BUREAU OF RECLAMATION

Conconully Safety of Dams Modification Project
Draft Environmental Assessment

U.S. Department of the Interior
Bureau of Reclamation
Columbia-Pacific Northwest Region
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Mission Statements

The U.S. Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated Island Communities.

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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Acronyms and Abbreviations

Acronym or Abbreviation	Full Phrase
4,4'-DDE	dichlorodiphenyldichloroethylene
APE	area of potential effect
BA	biological assessment
BMP	best management practice
°C	degrees Celsius
CFR	Code of Federal Regulations
cfs	cubic feet per second
CTCR	Confederated Tribes of the Colville Reservation
CWA	Clean Water Act
DAHP	Department of Archaeology and Historic Preservation
dB	decibel
dBA	A-weighted decibel
DOI	Department of Interior
DPS	distinct population segment
DSM	deep soil mixing
EA	environmental assessment
Ecology	Washington State Department of Ecology
EDNA	environmental designation for noise abatement
EFH	Essential Fish Habitat
EO	executive order
EPA	Environmental Protection Agency
ESA	Endangered Species Act of 1973
ESU	evolutionarily significant unit
°F	degrees Fahrenheit
Forest Service	United States Forest Service
FR	Federal Register
FTA	Federal Transit Administration
HDPE	High-density polyethylene
ITA	Indian Trust Asset
JARPA	Joint Aquatic Resources Permit Application
KOP	key observation point
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
LOE	level of effort

MBTA	Migratory Bird Treaty Act
MOA	memorandum of agreement
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
O&M	operations and maintenance
OHWM	ordinary high water mark
OID	Okanogan Irrigation District
PCB	polychlorinated biphenyls
pH	potential of hydrogen
PL	Public Law
Reclamation	Bureau of Reclamation
SHPO	State Historic Preservation Office
SOD	safety of dams
SWE	snow water equivalent
SWPPP	stormwater pollution prevention plan
TCP	traditional cultural place
THPO	Tribal Historic Preservation Office or Officer
TMDL	total maximum daily load
U.S.	United States
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
VRM	visual resource management
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WHR	Washington Heritage Register

Chapter 1. Purpose and Need

1.1 Introduction

The United States (U.S.) Department of the Interior (DOI), Bureau of Reclamation (Reclamation) owns Conconully Dam, and the associated Conconully Reservoir in north-central Washington (**Map 1-1** in **Appendix A**). Operated by the Okanogan Irrigation District (OID), Conconully Dam is performing as designed; however, Reclamation has determined that the risk of seismic failure exists at the dam. Investigations conducted under Reclamation's Safety of Dams (SOD) program determined that the dam and foundation are potentially at risk of seismic failure associated with liquefaction of the embankment and foundation materials. Liquefaction occurs when loosely packed, water-logged sediments at or near the ground surface lose their strength in response to strong ground shaking. This risk could result in dam failure, which poses unacceptable risk levels to people, property, and the environment.

Reclamation has prepared this environmental assessment (EA) consistent with the statutory and regulatory requirements of the National Environmental Policy Act (NEPA; 42 United States Code [U.S.C.] 4321 et seq.)[1], Department of the Interior's NEPA regulations (43 Code of Federal Regulations [CFR] 46), long-standing federal judicial and regulatory interpretations, and administration priorities and policies.

Reclamation proposes to reduce the risk of dam failure by constructing a stability berm on a foundation of deep soil mixing (DSM)[2] reinforcement columns on the downstream face of Conconully Dam. To provide improved operational functionality and compatibility with the proposed stability berm, Reclamation also proposes to upgrade the outlet works by extending, lining, and reinforcing water conveyance components and installing contemporary water control systems and facilities (such as multiple state-of-the-art valves and a new valve house). Additional details and description of the alternatives analyzed are in **Chapter 2**.

[1] Executive Order (EO) 14154, Unleashing American Energy (Jan. 20, 2025), and a Presidential Memorandum, Ending Illegal Discrimination and Restoring Merit-Based Opportunity (Jan. 21, 2025), require the Department to strictly adhere to NEPA, 42 U.S.C. §§ 4321 et seq. Further, such Order and Memorandum repeal EOs 12898 (Feb. 11, 1994) and 14096 (Apr. 21, 2023). Because EOs 12898 and 14096 have been repealed, such Orders are not currently being recognized by Reclamation during their NEPA compliance process. Reclamation verifies that it has complied with the requirements of NEPA, including the Department's regulations and procedures implementing NEPA at 43 CFR. Part 46 and Part 516 of the Departmental Manual, consistent with the President's January 2025 Order and Memorandum. Reclamation has also voluntarily considered the Council on Environmental Quality's rescinded regulations implementing NEPA, previously found at 40 CFR Parts 1500–1508, as guidance to the extent appropriate and consistent with the requirements of NEPA and EO 14154.

[2] Deep soil mixing is a ground improvement technique that augments the characteristics of weak soils by mechanically mixing them with a cement-based mixture to a target depth. The proposed rows of soil-cement—referred to as soilcrete—create reinforced columns that strengthen the ground and provide support for structures built on it. The DSM columns essentially act as a structural support by improving the soil's load-bearing capacity.

Should a determination be made that the Conconully SOD Modification Project would not result in significant environmental impacts, a Finding of No Significant Impact would be prepared to document that determination and to provide a rationale for approving the selected alternative. If not, then a decision would be made to either select the No Action alternative or issue a notice of intent to prepare an environmental impact statement.

1.2 Project Background

Conconully Dam and the associated Conconully Reservoir are on Salmon Creek, approximately 17 miles north of Omak, Washington (**Map 1-1** in **Appendix A**). As a component of the Okanogan Project[3], Conconully Reservoir provides irrigation water to downstream irrigators, water for fish and wildlife habitat, and recreational opportunities for visitors and residents of the town of Conconully, located north of the dam. Conconully Reservoir has an estimated storage capacity of 13,000 acre-feet, and a reservoir water surface area of 450 acres at normal reservoir water surface elevation[4].

Conconully Dam was constructed using hydraulic fill methods between 1907 and 1910 at the confluence of the north and west forks of Salmon Creek. The hydraulic fill construction technique consisted of selectively placing soil or other materials using a stream of water to move embankment materials through flumes to the dam site. The resulting puddled-core[5] embankment is currently known to be susceptible to liquefaction and at increased risk of failure in the event of seismic activity. Seepage and internal erosion issues are also present throughout the dam embankment.

Evaluations of the risk of seismic failure associated with liquefaction of the dam's embankment and foundation materials began in the 1990s. The geotechnical and risk analyses indicated that existing risks were at an unacceptable level based on Reclamation's Public Protection Guidelines (Reclamation 2022a); the analyses also justified additional work to better define or understand the risks. Subsequent geotechnical evaluations, field explorations, and risk analyses demonstrated that the dam embankment requires modifications to reduce seismic risks to the dam.

1.3 Purpose of and Need for Action

The **purpose** of the proposed project is to improve public safety by reducing the risk associated with liquefaction of embankment and foundation materials; maintain water deliveries and flows for irrigators and endangered species; and continue to provide recreational benefits and fish and wildlife habitat.

[3] The Okanogan Project, authorized in 1905 by the Department of the Interior and completed in 1910, was the first irrigation project in Washington State. The project's primary goal was to provide irrigation for farmland in North Central Washington. Conconully Dam is a key component of the project's water storage and delivery system.
[4] Normal reservoir water surface elevation is the maximum level to which water may rise under normal operating conditions.
[5] A puddled-core embankment contains a central section of clay mixed with water and compacted to form an impermeable layer known as puddle clay. This method was used commonly in turn of the century dam design before the development of modern waterproofing materials.

The **need** for the proposed project is to comply with Reclamation's SOD requirements and reduce static, seismic, and hydrologic risks at Conconully Dam to acceptable levels based on public protection guidelines; improve control of water flows through the outlet works; and increase reliability and longevity of the dam and water conveyance system.

1.4 Authorities and Regulatory Compliance

Reclamation Act of 1902 (Public Law [PL] 57-161). The Reclamation Act authorized the Secretary of the Interior to construct the Okanogan Project. The purpose of the Okanogan Project is to store water from Salmon Creek in Conconully Reservoir and to supply irrigation water for farmland in North Central Washington. The act was supplemented by the Reclamation Reform Act of 1982 (PL 97-293), which increased the amount of land that could be irrigated with federal water for projects where it applies.

SOD Act (PL 95-578). In 1978, Congress passed the SOD Act (PL 95-578). The SOD Act provides authority and a means to fund the correction of safety problems at Reclamation's dams, including the construction, restoration, operation, and maintenance of new or modified features at existing federal dams. Congress amended the SOD Act in 1984 to provide additional funding for SOD projects and to add provisions requiring 15 percent cost sharing by authorized project beneficiaries, such as irrigation, hydropower, municipal, and industrial beneficiaries (PL 98-404). Congress further amended the SOD Act in 2000 (PL 106-377), 2002 (PL 107-117), and 2004 (PL 108-439), primarily for the purpose of additional funding authority.

Federal Water Project Recreation Act of 1965 (PL 89-72). The Federal Water Project Recreation Act of 1965 (PL 89-72) was enacted on July 9, 1965. It requires that recreation and fish and wildlife enhancement be given full consideration in federal water development projects.

Regulatory compliance with relevant federal requirements and applicable state and local regulations would be adhered to. Reclamation is also required to address sacred sites and Indian Trust Assets (ITAs) in the EA. See **Appendix B** for laws, regulations, and policies that apply to the EA.

1.5 Public Involvement

On August 9, 2024, Reclamation announced the start of the public scoping period to solicit public comments and to identify issues or alternatives to be considered. Reclamation solicited comments from agencies, the Confederated Tribes of the Colville Reservation (CTCR), and the public through various scoping meetings, including a virtual public meeting room website that was available 24 hours a day during the public scoping period. The public scoping period ended on September 8, 2024. The description and outcomes of the scoping process are summarized in the Scoping Report[6] (Reclamation 2024a) posted October 21, 2024, on Reclamation's project website.

[6] The Conconully SOD Modification Project Scoping Report can be accessed at: https://www.usbr.gov/pn/programs/sod/conconully/ConSOD_ScopingReport_FINAL_20241021_508.PDF.

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Chapter 2. Proposed Action and Alternatives

The alternatives presented in this chapter were developed based on the project purpose and need, as described in **Chapter 1** and the issues raised during scoping. The No Action alternative and the action alternatives are described in detail in this chapter. Anticipated acres of surface disturbance from the alternatives, and a summary comparison of the impacts resulting from the alternatives is provided in **Appendix C**. An overview of the alternatives considered but eliminated from detailed study is also provided; additional information is provided in **Appendix D**. Information on construction timing and activities, and design drawings of the proposed stability berm and outlet works are included in **Appendix J**.

The specifications for surface disturbance acres, quantities, dimensions, and distances are approximate and used as the basis for analysis in **Chapter 3**. The precise specifications are subject to final contractor means and methods of construction; however, conservative analysis assumptions were used to allow for analysis of maximum potential impacts.

2.1 Alternatives Development Process

The alternatives development process incorporated guiding principles as provided by relevant laws and guidance, including the Department of the Interior's NEPA regulations (43 CFR 46), Reclamation's NEPA handbook (Reclamation 2012), and the Council of Environmental Quality's Updated Principles and Requirements for Water Resources Implementation Studies (CEQ 2013). These regulations require agencies to:

- Rigorously explore all reasonable alternatives that meet the purpose of and need for the proposed action and, for alternatives that were eliminated from detailed study, briefly discuss the reasons for elimination
- Include the alternative of no action
- Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft EA and identify such alternative in the final EA

Interdisciplinary collaboration is a critical step in the alternatives development process. Agencies should seek to achieve agreement from diverse interests on the goals, purposes, and needs for agency plans and activities, as well as on the methods anticipated to carry out those plans and activities (43 CFR 46.110(a)). The alternatives development process involved collaboration with interested parties, including participating agencies, and completion of engineering and feasibility analyses. During the 30 day-public scoping period in 2024, Reclamation asked for public and agency input on issues or alternatives to be considered in relation to proposed safety modifications at Conconully Dam. Comments related to alternatives were carried forward into alternatives development.

2.2 Description of the Alternatives

2.2.1 Alternative A – No Action

The purpose of the No Action alternative is to allow decision-makers to compare the effects of choosing an action alternative for implementation with the effects of maintaining the current conditions. The No Action alternative reflects existing and expected future conditions in the project area if no action is taken (**Map 2-1** in **Appendix A**). Under the No Action alternative, there would be no new surface disturbance or structural or operational changes to Conconully Dam, or the outlet works. Operations and maintenance (O&M) activities would continue as currently implemented.

The existing outlet works includes a trashrack intake structure, a 60-inch-diameter precast concrete pipe in the upstream tunnel, a gate chamber containing two 54-inch-diameter cast iron slide gates that serve as guard gates, and two 36-inch-diameter gate valves used for regulating water flows. The outlet works has several potential operational and dam safety issues associated with the unlined rock tunnel and condition of the existing operating gates. These limitations currently restrict the outlet works release capacity to 200 cubic feet per second (cfs), unless higher discharges are required for emergency reservoir evacuation. This limited flow level is about one-third of the design release capacity of the existing outlet works. Under the No Action alternative, the risk of seismic failure associated with liquefaction would remain at an unacceptable level based on Reclamation's public protection guidelines (Reclamation 2022a), operational flexibility to control water flow through the outlet works would remain limited, and the seepage and internal erosion issues through the dam embankment would continue.

2.2.2 Alternative B – Proposed Action

Reclamation proposes to reduce the risk of dam failure in the event of seismic activity by constructing a stability berm on the downstream face of Conconully Dam. The stability berm would be built on a foundation of DSM reinforcement columns to improve the strength and resilience of the dam's foundation materials. Reclamation also proposes to upgrade and extend the outlet works to ensure compatibility with the proposed stability berm. Additionally, new water flow control systems and facilities would be installed to enhance operational functionality. Activities would primarily occur downstream of the dam (that is, dry or stream side), with limited activities upstream of the dam (that is, wet or reservoir side) (**Map 2-2** in **Appendix A**). Construction activities are anticipated to take place over a minimum 4-year period (**Table J-1** in **Appendix J**). Concrete and other materials needed for the Alternative B components listed below would be trucked in, as shown in **Table J 2** in **Appendix J**.

The total project area would be 120 acres. Alternative B would result in 60.5 acres of surface disturbance (**Map 2-3** in **Appendix A**). Of that area, 41.7 acres (69 percent of total surface disturbance area) would experience short-term disturbance and ultimately would be restored to pre-construction conditions. There would also be 18.7 acres (31 percent of total surface disturbance area) that would not be restored to pre-construction conditions; the disturbance of these acres typically represent facility footprints or removal of wetlands and would be considered permanent (**Table C-2** in **Appendix C**).

B.1 Outlet Works – East Alignment

The proposed outlet works modification would include a 700-foot-long, 60-inch-diameter steel pipe installed within the existing outlet works tunnel and extending further downstream through the stability berm to a valve house, where it would discharge into a stilling basin and discharge channel. The proposed outlet works extension would veer off from the existing outlet works tunnel alignment 30 feet upstream of the existing discharge point and cut into the hillside. In addition, the proposed outlet works – east alignment would include a 40-inch-diameter pipe for low flow situations (that is, low water elevations) that would have a separate discharge point into Salmon Creek upstream of the valve house outlet. The low flow pipe would allow discharges when the water surface elevation at Conconully Reservoir is lower than elevation 2,258[7]. The low flow pipe would tee off the main 60-inch-diameter pipe 100 feet upstream of the valve house. The low flow discharge point is needed because the proposed valve house in the east alignment would be located at a higher elevation than the reservoir intake (**Figure J-1** in **Appendix J**).

Once a bulkhead is installed into the existing intake structure to shut off water flow, 500 feet of rock slope downstream of the existing outlet works would be excavated. Following rock excavation, the 60-inch steel pipe would be installed into the outlet works from the existing upstream control gates to the proposed downstream valve house (**Map 2-4** in **Appendix A**). The steel pipe would be grouted in place in both the existing unlined and lined portions of the outlet works tunnel and encased in reinforced concrete against the rock cut slope from the beginning of the extension to the valve house.

A temporary cofferdam and unwatering[8] would be required to remove backwater from the spillway channel to allow installation of the outlet works steel pipe and construction of the valve house. The cofferdam would consist of ecobags[9] filled with 2,200 cubic yards of miscellaneous fill from the borrow area and placed downstream of the discharge channel to prevent water from the spillway from backing up into the stream channel. After use, ecobag material would be reincorporated into the borrow area and contoured appropriately to the landscape. The cofferdam would span the stream channel and could be up to 80 feet wide and 20 feet high. A pipe placed in the bed of the current Salmon Creek stream bed would convey seepage water from the upstream weirs down to and through the cofferdam and discharged into Salmon Creek, or into a pool above the cofferdam and pumped over into Salmon Creek. The stream channel adjacent to the outlet works would be filled in so construction equipment could move around without impediment to building the outlet works. Wetlands adjacent to the outlet works would be avoided when practicable.

Intake Bulkhead

To facilitate the outlet works construction, a bulkhead would be installed in the existing outlet works intake structure to stop water flow from the reservoir. The bulkhead would be removed at the start

[7] In the context of a reservoir, water surface elevation refers to the height of the water's surface above a fixed point, such as mean sea level. Water surface elevation is important for ensuring dam safety and managing water resources as it helps assess water availability and control water flows.

[8] Unwatering is the process used to remove ponded or flowing surface water that is already present within an area. Unwatering would occur above the temporary cofferdam on Salmon Creek. Dewatering is the removal or control of groundwater or seepage from below the surface, which would occur through the relief wells.

[9] Ecobags, or cofferdam bags, act as a temporary barrier to hold back water and create a dry area for construction activities to take place. They are made of flexible and portable materials and are easily deployed and removed.

of the irrigation season (early April) and then set back in place at the end of the season (late September). This process would take place for two consecutive irrigation seasons. Bulkhead placement would be conducted from a floating barge in the reservoir or from a large crane situated on the dam access road adjacent to the intake structure (**Map 2-5** in **Appendix A**). The barge, if utilized, would be launched from the proposed boat ramp, described in **Section B.7**, below (**Map 2-2** in **Appendix A**).

Stilling Basin and Discharge Channel

The plunge pool stilling basin would comprise a deeper segment of the discharge channel directly downstream of the discharge point at the valve house. The proposed stilling basin would be excavated directly into rock and would remain unlined. The purpose of the stilling basin would be to help slow down the water released from the outlet works before it flows into Salmon Creek. The discharge channel would include a concrete-lined and riprap segments to transition the stilling basin to Salmon Creek's natural stream course.

Valve House

A valve house would be constructed at the downstream end of the outlet works to enclose and protect the various valves that would control water flow (**Map 2-4** in **Appendix A**). The two-story, 1,156-square-foot valve house would be built of concrete with a fire-resistant roof and would be painted in a color that minimizes contrast with the surrounding landscape. The valve house would contain three state-of-the-art valves to control water flow through Conconully Dam and improve operational functionality. Individual valve capacities would range from 2.5 cfs to 444 cfs and would be used for base flows (6-inch-diameter valve), irrigation flows (24-inch-diameter valve), and reservoir evacuation and emergency scenario flows (60-inch-diameter valve). The upper release limit of the outlet works with all valves opened would be 665 cfs. The valve house would be supplied with electricity and instrumentation to operate the valves. The valve house would include security features (**Section B.10**, below) and prevent unauthorized access to important and valuable equipment. It would also provide an indoor environment for valve O&M while protecting against inclement weather conditions like snow and ice.

B.2 Gate House and Control House

The existing gate and control houses on the left abutment contain the outlet works' controls and dam facilities' instrumentation, respectively (**Map 2-2** in **Appendix A**). The existing gate house would be demolished, and a new gate house would be rebuilt on the existing foundation. The proposed single-story, 150-square-foot gate house would be built of concrete with a fire-resistant roof. In addition, the undermined base of the existing gate house foundation facing the reservoir would be reinforced with a 2-foot-wide by 2-foot-deep concrete apron, and large boulder riprap would be placed in a 5-foot-wide area around the foundation reinforcement apron to prevent future erosion and structural damage.

The existing control house would remain intact, and all new controls and instrumentation for operating the outlet works and dam facilities would be installed and housed within it. Both houses would be supplied with electricity and be connected to the proposed fiber optic line.

B.3 Stability Berm

The proposed stability berm would be constructed on a foundation of reinforced DSM columns on the downstream side of the existing dam embankment (**Map 2-5** in **Appendix A**). The underground DSM columns would be installed individually in an overlapping pattern to create a foundation for the stability berm that would not be subject to liquefaction and would have a very low probability of strength loss due to seismic activity. The DSM process would form 3- to 8-foot-diameter individual soil cement columns to a depth of 62 feet in 30-foot-wide blocks. The grout mixing process and column installation would require 380,000 cubic yards of cement and 84 million gallons of water (260 acre-feet). Water for the process would be drawn from Conconully Reservoir. Neither dewatering nor reservoir restrictions would be required for DSM column installation.

The configuration of DSM columns would either be in a single-block or split-block pattern. All DSM columns, regardless of arrangement, would be placed within a 3-acre area located 30–170 feet from the toe of the existing dam (**Map 2-5** in **Appendix A**).

Once completed, the stability berm would be 1 foot higher than the current dam crest and would be 180 feet wide. The toe of the new stability berm would be located 255 feet from the toe of the current dam (**Figure J-2 in Appendix J**).

The stability berm would be constructed on the DSM column foundation with zones of sand (55,000 cubic yards) and gravel (38,000 cubic yards) to provide internal filtration, capture, and drainage of water from the dam and berm. The remainder of the stability berm would be composed of miscellaneous compacted backfill (450,000 cubic yards) obtained from the borrow area. The stability berm would be armored with gravels, cobbles, and boulders obtained from the borrow area for slope protection and erosion control.

Sand filter and gravel drain materials could be commercially sourced, and/or processed on site. If the sand and gravel is refined on site, the process would occur within the borrow area (**Map 2-2** in **Appendix A**). Water (57,600 gallons per day; 0.2 acre-feet per day) would be drawn from Conconully Reservoir for cleaning. After cleaning, the discharged water would travel through channels to a settling pond (1.3 acres in size and up to 25 feet deep), located within the borrow area boundary. The pond would be surrounded by a temporary security fence for safety. Water in the settling pond would not be toxic and would either evaporate, infiltrate into the ground over time, or be periodically pumped back into the reservoir. Fine sediments would settle to the bottom of the pond and remain there until the end of the construction period. After construction is completed, the resultant sediment and pond depression would be covered with miscellaneous fill from the borrow area and contoured appropriately to the landscape.

Toe Drain

To convey drainage away from the dam, a proposed 1,335-foot-long toe drain would be installed at the downstream toe of the stability berm (**Map 2-5** in **Appendix A**). A trench would be dug along the base of the stability berm, where an 18-inch-diameter, perforated, dual wall high-density polyethylene (HDPE) pipe would be installed and backfilled. The toe drain would have two discharge points. The first discharge point would empty into the spillway channel using the existing low area created by the seep adjacent to the right dam abutment. The second discharge point would

empty into Salmon Creek near the outlet works discharge channel. In addition, up to three 8-foot diameter precast vaults would be installed along the toe drain length with weir boxes to measure seepage rates.

B.4 Relief Wells

Up to 20 relief wells, using 18-inch borings, would be installed downstream of the stability berm and foundation to minimize the potential for excessive uplift within the spillway channel due to anticipated changes in seepage paths caused by the impermeable blocks of DSM columns (**Map 2-5** in **Appendix A**). The proposed relief wells would be spaced at 50-foot intervals along the spillway channel bank to a depth of no more than 200 feet from the surface. The water from the relief wells would flow into a buried collector pipe, which would discharge into Salmon Creek downstream of the outlet works.

B.5 Spillway Pumps

Temporary pumps would be used to move water over the spillway during the non-irrigation season from early October through early April. A sufficient number of pumps would be used by the construction contractor to meet base flow requirements (2-20 cfs) in Salmon Creek. The pumps would comply with existing ramping requirements and operate 24 hours a day, 7 days a week. The required flow rate for each pump would be 3 cfs, which is roughly equal to 1,350 gallons per minute. The pumps (electrical or diesel) would be needed to deliver the temporary water supply required; the maximum noise level would be 75 decibels (db) per pump. The pumps may be supplied with electricity via on-site power or diesel generators located onshore.

The temporary pumps would be located either on a floating barge in the reservoir or on the shore near the spillway. The barge could be anchored to the bottom of the reservoir, the shoreline, or the spillway, or any combination of the three. Anchor points would be temporary and may include but not be limited to helical anchors (such as helix piles or screw anchors), precast concrete dock anchor weights, or anchor bolts into existing concrete. If needed, shoreline anchor points could include fastening to spillway wing walls or other existing above-water infrastructure in previously disturbed areas. The barge could be launched from the proposed borrow area boat ramp (**Map 2-2** in **Appendix A**).

If a barge is not used, the pumps would be placed on a series of constructed level areas on the shore near the spillway (**Figure 2-1** shows a representative example). Three level areas or fill platforms would be constructed on the shore. Platforms would be used to set the pumps at elevations close enough to the reservoir water surface elevation to simultaneously reach the water and pump the water over the spillway. The pumping platform utilized may need to shift over the non-irrigation season due to fluctuations in the

Figure 2-1. Land-based spillway pumps at Kachess Dam. Photo: Jason Sutter, Reclamation

reservoir water surface elevation. The most likely platform sequencing would be platforms at the lowest water elevations at the start of the non-irrigation season with one or two adjustments up the slope as the reservoir slowly rises during the winter. Each platform would be constructed by placing Eco-Blocks (or equivalent environmentally friendly blocks) in a line parallel with the shore, then backfilled with gravel or suitable fill from the borrow area until level and sturdy enough to support the pumps. The blocks would be lined up 10 feet wide, be set every 12 feet down the slope, and require up to 100 cubic yards of fill per platform. Additional fill may be required next to the leveled areas to provide access to the pump platforms. Each pump platform would remain in place for the duration of construction of the outlet works. The blocks would remain the property of the construction contractor and would be removed once no longer needed. Any fill material used for the platforms would be reused where needed or returned and incorporated into the borrow area during final contouring.

B.6 Borrow Area

Reclamation-managed lands on the east bank of Conconully Reservoir adjacent to the dam offer sufficient quality and quantities of material to serve as a suitable borrow source (**Map 2-2** in **Appendix A**). The borrow area would provide the material for the construction of project components, including but not limited to the stability berm (potentially including filter sands and drainage gravels), the outlet works, the gate house foundation reinforcement, the pump platforms, the access roads, the administrative/storage/staging area, and the boat ramp. The borrow area would cover 20 acres; a 7-acre portion in the southwest corner of the borrow area would be excavated to a depth of 45 feet from the current surface for material.

Once borrow material is no longer needed, the excavated borrow area would be contoured and sloped to a natural grade and stabilized to avoid excessive erosion and ensure public safety. Stabilization activities at the borrow area would include grading to drain runoff, contouring to match the landscape, and restoration efforts following the U.S. Forest Service's (Forest Service) revegetation plan (**Appendix E**). The restored borrow area would be left in a state amenable to the development of future recreational amenities (for example, a parking lot, vault toilet, and information kiosk) as part of anticipated recreation planning and coordination with a suitable concessionaire, such as a private company or Washington State Parks.

B.7 Boat Ramp

To launch the barges for spillway pumping and intake bulkhead placement, a proposed 20-foot-wide by 185-foot-long boat ramp would be constructed in the southeast corner of Conconully Reservoir (**Map 2-2** in **Appendix A**). The boat ramp would be constructed within 900 feet of the gate house and avoid wetlands identified in the Conconully Safety of Dams Project Aquatic Resources Delineation Reports (Reclamation 2021a, 2024b). Miscellaneous backfill materials from the borrow area (up to 5,000 cubic yards) would be used to fill and level portions of the boat ramp. Construction of some portions of the boat ramp would consist of in-water work based on the normal reservoir water surface elevation. Precast interlocking concrete blocks, cast in place concrete, concrete planks, or aggregate surfacing could be placed on top of the fill to form the surface of the boat ramp. The boat ramp would remain in place after completion of construction activities; however, access to the boat ramp and parking area would be restricted to authorized vehicles only until further recreation planning for the site takes place.

B.8 Access Roads

An access road would be constructed from Conconully Road to the dam to provide permanent access to dam facilities and facilitate future O&M activities. The proposed dam access road would be 24 feet wide and 1 mile long. The access road would follow a north-south direction along the eastern boundary of Reclamation property before heading in an east-west direction in the general vicinity of the existing access road before reaching the dam (**Map 2-2** in **Appendix A**). The dam access road would be surfaced with 2,800 cubic yards of gravel and built to Reclamation road-building specifications, including standard erosion control and drainage measures (**Appendix F**). Gravel for the access road would be sourced from the borrow area and/or commercial sources. Once construction activities are complete, a linear barrier (for example, large boulders or buck and pole fence) would be placed along the west side of the access road to restrict vehicle traffic to the road area and protect revegetation efforts.

Portions of the unmaintained service road along Salmon Creek would be improved as needed (for example, by vegetation clearing, grading, widening, or surfacing) for construction, safety, and access to Salmon Creek below the dam (**Map 2-2** in **Appendix A**).

B.9 Administrative/Storage/Staging Area

A 3.6-acre area for vehicle parking and the staging and storage of construction staff administration trailers and construction equipment and materials would be designated south of the borrow area and dam access road, and east of the dam (**Map 2-2** in **Appendix A**). Construction workers would be able to stay overnight in temporary housing authorized by Reclamation's Contracting Officer's Representative within this area. The area would be covered with gravel and would remain in that condition after project completion. Gravel for the administrative/storage/staging area would be a mix sourced from the borrow area and/or commercial sources.

B.10 Security Infrastructure

At the beginning of the construction period, the existing security gate near the dam (**Map 2-1** in **Appendix A**) would be removed and a temporary security gate would be installed near the start of the dam access road, within 170–470 feet from Conconully Road. The temporary security gate location would allow large trucks and other construction vehicles and authorized vehicles ample space to fully turn off Conconully Road to avoid blocking traffic and associated public safety concerns (**Map 2-2** in **Appendix A**). Only authorized personnel would be permitted beyond the entrance gate; there would be no public access during the construction period.

Once construction activities conclude, a permanent security gate would be installed to prevent unauthorized vehicle access to the dam facilities and the unmaintained service road along Salmon Creek. The temporary gate near Conconully Road would remain in place while revegetation activities are taking place (6 months post-construction; **Appendix E**) and for up to 2 additional years post-construction to prevent unauthorized vehicles from entering the project area while new vegetation is established (**Appendix E**). Pedestrian traffic would be permitted within the project area following construction and initial revegetation activities. The temporary gate would be removed and vehicle access would be allowed once monitoring indicates that soil stabilization has been achieved and vegetation successfully established. Buck and pole fencing or boulders would be placed along the west side of the access road to prevent unplanned vehicle routes and to protect revegetation efforts.

Temporary fencing delineating sensitive resource areas, such as wetlands, or demarcating work areas may be erected in the project area during construction. Before completion of construction, permanent chain-link fences would be installed around the gate and control houses and around the valve house as an added security measure.

Temporary lighting would be utilized during construction as required by ambient conditions (for example, early morning, night, and various atmospheric conditions) to increase visibility and safety during workday hours. No permanent outdoor lighting would be installed at any dam facility once construction is complete.

B.11 Utilities

The existing single-phase power line would be upgraded to a three-phase power line and would be buried along the dam access road or strung on new poles placed in the same locations as existing power poles. If the power line is buried, the existing power poles within the project area would be removed. The electrical lines would be connected to and supply electricity to the gate house, control house, and valve house.

A new fiber optic cable line would be installed during construction to provide data networking and telecommunications. The new 4,000-foot-long cable line would tie into the main line at the intersection of Conconully Road and the dam access road and connect to instrumentation at the control house. The cable would be placed directly in the ground or encased in a conduit and buried in a trench up to 36 inches deep alongside the dam access road (**Map 2-2** in **Appendix A**).

Temporary trash collection services and sewer options (for example, portable toilets) would be used in the project area during construction. The existing telephone line and riser boxes would remain in place and would be available to provide service to temporary administrative trailers in the administrative/storage/staging area during the construction period.

B.12 Upland Revegetation and Aquatic Habitat and Wetland Restoration

Upland Revegetation

To address anticipated impacts to upland vegetation communities, wetlands, and in-stream aquatic habitats affected by construction activities, Alternative B includes a suite of treatments targeted at creation, restoration, enhancement, or maintenance of impacted vegetation communities within the project area. Revegetation efforts aimed at restoring upland vegetation communities, particularly in the borrow area, would follow the guidelines outlined in the Forest Service's Revegetation Plan (**Appendix E**). Revegetation activities would begin once construction activities have concluded and are expected to take 6 months post-construction to complete. It is assumed that desired vegetation conditions would be successfully established within 10 years post-construction.

Aquatic and Wetland Habitat Restoration

As part of Alternative B, Reclamation would replace, restore, and enhance protected in-stream and wetland habitats in a 19.5-acre area in the Salmon Creek floodplain directly downstream of the dam and outlet works to compensate for impacts on and losses of these vegetation and habitat types (**Map 2-2** in **Appendix A**). Reclamation identified an area where restoration activities would take place through coordination with the CTCR Fish and Wildlife Department, National Marine

Fisheries Service (NMFS), and the Washington Department of Fish and Wildlife (WDFW). Restoration activities would occur only on Reclamation-owned lands within the project area. The exact locations of proposed restoration treatments or features within the habitat restoration area are not currently known. Alternative B does not include site-specific project proposals for these restoration actions; rather, it identifies and describes potential actions to be implemented throughout the project area at a programmatic level. The potential categories of restoration actions are further discussed in **Appendix G**, and include the following actions:

- Pilot channel creation
- Log jams
- Post-assisted log structures
- Riparian benching
- Gravel augmentation or sediment addition

Best Management Practices

To minimize impacts on resources from the action alternatives, the best management practices (BMPs) in **Appendix F** would be implemented. The BMPs would be applied during construction to reduce or avoid impacts and would be incorporated into the construction contract design specifications. The BMPs are drawn from a combination of standard construction contract BMPs, including measures associated with borrow areas, staging areas, temporary access, equipment use, erosion control, dust abatement, and spill prevention and control. A BMP can be a physical thing installed on the ground (such as a silt fence or ground cover vegetation) or a process used to plan and conduct an activity (such as marking stream buffers). The impact analyses presented in **Chapter 3** describe impacts with BMPs applied, as applicable.

Additional mitigation measures may be required as part of the U.S. Army Corps of Engineers (USACE) permitting process and U.S. Fish and Wildlife Service (USFWS) and NMFS biological opinions that would minimize or offset impacts on wetlands and Endangered Species Act (ESA)-listed steelhead and their critical habitat.

Permitting

Several federal and state regulatory permit approvals would be required before construction begins. Reclamation would obtain all required regulatory permits prior to construction implementation. Reclamation would use the State of Washington's Joint Aquatic Resources Permit Application (JARPA) to apply for applicable permits. A Wetlands and Waters Compensatory Mitigation Plan would be appended to the JARPA. Permits and exemptions that would be obtained include the following:

- Clean Water Act (CWA) Section 404 Individual Permit, via USACE
- CWA Section 401 Water Quality Certification, via State of Washington
- Hydraulic Project Approval from WDFW

- U.S. Environmental Protection Agency (EPA) Construction General Permit
- Shoreline exemption from the substantial development permit process in Okanogan County, Washington

2.2.3 Alternative C

Under Alternative C, Reclamation would upgrade the strength and resilience of the Conconully Dam as described under Alternative B but with a few component construction and location differences (**Map 2-6** in **Appendix A**). The key differences in the components under Alternative C when compared with Alternative B would be the west alignment of the outlet works and corresponding adjusted size of the stability berm, and the locations of the toe drain, impact basin and discharge channel, and valve house (**Map 2-8** in **Appendix A**).

The size of the project area under Alternative C would be the same as under Alternative B (120 acres). Alternative C would result in 60.1 acres of surface disturbance (**Map 2-7** in **Appendix A**). Of that area, 42.2 acres (70 percent of total surface disturbance area) would experience short-term disturbance and ultimately would be restored to pre-construction conditions. There would also be 17.9 acres (30 percent of total surface disturbance area) that would experience permanent disturbance (**Table C-2** in **Appendix C**). While Alternative C would include slightly more acres of short-term disturbance than Alternative B, there would be less permanent disturbance and less total surface disturbance under Alternative C than under Alternative B.

C.1 Outlet Works – West Alignment

Under Alternative C, the alignment of the outlet works would be shifted west from the Alternative B alignment, requiring less rock excavation (**Figure J-3** in **Appendix J**). The outlet works extension would be shorter under Alternative C in comparison with Alternative B, and would discharge into Salmon Creek at one location as opposed to two locations under Alternative B.

Impact Basin and Discharge Channel

Under Alternative C, the location of the impact basin and discharge channel would conform with the differences noted above for the outlet works under Alternative C. A 19-foot long by 15-foot wide by 11-foot-high concrete impact basin structure (**Figure 2-2** shows a representative example) would be constructed in lieu of an excavated stilling basin as described under Alternative B. The impact basin structure would be embedded in the stability berm and located 5 feet above the discharge channel. Water velocity slowing functions would be performed the same as described under Alternative B.

Figure 2-2. Impact basin example
Photo: Reclamation

Valve House

The valves and configuration of the valve house would be similar to Alternative B. Under Alternative C, the valve house would be slightly larger than under Alternative B at 1,369 square feet; however, the structure would be placed below ground to a depth of 27 feet. The only part of the valve house that would be exposed at the surface would be the concrete roof. The roof would

contain one hatch for access via ladder into the valve house and another large hatch for valve maintenance. Additionally, there would not be a separate low elevation 42-inch-diameter pipe or valve as described under Alternative B. Low elevation flows would be accommodated by the valves in the valve house. The valve house under Alternative C would be located further upstream than under Alternative B to correspond with the single discharge point into Salmon Creek. (**Map 2-8** in **Appendix A**).

C.3 Stability Berm

The stability berm under Alternative C would not be as wide as described under Alternative B because the outlet works extension would be shorter. The toe of the new stability berm under Alternative C would be located 205 feet from the toe of the existing dam (**Figure J-4** in **Appendix J**). There would be 400,000 cubic yards of fill material required for the stability berm construction under Alternative C, as compared with the 450,000 cubic yards of fill material required under Alternative B. The stability berm would be constructed with the same specifications and using the same processes described under Alternative B.

Toe Drain

The toe drain location would shift with the configuration of the stability berm. The toe drain would be constructed with the same specifications and using the same processes described under Alternative B (**Map 2-6** in **Appendix A**).

C.7 Boat Ramp

Under Alternative C, a boat ramp would not be constructed. Instead, any barges needed for intake bulkhead installation or the spillway pumps would be deployed by being lowered into the reservoir with a crane or launched from the existing boat ramp at Conconully State Park, if feasible.

2.3 Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required to rigorously explore and objectively evaluate all reasonable alternatives and to discuss the reasons for eliminating any action alternatives not analyzed in detail (43 CFR 46).

The alternatives that Reclamation considered but eliminated from detailed study, along with a brief rationale for their elimination, are noted below. **Appendix D** includes additional details.

- **Excavate and replace**—This alternative would excavate unsuitable foundation materials and replace them with densely compacted materials to create a shear key[10]. Because this alternative would require a reservoir restriction, Reclamation eliminated this alternative from further consideration because it would not meet the purpose and need by failing to meet water delivery obligations and other benefits of the Okanogan Project during the reservoir restriction period. This alternative would also temporarily restrict the OID's ability to regulate flows and would lead to additional costs in the form of lost economic benefits.

[10] A shear key is a dam feature that enhances stability by increasing resistance to lateral forces such as earth and water pressures, earthquakes, and wind.

- **Reservoir restriction**—This alternative would involve consideration of a permanent reservoir restriction to reduce the potential failure of the dam. Reclamation eliminated this alternative from further consideration because it would not meet the purpose and need of fulfilling water delivery obligations and other benefits of the Okanogan Project, such as recreation and fish and wildlife habitats. Additionally, compared with the proposed action and Alternative C, this alternative would severely restrict the OID's ability to regulate flows and lead to additional economic costs in the form of lost economic benefits for the OID.
- **Controlled dam breach**—This alternative would involve draining the reservoir and removing the dam embankment. Reclamation eliminated this alternative from further consideration because it would not meet the purpose and need to maintain water deliveries and flows for irrigators and fish and wildlife habitats or continue to provide recreational benefits.

2.4 Summary Comparison of Impacts

Table C-2 in **Appendix C** shows the amount of short-term and permanent surface disturbance anticipated under each alternative. **Table C-3** in **Appendix C** summarizes the impacts on resources and resource uses under each alternative, including the No Action alternative. **Chapter 3** contains detailed descriptions of these effects.

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Chapter 3. Affected Environment and Environmental Consequences

3.1 Introduction

This chapter describes existing physical, biological, social, and cultural resources that could be affected by the No Action alternative and the action alternatives, as described in **Chapter 2**. It also identifies potential environmental consequences—beneficial or adverse—to those resources that could result from implementing any of the three alternatives. Potential impacts on resources are described in terms of duration, intensity, type and context; definitions for these terms can be found in **Appendix C**.

Table C-1 in **Appendix C** identifies the presence or absence of resources or resource uses in the project area and the rationale for those that do not warrant detailed analysis in the EA. Resources or resource uses that may substantively be affected by the alternatives, or are required to be addressed by DOI regulations or Reclamation policy are further described and analyzed in the EA as noted in **Table C-1** in **Appendix C**. **Table C-2** in **Appendix C** provides an overview of the amount of short-term and permanent surface disturbance anticipated under each alternative. **Table C-3** in **Appendix C** summarize impacts by resources and alternatives.

3.2 Water Resources

3.2.1 Analysis Area

The analysis area for water resources is the project area, which includes Conconully Dam, Conconully Reservoir, the east bank of the reservoir from the cemetery to the dam, and Salmon Creek below the dam (see **Map 2-1** in **Appendix A**).

3.2.2 Affected Environment

The project area has a semi-arid climate with cold winters and warm, dry summers. Located in the Okanogan Valley, the region is characterized by its relatively low annual precipitation, averaging around 14 to 16 inches per year (U.S. Climate Data 2025). Most of the precipitation occurs during winter and early spring, often as snow when temperatures drop below freezing. Summers are typically hot and dry, with temperatures frequently rising above 80 degrees Fahrenheit (°F; 27 degrees Celsius [°C]). Due to the surrounding mountainous terrain of the Cascade Range, the project area can experience a variety of weather patterns, including thunderstorms and dry periods during the warmer months, and stretches of cold temperatures in the winter. The combination of seasonal snowfall and dry summer conditions plays a substantial role in shaping the region's water resources and dynamics.

Reclamation assessed the presence of waters of the U.S. that fall under USACE jurisdiction under Section 404 of the CWA. This section's discussion of waters of the U.S. does not include wetlands; for information on wetlands see **Section 3.3**. Reclamation identified the ordinary high-water mark (OHWM)[1] by following the 2005 USACE Regulatory Guidance Letter No. 05-05, Ordinary High Water Mark Identification (Reclamation 2024b). Areas subject to USACE jurisdiction include lakes, rivers, streams, and all areas below the high tide line affected by tidal influence. The USACE jurisdiction for Conconully Reservoir extends to the OHWM at the normal surface water elevation of 2287 feet (Reclamation 2024b). These OHWM distinctions are important in determining required permit approvals and thus imposing BMPs specific to water quality standards and resources (**Map 3-1** in **Appendix A**).

Conconully Reservoir has a drainage area of 121 square miles (Reclamation GIS 2025). The reservoir receives inflows from the perennial North and West Forks of Salmon Creek and Conconully Lake (**Maps 3-1** and **3-2** in **Appendix A**), along with their tributaries, which originate in the Okanogan National Forest to the west and north.

In-stream flow monitoring for North and West Forks of Salmon Creek (U.S. Geological Survey 12446150 and 12446400, respectively) started in the 2013 water year.[2] From water years 2013 to 2020, the annual combined inflows to Salmon Creek from the North and West Forks have ranged between approximately 20,000 and 63,400 acre-feet, with an average of around 37,600 acre-feet (Reclamation 2022b). Flows from the West Fork Salmon Creek only enter the reservoir and do not contribute to Conconully Lake, with an average annual inflow of approximately 18,700 acre-feet from 2013 to 2020 (Reclamation 2022b). Inflows from North Fork Salmon Creek averaged approximately 18,900 acre-feet annually from 2013 through 2020. These flows are typically used to fill Conconully Reservoir first. Once the reservoir is full, 60 cfs can be diverted above the reservoir to Conconully Lake through a water diversion installed by the CTCR. Water not diverted via the diversion canal flows into Conconully Reservoir.

Water continues into Salmon Creek through the dam outlet works and, during higher flows, the spillway. Runoff is stored for irrigation when excess water can be captured in the reservoir. The reservoir can actively store approximately 13,000 acre-feet.

Water Deliveries

Currently, the dam can release up to 200 cfs via the outlet works to assist with reservoir water elevations, provide water for irrigation, and maintain minimum flow requirements. Reservoir flow inputs from Conconully Lake can reach a maximum of 360 cfs to meet irrigation and minimum flow requirements, ensuring the reservoir does not fall below 2245 feet. Downstream of the reservoir, flows can be diverted from Salmon Creek into the OID's main canal from February 14 to November 30 (Reclamation 2022b). If irrigation and in-stream flow requirements surpass available flows in Salmon Creek, additional water can be released from the reservoir through the outlet works.

[1] The OHWM is used interchangeably with the Ordinary High Water Line (WAC 220-660-030). See Glossary for definitions.

[2] A water year typically starts October 1 and ends September 30 the follow year. This timing is used to best align with hydrological cycles, especially in regions where the majority of precipitation occurs during the winter and spring months.

Water diverted for OID's main irrigation canal has a combined annual water right of 17,612 acre-feet.

Fish Flows

Salmon Creek is a source of cool water to the Okanogan River, historically supporting spawning habitat and anadromous fish runs, in particular for summer steelhead (*Oncorhynchus mykiss*) and spring Chinook salmon (*Oncorhynchus tshawytscha)* (Mullan et al. 1992). Additional information on habitat and anadromous fish is found in **Section 3.3**. According to an in-stream flow study for lower Salmon Creek conducted in May 2022, flows between the OID diversion and the Okanogan River of 4 cfs would meet passage criteria for summer steelhead, while spring Chinook salmon would require flows of 6 to 8 cfs in order to enable upstream passage (Blum Environmental and Anchor QEA 2022).

In-stream flow requirements for anadromous fish are based on two factors: 1) flows defined in the 2006 OID and CTCR Memorandum of Agreement (MOA) (OID 2006); and 2) volumes being assessed in the Draft Salmon Creek Biological Assessment (BA) (Reclamation 2008). The flow metrics considered in the Draft Salmon Creek BA have not been finalized, but two annual flow volumes being assessed are 1,800 or 2,800 acre-feet (Reclamation 2022b). It is important to note these flows would be in addition to those being released based on MOA annual volumes; however, they do not vary based on the water year like those described in the MOA. Minimum flow ranges in the MOA (600 to 1,800 acre-feet) can vary based on the amount of regional precipitation of each water year. Furthermore, if Conconully Reservoir contains less than 7,500 acre-feet for a given year, the MOA allows for shifting flow ranges based on the snow water equivalent (SWE),[3] which is compared with the 30-year water year average. **Table 3-1** presents the combinations of in-stream flows based on the SWE and reservoir storage.

Table 3-1. Annual in-stream flow combinations

Flow scenario (acre-feet)	Reservoir storage ≥ 7,500 acre-feet	Reservoir storage < 7,500 acre-feet		
	Any SWE (acre-feet)	SWE >75% of 30-year average (acre-feet)	SWE 50% to 75% of 30-year average (acre-feet)	SWE <50% of 30-year average (acre-feet)
3,600	3,600 (1,800 + 1,800)	3,150 (1,350 + 1,800)	2,700 (900 + 1,800)	2,400 (600 + 1,800)
4,600	4,600 (1,800 + 2,800)	4,150 (1,350 + 2,800)	3,700 a (900 + 2,800)	3,400 (600 + 2,800)

Source: Reclamation 2022b

Water Quality

The State of Washington oversees water quality within the project area in accordance with the CWA. Washington has set water quality standards for specific physical and chemical parameters to ensure conditions are appropriate for supporting designated and potential uses. Surface water can serve a

[3] SWE is a measurement that indicates the amount of water stored in snow. It can be expressed in inches or millimeters and represents the depth of water that would result if the snow were to melt.

variety of purposes, and under Section 303 of the CWA, states are obligated to identify the potential uses of each waterbody and prevent the impairment of those uses due to human-made pollutants or indirect human-made factors.

Section 303(d) of the CWA mandates that states and Tribes identify waterbodies that fail to meet water quality standards. The most recent 303(d) list for Washington is the Draft 2022 Water Quality Assessment, which was released for public review from November 2, 2024, to January 10, 2025 (Ecology 2025). Once the Washington State Department of Ecology (Ecology) completes responses to the public comment, the final 2022 Water Quality Assessment will be submitted to the EPA for approval. For lakes, rivers, and streams included on this list, states and Tribes must create water quality improvement plans, referred to as total maximum daily loads (TMDLs). These TMDLs define the maximum amount of a pollutant a waterbody can tolerate while still meeting water quality standards.

There are no waterbodies within the analysis area listed as a 303(d) lake or stream; therefore, there are no active TMDLs. Based on the Washington State Water Quality Assessment 2018[4] and 2022 cycles, Conconully Reservoir is listed as a Category 2[5] waterbody. This determination was based on testing rainbow trout tissue samples for methylmercury, polychlorinated biphenyls (PCBs), and dichlorodiphenyldichloroethylene (4,4'-DDE).[6] All three sampled parameters exceeded the respective threshold standards, but the data were insufficient for a Category 5[7] determination.

3.2.3 Environmental Consequences

Methods and Criteria

Water Deliveries

Analysis Indicators

- Reduction in flows (in acre-feet) below the amount of authorized irrigation deliveries

Assumptions

- No reservoir drawdown or temporary reservoir restriction will be implemented.
- Irrigation deliveries will be able to continue as normal during the irrigation season. The construction contractor would be responsible for providing supplemental flows as needed to meet irrigation demand.

[4] The 2018 Water Quality Assessment was approved by the EPA Region 10 on August 26, 2022. This assessment is current and replaces any previous assessments for CWA regulatory purposes until the 2022 Assessment is approved by the EPA.
[5] Waterbodies in Category 2 may be partially impaired due to specific water quality issues that affect certain uses, such as recreational use or aquatic life support, but they do not fully fail to meet water quality standards. These waters often require additional monitoring or management to address water quality impairments.
[6] 4,4'-DDE is a breakdown product of DDT (dichlorodiphenyltrichloroethane), a synthetic pesticide once widely used for agricultural purposes and in malaria control. DDT itself is a persistent organic pollutant that can accumulate in the environment and in living organisms, including humans.
[7] Waterbodies in Category 5 are considered impaired and have failed to meet the state's water quality standard for one or more designated uses (such as, drinking, recreation, aquatic life support).

Fish Flows

Analysis Indicators

- Reduction in flows to a cfs rate that is below current agreements

Assumptions

- No reservoir drawdown or temporary reservoir restriction will be implemented.
- The pump or siphon over the spillway will be large enough to accommodate fish flows when the outlet works are turned off.
- The time window for pumping over the spillway (early October – early April) can be extended to meet fish flow demands.

Water Quality

Analysis Indicators

- Increase in turbidity/total suspended solids and temperature, or a decrease in dissolved oxygen, or a major change in potential of hydrogen (pH)

Assumptions

- Changes in water quality parameters will not exceed those allowable under the applicable permit(s), and BMPs will be used to reduce impacts on water quality.

Alternative A – No Action

Water Deliveries

Under the No Action alternative, Reclamation would be unable to control water deliveries if a seismic event occurred that caused the Conconully Dam to fail. If controlled management of water releases is lost, Reclamation would work with local, state, and federal authorities to ensure adequate cleanup of the area. With Reclamation's potential inability to control flows caused by a dam failure, there could also be an impact on the downstream diversion dam and canal owned and managed by OID that ultimately affects dependable flow volumes for irrigation. Under this alternative, there would be no impact on water deliveries unless a seismic event occurred that resulted in dam failure. There would be no impacts to water deliveries under this alternative resulting from construction activities or surface disturbance, as no structural changes to Conconully Dam would occur.

Fish Flows

Reclamation would be unable to control minimum in-stream fish flows if a seismic event resulted in dam failure, which would reduce dependable flows during dry months or water years. Additionally, dam failure would impact Conconully Reservoir's ability to store water, which would otherwise be used to supplement in-stream flows during dry water years.

Water Quality

Under the No Action alternative, there would be no structural changes to Conconully Dam; therefore, there would be no changes to impacts on water quality, including turbidity, water temperature, and pH from current trends. Water quality parameters tested under the 2018 Water

Quality Assessment would likely remain unchanged. Current O&M activities would continue and would not result in impacts on water quality within the project area. Seepage and erosion that currently exists from the dam embankment would continue to introduce sediment downstream and potentially increase turbidity in stretches of Salmon Creek. In the event of a seismic event and dam failure, there would be major impacts on downstream turbidity in Salmon Creek, which would adversely impact summer steelhead and spring Chinook populations (**Section 3.3**). Impacts on water quality associated with climate variability would continue along current trends.

Alternative B – Proposed Action

Water Deliveries

Under Alternative B, there would be no reservoir restriction and Conconully Reservoir would continue to be managed within its historical/current operating range of elevation 2250 to 2287 feet (see **Map 3-1** in **Appendix A**). The outlet works would be closed and bulkheaded from early October through early April during the 4-year construction period (**Section 2.2.2**, **B.1**) to allow for construction. Outside this time window, the outlet works would be required to be operational and there would be no impact on downstream diversions for irrigation demands, which total a combined water right of 17,612 acre-feet (Reclamation 2022b). The reduced likelihood of dam failure from a catastrophic seismic event would maintain future water deliveries.

Fish Flows

During the minimum 4-year period of construction, there would be no interruption to minimum in-stream flow requirements for fish. To move water over the spillway and ensure required baseflows in Salmon Creek, spillway pumps would be utilized from early October through early April (**Section 2.2.2**, **B.5**). Operation of the spillway pumps would ensure minimum in-stream flows, consistent with required volumes in the OID and CTCR MOA, and those being proposed in the Draft Salmon Creek BA (Reclamation 2008). Compared with the No Action alternative, the reduced likelihood of dam failure from a catastrophic seismic event would secure dependable in-stream flow requirements for fish in Salmon Creek.

Water Quality

Under Alternative B, there would be approximately 60.5 acres of surface disturbance. A borrow area would be used to collect and process material for construction (**Section 2.2.2, B.6**). Surface disturbance throughout the project area would create the potential for short-term adverse impacts on water quality through surface runoff, oil or grease inputs from construction equipment, or increased water temperatures from warmer runoff over exposed non-vegetated surfaces. Implementation of BMPs (**Appendix F**), such as erosion and spill prevention and control and treatment of discharged waters, would reduce water quality impacts to a negligible amount. Once the borrow area and material for construction are no longer needed, the excavated borrow area would be graded to its natural slope to prevent future erosion. Stabilization efforts would include grading in accordance with specific runoff management and restoration guidelines per the proposed Revegetation Plan (**Appendix E**). Upon final grading and armoring, there would be no permanent impacts on water quality from construction activities associated with the stability berm.

Under Alternative B, a series of relief wells would be installed downstream of the stability berm to reduce existing foundation artesian water pressures. Based on Reclamation modeling, there would be 10 to 20 relief wells which would collect and discharge the artesian water (approximately 30 to 40 gallons per minute) into Salmon Creek[8]. It is anticipated that the artesian water would be cooler in temperature, relative to the surface water from the reservoir, and free of pollutants. Given the additional small volume input from artesian water, there would only be a minimal localized impact on water temperature where flows enter Salmon Creek. Clean, cold water may be present in relatively distinct zones where the relief wells discharge into Salmon Creek. However, it is expected there would be no adverse impacts on water temperature or water quality in Salmon Creek given the relative artesian water volume input in comparison to the overall volume of water released from the outlet works, with an upper release limit of 665 cfs with all valves open. The pockets of colder water discharge into Salmon Creek from the relief wells would create a beneficial effect for steelhead and Chinook salmon.

A boat ramp would be constructed within 900 feet of the gate house. To minimize turbidity, Reclamation would construct the boat ramp foundation during periods of the lowest reservoir elevations. Miscellaneous backfill material from the borrow area would be used to create the foundation of the boat ramp. The foundation would be mostly placed on land, with only the farthest end placed in the water. During this period of foundation placement, temporary increases in suspended sediment from the reservoir's floor may occur; however, suspended material would remain localized to the boat ramp construction area and not travel downstream to Salmon Creek.

Under Alternative B, it is anticipated that updating the dam's outlet works (**Section 2.2.2**, **B.1**) would require Reclamation to obtain federal and state regulatory permit approvals. These permit approvals, such as a CWA Section 404 individual permit, via USACE JARPA, or CWA Section 401 water quality certification, via the State of Washington's JARPA, would further define necessary mitigation measures to reduce potential impacts on water quality parameters and comply with federal and state water quality standards. Typically, as part of a CWA Section 401 water quality certification, a SWPPP would be required. In the context of a CWA 401 water quality certification, a SWPPP would be essential in protecting water quality during and after the proposed action. It would outline measures to control stormwater runoff, minimize erosion and pollutants, and ensure that the proposed action complies with both federal and state water quality standards. See **Section 4.2.5** for more information pertaining to CWA consultation.

A temporary cofferdam would be installed in Salmon Creek to manage backwaters from the spillway channel and allow installation of the outlet works steel pipe and construction of the valve house. A pipe installed in the current bed of Salmon Creek would transport seepage water from the upstream weirs to the cofferdam, potentially flowing through it to be discharged directly into Salmon Creek or directed into a pool above the cofferdam and then pumped into Salmon Creek using a sump pump. This would allow sediment to settle so that water diverted back into Salmon Creek would meet water quality standards. See **Section 2.2.2, B.1**, and **Map 2-4** in **Appendix A** for more information regarding the placement and design of the cofferdam. As part of this unwatering process,

[8] Personal communication between Jason Sutter, Reclamation Natural Resource Specialist; McLain Johnson, Reclamation Fish Biologist; John Uranga, Reclamation Civil Engineer; and Ted Howard, Reclamation Geotechnical Engineer on March 3, 2025.

Reclamation would regularly monitor water conditions, including pH (particularly during any cement work), temperature, and dissolved oxygen, as required by permit approvals.

It is anticipated that surface disturbing activities or in-water work under Alternative B would expose contaminants detected in the 2018 and 2022 water quality assessments (methylmercury, PCBs, or 4,4'-DDE), which could negatively impact water quality. These potential effects would be reduced by implementing appropriate BMPs such as regular water quality monitoring (**Appendix F**) As such, the listing of Conconully Reservoir as a Category 2 waterbody would remain unchanged.

Under Alternative B, DSM columns would be installed using a grouting process. To prevent the grout from spreading into the Conconully Reservoir or Salmon Creek, Reclamation would follow a monitoring plan that includes visual assessments of the construction area during grouting. Additionally, it is unlikely for grout to spread given the low-pressure grout injection technique used for DSM.

With appropriate BMPs (see **Appendix F**) in place, there would be negligible adverse impacts on surface water quality under Alternative B.

Reclamation is proposing downstream aquatic and wetland habitat restoration in Salmon Creek within the project area to reduce anticipated impacts from construction activities. All restoration activities would be limited to a 19.5-acre area of Reclamation land within the project area (**Map 2-2** in **Appendix A**). Exact locations of the proposed in-stream restoration activities have yet to be identified. However, overall goals include increasing habitat abundance, diversity, and complexity for salmonids like steelhead and Chinook salmon; increasing overwinter rearing habitat for these species during their life stages within the project area; and increasing the duration and depth of floodplain inundation (**Section 2.2.2**, **B.12**). Large woody material in the form of engineered log jams placed in Salmon Creek would impact in-stream aquatic habitat by slowing in-stream flow velocities. Restoration treatments would include increasing side or secondary channels and areas for backwaters. This would not only create additional habitat for salmonid life cycles but also would allow water to passively filter potential pollutants, thereby enhancing water quality, and would increase the extent of groundwater. Reclamation is also proposing streambank stabilization using large wood features, bank reshaping, and sediment sinks, ultimately aimed at reducing bank erosion and additional sediment discharge. Though these in-stream restoration efforts could have short-term impacts on water quality, they would have a net positive permanent effect on water resources.

Under Alternative B, there would be a reduced likelihood of increased sediment delivery and increased turbidity for downstream portions of Salmon Creek in the event of a seismic event and dam failure. With the reduced likelihood of a dam failure under Alternative B, any impacts to water quality in Salmon Creek associated with increased turbidity and sediment input would be temporary during the construction period.

In addition to Alternative B, other plans and projects near the project area would benefit water resources over time. This includes the Salmon Creek River Mile 8 Restoration Project which would take place on CTCR land. The primary objective of this project is to restore fish habitat, improve anadromous fish passage, and sustain necessary in-stream flows. Project activities such as placement of in-stream substrate, side channel connectivity to the mainstream channel, stream bank

stabilization and revegetation would potentially have short-term impacts to water resources. This project would ultimately improve water quality and in-stream flows in Salmon Creek. Reclamation, in partnership with OID and CTCR, is proceeding with plans to replace an inefficient screening operation to promote adult fish passage around the OID Diversion on Salmon Creek (River Mile 4). These project activities would potentially both result in temporary impacts on water resources associated with construction activities. Alternative B would also contribute to temporary impacts on water resources during construction. However, all three projects would ultimately contribute to long-term, beneficial impacts on water resources through the reduced risk of dam failure and improvement of water conditions for aquatic species and habitat in Salmon Creek through restoration activities.

Alternative C

Water Deliveries
Impacts on water deliveries under Alternative C would be the same as those described above under Alternative B.

Fish Flows
Impacts on fish flows under Alternative C would be the same as those described under Alternative B.

Water Quality
The impacts on water quality would be similar to those described under Alternative B except that - under Alternative C, it is anticipated short-term impacts on water quality would be slightly less than those described under Alternative B. The alignment of the outlet works would be shifted westward compared with Alternative B, resulting in less rock excavation, and the outlet works extension would be shorter than under Alternative B. BMPs to ensure water quality standards are upheld (**Appendix F**) would be the same as those required under Alternative B. The reduction in rock excavation and shortening of the outlet would have a smaller construction footprint thereby likely decreasing the potential for short-term impacts on water quality under Alternative C. Additionally, Alternative C does not include construction of a boat ramp and thus would have no short-term increase in turbidity. Under Alternative C, there would be no permanent adverse impacts on water quality.

3.3 Biological Resources

3.3.1 Analysis Area

The analysis area for biological resources is the project area, including Conconully Dam, Conconully Reservoir (the east bank of the reservoir from the cemetery to the dam), and Salmon Creek, as shown in **Map 2-1** in **Appendix A**. The analysis area for effects on fisheries and other aquatic species includes the upstream side of Conconully Dam within the project area to the most downstream extent of proposed aquatic and wetland habitat restoration activities in Salmon Creek (**Map 2-1** in **Appendix A**).

3.3.2 Affected Environment

Fisheries and Other Aquatic Species

The following section describes the existing conditions for fisheries and other aquatic species, including aquatic habitats, special status fish species, and sport fisheries known to occur in the project area.

Aquatic Habitats

Aquatic habitats in the project area include Salmon Creek and Conconully Reservoir (an impoundment of Salmon Creek). Salmon Creek flows 17.0 miles downstream from Conconully Reservoir to join the Okanogan River, which is a tributary of the Columbia River and Pacific Ocean. Conconully Reservoir receives inflows from Conconully Lake and West and North Forks of Salmon Creek, to the north and west of the project area. As described in **Section 3.2.2**, excess water can be diverted to Conconully Lake. Water not diverted via the diversion canal flows into Conconully Reservoir. Salmon Creek is one of the few cold water tributaries to the Okanogan River and provides productive and favorable habitat for summer steelhead (*Oncorhynchus mykiss*) (Arterburn et al. 2007).

The Salmon Creek watershed historically supported a variety of anadromous salmonids and resident fish species (BPA 2004). These fisheries resources provided important subsistence, cultural, and economic value to native peoples, especially the nearby Okanogan Indian Tribe. Irrigation diversions and construction of the OID diversion dam in the early 1900s resulted in the lower 4.3 miles of Salmon Creek being completely dry for portions of the irrigation season, contributing to the decline of anadromous fish from Salmon Creek (BPA 2004). The OID diversion dam also precluded anadromous salmonids from accessing upstream spawning and rearing habitat during certain times of the year.

In 2006, the OID and the CTCR agreed to implement an MOA to restore in-stream flows in lower Salmon Creek, as described in **Section 3.2.2**. In 2019, Reclamation, the CTCR, and the OID agreed to expand perennial flows in Salmon Creek downstream of the OID diversion dam, enhancing access to quality spawning and rearing habitat for summer steelhead (NMFS 2022a). Since then, at least 3,600 acre-feet of water have been released annually to provide perennial flow (NMFS 2022a; Blum Environmental and Anchor QEA 2022; WWT 2025). Controlled releases for irrigation deliveries are made from Conconully Reservoir between early April and late September. Over the past 5 years (2020–2025), daily stream flows in Salmon Creek (above the OID diversion dam) ranged from 0.3 cfs (February 13, 2022) to 604 cfs (May 8, 2023) with a mean of 38.3 cfs (USGS 2025a). Lower Salmon Creek flows released from the OID diversion dam from 2020 to 2021 are characterized in **Table H-2** in **Appendix H**. Additional information on hydrology and in-stream flow requirements to support anadromous fish in Salmon Creek is found in **Section 3.2**.

Water is released from Conconully Reservoir into Salmon Creek via the Conconully Dam outlet works and over the spillway during higher flows. Conconully Reservoir is 450 acres in size with a maximum depth of 50 feet. The shoreline of Conconully Reservoir in the project area supports discontinuous trees and shrubs, mostly cottonwoods (*Populus* spp.) and willows (*Salix* spp.), with some herbaceous wetland vegetation. Water that enters the outlet works passes through a 333-foot-

long tunnel before discharging into the open stream channel. The spillway channel converges with Salmon Creek 800 feet downstream of the outlet works discharge point (Reclamation GIS 2025).

Conconully Dam is a complete migration barrier to upstream fish passage, precluding anadromous species from accessing the reservoir and its tributaries. However, resident fishes do occupy the reservoir and have access to its tributaries. The reservoir provides lentic (still-water) habitat that is subject to warmer water temperatures in the summer from solar radiation. Artificial structures are present along the south side of Conconully Reservoir. Riprap covers the upstream face of Conconully Dam, and concrete structures are present along the dam outlet works structure and spillway. These artificial structures may provide habitat for warmwater fishes.

Special Status Species

Federally-listed fish that may occur in the project area include summer steelhead, spring Chinook salmon (*O. tshawytscha*), and species of concern such as Pacific lamprey (*Entosphenus tridentatus*) and westslope cutthroat trout (*O. lewisi*) (**Table H-1** in **Appendix H**; WDFW 2025a). It is likely that any Chinook salmon present in the project area would be comprised of non-listed fish that are part of the "nonessential experimental population" of spring-run Chinook salmon in the Okanogan River. Due to the blockage of anadromous fish passage at Conconully Dam, only westslope cutthroat trout are found above the dam.

Federally threatened bull trout are not known to occur in Salmon Creek or Conconully Reservoir. Temperature and climate data modeling indicate that the Salmon Creek watershed has some of the better potential bull trout habitat in the U.S. portions of the Okanogan Basin, but there is no evidence that a permanent population has ever existed in the watershed (McPhail and Baxter 1996; Haas and McPhail 2001). Additionally, the USFWS bull trout recovery plan excludes the Okanogan River as a core area within the Mid-Columbia Recovery Unit and states the species is "likely extirpated" from the Okanogan Basin in Washington (USFWS 2015). It is possible that bull trout were extirpated from Salmon Creek due to interbreeding with eastern brook trout (*Salvelinus fontinalis*) (BPA 2004). Based on these factors, the project would have no effect on bull trout due to their lack of presence within the action area and are not analyzed further.

Summer Steelhead (*Oncorhynchus mykiss*) Upper Columbia River Distinct Population Segment (DPS)

Salmon Creek, downstream from Conconully Dam, supports spawning and rearing of federally threatened steelhead (WDFW 2025a). Critical habitat for the Upper Columbia River Steelhead DPS was designated in 2014 and includes Salmon Creek, between Conconully Dam and its downstream confluence with the Okanogan River (79 Federal Register [FR] 20802). There are 0.9 linear miles of critical habitat designated within the project area; critical habitat continues downstream of the project area to the Okanogan River (**Map 3-2** in **Appendix A**). The NMFS developed a list of primary constituent elements that are essential to the species' conservation and based on the unique life history of steelhead and their biological needs. Salmon Creek supports the following three primary constituent elements:

1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation, and larval development

2. Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover that help ensure their survival
3. Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival

Adult summer steelhead begin returning to spawn in Salmon Creek in March, and spawning continues through May with peak spawning occurring in April (OBMEP 2025; **Table H-3** in **Appendix H**). After spawning, many adults out-migrate and, unlike other anadromous species, can return in following years to spawn again. Egg incubation and fry emergence ranges from May through June (BPA 2004). Juveniles overwinter in the creek and out-migrate as smolts during April and May of the following year (BPA 2004).

Salmon Creek sustains the greatest number of spawning steelhead in the entire Okanogan River subbasin. The Okanogan Basin Monitoring and Evaluation Program has monitored summer steelhead abundance data in the basin since 2005. From 2005 to 2023, the average number of return spawners (both hatchery-origin and natural-origin) was 1,289 fish, with 815 adults returning in 2024 (OBMEP 2025). An estimated 8,186 natural-origin juvenile steelhead out-migrated from creeks in the Washington State portion of the Okanogan River subbasin in 2024. The majority (5,128) of these out-migrants were produced in Salmon Creek (**Table H-4** in **Appendix H**). The number of natural-origin steelhead spawning in the Okanogan River subbasin has been trending in a decline and remains below the viable salmonid population minimum abundance threshold (500) for the U.S. portion of the subbasin (OBMEP 2025). Previous spawning surveys have documented redds (nests) throughout Salmon Creek as far upstream as the confluence of the Conconully Dam spillway channel and outlet works channel (OBMEP 2023).

Salmon Creek has historically had the highest productivity of summer steelhead juveniles in the Okanogan River subbasin. However, the natural flow regime has been altered and the stream lacks habitat complexity. A previous limiting factors assessment found that large woody debris, fine sediment (substrate), and floodplain connectivity were the most poorly rated habitat features within Salmon Creek immediately downstream of Conconully Reservoir (Entrix and Golder 2004). This reach shows large potential gains in population abundance if priority habitats are restored (OBMEP 2025). Steelhead habitat potential in Salmon Creek showed a positive trend from 2009 to 2021 (OBMEP 2025).

Mean weekly maximum temperature (that is, the seven-day average of the daily maximum temperatures) indicates that temperatures in Salmon Creek, particularly in the summer, may expose juvenile salmonids to lethal or sublethal effects. This may occur in the stream reach immediately downstream from the diversion dam, as well as other areas in the watershed that lack in suitable riparian cover and habitat complexity. Although juveniles may seek refuge in interstitial spaces (that is, spaces between physical attributes such as gravel and sediment) (OBMEP 2025), the lack of deep pool refugia likely negatively impacts rearing steelhead. Flows are generally low from summer through winter, which likely limits overwintering opportunities.

Minimum daily mean discharge from Salmon Creek into the Okanogan River is 0.3–3.3 cfs, while maximum daily mean discharge can range from 75 cfs to 750 cfs (OBMEP 2025). Variations in flow are largely due to diversions for irrigation and arid geography (OBMEP 2025). Although a high percentage of fines (small particles) have been documented throughout the Okanogan River, fines in Salmon Creek represent a small percentage of sediment composition relative to other tributaries (OBMEP 2025).

An in-stream flow study was recently performed to evaluate how flow releases of 30 cfs and less would affect downstream habitat use by salmonids in lower Salmon Creek (Blum Environmental and Anchor QEA 2022). Although steelhead are known to spawn below the OID diversion dam, spawning habitat is limited in this reach due to historical uncontrolled dam releases that flushed out much of the suitable spawning substrate and high gradient. Results of the study indicate that weighted usable area for all salmonid life stages generally increases with the range of flows modeled and suggested that the weighted usable area would likely peak above 50 cfs if higher flows were modeled. The study found that the greatest benefit from providing perennial flows during dam upgrades will be realized by providing fish access to higher quality spawning and rearing habitats above the OID diversion dam (Blum Environmental and Anchor QEA 2022).

Spring Chinook Salmon (*Oncorhynchus tshawytscha*) Upper Columbia River Spring Chinook Salmon Evolutionarily Significant Unit (ESU)

Salmon Creek historically supported spring Chinook and the CTCR has documented spring Chinook redds above the OID diversion dam, though none have been found in recent years (Blum Environmental and Anchor QEA 2022). However, adults from adjacent streams enter the Okanogan River subbasin in low numbers and may contribute to juvenile production in Salmon Creek. In 2014, NMFS designated a "nonessential experimental population" of spring-run Chinook salmon in the Okanogan River subbasin under Section 10(j) of the ESA in 2014 (79 FR 20802). These fish are not included as part of the listed ESU (NMFS 2023). Thus, it is possible that some spring Chinook may spawn and rear in Salmon Creek, particularly upstream from the OID diversion dam. Abundances of juvenile spring Chinook in Salmon Creek increased after the experimental population was introduced (**Table H-5** in **Appendix H**), so it is likely that most fish in the creek are part of the non-listed population. Salmon Creek below Conconully Dam is designated Essential Fish Habitat (EFH) for Chinook salmon due to their historical presence within the Okanogan River subbasin (NMFS 2025).

Adult spring Chinook are expected to migrate into Salmon Creek starting in May, with arrival timing dependent on snowmelt and flow availability. Spawning occurs in the late summer, peaking in mid- to late August. Egg incubation occurs over the winter, with emergence continuing until mid-April. Smolts emigrate the following year as 1+[9] from mid-April to mid-June (BPA 2004; OBMEP 2025). Chinook adults may be more susceptible to thermal stress as they continue to migrate and spawn during the elevated temperatures of summer.

[9] 1+ is a smolt that is one year old or older at the time it migrates downstream to the ocean.

Pacific lamprey (*Entosphenus tridentatus*)

Pacific lamprey share many habitat requirements with Pacific salmonids, particularly cold, clear water for spawning and incubation. Most Pacific lampreys are anadromous, spending part of their life cycle in the ocean and migrating to freshwater spawning sites. Lamprey build nest depressions in low-gradient riffles that support gravel and cobble substrates and are typically associated with vegetation cover and woody debris. Upon hatching, juvenile lampreys (ammocoetes) are washed downstream to areas of sand or mud, where they burrow and begin feeding on organic matter and algae from the stream substrate. After 5 to 7 years, ammocoetes metamorphose and develop saltwater tolerance. Upon high-flow events in the winter or spring, lampreys migrate downstream to the ocean. Adult lampreys use these same high flows to migrate upstream from the ocean to spawning sites (Moyle et al. 2015).

Lampreys have been recently reintroduced to the Okanogan Basin and are known to occur in Salmon Creek. Ammocoetes could occur year-round in Salmon Creek substrate. Lampreys would not occur above Conconully Dam because the dam lacks adequate passage facilities (Campobasso 2020). Larval entrainment is being addressed at the OID diversion dam. This diversion screen is undergoing a fish-friendly redesign that will reduce entrainment and stranding of larval/juvenile lampreys in the irrigation canal, which is an important consideration now that adult lampreys are successfully reproducing in Salmon Creek (Grote and Lampman 2024).

Westslope Cutthroat Trout (*Oncorhynchus lewisi*)

The westslope cutthroat trout is a federally-listed species of concern and one of two cutthroat trout subspecies that are native to Washington. Westslope cutthroat trout are common in headwaters, lakes, and streams. They have been observed in North Fork Salmon Creek and may occur throughout the project area (BPA 2004; WDFW 2025b). Westslope cutthroat trout tend to thrive better in streams with more pool habitat and cover than in streams with very few pools and little or no cover. The status of westslope cutthroat trout in the Okanogan Basin is unknown. It is speculated that those currently present in Salmon Creek may have been planted (BPA 2004).

Westslope cutthroat trout exhibit adfluvial (that is, living in lakes and spawning in tributaries), fluvial (living in rivers and spawning in tributaries), and resident life-history forms, and their use of lakes and larger rivers may provide them with some resilience to higher temperatures and decreasing flows that may occur in smaller tributaries during summer months (WDFW 2025b). Adult cutthroat trout spawn in spring and early summer. Eggs usually hatch in 6–7 weeks. Emergence can take place through August, when some fry can move into lake environments, such as Conconully Reservoir.

Other Aquatic Species

Columbia spotted frog (*Rana luteiventris*), northern leopard frog (*R. pipiens*), and western toad (*Bufo boreas*) are federal species of concern that are known to occur within the Okanogan Basin (BPA 2004). These species prefer ponded areas, wetlands, and still water habitats within margins of rivers, streams, and lakes. Although these species may be found in the project vicinity, they are not known to occur within the construction portion of the project area (WDFW 2025c).

Salmonid Prey Base

Salmonid freshwater prey are expected to occur within habitats in the project area. Juvenile salmon and steelhead prey on a mixed diet of aquatic and terrestrial insects, crustaceans, and other forms of macroinvertebrates. These organisms may be found within stream and lake habitats in Salmon Creek and Conconully Reservoir. Riparian habitats along Salmon Creek provide a source of terrestrial insect production. Upon emergence, fry actively feed on a variety of aquatic insects that drift through the water column. Taxonomic groups prominent in behavioral drift are amphipods, Ephemeroptera (mayflies), Plecoptera (stoneflies), Tricoptera (caddisflies), and Simuliidae (blackfly larvae). Factors that increase survival of salmon eggs and fry (namely, low levels of fine sands and silts) also apply to aquatic invertebrates. Thus, protection from natural physical disturbance is important for early life stages of salmon and their prey base (Cederholm et al. 2000).

For salmonids that rear for extended periods (such as steelhead), terrestrial food items may comprise more than 30 percent of their diet. Primary terrestrial prey items include dipterans, primarily Chironomidae (midges). Stonefly and mayfly nymphs are consumed by Chinook salmon fry. The influence of riparian vegetation along streams and estuaries appears to be an important factor in determining abundance and type of terrestrial insects on which salmon are able to forage. Sockeye fry are known to feed on cladocerens, copepods, and gammarid amphipods in lakes; it is anticipated that these organisms may be consumed by cutthroat and kokanee (*O. nerka*, landlocked sockeye salmon) in Conconully Reservoir. Larger-sized juvenile salmon may supplement their diet with occasional salmon eggs or fry (Cederholm et al. 2000).

Sport Fisheries

Salmon Creek and Conconully Reservoir support non-listed fishes (both native and nonnative), including resident rainbow trout (*O. mykiss*), eastern brook trout (*Salvelinus fontinalis*), kokanee, and various warmwater fishes such as smallmouth bass (*Micropterus dolomieu*) and largemouth bass (*M. salmoides*). Many of these fishes are targeted by recreational fishers in Conconully Reservoir (WDFW 2025d).

Wetlands

Aquatic resources, including wetlands and other non-wetland waters of the U.S., are potentially subject to jurisdiction under Section 404 of the CWA. Through a recent wetland delineation and assessment of functional condition, 22 wetlands in the project area were identified, totaling 9.86 acres (**Map 3-3** in **Appendix A**; Reclamation 2021b, 2024b). **Table H-10** in **Appendix H** summarizes the identified wetlands, including their classification and functional condition.

Wetlands mapped in the project area generally fall into one of four types: depressional, slope, lake fringe and riverine (**Table H-10** in **Appendix H**). Wetland types are briefly summarized below. For more detailed descriptions of the vegetation, soils, and hydrologic indicators associated with wetlands in the project area, see the Conconully Safety of Dams Project: Aquatic Resources Delineation Reports (Reclamation 2021b, 2024b).

Numerous riverine wetlands are commonly found along the edges of Salmon Creek and on its gravel bars, where wetland vegetation grows on low riparian terraces within and slightly above the creek's OHWM. In these wetlands, continuous subsurface hydrology is present from Salmon Creek,

depending on the volume of water released at the outlet works. In the lower areas where soils are inundated, Nebraska sedge (*Carex nebrascensis*) is strongly dominant. As relative elevations from the Salmon Creek increase and surface inundation decreases, more diverse wetland communities are present. Common plant species in these areas include soft rush (*Juncus effusus*), daggerleaf rush (*Juncus ensifolius*), creeping bentgrass (*Agrostis stolonifera*), short-awn foxtail (*Alopecurus aequalis*), wild mint (*Mentha arvensis*), white clover (*Trifolium repens*), and hooded skullcap (*Scutellaria galerinculata*).

Slope wetlands in the Salmon Creek drainage are sustained by a combination of flows from Salmon Creek and from seeps on the adjacent hillsides. The vegetation composition is mountain alder and red-osier dogwood, which are both dominant. Water birch (*Betula occidentalis)*, Mackenzie's willow (*Salix prolixa*), and quaking aspen (*Populus tremuloides*) are also occasionally present. Herbaceous understory is typically sparse, most notably where dogwood is dominant due to the dense, nearly impenetrable thicket this species' growth form creates.

Below the dam spillway, relatively deep water precludes plant growth in some areas year-round, whereas in shallower areas, sparse to dense emergent vegetation is present, including hardstem bulrush (*Schoenoplectus acutus*), panicled bulrush (*Scirpus microcarpus*), and common cattail (*Typha latifolia*). These depressional wetlands are enhanced by a large beaver dam built near the confluence of the spillway channel and Salmon Creek.

Finally, along the shoreline of Conconully Reservoir, several lake fringe wetlands comprised mostly of narrowleaf willow (*Salix exigua*) are present. Fluctuating water levels in the reservoir, coupled with wave action from powerboat wakes, prevent the establishment and growth of most other herbaceous vegetation.

Terrestrial Wildlife

Migratory Birds and Raptors

Common migratory bird species inhabiting the project area include cedar waxwing (*Bombycilla cedrom*), red-winged blackbird (*Agelaius phoeniceus*), black-capped chickadee (*Poecile atricapillus*), and yellow warbler (*Dendroica petechia*) (Reclamation 2020). The project area supports a variety of migratory birds that fall under the USFWS' Birds of Conservation Concern list; species from the list that could occur in the project area include the olive-sided flycatcher (*Contopus cooperi*), rufous hummingbird (*Selasphorus rufus*), and Cassin's finch (*Haemorhous cassinii*) (USFWS 2025). All migratory birds are protected under the Migratory Bird Treaty Act (MBTA).

There are no known bald eagle (*Haliaeetus leucocephalus*) in or near the project area (WDFW 2004); however, Reclamation staff and contractors have recently seen juvenile and adult bald eagles flying over the project area (WDFW 2025e). There is one documented golden eagle (*Aquila chrysaetos*) nest within the 2-mile buffer area southeast of the project area along Salmon Creek; no surface disturbing activities are planned outside of the project area boundary (WDFW 2025e). Additionally, territorial and breeding behavior of bald eagles has been detected near the project area during recent avian surveys (Reclamation 2020). While the bald eagle was removed from Washington's list of endangered species in 2016, protections intended to sustain the population (that is, the Bald and Golden Eagle Protection Act and the MBTA) are still in place.

Special Status Species

Seven federally-listed or proposed, or state-listed terrestrial wildlife species could inhabit the project area (**Table H-1** in **Appendix H)**. Of these, five species, the gray wolf (*Canis lupus*), Canada lynx (*Lynx canadensis*), yellow-billed cuckoo (*Coccyzus americanus*), Suckley's cuckoo bumblebee (*Bombus suckleyi*), and monarch butterfly (*Danaus plexippus*), have the potential to occur due to the presence of suitable habitat, as described in more detail below. The remaining potentially-occurring species, North American wolverine (*Gulo gulo luscus*) and Mount Rainier white-tailed ptarmigan (*Legopus leucura rainierensis*) are unlikely to occur because the project area lacks suitable habitat. The project area does not contain any proposed or designated critical habitat for federally-listed terrestrial species.

Gray wolf. The gray wolf has been listed as an endangered species in the state of Washington since passage of the ESA in 1973. The USFWS delisted the species in 2011 in the eastern third of the state due to recovery; however, the endangered status was still retained for the western two-thirds of the state, which is where the project area lies (Wiles et al. 2011). Gray wolves are considered habitat generalists and have historically occurred in every habitat where large ungulates (gray wolves' preferred prey species) occur, including forests, deserts, prairies, swamps, tundra, and coasts. Additionally, gray wolves occupy large territories that average 350 square miles in Washington (Wiles et al. 2011). There is one known wolf pack that overlaps the project area, the Reed Mountain wolf pack, which is considered a non-breeding pack. However, there are multiple breeding and non-breeding packs in proximity to the project area (WDFW 2024a). As such, given the species' ability to move through and occupy large areas of land, coupled with their generalist habitat uses, the species could occur in the project area, though there are no known den or rendezvous sites nor is critical habitat present (USFWS 2025). Because the species prefers remote, heavily forested areas, use of the project area would likely be limited to infrequent migrations between territories or dispersals. Therefore, the likelihood of the species using the project area is relatively low.

Canada lynx. The Canada lynx (*Lynx canadensis*) was listed as threatened under the ESA in 2000 (65 FR 16053). Critical habitat was designated in 2006 (71 FR 66008), with subsequent revisions in 2014 and 2024 (79 FR 35303, 89 FR 94656). While there is no designated critical habitat for the species in the project area, there is a critical habitat designation 3 miles from the project area. However, there is a low potential for species presence in the project area as it contains a negligible amount of suitable habitat for the species' preferred prey, the snowshoe hare (*Lepus americanus*). More suitable habitat for the species is located to the north and west of the project area

Yellow-billed cuckoo. The yellow-billed cuckoo (*Coccyzus americanus*) was listed as federally threatened under the ESA in 2014 (79 FR 71373), and critical habitat was designated in 2021 (86 FR 20798); however, there is no designated critical habitat in Washington state or the project area. Yellow-billed cuckoos are most commonly associated with riparian habitat dominated by cottonwoods (*Populus* spp.) and willows (*Salix* spp.). Breeding yellow-billed cuckoos are riparian obligates and nest almost exclusively in low- to moderate-elevation riparian woodlands with native broadleaf trees and shrubs, with relatively large continuous patches (50 acres or more in size) of multilayered riparian habitat (USFWS 2014). The yellow-billed cuckoo is a migratory bird species, traveling between its wintering grounds in Central and South America and its breeding ground in North America (continental U.S. and Mexico) each spring and fall using river corridors as travel

routes. Reclamation carried out surveys to document the presence of yellow-billed cuckoos in the project area and despite the presence of suitable habitat, resulted in no detections (Reclamation 2020).

Suckley's cuckoo bumble bee. The Suckley's cuckoo bumble bee was proposed for federal listing as an endangered species under the ESA in 2024 (89 FR 102074). The species is intimately tied to the presence of its bumble bee host colonies and therefore the presence of suitable habitats associated with host bumble bee colonies (such as open grasslands) can be an indicator of species presence. While the project area does support suitable habitat for the Suckley's cuckoo bumble bee via the presence of host colony habitats, there are no known records of species occurrence in the project area.

Monarch butterfly. The USFWS petitioned to list the monarch butterfly for protection under the ESA due to the long-term declining trends in the two North American monarch butterfly populations. A range-wide status review of the monarch butterfly began in 2021. The USFWS determined that the species would remain as a candidate species and is warranted for listing, but it is precluded due to other species having higher priorities (USFWS 2021). In December 2024, the USFWS changed the status of the monarch butterfly to propose that the butterfly be listed as threatened. Currently, the proposal is out for public comment, and the final listing decision will be determined in late 2025.

Adult monarch butterflies require a diversity of blooming nectar resources, which they feed on throughout their migration routes and breeding grounds (spring through fall). Monarch butterflies also need milkweed (*Asclepias* spp., for both egg laying and larval feeding) embedded within this diverse nectaring habitat. The correct phenology, or timing, of both monarch butterflies and nectar plants and milkweed is important for monarch butterflies' survival. Individual monarch butterflies in temperate climates, such as eastern and western North America, undergo long-distance migration in spring and summer. The western North American population of monarch butterflies has generally been in decline and the risk of extinction is increasing. Washington is within the core of the western monarch butterflies' range, which also consists of Arizona, California, Idaho, Nevada, Oregon, and Utah.

3.3.3 Environmental Consequences

Methods and Criteria

Analysis Indicators

- Fisheries and Other Aquatic Species
    - The potential for take of federally-listed fish species or adverse modification of critical habitat
    - Injury or mortality of common or special status fish species that results in population-level effects or that affects population viability
    - Displacement of common or special status fish species that results in population-level effects, affects population viability, or occurs during a critical or sensitive period
    - Permanent loss, degradation, or modification of aquatic habitat or EFH

- Wetlands
  - The potential for loss (dredge or fill) of wetlands and other waters of the U.S.
- Terrestrial Wildlife
  - The potential for permanent loss, degradation, or modification of habitat for migratory birds, and special status wildlife species
  - The potential for injury or mortality of migratory birds and special status wildlife species that results in population-level effects or that affects population viability
  - The potential for disturbance-related take of bald or golden eagles

Assumptions

- Fisheries and Other Aquatic Species
  - Impacts on aquatic species will be dependent on the intensity, duration, and timing of construction activities, presence of aquatic species, and implementation of conservation measures and BMPs.
  - In-water construction activities will adhere to the approved WDFW in-water work window unless modifications to the work window are approved by the WDFW.
  - Water levels in the reservoir will not change beyond normal operational fluctuations.
  - Base flows in Salmon Creek will not be reduced by the project.

- Wetlands
  - Loss of wetlands and waters of the U.S. would be offset by required mitigation as determined through the CWA permitting process.

- Terrestrial Wildlife
  - The changes in quality of wildlife habitat are related to the change in the quality of the associated vegetation communities. Vegetation communities that degrade due to project activities would be less likely to support associated native wildlife, and associated populations would decline.
  - Reclamation would follow BMPs (**Appendix F**) for minimizing wildlife effects, including conducting breeding bird surveys and clearing vegetation and conducting construction outside the breeding season.

Alternative A – No Action

Fisheries and Other Aquatic Species

Under the No Action alternative, no impacts on aquatic species would occur, as no structural changes to Conconully Dam would be made. There would be no operational changes to the outlet works that would change streamflows for downstream salmonids in Salmon Creek. Additionally, aquatic habitat conditions would remain unchanged, and stream restoration actions would not take place downstream from the dam and outlet works. Without targeted habitat improvements, the habitat in Salmon Creek downstream from the dam would continue to limit steelhead spawning and rearing potential due to the lack of suitable cover and complexity.

Under the No Action alternative, Conconully Dam would still be at risk of seismic failure from liquefaction of embankment and foundation materials. Dam failure could have major adverse effects on fish and aquatic species by leading to rapid release of impounded water, drastically altering downstream flow regimes, and potentially destroying or degrading steelhead spawning and rearing habitat. A dam failure would release large volumes of sediment, increasing turbidity and smothering spawning gravels, impacting egg incubation and fry emergence. Altered flow regimes could degrade or eliminate riffles and pools, which are important habitat features for salmonids. Dam failure and subsequent habitat degradation could disrupt the entire stream ecosystem, impacting food webs and other aquatic organisms. Overall, a dam failure would have cascading negative effects on fish and their habitat, particularly impacting spawning success and potentially leading to major long-term population declines that would likely take many decades to recover.

Wetlands

No effects on wetlands would occur under the No Action alternative because Reclamation would not make any structural changes to Conconully Dam. If a seismic event were to occur that resulted in dam failure, the subsequent downstream flooding of Salmon Creek would cause long-term damage or alter wetlands in the project area.

Terrestrial Wildlife

No effects on nesting birds, eagles, or special status wildlife or their habitats would occur under the No Action alternative because Reclamation would not make any structural changes to Conconully Dam. Recreational use of the project area would continue to result in negligible levels of temporary disturbance or displacement to terrestrial wildlife species due to human presence. If there is a seismic event that causes the Conconully Dam to fail, flooding could cause long-term to permanent damage to wildlife habitats, making them unsuitable for use by nesting birds, eagles, or special status wildlife in the project area.

Alternative B – Proposed Action

Fisheries and Other Aquatic Species

Construction Activities

Upgrading the Conconully Dam outlet works and installing new water control systems and facilities would enhance operational functionality, benefitting steelhead and other fish species downstream from the dam. Suitable perennial baseflows and water temperature are the primary limiting factors for salmonid production in Salmon Creek. Improved control of flow releases would ensure that adults can access downstream spawning grounds and enhance juvenile survival, overwintering, and out-migration, relative to the No Action alternative, where there would be no flow control improvements that could benefit downstream salmonids.

Construction activities that involve vegetation clearing, soil and rock excavation, fill, degradation, or loss of aquatic habitats, and in-water construction, would result in short-term and permanent impacts on fisheries and other aquatic species and aquatic habitats. In general, the types of construction activities under Alternative B that may result in these effects include dam and outlet works modifications and associated loss of in-stream habitat, road improvements, borrow area and

boat launch construction, and care and handling of irrigation delivery water during construction, which are described in further detail below.

Habitat Loss and Modification

Under Alternative B, dam and outlet works modifications would result in permanent loss of 642 linear feet of Salmon Creek stream habitat (Reclamation GIS 2025). This loss would occur because a portion of Salmon Creek, originating at the existing outlet works, would be located under the proposed stability berm and new outlet works and filled to enable construction work to proceed (**Map 2-2** and **Map 2-4** in **Appendix A**). This stream reach is designated critical habitat for steelhead and EFH for Pacific salmon.

In addition, modifications would result in short-term impacts on 243 linear feet of Salmon Creek stream habitat (Reclamation GIS 2025). This loss would occur because a portion of Salmon Creek, extending downstream of the new stability berm and outlet works to the temporary cofferdam would be unwatered during construction (**Map 2-4** in **Appendix A**). Following construction, the unwatered stream channel would be backwatered by flows in the creek once the cofferdam is removed and would be restored to existing conditions. The stream banks would be revegetated and the stream rewatered so that it can continue to provide habitat for listed steelhead and other fish species. These impacts are considered short-term because it would take some time after construction (between 1-10 years) for the stream to stabilize and reestablish macroinvertebrate and vegetation communities. Short-term and permanent impacts to aquatic habitats are summarized in **Table H-6** in **Appendix H.**

The reach of Salmon Creek below the outlet works may provide spawning and rearing habitat for federally-listed steelhead and potentially non-listed Chinook salmon. Outlet works construction may occur over a 4-year timeframe, which would prevent all fish from using the affected portion of the creek during this entire period. Proposed stream restoration activities in Salmon Creek, downstream from the dam and outlet works (**Appendix G**; **Map 2-2** in **Appendix A**), would help offset the short-term and permanent impacts on stream habitat. Further, BMPs described below and in **Appendix F**, would be implemented to avoid or minimize the potential for effects on all fish species and habitat to the maximum extent practicable, during both construction and aquatic and wetland habitat restoration activities.

Although 243 linear feet of Salmon Creek stream habitat would be impacted in the short-term and 642 linear feet would be permanently lost following stability berm and outlet works construction, it is not anticipated that this would result in population-level effects on steelhead, considering that steelhead are known to spawn, rear, and forage within many reaches throughout the full 17.0-mile length of Salmon Creek downstream from Conconully Dam. Even though spawning habitat is sparse throughout upper Salmon Creek, spawning redds have been documented within and just downstream from the area identified for habitat restoration activities (**Map 2-2** in **Appendix A**), so proposed stream restoration would augment spawning and rearing habitat for steelhead that use this reach (OBMEP 2023). While some aquatic and terrestrial insects and other macroinvertebrates would be lost or disturbed by the project, it is anticipated that invertebrates would recolonize the in-in-stream work area within a matter of weeks to months after construction and restoration is complete (Collier et al. 2002; Biederman 2024). Further, studies have shown that stream restoration

projects generally result in significant benefits to macroinvertebrates, which would help offset impacts resulting from habitat loss (Seitzer 2024). No other federally-listed species are expected to occur in this reach of Salmon Creek, which would reduce the scale and severity of impacts from construction activities.

Work Area Isolation and Unwatering

During outlet works construction, the potential for temporary effects on all fish species would be reduced by isolating and unwatering the in-water work area to prevent fish access, as follows. A bulkhead would be installed at the existing intake structure to prevent water from Conconully Reservoir from entering the existing dam outlet works. Bulkhead installation would occur inside the existing intake structure underwater and would not require piledriving or other surface-disturbing or noise-generating activities, so it would not affect fish or habitat in the reservoir. Then, a temporary cofferdam would be constructed in Salmon Creek at the downstream extent of the temporary construction work area to prevent backwatering of the construction area from Salmon Creek and the spillway channel. Thus, fish would not be able to access the isolated work area from the reservoir (upstream) or from Salmon Creek (downstream). The isolated work area would contain any sedimentation, contaminants, or spills that could affect downstream fish species and their habitat. The 80-foot-wide by 20-foot-high cofferdam would be regularly inspected and maintained throughout construction to ensure integrity and prevent failure.

Placement of the cofferdam would mobilize sediments in Salmon Creek. This could temporarily increase turbidity within and downstream of the construction area during and shortly after cofferdam placement, exposing fish to elevated levels of suspended sediment. Suspended sediments can result in short-term and permanent effects on fish depending on the quantity and composition of sediment and length of exposure. Potential exposure to listed steelhead would be minimized because the cofferdam would be placed and removed during the WDFW in-water work window, which is July 1 to February 28 each year, to avoid peak spawning and outmigration periods for adult and juvenile steelhead (WDFW 2018). However, juvenile steelhead may rear year-round in Salmon Creek so a few individuals could be present during cofferdam placement and exposed to sediment. Steelhead and other mobile fish species would be expected to move to other areas of Salmon Creek in response to the noise and turbidity caused by placing the cofferdam. Further, Reclamation would monitor and collect water samples to measure potential increases in turbidity to ensure compliance with Water Quality Standards for Surface Waters (Washington Administrative Code [WAC] 173-201A) during cofferdam placement.

Similar effects could be expected from cofferdam removal; this would also be done during the in-water work window, and turbidity monitoring would occur during removal, to minimize effects. It is anticipated that the temporary cofferdam would need to be installed and removed during at least two separate events during the construction period. Qualified fish biologists would ensure fish are not impinged beneath the cofferdam during installation.

Once the in-water work area is isolated from Salmon Creek, unwatering and fish salvage and relocation would be performed. Handling and relocation of fish that are present within the project area has the potential to cause fish injury or mortality. As discussed, work area isolation and fish removal would be conducted during the WDFW in-water work window for salmonids (WDFW

2018). However, listed juvenile steelhead are known to rear year-round within Salmon Creek, including in the area downstream from Conconully Dam, so it is likely that some individuals would require handling and removal from the work area. Further, Reclamation anticipates that a small number of juvenile steelhead would not be able to be removed from the work area, in which case they would be subject to mortality when the area is unwatered. Experienced fish biologists would perform fish salvage efforts, following NMFS and WDFW guidelines, to maximize the potential for capturing and relocating fish in the isolated area while reducing the potential for fish mortality or injury during relocation activities.

While it is not anticipated that other federally-listed fish species (spring Chinook or bull trout) would be present in the project area due to lack of recent documented observations in this reach of Salmon Creek, species of concern, such as Pacific lamprey and westslope cutthroat trout, may be present. All captured fish species would be carefully relocated into Salmon Creek, downstream from the work area in accordance with NMFS and WDFW guidelines. The area isolated by the cofferdam would be partially unwatered prior to fish capture. To minimize injury or mortality from fish entrainment in sump pumps, Reclamation would screen sump pump intakes to help prevent aquatic life from entering the intake. Fish screens or guards would comply with the most recent fish screening guidelines for anadromous salmonids prescribed by NMFS (NMFS 2022b).

Any construction water pumped out of the area isolated by the cofferdam would be discharged into adjacent uplands and allowed to infiltrate into the ground or placed into a Baker Tank[10] for settling prior to discharge into Salmon Creek. Any discharge to Salmon Creek would need to meet state and federal water quality criteria, including CWA Section 401 certification requirements, to protect water quality and prevent suspended sediment effects on downstream fish species and degradation of spawning and rearing habitat.

Effects from sedimentation and contamination would be minimized by implementing water quality BMPs (**Appendix F**) and complying with the stormwater pollution prevention plan (SWPPP). As such, it is unlikely that sedimentation and contamination would substantially affect protected aquatic species or have a substantial adverse effect on species' movement, aquatic-dependent species, native resident or migratory corridors, or use of existing native nursery sites.

Reservoir Flow Releases during Construction

To ensure that minimum required base flows are present in Salmon Creek throughout the 4-year construction period, Reclamation would pump water from the reservoir over the dam spillway. Pump intakes would be screened to help prevent aquatic life from entering the intakes. Fish screens or guards would comply with the most recent fish screening guidelines for anadromous salmonids prescribed by NMFS (NMFS 2022b).

Outside of the irrigation season, pumping would ensure a base flow of 2–20 cfs in Salmon Creek from early October through early April. Perennial flows during this period are essential for all steelhead life stages, including adult migration, spawning, egg incubation, emergence, and juvenile

[10] A Baker tank, also known as a portable sediment tank or Rain for Rent tank, is a temporary, portable structure used in construction to remove sediment from stormwater runoff and groundwater by allowing solids to settle out of the water. The sediments and remaining water can then be hauled off and disposed of at an off-site location

rearing. Juveniles overwinter in Salmon Creek, so perennial flows throughout the winter months are critical to their survival. Flow releases during the irrigation season (early April to late September) would be maintained to support downstream salmonids, consistent with current conditions. As a result, no net decrease in-stream flows would be expected, and there would be no decrease in in-stream flow or effects on fish passage within Salmon Creek as a result of construction. Further, there would be no disruption or change to base or irrigation flows during construction or after the project is completed.

The temporary pumps would either be located on a floating barge in the reservoir or on the shore near the spillway. If used, the barge would be deployed via the proposed boat ramp, discussed in more detail below. Barge anchoring would result in limited substrate disturbance during deployment, but any turbidity increases would be relatively minor and rapidly dissipate. Use of barges and anchors would result in a slight increase in overwater shading and would enhance warmwater fish predator habitat, but these potential impacts on aquatic species would be minor, given the current presence of nonnative fish species in Conconully Reservoir and the absence of federally-listed fish species and critical habitat in the reservoir.

Any barge anchors or pumps used along the shoreline would occur in previously disturbed areas, with measures implemented to minimize bank erosion. Pump platforms may require placement of fill in the reservoir, resulting in a near negligible amount of temporary lentic habitat loss while the pumps are in use. Each pump platform would remain in place for the duration of construction of the outlet works and would be removed when they are no longer needed.

In the reservoir, construction of the boat ramp would include fill placement in the reservoir, resulting in a total of 0.4 acres of permanent lentic habitat loss (**Table H-6** in **Appendix H**). The permanent habitat loss would result from the placement of boat ramp fill material. Short-term habitat impacts would result from borrow area construction, as well as spillway pump construction activities Fill material and large boulder riprap would modify habitat, increase fish predator habitat, and cause temporary loss of benthic macroinvertebrates. However, the reservoir shoreline is already highly disturbed in this area and this type of habitat is common around the reservoir, so the resulting impact would be minor.

Construction Noise

Construction of the outlet works east alignment (**Map 2-4** in **Appendix A**) would involve excavation of the hillside at the dam's east abutment, above the east bank of Salmon Creek. Excavation using heavy equipment would temporarily generate sound and vibration, which may propagate into portions of Salmon Creek outside of the isolated work area; excavation would be as near as 150 feet from the Salmon Creek wetted channel. A rock hammer/hydraulic hammer could be used for outlet works construction, if intact bedrock or large boulders are encountered in the area to be excavated for outlet works construction. Such a pneumatic tool would generate impact sounds, which result from a rapid release of energy when two objects hit one another (Hastings and Popper 2005). These impact sounds could propagate into the Salmon Creek wetted channel via the air and the substrate of the streambanks and streambed.

High levels of underwater sound can have negative physiological effects on fish (Hastings and Popper 2005), and underwater sounds that interfere with the ability of a fish to detect and respond to biologically relevant sounds can decrease survival and fitness of individuals and populations (Popper and Hawkins 2019). The severity of the effects depends on physical, environmental, and biological factors, including the sound-generating activity, sound intensity, sound duration, distance of fish from the point of origin, depth of water, and location of fish in the water column, size of fish, fish species, and ambient noise levels. For example, while these activities are not proposed, impact piledriving and blasting can generate intense underwater sound pressure waves that have been shown to injure and kill fishes (Hastings and Popper 2005; Popper and Hawkins 2019). Sound pressure levels of 100 decibels (dB) above the threshold for hearing are sufficient to damage the auditory system in many fishes (Hastings and Popper 2005). Sound waves in excess of 190 dB may be fatal to fish, and 155 dB may be sufficient to stun small fish (Hastings 1995, 2002).

Sounds and vibrations generated during excavation are not expected to reach injurious or lethal intensities associated with, for example, blasting or impact piledriving. This is because excavation would be done by typical heavy equipment. However, temporary, sublethal behavioral effects (namely, disturbance, displacement, and the masking of biologically relevant sounds) could occur. If present in Salmon Creek near the construction work area, most fish would disperse into nearby habitat in response to the noise and vibration. This avoidance is expected to be localized and temporary, such that effects on feeding and sheltering would be undetectable.

While sound generated by a pneumatic tool, if used, also would not be expected to reach intensities associated with blasting or piledriving, some physiological effects on fish could occur if individuals were present in Salmon Creek habitat near the work area. Removal of fish within the isolated work area would prevent exposure to fish near the noise generating activities. Sound levels experienced by fish are not expected to reach injurious or lethal levels but may cause temporary disturbance and displacement. Effects would be temporary, lasting the duration of the noise-generating activity.

Access Roads

Access road construction and improvements could affect aquatic habitats and species, should access roads contribute to sediment mobilization into waterways. To reduce the potential for this, access roads would be designed to follow the appropriate design standards in the most current version of the NMFS Anadromous Salmonid Fish Facility Design Manual (NMFS 2022b). Any stormwater runoff from the access roads would infiltrate into adjacent land or stormwater facilities would be designed, as needed, to treat stormwater runoff per federal, state, and local requirements. Therefore, new access roads would be unlikely to cause a substantial adverse effect on protected aquatic species, species' movement, aquatic-dependent species, native resident or migratory corridors, or use of these areas as native nursery sites.

Aquatic Invasive Species

Construction activities could cause the spread of aquatic invasive or nonnative species during in-water work. The boat ramp would be used for construction and would remain in place after construction ends. As a result, there is a small risk for vessels to introduce aquatic invasive species into the reservoir. Aquatic invasive species could then make their way to downstream reaches of Salmon Creek, negatively affecting aquatic habitat conditions. Reclamation would follow equipment

cleaning procedures to prevent the introduction of aquatic invasive species into the reservoir during construction (**Appendix F**). These precautions would be followed during use of the boat ramp during the project. There are other boat ramps in the reservoir that are frequently used by recreational vessels. Given precautionary procedures that would be in place during construction the potential for aquatic invasive species' introductions to aquatic habitats in the project area would be low.

Stability Berm and Borrow Area

Construction of the stability berm and use of the borrow area are not expected to result in any appreciable effects on fish species and their habitats above or below Conconully Dam because these activities would occur in upland areas, so no in-water work would be involved. Further, stormwater management measures would be in place during construction (**Appendix F**) and would prevent sediment-laden runoff from entering Conconully Reservoir or Salmon Creek. Construction noise would be limited to standard equipment so no piledriving, rock hammering, or blasting would be performed.

Process water would be drawn from Conconully Reservoir for cleaning material extracted from the borrow area and for construction activities associated with the stability berm (grout mixing and column installation). Any excess process water from the borrow area would be contained in a settling pond surrounded by berms at a designated upland site. It is possible that settling pond water may be periodically pumped back into the reservoir during construction. Any return water discharge would comply with Water Quality Standards for Surface Waters (WAC 1730201). The settling pond would be filled in after construction is complete and no water would be discharged to the reservoir or Salmon Creek. Water withdrawals may cause a small decrease in reservoir water levels, but levels would be maintained between the historical/current operating range of elevation 2250 to 2287 feet. Fish screening of pump intakes would be followed per NMFS guidance to reduce effects. Conservation measures and BMPs (**Appendix F**) would be implemented to avoid and minimize effects. Project activities on the reservoir side of the dam are only expected to have minimal effects on the reservoir fisheries, which include kokanee and warmwater sport fish.

Stream Habitat Enhancement and Restoration

Reclamation would enhance and restore aquatic habitat in the Salmon Creek floodplain downstream of the dam and outlet works to offset anticipated short-term and permanent loss of in-stream habitat from construction activities (**Appendix G**; **Map 2-2** in **Appendix A**). The restoration reach currently supports high abundance of steelhead and has high habitat potential but currently lacks suitable cover and complexity features. The proposed restoration efforts would increase habitat abundance, diversity, and complexity as well as overwinter rearing habitat for all steelhead life stages within the project area. Restoration would also benefit spring Chinook salmon, Pacific lamprey, and other native fish species that use the project area. Reclamation identified this restoration area through coordination with the CTCR Fish and Wildlife Department, NMFS, and WDFW. The exact amount, type, and locations of proposed restoration treatments or features are not known at this time but could generally include installation of log jams and anchored woody material, side-channel construction, riparian bench creation, and sediment augmentation. Specific stream restoration design details would be developed, and regulatory agencies permits and approvals would be obtained prior to construction.

Generally, habitat creation and enhancement would require construction using heavy machinery and in-water work. While details would be developed, Reclamation assumes that all in-water work would be done during salmonid in-water work windows described above, and that construction area unwatering using cofferdams and work area unwatering and fish salvage would also follow the procedures described above. As described in the analysis above, these procedures would reduce, but not avoid, the potential for impacts on salmonids and other fish in Salmon Creek. Work area unwatering could be accomplished using a variety of cofferdam methods, including installing sheet pile into the streambed with a pneumatic driver. Although construction equipment would need to access the stream, which would compact sediments in the short-term and result in loss of some macroinvertebrates, habitat enhancement would have net permanent beneficial effects on aquatic species and their habitat.

Installing log jams and anchored woody material at strategic locations within Salmon Creek would enhance salmonid habitat by providing rearing and overwintering habitat. Recent habitat surveys have found that large wood density and pool habitat are below optimal levels in the upper Salmon Creek watershed. Large wood is crucial for healthy fish habitats, providing cover, slowing water flow, and supporting the food web by trapping nutrients and organic matter. Overwintering steelhead and spring Chinook are dependent on pools for rearing, and large wood is essential for providing this habitat (PSP 2011).

The log configuration would be designed for maximum stability and may include excavation of the stream bed during log placement or fill material placed on and within the logjam to provide necessary ballast. Additional wood may be installed in the habitat restoration area to enhance cover and complexity for juvenile salmonids using low-tech restoration practices, such as hand-built, post-assisted log structures, or "beaver dam analogs." The impacts on aquatic species and habitats are generally minimal for this type of activity due to the absence of heavy equipment.

Pilot channels may be constructed within the habitat restoration area to create off-channel habitat for rearing salmonids, which would increase foraging opportunities and flow refugia. This activity would direct water flow to promote the development of hydraulic patterns in areas that have become detached or isolated from typical river flow patterns. This can engage relict floodplains and provide a host of ecological benefits such as wetland creation and improved hydrologic functionality.

Riparian benching may be used to create flat terraces along Salmon Creek in areas that have incised channels or eroding banks. Riparian benching would enhance fish habitat by reconnecting the floodplain, reducing sediment input that can degrade spawning habitat, and reducing water velocities for rearing salmonids. Riparian enhancement provides shading, a source of future large wood material, and improved productivity of terrestrial invertebrates, which can provide a food source for juvenile salmonids. Riparian benching is accomplished with excavation above the wetted channel, so this activity may not necessitate isolation, unwatering, and fish salvage.

Sediment augmentation would promote sediment movement and promote the development of habitat forming features downstream, such as suitable spawning gravels. The primary purpose of sediment augmentation would be to improve or create spawning habitat and enhance sediment

transport. Sediment placement sites, and size and amount of sediment, would be selected based on ecological compatibility to ensure enhancement of the stream's natural habitat.

Wetlands

Construction activities would result in fill of discharged materials into wetlands and other non-wetland waters of the U.S in the project area, causing 1.10 acres of short-term disturbance, and 0.92 acres of permanent disturbance compared with the No Action alternative. **Table H-11** in **Appendix H** presents the acres of delineated wetlands that would experience short-term and permanent disturbance under Alternative B. Areas that would not be restored to pre-construction conditions, and thus would sustain permanent disturbance, include the proposed pumping platforms, stability berm, outlet works, dam access road, and boat ramp (**Maps 2-2** and **2-3** in **Appendix A**).

Under Alternative B, approximately 0.4 acres of Conconully Reservoir and 642 linear feet of Salmon Creek, both non-wetland waters of the U.S., would be permanently filled. Permanent fill of the portion of Conconully Reservoir would be associated with construction of the boat ramp. The portion of Salmon Creek would be permanently affected by construction of the stability berm and outlet works components and the associated required construction areas for both of these components (Reclamation GIS 2025).

Clearing the administrative/storage/staging area and constructing temporary roads would introduce a temporary risk of sedimentation or contamination from machinery fluids to nearby wetlands. These potential disturbances from sedimentation and contamination would be minimized by implementing BMPs to avoid and protect wetlands during construction (**Appendix F**). Additionally, several federal and state regulatory permit approvals would be obtained before construction; they would include CWA Section 401 and 404 permits, Hydraulic Project Approval from WDFW, and an EPA Construction General Permit, which would establish plans to reduce impacts on wetlands.

Unwatering 243 linear feet of Salmon Creek during construction would lead to a short-term interruption to the hydrology of wetlands in the project area. This interruption would cause at least a portion of the wetlands to dry, and wetland-obligate plants would be outcompeted by plants tolerant of drier conditions, resulting in a loss of wetland function during the construction period.

To mitigate the adverse impacts on wetlands, Reclamation would determine mitigation measures for the short-term, and permanent disturbance of wetlands and other waters of the U.S. through the CWA Section 404 permit process with the USACE and the CWA Section 401 permit process with the State of Washington. While the permanent disturbance of wetlands in the project area would still occur under Alternative B, Reclamation would follow permit conditions identified by the USACE to offset the disturbance of wetlands. Mitigation for disturbance to wetlands would occur in tandem with the in-stream aquatic and wetland habitat restoration efforts identified in **Appendix G**.

Terrestrial Wildlife

Migratory Birds and Raptors

Conversion of vegetation communities to permanently developed areas would result in the localized removal or conversion of important stopover habitat for migratory birds who could utilize habitats

present in the project area during migration. Further, noise associated with construction activities, vehicle and heavy equipment use, and human presence could cause avian species to avoid the construction area during migration.

Reclamation would clear vegetation within the project area outside of the breeding season and would conduct breeding bird surveys when project activities could not occur outside of the breeding season (**Appendix F**). Project BMPs to remove vegetation outside the breeding bird season or avoid nesting birds through pre-construction surveys and avoidance buffers around nests would minimize potential impacts on migratory birds to negligible levels. Buffers around nests would prevent noise and human presence associated with Alternative B from causing nest abandonment. As a result, reproductive success for individual nesting birds would not be altered, nor would it lead to nest failure

Special Status Species

Effects on special status wildlife species would be similar to general wildlife species. In summary, effects would mostly be temporary related to displacement, lasting for the duration of construction. Further, short-term impact intensity would be reduced by implementing the BMPs described in **Appendix F**, such as minimizing the project footprint, restoring disturbed areas, minimizing the potential for noxious weed and nonnative invasive plant spread, and carrying out breeding bird surveys to identify avoidance areas.

While federally-listed, and proposed species are not known to occupy the project area, suitable habitats are present. As such, there is a possibility that individuals could move through the project area to use these habitats and could be affected by construction-related noise or other disturbance under Alternative B. However, no effects would be anticipated on the gray wolf, Canada lynx, yellow-billed cuckoo, Suckley's cuckoo bumble bee, or monarch butterfly under Alternative B.

In addition to Alternative B, other plans and projects taking place near the project area would affect biological resources. The Salmon Creek River Mile 8 Restoration Project would take place on CTCR land south of the project area. At the OID Diversion on Salmon Creek (River Mile 4), a largescale evaluation of the diversion infrastructure was recently completed, and Reclamation (in partnership with OID and CTCR) is proceeding with plans to replace an inefficient screening operation and promote adult passage around the facility. Both of these projects could cause temporary increases in sedimentation and contamination and altered hydrology in Salmon Creek during their respective construction periods, which would degrade fisheries habitat and riparian and wetland conditions. Migratory birds and raptors and special status wildlife species in these areas could experience temporary displacement during construction, which could lead to reduced reproductive success, malnutrition, or increased predation risks.

However, over time, both projects would improve habitat for fisheries, migratory birds and raptors, and special status wildlife, riparian and wetland conditions, and hydrological function in Salmon Creek. With the implementation of aquatic and wetland habitat restoration actions identified in **Appendix G**, Alternative B would further contribute to short-term to permanent, beneficial impacts on biological resources in and around Salmon Creek.

Alternative C

Fisheries and Other Aquatic Species

The impacts on fisheries and other aquatic species under Alternative C would be similar to those under Alternative B, with some minor differences described below.

The modified alignment of the outlet works under Alternative C (**Map 2-8** in **Appendix A**) would reduce the amount of rock excavation from the hillside. This would result in less noise disturbance from construction equipment than Alternative B, reducing disturbance to fish species that are present in Salmon Creek, downstream from the work area.

Although the outlet works extension would be shorter and the valve house located further upstream than under Alternative B (**Map 2-8** in **Appendix A**), permanent and short-term impacts to stream habitat would be the same as described under Alternative B. This stream reach is designated critical habitat for steelhead and EFH for Pacific salmon. However, similar to impacts described under Alternative B, it is not anticipated that this loss of habitat would result in population-level effects on steelhead because the species is known to spawn, rear, and forage within many reaches throughout the entire 17-mile length of Salmon Creek downstream from Conconully Dam.

Under Alternative C, a concrete impact basin structure would be constructed in lieu of an excavated stilling basin as under Alternative B. The work area to install the impact basin would be isolated during concrete pouring to prevent spills that could affect downstream fish species. The impact basin structure would be embedded in the stability berm above the discharge channel and help reduce water velocities in a similar manner as the stilling basin proposed in Alternative B **(Figure 2-2** in **Chapter 2**).

No appreciable benefits to fish species would be anticipated from the slightly smaller stability berm. Less material would need to be relocated from the borrow pit, which could reduce potential for erosion and sedimentation into the reservoir (**Map 2-7** in **Appendix A**). Similar to Alternative B, spillway pump landings would result in temporary impacts to fish habitat in the reservoir. However, Alternative C would only result in 0.1 acres of permanent aquatic habitat impacts (0.3 acres less than Alternative B) because the boat ramp would not be constructed (**Table H-7** in **Appendix H**). Impacts to fisheries and aquatic habitats in the reservoir would be similar to those described under Alternative B. The same BMPs (**Appendix F**) and habitat restoration activities would apply as those discussed under Alternative B (**Appendix G**; **Map 2-6** in **Appendix A**).

Under Alternative C, the boat ramp would not be constructed. Instead, any barges needed for intake bulkhead installation or the spillway pumps would be lowered into the reservoir with a crane or launched from the existing boat ramp at Conconully State Park. This would reduce permanent habitat modifications to the reservoir shoreline and the potential for releases of aquatic invasive species into waterways. The contractor would follow Reclamation and WDFW guidelines to prevent the spread of aquatic invasive species when using the state park boat ramp during construction activities.

Wetlands

Impacts on wetland communities under Alternative C would be the same as those described for Alternative B. Impacts on non-wetland waters of the U.S. would be similar to those described under Alternative B. Under Alternative C, approximately 0.1 acres of Conconully Reservoir (0.3 fewer acres than under Alternative B) would be permanently impacted because a new boat ramp would not be constructed (Reclamation GIS 2025).

Terrestrial Wildlife

Migratory Birds and Raptors

Under Alternative C, impacts on nesting birds, including migratory birds and raptors would be the same as those described under Alternative B.

Special Status Species

Impacts on special status wildlife under Alternative C would be the same as those described under Alternative B.

3.4 Cultural Resources

3.4.1 Analysis Area

The analysis area for cultural resources is the area of potential effect (APE), as defined in the Class III cultural resources inventory undertaken for this project (**Map 3-4** in **Appendix A**). The APE, which is 127.0 acres in size (slightly larger than the project area), is located to the southeast of Conconully Reservoir in the Salmon Creek drainage area in the Okanogan Highlands within north-central Washington.

3.4.2 Affected Environment

In compliance with Section 106 of the National Historic Preservation Act (NHPA), Class III surveys for cultural resources were undertaken in 2020 and 2024 within the analysis area (Adams et al. 2020; Derr et al. 2024). "Cultural resources" is an inclusive term that has been adopted and widely used to refer to the diverse human record found in sites, structures, objects, and places created and/or used by people. These may comprise archaeological, historic, or architectural districts, sites, structures, objects, or places such as cultural landscapes. The term "cultural resources" also includes historic properties, which the NHPA defines as cultural resources determined to be greater than 50 years old and eligible for listing on the National Register of Historic Places (NRHP).

The regulations that implement Section 106 of the NHPA require that federal agencies make a "good faith effort" to identify and evaluate cultural resources for eligibility for listing on the NRHP (36 CFR 800.4(b)(1)). They also stipulate that federal agencies evaluate, consider, and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties (36 CFR 800.4(c)) through consultation with interested parties.

Archaeological evidence indicates that humans have been inhabiting the dam site area for over 10,000 years. A detailed historical background for the area can be found in the reports produced by Historical Research Associates Inc. to support the EA (Adams et al. 2020; Derr et al. 2024).

Recent cultural resource inventories undertaken in support of the EA indicate that there have been 13 cultural resource studies conducted within 1 mile of the project APE (Adams et al. 2020; Derr et al. 2024). Overall, these cultural resource assessments identified eight archaeological resources within the APE and six further archaeological resources within a 1-mile radius of the APE. These resources range in date from the prehistoric to historic period. None of these archaeological resources were recommended as eligible for inclusion on the NRHP or Washington Heritage Register (WHR).

The 2024 Class III inventory completed in support of the project also remapped the fenced boundary of the Conconully Cemetery (Derr et al. 2024). Although the remainder of the resource was not surveyed or evaluated, its age and importance to the greater Conconully community means it is likely eligible for inclusion on the NRHP and WHR under Criterion A.[11]

During the 2024 built-environment survey, two historic resources were also identified: the Conconully Dam[12] with its associated features and a Conconully Reservoir Dam cabin with its associated outhouse. The latter was not recommended as eligible for listing on the NRHP. The Conconully Dam was listed on the NRHP and WHR in 1974 under Criteria A and C.[13] In addition to being eligible for listing on the NRHP on its own, the dam was also determined to be an element contributing to the NRHP eligibility of the Okanogan Project historic district in 2014.

There have been no traditional cultural places (TCPs) identified within the APE. Further discussion on TCPs can be found under **Section 3.5**, Tribal Interests.

Conconully Dam has undergone numerous improvements since its establishment to cope with heavy rains, seepage issues, concrete deterioration, and erosion. Repairs are documented throughout the 1920s, 1930s, 1950s, and 1960s (Autobee 1996). The built integrity of the dam has been affected by numerous past repairs but overall remains intact.

The APE is situated adjacent to Conconully Reservoir. The reservoir and adjacent lands are used regularly for various recreational activities such as fishing, hiking, and snowmobiling. The public aspect of the APE's environment makes the cultural resources in the APE, particularly the dam, which serves as a tourist attraction, vulnerable to vandalism and unintentional damage by visitors.

[11] Properties may be eligible for listing on the NRHP under Criteria A if they "are associated with events that have made a significant contribution to the broad patterns of our history" (36 CFR 60.4).
[12] Conconully Dam is referred to as Conconully Reservoir Dam (Site 45OK491) within the cultural resources inventory reports undertaken to support this EA and in the NRHP (Adams et al. 2020; Derr et al. 2024).
[13] Properties may be eligible for listing on the NRHP under Criteria C if they "embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction" (36 CFR 60.4).

3.4.3 Environmental Consequences

Methods and Criteria

Analysis Indicators

- Determination of adverse effects on NRHP-eligible historic properties per the NHPA (36 CFR 800.5)
- Impacts on cultural resources that may not be formally documented historic properties or that are historic properties that have not been evaluated for NRHP eligibility, including resources that have been identified as potential TCPs

Assumptions

- Many cultural resources are nonrenewable resources, and damage to them typically results in permanent impacts.
- Reclamation will continue to consult with the Tribes to better understand potential impacts on cultural resources and specifically TCPs.
- For resources within the analysis area that would be subject to data collection, construction, or improvements, potentially significant adverse effects could require resolution of adverse effects through future NHPA Section 106 compliance; this could include the development of an MOA if avoidance and minimization measures are not sufficient to avoid an adverse effect.

Alternative A – No Action

Under the No Action alternative, there would be no adverse impacts on cultural resources. However, current trends related to deteriorating conditions of cultural resources related to general age and recreational and other uses would continue and the risk of dam failure would persist.

Alternative B – Proposed Action

Under Alternative B, there would be 60.5 acres of surface disturbance (**Map 2-3** in **Appendix A**) associated with proposed project activities within the APE. Impacts on cultural resources would include direct and indirect effects due to construction, demolition, and continued operation of the dam and its supporting infrastructure. It is anticipated that construction activities would physically impact the NRHP-eligible dam. There are also 14 cultural resources within the APE that have been determined not eligible for listing on the NRHP. Although these resources could be impacted, protection measures are not required for cultural resources that are not eligible for listing on the NRHP. Because no surface disturbance would occur within the cemetery's fenced boundary, no physical impacts would be anticipated there.

A 350-foot construction buffer would be implemented to the south of the Conconully Cemetery boundary to help prevent impacts. The existing dam access road would be used for project-related construction activities. Road improvements would occur within the existing road prism in the narrow corridor adjacent to the cemetery. Although burials are not likely located along the dam access road, grading and excavation would be avoided within the cemetery boundary itself, as shown on the Washington Information System for Architectural and Archeological Records Data.

There is one historic property that has been determined eligible to the NRHP within the APE, the Conconully Dam. Other historic properties within the APE have been determined not eligible for listing. Conconully Dam was determined eligible for listing on the NRHP due to its hydraulic earth fill method of construction and the historic use as a dam for a storage reservoir that delivered irrigation water to agricultural lands. Alternative B would result in alterations to the dam's dimensions, profile, outlet works, and original engineering design. This would result in an adverse effect on the dam's integrity of design, materials, workmanship, and feeling.

As defined under 36 CFR 800.5(a)(1), an adverse effect on historic properties occurs when a federal undertaking directly or indirectly alters any characteristics of a historic property that qualify the property for the NRHP. An adverse effect on a historic property is not limited to physical destruction or damage, such as alterations to the setting and context of the site; adverse effects also may include relocation of the property, changes in the character of the property's setting, and the introduction of visual, atmospheric, or audible intrusions. Impacts from a federal undertaking that result in an adverse effect on a historic property may also include reasonably foreseeable effects caused by the undertaking that may occur later in time.

The built integrity of the dam has already been affected by numerous past repairs (although it has been determined to remain sufficiently intact for the dam to remain eligible for the NRHP), and the proposed construction of a stability berm would be another addition to this long history of alterations. Although the proposed stability berm would further alter the dam's original design, materials, workmanship, and feeling, the berm would address the risk of dam failure due to the liquefaction of embankment and foundation materials.

Reclamation is engaged in consultation with the Washington State Historic Preservation Office (SHPO) and interested Tribes (**Section 3.5**). The SHPO and the Tribal Historic Preservation Officer (THPO) for the CTCR concurred that the proposed work would result in adverse effects to Conconully Dam. Reclamation is consulting with these parties on the creation of an MOA, which will stipulate mitigation measures, the responsibilities for cultural resource monitoring, inadvertent discoveries, Tribal involvement, and overall protective management for the duration of the project. In coordination with the NEPA review (36 CFR 800.8), execution of the MOA would meet the requirements of the NHPA Section 106 process (36 CFR 800.2(d)(3)) and resolve the potential for adverse effects on historic properties from this undertaking. As required by the SHPO, the Plan and Procedures for the Inadvertent Discovery of Cultural Resources and Human Remains (Ecology 2021) will be followed in the case of an inadvertent discovery of cultural resources or human remains during construction.

In addition to direct effects, construction activities would result in indirect effects, including increased noise from heavy equipment and an increase in construction-related traffic. These atmospheric and audible impacts would be temporary and largely limited to the construction phase; these effects could impact how cultural resources are experienced, but it is not anticipated that they would adversely impact the integrity of cultural resources in the APE.

The proposed project would introduce changes to the surrounding area that would modify the area's visual character. The berm, borrow area, and spillway pumps would affect views of the historic dam

site. Although the visual impacts introduced by the borrow area and spillway pumps would, respectively, be short-term and temporary in nature, the berm's impact would be permanent and affect interpretation of the historic site. Alternative B would contribute to permanent impacts, which affect the integrity of the dam's original design, materials, workmanship, and feeling. However, these impacts would be reduced to acceptable levels through the MOA process.

There are no known TCPs within the APE; however, TCPs could be identified at a later date through ongoing consultation with the Tribes. At that time, Reclamation would coordinate with the Tribes to ensure impacts are avoided or minimized. Any new cultural resources identified during the project's duration would be addressed under an unanticipated discovery plan completed prior to construction.

Alternative C

Under Alternative C, impacts on cultural resources would be similar to those described under Alternative B. Under Alternative C, there would be 60.1 acres of surface disturbance associated with proposed project activities within the APE (0.4 fewer acres than under Alternative B; **Map 2-7** in **Appendix A**). The same MOA mitigation measures would be applied under Alternative C to resolve adverse effects during construction and operation.

3.5 Tribal Interests

3.5.1 Analysis Area

The analysis area for Tribal interests is the 127.0-acre APE, on the southeast side of Conconully Reservoir (**Map 3-4** in **Appendix A**).

3.5.2 Affected Environment

The analysis area is within the traditional homeland of the Southern Okanogan or Sinkaietk, a Salish-speaking group, that lived in areas around the Okanogan River. Their homeland stretched from north of the Canadian border to the confluence of the Okanogan and Columbia Rivers to the south (Ray 1936:103, 122; Spier 1938).

The traditional lands of the Sinkaietk east of the Okanogan River became part of the Colville Reservation in 1872, while their territory on the west side of the Okanogan River became part of the short-lived Moses Reservation (1879–1886). The Sinkaietk were one of several groups relocated to the Colville Reservation when it was established by EO in 1872, and they continue to be affiliated with the CTCR (CTCR 2020).

Indian Trust Assets

ITAs are legal interests in property held in trust by the U.S. for federally recognized Indian Tribes or individual Indians. ITAs may include land, minerals, federally reserved hunting and fishing rights, federally reserved water rights, and in-stream flows associated with trust land. The General Allotment Act of 1887 allotted land to some Tribes, while other Tribes were allotted land through treaty or specific legislation until 1934. These allotments are ITAs. In 1934, further allotments were prohibited. There are no ITAs identified or anticipated within the APE.

Areas of Tribal Importance and Use

The importance of locations and uses to Tribes is defined through Tribal consultation. These locations and uses could be important for a variety of reasons and could relate to sacred sites; ITAs; culturally important fish, wildlife, and plants; or TCPs. A TCP is a particular kind of ethnographic cultural resource, such as a sacred site, that is associated with the cultural practices of a living community and meets the criteria for listing on the NRHP (**Section 3.4**). No TCPs were identified in the analysis area during a cultural resource inventory undertaken for this project (Derr et al. 2024); however, it is anticipated that locations of importance to the Tribes are likely present. Outreach and coordination with the Tribes will continue throughout the EA development process to help ensure concerns are identified and considered.

Salmon Creek below Conconully Dam is valuable fish and wildlife habitat, including designated critical habitat for summer steelhead (**Section 3.3**). The fish habitat in Salmon Creek is important enough to the CTCR that since 2006 the Tribes have purchased water from the OID that would otherwise be diverted, to ensure adequate streamflows in Salmon Creek for returning adults and out-migrating juvenile salmonids (OBMEP 2025). CTCR also owns land along Salmon Creek, just to the south of the APE and project area.

Consultation

Reclamation conducts consultation with federally recognized Tribes in accordance with legal and regulatory guidelines, including, but not limited to, the NHPA; the American Indian Religious Freedom Act; the Native American Graves Protection and Repatriation Act; EO 13175, Consultation and Coordination with Indian Tribal Governments; Joint Secretarial Order 3403 on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters; Departmental Manual, Series 30 Part 512, American Indian and Alaska Natives Programs; and Reclamation Manual, Indian Policy of the Bureau of Reclamation (NIA P10). An up-to-date summary of outreach and communication with federally recognized Tribes is presented in **Chapter 4**.

Reclamation is in active NHPA, Section 106 consultation with the CTCR. The Tribes have approved the APE, and the THPO has confirmed their determination that the proposed action would result in adverse effects. Reclamation has identified concerns through consultation; these concerns include site access during construction periods in areas where active traditional harvest activities by Tribal members could occur. The Tribes may conduct plant surveys in the future and advise on specific times of the year when access may need to be coordinated as well as what types of seed should be utilized for re-planting efforts. Pending discussions with the CTCR, Reclamation would proceed with the development of a MOA (also discussed in **Section 3.4**).

3.5.3 Environmental Consequences

Methods and Criteria

Analysis Indicators

- Degree of impact as defined by the Tribes during consultation

Assumptions

- Ongoing Tribal consultation prior to project activities would identify locations and uses important to Tribes to avoid or mitigate any adverse impacts.
- Locations of Tribal importance within the analysis area would be identified by the Tribes and through review of existing, published literature.
- Surface disturbance could have both direct and indirect (visual and auditory) impacts on locations of Tribal importance and Tribal uses.
- Impacts on ITAs are most likely on lands owned by the Tribes or federal agencies.

Alternative A – No Action

Under the No Action alternative, no construction would occur; therefore, there would be no impacts from project activities on locations of Tribal importance and use or ITAs (no ITAs have been identified within the APE). Impacts on ITAs or locations of Tribal importance and use, such as damage resulting from erosion and surface disturbance, could occur if a seismic event took place that resulted in the failure of Conconully Dam. A dam failure would release large volumes of water and sediment into Salmon Creek, which could modify topography and vegetation composition of the area.

Alternative B – Proposed Action

Indian Trust Assets

Currently, there are no ITAs identified or anticipated within the APE. Therefore, no impacts on ITAs would occur under Alternative B.

Areas of Tribal Importance and Use

Although no TCPs have been identified to date within the APE, outreach and coordination with the Tribes would continue throughout the EA development process to help ensure concerns are considered. Direct impacts to TCPs or other locations of Tribal importance could include physical damage to locations or resources commonly used or collected by Tribes as a result of surface disturbance and construction activities. Temporary, indirect impacts would include changes in the visual and auditory environment in proximity to important locations and areas of use. Some direct and indirect impacts would be short-term, such as surface disturbance, while others would be permanent, including new infrastructure and permanent changes in the landscapes or vegetation cover.

Under Alternative B, it is anticipated that impacts, in the form of damage and loss resulting from surface disturbance on upland vegetation communities, wetlands, and in-stream aquatic habitats would occur, which are likely of interest to the Tribes. Consequently, vegetation community restoration, enhancement, and maintenance have been planned as part of this alternative (**Appendix E**). In coordination with the CTCR Fish and Wildlife Department, an aquatic and wetland habitat restoration area was identified in the Salmon Creek floodplain downstream of the dam and proposed outlet works. Actions in the Aquatic and Wetland Habitat Restoration Plan (**Appendix G**) would aim to increase habitat abundance, diversity, and complexity, and overwinter rearing habitat for all salmonids, including the steelhead valued by Tribes.

Due to health and safety concerns, temporary construction activities could limit site access. The Tribes have expressed concern about limitations in access. Formal channels of communication and agreements on site access could be topics addressed under an MOA (currently under development).

While no residual impacts are anticipated, some options for avoiding or minimizing impacts on Tribal interests are provided in **Appendix F** and include formal communication protocols which could be incorporated into the MOA currently being developed.

Alternative C

Under Alternative C, impacts on Tribal interests would be the same as those described under Alternative B. The BMPs (**Appendix F**) and mitigation measures described under Alternative B would also be applied under Alternative C to reduce potential adverse effects on Tribal interests.

3.6 Noise

3.6.1 Analysis Area

The analysis area for noise is a 0.5-mile buffer around the project area as shown in **Map 3-6** in **Appendix A**.

3.6.2 Affected Environment

Noise-sensitive receptors are individuals or noise-sensitive land uses that could be affected by project-related noise levels, such as permanent and seasonal residents, or recreational areas. The noise analysis area includes four permanent residences, and two resorts that offer cabins and campsites. The residences range in distance from 679 feet to 2,358 feet from the limits of construction, and the resorts are approximately 2,300-2,482 feet away. Conconully Reservoir is also in the noise analysis area and is used for recreational fishing and boating.

Existing background noise levels in the noise analysis area were estimated using a geospatial noise model created by the National Park Service (Mennitt et al. 2013). Variables in the model include human and environmental factors that can affect ambient noise, such as proximity of transportation infrastructure and flight paths, landcover, and weather averages. The model predicts that median daytime (defined as 7:00 a.m. – 7:00 p.m. in the model) noise levels within the noise analysis area during the summer would range from 31-36 A-weighted decibels (dBA), with a median of 33 dBA. Nighttime (in context of the model, 7:00 p.m. – 7:00 a.m.) and wintertime noise levels are expected to be somewhat lower (less than 33 dBA on average) primarily due to reduced human activity. Note that all decibel levels given in this section refer to sound pressure level in air, with a reference pressure of 20 micropascals.

Where noise-sensitive biological resources are identified within the analysis area, certain federal provisions may apply depending on the resource (**Section 3.3**). The EPA offers non-binding guidelines for noise levels, including a maximum day-night sound level (L_{dn}) of 55 dBA in residential areas in an effort to address interference with sleep. However, the Noise Control Act of 1972 (**Appendix B**) reserves primary responsibility for setting noise limits to state and local authorities.

WAC Chapter 173-60 regulates maximum allowable noise levels using different limits for receiving lands of differing noise sensitivity. This section of the WAC establishes different noise limits, depending upon the environmental designation for noise abatement (EDNA) of the noise source and the noise receiver. Note that construction noise is exempt from the limits described in this section unless it occurs during nighttime hours (10:00 p.m. to 7:00 a.m.), when it is subject to the limits as described in this section. **Map 3-6** in **Appendix A** shows the EDNA classes within the project area.

- EDNA Class A represents lands where people reside and sleep.
  - Typically characterized as residential; also includes camping facilities and resorts, hospitals
- EDNA Class B represents lands with uses requiring protection against noise interference with speech.
  - Typically characterized as commercial/recreational; also includes commercial, recreational, and institutional uses not used for overnight habitation.
- EDNA Class C represents lands with economic activities of such a nature that higher noise levels than experienced in other areas is normally anticipated.
  - Typically characterized as industrial; also includes agricultural and silvicultural uses.

Under the WAC, no person may cause or permit noise that exceeds the maximum permissible noise levels listed in **Table 3-2** to intrude into the property of another person. At any hour of the day or night, those noise limitations may be exceeded for any receiving property by no more than:

- 5 dBA for a total of 15 minutes in any 1-hour period; or
- 10 dBA for a total of 5 minutes in any 1-hour period; or
- 15 dBA for a total of 1.5 minutes in any 1-hour period.

The Okanogan County Code does not include quantitative noise limits. It does indicate that continuous or repetitive operation of motors and engines may constitute an unlawful public disturbance by noise. Such activities are presumed to disturb the peace when they occur between 10:30 p.m. and 7:00 a.m. in a residential area or one containing places of repose, such as resorts. Construction noise is not specifically exempt.

Table 3-2. Washington Administrative Code noise limits for noise sources and receiving property

EDNA of Noise Source	EDNA of Receiving Property			
	Class A (Daytime)[1]	Class A (Nighttime)[2]	Class B	Class C
Class A	55 dBA	45 dBA	57 dBA	60 dBA
Class B	57 dBA	47 dBA	60 dBA	65 dBA
Class C	60 dBA	50 dBA	65 dBA	70 dBA

Source: Washington Administrative Code, Chapter 173-60

[1] Daytime = 7:00 a.m. to 10:00 p.m.

[2] Nighttime = 10:00 p.m. to 7:00 a.m.

Although construction noise exemptions exist in the WAC, this EA also relies on impact indicators for analysis of effects. Construction noise criteria are recommended by the Federal Transit Administration (FTA) to limit annoyance from noise. These guidelines are found in FTA's Transit Noise and Vibration Impact Assessment Manual (FTA 2018). These are recommendations only, not regulatory thresholds.

FTA's recommended limits for construction noise are a 1-hour equivalent sound pressure level (L_{eq}) of 90 dBA during daytime hours (7:00 a.m. – 10:00 p.m.) and 80 dBA during nighttime hours (10:00 p.m. – 7:00 a.m.). FTA also recommends an 8-hour equivalent noise level of no more than 80 dBA during the day and a 30-day L_{dn} of no more than 75 dBA at residential receivers (here understood to include campgrounds/resorts), though these criteria are dependent on having detailed enough data on construction duration and equipment utilization.

3.6.3 Environmental Consequences

Methods and Criteria

Analysis Indicators

- Sensitive anthropogenic receptors are identified based on their proximity to construction areas and surrounding land use. Receptors within 0.5 miles from construction areas are given primary consideration for noise.
- Noise levels are evaluated in dBA and are compared against state/local ordinances, FTA criteria, and existing levels, as applicable

Assumptions

Construction could affect noise-sensitive areas beyond the noise analysis area. However, noise levels in these areas would be lower than those at receptors within the noise analysis area. Any BMPs (**Appendix F**) to reduce noise levels at receptors within the analysis area would also reduce noise levels at more distant receptors.

The level of detail of the construction noise analysis is dependent on the level of detail on construction equipment, usage, phasing, locations, and duration provided. Assumptions have been made on the equipment type and extent of use based on Reclamation's experience with other dam projects and have been used in this analysis to project the construction phase noise levels.

Alternative A – No Action

No construction activities would occur as part of the No Action alternative, and therefore, no construction noise would be generated. There would be no noise impacts on sensitive receptors under the No Action alternative.

Alternative B – Proposed Action

Typical, representative noise levels for a variety of equipment that are commonly used in dam and related infrastructure construction are shown in **Table 3-3**. Levels are given as the sound pressure level at 50 feet from the equipment. Also presented are the distances at which the noise level

Table 3-3. Typical noise emission levels of equipment used for project construction

Equipment	Typical Sound Pressure Level at 50 feet from Source (dBA)	Distance to 90 dBA, the FTA daytime limit (feet)	Distance to 45 dBA, the Class A nighttime limit (feet)
Air Compressor	80	16	2,812
Backhoe	80	16	2,812
Compactor	82	20	3,540
Concrete Mixer	85	28	5,000
Concrete Pump	82	20	3,540
Concrete Vibrator	76	10	1,774
Crane, Derrick	88	40	7,063
Crane, Mobile	83	22	3,972
Dozer	85	28	5,000
Generator	82	20	3,540
Grader	85	28	5,000
Impact Wrench	85	28	5,000
Jackhammer	88	40	7,063
Loader	80	16	2,812
Paver	85	28	5,000
Impact Pile Driver	101	177	31,548
Sonic Pile Driver	95	89	15,811
Pneumatic Tool	85	28	5,000
Pump	77	11	1,991
Rock Drill	95	89	15,811
Roller	85	28	5,000
Saw	76	10	1,774
Scraper	85	28	5,000
Shovel	82	20	3,540
Truck	84	25	4,456

Source: FTA 2018
Daytime = 7:00 AM to 10:00 PM
Nighttime = 10:00 PM to 7:00 AM

from an individual source would decay to 90 dBA and 45 dBA based on propagation over distance only (without consideration of other effects for outdoor propagation attenuation, such as atmospheric absorption of sound). Ninety (90) dBA is the recommended FTA threshold for daytime (7:00 a.m. – 10:00 p.m.) construction noise, and 45 dBA is the nighttime (10:00 p.m. – 7:00 a.m.) WAC noise limit for Class A receptors such as residences and campgrounds.

Given that the nearest residence is 679 feet away from the limits of construction, the 90 dBA FTA limit is unlikely to be exceeded at any noise-sensitive areas by individual pieces of equipment. However, the distance to the 45 dBA WAC nighttime limit for Class A receptors extends beyond the edge of the 0.5-mile (2,640 foot) noise analysis area for many equipment types. The WAC

ordinance does allow for the noise limits to be exceeded by certain amounts for limited times within an hour, but the 45 dBA limit would apply to any equipment that operates for more than 15 minutes per hour at night. Based on the 45 dBA distances in the table above compared to the analysis area, anticipated construction noise levels would likely to represent a moderate to major impact to nearby noise sensitive areas, particularly if nighttime operation (10:00 p.m. – 7:00 a.m.) is required. However, construction noise impacts would be temporary, as they would only occur during construction. In addition, nighttime construction would be conditional on authorization by the Contracting Officer's Representative and would not occur consistently throughout the entire construction period. Also note that even compliance with the 45 dBA limit may still represent a noticeable relative increase over existing nighttime background noise levels (expected to be less than 33 dBA on average) under the No Action alternative, which could be a source of annoyance and a minor, temporary impact.

Of particular importance for noise would be equipment that needs to run continuously, including at night. This includes the spillway pumps, which would be in place during construction of the outlet works outside of the irrigation period, and the drill rigs, which would be operating during the installation of the DSM columns for the stability berm. Noise from drill rigs can vary widely depending on equipment selection, which is not known at this time.

As described in **Chapter 2**, the pumps would be limited to a maximum noise level of 75 dB for each pump. Assuming this is intended to indicate a sound pressure level of 75 dBA at 3 feet from the pump enclosure, a group of pumps would comply with nighttime WAC limits of 45 dBA at Class A receptors at an approximate distance of 165 feet. If the pumps are powered by diesel generators, those generators should also be fitted with noise mitigation according to the Noise Monitoring and Abatement Plan to be prepared by the contractor (**Appendix F**).

Delivery of sand filter and gravel drain material during construction would require an average of 8-12 trips per day over the course of 36-52 weeks (**Table J-2** in **Appendix J**). This may result in a temporary increase in traffic noise levels on Conconully Road. In addition, noise in the vicinity of the dam access road would be expected to increase during construction due to hauling trucks and worker vehicles in an area where there was minimal traffic previously.

To reduce the impacts due to noise, the hours between 10:00 p.m. and 7:00 a.m. would be considered reduced noise hours. A Noise Monitoring and Abatement Plan would be developed prior to construction which would detail means and methods to reduce the noise levels of the operation to the extent feasible (**Appendix F**). The plan would pay special attention to equipment that may be required to operate during nighttime hours (10:00 p.m. to 7:00 a.m.), such as pumps, generators, and drill rigs. However, drill rigs would not be operating during nighttime hours unless specifically authorized by the Contracting Officer's Representative. The plan would include measuring existing pre-construction background noise levels in the analysis area to confirm baseline levels. It would also provide BMPs to reduce construction noise to comply with applicable limits (including both FTA and WAC limits) and minimize the increase over baseline noise to the extent feasible and reasonable. The implementation of BMPs (**Appendix F**) would reduce the overall severity and timing of construction impacts to below moderate to major levels.

No new permanent noise sources would be present upon completion of construction for Alternative B. Therefore, impacts from noise would be considered temporary in duration, and noise levels would return to baseline conditions after construction is complete.

Alternative C

The project description for Alternative C is largely the same as Alternative B, with the following differences that would affect noise.

The alignment of the outlet works under Alternative C would be shifted west of the Alternative B alignment, requiring less rock excavation and less pipe length. This would reduce the duration of noise emitted during rock excavation and pipe installation, including reducing the number of truck trips for pipe deliveries.

Under Alternative C, a boat ramp would not be constructed. Instead, any barges needed for intake bulkhead installation, or the spillway pumps would be deployed using an alternative method, such as, being lowered into the reservoir with a crane or launched from the existing boat ramp at Conconully State Park, if feasible. While construction noise associated with boat ramp construction would not occur under this alternative, some additional temporary noise could occur associated with the crane operation or additional traffic at the existing boat ramp during barge deployment.

As under Alternative B, impacts due to construction noise would be localized, temporary, moderate to major, and adverse. The implementation of BMPs (**Appendix F**) would reduce the overall severity and timing of construction impacts to below moderate to major levels; noise levels would return to baseline conditions after construction is complete.

3.7 Visual Resources

3.7.1 Analysis Area

The analysis area for visual resources encompasses the entire reservoir and surrounding landscape, as shown in **Map I-1** in **Appendix I**.

3.7.2 Affected Environment

Visual Landscape

Conconully Reservoir is the dominant feature in a diverse topography of rolling hills, rocky outcroppings, and steep slopes. This semi-enclosed landscape consists of varied elevations, where expansive forests predominantly consist of coniferous trees such as pine, fir, and spruce. These forests gradually open to areas with scattered trees and shrubs, primarily cottonwoods and willows, accompanied by limited herbaceous wetland vegetation and grassland cover on the hillsides. This forested environment not only provides habitat for wildlife but also offers a serene, natural setting for visitors to appreciate.

The project area[14] is on the southeastern side of Conconully Reservoir in the Salmon Creek drainage in Okanogan County, Washington. The project area encompasses a portion of Graveyard Flat, a saddle landform with a rolling topography of glacial kettle depressions. The topography slopes steeply westward toward Conconully Reservoir (Franklin and Dyrness 1973). The elevation in the project area ranges from approximately 2,226 feet along Salmon Creek to approximately 2,350 feet on the hillslope to the south of the Graveyard Flat area (Reclamation GIS 2025).

Conconully Reservoir was formed by the construction of Conconully Dam in 1910 (Reclamation 2025a). Conconully Reservoir is 450 acres in size with a maximum depth of 50 feet. Water flows into Salmon Creek through the dam outlet works and, during higher flows, the spillway. The normal reservoir water surface elevation of Conconully Reservoir is between 2250 to 2287 feet The reservoir can actively store approximately 13,000 acre-feet (Reclamation 2025a).

Generally, there are three distinct vegetation communities in the analysis area. Shrubland community intermixed with sparse shrub and grasses, such as blue wild-rye (*Elymus glaucus*) and Thurber's ricegrass (*Acnatherum thuberiana*), drought tolerant forbs, such as Thompson's Indian paintbrush (*Castilleja thompsonii*) and snow buckwheat (*Eriogonum heracleoides*), and invasive species including cheatgrass (*Bromus tectorum*) dominate the Graveyard Flat area. A small area of conifer forest is present on north-facing hillsides in the vicinity of the dam tender house to the south of Graveyard Flat. The shoreline of Conconully Reservoir in the analysis area supports discontinuous trees and shrubs, mostly cottonwoods and willows, with little herbaceous wetland vegetation. The most prominent visual features from the analysis area are Conconully Reservoir and the surrounding grassland hills. Background features include forested hills and mountain ridges.

Conconully enjoys relatively dark skies due to low light pollution and minimal urban interference. These existing conditions are favorable for stargazing, enabling residents to appreciate the beauty of the night sky, including the visibility of the Milky Way and numerous stars. Maintaining these dark sky conditions supports local tourism and contributes to the quality of life for residents.

Human presence is evident within the analysis area, including roads, recreational facilities, residential communities and businesses, and a cemetery. Conconully Reservoir is a popular local destination, offering a variety of recreational activities including fishing, boating, camping, picnicking, hiking, and wildlife viewing. Conconully State Park is on the northeastern shoreline of Conconully Reservoir and includes shoreline access, and a boat ramp and boat dock to handle motorized and nonmotorized boats (Washington State Parks 2025). There are several residences on the southeast shore, as well as a recreation area featuring campsites and cabin rentals. Artificial lights from communities and from vehicles traveling on roads are also indicative of human presence on the landscape, especially during evening and nighttime hours.

Sensitive viewers, such as recreational users, Tribal members and local residents, are likely to be in proximity to the proposed project. Areas of potential viewer sensitivity include Conconully State Park, Shady Pines Resort and nearby residences on the southeastern shoreline, Liars Cove Resort on the western shoreline, and Conconully Cemetery on the southwestern shoreline. Concerns for visual

[14] The project area is the smaller portion of the larger visual resources analysis area where impacts on visual resources from project activities would occur.

resources vary by individual and group. These individuals and groups have a strong connection to the natural landscape and recreation opportunities.

3.7.3 Environmental Consequences

Methods and Criteria

Reclamation has adopted an analytical approach to assess potential impacts on visual resources. This approach considers the amount of contrast that is introduced by the alternatives as viewed from key observation points (KOPs). This approach was developed by BLM in 1986 and has been proved to be effective at anticipating and reducing impacts on visual quality. Significance is based on adherence to visual resource management (VRM) objectives and the potential impact to sensitive viewers.

After reviewing the management plans established by Okanogan County and the Forest Service, VRM Class III objectives were deemed the most suitable for the analysis area. These objectives are to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape (BLM 1986). For detailed information regarding this methodology, selected KOPs and field studies and the use of photo simulations reference (**Appendix I**).

The degree of contrast is measured by comparing the natural landscape's basic elements of form, line, color, and texture with the visual intrusions created by the action alternatives. Contrast ratings are conducted from KOPs, such as along commonly traveled routes and important recreation areas. This assessment process provides a means for determining visual contrast and for identifying measures to eliminate or reduce these impacts (BLM 1986; Reclamation n.d.).

Reclamation selected the following three KOPs for conducting the contrast ratings: Liar's Cove Resort, Shady Pines Resort, and Conconully Cemetery (**Map I-1** in **Appendix I**). A fourth viewpoint (Conconully State Park) was used to show the overall project setting but was not used in the contrast ratings (**Figure I-7** in **Appendix I**. Reclamation chose KOPs that represent recreation areas and community locations. **Maps I-2**, **I-3**, **I-4**, and **I-5** in **Appendix I** depict areas visible from these locations.

Analysis Indicators

- Conformance with VRM Class III objective from the KOPs

Assumptions

- Impacts on visual resources would be localized due to vegetation (primarily trees) loss and changes in the landform.
- Artificial light levels after construction and during operations and maintenance would be the same as existing artificial light levels.

Alternative A – No Action

Under the No Action alternative, there would be no structural changes to Conconully Dam and no construction-related impacts on visual resources. Visual resources within the analysis area would continue to remain similar to existing conditions. Naturally occurring events, such as wildfires and flooding, and shifts in temperature and precipitation patterns, would continue to alter the landscape with effects on visual resources in the analysis area.

Under the No Action alternative, the risk of dam failure due to a seismic event would continue. Uncontrolled reservoir draining due to dam failure could impact water levels in Conconully Reservoir, altering the visual characteristics of the shoreline and the lake itself. Additional impacts on visual resources could include the loss of existing dam structures and modifications to local topography and vegetation patterns. Impacts on visual quality would extend beyond the immediate analysis area, as floodwaters travel 15 miles down Salmon Creek to meet the Okanogan River, continuing an additional 40 miles downstream to Lake Pateros. These floodwaters would carry silts, heavier loamy soils, and debris, leading to mass wasting and soil erosion. Structures would collapse, trees would be uprooted, and native vegetation along with irrigated crops could become buried.

VRM Class III Objective Conformance

There would continue to be no structural changes to Conconully Dam under the No Action alternative. Consequently, there would be no changes to the landscape. In the event of a seismic event and dam failure, the newly formed landscape would present a stark contrast to the existing scenery. Visual changes could include the creation of irregular forms, fragmented lines, and rough, jagged textures as a result of collapsed structures and displaced earth and debris. As floodwaters stir up sediment, uproot vegetation, and disperse debris across the area, the dark greens and golden yellows of the vegetation communities, along with the dark browns of the loamy soils, would shift into muddy browns, grays, and washed-out tones. This would result in major landscape modifications that would dominate the view, failing to meet the objectives of VRM Class III.

Impacts on viewers would vary based on sensitivity level and impacts to the existing land use. Viewers may feel sadness, loss, or anxiety when witnessing altered landscapes, especially if familiar and cherished places have been transformed or damaged. For certain communities, specific landscapes may hold cultural or historical significance, making alterations due to flooding particularly poignant.

Alternative B – Proposed Action

Along Conconully Reservoir upstream of the dam, construction activities would draw the attention of the casual observer. Activities that would be most visible would be related to the transportation of materials and construction near the upstream side of the dam. Under Alternative B, most activities related to the construction of the stability berm, outlet works, and new water control components would occur downstream of the dam. This area is not visible from the KOPs (**Maps I-2, I-3**, **I-4**, and **I-5** in **Appendix I**).

During the construction phase, temporary visual contrast would result from the presence of construction equipment, material stockpiles, disturbed soil, and increased human activity. Within the borrow area, earthmoving activities during construction would have short-term impacts on the

visual landscape from the KOPs due to the removal of vegetation and the disruption of landforms. The excavated areas and the lack of vegetation would result in a stark and abrupt change in color (such as, golden grasses, dark green and brown trees to gray-brown excavated areas) and texture as the smooth, bare slopes contrast with the surrounding environment. Along the shoreline of the borrow area, construction of the new boat ramp would result in minimal impacts to the visual quality of the landscape based on the scale of construction activities.

Temporary lighting used for construction activities would be viewed as dispersed points of white light; it would cause glare and be a source of artificial light between sunset and sunrise and during low-visibility work periods[15]. While the lighting would be periodically noticeable during construction, it would be a temporary impact. Reclamation would implement BMPs (**Appendix F**) and lighting controls during construction to minimize the potential for impacts from artificial light, including the use of downward-directed, focused lighting fixtures to minimize glare and light pollution. There would be no increase in light pollution, thereby eliminating the potential to impact the quality of dark skies within the analysis area. Artificial lighting levels would return to the current levels after construction is complete.

Permanent visual contrast would also result from modifications to the landscape and the introduction of permanent infrastructure associated with Alternative B. Most structural modifications to the dam, such as the stability berm, outlet works, and water control components, would be constructed downstream of the dam. These changes would not be visible from the KOPs. However, there is the potential for adverse impacts to the visual integrity of historic structures under Alternative B (**Section 3.4**).

Use of the borrow area located along the shoreline would initially disturb approximately 20 acres, which would be recontoured and sloped to blend with the existing landscape contours. Successful restoration efforts are expected to eliminate or reduce the majority of permanent impacts in this area. However, moderate visual contrast is anticipated due to changes in color and texture. The boat ramp would introduce minor contrast through the addition of hard geometric forms that diverge from the existing shoreline. Nonetheless, these visual changes would resemble the geometric patterns characteristic of the dam (**Map 2-2** in **Appendix A**).

Restoration and revegetation activities following construction would be implemented to minimize visual contrast (**Appendix E**). Photo simulations of the project area (**Appendix I**) when viewed from the KOPs were completed to depict future project conditions 5 years after restoration and revegetation per the proposed Revegetation Plan. The borrow area would be recontoured to blend with the surrounding landforms, and native species would be planted to restore the natural environment. The contrast would primarily be noticeable from the KOP at Conconully Cemetery because of its proximity to project area around the dam (**Appendix I**). The level of change to the characteristic landscape around the dam would be weak to moderate. After construction and revegetation activities conclude, the contrast would decrease as the disruption from construction dust and the presence of heavy equipment are reduced and natural textures and forms of Conconully Reservoir are reestablished. Within 5 years post-construction, new, young vegetation communities

[15] Various atmospheric condition scenarios may require artificial lighting to increase visibility and safety during workday hours.

would be reestablished. Because natural revegetation would soften the abrupt visual changes, the borrow area would begin to mimic existing openings in the landscape and the contrast would gradually diminish over time until bushes and trees mature.

VRM Class III Objective Conformance

Alternative B would result in temporary and short-term impacts on visual resources during construction and permanent impacts on visual resources due to the introduction of permanent infrastructure and modifications to the landscape. However, implementation of BMPs (**Appendix F**) and the proposed Revegetation Plan would minimize temporary and short-term disruptions and contribute to the gradual recovery of visual landscape in the analysis area.

From the KOPs, the level of change to the contrast would be weak to moderate after 5 years. Permanent infrastructure and modifications to the landscape would not blend with the existing landscape but would also not attract attention. Sensitive viewers may experience the most adverse effects during the commencement of construction activities; however, these impacts would likely diminish as successful vegetation matures. Overall, Alternative B would conform with VRM Class III objectives from the KOPs.

Alternative C

Impacts on visual resources under Alternative C would be largely the same as those described under Alternative B. However, under Alternative C, the boat ramp would not be constructed. This would avoid a permanent impact on visual resources and therefore result in slightly less visual contrast than under Alternative B. Alternative C would also conform with VRM Class III objectives from the KOPs.

3.8 Recreation

3.8.1 Analysis Area

The analysis area for recreation is the project area, Conconully Reservoir and shoreline, and the developed recreation areas around the reservoir consisting of Conconully State Park, Liar's Cove Resort, and Shady Pines Resort (**Map 1-1** in **Appendix A**).

3.8.2 Affected Environment

Recreational Opportunities

The project area is used by local residents for walking and bird-watching. Adjacent to the project area, Conconully Reservoir is a popular regional recreation area that provides opportunities for picnicking, fishing, boating, camping, winter sports, and water sports. Washington State Parks maintains recreational facilities along Conconully Reservoir at Conconully State Park, which is located on the northeastern end of Conconully Reservoir approximately 1 mile north of the project area. Conconully State Park is a 97-acre park with 5,400 feet of shoreline and is popular for fishing, waterskiing, swimming, and bird-watching. Conconully State Park is open from April through October, and overnight cabin rentals are available. Conconully State Park is a fee area; visitors are required to purchase a $10 day-use parking pass or a $30 annual pass. Other fees include a $7

watercraft launch fee. Conconully State Park is not located within the project area (Washington State Parks 2025).

Other recreation sites along Conconully Reservoir include Liar's Cove Resort, on the east side of Conconully Reservoir, and Shady Pines Resort, on the west side of Conconully Reservoir (**Map 1-1** in **Appendix A**). Both offer cabins, recreational vehicle and tent campsites, a gift and tackle shop, and rental boats. Shady Pines Resort also offers cabin rentals in the winter season, which support snowmobiling, cross-country skiing, dog sledding, and other winter recreational activities in the area. Liar's Cove Resort and Shady Pines Resort also provide accessible paved pathways, pavilions, group picnic areas, drinking water, watercraft rentals, bicycle amenities, and boat ramps (Liar's Cove Resort 2025; Shady Pines Resort 2025). Neither of these developed recreation areas are in the project area. Liar's Cove Resort is 0.6 miles north of the project area, and Shady Pines Resort is 0.4 miles northwest of the project area.

Fishing in Conconully Reservoir is allowed with a license from WDFW; it is one of the most popular recreational activities at Conconully Reservoir. Conconully Reservoir is stocked annually by WDFW with rainbow trout and kokanee. WDFW encourages anglers to retain as many bass as the daily limit allows to reduce competition with trout species (Washington State Parks 2025; WDFW 2024b). The areas near the dams are known for being the best fishing locations on the reservoir. These deeper waters are ideal for trolling and jigging, particularly appealing for kokanee.

Angling on Salmon Creek below Conconully Dam can be popular, especially for anglers interested in catching trout. The area offers scenic views and a quiet setting, which attracts both local anglers and visitors. Salmon Creek is also used by local Tribes for subsistence fishing (**Section 3.5**).

The annual Trout Derby is a recreational event that occurs on Conconully Reservoir on the opening weekend of fishing season. Those who participate may fish from land or boat. Conconully State Park has two boat ramps and one 80-foot boat dock for launching motorized and nonmotorized boats located within the analysis area (Conconully 2025; Washington State Parks 2025).

The Okanogan County Outdoor Recreation Plan analyzed recreational trends in the county (Okanogan County 2020). According to that plan, the older and retired populations continue to grow within the county, with many expected to stay active and likely demand more recreational opportunities. More generations and changing work patterns have created off-peak demand for recreational facilities and more options for multigenerational activities. There is an increased interest in physical activity among the population in the county, and residents are increasingly interested in convenient recreational activities, such as those that are closer to home (Okanogan County 2020).

Recreational Access

The project area is accessible by vehicle on an existing access road, off Conconully Road, up to the security gate. From there, visitors can access the project area by foot. There are several informal parking areas used by visitors within the project area (**Map 2-1** in **Appendix A**). There are no designated beaches or shoreline access points to Conconully Reservoir in the project area due to the steep sloping nature of the terrain and restricted access at the dam site. There also are no developed recreational trails that lead to or cross the project area.

Access to developed recreation areas around Conconully Reservoir is provided by existing roads. The portion of Conconully State Park along Conconully Reservoir can be accessed from the town of Conconully via Broadway Street or North Main Street. Liar's Cove Resort can be accessed from the north, on North Main Street, or from the south on Conconully Road. Recreationists seeking to access Shady Pines Resort, on the west side of Conconully Reservoir, have to travel on West Fork Road from the north or the south.

Recreational Experience

In 2022, the Washington State Parks and Recreation Commission noted that Conconully State Park was one of 20 state parks to experience the largest visitation increase between 2019 and 2022. Visitation to Conconully State Park increased 45 percent, from 89,679 annual visitors to 130,397 visitors during this time (Washington State Parks 2022). These numbers only reflect increased visitation to Conconully State Park; they do not include visitation increases to other recreation areas along Conconully Reservoir's shoreline.

The visual features around the project area are a key part of recreational experience. The reservoir itself is surrounded by rolling grassland hills that exhibit large swaths of conifer forest and open areas. Natural-appearing rural landscapes of grasslands, shrublands, and forests make up the visual environment within the analysis area. Noise sources in the analysis area come from traffic on existing roads, visitor use of existing recreation areas, and recreational boating on Conconully Reservoir. Noise levels are highest during the peak recreation season, which typically occurs between late May through October. For more information regarding the auditory and visual setting in the analysis area, please refer to **Section 3.6** and **Section 3.7**, respectively.

3.8.3 Environmental Consequences

Methods and Criteria

Analysis Indicators

- Changes to recreational opportunities
- Changes in access to recreational sites
- Changes to the recreational experience

Assumptions

- Demand for recreational opportunities would remain the same during construction. After construction, demand for recreational opportunities is expected to increase due to project improvements conducive for recreational activities.
- Existing recreational facilities in the analysis area would be maintained to provide the same amenities and opportunities that currently exist.
- Any delays caused by construction-related traffic would be intermittent and temporary and not prevent access to recreation sites.

Alternative A – No Action

Under the No Action alternative, there would be no structural changes to Conconully Dam and no construction-related impacts on recreational opportunities, recreation site access, and the quality of recreation experience. As dam integrity remains, so would the existing recreational opportunities, access, and the recreational experience.

Without the implementation of safety modifications, the dam would continue to be at a higher risk for failure, which could result in uncontrolled reservoir draining. If the dam were to fail, recreational opportunities on and around Conconully Reservoir would be drastically changed. Recreation would be adversely affected without the presence and operation of Conconully Dam. The No Action alternative would not meet the project's purpose of continuing to provide recreational benefits.

Alternative B – Proposed Action

Recreational Opportunities

Public vehicle and pedestrian access to the project area would be closed for the duration of the 4-year construction period, which would create a temporary minor impact to visitors through removal of undeveloped recreational opportunities. Under Alternative B, the excavated borrow area would be sloped to a natural grade and stabilized to ensure public safety and avoid excessive erosion upon project completion. The borrow area would be left in a state amenable to the development of future recreational amenities, such as a parking lot, vault toilets, or informational kiosks as part of anticipated recreation planning and coordination with a suitable concessionaire. Additionally, under Alternative B, a 20-foot-wide by 185-foot-long boat ramp would be constructed in the southeast corner of Conconully Reservoir to launch barges for spillway pumping and the intake bulkhead placement. The boat ramp would remain in place after project completion. The boat ramp and the potential for future recreational facilities in the project area would provide additional entry points to Conconully Reservoir and offer increased opportunities to launch motorized and nonmotorized watercrafts, to fish from the shore and from the water, and to view scenery.

Under Alternative B, no project activities would occur within Conconully State Park, Liar's Cove Resort, or Shady Pines Resort. Alternative B would not result in any closures to these recreation areas, nor would it result in any interruption of recreational opportunities available at these locations.

Alternative B would close the dam area to anglers for the 4-year duration of project construction, and portions of Salmon Creek below the dam during restoration activities. Anglers would be displaced to other areas of the reservoir, which may be perceived as inferior locations for a successful fishing experience. Portions of Salmon Creek directly below the proposed stability berm and outlet works would also be closed, temporarily, during restoration activities as part of Alternative B. Fishing opportunities would be restored after construction is complete.

It is anticipated that Alternative B would not prevent or displace the annual Trout Derby or other recreation-related events on Conconully Reservoir during project construction. The project area would be temporarily closed to shore fishing; however, this closure would not affect the overall ability of the event organizers to execute the annual event.

Overall, Alternative B would protect the viability of Conconully Reservoir as a recreation destination through reducing the risk of dam failure. Recreational opportunities in the project area would increase under Alternative B as compared with the No Action alternative due to the installation of a new boat ramp needed during construction but would remain in place following project completion, as well as the restored borrow area offering space for future recreational improvements.

Recreational Access

Under Alternative B, foot and vehicle access to the project area would be closed for the entire 4-year construction period, which would reduce recreational access as compared to the No Action alternative. The dam access road would be constructed from Conconully Road to the dam site to provide permanent access to dam facilities for future O&M activities. Once construction and revegetation efforts finish under Alternative B, this road would allow visitors to once again access the project area by vehicle and foot up to the new security gate. The existing informal parking areas within the project area would be permanently removed due to construction of the borrow area and the administrative/storage/staging area. The gravel surface of the administrative/storage/staging area would remain after project completion; this area would be available for visitor parking.

Compared with the No Action alternative, Alternative B would result in a temporary increase in construction-related traffic on local roads; however, this would have a negligible impact on access to recreational sites during the 4-year construction period. Additionally, Alternative B would not result in detours, closures, or access restrictions to Conconully Reservoir, Liar's Cove Resort, or Shady Pines Resort.

Recreational Experience

Under Alternative B, temporary features such as fencing and lighting would be erected and remain in place for the 4-year construction period. Temporary fencing would be used to delineate and protect sensitive areas and would be bright in color. Temporary lighting would be used to increase visibility and safety during workday hours. The lighting would be most noticeable between sunset and sunrise. The fencing and lighting would temporarily degrade the recreational experience, particularly for recreationists with views of the project area. It is anticipated that the temporary fencing and lighting would be visible from designated recreation areas such as Conconully State Park, Liar's Cove Resort, and Shady Pines Resort. The temporary fencing and lighting would be removed after project construction was completed. These impacts on the recreation experience would be minor compared to the devastation caused by dam failure, which could take place under the No Action alternative. Reclamation would implement lighting controls during construction to minimize the potential for impacts from artificial light at night from construction (**Appendix F**).

Alternative B would temporarily adversely affect the recreational experience within the analysis area due to the use of noisy, heavy equipment during construction. Project activities such as demolition, excavation, reconstruction of the dam components, construction and use of temporary roads, and the clearing and use of the borrow area would all result in increased noise levels compared with existing conditions. Noise from heavy equipment operations would be audible from designated recreation areas, particularly Liar's Cove Resort and Shady Pines Resort. Vehicle and construction noise would also be audible from the water, impacting motorized and nonmotorized boaters. BMPs

(**Appendix F**) would help minimize impacts from construction noise, including limiting construction to daytime hours.

The sights and sounds of these project activities would draw the attention of visitors and be exacerbated by the physical changes to the environment. The clearing of the borrow area along the southeast side of Conconully Reservoir would result in temporary and short-term adverse impacts on the recreational experience. During construction, the removal of trees and extraction of earthen materials would be visible to recreationists throughout the Conconully Reservoir area, especially from the lake itself and designated recreation areas. The exposure of bare earth would be a noticeable change to the recreational setting along the shoreline of Conconully Reservoir and would last until revegetation efforts become successful. For visitors who view the forested areas surrounding the lake as contributing positively to their recreational experience, the creation of the borrow area would diminish the recreational experience within the analysis area in the short-term until revegetation occurs.

Reclamation would implement the BMPs identified in **Appendix F** that are directly related to recreation, as well as the BMPs related to visual quality, transportation, and public health and safety which would also reduce impacts on recreational experiences. The implementation of BMPs would not eliminate all impacts described above; however, they would reduce impacts to below a minor level.

In addition to Alternative B, other projects in or near the analysis area would affect recreation opportunities and recreational experience along Salmon Creek. Seven miles downstream of the project area, the Salmon Creek River Mile 8 Restoration Project would restore fish habitat, while also improving migratory passage and water retention in the creek. During the construction of both Alternative B and the Salmon Creek River Mile 8 Restoration Project, anglers would be displaced from both project areas for up to 4 years. Due to the distance between both projects, it is unlikely that angling closures would result in a combined negative impact to recreation opportunities and access. However, the displacement of fishing opportunities during construction may cause anglers to seek fishing opportunities elsewhere. Fishing opportunities would be restored upon the completion of both projects, but if displaced anglers choose not to return, impacts would be considered long-term. The restoration of Salmon Creek as a result of Alternative B, when combined with restoration efforts from the River Mile 8 project, would benefit the recreational experience in the long-term, by improving the scenic qualities and ecological conditions of Salmon Creek.

Alternative C

Impacts on recreation opportunities, access, and experience under Alternative C would be largely the same as those described under Alternative B. Under Alternative C, a new boat ramp within the borrow area would not be constructed, which could reduce the potential for new recreational access in the future. However, the borrow area would still be restored, revegetated, and developed to provide an increase in recreational experience within the project area. Under Alternative C, Reclamation would implement the same BMPs as under Alternative B to reduce impacts on recreation opportunities, access, and experience to below a minor level.

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Chapter 4. Consultation and Coordination

4.1 Introduction

This chapter describes the consultation and coordination among Reclamation and other federal, state, and local agencies; Native American Tribes; and the public in preparing this EA. It also includes records of necessary compliance with other applicable statutes and permitting, and any public involvement activities. Federal laws require Reclamation to consult with certain federal and state agencies, other entities, and Native American Tribes during the NEPA decision-making process. Reclamation is also directed to integrate NEPA requirements with other environmental review and consultation requirements to reduce paperwork and delays.

Reclamation followed the public involvement requirements documented in 43 CFR 46. NEPA and associated laws, regulations, and policies require Reclamation to involve the public as much as possible while preparing and implementing their NEPA procedures, to build consensus for the final decision.

The requirement for public notice varies by the level of NEPA compliance. Public notice of the availability of EAs and findings of no significant impact is required, though the requirements depend on the proposed action, potential issues, and public interest. Public notice may include posting to a regional website, posting to community bulletin boards, direct mailings, or other methods (Reclamation 2012). As summarized in the Scoping Report (Reclamation 2024a), Reclamation involved the public, Tribes, and other agencies through a news release, postcard mailer, email blast, the virtual public meeting room website, in-person public scoping meetings, and updates on Reclamation's project website[1].

4.2 Consultation and Coordination

4.2.1 Participating Agencies

At the outset of the EA process, Reclamation asked federal, state, and local agencies and Tribes if they would like to be a part of the NEPA process as cooperating agencies. Cooperating agencies are those federal, state, and local agencies and Tribes that have jurisdiction by law or special expertise with respect to any environmental impact involved in a proposed project or project alternative (43 CFR 46.225). None of the entities invited formally accepted the cooperating agency request.

However, several agencies and Tribes joined the EA process as participating agencies because they have already been engaged with the project's planning and development. The intent of a participating agency's role is to enhance interagency coordination and ensure that issues of concern

[1] The project website can be accessed at: https://www.usbr.gov/pn/programs/sod/conconully/index.html

are identified early and addressed in the NEPA document. Reclamation will continue coordinating with each agency and Tribe throughout the NEPA process. Participating agencies include USACE, USFWS, NMFS, CTCR, Department of Archaeology and Historic Preservation (DAHP), Ecology, and WDFW.

Reclamation held meetings with the participating agencies throughout the EA development process and will continue throughout the NEPA, permitting, consultation, and construction processes. The purpose of these outreach efforts was to inform and receive input from participating agencies respective to their jurisdiction, special expertise, or interests. **Table 4-1** summarizes outreach with the participating agencies to date throughout the project design and EA development process.

Table 4-1. Agency meetings

Meeting Purpose	Date	Participating Agency Representation
Permitting and consulting agency meeting #1	November 16, 2023	USACE, USFWS, CTCR, DAHP, WDFW, Ecology, Okanogan County
Permitting and consulting agency meeting #2	February 21, 2024	USACE, USFWS, NMFS, CTCR, DAHP, WDFW, Ecology, OID
Permitting and consulting agency meeting #3	June 4, 2024	USACE, USFWS, Forest Service, CTCR, WDFW, Ecology, Okanogan County, OID
Scoping meeting	August 28, 2024	USFWS, NMFS, USFS, CTCR, DAHP, WDFW, Ecology
BA coordination	April 1, 2025	USFWS, NMFS
Permitting and consulting agency meeting #4	April 30, 2025	USACE, USFWS, Forest Service, CTCR, DAHP, WDFW, Ecology, OID

4.2.2 Government-to-Government Consultation

EO 13175, Consultation and Coordination with Tribal Governments, requires federal agencies to coordinate and consult on a government-to-government basis with sovereign Native American Tribal governments whose interests may be directly and substantially affected by activities on federally administered lands. Coordination and consultation with Native American Tribes are part of the NEPA scoping process. Outreach and coordination with the CTCR continued throughout the EA development process. To date, Reclamation has not received a request for formal government-to-government consultation from the Tribes.

4.2.3 State and Tribal Historic Preservation Office Consultation

In compliance with Section 106 of the NHPA, as amended, Reclamation initiated consultation on the level of effort and APE with the Washington DAHP SHPO and the CTCR THPO on November 14, 2023. The SHPO initially expressed concerns about the proximity of a historic cemetery, and Reclamation met with DAHP on November 20, 2023, to discuss these concerns. Based on this discussion, Reclamation revised the APE. The revised APE/level of effort (LOE) was submitted to DAHP and CTCR on January 12, 2024. The SHPO provided concurrence on the APE and level of effort on January 16, 2024. The THPO provided concurrence on February 29, 2024.

Reclamation provided the cultural resources report to DAHP and CTCR on October 18, 2024. However, due to new, additional changes in project design, Reclamation provided a revised APE/LOE to DAHP and the CTCR on December 16, 2024. Concurrence with the revised APE/LOE from both entities was received on December 17, 2024. Concurrence with Reclamation's determination that the proposed action would have an adverse effect on historic properties was received from the SHPO. Section 106 consultation with the CTCR to ensure Reclamation addresses Tribal feedback is currently ongoing. Reclamation held its MOA kickoff meeting with the DAHP SHPO and CTCR THPO to begin discussions on mitigation to resolve adverse effects on cultural resources on May 7, 2025.

4.2.4 Endangered Species Act Consultation

To comply with ESA Section 7(a)(2) and 50 CFR 402, Reclamation is preparing a BA to determine the potential impacts of the proposed action on federally-listed species, and their designated critical habitat. Prior to delivery of the BA to NMFS and USFWS, Reclamation held a pre-consultation discussion with NMFS and USFWS on April 1, 2025, to review project design elements and potential impacts on the species within the project area. Reclamation will continue to meet with NMFS and USFWS throughout the consultation process.

4.2.5 Clean Water Act Consultation

Prior to construction implementation, Reclamation would obtain all required regulatory permits using the State of Washington's JARPA form. Reclamation would prepare a JARPA to obtain a permit for the placement of dredge or fill materials into waters of the U.S. under Section 404 of the CWA (Section 404 Individual Permit) and for the placement into or removal of fill materials from waters of the state (Section 401 of the CWA, 401 Water Quality Certification from Ecology). Ecology administers Section 401 on behalf of the EPA. Separately, although using the same JARPA, Ecology administers the Water Pollution Control Act and the Shoreline Management Act, which protects state jurisdictional wetlands and waters independent of federal CWA rules. Ecology jointly administers their shoreline permitting program with Okanogan County; however, the primary permitting responsibility for the Shoreline Management Act would fall to the county.

4.3 Public Collaboration and Outreach

Reclamation held two in-person public scoping meetings to solicit oral and written comments from the public, and one scoping meeting attended by cooperating and permitting agencies and the CTCR. Results of public scoping and agency and Tribal input were used by Reclamation to develop a reasonable range of alternatives to analyze in this EA.

The draft EA was made available for public review with its publication to the Reclamation project website and virtual public meeting room on June 10, 2025. Reclamation notified the public that the EA was available for public comment via the public notice of the availability of the EA, a news release to local media, and mailings to interested parties. The release of the EA initiated a 30-day public comment period.

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Chapter 6. Glossary

Access—The ability of a particular transportation mode, such as a vehicle or pedestrian, to enter or use a portion of the transportation network.

Air quality—A measure of the health-related and visual characteristics of the air, often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.

Ambient (air)—The surrounding atmospheric conditions to which the general public has access.

Archaeological site—A location that contains material remains of past human activities, generally defined as over 50 years old.

Best management practices (BMPs)—Activities that are added to typical operation, construction, or maintenance efforts that help to protect environmental resources by avoiding or minimizing impacts of an action.

Cofferdam—A watertight enclosure pumped dry to permit construction work below the waterline.

Cubic feet per second (cfs)—An Imperial unit/U.S. customary unit volumetric flow rate, which is equivalent to a volume of 1 cubic foot flowing every second. The amount of cubic feet of water that passes a specific point on the river in 1 second.

Cultural resources—The present expressions of human culture and the physical remains of past activities, such as historic buildings, structures, objects, districts, landscapes, and archaeological sites. These resources can be significant in the context of national, regional, or local history, architecture, archaeology, engineering, or culture. They may also include sacred sites and natural features of landscapes that are significant to living communities.

Dewatering—The removal or control of groundwater or seepage from below the surface, which would occur through the relief wells.

Dichlorodiphenyldichloroethylene (4,4'-DDE)—A breakdown product of DDT (dichlorodiphenyltrichloroethane), a synthetic pesticide once widely used for agricultural purposes and in malaria control. DDT itself is a persistent organic pollutant that can accumulate in the environment and in living organisms, including humans.

Distinct population segment (DPS)—Under the Endangered Species Act, a vertebrate population or group of populations that is discrete from other populations of the species and is significant in relation to the entire species.

Easement—Conveys a possessory interest (control of property without ownership) in real property.

Evolutionarily significant unit (ESU)—A distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout that is uniquely adapted to a particular area or environment and cannot be replaced.

Fire frequency—A general term referring to the recurrence of fire in a given area over time. It is sometimes stated as number of fires per unit of time in a designated area. It is also used to refer to the probability of an element burning per unit of time.

Fugitive dust—Airborne particles emitted from any source other than through a stack or vent.

Hazardous materials/hazardous substances—The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 102(a) authorizes the Environmental Protection Agency to designate as hazardous and assign reportable quantities to those substances that, when released into the environment, may present substantial danger to the public health or welfare or the environment.

Historic built environment—Buildings, structures, objects, districts, and linear features, such as roads, trails, and irrigation ditches, that are at least 50 years old.

Historic property—A cultural resource, such as a historic building, structure, object, district, or archaeological site, that is listed on, or eligible for listing on, the National Register of Historic Places.

Impervious Surfaces—These are artificial structures such as pavement and concrete that are water resistant and do not allow water to seep into the ground.

Indian Trust Asset (ITAs)—Legal interests in property held in trust by the U.S. for Indian Tribes or individuals. ITAs include trust lands, natural resources, trust funds, or other assets held by the federal government in trust. An ITA has three components: (1) the trustee, (2) the beneficiary, and (3) the trust asset.

Key observation point—One or a series of points on a travel route or at a use area (or a potential use area) where the view of a management activity would be most revealing.

Level of service (LOS)—A metric that describes the operating conditions of a roadway based on factors such as the physical roadway capacity, speed, maneuverability, safety, and traffic volume.

Listed species—Any species of fish, wildlife or plant which has been determined to be endangered or threatened under section 4 of the Endangered Species Act [50 CFR Section 402.02].

Liquefaction—A process that occurs when loosely packed, water-logged sediments at or near the ground lose their strength in response to strong ground shaking.

National Register of Historic Places (NRHP)—A listing of resources that are considered significant at the national, state, or local level and that have been found to meet specific criteria of historic significance, integrity, and age.

Ordinary high water line (OHWL)—"The mark on the shores of all water that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so

common and usual, and so long continued in ordinary years as to mark upon the soil or vegetation a character distinct from the abutting upland. Provided, that in any area where the ordinary high water line cannot be found, the ordinary high water line adjoining saltwater is the line of mean higher high water and the ordinary high water line adjoining freshwater is the elevation of the mean annual flood." (WAC 220-660-030). Also see *Ordinary high water mark*.

Ordinary high water mark (OHWM)—"That line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." (33 CFR 328.3(e)). Also see *Ordinary high water line*.

Outlet works—The essential structures and equipment in dams used to control the release of water from the reservoir.

Redd—A gravel nest, or spawning bed, constructed by female salmon (and other trout species) to lay and incubate their eggs.

Release—CERCLA Section 101(22) defines "release" as any "… spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance or pollutant or contaminant)...".

Sacred site—Executive Order 13007, Indian Sacred Sites defines an Indian sacred site as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian Tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion."

Scenic quality—The relative worth of a landscape from a visual perception point of view.

Section 7—The section of the ESA of 1973, as amended, outlining procedures for interagency cooperation to conserve federally-listed species and designated critical habitats. Section 7(a)(1) requires federal agencies to use their authorities to further the conservation of listed species. Section 7(a)(2) requires federal agencies to consult with the USFWS and NMFS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat.

Stormwater—Consists of water that originates from precipitation, such as heavy rain or snow.

Traditional cultural property (TCP)—Ethnographic resources, such as sacred sites, that are associated with the cultural practices of a living community and that meet the criteria for listing on the NRHP.

Tribal Historic Preservation Officer (THPO)—Tribal official who must be consulted on National Historic Preservation Act and Native American Graves Protection and Repatriation Act issues.

Unwatering— The process used to remove ponded or flowing surface water that is already present within an area.

Viewshed—The landscape that can be directly seen under favorable atmospheric conditions, from a viewpoint or along a transportation corridor.

Visual resources—The visible physical features on a landscape (for example, land, water, vegetation, animals, structures, and other features).

Appendix A

Maps

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Appendix A. Maps

Map List

1-1 Project Area – Overview
2-1 No Action – Overview
2-2 Alternative B – Overview
2-3 Alternative B – Surface Disturbance
2-4 Alternative B – Dam Site
2-5 Alternative C – Overview
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3-5 Cultural Resources and Tribal Interests Area of Potential Effects
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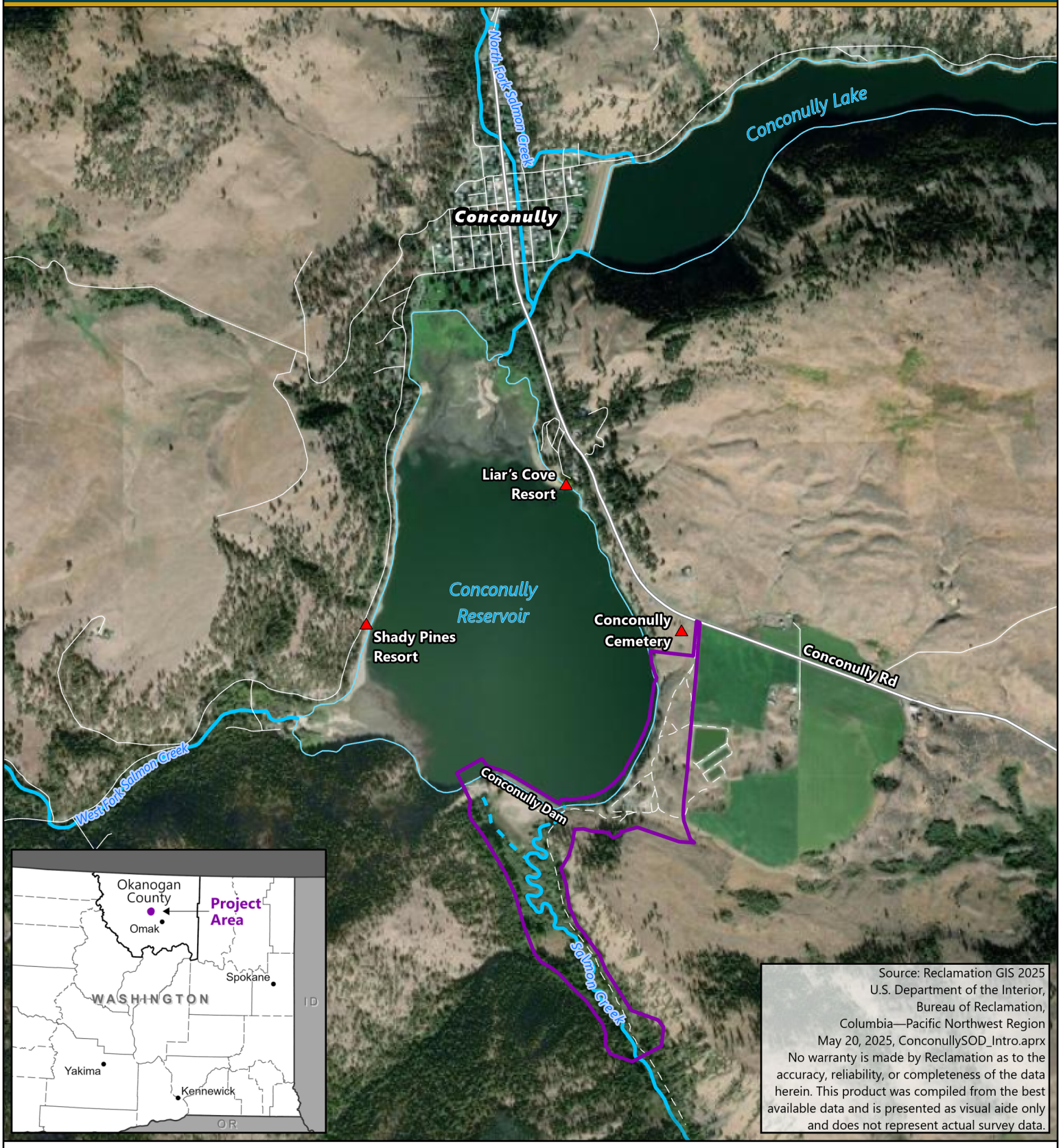

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Map 1-1. Project Area – Overview

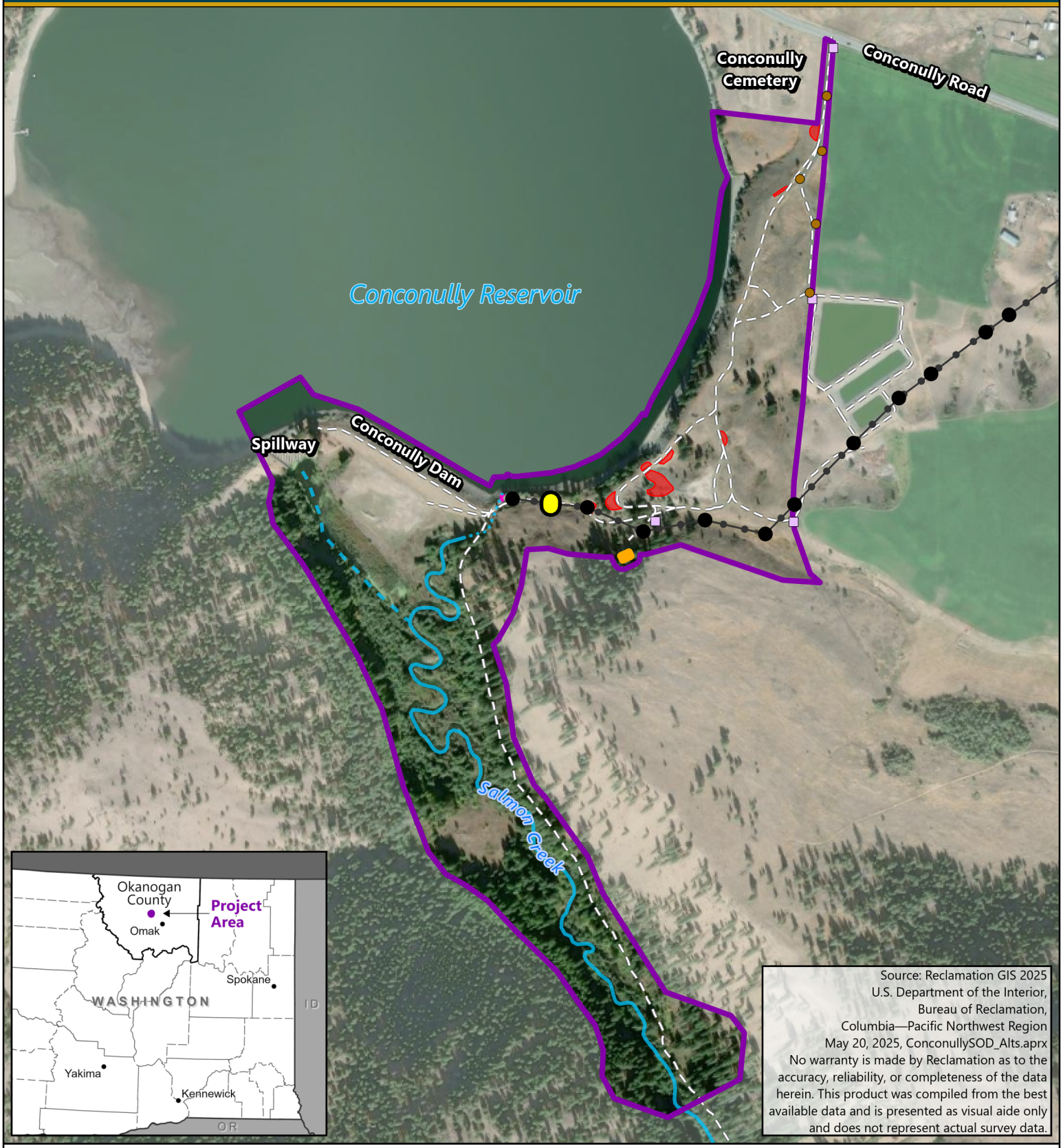
Project Area
Point of Interest
Outlet Works Tunnel
Roads
Spillway Channel
Stream

N

0 0.25 0.5 Miles

CONCONULLY SAFETY OF DAMS MODIFICATION PROJECT

Environmental Assessment



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Map 2-1. No Action – Overview

- Project Area
- Telephone Box
- Utility Pole
- Sewer Manhole
- Electrical Line
- Permanent Security Gate
- Roads
- Control House and Gate House
- Dispersed Parking
- Cabin
- Outlet Works Tunnel
- Spillway Channel
- Stream

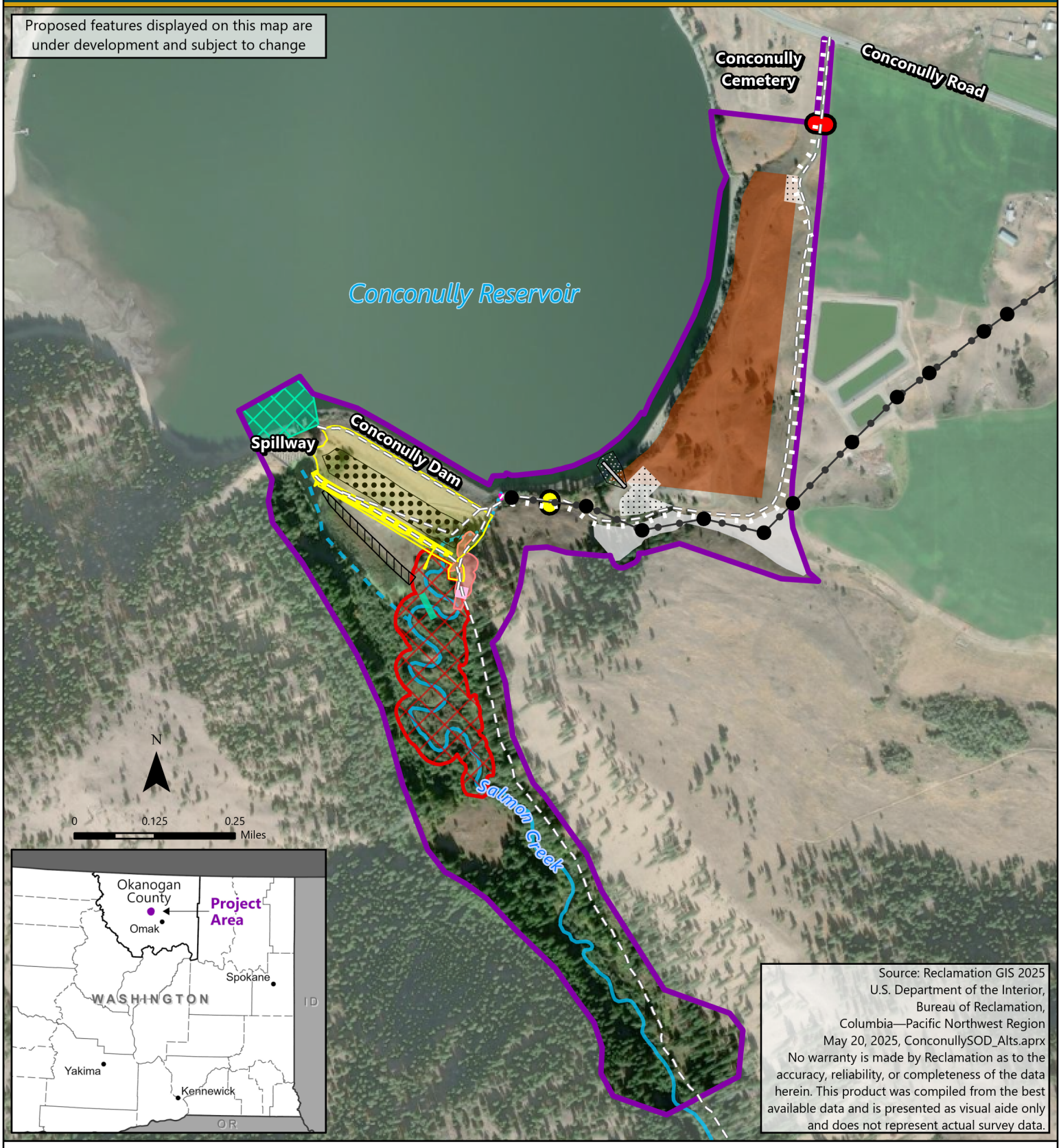
N

0 0.125 0.25 Miles

— BUREAU OF —
RECLAMATION

CONCONULLY SAFETY OF DAMS MODIFICATION PROJECT

Environmental Assessment



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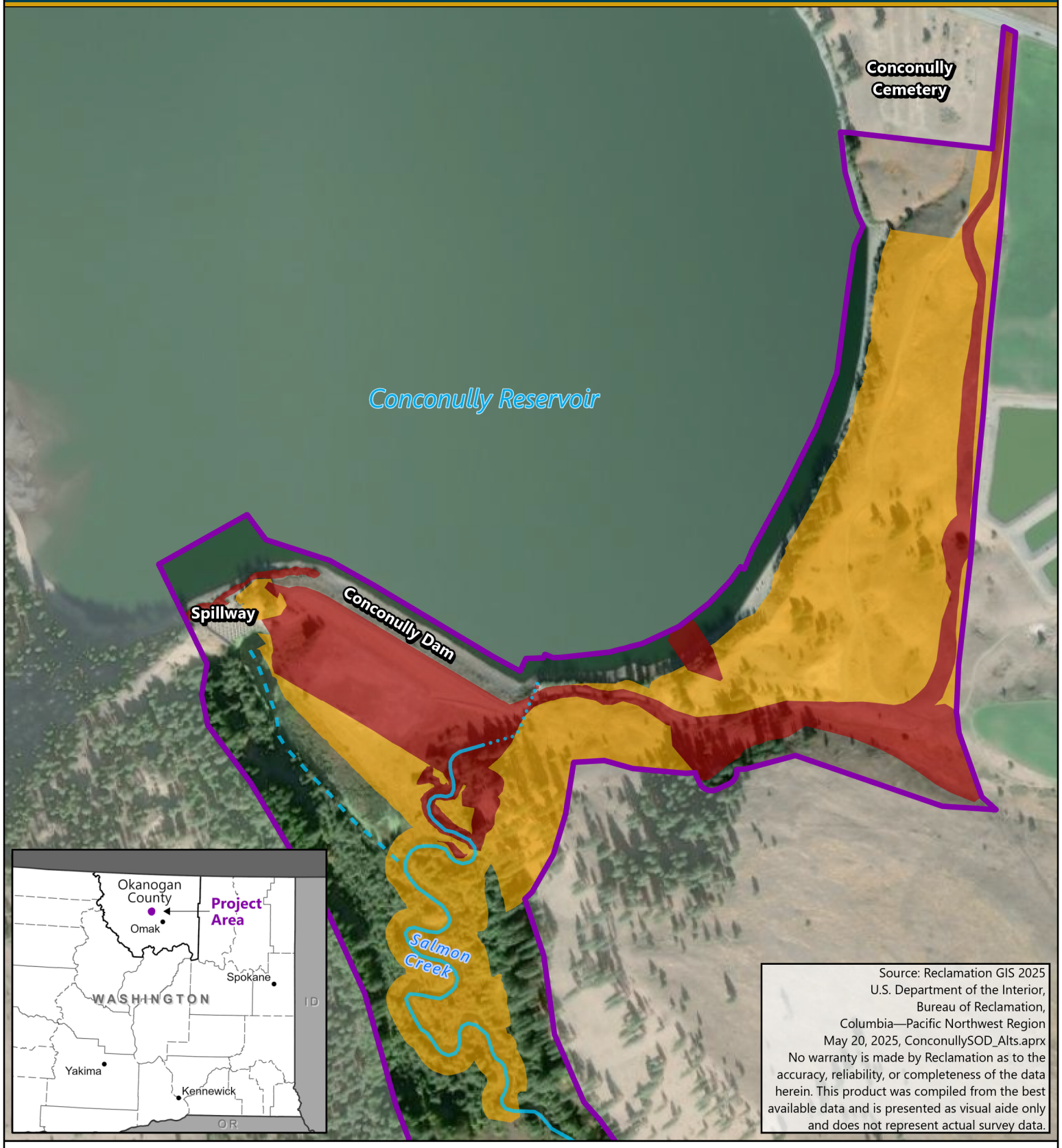
Map 2-2. Alternative B – Overview

- Project Area
- Utility Pole
- Electrical Line
- Permanent Security Gate
- Temporary Security Gate
- Roads
- Fiber Optic Cable
- Control House and Gate House
- Valve House
- Stability Berm
- Administrative/Storage/ Staging Area
- Boat Ramp
- Boat Ramp Excavation and Fill
- Parking Area
- Borrow Area
- Cofferdam
- Spillway Pump Area
- Outlet Works
- Relief Wells
- Toe Drain
- Deep Soil Mixing Foundation
- Mitigation Area
- Outlet Works Tunnel
- Spillway Channel
- Stream



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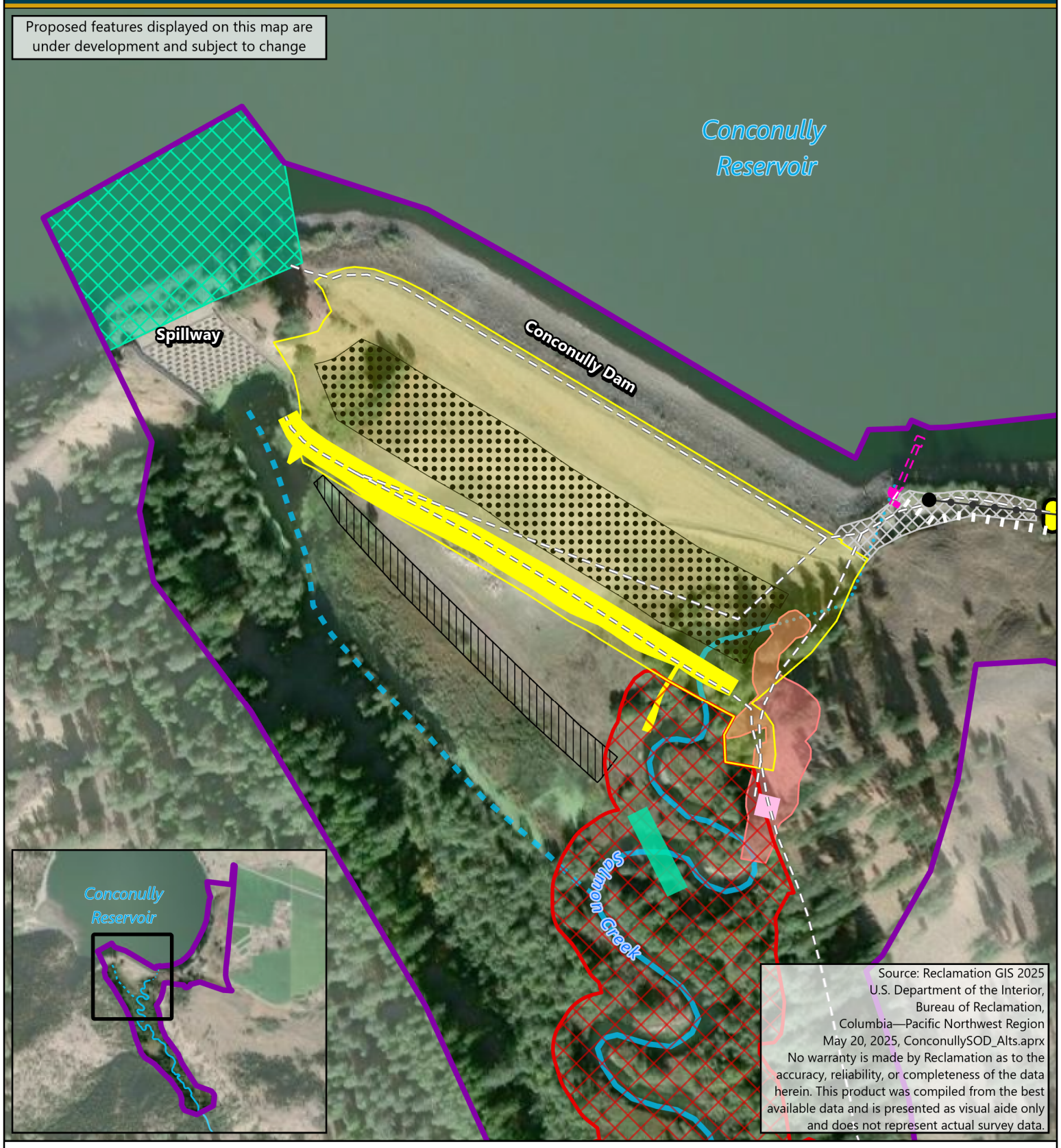
Map 2-3. Alternative B – Surface Disturbance

Project Area
Disturbance
Permanent
Short-term
Outlet Works Tunnel
Spillway Channel
Stream

N

0 0.125 0.25 Miles

Proposed features displayed on this map are under development and subject to change



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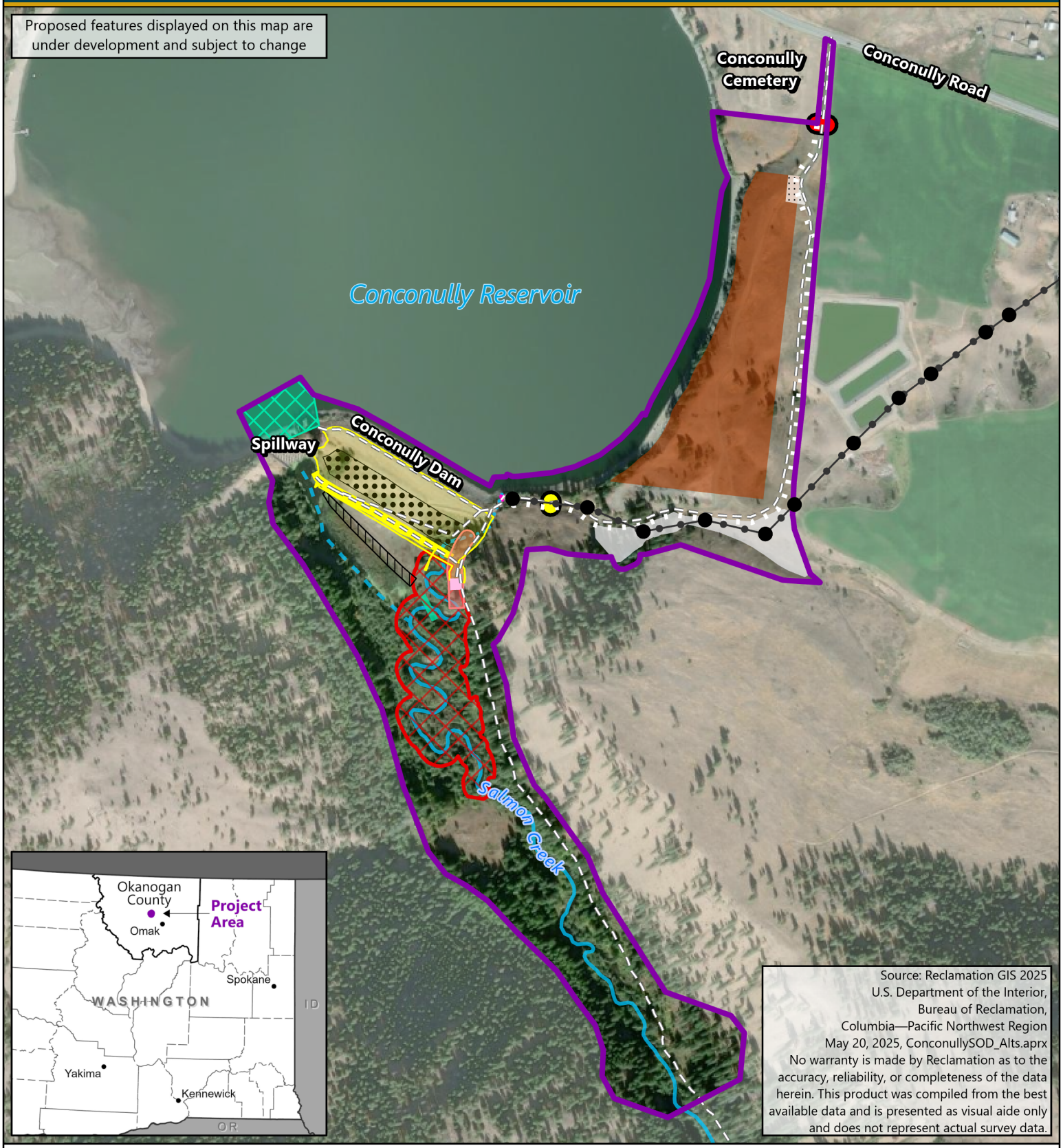
Map 2-4. Alternative B – Dam Site

- Project Area
- Utility Pole
- Electrical Line
- Permanent Security Gate
- Roads
- Fiber Optic Cable
- Control House and Gate House
- Intake Structure
- Valve House
- Stability Berm
- Cofferdam
- Spillway Pump Area
- Outlet Works
- Relief Wells
- Toe Drain
- Deep Soil Mixing Foundation
- Mitigation Area
- Intake Bulkhead Crane Area
- Outlet Works Tunnel
- Spillway Channel
- Stream

N

0 100 200 Feet

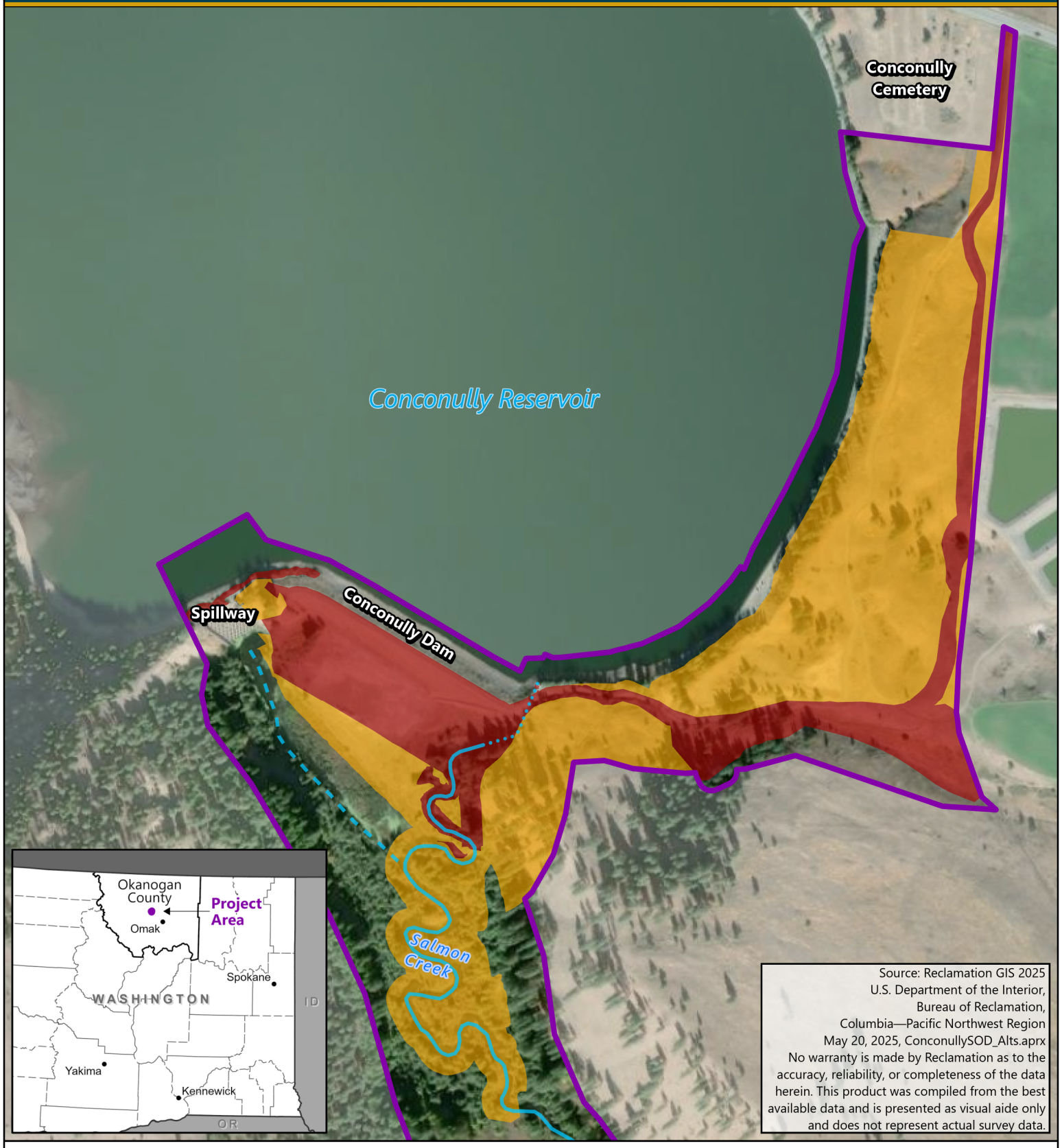


Map 2-5. Alternative C — Overview

- Project Area
- Utility Pole
- Electrical Line
- Permanent Security Gate
- Temporary Security Gate
- Roads
- Fiber Optic Cable
- Control House and Gate House
- Valve House
- Stability Berm
- Administrative/Storage/ Staging Area
- Parking Area
- Spillway Pump Area
- Outlet Works
- Relief Wells
- Toe Drain
- Deep Soil Mixing Foundation
- Mitigation Area
- Borrow Area
- Cofferdam
- Outlet Works Tunnel
- Spillway Channel
- Stream

N

0 0.125 0.25 Miles



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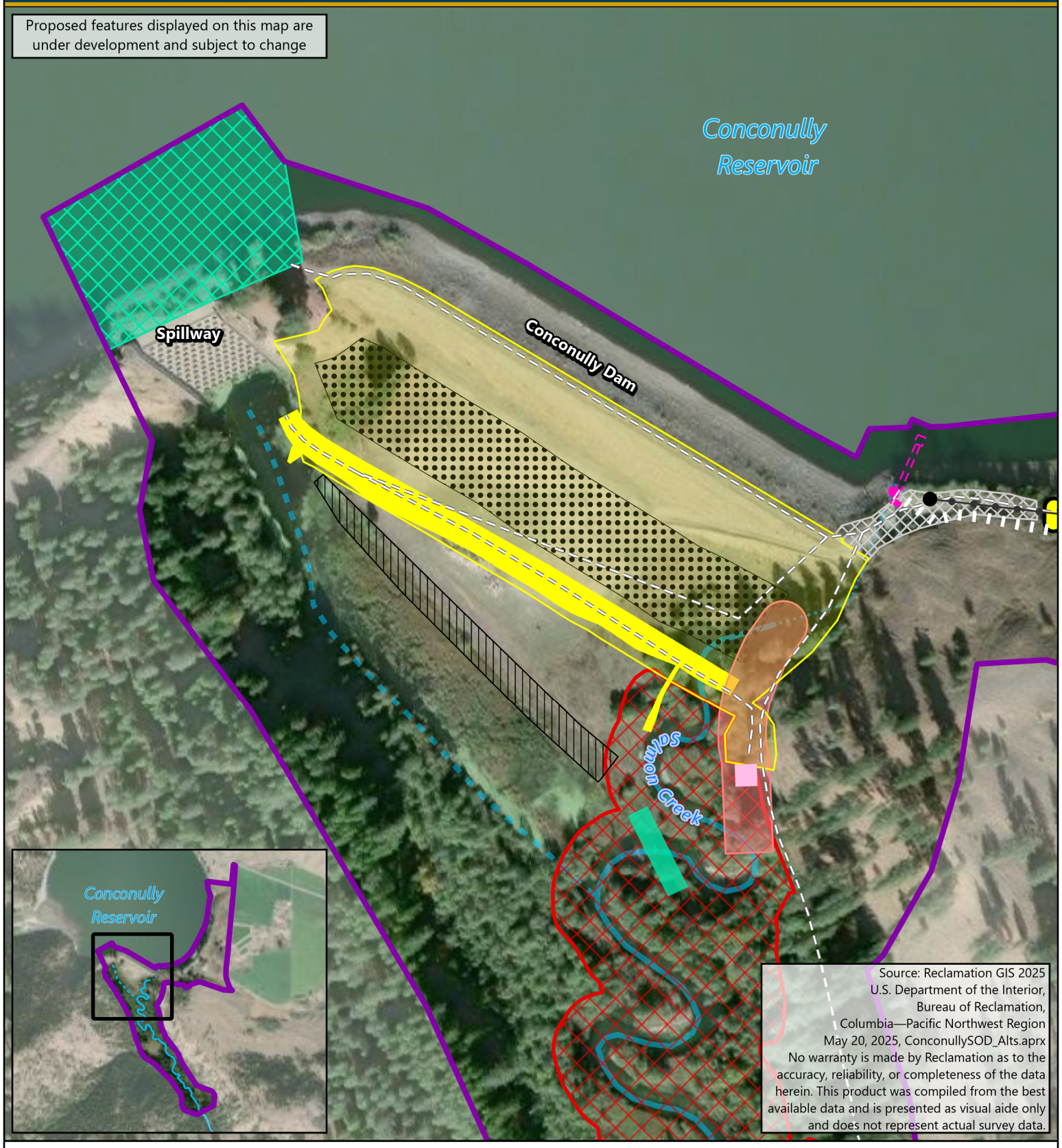
Map 2-6. Alternative C – Surface Disturbance

Project Area
Disturbance
Permanent
Short-term
Outlet Works Tunnel
Spillway Channel
Stream

N

0 0.125 0.25 Miles

Proposed features displayed on this map are under development and subject to change



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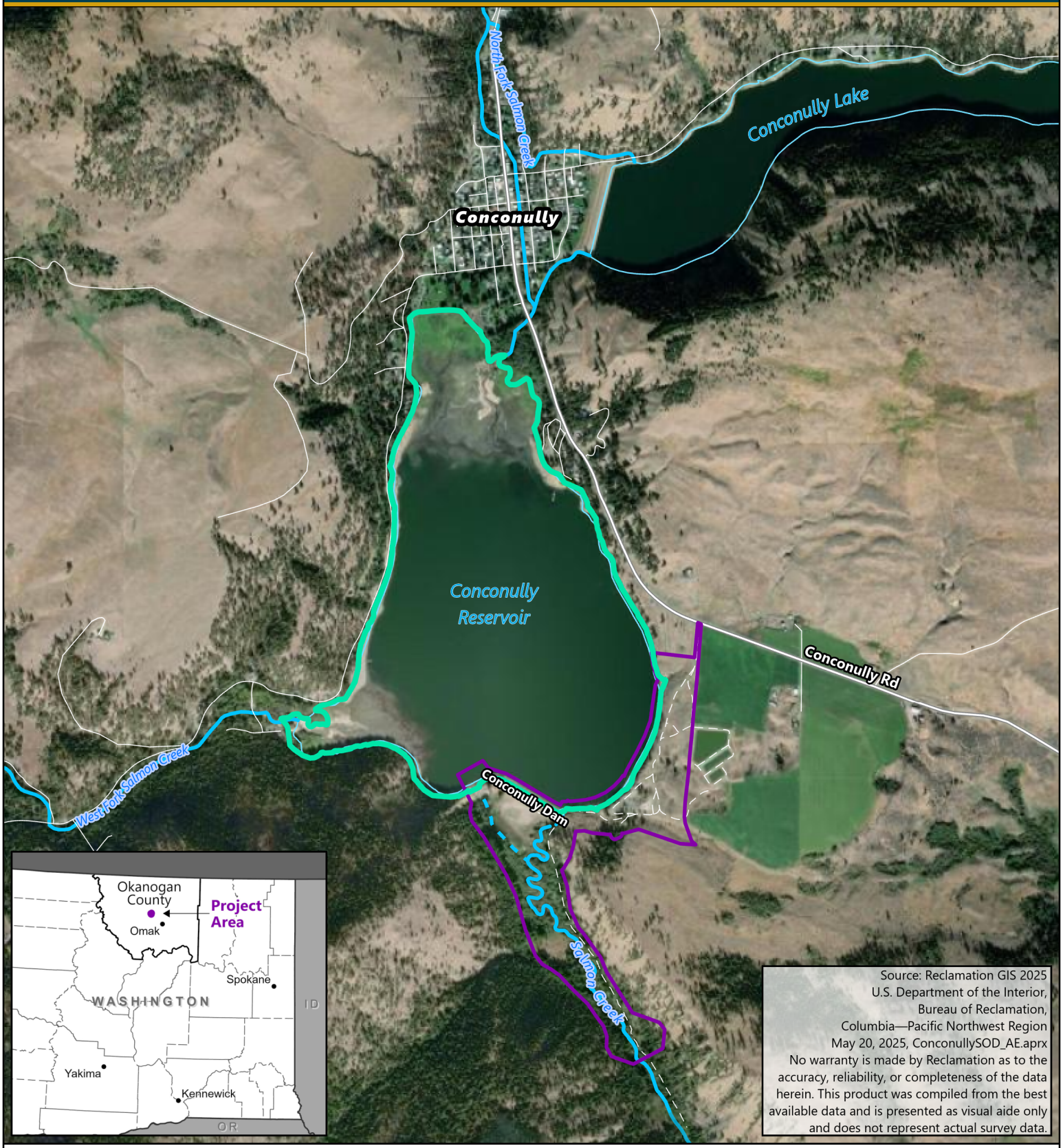
Map 2-7. Alternative C – Dam Site

- Project Area
- Utility Pole
- Electrical Line
- Permanent Security Gate
- Roads
- Fiber Optic Cable
- Control House and Gate House
- Intake Structure
- Valve House
- Stability Berm
- Cofferdam
- Spillway Pump Area
- Outlet Works
- Relief Wells
- Toe Drain
- Deep Soil Mixing Foundation
- Mitigation Area
- Intake Bulkhead Crane Area
- Outlet Works Tunnel
- Spillway Channel
- Stream

N

0 100 200 Feet



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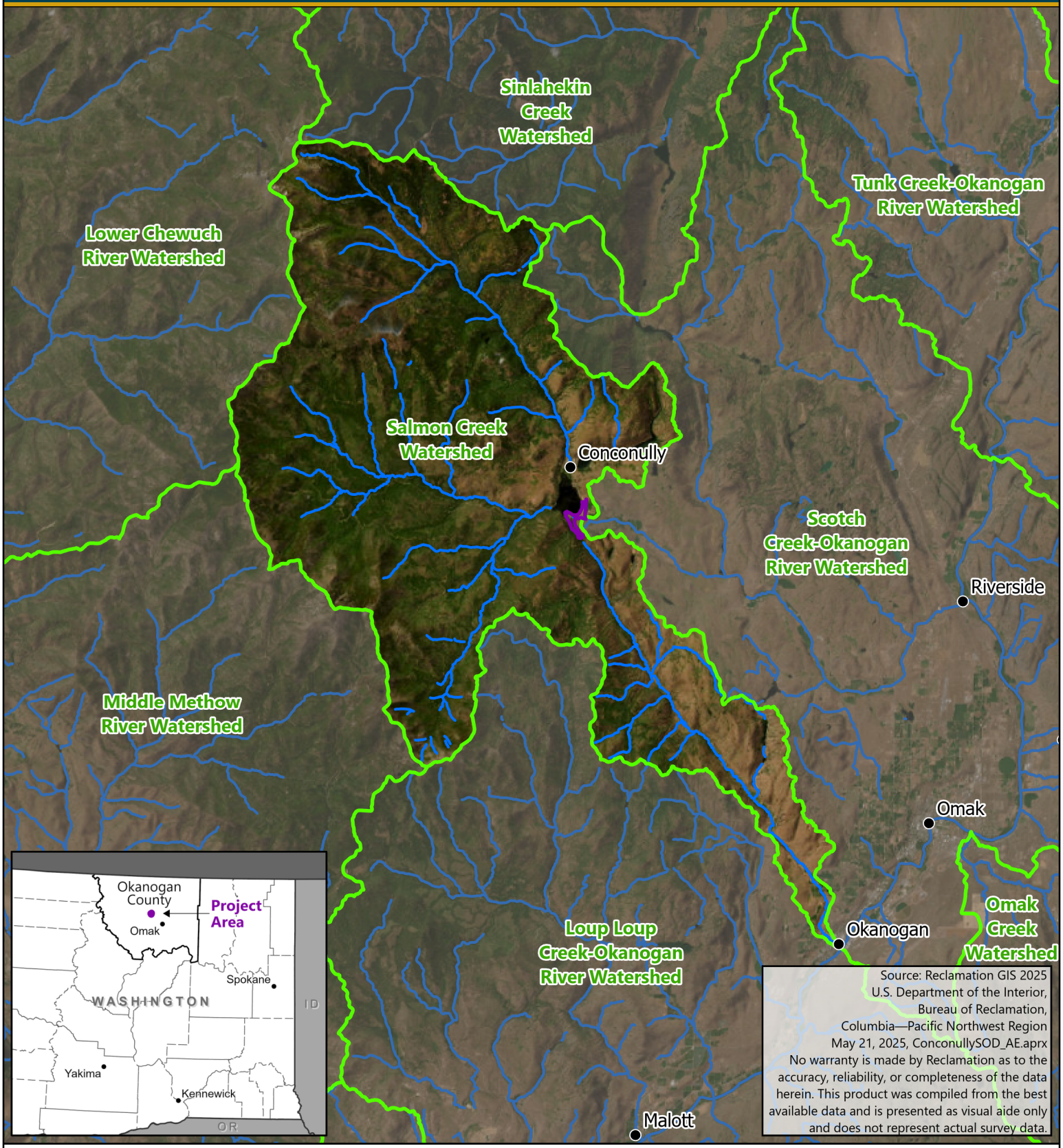
Map 3-1. Ordinary High Water Mark

Project Area
Ordinary High Water Mark
Roads
Outlet Works Tunnel
Spillway Channel
Stream

N

0 0.25 0.5 Miles

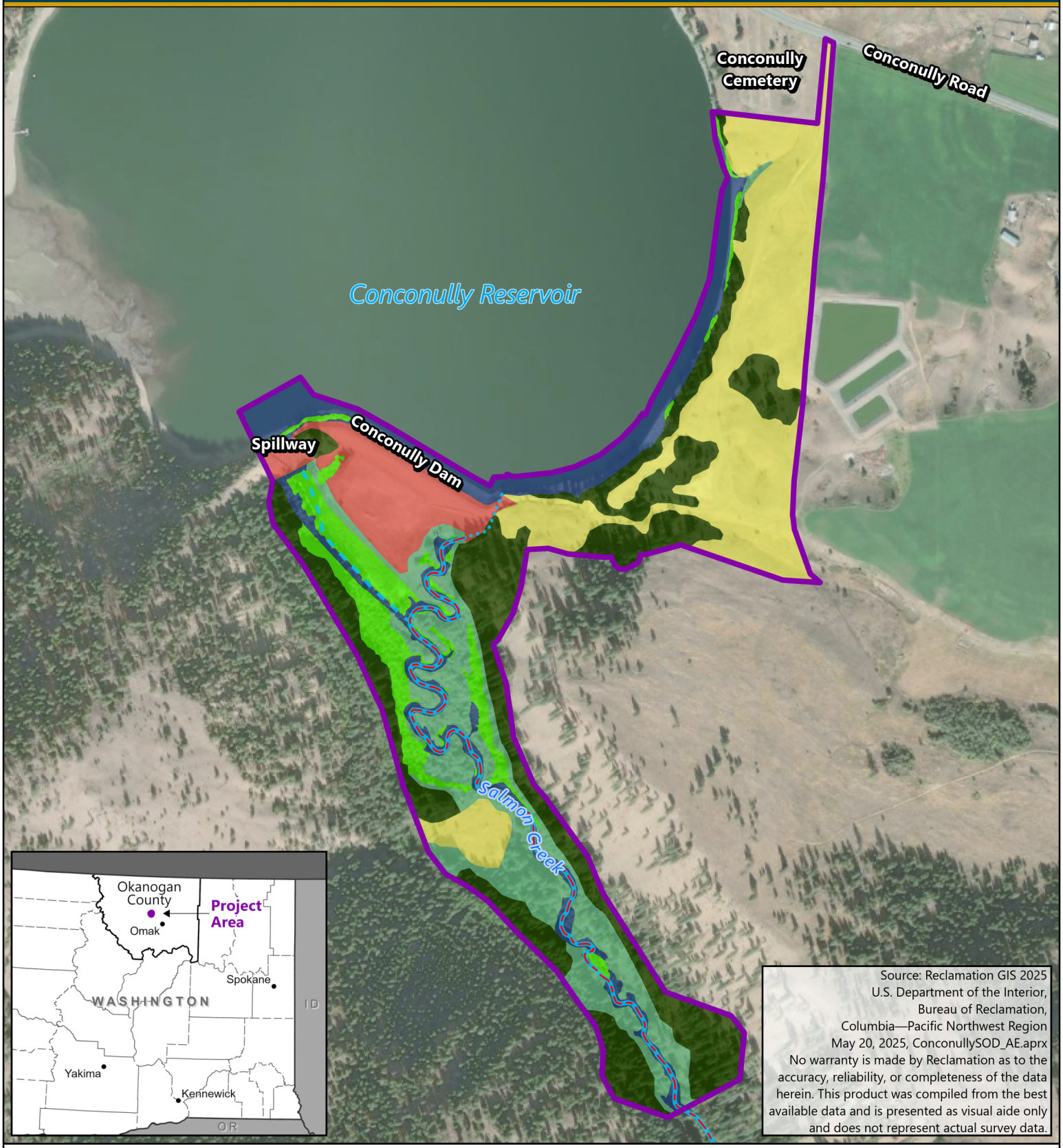


Map 3-2. Salmon Creek Watershed

Project Area
Town
River
HUC10 Watershed

N

0 5 10 Miles



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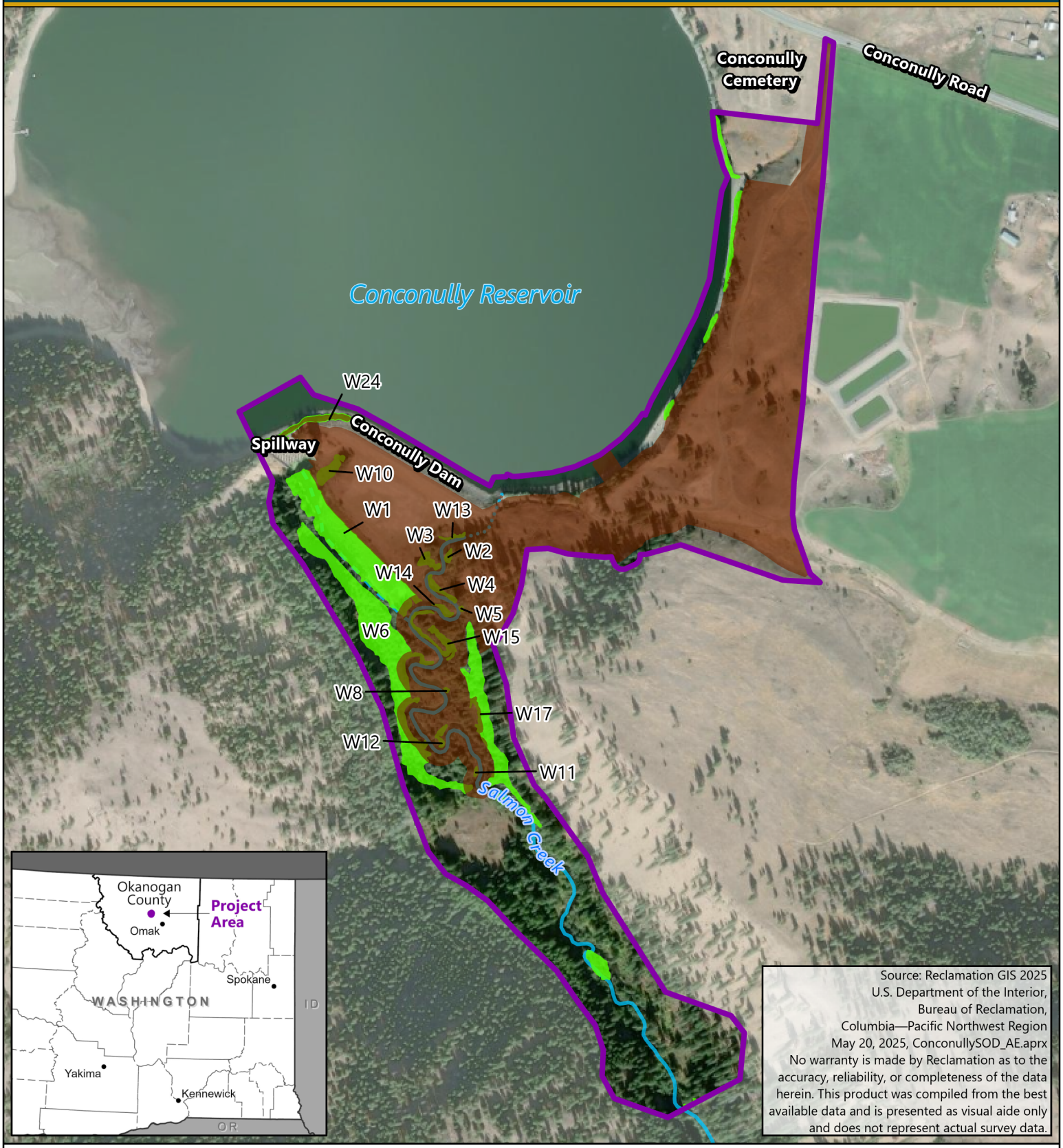
Map 3-3. Aquatic Critical Habitat and General Vegetation Cover Types

- Project Area
- Steelhead critical habitat*
- Forests
- Shrublands
- Non-wetland riparian communities
- Wetlands
- Developed areas
- Open Water
- Outlet Works Tunnel
- Spillway Channel
- Stream

N

0 0.125 0.25 Miles

*NOAA's published GIS data on critical habitat does not match the critical habitat displayed due to scale differences.



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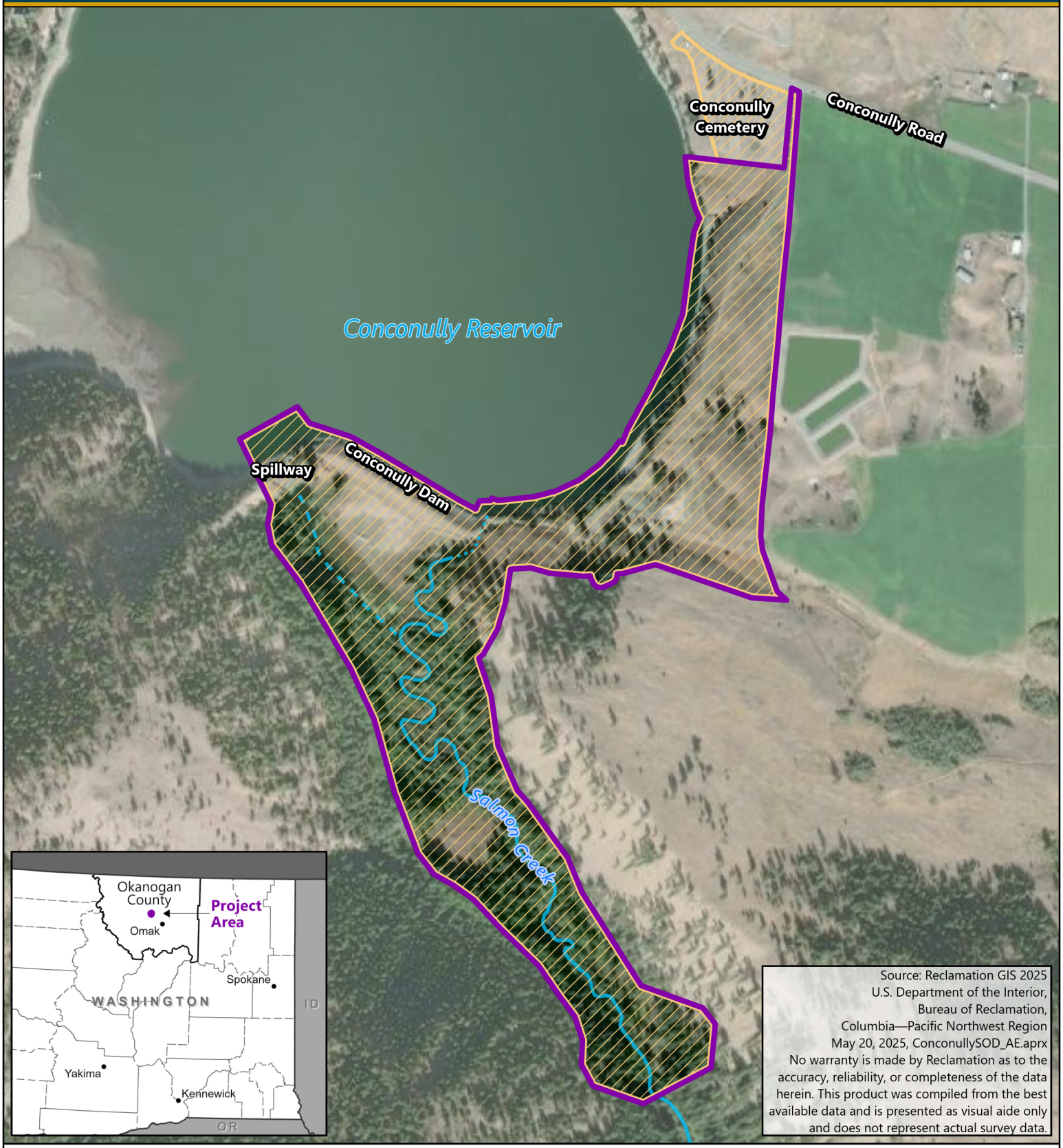
Map 3-4. Delineated Wetlands Impacted by Surface Disturbance

- Project Area
- Undisturbed Wetland
- Disturbed Wetland
- Surface Disturbance
- Outlet Works Tunnel
- Spillway Channel
- Stream

N

0 0.125 0.25 Miles



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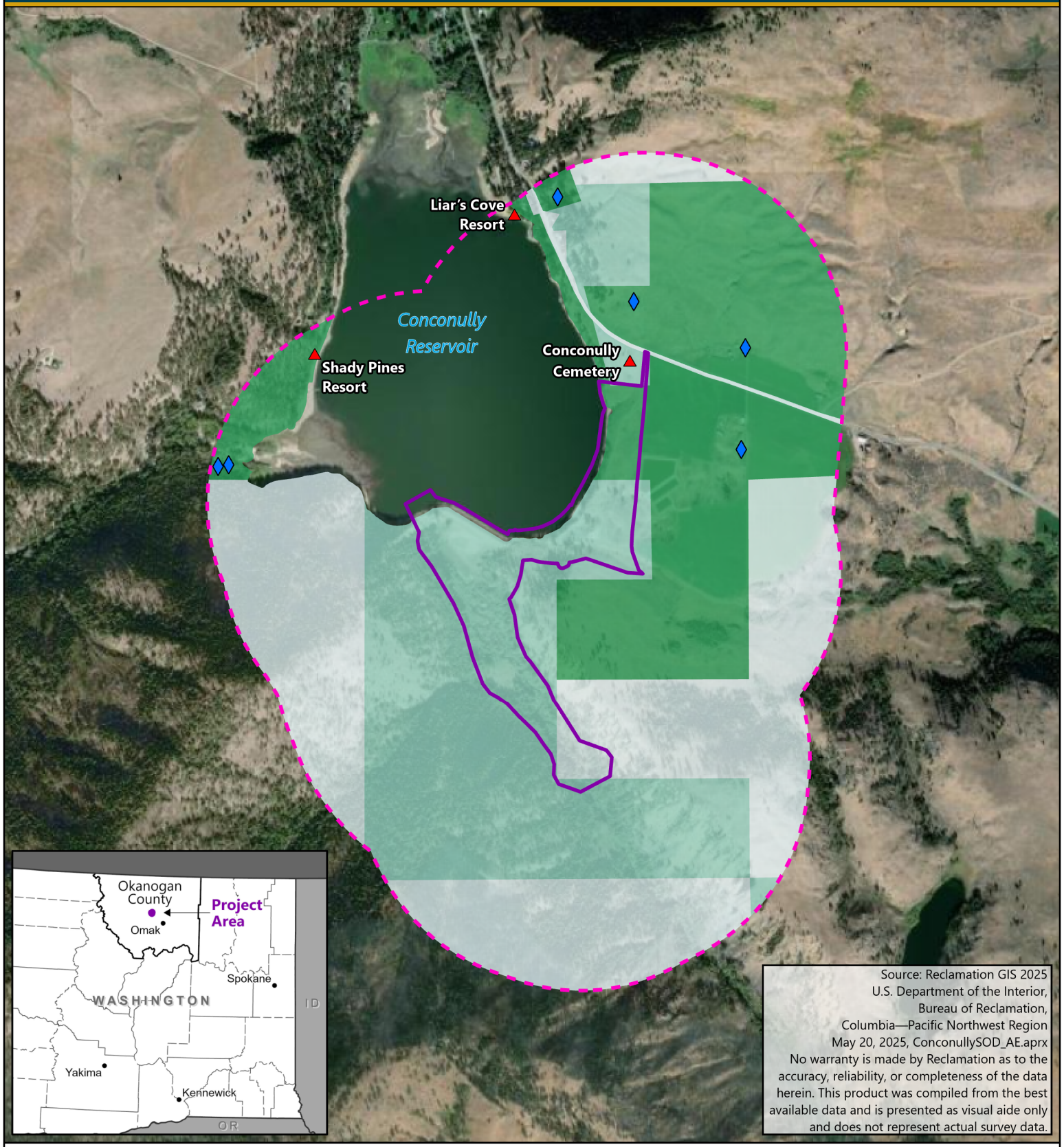
Map 3-5. Cultural Resources and Tribal Interests Area of Potential Effects

Project Area
Area of Potential Effects
Outlet Works Tunnel
Spillway Channel
Stream

N

0 0.125 0.25 Miles



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Map 3-6. Noise Analysis Area

- Project Area
- Point of Interest
- Residence
- Noise Analysis Area
- EDNA Class A
- EDNA Class B
- EDNA Class C

N

0 0.25 0.5 Miles

Appendix B

Laws, Regulations, and Policies

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Appendix B. Laws, Regulations, and Policies

This appendix summarizes the federal, state, and local laws, regulations, statutes, and policies that apply to the resources evaluated in this Environmental Assessment. The applicable federal requirements are presented below, and state and local regulations are incorporated where relevant.

B.1 Federal Statutes, Regulations, and Orders

- **Archaeological Resources Protection Act of 1979, as amended (16 United States Code [U.S.C.] §§ 470aa–470mm with accompanying regulations at 43 Code of Federal Regulations [CFR] Part 7)**: Provides archeologists and law enforcement with tools to protect archeological resources on public lands and Indian lands.
- **Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668–668d with accompanying regulations at 50 CFR Part 22)**: Prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts (including feathers), nests, or eggs.
- **Clean Air Act of 1963, as amended (42 U.S.C. §§ 7401 – 7671q)**: Comprehensive federal law that regulates air emissions from stationary and mobile sources. Among other aspects, this law authorizes the Environmental Protection Agency to establish National Ambient Air Quality Standards to protect public health and public welfare and to regulate emissions of hazardous air pollutants.
- **Clean Water Act of 1972, as amended (33 U.S.C. §§ 1251–1387)**: Establishes the basic structure for regulating discharges of pollutants into the waters of the United States (U.S.) and regulating quality standards for surface waters. Under the Act, it is unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. Point sources are discrete conveyances, such as pipes or man-made ditches. Section 404 prohibits the discharge of dredged or fill material, including soils, into waters of the U.S.
- **Endangered Species Act, as amended (16 U.S.C. §§ 1531-1544)**: Developed to conserve species determined to be at risk of extinction. Made it illegal to kill, harm, or harass animals or plants listed as threatened or endangered. Requires designation of critical habitat for each listed species; this habitat is similarly protected from destruction or adverse modification. Federal action agencies must consult with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service to mitigate project effects on Endangered Species Act-listed species.
- **Executive Order 11990—Protection of Wetlands (May 24, 1977; 42 Federal Register 26961; subsequently amended)**: Requires federal agencies to avoid, to the extent possible, long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid new construction in wetlands.

- **Executive Order 13007—Indian Sacred Sites (May 24, 1996; 61 Federal Register 26771)**: Directs federal land managing agencies to promote the accommodation of access to and protect the physical integrity of American Indian sacred sites. An Indian Tribe or an Indian individual determined to be an appropriately authoritative representative must identify a site as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion.
- **Executive Order 13175—Consultation and Coordination with Indian Tribal Governments (November 6, 2000; 65 Federal Register 67249)**: The U.S. has an Indian trust responsibility to protect and maintain rights reserved by or granted to Indian Tribes or Indian individuals by treaties, statutes, and Executive Orders. These rights are sometimes further interpreted through court decisions and regulations. This trust responsibility requires that officials from federal agencies, including Reclamation, consult with Tribal governments and take all actions reasonably necessary to protect ITAs when administering programs under their control.
- **Federal Water Project Recreation Act of 1965 (16 U.S.C.s §§ 460l-12 - 460l-21)**: Allows Reclamation to seek qualified non-federal government partners to manage recreation at its water projects through a management agreement and to cost share in planning, developing, operating, and maintaining the leased areas. It also allows Reclamation to transfer recreation and other land management responsibilities to another federal agency if such lands are included or proposed for inclusion within a national recreation area, or are appropriate for administration by another federal agency as part of the national forest system, as a part of the public lands classified for retention in federal ownership, or in connection with an authorized federal program for the conservation and development of fish and wildlife.
- **Fish and Wildlife Coordination Act (16 U.S.C. §§ 661-666(e))**: Directs federal agencies to investigate and report on proposed actions that affect any stream or other body of water; provide recommendations to minimize impacts on fish and wildlife resources; and ensure that fish and wildlife resources receive equal considerations of other project features.
- **Joint Secretarial Order 3403—Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters (November 15, 2021)**: Directs the Departments of the Interior and Agriculture to manage federal lands and waters in a manner that seeks to protect the treaty, religious, subsistence, and cultural interests of federally-recognized Indian Tribes, including the Native Hawaiian Community; ensures that such management is consistent with the nation-to-nation relationship between the U.S. and federally recognized Indian Tribes; and fulfills the U.S.' unique trust obligation to federally-recognized Indian Tribes and their citizens.
- **Migratory Bird Treaty Act (16 U.S.C. §§ 703-712)**: Protects nearly all native birds, including eggs and nests, in the U.S. and Canada from being killed, captured, sold, traded, or transported without prior authorization from the U.S. Fish and Wildlife Service.
- **Native American Graves Protection and Repatriation Act (25 U.S.C. § 3001, et seq. with accompanying regulations at 43 C.F.R. Part 10)**: Protects and returns Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony to their appropriate lineal descendants, Indian Tribes, and Native Hawaiian organizations. It requires federal agencies and institutions that receive federal funds (including museums, universities, state agencies, and local governments) to repatriate or transfer these cultural items.

- **National Environmental Policy Act of 1969, as amended (42 U.S.C. § 4321, et seq. and implemented at 43 CFR Part 46 by the Department of the Interior)**: Requires federal agencies to assess the environmental impacts of proposed major federal actions prior to making decisions.
- **National Historic Preservation Act of 1966 (NHPA), as amended (16 U.S.C. § 470, et seq. with implementing regulations at 36 CFR Part 800)**: Protects historic and archaeological sites across the U.S, while establishing the National Register of Historic Places and the Advisory Council on Historic Preservation. A key component of the act, Section 106, requires federal agencies to consult with relevant state historic preservation officers and tribal historic preservation officers prior to undertakings that could affect properties on or eligible for the National Register of Historic Places and, as a part of those consultations, to provide adequate mitigation.
- **National Register of Historic Places implementing regulations (36 CFR 60 and 36 CFR 63) authorized under the NHPA of 1966**: The processes for determining the official list of sites, buildings, structures, districts, and objects deemed worthy of preservation for their historical significance.
- **Noise Control Act of 1972 (42 U.S.C. § 4901 et seq.)**: Establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. The Act also serves to establish a means for effective coordination of federal research and activities in noise control, authorize the establishment of federal noise emission standards for products distributed in commerce, and provide information to the public respecting the noise emission and noise reduction characteristics of such products. While primary responsibility for control of noise rests with state and local governments, federal action is essential to deal with major noise sources in commerce, control of which require national uniformity of treatment.
- **Public Conduct on Bureau of Reclamation Facilities, Lands, and Waterbodies (43 CFR Part 423)**: Maintains law and order and protects persons and property within Reclamation projects and on Reclamation facilities, lands, and waterbodies.
- **Reclamation Act of 1902 (Public Law 57–161)**: Authorizes the federal government to construct irrigation projects in the arid and semi-arid western states and serves as a foundational law for all Reclamation projects.
- **Reclamation Project Act of 1939, as amended (43 U.S.C. § 485, et seq.)**: A fundamental law for establishing the authority of the Secretary of the Interior on Reclamation projects. It also provides a revised and comprehensive approach to address repayment issues for Reclamation projects.
- **Reclamation Reform Act of 1982 (Public Law 97-293)**: Modernizes U.S. federal reclamation law by increasing land ownership entitlements and introducing full-cost pricing for irrigation water. It raised the acreage limitation for landowners benefiting from federally subsidized irrigation and established pricing restrictions to ensure fair water distribution. The Act aims to prevent speculation and promote sustainable agricultural development in arid regions. It only affects projects that have entered into a qualifying agreement since the Act's inception.

- **Resource Conservation and Recovery Act (42 U.S.C. § 6901, et seq.)**: Controls hazardous waste from cradle to grave, including the generation, transportation, treatment, storage, and disposal of hazardous waste. The Act also sets forth a framework for the management of non-hazardous solid wastes.
- **Secretarial Order 3206—American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act (June 5, 1997)**: Clarifies the responsibilities of component agencies, bureaus, and offices of the Department of the Interior when actions are taken under the Endangered Species Act that might affect Indian lands, Tribal trust resources, or the exercise of American Indian tribal rights. It seeks to acknowledge the trust responsibility and treaty obligations of the U.S. towards Indian tribes and Tribal members as well as the government-to-government relationship when dealing with Tribes. It requires the Department of the Interior to carry out responsibilities under the Endangered Species Act in a manner that harmonizes trust responsibilities, tribal sovereignty, and statutory missions of the Departments while ensuring that Indian tribes do not bear a disproportionate burden in the conservation of listed species.
- **Spill Prevention, Control, and Countermeasure Plans (40 C.F.R. § 112.7)**: Purpose is to help facilities prevent a discharge of oil into navigable waters or adjoining shorelines. Requires facilities to develop, maintain, and implement an oil spill prevention plan to help facilities prevent oil spills, as well as control a spill should one occur.

B.2 Tribal Laws

- **Colville Tribal Law and Order Code, Chapter 4-4, Cultural Resource Protection**: Establishes the Tribe's policies and protections for cultural resources under Colville Tribal Law.

B.3 State and Local Laws

- **State of Washington, Water Quality Standards for Surface Waters (Washington Administrative Code [WAC] 173-201A-200)**: State rules governing water quality standards that implement the Clean Water Act.
- **State of Washington, Washington Clean Air Act (Revised Code of Washington [RCW] 70.94) and General Regulations for Air Pollution Sources (WAC 173-400)**: These state laws regulate air pollution. Among other rules, they require owners and operators of fugitive dust sources to prevent fugitive dust from becoming airborne and to maintain and operate sources in a manner that minimizes emissions.
- **Okanogan County Code on Noise Disturbances (Chapter 9.16)**: The Okanogan County Code does not include quantitative noise limits. It does indicate that continuous or repetitive operation of motors and engines may constitute an unlawful public disturbance by noise. Such activities are presumed to disturb the peace when they occur between 10:30 pm and 7:00 am in a residential area or an area containing hospitals, hostelries, convalescent centers, or other places of repose. Construction noise is not specifically exempted.

- **State of Washington, Planning and Zoning Laws (RCW 36.70 – 36.70C)**: Addresses the Planning Enabling Act, Growth Management Act, local project review, and judicial review of land use decisions within Washington counties.
- **State of Washington, Roadway Construction Zone Laws (RCW 46.61.527)**: Addresses roadway construction zones in Washington state.
- **State of Washington, Public Utilities Law (RCW Title 80)**: Governs public utilities in Washington state.
- **State of Washington, Water Pollution Control Laws (RCW 90.48.080)**: Prohibits the discharge of polluting matter into waters of Washington state.
- **State of Washington, Archaeological Sites and Resources Law (RCW 27.53)**: Designates the Department of Archaeology and Historic Preservation as the State Historic Preservation Office and provides for regulations regarding archaeological and historical resources in Washington state.
- **State of Washington, Executive Order 21-02, Archaeological and Cultural Resource Policies**: Requires that state agencies take all reasonable action to avoid, minimize or mitigate adverse effects to archeological and historic archaeological sites, historic buildings/structures, traditional cultural places, sacred sites, or other cultural resources.
- **State of Washington, Human Remains Laws (RCW 68.50)**: Sets requirements for the removal and disposition of human remains.
- **State of Washington, Indian Graves and Records Laws (RCW 27.44)**: Aims to protect native Indian graves, historic graves, cairns, and glyptic markings on both public and private land.
- **State of Washington, State Environmental Policy Act (RCW Chapter 43.21C)**: Aims to promote environmental protection and encourage sustainable development. It requires state and local agencies to consider the environmental impacts of their actions, particularly for projects and decisions that could significantly affect the environment. The core purpose is to ensure that proposed actions are carefully evaluated for their potential environmental consequences before they are implemented.
- **State of Washington, Limiting Greenhouse Gas Emissions Law (RCW 70A.45)**: A state law that limits the emission of greenhouse gases to achieve the following limits for Washington state:
    - By 2020, reduce overall emissions of greenhouse gases in the State to 1990 levels;
    - By 2035, reduce overall emissions of greenhouse gases in the State to 25 percent below 1990 levels;
    - By 2050, reduce overall emissions of greenhouse gases to 50 percent below 1990 levels or 70 percent below the State's projected emissions that year.
- **State of Washington, Maximum Environmental Noise Levels Law (WAC Chapter 173-60)**: Regulates maximum allowable noise levels using different limits for receiving lands of differing noise sensitivity. This section of the WAC establishes different noise limits depending

on the Environmental Designation for Noise Abatement (EDNA) of the noise source and the noise receiver.

- **State of Washington, Endangered Species Law (WAC 220-610-110)**: Enables wildlife species to be listed as endangered or threatened on the state list upon review of documented and verifiable scientific information.
- **State of Washington, Land Use Elements Law (WAC 365-196-405)**: Outlines requirements for the land use element in comprehensive plans, including provisions for rural and other land uses.

B.4 Other Relevant Policies

- **Comprehensive Emergency Management Plan**: A county-level policy document that establishes responsibilities for Okanogan County agencies and organizations for emergency preparedness, response, recovery, and mitigation.
- **Okanogan County Comprehensive Plan (2021) – Recreation Element**: A policy document adopted by the Okanogan County Board of Commissioners that outlines recreation goals and objectives, establishes a vision for countywide outdoor recreation, and provides guidance for future land-use and facility decisions.
- **Okanogan County Outdoor Recreation Plan (2020)**: A policy plan prepared by the County's Parks and Recreation Department that inventories existing recreation resources, identifies current and projected needs, and recommends prioritized actions to expand and improve trails, parks, and water-based recreation opportunities.
- **Okanogan Forest Plan, 1989**: Conconully Dam is adjacent to the Okanogan National Forest. Reclamation's management of visual resources may need to align with forest management to achieve aesthetic and environmental goals. Management in the Okanogan National Forest focuses on maintaining or enhancing the visual quality of landscapes by considering scenic beauty and natural aesthetics. For Reclamation, this alignment could involve designing infrastructure that integrates with the natural landscape, using colors, textures, and designs that blend with the surroundings, and planning for reclamation and restoration post-construction to mitigate visual impacts.
- **State of Washington, Centennial Accord**: A government-to-government policy agreement between the State of Washington and federally recognized Tribes that affirms Tribal sovereignty and establishes the Governor's Office of Indian Affairs.
- **Scotch Creek and Sinlahekin Wildlife Areas Management Plan (2017)**: A policy-level management document prepared by the Washington Department of Fish and Wildlife that outlines recreation and public-use objectives, including permitted activities, seasonal access restrictions, habitat-protection measures, and stakeholder engagement processes designed to balance public enjoyment with conservation goals.

Appendix C

Impact Analysis Methods and Summary

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Appendix C. Impact Analysis Methods and Summary

C.1 Impact Analysis Methodology

This EA describes existing physical, biological, social, and cultural resources that could be affected by the No Action alternative and the action alternatives. It also identifies potential environmental consequences—beneficial or adverse—to those resources that could result from implementing any of the three alternatives. Potential impacts are described in terms of duration, intensity, type and context

For the purposes of this analysis, impact duration is defined as follows:

- Temporary: impacts that would only occur during the entire duration of the construction period
- Short-term: impacts that would occur for up to 10 years post-construction.
- Permanent: impacts that would occur for 10 years or longer.

For the purposes of this analysis, impact intensity is defined as follows:

- Negligible: changes would not be detectable or measurable. The resource topic would be essentially unchanged or unaltered.
- Minor: changes would be detectable, localized, and/or measurable and would have a slight change or alteration to the resource.
- Moderate or major: changes would be clearly measurable or readily detectable, and/or have an appreciable to substantive effect on the resource or resource use. The resource or resource use would be notably to substantially changed or altered. Project activities could change the indicator over a small to large area and/or from a moderate to large degree.

For the purposes of this analysis, impact type is defined as follows:

- Adverse: impacts that would have a detrimental effect to a resource.
- Beneficial: impacts that would have a positive effect to a resource.

Context is the setting within which an impact is analyzed:

- Local: within and immediately adjacent to the project area.
- Regional: the area outside of the project area but within Okanogan County.

The 2020 amendment for updating CEQ's Procedural Provisions of NEPA (40 CFR parts 1502.15) states that "The environmental impact statement shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration, including the reasonably foreseeable environmental trends and planned actions in the area(s)." Reclamation has considered impacts that are reasonably foreseeable and have a reasonably close causal relationship to the action alternatives associated with the projects and plans listed below; impacts are discussed under the Environmental Consequences headings in Chapter 3 for applicable resources.

- The **Salmon Creek River Mile 8 Restoration Project** is located 7 miles downstream of the project area on property recently purchased by the CTCR. Bonneville Power Administration is providing funding for the project through the Columbia Basin Fish Accords. The primary objective is to restore fish habitat, while also improving migratory passage and water retention in the area. The project is in the conceptual design phase with an implementation goal of 2026 or 2027. Project objectives are likely to be accomplished with in-stream habitat structures (such as engineered log jams), floodplain engagement (such as side channel connection), and riparian area enhancement through sloping and plantings.
- The **OID Diversion River Mile 4 Project** is located 11 miles downstream of the project area. A largescale evaluation of the diversion infrastructure was completed and Reclamation, in partnership with OID and CTCR, plans to replace an inefficient aquatic resource screening operation and promote adult fish passage around the diversion facility. The objectives are to enable more reliable fish passage and reduce the stress on migrating fish traveling to upstream spawning habitat within Salmon Creek. The plan is in the conceptual phase. Since this project is still in the conceptual design stage, it is unexpected that this project will be implemented until after the action alternatives would be underway or completed.

C.2 Resource Topics Analyzed

Table C-1 identifies the presence or absence of resources or resource uses in the project area and the rationale for those that do not warrant detailed analysis in the EA. Resources or resource uses that may substantively be affected by the alternatives, or are required to be addressed by DOI regulations or Reclamation policy are further described in the EA as noted in **Table C-1**.

Table C-1. Determination and rationale for detailed analysis by resource topic

Resource Topic	Determination and Rationale for Detailed Analysis
Water Resources	See the detailed analysis in **Section 3.2**
Biological Resources	See the detailed analysis in **Section 3.3** (for Fisheries and Other Aquatic Species, Wetlands, and Terrestrial Wildlife Special Status Species) and **Appendix H** (for Vegetation and Terrestrial Wildlife)
Cultural Resources	See the detailed analysis in **Section 3.4**
Tribal Interests	See the detailed analysis in **Section 3.5**
Noise	See the detailed analysis in **Section 3.6**
Visual Resources	See the detailed analysis in **Section 3.7**
Recreation	See the detailed analysis in **Section 3.8**

Resource Topic	Determination and Rationale for Detailed Analysis
Air Quality and Climate*	Okanogan County is an area that is in attainment for all criteria air pollutants set by EPA that could result in adverse human health and environmental impacts (EPA 2025). Reclamation's 2021 SECURE Water Report projected increases in temperatures and drought occurrence, duration, and severity in the Columbia River Basin that would lead to water supply shortages and reduced reservoir levels (Reclamation 2021a). Any potential impacts under the action alternatives, such as generating fugitive dust or emitting criteria air pollutants and greenhouse gases, would be temporary in nature and only present during construction. The limited acres of surface disturbance, and localized, temporary nature of construction activities would not constitute a major portion of overall emissions in Okanogan County. Reclamation would implement BMPs (**Appendix F**) to minimize air quality impacts during construction. As a result, a detailed analysis of air quality and climate is not warranted in this EA.
Geology and Soils*	The project area contains soils highly susceptible to wind erosion, mainly within the proposed borrow area. Most of the soils in the project area are rated as having medium susceptibility to compaction and none are rated as highly susceptible to compaction. The action alternatives would reduce the likelihood of dam failure and the potential for geologic hazards to occur. Any potential impacts, such as erosion and compaction would be minor and short-term; however, BMPs would be implemented to reduce the severity of impacts (**Appendix F**). As a result, a detailed analysis of geology and soils is not warranted in this EA.
Vibration*	Humans, buildings, wildlife, and other structures can be sensitive to vibration. No major sources of vibration currently exist within the project area. Additionally, no residences, buildings, or campgrounds are within any of the distances listed for vibration impacts from construction equipment, measured from the limits of construction. As a result, a detailed analysis of vibration impacts on human receptors is not warranted in this EA. Impacts from vibration on fish and aquatic species are further discussed in **Section 3.3**.
Transportation and Traffic*	Under the action alternatives, construction traffic would lead to temporary, localized impacts on traffic levels from the movement of construction vehicles and equipment to and from the project area. Closing the dam access road during construction would temporarily prevent access to recreational use within the project area. Implementation of BMPs (**Appendix F**) would maintain the standard level of service for rural roads in Okanogan County, reduce the potential for damaged transportation infrastructure, and maintain emergency response access, which would reduce impacts to negligible levels. As a result, a detailed analysis of transportation and traffic is not warranted in this EA.

Resource Topic	Determination and Rationale for Detailed Analysis
Land Use*	Reclamation lands in the project area are managed to generally support dam and reservoir operations and do not contain existing land use designations; therefore, the action alternatives would not conflict with or result in any impacts on existing land status within the project area. The action alternatives would not result in impacts on existing adjacent land uses, would not require the federal acquisition of lands, would be consistent with local zoning, and would not affect any third-party land use authorizations. As a result, a detailed analysis of land use is not warranted in this EA.
Public Health and Safety*	The risk of dam failure associated with seismic activities would continue to pose a risk to public safety and increase over time under the No Action alternative; however, Reclamation would continue to maintain emergency operations procedures. Material samples from the dam tender house indicated that coated surfaces contained lead-based paint; however, regulations for lead removal and safe removal of lead-based paints would be followed to limit lead exposure and ensure health of construction workers. Construction activities under the action alternatives would have the potential to create temporary safety risks for work crews and increase workplace hazards, such as holes and trenches. Implementation of BMPs (**Appendix F**) and construction safety guidelines would reduce potential impacts to negligible levels. Installation of a temporary security gate during construction would restrict public access and reduce public safety risk associated with construction. As a result, a detailed analysis of public health and safety is not warranted in this EA.
Utilities and Service Systems*	Construction activities under the action alternatives would have the potential to impact utilities; however, impacts associated with construction, including use of the spillway pumps and the administrative/storage/staging area, and construction lighting would be localized, temporary, and negligible. Underground utilities would be located prior to construction to avoid damage (**Appendix F**). All electric loads, both during construction and from permanent improvements, would remain within the system's current capacity. Other utilities and service systems within the project area, including sewer, water, and trash services, would not be impacted by the action alternatives. As a result, a detailed analysis of utilities and service systems is not warranted in this EA.
Socioeconomics*	Project benefits provided by Conconully Dam and Reservoir are approximately $16.3 million yearly (in 2021 dollars). Under the No Action alternative, the risk of seismic failure would continue to threaten irrigation, recreation, and the broader local economy. The action alternatives would both reduce the risk of seismic failure and support the continued economic contributions of irrigation and recreation. Construction under the action alternatives would lead to temporary, localized impacts on recreation use and short-term impacts on federally-listed steelhead habitat, though these effects would be offset through BMPs (**Appendix F**) and aquatic and wetland habitat restoration (**Appendix G**). As a result, a detailed analysis of socioeconomics is not warranted in this EA.

*Resource Impact Analysis Memorandums for resources not analyzed in detail in the EA can be found on Reclamation's website: https://www.usbr.gov/pn/programs/sod/conconully/index.html.

C.3 Summary Comparison of Impacts

Table C-2 shows the amount of short-term and permanent surface disturbance anticipated under each alternative. **Table C-3** summarizes the impacts on resources and resource uses under each alternative, including the No Action alternative. **Chapter 3** contains detailed descriptions of these effects.

Table C-2. Acres of surface disturbance under each action alternative

Disturbance Type	**Alternative B – Proposed Action (acres)**[1]	**Alternative C (acres)**[1]
Permanent[2] disturbance	18.7	17.9
Short-term[3] disturbance	41.7	42.2
Total disturbance	**60.5**	**60.1**

Source: Reclamation GIS 2025

[1] Disturbance acres are approximate and used as the basis for analysis in **Chapter 3**. The precise amount of disturbance is subject to contractor means and methods of construction.

[2] Permanent disturbance includes impacts on areas that would not return to pre-construction conditions.

[3] Short-term disturbance includes impacts on areas that would return to pre-construction conditions within 10 years after construction activities are completed.

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Table C-3. Summary comparison of resource impacts for resources analyzed in detail

Resource Topic	Alternative A – No Action	Alternative B – Proposed Action	Alternative C
Water Resources	With the lack of adequate foundation, seepage and internal erosion issues would continue under this alternative, therefore the threat of dam failure would remain. Reclamation would be unable to control water deliveries for irrigation or minimum in-stream fish flows in the event of dam failure. There would be no impacts on water quality, including turbidity, water temperature, and pH, unless a dam failure were to occur.	There would be no impacts on flow requirements for irrigation demands or minimum in-stream flow requirements for fish under Alternative B. Surface disturbance could result in contaminants (for example, soil, lubricants, fuel) entering Salmon Creek, creating short-term adverse impacts on water quality. Reclamation's contractor would develop a stormwater pollution prevention plan (SWPPP) prior to any surface disturbance. BMPs (**Appendix F**) would be installed as designed in the SWPPP to prevent or reduce erosion and sedimentation from surface-disturbing activities. This would prevent sediment and other potential pollutants from entering the outlet channel and Salmon Creek downstream. Artesian water flows associated with the relief wells would not lead to adverse impacts on water temperature or water quality in Salmon Creek. New discharge of colder water into Salmon Creek from the relief wells would have a beneficial effect for summer steelhead and spring Chinook salmon.	Impacts on water deliveries and in-stream flow requirements for fish would be the same as described under Alternative B. With the reduction in rock excavation and shortening of the outlet works under Alternative C, short-term impacts on water quality in Salmon Creek would be slightly less than those described under Alternative B.

Resource Topic	Alternative A – No Action	Alternative B – Proposed Action	Alternative C
Biological Resources – Fisheries and Other Aquatic Species	There would be no impacts from construction under the No Action alternative. Without targeted habitat improvements, the habitat in Salmon Creek downstream from the dam would continue to limit steelhead spawning and rearing potential due to the lack of suitable cover and complexity. Further, Conconully Dam would still be at risk of seismic failure from liquefaction of embankment and foundation materials. Dam failure could have significant adverse effects on fish and aquatic species in Salmon Creek by leading to rapid release of impounded water, drastically altering downstream flow regimes, and potentially destroying or degrading steelhead spawning and rearing habitat. This could lead to significant long-term population declines. Full ecological recovery could take many years to decades.	Temporary unwatering and fill would result in a short-term loss of 243 linear feet of Salmon Creek stream habitat during the time that the stream channel would be restored to existing conditions. The placement of the stability berm and new outlet works extension would lead to a permanent loss of 642 linear feet of Salmon Creek stream habitat due to the stability berm. Restoration of aquatic habitat in the Salmon Creek floodplain downstream of the dam and outlet works would offset the anticipated short-term and permanent loss of in-stream habitat. Base flows for fish would be maintained throughout construction. Effects from the pump platforms, boat ramp, sound and vibration, access roads, invasive species, and settling ponds were determined to be negligible. Boat ramp construction would cause a permanent loss of 0.4 acres of aquatic reservoir habitat; however, this would not have a significant impact on reservoir fisheries due to the overall size of the reservoir and nature of the habitat impacted.	Impacts on Salmon Creek stream habitat would be the same as Alternative B. Alternative C would only result in 0.1 acres of permanent aquatic habitat impacts (0.3 acres less than Alternative B) because the boat ramp would not be constructed.

Resource Topic	Alternative A – No Action	Alternative B – Proposed Action	Alternative C
Biological Resources – Wetlands	There would be impacts from construction on wetlands under the No Action alternative. The existing risk of dam failure from seismic activity would remain at an unacceptable level, continuing the potential for damage or alteration to wetlands associated with seismic activity and possible dam failure.	Construction activities, such as excavation and use of the borrow area, would lead to the short-term disturbance of 1.10 acres of wetlands. BMPs, including revegetation, would be implemented to reduce short-term impacts on wetlands. New developed areas, such as the stability berm and outlet works would result in the permanent loss of 0.92 acres of wetlands. Mitigation would be implemented to offset the adverse impacts on wetlands.	Impacts would be the same as under Alternative B.
Biological Resources – Terrestrial Wildlife	There would be no change in terrestrial ecosystems or wildlife species. The existing risk of dam failure from seismic activity would remain at an unacceptable level, continuing the potential for damage to wildlife habitats, making them unsuitable for use by nesting birds, eagles, or special status wildlife species.	Under Alternative B, construction activities would lead to temporary and short-term disturbances on migratory birds and special status wildlife and their habitats; however, these impacts would be considered minor. Dam modifications could lead to permanent impacts on wildlife species by removing or converting feeding or cover habitat; however, Reclamation would implement BMPs to minimize these impacts.	Impacts would be similar to Alternative B; however, there would be a slight increase in short-term disturbance to wildlife habitats, and less permanent disturbances. Therefore, the potential avoidance of the area would be slightly less than Alternative B.

Resource Topic	Alternative A – No Action	Alternative B – Proposed Action	Alternative C
Cultural Resources	No ground disturbing activities would occur under this alternative and therefore, there would be no adverse impacts on cultural resources. Current trends in deteriorating conditions of cultural resources from age, recreational, and other uses would continue. Cultural resources would be impacted if there was seismic activity that resulted in impacts to the dam or dam failure.	There would be adverse effects on the NRHP-eligible Conconully Dam under Alternative B. The SHPO and Tribes have concurred that adverse effects will occur, and Reclamation will draft an MOA that would mitigate and resolve these effects. There are no known TCPs within the APE; however, there is the potential that they could be identified through ongoing consultation with the Tribes. At that time, Reclamation would coordinate with the Tribes to ensure impacts are avoided or minimized. Any new cultural resources identified during the project's construction period would be addressed under an unanticipated discovery plan.	Impacts would be the same as described under Alternative B.
Tribal Interests	No ground disturbing activities would occur; therefore, there would be no impacts on locations of Tribal importance and use of ITAs. Impacts, such as damage resulting from erosion and surface disturbance, on ITAs or locations of Tribal importance and use could occur if there is seismic activity that impacts Conconully Dam and its environs.	There are no ITAs identified or anticipated within the APE; therefore, no impacts on ITAs are anticipated. No specific locations of Tribal importance have been identified within the project area. Tribal consultation is ongoing and could result in the identification of locations of interest. Potential impacts could include physical damage to locations or resources commonly used or collected by Tribes from surface disturbance and construction activities or changes in the visual and auditory environment in proximity to important locations and areas of use.	Impacts would be the same as described under Alternative B.

Resource Topic	Alternative A – No Action	Alternative B – Proposed Action	Alternative C
Noise	There would be no new construction activity that would affect ambient sound levels. Sensitive noise receptors would continue to experience community and traffic noise.	Equipment and vehicle use associated with construction would temporarily raise ambient noise levels for sensitive receptors. Potential exists for temporary moderate to major adverse impacts from noise in the event of nighttime construction. However, noise impacts would be temporary, and noise levels would return to the baseline after construction is complete. Temporary construction noise would be reduced through implementation of Noise BMPs (**Appendix F**).	Impacts would be similar to those described under Alternative B. The reduced excavation needed for the outlet works could result in a slight decrease in noise from rock excavation.
Visual Resources	No adverse impacts are projected since no structural changes to the dam would occur. Visual resources within the area of analysis would remain similar to existing conditions. However, the risk of dam failure due to seismic activity would continue. Uncontrolled reservoir draining resulting from dam failure would impact the visual landscape, potentially altering the reservoir, shoreline, and surrounding vegetation. In the event of dam failure, extensive flooding could also reshape the landscape with debris, erosion, and stark changes in color and form. The No Action alternative would not conform with VRM Class III objectives.	Under Alternative B, impacts on visual resources would occur as temporary and short-term impacts from construction activities and permanent impacts resulting from changes to dam features. Project activities and alterations would add visual contrast into the natural-appearing landscape. Reclamation would apply BMPs (**Appendix F**) during construction to minimize the visual contrast and the impacts on observers traveling through the area and more sensitive viewers. Restoration and revegetation activities following construction would be implemented to minimize visual contrast. Alternative B would conform with VRM Class III objectives from the KOPs.	Impacts would be similar to those described under Alternative B. However, under Alternative C, the boat ramp would not be constructed, which would avoid a permanent impact on visual resources and result in slightly less visual contrast than under Alternative B. Alternative C would conform with VRM Class III objectives from the KOPs.

Resource Topic	Alternative A – No Action	Alternative B – Proposed Action	Alternative C
Recreation	There would be no construction-related changes to recreational opportunities, conditions, or access. Without the implementation of safety modifications, the dam would continue to be at a higher risk for failure, which could result in uncontrolled reservoir draining. If the dam were to fail, recreational opportunities on and around Conconully Reservoir would be drastically changed. Recreation would be adversely affected without the presence and operation of Conconully Dam.	During construction, the project area would be closed to vehicle and pedestrian access, which would create temporary, minor impacts to visitors through the removal of undeveloped recreational opportunities and restriction of recreational access. However, the modifications would lead to potential long-term benefits to the recreation experience through the construction of a new boat ramp. Additionally, a new parking area and staging area would create the potential for future recreational opportunities. Temporary features such as fencing and lighting would be erected during construction, which would temporarily degrade the recreational experience, particularly for recreationists with views of the project area.	Impacts would be similar to those described under Alternative B; however, no boat ramp would be constructed, which would result in fewer future recreational opportunities when compared with Alternative B.

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Appendix D

Alternatives Considered but Eliminated from Detailed Study

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Appendix D. Alternatives Considered but Eliminated from Detailed Study

Reclamation assessed additional structural and nonstructural options as part of the corrective action study to reduce the risk of seismic failure at Conconully Dam (Reclamation 2024a). Per Reclamation's SOD program requirements, a minimum of two technically feasible structural alternatives, a reservoir restriction alternative, and a dam breach alternative were studied. All options would reduce the risk of seismic-related dam failure and were considered technically feasible.

D.1 Excavate and Replace

Reclamation considered a structural alternative to excavate and replace Conconully Dam. Under this alternative, the unsuitable foundation materials that are susceptible to liquefaction would be excavated to a depth where liquefaction is unlikely to occur, such as bedrock or other dense foundation materials. These materials would be replaced with densely compacted materials, creating a shear key[1] on the downstream side of the dam that would not experience strength loss during an earthquake. Under this alternative, a temporary reservoir restriction would also be required to safely excavate the foundation materials without creating additional risk of dam failure.

While Reclamation concluded that the Excavate and Replace alternative would reduce the risk of dam failure in a seismic event, comparable with that under the proposed action, the estimated cost of implementing the Excavate and Replace alternative would be greater than the cost of implementing either the proposed action or Alternative C. A temporary reservoir restriction would be required under this alternative, which would require additional pumping from the Shell Rock Pumping Plant to meet water delivery requirements. This additional pumping would cause greater impacts on water deliveries and greenhouse gas emissions than the proposed action or Alternative C, under which a reservoir restriction and additional pumping would not be required. Additionally, the temporary reservoir restriction would severely restrict the OID's ability to regulate flows and would lead to additional costs in the form of lost economic benefits (that is, lost value of the Okanogan Project water) for the OID.

The Excavate and Replace alternative would not meet the purpose and need because it would not meet water delivery obligations and other benefits of the Okanogan Project, such as recreation and fish and wildlife habitats. Although this alternative would meet the purpose and need once construction activities were completed, a reservoir restriction at any level would have unacceptable

[1] A shear key is a solid, stabilizing feature that reduces the risk of the embankment dam sliding over its foundation in the upstream to downstream direction during a seismic event. It extends along the length of the dam down into its foundation.

economic impacts for irrigators and impacts on aquatic species, including ESA species. For these reasons, Reclamation eliminated this option from detailed study in the EA.

D.2 Reservoir Restriction

Under this alternative, a permanent reservoir restriction would be put in place to reduce the maximum volume of water impounded by the dam to lower the risk of water overtopping the dam following a seismically induced dam failure. If the embankment deformed due to seismic activity, the lowered maximum water level would decrease the likelihood of water breaching the dam. To achieve a reduction in risk comparable with the reduction under the action alternatives, the maximum reservoir elevation would be restricted to 2265 feet, which is 22 feet below the current maximum reservoir elevation. As a result, the reservoir would lose approximately 8,300 acre-feet of storage (Reclamation 2024b), which represents 64 percent of the total active storage capacity.

This alternative would not require modifications to the embankment. Reclamation would, however, need to modify the outlet works tunnel and controlling gates or lower the spillway crest from 2287 feet to the restricted reservoir elevation of 2265 feet to maintain the restricted reservoir elevation under runoff conditions (Reclamation 2024a). Without modification to the outlet works or spillway, water modeling results indicated the reservoir water surface could exceed the restricted elevation for months at a time, which would allow risks of exceeding Reclamation's public protection guideline levels.

While this alternative would be considered cost-effective, it would severely restrict the OID's ability to regulate flows and would lead to additional costs in the form of lost economic benefits for the OID. Additionally, this alternative would not meet the purpose and need because it would not meet water delivery obligations and other benefits of the Okanogan Project, such as recreation and fish and wildlife habitats. For these reasons, Reclamation eliminated this option from detailed study in the EA.

D.3 Controlled Dam Breach

Reclamation considered eliminating the risk of unintentional reservoir release by draining the reservoir to eliminate water storage. Under this nonstructural alternative, the dam embankment would be completely removed, the outlet works tunnel would be backfilled, the internal parts of the outlet works would be salvaged, the spillway would be completely demolished and backfilled, and the reservoir area would be restored.

Breaching the dam would involve implementation costs, including demolition and materials disposal, for excavating the breach channel. It would also result in additional economic impacts in the form of lost economic benefits (that is, lost value of Okanogan Project water) for the OID. Additionally, this alternative would not meet the purpose and need because it would not maintain water deliveries and flows for irrigators or provide recreational benefits. Furthermore, breaching the dam would require

an act of Congress. For these reasons, Reclamation eliminated this option from detailed study in the EA.

D.4 References

Reclamation (Bureau of Reclamation). 2024a. Corrective Action Study. Conconully Dam, Washington. Okanogan Project Columbia-Pacific Northwest Region. Boise, Idaho.

_____. 2024b. Evaluation of Risk for Dam Modification Alternatives. Conconully Dam, Washington. Okanogan Project Columbia-Pacific Northwest Region. Boise, Idaho.

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Appendix E

Draft Revegetation Plan

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USDA Forest Service- Region 6 Restoration Services Team
1220 SW 3rd Ave Portland, OR 97204

Revegetation Plan

Conconully Safety of Dams Modification Project

**Prepared by: United State Department of Agriculture,
Forest Service Region 6 Restoration Services Team,
Kelly Evans & Helen Lau**

Prepared for: Bureau of Reclamation

Date Prepared: 5/19/2025

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PROJECT INFORMATION

Project Information

Provisional seed zone: 15-20/6-12	Lat: 48.5426 Long: -119.7507	Elevation: 2,287 ft

LOCATION

The Conconully Safety of Dams Modification project area is in Township 35N, Range 24E and 25E in Okanogan County, Washington, approximately 17 miles north of Omak and south of the town of Conconully. It is near the Okanogan-Wenatchee National Forest and the Conconully cemetery, and the dam itself is located on Salmon Creek.

PROJECT HISTORY

The earthen dam was initially constructed between 1907 and 1910 by the United States Bureau of Reclamation, raised in 1920 and partially reconstructed in 1969. Conconully Dam impounds Salmon Creek for irrigation storage and is part of the larger Okanogan Project. The adjacent 1921 Salmon Lake Dam and its reservoir, Conconully Lake, are also part of the same project. Both are owned by the Bureau and operated by the local Okanogan Irrigation District. Salmon Creek has documented locations of salmon redds with current beaver activity and pools and riffles present in the creek.

The purpose of the Conconully Safety of Dams Modification project is to reduce the seismic risks of dam failure, provide water deliveries and flows for irrigators and endangered species, and maintain additional benefits for recreation and fish and wildlife habitat.

Reclamation proposes to reduce the risk of dam failure by constructing a stability berm on a foundation of deep soil mixed reinforcement columns on the downstream face of the dam. To provide improved operational functionality and compatibility with the proposed stability berm, Reclamation also proposes to upgrade the outlet works by extending, lining, and reinforcing water conveyance components and installing contemporary water control systems and facilities. The proposed modifications address issues important to public safety and the long-term functionality of the facilities.

AGENCIES AND PARTNERS

There are many stakeholders involved with this project including but not limited to: the United States Forest Service (USFS), United States Bureau of Reclamation (USBR), Washington State

Department of Fish and Wildlife (WDFW), Department of Ecology (DOE), US Army Corps of Engineers (USACE), the Okanogan Irrigation District (OID), the Confederated Tribes of the Colville Reservation (CTCR), the Environmental Protection Agency (EPA), the Department of Archaeology and Historic Preservation (DAHP), and the National Oceanic and Atmospheric Administration (NOAA) Fisheries.

SOILS PRESENT

The soils in and adjacent to this project area are primarily ashy/sandy loams of local type (Table 1, Figure 1). The outlet of the dam is considered poorly drained soils but typically better for plant growth. The primary upland restoration area is made up of the Owhi extremely stoney surface and outwash terraces not likely to have good water holding capacity as exhibited by its current vegetation being of a dry grassland and dry shrubsteppe vegetation type with some small pockets of deep rooting riparian plants. Closer to the Northwest corner of the upland restoration sites, more ashy fine sandy loam soil is present and adjacent to irrigated farmland containing more mixed volcanic ash (7 to 15 inches thick) over glacial outwash. The presence of some fines makes this soil slightly better for revegetation but low holding capacity with the high gravelly sand present at lower depths.

Table 1. Soil Content within project footprint. (NRCS 2025).

Okanogan County Area, Washington (WA649)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
245	Colville silt loam, 0 to 3 percent slopes	28.4	23.80%
247	Conconully gravelly ashy loam, 0 to 8 percent slopes	2.6	2.20%
250	Conconully gravelly ashy loam, 0 to 25 percent slopes, extremely stony	19.9	16.70%
270	Donavan ashy loam, 0 to 25 percent slopes, extremely stony	3	2.60%
272	Donavan-Rock outcrop complex, 20 to 40 percent slopes	1.1	0.90%
339	Lithic Haploxerepts-Conconully complex, 15 to 45 percent slopes	10.1	8.50%
434	Owhi ashy fine sandy loam, 3 to 8 percent slopes	9.9	8.30%
435	Owhi ashy fine sandy loam, 0 to 25 percent slopes, extremely stony	30.4	25.50%
437	Owhi gravelly ashy fine sandy loam, 0 to 8 percent slopes	1.4	1.10%
558	Water	12.5	10.40%
Totals for Area of Interest		**119.3**	**100.00%**

PROJECT INFORMATION

Figure 1. Map units for project soil profile (https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx)

CLIMATE

Average temperature ranges for this location are 16 -76 degrees Fahrenheit, with the lowest precipitation in July. Total yearly average rain fall was 26 inches/year. Sixty inches of average snowfall may be received by this site during the months of October-May (Table 2).

Table 2. Project site climatic data from 1929 to 2015 (https://www.ncei.noaa.gov/maps/monthly).

YEAR	MAX TEMP (°F)	MIN TEMP (°F)	AVE TOTAL PRECIP (inches)	AVE TOTAL SNOW (inches)
1929	86.4	2.6	5	25
1980	83.2	4.6	7	17
1990	83.3	15.8	18	20
1998	87.5	41.2	17	--
2015	84.5	20	6	6

PROJECT INFORMATION

HABITAT TYPES

There are three dominant habitat types in the project area: shrubsteppe upland, riparian, and wetland. The shrubsteppe upland is vegetated primarily with bunchgrasses, forbs, and shrubs with Ponderosa pine, Douglas fir, and black cottonwood trees sparsely distributed across the landscape (Figures 2). The riparian, which includes the shoreline and along Salmon Creek, is dominated with shrubs, providing wildlife and pollinator habitat, but the creek banks are eroding (Figures 3). The wetland complex is composed primarily of cattails and graminoid species such as sedges and provides aquatic habitat (Figure 3). Wetland flows enter from the south end of the western portion of the dam which is currently releasing water through some ground flows. Dominated by cattails, the construction of the dam created wetland from springs downstream of the dam on the west end. There will be minimal impacts with the majority occurring on the banks closest to the river. Invasive plant species such as diffuse knapweed are present in all the habitat types.

Figure 2. Upland shrubsteppe habitat (left); proposed borrow area (center); tree pocket (right).

PROJECT INFORMATION

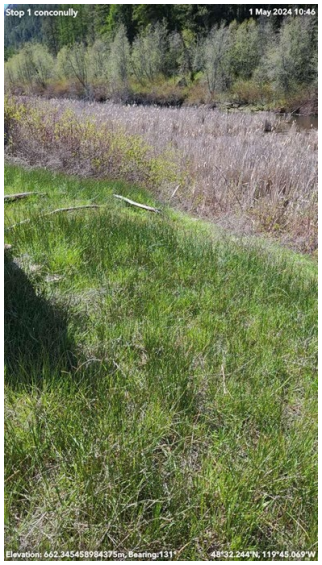

Figure 3. Clockwise from top: Current dam access road and upland habitat; sedge and cattail emergent wetland; Salmon Creek bank erosion; Salmon Creek riparian habitat.

PROJECT INFORMATION

CONSTRUCTION

Currently Reclamation is preparing the borrow area for several future recreational scenarios: 1) undeveloped and unmanaged dispersed recreational use, and 2) developed public recreation use. including a boat launch access and parking area (Figure 4). Lands disturbed by construction will be revegetated and restored using organic materials and planted with genetically adapted native vegetation based on reference plant communities. The revegetation goal is long-term sustainability of vegetation for ecological stability, climate adaptation, and benefit to organisms which rely on these vegetation communities.

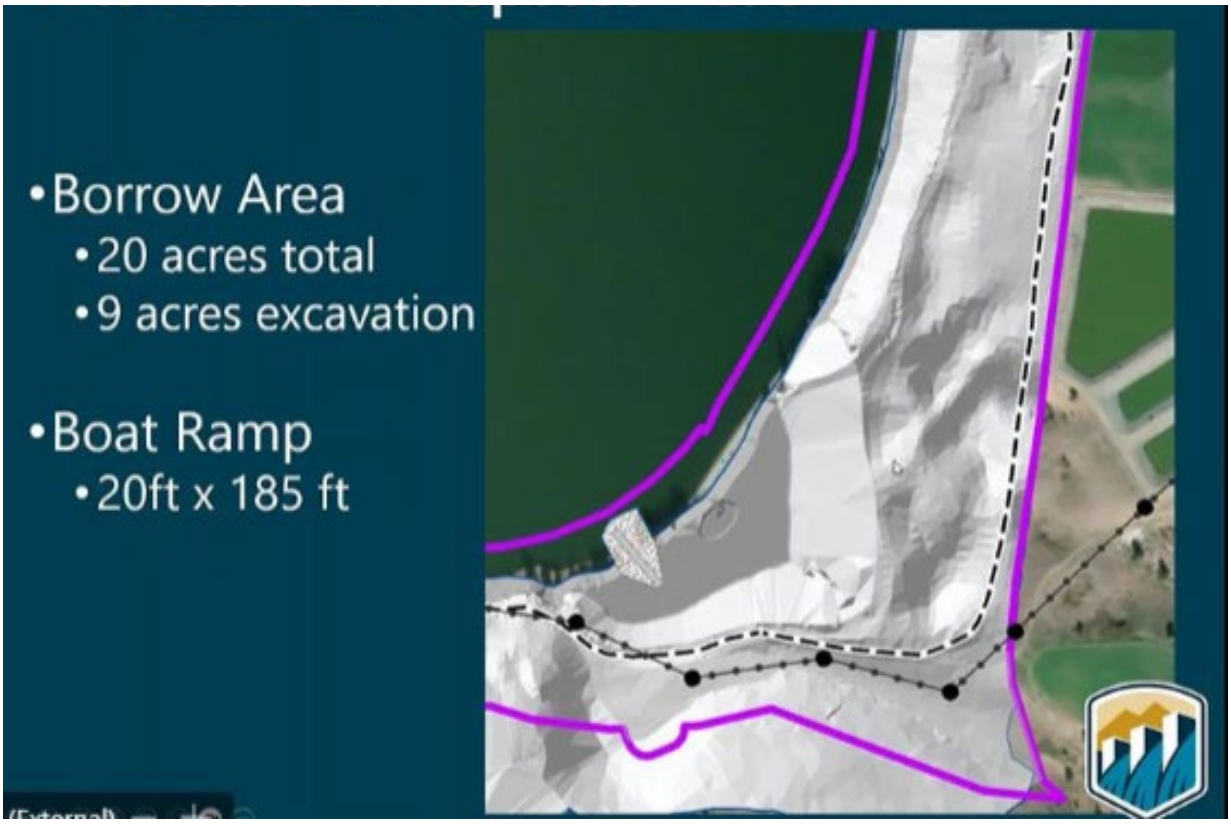

Figure 4. Simulation of the borrow area, boat ramp, and potential parking and facilities area. .
(Image from Bureau of Reclamation).

Revegetation Plan

STRATEGY

Revegetation techniques for this project shall be site-specific and guided by a restoration approach developed by the Federal Highway Administration, the Forest Service, and other collaborators (Armstrong et al. 2017). The site conditions of these project sites shall not significantly change from current conditions. Plant material shall be collected from the appropriate Provisional Seed Zone (WWETAC 2014) as determined by the Forest Service to ensure the use of locally adapted, genetically appropriate native plants in the project area (USFS 2008). Due to the challenging conditions of planting the reservoir shoreline, higher density planting shall occur at all sites to mitigate anticipated plant mortality.

The desired future condition (DFC) is that vegetation selected for the project will match the ecological amplitude of the site such as upland shrubsteppe, riparian, wetland, or long-term anthropogenic use. The desire is to increase diversity, allow for resilience of vegetation to be competitive against invasive plant introductions, and for natural succession to proceed. Macro- and microtopography features will mimic the diversity of terrain on adjacent lands and include features that trap sediment, retain moisture, and provide shade and other conditions that facilitate seed germination, increase seedling success, and promote plant vigor. Excessive soil movement and detrimental erosional features will be absent, and invasive plants will not jeopardize the ability of the area to provide native vegetation and wildlife habitat. Soil amendments, spreading of woody material to create microhabitat, invasive plant management, and soil stability treatments may be needed during revegetation of impacted areas within the project area. Invasive plant and soil stability treatments may be reduced and terminated over time due to the effectiveness and habitual nature of successful restoration efforts.

REFERENCE SITE(S)

Selecting reference sites and species for this project require both current disturbed conditions, desired future conditions, as well as current undisturbed conditions used for comparison purposes. Botanical surveys were completed to generate a list of species that are present and that have some restoration amplitude for revegetation. Sun-tolerant plants adapted to quick draining soils and within this ecological provenance will be selected based on the plant lists generated during vegetation surveys. Riparian transitional species will also be selected to help with the transition time between changes of hydrological connectivity in the site. The emergent planted areas will be primarily dominated by willow species and emergent graminoids and forbs. Locally sourced, genetically adapted plant materials collected from the same seed zone will be utilized for this project. Species selection is based on the known vegetation for the area as well as similar habitats in the surrounding area. The restoration techniques described in this document have been used on similar restoration projects with high success. Reference species are plants which are documented more commonly in the local habitats and have a variety of root shapes and depth structure to aid in slope stability and considerations of successional processes.

REVEGETATION UNITS AND SITE PREP

Site preparation is critical for setting the stage for planting success. Seeded and plantable areas will be decompacted to an appropriate depth based on rooted material and contain a a maximum of 20 inches of native soils with 4 inches of shredded mulch either incorporated into the soil or spread on top. If mulch is spread on top of soil, mulch depth should be no deeper than 2 inches where seeding shall occur and 4 inches where planting shall occur. If woody shreds can be made from on-site materials, the specifications for producing them in long spears can be found in Appendix A.

The project site is composed of two distinct provisional seed zones within the Salmon Creek watershed and the North Fork Salmon Creek subwatershed (Figure 5). These provisional seed zones are Climate Matched Seedzones based on high resolution climactic data, Omernik's Level IV Ecoregions, and common garden studies. Within these seed zones, there are potentially 3 different planting zones: upland, riparian, and wetland (Figure 6, Table 3).

Upland Zone - This planting zone is based on sun-tolerant species that grow in rapid draining soils and that are currently present at the site. In general, upland zones will contain forbs, graminoids, and shrubs found in the current reference conditions, which grow well in gravelly soils. In addition to the shrubsteppe community, this zone includes Ponderosa pine woodland and savanna and pockets of dry-mesic montane mixed conifer forest. Several shrub species are important understory shrubs and have forage value for wildlife. This zone will also include trees where appropriate. Adding forbs to the mix will increase the desired future conditions for pollinators and biological diversity. Along access roads a plant community dominated by grasses and forbs would reduce maintenance on the road edge and prevent invasive plant encroachment along these disturbed footprints. Fast growing herbaceous species such as grasses and forbs would be planted where potential recreational facilities may be developed in the future instead of slow-growing, non-woody species which require greater labor and cost investments.

Riparian Zone - This zone creates a stable ecosystem adjacent to water's edge with roots within the capillary zone. Riparian communities would be dominated by willows, riparian shrubs, and deciduous trees that reduce runoff, provide shade, and contribute organic matter and large woody material. Species in this revegetation unit are plants typically found along the water's edge in both forest riparian areas as well as the undisturbed water's edge. These plants all grow vigorously in full sunlight, benefit wildlife and important pollinator species, and can tolerate wet and drought conditions. Increased plant diversity in this zone is most important due to its transitional nature. Allowing nature to act on selection of species dominance is also relevant for this project. Plant species loss due to a natural selection process is projected to occur at this project site over time.

Wetland Zone – in preparation.

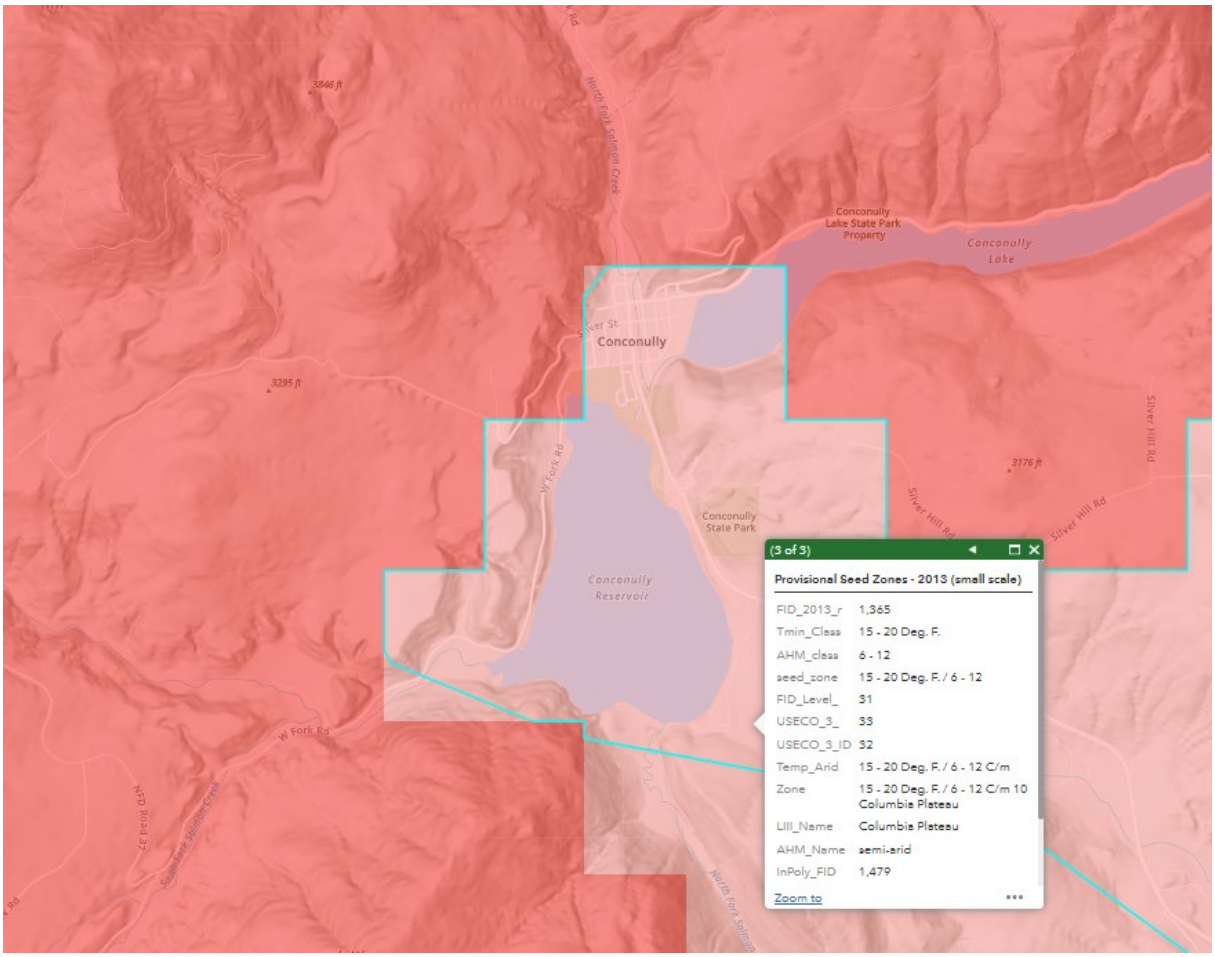

Figure 5. Climate Matched Seedzones. Darker pink is 15-20 Deg F/2-6 and the lighter pink is 15-20 Deg F./6-12.
https://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=229eb45b7cc2456db6d1ad866145d397

Figure 6a. Upland planting zone (yellow).


Figure 6b. Riparian and wetland planting zones (green).

Table 3. Proposed revegetation planting zones.

	WETLAND	RIPARIAN	RIPARIAN UPLAND	UPLAND
Zone Area (acres)	0.24	0.08	11.11	20
Spacing (ft)	1-3	3.5	8	10
Plants/acre	3,000	3,000	700	500
Plant quantity	720	240	7,777	10,000

All areas of construction disturbance will be seeded with a native plant seed mix and revegetated where appropriate with containerized plants as shown in Table 3 that includes a combination of 3 – 4 foot stakes, 40 cubic inch pots (4 in x 4 in x 10 in), and 0.75 gal tree pots (4 in x 4 in x 14 in). Additional seeding could occur post-plant installation by planting contractor to apply as needed.

Native Seed and Plants

Seed mixes shall be determined by the Forest Service for the species composition best suited for the project site. An example of a proposed restoration seed mix with several species and associated biotypes that was successfully used in a similar project is shown in Table 4. Hydroseeding with a temporary erosion control seed mix will occur post-construction to provide erosion control and minimize invasive plant establishment. Potential biotypes for this project

area are 'Duffy Creek', 'Moses Coulee', 'Sinlahekin-Palmer', and 'OkaWenN' (https://www.bfinativeseeds.com). Once a seed mix is developed, the primary construction contractor will purchase the seed mix directly from BFI Natives. The seed mix can either be shipped directly to the construction contractor or pickup can be arranged between the contractor and BFI Natives. Once post-construction soil preparation is finalized, additional seeding may be needed if sites require more compost or mulch post-planting. This seed mix will also be provided to the Forest Service planting contractors overseen by the Forest Service Contracting Officer Representative (COR). Seeding will be evaluated after both the construction contract and planting contract is complete. Seed applied by the primary construction contractor shall only be applied between October 15 and November 30 and soil temperature shall be less than 50°F, but above 32°F. The Forest Service planting contractor shall install all plant material and apply permanent seed to reduce erosion and weed infestation.

Table 4. Proposed seed mix species, biotypes, ratios, and seeding rate for all sites.

SPECIES	LBS/ACRE
Blue Wildrye (*Elymus glaucus*) 'Keechelus'	**10.0 lbs/acre**
Mountain brome *(Bromus marginatus)* 'Upper Yakima'	**10.0 lbs/acre**
Slender Hair Grass (*Deschampsia elongata*) 'Upper Yakima'	**2.0 lbs/acre**
Spike bentgrass (*Agrostis exarata*) 'Upper Yakima'	**1.5 lbs/acre**
Mt Stuart bluegrass (*Poa curtifolia*) Upper Yakima	**1.0 lbs/acre**
Common yarrow *(Achillea millefolium)* 'Upper Yakima'	**0.5 lbs/acre**
TOTAL	**25.0 lbs/acre**

Seedlings

Native plant containerized stock for the project shall be obtained via a plant propagation contract through the Region 6 Restoration Services Blanket Purchase Agreement (BPA) using seed provided by the Forest Service from the appropriate Provisional Seed Zone or as a micropurchase from local nurseries with the appropriate plant material.

Non-Native Plant Control

CURRENT CONDITIONS

Non-native plant populations shall be evaluated pre- and post-construction to prioritize treatment of listed Okanogan County invasive species present in the project area.

DESIRED FUTURE CONDITIONS

Future goals for this project are to establish vegetation in areas of surface disturbance to minimize establishment of county- and state-listed invasive plant populations in the project area.

Monitoring Plan

SUCCESS CRITERIA

The Forest Service shall monitor survivorship of plantings at Year 1, Year 2, and Year 3, with the objective of meeting the performance standard of 80% survivorship by the end of Year 3. A monitoring report shall be submitted to the Bureau of Reclamation at the end of each year with a description of monitoring protocol. The following criteria will be measured as an indication of success from the Bureau of Reclamation:

- Vegetation ground cover
- Bare soil cover
- Native grass and forb cover
- Number of native grass and forb species
- Seedling survival and density
- Tree growth (height per year)
- Pollinator density and abundance

DESIRED FUTURE OBJECTIVES

EROSION

- One year after initial seeding and revegetation efforts the amount of bare soil will be less than 60 percent if the rock content is less than 50%.

WILDLIFE/AQUATIC HABITAT/TEMPERTURE REGULATION

- One year after initial planting revegetation efforts the amount of bare soil will be less than 60 percent.

NATIVE PLANT SPECIES

- Three years after initial seeding and revegetation efforts, native plant species will comprise more than 75 percent more cover than previous plant communities on site.

CULTURALLY IMPORTANT PLANT SPECIES

- Three years after initial seeding and revegetation efforts, culturally important plant species that are expected to be located on this site will comprise more than 50 percent more cover than previous plant communities on site.

POLLINATOR/GRASSLAND PLANT SPECIES

- Three years after initial seeding and revegetation efforts, pollinator species will be 50 percent more cover than previous non-native communities on site.

INVASIVE PLANT SPECIES

- Three years after permanent seeding and revegetation efforts, invasive plant species are less than 10% aerial cover.

Approximate Timeline

Construction is planned to start fall of 2028 and potentially finish spring of 2030. Planting is tentatively planned to start no earlier than fall 2030, with contingency planting in the fall of 2031, and dependent upon a spring or summer assessment.

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Armstrong A, Christians R, Erickson V, Hopwood J, Horning M, Kern J, Kim T, Kramer A, Landis T, Moore L, Remley D, Riley L, Riley S, Roberts S, Skinner M, Steinfeld D, Stella K, Teuscher T, White A, Wilkinson K. 2017. Roadside revegetation: an integrated approach to establishing native plants and pollinator habitat. http://nativerevegetation.org/learn/manual_2017. Accessed 2/10/2025.

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Appendices

APPENDIX A

Shredded wood specifications

APPENDIX B

Traditional Plants of Concern

History/Archaeology Program

Confederated Tribes of the Colville Reservation

Trees

Common Name	Scientific Name	Habitat
Low/Ground Juniper	Juniperus communis	open woods, low/mid elevations
Rocky Mountain Juniper	Juniperus scopulorum	above the Columbia River
Western Red Cedar	Thuja plicata	moist places, streambanks, wetland margins, low/mid elevations
Whitebark Pine	Pinus albicaulis	Moist to dry, subalpine to alpine elevations
Pacific Yew	Taxus brevifolia	moist, shady areas, near streams, low/mid elevations
Paper birch & hybrids with water birch	Betula papyrifera & B. x utahensis	moist to wet streambanks & woods, low/mid elevations
Cascara	Frangula (Rhamnus) purshiana	moist forest understory & streambanks, low/mid elevation

Flowering Shrubs

Common Name	Scientific Name	Habitat
Devil's club	Oplopanax horridus	shady, moist forests and near streams, mid-elevation
Beaked hazelnut	Corylus cornuta var. californica	moist woods & near streams, low/mid elevation
American silverberry or wolfberry	Elaeagnus commutata	meadows, gravel bars, forest edges, low/mid elevation
Foamberry	Shepherdia canadensis	moist to dry, open to wooded, low/mid elevation
Western Labrador or Indian tea	Rhododendron columbianum	wet to moist forests & bogs, low/mid elevation
Dwarf huckleberry	Vaccinium caespitosum	dry to moist forests and meadows, low/high elevation
Tall, thin-leaf or black huckleberry	Vaccinium membranaceum	dry to moist forests and clearings, mid/high elevation
Grouseberry	Vaccinium scoparium	dry to moist forests and clearings, mid/high elevation
Low blueberry, Velvet-leaf huckleberry	Vaccinium myrtillus, V. myrtilloides	dry to moist forests and clearings, mid/high elevation
Chokecherry	Prunus virginiana	forest
Serviceberry, sarvisberry, buffaloberry	Amelanchier alnifolia	forest
American red raspberry	Rubus idaeus	forest

Flowering Herbs

Common Name	Scientific Name	Habitat
Xasxes or Canby's lovage	Ligusticum canbyi	Moist or wet places, forested wetlands and drier sites in open woods, mid/high elevations
Indian potatoes or lanceleaf springbeauty	Claytonia lanceolata	wooded areas and forest margins, low/high elevation
Bitterroot	Lewisia rediviva	rocky sites including forest openings, low/mid elevation
Mountain lady's slipper & Yellow lady's slipper	Cypripedium montanum & C. parviflorum	dry to moist, open woods, low/mid elevation
Rattlesnake plantain	Goodyera oblongifolia	moist to dry forests, low/mid elevation
Wapato		wetlands
Indian carrots or yampah	Perideridia gairdneri	forest
Sweet cicely	Osmorhiza spp.	forest
Tiger lilies	Lilium columbianum	forest
Canby's biscuitroot	Lomatium canbyi	lithosols, balds
Black camas	Camassia quamash	moist swales, shallow marsh soils, areas that are winter wet and summer dry

APPENDICES

APPENDIX C

BOTANICAL INVENTORY

TABLE of NATIVE, NON-NATIVE, WETLAND STATUS, CULTURAL SIGNIFICANCE, RESTORATION SPECIES (includes flower color for pollinator data).

Type	Scientific Name	Common Name	Observed Species	Potential Restoration Species	Native Species	Cultural Significance Species	Pollinator Species (flower)
Tree	*Acer glabrum*	Douglas maple	x	x	x	x	–
Tree	*Crataegus douglasii*	black hawthorn, Douglas's hawthorn	x	x	x	x	–
Tree	*Larix occidentalis*	western larch	x	x	x	x	–
Tree	*Malus pumila*	cultivated apple	x	–	–	–	–
Tree	*Pinus ponderosa*	Ponderosa pine	x	x	x	x	–
Tree	*Populus balsamifera ssp. trichocarpa*	black cottonwood	x	x	x	–	–
Tree	*Populus tremuloides*	quaking aspen	x	x	x	–	–
Tree	*Pseudotsuga menziesii*	Douglas-fir	x	x	x	x	–
Tree	*Rhus glabra*	smooth sumac	x	x	x	x	–
Shrub	*Alnus incana ssp. tenuifolia*	mountain alder	x	x	x	x	–
Shrub	*Amelanchier alnifolia*	serviceberry	x	x	x	x	–
Shrub	*Arctium minus*	common burdock, lesser burdock	x	–	–	–	–
Shrub	*Artemisia tridentata*	big sagebrush	x	x	x	x	–
Shrub	*Artemisia tripartita*	threetip sagebrush	x	x	x	–	–
Shrub	*Betula occidentalis*	water birch	x	x	x	x	–
Shrub	*Cornus stolonifera*	red-osier dogwood	x	x	x	x	–
Shrub	*Euphorbia cyparissias*	Cypress spurge	x	–	–	–	–
Shrub	*Holodiscus discolor var.discolor*	ocean-spray	x	x	x	–	–

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Type	Scientific Name	Common Name	Observed Species	Potential Restoration Species	Native Species	Cultural Significance Species	Pollinator Species (flower)
Shrub	*Lonicera involucrata*	bearberry honeysuckle black twin-berry	x	x	x	–	Red
Shrub	*Mahonia aquifolium [Berberis aquifolium]*	Oregon-grape	x	x	x	–	Yellow
Shrub	*Philadelphus lewisii*	Lewis' mock orange	x	x	x	–	–
Shrub	*Physocarpus malvaceus*	mallow ninebark, mallowleaf ninebark	x	x	x	–	–
Shrub	*Prunus virginiana*	chokecherry	x	x	x	x	–
Shrub	*Ribes cereum var. cereum*	wax currant	x	x	x	x	Orange
Shrub	*Rosa nutkana*	Nootka rose	x	x	x	x	Purple
Shrub	*Rosa woodsi*	Woods' rose	x	x	x	x	Purple
Shrub	*Rubus idaeus*	red raspberry	x	–	–	x	–
Shrub	*Salix bebbiana*	Bebb's willow, gray willow, long-beak willow	x	x	x	–	–
Shrub	*Salix exigua*	coyote willow, narrowleaf willow	x	x	x	x	–
Shrub	*Salix prolixa*	Mackenzie's willow	x	x	x	–	–
Shrub	*Sambucus cerulea*	blue elderberry	x	x	x	x	–
Shrub	*Sambucus racemosa*	red elderberry	x	x	x	–	–
Shrub	*Symphoricarpos albus*	common snowberry	x	x	x	x	–
Forb	*Achillea millefolium*	yarrow	x	x	x	x	–
Forb	*Actaea rubra*	baneberry	x	–	x	–	–
Forb	*Agoseris heterophylla*	annual agoseris	x	–	x	–	Yellow
Forb	*Alisma plantago-aquatica*	European water plantain	x	–	x	–	–
Forb	*Antennaria dimorpha*	low pussytoes	x	–	x	–	–

APPENDICES

Type	Scientific Name	Common Name	Observed Species	Potential Restoration Species	Native Species	Cultural Significance Species	Pollinator Species (flower)
Forb	*Antennaria racemosa*	raceme pussytoe	–	x	x	–	–
Forb	*Antennaria rosea*	rosy pussytoes	x	x	x	–	Pink
Forb	*Apocynum androsaemifolium*	Spreading dogbane	–	x	x	–	Pink
Forb	*Artemisia campestris*	field sagewort	x	x	x	–	–
Forb	*Artemisia dracunculus*	tarragon	x	–	–	–	–
Forb	*Asparagus officinalis*	asparagus	x	–	–	–	–
Forb	*Asperugo procumbens*	German-madwort	x	–	–	–	–
Forb	*Astragalus sp.*	milkvetch	x	–	x	–	–
Forb	*Balsamorhiza sagittata*	balsamroot	x	–	x	x	Yellow
Forb	*Barbarea orthoceras*	American wintercress rocket, yellow rocket	x	–	x	–	–
Forb	*Bochera rectofracta*	reflexed rockcress	x	–	x	–	Purple
Forb	*Calochortus lyallii*	Lyall's mariposa lily	x	–	x	–	Pink
Forb	*Canadanthus modestus*	[Aster m. few-flowered aster, great norther aster	x	x	x	–	Purple
Forb	*Capsella bursa-pastoris*	shepherd's-purse	x	–	–	–	–
Forb	*Cardamine pensylvanica*	Pennsylvania bittercress, quaker bittercress	x	–	x	–	–
Forb	*Castilleja miniata*	scarlet paintbrush	x	–	x	–	Red
Forb	*Castilleja thompsonii*	Thompson's Indian paintbrush	x	–	x	–	Yellow-Green
Forb	*Centaurea diffusa*	diffuse knapweed	x	–	–	–	–
Forb	*Centaurea stoebe*	spotted knapweed	x	–	–	–	–
Forb	*Cerastium fontanum ssp. vulgare*	common chickweed, mouse-ear chickweed	x	–	x	–	–
Forb	*Chaenactis douglasii*	dusty maiden	x	x	x	x	–

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Type	Scientific Name	Common Name	Observed Species	Potential Restoration Species	Native Species	Cultural Significance Species	Pollinator Species (flower)
Forb	*Chamaenerion angustifolium*	fireweed	x	x	x	–	Magenta-Pink
Forb	*Chimaphila umbellata ssp.umbellata*	Pipsissewa, common prince's-pine	x	–	–	–	–
Forb	*Cirsium arvense*	Canada thistle	x	–	–	–	–
Forb	*Cirsium hookerianum*	Hooker's thistle, white	x	x	x	–	–
Forb	*Cirsium vulgare*	bull thistle, common thistle	x	–	–	–	–
Forb	*Clematis ligusticifolia*	western clematis	x	–	x	–	–
Forb	*Collinsia parviflora*	maiden blue eyed Mary	x	–	x	–	Purple
Forb	*Comandra umbellata*	bastard toadflax	x	–	x	–	Pink
Forb	*Convolvulus arvensis*	field bindweed	x	–	–	–	–
Forb	*Conyza canadensis*	Canadian fleabane,horseweed	x	–	x	–	–
Forb	*Drymocallis glandulosa*	sticky cinquefoil	x	x	x	–	–
Forb	*Epilobium ciliatum*	fringed willowherb	x		x	–	–
Forb	*Erigeron filifolius*	threadleaf fleabane	x	x	x	–	–
Forb	*Erigeron philadelphicus var.philadelphicus*	Philadelphia fleabane	x	–	x	–	–
Forb	*Eriogonum heracleoides*	parsnip-flowered buckwheat	x	–	x	–	Pink
Forb	*Eriogonum niveum*	snow buckwheat	x	x	x	–	–
Forb	*Eucephalis engelmannii*	Engelmann's aster	–	–	x	–	–
Forb	*Fragaria virginiana ssp.glauca*	blueleaf strawberry,broadpetal strawberry,wild strawberry	x	x	x	x	–
Forb	*Galium triflorum*	fragrant bedstraw	x	–	x	–	–

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Type	Scientific Name	Common Name	Observed Species	Potential Restoration Species	Native Species	Cultural Significance Species	Pollinator Species (flower)
Forb	*Geranium viscosissimum*	sticky purple crane's-bill,sticky purple geranium	x	–	–	–	–
Forb	*Geum macrophyllum*	largeleaf avens	x	–	x	–	Yellow
Forb	*Gnaphalium palustre*	lowland cudweed,western marsh cudweed	x	–	–	–	–
Forb	*Gypsophila paniculata*	baby's breath	x	–	–	–	–
Forb	*Heuchera cylindrica*	roundleaf alumroot	x	x	x	–	Yellow
Forb	*Hippuris vulgaris*	common mare's-tail	x	–	x	–	–
Forb	*Hypericum perforatum*	common St. John's-wort	x	–	–	–	–
Forb	*Ipomopsis aggregata*	scarlet gilia	x	x	x	–	Red
Forb	*Lactuca serriola*	prickly lettuce	x	–	–	–	–
Forb	*Lemna minor*	common duckweed	x	–	x	–	–
Forb	*Lilium columbianum*	Columbia lily NL	x	–	x	x	Orange
Forb	*Lithospermum ruderale*	western stoneseed	x	–	x	–	Yellow
Forb	*Lomatium farinosum*	northern biscuit-root, Hamblen's lomatium	x	x	x	x	Yellow
Forb	*Lomatium geyeri*	Geyer's biscuitroot	x	–	x	x	–
Forb	*Lomatium macrocarpum*	large-fruit desert-parsley	x	x	x	x	Yellow
Forb	*Lomatium nudicaule*	Barestem biscuitroot		x	x	–	Yellow
Forb	*Lomatium triternatum*	triternate biscuit-root	x	x	x	x	Yellow
Forb	*Lupinus sericeus*	silky lupine	x	x	x	–	Purple
Forb	*Maianthemum racemosum*	large false Solomon's seal	x	–	x	–	–
Forb	*Medicago lupulina*	black medic	x	–	–	–	–
Forb	*Melilotus albus*	white sweet-clover	x	–	–	–	–

APPENDICES

Type	Scientific Name	Common Name	Observed Species	Potential Restoration Species	Native Species	Cultural Significance Species	Pollinator Species (flower)
Forb	*Mentha canadensis*	wild mint	x	x	x	–	–
Forb	*Nasturtium officinale [Rorippa nasturtiumaquaticum]*	watercress	x	–	–	–	–
Forb	*Penstemon fruiticosus*	bush penstemon	–	–	x	–	–
Forb	*Penstemon sp.*	beardtongue	x	–	x	–	–
Forb	*Persicaria punctata*	water smartweed	x	–	x	–	–
Forb	*Phacelia hastata*	silverleaf phacelia	x	x	x	–	Purple
Forb	*Plantago lanceolata*	English plantain	x	–	–	–	–
Forb	*Plantago major*	nippleseed, common plantain, great plantain	x	–	–	–	–
Forb	*Plantago patagonica*	woolly plantain	x	–	–	–	–
Forb	*Polemonium micranthum*	annual polemonium	x	–	x	–	–
Forb	*Polygonum aviculare*	common knotweed	x	–	–	–	–
Forb	*Prosartes trachycarpa*	wartberry fairybells	x	–	x	–	–
Forb	*Ranunculus aquatilis*	Ranunculaceae Ranunculus aquatilis white western buttercup, water crowfoot, white water crowfoot	x	–	x	–	–
Forb	*Ranunculus repens*	creeping buttercup	x	–	–	–	–
Forb	*Rhaponticum repens*	Russian thistle	x	–	–	–	–
Forb	*Rorippa curvisiliqua*	curvepod yellowcress	x	–	x	–	Yellow
Forb	*Rumex acetosella*	common sheep sorrel	x	–	–	–	–
Forb	*Rumex crispus*	curly dock	x	–	–	–	–
Forb	*Scutellaria galericulata*	hooded skullcap, marsh skullcap	x	–	x	–	Purple
Forb	*Sedum lanceolatum*	spearleaf stonecrop	x	x	x	x	Yellow

APPENDICES

Type	Scientific Name	Common Name	Observed Species	Potential Restoration Species	Native Species	Cultural Significance Species	Pollinator Species (flower)
Forb	*Solanum dulcamara*	felonwort, bittersweet nightshade, climbing nightshade	x	–	–	–	–
Forb	*Solidago lepida*	goldenrod	x	–	x	–	Yellow
Forb	*Stellaria media*	common chickweed	x	–	x	–	–
Forb	*Taraxacum officinale*	common dandelion	x	–	–	–	–
Forb	*Thalictrum occidentale*	western meadow rue	x	–	x	–	Pink
Forb	*Toxicoscordion paniculatum*	sand corn, panicled death-camas	x	–	x	–	–
Forb	*Tragopogon dubius*	yellow salsify	x	–	–	–	–
Forb	*Trifolium pratense*	red clover	x	–	–	–	–
Forb	*Trifolium repens*	white clover	x	–	–	–	–
Forb	*Urtica dioica*	stinging nettle	x	–	x	x	–
Forb	*Verbascum thapsus ssp.thapsus*	common mullein	x	–	–	–	–
Forb	*Veronica anagallis-aquatica*	blue water speedwell	x	–	x	–	Purple
Ferns and Lycophytes	*Athyrium filix-femina*	lady-fern	x	–	x	–	–
Ferns and Lycophytes	*Equisetum arvense*	common horsetail, field horsetail	x	x	x	–	–
Ferns and Lycophytes	*Equisetum hyemale*	scouringrush horsetail	x	–	x	–	–
Ferns and Lycophytes	*Equisetum laevigatum*	smooth scouringrush horsetail	x	–	x	–	–
Graminoid	*Acnatherum thuberiana*	Thurber's ricegrass	x	x	x	–	–
Graminoid	*Agropyron cristatum*	crested wheatgrass	x	–	–	–	–
Graminoid	*Agrostis exarata*	Spike bentgrass	–	x	x	–	–
Graminoid	*Agrostis stolonifera*	creeping bentgrass	x	–	–	–	–
Graminoid	*Alopecurus aequalis*	short-awn foxtail	x	–	x	–	–

APPENDICES

Type	Scientific Name	Common Name	Observed Species	Potential Restoration Species	Native Species	Cultural Significance Species	Pollinator Species (flower)
Graminoid	*Bromus inermis*	smooth brome	x	–	–	–	–
Graminoid	*Bromus sitchensis*	Sitka brome	–	x	x	–	–
Graminoid	*Bromus tectorum*	cheatgrass	x	–	–	–	–
Graminoid	*Carex athrostachya*	slender-beak sedge	x	x	x	–	–
Graminoid	*Carex nebrascensis*	Nebraska sedge	x	x	x	–	–
Graminoid	*Carex pachystachya*	thick-head sedge	x	x	x	–	–
Graminoid	*Carex retrorsa*	retrorse sedge	x	x	x	–	–
Graminoid	*Carex utriculata*	beaked sedge, inflated sedge, Northwest Territory sedge	x	x	x	–	–
Graminoid	*Cinna latifolia*	slender wood-reed	x	x	x	–	–
Graminoid	*Dactylis glomerata*	orchard grass	x	–	–	–	–
Graminoid	*Descampsia elongata*	slender hairgrass	x	x	x	–	–
Graminoid	*Eleocharis palustris*	common spikerush	x	x	x	–	–
Graminoid	*Elymus elymoides*	squirreltail	x	x	x	–	–
Graminoid	*Elymus glaucus*	blue wild-rye	x	x	x	–	–
Graminoid	*Elymus trachycaulus*	slender wheatgrass	x	x	x	–	–
Graminoid	*Festuca idahoensis*	Idaho fescue		x	x	–	–
Graminoid	*Festuca subulata*	bearded fescue	x	x	x	–	–
Graminoid	*Glyceria grandis*	American mannagrass	x	x	x	–	–
Graminoid	*Juncus articulatus*	joint-leaved rush, jointed rush	x	x	x	–	–
Graminoid	*Juncus balticus ssp. ater*	Baltic rush, valley rush	x	x	x	–	–
Graminoid	*Juncus bufonius*	toad rush	x	x	x	–	–
Graminoid	*Juncus effusus*	soft rush	x	x	x	–	–
Graminoid	*Juncus ensifolius*	dagger rush, daggerleaf	x	x	x	–	–

APPENDICES

Type	Scientific Name	Common Name	Observed Species	Potential Restoration Species	Native Species	Cultural Significance Species	Pollinator Species (flower)
Graminoid	*Koeleria macrantha*	Prairie junegrass	–	x	x	–	–
Graminoid	*Leymus cinereus*	Great Basin wildrye	x	x	x	–	–
Graminoid	*Panicum capillare ssp.capillare*	common panicgrass,witchgrass	x	x	x	–	–
Graminoid	*Phalaris arundinacea*	reed canary grass	x	–	–	–	–
Graminoid	*Phleum pratense*	Poaceae Phleum pratense timothy	x	–	–	–	–
Graminoid	*Platanthera unalascensis*	Alaska rein orchid	x	–	x	–	–
Graminoid	*Poa annua annual*	annual blue grass	x	–	x	–	–
Graminoid	*Poa palustris*	fowl blue grass	x	–	x	–	–
Graminoid	*Poa secunda*	bluegrass	x	x	x	–	–
Graminoid	*Pseudoroegneria spicata*	bluebunch wheatgrass	x	x	x	–	–
Graminoid	*Schoenoplectus acutus*	hardstem bulrush	x	x	x	–	–
Graminoid	*Scirpus microcarpus*	panicled bulrush	x	x	x	–	–
Graminoid	*Trisetum spicatum*	spike false oat	–	x	x	–	–
Graminoid	*Typha latifolia*	common cattail	x	–	x	–	–

Appendix F

Best Management Practices

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Appendix F. Best Management Practices

To minimize impacts on resources from the action alternatives, Reclamation would implement the best management practices (BMPs) described in **Table F-1**. BMPs are drawn from measures described in the construction specifications, including measures associated with site layout, temporary access, the administrative/storage/staging area, equipment use, erosion control, dust abatement, timing of in-water work and worksite isolation, and spill prevention and control.

Reclamation would also obtain required regulatory permits and implement terms and conditions contained therein. If permit requirements, BMPs, or other measures contradict each other, Reclamation's contract specification requires that Reclamation's contractor abide by the most stringent of requirements.

Table F-1. Best management practices

Resource Topic	Best Management Practice
General	• Limit heavy equipment use to options with the least adverse environmental effects (e.g., minimally sized, low ground pressure equipment, use of matting). • Conduct operations to prevent unnecessary destruction, scarring, or defacing of natural surroundings in the vicinity of the work.
Air Quality and Climate	• Comply with all applicable federal, state, and local laws and regulations (see **Appendix B**) concerning prevention and control of air pollution. • Prevent, control, and abate dust pollution on access roads, haul roads, the administrative/storage/staging area, soil storage piles, and other disturbed areas. • Limit vehicle traffic on unpaved surfaces to 10 miles per hour to minimize dust generation. • Provide labor, equipment, and materials, and use efficient methods wherever and whenever required to prevent dust nuisance or damage to persons, property, or activities. • Provide means for eliminating atmospheric discharges of dust during mixing, handling, and storing of cement and concrete aggregate. • Use reasonably available methods and devices to prevent, control, and otherwise minimize atmospheric emissions or discharges of air contaminants. • Repair or adjust equipment and vehicles showing excessive exhaust gas emissions before operating to ensure emissions are reduced to acceptable levels. • Use electric power, when practical, to drive dewatering pumps where dewatering is necessary.

Resource Topic	Best Management Practice
Geology and Soils	• Use erosion blankets, dust control, and other methods of temporary sediment control and wind erosion control, to protect exposed soil surfaces from splash erosion, slow water flows across a site, and reduce wind erosion. • Utilize the planting of grasses, forbs, shrubs, or trees, or the placement of riprap, sandbags, sod, erosion mats, bale dikes, mulch, or excelsior blankets to prevent and minimize erosion and siltation during construction and during the period needed to reestablish permanent vegetative cover on disturbed sites. • Initiate erosion control and site restoration measures as soon as a particular area is no longer needed for construction, stockpiling, or access. Arrange schedules to minimize exposure of soils. Restore and reseed areas as soon as possible once project activity is complete in that area. • Apply standard erosion control measures during road construction to avoid excessive erosion. • Avoid temporary roads and trails across slopes greater than 30 percent when feasible. • Use existing roadways or travel paths whenever possible. • Minimize the number of temporary access roads, and design roads to avoid adverse effects like creating excessive erosion. • Ensure standalone motorized equipment (such as pumps) have aprons or containment beneath them to prevent any leaks from entering soils.

Resource Topic	Best Management Practice
Water Resources	**General** • Perform construction activities by methods that will prevent entrance, or accidental spillage, of solid matter, contaminants, debris, or other pollutants or wastes into streams, flowing or dry watercourses, lakes, wetlands, reservoirs, or underground water sources. • Take measures to ensure that no petroleum products, hydraulic fluid, fresh cement, sediments, sediment-laden water, chemicals, or any other toxic or deleterious materials are allowed to enter or leach into waters of the United States (U.S.). • Avoid using acids to clean or prepare concrete surfaces for repair; the practice is not allowed. • To reduce environmental damage, do not use wetlands, riparian areas, steep slopes, or other critical environmental areas for equipment or material storage or stockpiling; construction staging or maintenance; or hazardous material or fuel storage, handling, or transfer. • Follow terms and conditions from the Clean Water Act (CWA) Section 404 permit and CWA Section 401 certification. **In-water work** • Prepare a Work Area Isolation Plan for all work below the bankfull elevation requiring flow diversion or isolation. Include the sequencing and schedule of dewatering and rewatering activities, a plan view of all isolation elements, and a list of equipment and materials to adequately provide appropriate redundancy of all key plan functions (for example, an operational, properly sized backup pump and/or generator). • Use rapidly deployable prefabricated cofferdam systems to minimize impacts on subgrade and surrounding water. • When conducting in-water or bank work, fill machine hydraulic lines with vegetable oil for the duration of the project to minimize the impacts of potential spills and leaks. • Keep spill prevention and clean-up kits on-site when heavy equipment is operating within 25 feet of the water. • To the extent feasible, complete work requiring the use of heavy equipment by working from the top of the bank (that is, landward of the ordinary high watermark). • Check equipment daily for leaks and complete any necessary repairs prior to commencing work activities around the water. • Allow equipment to cross the stream in-water only under the following conditions: o Equipment is free of external petroleum-based products, and soil and debris have been removed from the drive mechanisms and undercarriage; o The substrate is bedrock or coarse rock and gravel; o Mats or logs are used in soft bottom situations to minimize compaction while driving across streams;

Resource Topic	Best Management Practice
Water Resources *(cont.)*	○ Stream crossings will be performed at right angles (90 degrees) to the bank if possible; ○ No stream crossings will be performed at spawning sites when spawners of Endangered Species Act listed fishes are present or eggs or juvenile fish could be in the gravel. • The number of crossings will be minimized. • Cease project operations under high flow conditions that could inundate the project area, except as necessary to avoid or minimize resource damage. • Where practicable, install a turbidity and/or debris containment device prior to commencing in-water work. • When working in-water, some turbidity monitoring may be required, subject to the U.S. Army Corps of Engineers (USACE) permit requirements or CWA Section 401 certification. Turbidity monitoring generally is required when working in streams with more than 40 percent fines (silt/clay) in the substrate. Turbidity will be monitored only when turbidity generating work takes place (for example, during the installation of coffer dams, pulling the culvert in-water, or reintroducing water). The applicant will measure the duration and extent of the turbidity plume (visible turbidity above background) generated. The data will be submitted to the USACE, National Marine Fisheries Service[1], and the United States Fish and Wildlife Service immediately following project construction. Turbidity measurements will be used to develop procedures to minimize turbidity and estimate take. • Ensure equipment used in the in-stream channel has containment methods to address possible fuel and oil leaks. • Prevent eroded materials from entering streams or watercourses during dewatered activities associated with structure foundations or earthwork operations adjacent to, or encroaching on, streams or watercourses. **Erosion and spill prevention and control** • Prepare and carry out a Temporary Erosion and Sediment Control Plan and a Spill Prevention, Control, and Countermeasure (SPCC) Plan, commensurate with the size of the project, to prevent pollution caused by surveying or construction operations. • Prepare the SPCC Plan prior to construction, as follows: ○ A SPCC Plan in accordance with 40 Code of Federal Regulations (CFR) 112 is required where release of oil and oil products could reasonably be expected to enter into or upon navigable waters of the U.S. or adjoining shorelines in quantities that may be harmful (40 CFR 110), and aggregate on site oil storage capacity is over 1,320 gallons. Only containers with capacity of 55 gallons and greater are included in determining on site aggregate storage capacity. ○ Prevent, stop, and control spills or leaks during construction activities: ▪ Stop the source of spill or leak. ▪ Stop the migration of the spill or leak. ▪ Place a berm of sorbent material around the perimeter of the spill. ▪ Solidify freestanding oil.

Resource Topic	Best Management Practice
Water Resources *(cont.)*	• Prepare and follow Water Quality Monitoring Plan. • Keep a supply of emergency erosion control materials on hand, and install and maintain in place temporary erosion controls until site restoration is complete. • Use landward erosion control methods to prevent silt-laden water from entering waters of the U.S. These may include, but are not limited to, filter fabric, temporary sediment ponds, check dams of pea gravel-filled burlap bags or other material, and/or immediate mulching of exposed areas. • Control pollutants by use of sediment and erosion controls, wastewater and stormwater management controls, construction site management practices, and other controls including state and local control requirements. • Sediment and Erosion Controls: o Establish methods for controlling sediment and erosion that address vegetative practices, structural control, silt fences, straw dikes, sediment controls, and operator controls as appropriate. o Institute stormwater management measures as required, including velocity dissipators, and solid waste controls that address controls for building materials and offsite tracking of sediment. • Pollution Prevention Measures: o Use methods of dewatering, unwatering, excavating, or stockpiling earth and rock materials that include prevention measures to control silting and erosion and that will intercept and settle any runoff of sediment-laden waters. o Prevent wastewater from general construction activities, such as drainwater collection, aggregate processing, concrete batching, drilling, grouting, or other construction operations, from entering flowing or dry watercourses without the use of approved turbidity control methods. o Divert stormwater runoff from upslope areas away from disturbed areas. • Turbidity Prevention Measures: o Use methods for preventing excess turbidity that include, but are not restricted to, intercepting ditches, settling ponds, gravel filter entrapment dikes, flocculating processes, recirculation, combinations thereof, or other approved methods that are not harmful to aquatic life. o Ensure that wastewaters discharged into surface waters meet conditions of CWA Section 402, the National Pollutant Discharge Elimination System permit. o Do not operate mechanized equipment in waterbodies without having first obtained a CWA Section 404 permit, and then only as necessary to construct crossings or perform the required construction. • Clean up spills or leaks in a manner that complies with applicable federal, state, and local laws and regulations (**Appendix B**).

[1] This agency is also known as National Oceanic Atmospheric Administration Fisheries.

Resource Topic	Best Management Practice
Water Resources *(cont.)*	• Dispose of spilled or leaked materials: ○ Handle and dispose of spilled or leaked materials contaminated with 50 parts per million or greater polychlorinated biphenyls. • Handle and dispose of spilled or leaked materials not contaminated or contaminated with less than 50 parts per million polychlorinated biphenyls in accordance with applicable federal, state, and local regulations. **Discharge water and wastes** • Treat all discharge water created by construction (such as concrete washout, pumping for work area isolation, vehicle wash water, and drilling fluids) to avoid negative water quality and quantity impacts. Use bioswales for the removal of fines; use infiltration for concrete washout water with an altered pH; and use straw bales and silt fences to direct discharged water from aggregate wash plants into channels that flow into the settling pond. • Route wastewater from project activities and water removed from within the work area to an upland disposal site (landward of the ordinary high watermark) to allow removal of fine sediment and other contaminants prior to being discharged to the waters of the U.S. • Generally deposit all waste material, such as construction debris, silt, excess dirt, or overburden resulting from the project, above the limits of floodwater in an upland disposal site. • Develop and implement a the Stormwater Pollution Prevention Plan and ensure that it addresses potential pollution-generating activities that may be reasonably expected to impact the quality of stormwater discharges from the construction site. **Storage and staging** • Store and protect manufactured products in accordance with manufacturer's instructions and the Reclamation Safety and Health Standards (available at: http://www.usbr.gov/safety/rshs/index.html). • Obtain instructions from the manufacturer before delivery of materials to the jobsite and maintain a copy of the instructions at the job site; these instructions may include but not be limited to protection of materials subject to adverse effects from moisture, sunlight, ultraviolet light, or weather during storage at jobsite. • When not in use, store vehicles and equipment containing oil, fuel, and/or chemicals in a staging area located at least 150 feet from the boundary of wetlands and waterbodies. If possible, locate staging at least 300 feet away from the boundary of wetlands and waterbodies, and on impervious surfaces to prevent spills from reaching groundwater. • Avoid storing equipment overnight in the in-stream channel. • Avoid stockpiling or depositing excavated materials or other construction materials near or on streambanks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm runoff or can in any way encroach upon the watercourse.

Resource Topic	Best Management Practice

Water Resources *(cont.)*	• Petroleum product storage tank management:
	  o Place oil or other petroleum product storage tanks at least 20 feet from streams, flowing or dry watercourses, lakes, wetlands, reservoirs, and any other water source.
	• Avoid using underground storage tanks.
	  o Construct storage area dikes at least 12 inches high or graded and sloped to permit safe containment of leaks and spills equal to storage tank capacity located in the area plus sufficient freeboard to contain the 25-year rainstorm. Line diked areas with an impermeable barrier at least 50 mils thick.
	  o Line areas for refueling operations with impermeable barrier at least 40 mils thick covered with 2 to 4 inches of soil.
	
	Reclamation of temporary disturbance
	• Remove and plant all temporary access (including gravel surfaces) after project completion.
	• Within 7 calendar days from project completion, protect any disturbed bank and riparian areas using native vegetation or other erosion control measures as appropriate. For erosion control, sterile grasses may be used in lieu of native seed mixes. Alternative methods (such as spreading timber harvest slash) may be used for erosion control if approved by the USACE.

Biological Resources (Aquatic Ecosystems)	**Riparian areas** • Minimize the removal of riparian vegetation. • To the extent practicable, ensure that all native, noninvasive organic material (large and small wood) cleared for access remains on site. • Mark the boundaries of clearing limits associated with site access and construction to avoid or minimize disturbance of riparian vegetation, wetlands, and other sensitive sites. • Replant and monitor areas of disturbance following the Revegetation Plan (**Appendix E**), or Aquatic Habitat Restoration Plan (**Appendix G**). These plans will be completed before the start of the project. • Install fencing as necessary to prevent access to revegetated sites by livestock, beavers, or unauthorized persons. Install beaver fencing around individual plants where necessary. **Fisheries and aquatic wildlife** • Obtain Reclamation approval before using jackhammers exceeding 30 pounds. Do not permit blasting. • Meet existing flow requirements for Salmon Creek. If flow requirements cannot be maintained during construction activities, implement water bypass. • Follow protocol and standards for fish exclusion, capture, handling, and relocation that meet Endangered Species Act consultation standards and the Fish Relocation and Salvage Plan. Follow any additional requirements that meet consultation standards with the United States Fish and Wildlife Service and the National Marine Fisheries Service.

Resource Topic	Best Management Practice
Biological Resources (Terrestrial Wildlife)	• Schedule all necessary vegetation removal, trimming, and grading of vegetated areas outside of the bird breeding season (generally March 1 to August 31) to the maximum extent practicable. • Avoid construction activities during bird breeding season to the extent practicable. When project activities cannot occur outside the bird breeding season (generally March 1 to August 31), conduct surveys prior to scheduled activity to determine if active nests are present on or near the project area and buffer any active nesting locations found during surveys. Surveys should be conducted by a qualified biologist no more than 7 days prior to disturbance activities. If active nests are detected during these surveys, a no-activity buffer zone around the nest will be established by a qualified biologist based on species, project disturbance level, topography, existing disturbance levels, and habitat type until fledging has occurred. If a bird establishes a new nest during ongoing project activities, the nest vegetation will not be removed or modified, and no buffer zone will be required. Conduct an additional nesting bird survey if project activities are paused for more than 7 days.
Biological Resources (Vegetation)	• To the maximum extent practicable, preserve and protect from damage or injury caused by construction operations and equipment all existing trees, shrubs, and other naturally occurring vegetation, except where clearing operations are required for permanent structures, approved construction roads, or excavation operations. • To the maximum extent practicable, minimize clearing vegetation to that area needed for construction. In sensitive habitat areas, including but not limited to wetlands and riparian areas, clearing may be restricted to only a few feet beyond areas required for construction. • Prepare a Revegetation Plan in coordination with the Forest Service. Reseed or replant areas of short-term disturbance according to the Revegetation Plan (**Appendix E**). Replant disturbed areas with native vegetation and weed-free topsoil to the extent possible. Choose species appropriate for site conditions. Where applicable, consult with the Washington Department of Fish and Wildlife, the Washington Department of Natural Resources, and the Confederated Tribes of the Colville Reservation (CTCR) to determine the recommended plant species composition, seeding rates, and planting dates. Consider species beneficial to wildlife when determining seed mix and plant species composition. • Reseed staging areas following completion of construction according to the Revegetation Plan (**Appendix E**) where applicable. • Revegetate the borrow area according to the Revegetation Plan (**Appendix E**). • Place soil or rock stockpiles, excavated materials, or excess soil materials outside sensitive habitats, including water channels, wetlands, riparian areas, and on native or naturally occurring vegetation. • Mark the boundaries of clearing limits associated with site access and construction to avoid or minimize disturbance of riparian vegetation, wetlands, and other sensitive sites. • To the maximum extent possible, locate staging areas, access roads, and other site disturbances in disturbed areas, not in native or naturally occurring vegetation.

Resource Topic	Best Management Practice
Biological Resources (Vegetation) *(cont.)*	• Following completion of construction, restore contractor use areas to preconstruction condition. • Reseed areas of short-term disturbance according to the Revegetation Plan (**Appendix E**). • After revegetation efforts have been successfully established, erect buck and pole fence or line the west side of the access road prism with large boulders to restrict vehicles to the existing access road and protect revegetation efforts. • Use cleaning procedures that result in equipment being cleaned as well as or better than the procedures described in Reclamation's Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species (Reclamation 2021). • Inspect construction equipment following procedures described in the Reclamation Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species (Reclamation 2021) before allowing the equipment onsite. • Do not use trees for anchorages except in emergency cases or as approved by Reclamation. Where approved, wrap the trunk with a sufficient thickness of approved protective material before rope, cable, or wire is placed. • Use safety ropes where tree climbing is necessary; do not use climbing spurs. • Clean construction equipment before bringing it on site to remove dirt, vegetation, and other organic material to prevent introduction of noxious weeds and invasive plant and animal species.
Cultural Resources	• Develop and implement a plan for the inadvertent discovery of cultural resources and a Native American Graves Protection and Repatriation Act (NAGPRA) Plan of Action for Human Remains in the case of inadvertent discovery of cultural resources or human remains during construction.

Resource Topic	Best Management Practice
Tribal Interests	• Develop and implement NAGPRA Plan of Action. • Per Reclamation policy, avoid impacts on Indian Sacred Sites whenever possible. Continued coordination with affected Tribes may result in future identification of sacred sites. If this occurs, Reclamation will further evaluate impacts on these resources. Consultation with the CTCR will identify how to protect sacred sites if they are identified and how to provide continued access if any such sites are affected by project construction. • If Indian Trust Assets are identified in the project area, coordinate with the affected Tribes to determine how to protect such sites and how to provide continued access if any sites are affected by project construction. Avoid impacts to sacred sites whenever possible, consistent with Executive Order 13007. • If adverse impacts on Indian Trust Assets cannot be avoided, the co-lead agencies would engage with the appropriate Tribes to discuss ways to avoid, minimize, or mitigate the adverse impacts. • Notify Tribes and time construction activities to decrease the visual and auditory impacts on areas important to Tribes. • Consider the timing of activities to account for and avoid impacts on Tribal uses. • These BMPs could be incorporated into the Memorandum of Agreement between Reclamation and the CTCR, which is currently in development.

Resource Topic	Best Management Practice
Noise	• Use reasonably available methods and devices to control, prevent, and reduce noise. • Develop and furnish a Noise Monitoring and Abatement Plan prior to construction. • The Noise Monitoring and Abatement Plan would detail the contractor's means and methods to reduce the noise levels of the operation to the extent feasible. Equipment mufflers are required and must meet or exceed factory original equipment manufacturer standards for noise reduction. • Comply with the requirement of noise reduction measures detailed in the Noise Monitoring and Abatement plan for both daytime and nighttime work. Follow more restrictions and noise reduction measures for nighttime work than daytime work as per the approved Noise Monitoring and Abatement Plan. • Continuously monitor noise (day and night) during construction in at least two locations to be determined by Reclamation. • Determine the baseline noise levels based on daytime measurements prior to construction. • Consider the hours of 10:00 p.m. to 7:00 a.m. to be reduced noise hours. Reduce nighttime noise levels, as measured at nearest noise-sensitive areas (**Map 3-6** in **Appendix A**), by 10 decibels over the daytime measurement at the same location. o Only work acceptable to Reclamation's Contracting Officer's Representative will be allowed during these hours. Maximum allowable noise level for identified locations adjacent to the work areas shall be established and enforced. • Conduct only the construction activities specified in the approved Noise Monitoring and Abatement Plan during nighttime hours (that is, reduced noise hours), unless approved 72 hours in advance by Reclamation. • Jackhammering in excess of 30 pounds is not permitted without Reclamation approval. • Blasting is not permitted. • Pile driving is not permitted. • Pumps would be limited to a maximum sound pressure level of 75 decibels at 3 feet per pump.

Resource Topic	Best Management Practice
Visual Resources	• Minimize, to the greatest extent practicable, clearings and cuts through vegetation. Irregularly shape authorized clearings and cuts to soften undesirable aesthetic impacts. • Preserve natural landscape and preserve and protect existing vegetation not required or otherwise authorized to be removed. To the maximum extent possible, preserve existing and use native plants for landscaping. • Use the following lighting controls during construction to minimize the potential for impacts from artificial light at night from construction: o Shine direct stationary floodlights downward at an angle less than horizontal. o Shield floodlights so that floodlights will not be a nuisance to surrounding areas. o Direct lighting so that residences and adjacent roadways are not in the light's direct beam. • Correct lighting control problems when they occur, as approved by Reclamation's Contracting Officer's Representative. • In construction areas, always minimize waste and prevent trash build up. • Remove all unused materials and trash from construction and storage sites during the final phase of work. Place all removed material in approved sanitary landfills or storage sites and leave work areas conforming to the natural landscape. • Grade disturbed land following construction to provide proper drainage and to blend with the natural contour of the land.
Transportation and Traffic	• Perform work on rights-of-way established by the government as necessary to construct and maintain any roads, bridges, or drainage structures required for establishment and use of haul routes for construction operations. • Minimize congestion or interference with local traffic. • Maintain roadways, parking areas, and haul routes in a sound, smooth condition. • Promptly repair ruts, broken pavement, potholes, low areas with standing water, and other deficiencies to maintain road surfacing and drainage in original or specified condition. • After revegetation efforts have been successfully established, erect buck and pole fence or line the west side of the access road prism with large boulders to restrict vehicles to the existing access road and protect revegetation efforts.
Land Use	• Restore contractor use areas to preconstruction condition.

Resource Topic	Best Management Practice
Public Health and Safety	**Hazardous waste disposal** • Dispose of hazardous wastes by removal from the jobsite. • Recycle hazardous waste whenever possible. • Dispose of hazardous waste materials that are not recycled at appropriately permitted treatment or disposal facilities. • Transport hazardous waste in accordance with 49 CFR 171-179. • Clean up any accidental release of hazardous materials according to the contractor's SPCC Plan. • Provide protection for personnel and existing facilities from harm due to demolition activities. • Ensure lead abatement, if needed, is conducted by individuals trained and certified in lead abatement processes. • Follow regulations included in CFR 1926.62 for lead removal and 40 CFR 402/404 for the safe removal of lead-based paints to limit lead exposure and ensure the health of construction workers. • Report the inadvertent discovery of hazardous wastes or materials to Reclamation within 24 hours of discovery. Cease construction in the vicinity of the discovery until the appropriate disposal procedures are identified and conducted in coordination with Reclamation. • Separate coated surfaces containing lead by type at the time of demolition, and collect and analyze representative samples for materials with lead-based coatings to determine appropriate handling and disposal methods for each waste stream. • If previously unsampled potential asbestos-containing material is encountered during demolition, either sample or manage/abate the material as asbestos-containing material. **Wildfire** • Develop and follow Emergency Evacuation Plan. • For fire protection and prevention, comply with Section 1.09 of Reclamation's Safety and Health Standards (Reclamation 2024). Per these standards, prepare and follow a Fire Protection and Prevention Plan. • For fire protection and prevention, comply with applicable federal, state, and local wildfire prevention measures, including those outlined in Okanogan County's Comprehensive Emergency Management Plan (**Appendix B**). • As part of the Fire Protection and Prevention Plan, develop a list of all major fire hazards, proper handling and storage procedures for hazardous materials, potential ignition sources and their control, and the type of fire protection equipment necessary to control each major hazard. • Develop a means to educate all construction workers about the risk of starting a wildfire, how to avoid it, and who to contact in case a wildfire is started. • Create a fire break around and adjacent to work areas by clearing away all flammable vegetation or combustible growth.

Resource Topic	Best Management Practice

Public Health and Safety *(cont.)*	• Passenger vehicles and construction machinery requirements:
	  ○ Equip passenger vehicles, cars, pickups, light trucks, with one water fire extinguisher or backpack pump 5-pound minimum capacity, excluding personal vehicles parked at the proposed administrative/storage/staging area.
	  ○ Equip any internal combustion engine operated on or near forest, brush, or grass-covered land with a spark arrester or construct, equip, and maintain the engine for the prevention of fire.
	• Fire tools required in areas where portable tools powered by internal combustion engines are used within 25 feet of any flammable material:
	  ○ Maintain one serviceable round-point shovel, minimum overall length 46 inches.
	  ○ Provide a fire extinguisher, not rated less than 10 Class B, within 5 gallons of flammable liquids or 5 pounds of flammable gas being used in the project area.
	  ○ Keep required fire tools within 25 feet of operating equipment powered by an internal combustion engine.
	• Fire tools and preventative actions required at shops, staging areas, and other stationary work areas where equipment machinery or tools that can cause sparks are used:
	  ○ Clear away flammable materials for 25 feet.
	• Provide a water truck equipped with 500 feet of 1.5-inch, single-jacket hose, nozzle, and pressure pump. A truck with 300 gallons (minimum) of water must be on site at each work feature where work is being performed, with a trained operator during work hours. The water truck may be used for other watering work, such as dust suppression, but it must be immediately available for fire suppression duty.
	• Halt all construction activities in case of a wildfire in the area. Comply with area evacuation orders enacted by the Okanogan County Fire District, Okanogan County Emergency Management, and the Washington Department of Natural Resources or other jurisdictional entity and ensure an orderly evacuation of the area.

Utilities and Service Systems	• Coordinate a locate for underground utilities with the Washington Utility Notification Center (http://www.callbeforeyoudig.org/washington/index.asp) prior to construction.

F.1 Contractor Plan Submittals

The following plans would be prepared before project construction, but are not limited to:

- Work Area Isolation Plan
- Temporary Erosion and Sediment Control Plan
- SPCC Plan
- Aquatic Habitat Restoration Plan
- Fish Relocation and Salvage Plan
- Stormwater Pollution Prevention Plan
- Water Quality Monitoring Plan
- Revegetation Plan
- Plan for the Inadvertent Discovery of Cultural Resources
- NAGPRA Plan of Action
- Noise Monitoring and Abatement Plan
- Fire Protection and Prevention Plan
- Emergency Evacuation Plan

F.2 References

Reclamation (U.S. Department of the Interior, Bureau of Reclamation). 2021. Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species. United States Department of the Interior, Bureau of Reclamation, Policy and Programs, Environmental Compliance Division. Internet website: https://www.usbr.gov/mussels/prevention/docs/EquipmentInspectionandCleaningManual2021.pdf.

_____. 2024. Reclamation Safety and Health Standards. Section 1.09, Fire Prevention and Protection. Internet website: https://www.usbr.gov/safety/rshs/documents/1.09%20Fire%20Prevention%20and%20Protection.pdf.

Appendix G

Draft Aquatic and Wetland Habitat Restoration Plan

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Appendix G. Draft Aquatic and Wetland Habitat Restoration Plan

G.1 Background

The Conconully Safety of Dams Modification Project Aquatic and Wetland Habitat Restoration Plan aims to implement a suite of aquatic and wetland habitat restoration treatments in the Salmon Creek floodplain directly downstream of Conconully Dam. These improvements would offset 642 feet of permanent losses of in-stream habitat and 0.92-acres of permanent and short-term loss of wetlands associated with project construction activities. The habitat restoration elements linked to the goals and objectives below would be designed, vetted, and implemented in close coordination with the U.S. Army Corps of Engineers, National Marine Fisheries Service, the Confederated Tribes of the Colville Reservation, the Washington Department of Fish and Wildlife and the Washington Department of Ecology.

G.1.1 Restoration Goals and Objectives

The goals and objectives of the aquatic and wetland habitat restoration efforts on Salmon Creek are outlined below. Restoration objectives also identify specific actions that will be applied through the design process to address each goal.

GOAL 1. Increase in-stream habitat abundance, diversity and complexity for all life stages of salmonid species, with an emphasis on overwinter rearing habitat for summer steelhead (*Oncorhynchus mykiss*) within the project area.

OBJECTIVE 1. Increase quantity and quality of off-channel rearing habitat and improve floodplain processes inherent to habitat development and maintenance using the following elements:

a) Construct a multi-thread channel network consisting of main, secondary, and tertiary channels with varied activation thresholds and duration within the historic floodplain. Constructed channels will include pool-riffle-run bed morphology and coarse substrate suitable for spawning.
b) Increase floodplain inundation by creating bench features that are accessible under the existing hydrologic regime through excavation of the bank along existing and new channels.
c) Leverage existing topography to develop or enhance features such as alcoves, ponds, and wetland areas.
    i. Target preferred depth and velocities for juvenile summer steelhead and spring Chinook salmon (*Oncorhynchus tshawytscha*) rearing as identified by Blum Environmental and Anchor QEA (2022) and WDFW and Ecology (2022).
d) Restore main channel geometry to width-to-depth ratios ≤ 10 (WDOT 2023) and increase planform complexity index using the following elements.

i. Constructed gravel and cobble islands with undercut bank features
ii. Construct or enhance gravel bars on the inside of bends.

e) Increase preferred in-stream cover types as identified by Blum Environmental and Anchor QEA (2022) and WDFW and Ecology (2022) using the following types of engineered log jam features:
   i. In-stream cover and roughness
   ii. Apex at top of flow bifurcation
   iii. Bank jams at the top of depositional bar features
   iv. Channel spanning jams

GOAL 2. Provide the timely creation, restoration, and enhancement of wetland habitat concomitant with in-stream habitat improvement which directly addresses wetland habitat loss associated with project construction activities.

OBJECTIVE 2. Create conditions that support wetlands at the required functional category for mitigation, with areas equal to or greater than those required using the following actions:

a) Convert sections of existing channel to functioning wetland floodplain through channel fill, bench, and island construction to elevations close to groundwater.

G.2 Ecosystem Indicators

The goals and objectives listed in **Section G.1.1** were designed to help improve the status of several poorly functioning ecosystem indicators. There were seven identified ecosystem indicators identified to help track the success of restoration actions:

- Substrate
- Large Woody Material
- Pool Frequency and Quality
- Off-Channel Habitat and Refugia
- Width to Depth Ratio
- Stream Bank Conditions
- Floodplain Connectivity

G.2.1 Substrate

Improve substrate conditions through installation of gravel/cobble features (for example, channel fill, riffles, bars, benches, and islands) to augment lacking substrate and improve hydraulic conditions that support and maintain properly functioning substrate transport.

G.2.2 Large Woody Material

Increase in-stream large wood pieces per mile to adequate levels as defined in a matrix of pathways and indicators defined by Reclamation and agency and Tribal partners specific to the Conconully Safety of Dams Modification project. Increases in pieces of large wood per mile would be

accomplished through the installation of multiple types of engineered log jams and the improvement of future wood inputs through riparian enhancement accomplished by riparian benching.

G.2.3 Pool Frequency and Quality

Construct or enhance pools for fish use (such as for adult holding and juvenile rearing) and achieve a pools-per-mile metric or as agreed upon by project partners and sponsors. Details of pool construction would be developed in subsequent design iterations. Pool creation and pool maintenance would be accomplished in tandem with the installation of engineered log jams (**Section G.3.2**).

Ensure all pools within the project area (created or existing) have complexity features and processes that maintain them to the greatest extent possible (such as, cover and sufficient hydraulic conditions to prevent volume loss due to sedimentation).

G.2.4 Off-Channel Habitat and Refugia

Increase off channel habitat such as side channels, alcoves, backwater areas and other low energy areas to the greatest extent possible. This would be addressed through a combination of constructing pilot channels, side channels, and alcoves and those methods identified for improving floodplain connectivity (for example, channel filling, channel-spanning log structures, and constructed riffles). Benches and bars would also provide refugia during higher flow events.

G.2.5 Width to Depth Ratio

While addressing the other ecosystem indicators, ensure adequate and varied width to depth ratios are implemented with those features.

G.2.6 Stream Bank Conditions

Reduce sediment input and incision by reducing shear stress on stream banks via methods included but not limited to:

- Large wood features to protect the stream bank
- Bank (re)shaping
- Design of local "sediment sinks" to capture sediment that is incorporated in the stream

G.2.7 Floodplain Connectivity

To the extent possible increase the duration and depth of floodplain inundation through increased water surface elevations accomplished through various methods and features such as channel filling, channel-spanning log structures, and constructed riffles. Note that based on initial relative elevations analysis, aggressive methods would be needed to improve the function of this indicator.

G.3 Restoration Actions

Reclamation is proposing to utilize multiple categories of restoration and restoration-related actions within the project's habitat restoration area to achieve the identified goals and objectives. These

actions would be further designed, vetted, and implemented in close coordination with U.S. Army Corps of Engineers, National Marine Fisheries Service, the Confederated Tribes of the Colville Reservation, the Washington Department of Fish and Wildlife, and the Washington Department of Ecology.

Table G-1 shows which restoration actions would address the various ecosystem indicators. Each restoration action is further described in the sections below.

Table G-1. Salmon Creek restoration actions and ecosystem indicators

Ecosystem Indicator	Restoration Action				
	Multi-thread Channel Network	**Engineered Log Jam**	**Post-Assisted Log Structure**	**Riparian Benching**	**Gravel Augmentation/ Sediment Addition**
Substrate	X				X
Large woody material		X	X		
Pool frequency and quality		X	X		X
Off-channel habitat and refugia	X	X	X	X	X
Width to depth ratio		X	X		
Stream bank conditions	X	X	X	X	X
Floodplain connectivity	X			X	

G.3.1 Multi-thread Channel Network

A muti-thread channel network would be created to increase quantity and enhance the complexity of in-stream and off channel habitat. This network provides a host of ecological benefits such as wetland creation and improved hydrologic functionality. There may be 2 to 4 side channels created for the project, with up to approximately 15,000 cubic yards of excavated material removed from each channel.

The excavator would be the primary tool used to excavate the side channel network. Much of the work would be completed out of water and would not require isolation, while in-water work would be required to isolate the channel inlets and outlets to make connections to the existing channel.

G.3.2 Engineered Log Jam

Logs with a minimum diameter of 10 inches would be preferred for use in constructed log jams. Apex log jams specific to Salmon Creek may consist of around 6 to 8 of these large logs, with additional small woody debris less than 10 inches in diameter. The project would likely feature 1-3 apex log jams. Bank-buried log jams are smaller structures and would generally have fewer and smaller diameter logs. The project would likely feature 3-6 bank buried log jams.

Logs used for constructing log jams would typically be sourced from trees removed within the project area during construction activities. When sourcing logs from the project area is impractical, logs may be obtained from nearby forests or mills.

The initial phase of the installation of log jams would involve the isolation of the area. This can be accomplished using super sacks, bladders, or sheet piles, with sheet piling being the preferred method in modern restoration practices in the Upper Columbia region. Sheet pile installation entails driving steel sheets into the streambed using an excavator equipped with a pneumatic drill, reaching a depth of 6-12 feet to effectively prevent water from entering the isolated area.

Following isolation of the area, unwatering would be conducted through natural drainage or pumping, during which fish salvage efforts typically occur. Water that is pumped out would be discharged through hoses to dry areas to promote infiltration and minimize turbidity entering the stream. An excavator would then proceed to excavate the stream channel and/or bank to a depth appropriate for log jam placement, usually between 3-10 feet.

Logs would be handed to the excavator from a front-end loader, or another excavator situated at the staging area. The installation process would involve placing logs incrementally, one at a time, in a configuration designed for maximum stability. Additionally, fill material would be placed on and within the log jam to provide necessary ballast. This fill is often sourced from the material excavated during the initial excavation process. If additional fill is required for stability, material from the borrow area may also be utilized.

Once the log jam construction is completed, the sheet piling would be gradually removed with a claw attachment on the excavator's arm, ensuring a careful and measured rewatering.

G.3.3 Post-assisted Log Structures

There may be 2-6 post-assisted log structures (or similar "beaver dam analogs") installed in the project area, situated in areas of the floodplain that would be engaged with the excavation of pilot channels.

Post-assisted log structures are generally built by hand and involve smaller logs (less than 10 inches in diameter, 8 feet in length) driven into the floodplain. Logs would be driven into the stream bed using a handheld pneumatic post pounder. Between 5-20 logs would be driven into the desired area for each structure without the use of heavy machinery. This approach is considered low-tech restoration, and the impacts on the environment are generally minimal due to the absence of heavy equipment.

G.3.4 Riparian Benching

Riparian benching is a restoration technique that involves creating flat benches or terraces along stream banks to alleviate incision, stabilize a bank, and improve riparian conditions. This project may include 2-4 riparian benches, which could require the removal of up to approximately 250 cubic yards of riverbank material for each bench.

Riparian benching is accomplished with excavation but can occur in the dry and may not necessitate isolation, unwatering, and fish salvage. This technique would be done with an excavator, which

would systematically remove bank material, and flatten portions of riverbank, mimicking natural riverbank features.

G.3.5 Gravel Augmentation or Sediment Addition

The primary purpose of gravel augmentation includes improving or creating spawning habitat and enhancing sediment transport. Isolation, unwatering, and fish salvage would usually be required during this process. This project may include 1-2 areas designated for gravel augmentation and/or sediment addition, with each requiring up to approximately 500 cubic yards of suitable material.

An excavator would place pre-selected fill material or gravel into the stream. The selection of gravel should be based on ecological compatibility to ensure the enhancement of the stream's natural habitat.

G.4 References

Blum Environmental and Anchor QEA (Blum Environmental Consultants and Anchor QEA). 2022. Safety of Dams Project, Conconully Dam. Lower Salmon Creek Instream Flow Study and Aquatic Habitat Assessment. Final Report. Prepared for the U.S. Bureau of Reclamation. March 2022.

WDFW and Ecology (Washington Department of Fish and Wildlife and Washington State Department of Ecology). 2022. Instream flow study guidelines: technical and habitat suitability issues including fish preference curves. Updated January 25, 2022.

WDOT (Washington Department of Transportation). 2023. Biological Assessment Preparation Manual, Chapter 9.0 Environmental Setting. Updated July 2023. Internet website: https://wsdot.wa.gov/sites/default/files/2023-07/BA-Manual-Chapter9.pdf.

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Appendix H

Biological Resources

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Appendix H. Biological Resources

H.1 Overview

This appendix contains information that supports **Section 3.4**, Biological Resources. The federally- and state-listed species that have the potential to occur in the project area are shown in **Table H-1**.

Table H-1. Federally- and state-listed species with the potential to occur in the project area

Common Name Scientific Name	**Federal Status[1]**	**State Status[2]**	**Preferred Habitat**	**Potential for Occurrence**
Canada lynx *Lynx canadensis*	FT	--	Tundra, mixed high-elevation forest	Yes, although potential for occurrence would be low. The project area does not provide suitable habitat.
Gray wolf *Canis lupus*	FE	--	Most common in relatively flat forested areas, rolling hills, or open spaces such as river valleys and basins	Yes, but use of project area would likely be limited to infrequent migrations or dispersals. One non-breeding wolf pack territory (Reed Mountain) overlaps project area. No known dens or rendezvous sites have been documented within project area.
North American wolverine *Gulo gulo luscus*	FT	--	Alpine and arctic tundra, boreal and mountain forests	No, suitable habitat is not present and there are no known occurrences.
Mt. Rainier white-tailed ptarmigan *Lagopus leucura rainierensis*	FT	--	Alpine, bare rock	No, suitable habitat is not present and there are no known occurrences.
Yellow-billed cuckoo *Coccyzus americanus*	FT	--	Large, continuous riparian zones; scrub-shrub wetlands	Yes, although very unlikely to occur in project area. No known occurrences in project vicinity so any use of Salmon Creek riparian areas would be limited to rare seasonal migrants.
Summer steelhead *Oncorhynchus mykiss* Upper Columbia River Steelhead DPS	FT	SC	Spawn in gravel/cobble substrates; require cold, clean, complex habitats.	Yes, known to occupy Salmon Creek downstream of Conconully Dam. Critical habitat is designated in Salmon Creek downstream from Conconully Dam.

Common Name Scientific Name	Federal Status[1]	State Status[2]	Preferred Habitat	Potential for Occurrence
Spring Chinook *Oncorhynchus tshawytscha* Upper Columbia River Spring-Run Chinook Salmon ESU	FE/EX	--	Spawn in larger rivers and streams with cobble/gravel substrates; require cold, clean, complex habitats.	No, this ESU does not include the Okanogan River subbasin. Any spring Chinook in Salmon Creek are likely part of the non-listed experimental population.
Bull trout *Salvelinus confluentus* Coterminous United States DPS	FT	SC	Cold, clean, complex, connected habitat; typically restricted to cold headwater rivers and streams.	No. Bull trout may be present in North Fork Salmon Creek but have likely been extirpated from Salmon Creek, below Conconully Dam. No recent occurrences in the project vicinity.
Pacific lamprey *Entosphenus tridentatus*	SOC	--	Adults spawn in gravel substrates; larvae burrow and filter feed in silt/sand substrates.	Yes, lamprey have been recently introduced into Okanogan basin. They have been documented at the Okanogan Irrigation District (OID) diversion dam so could be present in upper Salmon Creek. The Conconully Reservoir blocks upstream passage.
Westslope cutthroat trout *Oncorhynchus lewisi*	SOC	--	Spawn in gravel/cobble substrates; require cold, clean, complex habitats.	Yes, both Salmon Creek and Conconully Reservoir.
Monarch butterfly *Danaus plexippus*	FPT	--	Herbaceous and scrub-shrub wetlands	Yes, although presence would be limited to rare occurrences during spring and fall migrations. No milkweed has been documented within the project area.
Suckley's cuckoo bumble bee	FPE	--	Open grassy areas, chaparral and shrub areas, mountain meadows	Yes, but presence would be very unlikely. Although suitable habitat is present, this species is only known to occur in six localities throughout the state.
Ute ladies'-tresses *Spiranthes diluvialis*[3]	FT	SE	Alluvial banks, point bars, and floodplains	Yes, but presence would be very unlikely due to lack of consistent inundation. No individuals were observed during recent survey efforts.

Source: WDFW 2024, 2025a, 2025b, 2025c; USFWS 2025; NatureServe 2025

[1] FE = federally endangered; FPE = federally proposed endangered; FPT = federally proposed threatened; FT = federally threatened; EX = experimental population; SOC= species of concern

[2] SC= state candidate; SE = state endangered; (--) = Not Listed

[3] Ute ladies' tresses has been recently proposed for delisting; however, Ute ladies'-tresses was included since the species is currently listed as FT at the time of this draft EA.

H.2 Fisheries and Other Aquatic Species

H.2.1 Affected Environment

Stream flows are released from the OID diversion dam to allow fish passage through this segment of lower Salmon Creek. Lower Salmon Creek flows released from the OID diversion dam from 2020 to 2021 are characterized in **Table H-2**.

Table H-2. Lower Salmon Creek flow regime at OID diversion dam, 2020–2021

Date Range	Flow (cfs)
March 15–April 5, 2020	8
April 6–April 9, 2020	12
April 10–April 30, 2020	16
May 1–May 20, 2020	12
May 21–June 4, 2020	8
June 5–October 15, 2020	4
October 16, 2020–March 14, 2021	2.3

Source: Blum 2022; cfs= cubic feet per second

Adult summer steelhead begin returning to spawn in Salmon Creek in March, and spawning continues through May with peak spawning occurring in April (OBMEP 2025). The anticipated timing of summer steelhead and spring Chinook salmon life stages in Salmon Creek are shown in **Table H-3**.

Table H-3. Anticipated timing of summer steelhead and spring Chinook salmon life stages in Salmon Creek

Life Stage	Summer Steelhead Date Range	Spring Chinook Date Range
Adult Migration	March–May	July-Sept
Spawning	March-April	Sept-Oct
Peak Spawning	April	October
Incubation	April-July	Sept-Feb
Fry Emergence	May–June	Jan-April
Smolt Emigration	April- early May	April-May

Sources: OBMEP 2025; BPA 2004

Salmon Creek sustains the greatest number of spawning steelhead in the entire Okanogan River subbasin. The Okanogan Basin Monitoring and Evaluation Program has monitored summer steelhead abundance data in the basin since 2005. Of the natural-origin juvenile steelhead out-migrated from creeks in the Washington State portion of the Okanogan River subbasin, a majority were produced in Salmon Creek in 2024 (**Table H-4**).

Table H-4. Annual estimates of out-migrating steelhead juveniles originating from Salmon Creek

Year	Estimate (number of juveniles)
2014	9,077
2015	7,918
2016	8,831
2017	20,730
2018	9,593
2019	6,578
2020	5,357
2021	10,580
2022	8,882
2023	10,274
2024	5,128

Source: Adapted from OBMEP 2025, Table B-3.

In 2014, the National Marine Fisheries Service designated a "nonessential experimental population" of spring-run Chinook salmon in the Okanogan River subbasin under section 10(j) of the Endangered Species Act. Abundances of juvenile spring Chinook in Salmon Creek increased after the experimental population was introduced (**Table H-5**).

Table H-5. Annual estimates of out-migrating Chinook Salmon juveniles originating from Salmon Creek

Year	Estimate (number of juveniles)
2014	0
2015	0
2016	0
2017	18
2018	1,893
2019	219
2020	21
2021	553
2022	20
2023	61

Source: Adapted from OBMEP 2025, Table B-4

H.2.2 Environmental Consequences

Short-term and permanent impacts to aquatic habitat under Alternative B are summarized in **Table H-6**.

Table H-6. Aquatic habitat impact assessment for Alternative B

Aquatic Habitat	Project Element(s) Causing Impacts	Short-term Impact	Permanent Impact
Conconully Reservoir	Spillway pump landings and anchors, gatehouse reinforcement, and boat ramp cut and fill area	N/A*	0.4 acres (loss and modification)
Salmon Creek (downstream of dam outlet works tunnel[1])	Stability berm and outlet works extension, temporary cofferdam, and stream unwatering	243 linear feet (unwatered)	642 linear feet (loss)
Salmon Creek (downstream of dam outlet works tunnel[1])	Aquatic habitat enhancement	2,097 linear feet	N/A*

Source: Reclamation GIS 2025

[1] Although Salmon Creek, downstream from Conconully Reservoir, supports steelhead critical habitat and Chinook salmon Essential Fish Habitat, this portion of the creek in the existing dam outlet works tunnel is not accessible to anadromous fish. Thus, effects on anadromous fish would be limited to the Salmon Creek stream segment downstream of the existing outlet works tunnel.

* Not applicable

Short-term and permanent impacts to aquatic habitat under Alternative C are summarized in **Table H-7**.

Table H-7. Aquatic habitat impact assessment for Alternative C

Aquatic Habitat	Project Element(s) Causing Impacts	Short-term Impact	Permanent Impact
Conconully Reservoir	Spillway pump landings and anchors, gatehouse reinforcement, and boat ramp cut and fill area	<0.1 acres (modification)	0.1 acres (modification)
Salmon Creek (downstream of dam outlet works tunnel[1])	Stability berm, outlet works extension, temporary cofferdam and stream unwatering	243 linear feet (unwatered)	642 linear feet (loss)
Salmon Creek (downstream of dam outlet works tunnel[1])	Aquatic habitat restoration	2,097 linear feet	N/A*

Source: Reclamation GIS 2025

[1]Although Salmon Creek, downstream from Conconully Reservoir, supports steelhead critical habitat and Chinook salmon Essential Fish Habitat, the portion of the creek in the existing dam outlet works tunnel is not accessible to anadromous fish. Thus, effects on anadromous fish would be limited to the Salmon Creek stream segment downstream of the existing outlet works tunnel.

H.3 Vegetation

The following section describes the existing conditions for vegetation, including vegetation communities; noxious weeds and nonnative, invasive plant species; and special status plant species, known to occur in the project area.

H.3.1 Analysis Area

The analysis area for vegetation is the project area, including Conconully Dam, Conconully Reservoir (the east bank of the reservoir from the cemetery to the dam), and Salmon Creek, as shown in **Map 2-1** in **Appendix A**.

H.3.2 Affected Environment

General Vegetation

General vegetation in the project area is categorized by grouping United States (U.S.) Geological Survey Gap Analysis Project (GAP) land cover categories (USGS 2025) and Washington Department of Natural Resources' Ecological Systems of Washington (WDNR GIS 2025). Vegetation in each land cover category is further categorized based on the results of surveys carried out by Reclamation in the project area, such as the Conconully Safety of Dams Final Rare Plant Report (Reclamation 2020). **Table H-8** summarizes the general vegetation communities found in the project area which were delineated from the GAP analysis. **Map 3-3** in **Appendix A** shows these communities within the project area. Brief descriptions of each community follow the table.

Table H-8. General vegetation communities within the project area

Vegetation Community	Acres
Forest communities	
Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest	10.9
Northern Rocky Mountain Ponderosa Pine Woodland and Savanna	20.0
Rocky Mountain Aspen Forest and Woodland	1.4
Shrubland communities	
Inter-Mountain Basin Big Sagebrush Shrubland	33.1
Developed areas	
Developed Low Intensity	9.4
Non-wetland riparian communities	
Columbia Basin Foothill Riparian Woodland and Shrubland	9.5
Rocky Mountain Subalpine-Montane Riparian Shrubland	4.9
Rocky Mountain Subalpine-Montane Riparian Woodland	3.9
Open water	
Open Water	17.5
Wetlands	
Delineated Wetland[1]	9.9
Total	**120.5**

1 Note that delineated wetlands have not been categorized as any of the GAP land cover categories listed as general vegetation communities in the table. Delineated wetlands likely include several of the listed general vegetation communities.

Sources: USGS 2025; USGS GIS 2025; Reclamation GIS 2025; WDNR GIS 2025

Forested communities are the most widespread types of vegetation in the project area (32.3 acres). The Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest occurs on north-facing slopes and has a high tree density and closed canopy. Northern Rocky Mountain Ponderosa Pine Woodland and Savanna occurs on south-facing slopes and in flat areas; trees are scattered in groves with a relatively open canopy. As reflected in the acreage, the Rocky Mountain Aspen Forest and Woodland has a limited distribution in the project area. Forest understories are primarily comprised of shrubs, forbs, and perennial bunchgrasses. Common understory species include ocean-spray (*Holodiscus discolor*), saskatoon berry (*Amelanchier alnifolia*), and Oregon grape (*Mabonia aquifolium*), parsnipflower buckwheat (*Eriogonum heracleoides*) and silky lupine (*Lupinus sericeus*).

The shrubland community (33.1 acres) primarily occurs in the non-forested portions of the Graveyard Flat area. Species that occur in this community include shrubs such as big sagebrush (*Artemisia tridentata*) and threetip sagebrush (*A. tripartita*), grasses such as blue wild-rye (*Elymus glaucus*) and Thurber's ricegrass (*Acnatherum thuberiana*), and forbs such as Thompson's Indian paintbrush (*Castilleja thompsonii*) and snow buckwheat (*Eriogonum heracleoides*). Nonnative species observed in these areas are crested wheatgrass (*Agropyron cristatum*), cheatgrass (*Bromus tectorum*), orchard grass (*Dactylis glomerata*), tarragon (*Artemisia dracunculus*), and black medic (*Medicago lupulina*) (Reclamation 2020; **Appendix E**).

Developed areas (9.4 acres) include portions of the project area where native vegetation has been removed by human activities and disturbance, primarily the existing dam facilities.

Delineated wetlands and non-wetland riparian areas (28.2 acres) can be found along Salmon Creek downstream of Conconully Dam, downstream of the Conconully Dam spillway, and along the southern shoreline of Conconully Reservoir. Riparian trees and shrubs include mountain alder (*Alnus incana*), red-osier dogwood (*Cornus stolonifera*), and willows, while herbaceous wetlands have high cover of native herbaceous wetland species, with a few nonnative species also present. Wetlands and associated vegetation are described in more detail in **Section 3.4.3**.

While there are 17.5 acres of open water in the project area, there are no vegetation communities associated with this habitat type, due to depth inhibiting establishment and growth of most plant species.

For additional information on vegetation communities in the project area, see the Conconully Safety of Dams Project: Aquatic Resources Delineation Reports (Reclamation 2021, 2024) and Conconully Safety of Dams Final Rare Plant Report (Reclamation 2020).

Noxious Weeds and Nonnative, Invasive Plant Species

Invasive plants are nonnative species that have been introduced into an environment in which they did not evolve. Noxious weeds, a subset of invasive plants, are designated and regulated by state and federal laws because they are known to be detrimental to agriculture, commerce, natural resources, and public health. The Washington State Noxious Weed Control Board's noxious weed list (Washington State Noxious Weed Control Board 2023) represents concerns and priorities at the state level.

Noxious weeds and nonnative, invasive plant species that have been documented in and near the project area include diffuse knapweed (*Centaurea diffusa*), spotted knapweed (*Centaurea stoebe*), reed canary grass *(Phalaris arundinacea)*, and Canada thistle (*Cirsium arvense)*. Other noxious weeds and nonnative, invasive plant species could potentially be present in the project area.

Special Status Plants

The U.S. Fish and Wildlife Service manages federally-listed plant species under the Endangered Species Act of 1973, while state-listed plant species are managed by the Washington Department of Agriculture. While there are no federally- or state-listed plant species known to occur in the project area, one federally- and state-listed plant species, Ute ladies'-tresses (*Spiranthes diluvialis*), has the potential to occur (**Table H-1**). However, despite the presence of suitable habitat (such as alluvial banks along the Conconully Reservoir shoreline), results from recent survey efforts indicate no individuals were observed, which is likely due in part to a lack of other habitat requirements the species relies on, such as consistent inundation in these areas (Reclamation 2020). For more information, see the Conconully Safety of Dams Final Rare Plant Report (Reclamation 2020).

H.3.3 Environmental Consequences

Methods and Criteria

Analysis Indicators

- The potential for permanent loss, degradation, or modification of vegetation communities
- The potential for the introduction, establishment, or spread of noxious weeds or nonnative, invasive plant species
- Permanent loss, degradation, or modification of special status plant habitat

Assumptions

- Reclamation would follow BMPs (**Appendix F**) for reseeding and replanting areas of short-term surface disturbance and minimizing or avoiding the establishment and spread of noxious weeds and nonnative, invasive plant species.

Alternative A – No Action

No effects on general vegetation, or special status plant species would occur because Reclamation would not make any structural changes to Conconully Dam. Noxious weeds and nonnative, invasive plant species would continue to be introduced by unmanaged recreational use of the project area, as well as by natural processes. If there is a seismic event that causes the Conconully Dam to fail, flooding could cause long-term damage or alter general vegetation communities, or specials status plants in the project area.

Alternative B – Proposed Action

General Vegetation

Activities associated with construction, such as excavation, dam modification, use of the borrow area, and road creation would directly remove existing vegetation, with short-term or permanent impacts on vegetation communities. Under Alternative B, there would be 41.7 acres of short-term

disturbance, and 18.7 acres of permanent disturbance associated with construction activities—resulting in a total of 60.4 total acres of disturbance to existing vegetation communities (**Table H-9**) compared with the No Action alternative. Because Reclamation would follow BMPs, such as minimizing the project footprint and using previously disturbed areas wherever possible, population-level effects on vegetation communities are not expected (**Appendix F**).

Table H-9. Alternative B surface disturbance acreage within general vegetation communities

	Short-term Disturbance[1] (Acres)	Permanent Disturbance[2] (Acres)
Forest Communities		
Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest	0.3	1.6
Northern Rocky Mountain Ponderosa Pine Woodland and Savanna	10.6	1.6
Shrubland communities		
Inter-Mountain Basins Big Sagebrush Shrubland	19.6	6.5
Developed areas		
Developed Low Intensity	1.4	6.5
Non-wetland riparian communities		
Columbia Basin Foothill Riparian Woodland and Shrubland	6.1	0.6
Open Water		
Open Water	2.6	1.0
Wetlands		
Delineated Wetland	1.1	0.9
Total	**41.7**	**18.7**

Source: USGS 2025; USGS GIS 2025; Reclamation GIS 2025; WDNR GIS 2025

[1] Short-term disturbance includes impacts on areas that would return to pre-construction conditions within 10 years after construction activities are completed.

[2] Permanent disturbance includes impacts on areas that would not return to pre-construction conditions.

While most impacts would be short-term in nature, such as those associated with the use of the borrow area, converting vegetation to developed areas in the construction administrative/storage/staging area would lead to permanent impacts since that area would no longer support native vegetation. Following the implementation of BMPs (**Appendix F**), including carrying out revegetation of short-term disturbed areas in accordance with the proposed Revegetation Plan (**Appendix E**), adverse impacts on vegetation would be minor overall. Further, the implementation of reseeding and planting practices would improve native vegetation in the long term, decreasing the likelihood of establishment and spread of nonnative, invasive species.

Noxious Weeds and Nonnative, Invasive Plant Species

Surface-disturbing activities, such as excavation and construction, and the use of vehicles and machinery off existing roads would increase the potential for introduction or spread of noxious

weeds and nonnative, invasive plant species in the project area. Noxious weeds and nonnative invasive plants often outcompete native plant species and could make reestablishment of native species on-site during restoration or after construction more difficult in the long-term or permanently. BMPs would minimize the likelihood of the introduction or spread of noxious weeds and nonnative, invasive plants from surface-disturbing activities. For example, the use of weed-free materials, as well as implementation of protocols for cleaning construction equipment, would reduce impacts of noxious weed introduction to the project area (**Appendix F**).

Special Status Plants

While there are no known federally- or state-listed plant species in the project area, some suitable habitat for Ute ladies'-tresses is present (for instance, alluvial banks). As such these areas may be impacted by short-term and permanent disturbance associated with construction under Alternative B. However, only a small amount of suitable habitat close to the outlet works could be affected. Additionally, wetland mitigation implemented by Reclamation would ultimately result in an increase in the amount of potentially suitable habitat for the species over time.

In addition to Alternative B, other projects in the area would affect general vegetation communities, noxious weeds and nonnative, invasive plant species, and special status plants, including the Salmon Creek River Mile 8 Restoration Project. In the short term, that project could remove and crush vegetation or special status plants or introduce or spread noxious weeds or nonnative, invasive plant species. With the implementation of BMPs (**Appendix F**), the contribution from Alternative B to such impacts on vegetation would be negligible.

Over the long term, the Salmon Creek River Mile 8 Restoration Project would improve vegetation conditions by re-establishing native riparian vegetation. Noxious weeds and nonnative, invasive plant species would be reduced and habitat for special status plants may be improved. In addition to the Salmon Creek River Mile 8 Restoration Project, Alternative B would further contribute to beneficial, long-term impacts on vegetation in the project area.

Alternative C

General Vegetation

Impacts on vegetation communities under Alternative C would be similar to those described under Alternative B; however, under Alternative C, there would be a slight increase in short-term disturbance (0.5 additional disturbed acres) and a slight decrease in permanent disturbance (0.8 fewer disturbed acres). This is because under Alternative C, the outlet works would be configured differently, which would cause slight changes to disturbances associated with construction. As such, there would be an increase in acres of short-term disturbance. However, total disturbed acres would be 0.4 acres lower under Alternative C (60.1 acres).

Noxious Weeds and Nonnative, Invasive Plant Species

Impacts on noxious weeds and nonnative, invasive species under Alternative C would be the same as those described under Alternative B.

Special Status Plants

Impacts on special status plants under Alternative C would be the same as those described under Alternative B since the acreage of disturbed wetlands would be the same.

H.4 Wetlands

H.4.1 Affected Environment

Through a recent wetland delineation and assessment of function condition, 22 wetlands in the project area were identified, totaling 10.98 acres. **Table H-10** summarizes the identified wetlands, including their classification and functional condition.

Table H-10. Classification and functional condition of delineated wetlands in the project area

Wetland	Size (Acres)[1]	Cowardin Classification[2]	Functional Assessment Classification[3]	Functional Assessment Score[4]	Functional Assessment Category[4]
W1	2.81	PEM1Hb	Depressional[3]	19	II
W2	0.04	PSS1F	Riverine[3]	19	II
W3	0.11	PSS1F	Riverine	20	II
W4	0.09	PSS1F	Riverine	18	III
W5	0.01	PSS1F	Riverine	19	II
W6	3.71	PSS1B	Slope[3]	16	III
W7	0.06	PSS1F	Riverine	18	III
W8	0.01	PSS1F	Riverine	18	III
W9	0.01	R3EMF	Riverine	16	III
W10	0.21	PEM1B	Depressional	18	III
W11	0.01	PSS1F	Riverine	17	III
W12	0.05	PSS1F	Riverine	17	III
W13	0.02	PSS1F	Riverine	16	III
W14	0.05	PSS1F	Riverine	18	III
W15	0.22	PSS1F	Riverine	19	II
W16	0.23	R3EMF	Riverine	19	II
W17	1.35	PSS1B	Slope	18	III
W20	0.05	PSS1Bh	Lake fringe[3]	18	III
W21	0.07	PSS1Bh	Lake fringe	18	III
W22	0.22	PSS1Bh	Lake fringe	18	III
W23	0.13	PSS1Bh	Lake fringe	18	III
W24	0.39	PSS1Bh	Lake fringe	18	III
Total Acres	**9.86**	—	—	—	—

Sources: Reclamation GIS 2025; Hruby 2014

[1] Acres are rounded to the nearest hundredth of an acre.

[2] Per Cowardin et al. (1979). Wetland classification codes are available from the U.S. Fish and Wildlife Service National Wetlands Inventory at https://www.fws.gov/program/national-wetlands-inventory/classification-codes.

[3] Classifications per Hruby (2014):

- Depressional wetlands occur in topographic depressions where the elevation of the surface within the wetland is lower than in the surrounding landscape.

- Riverine wetlands occur in valleys associated with stream or river channels. They lie in the active floodplain and have important hydrologic links to the flows in the river or stream.
- Slope wetlands occur on slopes where groundwater surfaces begin running along the surface or immediately below the surface. Water in these wetlands flows only in one direction (down the slope), and the gradient is steep enough that the water is not impounded. The downhill side of the wetland is always the point of lowest elevation.
- Lake fringe wetlands exist when the vegetated part of the wetland is on the water side of the ordinary high-water mark of a body of permanent water at least 20 acres in size, and at least 30 percent of the open water is deeper than 10 feet.

[4] Score and category per Hruby (2014):

- Category I wetlands are those that meet specific criteria, such as overlapping data from known or historical polygons, or providing certain functions or values
- Category II wetlands are considered to have some level of disturbance but still retain high function in some areas.
- Category III wetlands have a moderate level of function and can often be adequately replaced with a well-planned mitigation project. These are typically wetlands that have been disturbed in some ways and are often less diverse or more isolated from other natural resources on the landscape than higher-functioning wetlands.

H.4.2 Environmental Consequences

Under Alternative B, surface disturbance would affect wetlands as shown in **Table H-11**.

Table H-11. Alternative B surface disturbance acreage within wetlands

Wetlands	Short-term Disturbance (Acres) [2]	Permanent Disturbance (Acres)[3]
W1	0.10	–
W2	–	0.04
W3	–	0.11
W4	–	0.09
W5	–	0.01
W6	0.60	–
W8	0.01	–
W10	–	0.21
W11	0.01	–
W12	0.05	–
W13	–	0.02
W14	–	0.05
W15	0.22	–
W17	0.11	–
W24	–	0.38
Total	**1.10**	**0.92**

Source: Reclamation GIS 2025

[1] Short-term disturbance includes impacts on areas that would return to pre-construction conditions within 10 years after construction activities are completed.

[2] Permanent disturbance includes impacts on areas that would not return to pre-construction conditions.

Note: Not all wetlands are included in this table because they either will not experience disturbance from project activities, or the acreage disturbed is so negligible that it rounds up to 0 acres.

Numbers may not add up due to rounding.

H.5 Terrestrial Wildlife

H.5.1 Analysis Area

The analysis area for terrestrial wildlife is the project area, including Conconully Dam, Conconully Reservoir (the east bank of the reservoir from the cemetery to the dam), and Salmon Creek, as shown in **Map 2-1** in **Appendix A**.

H.5.2 Affected Environment

Terrestrial wildlife habitats in the project area correspond to existing vegetation communities (**Table H-8**) and support many functions for general wildlife in the project area. For example, perennial grasslands provide good forage and cover opportunities for a multitude of species, whereas the presence of mixed conifer forest and ponderosa pine woodland and savanna can serve as good stopover habitat for migratory birds. Wetland and riparian areas are also important for wildlife, offering additional forage opportunities as well as access to water.

Many wildlife species utilize a variety of habitats in the project area. These habitats provide forage, nesting substrate, and cover for a variety of bird, mammal, amphibian, and reptile species common to northcentral Washington and the North Cascades and Columbia Plateau regions. The majority of these species are considered common with wide distributions across the state and region. Consequently, the relationship of most of these species to the project is not discussed here in the same depth as species upon which federal and state agencies place management emphasis. Examples of representative wildlife that could occur in habitats in the project area include reptiles such as the western rattlesnake (*Crotalus oreganus*) and common garter snake (*Thamnophis sirtalis*), amphibians such as the Pacific treefrog (*Pseudacris regilla*) and American bullfrog (*Lithobates catesbeianus*), birds such as the common loon (*Gavia immer*) and black-capped chickadee (*Poecile atricapillus*), and mammals such as water shrews (*Neomys fodiens*) (WDFW 2017; eBird 2025).

H.5.3 Environmental Consequences

Methods and Criteria

Analysis Indicators

- The potential for permanent loss, degradation, or modification of habitat for terrestrial wildlife species
- The potential for injury or mortality of terrestrial wildlife species that results in population-level effects or that affects population viability

Assumptions

- The changes in quality of wildlife habitat are related to the change in the quality of the associated vegetation communities. Vegetation communities that degrade due to project activities would be less likely to support associated native wildlife, and associated populations would decline.

Alternative A – No Action

No effects on general wildlife would occur because Reclamation would not make any structural changes to Conconully Dam. Recreational use of the project area would continue to result in minor

levels of disturbance to terrestrial wildlife species and habitats. If there is a seismic event that causes the Conconully Dam to fail, flooding could cause permanent damage to wildlife habitats, making them unsuitable for use by general wildlife in the project area.

Alternative B – Proposed Action

Activities included under Alternative B, such as excavation and construction, borrow area use, and road use, would affect wildlife and their habitats. Impacts would be associated with the removal or conversion of feeding or cover for the species that rely on these habitats. As a result, there could be short-term and permanent impacts on wildlife species, such as reduced reproductive success, malnutrition, or increased predation risks leading to displacement. However, Reclamation would implement BMPs such as minimizing the construction footprint, which would minimize loss and degradation of wildlife habitats (**Appendix F**). Additional measures to reduce the spread of noxious weeds and nonnative, invasive plants would further help to minimize loss and degradation of wildlife habitats in areas adjacent to construction.

Additionally, vegetation removal, excavation, and the use of heavy machinery and vehicles on-site could result in injury or harm to individual wildlife; such impacts would be more likely to occur on smaller, less mobile species unable to flee the area quickly. However, impacts would be considered temporary, lasting for the duration of construction activities. Impacts would vary in duration and intensity depending on the construction activity and location.

Noise and human presence could also disturb wildlife by causing temporary habitat avoidance for the duration of construction activities. Effects associated with habitat avoidance would be reduced opportunities for foraging or sheltering for general wildlife species; individuals could experience reduced fitness or reproductive success if alternate habitats are not available nearby. While this is likely to occur in various parts of the project area throughout the duration of construction activities, it is unlikely to cause a population-level effect on any species. This is because once construction is completed in the project area, both noise and human presence would return to baseline levels, and wildlife would likely return to that location unless the habitat was permanently removed.

Other projects that would have the potential to affect terrestrial wildlife species and their habitats include the Salmon Creek River Mile 8 Restoration Project, which would have similar impacts on general wildlife species as Alternative B, such as reduced reproductive success, malnutrition, or increased predation risks which may lead to displacement. When combined with other projects, Alternative B would further contribute to these impacts.

Alternative C

Impacts on wildlife under Alternative C would be the same as those described under Alternative B.

H.6 Acronyms

cfs	cubic feet per second
EX	experimental population
FE	federally endangered
FPE	federally proposed endangered
FPT	federally proposed threatened
FT	federally threatened
GAP	Gap Analysis Project
OID	Okanogan Irrigation District
SC	state candidate
SE	state endangered
SOC	species of concern
U.S.	United States

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Appendix I

Visual Resources Report

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Acronyms and Abbreviations

	Full Phrase
BLM	U.S. Bureau of Land Management
BMP	best management practice
EA	environmental assessment
KOP	key observation point
Reclamation	U.S. Bureau of Reclamation
U.S.	United States
VRM	visual resource management

Appendix I. Visual Resources Report

I.1 Project Description

The United States (U.S.) Department of the Interior, Bureau of Reclamation (Reclamation) owns the Conconully Dam, which is in north-central Washington. Operated by the Okanogan Irrigation District, Conconully Dam is performing as designed; however, Reclamation has determined that the risk of seismic failure exists at the dam. Investigations conducted under Reclamation's Safety of Dams program determined that the dam and foundation are potentially at risk of seismic failure associated with liquefaction of the embankment and foundation materials. Liquefaction occurs when loosely packed, water-logged sediments at or near the ground surface lose their strength in response to strong ground shaking. This risk could result in dam failure, which poses unacceptable risk levels to people, property, and the environment. This proposed project is authorized under the Safety of Dams Act (Public Law 95-578).

Reclamation proposes to reduce the risk of dam failure by constructing a stability berm on a foundation of deep soil mixing reinforcement columns on the downstream face of Conconully Dam. To provide improved operational functionality and compatibility with the proposed stability berm, Reclamation also proposes to upgrade the outlet works by extending, lining, and reinforcing the water conveyance components and installing contemporary water control systems and facilities (such as multiple state-of-the-art valves and a new valve house). These modifications would be performed primarily downstream (also called the dry or stream side) of the dam, with limited activities upstream (also called the wet or reservoir side) of the dam. Fill material would be excavated from a borrow area on the left bank of the reservoir.

The alternatives analyzed in the environmental assessment (EA) and this report include the Alternative A – No Action, Alternative B – Proposed Action, and Alternative C. The No Action alternative reflects existing and expected future conditions in the project area if no action is taken (**Map 2-1** in **Appendix A** of the EA). There would be no new ground disturbance under this alternative. Under the No Action alternative, there would be no structural or operational changes to Conconully Dam, or the outlet works. Under Alternative B, Reclamation proposes to reduce the risk of dam failure due to seismic activity by constructing a stability berm on the downstream face of Conconully Dam, upgrading and extending the outlet works, and installing new water flow control systems and facilities to enhance operational functionality. Activities would primarily occur downstream of the dam with limited activities upstream of the dam. Under Alternative C, Reclamation would upgrade the strength and resilience of the Conconully Dam as described under Alternative B but with a few component construction and location differences (**Map 2-7** in **Appendix A** of the EA).

Additional details and description of the alternatives analyzed can be found in **Chapter 2** of the EA.

I.2 Methodology

Reclamation used the U.S. Bureau of Land Management (BLM) visual resource management (VRM) system for analyzing the impacts on scenery from the action alternatives (Reclamation 2024). The BLM VRM system involves inventorying scenic values and establishing VRM classes with objectives for those values (BLM 1984). The contrast rating system (BLM Manual 8431, Visual Resource Contrast Rating) is a systematic process used by the BLM to analyze potential visual impacts of proposed projects and activities (BLM 1986). Reclamation has not formally established VRM classes for Conconully Dam and the surrounding area. However, existing planning documents, such as the Okanogan County Comprehensive Plan (Okanogan County 2021) and Okanogan Forest Plan (Forest Service 1989) have been reviewed to assign an appropriate VRM class for analysis purposes (Reclamation 2024). These plans place importance on protecting natural landscapes and outdoor recreational opportunities, and they set management objectives for visual resources (Okanogan County 2021; Forest Service 1989). Reclamation lands are not subject to these plans, but the plans are used to assign an appropriate VRM class for analysis purposes because lands that are subject to these plans are near the proposed project.

The Okanogan Forest Plan 1989 includes numerous best management practices (BMPs) designed to limit impacts on the visual quality of the existing landscape. Examples include developing facilities that complement their surroundings and are subservient with the surrounding landscape, limiting disturbance of native vegetation communities and wetlands, implementing reclamation and revegetation efforts to increase visual variety or enhance visual quality levels, and rehabilitating areas which do not meet desired visual quality levels can be rehabilitated (Forest Service 1989).

The Okanogan County Comprehensive Plan does not contain specific management goals for visual resources but includes a Recreation Plan outlining objectives to provide recreational opportunities, which can be closely tied to visual resources, to meet the diverse needs of residents and visitors (Okanogan County 2020, 2021). Demand for the visual resource can be assumed to be closely related to the demand for various recreation opportunities and the lake and nearby lands are identified as significant natural resources based on the importance of the existing recreation values (Okanogan County 2020). The Okanogan County Recreation Plan supports the development of trails (for example, connecting trail down Salmon Creek to old Ruby), improvement and expansion of the facilities in Conconully State Park, improved access to Conconully and Salmon Lakes, and identification of mountain bike routes (Okanogan County 2020, 2021).

Reclamation used VRM Class III objectives to analyze the effects of the visual disturbance resulting from the action alternatives (Reclamation 2024). The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape (BLM 1986).

The degree of contrast is measured by comparing the natural landscape's basic elements of form, line, color, and texture with the visual intrusions created by the action alternatives. Contrast ratings are conducted from key observation points (KOPs), such as along commonly traveled routes and

important recreation areas. This assessment process provides a means for determining visual contrast and for identifying measures to mitigate these impacts (BLM 1986; Reclamation 2024).

Reclamation selected the following three KOPs for conducting the contrast ratings (**Map I-1** in **Attachment A**):

- Liar's Cove Resort
- Shady Pines Resort
- Conconully Cemetery

Reclamation chose KOPs that represent recreation areas and community locations. **Maps I-2**, **I-3**, **I-4**, and **I-5** in **Attachment A** depict areas visible from these locations. A fourth viewpoint (Conconully State Park) was used to show the overall project setting but was not used in the contrast ratings (**Figure B-7** in **Attachment B**).

The contrast ratings were completed by visiting the three KOPs to determine the degree of contrast on the landscape that would be created by the action alternatives from existing and future conditions; such contrasts would be seen by various viewer groups, such as recreationists, motorists, residents, or area Tribes. Each KOP was visited on August 20, 2024, to confirm a line of sight, take landscape photographs, and record site conditions for completing "Section B: Landscape Description" of the visual contrast rating form.

The photographs taken at the KOPs show existing landscape conditions. Photo simulations of the project area when viewed from the KOPs were completed to depict future project conditions approximately 5 years after restoration and revegetation per the Draft Revegetation Plan (**Appendix E** of the EA). The simulations portray the relative scale and extent of the proposed project. They also help public groups visualize and respond to development proposals, making public participation in the planning process more effective. The simulations aid in completing "Section C: Proposed Management Activity" of the visual contrast rating form. **Attachment B** contains the contrast rating forms, photographs of existing conditions, and photo simulations.

The degree of contrast is rated using the matrix provided in "Section D: Contrast Rating" of the visual contrast rating form. Proposed BMPs are considered in the rating. The rating is completed by determining the degree of contrast (strong, moderate, weak, or none) for each element (form, line, color, and texture). This is used to determine conformance with VRM Class III objectives by comparing the contrast ratings with the objectives for VRM Class III.

I.3 Affected Environment

I.3.1 Visual Landscape

The analysis area for visual resources encompasses the entire reservoir and surrounding landscape. Conconully Reservoir takes center stage amidst a diverse topography of rolling hills, rocky outcroppings, and steep slopes. This semi-enclosed landscape showcases varied elevations, where expansive forests predominantly consist of coniferous trees such as pine, fir, and spruce. These

forests gradually open to areas with scattered trees and shrubs, primarily cottonwoods and willows, accompanied by limited herbaceous wetland vegetation and grassland cover on the hillsides. This forested environment not only provides habitat for wildlife but also offers a serene, natural setting for visitors to appreciate.

The project area[1] is on the southeastern side of Conconully Reservoir in the Salmon Creek drainage in Okanogan County, Washington. The project area encompasses a portion of Graveyard Flat, a saddle landform with a rolling topography of glacial kettle depressions. The topography slopes steeply westward toward Conconully Reservoir (Franklin and Dyrness 1973). The elevation in the project area ranges from approximately 2,226 feet along the shoreline of Conconully Reservoir to approximately 2,350 feet on the hillslope to the south of the Graveyard Flat area (Reclamation GIS 2025).

Conconully Reservoir was formed by the construction of Conconully Dam in 1910 (Reclamation 2025a). Conconully Reservoir is 450 acres in size with a maximum depth of 50 feet. Water flows into Salmon Creek through the dam outlet works and, during higher flows, the spillway. The normal reservoir water surface elevation of Conconully Reservoir is 2287 feet (Reclamation 2025b). The reservoir can actively store approximately 13,000 acre-feet (Wilson Engineering 2012).

Generally, there are three distinct vegetation communities in the project area. Shrubland communities with sparse shrub and perennial grasses, such as Sandburg bluegrass and Idaho fescue, intermixed with drought tolerant forbs and invasive species like cheatgrass dominate the Graveyard Flat area. A small area of conifer forest is present on north-facing hillsides in the vicinity of the dam tender house to the south of Graveyard Flat. The shoreline of Conconully Reservoir in the project area supports discontinuous trees and shrubs, mostly cottonwoods and willows, with little herbaceous wetland vegetation. The most prominent visual features from the analysis area are Conconully Reservoir and the surrounding grassland hills. Background features include forested hills and mountain ridges.

Sustained changes in temperature and precipitation patterns, human activity, and naturally occurring events such as wildfires and flooding, could alter the visual characteristics of the landscape. For example, shifting the composition and distribution of plant communities could alter the landscape's visual texture and diversity by changing the colors and patterns of grasslands, forests, and shoreline vegetation. Water levels in Conconully Reservoir could also fluctuate, potentially altering the visual characteristics of the shoreline and the lake itself.

Human presence is evident within the analysis area, including roads, recreational facilities, residential communities and businesses, and a cemetery. Conconully Reservoir is a popular local destination, offering a variety of recreational activities including fishing, boating, camping, picnicking, hiking, and wildlife viewing. Conconully State Park is on the northeastern shoreline of Conconully Reservoir and includes shoreline access, and a boat ramp and boat dock to handle motorized and nonmotorized boats (Washington State Parks 2025). There are several residences on the southeast shore, as well as a recreation area featuring campsites and cabin rentals. Artificial lights from communities and from vehicles traveling on roads are also indicative of human presence on the

[1] The project area is the smaller portion of the larger visual resources analysis area where project activities would occur.

landscape, especially during evening and nighttime hours. However, Conconully Reservoir and its shoreline experience relatively dark skies due to low light pollution and minimal urban interference. These existing conditions are favorable for stargazing, enabling residents to appreciate the beauty of the night sky, including the visibility of numerous stars and the Milky Way. Maintaining these dark sky conditions supports local tourism and contributes to the quality of life for residents.

Sensitive viewers, such as recreational users, Tribal members, and local residents, are likely to be in proximity to the proposed project. Areas of potential viewer sensitivity include Conconully State Park, Shady Pines Resort and nearby residences on the southeastern shoreline, Liar's Cove Resort on the western shoreline, and Conconully Cemetery on the southwestern shoreline. Concerns for visual resources vary by individual and group. These individuals and groups have a strong connection to the natural landscape and recreation opportunities.

I.4 Impact Analysis and Best Management Practices

I.4.1 Impact Analysis

Methods and Criteria

Analysis Indicators

- Conformance with VRM Class III objective from KOPs.

Assumptions

- Impacts on visual resources would be localized due to vegetation (primarily trees) loss and changes in the landform.
- Artificial light levels after construction and during operations and maintenance would be the same as existing artificial light levels.

Alternative A – No Action

Under the No Action alternative, there would be no structural changes to Conconully Dam and no construction-related impacts on visual resources. Visual resources within the area of analysis would continue to remain similar to existing conditions. Naturally occurring events, such as wildfires and flooding, and shifts in temperature and precipitation patterns, would continue to alter the landscape with effects on visual resources in the analysis area.

Under the No Action alternative, the risk of dam failure due to a seismic event would continue. Uncontrolled reservoir draining due to dam failure could impact water levels in Conconully Reservoir, altering the visual characteristics of the shoreline and the lake itself. Impacts on visual resources could include the loss of existing dam structures and modifications to local topography and vegetation patterns. Dam failure could create irregular forms, fragmented lines, and rough, jagged textures as a result of collapsed structures and displaced earth and debris. Color could shift to muddy browns, greys, and washed-out tones, as floodwaters stir up sediment, vegetation is uprooted, and debris spreads across the area. Moreover, impacts on visual quality resulting from dam failure would extend beyond the analysis area, as floodwaters would impact over 3,400 acres

below the dam, including the town of Okanogan and areas along U.S. Route 97. These floodwaters would carry silts, heavier loamy soils, and debris, leading to mass wasting and soil erosion. Structures would collapse, trees would be uprooted, and native vegetation along with irrigated crops could become buried.

VRM Class III Objective Conformance

There would be no structural changes to Conconully Dam under Alternative A. Consequently, there would be no changes to the landscape. In the event of a seismic event and dam failure, the newly formed landscape would present a stark contrast to the existing scenery. Visual changes could include the creation of irregular forms, fragmented lines, and rough, jagged textures as a result of collapsed structures and displaced earth and debris. As floodwaters stir up sediment, uproot vegetation, and disperse debris across the area, the dark greens and golden yellows of the vegetation communities, along with the dark browns of the loamy soils, would shift into muddy browns, grays, and washed-out tones. This would result in major landscape modifications that would dominate the view, failing to meet the objectives of VRM Class III.

Impacts on viewers would vary based on sensitivity level and impacts on the existing land use. Many viewers may feel sadness, loss, or anxiety when witnessing altered landscapes, especially if familiar and cherished places have been transformed or damaged. For individuals directly affected by flooding, the perception may be linked to traumatic experiences, increasing distress or fear. For certain communities, specific landscapes may hold cultural or historical significance, making alterations due to flooding particularly poignant. Over time, some viewers may focus on community resilience and the potential for adaptive strategies in response to changing landscapes, fostering a sense of hope and agency.

Alternative B – Proposed Action

Temporary and Short-term Impacts

Along southeastern shore of Conconully Reservoir, upstream of the dam, construction activities would draw the attention of the casual observer. Activities that would be most visible would be related to the transportation of materials and construction near the upstream side of the dam and within the borrow area. Under Alternative B, most activities related to the construction of the stability berm, outlet works, and new water control components would occur downstream of the dam in areas not visible from the KOPs (**Maps I-2**, **I-3**, and **I-4** in **Attachment A**).

During the construction phase, temporary visual contrast would result from the presence of construction equipment, material stockpiles, disturbed soil, and increased human activity. Within the borrow area, earthmoving activities during construction would have temporary and short-term impacts on the visual landscape from the KOPs due to the removal of vegetation and the disruption of landforms. The excavated areas and the lack of vegetation would result in a stark and abrupt change in color (such as, golden grasses, dark green and brown trees changing to gray-brown excavated areas) and texture as the smooth, bare slopes contrast with the surrounding environment. Along the shoreline of the borrow area, construction of the new boat ramp would impact the visual landscape due to changes in form and texture and the introduction of infrastructure to the

landscape. The new boat ramp would result in minimal temporary impacts on the visual quality of the landscape based on the scale of construction activities associated with this project component.

Temporary lighting used for construction activities would be dispersed points of white light; it would cause glare and be a source of artificial light between sunset and sunrise and during low-visibility work periods[2]. While the lighting would be noticeable during construction, it would be a temporary impact. Reclamation would implement BMPs (**Section I.4.2**) and lighting controls during construction to minimize the potential for impacts from artificial light, including the use of downward-directed, focused lighting fixtures to minimize glare and light pollution. There would be no increase in light pollution, thereby eliminating the potential to impact the quality of dark skies within the analysis area. Artificial lighting levels would return to the current levels after construction is complete.

Permanent Impacts

Permanent visual contrast would occur as a result of permanent infrastructure and modifications to the landscape. Most structural modifications to the dam, such as the stability berm, outlet works, and water control components, would be constructed downstream of the dam. These changes would not be visible from the KOPs. However, is the dam modifications under Alternative B would create the potential for adverse impacts on the visual integrity of historic structures (**Section 3.4** of the EA). The new boat ramp would introduce minor permanent visual contrast through the addition of hard geometric forms that diverge from the existing shoreline. Nonetheless, these visual changes would resemble the geometric patterns characteristic of the dam (**Map I-2** in **Attachment A**).

Use of the borrow area along the shoreline would disturb approximately 20 acres; a 7-acre section of the borrow area would be excavated for material to a depth of 45 feet. The excavated borrow area would be recontoured and sloped to blend with the existing landscape contours once borrow materials were no longer needed. Revegetation efforts would reduce the majority of long-term impacts in this area. However, moderate visual contrast would be anticipated due to changes in color and texture. The new boat ramp would introduce minor visual contrast through the addition of hard geometric forms that diverge from the existing shoreline. Nonetheless, these visual changes would resemble the geometric patterns characteristic of the dam (**Map I-2** in **Attachment A**).

In the event of a seismic event and dam failure, impacts would be similar to those described under the No Action alternative. However, the risk of dam failure due to a seismic event would be reduced under Alternative B compared with the No Action alternative.

Restoration and Revegetation

Restoration and revegetation activities following construction would be implemented to minimize visual contrast (**Appendix E** of the EA). Photo simulations of the project area (**Attachment B**) when viewed from the KOPs were completed to depict future project conditions 5 years after site restoration and revegetation efforts. The borrow area would be recontoured to blend with the surrounding landforms, and native species would be planted to restore the natural environment. The contrast would primarily be noticeable from the KOP at Conconully Cemetery because of its

[2] Various atmospheric condition scenarios may require artificial lighting to increase visibility and safety during workday hours.

proximity to the project area around the dam (**Map I-2** in **Attachment A**). The level of change to the characteristic landscape around the dam would be weak to moderate. After the conclusion of construction and revegetation activities, the visual contrast would decrease as the disruption from construction dust and the presence of heavy equipment would be reduced and natural textures and forms of Conconully Reservoir would be reestablished. Within 5 years post-construction, new, young vegetation communities would be reestablished. Because natural revegetation would soften the abrupt visual changes, the borrow area would begin to mimic existing openings in the landscape and the contrast would gradually diminish over time until bushes and trees mature.

VRM Class III Objective Conformance

Alternative B would result in temporary and short-term impacts on visual resources during construction and permanent impacts on visual resources due to the introduction of permanent infrastructure and modifications to the landscape. Implementation of BMPs (**Section I.4.2**) and the Revegetation Plan (**Appendix E** of the EA) would minimize temporary and short-term disruptions and contribute to minimizing visual contrast and the gradual recovery of visual landscape in the analysis area.

From the KOPs, the level of change to the contrast would be weak to moderate after 5 years. Permanent infrastructure and modifications to the landscape would not blend with the existing landscape and would not attract attention. Sensitive viewers may experience the most adverse effects during the commencement of construction activities; however, the intensity these impacts would diminish over time. Overall, Alternative B would conform with VRM Class III objectives from the KOPs.

Alternative B would also avoid any strong visual contrast in the landscape that would result from dam failure after a seismic event.

Alternative C

Impacts on visual resources under Alternative C would be largely the same as those described under Alternative B. However, under Alternative C, the boat ramp would not be constructed. This would avoid a permanent impact on visual resources and therefore result in slightly less visual contrast than under Alternative B. Alternative C would also conform with VRM Class III objectives from the KOPs.

I.4.2 Best Management Practices

Reclamation would apply BMPs during construction to reduce or avoid impacts. The BMPs would also be incorporated into the construction contract design specifications. The BMPs would change the VRM conformance determinations; however, they would minimize the visual contrast and the impacts on casual observers traveling through the area and more sensitive viewers, such as nearby recreationists, local residents, and Tribal members.

BMPs that would reduce or avoid impacts on visual resources include the following:

- Preserve the natural landscape and preserve and protect existing vegetation not required or otherwise authorized to be removed. To the maximum extent possible, preserve existing plants and use native plants for landscaping.
- Minimize, to the greatest extent practicable, clearings and cuts through vegetation. Irregularly shape authorized clearings and cuts to soften undesirable aesthetic impacts.
- Use the following lighting controls during construction to minimize the potential for impacts from artificial light at night from construction:
    - Shine direct stationary floodlights downward at an angle less than horizontal.
    - Shield floodlights so that floodlights are not a nuisance to surrounding areas.
    - Direct lighting so that residences and adjacent roadways are not in the light's direct beam.
- Correct lighting control problems when they occur, as approved by Reclamation's Contracting Officer's Representative.
- Ensure developed facilities complement and are subservient to the surrounding landscape, wherever possible and compatible with scenic values.
- In construction areas, always minimize waste and prevent trash build up.
- Remove all unused materials and trash from construction and storage sites during the final phase of work. Place all removed material in approved sanitary landfills or storage sites and leave work areas conforming to the natural landscape.
- Grade disturbed land following construction to provide proper drainage and to blend with the natural contour of the land.

I.5 Preparers and Contributors

This report was prepared by the individuals identified in **Table I-1**.

Table I-1. List of preparers and contributors

Name	Role/Responsibility
Reclamation	
Jason Sutter	National Environmental Policy Act Lead, Contracting Officer's Representative
Eve Skillman	Visual Resources Specialist
AECOM	
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Val Stanson	Deputy Project Manager
Theresa O'Halloran	Visual Resources Specialist
Derek Holmgren	Visual Resources Specialist
Rob Lavie	Geographic Information System Specialist
HDR	
James Lane	Visual Resources Photograph Simulations

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Attachment A

Maps

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Attachment A. Maps

Map List

I-1 Key Observation Points
I-2 Conconully Cemetery Viewshed
I-3 Shady Pines Resort Viewshed
I-4 Liar's Cove Resort Viewshed
I-5 Conconully State Park Viewshed

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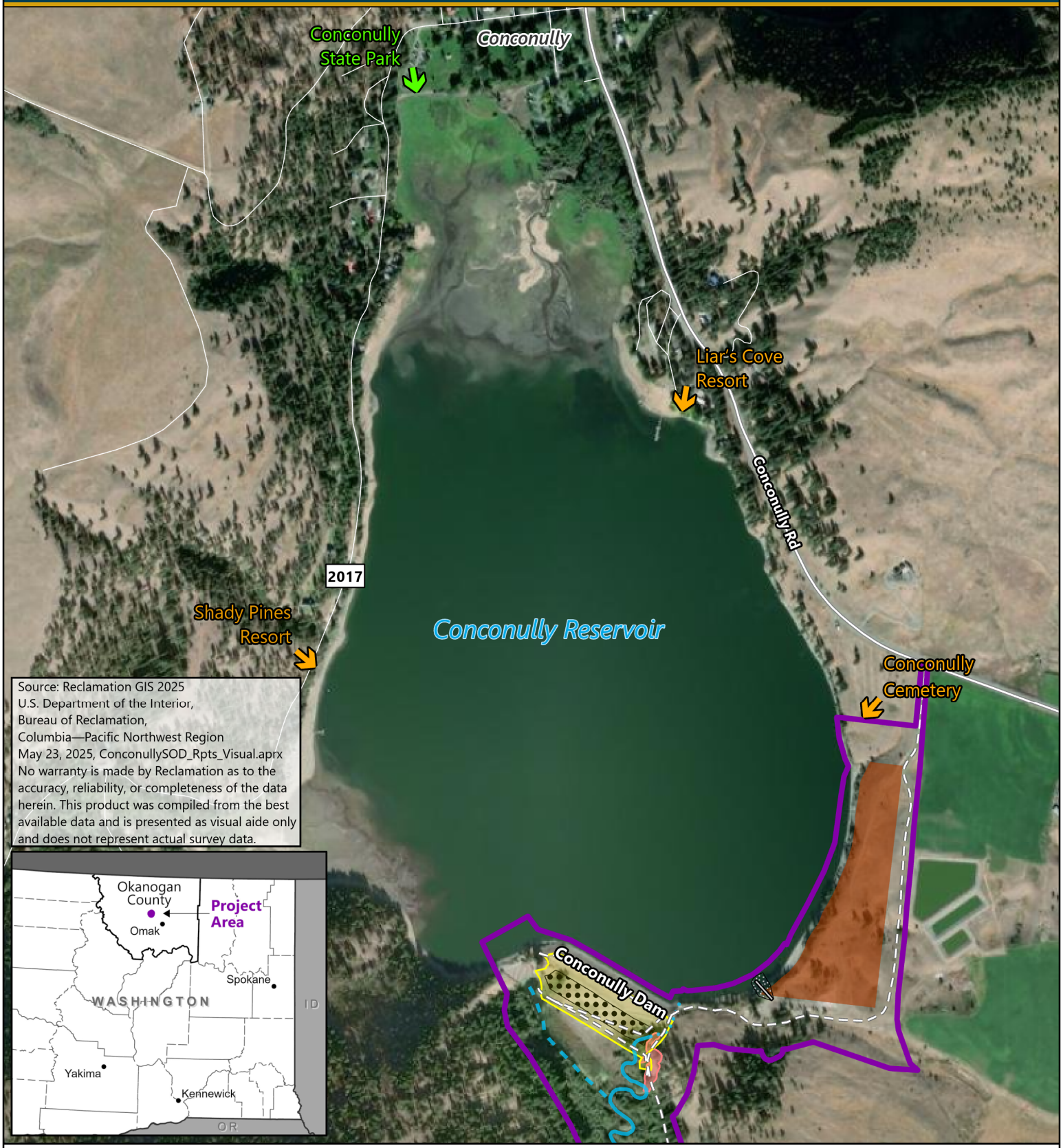
CONCONULLY SAFETY OF DAMS MODIFICATION PROJECT

Environmental Assessment

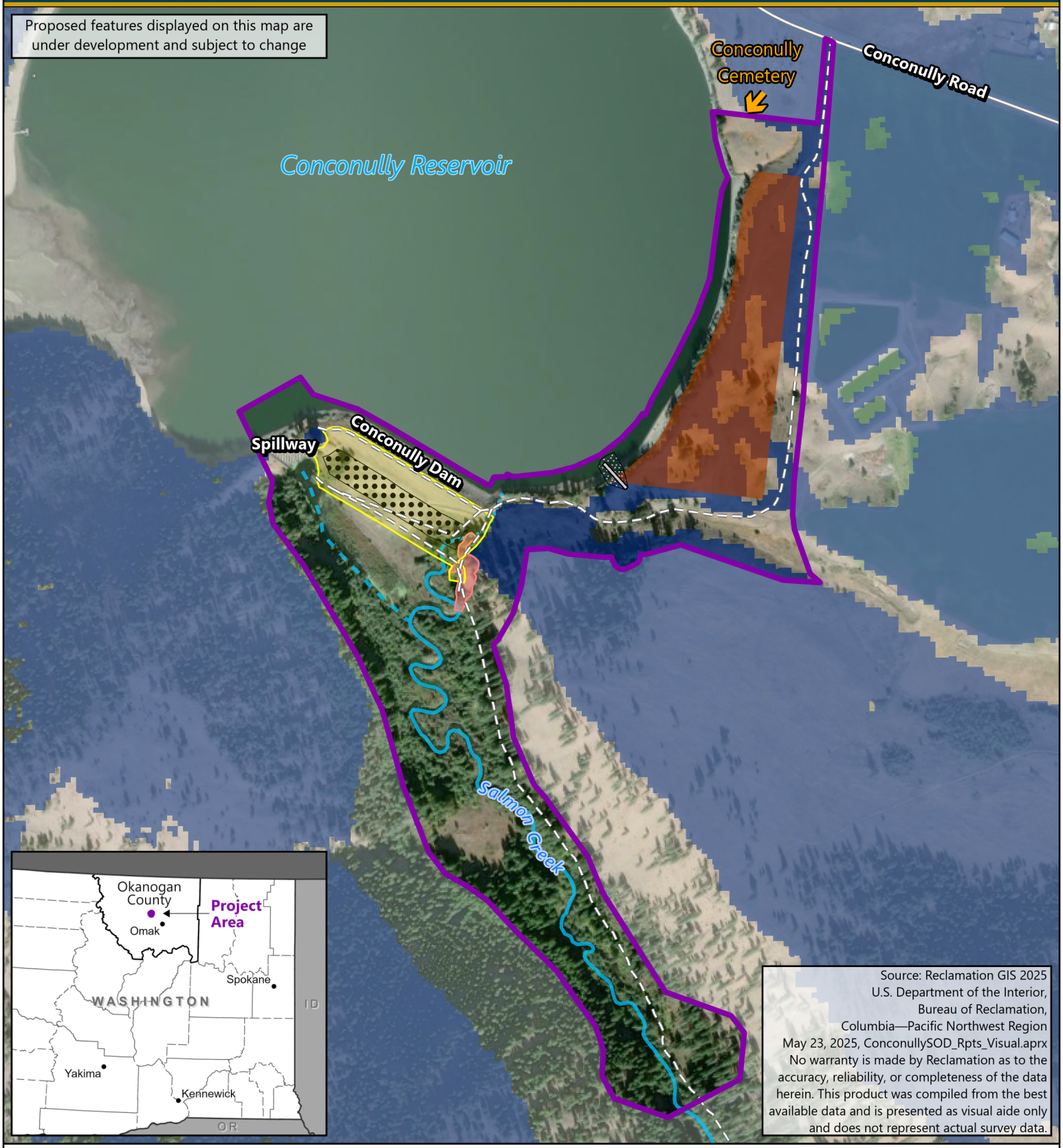


Map I-1. Key Observation Points

- Project Area
- Key Observation Point (KOP)
- Viewpoint
- Stability Berm
- Boat Ramp
- Boat Ramp Excavation and Fill
- Borrow Area
- Outlet Works
- Deep Soil Mixing Foundation
- Roads
- Outlet Works Tunnel
- Spillway Channel
- Stream

N

0 0.125 0.25 Miles

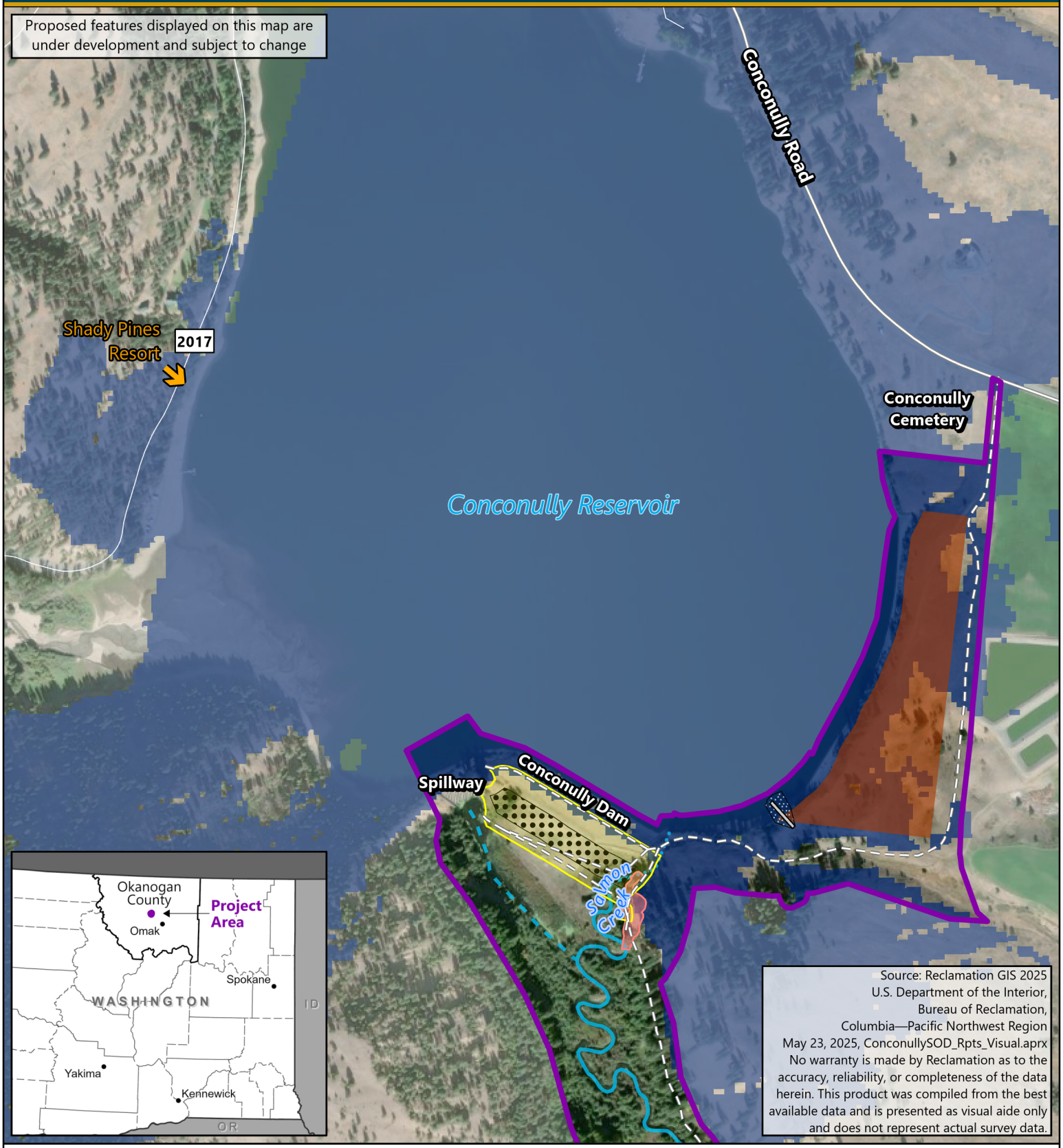


Map I-2. Conconully Cemetery Viewshed

- Project Area
- Key observation point (KOP)
- Area visible from KOP
- Stability Berm
- Boat Ramp
- Boat Ramp Excavation and Fill
- Borrow Area
- Outlet Works
- Deep Soil Mixing Foundation
- Roads
- Outlet Works Tunnel
- Spillway Channel
- Stream

N

0 0.125 0.25 Miles

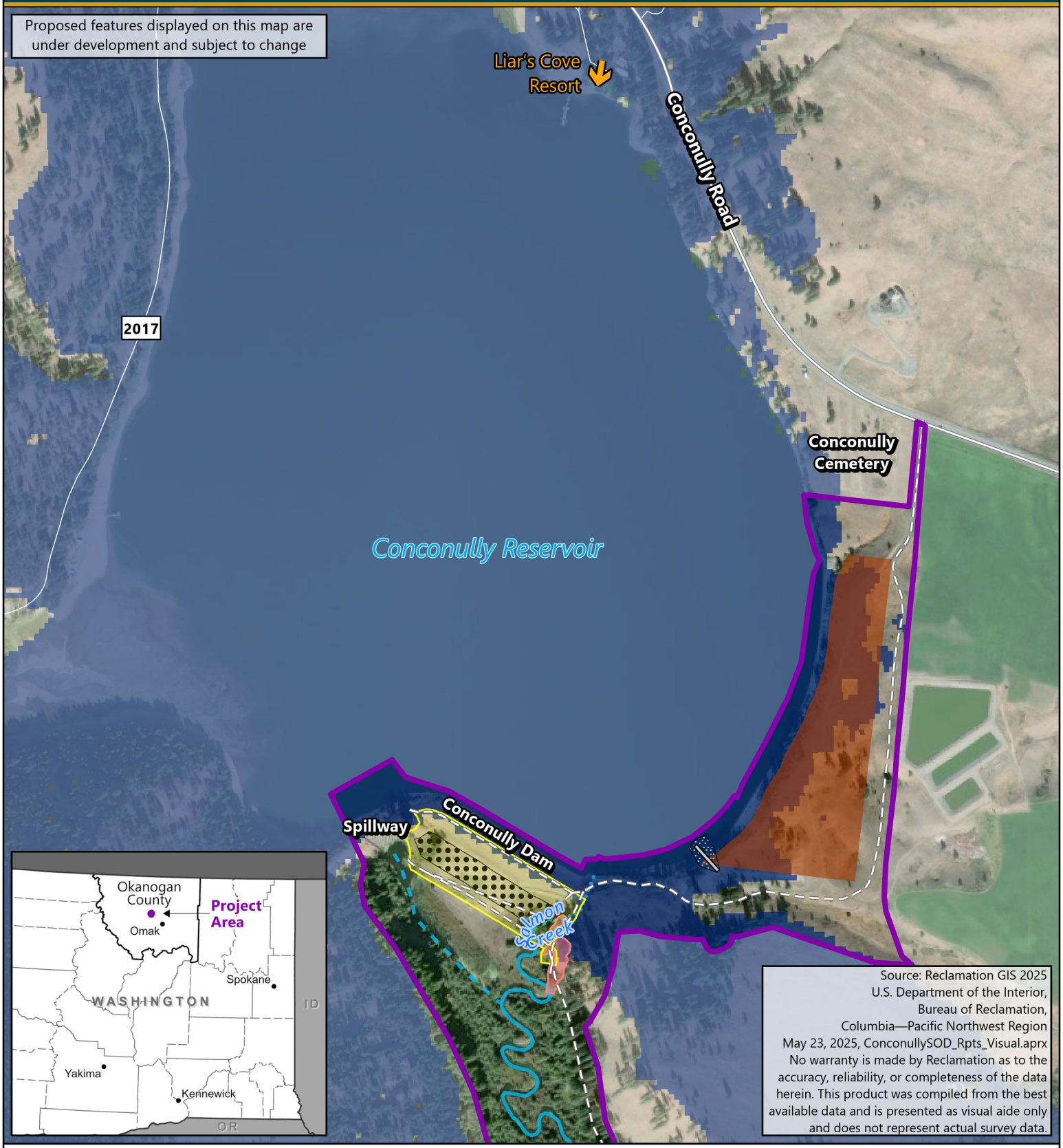


Map I-3. Shady Pines Resort Viewshed

- Project Area
- Key observation point (KOP)
- Area visible from KOP
- Stability Berm
- Boat Ramp
- Boat Ramp Excavation and Fill
- Borrow Area
- Outlet Works
- Deep Soil Mixing Foundation
- Roads
- Outlet Works Tunnel
- Spillway Channel
- Stream

N

0 0.125 0.25 Miles

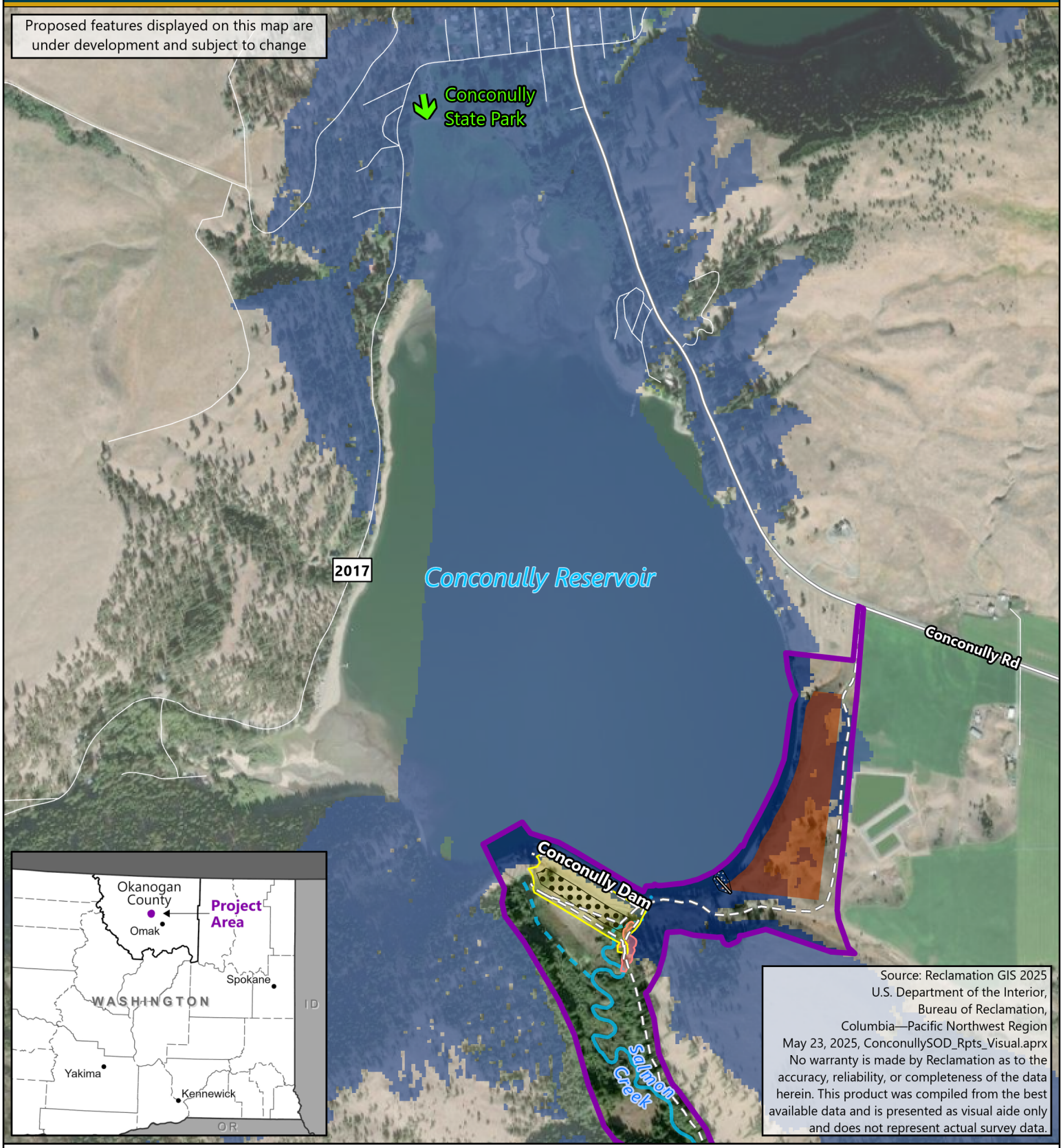


Map I-4. Liar's Cove Resort Viewshed

- Project Area
- Key observation point (KOP)
- Area visible from KOP
- Stability Berm
- Boat Ramp
- Boat Ramp Excavation and Fill
- Borrow Area
- Outlet Works
- Deep Soil Mixing Foundation
- Roads
- Outlet Works Tunnel
- Spillway Channel
- Stream

N

0 0.125 0.25 Miles



Map I-5. Conconully State Park Viewshed

Project Area
Viewpoint
Area visible from viewpoint
Stability Berm
Boat Ramp
Boat Ramp Excavation and Fill
Borrow Area
Outlet Works
Deep Soil Mixing Foundation
Roads
Outlet Works Tunnel
Spillway Channel
Stream

N

0 0.125 0.25 Miles

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Attachment B

Key Observation Point Contrast Rating Worksheets, Photographs, and Simulations

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Attachment B. Key Observation Point Contrast Rating Worksheets, Photographs, and Simulations

Key Observation Point 1

Figure B-1. Key Observation Point 1 is Conconully Cemetery. The existing view is toward the borrow area and the dam.

Figure B-2. Simulated view from Key Observation Point 1 of the borrow area 5 years after excavation, grading, and revegetation. The view is toward the borrow area and the dam.

Visual Contrast Rating Form

Date: April 23, 2025

Project: Conconully SOD EIS

Area/Field Office: Columbia-Pacific Northwest Regional Office

Project Type: Safety of Dams (SOD)

Section A: Project Information

Project Name: Conconully SOD EIS - Visual Resources Report	Location: Lat.48.54317 Long. 119.74180	Location Description: Conconully Cemetery
Key Observation Point: 1		
VRM Class: III		

Section B: Landscape Description

Land and Water Forms

	Foreground	Mid-ground	Background
Form	Gently rolling hills and flat lake.	Gently rolling hills and flat lake.	Steep hills.
Line	Flat and diagonal hills. Horizontal lake. Abrupt edge between hills and water.	Flat and diagonal hills. Transitional edge between rolling hills and steep hills. Abrupt edge between hills and water.	Diagonal and nearly vertical hills. Curving hillsides broken by steep and rugged hills.
Color	Warm browns across hills. Grayish blue water.	Warm browns across hills. Grayish blue water.	Warm to dark browns across hills.
Texture	Smooth hills. Smooth water.	Relatively smooth to bumpy hills. Smooth water.	Bumpy hills.

Vegetation

	Foreground	Mid-ground	Background
Form	Short grasses and discrete conifer trees.	Short grasses and patchy stands of conifer trees.	Larger patches of stands of conifer trees.
Line	Continuous grasses and vertical trees.	Continuous grasses broken by abrupt edge from burn scar. Diagonal stands of vertical trees.	Diagonal stands of vertical trees.
Color	Golden grasses and medium to dark green trees.	Golden grasses with dark brown-black burn scar. Dark green and brown trees.	Golden grasses. Dark green trees with dark brown-black burn areas.
Texture	Smooth, even grasses and stippled trees.	Bumpy vegetation.	Moderately smooth.

Structures

	Foreground	Mid-ground	Background
Form	Discrete utility poles.	Sparse and angular structures (dam and outbuildings).	None
Line	Regular, vertical utility poles.	Isolated structures.	None
Color	Brown utility poles.	White to grey structures.	None
Texture	Stippled utility poles.	Mostly smooth structures.	None

Section C: Proposed Management Activity			
Land and Water Forms			
	Foreground	Mid-ground	Background
Form	Gently rolling hills and flat lake.	Gently rolling hills and flat lake.	Steep hills.
Line	Flat and diagonal hills. Horizontal lake. Abrupt edge between hills and water.	Flat and diagonal hills. Transitional edge between rolling hills and steep hills. Abrupt edge between hills and water.	Diagonal and nearly vertical hills. Curving hillsides broken by steep and rugged hills.
Color	Warm browns across hills. Grayish blue water.	Warm browns across hills. Grayish blue water.	Warm to dark browns across hills.
Texture	Smooth hills. Smooth water.	Relatively smooth to bumpy hills. Smooth water.	Bumpy hills.
Vegetation			
	Foreground	Mid-ground	Background
Form	Short grasses and discrete conifer trees.	Short grasses and patchy stands of conifer trees. Smooth clearings created by restoration and revegetation.	Larger patches of stands of conifer trees.
Line	Continuous grasses and vertical trees.	Continuous grasses. Diagonal stands of vertical trees. Irregular lines created by edge effect of clearings.	Diagonal stands of vertical trees.
Color	Golden grasses and medium to dark green trees.	Golden grasses. Dark green and brown trees. Gray gravel and warm browns in clearings created by restoration and revegetation.	Golden grasses. Dark green trees with dark brown-black burn areas.
Texture	Smooth, even grasses and stippled trees.	Bumpy vegetation.	Moderately smooth.
Structures			
	Foreground	Mid-ground	Background
Form	Discrete utility poles.	Sparse and angular structures (dam and outbuildings).	None
Line	Regular, vertical utility poles.	Isolated structures.	None
Color	Brown utility poles.	White to grey structures.	None
Texture	Stippled utility poles.	Mostly smooth structures.	None

Section D: Contrast Rating													
Degree of Contrast		Features											
		Land/Water Form				Vegetation				Structures			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Elements	Form				x		x						x
	Line				x		x						x
	Color				x		x						x
	Texture				x				x				x
Brief Description of Impacts (Short term is generally 1-5 years)		From KOP 1, the level of change to the contrast would be moderate after five years. Permanent infrastructure and modifications to the landscape would not attract attention and would not dominate the view of the casual observer from the KOP.											
Visual Resource Management Objectives		Proposed Action would conform with VRM Class III objectives.											
Mitigation		Implementation of BMPs and the Revegetation Plan would minimize visual contrast and contribute to the gradual recovery of the visual landscape.											

Key Observation Point 2

Figure B-3. Key Observation Point 2 is Liar's Cove Resort. The existing view is toward the borrow area and the dam.

Figure B-4. Simulated view from Key Observation Point 2 of the borrow areas 5 years after excavation, grading, and revegetation. The view is toward the borrow area and the dam.

Visual Contrast Rating Form	Date: April 23, 2025 Project: Conconully SOD EIS Area/Field Office: Columbia-Pacific Northwest Regional Office Project Type: Safety of Dams (SOD)

Section A: Project Information

Project Name: Conconully SOD EIS - Visual Resources Report	Location: Lat. 4854925 Long. 119.74722	Location Description: Liar's Cove Resort
Key Observation Point: 2		
VRM Class: III		

Section B: Landscape Description

Land and Water Forms	Foreground	Mid-ground	Background
Form	Gently sloping shoreline, flat lake, and steep hills	Gently rolling hills and flat lake.	Steep hills.
Line	Flat shoreline, horizontal lake, and diagonal hills. Transitional edge between hills and shoreline. Abrupt edge between shoreline and water.	Flat and diagonal hills. Transitional edge between rolling hills and steep hills. Abrupt edge between hills and water.	Diagonal and nearly vertical hills. Curving hillsides broken by steep and rugged hills.
Color	Warm browns across hills. Dark browns and grays across shoreline. Grayish blue water.	Warm browns across hills. Grayish blue water.	Warm to dark browns across hills.
Texture	Smooth hills. Coarse shoreline. Smooth water.	Relatively smooth to bumpy hills. Smooth water.	Bumpy hills.

Vegetation	Foreground	Mid-ground	Background
Form	Patchy bushes, short grasses, and larger patches of stands of conifer trees.	Short grasses and patchy stands of conifer trees.	Larger patches of stands of conifer trees.
Line	Round bushes, continuous grasses, and vertical trees.	Continuous grasses broken by abrupt edge from burn scar. Diagonal stands of vertical trees.	Diagonal stands of vertical trees.
Color	Golden grasses, light green bushes, and medium to dark green trees.	Golden grasses with dark brown-black burn scar. Dark green and brown trees.	Golden grasses. Dark green trees with dark brown-black burn areas.
Texture	Smooth grasses and bushes, stippled trees.	Bumpy vegetation.	Moderately smooth.

Structures	Foreground	Mid-ground	Background
Form	Sparse and angular structures (cabin)	Sparse and angular structures (dam and outbuildings).	None
Line	Isolated structures.	Isolated structures.	None
Color	Brown and light green structures	White to grey structures.	None
Texture	Mostly smooth structures.	Mostly smooth structures.	None

Section C: Proposed Management Activity			
Land and Water Forms			
	Foreground	Mid-ground	Background
Form	Gently sloping shoreline, flat lake, and steep hills	Gently rolling hills and flat lake.	Steep hills.
Line	Flat shoreline, horizontal lake, and diagonal hills. Transitional edge between hills and shoreline. Abrupt edge between shoreline and water.	Flat and diagonal hills. Transitional edge between rolling hills and steep hills. Abrupt edge between hills and water.	Diagonal and nearly vertical hills. Curving hillsides broken by steep and rugged hills.
Color	Warm browns across hills. Dark browns and grays across shoreline. Grayish blue water.	Warm browns across hills. Grayish blue water.	Warm to dark browns across hills.
Texture	Smooth hills. Coarse shoreline. Smooth water.	Relatively smooth to bumpy hills. Smooth water.	Bumpy hills.
Vegetation			
	Foreground	Mid-ground	Background
Form	Patchy bushes, short grasses, and larger patches of stands of conifer trees.	Short grasses and patchy stands of conifer trees. Smooth clearings created by restoration and revegetation.	Larger patches of stands of conifer trees.
Line	Round bushes, continuous grasses, and vertical trees.	Continuous grasses. Diagonal stands of vertical trees.	Diagonal stands of vertical trees.
Color	Golden grasses, light green bushes, and medium to dark green trees.	Golden grasses. Dark green and brown trees. Warm browns in clearings created by restoration and revegetation.	Golden grasses. Dark green trees with dark brown-black burn areas.
Texture	Smooth grasses and bushes, stippled trees.	Bumpy vegetation.	Moderately smooth.
Structures			
	Foreground	Mid-ground	Background
Form	Sparse and angular structures (cabin)	Sparse and angular structures (dam and outbuildings).	None
Line	Isolated structures.	Isolated structures.	None
Color	Brown and light green structures	White to grey structures.	None
Texture	Mostly smooth structures.	Mostly smooth structures.	None

Section D: Contrast Rating													
Degree of Contrast		Features											
		Land/Water Form				Vegetation				Structures			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Elements	Form				x			x					x
	Line				x				x				x
	Color				x			x					x
	Texture				x				x				x
Brief Description of Impacts (Short term is generally 1-5 years)		From KOP 2, the level of change to the contrast would be weak after five years. Permanent infrastructure and modifications to the landscape would not attract attention and would not dominate the view of the casual observer from the KOP.											
Visual Resource Management Objectives		Proposed Action would conform with VRM Class III objectives.											
Mitigation		Implementation of BMPs and the Revegetation Plan would minimize visual contrast and contribute to the gradual recovery of visual landscape.											

Key Observation Point 3

Figure B-5. Key Observation Point 3 is Shady Pines Resort. The existing view is toward the borrow area and the dam.

Figure B-6. Simulated view from Key Observation Point 3 of the borrow areas 5 years after excavation, grading, and revegetation. The view is toward the borrow area and the dam.

Visual Contrast Rating Form	Date: April 23, 2025 Project: Conconully SOD EIS Area/Field Office: Columbia-Pacific Northwest Regional Office Project Type: Safety of Dams (SOD)

Section A: Project Information

Project Name: Conconully SOD EIS - Visual Resources Report	Location: Lat.48.54418 Long. 119.75820	Location Description: Shady Pines Resort
Key Observation Point: 3		
VRM Class: III		

Section B: Landscape Description

Land and Water Forms

	Foreground	Mid-ground	Background
Form	Flat lake.	Flat lake. Steep and gently rolling hills.	Gently rolling hills.
Line	Horizontal lake.	Horizontal lake. Flat, curving, and diagonal hills. Transitional edge between rolling hills and steep hills. Abrupt edge between hills and water.	Flat and curving hillsides.
Color	Grayish blue water.	Warm to dark browns across hills. Grayish blue water.	Dark browns across hills.
Texture	Smooth water.	Relatively smooth to bumpy hills. Smooth water.	Smooth hills.

Vegetation

	Foreground	Mid-ground	Background
Form	None.	Short grasses and patchy stands of conifer trees.	Short grasses and patchy stands of conifer trees.
Line	None.	Continuous grasses broken by abrupt edge from burn scar. Diagonal stands of vertical trees.	Continuous grasses and diagonal stands of vertical trees.
Color	None.	Golden grasses with dark brown-black burn scar. Medium to dark green trees.	Golden grasses. Dark green trees.
Texture	None.	Bumpy vegetation.	Moderately smooth.

Structures

	Foreground	Mid-ground	Background
Form	None	Sparse and angular structures (dam and outbuildings).	None
Line	None	Isolated structures.	None
Color	None	White to grey structures.	None
Texture	None	Mostly smooth structures.	None

Section C: Proposed Management Activity			
Land and Water Forms			
	Foreground	Mid-ground	Background
Form	Flat lake.	Flat lake. Steep and gently rolling hills.	Gently rolling hills.
Line	Horizontal lake.	Horizontal lake. Flat, curving, and diagonal hills. Transitional edge between rolling hills and steep hills. Abrupt edge between hills	Flat and curving hillsides.
Color	Grayish blue water.	Warm to dark browns across hills. Grayish blue water.	Dark browns across hills.
Texture	Smooth water.	Relatively smooth to bumpy hills. Smooth water.	Smooth hills.
Vegetation			
	Foreground	Mid-ground	Background
Form	None.	Short grasses and patchy stands of conifer trees. Smooth clearings created by restoration and revegetation.	Short grasses and patchy stands of conifer trees.
Line	None.	Continuous grasses. Diagonal stands of vertical trees.	Continuous grasses and diagonal stands of vertical trees.
Color	None.	Golden grasses. Medium to dark green trees. Warm browns in clearings created by restoration and revegetation.	Golden grasses. Dark green trees.
Texture	None.	Bumpy vegetation.	Moderately smooth.
Structures			
	Foreground	Mid-ground	Background
Form	None.	Sparse and angular structures (dam and outbuildings).	None
Line	None.	Isolated structures.	None
Color	None.	White to grey structures.	None
Texture	None.	Mostly smooth structures.	None

Section D: Contrast Rating													
Degree of Contrast		Features											
		Land/Water Form				Vegetation				Structures			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Elements	Form				X			X					X
	Line				X				X				X
	Color				X			X					X
	Texture				X				X				X
Brief Description of Impacts		From KOP 3, the level of change to the contrast would be weak after five years. Permanent infrastructure and modifications to the landscape would not attract attention and would not dominate the view of the casual observer from the KOP.											
Visual Resource Management Objectives		Proposed Action would conform with VRM Class III objectives.											
Mitigation		Implementation of BMPs and the Revegetation Plan would minimize visual contrast and contribute to the gradual recovery of visual landscape.											

Figure B-7. Viewpoint from Conconully State Park toward the borrow area and the dam to show the overall setting. This viewpoint was not used in the contrast ratings.

Appendix J

Design and Construction Information

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Appendix J. Design and Construction Information

J.1 Alternative B – Design Drawings

J.1.1 Outlet Works – East Alignment

Figure J-1 shows an overview and profile view of the proposed outlet works modification. The proposed outlet works includes a 700-foot-long, 60-inch-diameter steel pipe installed within the existing outlet works tunnel and extending further downstream through the stability berm to a valve house, where it would discharge into a stilling basin and discharge channel.

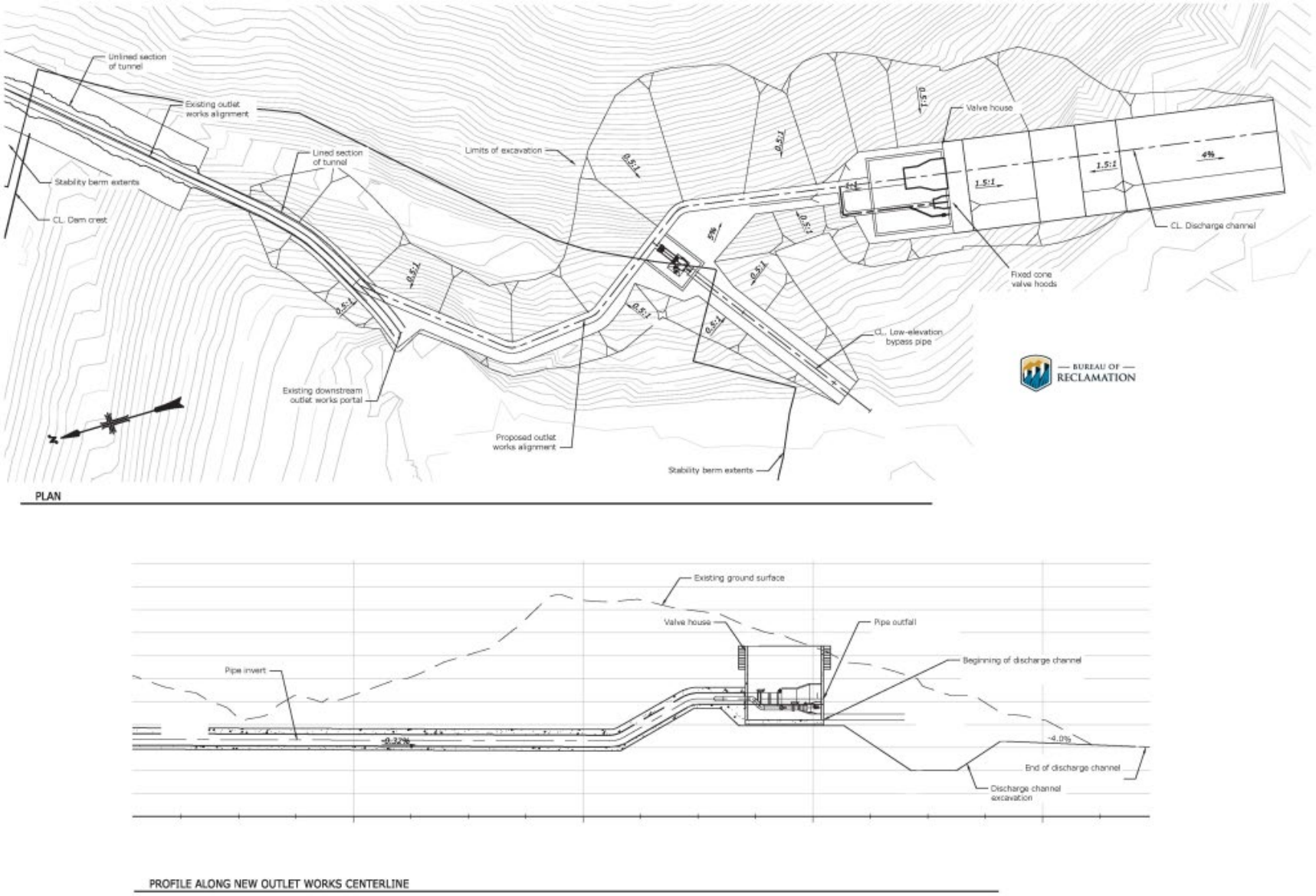

Figure J-1. Overview and profile of Alternative B outlet works – east alignment

J.1.2 Stability Berm

The proposed stability berm would be constructed on a foundation of reinforced DSM columns on the downstream side of the existing dam embankment. Once completed, the stability berm would be 1 foot higher than the current dam crest and would be 180 feet wide. The toe of the new stability berm would be located 255 feet from the toe of the current dam.

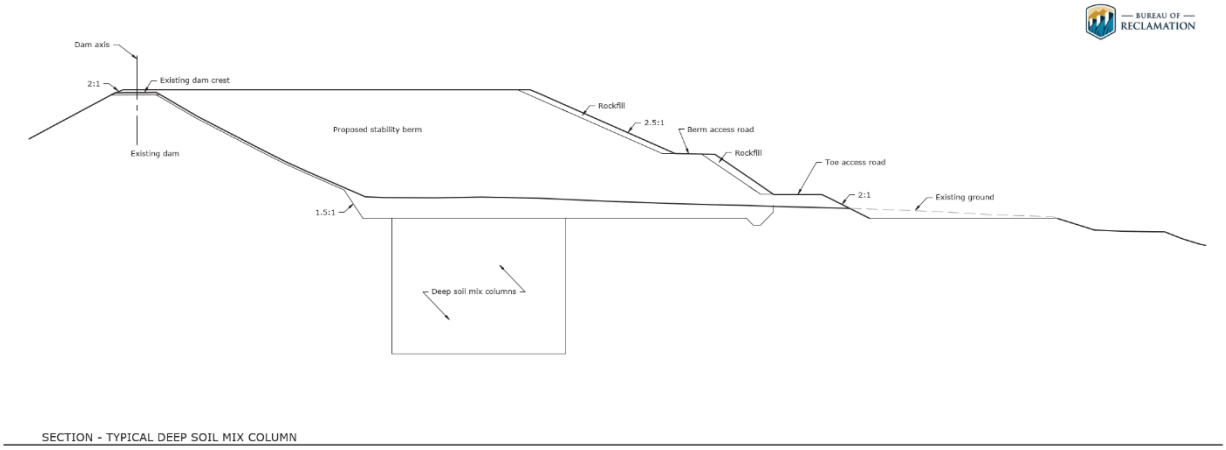

Figure J-2. Alternative B stability berm profile

J.2 Alternative C – Design Drawings

J.2.1 Outlet Works – West Alignment

Under Alternative C, the alignment of the outlet works would be shifted west from the Alternative B alignment, requiring less rock excavation. The outlet works extension would be shorter under Alternative C in comparison with Alternative B and would discharge into Salmon Creek at one location as opposed to two locations under Alternative B.

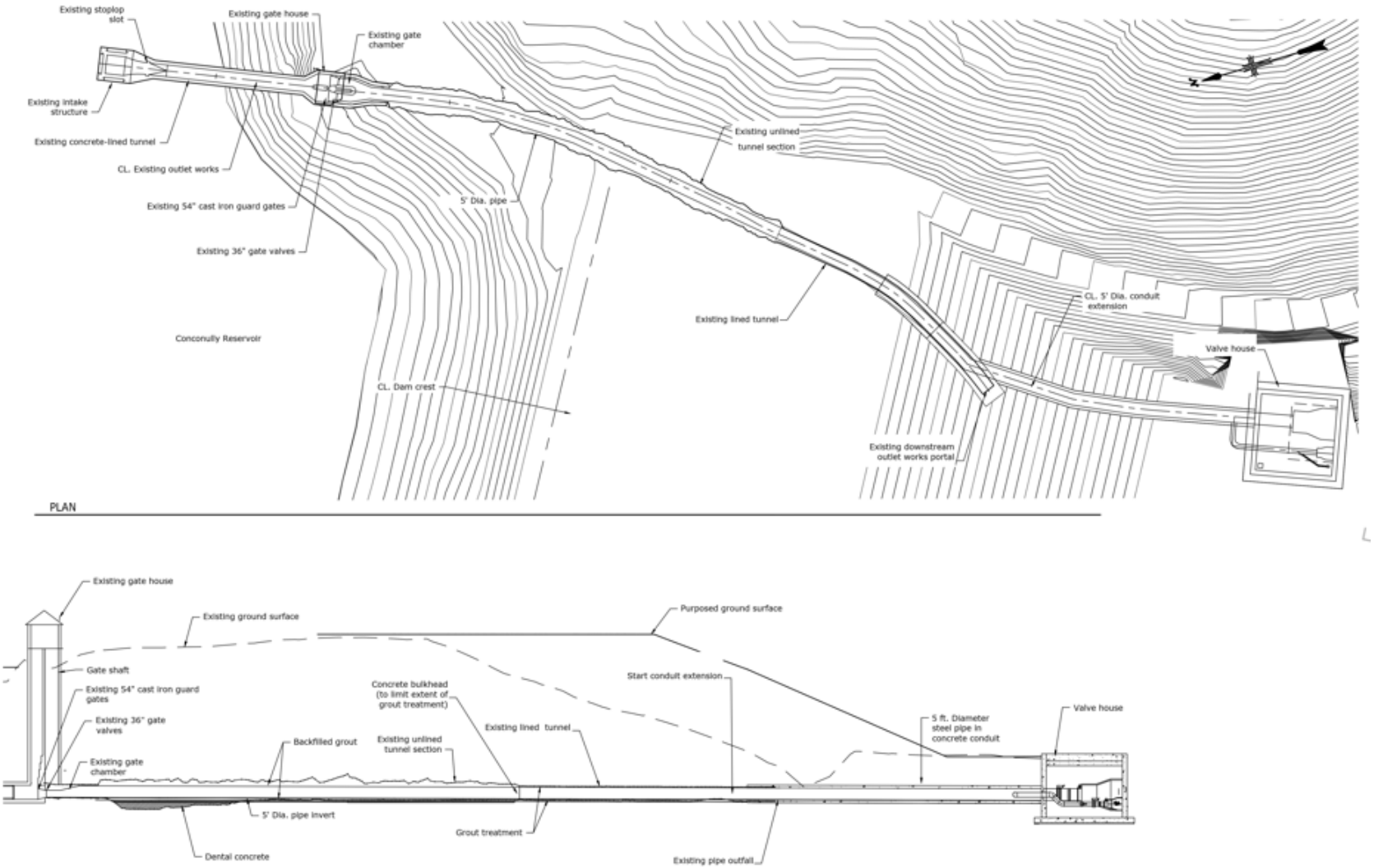

Figure J-3. Overview and profile of Alternative C outlet works – west alignment

J.2.2 Stability Berm

The stability berm under Alternative C would not be as wide as described under Alternative B because the outlet works extension would be shorter. The toe of the new stability berm under Alternative C would be located 205 feet from the toe of the existing dam.

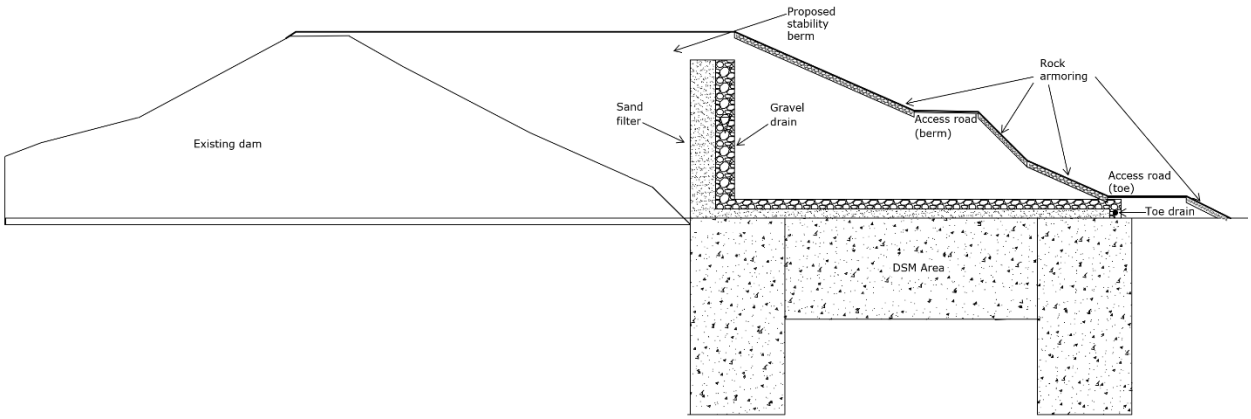

Figure J-4. Alternative C stability berm profile

J.3 Construction

Construction activities are anticipated to take place over a minimum 4-year period. **Table J-1** identifies the general timing of each component. Construction equipment would likely operate continuously during regular workday hours of 7:00 a.m. to 10:00 p.m. throughout the construction period (as deemed acceptable under Washington Administrative Code [WAC] 332-52-130) for up to 6 days per week. However, there could be certain circumstances where longer work periods would be necessary that would require Reclamation's Contracting Officer's Representative approval.

To prepare the project area for construction activities, all vegetation, including shrubs and trees, would be cleared and roots removed where required (such as within the borrow area, stability berm, and outlet works footprints). Trees cleared from the project area would be stored on-site for use in revegetation and habitat restoration efforts; surplus trees would be removed from the site and disposed of properly (for example, as lumber or landfill). Non-woody vegetation would be cleared from designated construction areas and masticated on site for use in revegetation efforts or disposed of by the contractor. Topsoil would be removed and stored for future use in site reclamation efforts. During construction, Conconully Reservoir would be managed within its historical/current operating range of elevation 2250 to 2287. After the completion of the construction activities, site restoration activities, including revegetation of disturbed upland and wetland/riparian areas within the project area, would be implemented (**Appendix E**).

Table J-1. General timing of component construction and use for the action alternatives

Activity	Year 1	Year 2	Year 3	Year 4	Year 5
Outlet works (including intake bulkhead, stilling basin/discharge channel, and valve house)[1]	X	X	X	X	—
Spillway pumps	X	X	X	X	—
Borrow area	X	X	X	X	—
Administrative/storage/staging area	X	X	X	X	X
Dam access road[2]	X	—	—	X	—
Security infrastructure[3]	X	—	—	X	—
Boat ramp	X	—	—	—	—
Toe drain	X	X	—		—
Utilities	X	—	—	—	—
Temporary cofferdam (installation and removal)	X	X	X	X	—
Relief wells	—	X	—	—	—
Foundation	—	X	X	X	—
Stability berm			X	X	—
Gate house and control house	—	—	X	X	—
Restoration and revegetation projects	—	—	—	X	X

[1]Construction of the outlet works is complex and could extend the construction period up to an additional 2 years if construction conditions are not favorable.
[2] The temporary alignment of the dam access road would be constructed at the start of the project (Year 1). The final, permanent alignment of the dam access road would be put in place once construction has been completed.
[3] A temporary access gate near Conconully Road and temporary lighting would be installed at the start of the construction period. A permanent access gate would be installed at the end of construction. The temporary access gate would be removed once monitoring indicates that soil stabilization has been achieved and vegetation has been successfully established.

J.3.1 Outlet Works

Construction of the outlet works would start after the irrigation season ends during the fall/winter of Year 1, pause during the following spring and summer irrigation season, and resume in the fall/winter of Year 2. It is anticipated to be completed by the following spring of Year 3 (**Table J-1**). However, construction of the outlet works is complex, and the construction period could be extended through the fall/winter of Year 3 with completion in the spring of Year 4 if work conditions are not favorable. Construction and completion of the outlet works and valve house may run concurrently with DSM activities for the foundation.

The rock slope downstream of the existing outlet works would be excavated using an excavator fitted with a rock hammer/hydraulic hammer to create the trench to place the outlet works pipe extension. Material excavated from the trench would be used for armoring the stability berm or elsewhere within the project area, as needed.

J.3.2 Gate House and Control House

Work on reinforcing the base of the existing gate house foundation with a concrete apron and riprap would likely occur between mid-September and mid-December during Years 3 and 4 when the reservoir level is at its seasonal low (**Table J-1**).

J.3.3 Stability Berm

Cement for the DSM columns in the foundation would be delivered to the site prior to construction and would require 10 delivery trucks per week for 1.5 years (**Table J-2**). A paddle auger mounted on a drilling rod would mix soil with grout pumped through nozzles at the end of the auger to create each DSM column. DSM columns would be installed with two drill rigs running simultaneously for an estimated 6-month duration of column installation (unless equipment breakdown occurs).

The construction of the stability berm is expected to take about 9–12 months, from the winter of Year 3 into the fall of Year 4 (**Table J-1**). Fill materials would be transported to the dam site using typical heavy equipment, such as, but not limited to scrapers or articulated trucks; blended using a tractor and disc pair; and compacted with a roller. Construction of the stability berm would be finalized by grading using a motor grader and dozer. Most of the heavy machinery required for stability berm construction would likely operate continuously during regular workday hours of 7:00 a.m. to 10:00 p.m. throughout the construction period (with potential exceptions noted above).

Table J-2. Construction truck trips and timeframe for the action alternatives[1]

Component/Activity	Number of Truck Trips (total)	Timeframe for Truck Trips (total number of weeks)
Outlet works (Alternative B) – pipe delivery	20	1–20
Outlet works (Alternative C) – pipe delivery	11	1–10
Foundation – DSM cement delivery	640	64–96
Stability berm – sand filter and gravel drain material	2,240	36-52
Toe drain – HDPE pipe and precast vaults	6	2–4
Relief well – well casings and filter sand	10	3–6
Boat ramp – surface (Alternative B only)	20	4–8
Access roads – gravel	10	4–8
Administrative/storage/staging area	300	16-20

[1] Components/activities would be the same for both action alternatives unless otherwise specified.

J.3.4 Toe Drain

Up to six large trucks would deliver the HDPE pipe and precast vaults needed for the toe drain (**Table J-2**). Truck deliveries for these materials would occur over 2-4 weeks.

J.3.5 Relief Wells

Up to 10 large trucks would deliver the materials needed to construct the relief wells, including the well casings and filter sand (**Table J-2**). Truck deliveries for these materials would occur over 3-6 weeks.

J.3.6 Borrow Area

At the start of construction, vegetation would be cleared from the borrow area and topsoil would be stripped and stockpiled for use in later revegetation efforts. Sand, gravel, and miscellaneous backfill to construct the stability berm would be processed from material excavated from the borrow area

and/or commercially sourced. A track- or wheel-mounted screening plant[1] may be used to process the material. A mobile crusher[2] could also be utilized to assist with aggregate production. A wash plant, with water from Conconully Reservoir, would be used for cleaning.

The borrow area would be in use for the full duration of the 4-year construction period (**Table J-1**). Up to 450,000 cubic yards of native material would be excavated from the borrow area under Alternative B.

J.3.7 Boat Ramp

The surface of the boat ramp could be constructed with precast interlocking concrete blocks, cast in place concrete, concrete planks, or aggregate surfacing. The selected boat ramp surface would be delivered by 20 trucks over the course of 4-8 weeks (**Table J-2**).

J.3.8 Access Roads

The dam access road would be surfaced with gravel, which would be a mix of material obtained from commercial sources and/or the borrow area. It is also possible that the contractor would need gravel to build up roads within the borrow area during construction. Gravel needed for the access roads would be delivered by up to 10 trucks over the course of 4-8 weeks (**Table J-2**).

J.3.9 Administrative/Storage/Staging Area

Approximately 2,990 cubic yards of gravel for the surface of the administrative/storage/staging area would be a mix of material obtained from commercial sources and/or the borrow area that would be delivered by up to 300 trucks over the course of 4 months (**Table J-2**).

J.3.10 Aquatic and Wetland Habitat Restoration

To facilitate movement of equipment and materials associated with restoration activities, access to Salmon Creek would be constructed; site access details would be identified in future site-specific planning efforts. It is assumed this road would utilize existing construction roads when possible and would be surfaced with gravel. This road would be reclaimed once restoration activities were completed.

A staging area for equipment and materials specific to restoration activities would be identified within a location with previous surface disturbance from project construction activities. This area would be sufficiently spacious to accommodate a variety of materials, including fill soil, log decks, and project equipment. It would also allow ample room for vehicles and machinery, such as trucks and heavy equipment, to maneuver and turn around safely.

A trackhoe would likely be the primary tool utilized for restoration activities such as logjam construction, channel excavation, adding woody material, or gravel augmentation. Often, two excavators would work in tandem to enhance efficiency. A front-end loader or articulated truck would be responsible for transporting wood and fill material to the excavator's worksite from a

[1] Example of a track- or wheel mounted screening plant: https://www.metso.com/portfolio/nordtrack-screens/
[2] Example of a mobile crusher: https://www.metso.com/portfolio/nordtrack-crushers/

staging area. Excavators generally remain stationary until the designated tasks are complete, as moving them frequently would be highly inefficient.

Additional information on proposed aquatic and wetland habitat restoration activities can be found in **Appendix G**.

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Appendix K

List of Preparers

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Appendix K. List of Preparers

K.1 Preparers and Contributors

The EA was prepared by the individuals identified in **Table K-1.**

Table K-1. List of preparers

Name	Role/Responsibility
Reclamation Interdisciplinary Team	
Jason Sutter	NEPA Lead, Biological Resources, Geology and Soils, Public Health and Safety, Transportation and Traffic, Utilities and Service Systems, Habitat Restoration, GIS
Matt Uranga	Project Manager, Project Engineer
Keenan Arnold	Columbia-Pacific Northwest SOD Coordinator, Project Engineer
Eric Bergstrom	Design Team Lead, Project Engineer
Christopher Schwartz	Legal Review
Rebecca Thompson	Policy Review, Noise
Jessica Peters	Air Quality and Climate
Cory Sandow	Water Resources
McLain Johnson	Biological Resources (Fish and Aquatic Resources), Habitat Restoration
Kaitlin Hovanes	Cultural Resources (Built Environment)
Mary Velazquez	Cultural Resources (Archaeologist)
Melinda Hernandez Burke	Tribal Interests
Eve Skillman	Visual Resources
Julie McPherson	Recreation
Karissa McDonald	Land Use
Iris Maska	Socioeconomics
Peter Purchase	Public Health and Safety (Hazardous Materials)
AECOM	
Amy Lewis	Project Manager
Val Stanson	Deputy Project Manager, Public Health and Safety, Transportation
Rob Lavie	GIS Specialist
Shine Roshan	Air Quality and Climate
Dylan Lanka	Air Quality and Climate
Claire Elias	Geology and Soils
Kirsti Davis	Geology and Soils
David Scott	Water Resources
Brandt Bates	Water Resources
Morgan Trieger	Biological Resources
Sara Piccolomini	Biological Resources (Vegetation, Terrestrial Wildlife)
Andy Clodfelter	Biological Resources (Fish and Aquatic Resources)

Name	Role/Responsibility
Rachel Laird	Biological Resources (Fish and Aquatic Resources)
Perry Lown	Cultural Resources, Tribal Interests
Rachel Pearson	Cultural Resources
Theresa O'Halloran	Visual Resources
Derek Holmgren	Recreation, Visual Resources
Allison Piazzoni	Recreation
Megan Hillgartner	Land Use, Utilities and Service Systems
Zoe Ghali	Socioeconomics
David Rice	Socioeconomics
Eddie Sanchez	Public Health and Safety, Transportation and Traffic
HDR	
Robert Brenneman	Noise
Benjamin Copenhaver	Noise