

# Yakima River Basin Study

## Environmental, Policy and Legal Barriers Technical Memorandum

U.S. Bureau of Reclamation  
Contract No. 08CA10677A ID/IQ, Task 5.2

*Prepared by*

ESA Adolfson



U.S. Department of the Interior  
Bureau of Reclamation  
Pacific Northwest Region  
Columbia-Cascades Area Office



State of Washington  
Department of Ecology  
Office of Columbia River

June 2011

## **MISSION STATEMENTS**

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian tribes and our commitments to island communities.

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The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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The Mission of the Washington State Department of Ecology is to protect, preserve and enhance Washington's environment, and promote the wise management of our air, land and water for the benefit of current and future generations.

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# 1.0 Introduction

This technical memorandum describes potential environmental, policy, and legal barriers to implementing the projects proposed in the Yakima Basin Integrated Water Resources Management Plan (Integrated Plan). The term “barriers” is used instead of impacts because this analysis focuses on major issues that could prevent a project from moving forward. This analysis is not intended to be on the level of an environmental impact statement, but a summary of the major issues associated with each project. This information is provided to help the Yakima River Basin Water Enhancement Project (YRBWEP) Workgroup understand challenges that may be associated with implementing the Integrated Plan.

Environmental barriers include impacts on natural resources such as water, habitat, and wildlife; cultural resources such as historic and archaeological resources; and social issues such as recreation and property acquisition. The major potential environmental impacts for each project are briefly described in this technical memorandum, followed by a summary of any environmental impacts that could prevent or delay implementation of the project.

General construction impacts are discussed for each element of the Integrated Plan, but not for each project. These impacts are considered temporary and would end after construction is completed. Some projects would generate only construction impacts and would have no long-term impacts. It is assumed that projects would comply with permit requirements and employ best management practices to minimize construction impacts.

The full extent of potential environmental impacts on any of the proposed projects is not yet known. Specific projects recommended in the Integrated Plan would require additional environmental review if they are carried forward, including review under the National Environmental Policy Act (NEPA) and/or State Environmental Policy Act (SEPA), consultation under the Endangered Species Act (ESA), and cultural resources review and consultation.

Policy and legal barriers are described for each element of the Integrated Plan and for specific projects where appropriate. These barriers include laws and regulations that may prevent or delay project implementation, some Congressional and legislative authorizations that would need to be changed, and cultural and public perceptions.

A mitigation section is presented for each element of the Integrated Plan, focusing on possible mitigation strategies for major barriers to implementing a project. A programmatic approach is used to describe recommended mitigation since project details are not yet known. The recommended mitigation strategy is a coordinated programmatic approach to mitigation that would involve interested parties, including agencies, environmental groups, and the Yakama Nation. Proposed Mitigation measures developed by these stakeholders would be included as part of the Integrated Plan.

All of the projects will require compliance with a variety of Federal, State, and local permits. Tables in Section 4 present the likely permits for each Integrated Plan element.

This technical memorandum evaluates potential environmental, policy and legal barriers associated with *individual* elements and projects of the Integrated Plan. Impacts of the Integrated Plan as a whole will likely need to be evaluated after the plan elements have been finalized. The synergistic or cumulative impacts of the plan as a whole, such as effects on flow levels in the Columbia River, will be evaluated during future environmental review.

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## 2.0 Summary of Potential Barriers

This section summarizes, by Integrated Plan element, which potential environmental, policy and legal impacts could present potential barriers to implementation. (Section 3 presents a brief analysis of these potential impacts.)

**Fish Passage Element.** The Fish Passage Element is not expected to present any environmental, policy or legal barriers to implementation. The only environmental impacts would be temporary during construction and overall the projects would benefit the environment.

**Structural or Operational Changes Element.** The only environmental impacts associated with the Structural or Operational Changes Element would be related to temporary construction. Therefore, no environmental barriers are anticipated. Raising the pool level at Cle Elum Reservoir would require major property or easement acquisitions that could delay the project. Subordinating power at the Roza and Chandler Powerplants would require alternative power sources to replace the lost power, which would present policy barriers to implementation, especially if agreements with the Bonneville Power Administration (BPA) cannot be reached for the Roza Powerplant.

**New or Expanded Storage Element.** Constructing a new Wymer Reservoir and its conveyance lines would cause impacts on shrub-steppe and greater sage-grouse habitat. Expanding the existing Bumping Lake Reservoir would impact old-growth forest, habitat for the northern spotted owl, spawning areas for bull trout, and existing recreational facilities. The Kachess Reservoir Inactive Storage Project may affect bull trout access to Box Canyon Creek. Those impacts may present environmental barriers that could prevent or delay the projects. In addition, water storage projects often generate opposition from some members of the public, which may delay implementation.

**Groundwater Storage Element.** The Groundwater Storage Element is not expected to cause environmental impacts that would be considered environmental barriers. Both the Municipal Aquifer Storage and Recovery Project and the Groundwater Infiltration Project are relatively new concepts that may encounter delays in permitting.

**Fish Habitat Enhancements Element.** The proposed fish habitat enhancement projects would benefit fish throughout the basin and only cause temporary construction impacts. These projects may require property acquisition, which could delay the projects.

**Enhanced Water Conservation Element.** No environmental barriers are anticipated for this element. Neither agricultural nor municipal conservation would generate environmental impacts. Implementing municipal water conservation would require coordination among agencies and cooperation of water users that could present a policy barrier, but the coordinated, incentive-based program is intended to overcome that potential barrier.

**Market-based Reallocation of Water Resources Element.** This element would not generate environmental impacts, and therefore would have no environmental barriers. The proposal is intended to overcome existing policy and legal barriers to water transfers, and therefore is not expected to present policy or legal barriers.

## 3.0 Environmental, Policy and Legal Barriers and Mitigation Strategies

The following subsections describe the potential environmental, policy and legal barriers and potential mitigation strategies for each of the seven elements of the Integrated Plan:

- 
- Fish Passage
  - Structural or Operational Changes
  - New or Expanded Storage
  - Groundwater Storage
  - Fish Habitat Enhancement
  - Enhanced Water Conservation
  - Market-based Reallocation of Water Resources

### **3.1 Fish Passage Element**

None of the Yakima Project storage dams included fish passage facilities when they were constructed in the early 20th Century. The lack of fish passage has blocked access to upstream habitat and contributed to the extirpation of sockeye salmon runs in the Yakima River Basin. The Fish Passage Element includes proposals to add fish passage facilities at the Cle Elum, Bumping Lake, and Clear Lake dams. The Cle Elum and Bumping Lake projects would be conducted in conjunction with a fish reintroduction program to achieve the greatest benefit to fish. Additionally, this element includes provisions for fish passage at Tieton, Keechelus, and Kachess dams subject to future studies.

#### **Temporary Construction Impacts**

Most impacts associated with installing fish passage facilities at Yakima Project dams would be related to temporary construction. Using the Cle Elum Dam project as an example, temporary impacts are expected to last approximately 3 years. These would include increased potential for erosion and sedimentation, reduced water quality, habitat disturbance, noise, and construction traffic. Recreational activities could be disrupted by noise and possible closures during construction. Installation of passage facilities downstream from the dams may require diversion of the river and temporary fish removal. It is anticipated that these impacts would be mitigated by following permit requirements and employing best management practices.

Impacts on cultural resources could include modification of historic dams and their appurtenances and disturbance of cultural resources in the area. While the actions would occur in the short term, these impacts would be permanent. Measures to avoid affecting cultural resources would be employed prior to construction to minimize these potential impacts.

#### **Environmental Barriers**

##### ***Cle Elum Dam***

Cle Elum Dam, located in the upper Yakima River Basin, was constructed without fish passage. Currently there are no upstream fish passage facilities at the dam and only temporary downstream fish passage facilities. Providing upstream and downstream fish passage would open up reservoir habitat and 29.4 miles of high-quality tributary habitat.

The most technically feasible option for downstream passage is a multi-level, gated concrete intake structure located just above the spillway inlet channel and a conduit through the right abutment of the dam (Reclamation 2010). For upstream passage, a trap-and-haul facility is proposed in lieu of a fish ladder. Trap-and-haul facilities were selected for all the Yakima Project dams because high reservoir fluctuations make fish ladders infeasible. Reclamation is preparing an environmental impact statement

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(EIS) for the Cle Elum fish passage project and released the Draft EIS in January 2010 (Reclamation 2010).

The major environmental impacts associated with this fish passage project include permanent loss of habitat where fish passage facilities are located, including:

- Approximately 7,600 square feet (0.17 acres) of Douglas fir, black cottonwood, lodgepole pine, and chokecherry for the fish passage conduit
- Approximately 23,700 square feet (0.54 acres) of riparian and second-growth Douglas fir, black cottonwood, lodgepole pine, and chokecherry for the adult fish collection facility
- Approximately 3,150 linear feet of habitat associated with road upgrades and new roads.

Most threatened and endangered species present in the Cle Elum River basin are expected to benefit from the project. The only exception may be adfluvial bull trout (bull trout that migrate to lakes to spawn) in Cle Elum Lake, which would experience increased competition from reintroduced fish. Overall, bull trout would benefit from an increased prey base and connection to downstream populations.

Ground disturbance could affect cultural resources in the area. The proposed downstream fish passage conduit passes through the original construction camp used during the building of Cle Elum Dam. While no standing structures remain, there may be historical or archaeological values that could be affected by ground disturbance. A Kittitas-Yakama seasonal camp, *Aiyalim*, is also located in the dam area. Its exact location is unknown, but the camp could be disturbed by construction. Furthermore, the intake structure may be attached to Cle Elum Dam, which is potentially eligible for the National Register of Historic Places (NRHP). These facilities could detract from the historic qualities of the dam, but the dam has undergone other modifications since it was constructed.

None of these impacts are expected to present environmental barriers that would prevent or delay the project.

### ***Bumping Lake Dam***

Bumping Lake Dam is located at the lower end of a natural lake at River Mile 17 on the Bumping River in the upper Naches River basin. The Integrated Plan includes a proposal to expand the existing reservoir by constructing a new dam downstream from the existing dam. The fish passage facilities described in this section are for the new dam. Proposed facilities include downstream juvenile passage and upstream adult passage, similar to those described for Cle Elum Dam. The downstream passage facilities would consist of a multi-level concrete intake structure with a conduit through the dam. Upstream fish passage would involve a trap-and-haul system using a barrier structure to direct fish to a collection facility. Fish would be transported by truck above the dam and released into Bumping Lake.

Fish passage facilities for the new dam would be located within spotted owl Critical Habitat Unit Number 6: Southeast Washington Cascades (USFWS 2008a). Precise impacts are not known since detailed designs have not been completed. Based on preliminary designs for fish passage facilities at the existing dam, approximately 20,000 square feet (0.5 acres) of riparian and second-growth Douglas fir would be replaced by passage facilities. Impacts on spotted owl habitat would be coincidental to those associated with expanding Bumping Lake Reservoir, as described in Section 2.3.2.4.

Fish passage facilities are expected to benefit fish and wildlife above the dam. While bull trout populations would experience increased competition from reintroduced fish, they are expected to benefit from an increased prey base and connection to downstream populations.

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None of these impacts are expected to present environmental barriers that would prevent or delay the project.

### ***Clear Lake Dam***

Clear Lake Dam is located upstream of Tieton Dam on the North Fork of the Tieton River. Modifications to improve upstream passage at the dam and/or spillway would allow a migratory pathway for adfluvial bull trout moving from Rimrock Reservoir. Additional studies are needed before fish passage facilities can be designed. Similar to the other fish passage facilities projects, it is anticipated that environmental impacts would be limited to construction activities, and no environmental barriers are anticipated.

### ***3.1.2.4 Tieton, Kecheelus, and Kachees Dams***

Fish passage facilities are also proposed at Tieton, Kecheelus, and Kachees Dams; however, passage at these dams will be more complex than passage at the other Yakima Project dams. Additional study is needed to determine what fish passage facilities are most appropriate for these three dams. It is anticipated that the environmental impacts of establishing fish passage at Tieton, Kecheelus, and Kachees Dams would be generally similar to the environmental impacts barriers for the other three dams. Therefore, no environmental barriers are anticipated.

## **Policy and Legal Barriers**

No significant policy barriers are anticipated to installing fish passage facilities at the Yakima Project storage dams. Installation of fish passage facilities and related fish reintroduction projects would not negatively affect water supply. Reclamation is committed to ensuring that the following principles are met (Reclamation 2010):

- Fish passage facilities would not change the timing or quantity of releases from dams.
- Fish passage facilities would be designed and operated within existing operational considerations and constraints as outlined in the Interim Comprehensive Basin Operating Plan (Reclamation 2002).
- Fish passage facilities would not impact total water supply available (TWSA).
- Operations would continue to serve existing Reclamation contracts.
- Potential operational changes that might enhance passage without impacting service to existing contracts or TWSA would be considered.
- Fish passage facility projects would not be constrained by ESA issues.
- Fish passage facilities would not affect the irrigation community in any way, including TWSA and water delivery.

### ***Cle Elum Dam Fish Passage***

Reclamation and the Washington Department of Ecology are moving forward with the design and environmental review for fish passage facilities and a fish reintroduction program at Cle Elum Dam. The fish passage element will be considered in the context of the Integrated Plan. However, completion of the final EIS and construction design for fish passage at Cle Elum Dam is expected to continue on a separate path. Fish passage at Cle Elum Dam is not dependent on actions proposed in the Integrated Plan and could be constructed independently. However, the Integrated Plan also provides instream flow

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improvements that would enhance the benefits of passage facilities at Cle Elum Dam. No legal or policy barriers are expected with respect to installing fish passage facilities at Cle Elum Dam.

### ***Bumping Lake Dam Fish Passage***

No legal or policy barriers are expected to installing fish passage facilities at Bumping Lake Dam.

### ***Clear Lake Dam Fish Passage***

No legal or policy barriers are anticipated to installing fish passage facilities at Clear Lake Dam.

## **Mitigation Strategies**

No environmental barriers are anticipated with the installation of fish passage facilities. Reclamation would operate the facilities to ensure that existing Reclamation contracts are met and TWSA would not be affected. No additional mitigation strategies are proposed.

## **3.2 Structural and Operational Changes**

Structural and operational changes at existing facilities are intended to improve water supply for irrigation and benefit streamflows and anadromous fish passage. Environmental impacts associated with these projects would primarily be related to temporary construction. Once operational, no environmental impacts are anticipated.

### **Temporary Construction Impacts**

Construction activities for projects involving structural changes would require the use of heavy equipment, such as bulldozers, excavators, and dump trucks. The following general types of temporary impacts are likely to occur with any project element requiring the use of heavy equipment:

- Increased noise and dust
- Potential for erosion of exposed soils
- Temporary disturbance of wildlife
- Clearing and grading
- Potential for degraded water quality if sediments or chemicals (such as fuels) enter surface waters
- In-water work to install or remove pipes and pumps
- Temporary road closures or traffic detours

The types of equipment used, and the intensity and duration of construction work, would vary by project. The most intensive heavy equipment work is likely to occur during deep excavation or blasting through bedrock along a portion of the Keechelus to Kachess Pipeline.

In general, construction would occur in areas that are already developed and primarily used for agriculture or irrigation supply facilities. Wildlife that use disturbed habitats in these areas are likely accustomed to this level of activity. While they would experience temporary disruptions during construction, they would likely resume their use of the project area after construction is completed. Cle Elum, Keechelus, and Kachess reservoirs are located in areas that support listed species, including northern spotted owl, gray wolf and fish. Construction would comply with applicable seasonal construction windows to protect sensitive life stages, and methods would be used to protect listed species.

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## **Environmental Barriers**

### ***Conveyance Changes at Wapatox Diversion***

This project would modify the conveyance system for the former Wapatox Power Plant to reduce water diversions from the lower Naches River. Modifications would allow irrigators access to their full water rights while allowing additional water to be left instream.

The project includes piping or lining the 8-mile-long Wapatox Canal, installing a new pump station to supply the Wapatox and Naches Irrigation Districts, and consolidating diversions for the Gleed Ditch and Yakima Water Treatment Plant from the Wapatox Canal. The Gleed Ditch and Yakima Water Treatment Plant would be served through piped connections to the downstream end of the pipeline that replaces the Wapatox Canal. Less than 1 mile of new pipeline would be required for these piped connections to the Gleed Ditch and treatment plant.

No long-term environmental impacts are anticipated from this project. Therefore the project would not present environmental barriers that could prevent or delay the project.

### ***Subordinate Power at Roza Powerplant***

The purpose of this project is to improve streamflows by reducing or eliminating water diversions for hydropower generation at the Roza Powerplant during outmigration of juvenile anadromous fish in the spring. The project would improve streamflow below Roza Dam for spring outmigration of Chinook, sockeye and coho.

No environmental barriers are anticipated from the operational changes of this project..

### ***Subordinate Power at Chandler Powerplant***

This project is similar to the Roza Powerplant Subordination Project. It would reduce or eliminate water diversions for hydropower generation at the Chandler Powerplant during outmigration of juvenile anadromous fish. In addition to improving streamflows between Prosser Dam and the Chandler Powerplant outfall, the project would reduce the number of smolts entrained to the Chandler canal and thereby reduce mortality rates in the juvenile fish bypass system.

No environmental impacts or barriers are anticipated as a result of the operational changes of this project.

### ***KRD Main Canal and South Branch Canal Modifications***

This project would replace 10 open laterals on the Kittitas Reclamation District (KRD) Main Canal and South Branch Canal with pressurized pipe systems, reducing seepage and spill at the tail end of the lateral. These modifications would allow water discharge directly to tributary streams or water users who currently divert water from tributaries. A pump station would be constructed on the Yakima River near the tail end of the South Branch Canal to pump water to existing diversions on Manastash Creek. This would allow additional flow to remain in that creek during periods of low stream flow (from July to the end of the irrigation season).

No significant long-term environmental impacts are anticipated with this project. Piping canals could result in the loss of some temporary ponds and wetlands that may have formed along the irrigation canals and ditches by removing the hydrology source for the wetlands. These artificial wetlands may provide habitat for amphibians, birds, and other wildlife. The loss of water may cause a shift of species composition toward non-wetland or more arid plant community types, but this would be a change toward more natural conditions and would not be considered a significant impact.

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The project is not expected to present environmental barriers that would prevent or delay construction.

### ***Raise Pool Elevation at Cle Elum Reservoir***

The purpose of this project is to raise the pool level behind Cle Elum Dam by modifying the spillway gates, and to use the additional stored water to increase water supply in the Yakima River. The project would provide approximately 14,300 acre-feet of additional storage. The maximum water surface elevation of the reservoir would be raised by 3 feet by adding stiffened flashboards to the spillway gates on the existing dam. Raising the pool level would flood additional land around the reservoir for approximately three to ten weeks per year (average of seven weeks). The higher water levels would typically occur between April and August. The project includes installing measures to protect the shoreline from erosion due to higher water levels.

Forest and riparian habitat areas surrounding Cle Elum Reservoir are known to provide suitable habitat for several State and Federal listed species. Project impacts would be confined to a small area adjacent to the shoreline that is not considered high-quality habitat for these species. Therefore, the project is not expected to impact these species.

Cle Elum Reservoir supports a remnant population of Federally listed bull trout species (Reclamation and Ecology 2010). Raising the water level of the reservoir would seasonally flood the mouths of tributary streams, but flooding would not occur during spawning and is not expected to adversely affect bull trout.

The addition of flashboards to the spillway gates could detract from the historic qualities of Cle Elum Dam, which is potentially eligible for the NRHP. However, the dam has undergone other modifications since it was constructed. Cultural resources have been identified in the vicinity of Cle Elum Reservoir, including sites related to the prehistoric and early historic Native American occupation of the area, and sites related to historic Euro-American water development (Reclamation and Ecology 2010). Any cultural resources located in the shoreline area could be disturbed by the installation of shoreline protection measures or exposed by erosion from the higher reservoir level.

The inundation of additional shoreline areas would not permanently affect any formal camping areas or other recreational facilities. Recreationists would notice the change in water levels, but are expected to adapt their activities accordingly.

The project would impact 56 acres that would either be seasonally flooded or used for shoreline protection measures. This includes portions of 33 privately owned parcels. The effects would occur along a relatively narrow strip of shoreline fronting each parcel. Property owners would need to be compensated for these effects, likely through acquisitions of parcels or easements.

None of these environmental impacts represent environmental barriers that would prevent the project from moving forward. Because of the number of properties involved, easement acquisition could delay the project.

### ***Keechelus to Kachess Pipeline***

This project involves constructing approximately 5 miles of new pipeline to transfer water from Keechelus Reservoir for seasonal storage in Kachess Reservoir. It would also reduce high summertime flows in the Keechelus River that can impair fish habitat. The new pipeline would be approximately 96 inches in diameter, conveying an average of 400 cfs. Reclamation intends to coordinate this project with construction of a new wildlife crossing of Interstate 90 planned by the Washington Department of Transportation (WSDOT).

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At the eastern end of the alignment, the new pipeline would extend approximately 550 feet below the high-water shoreline of Kachess Reservoir so the discharge end of the pipe would remain submerged during reservoir drawdown. The first 200 feet of the outfall pipeline would be buried in the lake bottom, while the rest would be anchored to the lake bottom with concrete weights.

Environmental impacts associated with this project would primarily be related to construction. Moving water between the two reservoirs is not expected to change water elevations beyond their existing operational ranges. The additional water in Kachess Reservoir is likely to improve bull trout migration into tributary streams. The pipeline would require easements across 64 parcels located between Keechelus and Kachess Reservoirs, owned by 39 separate landowners. Of this total, 46 parcels are privately owned.

No environmental barriers are anticipated that would prevent or delay the project.

### **Policy and Legal Barriers**

Most structural and operational changes to existing facilities are not expected to encounter legal or policy barriers. Some projects would require water rights changes to allow changes in points of diversion, but no problems are anticipated in obtaining those changes. None of the projects would negatively affect irrigation diversions or deliveries. Potential policy and legal issues are described below.

#### ***Conveyance Changes at Wapatox Diversion***

Consolidating the Wapatox and Naches Selah irrigation districts' diversions and/or using the Wapatox diversion to supply water to the Yakima Water Treatment Plant and the Glead Ditch would require changes in the point of diversion of water rights confirmed in the Yakima Adjudication. Because the project would improve both water deliveries and instream flows, no barriers to water rights changes are anticipated.

#### ***Subordinate Power at Roza Powerplant***

This project would increase flows for fish outmigration in the Yakima River below Roza Dam by reducing or eliminating water diversions from Roza Dam to the Roza Powerplant in the spring. Current operations also involve significant subordination of power production at Roza Powerplant, although it is not as extensive as that being proposed. The amount of power not produced at Roza Powerplant depends on the amount of increased instream flow desired. The estimated loss of power ranges from 1,092,000 kilowatt hour (kWh) for a 50 cubic-foot-per-second (cfs) flow increase to 6,522,000 kWh for a 300 cfs flow increase (Ecology 2009a).

Reclamation is contractually required to provide power for Roza Irrigation District's large irrigation pumps. A minimum amount of power must be generated at Roza Powerplant to maintain a net benefit to BPA. BPA advances funds for maintenance of the facilities and provides power from its grid, at the cost of producing it at Roza Powerplant, during times in the irrigation season when the powerplant is out of service.

#### ***Subordinate Power at Chandler Powerplant***

Similar to the Roza subordination project, subordination of power at the Chandler Powerplant would increase flows in the Yakima River below Prosser Dam, but decrease power generation. The decreased power generation would range from 236,700 kWh for a flow level of 1,100 cfs to 2,174,000 kWh for a flow level of 2,000 cfs (Ecology 2009a). Reclamation does not have an agreement with BPA for power generation.

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### ***KRD Canal Modifications***

One option for this project would be for KRD to directly supply water to users who are now diverting from tributary creeks. This would require approval from Ecology to change the point of diversion and source of water under existing water rights. KRD and the water rights holders would need to enter into an agreement for KRD to divert and convey water through its system to the individual users. Ecology is likely to approve the water rights change because it would improve both streamflows and the reliability of water rights for the users. Some water rights holders may be reluctant to change their individual creek water rights to KRD rights.

### ***Raise Pool Elevation at Cle Elum Reservoir***

Raising the elevation of Cle Elum Reservoir was authorized in Section 1206 of Title XII of the Yakima River Basin Water Enhancement Act of 1994. The Act authorized additional water to be used exclusively for instream flows for fish and wildlife. YRBWEP Workgroup members have indicated this restriction is outdated and that the additional water should be used in whatever manner is most appropriate. Using the water for other uses would require new authorization from Congress.

This project would be coordinated with the Cle Elum Dam fish passage project.

### ***Keechelus to Kachess Pipeline***

No policy or legal barriers are anticipated to piping water from Keechelus Reservoir to Kachess Reservoir. Reclamation plans to coordinate the Interstate 90 crossing with WSDOT's planned wildlife crossing of the highway to minimize the duration of construction disturbance. However, coordinating schedules for the two projects could be difficult since the WSDOT project is more advanced.

### **Mitigation Strategies**

Standard mitigation strategies would be employed to minimize construction impacts.

## **3.3 New and Expanded Storage**

The Integrated Plan proposes new and expanded storage facilities to improve water supplies for irrigation and streamflow conditions. These include a proposal for a new off-channel reservoir (Wymer Reservoir), expansion of Bumping Lake Reservoir, and using inactive storage at Kachess Reservoir. Wymer Reservoir would be filled with water from the Yakima River. The Integrated Plan includes an option for diverting the water from the upper Yakima River near Thorp and using KRD infrastructure to convey the water to the reservoir. It also includes a proposal to convey water directly from Wymer Reservoir to the Roza Irrigation District canal.

### **Temporary Construction Impacts**

The New Storage Element has the highest potential for construction-related impacts because of the scale and duration of the projects. Creating new or expanded storage reservoirs would involve clearing and excavation for dam facilities and access roads. Excavation would increase the potential for erosion.

Construction of new or expanded storage projects would have other short-term impacts from construction, such as:

- Access limitations from temporary road closures
- Increased traffic on the roadways

- 
- Soil erosion from construction activities within the borrow areas and construction of access roads, which would contribute to turbidity in surface waters
  - Temporary water quality impacts from inundation of new areas
  - Temporary closures of recreation facilities

Construction of a new dam at Bumping Lake would require bypassing the Bumping River around the construction area. During dam construction, a cofferdam and bypass channels may be required to route the flowing water away from construction activity.

Wymer Reservoir conveyance lines would temporarily disrupt transportation routes in the lower Kittitas Valley. Canal upgrades would impact existing bridges (23 small bridges and 13 county road bridges), two existing tunnels, two existing siphons, and all existing diversion structures. Construction of conveyance line improvements may also cause temporary closures of the John Wayne Pioneer Trail, which crosses the affected portion of the KRD North Branch Canal near Interstate 90 and Stevens Road.

## **Environmental Barriers**

### ***Wymer Reservoir***

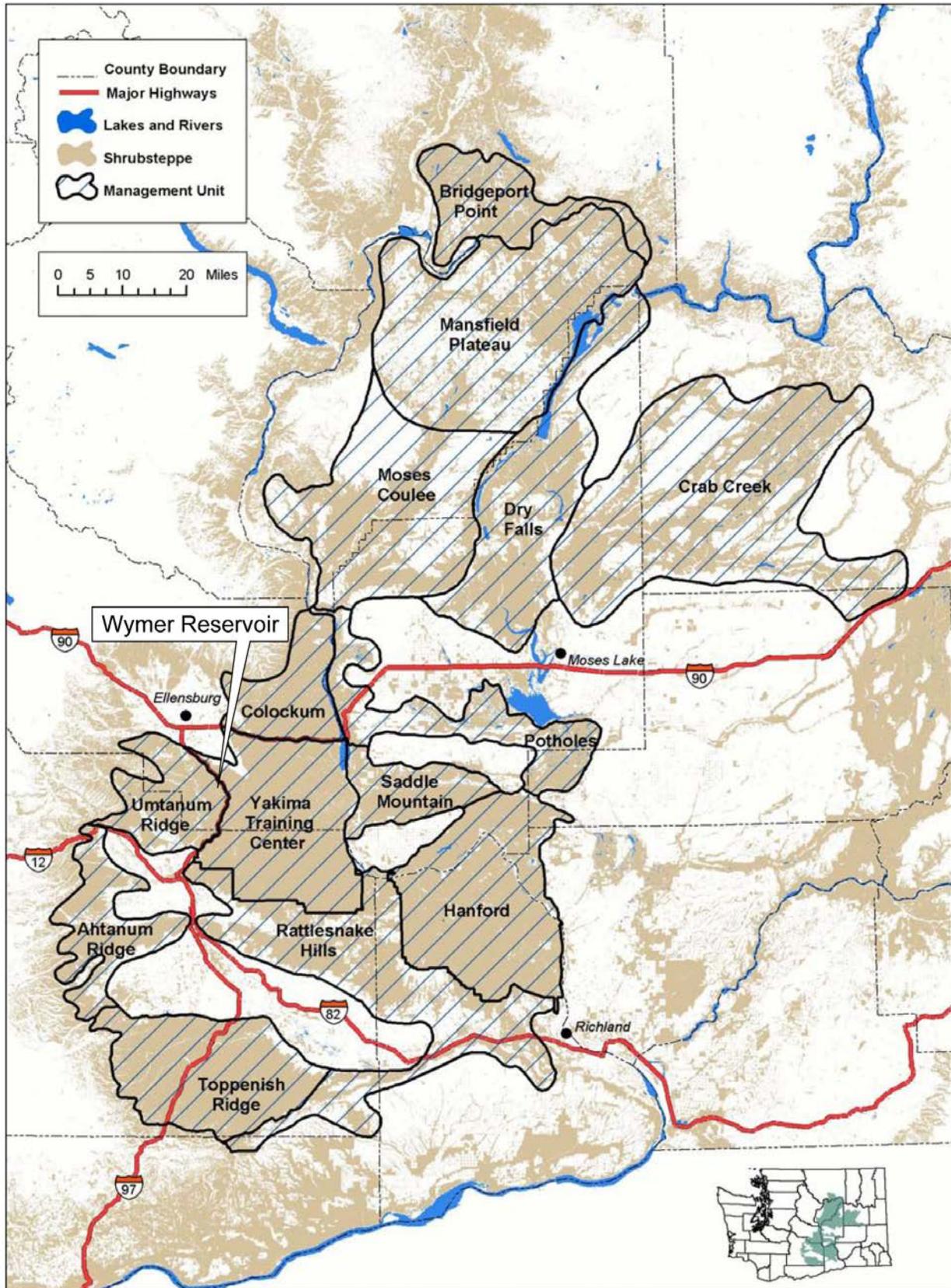
Wymer Reservoir is proposed in a canyon that contains Lmuma Creek, an intermittent tributary channel to the Yakima River. The mouth of the creek is located on the Yakima River approximately 8 miles upstream of Roza Diversion Dam. The reservoir would have an active capacity of 162,500 acre-feet, including 82,500 acre-feet for annual use for downstream irrigation and instream flows and 80,000 acre-feet for use in dry years. Options for filling the reservoir and conveying water to the Roza Canal are described in the next sections.

Wymer Reservoir would inundate substantial areas of wildlife habitat. Initial studies have indicated that the lands within the reservoir footprint are of relatively high value for shrub-steppe species (Reclamation 2008). The Wymer Reservoir area provides core habitat for a number of species, including greater sage-grouse, ferruginous hawk, sage sparrow, Brewer's sparrow, bighorn sheep, mule deer, and numerous other birds and small mammals. Wymer Reservoir would inundate habitat and movement corridors for these species.

The greater sage-grouse is State-listed as threatened and is a Federal candidate for listing under the ESA. In Washington, sage-grouse formerly ranged from the Columbia River north to Oroville, west to the foothills of the Cascade Range, and east to the Spokane River. Sage-grouse in Washington currently are restricted to three isolated populations. The largest (estimated at about 600 birds) is located on mostly private land in Douglas and Grant counties. A second population of 300 to 400 birds is on the Yakima Training Center in Kittitas and Yakima counties adjacent to the Wymer Reservoir site, and a third population of 25 to 30 birds occurs within the Yakama Reservation (Stinson et al. 2004).

Data from radio-tagged sage-grouse found that they use habitat in the Wymer Reservoir site (Reclamation 2010). The shrub-steppe habitat in the project area is within the Umtanum Ridge Management Unit identified by the State as a potential expansion and reintroduction area for greater sage-grouse (see Figure 1) (Stinson et al. 2004).

Preferred habitat for greater sage-grouse includes areas with greater than 10 percent cover of sagebrush, with moderate bunchgrass understory. Typical home-range size is 0.8 to 17 square miles in Washington (Stinson et al. 2004). Males gather at leks, mating and displaying locations, returning to the same lek annually. Females choose nest sites then travel to leks to select mates. Females were found to nest approximately 0.5 to 12 miles from leks on the Yakima Training Center (Stinson et al. 2004).



SOURCE: Stinson et al. 2004.

Figure 1. Sage-Grouse Management Units in Washington

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According to Reclamation (2008), Wymer Reservoir would inundate the following habitats (see Figure 2):

- 1,055 acres of shrub-steppe habitat
- 167 acres of grassland
- 62 acres of barren land
- 50 acres of riparian area
- 11 acres of agricultural cropland
- 6 acres of forest habitat
- 4 acres of wetlands

Greater sage-grouse use shrub-steppe and, to a lesser extent, grassland and agricultural areas. Loss of this habitat at the Wymer site would exacerbate ongoing losses in the area.

Movement corridors and habitat for the greater sage-grouse would be affected directly by Wymer Reservoir. A movement corridor runs north to south through the Yakima River Canyon. The reservoir lies east of the canyon. Sage-grouse moving west from the Yakima Training Center to the canyon would be required to migrate to the north or south of the reservoir (Reclamation 2008). The reservoir would cause some loss of movement corridors and would further isolate and fragment greater sage-grouse populations and substantially decrease and/or eliminate suitable habitats.

Shrub-steppe habitat in eastern Washington has been altered significantly by agricultural, residential, and urban development over the past century. Most recently, areas of shrub-steppe have been developed for wind energy. Three large areas of shrub-steppe remain in the Yakima River basin; two are on public land (the Yakima Training Center and the Hanford Reach National Monument); the third is on the Yakama Reservation. These large blocks are protected from future residential and urban development.

Management efforts are being implemented at these three remaining sites to preserve, restore, and increase shrub-steppe habitat and connectivity. The South-Central Washington Shrub Steppe/Rangeland Conservation Partnership and Washington's Greater Sage-Grouse Recovery Plan seek to implement these objectives for the remaining tracts of shrub-steppe (Stinson et al. 2004). Outside of these larger protected areas, residual shrub-steppe habitat continues to be threatened by urban and residential development and habitat fragmentation.

Wymer Reservoir could cause groundwater seepage west toward the Yakima River. Permeability testing has indicated very high hydraulic conductivity values in the upper basaltic layers. The Yakima River Valley is less than 1 mile from the Wymer dam site, so seepage would have a short flow path and would be under a high-flow gradient from the full reservoir to the river valley below. Mitigation would be required to control the seepage and potential for sediment transport through the abutments and reservoir rim.

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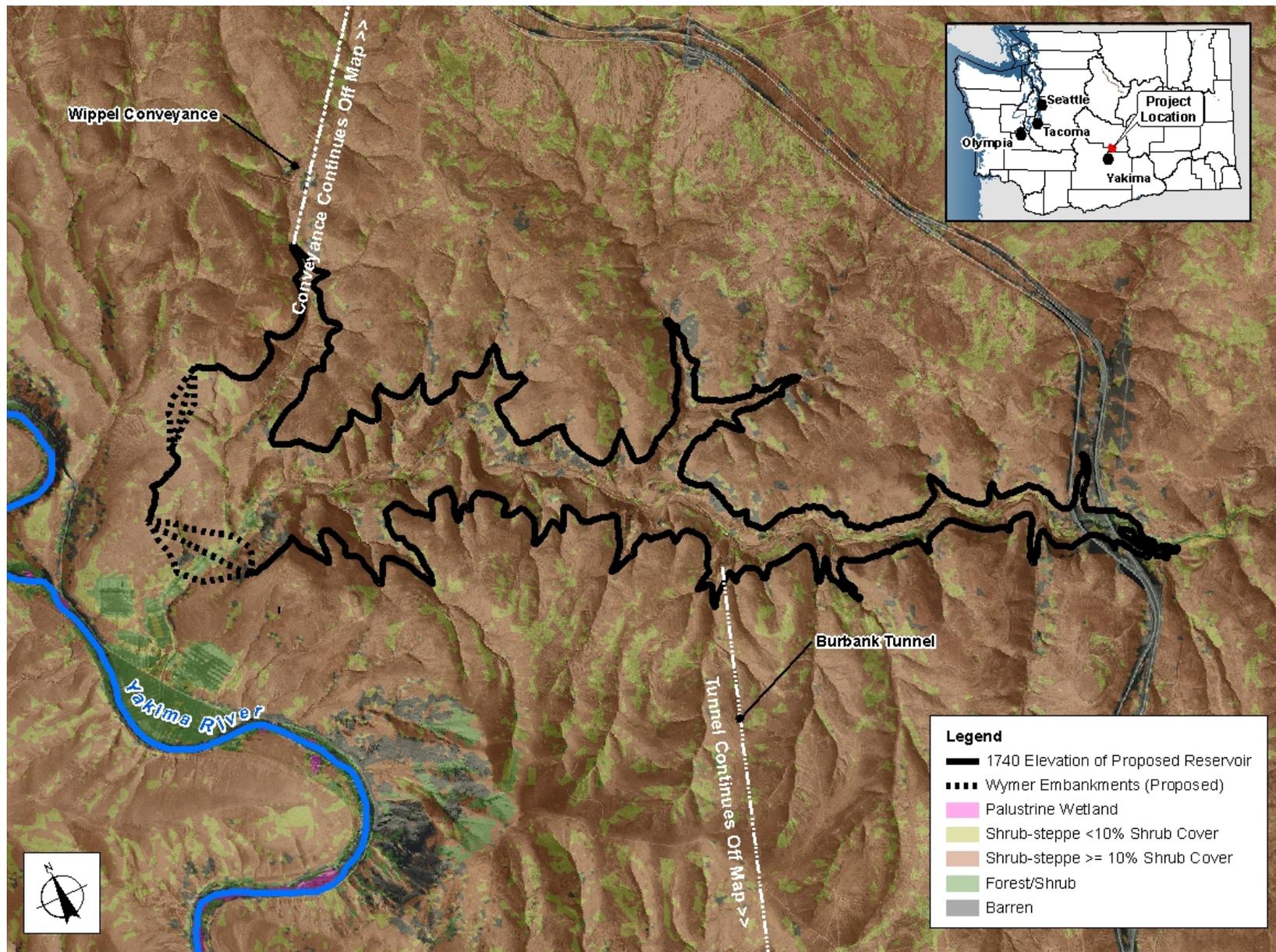


Figure 2. Wymer Reservoir Inundation Area

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The Wymer Reservoir site has high potential for historic and cultural resources. The site is on territory ceded by the Yakama Nation under the Walla Walla Treaty of 1855. As part of its EIS for the Storage Study, Reclamation conducted a records and literature review of cultural resources at the proposed reservoir and pipeline locations, including within a 1-mile radius of Wymer Reservoir (Reclamation 2008). No resources eligible for NRHP listing were identified in the search.

Development of Wymer Reservoir would require acquisition of 4,000 acres of privately owned land in the Lmuma Creek basin that is used as open pasture and rangeland. The land is owned by two individuals and no other land owners would be directly affected. Operation and use of the reservoir could indirectly impact adjacent private lands by disrupting access.

The Interstate 82 bridge over Lmuma Creek would require reinforcement and protection of its piers to avoid negative impacts from inundation, but major disruption is not anticipated.

The most significant of the environmental impacts associated with Wymer Reservoir would be impacts on shrub-steppe habitat and greater sage-grouse. Unless appropriate mitigation strategies can be developed, this issue would likely be an environmental barrier to the project.

### ***Thorp Pump Station and Conveyance***

The Wymer Reservoir conveyance projects are designed to divert up to 1,000 cfs of flow from the Yakima River near Thorp and deliver it to the proposed Wymer Reservoir using the existing canal system and a new siphon and tunnel. The conveyance line would consist of the following elements:

- A diversion in the Yakima River and a new pump station on the Yakima River approximately 1.7 miles northwest of Thorp
- A new transmission main, approximately 4,200 feet long, from the Thorp pump station to deliver about 1,000 cfs of water to the existing KRD Canal system
- Approximately 33 miles of upgrades to the KRD North Branch Canal to convey the additional flow
- A new siphon approximately 3 miles long at the south end of Kittitas Valley at Wippel, where the main canal divides into three canals
- A new tunnel approximately 3 miles long from the siphon at Wippel to Wymer Reservoir at Scorpion Creek.

The Thorp pump station and diversion has potential to cause fish impacts. The diversion could impede movement of fish, which could find their way into the pipeline. These impacts would be avoided by including fish screens and upstream and downstream fish passage.

Construction of the conveyance line could impact critical habitat in the area. According to the Washington Department of Fish and Wildlife (WDFW), the area crossed by the pipeline from the Thorp pumping station to the KRD North Branch Canal is priority habitat for mule deer (WDFW 2010). The pipeline and tunnel from Wippel to the Wymer Reservoir would impact approximately 64 acres of shrub-steppe habitat, including 58 acres that have greater than 10 percent shrub cover. The pipeline and tunnel also have the potential to impact approximately 47 acres of bighorn sheep habitat. This shrub-steppe habitat lies within the Umtanum Ridge Management Unit that has been identified by the State as a potential expansion and reintroduction area for greater sage-grouse (Stinson et al. 2004). Construction would temporarily preclude grouse from using or moving through this area. Sage-grouse would likely return to this area after restoration of the construction site if the pipelines are buried. Above-ground pipelines could present a barrier to migration.

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The siphon and tunnel locations have a high potential for historic and prehistoric resources, similar to the Wymer Reservoir site. If any cultural resources are located along the conveyance line, they would be disturbed by construction activities.

The Wymer conveyance projects are estimated to require the following property easements and purchases:

- 10 acres for the Thorp Pump Station and diversion dam
- 2 acres each for the Thorp Pump Station discharge and Wippel diversion structures
- 4 acres for the siphon-to-tunnel connection structure
- 50-foot easements on parcels crossed by the Thorp pipeline, the expanded canal, and the tunnel from Wippel.

Similar to Wymer Reservoir, impacts on greater sage-grouse habitat could pose an environmental barrier to implementing the project.

### ***Conveyance to Roza Headgate***

Under this proposal, water released from Wymer Reservoir would be conveyed directly to the Roza Canal. The project would include:

- 3.2-mile Burbank Tunnel
- 1.7-mile Roza Tunnel
- 930-foot-long siphon at Burbank Creek
- New hydroelectric facility at existing Roza Dam
- Elevated flume spanning the Yakima River and connecting to existing headworks for the Roza Canal.

An intake structure for Burbank Tunnel would be located in critical habitat for bighorn sheep. Both the Burbank Tunnel and Roza Tunnel would cross additional preferred habitat for bighorn sheep and sage-grouse habitat within the Umtanum Ridge Management Unit identified by the State as a potential expansion and reintroduction area for greater sage-grouse (Stinson et al. 2004). Above-ground construction would temporarily preclude sage-grouse from using or moving through this area and noise from tunneling could affect sage-grouse. Sage-grouse would likely return to this area after the site is restored. The outlet structure at the Roza canal headworks would be located within a sage-grouse movement corridor to Yakima Canyon.

This conveyance line has a high potential for historic or prehistoric resources, similar to the other Wymer Reservoir projects. If any cultural resources are located along the conveyance line, they would be disturbed by construction activities.

Minor property or easement acquisition may be required. Parcels crossed by the pipelines and tunnel would require a 50-foot permanent easement.

Similar to Wymer Reservoir, impacts on greater sage-grouse habitat could pose an environmental barrier to implementing the project.

### ***Bumping Lake Enlargement***

Bumping Lake is located on the Bumping River, 16.6 miles upstream of the confluence with the Little Naches River. The current reservoir has a 61-foot-high earth dam with a storage capacity of 33,700 acre-feet (Reclamation 2006). Expansion of Bumping Lake would involve construction of a new, higher dam

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about 0.5 miles downstream from the existing dam. The expanded reservoir would have a total storage capacity of 190,000 acre-feet.

Enlargement of the reservoir would flood forested area above the current level of Bumping Lake (see Figure 3). This could adversely affect listed and priority species and habitats known to occur in the vicinity, including the northern spotted owl. Both mapped northern spotted owl habitat and late successional (old-growth) forest habitat would be inundated (WDFW 2010). Potential habitat impacts have been estimated to include the following:

- 982 acres of late old-growth forest habitat
- 719 acres of northern spotted owl habitat

The northern spotted owl was Federally listed as a threatened species in 1990 because of widespread habitat loss and degradation and a lack of effective regulations to conserve the species. The major causes of the species' decline are considered to be timber harvesting; catastrophic natural events such as fire, volcanic eruption and wind storms; and competition from barred owls (USFWS 2009). Northern spotted owls generally rely on mature and old-growth forests that provide the habitat structures and characteristics required for nesting, roosting, and foraging (USFWS 2008).

Enlargement of the reservoir would flood areas of mapped spotted owl habitat located around most of the perimeter of Bumping Lake, incrementally reducing the amount of habitat available for the northern spotted owl in eastern Washington. The largest contiguous spotted owl habitat in the project area overlaps with mapped old-growth forest habitat on the south side of the lake and in the Deep Creek and Granite Creek drainage basins. The expanded reservoir would replace existing forest habitat with open water.

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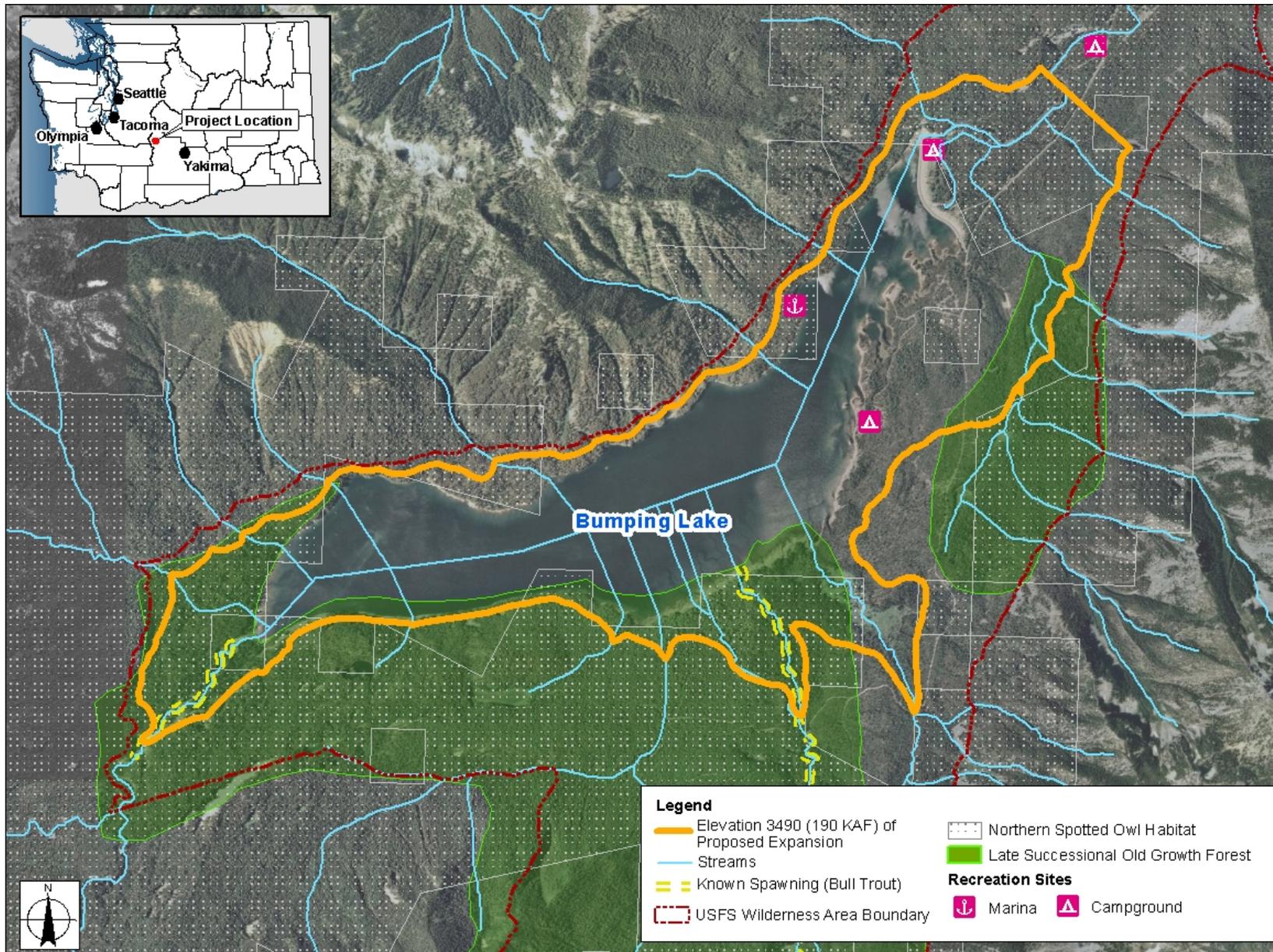


Figure 3. Bumping Lake Inundation Area

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The expanded reservoir would inundate perennial and intermittent stream habitat downstream from the existing dam and upstream of the existing reservoir, including approximately 3,500 linear feet of Deep Creek and the Bumping River. Bull trout were Federally listed as threatened in the Columbia and Klamath River basins in 1998. The inundated area includes portions of Deep Creek and the Bumping River that are designated as critical bull trout habitat (Reclamation and Ecology 2008). Bull trout currently use Bumping Lake and its tributaries above Bumping Lake Dam. Deep Creek is thought to be the primary tributary of Bumping Lake where bull trout spawn (Ecology 2009a). The USFWS is currently performing redd surveys to evaluate more specifically where bull trout spawn in this area.

Increasing storage in Bumping Lake Reservoir would have positive and negative effects on bull trout. Negative impacts include the loss of stream-spawning habitat in the Bumping River and lower portion of Deep Creek and its tributaries, which would be inundated. The reservoir is sized to reduce the extent of flooding of Deep Creek. Because the new dam would include fish passage facilities that are currently lacking, bull trout are expected to benefit from fish passage. Benefits would include:

- A greater opportunity for genetic mixing of bull trout stocks below and above the reservoir with installation of fish passage facilities at the new dam
- Increased prey base for bull trout from reintroduced fish above the dam
- A general increase in ecosystem productivity above the dam

The expanded reservoir would inundate forest communities and displace wildlife. Mobile wildlife species would be permanently displaced to adjacent suitable habitats. Travel corridors for wildlife would also be impacted by the change in lake level, likely resulting in adverse impacts on elk, deer, and small mammals.

The expansion area is known to have cultural resource features such as those related to construction of the original dam, historic recreational residences, and recorded archaeological sites from the pre European contact period. These cultural resources, some of which may be eligible for the NRHP, could be impacted by reservoir expansion.

All existing lakeshore access and recreational facilities would be inundated by expansion of the reservoir, including:

- Boat launch, picnic area, and parking
- Marina and parking
- Two campgrounds
- Several informal campsites
- Approximately 15 vacation cabins
- Access to trails and trailheads
- The lower portion of Forest Roads 1800, 1808 and 1809, preventing access to some recreation areas

New recreational facilities would be constructed where possible, but it is unlikely that comparable replacement locations for the residences and the marina could be provided on Bumping Lake, given the steepness of the topography on the north and the proximity of the William O. Douglas Wilderness Area. Replacing recreation facilities such as the campground and boat launch would cause additional impacts on forested communities that could further adversely affect the listed and priority species and habitats known to occur in the vicinity.

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The project would also eliminate 11.14 miles of roads that provide access to recreational sites and facilities above Bumping Lake. Opportunities to construct new access roads to trailheads would be limited. Reduced access would complicate the U.S. Forest Service's ability to provide fire protection in the affected area.

All the land surrounding Bumping Lake is owned and managed by the Forest Service. The area needed for reservoir expansion has been reserved for Reclamation for the purpose of expanding the reservoir. No property would have to be acquired, but a Special Use Permit would be required from the Forest Service. Several private cabins on the north shore of Bumping Lake are located on land leased from the Forest Service. These cabins may need to be relocated or the lessees may need to be compensated.

Three potential environmental barriers are associated with expansion of Bumping Lake: flooding of spotted owl habitat and late successional old-growth forest, inundation of bull trout spawning areas, and impacts on recreational facilities.

### ***Kachess Inactive Storage***

Kachess Reservoir is located about 2 miles northwest of Easton in the upper Yakima River Basin. It releases water into the Kachess River, which flows into the Yakima River at River Mile 203.5. Kachess Reservoir was constructed over a natural lake and has an active capacity of 239,000 acre-feet at an elevation of 2,268 feet (Reclamation 2002).

The Kachess Inactive Storage Project would modify the existing reservoir to provide an additional 200,000 acre-feet of water for downstream beneficial use, such as during drought years. The water would be withdrawn, when needed, at depths below the current minimum pool elevation. Two alternatives have been identified to withdraw the additional water: 1) through a gravity-flow tunnel that would discharge several miles downstream into the Yakima River, or 2) through a pump station that would discharge to the Kachess River just downstream from the existing dam. Both alternatives would include a new lake tap outlet. This project is currently being studied in more detail to determine its feasibility and practicality.

The project could lower the lake level up to an additional 80 feet during drought years, reducing habitat available in Kachess Reservoir for priority aquatic species such as bull trout. Bull trout spawning areas are present in two tributary streams in the northern reaches of the lake, which may become inaccessible during drawdown. Pre-spawn bull trout have frequent and severe upstream passage problems at the mouth of Box Canyon Creek. It is expected that in most years the Keechelus to Kachess Pipeline Project (see Section 2.2.2.6) would increase water levels in Kachess Reservoir and improve bull trout passage. During drought years, the Kachess Inactive Storage Project could increase drawdowns to the extent that tributary streams are inaccessible to bull trout.

Periodic reservoir drawdowns may also have an adverse effect on water quality by altering temperatures in the lake. The drawdown would also likely affect existing wetlands associated with the lake, and may permanently change the character and function of the shoreline in the event of successive drought years.

Some structures, such as features of the dam constructed in 1921, could be eligible for the NRHP. Other cultural resources in the area could also be affected by the tunnel or pump station.

All lake access and facilities such as boat launches would not be functional during drawdown periods. Because the drawdowns would be temporary, no new recreational facilities would likely be constructed, but it might be possible to extend facilities such as boat launches to accommodate changing lake levels.

Both alternatives would require purchasing property at the portal and flow-discharge locations. The portal and discharge locations immediately south of Kachess Reservoir are on Wenatchee National Forest property, and the Yakima River portal and outlet locations are on two privately-owned parcels.

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Easements would also be required for areas where pipelines or tunnels would cross open space. The required easements would cross 26 parcels – 15 owned by private landowners and 11 by the Wenatchee National Forest.

Impacts on bull trout would be the only environmental impact that could be considered an environmental barrier.

### **Policy and Legal Barriers**

Construction of new storage facilities or expansion of existing ones requires lengthy environmental review, and such projects generally elicit significant public opposition. These policy and legal barriers and public opposition can delay and sometimes prevent construction or expansion of facilities.

#### ***Wymer Reservoir and New Conveyance Lines***

The Wymer Reservoir site is located in an isolated canyon on an intermittent stream. Because the reservoir would not be located on a fish-bearing stream and no development would be disrupted, it would create fewer environmental impacts than reservoirs proposed on main channels and in developed areas. Permitting would require coordination with WSDOT for potential impacts on Interstate 82 and the U.S. Department of Defense because the reservoir water level would encroach about 2,500 feet onto the Yakima Training Center.

New conveyance facilities to and from Wymer Reservoir would require property acquisition and extensive construction, which would extend the environmental review and permitting time.

#### ***Bumping Lake Enlargement***

The expansion of Bumping Lake Reservoir would affect popular recreation facilities and critical habitat for northern spotted owl and bull trout. The project would require a Special Use Permit from the Forest Service, which has expressed concerns about impacts on its facilities (Ecology 2008). Impacts on northern spotted owl and bull trout would require mitigation programs that would increase the cost of the project and extend the environmental review and permitting time.

There is a long history of public opposition to expansion of Bumping Lake. When expansion was proposed in the 1970s, it was met with organized opposition from residents and environmental groups and the proposal did not move forward. Ecology received over 50 comments on its Draft EIS for the Integrated Water Resources Management Alternative in opposition to the proposal (Ecology 2009a). The YRBWEP Workgroup has heard from environmental groups that oppose the project, and public opposition is likely to remain a barrier to expanding Bumping Lake.

#### ***Kachess Inactive Storage***

This project would require changes to Reclamation's operational rules for the reservoir. It is anticipated that the project could be coordinated with existing operations and would not present policy or legal barriers to implementation.

### **Mitigation Strategies**

This section presents mitigation strategies to address potential environmental, policy and legal barriers for the proposed new storage projects. The proposed strategy is a coordinated programmatic approach to mitigation that would involve interested parties, including agencies, environmental groups, and the Yakama Nation.

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Environmental barriers for the Wymer and Bumping Lake projects involve impacts on threatened species and their declining habitat – shrub-steppe and old-growth forest. Because project details are not yet fully known, the proposed mitigation strategies are programmatic and do not identify specific properties. The strategy for both projects would involve acquiring, protecting, and restoring properties with similar habitat attributes.

Mitigation for impacts on shrub-steppe habitat losses should be coordinated with ongoing shrub-steppe and sage-grouse restoration programs, including the Washington State Recovery Plan for Greater Sage-Grouse (Stinson et al. 2004). The Wymer Reservoir site is located in the Umtanum Ridge Management Unit of the recovery plan. Mitigation property for the Wymer project should be located within or near that management unit. Since the Wymer project would also affect greater sage-grouse migration corridors, the mitigation strategy should include protection or restoration of areas to improve sage-grouse migration through the area.

Mitigation should include preservation of high quality shrub-steppe habitat through property acquisition or conservation easements and restoration of degraded habitat. A similar strategy of property acquisition and restoration could be used for mitigating impacts on old-growth forest and spotted owl habitat from Bumping Lake expansion. Most spotted owl habitat in the Yakima Basin is on Forest Service land, but a significant amount is on private property. Obtaining and protecting such properties would expand spotted owl habitat, which is especially threatened by fire and climate change in the eastern Cascades (USFWS 2008). Obtaining and protecting large areas of spotted owl habitat would be compatible with recovery actions proposed in the Recovery Plan for the Northern Spotted Owl (USFWS 2008).

Ecology has initiated discussions with an owner of private land in the upper Teanaway Basin to acquire property that includes spotted owl habitat as potential mitigation for impacts at Bumping Lake Reservoir. Ecology recently decided to expand the scope of its evaluation of mitigation properties to include reconnaissance of available property to serve as mitigation sites for Integrated Plan projects that would impact old-growth or shrub-steppe habitat. The department will evaluate properties based on suitable mitigation criteria, including location and specific habitat attributes. These criteria will be developed as part of the scope of the reconnaissance study.

This property acquisition approach is intended primarily to mitigate for the major losses of habitat associated with the Wymer and Bumping Lake projects. The approach could also provide appropriate mitigation for smaller habitat losses such as those associated with construction disturbance for pipeline installations.

Expanding Bumping Lake would affect bull trout spawning areas in the reservoir. The additional drawdown of Kachess Reservoir could affect bull trout access to tributary streams. Other projects included in the Integrated Plan would benefit bull trout, including the Fish Passage and Fish Habitat Enhancement Elements. However, remaining bull trout populations in the basin are small, with the Bumping Lake Reservoir population considered one of the healthiest in the Yakima Basin. The proposed expansion level of Bumping Lake is intended to minimize inundation of critical spawning habitat in Deep Creek. Other mitigation strategies for bull trout may be explored, including a feasibility study of reintroduction or supplementation, but no specific strategies have been identified at this time.

### ***Wymer Reservoir and Conveyance***

In addition to the programmatic mitigation strategy for lost shrub-steppe habitat, the Wymer mitigation strategy should include project design to minimize impacts on habitat for both the reservoir and conveyance lines. Areas disturbed during construction should be replanted with shrub-steppe species, and the replanted areas should be maintained until the vegetation is well established. Conveyance pipelines should be buried rather than above ground to allow species to migrate through the areas.

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Potential impacts on historic and cultural resources could be reduced by conducting appropriate surveys prior to construction. To the extent possible, facilities should be located to avoid cultural resources. If the project would impact cultural resources, appropriate mitigation strategies would be developed in consultation with the Washington State Department of Archaeology and Historic Preservation and the Yakama Nation.

### ***Bumping Lake Reservoir Expansion***

Existing recreational facilities at Bumping Lake would be inundated by the expanded reservoir. Replacing those facilities would be complicated by steep topography and potential to further impact old-growth and spotted owl habitat. The project would require coordination with the Forest Service to develop appropriate mitigation for inundated recreation facilities. Specific options have not yet been identified.

The proposed mitigation strategies may alleviate some public and agency concerns about the water storage projects. However, it is anticipated that public opposition would continue to be a barrier to constructing new storage projects and could significantly delay or even prevent implementation of this project.

### ***Kachess Inactive Storage***

Improvements to bull trout passage to allow the fish to migrate upstream from the reservoir to Box Canyon Creek at Kachess Reservoir would be explored. Improvements may include dredging or similar techniques.

## **3.4 Groundwater Storage**

The Groundwater Storage Element proposes to use surface water to recharge aquifers and the natural storage capacity of geologic formations to store water for later recovery and use. Aquifers would typically be recharged with surface water during high flow periods. Stored water would be used to supply out-of-stream uses or increase streamflows through increased groundwater discharge.

Groundwater storage is a relatively new concept in Washington and has not been used in the Yakima River Basin. Two types of groundwater storage are proposed in the Integrated Plan – municipal aquifer storage and recharge (ASR) and groundwater infiltration for agricultural use. Both are proposed as pilot studies to determine the feasibility of the programs.

### **Temporary Construction Impacts**

Major construction impacts for the Groundwater Storage Element would be associated with groundwater infiltration projects. Municipal ASR projects would rely mostly on existing infrastructure and little construction would be required. Depending on the location of injection wells, conveyance lines might need to be constructed. Groundwater infiltration would require construction of infiltration ponds ranging from 1 to 20 acres. Depending on the location of those ponds, wildlife habitat, private property, recreational facilities, or other land uses could be affected. However, it should be possible to locate the ponds in areas to minimize impacts. Proposed pilot test sites for groundwater infiltration are located in areas that have been intensively developed for agricultural use, so it is unlikely that the ponds would be located in high-quality habitat.

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## **Environmental Barriers**

### ***Municipal Aquifer Storage Recharge – City of Yakima***

The Municipal ASR Project is proposed by the City of Yakima. Water from the Naches River would be treated at the City's existing water treatment plant during the winter, conveyed to an existing well, and injected into the aquifer. The water would be withdrawn from the well to supply municipal needs. The City's proposal would be used to evaluate the feasibility of using municipal ASR for other Yakima Basin municipalities.

Municipal ASR is not expected to result in major environmental impacts. Water injected into the aquifer would be treated at the existing water treatment plant and would meet State water quality standards for injection and municipal use. The project would use existing or modified infrastructure to convey water to the injection well and deliver it to municipal users.

No environmental barriers are anticipated that would prevent or the delay the project.

### ***Groundwater Infiltration Prior to Storage Control***

The Groundwater Infiltration Project involves using Yakima River flows in the spring to recharge aquifers in the vicinity of major irrigation canals. Two study sites are proposed – the Kittitas Reclamation District near Ellensburg and the Wapato Irrigation Project near Toppenish. Water would be infiltrated into aquifers within the irrigation districts before the start of storage control, which begins when natural flows in the river can no longer meet water entitlements and Reclamation starts regulating storage releases (the average date for starting storage control is June 24). Water would be withdrawn from the aquifer to reduce reservoir releases after storage control begins.

The projects would infiltrate water from the Yakima River into shallow aquifers. There is potential to alter water quality of the aquifers. However, since the infiltrated water would not be treated with fertilizers or herbicides, it would likely be of better quality than water currently infiltrating from irrigation practices. It is anticipated that the infiltrated water would increase concentrations of nitrate and may also cause a minor increase in water temperature (Ecology 2007). Site-specific studies would be conducted to determine potential water quality impacts and appropriate strategies to minimize water quality degradation.

Based on existing information, no environmental barriers have been identified that would prevent or delay this project.

## **Policy and Legal Barriers**

Both proposals for the Groundwater Storage Element are relatively new to the State of Washington and the regulations for such projects are still evolving. This adds to the uncertainty of permitting the projects. Only three municipal ASR projects have been permitted in Washington – two for the Sammamish Plateau Water and Sewer District and one for the Lakehaven Water District (Nazy, personal communication, 2010). Other proposals are pending.

### ***Municipal Aquifer Storage Recharge – City of Yakima***

Regulatory oversight of ASR is still evolving in Washington. The City of Yakima has been coordinating with Ecology and the Washington Department of Health, which both currently have regulatory roles. Changing regulatory requirements could lengthen the time for approval of the project.

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### ***Groundwater Infiltration Prior to Storage Control***

New water rights would be required to divert, store and use river water for recharge. Since this project is a new concept in groundwater recharge in Washington, regulatory requirements are uncertain, which may delay implementation of the project. The project is proposed as a pilot to test the feasibility of the concept, including potential policy and permitting barriers, and its design and implementation would be closely coordinated with regulatory agencies.

### **Mitigation Strategies**

The Groundwater Storage Element is not expected to cause environmental barriers. However, both projects are new concepts and may encounter implementation difficulties from permitting agencies. Close coordination with regulatory agencies would be required as the pilot studies are developed.

## **3.5 Fish Habitat Enhancements**

This element includes proposals to improve habitat for anadromous and resident fish on the mainstem and tributaries in the Yakima River Basin. The projects include reconnecting floodplains, reestablishing side channels, restoring natural river and riparian conditions, and acquiring habitat for protection. Both the mainstem and tributary habitat enhancement proposals in the Integrated Plan are programmatic in nature and do not yet include specific project locations.

### **Temporary Construction Impacts**

Most construction impacts of habitat enhancement projects would be temporary and relevant to mainstem floodplain restoration and tributary habitat enhancement.

Construction activities could cause a number of short-term natural resource impacts, including:

- Ground disturbance that would potentially cause erosion and affect slope stability
- Increased sediment loading from in-stream construction
- Increased nutrients and soil contaminants in impounded and downstream waters from floodplain reconstruction
- Temporarily removed vegetation and displaced wildlife species
- Temporary impacts on fish from in-water or streamside work
- Temporary access limitations for streamside activities such as fishing and wildlife viewing

Construction of habitat enhancement projects could adversely impact cultural resources through ground-disturbing activities, removal of vegetation, earthmoving, and use of heavy equipment.

### **Environmental Barriers**

#### ***Mainstem Floodplain Restoration***

Mainstem floodplain restoration efforts would emphasize protecting and restoring floodplains on the Yakima and Naches Rivers. Proposed project types include:

- Reconnecting side channels and off-channel habitat to stream channels
- Reconnecting floodplains to river channels and setting back levees
- Relocating or improving floodplain infrastructure and roads

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- Placing stable wood and other large organic debris in stream banks
  - Improving instream habitat by restoring natural channel form
  - Restoring natural riparian vegetative communities
  - Acquiring property for protection
  - Improving instream flows

Environmental impacts associated with habitat restoration would generally be related to construction with no long-term adverse impacts. Any cultural resources in the vicinity of habitat enhancement projects might be exposed to increased erosion of cultural deposits. Some property acquisition or easements could be required and some traditional recreational uses such as fishing and camping could be precluded at specific sites.

No environmental barriers are anticipated that would prevent or delay the projects.

### ***Tributary Habitat Enhancement***

Proposed tributary habitat improvements include protecting, restoring, and enhancing channel and floodplain connectivity, riparian habitat, fish passage, instream flows, and instream channel complexity. The Tributary Habitat Enhancement projects also include measures to benefit bull trout. Specific activities could include:

- Protecting and planting riparian vegetation
- Placing large woody debris and engineered log jams in stream channels
- Reshaping banks and reconnecting side channels to improve floodplain function
- Restoring fish passage at man-made barriers
- Screening water diversions
- Lake trout removal to reduce predation on native fish
- Bull trout reintroduction
- Securing commitments to increase instream flows

Environmental impacts of tributary habitat enhancement projects would be similar to those described above for mainstem floodplain restoration projects.

The projects are not expected to cause environmental barriers that would prevent or delay the projects.

### **Policy and Legal Barriers**

No policy or legal barriers are anticipated for the Habitat Restoration Element. The projects would be located in riparian areas and would need to be coordinated with critical-area regulations, shoreline management programs, and floodplain regulations. There may be some public misperceptions about the effect of the projects on adjacent land that may require educating land owners.

### ***Mainstem Floodplain Restoration Program***

A major component of the floodplain restoration program is setting back levees along river mainstems. The setbacks may require property acquisition and could change flooding patterns. Property owners and adjacent property owners may oppose the projects because of impacts on their property and perceived

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increases in flood potential. Carefully designed projects, combined with an education program, could reduce the opposition.

### ***Tributary Habitat Enhancement Program***

Tributary habitat enhancement projects would be located on a variety of private, State, Federal and tribal lands. Coordination with those entities would be required, but is not expected to pose policy barriers to implementation.

### **Mitigation Strategies**

No mitigation is proposed since the projects are not expected to cause environmental barriers or significant environmental impacts. Construction impacts would be minimized by using best management practices and meeting permit requirements. The fish habitat enhancement projects would serve as mitigation for past environmental damage. Outreach programs may be needed to help address land owner concerns about property acquisition and flood potential.

## **3.6 Enhanced Water Conservation Element**

The Enhanced Water Conservation Element is an aggressive program of proposed agricultural and municipal water conservation measures intended to improve basin water supply.

### **Temporary Construction Impacts**

Agricultural water conservation projects may cause temporary construction impacts such as sedimentation, reduced water quality, habitat disturbance, increased traffic and noise, and temporary road closures. All construction impacts would be temporary and localized. The degree of impact would depend on the scale of the project.

### **Environmental Barriers**

#### ***Agricultural Water Conservation***

Agricultural water conservation measures included in the Enhanced Water Conservation Element have been identified in currently published water conservation plans or other documents prepared by irrigation districts, conservation districts, or State and Federal entities. Many proposed projects include lining canals or replacing them with piping, which could result in the loss of some temporary ponds and wetlands that exist because of leakage from irrigation canals and ditches. These artificial wetlands may provide habitat for amphibians, birds and other wildlife. Lining or piping the canals would remove the hydrology source of these wetlands and may result in a shift of species composition toward non-wetland or more arid plant community types. This shift would be toward more natural conditions and is not considered a significant impact.

Agricultural water conservation projects are not expected to cause significant environmental impacts or environmental barriers that would prevent or delay the projects.

#### ***Municipal Water Conservation***

Municipal Water Conservation proposed under the Integrated Plan includes the following components:

- Establish an advisory committee to organize outreach to local elected officials and provide liaison with Reclamation, Ecology and the Department of Health

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- Create standards to encourage water conservation for any new municipal or domestic water supply provided by the Integrated Plan, such as:
    - Implement rate structures to encourage conservation
    - Establish and meet targets to reduce residential per-capita water use by 2020 and 2030
    - Meet State-required standards for water loss of 10 percent or less
    - Offer a comprehensive menu of conservation program options for customers or constituents
  - Create a fund as part of the Integrated Plan to promote water-use efficiency basin-wide using voluntary, incentive-based programs
  - Focus advisory committee efforts on education, incentives and other measures to encourage residential and commercial users to improve efficiency of landscape irrigation where the source of supply is agricultural irrigation canals or ditches

Municipal conservation projects are not expected to create environmental impacts or environmental barriers that would prevent or delay implementation.

### **Policy and Legal Barriers**

One potential barrier to enhanced conservation is the public perception about how much water can be directed to other uses through conservation. Although it may seem that using less water for irrigation would result in increased instream flows or more water for other users, that is often not the case. Typically only the consumptive use portion of a water right can be transferred or reallocated from one water use to another. This is the portion of withdrawn water that is consumed or lost to further use, primarily through evaporation (WAC 173-500-050[5]). Irrigation and some industrial uses are consumptive uses. Nonconsumptive use is water that is not diverted from a source water body or there is no diminishment of the source (WAC 173-500-050(9)). Examples of nonconsumptive use include seepage and return flow from irrigation and municipal uses, and fish hatchery and hydropower uses.

Some of the projects proposed for the Enhanced Water Conservation Element involve reducing seepage and return flow, which are nonconsumptive uses. Reducing nonconsumptive uses does not result in major amounts of water available for increases in instream flow or other water uses. The agricultural water conservation program is expected to result in increased instream flows below the gauge at Parker and increased TWSA and irrigation water supply in most years, the primary benefit of conservation may be mostly limited to improving instream flows in shorter reaches rather than providing large blocks of water for new uses.

### ***Agricultural Water Conservation Program***

Few policy or legal barriers are anticipated for agricultural conservation projects because they would primarily involve modifications to existing irrigation systems and agricultural conservation is accepted by users in the Yakima River Basin. The Enhanced Agricultural Conservation Program would modify the existing YRBWEP Phase II agricultural conservation program which currently requires that two-thirds of the resulting conserved water be retained by the irrigator for his or her use. The conserved water allocated to an irrigation district cannot be used for additional irrigation except where it is involved with the Yakama Indian Reservation. The existing program requires a 17.5 percent district and 82.5 percent State and Federal cost share. The current allocation has been identified as a potential disincentive to implementing conservation because a district may receive little agricultural benefit from its share of the saved water and have difficulty justifying its associated costs share of 17.5 percent. To increase incentives for participation, the proposed Enhanced Agricultural Water Conservation Program

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recommends that the YRBWEP II allocation be revisited to require 100 percent Federal and State funding with all the conserved water made available for management by Reclamation.

### ***Municipal or Domestic Conservation Program***

To be successful the Municipal Water Conservation Program would require actions by diverse local jurisdictions and water systems throughout the Yakima Basin. Achieving coordination and consistency among these organizations poses a substantial challenge. New administrative systems would be needed to encourage domestic well owners to implement water conservation programs. Financial incentives to conserve water use would be lower for domestic well owners who currently do not pay utility rates than for customers of public water systems who do pay utility rates.

Municipal and domestic water conservation actions also depend on residents and businesses to take action. The most significant area for water savings is in outdoor water usage, but some residents and businesses may be unwilling to change their outdoor water-use practices and elected officials may be unlikely to approve municipal and domestic water conservation measures without public support. Overcoming these challenges would require a continued and effective program to educate the public and elected officials on the merits of water conservation as well as techniques to improve water-use efficiency without disrupting Yakima River Basin lifestyles.

### **Mitigation Strategies**

No mitigation strategies are proposed for the Enhanced Water Conservation Element because no significant environmental impacts or environmental barriers are anticipated. Outreach and incentive programs will need to be included in the municipal Water Conservation Program to maximize public participation.

## **3.7 Market-Based Reallocation of Water Resources Element**

The Market-Based Reallocation of Water Resources Element proposes to reallocate water resources through a water market and/or water bank to improve supply in the Yakima River basin. The element intends to:

- Increase flexibility for voluntary reallocation of water from low-value to high-value uses
- Reduce delays and costs of transactions to reallocate water
- Consider potential third-party impacts such as public values, viability of industries, and the agricultural community before completing a water transaction

This element consists of recommendations for legislative changes and funding requests to facilitate water transfers. The proposal includes two phases: a short-term option that would build on existing water market programs and a long-term option that requires more substantial changes to existing laws and policies that regulate transfers from irrigation districts.

### **Temporary Construction Impacts**

This element does not require construction and would not cause construction impacts.

### **Environmental Barriers**

An increase in water transfers would result in few environmental impacts. One potential impact is the effect of fallowing agricultural lands in order to transfer the associated water rights. Fallowed lands can generate dust and become infested with weeds if not maintained properly. Although fallowing in the

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Yakima Basin is primarily expected to be temporary and occur during drought years, the legislative proposal for the Market-Based Reallocation of Water Resources Element includes recommendations to mitigate for this potential impact by requiring that fallowed lands be restored or revegetated.

The Market-Based Reallocation of Water element is not expected to cause environmental barriers that would prevent or delay implementation of a flexible water market.

### **Policy and Legal Barriers**

Policy and legal barriers to a flexible water market system were identified in Ecology's Final EIS on the Integrated Water Resource Management Alternative and the accompanying technical report on the Market-Based Reallocation of Water Resources Element (Ecology 2009a and b). The market-based reallocation program includes recommendations to overcome those barriers. The major barriers identified were:

- Legal impediments to water transfers – These may include limits on who can transfer water rights, where it can be transferred, the uses to which transferred water may be applied, and how much can be transferred. Legal impediments include limitations on transfers out of irrigation districts.
- Lengthy approval process – Recent legislation established a separate review process for water rights changes and reduced the review time. However, the review time still contributes to the high cost of water transfers.
- Lack of information about prices and water available for sale or purchase – This lack of information may limit the willingness of water users to participate in the market.
- High transaction costs – Transaction costs include legal expenses to overcome the complexity of transfers. Delays in processing applications add to the cost.
- Lack of trust in the entity administering water markets – Because Ecology is also a regulatory authority, its determination of the validity and extent of existing water rights is perceived by some water rights holders as an unwelcome opportunity for enforcement actions.
- Third-party impacts – Third-party impacts include not just the effect on the water right of a third party, but also how it would affect public values, the viability of the agricultural industry, and the prosperity of a community.

The market-based reallocation proposal includes recommendations to the legislature to amend existing water law to overcome these barriers. These recommendations represent fairly major changes, which the legislature has been reluctant to enact in the past, and may be reluctant to enact now.

### **Mitigation Strategies**

The legislative recommendations included in the Market-Based Reallocation of Water Resources Element are intended to overcome policy and legal barriers to a flexible water market system. These recommendations also include proposals to mitigate for third-party impacts. Therefore, no barriers to implementation are anticipated and no additional mitigation measures are proposed.

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## 4.0 Permitting Requirements

Activities associated with siting, construction, and operation of the Integrated Plan projects are subject to regulatory authority at the Federal, State, and local levels. The following tables identify the permits that could be required – or, in some cases may not be required. All projects proposed for consideration in the Integrated Plan are listed in the tables below, organized by element. No table is included for the Market-Based Reallocation of Water Resources Element because the only permits anticipated for water transfers are water rights changes from Ecology. The likelihood that each permit will be required is labeled as follows:

- Permits that would be required, based on the information known to date for each project, are labeled “Yes.”
- Those that are not likely to be required are labeled “No.”
- Permits that may be required, but information about the project is lacking (e.g., the exact location of the proposed facility) are labeled “Potential.”

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**Table 1. Potential Permit Requirements, Fish Passage Element**

	CLE ELUM DAM	BUMPING LAKE DAM	CLEAR LAKE DAM
<b>Federal Permits/Authorizations</b>			
Section 404 - Clean Water Act US Army Corps of Engineers	Yes	Yes	Yes
Section 7 - Endangered Species Act NOAA Fisheries/US Fish and Wildlife Service	Yes	Yes	Yes
Section 106 Review – National Historic Preservation Act Department of Archaeology and Historic Preservation	Yes	Yes	Yes
Special Uses Permit US Forest Service	Yes	Yes	Yes
<b>State Permits/Authorizations</b>			
Section 401 Water Quality Certification Department of Ecology	Yes	Yes	Yes
Dam Safety Construction Permit Department of Ecology	Yes	Yes	Yes
National Pollutant Discharge Elimination System / Construction Permit Department of Ecology	Yes	Yes	Yes
Shoreline Conditional Use Permit, or Variance Department of Ecology	Yes	Yes	Yes
Hydraulic Project Approval Department of Fish and Wildlife	Yes	Yes	Yes
Aquatic Resources Use Authorization Department of Natural Resources	Yes	Yes	Yes
<b>Local Permits/Authorizations</b>			
Critical Areas Permits/Approvals	Yes	Yes	Yes
Shoreline Substantial Development Permit, Conditional Use Permit, Variance, or Exemption	Yes	Yes	Yes
Building Permit	Yes	Yes	Yes
Clearing and Grading Permit	Yes	Yes	Yes

**Table 2. Potential Permit Requirements, Structural or Operation Changes Element**

	CONVEYANCE CHANGES AT WAPATOX DIVERSION	SUBORDINATE POWER AT ROZA AND CHANDLER	KRD MAIN CANAL MODIFICATIONS	RAISE POOL ELEVATION AT CLE ELUM RESERVOIR	KEECHELUS TO KACHESS PIPELINE
<b>Federal Permits/Authorizations</b>					
Section 404 - Clean Water Act US Army Corps of Engineers	No	No	Yes	Yes	Yes
Section 7 - Endangered Species Act NOAA Fisheries/US Fish and Wildlife Service	Yes	Yes	Yes	Yes	Yes
Section 106 Review – National Historic Preservation Act Department of Archaeology and Historic Preservation	Yes	Yes	Yes	Yes	Yes
Special Uses Permit US Forest Service	No	No	No	Yes	Yes
<b>State Permits/Authorizations</b>					
Section 401 Water Quality Certification Department of Ecology	Yes	No	Yes	Yes	Yes
Water Use / Water Right Department of Ecology	No	No	Yes	No	No
Dam Safety Construction Permit Department of Ecology	No	No	No	Yes	No
National Pollutant Discharge Elimination System Permit(s) Department of Ecology	Yes	No	Yes	Yes	Yes
Shoreline Conditional Use Permit, or Variance Department of Ecology	Yes	No	Yes	Yes	Yes
Hydraulic Project Approval Department of Fish and Wildlife	Yes	No	Yes	Yes	Yes

**Table 2. Potential Permit Requirements, Structural or Operation Changes Element (Continued)**

	CONVEYANCE CHANGES AT WAPATOX DIVERSION	SUBORDINATE POWER AT ROZA AND CHANDLER	KRD MAIN CANAL MODIFICATIONS	RAISE POOL ELEVATION AT CLE ELUM RESERVOIR	KEECHELUS TO KACHESS PIPELINE
Forest Practices Approval/Permit Department of Natural Resources	No	No	No	Yes	Yes
Aquatic Resources Use Authorization Department of Natural Resources	No	No	Yes	Yes	Yes
<b>Local Permits/Authorizations</b>					
Critical Areas Permits/Approvals	Yes	No	Yes	Yes	Yes
Shoreline Substantial Development Permit, Conditional Use Permit, Variance, or Exemption	Yes	No	Yes	Yes	Yes
Clearing and Grading Permit	Yes	No	Yes	No	Yes

**Table 3. Potential Permit Requirements, New or Expanded Storage Element**

	WYMER RESERVOIR	WYMER CONVEYANCE	THORP PUMP STATION	CONVEYANCE TO ROZA HEADGATE	BUMPING LAKE ENLARGEMENT	KACHESS INACTIVE STORAGE
<b>Federal Permits/Authorizations</b>						
Section 404 - Clean Water Act US Army Corps of Engineers	Yes	Yes	Yes	Yes	Yes	Yes
Section 7 - Endangered Species Act NOAA Fisheries/US Fish and Wildlife Service	Yes	Yes	Yes	Yes	Yes	Yes
Section 106 Review – National Historic Preservation Act Department of Archaeology and Historic Preservation	Yes	Yes	Yes	Yes	Yes	Yes
Special Uses Permit US Forest Service	No	No	No	No	Yes	Yes
<b>State Permits/Authorizations</b>						
Section 401 Water Quality Certification Department of Ecology	Yes	No	Yes	Potential	Yes	Yes
Water Use / Water Right Department of Ecology	Yes	No	Yes	No	No	No
Reservoir Permit / Aquifer Storage and Recovery Department of Ecology	Yes	No	Yes	No	Yes	No
Dam Safety Construction Permit Department of Ecology	Yes	No	Yes	No	Yes	No
National Pollutant Discharge Elimination System Permit(s) Department of Ecology	Yes	Yes	Yes	Yes	Yes	Yes
Shoreline Conditional Use Permit, or Variance Department of Ecology	Yes	Yes	Yes	Yes	Yes	Yes
Hydraulic Project Approval Department of Fish and Wildlife	Yes	Yes	Yes	Yes	Yes	Yes

**Table 3. Potential Permit Requirements, New or Expanded Storage Element (Continued)**

	WYMER RESERVOIR	WYMER CONVEYANCE	THORP PUMP STATION	CONVEYANCE TO ROZA HEADGATE	BUMPING LAKE ENLARGEMENT	KACHESS INACTIVE STORAGE
Forest Practices Approval/Permit Department of Natural Resources	No	No	No	No	No	Potential
Aquatic Resources Use Authorization Department of Natural Resources	Yes	No	Yes	No	Yes	Yes
<b>Local Permits/Authorizations</b>						
Critical Areas Permits/Approvals	Yes	Yes	Yes	Yes	Yes	Yes
Shoreline Substantial Development Permit, Conditional Use Permit, Variance, or Exemption	Yes	Yes	Yes	Yes	Yes	Yes
Clearing and Grading Permit	Yes	Yes	Yes	Yes	Yes	Yes

**Table 4. Potential Permit Requirements, Groundwater Storage Element**

	Municipal ASR – City of Yakima example	Groundwater Infiltration Prior to Storage Control
<b>Federal Permits/Authorizations</b>		
Section 404 - Clean Water Act US Army Corps of Engineers	No	Potential
Section 7 - Endangered Species Act NOAA Fisheries/US Fish and Wildlife Service	No	Potential
Section 106 Review – National Historic Preservation Act Department of Archaeology and Historic Preservation	No	Potential
<b>State Permits/Authorizations</b>		
Underground Injection Control registration 9048 RCW Department of Ecology	Yes	Yes
Water Use / Water Right Department of Ecology	Yes	Yes
Reservoir Permit / Aquifer Storage and Recovery Department of Ecology	Yes	Yes
National Pollutant Discharge Elimination System Permit(s) Department of Ecology	No	Yes
Notice of Intent to Construct or Decommission a Well Department of Ecology	Yes	No
Well Construction and Operator's License Department of Ecology	Yes	No
Underground Injection Control Registration Department of Ecology	Yes	Yes
<b>Local Permits/Authorizations</b>		
Clearing and Grading Permit	No	Yes

**Table 5. Potential Permit Requirements, Enhanced Conservation Element**

	Agricultural Water Conservation	Municipal Water Conservation
<b>Federal Permits/Authorizations</b>		
Section 404 - Clean Water Act US Army Corps of Engineers	Potential	No
Section 7 - Endangered Species Act NOAA Fisheries/US Fish and Wildlife Service	Potential	No
Section 106 Review – National Historic Preservation Act Department of Archaeology and Historic Preservation	Yes	No
<b>State Permits/Authorizations</b>		
Section 401 Water Quality Certification Department of Ecology	Potential	No
Water Use / Water Right Department of Ecology	No	No
National Pollutant Discharge Elimination System Permit(s) Department of Ecology	Yes	No
Shoreline Conditional Use Permit, or Variance Department of Ecology	Yes	No
Hydraulic Project Approval Department of Fish and Wildlife	Yes	No
<b>Local Permits/Authorizations</b>		
Critical Areas Permits/Approvals	Potential	No
Shoreline Substantial Development Permit, Conditional Use Permit, Variance, or Exemption	Potential	No
Clearing and Grading Permit	Potential	No

**Table 6. Potential Permit Requirements, Habitat Enhancement Element**

	Mainstream Floodplain Restoration	Tributary Habitat Enhancement
<b>Federal Permits/Authorizations</b>		
Section 404 - Clean Water Act US Army Corps of Engineers	Yes	Yes
Section 7 - Endangered Species Act NOAA Fisheries/US Fish and Wildlife Service	Yes	Yes
Section 106 Review – National Historic Preservation Act Department of Archaeology and Historic Preservation	Yes	Yes
Special Uses Permit US Forest Service	Yes	Yes
<b>State Permits/Authorizations</b>		
Section 401 Water Quality Certification Department of Ecology	Yes	Yes
National Pollutant Discharge Elimination System Permit(s) Department of Ecology	Yes	Yes
Shoreline Conditional Use Permit, or Variance Department of Ecology	Yes	Potential
Hydraulic Project Approval Department of Fish and Wildlife	Yes	Yes
Forest Practices Approval/Permit Department of Natural Resources	Potential	Potential
Aquatic Resources Use Authorization Department of Natural Resources	Potential	Potential
Fish Habitat Enhancement Department of Ecology	Yes	Yes
<b>Local Permits/Authorizations</b>		
Critical Areas Permits/Approvals	Yes	Yes
Shoreline Substantial Development Permit, Conditional Use Permit, Variance, or Exemption	Yes	Potential
Clearing and Grading Permit	Yes	Yes

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## 6.0 List of Preparers

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