

WORKING DRAFT
Coquille Valley Wildlife Area
Management Prospectus

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Oregon Department of Fish and Wildlife
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DRAFT

Executive Summary

The Coquille Valley Wildlife Area (CVWA) was obtained through land exchange by Oregon Department of Fish and Wildlife (the Department) in February 2013 with the assistance of The Nature Conservancy. The Department exchanged its ownership of land located on the east side of Eel Lake for 583.76 acres in two parcels within the lower Coquille River drainage belonging to Bandon Biota LLC.

These parcels are Winter Lake Tract and Beaver Slough Tract. Both of these parcels are located between the cities of Coquille and Bandon along Hwy 42 and North Bank Road. They are both surrounded by private land, a railroad or travel right-of-ways. Winter Lake Tract is located south of the intersection of Hwy. 42 and North Bank Lane. This tract is composed of 287.56 acres and lies west of Highway 42. It encompasses a portion of the Coquille River flood plain colloquially called Winter Lake. The Department intends to conduct fish and wildlife habitat restoration projects on this tract. Beaver Slough Tract is located to the north of Winter Lake Tract, near the intersection of Hwy 42 and North Bank Lane. It is composed of 296.2 acres and lies on either side of Beaver Slough extending upstream for a distance of about 1.4 miles. Much of this tract has fish and wildlife habitat that is intact for the most part and can be considered a good example of potential habitat for restoration efforts in the Coquille Valley. CVWA sits, in its entirety, in Coos County which has a population of about 63,000 people.

This plan describes issues facing CVWA and provides actions to address these issues. Many of the issues facing CVWA are related to the fact that the properties are located in or near agricultural areas and that they are surrounded by private land. Also CVWA will function to provide public access to an area where it has not been provided before. Actions will be implemented throughout the life of the plan and will be subject to personnel and budget availability. The plan will be reviewed within 5 years of its implementation and at least every 10 years after that to gauge implementation progress and make necessary revisions.

Introduction

Purpose of the Plan

This plan was written after the Department acquired the lands that constitute CVWA and before much restoration of habitats has been implemented. As such, this plan will guide management of CVWA for up to the next 5 years, during which time restoration plans and plans for developing a public use program will be implemented. The Department's management planning process for Wildlife Areas involves the development of broad goals for the areas, and formulation of

specific objectives and management strategies to achieve those goals. The purposes of this plan are:

- To provide clear direction for management of CVWA for up to the next 5 years;
- To provide continuity in CVWA management;
- To communicate the Department's management priorities for CVWA to its neighbors, visitors, and the public;
- To ensure management programs on CVWA are consistent with the original mandate and purpose of the area set when first established;
- To ensure management of CVWA is consistent with Federal, State, and local laws and plans;
- To ensure management activities address conservation priorities and recommendations described in the 2006 Oregon Conservation Strategy, and;
- To provide a basis for budget requests to support CVWA needs for staffing, operations, maintenance, and capital improvements.

Oregon Department of Fish and Wildlife Mission and Authority

"The mission of the Oregon Department of Fish and Wildlife is to protect and enhance Oregon's fish and wildlife and their habitats for use and enjoyment by present and future generations." The Department is the only state agency charged exclusively with protecting Oregon's fish and wildlife resources. The State Wildlife Policy (ORS 496.012) and Food Fish Management Policy (ORS 506.109) are the primary statutes that govern management of fish and wildlife resources.

Purpose and Need of CVWA

CVWA was established in 2013 with two equally important primary objectives; (1) To protect, enhance, and restore habitats located on CVWA emphasizing habitats for native fish and wildlife species, and (2) to provide a wide variety of wildlife-oriented recreational and educational opportunities to the public.

Lands that compose CVWA were acquired by the Department as the result of a voluntary land exchange in April 2013. These properties provide significant opportunity to enhance overwintering habitat for fish and increase wildlife related recreation for Oregon's public.

The "Original Land Cadastral Survey Notes" from the late 1800s identified over 12,000 acres of wetlands and tidally influenced lands present in the Coquille River Valley (Benner 1992). These highly productive habitat types are known to have contributed to the large numbers of waterfowl, salmon, and steelhead using the Coquille River basin historically. Subsequent to these surveys, waterfowl diversity and abundance is thought to have declined substantially, while salmon

and steelhead returns have seen severe reductions. In 1990, there were only about 400 acres of these habitats remaining in the Coquille Valley (Benner 1992). Since 2000, there have been several efforts to reestablish and restore wetlands and tidelands in the Coquille River Valley and resulting in roughly 1,000 acres of these habitats. The CVWA will protect or enhance an additional 583.76 acres of wetland, upland and tidally influenced lands.

The Department's Coho Conservation Plan (ODFW 2007) lists the primary and secondary limiting factors for Coho Salmon (*Oncorhynchus kisutch*) in Table 4. For the Coquille population, "Stream Complexity" is listed as primary, while "Water Quality" is listed as secondary. Stream Complexity is further defined to explain that high-quality over-wintering habitat is most limiting in the Oregon Coast Evolutionary Significant Unit. High quality overwintering habitat creates shelter for juvenile Coho Salmon during high flow events. This shelter helps prevent them from being flushed down main rivers to saltwater environments before they are physiologically prepared to migrate to the ocean. High quality off-channel habitats provide refuge from high water velocities, cover from predators, and productive forage areas. River-connected floodplains, beaver ponds, wetlands and tidal marshes provide these attributes in areas where stream gradients are low and valleys are broad. The CVWA has the capability of providing these high-quality habitats where tidal connectivity can be restored.

The Coho Conservation Plan's Appendix 2--Table 7 includes the goals for the amount of high-quality habitat miles for each population. In the Coquille, the goal is for a total of 321 miles of high-quality Coho habitat. Currently the existing high-quality miles are estimated at 108 miles (34% of goal).

The Coquille Tribe's Coquille River Sub-basin Plan (Coquille Indian Tribe 2007) describes biological and habitat objectives for a 25-year time horizon (2007-2032), for Coho Salmon, Chinook Salmon (*Oncorhynchus tshawytscha*), Pacific Lamprey (*Entosphenus tridentata*) and other native fishes. Biological Objective 3 calls for restoring passage through all high priority man-made barriers, while Biological Objective 4 calls for improving 167 miles of High Intrinsic Potential (HIP) over-wintering Coho habitat to high quality condition over that time period. Coho summer rearing habitat quality (particularly elevated water temperatures) is identified as a secondary limiting factor. Deficient habitat characteristics in the mainstem Coquille River and tributaries of this section are listed as: riparian conifers, large woody debris, substrate fines, water quality, sediment, and water temperatures. Restoration actions on the CVWA will focus on improving and/or restoring these high-quality habitat attributes.

The CVWA may contribute an additional 11 to 17 returning adult Coho salmon per acre per year for restored acreage, based on a review of existing tidal wetland restoration projects (Nickelson 2012). The Department estimates 3,100 to 4,200 additional returning Coho Salmon adults to the Coquille River each year

if restoration plans are implemented fully. Chinook runs in the Coquille River could also increase by 1,000 returning adult salmon.

While waterfowl use flooded agricultural lands in the Coquille Valley heavily during the fall, winter and spring, the establishment of CVWA and wetland that will be restored on this land will result in increased habitat diversity by allowing an opportunity to promote moist-soil dependent plant communities. Only in a few locations have these plant communities been retained in the Coquille Valley. As described in “A Primer on Moist-Soil Management” (Ducks Unlimited, 2015), compared to agricultural lands, moist-soil habitats provide more nutrition, offer better cover and support a greater abundance and diversity of species. This document also explains that wetlands with water depth of one to 18 inches will support the greatest diversity of waterfowl and other wildlife.

Wetland plants produce large quantities of seeds that are a valuable food resource for waterfowl and other wildlife. These seeds are highly nutritious because they are resistant to decay and tend to persist as a usable food resource for a long period of time. Also, invertebrate communities that respond to the creation of wetland habitats provide a diversity of nutrients to wildlife and, therefore, help satisfy nutritional requirements for these species. High quality, diverse feed results in waterfowl being better able to build fat reserves in preparation for migration and egg production in the upcoming breeding season (Ducks Unlimited, 2015).

Implementation Approach

An implementation plan will be created to direct specific restoration and development activities on properties obtained by the Department. Restoration and development of CVWA will consist of two equally important endeavors. One will be to restore upland, tidally influenced wetland habitats and historic stream courses on the property to the extent possible. The other will be to develop recreational opportunities for the public benefit.

To assist the Department in writing this management plan, a stakeholder group was formed comprising neighboring landowners, sporting groups, professionals who work in the Coquille Valley, and people with pertinent knowledge of the area. This group will function to provide the Department with input from the perspective of user groups of CVWA and those potentially affected by the existence and operation of CVWA. Below is a list of the Stakeholder Committee members:

John Knutson	China Camp Creek Gun Club
Sharon Waterman	Landowner
Charlie Waterman	Coaledo Drainage District
Pat Burris	Garden Valley Landowner (deceased)
Amy Wilson	Natural Resources Conservation Service (NRCS)

Ty Stubblefield	Oregon Hunter's Association (OHA)
Don Chance	Hunter
Paul Merz	Commercial Fisher
Mindie Wilson	Sport Fisher
Craig Cornu	South Slough National Estuarine Research Reserve (SSNERR)
Fred Messerle	Beaver Slough Drainage District
Stuart Love	ODFW

In order to demonstrate the success of the project, monitoring procedures will be devised and implemented to record changes in species diversity, abundance, and their level of use on CVWA. Monitoring procedures will also be implemented to record changes in aquatic and upland habitat on CVWA. In addition, monitoring programs will measure public use of CVWA.

The Department is committed to being a good neighbor, so monitoring will be implemented to record effects on private lands from the project, if any. This information will be used in adjustment of current and future habitat management activities and the management of the public use program on CVWA.

CVWA exists in two drainage districts. As a result, the Department will become an active member of these drainage districts. The Winter Lake Tract sits in the Beaver Slough Drainage District and the Beaver Slough Tract sits in the Coaledo Drainage District. The Department will coordinate activities on CVWA, including restoration efforts, with the appropriate drainage district as a matter of cooperation.

The Department will ensure that all restoration activities are conducted according to federal, state, and local laws. Fill and removal activities in wetlands and waterways are under 404 Clean Water Act and Section 10 laws requiring federal U.S. Army Corps of Engineers and Oregon Department of State Lands permitting.

Coquille Valley Wildlife Area Vision Statement

Management of CVWA will protect, enhance, and restore aquatic, riparian and upland habitats in the Coquille Valley while avoiding adverse impacts to neighboring landowners. This will be accomplished on uplands, seasonal wetlands, and historic stream channels on multiple properties for the benefit of both wildlife and fish resources. This effort is expected to result in public benefit by improving fish and wildlife populations and providing lands where recreational and educational activities related to fish and wildlife will occur. These activities include hunting, fishing, wildlife viewing, research, and education.

Fish and Wildlife Area Goals and Objectives

Wildlife area goals are broad, open-ended statements of desired future conditions that convey a purpose but do not define measurable units. In contrast, objectives are more concise statements of what the Department wants to achieve, how much the Department wants to achieve, when and where to achieve it, and who will be responsible for the work. Objectives derive from goals and provide the basis for determining strategies, monitoring fish and wildlife area accomplishments, and evaluating the success of strategies. The goals and objectives for the CVWA Area are:

Goal 1: Protect, enhance, and restore lands within CVWA which consist of tidally influenced freshwater wetlands, riparian lands, aquatic habitats, and uplands for the benefit of fish and wildlife.

Objective 1.1: Restore wetlands, riparian areas, and other aquatic habitats at key locations on the Winter Lake Tract of CVWA to mimic habitats that once occurred naturally, with emphasis placed on over-wintering habitat for Coho Salmon.

Objective 1.2: Protect, enhance, and restore upland habitats within CVWA lands for the benefit of fish and wildlife.

Goal 2: Build, maintain and enhance CVWA facilities and any new equipment and structures to conduct habitat management and public use (also pertains to Goal 3) projects on the CVWA.

Objective 2.1: Develop and maintain CVWA infrastructure to facilitate programs for public use, resource monitoring, and maintenance of habitats.

Objective 2.2: Maintain berms and channels in coordination with Beaver Slough Drainage District and Coaledo Drainage District.

Goal 3: Provide a variety of quality fish and wildlife oriented recreational and educational opportunities to the public.

Objective 3.1: Develop safe public access to CVWA lands in such a way that impacts to neighbors are minimized.

Objective 3.2: Encourage compliance with CVWA public use program.

Objective 3.3: Provide approximately 800 hunting, trapping, and angling use days annually.

Objective 3.4: Provide approximately 800 other recreation/interpretation days annually.

Objective 3.5: Provide approximately 60 student days annually through class tours, volunteer education/work days, and individual instruction by communicating educational opportunities with local schools and other educational organizations.

Goal 4: Maintain properties to provide habitat benefits to fish and wildlife in ways that are consistent with the Department's mission and compatible with neighboring land uses.

Objective 4.1: Evaluate and prioritize invasive plant, fish and terrestrial animal species found on CVWA based on the risk they pose to native species and habitats to determine whether control is warranted.

Objective 4.2: Monitor effects of restoration within and outside of CVWA and adjust activities to accomplish desired conditions

Objective 4.3: Design and implement monitoring programs for fish and wildlife populations on, or utilizing CVWA.

Objective 4.4: Manage habitats to benefit fish and wildlife populations on CVWA.

Planning Approach

Because this plan was compiled before restoration projects have been completed and before a public use program has been in use, it should be considered a proposal for: 1) restoration of fish and wildlife habitats, and 2) development of a public use program.

These two efforts will occur separately, but are equal in importance. Portions of each will occur simultaneously and efforts in one are expected to benefit the other.

CVWA Establishment

The establishment of CVWA was initiated with a land trade between the Department and Bandon Biota LLC in February 2013. The Department traded 607 acres of timberland adjacent to Eel Lake near Lakeside, Oregon for 546 acres of primarily wetlands and converted wetland/ag lands, in two land parcels. Then in September 2014, The Nature Conservancy transferred an additional 37.3 acres of land located along North Bank Lane to the Department to improve public access to Department lands. These two actions created CVWA, which currently is 583.76 acres in size.

The CVWA was created because wetland habitats in the Coquille Valley had a higher potential for providing the Department with opportunities to undertake

projects to restore critical fish and wildlife habitats. Wetlands are identified as Key Habitats of the Coquille Valley in the Oregon Conservation Strategy (ODFW, 2006). These habitats in the Coquille Valley provide winter refugia for fingerling Coho Salmon before they migrate to the ocean. Loss of winter refugia has been identified as one of the most significant limiting factors for Coho in Oregon coastal stream systems (Coho Conservation Plan, ODFW 2007). The Coquille Valley is also considered to be the most significant estuary for wintering water birds, based on water bird inventories done by the US Fish and Wildlife Service in Oregon other than the Columbia River estuary (Lowe, Pers. Comm). The Department also considers lands in the Coquille Valley to have a higher potential value for providing fish and wildlife related recreation opportunities than the timberlands it owned at Eel Lake.

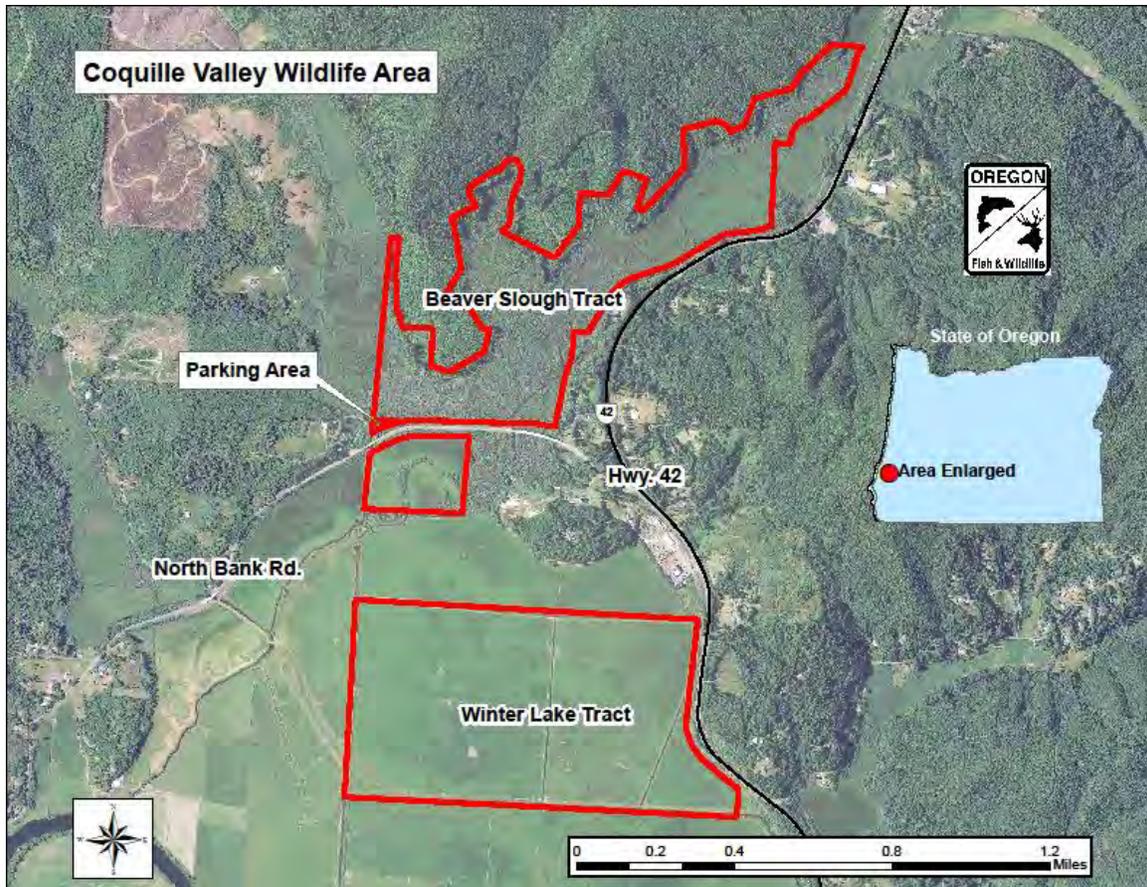
Description and Environment

Physical Resources and Historical Background

Location

The CVWA is located in the Coquille River Valley approximately 3.5 miles downstream from the town of Coquille and in the portion of Beaver Slough adjacent to Hwy. 42 near Coaledo. The area consists of two tracts; the Winter Lake Tract and the Beaver Slough Tract. Figure 1 shows the location of these tracts.

Figure 1. Coquille Valley Wildlife Area



Climate

Coos County has a mild and humid marine climate which results from the moderating influences of the Pacific Ocean and from rainfall induced by the Coast Range. According to the Coos County Multi-Jurisdictional Natural Hazard Mitigation Plan, average January temperatures are 44.2 degrees Fahrenheit, and average July temperatures are 60.9 degrees F. Average annual rainfall in Coos County is 56.8 inches. Rainfall amounts vary depending on the location. Along the lower coastal elevations, rainfall averages between 60 and 95 inches per year, while areas on the higher west slopes of the Coast Range may reach 200 inches. Although Coos County's climate is generally considered temperate, there are exceptions. In most winters, storms bring strong and sometimes damaging winds to the coastal areas, and in some years the accompanying heavy rains cause extensive flooding. Coastal storms are often slowed or stopped at the Coast Range peaks and may drop considerable amounts of precipitation in short periods of time (Partnership for Disaster Resilience, 2010).

The average flow rates for the Coquille River range from 8,250 cfs in February to 130 cfs in September (Partnership for Disaster Resilience, 2010).

Topography, Geology, and Soils

Coos County is located in southwest coastal Oregon and encompasses 1,629 square miles. The county is bounded to the north and east by Douglas County, to the south by Curry County, and to the west by the Pacific Ocean. Coos County has a diverse geography. The terrain along the coast and in the river valleys is relatively flat, while the Coast Range, which runs through the majority of the county, gives the inland areas a mountainous topography. The county's highest elevation is Mt. Bolivar at 4,319 ft., located in the southern portion of the county. Elevations in the Blue Ridge area in the north part of the county are somewhat lower, averaging 1,600 feet. Major rivers in Coos County include the Coquille River and its tributaries in the south and the Coos River and its tributaries in the north.

The Coquille Basin was formed in geologic times by interactions between the ocean and continental crustal plates. The drainage areas of the North, East, and Middle Forks of the Coquille River were part of the ocean floor until recent geologic times. This portion of the basin formed through deposition of shallow sea floor basalts, alternated with accumulations of shore-originated and sea sediments. The sources of these sediments were the ancestral Klamath Mountains, as well as undersea volcanoes. About 10 million years ago, regional uplift caused the land to rise above sea level, and subsequent glacial periods shaped the landscape.

The geology of the South Fork Coquille has a different origin. This land is part of the Rogue formation, is volcanic in origin, and was at one time an island. The regional uplift created a land bridge which connected this island with the northern area. Subsequently, the Coquille Basin has two stream substrate types: the South Fork has hard rock geology, while the remainder of the basin (including the CVWA) has a sandstone composition.

Stream gradients are steep in the upper reaches of the basin, but flatten as they enter the valley floor near Myrtle Point. The upper reach of tidewater influence is approximately 40 miles from the mouth of the Coquille River. Below this point, where the valley floor is much wider, the average stream gradient is about one foot per mile (Partnership for Disaster Resilience, 2010). CVWA, located at river mile 21, is in the reach where the valley flattens and it is well within the zone of tidal influence.

Habitat Types and Associated Fish and Wildlife

The Coquille River Valley is one of the largest river valleys in the Oregon portion of the Coast Mountain Range. This valley floods annually during the rainy season. The rainy season generally begins in November and extends through March. When flooding occurs, large portions of the valley floor become inundated with standing or slow moving water. Much of the inundation is shallow. Due to the size of the valley and the extent of flooding, the valley is an

important attraction for migrating waterfowl. Thousands of waterfowl congregate here as they migrate south to the central valleys of California in fall. Congregations occur again in spring as these birds move north towards nesting areas. In addition, a substantial population of waterfowl winter in the Coquille River Valley. Some nesting occurs in the valley during spring and summer, but nesting habitat is limited since the Coquille River and tributaries are channelized and much of the farming practices have resulted in conversion of wetland to intensively managed pasture dominated by reed canary grass (*Phalaris arundinacea*).

Other terrestrial wildlife that use the Coquille Valley include many species of resident and migratory passerine birds, wading birds and shore birds. Big game populations exist in the valley at moderate levels. Black-tailed deer (*Odocoileus hemionus columbianus*) and Roosevelt elk (*Cervus elephus roosevelti*) move to the valley fringe in winter from surrounding forested areas and some are resident year round. Black Bear (*Ursus americanus*) are present in the forested area and probably move to the valley when food resources such as black berries (*Rubus sp.*) are present. As a result of this diversity of species, the Coquille Valley is a significant location for wildlife viewers. Many of these species benefit most from upland habitats. For the purposes of this plan, uplands will be defined as those lands that are not inundated by water under tidal influence. As flooding occurs during the rainy season many of the uplands on CVWA are inundated by water.

The Coquille River is a coastal river with significant salmon, winter run steelhead (*Oncorhynchus mykiss*), resident and sea-run Cutthroat Trout (*Oncorhynchus clarkii*), and Pacific Lamprey runs. Channeling of the Coquille River, diking/drainage of tidelands, and conversion of wetlands to pasture has substantially reduced suitable habitat for these species. The valley floor aquatic and wetland habitats that remain provide critical habitat function:

- As an important area for wintering and migrating waterfowl and shorebirds;
- As an area that attracts the largest numbers of wintering waterfowl on the Oregon coast and is particularly important for dabbling ducks in mid-winter;
- As one of the most productive coastal river systems for Coho and fall Chinook salmon;
- As important overwintering and rearing habitat for juvenile salmonid fishes, where they grow prior to emigrating as smolts in the spring.

As described in the Original Land Surveys (Benner 1992), the lower main valley of the Coquille River was once a large, forested wetland and tidal marsh. These habitats, once estimated to be 9,000 to 12,000 acres, were disconnected from the river channel by dikes and drained for pasture formation, which probably started in the 1850s. By 1990, only an estimated 400 acres (3-4%) of these

former habitats remained. The vegetated, braided channels in this valley historically provided prime rearing habitat for the juvenile salmonids that were the product of spawning in higher gradient stream reaches in the basin. Historic habitat conditions would have provided forage production, suitable water temperatures, habitat complexity, nutrient settling, hiding cover, velocity refuge, and other attributes for salmonids, far beyond today's conditions. The Beaver Slough drainage has habitat that is probably similar to historic natural habitat.

Presently, much of the Coquille Valley floor is used for agricultural purposes. Agricultural interests include grazing of cattle, sheep, and goats, and growing grass for hay production. Much of the habitat encountered in Original Land Surveys (Benner 1992), including stands of willows, ash, and wetland dependent plants, have been lost due to drainage of these lands. In addition, many of the braided channels were filled in to produce a more uniform landscape which increased agricultural productivity.

Description of Management Units

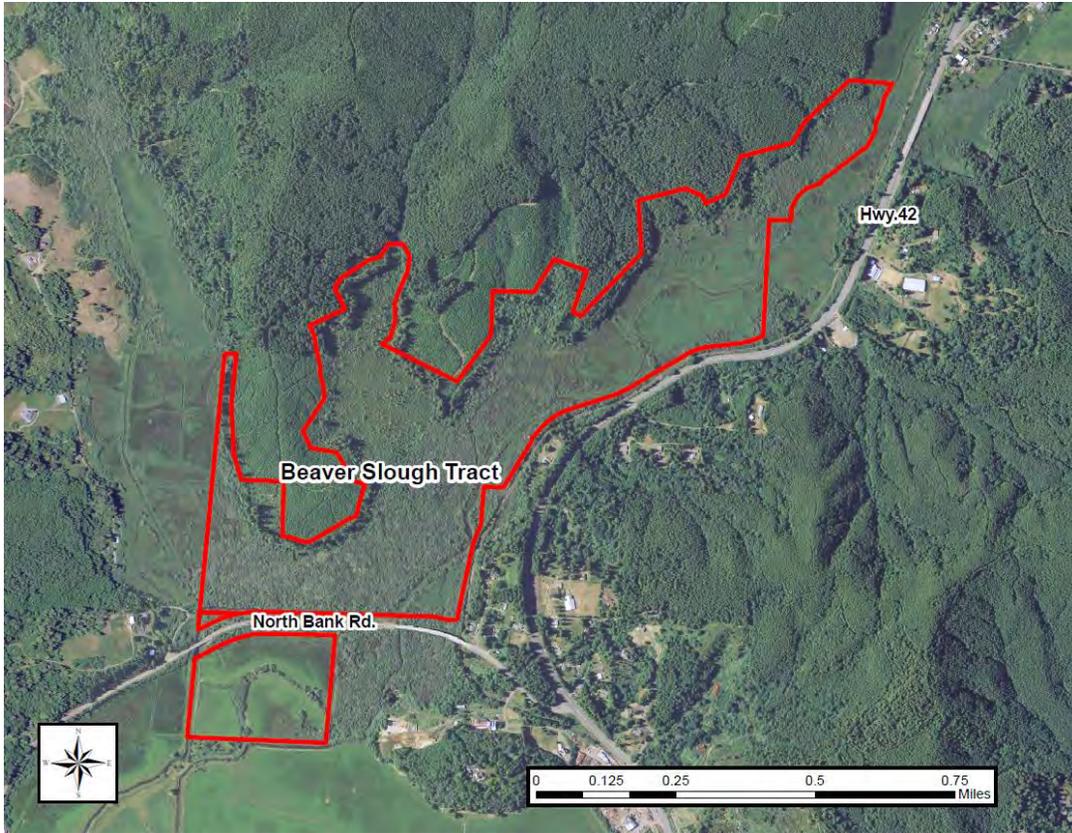
CVWA consists of two tracts; the Winter Lake Tract, 287.56 acres, and the Beaver Slough Tract, 296.2 acres. The Winter Lake Tract is situated west of Hwy. 42 between mile markers 7 and 8. The property is in an area where the lowest elevations of Winter Lake exist, making it ideal for restoration of salmonid habitat (Figure 2.). Thus, this is the area where most of the restoration work will be conducted on CVWA.

Figure 2, Winter Lake Tract, CVWA



Beaver Slough Tract is situated on either side of Beaver Slough starting at North Bank Lane and extending upstream for about 1.4 miles, ending near the Hwy. 42 bridge over Beaver Creek. This bridge is located just south of mile post 5. This tract is heavily vegetated and will require little in the way of restoration.

Figure 3, Beaver Slough Tract, CVWA



Biological Resources

The CVWA provides valuable habitat for a variety of wildlife species, in part because of its location in the Coquille Valley, the presence of extensive seasonal wetlands, and the potential for extensive wetland, upland, and aquatic habitat restoration.

As many as 50 bird species, 8 herptile species, (Oregon Watershed Enhancement Board 2010) and 52 mammal species (Verts and Carraway, 1984) are believed to exist in the Coquille Valley. See Appendix II, III, and IIIb, respectively, for a list of species within these three Orders.

The Coquille Valley is considered one of the most significant wintering areas for waterfowl on the Pacific Coast. The Audubon Society states that 50% of all the dabbling ducks that migrate along the Pacific Coast spend the winter there. There are also thousands of other wetland dependent wildlife species that use the Coquille Valley during all or part of the year. Some of these include great blue herons, great egrets, and a host of mammalian, reptilian, and amphibious species.

Appendix III and IIIb lists fish species found in the Coquille River drainage according to Department records. Species captured on the CVWA during 2013 spring monitoring are also listed in Appendix III. These species include a mix of native salmonid and non-game fish, as well as non-native fish.

Significant populations of Coho and Chinook salmon, winter run steelhead, Cutthroat Trout, and Pacific Lamprey are produced by and spend a portion of their life cycle in the Coquille River. The Department estimates 20,000 to 25,000 adult Coho Salmon return to the Coquille River presently. However, historic abundance may have been as high as 400,000 returning adult Coho Salmon (Lawson, 2004). Fall Chinook Salmon begin moving into the Coquille River in August and continue into November. Coho Salmon run primarily from September through January. There is also a small run of spring Chinook Salmon that return to the basin during April through June. Steelhead begin running in November and continue well into the spring months. Pacific Lamprey are thought to enter the river in the summer and fall. These fish over-winter and spawn the following spring from May to June.

Appendix IV lists plant species found on Bandon Marsh National Wildlife Refuge located in the lower Coquille River near the city of Bandon. This list provides an indication of plant species that may be found in other parts of the Coquille Valley.

Birds

Waterfowl

Management of the CVWA will be primarily directed towards preserving and enhancing tidally influenced wetland habitat. This will result in a variety of benefits including benefits to wintering and migrating waterfowl. Vegetation will be managed to mimic wetland qualities found in the basin historically. It is expected that habitat manipulation will increase nesting habitat, although this is a secondary benefit.

Marsh Breeding Birds

It is likely the Coquille River Valley provided extensive habitat for breeding marsh birds when wetland and flooded woodland habitats were present in large quantities. Currently only a small amount of natural wetland or flooded woodland habitat exists. In 1990, it was estimated that 400 acres of the historic 12,000 acres of these habitats were in existence (Benner 1992). Therefore, breeding marsh bird production is at relatively low levels. Restoration of tidally influenced wetland habitats will benefit these species.

Shorebirds

Shore birds, which feed in mud flats, are expected to benefit from restoration of tidal activity on CVWA since more mud flats will eventually be created and exposed at lower tides. Bird species such as Western sand pipers (*Calidris*

mauri) and greater yellow legs (*Tringa melanoleuca*) find feeding opportunities in intertidal areas where mud substrates are exposed during low tides.

Mammals

Mammalian species are expected to increase in population size as a result of restoration activities on CVWA due to an increase in the amount and diversity of habitats available in the Coquille Valley.

A large variety of mammal species find feeding, rearing, and escapement opportunities in healthy wetland habitats. For example, a tactic used by black-tailed deer fawns to evade predators is to hide in vegetative cover when predators are in their proximity. Areas with brushy cover are very conducive to employing this tactic. Also, black-tailed deer find quality browse in and around healthy vegetated wetlands.

Amphibians and Reptiles

As with mammals, herptile species are also expected to benefit from more diversity in habitats over time. Since tidal influence will decrease progressively between those areas at lowest elevations and those at highest elevations, benefits to herptiles will vary. Habitat types for these species will range from locations with continuous water inundation to upland areas.

Fish

Fish species known to occur in the Coquille Basin in the vicinity of CVWA include native and non-native species, game fish, non-game fish, and species with special State or Federal status (Appendix IIIb). Species such as anadromous salmonids (e.g. Coho Salmon, Chinook Salmon, steelhead) may be found in the main Coquille River seasonally, utilizing the river for: (a) migrating to spawning grounds (b) rearing and foraging when river conditions are favorable (i.e. low velocity, high clarity, and cold water temperatures) and c) moving to tributaries, off-channel areas, or side sloughs during inhospitable water conditions. Table 1 shows the last ten years of spawning escapement estimates for Coho and Chinook salmon in the Coquille Basin, and the last six years of winter steelhead redd counts for the Mid-South Coast strata.

Coho Salmon primarily exhibit what is referred to as a yearling smolt life history, spending their first year in fresh water and over-wintering before migrating to the ocean. This life history pattern contrasts with fall Chinook Salmon which migrate to the ocean in their first summer. Historic low gradient habitats provided by braided, vegetated, floodplain channels would have been highly beneficial for Coho over-wintering and preparing for out-migration. These habitats would have also benefited fall Chinook Salmon as a temporary feeding grounds prior to entering the ocean. Cutthroat Trout thrive in areas with abundant woody cover

and undercut banks, which would have been abundant in historic habitat. Spring Chinook are considered a “remnant” population today due to inhospitable summer habitat conditions in the upper basin. They typically exhibit the “stream-type” or yearling smolt life history and will benefit from a productive, low gradient, valley habitat as Coho would. Chum Salmon (*Oncorhynchus keta*) spawn in low-gradient streams a short distance from tidewater. Chum fry move through estuaries to the ocean within a short time after emergence, and off-channel foraging areas that provide growth during this migration should benefit their survival. The Coquille Basin is near the southern end of Chum Salmon distribution along the Pacific Coast, and they occur in relatively low numbers in this area. However, early commercial fishery records and historical accounts indicate that Chum Salmon were much more abundant than today. Winter steelhead have a lengthened freshwater residence time, with smolts migrating to the ocean at one to three years of age. Productive freshwater stream and wetland rearing areas with significant cover will provide protection and growth for rearing steelhead parr.

Table 1. Annual estimates of spawning escapement¹ for the Coquille Basin.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	Average
Fall Chinook	2,801	2,098	5,081	12,308	32,318	16,745	9,300	5,836	10,418	10,767
Coho	28,577	13,968	8,791	22,286	23,564	55,667	5,911	23,637	41,660	24,896
Winter Steelhead ²	19,550	24,312	18,806	9,136	19,927	9,504	7,414	15,423	10,877	14,994

¹ Number of spawning adult fish for coho and fall Chinook.

² Winter steelhead abundance is monitored by coastal strata and by redd numbers; not by individual basin spawner numbers. Number shown is redd abundance for the entire Mid-South Coast strata.

Native, non-salmonid species that would likely have thrived in the historic flooded woodland and wetland habitat in the Coquille Valley include Pacific Lamprey and Western Brook Lamprey (*Lampetra richardsoni*), Three-spined Stickleback (*Gasterosteus aculeatus*), and Staghorn Sculpin (*Leptocottus armatus*). These species find favorable habitat where water velocities are slower and substrates are finer with more sediment. Riparian vegetation and in-water wood/vegetation would have provided hiding cover, shade, insect production, and organic ecosystem inputs benefiting these species. All of these species are present today in the Coquille mainstem and tributaries, although at a reduced number from the historic condition. Non-native fish species are favored by existing habitats with warmer temperatures, reduced flow and tidal interchange, and reduced hiding cover. This allows for predation on native fish species, as well as competition for available food resources.

Native Plants

Native plants will be encouraged through cultivation, restoration, and maintenance to promote habitat diversity as appropriate. Promotion of native plant communities is expected to suppress invasive plant establishment and spread.

Non-Native Species

Non-native plants are widespread and persistent. A list of non-native plants expected to be present is shown in Appendix V. Non-native species often colonize areas of disturbance, or areas with fire suppression, thatch accumulation, and lack of biological control organisms. Noxious weed control will be a high priority on CVWA. There are several weed species that have become established in the Coquille Valley. Some of them are aquatic in nature, such as purple loosestrife (*Lythrum salicaria*). Other non-native plants common on the CVWA include reed canary grass and Scotch broom (*Cytisus scoparius*). Department personnel will monitor for weed infestation during normal activities on the area and, as appropriate, specific surveys will be conducted annually to accomplish early detection of infestations. The Department will aggressively treat weed infestations on CVWA using an integrated weed management approach. The agency will coordinate with the Coos County Weed Board or Oregon State University Agricultural Extension to ensure that the most up-to-date techniques are employed.

Grazing can be a very effective tool for removing grass and brush growth, which can be useful in controlling unwanted non-native vegetation. The Department will use grazing to control the amount of grass and brush growth as part of an integrated weed management program on Winter Lake Tract. The Department also plans to restore uplands, tidally affected wetlands and associated vegetation. Grazing will not be compatible with some of the proposed restoration. As restoration activities are undertaken and progress, grazing will be reduced from the amount that occurred at the time the property was acquired by the Department. At the point where restoration is complete grazing will continue to be considered as a tool to control or manipulate vegetation, and to maintain or improve habitat for the benefit of fish and wildlife.

If, grazing becomes unfeasible to a permittee due to a lack of available acreage, the Department may use mechanical means to remove vegetation in key areas. It is anticipated a tractor mower will be used to mow berms and other areas where removal is needed, but haying by a permittee will be considered if there is interest on the part of the public.

The presence of non-native fish species in the mainstem Coquille River and other streams, channels, and wetlands on the CVWA is a concern, as these species can directly or indirectly compete for food and space with native species.

Additionally, non-native fish species (e.g. Brown Bullhead (*Ameiurus nebulosus*) and Largemouth Bass (*Micropterus salmoides*)) can prey on native fishes. Appendix V includes a list of the non-native species in the Coquille Basin that were introduced to Oregon and were well-established in the local area by the mid-1900s. Black Crappie (*Pomoxis nigromaculatus*) and Smallmouth Bass (*Micropterus dolomieu*) were more recently introduced in the Coquille Basin. Although cold water riverine and tributary streams are not favorable to the non-native “warmwater” species such as crappie, Bluegill (*Lepomis macrochirus*), Largemouth Bass, and Brown Bullhead, these species can thrive in slough or pond habitats. Some isolated ponds off the main river channel produce these warmwater species, and are the source of fish found in the main river following floods that connected the ponds to the river. Smallmouth Bass were reported to have been illegally introduced in the last few years, and their presence in the South Fork Coquille River was verified by Department staff in 2011. The Department has documented Smallmouth in the mainstem of the Coquille River near the city of Coquille as recently as 2014. Yellow Perch (*Perca flavescens*) are present in Johnson Mill Pond and near river mile 29; and have recently been reported to the Department in the mainstem Coquille River by anglers. Johnson Mill Pond is commonly connected to the river when floodwaters over-top the dike. Some of the smaller, non-native species, such as Mosquitofish (*Gambusia affinis*), can play an important role in controlling mosquito populations.

Non-native, invasive, wildlife present on the CVWA include but are not limited to nutria (*Myocastor coypus*), Virginia opossum (*Didelphis virginiana*) and European starlings (*Sturnus vulgaris*). Specifically, nutria were first reported to the Department in the Coquille River Basin between 2005 and 2009 and are of particular management concern. A monitoring program coordinated by the Department’s Furbearer Program staff will be developed to document nutria populations. The Department or USDA Wildlife Services will manage nutria and other invasive non-native species populations levels that are consistent with management objectives set for the CVWA. Options to remove these animals include trapping or shooting using noise-suppressed rifles. The Department will consider using recreational trapping as a tool to control nutria, beaver and other aquatic rodents.

The Department will evaluate non-native species semi-annually based on survey information. The purpose of this evaluation will be to prioritize control effort based on species and the extent of infestation that has been identified. Prioritization will be based on the extent on infestation in terms of the number of individuals or their span of land based influence. Equally important for prioritization is likelihood that the organism being considered may have an effect on neighboring land ownerships.

Monitoring

Monitoring will be the responsibility of Umpqua Watershed District staff and will be dependent on staffing level and availability of resources related to monitoring, such as funding. For a more detailed summary of monitoring plans and priorities see Appendix IX. However, some monitoring tasks may be completed with the assistance of other entities at the discretion and direction of Umpqua Watershed District staff. For example, bird abundance and use of CVWA will, at times be conducted with assistance of private individuals, USFWS staff, or members of non-governmental organizations such as Audubon. Groundwater monitoring stations have been established in the Winter Lake area of the Beaver Slough Drainage District, with assistance from ODFW. Additional stations are planned for late summer/fall installation on the CVWA. Umpqua Watershed District staff will monitor/analyze data downloaded from stations on the CVWA, for sharing with BSDD and other interested parties. Finally, ODFW staff is seeking funding and outside expertise to develop and implement scientific studies evaluating both habitat change and fish response to restoration efforts. A fish and fish habitat monitoring plan is under development, with input/guidance provided by Oregon State University Extension and ODFW's Aquatic Inventory and Oregon Plan Monitoring program staff. Objectives of fish surveys include:

- Determine fish species composition in the two CVWA tracts, and differences between the tracts;
- Determine general time of use by fish;
- Develop an index of fish population abundance;
- Monitor fish ingress/egress through PIT tag arrays.

Although yet to be finalized, fish monitoring methods may include deployment of fish traps, seines, electrofishing, mark/recapture techniques, and detection arrays (e.g. PIT tags or acoustic tags). It will be important to collect physical habitat data concurrently with fish data, in order to monitor changes in fish use/abundance over time as restoration progresses.

Plants

Vegetation photo points will be established to document vegetative response to restoration activities. Periodic surveys will be conducted to monitor seedling establishment and survival of willow, ash and other tree and shrub plantings. Records will be kept of seedling survival and growth rate. These photo points and surveys will also be used to identify exotic plants and direct removal efforts.

Wildlife

Water birds, Big Game, and Other Wildlife

Monthly ground-based transect surveys will be conducted to document water bird use of the project area. After one year of monthly surveys, these surveys will continue as quarterly surveys in order to monitor progress of wildlife response to habitat restoration effort. During these surveys, species composition and approximate number of birds will be recorded. Other species such as deer and beaver (*Castor canadensis*) will be recorded as they are encountered. These surveys will consist of a series of point counts of visible wildlife. To establish a baseline for wildlife species diversity and relative abundance, surveys will begin before habitat restoration activities begin and continue through the five year period this plan will be in effect.

Burrowing and feeding activities by some wildlife (beaver and muskrat (*Ondatra zibethicus*)) can damage berms and dikes, neighboring property, and tree and shrub plantings. As a result, beaver and muskrat populations will be monitored as part of a population management program. Monitoring methods include point count or transect surveys for detection and evaluation of evidence of beaver and muskrat activity to assess populations. This evaluation method is described by the British Columbia Ministry of Environment, Lands and Parks in a publication called *Inventory Methods For Beaver and Muskrat* (Ministry of Environment, Lands and Parks Resources Inventory Branch, 1998).

It is expected that non-native nutria will increase at CVWA. A nutria inventory protocol will be developed similar to that used for beaver and muskrat. Any opportunity the Department has to remove these animals will be pursued. There will be no population management program for nutria that encourages establishment or maintenance of a self-sustaining population.

Fish

In order to establish baseline information, monitoring of fish use will begin before restoration efforts begin. Monitoring will continue after restoration occurs, to characterize and quantify changes in fish use and abundance. Monitoring in CVWA water bodies will be done primarily in late winter and spring (early December through May). Monitoring will provide a better understanding of migration patterns through and within CVWA, abundance, changes to fish species composition over time and the quality of habitat. Although the fish monitoring plan is not yet finalized, the following is a list of parameters that will likely be monitored:

- water temperature,
- dissolved oxygen (DO),
- water velocity,
- riparian shading,
- pool availability,
- large wood availability,
- fish passage,

- relative fish abundance,
- species composition.

Fish biologists will establish index sites for evaluating fish use based on habitat types and will establish basic monitoring protocols. Continued monitoring efforts will be overseen by Umpqua Watershed District staff. Fish habitat quality parameters such as water quality and dissolved oxygen can be monitored using passive data loggers. These will be deployed and periodically downloaded by various Umpqua Watershed District staff.

Fish use and presence will be monitored through a variety of collection methods, dependent on the sites selected and effectiveness of techniques. Methods may include electrofishing, beach seines, fyke traps, hoop traps, or other nets/traps. Umpqua Watershed District staff will coordinate and conduct these efforts, however portions of the work may be conducted by contractors, graduate students, researchers, or other entities like watershed councils. ODFW is seeking funding and outside expertise to develop and implement scientific studies evaluating both habitat change and fish response to restoration efforts.

Wildlife Diseases

The Department will cooperate with the Coos County Health Department and the U.S. Fish and Wildlife Service in the monitoring of wildlife diseases. Animals showing signs of disease may be tested as they are reported by the public or Department staff. Wildlife diseases that may occur in the project area include West Nile Virus (*Flavivirus sp.*), Avian Influenza (*Influenza*), Avian Botulism (*Clostridium botulinum*), Avian Cholera (*Pasturella multocida*), Deer Hair Loss Syndrome and others. ODFW Charleston Field Office Personnel will coordinate with the Department's veterinary staff, located in Corvallis, to respond appropriately to any disease issues that arise.

Mosquitoes

The Department has consulted with mosquito experts who indicate that proposed management should not create an abundance of salt marsh mosquito (*Aedes sp.*). However, some mosquitoes may respond to the restoration of aquatic habitats on the CVWA. The Department will manage the mosquito population that may respond to restoration of the Winter Lake Tract following an integrated management program. This program will originate with the restoration project itself. Engineering of the restoration project will ensure that all lands inundated with tide water will either drain on each tide cycle or will remain connected with water in the channel on Winter Lake Tract where fish populations exist. This will cause mosquito larvae to be accessible by fish and other predators.

Threespined Stickleback and Mosquitofish populations exist in the waters of CVWA, and these fish are known to effectively reduce mosquito production. If any disconnected water bodies are inadvertently created during the restoration

project, Department personnel will release fish, such as Threespined Stickleback, into these water bodies so these fish will prey on mosquito larvae.

If these measures are unsuccessful in controlling large mosquito outbreaks, the department will consider using *Bacillus thuringiensis* (BTI) to reduce mosquito larvae populations. BTI is a bacteria that kills mosquito larvae living in water bodies it is sprayed in. If BTI is not successful in controlling outbreaks of mosquitoes, the Department will consider the use of appropriate insecticides to reduce mosquito populations on CVWA. Finally, if these measures are not successful, the Department will modify tidal inundation to further limit mosquito production.

Water Use

Water use and distribution will be monitored using monitoring wells, hydrographs, and water height gages placed in key locations. With neighboring landowner approval and coordination, monitoring sites will include neighboring lands.

Cultural Resources

The Coquille Valley is an area where a significant amount of historic and prehistoric human activity has occurred. Radio carbon dating of archeological sites found in the Coquille Valley indicates Native Americans were present and subsisting in the area at least as far back as 140 to 420 AD. Middens, or locations where shells and bones of wildlife used for human subsistence have been uncovered in the Coquille Valley, indicate that these people relied on the river, associated wetlands and estuary to find food. During the development of the Ni-les'tun Unit of Bandon Marsh National Wildlife Refuge, many significant archeological sites and objects were found which were related to the history of Native American people stretching far back into prehistory. The Department is sensitive to the significance of these findings and is committed to preserving and protecting any significant sites on CVWA. In order to detect these sites, the Department and project contractors will coordinate with the Coquille Indian Tribe, the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians, and the Oregon State Historic Preservation Office. Appropriate measures to preserve known sites will be taken based on consultation with these entities.

European Settlement of the Coquille Valley

According to the book *A guide to the Oregon South Coast History* (Douthit 1999) the first Europeans to settle the Coquille Valley did so in the late 1850s for the purpose of establishing small farms. These farms produced a variety of crops, with the most significant crop produced being hay. In addition, livestock such as cattle (*Boss sp.*) and pigs (*Sus sp.*) were important products. Much of the existing dikes, fences, and other infrastructure related to agricultural production can be attributed to these people or their descendants. Dairy, beef, and sheep

production were the most significant agricultural products of the area by the mid-1920s.

As time went on, it was recognized that the Coquille River provided a very useful travel route for boat traffic, including cargo-carrying ships and ferries. There were many boats that regularly moved up and down the river, stopping at several river-side communities to pick up or unload people and products. This allowed agricultural and timber products to be moved to markets located some distance from the Coquille River Valley. Coal was discovered in the vicinity of the Coquille River, which resulted in significant industrial activity beginning in the mid-1890s. The ability to transport coal by boat was a great advantage to this industry.

Commercial fishing in the Coquille River was a large industry up until the mid-1950s, when commercial harvest of salmon was made illegal on Oregon coastal rivers. Information on commercial fishing on the lower Coquille River is available from at least as far back as 1889. The commercial catch of “Silver” Salmon (Coho) from the Coquille River from 1923 to 1949 ranged from 74,500 to nearly 673,000 pounds annually (OFC 1951). Several canneries once existed along the Coquille River. However, little evidence of their presence exists today. Wooden pilings still present along the river channel indicate a large amount of industry in this area, some of which was related to salmon fisheries.

Social Environment

Demographics

CVWA is situated in Coos County between the towns of Coquille and Bandon in the Coquille River Valley. Figures from the 2010 census indicate that 63,043 people lived in the county. The city of Coquille is the nearest incorporated city to CVWA and its population in 2010 was 4,184. Much of the Coquille River Valley at the lowest elevations is in private ownership. These lands are managed primarily for agricultural interests including grazing of cattle, sheep (*Ovis sp.*) and goats (*Capra sp.*) and growing hay for baling. At middle and higher elevations, private lands are managed for timber production.

During the rainy season (November through March), the Coquille River floods the valley near the city of Coquille, which creates Winter Lake. Many private land owners allow fee hunting for waterfowl on their flooded lands when waterfowl are attracted to these locations. Primarily, “private duck clubs” lease these properties and require membership, thus limiting use to individuals who enroll. Members of the public who want to hunt in this area but are not willing or able to pay a fee to hunt currently find limited public land opportunities to benefit from this resource.

Land use

Much of the Coquille Valley is managed for agriculture. In order to accomplish this some lands in the Coquille Valley were ditched and drained to create conditions that encourage growth of grass and other forage. The Winter Lake Tract has been managed this way. While this management scenario has provided benefits to wildlife, the Department believes restoring tidal influence and developing this tract to promote natural attributes will contribute to more diversity of habitats in the Coquille Valley.

Local residents recall that Beaver Slough was drained and diked in the past. However, it currently exhibits a more natural state. The Department intends to conserve the natural attributes of this tract.

Infrastructure

Developments/Facilities

Fencing

A perimeter fence will be constructed and maintained around all of the Winter Lake Tract and portions of Beaver Slough Tract to delineate property boundaries and to protect neighboring landowners from unwanted public access. This fence will also protect the CVWA from trespass livestock. This fence will be posted with CVWA boundary signs using the form that is standard for Department boundary signs. The spacing of these signs will be no more than 150 yards.

Interior fencing will be constructed on a temporary basis to direct grazing activity as needed to accomplish the Department's objectives in fish and wildlife habitat enhancement. Interior fences will likely be electric fences that are easily constructed and removed as needed.

Parking/Access/Easements

A parking area and access points will be developed with access to each tract to facilitate and manage public access. Initially, the Department will construct one access point on the Beaver Slough Tract. This parking area will require coordination with county and state road departments. It will comply with state and county law and permit requirements. It may be necessary for the Department to acquire access easements for public access to Winter Lake Tract. The parking and access point will be maintained to provide a safe and clean location for the public to enter CVWA by foot or in small water craft. Motor vehicle or heavy equipment access will be allowed for administrative purposes only.

Garbage/Dumping

Parking and access points will be maintained in such a way that they promote safe and clean use of CVWA. Typically, access points become focal areas for noxious weed control and garbage clean-up. Garbage cans and portable public restrooms may be provided and maintained during anticipated peak public use time periods.

Water Distribution and Control

A significant aspect of habitat restoration on CVWA will be the restoration of tidal influence to the Winter Lake Tract. This will be accomplished using tidegates fitted with muted tidal regulators (MTR) and a system of berms installed by the Beaver Slough Drainage District. MTRs allow the amount of tidal influence to be controlled. Water movement will be monitored at key locations using hydrographs and staff gauges.

The Department recognizes that the proposal for reintroducing tidal inundation on parts of Winter lake Tract has caused concern for some neighboring landowners. The appropriate level of tide inundation will be determined as the result of a slow increase in the amount of inundation allowed, starting well below a level that has any probability of causing effects to neighboring lands. The incremental increase in inundation level will occur over a long period of time to ensure that any effects from this will be recognized.

Facilities Maintenance

Maintenance activities will mostly involve minor maintenance of perimeter berms, fences, parking areas, access points, and restroom facilities. The BSDD is responsible for maintenance of major dikes and ditches essential to the operation of the drainage district. Since heavy equipment will not likely be assigned to or stored at CVWA, local companies will be called upon in emergency situations to provide heavy equipment. A retainer contract may be developed to address repairs that will be needed. These companies must be able to respond to breaks or leaks in the existing berm quickly enough to prevent further damage to the berm itself or prevent damage to neighboring private properties.

Some maintenance activities may be done using tractors and trucks housed at the Department's Umpqua Watershed District Office in Roseburg. Examples of these maintenance activities include mowing of the parking areas, repairs to damaged kiosks, and replacement of fence posts and fencing used to control access at access points.

Restrooms may be provided by a local company that can place and maintain portable toilets. This company may be kept on retainer as well.

Water Rights

Based on input from the Oregon Water Resources Department, it is not anticipated that any water rights will be needed for proposed activities on CVWA. To ensure unexpected issues are addressed, coordination will be maintained with Oregon Water Resources Department as plans for restoration and development are implemented.

Fish Passage/Screening

Fish Passage: The CVWA properties will encompass portions of several streams that have native migratory Cutthroat Trout, Coho Salmon, winter steelhead, and fall Chinook Salmon, in their juvenile and adult life stages. Other native migratory fish are present at different times during the year. Stream crossings and water control structures on lands within the CVWA will be inspected to ensure that they meet or exceed the Department's Fish Passage Criteria (OAR 635-412). Structures that fail to meet fish passage standards will be upgraded in order of importance to migratory fish, as funding is available. Specific tidegate adjustments by the Beaver Slough Drainage District may require consideration of flow volumes and engineering design criteria from Department engineering staff prior to approval by the Department's Statewide Fish Passage Coordinator.

Fish Screening: The Coquille River Valley receives substantial rain during spring, fall, and winter months. In the summer, groundwater levels are generally adequately near the surface to sub-irrigate the valley pastures. Therefore, it is not expected that irrigation will be needed to meet management objectives. However, any established Department water rights may be exercised as necessary to meet fish and wildlife habitat management objectives. Ditch networks and pump intakes that may be used will be screened following Department fish screening criteria to prevent native fish from entering irrigation networks.

Easements/Access Agreements

Easements or access agreements and permits will be obtained as necessary to provide administrative and public access to CVWA lands. Where needed these will be secured from willing landowners or managers before restoration and development begins.

Land Exchange and Adjustment

It is the policy of the Department to only obtain land or interests in lands, including easements and leases, from willing sellers, consistent with statutory authority and the Department's mission. These actions must be for conservation of fish and wildlife and their habitats and to provide fish and wildlife oriented public use for educational and recreational purposes. Land adjustments would allow for the sale, trade or exchange of land with willing landowners to enable the Department to consolidate CVWA boundaries.

There are three categories of lands that may be considered. These include: 1) Significant or unique habitats, especially those beneficial to threatened, endangered or sensitive species; 2) Sites, or access to sites that provide wildlife-related recreational opportunities; and, 3) Properties to facilitate the performance of the Department's mandated duties (e.g., storage warehouse, access routes, etc.).

County taxes and fire assessments will be paid on lands included in CVWA. The Department pays in-lieu of taxes as directed by Oregon Revised Statute (ORS 496.340). The rate paid is equal to the ad valorem taxes that would have been charged against the property if it had been assessed to a private owner. The Department also pays fire assessments to the local fire district at twice the rate private landowners would be assessed, with the exception of those lands that are managed for forestry benefits (ORS 477.230).

Public Use

Public Access

Public access will occur primarily through designated public access points with associated parking areas. Access will be allowed to properties year-round with the exception of specific time periods and locations when it must be restricted to protect the public, such as during some restoration activities. Access may also be restricted if there is need to protect Department employees, property and interests. Refuge areas within CVWA, where public access is tightly controlled, may be established if the Department determines it is needed to protect fish and wildlife resources or for other reasons.

A controlled access-by-permit system will be employed to manage the level of public use on CVWA during hunting seasons. A similar access-by-permit system may be employed for non-hunting public use. Specifically how public access is managed during the hunting and non-hunting seasons will be decided following an adaptive management policy for public use. Reasons for employing a controlled access system will be to enhance the quality of experience for the public or to protect fish and wildlife resources.

Hunting, Trapping, and Angling

CVWA will be open during all applicable hunting and fishing seasons unless those activities are deemed to be detrimental to sensitive resources. Demand for public access is expected to be significant, with the primary uses being waterfowl hunting and fishing. Coos Bay/North Bend is the largest urban area on the Oregon Coast, and is approximately 10 miles from the CVWA. In addition, CVWA is about 67 miles from Roseburg, and 134 miles from Eugene. If unregulated hunting results in conflicts between visitors to CVWA and neighboring landowners, the Department will consider a managed hunt program to reduce such conflict and to maintain a quality hunting experience. Access permits will be required for all public use. There may be some refuge areas set aside on CVWA to enhance attractiveness of the property to wildlife.

Angling regulations will be aligned with those of the surrounding waters in the basin, unless specific regulations are necessary to meet CVWA goals and objectives. If special regulations are implemented for CVWA, changes will be based on analysis of public use, fish population status, and the anticipated effect on fish populations as a result of the implementation of special fishing regulations.

Trapping may be allowed on CVWA through a permit system so activities can be closely monitored and used to manage furbearer and un-protected mammal populations at levels consistent with CVWA goals. Trapping will also be useful to manage damage to berms and water control structures and in controlling invasive species of mammals like nutria as part of an integrated pest management program.

Public use other than hunting and trapping

CVWA is expected to be a significant attraction for birders, photographers and other non-hunting or angling users because it will provide opportunities for encountering large numbers of waterfowl and other wildlife in a natural setting. Interpretive trails and viewpoints will be constructed, if appropriate, to enhance their experience. The goal will be to provide opportunities for a quality experience for these user groups in concert with hunters and fishers.

Dog training may be considered on CVWA in specified locations by permit. Consideration for the allowance of training will be based on need and potential impacts to wildlife species. If permits are allowed they will be issued by the ODFW District Wildlife Biologist in the Charleston Field Office.

Educational/Interpretive

CVWA will be managed to equally benefit fish and wildlife resources. As such, it will serve as an example of how coastal river wetlands can be managed to benefit multiple resources and users. Local schools will be encouraged to use the area for education. Department staff will be available, when appropriate, to conduct tours for schools or other groups for educational purposes.

Oregon has several birding trails that are used by wildlife viewers for birding trips. The Department will encourage the inclusion of CVWA in these activities.

Water Management

The following is the ODFW Winter Lake Restoration Project/CVWA General Water Management & Fish Use concept:

Note that this general description of water level management does not refer to water elevations in feet, as that level of detail will be determined in the engineering/design phase of the Restoration Project. These general water management concepts follow the three “water management seasons” as described by Fred Messerle, Chairman of the Board of Supervisors, Beaver Slough Drainage District.

Summer

Water management through the tidegates would be allowed to fill the restoration channels (main channel and secondaries) up to nearly bankfull, depending on the tidal magnitude. It is desirable to have secondary channels fill for habitat use. Main channel would not drain completely on low tides, however secondary channels may drain. This would allow for interchange of water to allow as much over-summer rearing for native species as possible. Over-topping is not desirable, so as not to create fish stranding/vulnerability episodes. Also, overtopping during the summer months may create habitat advantages for mosquito production. This is a situation ODFW wants to avoid as much as possible.

Currently, fish use in the summer (in major ditches) is limited to high temperature/low DO-tolerant species such as brown bullhead. In the new major restoration channels, with twice-daily tidal water interchange, we anticipate improved water quality to allow for summer rearing of native species such as Coho and Cutthroat. Additionally, there are spring sources on or that feed into Unit Two lands that may provide thermal refugia to provide summer rearing habitat. As temperatures warm and the Coquille River flow drops in the late spring/early summer, juvenile salmonids in the main river may be seeking

thermal refugia in which to rear until the following spring. The restoration project may provide this refugia.

Fall/Winter

Water management through the tidegates would be allowed to fill the restoration channels (main channel and secondaries) and exceed bankfull on most high tides. Depending on Coquille River level and rainfall, main channel and secondary channels may or may not drain on low tides. "Winter Lake" conditions (standing water on pastures) occur most years due to heavy rainfall and floods overtopping river dikes. Water levels over-topping into the floodplain of Unit Two is desirable to facilitate over-winter rearing, with high spots remaining exposed.

Ascending to spawning grounds, adult Coho and winter steelhead may enter the tidegates of Unit Two as a result of being attracted to water coming from Beaver Creek or China Camp Creek. If China Camp Creek is run exclusively down the main ditch (existing), then attraction of adult fish should be primarily through Unit One's tidegates.

Juvenile salmonids (especially fry) are often transported downstream from their natal stream during late fall/winter. This can occur from major freshets, if they are flushed downstream by high velocity flows, or due to displacement from high juvenile densities. These fish, coming downstream from upper Beaver and China Camp Creeks and from further upriver in the Coquille Basin, should enter the restoration project where they could rear in a large expanse of overwinter habitat. This habitat would offer low velocity water, hiding cover, and habitat diversity with increasing production once the project area is planted and vegetation proceeds towards maximum density. Tidal wetlands provide productive areas for juvenile salmonid rearing, including increased growth that translates into better survival, as opposed to stream-reared fish. Historically, the main Coquille Valley is believed to have provided a very large quantity of overwintering habitat, prior to diking and draining for pasture production. Historic accounts described the condition as "timbered, brushy marshland".

Notable benefits for waterfowl are expected by having tidal influence in the early fall months, due to increased aquatic macroinvertebrate production and having water present in shallow areas that don't typically provide habitat until later in the fall/winter season.

Spring Drain-out

Water management through the tidegates would be allowed to fill the restoration channels (main channel and secondaries) to exceed bankfull in the early spring, with decreasing overtopping events as the spring progresses. The transition from Spring Drain-out to Summer will likely be a gradual process, rather than an abrupt change. This gradual transition would create conditions that are not advantageous for mosquito production and drainage of floodplain would be monitored/managed to facilitate outmigration of rearing fish. Main channel and

secondary channels would not drain completely on low tides. Secondary channel drainage would occur more frequently as summer approaches.

Juvenile Coho that entered the restoration project as fry to find thermal refugia in the summer, or were displaced from upper basin habitats in the fall/winter would now prepare to smolt and migrate to the ocean as the spring progresses. Coho smolts are typically emigrating in late April through May, and should be in the ocean by mid-June. Young-of-the-year fall Chinook are produced higher in the basin, in the South, East, Middle, and North forks. They emigrate as a zero-age smolt, reaching the ocean by late August through September. On their way to the ocean, juvenile Chinook make temporary stops in tidal wetlands, utilizing these productive areas to accelerate growth and increase fitness for survival in the ocean.

For all periods, it is expected that tidal flushing will reduce conditions that currently favor warmwater, non-native fish species, toward favoring coldwater, native species.

Goals, Objectives and Strategies

As stated previously Wildlife Area Goals are broad, open-ended statements of desired future conditions that convey a purpose but do not define measurable units. In contrast, objectives are more concise statements of what the Department wants to achieve, how much the Department wants to achieve, when and where to achieve it. Objectives derive from goals and provide the basis for determining strategies, monitoring fish and wildlife area accomplishments, and evaluating the success of strategies. These strategies are specific projects that may be undertaken to accomplish goals and are based on staffing and funding levels and in some cases accomplished through cooperation with other entities. The strategies listed below are not all-inclusive of work that will be accomplished on CVWA.

Goal 1: Protect, enhance, and restore lands within CVWA which consist of tidally influenced wetlands, riparian lands, aquatic habitats, and uplands for the benefit of fish and wildlife.

Rationale

Coquille Valley provides habitat for a wide variety of fish and wildlife species. Habitats presently available are productive for many species. For example, the valley is a significant wintering area for Pacific Flyway waterfowl and other birds. In addition, Coho populations exist at a level that some fishing opportunity for them in the Coquille basin currently occurs, although this opportunity is limited. Several other coastal streams do not have populations healthy enough for any harvest opportunity.

Healthy estuaries and tidal marshes provide vital habitat components and diversity in habitat for waterfowl and over-wintering areas for Coho and other fish species. Estuaries are identified in the Oregon Wildlife Conservation Strategy as Strategy Habitats. As such, their restoration is of high priority for the Department. Reconnection of lands within CVWA will require coordination with pertinent drainage districts and neighboring private landowners.

Upland habitat supports a wide variety of game and watchable wildlife as well as several sensitive species. Strategies employed by the Department will support upland conservation actions described in the Oregon Conservation Strategy.

Objective 1.1: Restore wetlands, riparian areas, and other aquatic habitats at key locations on the Winter Lake Tract of CVWA to mimic habitats that once occurred naturally, with emphasis placed on over-wintering habitat for Coho Salmon.

Strategy 1: Fill in 1.5 miles of existing drainage ditch on the Winter Lake Tract and remove 3 miles of internal berms to restore hydrology to a portion of Winter Lake.

Strategy 2: Reconnect up to 10 miles of remnant stream channels on the Winter Lake Tract to the Coquille River.

Strategy 3: Place up to 100 pieces of large wood in reconstructed stream channels on the Winter Lake Tract to provide overwinter and rearing habitat for salmon, steelhead, and Cutthroat.

Strategy 4: Plant approximately 41 acres of wetland shrub vegetation on the Winter Lake Tract in such a way that diversity in habitats is accomplished. As funds are available, plant remaining 206 acres of property with wetland shrubs.

Strategy 5: Restore tidal influence to lands on the Winter Lake Tract that were historically tidally influenced, through coordination with Beaver Slough Drainage District's China Camp Creek Project.

Strategy 6: Construct and maintain a perimeter fence around the Winter Lake Tract to control livestock ingress and egress to Winter Lake Tract.

Strategy 7: Control invasive species; see Goal 3 for monitoring.

Strategy 8: Protect, enhance and restore aquatic and upland habitats on Beaver Slough Tract by controlling invasive species and encouraging survival of desirable vegetation where appropriate.

Objective 1.2: Protect, enhance, and restore upland habitats within CVWA lands for the benefit of fish and wildlife.

Strategy 1: Plant and cultivate approximately 40 acres of desirable upland vegetative species to promote quality upland habitat.

Strategy 2: Control invasive species; see Goal 3 for monitoring.

Goal 2, Build, maintain and enhance CVWA facilities and any new equipment and structures to conduct habitat management and public use (also pertains to Goal 3) projects on the CVWA.

Rationale:

Maintenance of fences, gates, check stations, parking lots, and viewing areas is necessary to control and enhance public use and ensure the safety of public use. In addition, maintenance, safe storage, and protection of equipment are essential to fulfill the vision of the CVWA.

Objective 2.1: Develop and maintain CVWA infrastructure to facilitate programs for public use, resource monitoring and maintenance of habitats.

Strategy 1: Develop and maintain access easements with adjacent landowners where needed.

Strategy 2: Develop and maintain a parking area (one is anticipated).

Strategy 3: Investigate options to purchase or build a storage facility for equipment on either Winter Lake Tract or Beaver Slough Tract. Secure facility with a fence and structures as appropriate.

Objective 2.2: Maintain berms and channels in coordination with Beaver Slough Drainage District and Coaledo Drainage District.

Strategy 1: conduct vegetative control on berms using mechanical vegetative removal, grazing and/or chemical methods.

Strategy 2: Maintain berms not maintained by Beaver Slough Drainage District and Coaledo Drainage District.

Goal 3: Provide a variety of quality fish and wildlife oriented recreational and educational opportunities to the public.

Rationale

The CVWA is funded in part by hunting and fishing license sales. The area is situated in Coos County between the towns of Coquille and Bandon in the Coquille River Valley. Census figures indicate that 63,043 (2010 census) people live in the county. Much of the Coquille River Valley at the lowest elevations is in private ownership. These lands are managed primarily for agricultural interests including grazing of domestic livestock which includes cattle, sheep and goats and growing hay for baling. At middle and higher elevations, private lands are managed for timber production.

From November through March, the rainy season, the Coquille River floods the valley near the town of Coquille, which creates Winter Lake. Many private land owners allow fee hunting on their flooded lands when waterfowl are attracted to these locations. Primarily, "private duck clubs" lease these properties and require membership, thus limiting use to individuals who enroll. Members of the public who want to hunt in this area but are not willing or able to pay the private land access fee currently find limited public land to hunt on.

The Coquille Basin provides extensive angling opportunities, but opportunities in the immediate area of the CVWA are limited by private land ownership with limited access. One purpose of the CVWA is to increase angling opportunity by both increasing the number of adult salmonids returning to the Coquille Basin and also providing opportunity for angling on CVWA property.

The Coquille Valley is also a very attractive location for people interested in viewing and photographing wildlife. However, limited access to quality wildlife habitat in the area reduces opportunities for these pursuits. Wildlife viewing attracts people who contribute to local economies significantly (International Associations of Fish and Wildlife Agencies, 2002) (USFWS 2006). Effort described in this plan will result in increased opportunities for public access to lands that provide these opportunities.

The Department has cultivated an active relationship with local schools associated with the Salmon and Trout Enhancement Program. That relationship could be extended to educational tours and classes involving CVWA. This will broaden the education of a variety of students, increasing the understanding of ecological processes, and the importance of tidally influenced wetlands for many species of fish and wildlife. Both Coquille and Bandon High Schools have committed to incorporating the CVWA restoration project into their environmental education curriculum. In addition, Southwestern Oregon Community College (SWOCC) has recently re-established a Natural Resources curriculum toward an Associate's Degree program (articulated with Oregon State University), and instructors have expressed interest in utilizing CVWA for field trips).

Objective 3.1: Develop safe public access to CVWA lands in such a way that impacts to neighbors are minimized.

Strategy 1: Develop access easements with adjacent landowners for both tracts where needed.

Strategy 2: Develop and maintain a drive way and a parking area.

Strategy 3: Build and maintain approximately 1 mile of trails along dikes.

Strategy 4: Provide portable restroom facilities at public access sites during high public use periods, including but not limited to hunting or fishing seasons, through contract.

Objective 3.2: Encourage compliance with CVWA public use program.

Strategy 1: Coordinate with Oregon State Police to enforce compliance with CVWA regulations.

Strategy 2: Develop and maintain interpretive kiosks and signage for the public access area with information regarding use and key rules related to the use of CVWA.

Strategy 3: Clearly delineate and sign both Winter Lake and Beaver Slough Tracts.

Objective 3.3: Provide approximately 800 hunting, trapping, and angling use days annually.

Strategy 1: Evaluate the need for and possibly implement a regulated public use program.

Strategy 2: Develop a system for providing permits to hunters. Hunters will check in and out of CVWA and provide information related to their activities.

Strategy 3: Develop and maintain interpretive kiosks and signage for each public access areas with information related to hunting and fishing use of CVWA.

Strategy 4: Develop news releases as needed noting hunting, trapping, angling and viewing opportunities on the CVWA.

Objective 3.4: Provide approximately 800 other recreation/interpretation days annually.

Strategy 1: Develop and maintain interpretive kiosks for the public access area with information targeting visitors who are not planning on engaging in hunting or fishing.

Strategy 2: Develop and send out news releases as appropriate concerning wildlife viewing opportunities on the CVWA.

Strategy 3: Work with Department Information and Education Staff to develop and distribute wildlife viewing opportunity pamphlets for CVWA. Distribute to local Department Offices, Chambers of Commerce, other agency offices, etc.

Strategy 4: Evaluate the need to implement a regulated public use program.

Objective 3.5 Provide approximately 60 student days annually through class tours, volunteer education/work days, and individual instruction by communicating educational opportunities with local schools and other educational organizations.

Strategy 1: Develop and release news releases as needed, noting viewing and other recreational opportunities on the CVWA.

Strategy 2: Develop and foster relationships with educational groups such as Oregon Stewardship, Audubon Society, Scouts, and local schools.

Strategy 3: Promote at least 4 class educational trips per year to the CVWA at local schools, emphasizing Department educational materials such as Project Wild, Project Aquatic, etc.

Strategy 4: Work with schools in Coquille, Bandon and other communities to incorporate CVWA restoration work into their curriculum. All education levels from kindergarten through college will be welcome and their participation will be actively pursued by the Department

Goal 4: Maintain properties to provide habitat benefits to fish and wildlife in ways that are consistent with the Department's mission and compatible with neighboring land uses.

Rationale

The Coquille River Valley has several invasive species present, including but not limited to: purple loosestrife, Scotch broom, blackberry, various thistles, reed canary grass, Largemouth Bass, *Gambusia (Mosquitofish)*, Brown Bullhead, European starlings and nutria.

During restoration, CVWA land will be disturbed which encourages the establishment of noxious weeds. Likewise restoration of tidal marsh habitat on CVWA will provide additional habitat for nutria and other non-native species. It is essential to protect these restored habitats from establishment and occupation by some of these species in order to maintain and improve ecological function and prevent adverse impacts to neighboring lands.

Restoration of tidal wetlands near areas that have been drained of surface water to benefit agriculture may have some effect on soil moisture. The Department plans to monitor these effects for the purpose of manipulating management strategies to limit effects on neighboring lands while achieving its goals for CVWA. In addition, restoration of habitat will result in potential increase of various wildlife and fish species in the area. The Department plans to monitor this response and adjust management strategies to limit negative effects on neighboring lands.

Objective 4.1: Evaluate and prioritize invasive plant, fish and terrestrial animal species found on CVWA based on the risk they pose to native species and habitats, to determine whether control is warranted.

Strategy 1: Conduct periodic surveys to detect establishment of invasive plant populations and monitor the development of existing populations to determine if species present on CVWA pose a high risk of having a negative impact to fish and wildlife habitats.

Strategy 2: Conduct periodic surveys to monitor populations of invasive wildlife to determine whether they pose a high risk of spreading to neighboring properties and becoming a problem for land management there.

Strategy 3: Control vegetative invasive species determined to be of high priority for control via an integrated pest management system which may include pesticide application according to label instructions, manual pulling, grazing, haying, burning, biological controls and other methods.

Strategy 4: Control mammalian or avian invasive species determined to be of high priority using an integrated pest management system, including but not limited to trapping or shooting. This may include using Department and USDA Wildlife Services staff as well as recreational trappers to remove non-native nutria through trapping and shooting.

Objective 4.2: Monitor effects of restoration within and outside of CVWA and adjust activities to accomplish desired conditions

Strategy 1: Develop and employ monitoring methodology to determine changes in water movement and distribution below ground level by the installation of piezometers in water wells at key locations within and adjacent to (with landowner permission) CVWA before restoration efforts commence to monitor ground water level before restoration.

Strategy 2: Continue to monitor these water wells after restoration is complete for a period of 5 years.

Strategy 3: Develop and employ monitoring methodology to determine changes in water movement and distribution above ground level by using water data loggers placed in key locations.

Strategy 4: Develop and employ monitoring methodology to determine changes in vegetation as a result of habitat restoration efforts by conducting upland, wetland and aquatic vegetative surveys periodically on CVWA. Methods may include but are not limited to the use of photo points, range cages and plot vegetative sampling surveys.

Strategy 5: Adjust water inundation level through adjustment of MTR to put the development of vegetative community on a trajectory toward desired conditions.

Objective 4.3 Design and implement monitoring programs for fish and wildlife populations on, or utilizing CVWA.

Strategy 1: Capture fish, with special emphasis on Coho Salmon, using appropriate traps for identification, enumeration and marking with passive integrated transponder (PIT) tags. This will be done pre- and post-habitat restoration.

Strategy 2: Install PIT tag monitoring equipment (detection arrays) to detect marked fish movement.

Strategy 3: Develop specific wildlife survey transect routes, with special emphasis on water birds, as part of a standardized survey method.

Strategy 4: Conduct wildlife surveys four times per year. This will be done pre- and post-habitat restoration.

Objective 4.4; Manage habitats to benefit fish and wildlife populations on CVWA.

Strategy 1: Adjust management regime on CVWA to benefit specific fish and wildlife populations based on the results of surveys of fish and wildlife populations.

Strategy 2: Adjust tidal inundation levels through an agreement with Beaver Slough Drainage District, to influence vegetation and access to the habitat for fish and wildlife.

Strategy 3: Influence plant communities above the inundation area by mowing, grazing and planting desirable plants to accomplish desired condition.

Plan Implementation

Funding

Initial funding for CVWA implementation and operation will come through funds obtained from the land exchange, since the land and its assets at Eel Lake were of higher value than CVWA. Funds will also be secured from the National Coastal Wetlands Conservation Grant Program administered by the U.S. Fish and Wildlife Service.

Additional funding is to be determined –Options include the Oregon Watershed Enhancement Board (OWEB), ODFW Fish Restoration and Enhancement Program (R&E) and Access and Habitat Program (A&H), Fish America Foundation, Wild Rivers Coast Alliance, PSC Southern Boundary Fund, Ducks Unlimited, The Nature Conservancy, USFWS Sport Fish Restoration, and Pittman-Robertson funds.

Staffing/Organization

Direction for managing CVWA will come from the Charleston Field Office of the Oregon Department of Fish and Wildlife. This office is supervised by the Umpqua Watershed District of the West Region. Existing staff from the Charleston Field Office and Roseburg Watershed District Office will have current duties revised to accomplish CVWA goals. In addition, the Department will seek funding to contract work through local government and/or non-government organizations.

Partnerships

A number of other state, federal, and local agencies and interest groups are anticipated to assist with management activities on the CVWA. Specific organizations and roles are to be determined, but may include: Coquille

Watershed Association, The Nature Conservancy, Ducks Unlimited, U.S. Fish and Wildlife Service, Coquille Indian Tribe, Coquille STEP, Wild Rivers Coast Alliance, Beaver Slough Drainage District, OWEB, USDA-Wildlife Services, R&E, A&H, Coquille High School, Bandon High School, and SWOCC.

Compliance Requirements

This document was developed to comply with all Federal and State laws, Oregon Revised Statutes (ORS), Oregon Administrative Rules (OAR) and Department policies. Full implementation of all components of this plan will require compliance with laws, regulations, rules and policies listed in Appendix VI.

Plan Amendment and Revision

It is the Department's intention to employ restoration, development and management actions as they are described in this document. Minor alterations to these actions are expected, based on information gained from the monitoring programs. Any major changes to actions will be reviewed by the Stakeholders Committee, then announced to the public prior to making those changes, in an effort to gain public input related to proposed changes before they occur. This input will be considered by the Department before changes are implemented. Neighboring landowners and user groups of CVWA will be the primary targets of this process to provide information before changes are implemented.

Adaptive Management

What is Adaptive Management?

Governmental entities charged with the task of making natural resource decisions need the ability to move toward overall ecological goals without complete or perfect information. With this in mind, agencies use a variety of approaches that involve different levels of political concern, historical precedence, data analysis, and evaluation. Instead of relying on a rigid set of rules that address anticipated outcomes, adaptive management allows for flexibility to adjust a project based on new information. Adaptive management allows for an open line of communication between a management decision and its outcome, and for a response to address the newly gained information. The two underlying principles of adaptive management are these: that (1) the views and knowledge of all interested parties are included (or considered), and (2) management must move forward even though leaders are not sure what all the effects of an action may be.

An adaptive approach involves exploring alternative ways to meet management objectives, predicting the outcomes of alternatives based on the current state of knowledge, implementing one or more of these alternatives, monitoring to learn

about the impacts of management actions, and then using the results to update knowledge and adjust management actions.

When Should Adaptive Management Be Used?

The Department of Interior (DOI) Technical Guide outlines conditions that call for an adaptive management approach (Johnson, B.L. 1999). According to the DOI, not all decisions can or should be adaptive. In some cases there is no opportunity to apply learning; in others, there is little uncertainty about what action to choose; and in still others, there is disagreement about objectives. The following conditions should be met in order to ensure successful application of adaptive management:

While the idea of adaptive management is attractive, it is worth reiterating the importance of stakeholder involvement in the process. In order for adaptive management to work, stakeholders must support project goals and objectives. Additionally, stakeholders must be able to function collaboratively in support of those goals and objectives.

Figure 1: Adaptive Management 6-Step Process (British Columbia Ministry of Forests and Range. 2012)



For each step of the 6-Step Process, it is anticipated that key stakeholders will take a lead position. It is important that though a group/agency may be designated as a lead, it does not mean that decisions will be made without input from other stakeholders.

What Role Will Adaptive Management Play In Managing CVWA?

The Department is committed to being a good neighbor through thoughtful restoration activities and operation of CVWA. Through the use of adaptive

management, it is believed that managers, with the help of surrounding landowners, can monitor activities, identify opportunities for better management, and adjust operations to capitalize on the identified opportunities.

At times when adaptive management will be employed on CVWA the following is a compilation of responsibilities for entities involved:

- *Assess Problem* – Oregon Department of Fish and Wildlife, Beaver Slough Drainage District, Coaledo Drainage District, Garden Valley Residents, The Nature Conservancy
- *Design* – Oregon Department of Fish and Wildlife, The Nature Conservancy, Stakeholder Committee
- *Implement* – Oregon Department of Fish and Wildlife, Beaver Slough Drainage District, Coaledo Drainage District.
- *Monitor* – Oregon Department of Fish and Wildlife, cooperators.
- *Evaluate* – All Stakeholders
- *Adjust* – Beaver Slough Drainage District, Coaledo Drainage District, Oregon Department of Fish and Wildlife.

Four aspects of CVWA operations have been identified to be suited for an adaptive management style approach. These operations are analyzed in respect to key questions (identified above) in the following table (Table 2).

Table 2: Adaptive Management six-step process example, CVWA

	Water Management	Wildlife Area Access	Hunter Management	Native/Invasive Species Management
Assess Problem	Hold regular meetings with Stakeholder Committee to identify and begin assessment of problems. Monitoring water level will reveal the issue.	Periodically interview users regarding quality of their experience on CVWA. Communicate with law enforcement to identify trespass and other violations.	Periodically interview users regarding quality of their experience on CVWA. Communicate with law enforcement to identify trespass and other violations.	Develop a list of expected invasive species and define management actions; solicit input from stakeholders
Design	Involve experts to design a solution to water level problem.	Secure legal access/easements CVWA access point. Post boundaries.	Development of permit system and administrative rules to address problem	Employ conventional methods to design integrated invasive species management system (IISMS). Based on availability of funding
Implement	Coordinate with Drainage District to manipulate MTR to attain appropriate inundation.	Ensure that legal access and posting is done before high public use times.	Implement needed changes according to legal authority coordinating with F&W Commission ruling.	Secure funding support from appropriate sources to employ IISMS.
Monitor	Monitor effects of water level changes on CVWA and neighboring properties.	ODFW and OSP will be a presence at CVWA as appropriate based on activities.	ODFW and OSP will be a presence at CVWA as appropriate based on activities	Employ conventional methods to monitor for invasive species establishment.
Evaluate	Include monitoring results, fish and wildlife reaction, and input from Steering Committee.	Consult with law enforcement, ODFW personnel and public input.	Consult with law enforcement, ODFW personnel and public input.	Evaluate IISMS in relation to CVWA goals.
Adjust	Make adjustments in water level if desired results are not attained.	Make adjustments as needed based on need and legal authority.	Make adjustments as needed based on need and legal authority.	Make adjustments if CVWA goals are not met.

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Appendix I DRAFT TIMELINE FOR RESTORATION AND DEVELOPMENT
Some priorities will be adjusted based on staff availability

Before restoration

ODFW will monitor fish and wildlife use and water movement to establish baseline information.

Year One

- a) Public Use, information, education
 - i) Identify and begin development of access point.
 - ii) Upgrade, repair and/or replace existing fences.
 - iii) Determine hunter, angler, and wildlife viewing access level considered compatible with existing infrastructure and other public users.
 - iv) Develop and adopt wildlife area regulations.
 - v) Post area boundaries.
 - vi) Develop a public hunting program with emphasis on waterfowl hunting.
 - vii) Evaluate the need for public waste disposal, both garbage and human waste.
 - viii) Disseminate information through available media (T.V., newspapers, ODFW website, radio) concerning need, goals, and development timeline for CVWA.
 - ix) Begin establishing on-site kiosks/information signs providing guidelines and rules for public use of the CVWA.
 - x) Determine appropriate hunting and angling regulations for the CVWA.

- b) Fish and Wildlife Habitat
 - i) Develop plans/designs for fish and wildlife habitat improvements/restoration on the CVWA including:
 - (1) Secure necessary permits for habitat improvement/restoration project. Ensure that all restoration activities will be conducted according to federal, state, and local laws, including, but not limited to: Fill and Removal, Oregon Civil Law regarding Doctrine of Drainage, etc.
 - (2) Initiate habitat restoration progress monitoring (i.e. photo points; population abundance/diversity monitoring). Pre-project/baseline monitoring prior to restoration actions.
 - (3) Initiate control of noxious weeds on all units of the CVWA.
 - (4) Develop Sharecrop/Grazing Agreements as a way to control vegetation and noxious weeds.

 - ii) Develop grant applications and seek funding for year two implementation of restoration actions.

- c) Develop a wildlife area management prospectus for adoption by the Fish and Wildlife Commission.
 - (i) Organize a Stakeholders Committee to assist with development

on wildlife area management prospectus.

- d) Direct Fish and Wildlife Management and Surveys
 - (i) Develop plan for management/survey of native and non-native fish and wildlife on the CVWA including:
 - (1) Fish and wildlife abundance and diversity surveys.
 - (2) Control of non-native/native wildlife, primarily nutria and monitoring of abundance and impacts.
 - (3) Strategies for use of livestock and monitoring of livestock use.

Year Two.

- c) Public Use, information, education
 - i) Complete development of access points for all units of the CVWA.
 - ii) Continue upgrade, repair and/or replacement of existing fences. Complete development of CVWA regulations.
 - iii) Complete posting of area boundaries.
 - iv) Fully implement hunt program.
 - (1) Monitor use and harvest.
 - v) Accommodate hunter, angler, and wildlife viewing access at a level considered compatible with existing infrastructure and other user groups.
 - vi) Implement public waste disposal, both garbage and human waste as is deemed necessary in year one.
 - vii) Continue dissemination of information through available media (T.V., newspapers, ODFW website, radio) goals, regulations, and restoration of CVWA.
 - viii) Complete establishment of on-site kiosks/information signs providing guidelines and rules for public use and species found on the CVWA.
- d) Fish and Wildlife Habitat
(Work with local volunteer organizations and watershed councils to assist with restoration projects)
 - i) Initiate implementation of fish habitat improvements/restoration on the CVWA including:
 - (1) Begin restoration of natural stream flow patterns and tidal regimes to the greatest extent possible on applicable units of the CVWA properties considering constraints
 - (2) Begin reestablishment of native site potential upland plant communities to the extent that they contribute to CVWA goals
 - (3) Begin reconstruction/restoration of natural stream channels to the extent possible for applicable units of the CVWA considering constraints such as adjacent landowners; historical condition/site potential; etc.
 - (4) Begin restoration of native riparian plant communities to the extent possible on all units of the CVWA.

- (5) Continue fish habitat restoration progress monitoring (i.e. photo points; population abundance/diversity monitoring). Complete baseline/pre-implementation monitoring.
 - (6) Control noxious weeds on all units of the CVWA.
 - (7) Continue to employ Sharecrop/Grazing Agreements with neighboring or adjoining landowners as a way to control vegetation and noxious weeds during restoration phase.
- c) Direct Fish and Wildlife Management and Surveys
- (i) Implement plan for management/survey of native and non-native fish and wildlife on the CVWA including:
 - (1) Continue and adapt fish and wildlife abundance and diversity surveys to be consistent with improved habitat.
 - (2) Implement control of non-native/native wildlife, (primarily nutria) and beaver as needed. Implement monitoring of abundance and impacts of species in need of control.
 - (3) Implement strategies identified in plan for use or nonuse of livestock.

Year Three

Continue Restoration actions; initiate post-restoration monitoring, depending on action progress.

Year Four and five

Continue Restoration actions; continue post-restoration monitoring, depending on action progress.

Year five—compile five-year progress report and plan review/update. Some actions will be adjusted to reflect new information from monitoring effort that dictates appropriate changes. Revisit and revise management prospectus as needed.

Year six develop a long range management plan for adoption by the Fish and wildlife Commission.

Appendix II

Wildlife Species on CVWA

Species of conservation concern that will benefit from the Coquille Wetlands restoration (Oregon Watershed Enhancement Board 2010).

WATERFOWL

Mallard	<i>Anas platyrhynchos</i>
Gadwall	<i>Anas strepera</i>
American Wigeon	<i>Anas americana</i>
Green-winged teal	<i>Anas crecca</i>
Northern Shoveler	<i>Anas clypeata</i>
Northern pintail	<i>Anas acuta</i>
Cinnamon teal	<i>Anas cyanoptera</i>
Canvasback	<i>Aythya valisineria</i>
Greater Scaup	<i>Aythya marila</i>
Lesser Scaup	<i>Aythya affinis</i>
Common Goldeneye	<i>Bucephala clangula</i>
Bufflehead	<i>Bucephala albeola</i>
Western Canada goose	<i>Branta canadensis</i>
Tundra swans	<i>Cygnus columbianus</i>

RAPTORS AND OWLS

Bald eagle	<i>Haliaeetus leucocephalus</i>
Peregrine falcon	<i>Falco peregrinus</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Northern goshawk	<i>Accipiter gentilis</i>
Northern harrier	<i>Circus cyaneus</i>
Short-eared owl	<i>Asio flammeus</i>
Merlin	<i>Falco columbarius</i>

HERONS AND EGRETS

Great blue heron	<i>Ardea herodias</i>
Snowy egret	<i>Egretta thula</i>

SHOREBIRDS

Black-bellied plover	<i>Pluvialis squatarola</i>
Killdeer	<i>Charadrius vociferus</i>
Greater yellowlegs	<i>Tringa melanoleuca</i>
Western sandpiper	<i>Calidris mauri</i>
Long-billed curlew	<i>Numenius americanus</i>

LANDBIRDS

Willow flycatcher	<i>Empidonax trailii</i>
Ash-throated flycatcher	<i>Myiarchus cinerascens</i>
Purple martin	<i>Progne subis</i>
Tree swallow	<i>Tachycineta bicolor</i>
Black-capped chickadee	<i>Parus atricapillus</i>
Chestnut-backed chickadee	<i>Parus rufescens</i>

LANDBIRDS (CONT'D)

White-breasted nuthatch	<i>Sitta carolinensis</i>
Bewick's wren	<i>Thryomanes bewickii</i>
Marsh wren	<i>Cistothorus palustris</i>
Swainson's thrush	<i>Catharus ustulatus</i>
Varied thrush	<i>Ixoreus naevius</i>
Hutton's vireo	<i>Vireo huttoni</i>
Orange-crowned warbler	<i>Vermivora celata</i>
Yellow warbler	<i>Dendroica petechia</i>
Wilson's warbler	<i>Wilsonia pusilla</i>
Lazuli bunting	<i>Passerina amoena</i>
Yellow-breasted chat	<i>Icteria virens</i>
Fox sparrow	<i>Passerella iliaca</i>
Golden-crowned sparrow	<i>Zonotrichia atricapilla</i>
Lesser goldfinch	<i>Carduelis psaltria</i>
Western meadowlark	<i>Sturnella neglecta</i>
Band-tailed pigeon	<i>Columba fasciata</i>

HERPTILES

Western pond turtle	<i>Clemmys marmorata</i>
Southern torrent salamander S V X	<i>Rhyacotriton variegatus</i>
Rough-skinned newt	<i>Taricha granulosa</i>
Clouded salamander	<i>Aneides ferreus</i>
Coastal tailed frog	<i>Ascaphus truei</i>
Western toad	<i>Bufo boreas</i>
Red-legged frog	<i>Rana aurora</i>
Foothill yellow-legged frog	<i>Rana boylei</i>

MAMMALIA

Virginia opossum	<i>Didelphis virginiana</i>
Vagrant Shrew	<i>Sorex vagrans</i>
Pacific shrew	<i>Sorex pacificus</i>
Marsh shrew	<i>Sorex bendirii</i>
Trowbridge's shrew	<i>Sorex trowbridgii</i>
Shrew-mole	<i>Neurotrichus gibbsii</i>
Townsend's mole	<i>Scapanus townsendii</i>
Little brown myotis	<i>Myotis lucifugus</i>
Yuma myotis	<i>Myotis yumanensis</i>
Long-eared yotis,	<i>Myotis evotis</i>
Long-legged myotis,	<i>Myotis volans</i>
California myotis	<i>Myotis californicus</i>
Silver-haired bat	<i>Lasionycteris noctivagans</i>
Big brown bat	<i>Eptesicus fuscus</i>
Hoary bat	<i>Lasiurus cinereus</i>
Townsend's big-eared bat	<i>Plecotus townsendii</i>
Brush rabbit	<i>Sylvilagus bachmani</i>

MAMMALIA (CONT'D)

Mountain beaver	<i>Aplodontia rufa</i>
Townsend's chipmunk	<i>Tamias townsendii</i>
California ground squirrel	<i>Spermophilus beecheyi</i> ,
Western gray squirrel,	<i>Sciurus griseus</i>
Douglas squirrel	<i>Tamiasciurus douglasii</i>
Northern flying squirrel	<i>Glaucomys sabrinus</i>
Dusky-footed woodrat	<i>Neotoma fuscipes</i>
Bushy-tailed woodrat	<i>Neotoma cinerea</i>
Beaver	<i>Castor canadensis</i>
Nutria	<i>Myocastor coypus</i>
Deer mouse	<i>Peromyscus maniculatus</i>
Western red-backed vole	<i>Clethrionomys californicus</i>
White-footed vole	<i>Phenacomys albipes</i>
Red tree vole	<i>Phenacomys longicaudus</i>
Townsend's vole	<i>Microtus townsendii</i>
Long-tailed vole	<i>Microtus longicaudus</i>
Creeping vole	<i>Microtus oregoni</i>
Muskrat	<i>Ondatra zibethicus</i>
Pacific jumping mouse	<i>Zapus trinotatus</i>
Porcupine	<i>Erethizon dorsatum</i>
Coyote	<i>Canis latrans</i>
Gray fox	<i>Urocyon cinereoargenteus</i>
Black bear	<i>Ursus americanus</i>
California sea lion	<i>Zalophus californianus</i>
Ringtail	<i>Bassariscus astutus</i>
Raccoon	<i>Procyon lotor</i>
Marten	<i>Martes americana</i>
Ermine	<i>Mustela ermine</i>
Long-tailed weasel	<i>Mustela frenata</i>
Mink	<i>Mustela vison</i>
Western spotted skunk	<i>Spilogale gracilis</i>
Striped skunk	<i>Mephitis mephitis</i>
River otter	<i>Lutra Canadensis</i>
Harbor seal	<i>Phoca vitulina</i>
Mountain lion	<i>Felis concolor</i>
Bobcat	<i>Felis rufus</i>
Elk or wapiti	<i>Cervus elaphus</i>
Black-tailed deer	<i>Odocoileus hemionus</i>

Appendix III

Fish species occurring in the Coquille River mainstem and tributaries (Below River Mile 40), and species sampled during monitoring in 2013.

Fish Species Occurring in the Coquille River Mainstem and Tributaries (below rm 40) ¹			
Common Name	Scientific Name	Game Fish	2013 CVWA Monitoring ²
NATIVE SPECIES:			
White Sturgeon	<i>Acipenser transmontanus</i>	✓	
Green Sturgeon	<i>Acipenser medirostris</i>	✓	
Pacific Eulachon/Smelt	<i>Thaleichthys pacificus</i>		
Pacific Lamprey	<i>Lampetra tridentata</i>		✓
Western Brook Lamprey	<i>Lampetra richardsoni</i>		
Coho Salmon	<i>Oncorhynchus kisutch</i>	✓	✓
Steelhead (winter run)	<i>O. mykiss</i>	✓	
Cutthroat Trout	<i>O. clarki ssp.</i>	✓	✓
Chinook (fall and spring run) Salmon	<i>O. tshawytscha</i>	✓	
Chum Salmon	<i>O. keta</i>	✓	
Speckled Dace	<i>Rhinichthys osculus</i>		
Largescale Sucker	<i>Catostomus macrocheilus</i>		
Three-spined Stickleback	<i>Gasterosteus aculeatus</i>		✓
Coast Range Sculpin	<i>Cottus aleuticus</i>		
Pacific Staghorn Sculpin	<i>Leptocottus armatus</i>		
Prickly Sculpin	<i>Cottus asper</i>		
NON-NATIVE SPECIES:			
Mosquitofish	<i>Gambusia affinis</i>		✓
American Shad	<i>Alosa sapidissima</i>	✓	
Largemouth Bass	<i>Micropterus salmoides</i>	✓	✓
Smallmouth Bass	<i>Micropterus dolomieu</i>	✓	
Striped Bass	<i>Morone saxatilis</i>	✓	
Bluegill	<i>Lepomis macrochirus</i>	✓	✓
Black Crappie	<i>Pomoxis nigromaculatus</i>	✓	✓
Brown Bullhead	<i>Ictalurus nebulosus</i>	✓	✓
		¹ List is not exhaustive; does not include species that are primarily marine-dependent (e.g. rockfish spp., gunnells, flounders/soles, etc.). ² Species identified in fish monitoring conducted in spring of 2013 in CVWA water bodies.	

Appendix IIIb.

Special status fish species in the mainstem Coquille River and tributaries.

Common Name	Scientific Name	State Status ¹	Federal Status ²
Green Sturgeon	<i>Acipenser medirostris</i>		T
Pacific Eulachon/Smelt	<i>Thaleichthys pacificus</i>		T
Pacific Lamprey	<i>Lampetra tridentata</i>	S/V	SoC
Western Brook Lamprey	<i>Lampetra richardsoni</i>	S/V	
OR Coast Coho	<i>Oncorhynchus kisutch</i>	S/V	T
OR Coast steelhead	<i>O. mykiss</i>	S/V	SoC
Coastal Cutthroat Trout	<i>O. clarki ssp.</i>		SoC
Coastal Chinook (spring run)	<i>O. tshawytscha</i>	S/C	
¹ S/V = State Sensitive/Vulnerable; S/C = State Sensitive/Critical. ² T = Threatened; SoC = Species of Concern.			

Appendix IV

Plant Species found on Bandon Marsh NWR.

Pacific silverweed	<i>Argentina egedii</i> [old: <i>Potentilla anserina</i> , <i>Potentilla pacifica</i>]
Douglas' aster	<i>Symphyotrichum subspicatum</i> var. <i>subspicatum</i> [old: <i>Aster subspicatus</i>]
Deer fern	<i>Blechnum spicant</i>
Lyngbye's sedge	<i>Carex lyngbyei</i>
Slough sedge	<i>Carex obnupta</i>
Tufted hairgrass	<i>Deschampsia cespitosa</i>
Seashore saltgrass	<i>Distichlis spicata</i>
Creeping spikerush	<i>Eleocharis palustris</i>
Fleshy jaumea	<i>Jaumea carnosa</i>
Baltic rush	<i>Juncus balticus</i>
Soft rush	<i>Juncus effuses</i>
Tall fescue	<i>Lolium arundinaceum</i>
Black twinberry	<i>Lonicera involucrate</i>
Skunk cabbage	<i>Lysichiton americanum</i>
Pacific crabapple	<i>Malus fusca</i>
California waxmyrtle	<i>Myrica californica</i>
Water parsley	<i>Oenanthe sarmentosa</i>
Reed canarygrass	<i>Phalaris arundinacea</i>
Salmonberry	<i>Rubus spectabilis</i>
Sitka spruce	<i>Picea sitchensis</i>
Coast willow	<i>Salix hookeriana</i>
Sitka willow	<i>Salix sitchensis</i>
Pickleweed	<i>Salicornia virginica</i>
Three-square bulrush	<i>Scirpus americanus</i>
Small-fruited bulrush	<i>Scirpus microcarpus</i>
Seaside arrowgrass	<i>Triglochin maritimum</i>
Evergreen huckleberry	<i>Vaccinium ovatum</i>

Any Lilies?

* Unless otherwise annotated, full name shown is currently accepted USDA listed name as of 9/30/02.

** New nomenclature [in brackets] is not yet in general use, so the older name was used in this report.

Appendix V

Non-native plants known to exist on CVWA

Himalayan blackberry	<i>Rubus discolor</i>
Scotch broom	<i>Cytisus scoparius</i>
Reed canary grass	<i>Phalaris arundinacea</i>
Canada thistle	<i>Cirsium arvense</i>
Bent grass	<i>Agrostis</i> Sp.
Velvet grass	<i>Holcus</i> Sp.

Appendix VI

Legal Obligations Influencing Management Of CVWA:

Federal Laws

Federal Aid in Wildlife Restoration Act
Pittman-Robertson Act of 1937
The Endangered Species Act of 1973, as amended
National Historic Preservation Act
National Environmental Policy Act
Americans with Disabilities Act

Oregon Revised Statutes

ORS 496.012 Oregon's Wildlife Policy
ORS 496.138 General Duties and Powers; Rulemaking Authority
ORS 496.146 Additional Powers of the Commission
ORS 496.162 Establishing seasons, amounts and manner of taking wildlife; rules
ORS 496.992 Penalties

Oregon Administrative Rules

Division 008 - Department of Fish and Wildlife Lands

635-008-0015 Agreements to Restrict Motor-propelled Vehicles
635-008-0040 Forage Removal from State Lands
635-008-0050 Fish and Wildlife Commission to Post and Enforce Rules
635-008-0080 Ken Denman Wildlife Area

Division 011 - Statewide Angling Regulations

635-011-0050 Procedure of Promulgation of Angling Regulations
635-011-0100 General Rule

Division 051 - General Game Bird Regulations

635-051-0000 Purpose and General Information
635-051-0065 State Wildlife Area Regulations

Division 065 - Game Mammal General Seasons and Regulations

635-065-0001 Purpose and General Information
635-065-0625 Regulations on State Wildlife Areas, Refuges and Special Areas

APPENDIX VII List of monitoring priorities:

DRAFT

Monitoring Elements - CVFWA - DRAFT 2/12/14

Note: Monitoring elements will be completed as staff time and funding allows. Information listed below is not deemed to be exhaustive, and does not restrict ODFW from adding, subtracting or modifying any of the information listed. See comments below.

Element	Priority (primary=1, secondary=2)	Time of year/frequency	Methods	Coordinator (staff)	Goals	Notes
water temperature	1	Apr-Oct/as opportunity allows	YSI Model 55 Handheld Unit; thermometers	ODFW (ODFW, OSU, SWOCC, Coquille HS, other volunteers)	determine water temperature differences pre- and post-project; infer reasons for temperature differences, if present	ODFW hopes to deploy automated water temperature sensors on Winter Lake, as funding allows. Staff biologists will continue monitoring water temperatures onsite as opportunity allows. Time of year was selected based on local condition knowledge and salmonid physiological tolerances.
dissolved oxygen	1	Apr-Oct/as opportunity allows	YSI Model 55 Handheld Unit	ODFW (ODFW, OSU, SWOCC, Coquille HS, other volunteers)	determine dissolved oxygen differences pre- and post-project; infer reasons for differences, if present	Time of year selected based on previous measurements and known low oxygen periods.
salinity	1	Aug-Oct/once per year	refractometer	ODFW (ODFW, OSU, SWOCC, Coquille HS, other volunteers)	determine if saltwater intrusion will be increased due to project implementation	Salinity measurements will be taken during highest tide cycle with lowest precipitation input.
water volume/CFS	2	Jul-Oct/once per year	stream flow discharge equipment	ODFW (ODFW, OSU, SWOCC, Coquille HS, Oregon Water Resources Department, other volunteers)	determine discharge of China Camp Creek and if volume is sufficient to cause water to back up east of Hwy 42 and into Garden Valley	Measurements taken during lowest freshwater input. Secondary priority because other monitoring elements indicate potential groundwater and surface water intrusion.
surface water elevations	1	year-round/once per hour	In-Situ LevelTroll 300	ODFW	determine how tidedgate operation affects surface water elevations in China Camp Creek above and below Hwy 42	Automated monitoring. Sensor set to collect water surface elevation automatically.
groundwater infiltration	1	year-round/once per hour	monitoring wells	Beaver Slough Drainage District	determine if lateral groundwater movement is occurring due to tidedgate operation	Automated monitoring. Sensor set to collect groundwater measurements automatically.
noxious weed monitoring and control	1	year-round/as opportunity allows	plant surveys across property	TNC (Coquille HS, SWOCC, OSU, other volunteers)	determine presence of noxious weeds, and apply best management practices	OWEB grant lists funds for invasive species control.
vegetation distribution/percent coverage	2	May-Jun/every other year	vegetation transects	TNC (Coquille HS, SWOCC, OSU, other volunteers)	determine relative abundance/coverage of different plant species/communities, track changes to composition over time	
photopoints	1	once per year	digital photography in established locations	ODFW (ODFW, OSU, SWOCC, Coquille HS, other volunteers)	demonstrate plant/habitat changes on Winter Lake property over time	Time of year to be determined.
designed landforms	2	pre- and post-restoration, and every 5 years	topographic surveys	ODFW (ODFW, OSU, SWOCC, Coquille HS, other volunteers)	determine development and changes over time of designed topographic variations such as high spots, tidal depressions, hummocks, etc.	Contracted firm will provide pre and post project surveys.
channel morphology/development	2	pre- and post-restoration, and every 5 years	channel cross-sections, on-the-ground topographic surveys	ODFW (ODFW, OSU, SWOCC, Coquille HS, other volunteers)	determine physical channel changes over time	Contracted firm will provide pre and post project surveys.
birds	1	walk and sight; use existing dikes and waterways as transects	Sep-May/4 times per year	ODFW (Audubon Society, ODFW, OSU, SWOCC, Coquille HS, other volunteers)	determine relative abundance of migratory and resident birds and track changes to abundance and/or presence over time	
aquatic mammals	1	year-round/2 times per year			determine presence and utilization by aquatic animals (beaver and nutria) that could have a negative impact on infrastructure and/or surrounding landowners	
mammals	2	Apr-Oct/as opportunity allows	walk and sight; use existing dikes and waterways as transects	ODFW (ODFW, OSU, SWOCC, Coquille HS, other volunteers)	determine presence and utilization of the area by mammals such as Black-tail Deer, Roosevelt Elk, Fox, Raccoon, Otter.	
mosquitos	1	Apr-Oct	traps, visual surveys	OSU Extension (Coos County, other volunteers)	determine presence/increase of mosquitos	Tentative commitment of funding/interest by Frank Burris (OSU Extension)
amphibians/reptiles	2	year-round/as opportunity allows	To Be Determined	TNC (Coquille HS, SWOCC, OSU, other volunteers)	determine use of the area by amphibians and reptiles such as Western Pond Turtle.	Explore using volunteers, interns or students to develop and implement surveys
fish	1	Now-Jun/2 times per month (as water conditions allow)	beach seine, traps (hoop nets, minnow traps), PIT tagging	ODFW (ODFW, OSU, SWOCC, Coquille HS, other volunteers)	determine CO juvenile relative densities pre- and post-project; determine presence of other species of interest, determine size and growth, determine habitat use and movement	
invertebrates	2	May-Jun/once per year	Serber sampler, kick nets; Ponar dredge, excavation/screen	ODFW (ODFW, OSU, SWOCC, Coquille HS, other volunteers)	determine structure/density of existing aquatic invertebrate community and define changes to structure/density over time	Possible sampling scenario: pre- and post-restoration, and then every other year (or longer).

Comments: Monitoring will be coordinated by ODFW and TNC. Data collection will be through ODFW and TNC efforts as time and funding allows, however, ODFW and TNC will seek to utilize others as often as possible. Data collection methods, data precision/accuracy will be managed by ODFW and TNC. Prioritization of the sampling of individual elements will be determined by ODFW and TNC. Some elements may require regular sampling (hourly, daily, weekly, seasonally, etc.) to determine parameters; other elements may require irregular or infrequent sampling regimes. Several elements may be of concern to neighboring landowners, and as such sampling frequency will be determined through coordinated communication and effort.