UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
Portland, Oregon 97232-1274

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Refer to NMFS No: WCRO-2020-01737

February 11, 2021

Michael S. Erickson
Chief, Environmental Compliance Section
U.S. Army Corps of Engineers, Walla Walla District
201 North 3rd Avenue
Walla Walla, WA 99362-1876

Re: Endangered Species Act Section 7(a)(2) Biological Opinion for the Mill Creek General Investigation Feasibility Study, Mill Creek Watershed (1707010202), in Walla Walla County, Washington

Dear Mr. Erickson:

Thank you for your letter of June 24, 2020, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Mill Creek General Investigation Feasibility Study in Walla Walla, Washington. This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

After reviewing the current status of the species, the environmental baseline, the effects of the proposed action, and the cumulative effects, NMFS concludes that the proposed project is not likely to jeopardize the continued existence of ESA-listed Middle Columbia River (MCR) steelhead (*Oncorhynchus mykiss*). NMFS also determined the action will not destroy or adversely modify designated critical habitat for MCR steelhead. Rationale for our conclusions is provided in the attached biological opinion (opinion). The enclosed opinion is based on information provided in your biological assessment, July 21 through July 28, 2020, emails and phone conversations between NMFS (Diane Driscoll) and the U.S. Army Corps of Engineers (Corps) (Ben Tice, Walla Walla District), additional information provided by Corps letter dated August 20, 2020, November 19 through December 21, 2020, email conversations between NMFS (Colleen Fagan) and Ben Tice, and other sources of information cited in the opinion.

As required by section 7 of the ESA, NMFS provided an incidental take statement (ITS) with the opinion. The ITS includes reasonable and prudent measures (RPMs) that NMFS considers necessary or appropriate to minimize incidental take associated with the proposed action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements that the Corps and any person who performs the action must comply with to carry out the RPMs.

Incidental take from the proposed action that meets these terms and conditions will be exempt from the ESA take prohibition.

Please contact Colleen Fagan, Interior Columbia Basin Office, La Grande, Oregon, (541) 962-8512 or colleen.fagan@noaa.gov, if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Assistant Regional Administrator
Interior Columbia Basin Office
NOAA Fisheries, West Coast Region

Enclosure

cc: [File]
Ben Tice, Ben.J.Tice@usace.army.mil
Jeff Krupka, USFWS, jeff_krupka@fws.gov
Katherine Sarensen, USFWS, Katherine_sarensen@fws.gov
Gary James, CTUIR, garyjames@ctuir.org
Mike Lambert, CTUIR, mikelambert@ctuir.org

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion

Mill Creek General Investigation Feasibility Study in Walla Walla, Washington

NMFS Consultation Number: WCRO-2020-01737

Action Agency: U.S. Army Corps of Engineers, Walla Walla District

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely To Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Middle Columbia River steelhead (*Oncorhynchus mykiss*)	Threatened	Yes	No	Yes	No

Consul isheries Service, West Coast Region

Issued ___

Assistant Regional Administrator
Interior Columbia Basin Office
NOAA Fisheries, West Coast Region

Date: February 11, 2021

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1. INTRODUCTION

This Introduction section provides information relevant to the other sections of this document and is incorporated by reference into Sections 2 and 3, below.

1.1. Background

National Marine Fisheries Service (NMFS) prepared the biological opinion (opinion) and incidental take statement (ITS) portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.), and implementing regulations at 50 CFR 402, as amended.

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. A complete record of this consultation is on file at NMFS' La Grande, Oregon office.

1.2. Consultation History

NMFS received the U.S. Army Corps of Engineers (Corps) request for formal consultation and a biological assessment (BA) on June 24, 2020. The Corps concluded that the proposed action is "likely to adversely affect" Middle Columbia River (MCR) steelhead (*Oncorhynchus mykiss*) and its designated critical habitat.

Emails and phone conversations between NMFS (Diane Driscoll) and the Corps (Ben Tice, Walla Walla District) occurred July 21, 2020, through July 28, 2020. NMFS then requested additional information via letter from Dale Bambrick on July 30, 2020. Within the letter, NMFS asked the Corps if they were interested in a framework biological opinion. NMFS also requested additional information on dewatering, fish salvage, turbidity, and precautions that would be taken to stormproof work areas and protect fish from hazardous materials. Additional information was provided by letter dated August 20, 2020, in which the Corps also indicated they did not wish to pursue a framework consultation.

Additional information on equipment use within the channel, fish salvage, temporary and permanent access ramps, construction at the railroad bridge and the North 13th Avenue Bridge, tree removal, relocation of utility poles, and the diversion trigger was requested by NMFS (Colleen Fagan), and provided by Ben Tice, between November 19 and December 21, 2020.

Consultation was initiated on December 22, 2020.

Over the past two decades, in multiple settings and contexts, NMFS, along with the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and the Washington Department of Fish and Wildlife (WDFW), has requested that the Corps provide reliable fish passage and improve habitat for ESA-listed steelhead at the Mill Creek Flood Control Project (MCFCP). The Corps did provide

a fish ladder at the First Division Works and has experimented with notching some of the concrete weirs to facilitate juvenile passage through the federally controlled portion of the channel.

Throughout development of the Mill Creek GI Study, NMFS, CTUIR, and WDFW urged the Corps to include in its proposed action reliable fish passage for adult and juvenile steelhead through the federally-controlled portion of the MCFCP, and through the Corps-constructed, transferred portions of the channel downstream, as well as measures to improve water quality and fish habitat in lower Mill Creek.

The Corps' Tentatively Selected Plan that is evaluated in this biological opinion does not include measures to improve passage or habitat conditions for Middle Columbia River steelhead. It is the Corps position that such actions are beyond the scope of their authorities and/or funding capabilities.

1.3. Proposed Federal Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies (50 CFR 402.02). The Walla Walla District of the Corps' General Investigation Feasibility Study (GI Study), begun in 2018 and scheduled to be completed in 2021, is being conducted within the Mill Creek Flood Control Project (MCFCP). The Corps is conducting its GI Study to identify alternatives to reduce the susceptibility of Walla Walla and surrounding areas to flood-related property damage and financial and human life losses from Mill Creek over the 50-year period of analysis. As part of the GI Study, the Corps proposes to (1) rehabilitate the concrete channel in high-risk areas, (2) raise levees up to 2.2 feet in six areas where the levee is too low, (3) and raise the trigger at which flood diversions to Bennington Reservoir begin from 1,400 cubic feet per second (cfs) to 1,700 cfs.

The MCFCP, authorized by Congress in 1938 [Public Law (PL) 75-761] (the Flood Control Act of 1938), was constructed to provide flood risk reduction to the city of Walla Walla and its adjacent lands. The MCFCP is 7 miles long and located entirely within Walla Walla County, Washington. It begins about 2 miles east of the city of Walla Walla and ends in the city of College Place at the Gose Street Bridge (Figure 1). The upstream 1.4 miles of the MCFCP is owned by the Federal Government, operated and maintained by the Corps. The federal portion consists of two dams, the First Division Dam and the Mill Creek Diversion Dam, approximately 1.1 miles of stabilized channel between the two dams, 556 acres of nearby land and open water (Bennington Reservoir), and two canals to drain the reservoir (Russel Creek Outlet Channel and Mill Creek Return Canal). The stabilized channel is confined on both banks by levees, and flows through a series of energy dissipater sills and weirs. The downstream 6 miles of the channel is owned by Walla Walla County, and operated and maintained by the Mill Creek Flood Control Zone District (MCFCZD). The locally owned and managed portion consists of approximately 4 miles of riprapped levees and channel spanning weirs, and 2 miles of concrete channel, which includes a long, unlighted subterranean section. Over 80 percent of the concrete flumed reach of Mill Creek is approximately 50 feet wide, with a trapezoidal to horizontal shaped overbank (high-flow channel), and a low flow trench (low-flow channel) of approximately 9 feet wide. Both the federal and the non-federal portions of the MCFCP are included in the GI Study consultation.

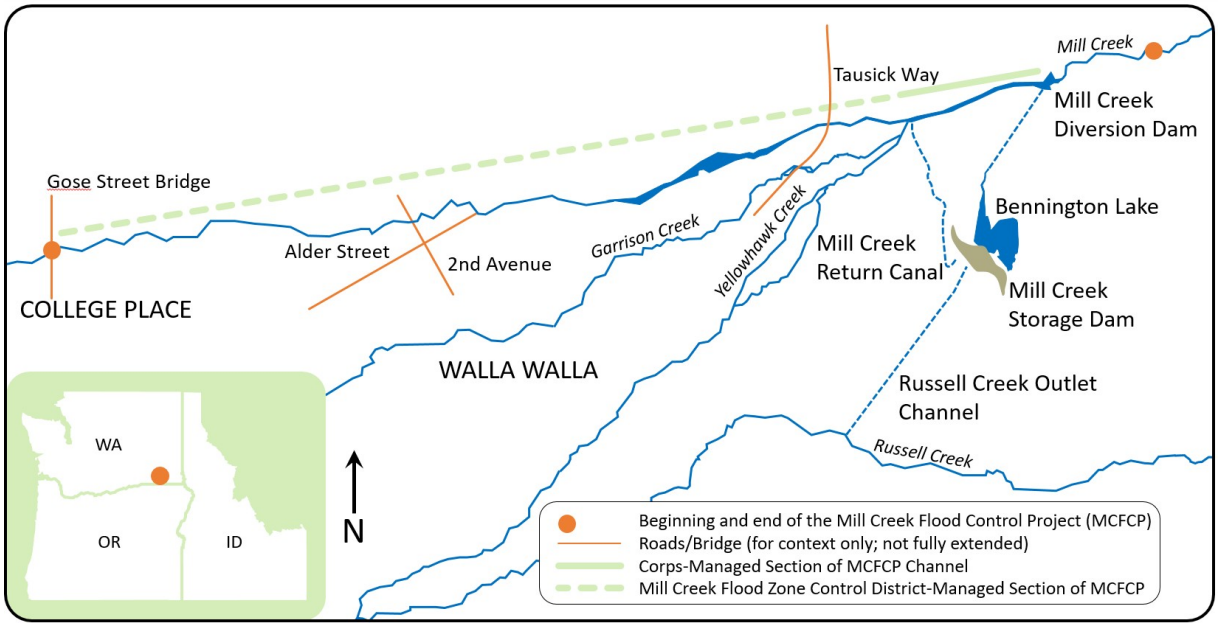

Figure 1. Location of the Mill Creek Flood Control Project in Walla Walla County, Washington.

The proposed action in the GI Study includes the following:

1. Rehabilitating approximately 870 feet of the concrete channel in areas that are determined to be at high-risk for failure.
2. Raising the levees a small amount in areas where they are too low (approximately 5,375 feet in length) to safely convey 3,700 cfs.
3. Raising the trigger at which flood diversions to Bennington Lake begin from 1,400 cfs to 1,700 cfs. Effects of this action have already been assessed and are included in WCRO-2018-00274, the Endangered Species Act Section 7(a)(2) Biological Opinion for the Operation and Maintenance of the Mill Creek Flood Control Project, Lower Mill Creek Subwatershed (170701020204), Middle Mill Creek Subwatershed (170701020202), Russell Creek Subwatershed (170701020801), Walla Walla County, Washington (Mill Creek O&M Biological Opinion).
4. Fish salvage.
5. Installation of temporary and permanent access ramps.

1.3.1. Rehabilitate Existing Concrete Channel

The Corps assessed the entire concrete channel section of the MCFCP and identified areas needing rehabilitation. Due to the high cost associated with repairing all of the deficiencies, the Corps prioritized areas based on risk and reliability. The three highest priority areas are included in the proposed action. Rehabilitation of these areas include:

1. Wall tiebacks using soil anchors (500 feet)
2. Center wall reinforcement (150 feet)
3. Channel cover removal (220 feet)

Concrete channel repair work will occur from July 15 to September 15, when flows are low (below 10 cfs) and Mill Creek is contained in the low-flow channel. The contractor will be

required to place debris barriers between all work areas and the low-flow channel to prevent any construction debris from entering Mill Creek and flowing water.

Wall Tiebacks Using Soil Anchors

Wall tieback will occur on the left bank of Mill Creek from Merriam Street to approximately 200 feet downstream of Otis Street. The length of wall repair is approximately 500 feet. Holes for the anchors will be core drilled in the wall to be tied back (Figure 2). The holes will be approximately 5 feet apart along the length of the wall. Anchors will be installed through the holes in the wall and approximately 20 feet into the soil beyond the wall. Base plates and nuts will be installed on each anchor. Once the anchors are installed, a 2-inch layer of concrete will be placed over the anchor. This work will occur during the summer when Mill Creek flows are low and confined to the center low-flow channel.

The work area will be isolated from Mill Creek and the low-flow channel will be covered with plywood or steel plates to keep construction material out of the water. No in-water construction will occur, but blocking may be installed in water to support the plywood and steel plates. Installation and removal of isolation materials may also require walking in the low-flow channel.

Staging and access will occur approximately 300-feet downstream of the project on the left bank. Equipment use will occur in the high-flow channel. Equipment used in the high-flow channel will likely include a skid steer with special cutting and drilling attachments and pickup trucks to haul construction materials.

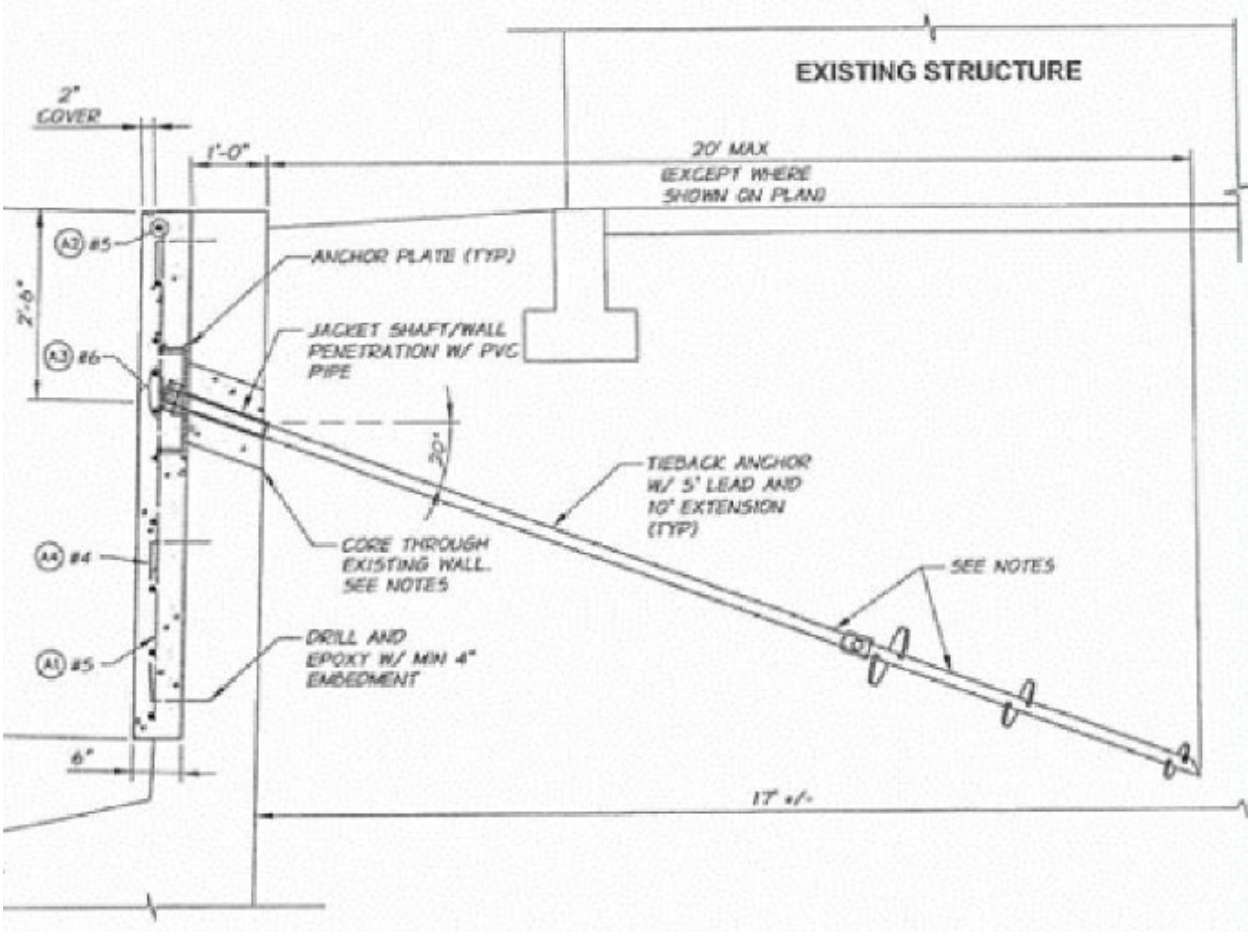

Figure 2. Typical engineer drawing for installation of wall tiebacks along 500 feet of the Mill Creek Flood Control Project levee.

Because of the location of construction activities within the high-flow channel, access will require construction of a temporary access ramp and fish salvage will occur. Both are discussed in more detail below.

Center Wall Reinforcement

The center wall under the Die Brucke Building, 38 East Main Street, is constructed of steel pipe columns with a timber plank and concrete/gravel in-fill between the columns. The timber planks and in-fill will be removed, and a cast-in-place, reinforced concrete wall will be constructed around the current steel pipe columns and anchored to the concrete footing below (Figure 3). The center wall reinforcement will likely be drilled, doweled, and then epoxied or grouted to hold the dowels in place. The wall will be approximately 16 inches thick and approximately 150 feet long. New concrete will be cured for a minimum of 20 days prior to contact with creek water to minimize impacts to water quality. Because of the location of construction activities within the high-flow channel, fish salvage will occur.

The work area will be isolated from Mill Creek, and the low-flow channel will be covered to keep construction material out of the water. Installation of isolation materials may require

walking in the low-flow channel, and in-water installation of blocking to support the plywood and steel plates used to cover Mill Creek. Staging and access will occur at South Colville Street, where Mill Creek goes subterranean. Equipment and vehicles will be operated from within the high-flow channel. These likely include a skid steer loader with a special drilling attachment and pickup trucks used to transport construction materials.

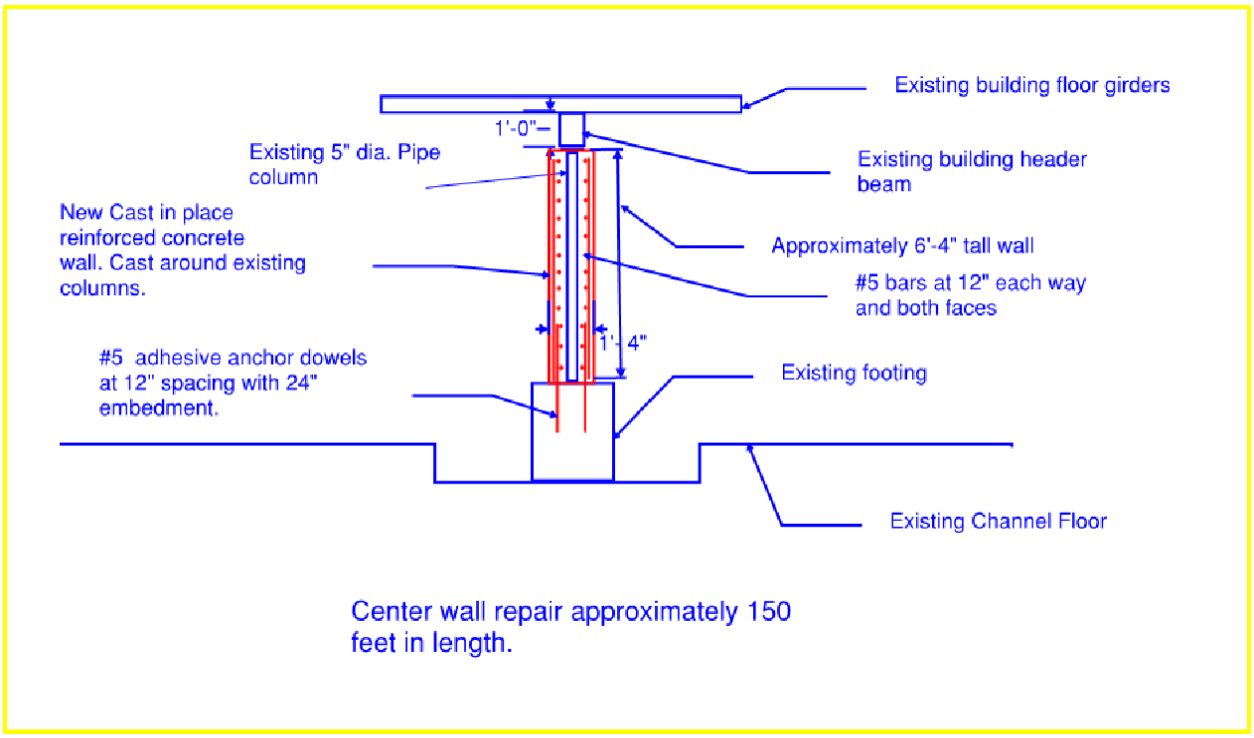

Figure 3. Center wall column reinforcement in the Mill Creek Flood Control Project channel below the Die Brucke Building in Walla Walla, Washington.

Channel Cover Removal

Two sections of the MCFCP channel cover are significantly deteriorated and will be removed (Figure 4). The first location is a parking area between 2nd and 3rd Avenues. Approximately 100 feet of cover over Mill Creek will be removed and a guardrail will be placed around the new opening. The second area for channel cover removal is upstream of 2nd Avenue. Approximately 120 feet of cover over Mill Creek will be removed and a concrete guardrail will be placed around the new opening. Because of the location of construction activities within the high-flow channel, fish salvage will occur.

Access to both locations will be from West Rose Street. Staging will occur in parking lots at both locations. Both work areas will be isolated from Mill Creek and the low-flow channel will be covered to keep construction material out of the water. Shoring will be installed around the areas to be removed to ensure the walls do not rotate and move while the ceiling is being removed. The shoring, likely steel members installed with concrete anchors on the walls of the channel, will be installed while working in the high-flow channel under the ceiling.

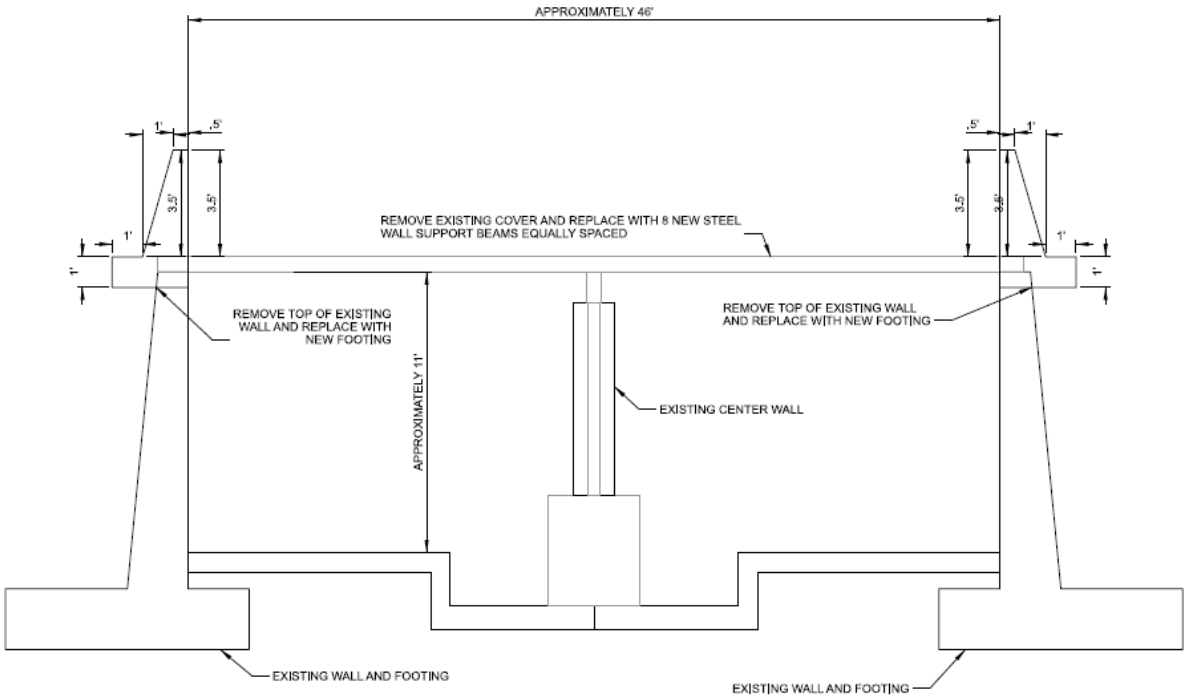

Figure 4. Typical design for channel cover removal in two locations of the Mill Creek Flood Control Project.

Some temporary decking will be installed over the low-flow channel to provide additional workspace, and to prevent debris from getting into the channel. Installation of isolation materials may require walking in the low-flow channel and in-water installation of blocking. Materials will likely be hauled up the high-flow channel from the access around 3rd or 4th Street by hand and with a small forklift.

Once the shoring and decking are in place, saw cuts will be made around part of the opening and an excavator with a bucket and a claw will remove the channel ceiling in pieces. Any debris that falls on the decking or the floor of the channel will be lifted out of the channel with an excavator, assisted by workers in the channel.

Once the demolition of the existing ceiling is complete, the top of the existing wall on both sides of Mill Creek will be removed by saw cutting, and some excavation on the sides of the channel will occur to install footings for the permanent concrete walls around the openings. Forming will be installed and concrete barrier walls will be poured around the openings. Some permanent steel bracing will be installed through the openings with an excavator or small crane. Once construction is complete, the temporary shoring, decking, and isolation materials will be removed from the channel.

Dewatering

Dewatering may occur for the center wall and ceiling repairs. This would involve construction of a temporary diversion dam (ecology blocks and plastic sheeting) upstream of the repair area with

a bypass pipeline, designed to convey at least 50 cfs, to transport water around the work area. The bypass pipe would be adequately sized and braced to pass anticipated flows during the work window as well as allow for downstream migration of fish. Once the dam is constructed, the water in the low-flow channel would recede and any fish within the project reach would move downstream, or nets and seines would be used to herd fish downstream, out of the construction site. Electrofishing would not occur. Corps staff would be present to ensure no fish are stranded. The area dewatered would be about 1,600 square feet around the center wall and 2,400 square feet around the ceiling removal areas, or 10,400 square feet for the entire reach, 1,300 feet long by 8 feet wide. The pipeline would remain in place until the repair work is complete. The contractor will be allowed to propose a different dewatering plan, but it would be subject to review and approval by the Corps prior to construction.

1.3.2. Raise the Levees

Some reaches of levee will need to be raised by a maximum of 2.2 feet in order to meet the 3,700 cfs, 1 percent annual exceedance probability flood criteria for the National Flood Insurance Program (Figure 5). This will allow for an increase in flow conveyance capacity through the leveed areas, which improves operational flexibility of the MCFCP. Levee heights were estimated from previous LiDAR survey information, with the "worst case" height being used at each reach for the analysis. As models are updated and refined, the locations and required heights for the levee raise may change.

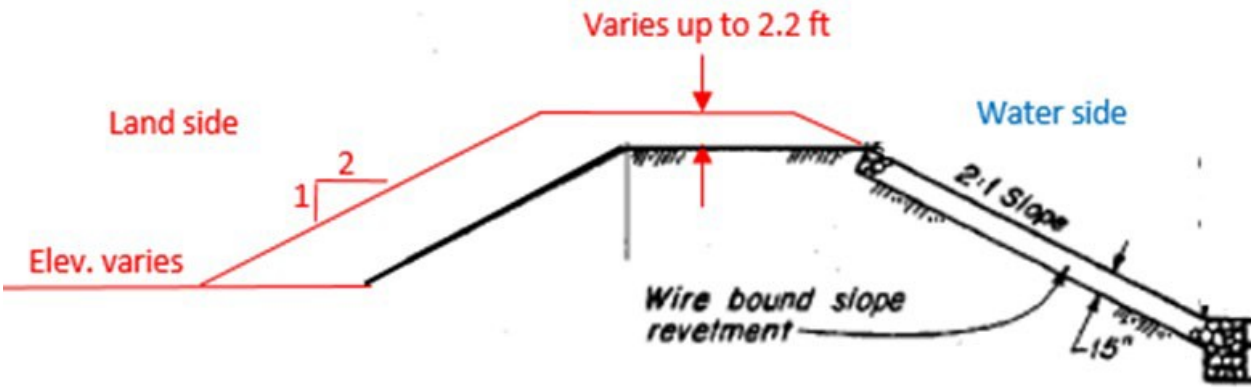

Figure 5. Typical section of proposed levee raise for the Mill Creek Flood Control Project.

The total length of levee raise is approximately 5,375 feet in six discontinuous sections on both the right and left banks, including:

1. Combination of road and levee raise and a new wall along 280 feet of the left bank at the First Division Works. A step structure will be constructed across the walkway entrance and tied into wall extensions on both sides. Approximately 225 feet of new wall will be constructed, 118 feet tying into the step structure downstream and 107 feet tying in upstream. Approximately 55 feet of existing concrete wall will be raised 1 foot. Anchor holes will be drilled into existing concrete and anchors will be installed. Forms will be installed and concrete will be placed in the forms. There will be no excavation or work within the channel.

2. Levee raise of 1 foot along 560 feet of the left bank immediately upstream of N. Tausick Way. The levee may need to be widened to meet current criteria. Levee widening would occur on the landside of the levee and include adding fill to maintain the appropriate slope. Site preparation includes removing approximately six trees (20-inch diameter or less), 3,000 square feet of canopy, along the landside slope. Existing fencing will be removed and replaced.
3. Gabion wall raise along 450 feet of the left bank near North Wilbur Road. A new gabion basket, 1.5 feet tall and 3 feet wide, will be placed on the existing wire bound rock revetment wall.
4. Combination of levee and wall raise along 800 feet of both banks between North 9th Avenue and the downstream railroad bridge, and installation of 80 feet of steel plates to the bottom of the railroad bridge structural members. Left and right bank levees will be raised 2.2 feet. At the railroad bridge, a new 30-foot levee tie-in wall or wall extension will be constructed on each bank. Additional riprap will be placed above existing riverside riprap to protect wall foundation from scour. One-half-inch-thick galvanized steel plates will be attached to the bottom of the railroad bridge structural members and form a continuous cover over the bottom surface of the bridge. Equipment (all-terrain forklift, ladders) will be used in Mill Creek to attach the plates. Plates will be attached using clamps so that the plates can be attached without drilling holes or modifying structural members. Existing fencing on the left bank will be removed and replaced. Existing utility poles on the levees may need to be relocated. If utility poles are relocated, they will be moved farther from Mill Creek.
5. Levee raise of 2 feet along 730 feet of both banks between the railroad bridge and North 13th Avenue. The levee raise includes constructing a concrete parapet wall across the North 13th Avenue Bridge to keep the highest flood flows from damaging the bridge, and construction of a new 30-foot concrete levee tie in wall on both banks. Existing fencing on the right bank will be removed and replaced. Temporary forms will be constructed on the upstream side of the bridge and a short concrete wall will be poured. Temporary shoring will be constructed in Mill Creek to support the forms and wall until they are cured.
6. Levee raise of 6 inches along 1,000 feet of the right bank at Northeast Myra Road.

Very little excavation, other than clearing and grubbing, is anticipated for raising the existing channel levees. For levees with smaller required raises, additional road gravel or asphalt concrete pavement will be used to meet criteria. For areas requiring raising and extending existing concrete walls by bridge abutments and the First Division Works, excavation into the existing levees will be required, but will be shallow due to the proposed height of the walls. Some additional riprap may be necessary above the existing riprap toe to protect the toe of the new wall extensions. One section of existing gabion wall will also need to be raised to reduce headcut potential upstream of a bridge abutment. Currently, it is assumed that the existing wirebound slope revetment will not need to be extended or modified under this proposed plan.

To provide access for normal maintenance operations and flood fighting operations, minimum crown widths of 10 to 12 feet are commonly used. If there are areas that do not meet the minimum 10-foot width, they will be widened during the levee raise.

All of the work to raise the levees will be conducted from the top or landside of the levees. Additional material will be placed on top of the levees and on the landward side of the levees and compacted. Therefore, there is no in-water or in-channel work associated with raising the levees. In-channel work will be required to construct new concrete walls and add the parapet at the North 13th Avenue Bridge and to install base plates on the bottom of the railroad bridge.

1.3.3. Modify the Flood Diversion Operations

The proposed action in the GI Study includes increasing the trigger at which water is diverted from Mill Creek to Bennington Reservoir, from 1,400 cfs to a trigger of 1,700 cfs. The effects of this change in diversion trigger were analyzed by NMFS in WCRO-2018-00274 (Mill Creek O&M Biological Opinion). Therefore, NMFS considers the flood control trigger of 1,700 cfs part of the environmental baseline and will not reevaluate it as part of this proposed action.

1.3.4. Fish Salvage

Mill Creek will be isolated from construction work. However, the Corps will conduct fish salvage in the concrete channel wherever construction takes place adjacent to where juvenile steelhead may be rearing. Fish will be seined and herded downstream, remaining in the concrete channel as long as there is a shaded area in the covered channel for them to remain. If there is no shaded area they will be translocated upstream. If a pipe is used to move the water through the center wall and ceiling removal work areas, fish will be moved by seine downstream to a shaded area or netted and moved to a location above the First Division Dam so that they will not get stranded as the water recedes. There will be little to no temperature difference between the locations fish are herded from and to if they remain in the concrete channel in a shaded location. If they are transported upstream, they will go from water that is around 70°F to similar, but possibly slightly warmer, water temperatures. Block nets will be installed at the upstream and downstream extent of isolation to block fish movement into the work areas.

At most, fish salvage will occur in four locations:

- 3,600 square feet, 600 feet long by 6 feet wide with a water depth of 2 to 4 inches, near Otis Street (wall tieback locations)
- 1,600 square feet, 200 feet long by 8 feet wide with a water depth of 2 to 3 inches, between South 1st Avenue and South Colville Street (center wall repair)
- 1,200 square feet, 200 feet by 6 feet wide with a water depth of 2 to 4 inches, upstream of North 2nd Avenue (ceiling removal)
- 1,200 square feet, 200 feet by 6 feet wide with a water depth of 2 to 4 inches, between North 2nd and 3rd avenues (ceiling removal)

If fish salvage occurs for the entire reach of ceiling removal, an additional 600 square feet (100 feet by 6 feet) would be isolated, for a total isolated area for ceiling removal of about 3,000 square feet (500 feet long by 6 feet wide). Fish salvage is not expected to occur downstream of 9th Avenue because flow is low (5 cfs) and water temperatures are generally above 80°F, and thus salmonids will not likely be present.

1.3.5. Installation of Temporary and Permanent Ramps

Temporary Ramps

To access the MCFCP channel for rehabilitation work, the contractor will construct three temporary access ramps. Temporary access ramps will be located approximately 450 feet downstream of Otis Street, 100 feet upstream of South Colville Street, and 100 feet upstream of North 5th Avenue.

Prior to ramp installation, the low-flow channel will be covered in the immediate area to prevent materials from entering Mill Creek water. A 15-foot wide section of the concrete wall will be cut with a concrete-cutting power saw or a power saw attached to a skid steer to create an opening for equipment to access Mill Creek. Material behind the concrete wall will be excavated to form the ramp and the ramp will not extend into the channel. Some rock and gravel may need to be imported to make a solid base for the ramp. Temporary ramps will be removed at the end of construction and any construction related debris will be swept and vacuumed. New concrete will be poured to rebuild the wall section that was removed.

Permanent Ramps

Permanent ramps may also be constructed. These ramps would also require removing a 15-foot section of the levee, material excavated behind the levee wall, and a rock/gravel base installed. Concrete would be used on top of the rock/gravel base to create a permanent ramp. Most ramp work will take place on side slopes and the landside of the levee. Minor excavation will occur to tie-in to the channel bottom at the toe of the slope. One of the proposed sites is already used by Walla Walla County for access (north ramp near Francis Avenue).

All permanent ramps would be located in the non-federal portion of the MCFCP, gated, and used for emergency access and maintenance access.

Emergency access. Permanent access ramps will be used for emergency access by rescue equipment if anyone were to fall into the creek. Rescue equipment would likely include ladder or boom trucks and personnel with ropes and poles. This type of access would occur during high water events.

Operation and maintenance. Maintenance typically occurs during the summer in-water work window, when flows are low. Operation and maintenance (O&M) of the federal portion of the MCFCP includes all structures associated with Mill Creek from approximately river mile (RM) 10.4 to RM 11.5. All current and future operation and management of the federal portion of the MCFCP is covered by WCRO-2018-00274 (Mill Creek O&M Biological Opinion).

The MCFCZD maintains the lower 6 miles of the stabilized channel according to the Water Control Manual for the MCFCP that was developed by the Corps (2018a; 2018b). Operation and maintenance of the locally owned and managed portion occurs independently of O&M of the federal portion of the MCFCP.

1.3.6. Best Management Practices

The Corps identifies several best management practices (BMPs) that will be taken to avoid or minimize impacts to MCR steelhead, critical habitat, and the environment. These include isolating Mill Creek from all construction and rehabilitation work, a qualified biologist overseeing fish salvage, construction occurring during the in-water work window, and cleanup and removal of all construction debris.

Hazardous Materials

Special measures will be taken to prevent concrete dust, chemicals, fuels, oils, greases, bituminous materials, waste washings, and sewage from entering surface and subsurface waters, including:

- All spill prevention and cleanup materials will comply with all federal and state laws and regulations.
- Fuel dispensing vehicles will carry a tanker fueling berm spill kit on board at all times.
- Equipment will not be fueled directly adjacent to Mill Creek.
- An emergency spill response kit will be located at the work site.
- Emergency spill response kits will be sufficient to contain the largest quantity spill that could occur based on equipment being used and will be appropriate for spills on land or in water.
- Any releases of oil or hazardous substances into state waters will be reported to the National Response Center and the Washington Emergency Management Division. Stabilization and cleanup of the spill will begin immediately.
- The contractor will not allow water used in any part of the construction process and equipment washing, or other waters, to enter any water course without prior treatment and without approval.
- The contractor will not allow deposit of any materials, effluents, trash, garbage, oil, grease, chemicals, or other contaminants in areas adjacent to streams. If any unwanted material is dumped in unauthorized areas, the material will be removed and the area restored to a condition approximate to the adjacent undisturbed area as directed by the Corps.
- Chemical emulsifiers, dispersants, coagulants, or other cleanup compounds will not be used without prior written approval.

We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would not.

1.3.7. Project Timeline

The GI Study started in 2018 and is scheduled to be completed in 2021. If the study is approved, it will take additional time to appropriate funding and begin any proposed construction or operational changes. Therefore, the Corps has not identified a specific implementation timeframe of the GI Study and the proposed actions.

1.3.8. Action Agency's Effects Determination

The Corps determined that the proposed actions for the GI Study may affect, and are likely to adversely affect, MCR steelhead and their critical habitat. The Corps bases their effects determination on isolating the creek from the work and construction materials, moving fish out of areas where the creek cannot be isolated and increased turbidity during in-water construction activities associated with operation and maintenance of the MCFCP.

2. ENDANGERED SPECIES ACT: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of the ESA, each Federal agency must ensure that its actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS, and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provide an opinion stating how the agency's actions would affect listed species and their critical habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes non-discretionary reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

2.1. Analytical Approach

This opinion includes both a jeopardy analysis and an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "jeopardize the continued existence of" a listed species, which is "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

This opinion relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species" (50 CFR 402.02).

The designation of critical habitat for MCR steelhead uses the term primary constituent element (PCE) or essential features. The 2016 critical habitat regulations (50 CFR 424.12) replaced this term with physical or biological features (PBF). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

The 2019 regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the regulations (84 FR 44977), that definition does not

change the scope of our analysis and in this opinion we use the terms "effects" and "consequences" interchangeably.

We use the following approach to determine whether a proposed action is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Evaluate the environmental baseline of the species and critical habitat.
- Evaluate the effects of the proposed action on species and their habitat using an exposure–response approach.
- Evaluate cumulative effects.
- In the integration and synthesis, add the effects of the action and cumulative effects to the environmental baseline, and, in light of the status of the species and critical habitat, analyze whether the proposed action is likely to: (1) directly or indirectly reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species, or (2) directly or indirectly result in an alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.
- If necessary, suggest a reasonable and prudent alternative to the proposed action.

2.2. Rangewide Status of the Species and Critical Habitat

In this opinion, we examine the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species faces, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. In this opinion we also examine the condition of critical habitat throughout the designated area, evaluate the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discuss the function of the PBFs that are essential for the conservation of the species.

2.2.1. Status of the Species

For Pacific salmon and steelhead, we commonly use the four "viable salmonid population" (VSP) criteria (McElhany et al. 2000) to assess the viability of the populations that, together, constitute the species. These four criteria (spatial structure, diversity, abundance, and productivity) encompass the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. When these parameters are collectively at appropriate levels, they maintain a population's capacity to adapt to various environmental conditions and allow it to sustain itself in the natural environment.

"Spatial structure" refers both to the spatial distributions of individuals in the population and the processes that generate that distribution. A population's spatial structure depends on habitat

quality and spatial configuration, and the dynamics and dispersal characteristics of individuals in the population.

"Diversity" refers to the distribution of traits within and among populations. These range in scale from DNA sequence variation in single genes to complex life history traits (McElhany et al. 2000).

"Abundance" generally refers to the number of naturally-produced adults (i.e., the progeny of naturally-spawning parents) in the natural environment (e.g., on spawning grounds).

"Productivity", as applied to viability factors, refers to the entire life cycle (i.e., the number of naturally-spawning adults produced per parent). When progeny replace or exceed the number of parents, a population is stable or increasing. When progeny fail to replace the number of parents, the population is declining. McElhany et al. (2000) use the terms "population growth rate" and "productivity" interchangeably when referring to production over the entire life cycle. They also refer to "trend in abundance", which is the manifestation of long-term population growth rate.

For species with multiple populations, once the biological status of a species' populations has been determined, we assess the status of the entire species using criteria for groups of populations, as described in recovery plans and guidance documents from technical recovery teams. Considerations for species viability include having multiple populations that are viable, ensuring that populations with unique life histories and phenotypes are viable, and that some viable populations are both widespread to avoid concurrent extinctions from mass catastrophes and spatially close to allow functioning as metapopulations (McElhany et al. 2000).

The summary that follows describes the status of MCR steelhead and its designated critical habitat. MCR steelhead is the one ESA-listed species that occurs within the geographic area of this proposed action and is considered in this opinion. More detailed information on the status and trends of this listed resource, and its biology and ecology, are in the listing regulations and critical habitat designations published in the Federal Register (Table 1), as well as applicable recovery plans and 5-year status reports. These additional documents are incorporated by reference (NMFS 2009; NMFS 2016). These documents are available on the NMFS West Coast Region website (http://www.westcoast.fisheries.noaa.gov/). The next 5-year status reviews will be completed in 2021.

Table 1. Listing status, status of critical habitat designation and protective regulations, and relevant Federal Register (FR) decision notices for Endangered Species Act-listed Middle Columbia River steelhead considered in this opinion.

Species	Listing Status	Critical Habitat	Protective Regulations
Middle Columbia River Steelhead (*Oncorhynchus mykiss*)	Threatened 3/25/1999; 64 FR 14517 Reaffirmed 5/26/2016; 81 FR 33458	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160

Middle Columbia River Steelhead Distinct Population Segment

NMFS listed the MCR steelhead Distinct Population Segment (DPS) as threatened on March 25, 1999 (64 FR 14517) and its threatened status was reaffirmed on May 26, 2016 (81 FR 33468). Critical habitat was designated on September 2, 2005 (70 FR 52630) and protective regulations were established on June 28, 2005 (70 FR 37159). A recovery plan is available for this species (NMFS 2009), and this plan details much of the existing status information for the MCR steelhead. The most recent 5-year status review was completed in 2015 (NMFS 2016), and a technical memo prepared by the Northwest Fisheries Science Center (NWFSC) for the status review contains detailed information on the biological status of MCR steelhead (NWFSC 2015).

Life history. The MCR steelhead DPS includes 16 summer-run populations and four winter-run populations. MCR summer steelhead enter freshwater (the Columbia River) between May and October and require several months to mature before spawning in late winter through spring. Winter steelhead enter freshwater between November and April and spawn shortly thereafter. Summer steelhead usually spawn further upstream than winter steelhead. Fry emergence typically occurs between May and August dependent on water temperature. Some juveniles move downstream to rear in larger tributaries and mainstem rivers. Most steelhead smolt at 2 years and adults return to the Columbia River after spending 1 to 2 years at sea (NMFS 2009).

Steelhead are iteroparous, meaning they can spawn more than once. Repeat spawning for Columbia River Basin steelhead ranges from reported rates of 2 to 4 percent above McNary Dam (Busby et al. 1996) to 17 percent in the unimpounded tributaries below Bonneville Dam (Leider et al. 1986).

Spatial structure and diversity. This species includes all naturally-spawned steelhead populations originating below natural and manmade impassable barriers from the Columbia River and its tributaries upstream and exclusive of the Wind River in Washington and the Hood River in Oregon, to and including the Yakima River in Washington, excluding steelhead originating from the Snake River Basin. The Interior Columbia Basin Technical Recovery Team (ICTRT) identified 17 extant populations in this DPS (ICTRT 2003; McClure et al. 2005). The populations fall into four Major Population Groups (MPGs): Cascade eastern slope tributaries (five extant and two extirpated populations), the John Day River (five extant populations), the Walla Walla and Umatilla rivers (three extant and one extirpated populations), and the Yakima River (four extant populations) (ICTRT 2003; McClure et al. 2005). This DPS includes steelhead from seven artificial propagation programs (USDC 2014). The DPS does not currently include steelhead that are designated as part of an experimental population above the Pelton Round Butte Hydroelectric Project in the Deschutes River Basin, Oregon (USDC 2013). NMFS has defined the steelhead DPSs to include only the anadromous members of this species (70 FR 67130). Viability ratings for the populations in the MCR steelhead DPS range from extirpated to highly viable (Table 2) (NMFS 2009; NWFSC 2015).

Table 2. Major population groups, populations, and scores for the key elements of abundance and productivity (A&P), diversity, and spatial structure and diversity (SS/D), used to determine current overall viability risk for Middle Columbia River steelhead during the most recent status review (NWFSC 2015). Risk ratings include very low (VL), low (L), moderate (M), high (H), and extirpated (E). Maintained (MT) population status indicates that the population does not meet the criteria for a viable population

but does support ecological functions and preserves options for recovery of the Distinct Population Segment.

Major Population Group	Population (Watershed)	A&P	Natural Processes Risk	Diversity	Integrated SS/D	Overall Viability Risk
Cascade Eastern Slope Tributaries	Fifteenmile Creek	M	VL	L	L	MT
	Klickitat River	M	L	M	M	MT
	Deschutes Eastside	L	L	M	M	Viable
	Deschutes Westside	H	L	M	M	H
	Rock Creek	*	M	M	M	H
	White Salmon	N/A	N/A	N/A	N/A	E
	Crooked River	N/A	N/A	N/A	N/A	E
John Day River	Upper John Day	M	VL	M	M	MT
	North Fork John Day	VL	VL	L	L	Highly Viable
	Middle Fork John Day	L	L	M	M	Viable
	South Fork John Day	L	VL	M	M	Viable
	Lower John Day Tributaries	M	VL	M	M	MT
Walla Walla and Umatilla rivers	Umatilla River	M	M	M	M	MT
	Touchet River	H	L	M	M	H
	Walla Walla River	M	M	M	M	MT
Yakima River	Satus Creek	L	L	M	M	Viable
	Toppenish Creek	L	L	M	M	Viable
	Naches River	M	L	M	M	M
	Upper Yakima	M	M	H	H	H

* Reintroduction efforts underway (NMFS 2009).

Abundance and productivity. During the most recent status review (NWFSC 2015; NMFS 2016), NMFS determined that for almost all populations in this DPS, the most recent 5-year geomean for natural-origin abundance had increased relative to the previous 5-year review.[1] Similarly, 15-year trends were positive for most populations in the DPS.[2] Based on the most recent status review, NMFS concluded that the MCR steelhead DPS was at moderate risk and remained threatened. While there had been improvements in the extinction risk for some populations, and while several populations were considered viable, the MCR steelhead DPS as a whole was not meeting delisting criteria, and most risk ratings remained unchanged from the previous review. The increases in abundance and productivity needed to achieve recovery goals for MCR steelhead were generally smaller than those needed for the other Interior Columbia River basin-listed DPSs (NWFSC 2015).

However, there has been a recent downturn in adult abundance. There was a substantial downward trend in the abundance of natural-origin spawners at the DPS level from 2014 to 2019 (NMFS 2019). Estimates of natural-origin and total (natural- plus hatchery-origin) spawners through 2018 or 2019 at the population level have also decreased recently, with substantial

[1] For all five populations in the John Day MPG, for all four populations in the Yakima River MPG, for all three populations in the Umatilla Walla Walla MPG; and for two of the three populations for which data were available in the East Cascade MPG.

[2] For four of five populations in the John Day MPG, all four populations in the Yakima River MPG, one population in the Umatilla/Walla Walla River MPG (a second population had a slightly negative trend and data were insufficient for the third); and for one of three populations with available data in the East Cascade MPG.

downward trends in abundance for most of the MPGs and populations (exceptions are the Klickitat and Yakima River populations) when compared to the number of spawners from 2009 to 2013. In many cases, the most recent 5-year geometric mean in natural-origin abundance is considerably below the minimum abundance thresholds established by the ICTRT. However, the Klickitat, Middle Fork John Day, and Umatilla River populations are well above these thresholds.

A relatively limited number of hatchery fish are present on the spawning grounds within this DPS. Therefore, the 5-year geometric means are the same or very close for both natural-origin and total estimates of adults. Stray levels into the John Day River populations have decreased in recent years. However, out of basin hatchery stray proportions, although reduced, remain high in spawning reaches within the Deschutes River Basin populations. The 2019 natural-origin abundance level for the South Fork John Day River population was higher than the geometric mean for 2013 to 2018, but the abundance levels for the Lower John Day River Tributaries, Middle Fork John Day River, Walla Walla River, and Touchet River were lower than their respective recent geometric means.

This recent downturn in adult abundance is thought to be driven primarily by marine environmental conditions and a decline in ocean productivity because hydropower operations, the overall availability and quality of tributary and estuary habitat, and hatchery practices have been relatively constant or improving over the past 10 years.[3] Increased abundance of sea lions in the lower Columbia River could also be a contributing factor.

NMFS will evaluate the implications for viability risk of these more recent returns in the upcoming 5-year status review, expected in 2021. The status review will also include new information on productivity, diversity, and spatial structure.

Limiting factors. Limiting factors for this species include (NMFS 2009; NWFSC 2015):

- Degradation of floodplain connectivity and function, channel structure and complexity, riparian areas, fish passage, stream substrate, stream flow, and water quality.
- Mainstem Columbia River hydropower-related impacts.
- Degraded estuarine and nearshore marine habitat.
- Hatchery-related effects.
- Harvest-related effects.
- Effects of predation, competition, and disease.

MCR Steelhead in the Walla Walla Basin

The proposed action will take place within the Umatilla/Walla Walla Basin MPG boundaries and will affect the Walla Walla River population. The Umatilla/Walla Walla MPG does not meet viability criteria because the abundance and productivity of the Umatilla and Walla Walla populations are considered at moderate risk, the Touchet River population abundance and

[3] Many factors (e.g., higher summer temperatures, lower late summer flows, low spring flows, etc.) affect the ability of tributary habitat to produce juvenile migrants (capacity) each year. Recent drought and temperature patterns may have had a negative effect on tributary habitat productivity, and as a result, lower than average juvenile production may have contributed in some years to downturns in adult abundance.

productivity is at high risk, and all three populations have moderate risk for spatial structure and diversity. Overall, the Umatilla and Walla Walla River populations are considered maintained while the Touchet River population is considered to be at high risk. Recovery criteria for the Umatilla/Walla Walla MPG requires two populations to meet viability criteria and the third population to be maintained. The ICTRT also calls for at least one population to be highly viable. Under current conditions, the Umatilla River population is the closest to being highly viable. Of the remaining two populations, the Walla Walla is much closer to reaching viable status than the Touchet River population, thus the importance of the Mill Creek subpopulation to the viability of the Walla Walla population.

The Walla Walla River population occupies the Walla Walla River and its tributaries, except the Touchet River. The Walla Walla River population is considered intermediate sized, with an abundance threshold of 1,000 spawners (10–12 year geometric mean) and a productivity threshold of 1.35 recruits per spawner. Currently, the Walla Walla population does not meet its abundance and productivity or its spatial structure and diversity viability criteria (Table 2). In 2015, the 10-year geomean (2005–2014) of total abundance decreased for the Walla Walla River population and the most recent draft escapement data suggests the 10-year geomean (2010–2019) for the Walla Walla population is continuing to decline (Table 3). Based on current abundance and productivity and spatial structure and diversity, the Walla Walla steelhead population is considered at moderate risk of extinction, less than 25 percent risk of extinction over the next 100 years.

Table 3. The most recent 10-year geometric mean of natural-origin steelhead spawners and the most recent 20-year geometric mean of recruits per spawner for the Walla Walla River steelhead population. Source of data is the Oregon Department of Fish and Wildlife's salmon and steelhead recovery tracker.

10-Year Geometric Mean of Natural Origin Spawners		**20-Year Geometric Mean or Recruits Per Spawner**	
Abundance Threshold	**Spawn Years 2010–2019**	**Productivity Threshold**	**Brood Years 1993–2012**
1,000	713	1.35	0.9873

Within the Recovery Plan (NMFS 2009), NMFS identifies several limiting factors and proposed actions for the Walla Walla population and Mill Creek, including: (1) obstructions, (2) sedimentation, (3) lack of habitat diversity, (4) flow manipulation, (5) high temperatures, and (6) key habitat quantity. The actions to address these limiting factors include: (1) reduce the frequency of unscreened diversions into Bennington Reservoir, (2) improve passage through the modified channel and at both the Mill Creek Diversion Dam and the First Division Dam, (3) modify channel geometry, (4) install instream habitat, (5) set the levees back or remove them completely, and (6) add large wood.

2.2.2. Status of Critical Habitat

In this section, we examine the status of designated critical habitat affected by the proposed action by examining the condition and trends of the essential PBFs of that habitat throughout the designated areas (Table 4). These features are essential to the conservation of the ESA-listed species because they support one or more of the species' life stages (e.g., sites with conditions that support spawning, rearing, migration, and foraging). Rangewide, all habitat types are

impaired to some degree, even though many of the watersheds comprising the fully designated area are ranked as providing high conservation value. The proposed action, however, affects only freshwater rearing and freshwater migration habitats.

Table 4. Physical and biological features of critical habitat designated for Middle Columbia River steelhead, and corresponding species life history events.

Physical or Biological Features		Species Life History Event
Site Type	**Site Attribute**	
Freshwater Spawning	Substrate Water quality Water quantity	Adult spawning Embryo incubation Alevin growth and development
Freshwater Rearing	Floodplain connectivity Forage Natural Cover Water quality Water quantity	Fry/parr/smolt growth and development
Freshwater Migration	Free of artificial obstruction Natural cover Water quality Water quantity	Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration
Estuarine Areas	Forage Free of artificial obstruction Natural cover Salinity Water quality Water quantity	Adult sexual maturation and "reverse smoltification" Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration

For salmon and steelhead, NMFS' critical habitat analytical review teams (CHART) ranked watersheds within designated critical habitat at the scale of the fifth-field hydrologic unit code (HUC5) in terms of the conservation value they provide to each ESA-listed species that they support (NMFS 2005a). The conservation rankings are high, medium, or low. To determine the conservation value of each watershed to species viability, the CHART evaluated the quantity and quality of habitat features (e.g., spawning gravels, wood and water condition, and side channels), the relationship of the area compared to other areas within the species' range, and the significance of the population occupying that area to the species' viability criteria. Thus, even if a location had poor habitat quality, it could be ranked with a high conservation value, if it were essential due to factors such as limited availability (e.g., one of a very few spawning areas), a unique contribution of the population it served (e.g., a population at the extreme end of geographic distribution), or the fact that it serves another important role (e.g., obligate area for migration to upstream spawning areas).

Interior Columbia Recovery Domain

Critical habitat has been designated in the Interior Columbia recovery domain (ICRD), which includes the Umatilla and Walla Walla rivers. Habitat quality in tributary streams in the ICRD varies from excellent in wilderness and roadless areas to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994; NMFS 2009). Critical habitat throughout much of the ICRD has been degraded by intense agriculture, alteration of stream

morphology (i.e., channel modifications and diking), riparian vegetation disturbance, wetland draining and conversion, livestock grazing, dredging, road construction and maintenance, logging, mining, and urbanization (EPA 2020; Lee et al. 1997; McIver and Starr 2001; NMFS 2009). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems for critical habitat in developed areas.

Migratory habitat quality in this area has been affected by the development and operation of the Columbia River System dams and reservoirs in the mainstem Columbia River, Bureau of Reclamation tributary projects, and privately owned dams in the Snake and Upper Columbia River basins. For example, construction of Hells Canyon Dam eliminated access to several likely production areas in Oregon and Idaho, including the Burnt, Powder, Weiser, Payette, Malheur, Owyhee, and Boise river basins (Good et al. 2005), and Grand Coulee and Chief Joseph dams completely block anadromous fish passage on the upper mainstem Columbia River.

Hydroelectric development modified natural flow regimes, resulting in higher water temperatures, changes in fish community structure leading to increased rates of piscivorous and avian predation on juvenile salmon and steelhead, and delayed migration for both adult and juveniles. Physical features of dams such as turbines also kill migrating fish. In-river survival is inversely related to the number of hydropower projects encountered by emigrating juveniles. Similarly, development and operation of extensive irrigation systems and dams for water withdrawal and storage in tributaries have altered hydrological cycles.

A series of large regulating dams on the middle and upper Deschutes River affect flow and block access to upstream habitat, and have extirpated one or more populations from the Cascades Eastern Slope major population. Also, operation and maintenance of large water reclamation systems such as the Umatilla Basin and Yakima projects have significantly modified flow regimes and degraded water quality and physical habitat in this domain.

Many stream reaches designated as critical habitat in the ICRD are over-allocated, with more allocated water rights than existing streamflow. Withdrawal of water, particularly during low-flow periods that commonly overlap with agricultural withdrawals, often increases summer stream temperatures, blocks fish migration, strands fish, and alters sediment transport (Spence et al. 1996). Reduced tributary streamflow has been identified as a major limiting factor for MCR steelhead in this area (NMFS 2007; NMFS 2011).

Many stream reaches designated as critical habitat are listed on Oregon's and Washington's Section 303(d) lists for water temperature. Many areas that were historically suitable rearing and spawning habitat are now unsuitable due to high summer stream temperatures. Removal of riparian vegetation, alteration of natural stream morphology, and withdrawal of water for agricultural or municipal use all contribute to elevated stream temperatures. Contaminants such as insecticides and herbicides from agricultural runoff and heavy metals from mine waste are common in some areas of critical habitat.

The ICRD is a very large and diverse area. The CHART determined that few watersheds with PBFs for Chinook salmon or steelhead are in good-to-excellent condition with no potential for

improvement. Overall, most ICRD watersheds are in fair-to-poor or fair-to-good condition. However, most of these watersheds have some or high potential for improvement.

Despite these degraded habitat conditions, the HUCs that have been identified as critical habitat for this species are largely ranked as having high conservation value. Conservation value reflects several factors, including: (1) how important the area is for various life history stage, (2) how necessary the area is to access other vital areas of habitat, and (3) the relative importance of the populations the area supports relative to the overall viability of the Evolutionarily Significant Unit (ESU) or DPS.

A summary of the status of critical habitats considered in this opinion is provided in Table 5.

Table 5. Critical habitat, designation date, Federal Register citation, and status summary for critical habitat considered in this opinion.

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Middle Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 15 subbasins in Oregon and Washington containing 111 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most fifth-field hydrologic code watersheds with physical or biological features for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005a). However, most of these watersheds have some or a high potential for improvement. The conservation value of occupied fifth-field hydrologic code watersheds is rated as high for 80 watersheds, medium for 24 watersheds, and low for 9 watersheds.

Walla Walla River Subbasin

The Walla Walla River subbasin is designated critical habitat for MCR steelhead. The Walla Walla subbasin is located in southeast Washington and northeast Oregon. The subbasin contains 11 watersheds, nine of which are occupied by the ESU. Occupied watersheds encompass approximately 1,525 square miles and 4,388 miles of streams.

The CHART concluded that the occupied HUC5 watersheds in this subbasin range from high to low conservation value to the ESU. Of the nine HUC5s reviewed, five were rated as having high, three as having medium, and one (Pine Creek) was rated as having low conservation value. The CHART also concluded that while the tributary habitats in some of the HUC5s were of medium conservation value, the HUC5s still contain a high value rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean.

Critical Habitat in the Action Area

Mill Creek is critical habitat for MCR steelhead, including the action area. The CHART rated the Mill Creek watershed as high conservation value for MCR steelhead. The watershed has had limited hatchery influence, is the highest elevation watershed in the subbasin, and the uppermost

reaches are within U.S. Forest Service boundaries and are in very good to pristine condition (NMFS 2005b).

The present conditions of the PBFs within the action area are substantially degraded. Rearing conditions are degraded by both the existing structures and the legacies and ongoing effects of management and operation of the MCFCP. The former include the dams, levees, and the stabilized channel. The latter include water withdrawals and maintenance activities that have severely reduced riparian functions (NMFS 2005a; 2005b). Rearing habitat is further limited by the lack of in-stream habitat diversity and irrigation withdrawals.

The MCFCP is the most significant impediment to the proper function of the migration corridor in Mill Creek. In addition to the inadequate fish ladder at the Mill Creek Diversion Dam, which does not function at a significant range of flow levels common during the adult steelhead migration (as discussed in detail below), there are a number of other factors responsible for degraded migration corridors. These include flow management combined with structural barriers, irrigation withdrawals, and elevated summer water temperatures. The structural components and channel configuration spread low flows out across an unnaturally wide and completely unshaded channel, where water temperatures reach harmful and occasionally lethal levels. Normal migratory movement is no longer possible when flows decline to less than 100 cfs, forcing fish to remain between the stabilizing weirs for months as water temperatures increase. The stabilized channel lacks natural logjams and large wood accumulations that enable the development of deep pools with complex natural hiding and escape cover that support adult and juvenile holding habitat (NMFS 2005a; 2005b).

2.2.3. Climate Change

One factor affecting the status of ESA-listed species considered in this opinion, and aquatic habitat at large, is climate change. Climate change is likely to play an increasingly important role in determining the abundance and distribution of ESA-listed species, and the conservation value of its designated critical habitats, in the Pacific Northwest. These changes will not be spatially homogeneous across the Pacific Northwest. The largest hydrologic responses are expected to occur in basins with significant snow accumulation, where warming decreases snow pack, increases winter flows, and advances the timing of spring melt (Mote et al. 2014, 2016). Rain-dominated watersheds and those with significant contributions from groundwater may be less sensitive to predicted changes in climate (Tague et al. 2013; Mote et al. 2014).

During the last century, average regional air temperatures in the Pacific Northwest increased by 1 to 1.4°F as an annual average, and up to 2°F in some seasons, based on average linear increase per decade (Abatzoglou et al. 2014; Kunkel et al. 2013). Warming is likely to continue during the next century as average temperatures are projected to increase another 3 to 10°F, with the largest increases predicted to occur in the summer (Mote et al. 2014).

Decreases in summer precipitation of as much as 30 percent by the end of the century are consistently predicted across climate models (Mote et al. 2014). Precipitation is more likely to occur from October through March, less during summer months, and more winter precipitation will be rain than snow (ISAB 2007; Mote et al. 2014). Earlier snowmelt will cause lower stream flows in late spring, summer, and fall, and water temperatures will be warmer (ISAB 2007; Mote

et al. 2014). Models consistently predict increases in the frequency of severe winter precipitation events (i.e., 20-year and 50-year events), in the western United States (Dominguez et al. 2012). The largest increases in winter flood frequency and magnitude are predicted in mixed rain-snow watersheds (Mote et al. 2014).

The combined effects of increasing air temperatures and decreasing spring through fall flows are expected to cause increasing stream temperatures. Overall, about one-third of the current cold-water salmonid habitat in the Pacific Northwest is likely to exceed key water temperature thresholds by the end of this century (Mantua et al. 2009). Higher temperatures will reduce the quality of available salmonid habitat for most freshwater life stages (ISAB 2007). Reduced flows will make it more difficult for migrating fish to pass physical and thermal obstructions, limiting their access to available habitat (Isaak et al. 2012; Mantua et al. 2010). Temperature increases shift timing of key life cycle events for salmonids and species forming the base of their aquatic foodwebs (Crozier et al. 2011; Tillmann and Siemann 2011; Winder and Schindler 2004). Higher stream temperatures will also cause decreases in dissolved oxygen and may also cause earlier onset of stratification and reduced mixing between layers in lakes and reservoirs, which can also result in reduced oxygen (Meyer et al. 1999; Raymondi et al. 2013; Winder and Schindler 2004). Higher temperatures are likely to cause several species to become more susceptible to parasites, disease, and higher predation rates (Crozier et al. 2008; Raymondi et al. 2013; Wainwright and Weitkamp 2013).

As more basins become rain-dominated and prone to more severe winter storms, higher winter stream flows may increase the risk that winter or spring floods in sensitive watersheds will damage spawning redds and wash away incubating eggs (Goode et al. 2013). Earlier peak stream flows will also alter migration timing for salmon smolts and may flush some young salmon and steelhead from rivers to estuaries before they are physically mature, increasing stress and reducing smolt survival (McMahon and Hartman 1989; Lawson et al. 2004).

In addition to changes in freshwater conditions, predicted changes for coastal waters in the Pacific Northwest as a result of climate change include increasing surface water temperature, increasing but highly variable acidity, and increasing storm frequency and magnitude (Mote et al. 2014). Elevated ocean temperatures already documented for the Pacific Northwest are highly likely to continue during the next century, with sea surface temperature projected to increase by 1.0 to 3.7^{o}C by the end of the century (IPCC 2014). Habitat loss, shifts in species' ranges and abundances, and altered marine food webs could have substantial consequences to anadromous, coastal, and marine species in the Pacific Northwest (Tillmann and Siemann 2011).

Moreover, as atmospheric carbon emissions increase, increasing levels of carbon are absorbed by the oceans, changing the pH of the water. A 38 to 109 percent increase in acidity is projected by the end of this century in all but the most stringent CO_2 mitigation scenarios, and is essentially irreversible over a time scale of centuries (IPCC 2014). Regional factors appear to be amplifying acidification in Northwest ocean waters, which is occurring earlier and more acutely than in other regions and is already impacting important local marine species (Barton et al. 2012; Feely et al. 2012). Acidification also affects sensitive estuary habitats, where organic matter and nutrient inputs further reduce pH and produce conditions more corrosive than those in offshore waters (Feely et al. 2012; Sunda and Cai 2012).

Global sea levels are expected to continue rising throughout this century, reaching likely predicted increases of 10 to 32 inches by 2081–2100 (IPCC 2014). These changes will likely result in increased erosion and more frequent and severe coastal flooding and shifts in the composition of nearshore habitats (Tillmann and Siemann 2011). Estuarine-dependent salmonids such as chum and Chinook salmon are predicted to be impacted by significant reductions in rearing habitat in some Pacific Northwest coastal areas (Glick et al. 2007). Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon and steelhead, while cooler ocean periods have coincided with relatively high abundances, and therefore these species are predicted to fare poorly in warming ocean conditions (Scheuerell and Williams 2005; Zabel et al. 2006). This is supported by the recent observation that anomalously warm sea surface temperatures off the coast of Washington from 2013 to 2016 resulted in poor coho and Chinook salmon body condition for juveniles caught in those waters (NWFSC 2015). Changes to estuarine and coastal conditions, as well as the timing of seasonal shifts in these habitats, have the potential to impact a wide range of listed aquatic species (Tillmann and Siemann 2011; Reeder et al. 2013).

The adaptive ability of these threatened and endangered species is depressed due to reductions in population size, habitat quantity and diversity, and loss of behavioral and genetic variation. Without these natural sources of resilience, systematic changes in local and regional climatic conditions due to anthropogenic global climate change will likely reduce long-term viability and sustainability of populations in many of these ESUs and DPSs (NWFSC 2015). New stressors generated by climate change, or existing stressors with effects that have been amplified by climate change, may also have synergistic impacts on species and ecosystems (Doney et al. 2012). These conditions will possibly intensify the climate change stressors inhibiting recovery of ESA-listed species in the future.

Potential climate change effects in the Walla Walla River subbasin and the Mill Creek watershed in particular are likely to include more precipitation in the form of rain than snow, increased frequency of high flows in the late fall and winter, and an earlier onset of spring snowmelt (Stewart et al. 2005). These changes will affect adult upstream migration, spring outmigrating flows, and lower late season flows (Elsner et al. 2010). The headwaters of Mill Creek are in the Blue Mountains and produce very flashy events where flows increase very quickly but usually decline within a few hours to a few days at most. A change in precipitation events from snow to rain would increase the potential for flashy, high volume winter and spring events when adult MCR steelhead are trying to move upstream to spawning areas. This could prevent adult upstream migration in Mill Creek, increase the frequency and duration of fish ladder closures at the Mill Creek Diversion Dam, and result in unscreened diversions into Bennington Reservoir during critical migration periods for both adults and juveniles. With a reduction in snowpack, the infiltration into groundwater that occurs from slow melting will be reduced and the corresponding late season flows that are fed by the groundwater will decline. A further reduction in late season flows will increase the need for fish to access higher elevations of Mill Creek during the summer to find areas of cooler water. The higher elevation areas contain much greater habitat diversity providing areas of cool water upwelling in the summer and refugia during floods. The potential changes in the hydrology of Mill Creek further emphasize the need for passage in the MCFCP, so that fish can access higher elevation areas with more suitable water temperatures and greater habitat diversity. Overall, climate change represents a significant threat

to recovery of MCR steelhead populations, including the Walla Walla population (ISAB 2007; NMFS 2009).

2.3. Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The approximately 110-acre action area is the MCFCP, beginning 150 feet upstream of the First Division Works and ending in the city of College Place at the Gose Street Bridge. The action area includes concrete channel rehabilitation locations, levee raise locations, project staging areas, project access areas, vegetation removal locations, and areas upstream and downstream of the in-channel and in-water work areas that are likely to be affected by the proposed action, both directly and indirectly.

The action area is used by MCR steelhead primarily for rearing and migration. Juveniles are present year-round and adults are observed December through June.

2.4. Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of state or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

2.4.1. Mill Creek Watershed

The Mill Creek watershed covers 113.7 square miles in southeastern Washington and northeastern Oregon. Mill Creek is a steeply graded mountain stream that flows 37.4 miles from its headwaters in the western slopes of the Blue Mountains in the Umatilla National Forest, through the city of Walla Walla, Washington, to its confluence with the Walla Walla River. The watershed elevation ranges from 6,250 feet mean sea level at the headwaters to 590 feet mean sea level at the mouth.

Mill Creek is typical of Eastern Washington streams and rivers with high flows from approximately November through May and low flows from approximately June through October. Snowmelt runoff in the spring usually extends from March to May; however, flooding events tend to be the result of intense rainfall occurring on saturated ground or by rain-on-snow events in winter or spring. Precipitation varies in the subbasin, with most moisture coming in the form of snow from November through May. Irrigation withdrawals combined with seasonal low flows have a significant negative impact in the Walla Walla subbasin including Mill Creek. The Mill Creek watershed represents 4 percent of the Walla Walla subbasin land area but it contributes approximately 15 percent of the subbasin runoff (NPCC 2004).

Upstream of the Mill Creek Diversion Dam, Mill Creek has good to high quality steelhead habitat throughout the Washington portion and into Oregon up to the new City of Walla Walla water intake at RM 25.2 (NPCC 2004). The water intake includes a dam and fish ladder that impedes passage at some flows; designs are completed and upgrades to the fish ladder are on-going. Above the city's water intake, human access is restricted and habitat conditions are nearly pristine.

In the 1940s, after several large floods, the Corps constructed the MCFCP on approximately 7 miles of Mill Creek, from approximately RM 4.8 to RM 11.5. Two miles are a concrete-lined flume through downtown Walla Walla. Upstream and downstream of flumed concrete portions of the stream, Mill Creek is confined on both banks by levees, flowing through a series of energy dissipating sills and weirs.

The lower 4.8 miles of Mill Creek are a relatively natural channel primarily through agricultural areas.

2.4.2. Mill Creek in the Action Area

The various structures that comprise the MCFCP, as well as O&M of those structures, are considered part of the environmental baseline. The environmental baseline also includes the diversion trigger of 1,700 cfs at the Diversion Dam, the effects of which were analyzed by NMFS in WCRO-2018-00274 (Mill Creek O&M Biological Opinion).

Middle Columbia River steelhead primarily use the action area for rearing and migration with the vast majority of high quality spawning habitat located upstream of the action area. Juvenile MCR steelhead use the action area year-round (Mahoney et al. 2009, 2011, 2013; Mendel et al. 1999, 2000, 2002, 2003, 2004, 2005, 2007, 2014). Large numbers of juvenile *O. mykiss* in Mill Creek try to move upstream as water temperatures increase and flows decrease in early summer (Contor et. al 2003). Once migratory movement through the MCFCP is precluded by lack of flow, juveniles are forced to remain in very poor and potentially lethal habitat conditions in the stabilized Mill Creek channel until high flows return in late fall or early winter.

Adult MCR steelhead migrate upstream to spawning areas above the Mill Creek Diversion Dam using Mill Creek and Yellowhawk Creek (primarily Mill Creek water). From RM 4.8 to RM 11.5 they encounter numerous structural barriers and managed (low) flows. Video monitoring by the Corps and sporadic redd surveys by the Washington Department of Fish and Wildlife (WDFW) and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) have confirmed that some adult steelhead and Chinook salmon are able to move upstream through the stabilized channel, but there is no information on how long the passage takes or how many fish are unable to successfully use this route.

Flow, passage obstructions, sediment transport, and the lack of habitat diversity have high to extreme impacts to all life stages of MCR steelhead. In 2004, the WDFW conducted a preliminary assessment of the stabilized channel and in 2008 the Mill Creek Work Group (MCWG) initiated a second and more extensive assessment. The results of both studies confirmed poor or periodically blocked passage from RM 4.8 to RM 11.5 because of structures

and flows, and inadequate fish ladders at the First Division Dam (replaced in 2020) and Mill Creek Diversion Dam (Burns et al. 2009; CTUIR 2017).

Mill Creek from Gose Street at RM 4.8 to the fish ladder at the Mill Creek Diversion Dam presents numerous structural and flow barriers. Between Gose Street and the Mill Creek Diversion Dam, Mill Creek is confined both laterally (levees and concrete walls) and vertically (concrete, rock, and rebar prevent any thalweg development, aggradation or deposition), and flow is heavily controlled. Virtually all habitat-forming processes are restricted or eliminated by the O&M of the MCFCP. The movement of sediment and organic material is severely altered by the Mill Creek Diversion Dam and the structure of the stabilized channel. The O&M actions of the project have severely restricted the ability of Mill Creek to provide passage, forage, refuge, spawning or rearing habitat (Burns et al. 2009; Corps 2018a, 2018b).

Non-Federal Sections of the Mill Creek Flood Control Project

Within the first section of the MCFCP, from Gose Street at RM 4.8 upstream roughly 2 miles to Mullan Avenue (RM 6.4), riprapped levees confine the channel, and weirs located every 70 feet act as grade control structures. The weirs consist of wire mesh wrapped rock gabions, reinforced with concrete caps and sheet pile, extending from bank to bank across a gravel channel bottom. The concrete weir caps have rounded crests, with the apex between 2.5 and 4 feet upstream from the face of the weir. This introduces a horizontal component to the required leap for fish. The design capacity of the channel in this section is 3,500 cfs (Corps 2018a).

In the second section of stabilized channel, from Mullan Avenue to just above Roosevelt Street (RM 8.5), Mill Creek flows through a concrete flume that runs through and under the city of Walla Walla. The low-flow channel in the flume is roughly 9 feet wide and 20 inches deep with partial baffles spaced at 60-foot intervals. A nearly continuous reach of approximately 1,500 feet runs underneath downtown buildings and streets. The concrete flume has a capacity of 5,400 cfs (Corps 2018a).

The third section of the MCFCP, RM 8.5 to 10.4, is similar to the first section. Extending roughly 2 miles from Roosevelt Street to approximately 300 feet downstream of the First Division Dam, riprapped levees confine the channel. Concrete capped weirs control the gradient of the channel across a gravel bottom. The channel width varies non-uniformly from 70 feet to 540 feet and the spacing between weirs varies from 50 feet to 205 feet (Corps 2018a). The flow capacity in this section is also 3,500 cfs. The upstream boundary of this section where it becomes federal property is three weirs downstream of the First Division Dam and fish ladder, where Mill Creek flows are diverted into Yellowhawk Creek. A United States Geologic Service gage is located at the upstream end of this section near the Division Dam.

During fish salvage operations conducted in this 2-mile section of stabilized channel in late June 2004, 948 *O. mykiss* stranded between channel weirs after all flows were diverted to the Yellowhawk–Garrison canal were captured (Mendel 2004). The limited water remaining in the Mill Creek channel after the gates and fish ladder are closed at the First Division Dam is insufficient for juvenile passage over the weirs, so fish are stranded and unable to reach safe habitat upstream. While some *O. mykiss* and other resident fish may survive in the stabilized

channel during the summer, where pockets of cool water persist, a substantial portion of those stranded in the stabilized channel likely die during the summer after flows decline and temperatures increase.

Federal Section of the Mill Creek Flood Control Project

Similar to the first and third sections, the channel is confined by levees riprapped with large, angular rock and little to no vegetation. This reach is comprised of 84 2- to 3-foot-high, concrete-capped channel spanning weirs spaced 60 feet apart. The channel is oriented east to west and completely exposed to solar radiation. In 1986, the Corps placed boulders within the channel to provide fish habitat. The designed flow capacity in this reach is 3,500 cfs (Corps 2018a). All current and future operation and management of the Federal section of the MCFCP is covered by WCRO-2018-00274 (Mill Creek O&M Biological Opinion).

The first division dam and headworks. The Corps replaced the First Division Dam fish ladder in October 2020 to provide passage at flows as low 5 cfs and up to at least 400 cfs. The headworks includes an intake gate with a fish passage slot and the 500-foot-long Yellowhawk–Garrison canal with a small, rock, grade control dam where flow is split between Yellowhawk and Garrison Creeks. In 2008, Garrison Creek was screened to prevent fish from entering where they would become stranded. Immediately upstream of the Garrison Creek screen are two culverts that occasionally accumulate debris that must be removed.

Mill Creek Diversion Dam. The Mill Creek Diversion Dam structure includes a dam spillway, low-flow outlet, fish ladder, intake gates and rotating drum screens to divert flows to Bennington Reservoir, a diversion channel, a levee on the north side of the forebay, and debris barriers in the forebay.

The fish ladder is located on the south end of the spillway with the low-flow outlet adjacent on the north side of the ladder. The design capacity flow for the existing fish ladder is 42 cfs. When flows reach 200 cfs, passage begins to become a problem for some fish, and when flows reach 400 cfs, the current ladder and the low-flow outlet are closed, leaving fish with no way to move upstream. Presently, the fish ladder does not meet NMFS fish passage criteria. The Corps is planning to replace the fish ladder at the Diversion Dam by the end of 2025. Effects from the construction of the fish ladder are analyzed in a separate biological opinion, the Corps Fish Passage and Restoration Actions in Washington State (FPRP III) (WCR-2014-1857).

The headworks structure on the left bank of the Mill Creek Diversion Dam diverts water into Bennington Reservoir. Prior to 2001, all diversions to Bennington Reservoir were unscreened regardless of the flood diversion criterion or flow level. Since 2001, the diversion criteria has ranged from 1,100 cfs from 2001 to 2012, 2,400 cfs from 2012 until 2017 to comply with NMFS' 2011 Biological Opinion (NMFS 2011), 1,400 cfs from 2017 to 2020, and 1,700 cfs from January 2020 to the present time. The proposed action in the GI Study includes increasing the diversion criteria from 1,400 cfs to a trigger of 1,700 cfs. The effects of this change in diversion trigger were analyzed by NMFS in WCRO-2018-00274 (Mill Creek O&M Biological Opinion).

Fish Passage in Mill Creek Flood Control Project

For at least 50 percent of the adult steelhead in Mill Creek to move upstream through the MCFCP, the minimum flow needed over the channel spanning weirs is 100 cfs (Burns et al. 2009). In the concrete flume (RM 6.4 to RM 8.4), flows of 20 to 60 cfs in some reaches and 200 to 400 cfs in other reaches are needed for 50 percent of adults to pass. In general, flows that increase passability in one channel type (i.e. weirs) decrease passability in another channel type (flume).

Adult steelhead move upstream from December into early June with the majority of upstream migration occurring in the months of March, April, and May. Flows are generally above 100 cfs during adult migration, and thus flows are sufficient for them to pass the 347 channel-spanning weirs in the MCFCP (Table 6). However, passage at the Mill Creek Diversion Dam fish ladder becomes more difficult between 200 and 400 cfs, and the ladder is closed when flows exceed 400 cfs. Thus, there is only a short window of opportunity when flows are suitable for MCR steelhead to pass upstream at the Diversion Dam.

Table 6. Mill Creek mean monthly flows in cubic feet per second from 1998 to 2019, measured at River Mile 12.6, approximately 1 mile upstream of Mill Creek Diversion Dam but downstream of some irrigation diversions. (https://waterdata.usgs.gov/wa/nwis/uv?site_no=14013700).

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
cfs	187	182	243	222	146	90	28	24	27	42	79	138

During a 2011 review, the Corps also noted very shallow depth over the weirs at low flow rates. According to the Corps, the "shape of the weirs causes shallow, high-velocity flow to occur from slightly before the crest of the weir to the end of the weir (over approximately 4 feet of shallow, fast water). This condition, multiplied by the number of weirs, creates a significant fish passage problem. At a width of 110 feet, the critical depth is 0.75 inches for a 10 cfs flow rate. At 20 cfs, the critical depth is 1.25 inches" (Corps 2011).

In 2012, the Corps modified or "notched" three of the 84 stabilizing weirs that are within the federally-owned portion of the Project to create a low-flow channel to "improve fish passage conditions during periods of low flow, and decrease stream temperature on the section of Mill Creek managed by the Corps" (Corps 2011). The weirs have remained stable. However, the effect of that modification to fish passage and water temperature is unknown. The channel remains unnaturally wide and without shade. The Corps proposes to construct a low flow channel by 2030. Effects from construction of the low-flow channel are analyzed in a separate biological opinion, the Corps Fish Passage and Restoration Actions in Washington State consultation (FPRP III) (WCR-2014-1857).

Instream Habitat

The stabilized MCFCP channel lacks instream habitat features. Aside from the pools that may be found on the downstream side of some of the channel weirs, the homogeneous channel offers few opportunities for fish to rest or find refuge throughout the entire 7 miles of modified

channel. Habitat complexity is a primary factor in allowing fish to resist displacement during high flows (Schwartz and Herricks 2005) and protection from predators (Hicks et al. 1991; Schlosser 1987). In addition, the lack of instream habitat substantially increases the risk of predation by aquatic or avian predators (Corps 2003; Hicks et al. 1991).

Vegetation Management

In all sections of the MCFCP, the Corps or the MCFCZD sprays, cuts or uses goats to prevent the development of woody riparian vegetation. They also remove woody debris from the channel to maintain hydraulic capacity (Corps 2018a). The small amount of vegetation found on some areas of the levees is mainly grass and small shrubs that do not provide shade or significant amounts of organic material. At NMFS' request, the Corps developed a vegetation management plan for the federally-owned portion of the Project, but conditions there remain degraded.

2.4.3. Ongoing Passage and Habitat Improvements

Since 2001, the WDFW, CTUIR, MCWG, Walla Walla Conservation District, the Snake River Salmon Recovery Board, the regional Fisheries Enhancement Group, Tri-State Steelheaders, Walla Walla Community College, the City of Walla Walla, and numerous private landowners have been engaged in improving passage and habitat conditions on the non-federal portion of Mill Creek (RM 4.8 to 10.5). These actions have improved passage conditions for adult and juvenile MCR steelhead, allowing more adults to reach spawning grounds and juveniles to reach good rearing habitat located upstream of the Diversion Dam. These passage and habitat improvements are ongoing.

2.4.4. Tribal Chinook Salmon Reintroduction

In 2001, the CTUIR began a reintroduction program for spring-run Chinook salmon in the Walla Walla River subbasin, including Mill Creek. Chinook salmon reintroduction is part of an overall comprehensive program to improve the health of fish and water in the Walla Walla River.

2.4.5. Urban Development

Walla Walla County continues to permit development in the floodplain of Mill Creek, and development is expected to continue. Expanding development will require increased flood protection and diversion of more flow away from Mill Creek. Mill Creek flows are expected to remain low or decrease further for flood control operations.

2.4.6. City of Walla Walla Municipal Water Source

The Mill Creek watershed is the primary municipal water source for the City of Walla Walla. The headwaters are located on the Umatilla National Forest, which protects the area from development and will continue to be supplemented by the City's Aquifer Storage and Recovery Program. Diversion of water for municipal use will continue into the future.

2.5. Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered 50 CFR 402.17(a) and (b).

Effects to MCR steelhead and critical habitat include: (1) temporary displacement of rearing juveniles from increased turbidity; (2) injury and mortality from work area isolation and fish salvage; (3) temporarily blocked migration and fish passage; (4) water quality impacts from temporary increases in turbidity, resuspension of sediment, and releases of small amounts of chemicals; and (5) temporary loss of forage.

2.5.1. Effects on Species

Presence and Exposure

The action area is used by MCR steelhead for rearing and migration. Middle Columbia River steelhead primarily use the action area of Mill Creek Channel as they migrate to and from spawning grounds and rearing areas higher in the watershed. Adult steelhead typically enter lower Mill Creek as early as December, though usually not until February, migrating past the project area through April, and as late as early June, to spawn within the upper watershed. Some limited steelhead rearing and use of the action area occurs year-round.

All project activities will occur during the in-water work window, July 15 to September 15. During the in-water work window, no adults will be present and juvenile MCR steelhead may be rearing in the concrete section of the MCFCP, starting at approximately the North 9th Avenue Bridge, upstream to the Diversion Dam. NMFS does not expect juvenile rearing to occur in the MCFCP downstream of the concrete section in the summer due to low flows (approximately 5 cfs) and high or lethal water temperatures (approximately 80ºF).

Physical Injury

Work involving the presence of equipment or vehicles in the active channel when ESA-listed fish are present can result in injury or death of some individuals as they come in contact with the equipment. Debris entering Mill Creek during project construction could also result in injury or death of juvenile MCR steelhead. In-water work will occur during concrete channel rehabilitation, installation of steel plating to the underside of the railroad bridge downstream of North 9th Avenue, construction of a concrete parapet wall across the North 13th Avenue Bridge, and installation of permanent access ramps.

Concrete channel rehabilitation. All in-water work associated with concrete channel rehabilitation will occur July 15 to September 15, when flows are low (below 10 cfs) and Mill Creek is expected to be contained in the low-flow channel. Direct injury or mortality could occur from in-water construction activities if steelhead juveniles are in the immediate vicinity of the

construction work. Decking and shoring will be installed while working in the high-flow channel under the ceiling, but will not require in-water work. Equipment and vehicles will be operated within the high-flow channel for channel rehabilitation, but will not be operated within the low-flow channel. Debris barriers will be placed to isolate Mill Creek from all work areas and the low-flow channel will be covered with plywood or steel plates to keep construction material out of the water. Installation of channel covers over Mill Creek may require walking in the low-flow channel and installation of blocks to support the channel cover, but will not require use of equipment within the low-flow channel. Walking in the channel and placement of blocks may displace juveniles within the concrete channel, but it is extremely unlikely that steelhead will be injured or killed. Therefore, NMFS considers the risk of physical injury or death from the proposed concrete channel rehabilitation extremely small since conservation measures used by the contractor should contain and control all debris, most rehabilitation work is located outside of the Mill Creek low-flow channel, and the small number of juvenile steelhead rearing in the concrete channel during the in-water work window will likely flee once construction activities begin.

Bridge work. In-water work and operation of heavy equipment and vehicles will occur during installation of steel plating to the underside of the railroad bridge downstream of North 9th Avenue, construction of a concrete parapet wall across the North 13th Avenue Bridge, and construction of shoring to support the forms and weir at the North 13th Avenue Bridge. It is extremely unlikely that juvenile steelhead will be present in Mill Creek during bridge work at either location. All in-water work associated with bridge work will occur from July 15 to September 15, when flows are low (around 5 cfs) and water temperatures are high and potentially lethal (around 80^{o}F). Special measures will also be taken to prevent concrete dust, chemicals, fuels, oils, greases, bituminous materials, waste washings, and sewage from entering Mill Creek. Therefore, it extremely unlikely that MCR steelhead will be injured or killed from construction at either bridge.

Installation of permanent access ramps. There may be three permanent access ramps constructed in the concrete section of the MCFCP to facilitate access to Mill Creek for emergencies and O&M. Prior to construction of these ramps, debris barriers will be placed to isolate Mill Creek from all work areas. Construction of these ramps will require minor excavation to tie-in to the channel bottom at the toe of the slope, which would occur from July 15 to September 15, when flows are low (below 10 cfs) and Mill Creek is expected to be contained in the low-flow channel. Most construction will occur on the landside slope of the levee. One of the proposed sites is already used by the County for access (north ramp at Francis Ave). Therefore, it is extremely unlikely that MCR steelhead will be injured or killed from installation of permanent access ramps.

Levee raises. There will be no in-water work to raise the levees. All of the work to raise the levees will be performed from the top and landside of the levee. No equipment will be operated in Mill Creek. Therefore, there will be no physical injury or death to MCR steelhead from levee raises.

Displacement

Proposed project activities will occur within, over, and adjacent to Mill Creek. Displacement of juvenile steelhead could occur from in-water work, debris entering Mill Creek, and noise. In-water work will occur during concrete channel rehabilitation, installation of steel plating to the underside of the railroad bridge downstream of North 9th Avenue, construction of a concrete parapet wall across the North 13th Avenue Bridge, and installation of permanent access ramps. Drilling will occur at the center wall rehabilitation and at the First Division Works. Machinery and vehicles will be operated in the high-flow channel, on top of levees, at both bridges, and over Mill Creek.

In-water work. In-water work and operation of heavy equipment and vehicles will occur during installation of steel plating to the underside of the railroad bridge downstream of North 9th Avenue, construction of a concrete parapet wall across the North 13th Avenue Bridge, and construction of shoring to support the forms and weir at the North 13th Avenue Bridge. It is extremely unlikely that juvenile steelhead will be present in Mill Creek during bridge work at either location. All in-water work associated with bridge work will occur July 15 to September 15, when flows are low (around 5 cfs) and water temperatures are high and potentially lethal (around 80^{o}F).

Installation of channel covers over Mill Creek to contain construction debris will occur for center wall rehabilitation and ceiling removal. Installation may require walking in the low-flow channel and in-water installation of blocks to support the channel cover. Installation is not expected to take more than a few hours, with only minutes spent in the low-flow channel. Construction of permanent access ramps will require minor excavation to tie-in to the channel bottom at the toe of the slope, but no other in-water work. If juvenile steelhead are present, they will likely flee the area. Given the small size of each work area, the short duration of in-water work, and the small number of fish expected to be in each area, the effects of in-water work on MCR steelhead is expected to be small, isolated, and short-term. If juvenile steelhead are displaced, they are expected to move short distances and only for a short time (minutes).

Debris. Debris entering Mill Creek during rehabilitation of the concrete channel, installation of permanent access ramps, raising levees, and bridge work could cause temporary behavior modifications and result in displacement of juvenile MCR steelhead. Conservation measures used by the contractor to contain and control all debris during channel rehabilitation and levee repairs, and the location of all construction outside of Mill Creek, should effectively minimize potential impacts to MCR steelhead from construction debris. During construction, MCR steelhead will be absent from the location of in-water and over-water work associated with the railroad bridge, North 13th Avenue Bridge, and levee raises below the concrete channel because of low flows and high water temperatures. All work to raise levees will occur on the top or landside of the levee, minimizing potential effect to steelhead present in the stabilized channel upstream of the concrete flume. In addition, juvenile steelhead will be excluded from all work areas in the concrete channel. Given the conservation measures to contain and control construction debris, the exclusion of steelhead from construction areas in the concrete channel, and the location of construction relative to juvenile steelhead, displacement of steelhead from construction debris is expected to be isolated and short-term, with fish moving short distances.

Noise-related effects. Heavy equipment operation, vehicle operation, and drilling will create noise and vibration disturbances. The Federal Highway Administration (FHWA) (2008) found typical construction equipment (e.g., backhoe, excavator, and trucks) noise production ranges between 74 and 89 decibels (dB) at 50 feet. These noises are in-air and cannot be directly compared against NMFS' 150 dB root mean square disturbance threshold for underwater noise for fish. Animal response to sound depends on a number of complicated factors, including noise level and frequency, distance and event duration, equipment type and condition, and frequency of noisy events over time (Popper and Hawkins 2019).

Noise disturbance will be localized, temporary, and will be generated outside out of the water. Levee raising will occur using machinery and vehicles on the top and the landside of the levee. At the First Division Works, leveeing raising will include pouring new concrete and drilling into the landside of existing concrete to install anchors. Drilling will also occur above Mill Creek at the center wall repair. Because of low flows and high temperatures, juvenile steelhead will not be in the areas of bridge construction. Steelhead will also be excluded from construction areas in the concrete channel. Because juvenile steelhead will be in the vicinity of construction, NMFS expects noise will cause some juvenile steelhead to temporarily move away from the disturbance. Even if fish move, juveniles are expected to migrate only short distances to an area where they feel more secure and only for a few minutes or a few hours in any given day. NMFS does not anticipate that short-term movements caused by construction equipment will result in effects substantially different than those they would experience if they remained in place. The expected noise levels and level of disturbance caused by construction equipment are unlikely to have more than minor behavioral impacts to any fish exposed.

Work Area Isolation and Fish Salvage

The Corps may use a variety of methods for work area isolation and fish salvage. Work area isolation will be accomplished by either: (1) seining (herding) and netting fish out of three or four work areas and installing barrier nets to block fish from each area; or (2) seining and netting fish out of one work area, and dewatering and installing a bypass pipeline around two or three work areas. Dewatering would also include herding and netting fish. Both isolation and fish salvage strategies could also include netting and translocating fish to above the First Division Dam.

NMFS does not expect any adult steelhead to be in Mill Creek when fish salvage would occur because adult steelhead are typically not present in Mill Creek during the in-water work window of July 15 to September 15. Therefore, only juveniles are expected to be affected. Many factors influence the success of fish salvage efforts including water depth, habitat complexity, temperature, salvage methods, crew experience, and care of fish after capture. At best, all fish are salvaged without injury and successfully released. However, in many cases some fish are difficult to capture, sustain injuries, and experience high stress.

(1) Fish Salvage without Dewatering

Fish salvage may be conducted in three or four locations, maximum length of 1,300 feet and maximum area of 8,200 square feet: (1) 3,600 square feet (600 feet by 6 feet), with a water depth of 2 to 4 inches at wall tieback near Otis Street; (2) 1,600 square feet (200 feet by 8 feet, both

sides of split channel around the center wall), with a water depth of 2 to 3 inches, near Palouse Street; (3) 1,200 square feet (200 feet by 6 feet), with a water depth of about 2 to 4 inches at ceiling removal location upstream of North 2nd avenue, and (4) 1,200 square feet (200 feet by 6 feet) with a water depth of about 2 to 4 inches at ceiling removal location between North 2nd and North 3rd Avenues. If fish salvage occurs for the entire reach of ceiling removal [referenced in (3) and (4) above], an additional 600 square feet (100 feet by 6 feet) would be isolated for a total isolated area for ceiling removal of about 3,000 square feet, 500 feet long by 6 feet wide. All areas are located in the concrete flume, shallow, and do not contain any instream habitat or habitat complexity. The Corps does not plan to salvage fish in any areas of levee raises because all work will be conducted from the top and landside of the levee. The Corps also does not plan to salvage fish in the bridge work areas because low flows and high water temperatures, generally above 80°F, preclude steelhead rearing.

Fish salvage will consist of herding fish out of the construction area and netting any fish that do not leave on their own. Any captured fish will be released back to the creek immediately in a shaded or covered area. If there is no shaded or covered area to herd fish to, they will be captured and translocated upstream. Block nets or other barrier material will be installed upstream and downstream of the work area to exclude fish from the construction area. No electrofishing will occur.

Summer distribution and density in the stabilized channel is limited by low streamflow and high water temperatures such that few salmonids have been documented during the summer. However, cold water springs that enter the concrete channel from Wildwood Park and downstream provide limited rearing within the concrete channel. Within the submitted BA, the Corps provided estimates of the number of juvenile steelhead it expected to be rearing in the concrete channel in the location of project construction. The Corps estimated zero steelhead will be present near Otis Street, less than 10 will be present between South 1st Avenue and South Colville Street, and 10 will be present in the entire ceiling removal location, upstream of North 2nd downstream to North 3rd Avenue.

NMFS used available data on Mill Creek to estimate the density of juvenile fish in the concrete channel during dewatering and fish salvage operations (Gallion and Anglin 2009; Mendel et al. 1999, 2000, 2004, 2005, 2007, 2014). NMFS reviewed the results of one fish salvage event in the concrete channel in 2004, and years of data collected by biologists, including a compilation of distribution and abundance data for 1998–2006 (Mendel et al. 2007). Based on this information, NMFS estimates there are 134 juvenile steelhead per mile rearing in the concrete channel. The entire distance to isolate and salvage is 0.246 miles. Therefore, NMFS estimates there will be 33 juvenile steelhead located in the concrete channel in areas that will be isolated and salvaged, including:

- Near Otis Street, NMFS estimates there will be 15 MCR steelhead in this area during the in-water work window and fish salvage. This stretch of Mill Creek is wide, shallow, and lacks cover. If fish are located in this area, they will likely need to be captured and translocated upstream.

- Between South 1st Avenue and South Colville Street, NMFS estimates there will be five MCR steelhead present. This location is covered, and capture and translocation of MCR steelhead is not anticipated.
- Upstream of North 2nd Avenue and between North 2nd and North 3rd avenues, NMFS estimates there will be five MCR steelhead in each area, or 13 MCR in the reach. There is a short section (300 feet) of covered channel downstream of these areas where fish could remain below a block net across the channel. Therefore, capture and translocation of MCR steelhead is not anticipated.

Herding will minimize the risk of injury and mortality to listed fish to the extent possible. However, seining, netting, capture, and handling may injure fish and can increase stress, resulting in harm or death to some individuals (Frisch and Anderson 2000; Hemre and Krogdahl 1996; Olla et al. 1995). Additionally, a small number of fish may not be found by the fish capture crew and could end up stranded during dewatering.

Because of the small size, shallow depth, and absence of substrate in the concrete flume of Mill Creek, most fish will leave salvage areas on their own volition. NMFS expects 95 percent of the juvenile steelhead (31) will be herded out of the area without being captured and handled. Therefore, two fish will be captured and handled. NMFS conservatively estimates that 80 percent of the juveniles handled and released downstream will be captured and released without ill effects. However, we expect 20 percent, or 1 fish (0.4 rounded up), will be killed or injured. We also expect that some juveniles will be injured during herding and experience injurious levels of stress sufficient to result in death. NMFS expects there will be no temperature difference between areas fish are herded to and from, if they remain in the concrete channel in a covered location. However, water temperature will be around 70^{o}F. Therefore, we conservatively estimate that 5 percent of the 31 fish herded without capture, two fish, will experience sufficient harm to result in death. NMFS estimates three juvenile MCR steelhead will be killed during fish salvage if there is no translocation.

If fish are captured and translocated, they will be placed in tanks and trucked and released upstream of the First Division Dam where conditions are suitable. Habitat conditions in this area are poor, but better than the concrete channel. Fish would be moved from water that is around 70^{o}F to similar, but possibly slightly warmer, water temperatures. If they are moved upstream, the Corps estimates handling stress could result in 50 percent mortality. Therefore, in a worst-case scenario, all 33 steelhead would be captured and translocated upstream of the First Division Dam. Due to handling, stress, and poor habitat conditions, 50 percent, 17 juvenile MCR steelhead, would experience sufficient harm to result in death. Two age classes of steelhead will likely be affected by fish salvage. Based on juvenile to adult survival rates for steelhead, the injury or death of up to 17 juvenile steelhead does not accrue to the loss of one adult steelhead, even if all fish are from the same brood year.

NMFS estimates 33 juvenile steelhead will be salvaged with 3 to 17 juvenile MCR steelhead killed by fish salvage efforts, if three or four areas are isolated and seined, and depending on if fish are captured and translocated, resulting in the loss of less than one adult steelhead.

(2) Fish Salvage with Dewatering

Dewatering may occur for the center pier wall repair and the ceiling repair. The area dewatered would be about 1,600 square feet around the center wall and 2,400 square feet around the ceiling removal areas, or 10,400 square feet for the entire reach, 1,300 feet long by 8 feet wide. Based on Mill Creek fish salvage, distribution, and abundance information, NMFS estimates 33 MCR steelhead will be present in the entire reach during dewatering. There is a short section (300 feet) of covered channel downstream of these areas where fish could remain below a block net across the channel. Therefore, capture and translocation of MCR steelhead to above the First Division Dam is not anticipated.

Because of the small size, shallow depth, and homogeneous habitat of Mill Creek in the area to be dewatered, NMFS conservatively estimates 95 percent, or 31 juvenile steelhead, will leave the area without being caught or handled. Therefore, Corps staff may need to capture and handle two juvenile MCR steelhead. NMFS also estimates that 80 percent of the juveniles handled and released downstream will be captured and released without ill effects. However, we expect 20 percent, or one fish (0.4 rounded up), will be killed or injured. All fish herded will remain in the concrete channel in similar conditions to habitat they are herded from. Because this habitat is considered poor based on low flows, high temperatures, and lack of habitat diversity, we expect that some juveniles will be injured during herding and experience injurious levels of stress sufficient to result in harm and death. Therefore, we conservatively estimate that 5 percent of the 31 fish herded, two fish, will experience sufficient harm to result in death. Because of the small number of fish that will be present in the concrete channel during the in-water work window, NMFS does not expect herding to result in overcrowding. NMFS estimates three fish will be killed during dewatering and fish salvage if there is no translocation.

In a worst-case scenario, all 33 steelhead would need to be captured and translocated upstream of the First Division Dam. NMFS would expect 50 percent mortality, 17 juvenile MCR steelhead, due to handling, stress, and poor habitat conditions. Two age classes would likely be affected. Based on juvenile to adult survival rates for steelhead, the injury or death of up to 17 juvenile steelhead does not accrue to the loss of one adult steelhead, even if all fish were from the same brood year.

Along with dewatering, fish salvage would also occur, without dewatering in a 600-foot reach near Otis Street. Using the same assumptions as above, NMFS estimates that 15 fish would be present in this reach, 95 percent (14 fish) will leave the area without being caught or handled, and the Corps may need to handle one fish. NMFS estimates that 20 percent of handled fish, or one fish (0.2 rounded up), will be killed or injured. We also estimate that that 5 percent of the 14 fish herded, one fish, will experience sufficient harm to result in death. In the worst-case scenario, all 15 fish would be captured and translocated, with mortality of 8 (50 percent).

Therefore, if the Corps conducts fish salvage with dewatering, NMFS estimates 48 juvenile steelhead will be salvaged, and 5 to 25 juvenile MCR steelhead would be killed, two to eight near Otis Street, and three to 17 in the area dewatered (Table 7). Based on juvenile to adult survival rates for steelhead, this would result in the loss of less than one adult steelhead.

Table 7. Estimated number of summer steelhead salvaged, and resultant mortalities, based on the U.S. Army Corps of Engineers' selected method for fish salvage, as part of its Mill Creek General Investigation Feasibility Study. Option 1 is seining three locations. Option 2 is seining one location and dewatering two locations.

Fish Salvage Method	Estimated Number of Fish Salvaged	Estimated Number of Mortalities if No Fish Translocated	Estimated Number of Mortalities if All Fish Translocated
Option 1–Seining Only	33	3	17
Option 2–Seining and Dewatering	48	5	25

Blocked Passage

Installation of block nets to exclude fish from work areas could prevent upstream and downstream migration of juvenile steelhead, and installation of a pipeline to dewater the work area for ceiling removal and center wall repair could prevent juvenile upstream passage. Some juvenile steelhead rear in the concrete section of Mill Creek year-round and will be present during project construction.

When natural flows decline below 100 cfs within the stabilized Mill Creek Channel, fish are unable to move upstream or downstream to find suitable habitat conditions (Burns et al. 2009). Installation of block nets will occur during the 2-month in-water work window of July 15 to September 15. During this timeframe, flow will be approximately 30 cfs above the First Division Dam, 5 cfs below the First Division Dam after most Mill Creek flow is diverted into Yellowhawk Creek, 10 cfs or less in the concrete flume, and 5 cfs below the North 9th Avenue Bridge following irrigation withdrawals. Low flows, and the unnaturally wide channel configuration in the stabilized channels upstream and downstream of the concrete channel, prevent upstream and downstream migration of juvenile steelhead from around June through November. Therefore, juvenile steelhead rearing in the concrete channel are unable to migrate upstream or downstream of the concrete channel before block nets will be installed.

Juveniles will be precluded from moving upstream or downstream of the block nets and/or upstream of the dewatered section of Mill Creek within the concrete channel for 2 months, July 15–September 15. Only one work area will be blocked at a time and exclusion from each area should be less than 2 months. By the in-water work window, fish have already moved upstream into rearing areas. Therefore, NMFS expects very few juvenile steelhead, if any, would be migratory within the concrete channel at this time.
Because there will be no migration occurring in the channel-spanning sections of Mill Creek below the concrete section and above the concrete section to Mill Creek First Division Dam, and very little or no migration in the concrete channel, blocked passage will not occur or will occur for a short amount of time in a very small area of Mill Creek. Therefore, NMFS does not expect any MCR steelhead to be harmed or killed by blocked passage.

Water Quality

Chemical contamination. Use of heavy machinery and equipment in the action area, and use of small machinery and vehicles within the dry high-flow channel and in Mill Creek at both

bridges, creates a risk of accidental spills of fuel, lubricants, hydraulic fluid, coolants, and other contaminants into Mill Creek where they could adversely affect habitat, injure or kill aquatic food organisms, or directly impact ESA-listed steelhead. Petroleum-based contaminants, such as fuel, oil, and some hydraulic fluids, contain polycyclic aromatic hydrocarbons (PAHs), which, at high levels of exposure, can kill and can cause sublethal, adverse effects at lower concentrations (Meador et al. 2006). Spills that make their way into Mill Creek could harm fish. However, NMFS anticipates PAH releases of only very small quantities (ounces) are likely with each accidental release or spill. BMPs will be implemented to minimize the use of toxic substances and prevent or contain any spill that may occur. In addition, a spill prevention control plan will be developed and adhered to by the construction contractor to ensure spills are prevented, appropriate cleanup provisions are in place, and appropriate spill containment materials are available at the project site at all times. These actions will minimize the opportunity for contaminants to enter the waterway and affect steelhead. Therefore, NMFS does not expect any MCR steelhead to be injured or killed by exposure to accidental releases of fuel, oil, and other contaminants caused by this action.

Lime is a major component of cement and concrete and is toxic to aquatic life. It dissolves easily in water and drastically changes the pH of water (increase in alkalinity), which can cause burns on fish and kill fish and other aquatic life. Uncured concrete and concrete dust/slurry entering Mill Creek during concrete replacement can result in burns and death of MCR steelhead. However, the proposed action includes BMPs aimed at minimizing the risk of uncured concrete and concrete dust/slurry entering Mill Creek. Prior to construction, the contractor awarded the contract will submit plans to the Corps that include practices to confine, remove, and dispose of concrete, including measures for washout facilities. These plans must be approved by the Corps before construction begins. Spill kits and cleanup materials will also be readily available during operations. Because of these BMPs, and the location of work relative to Mill Creek, NMFS does not expect uncured concrete to enter Mill Creek. NMFS expects very minor amounts of fugitive dust to enter Mill Creek, and the amount that enters to be insufficient to cause burns or death of MCR steelhead.

Vegetation removal. Immediately upstream of North Tausick Way, 560 feet of the left bank levee may need to be widened to meet current criteria. Site preparation would include removal of approximately six trees (20 inch diameter or less), 3,000 square feet (.09 acres) of canopy. These trees are located on the left bank of Mill Creek approximately 30 feet from the stream. Because of their location, and the orientation of Mill Creek, they provide very little shade. NMFS expects any increase of stream temperature in the summer from the effects of vegetation removal will be immeasurable.

Removal of these trees will also decrease input of insects and other forage to Mill Creek. However, drifting invertebrates from upstream will still provide a prey base. Due to the small area that will be affected, NMFS does not expect the loss of prey to effect growth, survival, or distribution of MCR steelhead in the action area.

Increased turbidity. In-water construction activities at the bridges and permanent access ramps, and during fish salvage and installation of isolation materials, will likely cause a minor and short term increase in turbidity levels and some minor sediment delivery. Elevated turbidity can cause

lethal, sublethal, and behavioral effects in juvenile and adult salmonids depending on the duration and intensity (Newcombe and Jensen 1996). Increased turbidity levels may result in temporary displacement of fish from preferred habitat or potential sublethal effects such as gill flaring, coughing, avoidance, and increase in blood sugar levels (Bisson and Bilby 1982; Berg and Northcote 1985; Servizi and Martens 1992).

Within the stabilized weir sections of Mill Creek at the bridges, sediment is present but flow will be mainly confined between the weirs and steelhead will not be present. Sediment delivery from upland disturbances could occur, but should be effectively minimized given the BMPs and proposed use of general sediment containment measures. All levee raising activities will occur on the top and landside of the levee, and containment measures will keep sediment away from Mill Creek. Therefore, NMFS does not expect increased resuspension of sediment and turbidity in these areas to effect steelhead behavior, or injure or kill fish.

Habitat within Mill Creek in the proposed area of channel rehabilitation is composed entirely of concrete with no natural substrates. Very limited sediment deposition may occur annually during low water periods, but typically scours out during subsequent high flows. This limits the amount of sediment resuspension and turbidity caused by the project. NMFS expects that resuspension of sediment during fish salvage and installation of work area isolation materials will be sufficient to cause temporary behavioral changes, with steelhead in the concrete channel volitionally seeking out adjacent, less turbid habitats, thus avoiding direct sediment exposure (Berg and Northcote 1985). This movement is expected to be of short duration (several minutes) and extent (less than 100 feet), with sediment settling quickly in the expected low flows. NMFS does not expect any MCR steelhead to be injured or killed by exposure to turbidity caused by this action.

2.5.2. Effects on Critical Habitat

The action area consists of freshwater rearing sites and a freshwater migration corridor, and their essential PBFs. The PBFs that support freshwater rearing and migration will be temporarily affected by degraded water quality and loss of forage within the action area.

Water Quality

The action is expected to suspend fine sediment during installation and removal of isolation materials and fish salvage, increasing turbidity in Mill Creek. Seining will disturb approximately 5,800 square feet, 0.14 acres. Habitat in this area is composed entirely of concrete with no natural substrates. Very limited sediment deposition may occur in this area annually during low water periods, but typically scours out during subsequent high flows. The increase in turbidity is expected to last for a few minutes and affect about 100 feet below the work site. NMFS expects any effects to water quality from suspension of fine sediment and increased turbidity will be minor and of short duration, and effectively minimized given the BMPs.

Minor and temporary increases in total suspended solids will also occur during in-water work associated with construction at the bridges. In-water work at the bridges will disturb approximately 0.50 acres, and is expected to result in a localized, short-term resuspension of sediment. NMFS expects suspended sediment to settle quickly in the low flows and remain in the

immediate area between the channel spanning weirs. Therefore, any effects to water quality from sediment will be minor and of short duration, and effectively minimized given the BMPs.

Impairment of water quality may result from accidental releases of fuel, oil, and other contaminants. Water quality could also be negatively affected by uncured concrete and concrete dust/slurry entering Mill Creek during concrete drilling, removal, and pouring. Sediment control and construction BMPs will be maintained throughout the project and the contractor will remove captured sediment and all construction debris prior to the removal of the BMPs to avoid the potential release of sediment and other materials to the creek. NMFS expects minor leaks and spills of petroleum-based fluids (not more than ounces) and very minor amounts of fugitive dust to enter Mill Creek. NMFS expects any effects to water quality from chemical contamination and concrete to be minor and of short duration, and effectively minimized given the BMPs.

Forage

Benthic forage organisms within the action area may be killed or displaced by equipment operation within Mill Creek, fish salvage and dewatering, concrete dust or slurry, and minor spills of fuel or lubricants. Measures implemented to minimize the impacts of elevated suspended sediment and chemical contamination will also minimize impacts on aquatic invertebrates. In-water equipment operation will occur at the railroad and North 13th Avenue bridges and disturb approximately 0.25 acres at each site, 0.5 acres total. The alteration of the riverbed will cause localized reductions in invertebrate populations found in the sediment and on the sediment surface (benthic invertebrates). The reductions are likely to be short-lived as disturbed areas are likely to be recolonized within several months to 1 year after project completion (Fowler 2004; Yount and Nemi 1990; Griffith and Andrews 1981).

Work area isolation and fish salvage will disturb a maximum of 14,000 square feet, 0.32 acres (0.24 acres dewatered and 0.08 acres isolated without dewatering near Otis Street). Habitat in these areas is composed entirely of concrete with no natural substrates. Some sediment deposition occurs annually and a small number of benthic invertebrates are present. Resuspension of sediment from the channel, crushing of benthic invertebrates during seining, and dewatering of benthic invertebrates is expected to result in short-term, localized effects to species composition and abundance of action area macroinvertebrates. NMFS expects this to result in a minor and temporary loss of forage for salmonids. Invertebrates from upstream and downstream of the action area will recolonize the area, likely within several months to 1 year. Given the small area of benthic habitat disturbance and the short-term nature of the action, NMFS does not expect this project will change the conservation value of forage in Mill Creek or at the fifth-field watershed scale.

Passage Free of Artificial Obstruction

Installation of block nets to keep fish out of work areas will temporarily prevent upstream and downstream juvenile migration in the concrete flume. Installation of a pipeline to dewater the work area for ceiling removal and center wall repair would temporarily prevent juvenile upstream passage in the concrete flume. Adults will not be in the project area during in-water work.

Unobstructed passage is critical to both juvenile and adult MCR steelhead. During the 2 years that juveniles will rear in Mill Creek, they will move to optimize foraging and growth. They will move downstream either involuntarily due to high flows or voluntarily to find better foraging habitat, followed by movements back upstream as flows decline and water temperatures rise in late spring (Contor et al. 2003). Block nets or the pipeline would block passage in the concrete channel for 2 months during the low flow, in-water work window. Only one work area would be isolated at a time. However, even without these temporary obstructions in place, juveniles would only be able to migrate as far upstream or downstream as the channel-spanning weirs, as these structures are impassible due to low flows at the time block nets or the pipeline would be installed. Thus, fish trapped below the block nets in the concrete channel would experience conditions similar to those they would otherwise be able to access, and would not be harmed or killed by temporarily blocked passage in the concrete channel.

Natural Cover

Cover, in the form of shade, will decline slightly due to the removal of minor amounts of riparian vegetation to widen 560 feet of levee. Because of their location and the orientation of Mill Creek, the trees provide very little shade. NMFS does not expect this project will change the conservation value of natural cover in Mill Creek or at the fifth-field watershed scale.

Floodplain Connectivity

All of the project area is confined between concrete walls or gabions. There is currently no floodplain connectivity.

Relevance of Effects on Physical or Biological Features to Conservation Value

As described above, the proposed action will have some short-term effects on water quality, forage, and safe passage. These negative effects, however, are minimal in the action area and even less consequential at the HUC5 watershed scale. Therefore, the proposed action will not affect the conservation value of critical habitat at the HUC5 watershed scale more than a very small amount.

2.6. Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR 402.02 and 402.17(a)). Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Some continuing non-federal activities are reasonably certain to contribute to climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline versus cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (Section 2.4).

2.6.1. Habitat Improvement

The Snake River Salmon Recovery Board (SRSRB) and Tri-State Steelheaders are modifying portions of the locally owned channel to remove passage barriers and provide resting habitat. Organizations and local irrigation districts are working on habitat improvements and water conservation throughout the action area. Several groups are also working on shallow aquifer recharge projects to divert spring runoff to areas with permeable soil to allow water to infiltrate into the shallow aquifer. In addition, the state of Washington recently funded and initiated a process to develop a 30-year Strategic Plan for water management in the Walla Walla River subbasin, Walla Walla 2050, which includes the action area. These actions are likely to continue for several more years, improving water quality and fish habitat.

2.6.2. Chinook Salmon Reintroduction

The CTUIR will continue to stock adult spring-run Chinook salmon in Mill Creek into the future. The CTUIR has seen the progeny of these Chinook salmon returning to Mill Creek on their own for several years and these returns are expected to increase in the future. The video monitoring for MCR steelhead and bull trout in Mill Creek has documented adult Chinook salmon returning to Mill Creek into early June. The extent to which interspecific competition may affect steelhead abundance or productivity in Mill Creek and the Walla Walla subbasin is unclear, but the two species historically co-existed in Mill Creek.

2.6.3. Continued Development

Between 2010 and 2018, the population of Walla Walla County increased by 3.6 percent.[4] NMFS assumes that future private and state actions will continue within the action area, increasing as population growth and density increase. As the human population in the action area continues to grow, demand for agricultural, commercial, or residential development is also likely to increase. Development of residential homes along Mill Creek is likely to continue into the future. Development could have negative effects on listed fish species and on designated critical habitat through changes to water quality, impacts to riparian habitats, use of shallow wells and resultant impact to river flows, and possibly decreased or blocked fish passage. This development will continue to restrict the Corps' flexibility to raise the flood diversion because of concern for development and infrastructure on Mill Creek. The flood diversion criteria determine the frequency and duration of unscreened flows into Bennington Reservoir and affects instream flow downstream of the Diversion Dam.

Upper Mill Creek is the water source for the city of Walla Walla and is a protected watershed. In addition, the water rights of the city of Walla Walla are limited so at least some of any new demand created by continuing development will have to be met through conservation.

[4] U.S. Census Bureau, State and County QuickFacts, Walla Walla County. Available at https://www.census.gov/quickfacts/fact/table/wallawallacountywashington,US/POP060210

2.6.4. Continued Use of Mill Creek Water for Municipal Water

The City of Walla Walla is likely to continue to use Mill Creek as their main public drinking water source, with the water pipeline also used as a source for hydroelectricity. The City discharges water into Mill Creek downstream of the federal footprint three to four times each year for a short period (few hours) when evacuating water storage tanks.

2.6.5. Continued Maintenance of the Non-Federal Portion of the Mill Creek Flood Control Project

In all sections of the MCFCP that it manages, the MCFCZD sprays, cuts or uses goats to prevent the development of woody riparian vegetation. They also remove woody debris from the channel to maintain hydraulic capacity (Corps 2018a). The small amount of vegetation found on some areas of the levees is mainly grass and small shrubs that do not provide shade or significant amounts of organic material. These O&M activities will continue into the future and limit riparian area development and contributions to habitat, forage, and water quality.

In total, cumulative effects will generally perpetuate the existing conditions in the action area that were described in the environmental baseline. However, modifications to the concrete channel should improve passability of the MCFCP for juvenile and adult MCR steelhead.

2.7. Integration and Synthesis

The Integration and Synthesis section is the final step in our assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action (Section 2.5) to the environmental baseline (Section 2.4) and the cumulative effects (Section 2.6), taking into account the status of the species and critical habitat (Section 2.2), to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminish the value of designated or proposed critical habitat as a whole for the conservation of the species.

Middle Columbia River steelhead from the Walla Walla River population inhabit the action area and depend on it to support critical life functions. Construction and operation of the MCFCP has degraded floodplain and channel structure, altered sediment routing, altered hydrology, and altered water quality. These impact MCR steelhead and their habitat, and impact Mill Creek's ability to support rearing and migration. The cumulative effects of state and private actions within the action area are anticipated to continue at approximately the same level that they are now occurring.

2.7.1. Middle Columbia River Steelhead

The MCR steelhead DPS is not currently meeting the viability criteria described in the Middle Columbia River Steelhead Distinct Population Segment Recovery Plan (NMFS 2009). The threatened status of the MCR steelhead DPS is largely a result of low viability (abundance, productivity, spatial structure, and diversity) in four populations. Seven populations in the DPS exhibit moderate or maintained viability, while six populations are rated as viable or highly

viable. The DPS cannot achieve viability and the associated low risk of extinction without significant improvements in abundance, productivity, and diversity for many populations. The Walla Walla River population of MCR steelhead, which is failing to reach viability, will be affected by the proposed action. Walla Walla River steelhead abundance has not increased over the last 5 years, and they are currently at a moderate risk for abundance, productivity, spatial structure, and diversity (NWFSC 2015). The Walla Walla River steelhead population has an overall viability risk rating of maintained. Ongoing climate change will generally impose additional barriers to survival and recovery.

As described in Section 2.5.1, the proposed action will have effects on juveniles of the Walla Walla River population. Based on the fish salvage method selected, up to 48 juvenile steelhead will be rearing in areas to be salvaged and/or dewatered. If salvage includes translocating all of these juveniles from the concrete channel to above the First Division Dam, NMFS estimates up to 25 fish will be injured or killed by the proposed action because of handling stress, high water temperatures, and poor habitat conditions in locations fish are moved from and to. Rearing juveniles comprise two age classes. Even if all deaths are from the same age class, NMFS estimates that the proposed action will reduce the number of adults returning by less than one quarter of one adult.

Considering the effects of the action in conjunction with the existing condition of the environmental baseline and the small level of potential cumulative effects, NMFS has determined that the loss of a small number of juvenile steelhead that may be caused by the proposed action will not be substantial enough to negatively influence VSP criteria at the population scale and should not appreciably reduce the likelihood of the Walla Walla River population maintaining its current status. Because the effects will not be substantial enough to negatively influence VSP criteria at the population scale, the viability of the Umatilla/Walla Walla MPG and the MCR steelhead DPS are also not expected to be reduced. The effects of the proposed action are not likely to reduce survival of MCR steelhead at the species level. Nor is the action likely to reduce the likelihood of recovery of this species.

2.7.2. Critical Habitat

Critical Habitat designated for MCR steelhead is, in general, not functioning well enough to support recovery of the DPS. Water storage and diversion projects have drastically altered the critical habitat in the Columbia River and some of its tributaries. Floodplain development and land management have had significant impacts in some tributaries, including the Walla Walla River. Critical habitat in the Columbia River estuary has been degraded by conversion of a formerly complex ecosystem to industrial, transportation, recreational, agricultural, and urban uses. The freshwater migration corridors and estuarine areas PBFs have been severely degraded. Freshwater rearing sites have generally been degraded in areas with heavy agricultural and urban development. Climate change will have a range of effects on critical habitat. Some effects are uncertain, though in general, climate change is likely to negatively affect critical habitat and continue to reduce the ability of critical habitat to support recovery.

The potential impacts of the proposed action on MCR steelhead critical habitat are described in Section 2.5.2. The proposed action will have short-term effects on water quality (sediment, turbidity, and chemical contamination), forage, and safe passage. NMFS expects adverse effects

to the above PBFs for ESA-listed salmonids from installation of steel plates to the underside of the railroad bridge, construction of a parapet on the North 13th Avenue Bridge, installation of debris containment measures, operation of machinery within Mill Creek and the high-flow channel, and fish salvage. Increases in total suspended solids and turbidity during project construction are expected to be small and persist only for a few minutes to a few hours. Forage prey will be eliminated from only a very small area of Mill Creek, and will recolonize disturbed areas within a few months to 1 year. The effects of work area isolation and temporary installation of block nets or a pipeline on free passage is expected to be minimal and not result in harm. Based on our analysis, adverse effects from the proposed action will cause a small and localized decline in the quality and function of PBFs in the action area. However, because the negative effects will be short-term and not appreciably impair the function of critical habitat, NMFS anticipates that the project as a whole will maintain the overall carrying capacity for migrating and rearing adult and juvenile fish.

For the reasons set out above with respect to MCR steelhead, considering the potential effects of the proposed action with the baseline conditions, potential effects of climate change, and the small level of potential cumulative effects in the action area, NMFS concludes that the proposed action is not expected to appreciably reduce the conservation value of the critical habitat in the action area or at the HUC5 watershed scale. Because the conservation value of critical habitat in the watershed will not be appreciably reduced, the conservation value of critical at the designation scale will also not be appreciably reduced.

2.7.3. Summary

For all the reasons described in the preceding paragraphs of this section, the proposed action will not appreciably reduce the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction or distribution nor will the proposed action reduce the value of designated critical habitat for the conservation of the species.

2.8. Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' opinion that the proposed action is not likely to jeopardize the continued existence of MCR steelhead or destroy or adversely modify its designated critical habitat.

2.9. Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted

by the Federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this ITS.

2.9.1 Amount or Extent of Take

In this opinion, NMFS determined that incidental take is reasonably certain to occur and will include harm and harassment caused by injury and mortality from work area isolation and fish salvage.

The Corps may use a variety of methods for work area isolation and fish salvage. Work area isolation will be accomplished by either: (1) seining (herding) and netting fish out of three or four work areas and installing barrier nets to block fish from each area; or (2) seining and netting fish out of one work area, and dewatering and installing a bypass pipeline around two or three work areas. Depending on the fish salvage method selected by the Corp, NMFS estimates that up to 48 juvenile steelhead will be captured and translocated from all fish salvage activities, with 25 juvenile steelhead experiencing sufficient harm to result in death. The extent of take will be exceeded if the Corps captures and handles more than 48 juvenile steelhead from all fish salvage activities, or if all fish salvage activities result in the death of more than 25 juvenile steelhead.

2.9.2. Effect of the Take

In the opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

2.9.3. Reasonable and Prudent Measures

"Reasonable and prudent measures" are nondiscretionary measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02).

The Corps shall:

1. Avoid or minimize take due to construction activities.
2. Minimize incidental take due to capture of individual fish during work area isolation and salvage efforts.
3. Track, monitor, and report on the proposed action to ensure that the project is implemented as proposed, and the amount and extent of take is not exceeded.

NMFS believes that full application of conservation measures included as part of the proposed action, together with the use of the RPMs and terms and conditions described below, are necessary and appropriate to minimize the likelihood of incidental take of listed species due to completion of the proposed action.

2.9.4. Terms and Conditions

The terms and conditions described below are non-discretionary, and the Corps or any applicant must comply with them in order to implement the RPMs (50 CFR 402.14). The Corps or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. To implement RPM 1 (minimize take due to construction activities) the Corps shall:
    a. Conduct all work below the Ordinary High Water Mark (OHWM) within as short a period as possible between July 15 and September 15.
    b. Confine all impacts to the minimum area necessary to achieve project goals.
    c. Implement all proposed impact minimization measures and BMPs as described in the Proposed Action section of this opinion and in the BA dated June 2020.
    d. Stage, service, store, and fuel all vehicles and construction equipment 150 feet or more from any natural waterbody.
    e. Clean all equipment before beginning operations to remove all external oil, grease, dirt, and mud.
    f. Inspect all vehicles operated within 150 feet of any stream, waterbody, or wetland daily for fluid leaks before leaving the vehicle staging area. Any leaks detected must be repaired in the vehicle staging area before the vehicle resumes operation. Inspections must be documented in a record that is available for review on request by NMFS.
    g. Select equipment that will have the least possible adverse effect to the environment, considering factors including, but not limited to, equipment that has the ability to conduct work from existing disturbed areas, exert the least soil compaction impact, and minimize the amount of vibration and noise that could disturb aquatic species.
    h. To the extent feasible, work with heavy equipment outside Mill Creek, unless work from another location would result in less habitat disturbance.

2. To implement RPM 2 (minimize incidental take due to capture of individual fish during work area isolation and salvage efforts) the Corps shall:
    a. Complete work below the OHWM between July 15 and September 15. In-water work occurring outside of this timeframe will require written approval from NMFS.
    b. Implement all isolation and relocation activities as described in the Proposed Action section of this opinion.
    c. Herd, capture, or translocate fish from work areas only if necessary to prevent incidental take from in-water and over-water construction activities. If both areas of ceiling removal will be isolated and salvaged separately, isolate the lower area first to prevent steelhead that are herded downstream from being herded or handled twice.

d. Monitor and document the number of juvenile steelhead that are captured and handled during work area isolation or fish salvage activities, and whether any juvenile steelhead die as a result of such activities. If the amount or extent of take is exceeded, stop project activities and notify NMFS immediately.

e. Post prominently at the worksite the following notice:

NOTICE: If a sick, injured or dead specimen of a threatened or endangered species is found in the action area, the finder must notify NMFS Law Enforcement at (206) 526-6133 or (800) 853-1964, through the contact person identified in the transmittal letter for this opinion, or through the NMFS Interior Columbia Basin Office. The finder must take care in handling sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder should carry out instructions provided by Law Enforcement to ensure evidence intrinsic to the specimen is not disturbed unnecessarily.

3. To implement RPM 3 (monitoring and reporting) the Corps shall:

a. Track and monitor construction activities to ensure that the conservation measures are meeting the objective of minimizing take. Monitoring shall be conducted by the Corps and include a daily visual survey for fish in the areas adjacent to construction and inside the in-water work area.

b. Submit a completion of project report to NMFS 2 months after project completion. The completion report shall include, at a minimum, the following:
   i. Starting and ending dates for work completed, with in-water work period specified.
   ii. Total area of in-water work. Include area of each work location isolated, seined, and or blocked.
   iii. Duration block nets or barrier materials were in place at each location.
   iv. Distance of blocked passage due to block nets and/or pipelines.
   v. Total area of vegetation removal.
   vi. Location and surface area of permanent access ramps.
   vii. Any daily observed sediment plume from the in-channel work area during the in-water construction period, including downstream extent and duration of the plume. Observations shall occur daily before, during, and after commencement of construction activities and compared to observable sediment load upstream of the action area.
   viii. A summary of pollution and erosion control inspection results, including results of implementing required BMPs, and including a description of any erosion control failure, contaminant release, and efforts to correct such incidences.
   ix. A description of all herding, capture, and release methods employed, including:
      1) Supervisory fish biologist's name and address.
      2) Methods used.
      3) Number of fish captured by species.
      4) Location and condition of all fish released.
      5) Observation of injury or mortality.

x. Reference to NMFS consultation number WCRO-2020-01737.

c. All reports will be sent to:

National Marine Fisheries Service
Interior Columbia Basin Office
304 South Water Street, Suite 201
Ellensburg, WA 98926

d. If the amount or extent of take is exceeded, stop project activities and notify NMFS immediately.

2.10. Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

The following conservation recommendations are discretionary measures that NMFS believes are consistent with this obligation and therefore should be carried out by the Federal action agency:

1. The MCFCP has contributed to a continuously degrading environmental baseline and poor fish passage conditions in Mill Creek. We recommend that the Corps find better long-term solutions that provide essential flood protection in a manner that is less detrimental to the survival and recovery of ESA-listed fish species.
2. The Corps should participate in the Walla Walla 2050 initiative to improve streamflows and water supplies in the Walla Walla River subbasin and reduce irrigation demands in the Mill Creek watershed through conservation and purchasing of existing water rights.
3. The Corps should work with local landowners and jurisdictions in the Walla Walla Subbasin to implement the recovery actions identified in the Recovery Plan (NMFS 2009).
4. The Corps should coordinate with NMFS and CTUIR to implement fish passage projects in lower Mill Creek, and to have the new fish ladder at Bennington Dam installed and operational by 2025.

2.11. Reinitiation of Consultation

This concludes formal consultation for the Mill Creek General Investigation Feasibility Study, Mill Creek Watershed (1707010202), in Walla Walla County, Washington.

As 50 CFR 402.16 states, reinitiation of consultation is required and shall be requested by the Federal agency or by NMFS where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and if: (1) the amount or extent of incidental taking specified in the ITS is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the identified action is subsequently modified in a manner that causes an effect to

the listed species or critical habitat that was not considered in the biological opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action.

3. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The Data Quality Act (DQA) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these DQA components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

3.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended user of this opinion is the Corps. Other interested users could include the WDFW, MCFCZD, and the citizens of Walla Walla, Washington. Individual copies of this opinion were provided to the Corps. The document will be available within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adheres to conventional standards for style.

3.2. Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

3.3. Objectivity

Information Product Category: Natural Resource Plan

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA regulations, 50 CFR 402.01 et seq., and the Magnuson–Stevens Fishery Conservation and Management Act implementing regulations regarding Essential Fish Habitat, 50 CFR 600.

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this opinion contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA, and reviewed in accordance with West Coast Region ESA quality control and assurance processes.

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