

Wood River Channel Restoration and Recreation Improvements

EA #OR-014-08-10

PROJECT TITLE/TYPE: Wood River Wetland Restoration and Recreation Improvements

PROJECT LOCATION: BLM Wood River Wetland and delta (See Project Location Map 1 in Appendix C.) The restoration and recreation improvements would be along the lower Wood River located approximately 10 miles west of Chiloquin, Oregon. The legal locations of the proposed actions are T34S, R 7.5 E Sections 25 (channel narrowing and deepening and floodplain restoration) and 36 (secondary channel outlet).

BLM OFFICE: Klamath Falls Resource Area, Lakeview District

CONFORMANCE WITH APPLICABLE LAND USE PLANS

This Environmental Assessment (EA) is tiered to the Final Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management (2008), including the Klamath Falls Resource Area. The analysis in the FEIS incorporated the Upper Klamath Basin and Wood River RMP/EIS (1995). Since no changes in management direction were made for the Wood River wetland, this project is in conformance with management direction under the 2008 Record of Decision and Resource Management Plan (2008 ROD)

- Vegetation Treatment on Bureau of Land Management (BLM) Lands in Thirteen Western States FEIS and ROD (1991)
- Integrated Noxious Weed Control Program EA #OR-013-93-03 (1994)
- Upper Klamath Basin and Wood River Wetland Record of Decision and Resource Management Plan, 1996

INTRODUCTION

Major restoration of the floodplain, delta and river channel of the lower Wood River began in 1996. These efforts were guided by the goals and objectives outlined in the Upper Klamath Basin and Wood River Wetland Record of Decision and Resource Management Plan, 1996 (RMP). The overarching goals of that plan are to improve habitat for endangered species, improve water quality entering Agency and Upper Klamath Lakes, and provide for increased quality and quantity of recreation opportunities consistent with meeting resource goals. In general, the objectives set forth in the RMP are to restore functionality of the Wood River and floodplains to increase channel complexity, increase floodplain connectivity, and restore wetland and riparian habitat. This should result in improved habitat for native fish species as well as improving the aesthetic and recreation qualities of the area. The proposed recreation improvements would increase visitor services for boat based recreation while also reducing resource damage. These projects would be implemented over the next 1 to 5 years under one or more decision records and dependent on funding.

PURPOSE AND NEED FOR ACTION

Purpose

The purpose of this project is to implement a combination of related projects which help achieve goals and objectives outlined in the RMP and Record of Decision. Primary among these objectives is to

restore fish habitat by restoring the hydrologic connection to one of several distributary (or secondary) river channels in the Wood River Delta near the confluence with Agency Lake.

Need

The KFRA has identified the need to:

- Provide improved fish migration conditions from Agency Lake into the lower Wood River. The current mouth of the river enters Agency Lake in a relatively shallow part of the lake. The cold water from the Wood River is currently dispersed upon entering Agency Lake in a relatively shallow part of the lake and may not be providing the best use of this valuable cold water resource. Sediments washed out of the river channel after excavation of the historic delta channel in 2000 have accumulated near the current river mouth exacerbating shallow conditions for boating and fish migrations in late summer and fall. The proposed remedy to this problem is to restore one of the historic channels which enters a deeper area of Agency Lake. It is expected that this will provide a deep, high quality holding area for migratory fish staging or over-summering in Agency Lake.
- Complete channel narrowing and floodplain restoration in the dredged channel upstream of the Wood River Dike Road Bridge. Channel narrowing and floodplain restoration began in 1998 between the confluence of Crooked Creek and the bridge at the Wood River Dike Road. Due to funding shortfalls and lack of fill material, the lower 200 yards of stream channel was not restored and remains overly wide and shallow. Because the channel is too wide in the area from historic dredging, this area does not transport the normal sediment load from upstream sources. The area is therefore filling with sediment creating boating obstacles and poor quality fish and riparian habitat.
- Provide for improved visitor services in the vicinity of the restoration work. Currently, no transitional boat dock facility exists in the vicinity of the Wood River Wetland day use area near the Wood River Dike Bridge. A boarding dock would provide improved access for boaters from the Wood River, Petric Park and Agency Lake to the Wood River Wetland Day use area and its associated facilities. This project would also benefit the area because it would alleviate the need to beach boats on the shoreline where erosion and soil instability are causing resource damage.
- Improve the aesthetic and natural habitat values of areas where previous restoration work resulted in exposed rock boulders. Large angular boulders are not a natural component of the Wood River Delta landscape. A rock weir installed in 2000 left exposed boulders which lack vegetation cover and is a potential boating hazard.

DESCRIPTION OF ALTERNATIVES INCLUDING NO ACTION AND PROPOSED ACTION

No Action

The BLM National Environmental Policy Act (NEPA) Handbook recommends the inclusion and analysis of a no action alternative. Under the no action alternative, projects considered in this analysis would not occur. Activities proposed in and adjacent to the analysis area that have been analyzed and approved in other NEPA documents would still occur such as routine road maintenance, wetland water management, recreation facilities maintenance and surveys. Selection of the no action alternative would not change the direction or previous decisions the BLM has made to manage these lands.

Proposed Action

The proposed action will be analyzed for consistency with the Klamath Falls Resource Area Upper Klamath Basin and Wood River Wetland Record of Decision and Resource Management Plan, 1996. The proposed action includes the following activities:

- Restore Secondary Channel Outlet - Excavate a historic secondary channel in the vicinity of the current mouth to provide for a deeper channel and improved boater access.

- Narrow and deepen channel and restore floodplain - Channel narrowing and deepening and floodplain restoration immediately upstream of the Wood River Dike Road Bridge.
- Install a transitional boat dock - Installation of a transitional boat dock on the Wood River in the vicinity of the Wood River Wetland bridge day use area.
- Cover Exposed Boulders - Fill and re-vegetate over rock boulders left exposed after previous restoration activities.

Restore Secondary Channel Outlet

This project component proposes to excavate a silted-in side channel to add an additional 600 feet of (secondary) channel entering a deeper part of Agency Lake. The existing channel entering Agency Lake would be left unchanged and open to the Lake. Equipment to accomplish the project would include a barge with downriggers (or spuds) with an excavator. The project would involve the removal and side-cast placement of approximately 2,900 cubic yards of organic muck, silts and sands. The restored channel would be constructed to approximately 30 feet wide and 4 feet deep. Over time, it is expected that pools will scour in a fashion similar to that observed upstream of the proposed project area. Since the proposed channel is much shorter, narrower and deeper, and enters a deeper part of Agency Lake, sand bar formation at this new river outlet is expected to occur at much lower rates. Characteristic morphologic evolution of the river channel is the natural formation of scour pools between 6 and 9 feet deep in river bends. This is the expected outcome of the proposed project. The channel that acts as the current mouth would not be modified and would remain an open channel to the lake. Work would be accomplished during the late fall period when the lake is at its lowest seasonal level and water quality is good throughout the lake and delta area and sensitive life stages of fish and wildlife species are not present.

Channel Narrowing and Deepening and Floodplain Restoration

This part of the project would restore approximately 1.8 acres of floodplain emergent wetland and result in a narrow, deep channel in the area immediately upstream of the Wood River Dike Bridge. It would involve the transport and placement of approximately 6,000 cubic yards of fill material followed by wetland vegetation planting and river bank stabilization measures. Equipment involved would include tracked earth movers, excavators and dump trucks. Most of the material would be excavated from the adjacent levee. The remainder would be obtained from deepening the channel or be transported from a nearby upland borrow source at the north end of the interior wetland area. Work would be accomplished during the fall period when the lake and river flows are low, water quality is good, and sensitive life stages of fish and wildlife species are not present.

Installation of a Transitional Boat Dock

A floating boat dock would be installed in the vicinity of the Wood River Bridge, in the northwest corner near the two picnic tables, or in the northeast corner, extending into the Petric canal. This facility would look and function very similarly to the floating dock that is currently in place at the entrance/parking area of the wetland. A concrete abutment would be formed and poured and the dock would be assembled and anchored to the abutment. The dock would extend between 6 and 16 meters from the abutment.

Cover Exposed Boulders

Soil and native wetland vegetation would be used to cover the rock, providing a natural look and improving habitat conditions. This part of the project would be focused on the large rock weir constructed in 2000 to block the non-historic mouth of the Wood River and redirect water down the restored historic channel to the current mouth of the Wood River. This action would also reduce the

potential for boat/rock collisions due to high water obscuring visibility of some of the rocks. An excavator or similar equipment would be used to transplant blocks of wetland soil and live native wetland plants from nearby and/or adjacent sources. Work would be accomplished during the late fall period when the lake is at its lowest seasonal level and water quality is good throughout the lake and delta area.

AFFECTED ENVIRONMENT

Vegetation/Botany

Special Status Plant Species

No known special status plant species have been located in the planning area. However, there has not been a recent survey for special status plant species in the Wood River Wetland.

Noxious Weeds

Noxious weeds do occur within the planning area, specifically along the levee. The species of concern that are currently found in the Wood River Wetland are Canada thistle (*Cirsium arvense*), Dalmatian toadflax (*Linaria dalmatica*), whitetop or hoary cress (*Cardaria draba*), Scotch thistle (*Onopordum acanthium*), perennial pepperweed (*Lepidium latifolium*), bull thistle (*Cirsium vulgare*), and yellow starthistle (*Centaurea solstitialis*).

Wildlife

The BLM Special Status Species Policy designates special status species into two categories: sensitive or strategic. All of the BLM Special Status Species being analyzed for the proposed project are designated as Bureau Sensitive. Bureau Sensitive species are generally the species which are restricted in their range and have natural or human-caused threats to their survival. A complete list of the Bureau's special status species is kept at the Klamath Falls Resource Area office and at the following website; <http://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/>. Additionally, the Fish and Wildlife Service prepared a list of birds that are of conservation concern in 2002. The purpose of this list is to identify the bird species (beyond those already listed under ESA) that are of the highest conservation concern and that are in need of conservation action (FWS 2002). The bird conservation region used in this analysis is region 9. The purpose of both of these designations is to protect, manage, and conserve the species so that management actions do not contribute to the need to list any of the species as threatened or endangered. This EA will consider those species displayed in Table 1 that may be affected by this project.

Tri-colored Blackbird (*Agelaius tricolor*)

The tri-colored blackbird colony has been documented along the north canal of the Wood River wetland nesting in willow habitat north of the project area. No colonies have been documented within the project area therefore there would be no detrimental affects to tri-colored blackbird individuals or their nesting and foraging habitat.

Bufflehead (*Bucephala albeola*), Red-necked Grebe (*Podiceps grisegena*) and American Pelican (*Pelecanus erythrorhynchos*)

No nesting habitat occurs within the project area for the Bufflehead, Red-necked Grebe or American Pelican. All three have been documented foraging in the project area.

Bald Eagle (*Haliaeetus leucocephalus*)

The Bald Eagle was delisted from the Endangered Species Act in 2007 (USDI FWS 2007) and is currently classified by the BLM as a Bureau Sensitive Species. There are no known nest sites within or

adjacent to the project area. However, the bald eagle has been documented using the project area as foraging habitat. The large cottonwoods along the Dike Road adjacent to the project are used by bald eagles throughout the year as perches for day roosting and foraging.

Osprey (*Pandion haliaetus*)

No osprey nest sites are within or adjacent to the project area. Similar to the bald eagle the osprey has been documented using the project area for foraging.

Table 1 - Species associated with habitat types occurring in the project area potentially affected by proposed actions

Common Name	Status	Key Habitat Association within the KFRA	Comments
Tri-colored Blackbird	BLM Sensitive	Breeding colonies occur in hardstem bulrush, cattail, nettles and willows. Cattails provide the most common nesting structure	Colony documented along the Wood River north of the project area nesting in willows
Bufflehead	BLM Sensitive	Open water for foraging on aquatic invertebrates; tree cavities or nest boxes for nest structure	No nesting structure within project area but have been documented foraging in the project area.
Red-Necked Grebe	BLM Sensitive	Open water for foraging primarily on aquatic invertebrates; Nesting habitat deep water with emergent vegetation for nesting structure and protection	No nesting documented in the project area but may use the area for foraging.
American Pelican	BLM Sensitive	Open shallow water for foraging; Nest in colonies on islands	No nesting habitat in project area. Documented using the mouth of the Wood River for foraging
Bald Eagle	BLM Sensitive	Open water for foraging. Typical nest structure consists of platforms built in large conifer trees.	No nests within project area. Documented foraging within project area
Osprey	Non Status	Open water for foraging; Snag or platform for nesting structure.	No nests within project area but has been documented foraging within project area

BLM Sensitive – Those Species considered By the Bureau of Land Management as a sensitive species

Non-Status - Not considered BLM Sensitive but addressed in the Klamath Falls RMP as a species that warranted additional protection

Recreation

The surrounding project area is popular for walking, birding, fishing, and waterfowl hunting. Land access is limited to non-motorized means of travel. This restriction would not change under the proposed action. Three public boat launches exist within two miles of the project area (BLM carry down launch, Petric County Park (launches to Petric Canal), and Henzel County Park (launches to Agency Lake). Boat based access to and from the Wood River from Agency Lake is limited by the shallowness of the current main channel where it enters Agency Lake, particularly in periods of low water conditions (July-November).

Cultural

Native Americans use of the area spans many millennia. The Klamath Tribes inhabited the area around the mouth of Wood River into the historic period. The Wood River area is known to be of high importance to The Klamath Tribes and is considered to have served as an important center for their economics, spiritually, and for social activities. There were many villages in the Wood River area, and the landscape was exploited for its rich resources; both for food and materials. The area is within a larger territory ceded to the United States in 1864 by The Klamath Tribes.

Historically, after the lands were ceded to the U.S., these lands were in private landownership and grazed and farmed. In 1994 the Bureau of Land Management was able to purchase these lands for federal management with a goal to restore the wetlands that were once present.

ACEC/Visual Resources Management

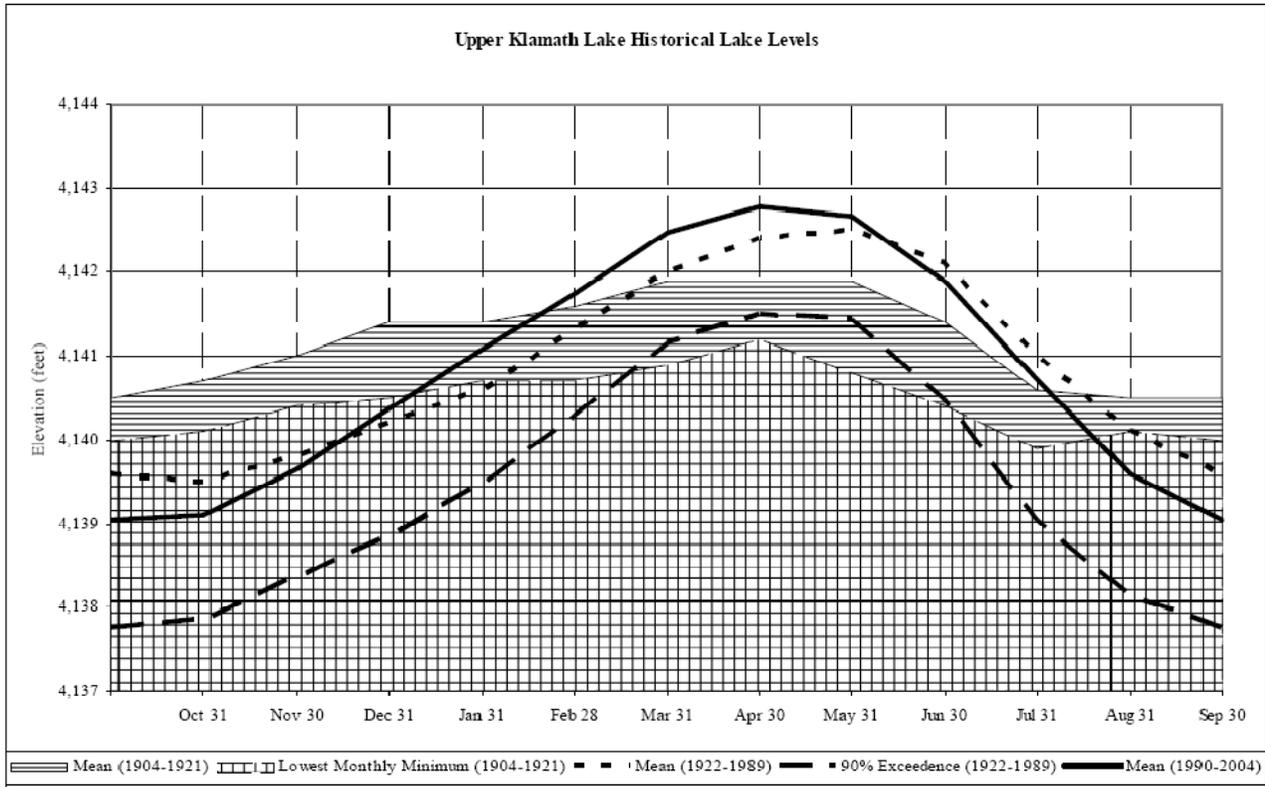
The wetland project is managed to meet Visual Resource Management (VRM) Class II objectives, which is to retain the natural character of the landscape. Any changes to the scenic resource caused by management activities should be low in intensity and visual contrasts may be seen by the casual observer, but do not attract attention. Management actions to date, such as river channel restoration and wetland restoration, have also restored the visual/scenic resources of the project area by increasing the amount and diversity of wetland vegetation, and by restoring the narrow, sinuous channel of the Wood River. Hydrology and Water Quality / Floodplain Wetlands/ Hydrology below Wood River Dike Bridge

The Wood River Delta hydrology is characterized by the interaction between variable lake levels and variable river flow. The hydrology of the project area is controlled by Bureau of Reclamation at Link River Dam. Typically, the water surface elevation starts the water year (Oct 1) at a minimum of about 4138 to 4139 feet and reaches a maximum of 4143.3 feet around mid-March to early April. Flows in the Wood River typically peak during winter storm events or during snowmelt in the spring. The stream channel has its highest energy (ability to transport sediment to the lake) during the fall (October through Mid-December) when the lake is lowest and stream flows are generally moderate to high. This is due to the increase in water surface slope and channel confinement that occurs during low lake conditions.

Historic and recent aerial photographs demonstrate that prior to cutting a navigation channel in the Wood River Delta, the delta wetland contained several active channels that split from the main channel near the apex of the delta. These channels were open waterways as late as the 1940s (see aerial photo maps of Wood River Delta comparing 1941 to 2005). Dredging and channelization beginning the early 1900s shortened the Wood River through the delta area and caused the historic channels to subsequently fill in with accumulated sediment and organic matter. The objective of this project is to restore the hydrology and fish habitat in the delta by removing some of the sediment that has accumulated in one of those side channels. The BLM, in cooperation with Oregon Trout restored 2.5 miles of the historic delta channel between 1997 and 2001. The approach taken in 2001 below Dike Bridge was to excavate the historic channel 2-3 feet deeper and allow additional sediment to move by river forces. The cut navigation channel was then blocked to redirect most of the river flow to the newly excavated historic channel. This allowed natural hydrology to reshape and deepen the channel to appropriate depths. A bathymetric survey of the restored channel and delta sand bar was performed by Graham Matthews and Associates in 2007 (GMA 2007). This data was compared to bathymetric surveys conducted before the project (2000), immediately following construction in 2001 and 3 years later (2004).

Since 1921 with the construction and operation of Link River Dam, hydrology of Upper Klamath Lake is characterized by lower late season inundation levels and slightly higher maximum elevations (see Figure 1).

Figure 1 - Hydrograph of Upper Klamath and Agency Lake



Wetland Functions and Soils

The project area is within the Wood River Delta wetland adjacent to Agency Lake. The hydrogeomorphic (HGM) class is LACUSTRINE FRINGE, a freshwater wetland and Subclass: Lacustrine Fringe, Valley (LFV) (Adamus 2001). Functions of this wetland include a high capacity for resident fish habitat (Adamus 2001). Other functions include water quality (nutrient cycling, nutrient sequestration and transformation, and sediment stabilization); Primary Production (carbon sequestration and decomposition); Wildlife Habitat; and Support of Characteristic Native Vegetation. Water storage and delay and thermoregulation are not considered to be primary functions for Lacustrine Fringe wetlands.

Soils in the entire Wood River Delta wetland are classified by the Klamath County Soil Survey as Histosols, ponded (see Soils Map in Appendix C). They are soils consisting of primarily organics (peat) occurring on the fringes of Upper Klamath and Agency Lake. The Klamath County Soil Survey describes them as stratified layers of peat and muck and thin layers of diatomaceous silt. In the Wood River Wetland, they are a mix of sandy ash deposits originating from fluvial transport of Mazama ash overlain with varying amounts of organic accumulations. The organic material is derived from several sources including fluvial transport by the Wood River, wind transport of floating material from the lake, and locally deposited organics resulting from accumulations of local wetland plants.

The dominant ground elevation of the emergent wetland in the project area is within the range of 4140 and 4141 feet. These elevations support primarily hardstem bulrush, cattail, bur-reed and spikerush (*Scirpus*, *Typha*, *Sparganium* and *Eleocharis*) emergent vegetation communities. A few older willow shrubs are present at higher elevation points along the historic distributary channels. Lower elevation points within the range of 4138 to 4139 feet support submergent and deepwater emergent aquatic

vegetation (Wocus lily (*Nuphar*) and Potamogeton) except in areas with exposure to lake wind and waves. Emergent vegetation generally occurs only at ground elevation greater than 4138 due to water depths. The project area is mapped in the National Wetlands Inventory map as Cowardin class: *Palustrine, Emergent, and intermittently flooded (P_EM_G_h)*.

The large amount of sand scoured from the channel has formed a large deposit at the mouth of the river in a relatively shallow area of Agency Lake. (See Figure 2, sheet 3 from GMA 2007.) These conditions are not favorable for fish migrating or seeking refuge from warm lake conditions. Fish attempting to migrate from the lake to the river must pass over an area that is very shallow, particularly in the fall at the onset of the spawning migration. This project proposes to excavate one of those historic secondary channels with the expectation that migration conditions would be improved and cold river water entering into this deeper part of the lake will have benefits to redband trout holding or seeking refuge from warm water in Agency Lake.

Hydrology above the Wood River Dike Bridge

The 1.2 miles of the Wood River above the bridge are, with the exception of the proposed project site, restored to an appropriate width/depth ratio and functions to efficiently transport the existing annual sediment load to the Dike Bridge area. The restored section of the Wood River between the confluence of Crooked Creek and the bridge is approximately 60 feet wide and 4-6 feet deep (GMA 2007). The area directly above the bridge and near the confluence with Petric Canal remains in its dredged and widened condition and does not adequately transport the sediment load. The area is therefore filling with sediment creating boating obstacles and poor quality fish and riparian habitat. The actual change in sediment volumes was compared between years in the entire reach and shows that the restored reach is in a state of relative equilibrium - that is, the river bed has small amounts of alternating deposition and scour but is neither substantially aggrading or degrading over time. Conversely, the river bed is severely aggrading in the unrestored reach. In recent years (2003-2007), virtually all of the sediment deposition (aggregation of approximately 4,000 cubic yards) occurred in the overly wide reach between the narrowed restored reach and Dike Bridge. (See Figure 3, sheet 2 from GMA 2007.)

Figure 2 – Sediment Volume at Wood River Mouth

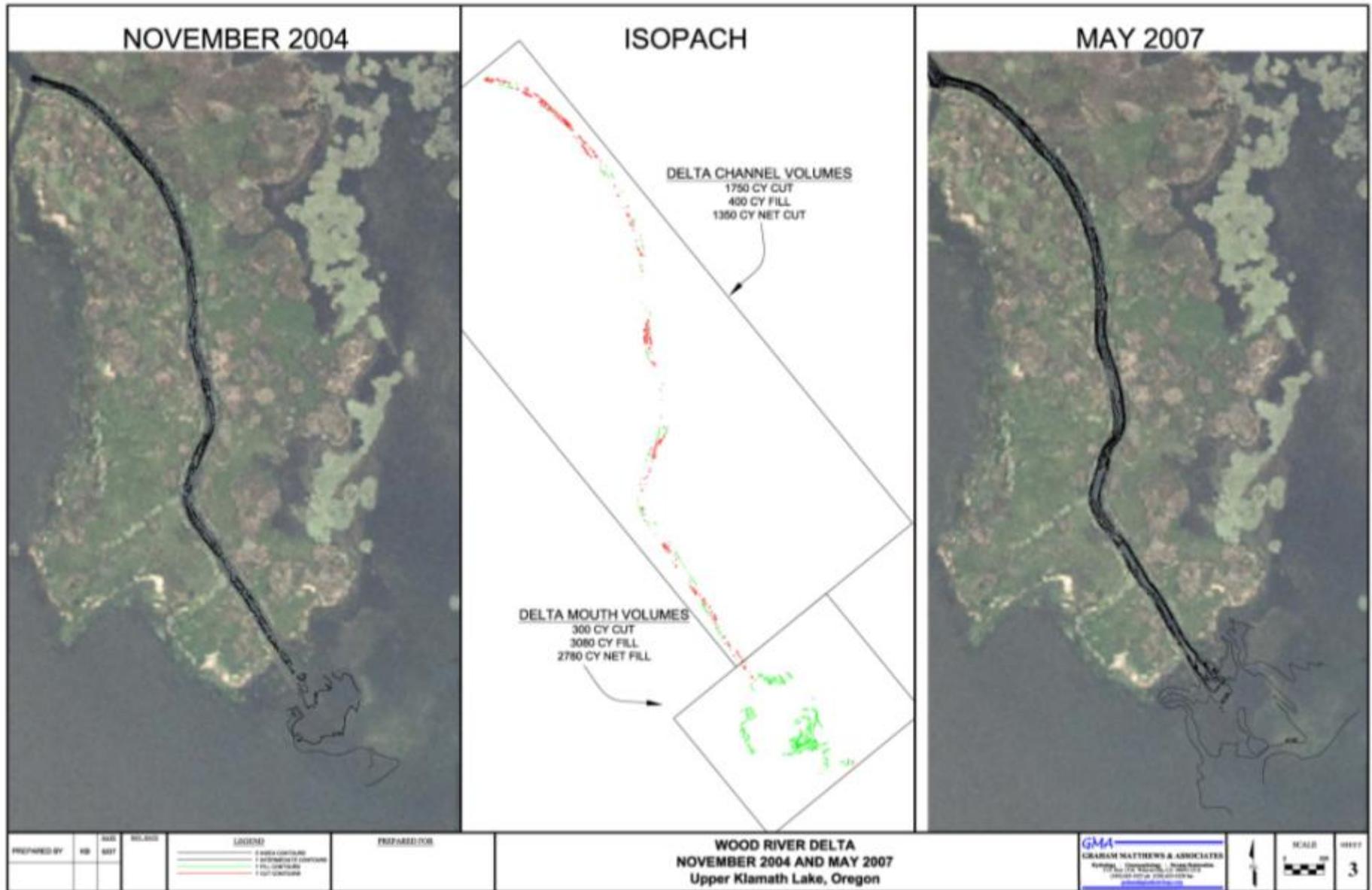
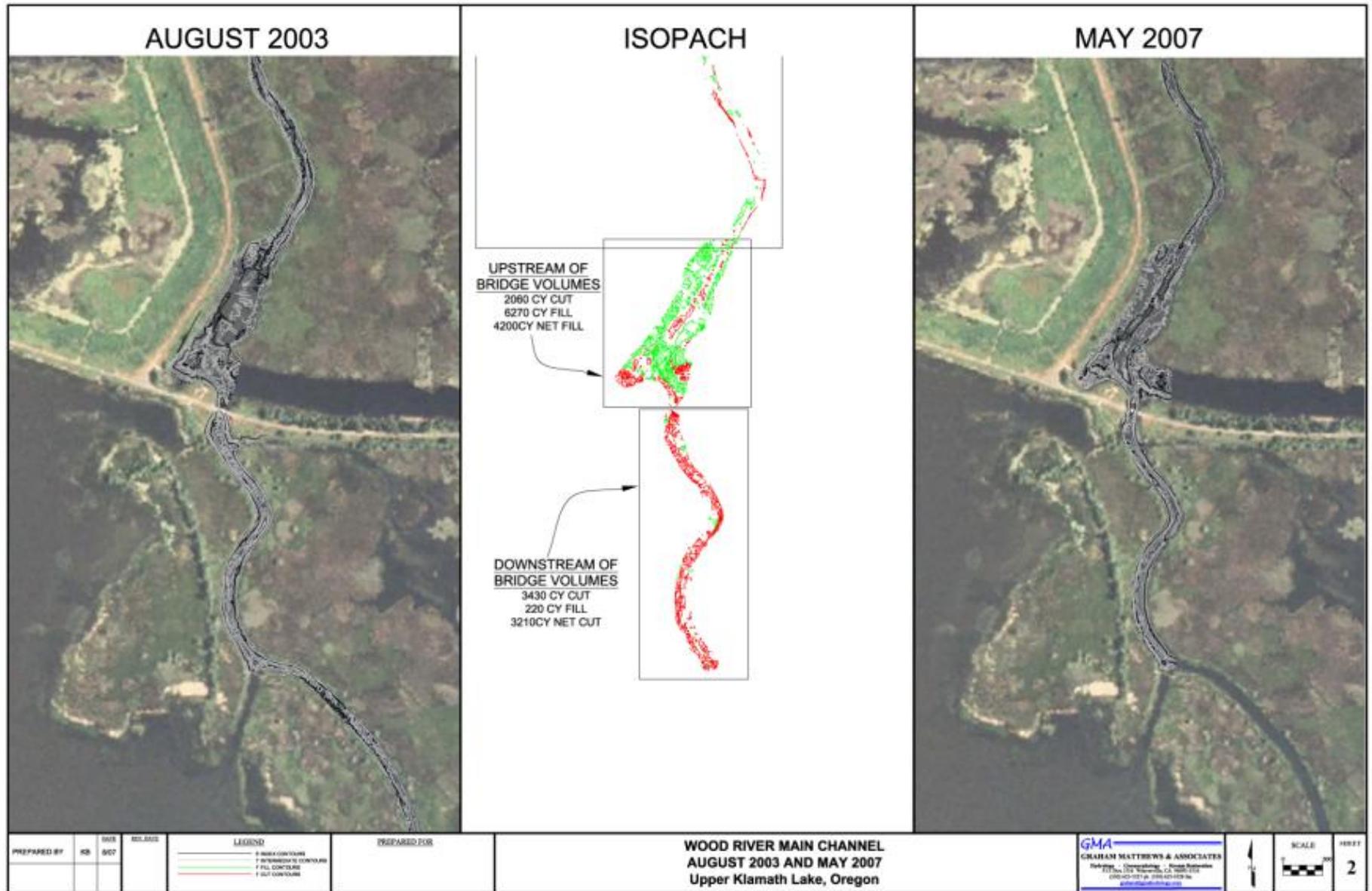


Figure 3 – Sediment Volume above Wood River Dike Bridge



Aquatic Species/T&E

The Wood River, its adjacent floodplain and the Wood River Wetland contain a diverse community of native and introduced aquatic species (see Table 2).

As previously mentioned in the Wildlife section, the BLM Special Status Species Policy designates special status species into two categories: sensitive or strategic. Bureau Sensitive species are generally the species which are restricted in their range and have natural or human-caused threats to their survival. Bureau Strategic species are species that are tracked by the BLM but are not analyzed during the NEPA process.

The species being analyzed for the proposed project in this section will be the Shortnose Sucker (*Chasmistes brevirostris*), Lost River Sucker (*Deltistes luxatus*), redband trout (*Oncorhynchus mykiss*), and the Oregon Spotted Frog (*Rana pretiosa*). The bull trout (*Salvelinus confluentus*) has not been documented within or adjacent to the project since early in the 20th century, however, the project area is currently listed by the USFWS as bull trout critical habitat. The bull trout will be addressed further in the ESA consultation section under Environmental Impacts. All of the other aquatic species listed in Table 2 will not be discussed further in this analysis. A complete list of the Bureau's special status species is kept at the Klamath Falls Resource Area office and at the following website; <http://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/>.

Table 2 – Aquatic species with BLM status potentially affected by the proposed actions within the Wood River project area.

Fish			
Common Name	Scientific Name	BLM Status	Comments
Shortnose Sucker	<i>Chasmistes brevirostris</i>	Federally Endangered	
Lost River Sucker	<i>Deltistes luxatus</i>	Federally Endangered	
Bull Trout (Historic)	<i>Salvelinus confluentus</i>	Federally Threatened	Not currently present
Redband Trout	<i>Oncorhynchus mykiss</i>	Regionally Significance	State regulated native game fish
Slender Sculpin	<i>Cottus tenuis</i>	BLM Strategic	
Amphibian			
Common Name	Scientific Name	BLM Status	
Oregon Spotted Frog	<i>Rana pretiosa</i>	BLM Sensitive	

Federally Endangered or Threatened – Those species listed under the Endangered Species Act as Endangered or Threatened

BLM Sensitive – Those species considered by the Bureau of Land Management as a sensitive species

BLM Strategic – Those species tracked by the BLM but no NEPA analysis required

Lost River Sucker (*Deltistes luxatus*) and Shortnose Sucker (*Chasmistes brevirostris*)

The Lost River and shortnose sucker are both listed under the Endangered Species Act as federally endangered. They are primarily lake dwelling species that migrate up tributaries to spawn in spring. After spawning they return to the lake environment. The Lost River and shortnose sucker have been documented in the Wood River (NRC, 2004, pg. 192), (Shively, 2002), (Markle and Simon, 1994).

The existing condition and status of these species was fully outlined in the *Biological Evaluation for the Wood River Wetland Project Implementation* (USDI, BLM 1996) and the resultant *Biological and Conference Opinions on the Wood River Wetlands Development Projects* (USDI, FWS 1996).

Surveys conducted by BLM and USFWS staff on the Wood River in 2003 and 2004 suggest that sucker larval presence may occur/continue slightly later than the Williamson River (USDI BLM 2005, WRW monitoring report).

Redband Trout (*Oncorhynchus mykiss*)

The Wood River contains a native, self-sustaining population of redband trout. Research has shown that these trout exhibit an adfluvial life strategy. The adult fish migrate into the Wood River from Agency and Upper Klamath Lakes to spawn. The juvenile trout remain in the river for one to two years before moving out into the lake, where they continue to grow until they are ready to spawn (USDI, BLM 1995, pg. 2-17).

Oregon Spotted Frog (*Rana pretiosa*)

An Oregon spotted frog population has been documented within the north eastern portion of the Wood River Wetland. They inhabit shallow pond or marsh habitat with abundant aquatic vegetation for breeding, oviposition, foraging and basking.

Air Quality

Air quality is a sensitive issue in the Upper Klamath Basin primarily because of the EPA's plan to designate part of the county as non-attainment for PM_{2.5}. Potential air quality consequences are important for the preservation of high quality visual values for the region.

National Ambient Air Quality Standards (NAAQS) were established by the 1963 Clean Air Act and subsequent amendments to protect the public health and welfare from adverse effects associated with the presence of pollutants in the ambient air. In 2006, EPA revised the 24-hour NAAQS for PM_{2.5} downward from 65 to 35 µg/m³. If the particulate matter for NAAQS is exceeded, the EPA is required to designate the area as a "nonattainment" area.

Air pollutants are emitted from a variety of sources in the Basin including woodstoves, open burning, industrial plants, and internal combustion engines. Woodstoves contribute greatly to particulate matter during the winter. Agricultural and forestry burning operations are significant sources in the fall. With the emphasis on reducing risk of wildfire, fuels reduction projects using prescribed fire are also becoming a more common source of pollutants that can contribute to reduced air quality.

ENVIRONMENTAL IMPACTS

The following descriptions of the No Action Alternative and the Proposed Action assume the combined relevant effects of all past actions. It is not necessary to individually identify or catalog these past actions as the description of the affected environment incorporates all those actions. For the cumulative effects analysis the description of resulting impacts is the cumulative effect of all past, present and reasonably foreseeable actions. Reasonably foreseeable future actions are assumed the same for the No Action as well as the Proposed Action.

The potential environmental impacts resulting from the alternatives relative to critical resource values are evaluated below. The results are summarized in Table 3. If the critical resources are affected by the proposed actions, the impacts are described in detail along with other resource impacts following the table. In a few cases, there are impacts from specific actions that are highlighted as a cumulative effect.

Table 3 – Critical resource values impact summary.

Critical Element/Resource Value	Affected		Critical Element/Resource Value	Affected	
	Yes	No		Yes	No
Air Quality	X		T & E Species	X	
ACEC/RNA's	X		Wilderness		X
Cultural Resources		X	Wild & Scenic Rivers		X
Farmlands, Prime/Unique		X	Hazardous Wastes		X
Floodplains	X		Water Quality	X	
Native American Cultural/Religious Concerns		X	Wetlands/Riparian Zones	X	
Low Income/Minority Population		X	Noxious Weeds	X	

Vegetation/Botany

Special Status Plant Species

No Action

No known special status plant species are known to occur within the proposed project area.

Proposed Action

No known special status plant species are known to occur within the proposed project area.

Noxious Weeds

No Action

Noxious weed management occurs seasonally in the form of herbicide application for Canada thistle, Dalmatian toadflax, whitetop, Scotch thistle, perennial pepperweed, bull thistle, and yellow starthistle. Under the no action alternative these activities would continue to reduce populations of these noxious weed species.

Proposed Action

The proposed action has a potential to increase current populations of noxious weeds in the wetland. Any upland or levee areas that are disturbed and left exposed may be colonized by native or invasive noxious weeds. Currently, Canada and bull thistle populations exist along the levee which would be excavated to fill the channel upstream of Dike Bridge. The excavation along the levee and from the borrow pit on the north end of the wetland would expose soil to invasion of noxious weed propagules. However, past similar excavations in this area have not resulted in major infestations of noxious weeds.

The project component restoring the secondary channel outlet into Agency Lake would produce small dredge piles. These piles will be seasonally inundated which would eliminate the risk of the current noxious weed species in the wetland spreading to them. The project component that would cover exposed barriers also has a low risk of noxious weed spread. By moving soil and live plants together, there should not be large amounts of exposed soil.

Wildlife

No Action

The No Action Alternative would have no direct or indirect impacts to terrestrial special status species. The current management would continue to provide habitat at its current levels. The project area does not contain nesting habitat for the American Pelican, Bald Eagle, Osprey, Red-necked Grebe or

Bufflehead (Marshall et al 2003) but does provide foraging habitat. The No Action Alternative would not alter foraging habitat or behavior.

Proposed Action

Overall the proposed project would be beneficial to wildlife habitat by increasing riparian and marsh habitat along the river. This will provide additional nesting habitat for those birds associated with that habitat including special status species.

The primary affects from the proposed action to those special status species (American Pelican, Bald Eagle, Osprey, Red-necked Grebe or Bufflehead) considered in this analysis would come in the form of short-term disturbance to individuals within the proximity of their foraging habitat. As stated in the affected environment the proposed project area does not have nesting habitat for any special status terrestrial wildlife species. Additionally all of the proposed actions with the exception of the installation of the floating boat dock will occur in the fall after nesting season. Therefore there will be no disturbance to nesting special status birds from the proposed action.

The project area does offer foraging habitat and most of the species (exception is the tri-colored blackbird) in Table 1 have been documented foraging in the project area. All of these species use open water to forage and within the upper Klamath Basin including the project area this is not a limiting factor. Furthermore the proposed project area is not a focal or critical foraging area in which these species must forage for their survival.

The proposed action will occur within four distinct portions of the Wood River within the next five years. The disturbance caused to individuals outside of the nesting season will be negligible and no loss of individuals would be anticipated. Individuals disturbed from the activities associated with the proposed action will simply shift foraging use away from the disturbance.

Cumulative Impacts

The Proposed Action and the No Action would not be additive when considered with other foreseeable actions. Only one project is currently proposed (large wood placement within the wood river) in the vicinity of the project in the foreseeable future and that project would have no adverse affects on any terrestrial special status species. Therefore the cumulative effects of both projects would be negligible to terrestrial special status species.

Recreation

No Action

Recreation opportunities such as walking, birding, fishing, and waterfowl hunting would continue to be provided. There may be some inconvenience to boaters that are unable to or unwilling to land their boats in the vicinity of the Wood River bridge, due to the lack of a dock facility. Some boaters would continue to have difficulties navigating the shallows in the current delta/mouth of the Wood River, particularly in low water conditions.

Proposed Action

This project is expected to increase the recreational value of the area by improving boat navigation and providing additional recreation opportunities. The deep water habitat developed by the project is expected to be an area that fish would hold in and migrate through during the summer and fall periods. The project is expected to benefit the population of spawning redband (rainbow) trout and would thus improve recreational fishing opportunities. Similarly, the additional open water riverine habitat created would potentially enhance waterfowl hunting opportunities. There would be minor short term

impacts to recreationists associated with the construction phase of the project, such as increased noise, traffic, dust, and temporary closures of areas for safety concerns. These impacts would be temporary in nature and minimized to the extent possible.

ACEC/VRM

No Action

No effects would occur to the ACEC and visual resources would continue to be managed to meet VRM class II objectives.

Proposed Action

The proposed action is designed to meet the objectives to enhance fisheries and wildlife habitat and restore deltaic hydrologic processes. These actions would be expected to maintain or enhance the values of the ACEC.

The proposed action would restore the wetland and riparian plant communities to a condition closer to the historic condition for which the ACEC was designated and restore natural hydrologic processes that would maintain these communities over time. Therefore, the proposed action would restore and maintain the natural process values for which the ACEC was designated.

There would be numerous impacts to scenic/visual resources during and immediately after the construction phase of the proposed action. Heavy equipment such as barges, excavators, and backhoes, would create strong visual contrasts to the natural setting. Newly constructed dikes of raw earth and boulders would also create unnatural appearing landscape elements. However, due to the rapid and prolific growth of wetland vegetation, these impacts would likely be very short lived and essentially undetectable within 3-5 years. The proposed work to replace rock/earth dikes with wetland vegetation would appear more natural in that setting and would help to maintain VRM class II management objectives. The boarding dock will be similar in appearance to the existing launch facility at the Wood River entrance. The reduction in bank erosion from boats will benefit the scenic resources.

Cumulative Impacts

The proposed action will provide cumulative long term benefits to protecting the ACEC and visual resource values. The opportunity to provide additional channel narrowing and floodplain restoration will serve to enhance the fisheries, wildlife habitat and visual resources along the river. The opportunity to reduce stream bank vegetation disturbance and soil erosion from boats will also serve to improve these resources along the river. Improving the aesthetic and natural habitat values of areas where previous restoration work resulted in exposed rock boulders will also enhance visual resources.

Cultural Resources

No Action

Under the no action alternative, archaeological sites would continue to be protected from ground disturbing activities.

Proposed Action

All proposed treatment areas above the waterline have been surveyed for cultural resources using BLM Class III survey methods and there are no known sites (BLM Report No. OR014-CRR-FY98-014 and OR014-CRR-FY98-022). Previous cultural monitoring in 1997/1998 for wetland restoration activities discovered submerged cultural properties. Due to prior monitoring discoveries and requests from The Klamath Tribes, cultural monitoring will occur within all submerged channel activities at Wood River.

Cumulative Impacts

Under the action alternative, the potential to encounter, or disturb, subsurface archaeological materials appears somewhat likely based on previous monitoring results and the nature of disturbances anticipated.

Hydrology and Water Quality / Floodplain Wetlands/

No Action

Hydrology and Wetlands below Wood River Dike Bridge

The no action alternative would result in natural hydrologic and geomorphic processes to promote the formation of the delta over time. It is unlikely that natural processes would ever result in reoccupation of the historic secondary channel. Existing shallow conditions at the confluence with Agency Lake would likely persist indefinitely, with the water level potentially becoming shallower as the sand bar at the mouth would continue to build itself into Agency Lake.

Hydrology and Wetlands above the Wood River Dike Bridge

The no action alternative would result in natural hydrologic and geomorphic processes to act to continue gradual aggregation of the former floodplain area. Eventually, a single or braided channel could form as sediment deposition increased sufficiently to allow for the colonization of emergent wetland plants. The rate of natural recovery would be dependent on annual sediment transport rates which are unknown at this time.

Proposed Action

Hydrology and Wetlands below Wood River Dike Bridge

The excavation required to reestablish the historic distributary channel mouth will result in approximately 0.3 acres of wetlands to change from primarily dense Tule/cattail emergent vegetation to primarily open water with submergent and deepwater emergent aquatic vegetation (*Najas* lily or *Nuphar*). The project is expected to increase the functional attributes of the contiguous dense Tule/cattail wetland by restoring historic topographic features and hydrologic functions between the main channel, the excavated side channel and the surrounding wetlands. This will result in both deeper and shallower habitat areas which are both lacking in the delta wetland compared to historic conditions. Open water channels areas in dense contiguous wetlands are generally considered beneficial for riparian dependent wildlife and fish species as they provide edge habitats, additional escape habitat and cover, and provide movement and migration corridors. It is expected that, like the historic channel, this naturally elevated area will support diverse natural regeneration of willows (*Salix* sp), Baltic rush (*Juncus baliticus*), giant lupine, and sedges (*Carex* sp). Past experience in restoring the three miles upstream of the proposed project area indicates that the abundant waterborne seed and vegetative sources carried by the river results in rapid re-colonization of wetland plants, precluding the need for seeding or planting. Due to the low gradient and low energy of the river in this area, no rock or geotechnical material will be required for erosion control or sediment control following construction.

Hydrology above the Wood River Dike Bridge

The effects of floodplain reconstruction above the Dike Bridge will result in an additional 1.8 acres of emergent floodplain wetland. This area will be converted from shallow open water habitat to palustrine emergent marsh. There are expected to be some short-term turbidity effects during construction. Some channel adjustment will occur immediately following construction. Further scouring and pool development within the narrowed channel is likely to occur during the first few

years following construction however, these adjustments are not expected to result in detrimental turbidity increases or additional downstream sedimentation.

Wetland soils in the potential borrow area are of the Lather series consisting of deep, very poorly drained soils that formed in organic material with thin layers of silt. When transported and used for floodplain restoration, these soils have proven to be good quality for wetland plant establishment purposes without excessive settling or compaction and are easily moved and re-graded. Borrow areas are expected to reestablish with wetland vegetation quickly, including willow shrub colonization from seed. This is due to the annual water inundation under current management and the abundant seed source of the surrounding wetland area.

Water Quality

Negative impacts to water quality are expected to be short-term and result in temporary increases in turbidity and particle bound nutrients only during construction. Turbidity and sediment related impacts are expected to subside within hours after construction as riverine water enters the still waters of Agency Lake. In the long-term, the addition of a secondary channel should increase the wetland filtering capacity of the deltaic wetland by increasing the amount of wetland channel edge coming into contact with the river as it travels downstream to Agency Lake. This will improve water quality in the long-term.

Cumulative Impacts

Restoration of geomorphic and hydrologic processes began in 1998 with the narrowing and deepening of the Wood River over a 1.8 mile section that was significantly altered by dredging and narrowing in the 1960s and 1970s. By narrowing and deepening the channel and restoring sinuosity, the sediment transport capacity was increased such that the area upstream of the bridge is capable of transporting most of the sediment entering from the upstream boundary. The proposed action upstream of Dike Bridge seeks to complete channel restoration to an appropriate width depth and sinuosity for efficient sediment transport and a functional floodplain wetland capable of nutrient and sediment filtering. The no action alternative would result in the area immediately upstream of the bridge to continue to function as a sediment depositional area and would continue to become shallower as it fills with sediment transported from the watershed upstream. Although some river restoration has occurred on private lands upstream of the project area in Crooked Creek and Wood River, these projects are not expected to contribute to significant changes in water quality or sediment processes in downstream reaches and therefore, will not contribute to cumulative impacts.

Downstream of Dike Road Bridge, the reconnection of the historic Wood River Channel in 2001 resulted in substantial lengthening of the main delta channel and a subsequent increase in sedimentation at the new mouth. The proposed action of adding an additional secondary channel outlet to the lake is not expected to substantially change the quantity of sediment entering the lake although the location of sediment entering to the lake will be changed. Since the sediment scoured from the restored channel has largely reached an equilibrium state (see page 6, Hydrology below Wood River Dike Bridge).

Overall, the cumulative impacts of the proposed and foreseeable actions are expected to achieve hydrologic and geomorphic conditions that closely mimic historic deltaic river functions. These functions include a river channel capable of transporting the average annual sediment load from upstream sources as well as improved sediment and nutrient filtering capacity of the deltaic wetlands.

Aquatic Species/T&E

No Action

Potential fish migration barriers would persist, the potential for an increase in predation in shallow water habitats would persist. Poor quality of adult holding and juvenile rearing habitat would remain in project sites. The Oregon spotted frog or its habitat on the Wood River Wetland would not be affected.

Proposed Action

Restore Secondary Channel Outlet

Lost River Sucker (*Deltistes luxatus*), Shortnose Sucker (*Chasmistes brevirostris*) and Redband trout (*Oncorhynchus mykiss*)

Fish migrating from Agency Lake into the Wood River will have improved migration access due to deeper water conditions. This project will restore the function of the delta to a condition more closely resembling historic delta hydrology and morphology and provide improved conditions for migratory Lost River suckers, shortnose suckers and redband trout. This part of the project will increase the amount of riverine riparian wetland habitat by approximately 500 feet and the amount of emergent fringe habitat will be increased by approximately 1000 feet. These areas are important for larval and juvenile Lost River, and shortnose suckers (NRC 2004) as well as being important rearing areas for trout fry and other native fish species. Additionally, material will be deposited to leave gaps of undisturbed wetlands which will allow for overbank flow to filter through the adjacent wetlands. This was done in the 2001 project work with good success in creating flow paths for over-bank flows to filter through the delta wetlands (see oblique aerial photograph of delta shortly after construction showing spoil gaps and undisturbed wetland fill). This design feature will increase the sediment deposition and nutrient filtering capacity. The substrate in the project area is not suitable for spawning suckers or trout species and is thus not affected by the project.

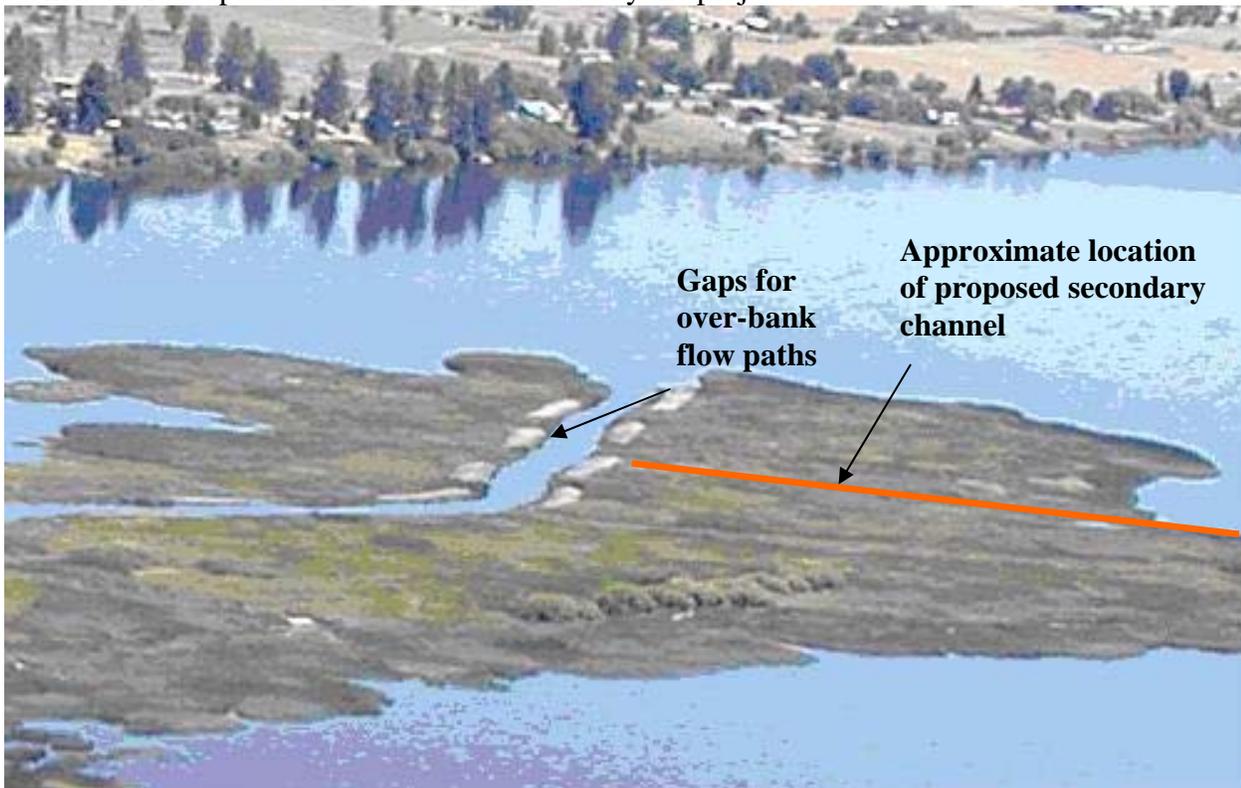


Figure 4 – Aerial photograph of lower end of completed historic channel excavation (2001) showing intentional gaps in fill spoils to provide over-bank flow paths and undisturbed wetland riparian fringe area.

This project will result in adding an improved migratory path for fish entering the Wood River from Agency Lake. Construction of this project will not result in any obstruction of fish passage during any time since it does not include obstructions in the main stream channel.

Oregon Spotted Frog (*Rana pretiosa*)

The Wood River Wetland (WRW) Oregon spotted frog site is currently restricted to the northeast area of the WRW. The southern-most part of the occupied site is approximately two miles upstream from this part of the proposed action. Therefore, there will be no affect on the Oregon spotted frog or its site from this part of the proposed action.

Channel narrowing and deepening and floodplain restoration

Lost River Sucker (*Deltistes luxatus*), Shortnose Sucker (*Chasmistes brevirostris*) and Redband trout (*Oncorhynchus mykiss*)

The river restoration completed immediately upstream of this project area has demonstrated the effectiveness of the proposed restoration methods used in rapidly restoring riverine riparian areas. The levee bank created by excavation spoils will increase wetland riparian diversity by increasing topographic variability in the range of elevations which supports wetland plant establishment. This increased diversity is evident in the riparian areas developed during projects completed upstream and downstream of the proposed project.

Oregon Spotted Frog (*Rana pretiosa*)

As stated above, the Oregon spotted frog (OSF) site is currently restricted to the northeast area of WRW. The southern-most part of the occupied site is approximately one mile upstream from this part of the proposed action. The restored floodplain of the Wood River between the OSF site and this part of the proposed action has been surveyed for OSF egg masses, metamorphs and adults periodically over the last decade (including 2008) by BLM/USFWS/USFS personnel. No egg masses or frogs have been documented.

The potential borrow area located near the constructed northeast pond of WRW is near the current OSF site. The northeast pond is considered potential OSF habitat and has been surveyed for OSF egg masses, metamorphs and adults periodically over the last decade (including 2008) by BLM/USFWS/USFS personnel. No egg masses or frogs have been documented in the northeast pond since 2000, when 2 egg masses were found (USDI BLM-WRW Monitoring Report, 2001). Material excavated from the pond will be taken from the outside of the levee that was constructed during the pond creation. The full height and width of the levee is not needed to constrain regulated water levels within the pond. Therefore, the material in this levee could be considered excess material. A Best Management Practice (BMP) is proposed to minimize the amount of disturbance to the pond during the potential material removal process (see Appendix A).

Installation of a day use boat dock

Lost River Sucker (*Deltistes luxatus*), Shortnose Sucker (*Chasmistes brevirostris*) and Redband trout (*Oncorhynchus mykiss*)

There are no foreseeable impacts to sucker or trout species from the installation of a boat dock near the confluence of the Wood River and Petric Canal.

Oregon Spotted Frog (*Rana pretiosa*)

Due to the proximity (see above) and nature of this part of the proposed action, there will be no affect on the Oregon spotted frog or its site from this part of the proposed action.

Cover Exposed Boulders

Lost River Sucker (*Deltistes luxatus*), Shortnose Sucker (*Chasmistes brevirostris*) and Redband trout (*Oncorhynchus mykiss*)

Currently, there is a notch in the rock weir that separates the Wood River and Agency Lake (see project map). This notch was constructed at the appropriate elevation to allow fish passage all year, and during low water conditions. Fish passage should not be impacted from this part of the proposed action.

Oregon Spotted Frog (*Rana pretiosa*)

Due to the proximity (see above) and nature of this part of the proposed action, there will be no effect on the Oregon spotted frog or its site from this part of the proposed action.

Threatened and Endangered Species Consultation

This project will benefit habitat conditions for state and federally listed shortnose and Lost River suckers by increasing the amount of deep cool water refugia at the mouth of the Wood River in Agency Lake, increasing the amount of riverine wetland fringe habitat, and increasing the total amount and quality of riparian habitat. Bull trout are listed in the Upper Klamath Lake watershed however, no bull trout have been documented in the Wood River or Agency Lake since early in the 20th century. Upstream of the Project Area, existing populations in the Recovery Plan Upper Klamath Lake Core area are comprised of three local populations – Sun Creek, Threemile Creek, and Lost Creek. Agency Lake is designated as Critical Habitat for bull trout. Although bull trout do not currently occur in the project area, this project will benefit bull trout habitat by increasing cold water holding areas in Agency Lake and increasing the amount of riparian fringe habitat along the lower Wood River.

This project will have no effect on any terrestrial threatened or endangered species. Regarding aquatic threatened or endangered species, on January 6, 2009, BLM met with the US Fish and Wildlife Service. During the meeting, both agencies agreed that this project meets criteria and is designed to meet Project Design Criteria for coverage under the Biological Opinion for Forest Service and Bureau of Land Management aquatic habitat restoration activities. The Secondary Channel Outlet Restoration section of the proposed project is applicable to category 2 (Reconnection of Existing Side Channels and Alcoves) and the Channel narrowing and deepening/floodplain restoration part of the proposed project is applicable to category 4 (Bank Restoration) (see Biological Opinion and Letter of Concurrence, USDA Forest Service, USDI Bureau of Land Management and the Coquille Indian Tribe for Programmatic Aquatic Habitat Restoration Activities in Oregon and Washington That Affect ESA-listed Fish, Wildlife and Plant Species and their Critical Habitats, US Fish and Wildlife Service, June 14, 2007). Use of this Biological Opinion requires that certain general and project category specific Conservation Measures (CMs) and Project Design Criteria (PDC) will be followed. These include spill containment and contingency plans, site preparation and restoration measures (see Appendix B) Additionally, all applicable RPMs resulting from incidental take will be adhered to. For listed fish, these include measures to monitor turbidity and sedimentation during construction (see page 185-186 of Aquatic Restoration Biological Opinion).

Cumulative Impacts

From 1998-2006, the Wood River from the confluence of Crooked Creek downstream to the mouth has undergone three phases of restoration by the Bureau of Land Management (BLM) and associated partners. This goal of this multi-phase restoration effort was to return the river back to a more natural condition. Some of the objectives achieved include; returning the river into its historic channel, floodplain reconnection, increase in channel sinuosity and increase in geomorphologic channel complexity.

It is likely that these efforts have had a beneficial cumulative impact to native aquatic species. The parts of the proposed action titled, *Restore Secondary Channel Outlet and Channel narrowing and Deepening and Floodplain Restoration*, will likely also have similar positive impacts to the same species.

In the foreseeable future, only one additional project in the Wood River is proposed by the BLM. This project entails large wood placement in the lower 2/3 mile of the river to further enhance aquatic species habitat and channel complexity. This project would be expected to have positive cumulative impacts to habitat for aquatic species by further increasing habitat complexity and suitable cover and depth for migrating fish and other aquatic species.

Air Quality

No Action

The No Action Alternative would have no impacts to air quality.

Proposed Action

The Proposed Action would likely produce some fugitive dust during implementation of this project. The particulate matter would mostly be greater than 2.5 µm but less than 10 µm in diameter. This courser PM₁₀ material presents less health concerns than smaller particles, such as those found in wood smoke (PM_{2.5}). The National Ambient Air Quality Standard for PM₁₀ is 150 µg/m³ averaged over a 24-hour period. It is not expected that particulate levels would reach that high.

Particulates would mostly be blown toward the eastern shore of Agency Lake. Residents near the shoreline may experience periods of heavy dust, particularly when stronger winds are present. Due to the low quantity of the dust, no negative effects on health are anticipated. Visibility may decrease during wind events.

PERSONS/AGENCIES CONSULTED

Oregon Department of Fish and Wildlife
17 adjacent landowners
US Fish and Wildlife Service
Oregon Trout
Klamath County Guides Association
Oregon Department of State Lands
Oregon Department of Environmental Quality
Perry Chooktoot and Les Anderson, The Klamath Tribes

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Rob Roninger	Fisheries
Eric Johnson	Fuels Specialist (Air Quality)

APPENDIX A – BEST MANAGEMENT PRACTICES/ PROJECT DESIGN FEATURES

Cultural

- In accordance with guidelines and directives in the Klamath Falls Resource Area RMP, BLM regulations, and the National Historic Preservation Act, areas not included in previous archaeological surveys will be surveyed before any ground-disturbing action is undertaken. Sites identified during survey, as well as any known sites found in previous surveys, will be buffered, flagged and avoided to prevent impacts.
- Cultural Monitoring will occur during all ground disturbing activities within the Wood River channel.

Fisheries, Hydrology & Riparian Reserve Treatments

BMPs for aquatic species protection and wetland areas:

- Construction will occur during low water season after water quality conditions in lake are cool and well oxygenated.
- In-water excavation will occur in non-moving (slack) water conditions.
- Construction in wetlands and riverine areas will be isolated from the lake and river until final plug removed and water is introduced to the secondary channel. The excavator will begin digging from the river or the lake and proceed to excavate the new channel. Silt barrier will be placed across the entry point to prevent any siltation from entering the lake or river during construction. The final action will be to remove the plug at the end of the project area once the channel excavation is complete.
- An undisturbed fringe of wetland vegetation buffer will be left between excavated channel and excavated spoil materials. Preservation of existing vegetation buffer strips is a recommended method for reducing sedimentation and minimizing erosion (Oregon DEQ, Erosion and Sediment Control Manual, April 28, 2005, APPENDIX E, EROSION PREVENTION BMPS PRESERVATION OF EXISTING VEGETATION / BUFFER STRIPS – EP-2).
- The project was designed to reoccupy a historic channel such that the pattern, dimension and profile of the channel are appropriate for the hydrologic, geologic, and biological settings. This will result in conditions that will sustain dynamic equilibrium and allow natural deltaic processes to function in a way that is beneficial to fish and wildlife species.
- Access to the project area will use existing waterways and staging areas such that disturbance to wetland areas will be minimal.
- All work will be done from a floating barge such that impacts to soils and vegetation will be minimized.
- A spill contingency plan will be implemented and include onsite oil/fuel spill equipment including containment booms and oil/fuel absorption pillows.
- Construction would commence by excavating enough area for the barge to enter the side channel area. Once inside the work area, a floating turbidity curtain would be immediately installed behind the barge to minimize turbidity and sediment from entering the lake and or river and conversely, isolate fish from entering the construction area. An alternative method for work area isolation would be to reconstruct an earthen dam once equipment is inside the work area berm with material excavated from the channel. This method of isolation may be preferable depending on lake water elevation and river flows.
- If the northeast pond area is needed for a borrow site for the proposed action, remove material only from the south side and/or top of the levee to avoid impacts to the pond.

- No rock or other artificial erosion protection will be needed for this project once construction is completed. Existing vegetation in the delta wetland is expected to provide immediate bank stabilization without the need for additional erosion protection measures. Spoils shall be deposited in such a manner as to leave a fringe of undisturbed vegetation along the cut area edge of between 5 and 10 feet wide. Spoil material contains live vegetation and adequate seed sources to quickly regenerate riparian vegetation cover. Additionally, material will be deposited to leave gaps of undisturbed wetlands and allow for overbank flows to filter through the adjacent wetlands. This will promote overbank deposition of suspended sediments and organic matter in the riparian area and increase nutrient filtering functions of the riparian wetland.

Noxious Weeds

- Require cleaning of all equipment and vehicles prior to moving on-site to prevent spread of noxious weeds. Also, if the job site includes a noxious weed infestation, require cleaning of all construction equipment and vehicles prior to leaving the job site. Removal of all dirt, grease, and plant parts that may carry noxious weed seeds or vegetative parts could be accomplished by using a pressure hose to clean the equipment.
- Identify and avoid working in concentrated areas of noxious weeds.
- Treat known noxious weed populations with herbicides or mowing to prevent seed heads prior to work in order to reduce the spread of plants.
- Conduct monitoring activities related to proposed treatments as described in the Klamath Falls ROD.

Special Status Plant Species

If any Special Status Plant Species are identified in the project area prior to work or during active work, the plants will be flagged and avoided.

Air Quality

Water roads as necessary to minimize fugitive dust.

APPENDIX B – USFWS AQUATIC PROGRAMMATIC BIOLOGICAL OPINION CONSULTATION PDCS, CMS AND APPLICABLE PROJECT ACTIVITY CATEGORIES

1. General PDCs and CM Applicable to All Activity Categories

General PDCs: All projects will be guided by PDCs that help restore or enhance stream channel, riparian, wetland, and/or upland functions that would occur under natural disturbance regimes.

General CMs: CMs are intended to minimize effects to the aquatic environment, and the following apply, when relevant, to all 19 activity types:

i. Technical Skill and Planning Requirements

- Ensure that an experienced professional fisheries biologist, hydrologist or technician is involved in the design of all projects covered by this BO. The experience should be commensurate with technical requirements of a project. If ESA-listed wildlife/plant species occur in the planning area, as determined by a unit wildlife biologist or botanist, the appropriate specialist will assist with project design.
- Planning and design includes field evaluations and site-specific surveys, which may include reference reach evaluations that describe the appropriate geomorphic context in which to implement the project. Planning and design involves appropriate expertise from professional staff or experienced technicians (e.g., engineer, silviculturist, fire/fuels specialists.)
- The project biologist should insure that PDCs and CMs are incorporated into any implementation contract agreements. If a biologist is not the Contracting Officers Representative (COR), then the biologist must regularly coordinate with the project COR to insure the PDCs and CMs are being followed.

ii. State and Federal Requirements

- Follow the appropriate state (Oregon Department of Fish and Wildlife (ODFW) or Washington Department of Fish and Wildlife (WDFW)) guidelines for timing of inwater work. Exceptions to ODFW and WDFW in-water work windows must be requested and granted from the appropriate state agency. Exceptions can be approved through documented phone conversations or email messages with the state agency(s). Such guidelines are intended to prevent project implementation in fish spawning habitat when fish spawning is taking place or while eggs and young fish are in or associated with channel substrates.
- Project actions will follow all provisions and requirements (including permits) of the Clean Water Act for maintenance of water quality standards as described by Oregon Department of Environmental Quality (Oregon FS and BLM), Washington Department of Ecology (Washington FS and BLM) and the MOU between WDFW and the FS regarding Hydraulic Projects Conducted by USDA Forest Service, Pacific Northwest Region, January 2005.
- All regulatory permits and official project authorizations will be secured prior to project implementation.

iii. Pollution and Erosion Control Plans

- Administrative Units will develop and implement a Pollution and Erosion Control Plan (PECP) for each authorized project, one that includes methods and measures to minimize erosion and sedimentation associated with the project. The following measures will assist in the creation of a PECP.

- Spill Prevention Control and Containment Plan (SPCCP) -The contractor will be required to have a written SPCCP, which describes measures to prevent or reduce impacts from potential spills (fuel, hydraulic fluid, etc). The SPCCP shall contain a description of the hazardous materials that will be used, including inventory, storage, handling procedures; a description of quick response containment supplies that will be available on the site (*e.g.*, a silt fence, straw bales, and an oil-absorbing, floating boom whenever surface water is present.)
- The PECP should be included in construction contracts or force account work plans.
- The PECP must be commensurate with the scale of the project and include the pertinent elements of iv, v, vi, and vii listed below.

iv. Minimize Site Preparation Impacts

- Establish staging areas (used for construction equipment storage, vehicle storage, fueling, servicing, hazardous material storage, etc) beyond the 100-year floodplain in a location and manner that will preclude erosion into or contamination of the stream or floodplain.
- Minimize clearing and grubbing activities when preparing staging, project, and or stockpile areas. Stockpile large wood, trees, vegetation, sand, topsoil and other excavated material, that is removed when establishing area(s) for site restoration
- Materials used for implementation of aquatic restoration categories (*e.g.*, large wood, boulders, fencing material etc.) can be staged within the 100-year floodplain.
- Prior to construction, flag critical riparian vegetation areas, wetlands, and other sensitive sites to prevent ground disturbance in these areas.
- Place sediment barriers prior to construction around sites where significant levels of erosion may enter the stream directly or through road ditches. Maintain barriers throughout construction.
- Where appropriate, include hazard tree removal (amount and type) in project design. Fell hazard trees within riparian areas when they pose a safety risk. If possible, fell trees towards the stream. Keep felled trees on-site when needed to meet coarse woody debris objectives.
- Wildlife biologist should determine if a hazard tree is a potential ESA listed bird nest tree. Nesting trees that are hazardous to restoration activities may only be removed outside of active nesting season. No BE nest trees will be removed. Hazard trees that are also suitable NSO and murrelet nest trees may only be removed if there are sufficient alternative suitable NSO and murrelet nest trees within the same stand that the hazard tree is located.

v. Minimize Heavy Equipment Impacts

- Consider contracting with operators who use non-petroleum lubricants and fluids in their machinery.
- The size and capability of heavy equipment will be commensurate with the project.
- All equipment used for instream work shall be cleaned and leaks repaired prior to entering the project area. Remove external oil and grease, along with dirt and mud prior to construction. Thereafter, inspect equipment daily for leaks or accumulations of grease, and fix any identified problems before entering streams or areas that drain directly to streams or wetlands.
- All equipment shall be cleaned of all dirt and weeds before entering the project area to prevent the spread of noxious weeds.
- Equipment used for instream or riparian work shall be fueled and serviced in an established staging area outside of riparian zone. When not in use, vehicles shall be stored in the staging area.
- Minimize the number and length of stream crossings and access routes through riparian areas. Crossings and access routes should be at right angles. Stream crossings shall not increase risks of channel re-routing at low and high water conditions and shall avoid potential listed fish spawning areas when possible.

- Existing roadways or travel paths will be used whenever reasonable. Minimize the number of new access paths to minimize impacts to riparian vegetation and functions.
- Project operations must cease under high flow conditions that inundate the project area, except for efforts to avoid or minimize resource damage.
- Minimize time in which heavy equipment is in stream channels, riparian areas, and wetlands. When operating heavy equipment in stream channels it is because project specialists reasoned that such actions are the only reasonable alternative for implementation and/or would result in less sediment in the stream channel or damage (short-or long-term) to the overall aquatic/riparian ecosystem relative to other alternatives.

vi. Site Restoration

- Upon project completion, remove project related waste.
- Initiate rehabilitation of all disturbed areas in a manner that results in similar or better than pre-work conditions through spreading of stockpiled materials (from b.iv.b. above), seeding, and/or planting with locally native seed mixes or plants. Planting shall be completed no later than spring planting season of the year following construction.
- Short-term stabilization measures may include the use of non-native sterile seed mix (when native seeds are not available); weed-free certified straw, jute matting, and other similar techniques. Short-term stabilization measures will be maintained until permanent erosion control measures are effective. Stabilization measures will be instigated within three days of construction completion.
- All riparian plantings shall follow one or both of the following direction documents: Regional FS letter to Units, Use of Native and Nonnative Plants on National Forests and Grasslands, May 2006 (Final Draft), and BLM Instruction Memorandum No. OR-2001-014, Policy on the Use of Native Species Plant Materials. When necessary, loosen compacted areas, such as access roads, stream crossings, staging, and stockpile areas.

2. Reconnection of Existing Side Channels and Alcoves

a) Description

Reconnect and/or restore existing side channels and alcoves to increase rearing habitat for juvenile fish and high flow refuge areas for all life stages of fish. Functioning side channels have inlet and outlet connections to the main channel and often contain flow only during flood events-bankfull or greater. Functioning alcoves are back-water channels that typically contain water during both low and high flows. This action includes the removal of plugs which block water movement through side channels and alcoves. Further, side channel and alcove improvements include fill removal within channels and alcoves, LWand/or boulder placement, riparian planting, etc. Boulder placement may be used in the main river to stabilize the channel and bring the entrance of the side channel into alignment (vertically and horizontally). Construction would involve use of heavy equipment, such as excavators, spiders, backhoes, and dump trucks.

b) Design Criteria

- Excavated material removed from side-channels or alcoves shall be hauled to an upland site or spread across the adjacent floodplain in a manner that does not restrict floodplain capacity.
- Design and construct side-channels in such a manner as to prevent the capture and relocation of the main channel.
- Design project to naturally maintain inlet and outlet connections with the main stream channel (i.e., placement of LW to increase local scour).
- Should fish rescue occur, use fish handling criteria listed under activity #5.

If other aquatic restoration activities included in this BO are used as complementary actions, follow the associated PDCs and CMs. c) Conservation Measures -No additional CMs are required. d) Excluded Activities -The following activities are not included in this BO: Creation of new side channels; Excavation of severely aggraded (completely filled in) side channels and alcoves.

4. Bank Restoration

a) Description

Restore eroding stream banks to reduce chronic bank erosion, improve water quality, restore natural channel cross-sections, expand floodplain area, promote growth of riparian vegetation and create undercut banks for adult and juvenile fish hiding cover. Projects will not significantly restrict the channel migration zone and ability of the channel to form and maintain habitat. Construction would involve use of heavy equipment, such as excavators, spiders, backhoes, and dump trucks.

b) Design Criteria

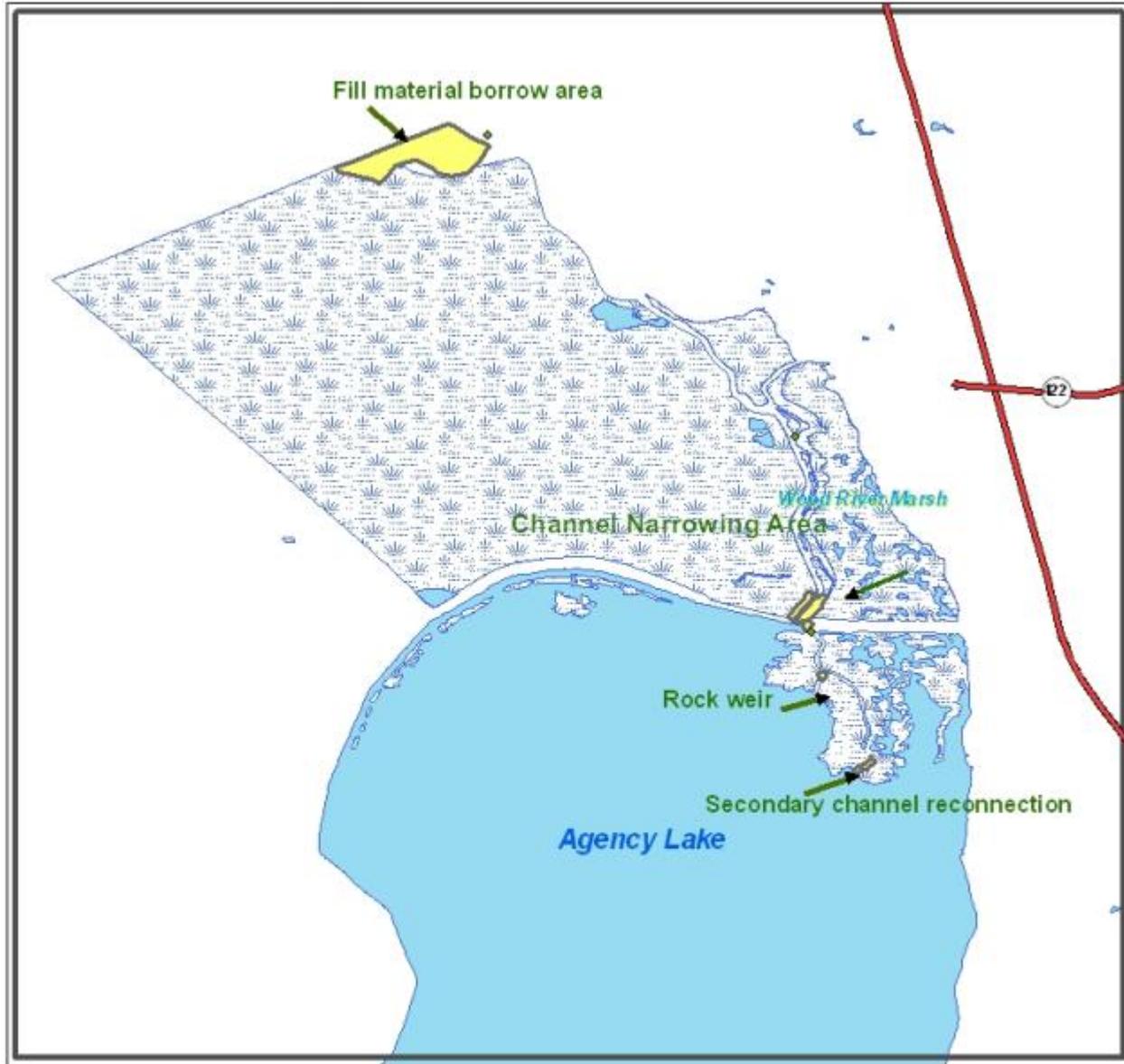
i. Work will focus on eroding stream banks, primarily the outside edge of meander bends.

ii. Limit bank restoration projects to those sites where existing channel conditions are at or near reference channel conditions-radius of curvature, etc. To the extent possible, use bank stabilizing materials that would naturally occur at that site (such as LW, woody and herbaceous plantings, native sedge/rush mats, and native rock).

iii. Banks may be reshaped and sloped where the objective is to reduce bank slope angle to provide more favorable planting surfaces. Such work should not change the location of the bank toe. Jute matting or other biodegradable material can be used with plantings to help prevent erosion of affected banks. If other aquatic restoration activities included in this BO are used as complementary actions, follow the associated PDCs and CMs. c) Conservation Measures -No additional CMs are required. d) Excluded Activities -The following activities are not included in this BO: Use of dikes, groins, buried groins, drop structures, porous weirs, weirs, riprap, rock toes, and similar structures to stabilize streambanks.

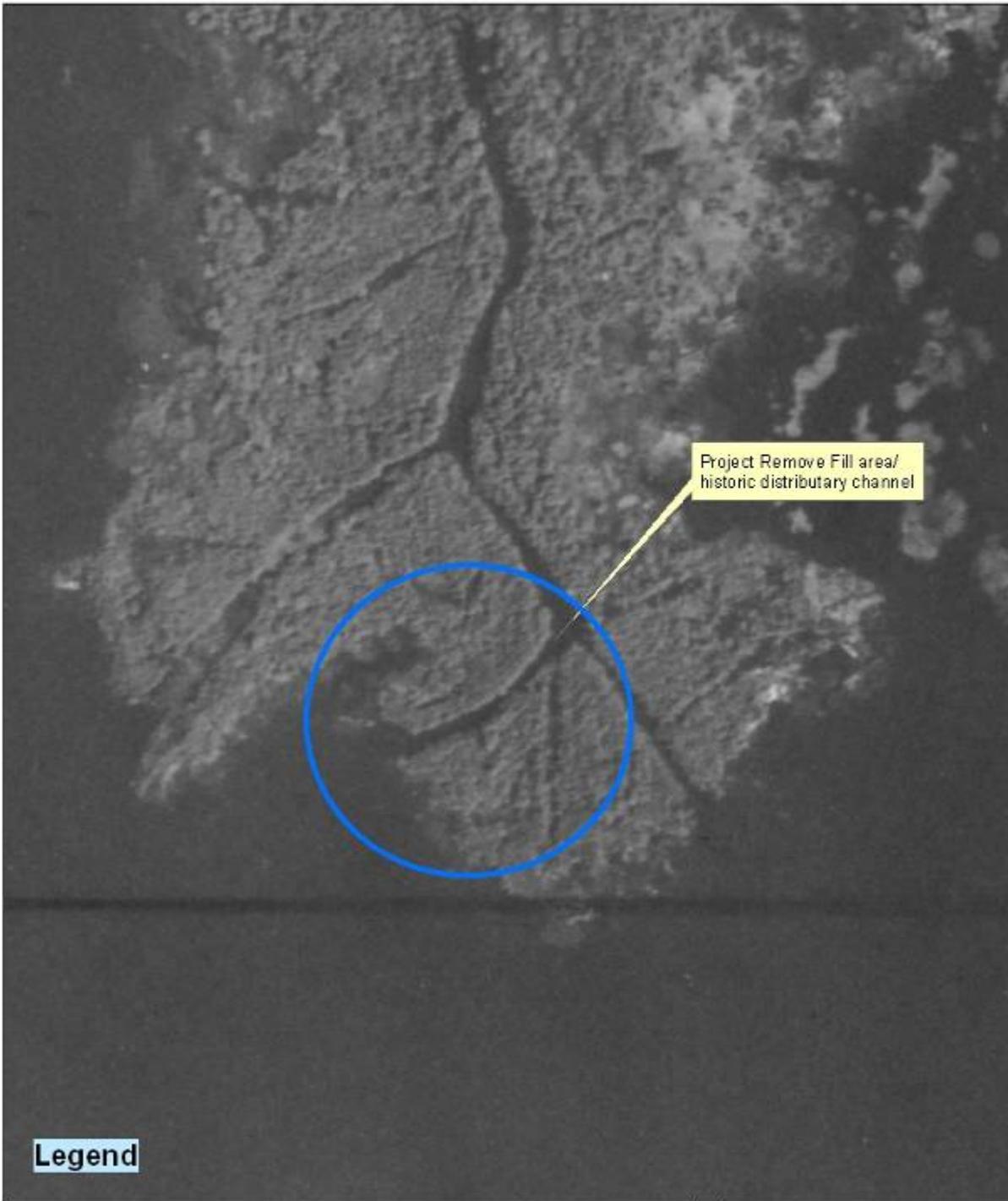
APPENDIX C – PROJECT MAPS

Location Map Wood River Channel Restoration

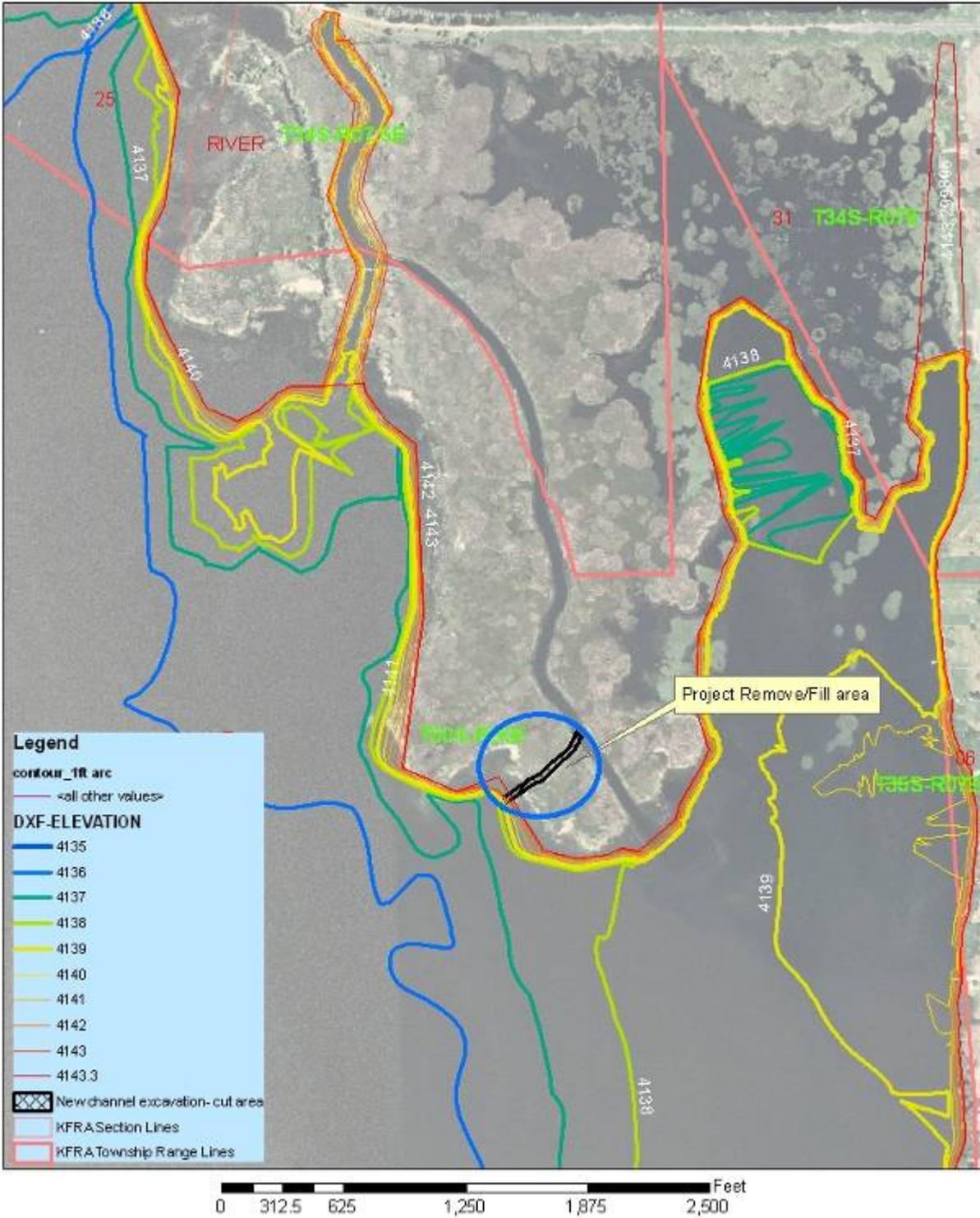


No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for any kind of aggregate use, including, but not limited to, the use of these data for navigation purposes. No liability is assumed for any errors or omissions.

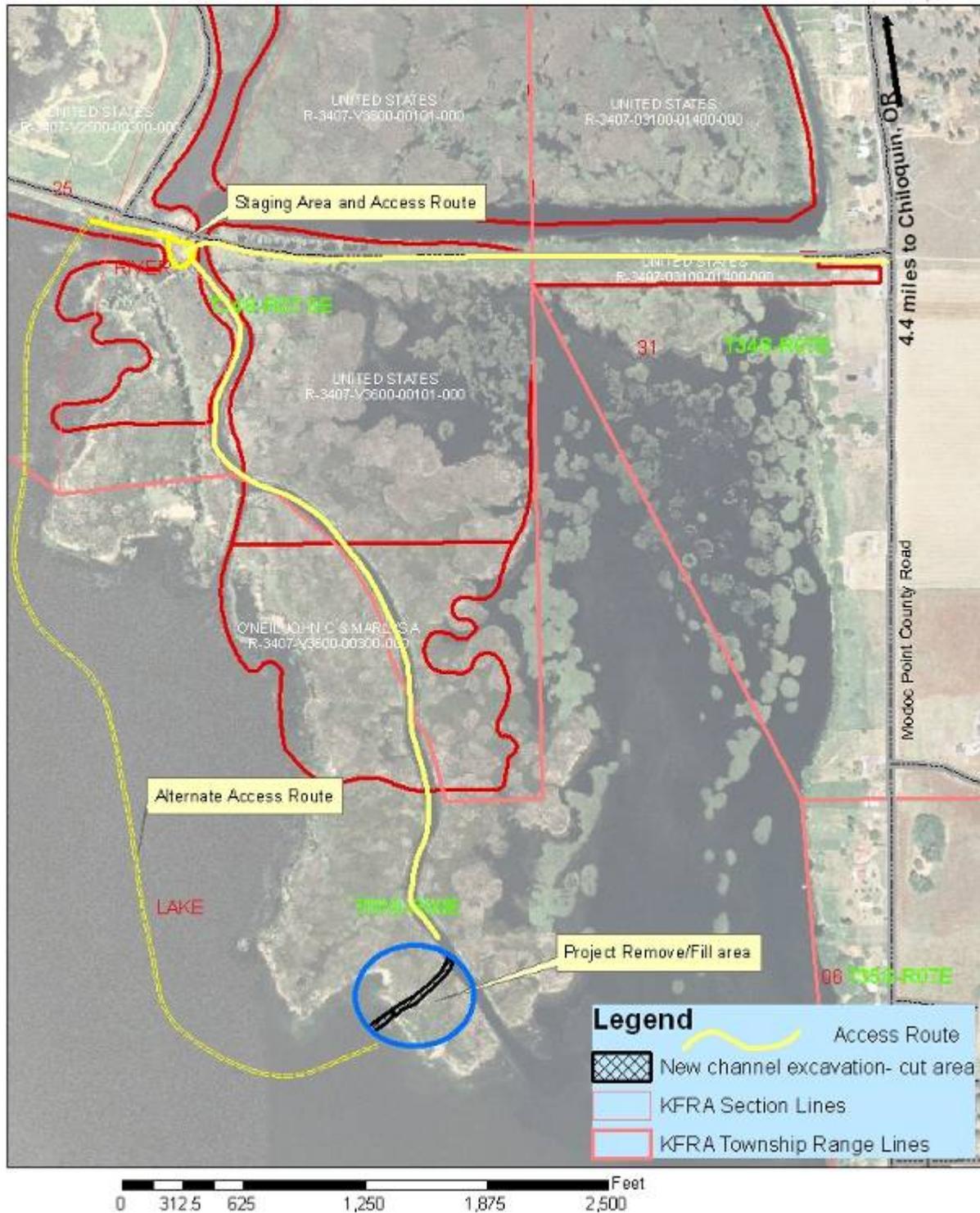
Wood River Delta Distributary Channel Restoration 1941 aerial photo



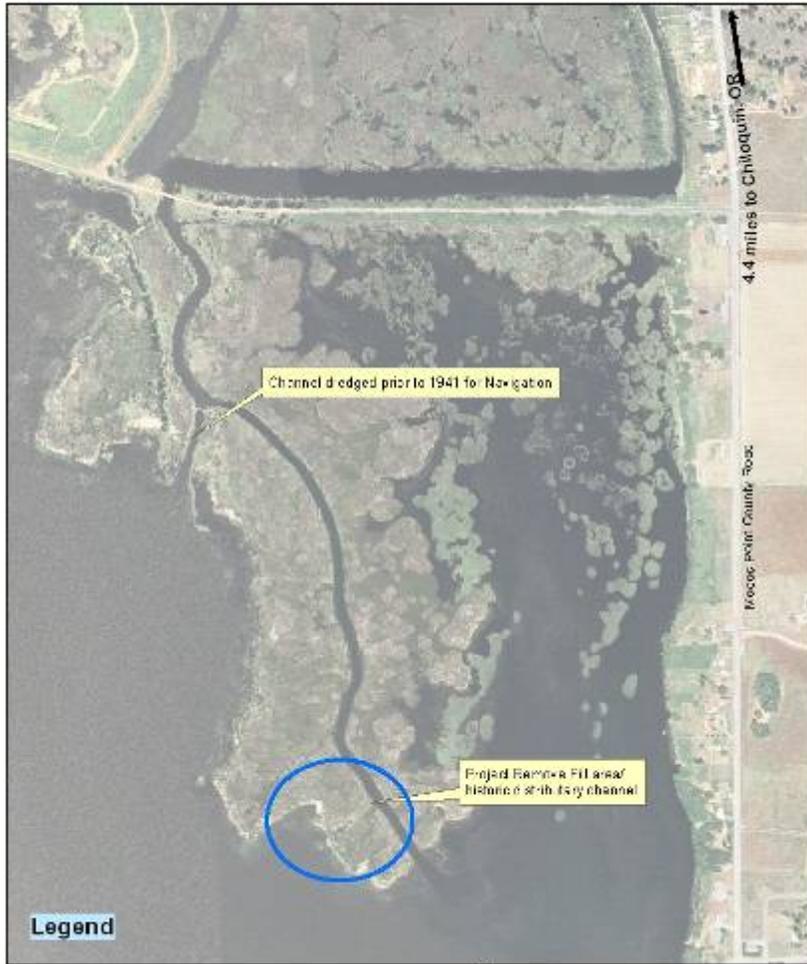
Wood River Delta Distributary Channel Restoration Lake Bottom Contour Map



Wood River Delta Distributary Channel Restoration Tax Lots and Access Route



Wood River Delta Distributary Channel Restoration
2005 aerial photo



Wood River Delta Distributary Channel Restoration
1941 aerial photo



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