

CTCLUSI Environmental Assessment of Tribal Lands



September 2011

1.0 INTRODUCTION

The Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians have undertaken an environmental assessment of the natural resources on its reservation, Fee and Trust lands. The assessment is meant to identify potential impacts to Tribal lands and to form the foundation for the Department of Natural Resources' strategic plan. Information provided in this assessment is intended to guide the Tribes cultural and natural resource management, protection, and planning. This assessment and information provided herein is subject to annual review and revision as necessary, but should be revised at least once every five years.

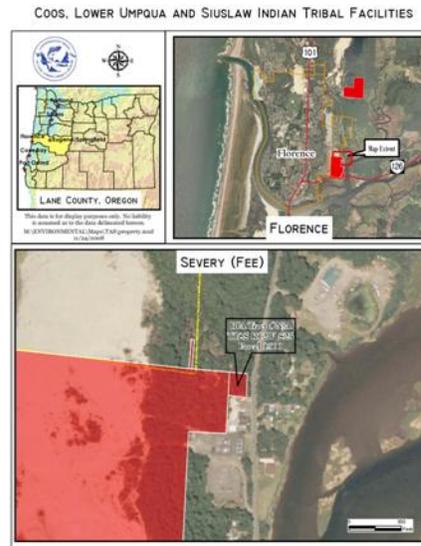
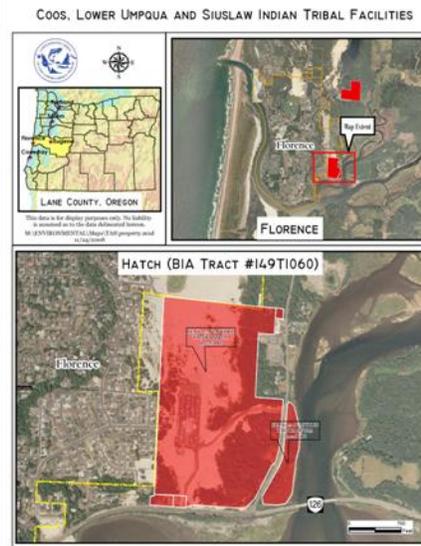
The Tribes have a total of 405 acres of land, 130 acres of which are in trust and 275 acres of which are in the process of being transferred into trust status. The Tribes' current land holdings are scattered among the Coos River, Sixes River, and Siuslaw River watersheds and consists of wetlands, forestlands, rural residential and commercial development land uses.

Information provided in this document focuses on the following tracts of land owned and managed by the Tribes and identifies the environmental conditions on or adjacent to these tracts. The tracts included in this assessment are those Tribal properties where significant natural resources, known or suspected environmental impacts, or current natural resource management or extraction activities are occurring.

TRACT NAME	COUNTY	TRACT ACRES	FEE	TRUST	RESERVATION
KENTUCK SLOUGH	COOS	0.02			0.02
SIXES RIVER	CURRY	1.25			1.25
HATCH	LANE	17.94		17.94	
HATCH	LANE	80.22		80.22	
MILUK VILLAGE	COOS	1.69		1.69	
LOTT	LANE	0.29		0.29	
ALISHANEE	COOS	1.43		1.43	
FISHER (KCBY)	COOS	2.24	2.24		
EASON	COOS	18.80	18.80		
MUNSEL LAKE	LANE	140.00	140.00		
COOS HEAD	COOS	43.10	43.10		
DUMAN	LANE	1.64	1.64		
WINDWARD	LANE	2.07	2.07		
FLANAGAN PIONEER CEMETERY	COOS	3.07	3.07		
BALDICH (GREGORY POINT)	COOS	24.10		24.10	
SEVERY	LANE	0.56	0.56		

Tract Assessments

Hatch Tract – Hatch, Duman, and Severy Tracts:



Current Land Use(s): Three Rivers Casino and Hotel; Wastewater Treatment Plant; Drinking Water Distribution; Source Water Protection; Wastewater Irrigation; Multi-Family Residential Housing.

Adjacent Land Use(s): Dominant land use adjacent to the Hatch Tract is rural residential housing. Multi-family housing and commercial buildings are also located within a one mile radius of this property. A golf course is located on the northern boundary of the Tribes' parcel and the City of Florence drinking water well field is located upgradient of the this parcel.

Property Overview: The Hatch, Duman, and Severy Tracts, located in the City of Florence, are not reliant upon a municipal water source and are drawing water directly from an EPA designated sole source aquifer. Water and wastewater distribution at the Hatch Tract is managed and maintained by the Tribes.

The majority of the Tribes' water and wastewater distribution activities at site are those associated with the Tribes' Three Rivers Casino (TRC) and Hotel located on the Hatch Tract.

We have located our drinking water source(s) using a Trimble Geo-XT Global Positioning System. These data have been differentially corrected to remove some of the common positioning errors. The location of the source(s) has been placed in a Geographic Information System (GIS) layer and projected onto sub-meter imagery.

The raw data was subjected to differential correction using the PATHFINDER software. The location data for our active wells using the WGS datum is as follows:

Source	Latitude	Longitude
Well 1	43° 58' 54.98" N	124° 05' 14.61" W
Well 2	43° 58' 54.11" N	124° 05' 11.01" W

Site Description, History & Background: The Tribes' Hatch Tract and the TRC and Hotel site location is a 98 acre parcel located in Lane County approximately 2 miles east of the city of Florence, Oregon at the confluence of the Siuslaw North Fork River and Mainstem of the Siuslaw River. According to the Lane County Regional Land information Database, 57% of this tract is dune land, with slopes ranging between 0 to 30%. A dune ridge extends from the northeastern property corner south toward Highway 126 and then westward in the southern portion of the property. A narrower, lower, and dissected dune ridge extends northward from the southwest property corner approximately two thirds of the way to the eastern terminus of Coastal Highlands Drive. The eastern, southern and western slopes of the horseshoe-shaped main dune ridge are densely vegetated with salal, manzanita, rhododendrons, and fir trees. Disturbed areas in the lower portions east of the dune ridge are vegetated with scotch broom and blackberries. The western slopes of the dune ridge and the central portions of the site are either lacking vegetation or sparsely vegetated with European beach grass, scotch broom, and pines. This area is also characterized by "hummocky topography" as a result of sand dune deposition and deflation of the sand. A seasonal lake a few hundred feet across is present in the northeast-central portion of the site between the main dune ridge and the North Fork Road, and another seasonal lake of similar dimension is present straddling the western property line near the northwest property corner. The western part of the site is underlain by active dunes, whereas the eastern portion is underlain by a deflation plain. Segments of the North Fork Siuslaw River and Siuslaw Estuary are included on or immediately adjacent to portions of this tract.

Hatch Tract is located over a sole source aquifer. According to the February 22, 2004 GeoScience, Inc. report titled *Dunal Aquifer Hydrogeology* prepared for the Tribes, "The site hydrology can be characterized as a dunal aquifer system which is recharged by precipitation and which discharges to surface water." Municipal wells for the City of Florence located approximately one mile upgradient of this site are reported to each yield 325 to 450 gallons per minute, or 468,000 to 648,000 gpd (gallons per day).

Summer irrigation of the golf course to the north of the Hatch Tract utilizes 400,000 gpd. The Tribes' Three Rivers Casino currently uses approximately 10,000 gallons per day. Future development of the site is not expected to use more than 70,000 to 200,000 gpd, based on other Tribal developments of this nature in western Oregon.

In addition to being a traditional village site, the Hatch Tract was the site of a bridge crossing and a lumber mill during the middle 20th century.

Siuslaw River Estuary

The Hatch Tract is immediately adjacent to the Siuslaw River Estuary. This estuary is classified by the Oregon Department of Land Conservation and Development (DLCDD) as a Shallow Draft Development estuary and as such, is managed for navigation and other public needs consistent with overall estuary management rules.

Potential Impacts to Source Water

Onsite wastewater irrigation has been implemented for the disposal of treated wastewater generated by the Tribes' Hatch Tract wastewater management facility. Additional potential on site contaminant sources identified by the Tribes' Department of Natural Resources Staff (DNR) during site surveys and reviews of Hatch Tract construction plans are: pesticide/fertilizer/petroleum/ storage (above ground storage tanks – ASTs), handling, mixing and cleaning areas; stormwater outfalls; potential impacts to groundwater associated with cone of depression well interference or well head cone of depression induced recharge from the North Fork River or wetland located below the Hatch Tract's drain field; and percolation of reclaimed water irrigation used for dune stabilization on the site. The wastewater irrigation site is located immediately downgradient of two source water wells that supply drinking water to site facilities. However, the elevation of the irrigation field is higher than those of the source water wells.

Duman Soil and Groundwater Contamination

CTCLUSI's Duman parcel is located in a residential/commercial area immediately north of Highway 126 in Florence, Oregon. This parcel is a former LUST site and as such has certain institutional controls associated with the implementation of any ground disturbing activities at the site. Lane County records identify the property as Tax Lot 2500 of Section 26, Township 18 South, Range 12 West.

The Duman parcel was previously owned by a small construction company. The previous owner denied any knowledge of underground storage tanks at the property. Interviews with the previous owner, historical records review, and a site inspection during a Phase 1 Environmental Site Assessment did not reveal evidence of any underground fuel storage tanks on the parcel.

During excavation for subsurface utilities on Duman, the contractor discovered a 1000-gallon underground storage tank and an associated release of petroleum hydrocarbons. The tank contained approximately 460 gallons of a gasoline and water mixture. The tank and contaminated soil in the immediate vicinity of the tank were removed from the site.

The following assumptions and recommendations apply to any ground disturbing activities implemented at the site.

1. An area of hydrocarbon contaminated soil of unknown extent and magnitude remains in place near the former tank excavation. The impacted soil is located at a minimum depth of approximately 5 feet below the surface.
2. A plume of impacted groundwater of unknown extent and magnitude underlies the site. The migration of the plume appears to be toward the south, southeast under Highway 126.
3. Chlorinated solvents were identified in groundwater downgradient from the former UST, which are above EPA's Preliminary Remediation Goals for drinking water.
4. Gasoline range hydrocarbons were identified in groundwater, downgradient from the former UST, which exceeds ODEQ *Occupational and Excavation Worker* pathways.
5. Due to concentrations of gasoline range hydrocarbons and chlorinated solvents, identified on the southwest portion of the site, that exceed ODEQ Risk Based Concentrations (RBCs) and EPA's Preliminary Remediation Goals, special precautions should be taken if any excavations in the vicinity of the former UST should occur that would encounter groundwater, a Health and Safety Plan should be administered and proper protective equipment should be used.

**Potential Contaminant Sources
that Pose a Risk to Hatch Tract Groundwater**



According to the Florence Source Water Assessment Report, the North Florence Dunal Aquifer is considered to be highly sensitive and susceptible to contamination from viral contaminant sources located within the two-year time-of-travel zone for the city's drinking water protection area (e.g. sewer lines and residential housing). The City of Florence's Drinking Water Protection Area is approximately one mile upgradient of the Tribes' Hatch Tract facilities, but does not include Hatch Tract in its delineation. However, due to the close proximity of Hatch Tract to the City of Florence's Drinking Water Protection Area, the potential contaminant sources for Hatch Tract source water are similar to those identified by the City of Florence Source Water Assessment Report. The delineated drinking water protection area for the wells located within the Florence drinking water protection area is primarily dominated by residential and municipal land use. However, four potential contaminant sources were identified in the two-year time-of-travel zone of the Florence drinking water protection area: a golf course; high density housing; a drinking water treatment plant; and city sewer lines. These findings were confirmed by our own GIS analysis and pose the same threat to Tribal source water resources at the Hatch Tract.

Surface Water Quality

The North Fork Siuslaw River is 303(d) listed for sedimentation and temperature and the Mainstem Siuslaw River is 303(d) listed for dissolved oxygen, temperature and fecal coliform year round.

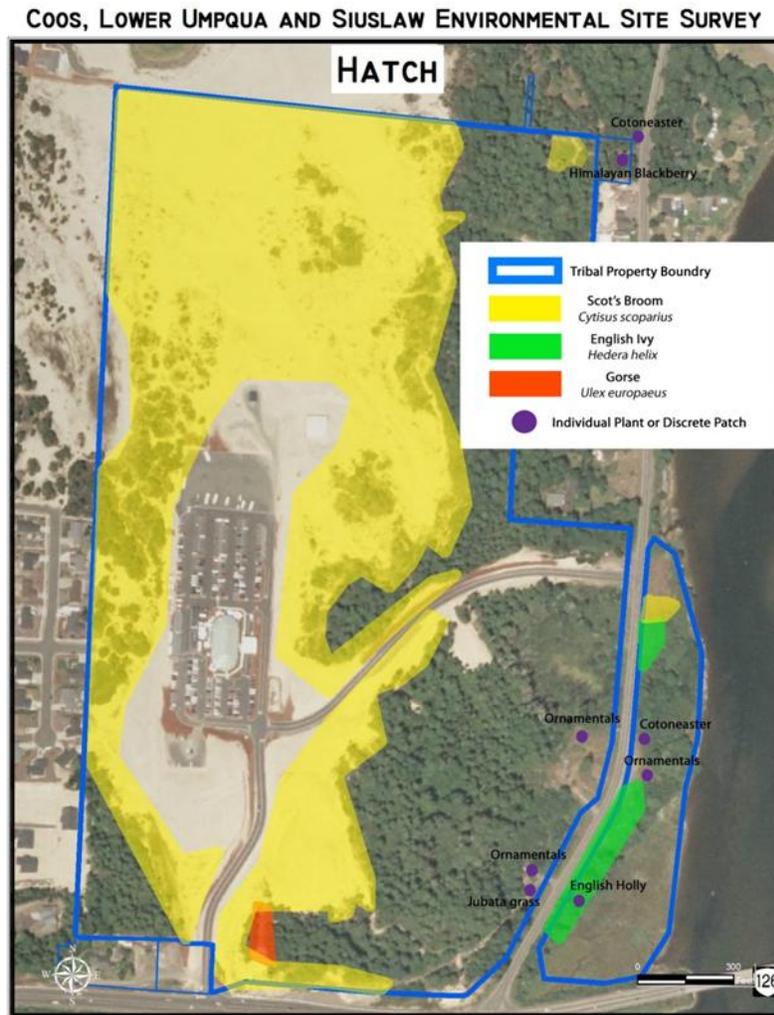
Wetlands

There are three National Wetland Inventory (NWI) mapped wetlands located on the Hatch Tract.

NWI Classification Code	Wetland Type	Acres
PABF	Freshwater Pond	1.46
PUSC	Freshwater Pond	2.59
E2EMP	Estuarine and Marine Wetland	3.49
Total NWI Acres		7.54

In addition to the NWI mapped wetlands, there are two Local Wetland Inventory (LWI), Department of State Lands (DSL), mapped wetlands located on the property.

Invasive/Nuisance Species: The Hatch Tract is dominated by Scotch Broom. A discrete Gorse patch is located under a treeless area under power lines. Both species have been mowed with very limited success. European Beach Grass has been intentionally planted for sand stabilization.

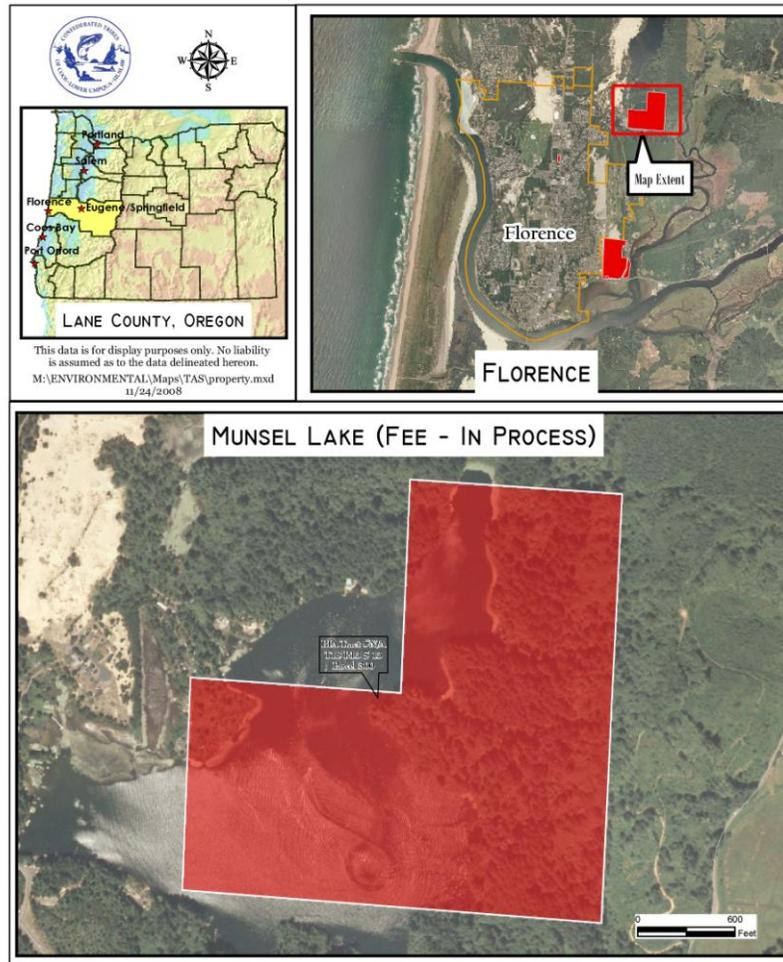


Recommendations:

1. Invasive and T&E species surveys should be done at least once a year but preferably twice a year to capture species that are more visible when in different stages of growth, such as when blooming for plant species or periods of higher activity for animal species.
2. Certify and implement the development of a Drinking Water Protection Plan.
3. Develop a contingency plan to address the potential loss of the drinking water supply.
4. Delineate the area that serves as the source of the public water supply (Drinking Water Protection Area-DWPA).
5. Inventory the potential risks or sources of contamination with the DWPA.
6. Develop and implement a wetland management plan.
7. Develop and implement an invasive species management plan.

Munsel Lake Tract:

COOS, LOWER UMPQUA AND SIUSLAW INDIAN TRIBAL FACILITIES



Current Land Use(s): The Confederated Tribes' Munsel Lake Tract is by deed restriction and Tribal Council Resolution to be maintained in a "pristine" condition (little logging has occurred on this tract) and will remain so: a Culture Camp for Tribal youth will be developed consistent with the intent of maintaining the pristine condition of the tract.

Adjacent Land Use(s): Munsel Lake's watershed is composed of forest, lakes, sand dunes and residential areas. Munsel Lake itself covers 10% of this watershed. A mixture of forest and sand dunes lie to the west of the lakes while forests cover foothills of the Coast Range to the west. Forests in this watershed consist of second growth conifer and hardwood species. Residential areas are present on the north and west shores of Munsel Lake. Roads are also concentrated in those areas.

Property Overview: The Munsel Lake Tract is a 120 acre parcel located along the eastern shore of Munsel Lake. Munsel Lake is located three miles north and 1 mile east of the city of Florence, Oregon. The Munsel Lake sub watershed in which this tract is located is dominated by sand dunes and other dune lakes, along with forest and residential development.

While 48% of this tract is submerged, 40% of the terrestrial portion of the CTCLUSI's Munsel Lake Tract is characterized by hillsides that range in percent slope of between 50 to 75%. Soil surface in undeveloped areas of Munsel Lake similar to this tract is covered with thin mats of grass, sedges, needles, and twigs. The Lane County Regional Land Information Database lists soils on this tract as being those composed of the Preacher-Bohannon-Slickrock complex. Tribal lake water resources of this tract are supplied with water from both the aquifer and surface runoff. However "[t]he relative importance of the aquifer is illustrated by the lack of substantial surface drainage despite an average annual precipitation of 79 inches" (PSU CLR). Both the PSU Center for Lakes and Reservoirs (CLR) and the City of Florence Stormwater Management Plan state that Munsel Lake covers nearly 100 acres and with depths of up to 29.3 meters is deeper than most coastal lakes. Munsel Lake is the last in a chain of four Oregon coast lakes that lie on the North Florence dunal aquifer. The headwaters for the Munsel Lake watershed originate in Collard Lake, flow south through Clear and Ackerly Lakes, and into Munsel Lake via Clear Creek.

"Munsel Creek drains the lake. Seasonally, surface streams do not flow out of Clear and Munsel Lakes. Within a mile downstream of Munsel Lake, however, Munsel Creek gathers groundwater discharge and flows year round. The surface system eventually flows into the Siuslaw River and the Pacific Ocean" (PSU CLR).

Site Description, History & Background: The Confederated Tribes' Munsel Lake Tract is by deed restriction and Tribal Council Resolution to be maintained in a "pristine" condition (little logging has occurred on this tract) and will remain so: a Culture Camp for Tribal youth will be developed consistent with the intent of maintaining the pristine condition of the tract. Evaluation and best professional judgment indicate that this "pristine" tract is not contributing to any degradation of Munsel Lake.

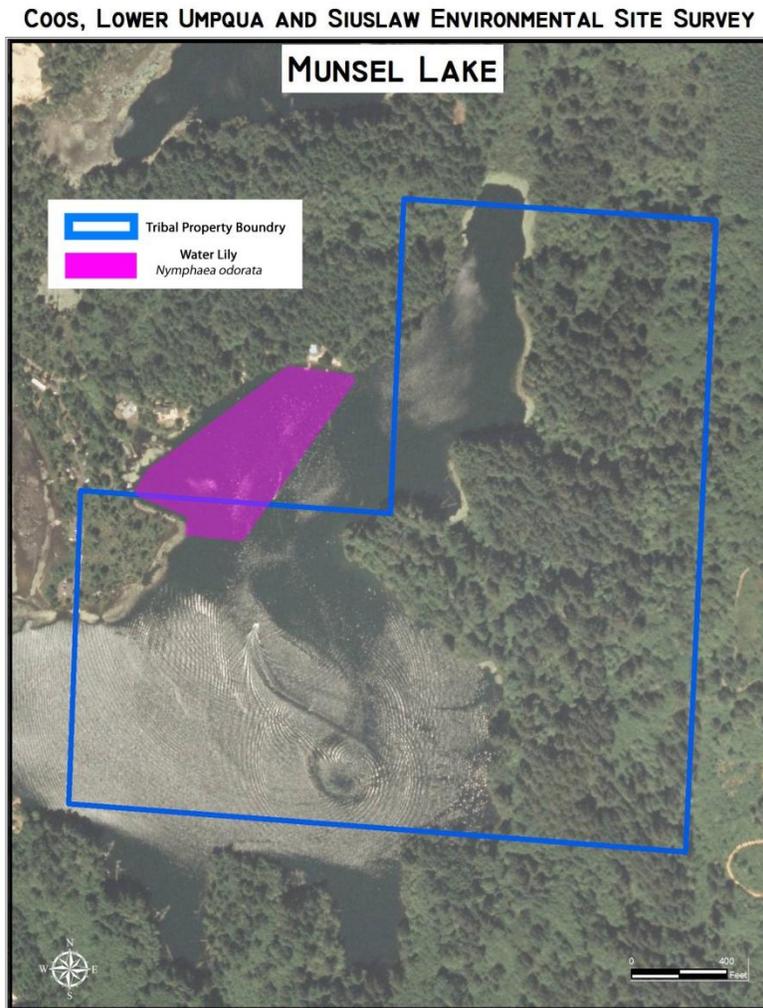
There are large amounts of native Pacific Labrador tea and good populations of the uncommon carnivorous sundew plant.

Surface Water: Portland State University Center for Lakes and Reservoir reports that during the summer of 2001 Munsel Lake was thermally stratified during between the depths of 6.0 and 6.9 meters. The deepest portion of the hypolimnion was anoxic during a July visit and most of the hypolimnion was anoxic during a September visit. This extensive anoxic area may be indicative of excessive nutrient loading to the lake.

Wetlands: No NWI or LWI wetlands occur on the Munsel Tract.

Invasive/Nuisance Species: Macrophyte beds are most extensive in the shallow north and south ends of the lake. The sand, clay and mud sediment in these areas support sparse stand of the floating leaf species *Brasenia schreberi*, *Nymphaea odorata*, *Potamogeton amplifolius*, and *Potamogeton amplifolius*. Submergent vegetation present includes *Najas spp.*, *Isoetes spp.*, and *Chara spp.*

There are large amounts of native Pacific Labrador tea and good populations of the uncommon carnivorous sundew plant.

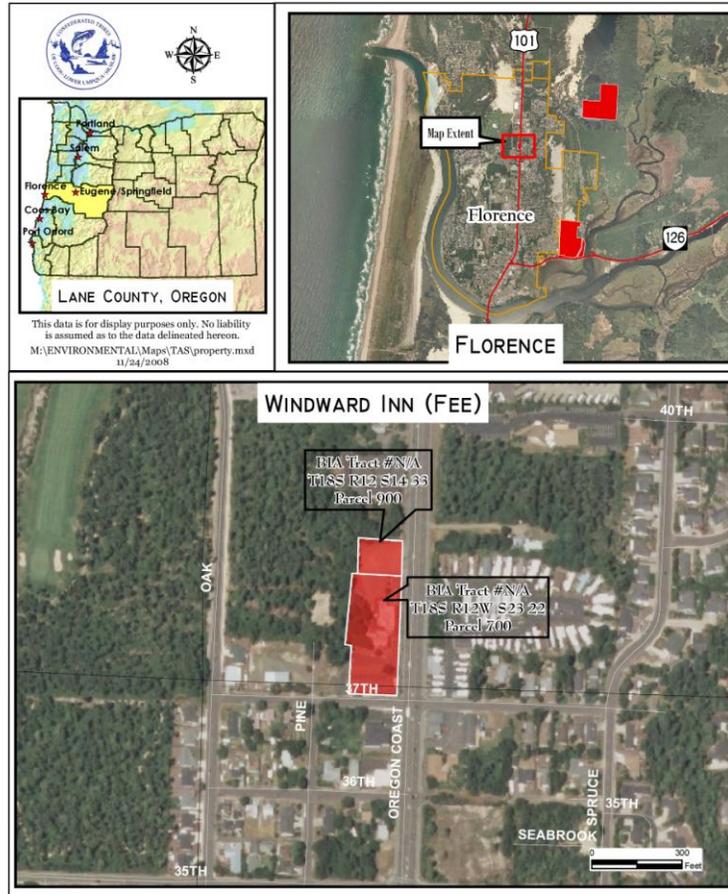


Recommendations:

1. Invasive and T&E species surveys should be done at least once a year but preferably twice a year to capture species that are more visible when in different stages of growth, such as when blooming for plant species or periods of higher activity for animal species.
2. Collect semi-annual surface water samples for the analysis of nutrients and bacteria.
3. Collect semi-annual measurements of physical water quality parameters.

Windward Inn Tract:

COOS, LOWER UMPQUA AND SIUSLAW INDIAN TRIBAL FACILITIES



Current Land Use(s): The Tribes' Florence Outreach office is housed within the single building located on this site. The building is surrounded by a paved parking lot.

Adjacent Land Use(s): At the time this assessment was conducted, property use in the site vicinity is characterized as commercial and residential use. Highway 101 and 37th Street abut the eastern and southern property lines. A RV park is located opposite Highway 101 and an Auto and RV commercial glass shop is located opposite 37th Street. An office for Finished Wall Construction and forestland is located west of the site along 37th Street and an Economy Inn is located north of the site.

Highway 101 and an area opposite the highway were developed east of the site prior to the late 1930's. A residence and outbuilding were located on the site in the 1930's and 1940's. These buildings appear from aerial photographs to have been razed and commercial buildings were developed in the mid-to-late 1950's and again in the 1970's. Areas south of the site, including 37th Street, were developed between 1945 and 1952. These sites appear from aerial photographs to be for residential and commercial use. Areas abutting the northern property line were developed prior to 1952 for commercial

use. Areas west of the site have been forestland except for a small area along 37th Street to the southwest currently occupied by Finished Wall Construction. This area appears from aerial photographs to have been developed prior to 1979.

Property Overview: The Windward Inn Tract is located in a mixed residential and commercial area of Florence, Oregon.

Site Description, History & Background: Prior to the Tribes' ownership of this property, a residence was located on the northern portion of the site in the 1930s and 1940's. The residence was razed prior to 1952 and that portion of the site has not been redeveloped. The single building on the site, currently housing the Tribes' Florence Outreach Office, was previously used as a restaurant. The building was used as a restaurant from approximately 1930 – 1995.

In addition to the above previous land uses, a gas pump operated on this site in the 1930s and 1940s. A garage was located just south of the restaurant building. From aerial photos, it appears that the gas pump was located under, what is now, the northern portion of the Tribes' Florence Outreach Office. The garage and the residence on the northern portion of the property were razed by 1952.

Surface Water: There are no surface waters located on this property.

Wetlands: There are no wetlands located on this property.

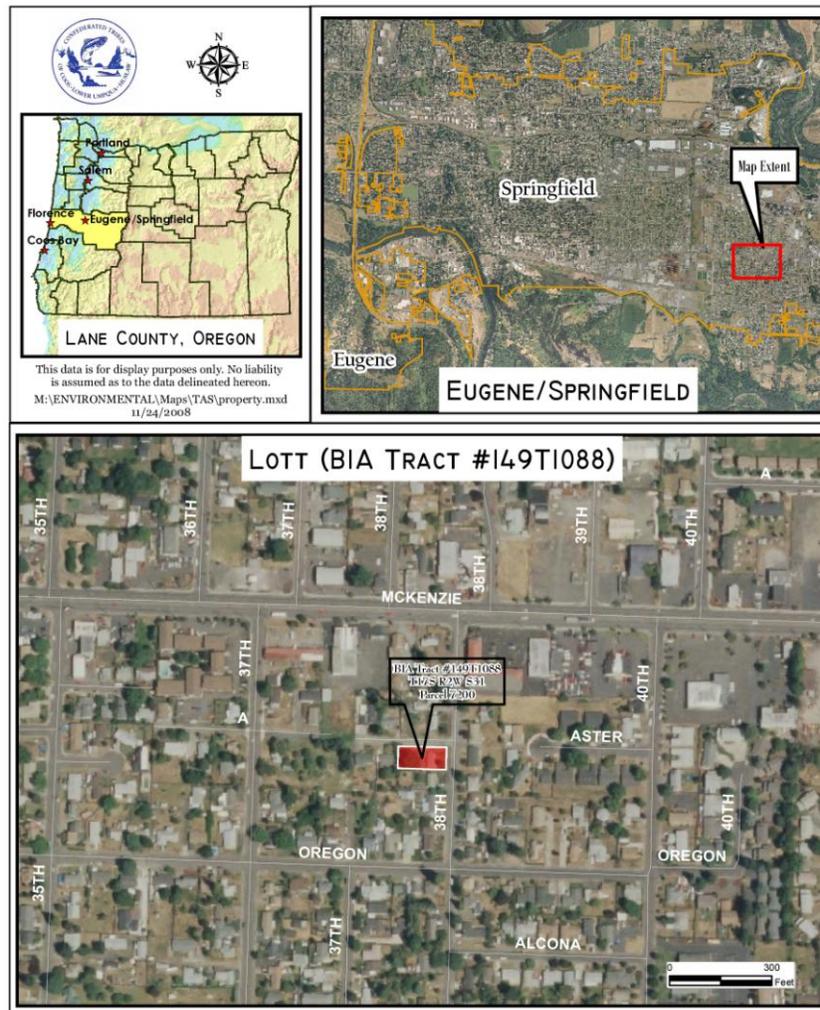
Invasive/Nuisance Species: This is a highly disturbed commercial property and as such plants and animals found on the site are landscape plants and domesticated animals.

Conclusions: A gas pump was located under what is now the northern end of the Tribes' Florence Outreach Office under the rear delivery door. Since there is no documentation that the storage tank was removed, the Tribes' assumed that the use of the site as a pump station in the 1930s and 1940s may have impacted native soil and groundwater. The Tribes contracted a limited subsurface investigation to investigate soil and groundwater in proximity to the former pump station. All soil and groundwater samples were analyzed using Method NWTPH-HCID. This analysis qualitatively identifies the type of hydrocarbon (Gasoline, Mineral Spirits, Kerosene, Diesel, Lube Oil) present in the soil. Results of the soil and groundwater analysis did not identify petroleum-based hydrocarbons in the soil. All of the groundwater and soil samples were identified as Non-Detect. A Non-Detect result indicates no detectable concentrations of hydrocarbons were present in the soil samples at the laboratory method detection limit. The consultants responsible for conducting the limited subsurface investigation issued an opinion that no further action was required at the site.

Recommendations: This is a highly disturbed and urban property. As such, there are no environmental management recommendations for this property.

Lott Tract:

COOS, LOWER UMPQUA AND SIUSLAW INDIAN TRIBAL FACILITIES



Current Land Use(s): This property is currently developed with a single-family two story house. Additional improvements include a small metal shed (approximately 8x8) located in the southwest corner of the property. The property contains a six-foot wooden fence on the western half of the property and a three foot wooden fence on the eastern half of the property.

Adjacent Land Use(s): Land use in the vicinity of this property is characterized primarily as residential neighborhood. The properties directly adjacent to the north, south, east and west are developed as single-family residential housing structures.

Past adjacent land use has been characterized agricultural until the mid1940s after which the area was gradually developed into a residential neighborhood.

Documented releases of petroleum products to groundwater and soil have occurred within ¼ mile of this tract. All of these sites are located down gradient of this tract and it is unlikely that subsurface conditions on the subject property have been adversely impacted.

Property Overview: This property is generally flat and level with the adjacent properties. A single-family, two story house is centrally located on the property. This two bedroom, one bathroom home is properly maintained and in good order. The majority of the property contains domestic landscaping (e.g. lawn grass) while the north side contains gravel and provides parking. Surface run-off from the paved street is diverted into a municipal surface water ditch located along the south side of the site. The property contains a 6 foot wooden fence along the north, west, and south boundaries while the eastside of the log has a three foot wooden fence.

Site Description, History & Background: Historic use of the Lott Tract, based on interviews, Lane County records, and aerial photographs, appears to have been agricultural until the mid-1940s after which the site was developed into a single-family home. Prior to the construction of the house, no structures appear to have occupied the site.

The house was heated with oil and was equipped with an AST until approximately 1967 when the AST was removed and the heat converted to natural gas. A well located on the north side of the house provided water and a septic tank located centrally on the property was used for wastewater. City water and wastewater were connected to the house in approximately 1965. The septic tank was back-filled and the water well is currently used for irrigation only. There has been no evidence of any hazardous material used or stored on the property.

Surface Water: There are no surface waters located on this property.

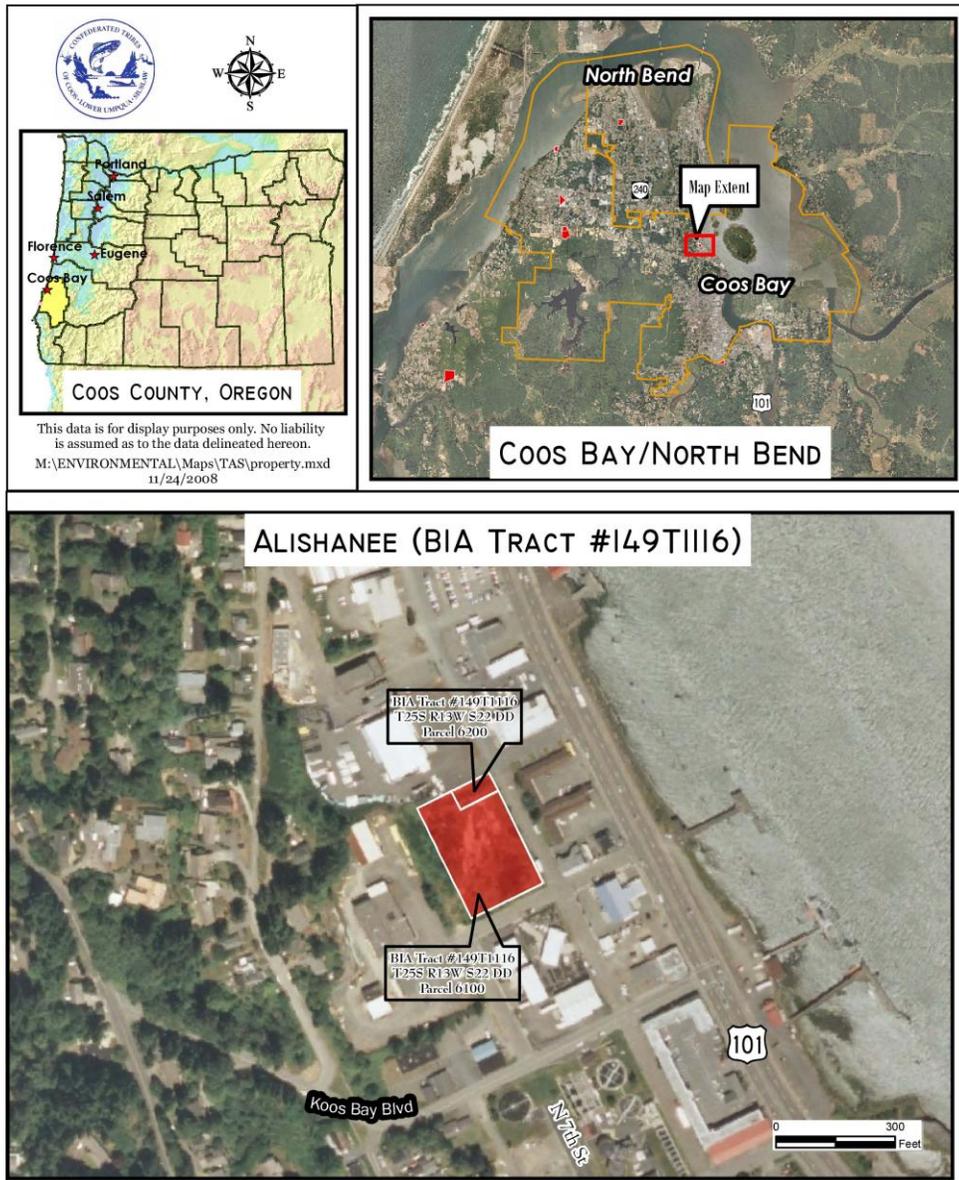
Wetlands: There are no wetlands located on this property.

Invasive/Nuisance Species: This is a highly disturbed commercial property and as such plants and animals found on the site are landscape plants and domesticated animals.

Recommendations: This is a highly disturbed and urban property. As such, there are no environmental management recommendations for this property.

Allishanee Tract:

COOS, LOWER UMPQUA AND SIUSLAW INDIAN TRIBAL FACILITIES



Current Land Use(s): This is a vacant tract and there are no current land uses.

Adjacent Land Use(s): Adjacent land use consists of industrial-commercial land uses.

Property Overview: The Allishanee Tract is located northwest of the intersection of North 6th Street and Kingwood Avenue in Coos Bay, Oregon. It is located west of North 6th St. and between Kingwood and Myrtle Avenues. The site is two blocks west of North Bayshore Drive (US Highway 101), the primary north-south thoroughfare on the northeast side of Coos Bay, in the downtown/bayfront area.

The site is currently undeveloped vacant land which is partially covered with vegetation. There are no structures on the site.

Site Description, History & Background: The site is located within 400 Feet of the tidelands of Coos Bay and the eastern third had been mapped within the 100 year flood zone. The site and properties north, south, and east are generally flat with a gentle slope to the east toward Coos Bay.

There appears to have been some fill placed on the site, small pieces of concrete and asphalt were observed in the surficial soils covering the site. A low mound of soil can be seen in the southwest quadrant of the site. There are no sanitary sewer connections or electrical power connections to the site, although they are available at the property lines.

Surface Water: The surface water on the site generally drains to the east towards North 6th Street. Local depressions or ruts on the site may restrict drainage or route runoff to the south. There are ten storm drains in the area. Infiltration at the site would not be large due to available drainage and the nature of the soils. Stormwater could run onto the site and Stormwater may also run onto the site from the northwest. The depth to the uppermost groundwater aquifer at the site is anticipated to be less than 10 Feet below ground surface and may be assumed to be brackish.

Wetlands

There are no NWI or LWI wetlands located on this property.

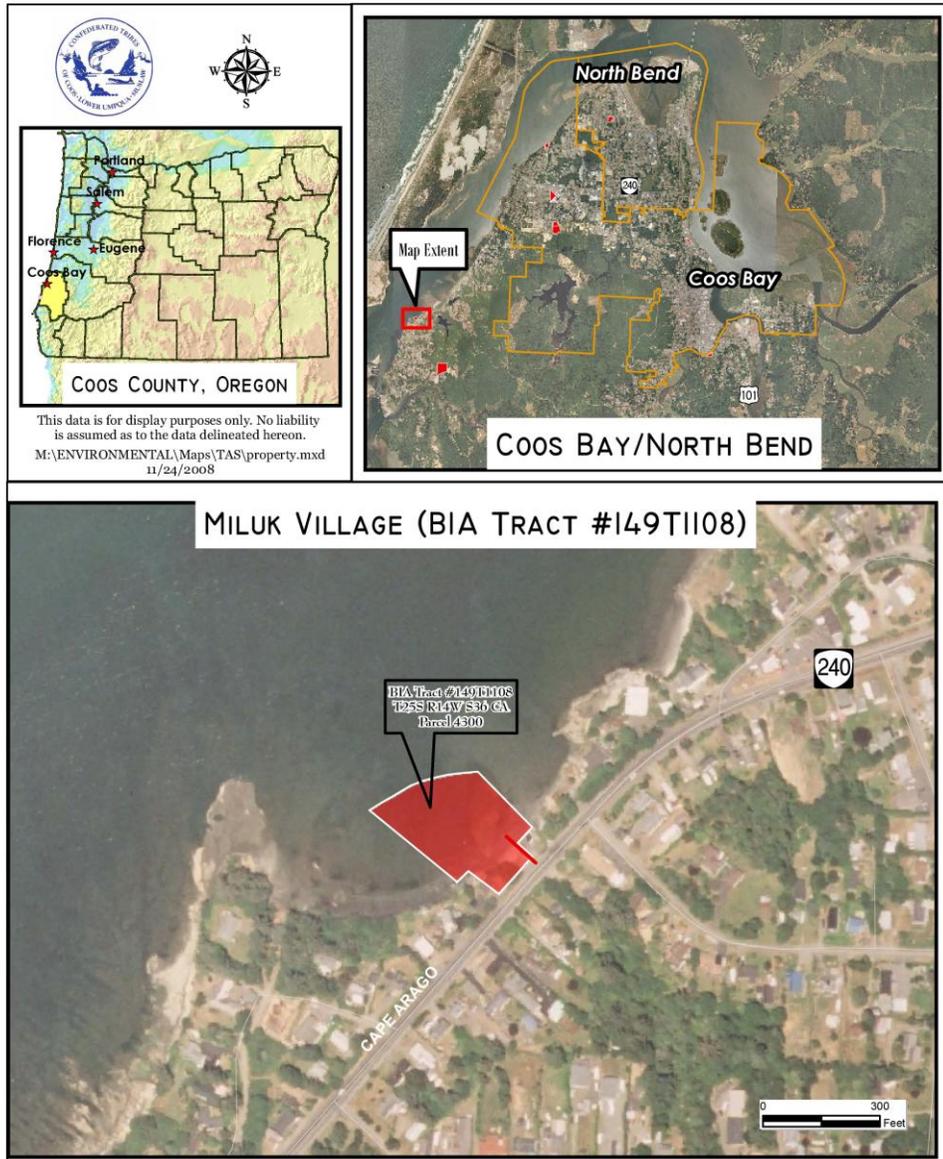
Invasive/Nuisance Species: This tract is dominated by Scotch Broom. French Broom, Fennel, Bull thistle, Knotweed, Horsetail, Railroad weed, Curly Dock, Rattlesnake grass, Cherry laurel (single plant) and Gorse also occur on this tract.



Recommendations: This is a highly disturbed and urban property. As such, there are no environmental management recommendations for this property.

Miluk Village Tract:

COOS, LOWER UMPQUA AND SIUSLAW INDIAN TRIBAL FACILITIES



Current Land Use(s): This is a vacant tract and there are no current land uses.

Adjacent Land Use(s): Land use adjacent to this tract consists of rural-residential housing.

Property Overview: The 1.69 acre Miluk Village Tract is located in and immediately adjacent to lower Coos Bay estuary tidelands. Due to safety and access issues the Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians have been monitoring waters pertaining to this tract at the Empire Boat ramp located upbay in the Empire district of Coos Bay. The Coos Estuary and its watershed are located in the lowlands of the southwestern Oregon Coast Range. It is the largest Oregon estuary completely contained within state boundaries and is the fifth largest estuary in the Pacific Northwest (South Slough National Estuarine Research Reserve (SSNERR) Management Plan, 13). The Coos River and its estuary are considered to be a “drowned river mouth” system.

“The Coos estuary is shaped like an inverted “U”, surrounded by thickly forested steep hills, with intense shoreline development along its eastern shore. Its main tributary, the Coos River, enters at the south –eastern end of the “U”. At the south western end, the estuary opens to the sea. The ocean mouth of the estuary is defined on the north by the tip of a seven mile long sand spit (North Spit), and on the south by a rocky headland (Coos Head)” (SSNERR Management Plan, 14).

Site Description, History & Background: Miluk Village is located adjacent to the marine dominated portion of the Coos Estuary. A Pre-existing pump station is located on this site.

Historic Conditions and Community Resources:

- **Community Resources:** Miluk Village is the only Tribally held tract with easy access to the estuary, the traditional center of Tribal life.
- **Historic Condition Assessment:** Based on the presence of riprap and fill, it is assumed that the estuarine community extended inland beyond the current boundary of Miluk Village.

Surface Water: A small unnamed stream drains into the estuary adjacent and to the north of Miluk Village.

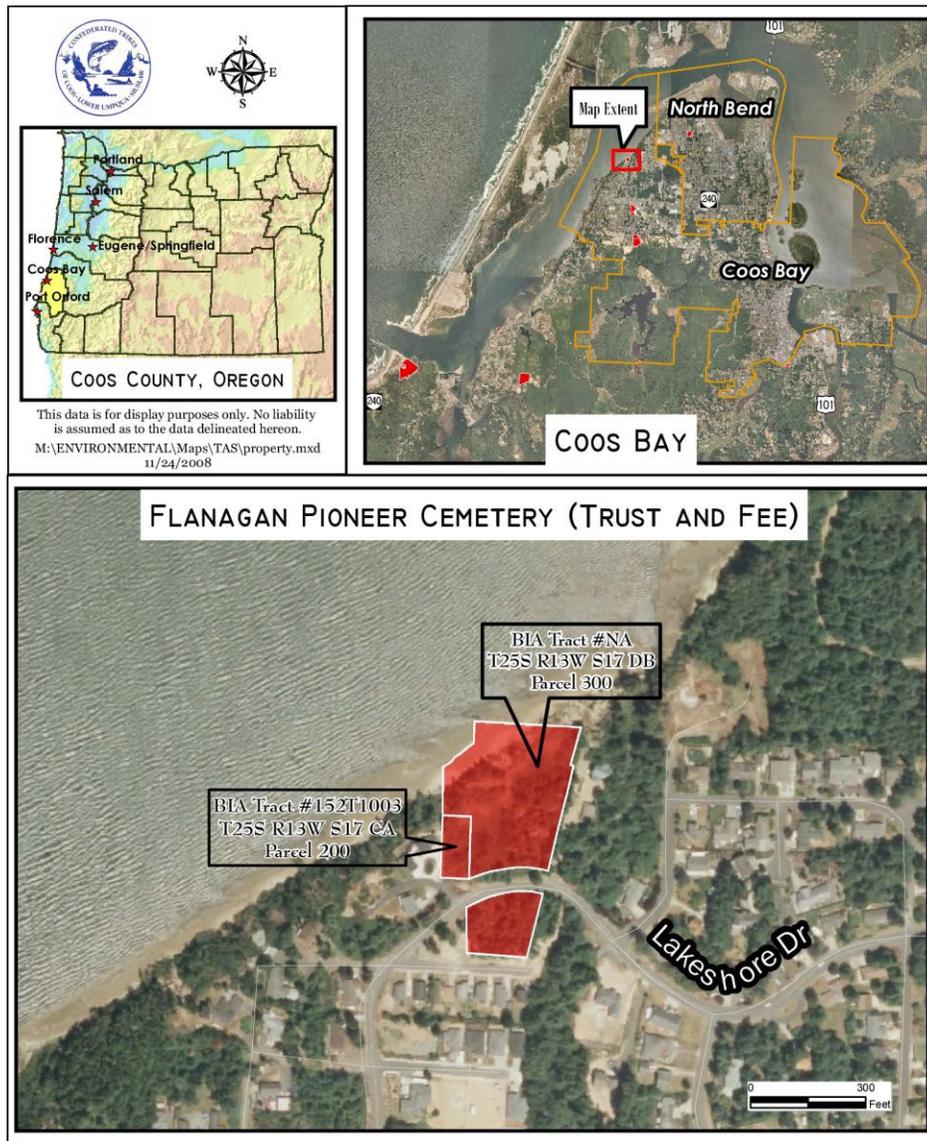
Wetlands: The majority of this tract is classified in the NWI as an estuarine and marine wetland type.

Invasive/Nuisance Species: The majority of the terrestrial portions of this tract are highly disturbed and covered with gravel. However, Himalayan Blackberry has been noted on the site.

Recommendations: Invasive and T&E species surveys should be done at least once a year but preferably twice a year to capture species that are more visible when in different stages of growth, such as when blooming for plant species or periods of higher activity for animal species.

Wulatch Tract/Flanagan Pioneer Cemetery:

COOS, LOWER UMPQUA AND SIUSLAW INDIAN TRIBAL FACILITIES



Current Landuse(s): This is a vacant tract and there are no current land uses.

Adjacent Landuse(s): Land use adjacent to this tract consists of rural-residential housing.

Property Overview: The Wulatch Tract is named for the Hanis Coos village which formerly occupied this site. The 0.25 acre Wulatch Tract is located immediately adjacent to lower Coos Bay estuary tidelands on vegetatively stabilized sand dunes overlying an uplifted marine terrace. Due to prehistoric changes in the drainage pattern of Coos Bay, sand is no longer replenishing this dune sheet, and so this coastline is receding. Chickses Creek, which drains Empire Lakes, and residential and commercial developments including WalMart and Southwestern Oregon Community College, is located

immediately to the east of Wulatch. Potential environmental impacts to tidelands associated with this site are those associated with the overall estuarine habitat of Coos Bay. Due to safety and access issues the Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians have been monitoring waters pertaining to this tract at the Empire Boat ramp located in the Empire district of Coos Bay.

Site Description, History & Background: Wulatch is located adjacent to the lower marine-dominated portion of the Coos Estuary.

Historic Conditions and Community Resources:

- **Community Resources:** The Wulatch Cemetery tract contains the remains of a tribal village and an early Euro American cemetery. This historical site was first recorded in 1974 by Stephen Dow Beckman. He recorded the site as being an Indian village and cemetery and documented shell midden deposits on the property. Gravestone transcriptions indicate that pioneers began using part of the tract as a cemetery in 1862.
- **Historic Condition Assessment:** As discussed under Community Resources, Wulatch is now less developed than it has been since Time Immemorial. The village area was presumably largely cleared, and early photographs of the Euro American cemetery show a cleared open graveyard. Naturally, invasive species were once not the issue that they are now.

Surface Water: No surface water drains through Wulatch. However, a small spring has been observed on the site. The tract is served by municipal water and sewer services, however, the tract is reserved for use as a cultural site and historical cemetery and so will not be developed.

This tract is located within a 100 yr floodplain.

Wetlands: No NWI or LWI wetlands are located on this tract.

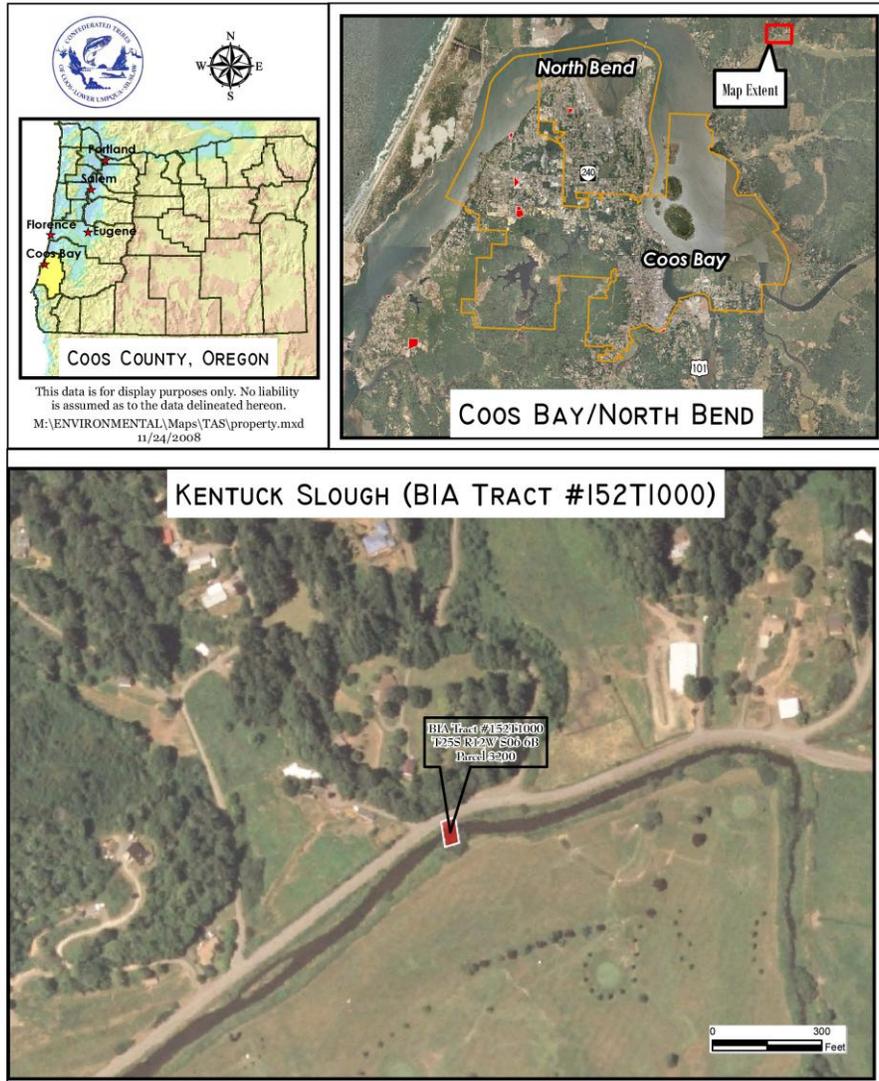
Invasive/Nuisance Species: The occurrence of nuisance species on this tract is dominated by Scot's Broom and English Ivy.



Recommendations: Invasive and T&E species surveys should be done at least once a year but preferably twice a year to capture species that are more visible when in different stages of growth, such as when blooming for plant species or periods of higher activity for animal species.

Kentuck Slough:

COOS, LOWER UMPQUA AND SIUSLAW INDIAN TRIBAL FACILITIES



Current Landuse(s): There is no current land use on this parcel.

Adjacent Landuse(s): 81% of land use in this watershed is private industrial and small woodlot owner forestry. In addition, two rock quarries are located upstream of this tract on Kentuck Creek.

Property Overview: The Kentuck Slough Tract is a 0.02 acre parcel north and east of North Bend. Kentuck Slough is a tributary that flows into the Upper Coos Bay Subsystem. Upstream of the tract are Mettman Creek and Kentuck Creek.

Site Description, History & Background:

Community Resources: Kentuck Tract is one of only four tracts with Reservation status. This twelve-foot wide tract provides a source of humor for the Confederated Tribes, one of whose members joked about standing at this tract with arms outstretched with a sign in each hand, one sign reading “Entering Coos Reservation,” and the other reading “Leaving Coos Reservation.”

Historic Condition Assessment: An Oregon Department of Fish and Wildlife (ODFW) report on Kentuck Slough from 1950 cites “two rock quarries and one sawmill on Kentuck Slough [as] dumping muddy water into the Creek. Residents report[ed] that the creek runs muddy all year round and that this keeps the salmon out of the creek” (Rulifson, 6). These operations were/are located upstream of CTCLUSI’s Kentuck Slough tract. Anecdotal information cited in the report also states that “[t]here (was) considerable difference of opinion on the part of local residents as to the size of salmon runs in former years... [However, they] attribute[d] the lack of salmon to the two gravel quarries... and)...reported that salmon runs seemed to disappear after installations of the tidal gates” (Rulifson, 1).

A 1986 ODFW memorandum documents the continued impact to sediment loading associated with the rock quarry located upstream from CTCLUSI’s Kentuck Slough tract.

“During February of 1986 a sluice – out (landslide) occurred in the Kentuck Creek Drainage on property owned by Main Rock Products, Inc. A large amount of overburden material from quarry operations was involved in the landslide. Material moved downslope across the county road and entered Kentuck Creek about 5 miles upstream from where Kentuck Creek enters Coos Bay through a tidegate” (Bender,1). Though the landslide occurred in February, turbidity samples taken in April of that year were still in violation of water quality standards. According to the memo, at least 5 miles of Kentuck Creek was in nearly continuous violation of water quality standards after the landslide. “Because of constant high levels of turbidity and extreme sedimentation in Kentuck Creek, salmonid production in the lower 5 miles of stream [was] severely curtailed or eliminated in 1986” (Bender, 3).

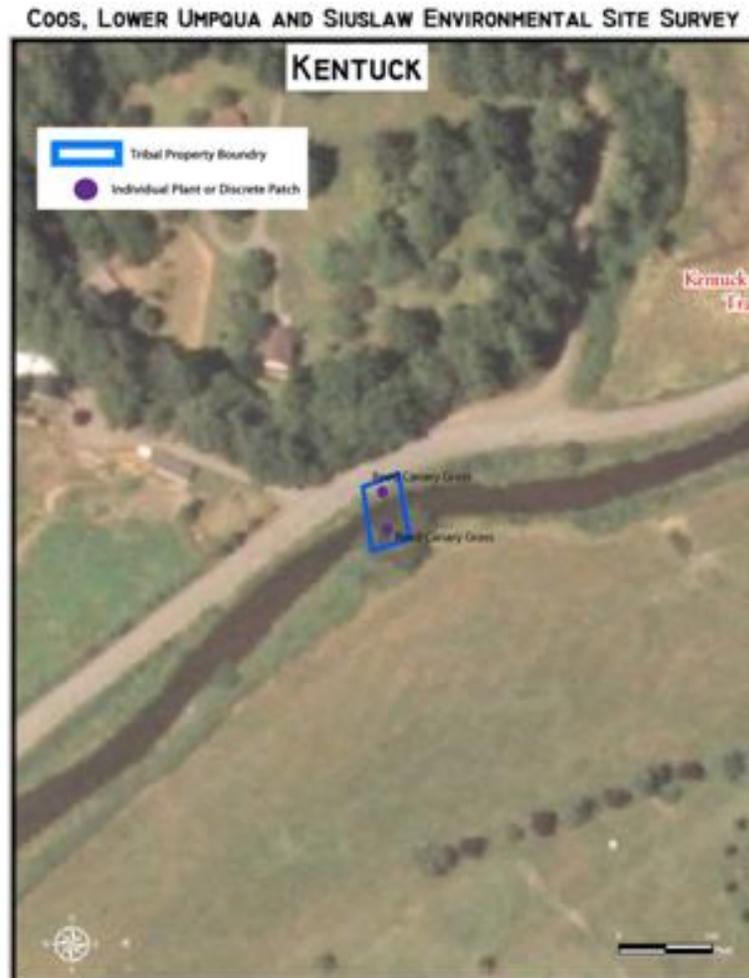
Surface Water: This tract is located within the lower tidal mainstem reach of Kentuck Slough. The tract and the tidal mainstem is a lowland tributary that is part of the large estuarine channel process group of Coos Bay. A tidegate located downstream of this tract could potentially impact water quality and to a lesser extent channel morphology at this site: this tidegate is likely affecting channel morphology immediately adjacent to the tidal gate and water quality upstream at the Tribe’s Kentuck Tract. Upstream scour at the tide gate can result in the formation of an inlet pool and water draining from the gate through the downstream side can form a deep scour pool at the outlet side of the gate. Tide gates cause freshwater stagnation and restrict tidal inflow. In this way they can increase upstream water temperatures and microbiological loading.

Consumptive water use within this system may be impacted by the diversion of creek or stream water by adjacent landowners for irrigation, domestic use, or the filling of ponds. No water is actively consumed by the Tribe from this tract. According to the Coos Watershed Association’s Draft Coos Bay Lowlands Assessment and Restoration plan, the consumptive water use in Kentuck Creek (upstream from Kentuck Slough) has increased 10% since 1993 (102).

This tract is located within a 100 yr. floodplain.

Wetlands: Freshwater emergent and riverine NWI wetland types are located on and immediately adjacent to this tract.

Invasive/Nuisance Species: The smallest of the tribal tracts is predominately covered with Reed Canary Grass with very minor amounts of blackberry and thistle. The water portion of the tract may harbor introduced snails such as *Assiminea parasitologica* and the New Zealand Mud Snail *Potamopyrgus antipodarum* which are widespread in the Coos Bay estuary.

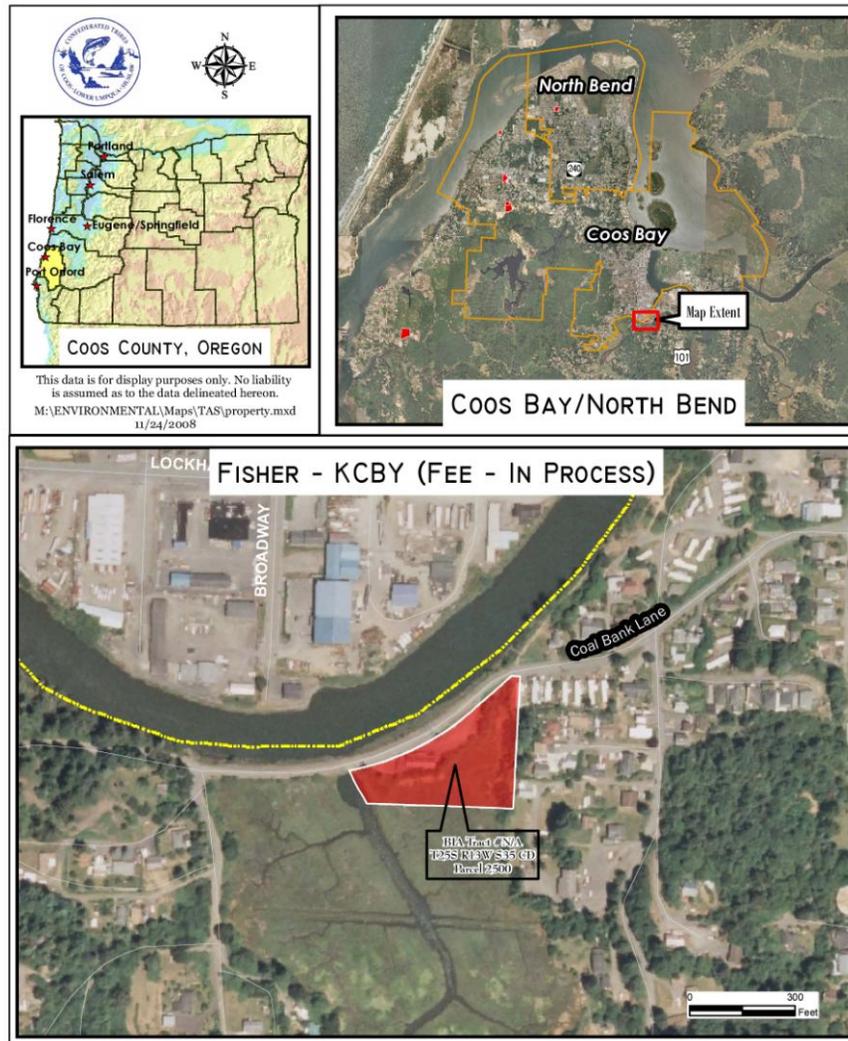


Recommendations:

1. Invasive and T&E species surveys should be done at least once a year but preferably twice a year to capture species that are more visible when in different stages of growth, such as when blooming for plant species or periods of higher activity for animal species.
2. Semi-annual water quality sampling for physical and chemical parameters used to assess potential impacts occurring to water quality.

Coalbank Slough:

COOS, LOWER UMPQUA AND SIUSLAW INDIAN TRIBAL FACILITIES



Current Landuse(s): The original building located on this tract has been renovated and is currently housing the Tribes' Blue Earth Corp. offices and staff.

Adjacent Landuse(s): Adjacent land use consists of residential and industrial-commercial land uses

Property Overview: According to a 1979 ODFW Natural Resources of Coos Bay Estuary Inventory Report, Coalbank Slough is part of the Isthmus Slough Subsystem (51). The Coalbank Slough Tract is a 2.24 acre parcel located south of the city of Coos Bay. A building located at the site has the address of 93420 Coalbank Lane. A portion of Coalbank Marsh is located immediately south of the tract. A small reach of Coalbank Slough is located northwest of the site, on north side of Coalbank Lane. Finally, a residential wooded hillside is located east of this tract.

CTCLUSI's Coalbank Slough tract is located approximately 3000ft south of the southern end of Coos Bay in a sediment filled valley adjacent to the bay and is comprised of two

relatively level areas separated by a berm. Soil at the site has been mapped as Udorthents. This soil is characteristic of flood plains, marshes, and tidal flats among major streams, bays, and estuaries. Udorthents soil is also found in areas on the tract that have been filled and leveled for commercial and industrial uses.

Site Description, History & Background: The Environmental Site Assessment prepared for the Fee to Trust process and acquisition of this tract reviewed aerial photographs and conducted historical research to determine historical uses of this area. The observations made from the historical resources are as follows:

1. **1939:** The tract was vacant and appeared to be at a level elevation. North of the tract was a road leading to a bridge across the arm of Coalbank Slough. This road led to a dock located on the south bank of Coalbank Slough. Property north of Coalbank Slough was undeveloped. Property to the east and south of the site were also undeveloped. However, residential development was present east of the tract.
2. **1954:** The site and surrounding area had changed little since the 1939 aerial photograph.
3. **1962:** A building was located on the tract that is likely the same building on the property today. There was an increase in industrial development north of the tract across Coalbank Slough.
4. **1994:** The tract and surrounding area had changed little since previous 1970 and 1980 aerial photographs.

Five potential environmental conditions were identified during the Phase 1 ESA conducted for the Fee to Trust process of this tract. They were an abandoned concrete tank and vault, a petroleum release from an above ground storage tank, a petroleum release from fuel lines, and a creosote release from a power pole. These potential environmental conditions were assessed by observation and/or sampling. From these observations and samplings it was determined that there is no reasonable basis for suspecting the disposal or release of hazardous substances or petroleum products at any of these structures. A phase II ESA was conducted to verify and eliminate these potential environmental conditions. Based on the Phase II ESA, no further investigation of the potential environmental conditions is necessary at this site.

Surface Water: Surface water on the northern portion of this tract flows into three storm drains that discharge into the southern portion of the tract and into Coalbank Slough. Surface water on the southern portion of the site also flows into Coalbank Slough via natural drainages.

This site is not only comprised of a lower elevation saltmarsh, but is also located within the 100 year floodplain of Coalbank Slough (Phase 1 Coalbank Lane Property ESA, 4). City services are available for this tract, however no surface or ground water is actively consumed by Tribes.

Wetlands: Over 50% of this tract consists of NWI and LWI mapped estuarine and marine wetland type.

Invasive/Nuisance Species: The KCBY building area is highly disturbed with few native species. English Ivy, English Holly, Cotoneaster, French Broom, Scotch Broom, Fennel, Bull thistle, Hawthorn, and Purple Salsify are all present on this tract. The slough area appears to be mostly native species but may harbor the introduced *Assiminea* and New Zealand mud snails which are widespread in Coos Bay.



Recommendations:

1. Invasive and T&E species surveys should be done at least once a year but preferably twice a year to capture species that are more visible when in different stages of growth, such as when blooming for plant species or periods of higher activity for animal species.
2. Develop and implement a wetland management plan.

Eason Tract:

COOS, LOWER UMPQUA AND SIUSLAW INDIAN TRIBAL FACILITIES



Current Landuse(s): This tract is currently vacant and has no current uses, except as timberland. The property has no improvements or utilities on site.

Adjacent Landuse(s): Adjacent land use consists of urban residential and forest. An historic is also located adjacent to this tract.

In 2002, the Tribes’ conducted an environmental site investigation to determine whether the historic landfill site located potentially upgradient from the tract was impacting groundwater on the site. The registered professional geologist contracted to perform the site investigation determined that the “data collected during the evaluation (e.g. test pit and groundwater samples) of the potential recognized environmental conditions provided sufficient information to support a professional opinion that there [is] no reasonable basis for suspecting the migration of hazardous substances or petroleum products onto the [tract] from an adjacent property”.

Property Overview: The Eason Tract is located approximately one and one half miles northeast of downtown Charleston, Oregon in wooded uplands. This tract is heavily wooded with areas of thick underbrush along the southern two thirds and eastern quarter. Within the interior are several small, shallow areas of standing water. There are few anthropomorphic objects within the Site, except for three obscure trails leading from Libby Five into the interior of the tract.

Site Description, History & Background: Historically, this tract has been wooded and vacant. With the exception of aerial photographs taken in 1967 in which the tract appears to have been logged.

Surface Water: There is no surface water on this tract.

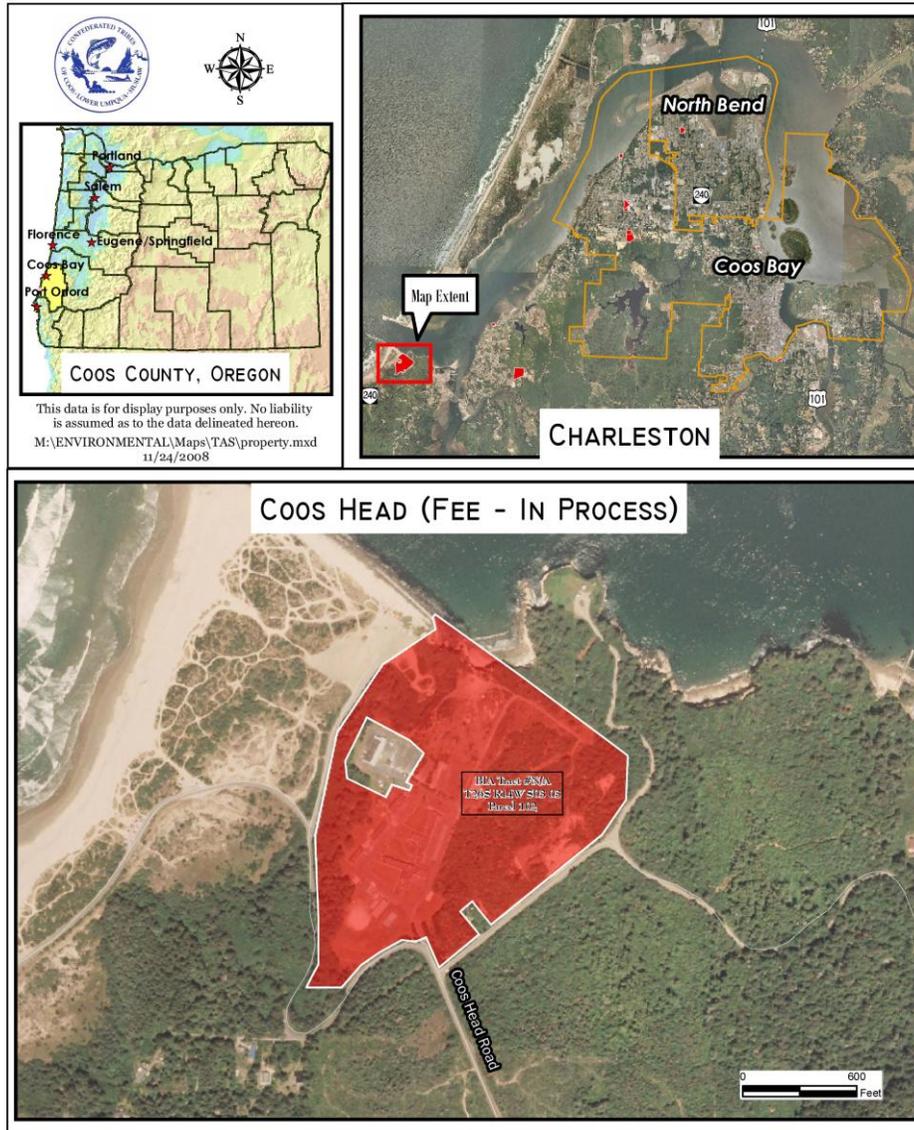
Wetlands: No NWI or LWI wetlands are located on this tract.

Invasive/Nuisance Species: The undisturbed wooded area is free of invasive species with the exception of the Port Orford cedar Root Rot (*Phytophthora lateralis* and *P. cinnamomi*) which appears to be killing some of the trees. On the disturbed gravel road edge there is French Broom, Scotch Broom, Cotoneaster, Himalayan Blackberry, Bull thistle and Rattlesnake grass.

Recommendations: Invasive and T&E species surveys should be done at least once a year but preferably twice a year to capture species that are more visible when in different stages of growth, such as when blooming for plant species or periods of higher activity for animal species.

Coos Head:

COOS, LOWER UMPQUA AND SIUSLAW INDIAN TRIBAL FACILITIES



Current Landuse(s): The Coos Head Tract is the site of a decommissioned U.S. Naval base located 0.5 miles west of the community of Charleston at the mouth of the Coos Bay Estuary. The Tribes' have built property caretaker housing and implemented drinking water and wastewater distribution system improvements on this tract.

Adjacent Landuse(s): To the west of this tract is Coos Bay's south jetty and Bastendorff Beach; to the north is a sandbar, a Coast Guard observation station, the entrance to Coos Bay, and the north jetty at the south end of the North Spit; and to the east and south is forested land including a wildlife preserve, recently logged land, and rural residential land.

Property Overview: The western half of the Coos Head Tract consists of buildings (previously used for storage and military operations), and recreational and parking areas. Three buildings were used for administration, unit training, dining, and temporary housing. Other buildings on the tract were used by the ANG for supply, maintenance shops, and vehicle maintenance, respectively.

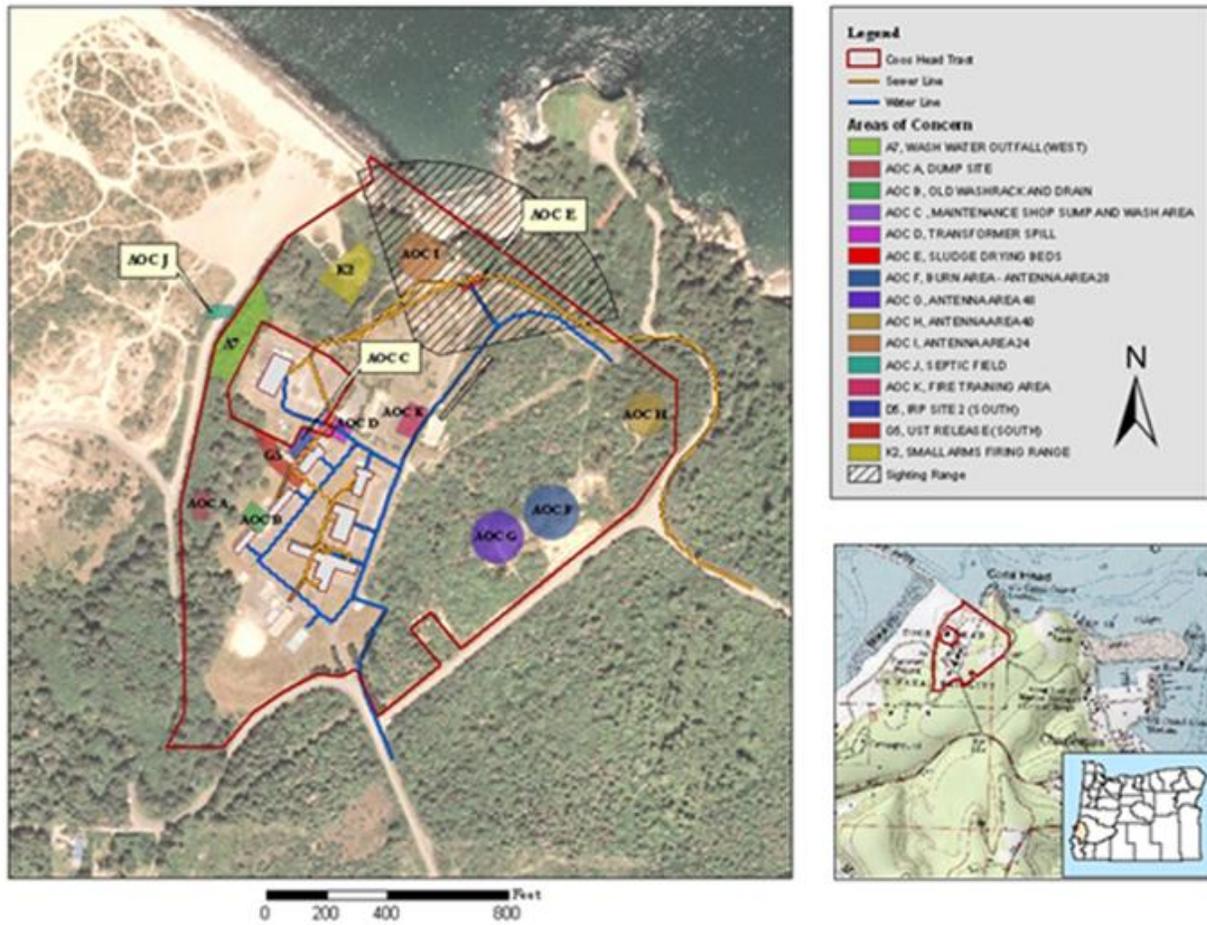
The eastern half of the property is predominately wooded land with three large cleared areas which were used as antenna sites by the USN prior to occupation by the ANG. In 1994, prior to field work commencing, soil was excavated from the largest antenna site and used to construct a 15-foot mound for a radar site. Two underground bunkers are located in the northeast corner of the station which were used to store munitions. Potable water supply and sanitary sewer service is provided to Coos Head by local municipal utilities.

Site Description, History & Background: Coos Head is a culturally significant headland to the Tribes. The tract was first developed when it was withdrawn from public domain by the Bureau of Land Management for military use June 14, 1874. The Army used the facility primarily for land-based inlet defense until 1957, when the property was transferred to the Navy. The station was developed by the Navy in 1957 as the Coos Head Naval Station. The Navy operated the stations from 1957 to 1987 as a land-based low frequency submarine communications site, and currently operates a small section of the present station known as the Terminal Building.

The ANG took operational control of the station on December 1, 1987, through a lease from the Bureau of Land Management to the Secretary of the Air Force, who in turn, licensed Coos Head ANG Station to the State of Oregon for ANG use. Coos Head ANG Station was under the operational management of the 104th Air Control Squadron (ACS), which is a Geographically Separate Unit (GSU) from the 142nd Fighter Wing. The mission of the 104th ACS was to provide and operate, on a worldwide bases, mobile communications equipment to support air-to-air and air-to-ground communications.

In October 1996, the 104th ACS ceased operations at the Coos Head ANG Station. Currently, the only operating mission is by the USN at the Terminal Building. The ANG portion of the tract was transferred to the Tribes by the General Service Administration (GSA) in October 2005.

During the military's tenure, several hazardous materials were discharged at the site. Investigations of these discharges have resulted in the identification of several areas of concern (*Map 1*). The Oregon Air National Guard (ANG) has accepted and retains responsibility for site remediation in accordance with various federal laws and their implementing programs (the Oregon ANG contact person is Roger C. Rein, Civ ORANG 142 FW/Environmental Manager, 506-665-4462). Under the terms of the Department of Defense and State Memorandum of Agreement (DSMOA) for Oregon, the Oregon Department of Environmental Quality (ODEQ) is providing oversight to the Oregon ANG.



Map.1

Surface Water: The Pacific Ocean and Coos Bay are located directly northwest and north of the station, respectively. The natural topography on this tract results in the drainage of surface water northward, toward the Pacific Ocean and Coos Bay.

Previous site investigations conducted by the ANG at this tract have identified shallow groundwater in five piezometers at depths ranging from 18 to 69 ft bgs. Based upon the lithology encountered, the shallow groundwater was interpreted to be perched above a sandy shale layer. Based upon potentiometric maps provided generated from ANG site investigations, the perched groundwater flows to the west and north toward the cliffs, which are a point of discharge. Seepage from the cliff face, varying from 5 to 40 ft bgs, was observed during previous site investigations conducted by the ANG at Coos Head as part of the remedial investigation and clean-up of soil and groundwater contamination at Coos Head.

Wetlands: No NWI or LWI wetlands are located on this tract. However, several wetland type areas have been observed on the tract.

Invasive/Nuisance Species: Disturbed areas on this tract are well populated with Scotch Broom and False dandelion. Modest to small amounts of European Beachgrass, Bull Thistle, Butterfly bush, Oxeye daisy, Jubata Grass, Tansy ragwort, Foxglove and Cedar Root Rot fungus are also present. English Ivy is growing on trees near softball field and a single discrete patch of ornamental Bamboo near spring. Native Beach Aster on cliff face noted as unusual. Gorse (*Ulex europaeus*) reported but none observed.

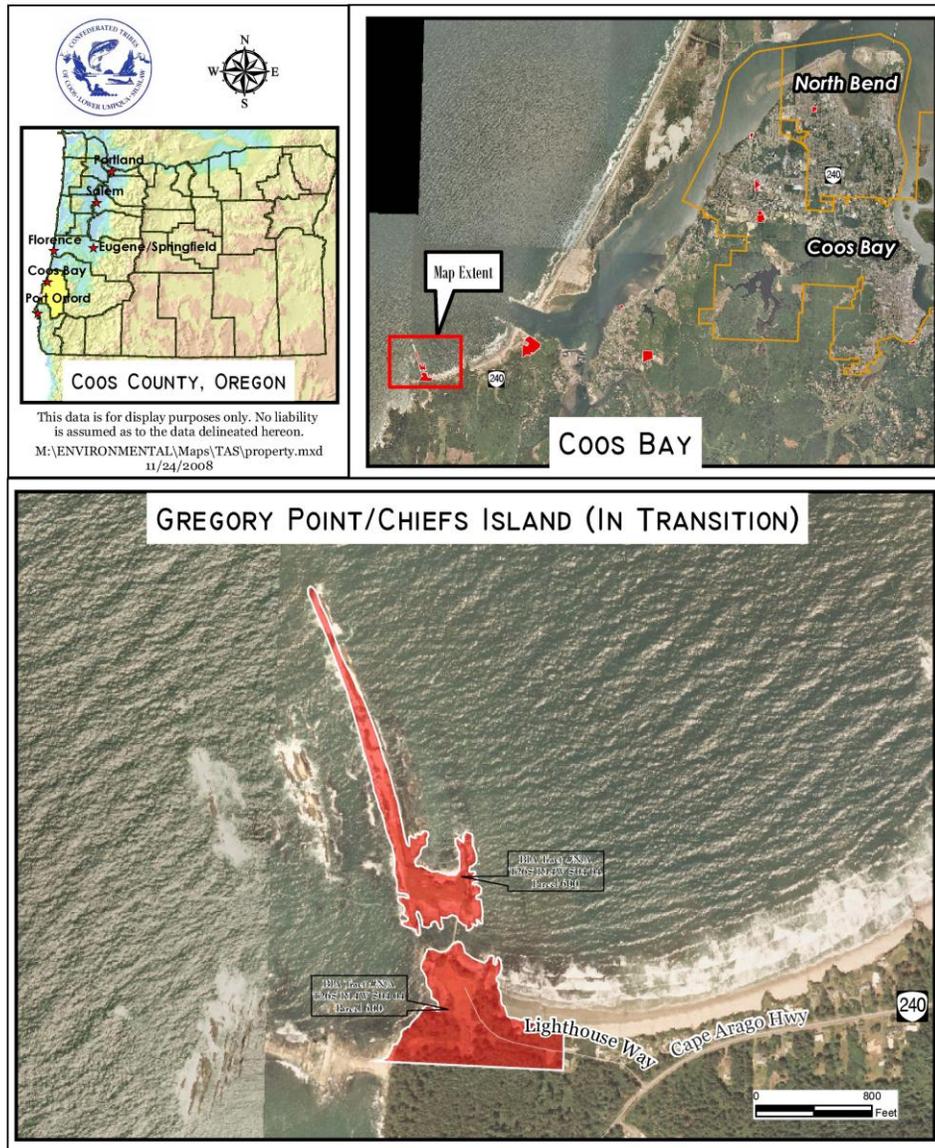


Recommendations:

1. The exact extent and location of wetlands on Coos Head require a wetland delineation and confirmation by the U.S. Army Corps of Engineers and the Oregon Division of State Lands.
2. Invasive species surveys should be done at least once a year but preferably twice a year to capture species that are more visible when in different stages of growth, such as when blooming for plant species or periods of higher activity for animal species.
3. Develop and implement a groundwater protection plan.
4. Develop and implement a wetland management plan.
5. Develop and implement an invasive species management plan.

Gregory Point:

COOS, LOWER UMPQUA AND SIUSLAW INDIAN TRIBAL FACILITIES



Current Landuse(s): An abandoned fourplex garage, and outbuilding are located on the mainland. The USCG is in the process of relinquishing its withdrawal, and the BIA is in the process seeking a withdrawal under which the Confederated Tribes would manage the property under the authority of PL 93-638 according to the terms of an MOA between the tribes and the BIA. Primary Tribal management goals include increased protection of the especially significant cultural and natural resources, and the renovation of the fourplex for the purpose of creating a cultural retreat center, possibly to include office space and a caretaker residence.

Adjacent Landuse(s): Landuses adjacent to this property included rural residential housing and Cape Arago State park day use recreation and overnight camping.

Property Overview: Gregory Point and Chiefs Island consist of approximately 31 acres located on an uplifted marine terrace along the Southern Oregon Coast approximately two miles south of the mouth of Coos Bay. The headland has been eroded by high energy wave action into cliffs, inlets, and coves. To the north is the Pacific Ocean, to the east is Lighthouse Beach, and to the southeast continues the marine terrace and private residences. Sunset Bay State Park is located immediately west of this tract.

The Gregory Point tract is located in a high energy rocky intertidal and subtidal area where wave energy excludes abundant or diverse hard substrate community. The uplifted marine terrace consists of a stratum of Pleistocene beach deposits overlying less-permeable Coaledo Formation sandstone. The tract is bordered by steep cliff sides to the north, south, and west. The eastern side of the tract is bound by Cape Arago Hwy.

Site Description, History & Background: This tract is the site of the Miluk Coos village of Bal'diyaka. Carbon 14 dates from this site indicate occupancy for at least 2000 years. A Tribal cemetery is located on the mainland. Cape Arago Lighthouse is currently located on Chiefs Island. Significant seabird nesting occurs on Chiefs Island, along with roosting by the endangered Brown Pelican.

Recorded archaeological sites are located on the mainland and on Chiefs Island. The lighthouse is listed in the National Registry. An historical report on this site has been completed by Dr. Stephen Dow Beckham and is on file with the Tribes.

Surface Water: A culvert runs underneath Cape Arago Hwy and onto the tract where it discharges onto the beach at Sunset Bay State Park. No perennial streams or ponds are located on the tract and surface runoff is generally the result of storm events. Water is provided to the tract by the Coos Bay North Bend Water Board: water lines are believed to contain asbestos. Wastewater is treated onsite by an aboveground sand filtration system due to the underlying geology.

Wetlands: 26.10 acres of a NWI mapped Freshwater Forested/Shrub Wetland type is located immediately adjacent to the southern boundary of this tract. In addition, according to the Oregon Rapid Assessment Protocol map tool, a LWI mapped wetland (listed as a Bog or Fen wetland type) is located on the Gregory Point Tract.

Previous environmental assessments conducted by CTCLUSI have cited three instances of potential wetland conditions at Gregory Point, in addition to the NWI and LWI mapped wetland types listed above.

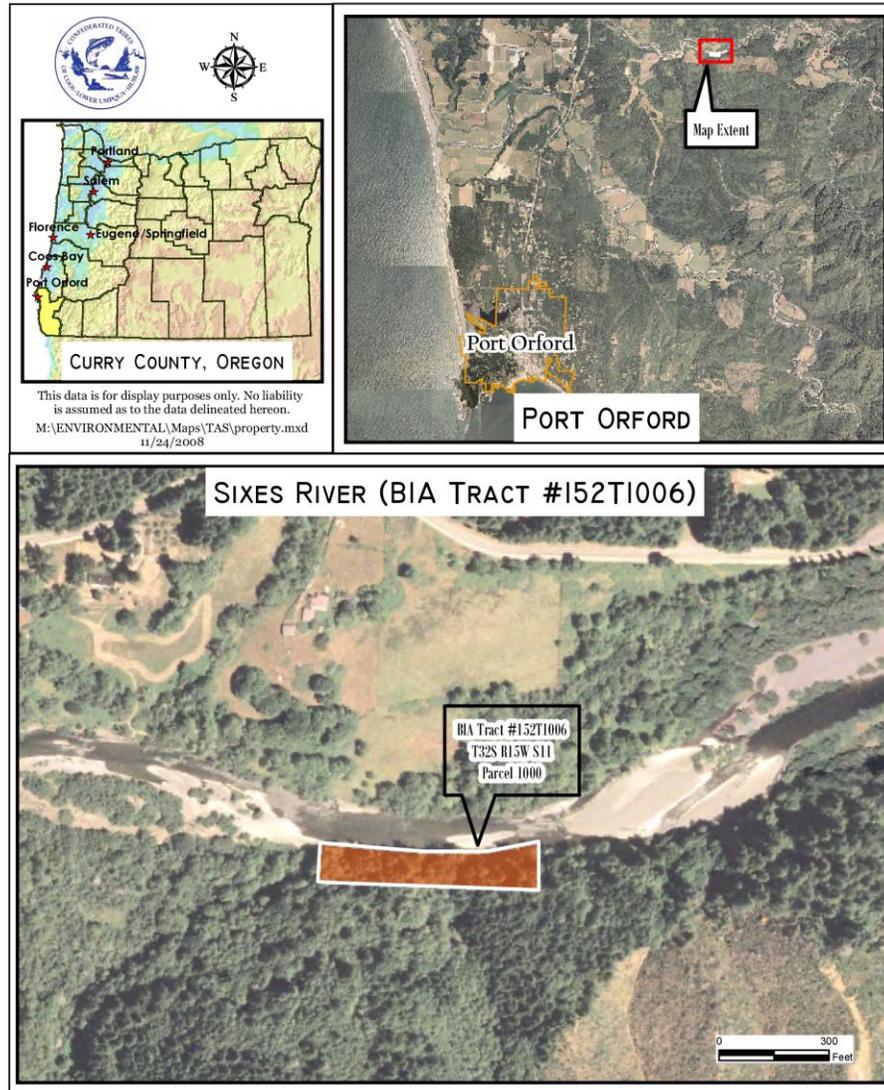
Invasive/Nuisance Species: The Tribes are in the process of conducting an invasive and nuisance species assessment of this tract.

Recommendations:

1. The exact extent and location of wetlands on Gregory Point require a wetland delineation and confirmation by the U.S. Army Corps of Engineers and the Oregon Division of State Lands.
2. Invasive and T&E species surveys should be done at least once a year but preferably twice a year to capture species that are more visible when in different stages of growth, such as when blooming for plant species or periods of higher activity for animal species.

Sixes River Tract:

COOS, LOWER UMPQUA AND SIUSLAW INDIAN TRIBAL FACILITIES



Current Landuse(s): At the time of this assessment, the Tribes do not have any current land uses occurring at the site. No utilities, improvements or structures are currently located on this property.

Adjacent Landuse(s): The dominant adjacent land use is forestry. Rural residential housing also occurs adjacent to this property.

Property Overview: The Sixes River Tract is a 1.25 acre parcel located on the lower mainstem of the Sixes River adjacent to milepost 2 on Sixes River Road in Curry County, Oregon.

Site Description, History & Background: The Sixes River watershed is a 5th field watershed that drains approximately 85, 832 acres (134 square miles). Sixes River is situated almost entirely within Curry County except for a small are of the Upper Sixes Mainstem sub-watershed that extends into Coos County. The upper

portion of the basin is characterized by steeply sloped forested areas with narrow valleys and tributary streams that have moderately steep to very steep gradient. Grazing, rural residential development and other agricultural uses are dominant in the lower portion of the basin. Approximately 69% of the watershed is in private ownership. Forestry is the most dominant land use in the Sixes River Watershed.

The Sixes River estuary is approximately 330 acres in area and has a watershed of approximately 129 square miles. Head of tide is about 2.5 miles from the mouth. The estuary is designated as a Nature estuary under the Oregon Estuary Classification system, and it is listed by The Wetlands Conservancy as one of "Oregon's Greatest Wetland's"

Surface Water: The Sixes River is 303(d) listed for dissolved oxygen and temperature. Additional parameters of concern within this watershed are nutrients. Data collected by local watershed assessments for this area appear to indicate that water quality within the Sixes River are is moderately impaired due to high nitrate, phosphorus, and fecal coliform levels.

Nitrate levels tend to exceed water quality standards during early winter high flow (storm) events. In addition, high phosphate and fecal coliform levels tend to occur from fall through early spring. The exceedences in phosphate and fecal coliform levels may also correlate with high flow events.

Wetlands: The Oregon Rapid Wetland Assessment Map Tool identifies the entire riparian buffer of the lower Sixes River as a Wetland Priority Area. The NWI Riverine wetland type also occurs on this property.

Invasive/Nuisance Species: Very small amounts of Armenian Blackberry and Foxglove are near the river's edge. Reed Canary grass is located along the margins on the gravel bar. Nearby, but outside of the Tribal property boundary, are major amounts of blackberry and a minor amount of English Ivy and Teasel. A formerly dense patch of Knotweed has been cut and sprayed with very few living plants remaining.

Recommendations:

1. Invasive and T&E species surveys should be done at least once a year but preferably twice a year to capture species that are more visible when in different stages of growth, such as when blooming for plant species or periods of higher activity for animal species.
2. Semi-annual water quality sampling for biological, physical and chemical parameters used to assess potential impacts occurring to water quality.