery phacelia, silver burweed, beach fescue, Pacific silverweed, and beach wormwood in areas otherwise unsuitable for these species (Figure 18). The map unit is moderately disturbed and contains a mix of native and exotic species. Despite its marginal viability in this map unit, presence of silvery phacelia makes the unit of primary importance.
5. Salt pannes with saltgrass (0.3 ac). These are depressions that flood during extreme high tides and storm surges where subsequent evaporation leaves high concentrations of salt. They are sometimes nearly devoid of vegetation. This map unit is of primary importance because of its wetland status and good to excellent condition.
6. Tidal stream channel with Lyngby sedge (0.3 ac; Figure 15). This unit meanders through low sand dunes to connect with deflation plain wetlands in the interior of the property. It receives regular to frequent tidal inundation. Restored tidal channels on Port of Bandon land south of the target property are used by a variety of juvenile fish, including salmonids, and undoubtedly the channels on the Keiser

property are used by fish also. This map unit is of primary importance because of its wetland status and good to excellent condition.

7. Low to middle salt marsh with tufted hairgrass, glasswort, fleshy jaumea, and salt-marsh dodder (1 ac). This unit receives frequent to infrequent tidal inundation. This map unit is of primary importance because of its wetland status and good to excellent condition.
8. Deflation plain connected to tidal channels, with saltgrass, fleshy jaumea, seaside plantain, sea-pink, brass buttons, and paintbrush orthocarpus (15 ac; Figures 10 and 11). Driftwood covers considerable acreage. This unit floods during extreme high tides and storm surges. Portions are severely disturbed by ORV activity, but most is in good condition and most vegetation is native. This map unit is of primary importance because of its wetland status and overall good to excellent condition.
9. Deflation plain with slough sedge and Pacific silverweed (0.2 ac)—may include Hooker willow, salt rush, spikerush, creeping buttercup, and dagger-leaved rush. These are depressions that flood during extreme high tides, storm surges, and seasonal periods of high precipitation. Water is less brackish than tidal marsh. This map unit, though tiny, is of primary importance because of its wetland status and good to excellent condition.
10. Low to middle salt marsh with unmappable mix of map units 3, 5, 6, 7 (1 ac; Figure 16). This unit receives frequent to infrequent tidal inundation and connects with deflation plain wetlands in the interior of the property. This map unit is of primary importance because of its wetland status and good to excellent condition.
11. Coquille River (10 ac). This unit presumably was once upland when it was surveyed in the 1800s but since then has been eroded by the shifting river channel. This map unit is of primary importance because of its riverine status.

Wetlands

About 40 percent of the target property is wetland that is generally distributed throughout the tract (Figure 5). About 20 percent of this is river and river beach under tidal influence, and the remaining 20 percent is tidal and deflation plain wetlands. Map units 1, 3, 6, 7, 10, and 11 are wetlands that flood during normal high to extreme high tides. Map unit 5 is wetland that floods during extreme high tides and seasonal storm surges. Map units 8 and 9 are wetlands that flood during extreme high tides, seasonal storm surges, and when high seasonal precipitation raises the water table. These periodically flooded units are used intensively by waterfowl off and on throughout the year. Wetland boundaries depicted in Figures 3 and 5 are approximations only and should be confirmed by a professional wetland delineation.



Figure 5. Extent of wetlands in Coquille Spit target property. 2005 NAIP imagery.

Rare, threatened, and endangered species

ORNHIC's Biotics database identified seven known occurrences of rare, threatened and endangered species from within a two-mile radius of the target area (Table 1). Another species, yellow sandverbena, was found at the target property in 2007.

Silvery phacelia (*Phacelia argentea*; Figure 13). The database contained records for two occurrences of silvery phacelia, a federal and state-listed rare plant, within the

boundaries of the target property. The plants were last seen in 1978 and were mapped as occurring on low sand dunes and deflation plain within the target property. A thorough search of these areas with Janet Rogers in 2007 yielded no plants, and they probably disappeared because of habitat conversion by European beachgrass. Four new occurrences of silvery phacelia were found on mounds of old dredge spoils adjacent to the Coquille River (Figure 7; Table 5). With permission of Janet Rogers, data for these occurrences of silvery phacelia were provided to Jennifer Kalt, a consultant under contract with USFWS to write a status report for silvery phacelia.

Today's populations of silvery phacelia on the dredge spoils appear to be only marginally viable, characterized by only a few plants in any given place, with considerable portions of the plants dead. Populations varied from two to 30 plants, with mortality ranging from 25 to 75 percent. The small size and apparently limited viability of these occurrences probably reflects limited habitat suitability at the site. Silvery phacelia requires unstabilized to partially stabilized dunes with ongoing disturbance by wind. The mounds of dredge spoils are the tallest features on the property with the greatest exposure to wind, but they have little exposed sand. The rocky or gravelly soil texture inhibits competing woody plants but the herb layer is well developed. Vehicle traffic on the mounds is the main source of disturbance and may help to maintain the few limited stands of silvery phacelia.

Short-stemmed sedge (*Carex brevicaulis*) was reported in 1994 from Bullards Beach State Park but was not seen on the target property.

Western snowy plover (*Charadrius alexandrinus nivosus*) occurred historically on the Coquille Spit but the last observed breeding activity was in 1990. The dunes on the spit have become too stabilized with vegetation and recreational use is probably too intense to provide suitable habitat for plovers. While no current breeding activity is known to occur on the spit, plovers probably use the spit for foraging any time of the year.

Both **steelhead (*Oncorhynchus mykiss* pop. 31)** and **coho salmon (*Oncorhynchus kisutch* pop. 3)** occur in the Coquille River along the east side of the property and along with other species of juvenile fish undoubtedly use the small tidal channels and interior wetlands during high tides and storm surges. Coastal cutthroat trout (*Oncorhynchus clarkii*) are also present in the Coquille River. The central coastal run of this species is a federal and state species of concern and is on the ORNHIC watch list. Kreag (1979) reported chum salmon (*Oncorhynchus keta*) from the Coquille but its current presence is not confirmed and ORNHIC has no historical records from the river.

Yellow sandverbena (*Abronia latifolia*) was seen in one or two places in map units 2 and 4 (Figure 3). The species has no state or federal status but is on the ORNHIC watch list because of a general decline in open dune habitat caused by European dunegrass.

Two other records from the area—**ringtail (*Bassariscus astutus*)** and **northern bog clubmoss (*Lycopodiella inundata*)**—are based on reports made between 1928 and 1970.

The actual locations for these records are uncertain but they probably occurred in the Bandon area south of the Coquille River.

Existing wildlife

A list of wildlife confirmed or potentially occurring within the target property is given in Table 2. It includes 3 amphibians, 11 reptiles, 100 birds and 39 mammals. Species of forests and freshwater wetlands are generally absent because of lack of habitat. Kreag (1979) reported 45 species of fish from the river. Most fish sampling data are limited to anadromous species, and include fall and spring chinook, steelhead, coho, and cutthroat trout.

The lower Coquille River valley is the most important area for wintering waterfowl on the coast of Oregon, hosting 57,000 ducks and geese (Adamus et al. 2005). The area's importance for wildlife is one of the reasons it is on The Wetlands Conservancy's list of Oregon's Greatest Wetlands. The salt marsh at Bandon Marsh National Wildlife Refuge, directly across the Coquille River from the target property, is an Important Bird Area (IBA) that is renowned for its concentrations of thousands of migrating birds, including rarely-seen species (Kreag 1979; Egger 1980; Audubon Society of Portland 2006). Similar wildlife use also occurs on the target property and elsewhere on Coquille Spit. Habitat values are greatest in and along the river, in the tidal channels, and in the seasonally-flooded deflation plain.

Existing vegetation

The habitat map units delineated in Figure 3 indicate the extent and composition of major vegetation units at the site. Sand flats and low dunes dominated by European beachgrass cover 56 percent of the target area (Figures 3 and 4) and contain a mix of exotic and native species. Portions of this map unit that have been stabilized for a longer period of time contain expanding pockets of woody vegetation that includes young shore pine, Sitka spruce, chaparral broom, Scots broom, salal, and waxmyrtle. These pockets will continue to expand as the deflation plain slowly develops a dense shore pine and Sitka spruce forest as can be seen to the north in Bullards Beach State Park. There are no mature trees on the target property. Apart from 18 acres of river and river beach, and 4 acres of old dredge spoils, the remaining 20 percent of the target area is primarily tidal and deflation plain wetlands dominated by glasswort, fleshy jaumea, tufted hairgrass, and saltgrass.

Rare native plant associations present in the target area are listed in Table 3. These are of conservation concern because of cumulative losses that have occurred in most of Oregon's estuaries. All of them are wetlands and are clearly delineated in Figures 3 and 5.

Table 4 lists 73 vascular plant species observed on the target property. The composition and diversity of species is typical of the open dune and deflation plain habitats that occur on Coquille Spit.

Exotic and invasive species

Of the 73 species of vascular plants reported in Table 4, 17 (23%) are exotic. These numbers are typical for dune and deflation plain habitats that are disturbed by seasonal flooding, wind, and human activities. Most of these species are common in dune areas and only a few are serious system modifiers. Gorse is the primary noxious weed present on the target property but fortunately not much is present and it could easily be controlled by cutting and treating the stumps with herbicide. These limited occurrences are mapped in Figure 8. Scots broom is widespread in older portions of the sand flats and low dunes dominated by European beachgrass in map unit 2. This species needs aggressive control because it spreads quickly, accelerates plant succession, and alters soil chemistry in dune habitats (Christy et al. 1998).

Potential management challenges

Considerable off-road vehicle (ORV) damage occurs in map units 3 and 4, particularly in winter and spring when soils are wet (see photos). Riding through water and mud of the fragile deflation plain is the primary attraction for ORVs in this kind of habitat, and such usage diminishes in summer as these habitats dry out. Although this kind of damage is common in dune habitats near roads, it does not occur on adjacent Bullards Beach State Park because of signage and a management presence. Vehicle access for driftwood cutting and fishing along the river occurs mostly in summer when soils are dry, and most traffic appears to be restricted to established tracks. Off-road activity on the site could be controlled with adequate signage and fencing to protect fragile resources.

Control of gorse and Scots broom on the tract presents management challenges, but thorough and persistent treatment with volunteer labor is entirely feasible and attainable.

Other human uses such as horseback riding, camping, garbage dumping, hunting, and target practice may occasionally occur but were not observed during this project. Potential for these uses presumably will continue to exist until a local stewardship or management presence is established.

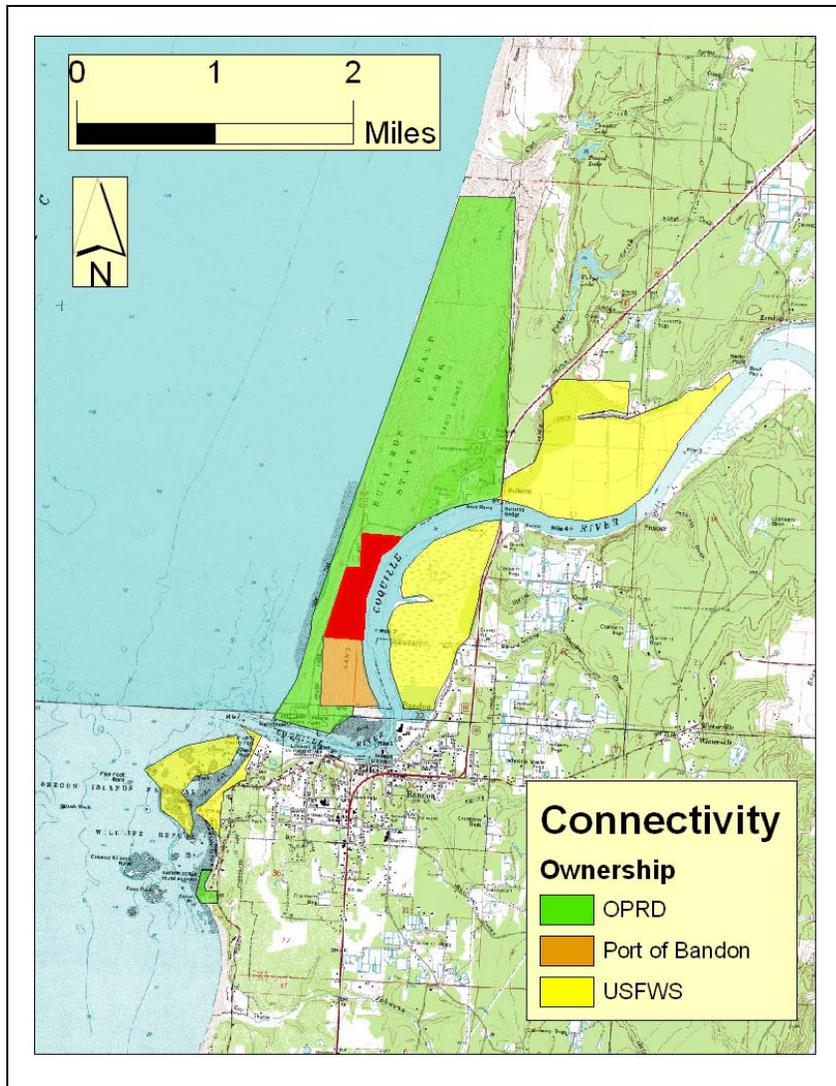


Figure 6. Potential connectivity of target property (red) to parks and other publicly owned land.

Recommendations for habitat protection and restoration

By itself, the Keiser property is composed of about 60 percent moderately disturbed upland sand dunes and about 40 percent high-quality wetland with habitat for rare species. The uplands are dominated by invasive European beachgrass. In the larger context of the entire Coquille Spit, the property has great value as a conservation site because it provides a significant opportunity for connecting lands already in conservation ownership (Figure 6). It is immediately adjacent to more than 1,300 acres in Bullards

Beach State Park to the north and west, about 100 acres of Port of Bandon land to the south, and more than 1,100 acres in the nearby Bandon Marsh and Oregon Islands National Wildlife refuges. The property has also been identified as a critical private

inholding that should be added to the state park system (Oregon Parks and Recreation Department 2005). If placed in conservation ownership it would protect the entire Coquille Spit and create five miles of contiguous habitat along the north bank of the Coquille River.

Protection of the target property and its inclusion in a larger area of conservation lands would benefit the known populations of steelhead and coho. There is little need for salt marsh restoration on the tract because these systems, though small, are functional and have not been altered by recent management practices. The estuarine restoration project completed in 1999-2000 on the Port of Bandon property to the south, and planned restoration of salt marsh, seasonally wet prairie, and Sitka spruce swamp at Bandon Marsh National Wildlife Refuge will enhance habitat values of the entire region. These projects will benefit a variety of wildlife species, including anadromous fish, waterbirds and shorebirds, bald eagle, osprey, purple martin, and osprey.

Populations of silvery phacelia on the Keiser property will never become robust without restoration of open sand dune habitat. This could be accomplished by removing vegetation on sand dunes and dredge spoils adjacent to the Coquille River. Removal of dune vegetation closer to the paved road on the spit could be problematic because of the potential for sand drifting across the road.

Restoration of open sand dune habitat for snowy plover on Coquille Spit is probably not feasible without closing the area to human visitation. The proximity of the spit and its many recreational opportunities to Bandon makes closure to public entry highly unlikely. Given the existence of better nesting areas in more remote locations, justification for closure of Coquille Spit probably would not be compelling enough to be an acceptable alternative to state and local planners, or to the public.

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Tables

Table 1. Records of rare, threatened, and endangered species from within two miles of the Coquille Spit target property. Source: ORNHIC Biotics database and ORNHIC (2007). Federal, state, and ORNHIC status and rank codes are defined below.

Scientific name	Common name	Location	Last seen	Federal status	State status	ORNHIC rank	ORNHIC list
<i>Phacelia argentea</i>	Silvery phacelia	North side of Coquille River, towards Bullards Beach	1978	SOC	LT	G2S2	1
<i>Carex brevicaulis</i>	Short-stemmed sedge	Bullards Beach State Park	1994			G5S2	2
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover	Coquille River north to Seven Devils Wayside	1990	PS:LT	LT	G4T3S2	2
<i>Bassariscus astutus</i>	Ringtail	Bandon	pre-1972		SU	G5S3	4
<i>Oncorhynchus mykiss pop. 31</i>	Steelhead (Oregon Coast ESU, winter run)	Coquille River and tributaries	pre-1996	SOC	SV	G5T2T3QS2S3	1
<i>Oncorhynchus kisutch pop. 3</i>	Coho salmon (Oregon Coast ESU)	Coquille River and tributaries	2002		SC	G4T2QS2	1
<i>Lycopodiella inundata</i>	Northern bog clubmoss	Boggy ground near Bandon; Bandon, deflation plain	1928			G5S2	2

Federal, state, and ORNHIC status and rank codes

1. Federal (USFWS)

LT = Listed threatened
P = Partial
PS = Partial Status
SOC = Species of Concern

2. State (ODFW, ODA)

LT = Listed threatened

SC = Sensitive critical

SU = Status undetermined

SV = Sensitive vulnerable

3. ORNHIC

ORNHIC participates in an international system for ranking rare, threatened and endangered species and plant associations throughout the world. The ranking is a 1-5 scale, primarily based on the number of known occurrences, but also includes threats, sensitivity, area occupied, and other biological factors. The Global Rank begins with a "G" and the State Rank begins with the letter "S." Details are available at:

<http://www.natureserve.org/explorer/ranking.htm#global>

1= Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences.

2 = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with 6-20 occurrences.

3 = Rare, uncommon or threatened, but not immediately imperiled, typically with 21-100 occurrences.

4 = Not rare and apparently secure, but with cause for long-term concern, usually with more than 100 occurrences.

5 = Demonstrably widespread, abundant, and secure.

Q = Taxonomic questions

T = Rank for subspecies or variety

Table 2. Wildlife confirmed or potentially occurring within the Twomile Creek target area. Source: ORNHIC. See Table 1 for definitions of federal, state, and ORNHIC status and rank codes.

Scientific Name	Common Name	ORNHIC rank	ORNHIC element track	Federal status	State status
AMPHIBIANS					
BUFO BOREAS	WESTERN TOAD	G4S4	N		SV
HYLA REGILLA	PACIFIC TREEFROG	G5S5	N		
RANA AURORA	RED-LEGGED FROG	G4S3	N		
BIRDS					
PODILYMBUS PODICEPS	PIED-BILLED GREBE	G5S5	N		
PHALACROCORAX AURITUS	DOUBLE-CRESTED CORMORANT	G5S5	N		
BOTAURUS LENTIGINOSUS	AMERICAN BITTERN	G4S4	N		
ARDEA HERODIAS	GREAT BLUE HERON	G5S4	N		
BUTORIDES VIRESCENS	GREEN HERON	G5S4	N		
BRANTA CANADENSIS	CANADA GOOSE	G5S5	N	(PS)	
AIX SPONSA	WOOD DUCK	G5S4	N		
ANAS PLATYRHYNCHOS	MALLARD	G5S5	N		
ANAS DISCORS	BLUE-WINGED TEAL	G5S4	N		
ANAS CYANOPTERA	CINNAMON TEAL	G5S5	N		
LOPHODYTES CUCULLATUS	HOODED MERGANSER	G5S4	N		
MERGUS MERGANSER	COMMON MERGANSER	G5S4	N		
CATHARTES AURA	TURKEY VULTURE	G5S5	N		
PANDION HALIAETUS	OSPREY	G5S4	N		
ELANUS LEUCURUS	WHITE-TAILED KITE	G5S1B,S3N	Y		

HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	G4S3B,S4N	Y	LT-P	LT
CIRCUS CYANEUS	NORTHERN HARRIER	G5S5	N		
ACCIPITER STRIATUS	SHARP-SHINNED HAWK	G5S4	N		
ACCIPITER COOPERII	COOPER'S HAWK	G5S4	N		
BUTEO LINEATUS	RED-SHOULDERED HAWK	G5S3N	N		
BUTEO JAMAICENSIS	RED-TAILED HAWK	G5S5	N		
FALCO SPARVERIUS	AMERICAN KESTREL	G5S5	N		
FULICA AMERICANA	AMERICAN COOT	G5S5	N		
CHARADRIUS VOCIFERUS	KILLDEER	G5S5	N		
ACTITIS MACULARIA	SPOTTED SANDPIPER	G5S4	N		
GALLINAGO GALLINAGO	COMMON SNIPE	G5S4	N		
LARUS OCCIDENTALIS	WESTERN GULL	G5S4	N		
TYTO ALBA	BARN OWL	G5S4?	N		
OTUS KENNICOTTII	WESTERN SCREECH-OWL	G5S4?	N		
BUBO VIRGINIANUS	GREAT HORNED OWL	G5S5	N		
GLAUCIDIUM GNOMA	NORTHERN PYGMY-OWL	G5S4?	N		SC
STRIX VARIA	BARRED OWL	G5SU	N		
ASIO OTUS	LONG-EARED OWL	G5S4?	N		
AEGOLIUS ACADICUS	NORTHERN SAW-WHET OWL	G5S4?	N		
CHORDEILES MINOR	COMMON NIGHTHAWK	G5S5	N		SC
CHAETURA VAUXI	VAUX'S SWIFT	G5S5	N		
CALYPTE ANNA	ANNA'S HUMMINGBIRD	G5S4?	N		
SELASPHORUS RUFUS	RUFOUS HUMMINGBIRD	G5S4	N		

CERYLE ALCYON	BELTED KINGFISHER	G5S4	N		
CONTOPUS COOPERI	OLIVE-SIDED FLYCATCHER	G4S4	N	SOC	SV
EMPIDONAX TRAILLII	WILLOW FLYCATCHER	G5S4	N	(PS)	
EMPIDONAX HAMMONDII	HAMMOND'S FLYCATCHER	G5S4	N		
EMPIDONAX DIFFICILIS	PACIFIC SLOPE FLYCATCHER	G5S4	N		
SAYORNIS NIGRICANS	BLACK PHOEBE	G5S3B,S3N	N		
TYRANNUS VERTICALIS	WESTERN KINGBIRD	G5S5	N		
EREMOPHILA ALPESTRIS	HORNED LARK	G5S5	N		
PROGNE SUBIS	PURPLE MARTIN	G5S3B	Y	SOC	SC
TACHYCINETA BICOLOR	TREE SWALLOW	G5S5	N		
TACHYCINETA THALASSINA	VIOLET-GREEN SWALLOW	G5S5	N		
STELGIDOPTERYX SERRIPENNIS	NORTHERN ROUGH-WINGED SWALLOW	G5S4	N		
PETROCHELIDON PYRRHONOTA	CLIFF SWALLOW	G5S5	N		
HIRUNDO RUSTICA	BARN SWALLOW	G5S5	N		
CYANOCITTA STELLERI	STELLER'S JAY	G5S5	N		
APHELOCOMA CALIFORNICA	WESTERN SCRUB-JAY	G5S5	N		
CORVUS BRACHYRHYNCHOS	AMERICAN CROW	G5S5	N		
CORVUS CORAX	COMMON RAVEN	G5S4	N		
POECILE ATRICAPILLA	BLACK-CAPPED CHICKADEE	G5S5	N		
POECILE RUFESCENS	CHESTNUT-BACKED CHICKADEE	G5S5	N		
PSALTRIPARUS MINIMUS	BUSHTIT	G5S5	N		
SITTA CANADENSIS	RED-BREASTED NUTHATCH	G5S5	N		
SITTA CAROLINENSIS	WHITE-BREASTED NUTHATCH	G5S4	N		

THRYOMANES BEWICKII	BEWICK'S WREN	G5S4	N		
TROGLODYTES AEDON	HOUSE WREN	G5S4	N		
TROGLODYTES TROGLODYTES	WINTER WREN	G5S4	N		
CISTOTHORUS PALUSTRIS	MARSH WREN	G5S5	N		
CINCLUS MEXICANUS	AMERICAN DIPPER	G5S4	N		
REGULUS SATRAPA	GOLDEN-CROWNED KINGLET	G5S4	N		
SIALIA MEXICANA	WESTERN BLUEBIRD	G5S4B,S4N	N		SV
TURDUS MIGRATORIUS	AMERICAN ROBIN	G5S5	N		
CHAMAEA FASCIATA	WRENTIT	G5S5	N		
BOMBYCILLA CEDRORUM	CEDAR WAXWING	G5S5	N		
STURNUS VULGARIS	EUROPEAN STARLING	G5SE	N		
VIREO HUTTONI	HUTTON'S VIREO	G5S4	N		
VIREO GILVUS	WARBLING VIREO	G5S5	N		
VIREO CASSINII	CASSIN'S VIREO	G5S4?B	N		
VERMIVORA CELATA	ORANGE-CROWNED WARBLER	G5S5	N		
DENDROICA PETECHIA	YELLOW WARBLER	G5S4	N		
DENDROICA CORONATA	YELLOW-RUMPED WARBLER	G5S5	N		
DENDROICA NIGRESCENS	BLACK-THROATED GRAY WARBLER	G5S5	N		
DENDROICA OCCIDENTALIS	HERMIT WARBLER	G4G5S4	N		
OPORORNIS TOLMIEI	MACGILLIVRAY'S WARBLER	G5S4	N		
GEOTHLYPIS TRICHAS	COMMON YELLOWTHROAT	G5S5	N		
WILSONIA PUSILLA	WILSON'S WARBLER	G5S5	N		
PIPILO MACULATUS	SPOTTED TOWHEE	G5S5	N		

SPIZELLA PASSERINA	CHIPPING SPARROW	G5S4	N		
POOECETES GRAMINEUS	VESPER SPARROW	G5S4B	N		SC
PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW	G5S5	N		
MELOSPIZA MELODIA	SONG SPARROW	G5S5	N		
ZONOTRICHIA LEUCOPHRYS	WHITE-CROWNED SPARROW	G5S5	N		
JUNCO HYEMALIS	DARK-EYED JUNCO	G5S5	N		
AGELAIUS PHOENICEUS	RED-WINGED BLACKBIRD	G5S5	N		
STURNELLA NEGLECTA	WESTERN MEADOWLARK	G5S5	N		SC
EUPHAGUS CYANOCEPHALUS	BREWER'S BLACKBIRD	G5S5	N		
MOLOTHRUS ATER	BROWN-HEADED COWBIRD	G5S5	N		
CARPODACUS PURPUREUS	PURPLE FINCH	G5S4	N		
CARPODACUS MEXICANUS	HOUSE FINCH	G5S5	N		
LOXIA CURVIROSTRA	RED CROSSBILL	G5S4	N		
CARDUELIS PINUS	PINE SISKIN	G5S5	N		
CARDUELIS PSALTRIA	LESSER GOLDFINCH	G5S4	N		
CARDUELIS TRISTIS	AMERICAN GOLDFINCH	G5S4	N		
PASSER DOMESTICUS	HOUSE SPARROW	G5SE	N		
MAMMALS					
DIDELPHIS VIRGINIANA	VIRGINIA OPOSSUM	G5SE	N		
SOREX VAGRANS	VAGRANT SHREW	G5S4	N		
SOREX BENDIRII	PACIFIC WATER SHREW	G4S4	N		
SOREX TROWBRIDGII	TROWBRIDGE'S SHREW	G5S4	N		
SOREX SONOMAE	FOG SHREW	G5SU			

NEUROTRICHUS GIBBSII	SHREW-MOLE	G5S4	N		
MYOTIS LUCIFUGUS	LITTLE BROWN MYOTIS	G5S4	N		
MYOTIS YUMANENSIS	YUMA BAT	G5S3	N	SOC	
MYOTIS EVOTIS	LONG-EARED BAT	G5S3	N	SOC	SU
MYOTIS THYSANODES	FRINGED BAT	G4G5S2?	Y	SOC	SV
MYOTIS VOLANS	LONG-LEGGED BAT	G5S3	N	SOC	SU
MYOTIS CALIFORNICUS	CALIFORNIA MYOTIS	G5S4	N		
LASIONYCTERIS NOCTIVAGANS	SILVER-HAIRED BAT	G5S4?	N	SOC	SU
EPTESICUS FUSCUS	BIG BROWN BAT	G5S4	N		
LASIURUS CINEREUS	HOARY BAT	G5S4?	N		
CORYNORHINUS TOWNSENDII	TOWNSEND'S BIG-EARED BAT	G4S3	N	(PS)	SC
SYLVILAGUS BACHMANI	BRUSH RABBIT	G5S5	N		
TAMIAS TOWNSENDII	TOWNSEND'S CHIPMUNK	G5S4	N		
SPERMOPHILUS BEECHEYI	CALIFORNIA GROUND SQUIRREL	G5S5	N		
PEROMYSCUS MANICULATUS	DEER MOUSE	G5S5	N		
MICROTUS TOWNSENDII	TOWNSEND'S VOLE	G5S4	N		
MICROTUS LONGICAUDUS	LONG-TAILED VOLE	G5S5	N		
MICROTUS OREGONI	CREEPING VOLE	G5S4	N		
ONDATRA ZIBETHICUS	MUSKRAT	G5S5	N		
RATTUS RATTUS	BLACK RAT	G5SE	N		
RATTUS NORVEGICUS	NORWAY RAT	G5SE	N		
MUS MUSCULUS	HOUSE MOUSE	G5SE	N		
ERETHIZON DORSATUM	COMMON PORCUPINE	G5S5	N		

CANIS LATRANS	COYOTE	G5S5	N		
UROCYON CINEREOARGENTEUS	COMMON GRAY FOX	G5S4	N		
URSUS AMERICANUS	BLACK BEAR	G5S4	N		
PROCYON LOTOR	COMMON RACCOON	G5S5	N		
MUSTELA FRENATA	LONG-TAILED WEASEL	G5S5	N		
MUSTELA VISON	MINK	G5S5	N		
SPILOGALE GRACILIS	WESTERN SPOTTED SKUNK	G5S4	N		
MEPHITIS MEPHITIS	STRIPED SKUNK	G5S5	N		
LYNX RUFUS	BOBCAT	G5S4	N		
CERVUS ELAPHUS	ELK	G5S5	N		
ODOCOILEUS HEMIONUS	BLACK-TAILED DEER	G5S5	N		
	REPTILES				
ELGARIA COERULEA	NORTHERN ALLIGATOR LIZARD	G5S5	N		
SCELOPORUS OCCIDENTALIS	WESTERN FENCE LIZARD	G5S5	N		
EUMECES SKILTONIANUS	WESTERN SKINK	G5S5	N		
CHARINA BOTTAE	RUBBER BOA	G5S4	N		
COLUBER CONSTRICTOR	RACER	G5S4?	N		
DIADOPHIS PUNCTATUS	RINGNECK SNAKE	G5S4?	N		
PITUOPHIS CATENIFER	GOPHER SNAKE	G5S5	N		
THAMNOPHIS ELEGANS	WESTERN TERRESTRIAL GARTER SNAKE	G5S5	N		
THAMNOPHIS ORDINOIDES	NORTHWESTERN GARTER SNAKE	G5S5	N		
THAMNOPHIS SIRTALIS	COMMON GARTER SNAKE	G5S5	N		
THAMNOPHIS ATRATUS	PACIFIC COAST AQUATIC GARTER SNAKE	G5S4?	N		

Table 3. Rare native plant associations on the Coquille Spit target property. Source: Kagan et al. (2004).

Association	ORNHIC rank
Glasswort salt marsh	G4S2
<i>Salicornia depressa</i>	
Saltgrass - (glasswort) salt marsh	G4S2
<i>Distichlis spicata</i> - (<i>Salicornia depressa</i>)	
Glasswort - saltgrass - arrow grass - (jaumea) salt marsh	G3S2
<i>Salicornia depressa</i> - <i>Distichlis spicata</i> - <i>Triglochin maritima</i> - (<i>Jaumea carnososa</i>)	
Lyngby sedge - (saltgrass - arrow grass) salt marsh	G4S2
<i>Carex lyngbyei</i> - (<i>Distichlis spicata</i> - <i>Triglochin maritimum</i>)	
Lyngby sedge - Pacific silverweed salt marsh	G4S2
<i>Carex lyngbyei</i> - <i>Argentina egedii</i>	

Table 4. Common vascular plant species observed on the Coquille Spit target property.

Scientific Name	Common Name	Exotic
<i>Abronia latifolia</i>	yellow sandverbena	
<i>Achillea millefolium</i>	yarrow	
<i>Agrostis stolonifera</i>	creeping bentgrass	Exotic
<i>Aira praecox</i>	little hairgrass	Exotic
<i>Ambrosia chamissonis</i>	silver burweed	
<i>Ammophila arenaria</i>	European beachgrass	Exotic
<i>Angelica hendersonii</i>	Henderson's angelica	
<i>Anthemis cotula</i>	stinking chamomile	Exotic
<i>Argentina egedii</i>	Pacific silverweed	
<i>Armeria maritima</i>	seapink	
<i>Artemisia pycnocephala</i>	beach wormwood	
<i>Atriplex patula</i>	shadscale	
<i>Baccharis pilularis</i>	chaparral broom	
<i>Briza minor</i>	little quaking-grass	Exotic
<i>Bromus diandrus</i>	ripgut brome	Exotic
<i>Bromus hordeaceus</i>	soft brome	Exotic
<i>Calystegia soldanella</i>	seashore false bindweed	
<i>Cardionema ramosissimum</i>	sand mat	
<i>Carex lyngbyei</i>	Lyngby sedge	
<i>Carex obnupta</i>	slough sedge	
<i>Carex pansa</i>	sand dune sedge	
<i>Castilleja ambigua</i>	paintbrush orthocarpus	
<i>Claytonia spathulata</i>	pale montia	
<i>Cotula coronopifolia</i>	brass buttons	Exotic
<i>Cuscuta salina</i>	salt-marsh dodder	
<i>Cytisus scoparius</i>	Scots broom	Exotic
<i>Deschampsia caespitosa</i>	tufted hairgrass	
<i>Distichlis spicata</i>	saltgrass	
<i>Epipactis gigantea</i>	giant helleborine	
<i>Festuca rubra var. arenicola</i>	beach fescue	
<i>Fragaria chiloensis</i>	coast strawberry	
<i>Frangula purshiana</i>	casara	
<i>Galium aparine</i>	cleavers	
<i>Gaultheria shallon</i>	salal	
<i>Glaux maritima</i>	sea milkwort	
<i>Holcus lanatus</i>	velvet grass	Exotic
<i>Hypochaeris radicata</i>	hairy cat's-ear	Exotic
<i>Jaumea carnosa</i>	fleshy jaumea	
<i>Juncus lesueurii</i>	salt rush	
<i>Lathyrus japonicus</i>	sea pea	
<i>Lathyrus littoralis</i>	beach pea	
<i>Leymus mollis</i>	American dunegrass	

<i>Lilaeopsis occidentalis</i>	lilaeopsis	
<i>Lupinus arboreus</i>	bush lupine	Exotic
<i>Lupinus littoralis</i>	seashore lupine	
<i>Luzula campestris</i>	field woodrush	
<i>Morella californica</i>	wax myrtle	
<i>Phacelia argentea</i>	silvery phacelia	
<i>Picea sitchensis</i>	Sitka spruce	
<i>Pinus contorta</i> var. <i>contorta</i>	shore pine	
<i>Plantago lanceolata</i>	narrowleaf plantain	Exotic
<i>Plantago maritima</i>	seaside plantain	
<i>Platystemon californicus</i>	creamcups	
<i>Poa douglasii</i> ssp. <i>macrantha</i>	seashore bluegrass	
<i>Polygonum paronychia</i>	beach knotweed	
<i>Polypodium glycyrrhiza</i>	licorice Fern	
<i>Polystichum munitum</i>	sword Fern	
<i>Rubus ursinus</i>	trailing blackberry	
<i>Rumex acetosella</i>	sheep sorrel	Exotic
<i>Ruppia maritima</i>	ditch-grass	
<i>Salicornia depressa</i>	pickleweed	
<i>Salix hookeriana</i>	coast willow	
<i>Tanacetum camphoratum</i>	seaside tansy	
<i>Trifolium dubium</i>	suckling clover	Exotic
<i>Trifolium wormskjoldii</i>	spring-bank clover	
<i>Triglochin maritimum</i>	seaside arrowgrass	
<i>Triphysaria</i>	triphysaria	
<i>Ulex europaeus</i>	gorse	Exotic
<i>Vaccinium ovatum</i>	evergreen huckleberry	
<i>Veronica scutellata</i>	marsh speedwell	
<i>Vicia americana</i>	American vetch	
<i>Vicia nigricans</i> ssp. <i>gigantea</i>	giant vetch	
<i>Vicia sativa</i>	garden vetch	Exotic

Table 5. GPS points for silvery phacelia on Coquille Spit, 2007. Datum is WGS 84. Accuracy ranged from 16-20 feet and readings were not averaged.

Site	Point	Date	Position
Coquille Spit	215	05-17-07 14:38	N43 08.155 W124 25.012
Coquille Spit	216	05-17-07 15:57	N43 08.356 W124 24.834
Coquille Spit	2171	05-17-07	N43 08.458 W124 24.816
Coquille Spit	217	05-17-07 16:13	N43 08.453 W124 24.816

Specific occurrence data for silvery phacelia, by GPS point:

215. Top of dredge spoil mound. Two plants, 75 % dead.

216. Top of dredge spoil mound. Five plants, 50 % dead.

217. Top of dredge spoil mound. Three plants, 20 % dead.

2171. Top of dredge spoil mound. Three groups of plants. First group covering about 20 x 20 inches, 25 % dead. Second group ca. 10 ft S of first, covering about 8 x 8 inches, 50 % dead. Third group 13 paces 200° from second group, covering about 10 x 10 inches, 25 % dead.

Appended Figures and Photographs

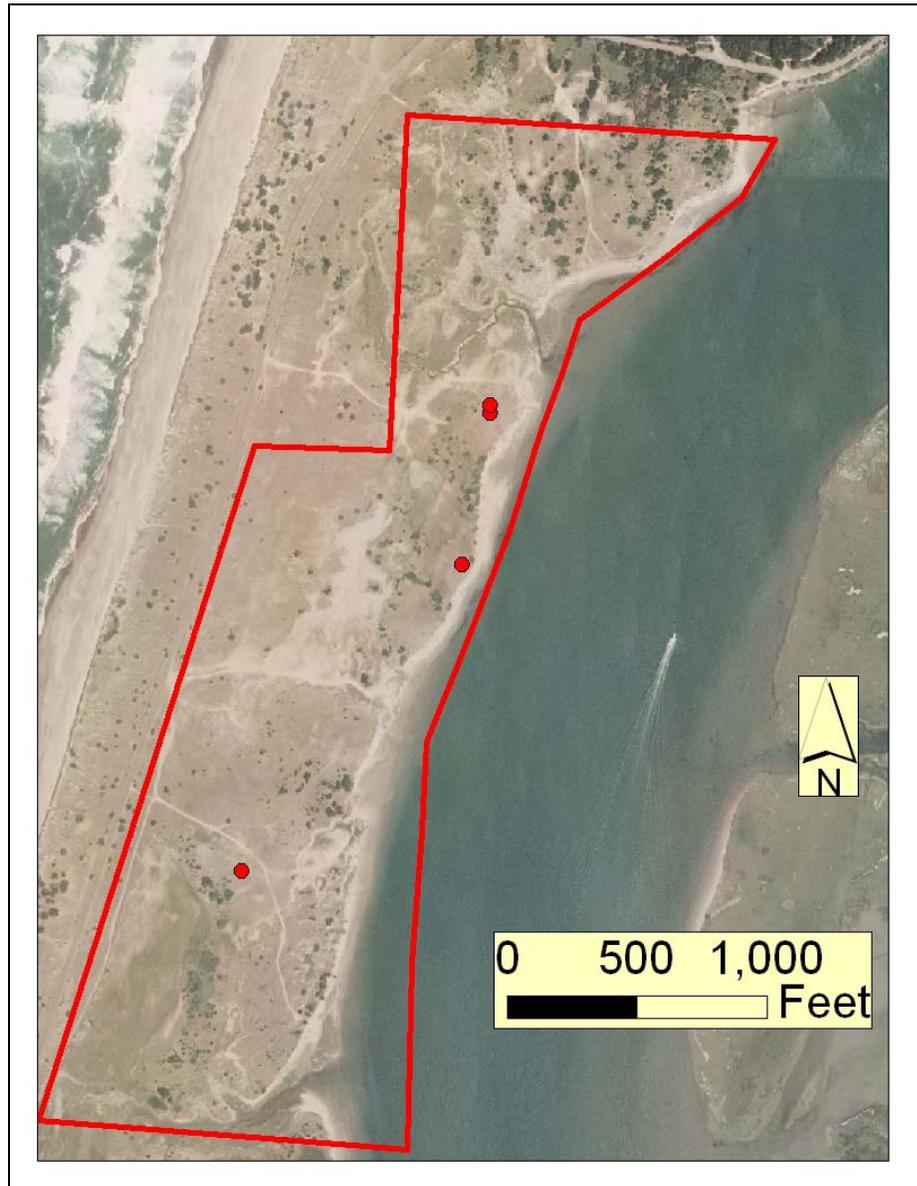


Figure 7. Distribution of silvery phacelia (red dots) on Coquille Spit target property. 2005 NAIP imagery



Figure 8. Distribution of gorse (red dots) on Coquille Spit target property. 2005 NAIP imagery.



Figure 9. Sand flats and low dunes with European beachgrass and expanding woody component (map unit 2). Northern Keiser property, looking south.



Figure 10. Deflation plain (map unit 8). Central Keiser property, looking north.



Figure 11. ORV damage in deflation plain (map unit 8). Southern end of Keiser property, looking north.



Figure 12. Top of old dredge spoils (map unit 4) with deflation plain and foredune distance. Central Keiser property, looking northwest.



Figure 13. Silvery phacelia on old dredge spoils. Keiser property.



Figure 14. Sand flats with European beachgrass (map unit 2). Near south end of Keiser property, looking northeast.



Figure 15. Tidal channel with Lyngby sedge and low salt marsh (map unit 6). Near north end of Keiser property, looking northeast.



Figure 16. Low to middle salt marsh along tidal channel (map unit 10). South end of Keiser property, looking east.



Figure 17. Old dredge spoil mound (map unit 4) with Coquille River in distance.



Figure 18. Dredge spoil mound (map unit 4) with smaller sand mounds on top, providing microhabitat for dune plants.