UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OREGON 97232-1274

Refer to NMFS No:
NWR-2009-2018

October 1, 2014

Dawn Wiedmeier
Acting CCAO Area Manager
Bureau of Reclamation
Columbia-Cascades Area Office
1917 Marsh Road
Yakima, Washington 98901-2058

Re: Endangered Species Act Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Operation and Maintenance of the Tualatin Project, Scoggins Creek (HUC 1709001003), near Gaston, Washington County, Oregon

Dear Ms. Wiedmeier:

The enclosed document contains a biological opinion (opinion) prepared by the National Marine Fisheries Service (NMFS) pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of Bureau of Reclamation (Reclamation) managing the proposed operation and maintenance of the Tualatin Project. In this opinion, NMFS concludes that the proposed action is not likely to adversely affect Upper Willamette River (UWR) Chinook salmon *(Oncorhynchus tshawytscha)*. NMFS also concluded that the proposed action is not likely to jeopardize the continued existence of UWR steelhead *(Oncorhynchus mykiss)* or result in the destruction or adverse modification of their designated critical habitats.

As required by section 7 of the ESA, NMFS is providing an incidental take statement with the opinion. The incidental take statement describes reasonable and prudent measures NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the Federal action agency must comply with to carry out the reasonable and prudent measures. Incidental take from actions that meet these terms and conditions will be exempt from the ESA's prohibition against the take of listed species.

This document also includes the results of our analysis of the action's likely effects on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes two conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH.

These conservation recommendations are not a subset of the ESA take statement's terms and conditions. Section 305(b) (4) (B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations if the response is inconsistent with the EFH conservation recommendations, the Federal action agency must explain why the recommendations will not be followed, including the scientific justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we request that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

Please direct questions regarding this opinion to Jim Turner, 503-231-6894.

Sincerely,

William W. Stelle, Jr.
Regional Administrator

cc: Yvonne Vallette - EPA
Joe Zisa - USFWS
Tom Murtagh - ODFW
Mike McCabe - DSL
Pete Anderson – DEQ

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion
and
Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Consultation
for the

Operation and Maintenance of the Tualatin Project
Scoggins Creek (HUC 1709001003)
Washington County, Oregon

NMFS Consultation Number: NWR-2009-2018

Action Agency: Bureau of Reclamation

Affected Species and Determinations:

ESA-Listed Species	ESA Status	Is the action likely to adversely affect this species or its critical habitat?	Is the Action likely to jeopardize this species?	Is the action likely to destroy or adversely modify critical habitat for this species?
Upper Willamette River steelhead	T	Yes	No	No
Upper Willamette River Chinook salmon	T	No	No	No

Fishery Management Plan that Describes EFH in the Action Area	Would the action adversely affect EFH?	Are EFH conservation recommendations provided?
Pacific Coast Salmon	Yes	Yes

Consultation Conducted By: National Marine Fisheries Service, Northwest Region

Issued by:

William W. Stelle, Jr.
Regional Administrator

Date Issued: October 1, 2014

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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

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

We also completed an essential fish habitat (EFH) consultation on the proposed action, in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801, *et seq.*) and implementing regulations at 50 CFR 600.

The opinion, incidental take statement, and EFH conservation recommendations are each in compliance with the Data Quality Act (44 U.S.C. 3504(d)(1) *et seq.*) and they underwent pre-dissemination review.

1.2 Consultation History

This opinion is based on information provided in the Bureau of Reclamation (Reclamation) April 21, 2009 request for consultation, biological assessment (BA), and other sources of information. During initial review of the description of the proposed action, we concluded that the BA provided an acceptable framework for initiating formal consultation for the operation and maintenance of the Tualatin Project, and that additional work would be necessary to assess the proposed action, the potential risk to ESA-listed fish from operating the pumping facilities, and to determine the most appropriate methodology for evaluating effects of the action.

Informal consultation was initiated in the late 1990s. Reclamation entered into discussion with us concerning the screens at the Patton Valley and Spring Hill pumping plants – part of the water distribution system for the Tualatin Project. This discussion expanded to include operation and maintenance of the project as a whole, and in March 23, 2000, Reclamation requested that we concur that the operation of the Tualatin Project would have no effect on Upper Willamette River (UWR) Chinook salmon (*Oncorhynchus tshawytscha*) and was not likely to adversely affect UWR steelhead (*Oncorhynchus mykiss*). At this same time, Reclamation was independently reconsidering their fish mitigation program that until then had funded hatchery operations to offset losses to fish production and recreational opportunities from the construction of the project in the 1970s. This hatchery program was ended after the listing of UWR steelhead in 1997.

We responded to Reclamation that we did not concur with their effect findings. In our non-concurrence letter of June 5, 2000, we indicated that formal consultation would be necessary for UWR steelhead, informal consultation should be completed for UWR Chinook salmon, and that

Reclamation should prepare a BA. Reclamation initiated discussions to outline a draft BA in March of 2004. Reclamation worked on the BA in coordination with us and other Federal and state resources agencies and partner organizations through 2008 in preparation for requesting formal consultation in April 2009.

We received Reclamation's request for formal consultation that included a BA on April 21, 2009. While we considered the BA lacking in some detail, or fully addressing the effects of the action, we accepted Reclamation's request for consultation and BA as adequate to initiate formal consultation in our letter of July 6, 2009. In this letter, we noted that the BA provided an acceptable framework for consultation and that additional work would be required.

We coordinated an initial meeting of an ad hoc interest group of Reclamation partners, Tribes, government, and non-government organizations in January 2010 to explain the consultation process and lay out an approach for gathering additional information. At this meeting, we presented an overview of the consultation process for ESA and EFH. We explained how the current status of the species and population numbers within the Tualatin subbasin would factor into our assessment and how the recovery plan for UWR Chinook salmon and steelhead would be considered. We speculated that consultation could be completed in 2012 and asked Reclamation in a letter dated July 6, 2010 for a time extension to collect information and to complete ESA and MSA consultation.

Following the January 2010 meeting, we focused attention on assessing watershed hydrology looking specifically at conditions in Scoggins Creek and the Tualatin River affected by the Tualatin Project We used readily available stream gage data and an analytical method to highlight flow parameters in ecological terms. We also considered a number of different scenarios comparing flow conditions in the Tualatin River before and after dam, and early and later in the 20th century – 1930s to 1970s. This information was summarized and provided to Reclamation and the ad hoc interest group in a memo dated August 20, 2010.

At the same time, we began working on how best to distinguish base level operation and maintenance of the Tualatin Project inherent in its original authorization and what constitutes a management choice subject to consultation. We recognize that the Tualatin Project was authorized to address flood control, provide irrigation and municipal and industrial water, and augment flows for fish, wildlife, and water quality benefits. And, that there is a certain level of operation and maintenance required to meet this basic purpose. Reclamation, in their request for consultation, has indicated that the proposed action is defined by all future activities required to keep the Tualatin Project functioning and to meet obligations under current agreements and contracts. For analytical purposes, Reclamation has defined this period beginning in 2005 and extending through 2020. They have suggested that 2005 sets the baseline conditions, and that the effects of the proposed action are defined by those anticipated changes in demand for irrigation and municipal and industrial water projected to the year 2020. After careful consideration, we agreed that the proposed action as described and analyzed in the BA provided a reasonable representation of the future operation and maintenance of the Tualatin Project and set the basis for evaluating effects on ESA-listed fish and EFH. Reclamation has analyzed the effects of the operation and maintenance of the Tualatin Project through 2020. The project will reach functional capacity (i.e. store that maximum water while accommodating flood control requirements). In 2020, all stored water within Hagg Lake will be fully used for irrigation; municipal and industrial use; and fish and wildlife and water quality benefits. Given that all of the available water will be utilized, Reclamation does not anticipate any future changes that would significantly increase the extent or level of impact considered in their BA. We have evaluated the effects of the Tulatin Project to the full extent of the project; absent changes in operation that would otherwise require reinitiation of consultation, we consider the analysis in the current opinion to be valid beyond 2020 for the life of the project.

As the consultation continued, we focused our attention on evaluating the potential adverse effects of the proposed action on ESA-listed fish and EFH. Environmental baseline conditions were assessed and current status of the species and state and condition of the stream habitat were considered. In March 2011, we presented the results of our ongoing analysis to Reclamation and the ad hoc interest group. At that meeting, we summarized current conditions, the results of hydrologic data analysis, fish population numbers, and general degradation of habitat access and connectivity. During this meeting we identified pending issues including the screens at Spring Hill pumping plant, habitat mitigation program along Gales Creek, and the role of the recovery planning for the upper Willamette River species. We indicated that based on the information that had been obtained and considered there was no indication that the proposed action would affect survival or recovery of UWR steelhead. Yet, we noted that more extensive evaluation of effects would be forthcoming.

Following the March 2011 meeting, Reclamation in coordination with us and ODFW funded a study to look at fish presence at the intake channel at Spring Hill plant and consider potential that ESA-listed fish might become entrained on the intake screens. The results of this study was provided to us in September of 2011, showing low likelihood that juvenile steelhead would either be present or if present not likely to be entrained in the pumps at the Spring Hill pumping plant (Courter *et al.* 2011).

From March 2011 to present, we worked to refine our approach for assessing effects from the operation and maintenance of the project, to collect and process information, and verify the nature and extent of the proposed action. We were concerned that the assessment methodology used to describe the potential adverse effects of the proposed action on ESA-listed fish or EFH was not very precise or accurate. In the spring of 2012, we reconsidered the analytical approach that had been taken and opted to create a new framework based on an ecological conceptual model as an attempt to better capture the effects of the proposed action on ESA-listed fish and EFH. The draft framework was provided to Reclamation in summer of 2012. A revised framework and preliminary results of the analysis was presented to Reclamation and the ad hoc interest group on March 19, 2013. At this meeting, we observed that the substantially degraded baseline conditions, the low numbers of ESA-listed steelhead and potential productivity, and the relative low level of physical disturbance to the stream systems anticipated from the proposed action had presented a challenge. We finished the meeting indicating that analysis was complete and the consultation would be concluded with completion of a Biological Opinion within the next few months.

In April 2013, we began drafting this opinion and verifying details of the proposed action. In response to a request, Reclamation provided some additional details on discharge of flood water that were held in Henry Hagg Lake as part of flood control operations, verification of screen mesh size and operation at Patton Valley and Spring Hill pumping plants, and clarification on the implementation of mitigation projects on Gales Creek. In response to NMFS concerns over individual unscreened or inadequately screened diversions of irrigators along the Tualatin River and main tributaries, Reclamation reiterated that these diversions were independent of the project and that Reclamation did not have contracts with these individuals and lacked authority or discretion to affect these diversions. With this clarification, NMFS included a conservation recommendation in this opinion to cooperatively work towards screening all diversions.

A complete record of this consultation is on file at the Oregon State Habitat Office in Portland, Oregon.

1.3 Proposed Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

Reclamation has proposed to operate and maintain the Federal Tualatin Project into the future according to its congressionally authorized purposes. Operation and maintenance of the facilities consist of managing the reservoir for the temporary holding, storage, release, and distribution of water out of the Scoggins Creek watershed, and it includes the various operation, maintenance, and construction or repair of existing structures and facilities. The proposed action is designed to meet the purpose of project as authorized in 1962 and as established in implementing agreements or contracts including irrigating approximately 17,000 acres of land in the Tualatin River Valley, providing municipal and industrial water, providing river regulation and flood control, providing recreation opportunities, providing for the conservation and development of fish and wildlife resources, and improving water quality.

The proposed action constitutes those activities necessary to maintain and operate the Tualatin Project facilities into the future including and extending beyond year 2020 (at which time the Tualatin Project will have reached its full functional capacity and year to year operational changes will have stabilized. Described below are the existing project and base of operation and maintenance and the future fully implemented project.

1.3.1 Base Project Operation and Maintenance

As described below, the project facilities consist of an earthen dam, outfall, spillway, gage stations, pumping facilities and a network of pipelines, and is operated to regulate floods, store water, and release and distribute water to various users.

<u>Dam/Reservoir Management</u>. The Tualatin Project dam and integrated facilities controls water runoff from the upper Scoggins Creek watershed and provides for the storage and delivery of water for irrigation, municipal and industrial use, flow augmentation and water quality benefits, and support recreation. The dam is 151' high and 2,700' long compacted earthen structure

completed in 1975. It forms Henry Hagg Lake with a capacity of 59,910 acre feet (ac-ft)of water. Of this, 53,640 ac-ft is active, available for managing flood flows and for storage and subsequent discharge for downstream use, 6,270 ac-ft is inactive and dead storage (below outlet and spillway) and constitutes the minimal pool dimensions. Discharges from the reservoir are managed through an outlet tunnel incorporating two high pressure gates that discharge with flows up to 300 cfs and are the primary mechanism for delivering irrigation, municipal and industrial, and flow augmentation water. In addition, the spillway channel can handle flows up to 14,000 cfs and is used primarily for managing flood water discharge.
The outlet and spillway are operated independently and discharge into Scoggins Creek through the combined outlet/spillway channel immediately below the dam.

The reservoir is managed to satisfy requirements for formal flood control, water storage, and water delivery. Emptying, filling, and release of the reservoir water occur at different times of the year in order to meet project purpose and goals. Operational procedures have been implemented to balance sometimes competing needs and result in overlapping functional periods of time. During November through April, the reservoir provides capacity to manage flood potential. From mid-January through mid-May, the reservoir is being filled. From March through November water is released from the reservoir to satisfy irrigation, municipal and industrial, and flow augmentation needs.

Flood Control. Flood control is one of the primary purposes of the Tualatin Project. The upper 20,300 ac-ft or the reservoirs capacity is effectively managed for this purpose. The dam and reservoir are designed to handle a 50 year 7-day storm event. Management procedures for formal flood control are established by the Corps of Engineers under authority of the 1944 Flood Control Act. These procedures are presented in their *Water Control Manual for Scoggins Dam - Henry Hagg Lake* (Corps 1988) and implemented through a1989 agreement between Reclamation and the Corps of Engineers. The flood rule curve established for the Tualatin Project provides for full control of a 50 year flood from November 1 through January 15 and then the capacity is gradually reduced to 0 by May 1. During the flood management period, outflow from the reservoir equals inflow until the downstream target river stage on the Tualatin River will be exceeded. The target has been set at the 16.5 feet or 1,250 cfs at the Dilley Gage station. From January 15 on, the available space for flood control is gradually reduced and reservoir filling begins. During a flood event at which time water levels at the Dilley gage would be expected to exceed the target of 16.5 feet, water flowing into the reservoir is held (within the limits of the storage space) and subsequently released downstream over an extended period of time. The release of flood waters is regulated such that the rise in water levels in Scoggins Creek is less than 2.5 ft/hour and continues to meet downstream targets on the Tualatin River.

Water Storage and Release. Reservoir filling occurs during January 15 to May 15 overlapping the project's flood control function. The reservoir has 53,640 ac-ft of active water storage. Of this, approximately 27,000 ac-ft of water is allocated for irrigation, 14,000 ac-ft of water is allocated for municipal and industrial use, and 13,000 ac-ft is allocated for flow augmentation. The stored water is distributed by contract to three primary users – Tualatin Valley Irrigation District (TVID), Joint Water Commission (JWC), and Clean Water Services (CWS) – and through other additional contracts with Stimpson Lumber Company, Lake Oswego Corp., Pumpkin Ridge golf course and Reserve Vineyards and Golf course.

- The TVID formed in 1962 and provides irrigation water for up to 17,000 acres of farm lands and approximately 400 acres of golf courses and has contract rights for up to 27,000 ac-ft of stored water. However, TVID typically uses less than 20,000 ac-ft on an average annual basis. TVID is under contract to operate and maintain much of the Tualatin Project facilities.
- The JWC is composed of the Cities of Beaverton, Forest Grove, Hillsboro, and Lake Oswego. Formed in 1976, this commission provides for the treatment and distribution of municipal and industrial water through independent water treatment facilities. The JWC cooperates and shares costs of the Spring Hill Pumping Plant (SHPP), yet independently owns and operates 4 of the 9 pumps at the SHPP facility. The JWC has contract rights for up to 13,500 ac-ft of stored water but typically uses less than 9,000 ac-ft annually.
- CWS was formed in 1970 (previously known as the Unified Sewerage Agency) and provides wastewater and more recently, stormwater services to a regional service area within the Tualatin subbasin. CWS operates wastewater treatment plants that seasonally discharge into the Tualatin River. CWS entered into contract with Reclamation in 1972 to meet in-stream flow objectives for water quality and in a more recent agreement with Reclamation has established target flows at Farmington of 120 cfs in June - July and 180 cfs from Aug - Nov. CWS has contract rights for 13,000 ac-ft of storage space in Henry Hagg Lake and typically uses up to the full amount of its allocated storage water each year.
- Separate contracts with Lake Oswego Corporation, Stimpson Lumber, Reserve Vineyard and golf course and Pumpkin Ridge golf course are in place. These contracts allow for the diversion of between 228 and 552 ac-ft of supplemental project water each year. These diversions are screened and consistent with NMFS guidelines.

Water Delivery and Distribution. Water is delivered on an as needed basis through water releases from the reservoir. Demand for water varies each year depending on seasonal variation in precipitation reflecting long-term climatic patterns and changing land use, agricultural practices, *etc*. In general, demand for project water begins in late spring and extends into fall. The irrigation season typically begins in April as precipitation decreases. Municipal and industrial water use also generally increases during the summer months. This occurs at the same time that natural flows are decreasing and the need to augment flows to lower water temperature and dilute concentration of nutrients and pollutants increases. Water is released from the reservoir following a standardized procedure initiated by a valid water user request followed by the release of water through the project outlet into the natural channels of Scoggins Creek and the Tualatin River for downstream diversion. Water releases and diversions are accounted for based on quantity of water released and anticipated time required for water to arrive at the point of diversion.

Project water released to meet demand contributes to natural flows affecting flow dynamics in Scoggins Creek and the Tualatin River. At a minimum, base flows in Scoggins Creek are set at 10 cfs from December through September and 20 cfs during October and November. Beginning as early as March 1, water releases for irrigation can occur. This is followed by increasing demand for municipal and industrial water, and flow augmentation. Requests for water by TVID, JWC, CWS, and others tends to overlap in the summer months. As a general approximation, requests for water through TVID result in releases of water and increasing instream flows of a few cfs beginning in March/April. This increases to over 100 cfs in August and tapers off to nothing in November. Similarly, water requests from JWC and CWS begin in June both adding approximately 20 cfs and peaking for JWC in August with around 40 cfs and for CWS in September with around 60 cfs. This demand also tapers off to less than a few cfs in November. The demand from Lake Oswego is limited to a few cfs in mid-summer. In total, releases from the project affecting flows in Scoggins Creek add 10s of cfs in spring, increase to over 200 cfs in August, are then reduced to over 100 cfs in September before delivery of project water stops in November (MWH 2004).

Water Distribution. Project water released from the reservoir is diverted from the natural stream channels at various locations along Scoggins Creek, Gales Creek, and the Tualatin River and distributed to water users. The main diversions will occur near the mouth of Scoggins Creek at the Patton Valley pumping plant – approximately 5% of water releases from the project - and on the Tualatin River downstream of Gales Creek at the Spring Hill pumping plant – approximately 75% of water releases from the project. Other diversions amounting to approximately 20% of water releases occurs along the Tualatin River all the way to West Linn and on Gales Creek.

Patton Valley. The Patton Valley pumping facilities services the TVID customers with irrigation water. Pumping occurs during late spring through summer and into the fall. These facilities are screened in accordance to NMFS guidelines (NMFS 2011) to avoid entrainment of juvenile salmonids. Patton Valley pumping plant is located on Scoggins Creek 2.5 miles downstream of dam. It includes 5 pumps with capacity of approximately 39 cfs. Modifications to the traveling screen system including the use of 3/32 mesh size and upgrading fish bypass facilities were in place in 2001. With these modifications and agreement to limit operation to 2 pumps and flow of less than 11 cfs, the facility meets NOAA Fisheries criteria for fish passage (NMFS 2011). Water diverted at Patton Valley is distributed through 3.5 miles of buried pipes.

Spring Hill. The Spring Hill pumping facilities diverts project water for irrigation for TVID customers and municipal and industrial water for the JWC during the late spring through summer and into the fall. In addition, natural flows (not project water) are diverted at this facility for municipal and industrial users on a year round basis. The Spring Hill pumping plant is located on the Tualatin River downstream of Forest Grove. The plant is a shared facility for distribution of project water to irrigators and as final diversion point for JWC. The plant operates with 9 pumps with a capacity of approximately 150 cfs and is associated with, but independent of, 4 pumps with capacity of approximately 130 cfs owned and operated by the JWC. Water diverted at Spring Hill is distributed through 83 miles of pressurized pipeline. Approximately 50,000 acre-feet of water pass through this facility per year (MWH 2003).

Due to problems with sedimentation in front of the intake, a backwater channel was constructed and a weir was put in place in the Tualatin River to back water up for the pumping plant to operate. Debris and fish screens put in place during channel modifications in 1984 were not functioning well due to this sedimentation and were subsequently removed. Currently, the pumping plant relies on the original traveling screens to exclude debris and fish. As a result, the facility is screened for all uses year round. The screen mesh size of the original traveling screens is 1/8" and is larger than the current standard of 3/32" as specified in NMFS guidelines (NMFS 2011).

In addition to the primary diversions at Patton Valley and Spring Hill, TVID water is delivered to many irrigators and water users through independently owned pumping and distribution facilities.

- The individual irrigators that take project water directly from the natural channel typically have preexisting rights to natural flows which are used prior to making a request for project water.
- Some TVID irrigators located within the Wapato Improvement District that would otherwise receive water through the Patton Valley distribution system have diverted water from the WID natural flow rights. Project water from the Tualatin Project is subsequently released into Scoggins and then the Tualatin River to replace water diverted upstream.
- Lake Oswego Corporation diverts project water from the Tualatin River at river mile 7. These facilities consists of a diversion canal connecting the Tualatin River and the lake and uses a cross channel weir/dam located on the Tualatin River downstream of the intake to the canal. The dam was modified as part of the original project in the 1970s to provide for fish passage. A fish ladder was built into the structure at that time. The Lake Oswego Corporation owns the canal and diversion dam and funds ODFW to maintain operation at the fish ladder.

1.3.2 Future Project Operation and Maintenance

Reclamation has proposed to operate and maintain the Tualatin Project into the future up to and beyond the year 2020, when the project is anticipated to fully satisfy all agreements and contracts and deliver full allocation of stored water. The proposed action includes facilities maintenance, dam and reservoir management, and water delivery and distribution. In addition, Reclamation will continue to fund stream habitat enhancement activities in Gales Creek.

Facilities Maintenance. Reclamation has proposed to continue to conduct routine facilities maintenance activities. This includes inspection and maintenance of discharge features, testing of mechanical equipment, vegetative and rodent control, roadway maintenance, debris removal, and instrument maintenance. Most of these activities would not affect stream systems, ESA-listed fish or EFH. Those activities that entail construction in or around streams or waterways affecting stream flows, stream riparian areas and channels are contained and managed to minimize the likelihood of adverse effects.

Dam/Reservoir Management. The proposed action will continue the general practices in place for controlling floods, water storage, and water delivery and distribution. Reclamation has indicated that future operation will entail a steady and continual increase in water demand up to 2020. How this increasing demand affects reservoir management depends on water availability each year and the timing and quantity of water requests and how each request is processed, this includes balancing of flood control and reservoir filling.

Flood control. The flood control operation under the proposed action will not change and continue as indicated above. Current practices involve regulating reservoir out flows when Tualatin River stage is likely to exceed 16.5' elevation at the Dilley gage station and releasing flood water in compliance with established formal flood control provisions. These include satisfying the rule curve for managing reservoir water levels, meeting flow guidelines at Dilley, and ensuring that downstream water levels do not rise more than 2.5 feet per hour.

Water Storage. Water storage or allocation within the reservoir under the proposed action will not change. Yet as anticipated under full contract level, there will be some adjustments in when and how the reservoir is filled. While the rule curve for balancing the available storage capacity in the reservoir for flood control and filling the reservoir has not changed, the higher demand for water will tend to empty the reservoir more than in years past. Depending on the natural seasonal variation in precipitation, this can result in either less water to augment flows at the end of the season in the fall, or a need to hold back more water at times to ensure adequate supply of water is available when needed later in the year.

Water Release. Water releases under the proposed action will increase during late spring, summer, and early fall. As agriculture shifts to a higher percentage of container nursery crops and with increasing population, the amount of water needed for irrigation and municipal and industrial use is anticipated to rise. While the higher demand was accounted for in the original authorization of the Tualatin Project, the proposed action indicates how the increased demand will be accommodated through greater release of water at specified times of the year. Increases in demand are attributed to irrigators under the TVID allocation and municipal and industrial users under the JWC allocation. Water releases are managed under existing agreements and requests for water are processed through contractees. In general, water releases for irrigators and municipal and industrial users are described in the study done for the Tualatin Basin Water Supply Project (MWH 2004) where demand will increase approximately 30%, building in June with an additional 10-20 cfs, peaking in August with additional 50-60 cfs, and tapering down in November to an additional 1-2 cfs. TVID and JWC water diversions are anticipated to increase to their full allocations each year which are 27,000 ac-ft and 13,500 ac-ft, respectively. CWS use and Lake Oswego Corporation use will not change and no changes for other users are anticipated.

Water Delivery and Distribution. Water diversions under the proposed action at Patton Valley, Spring Hill, and private diversions will increase. These diversions are the end point of the water delivery process that uses the natural stream channels and the start point for water distribution through existing pipelines. Irrigation water is either used at the point of diversion with private diversion or is distributed out through the existing pipelines extending from Patton Valley or Spring Hill pumping plants. Municipal and industrial water is pumped directly into water treatment facilities and distributed through existing systems. The facilities and methods for distributing water will not otherwise change and existing screening provisions will remain in place.

Habitat Enhancement. Reclamation will fund stream habitat planning, permitting, designing, and implementation of habitat restoration activities in the Tualatin River watershed. Reclamation has reached an agreement with the Tualatin River Watershed Council providing $30,000 per year to do a wide variety of work to educate, promote, and implement in-stream and riparian habitat projects along Gales Creek.

1.3.3 Interrelated Interdependent Actions

The following activities are not part of the proposed operation and maintenance of the Tualatin Project, yet are interrelated or interdependent. These activities include JWC's operation and maintenance of the four pumps and diversion of non-project water within the shared facilities at the Spring Hill pumping plant. The JWC withdraws water from the Tualatin River year round. While this diversion is independent of the Tualatin Project, the JWC uses shared facilities that incorporate existing screens, relies on channel configurations, and maintains pumping capacity that would not exist without the project. We therefore include the effects of these actions in the analysis of the proposed action.

1.4 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 action area originates at the Tualatin Project dam (river mile 5) on Scoggins Creek within the Tualatin Subbasin - 17090010 - 4th field HUC (Figure 1). The action area includes project facilities on Scoggins Creek, downstream on Scoggins Creek and the Tualatin River affected by flow alterations to its confluence with the Willamette River where changes in flow would not be detectable and lower Gales Creek for which habitat improvement projects are implemented. The action area also includes the Scoggins Creek watershed above the Tualatin Project dam affording potential habitat for salmon or steelhead.

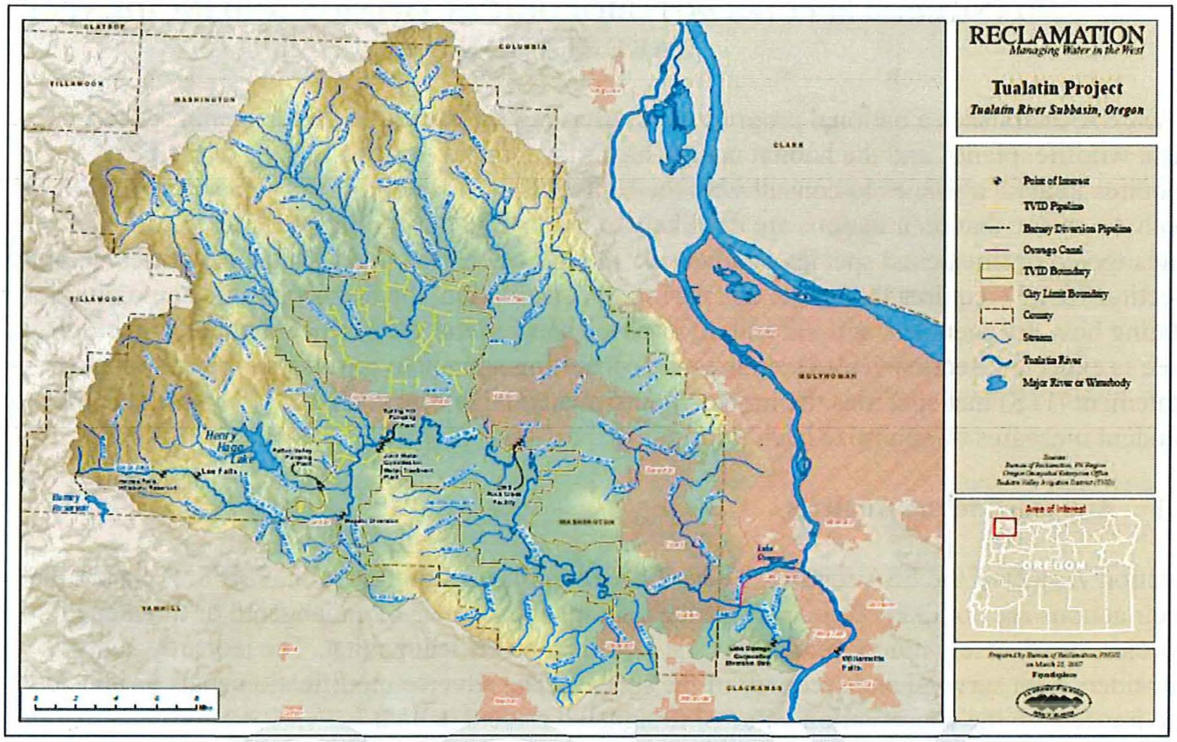

Figure 1. Tualatin subbasin showing the action area from Tualatin Project dam at Henry Hagg Lake downstream to the confluence of the Tualatin River with the Willamette River

This area downstream of the Tualatin Project dam is occupied by UWR Chinook salmon and UWR steelhead. The area is designated as EFH for Chinook and coho salmon, and the portion of the Tualatin River downstream of its confluence with Gales Creek as far as its confluence with Dairy Creek is designated critical habitat for UWR steelhead, 70 FR 52630.

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. Section 7(a)(2) of the ESA requires Federal agencies to consult with the United States Fish and Wildlife Service, NMFS, or both, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitat. Section 7(b)(3) requires that at the conclusion of consultation, the Service provide an opinion stating how the agencies' actions will affect listed species and their critical habitat. If incidental take is expected, section 7(b)(4) requires the consulting agency to provide an incidental take statement (ITS) that specifies the impact of any incidental taking and includes reasonable and prudent measures to minimize such impacts.

2.1 Approach to the Analysis

Section 7(a)(2) of the ESA requires Federal agencies, in consultation with NMFS, to insure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. The jeopardy analysis considers both survival and recovery of the species. The adverse modification analysis considers the impacts on the conservation value of designated critical habitat.

"To jeopardize the continued existence of a listed species" means to engage in an action that 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).

This opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat.[1]

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

- Identify the rangewide status of the species and critical habitat likely to be adversely affected by the proposed action.
- Describe the environmental baseline in the action area.
- Analyze the effects of the proposed action on both species and their habitat.
- Describe any cumulative effects in the action area.
- Integrate and synthesize the above factors to assess the risk that the proposed action poses to species and critical habitat.
- Determine if jeopardy or adverse modification conclusions are warranted.

[1] Memorandum from William T. Hogarth to Regional Administrators, Office of Protected Resources, NMFS (Application of the "Destruction or Adverse Modification" Standard Under Section 7(a)(2) of the Endangered Species Act) (November 7, 2005).

- If necessary, define a reasonable and prudent alternative to the proposed action or identify reasonable and prudent measures to minimize adverse effects of the action.

In this opinion, NMFS concludes that the proposed action is not likely to adversely affect UWR Chinook salmon. See Section 2.11 for details.

2.2 Rangewide Status of the Species and Critical Habitat

This opinion examines the status of each species that would be affected by the proposed action. The status is the level of risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. The species status section helps to inform the description of the species' current "reproduction, numbers, or distribution" as described in 50 CFR 402.02. The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the current function of the essential physical and biological features that help to form that conservation value.

Climate change is likely to play an increasingly important role in determining the abundance of ESA-listed species, and the conservation value of designated critical habitats, in the Pacific Northwest. These changes will not be spatially homogeneous across the Pacific Northwest. Areas with elevations high enough to maintain temperatures well below freezing for most of the winter and early spring would be less affected. Low-lying areas that historically have received scant precipitation contribute little to total streamflow and are likely to be more affected.

During the last century, average regional air temperatures increased by 1.5°F, and increased up to 4°F in some areas (USGCRP 2009). Warming is likely to continue during the next century as average temperatures increase another 3 to 10°F (USGCRP 2009). Overall, about one-third of the current cold-water fish habitat in the Pacific Northwest is likely to exceed key water temperature thresholds by the end of this century (USGCRP 2009).

Precipitation trends during the next century are less certain than for temperature but more precipitation is likely to occur during October through March and less during summer months, and more of the winter precipitation is likely to fall as rain rather than snow (ISAB 2007, USGCRP 2009). Where snow occurs, a warmer climate will cause earlier runoff so stream flows in late spring, summer, and fall will be lower and water temperatures will be warmer (ISAB 2007, USGCRP 2009).

Higher winter stream flows increase the risk that winter floods in sensitive watersheds will damage spawning redds and wash away incubating eggs (USGCRP 2009). Earlier peak stream flows will also flush some young salmon and steelhead from rivers to estuaries before they are physically mature, increasing stress and the risk of predation (USGCRP 2009). Lower stream flows and warmer water temperatures during summer will degrade summer rearing conditions, in part by increasing the prevalence and virulence of fish diseases and parasites (USGCRP 2009). Other adverse effects are likely to include altered migration patterns, accelerated embryo development, premature emergence of fry, variation in quality and quantity of tributary rearing habitat, and increased competition and predation risk from warm-water, non-native species (ISAB 2007).

The earth's oceans are also warming, with considerable interannual and inter-decadal variability superimposed on the longer-term trend (Bindoff *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 (Scheuerell and Williams 2005, Zabel *et al.* 2006, USGCRP 2009). Ocean conditions adverse to salmon and steelhead may be more likely under a warming climate (Zabel *et al.* 2006).

Reclamation's analysis has indicated that ongoing climate change will result in changes in the Tualatin subbasin and streams including:

- Temperatures increases during winter and summer,
- Precipitation increase (rain) in winter and decrease in summer,
- In stream temperatures likely to exceed current standards for more days, and
- Flows will decrease 10-20% starting in late spring and summer.

2.2.1 Status of the Species

For Pacific salmon and steelhead, NMFS commonly uses four parameters to assess the viability of the populations that, together, constitute the species: spatial structure, diversity, abundance, and productivity (McElhany et al. 2000). These "viable salmonid population" (VSP) criteria therefore 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. These attributes are influenced by survival, behavior, and experiences throughout a species' entire life cycle, and these characteristics, in turn, are influenced by habitat and other environmental conditions.

"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 fundamentally 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 at 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, NMFS assesses 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).

UWR steelhead. This DPS includes all naturally-spawned steelhead populations below natural and manmade impassable barriers in the Willamette River, Oregon, and its tributaries upstream from Willamette Falls to the Calapooia River. The Willamette Lower Columbia Technical Review Team (WLC-TRT) identified four historical populations of UWR steelhead, all with winter run timing and all within Oregon (Myers *et al.* 2006). Only winter steelhead historically existed in this area, because flow conditions over Willamette Falls allowed only late winter steelhead to ascend the falls, until a fish ladder was constructed in the early 1900s and summer steelhead were introduced. Summer steelhead have become established in the McKenzie River where historically no steelhead existed, although these fish were not considered in the identification of historical populations. UWR steelhead currently are found in many tributaries that drain the west side of the upper Willamette River basin. Analysis of historical observations, hatchery records, and genetic analysis strongly suggested that many of these spawning aggregations are the result of recent introductions and do not represent a historical population. Nevertheless, the WLC-TRT recognized that these tributaries may provide juvenile rearing habitat or may be temporarily (for one or more generations) colonized during periods of high abundance. The UWR steelhead in the Coast Range are thought to have originated from other populations and do not represent a historical population. Nevertheless, the action area provides juvenile rearing habitat and spawning habitat for the few adults that may enter the system. The only UWR steelhead affected by the proposed action are from west side tributaries.

The Recovery Plan for UWR steelhead and Chinook salmon (ODFW and NMFS 2011) states:

> "The lower reaches of some of the west-side subbasins (termed "West-Side tributaries" in this plan) have had documented presence of adult Chinook and steelhead, but it is not clear how these fish contribute or are related to the independent populations assigned in Myers *et al.* 2006). In the larger metapopulation context, fish produced in these subbasins presumably functioned as dependent populations of the UWR ESU [sic]. Some of the lower reaches in West-Side tributaries have also had documented presence of Chinook and steelhead juvenile life stages. These fish may be juvenile UWR Chinook and steelhead that were produced in natal Cascade Range subbasins, and are using these reaches for rearing habitat, or they were produced from extant dependent populations. These Coast Range subbasins include the Tualatin, Yamhill, Luckiamute, Marys, Coast Fork, and Long Tom rivers." (Recovery Plan, page 2-2)

> "Winter steelhead have been reported spawning in the West-side tributaries to the Willamette River above Willamette falls, and ODFW recognizes the Tualatin, Yamhill, Rickreall, and Luckiamute West-side subbasins as part of the Willamette Winter Steelhead SMU. In the WLC-TRT assessment these tributaries were not considered to have constituted independent populations historically. Rather, these tributaries may have functioned and continue to function as a population sink with the DPS metapopulation structure (Myers *et al.* 2006). Conversely, under current or future conditions, steelhead production from West-side subbasins may help buffer or compensate for independent populations that are not meeting recovery goals.." (Recovery Plan, page 2-11)

The major factors limiting recovery of UWR steelhead include lost/degraded floodplain connectivity and lowland stream habitat, degraded water quality, high water temperature, reduced streamflow, and reduced access to spawning/rearing habitat (NMFS 2006).

Spatial Structure and Diversity. Within the DPS, one stratum and four extant populations have been identified, and these are associated with sub-basins on the east-side of the Willamette. The Recovery Plan focuses on these four populations in analyzing what is needed for recovery of the DPS. As summarized in Ford (2011) spatial structure of the four population shows a wide range of risk from very low to high. And diversity ranked essentially as high risk.

As noted above, the WLC-TRT recognized that UWR steelhead have been documented in some of the west-side tributaries but these do not represent an historical independent population; rather, those tributaries may provide juvenile rearing habitat or may be temporarily (for one or more generations) colonized during periods of high abundance.

The Recovery Plan for UWR steelhead and Chinook salmon (ODFW and NMFS 2011) states:

> "The lower reaches of some of the west-side subbasins (termed "West-Side tributaries" in this plan) have had documented presence of adult Chinook and steelhead, but it is not clear how these fish contribute or are related to the independent populations assigned in Myers *et al.* 2006). In the larger metapopulation context, fish produced in these subbasins presumably functioned as dependent populations of the UWR ESU. Some of the lower reaches in West-Side tributaries have also had documented presence of Chinook and steelhead juvenile life stages. These fish may be juvenile UWR Chinook and steelhead that were produced in natal Cascade Range subbasins, and are using these reaches for rearing habitat, or they were produced from extant dependent populations. These Coast Range subbasins include the Tualatin, Yamhill, Luckiamute, Marys, Coast Fork, and Long Tom rivers." (Recovery Plan, page 2-2)

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tributaries may have functioned and continue to function as a population sink with the DPS metapopulation structure (Myers *et al.* 2006). Conversely, under current or future conditions, steelhead production from West-side subbasins may help buffer or compensate for independent populations that are not meeting recovery goals." (Recovery Plan, page 2-11)

Evolving information, including historical observations, hatchery records, and genetics suggest that the presence of UWR steelhead in many tributaries on the west side of the upper basin is the result of recent introductions. The listed DPS does not include any artificially propagated steelhead stocks that reside within the historical geographic range of the DPS. Hatchery summer-run steelhead that are released in the subbasins are from an out-of-basin stock, not part of the DPS. Additionally, stocked summer steelhead that have become established in the McKenzie River were not considered in the identification of historical populations (ODFW and NMFS 2011).

Abundance and Productivity. Since the last status review in 2005, UWR steelhead initially increased in abundance but subsequently declines and current abundance is at the levels observed in the mid-1990s when the DPS was first listed. The DPS continues to demonstrate the overall low abundance pattern that was of concern during the last status review. The elimination of winter-run hatchery release in the basin reduces hatchery threats, but non-native summer steelhead hatchery releases are still a concern for species diversity. Overall, the new information considered does not indicate a change in the biological risk category since the last status review (Ford 2011).

Limiting Factors. Limiting factors include (NOAA Fisheries 2011; ODFW and NMFS 2011):

- Degraded freshwater habitat: Floodplain connectivity and function, channel structure and complexity, riparian areas and large wood recruitment, and stream flow have been degraded as a result of cumulative impacts of agriculture, forestry, and development
- Degraded water quality and altered temperature as a result of both tributary dams and the cumulative impacts of agriculture, forestry, and urban development
- Reduced access to spawning and rearing habitats mainly as a result of artificial barriers in spawning tributaries
- Hatchery-related effects: impacts from the non-native summer steelhead hatchery program
- Anthropogenic introductions of non-native species and out-of-ESU races of salmon or steelhead have increased predation and competition on native UWR steelhead.

UWR Steelhead in Action Area. The potential distribution of steelhead in the Tualatin River subbasin is wide yet abundance is low. As shown in Figure 2, steelhead have access to the other primary tributaries within the subbasin. Yet areas of highest productivity are associated with the Upper Tualatin and Gales Creek. Little information on actual numbers of fish and their use of the Tualatin River and its tributaries exist. Survey data from back in the mid to late 1900s indicate that there has been some Chinook and coho salmon and steelhead use in the upper Tualatin River tributaries (McIntosh *et al.* 1990, Fulton 1970, Myers *et al.* 2006, Parkhurst *et al.* 1949) with unspecified numbers of fish. ODFW (1992) in their 1992 fish management plan estimated that steelhead was in general decline in the Tualatin system from a couple thousand in 1980s to a few hundred in the start of the 1990s. These estimates were based on returns from the hatchery program of stocking of the Tualatin with tens of thousands of steelhead smolts as mitigation for lost productivity in part due to losses associated with the Tualatin Project. The hatchery program was discontinued in the late 1990s due to concerns about negative hatchery fish interactions with listed wild fish. ODFW's 2005 Native Fish Status Report (ODFW 2005) provided no specific estimates of numbers of fish, but indication that use is widespread throughout the Tualatin with 90% of the habitat being accessible (Figure 2). Recent surveys by ODFW have characterized habitat for various tributaries and included fish abundance (Leader 2001, Hughes and Leader 2000). This information confirms the general observation that the greatest potential for producing steelhead included Gales Creek, Scoggins Creek, and the Upper Tualatin River.

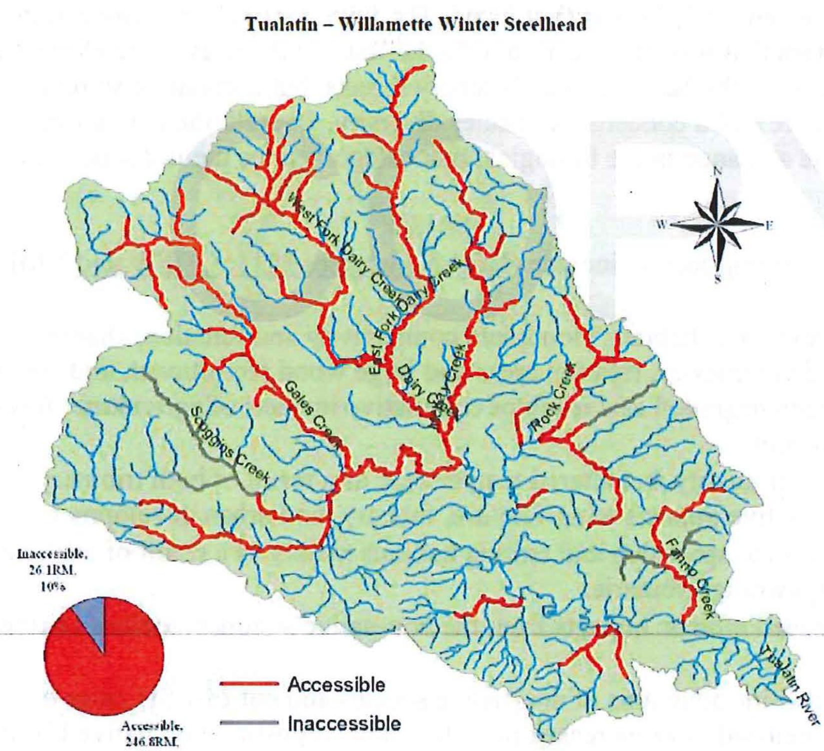


Figure 2. Winter Steelhead Accessible Habitat (ODFW 2005)

The Upper Willamette River Conservation and Recovery Plan for Chinook Salmon and Steelhead has noted the potential for the West-side subbasins to contribute to recovery of UWR steelhead or UWR Chinook. "...under current or future conditions, steelhead production from West-side subbasins may help buffer or compensate for independent populations that are not meeting recovery goals." (ODFW and NMFS 2011). As a dependent population, the west-sides role in meeting recovery remains uncertain and would have to be evaluated in conjunction with the independent populations of the Calapooia, South and North Santiam, and Molalla currently showing low to high risk for spatial distribution and at medium to high risk for diversity. The UWR steelhead within the Tualatin contributes to a limited extent to abundance and productivity to the DPS as a whole, while providing a wider spatial distribution and potential diversity for the species.

2.2.2. Status of the Critical Habitat

We review the status of designated critical habitat affected by the proposed action by examining the condition and trends of essential physical and biological features throughout the designated area. These features are essential to the conservation of the 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).

For salmon and steelhead, NMFS ranked watersheds within designated critical habitat at the scale of the fifth-field hydrologic unit code – 5th filed HUC - in terms of the conservation value they provide to each listed species they support,[2] the conservation rankings are high, medium, or low. To determine the conservation value of each watershed to species viability, NMFS' critical habitat analytical review teams (CHART) (NOAA Fisheries 2005) evaluated the quantity and quality of habitat features (for example, spawning gravels, wood and water condition, side channels), the relationship of the area compared to other areas within the species' range, and the significance to the species of the population occupying that area. Thus, even a location that has poor quality of habitat 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).

Critical habitat for UWR steelhead within the action area includes those primary constituent elements (PCE) of freshwater spawning and rearing including substrate, water quality, water quantity, floodplain connectivity, forage, and natural cover.

In the Willamette and Lower Columbia Rivers and their tributaries, major factors affecting PCEs are altered channel morphology and stability, lost/degraded floodplain connectivity, loss of habitat diversity, excessive sediment, degraded water quality, increased stream temperatures, reduced stream flows, and reduced access to spawning and rearing areas (NMFS 2006).

The current conditions within the 5th field HUC – critical habitat designation unit –are affected by climate, terrain, and land cover and reflect the level of human activity. These conditions include:

[2] The conservation value of a site depends upon "(1) the importance of the populations associated with a site to the ESU [or DPS] conservation, and (2) the contribution of that site to the conservation of the population through demonstrated or potential productivity of the area" (NOAA Fisheries 2005).

- Substrate - poor supply of clean gravel contained within the stream channel, banks, and floodplains - gravel with high level of fines in poorly established bars poorly and irregular inundation - limited hyporheic flow
- Floodplain - poorly connected rarely inundated floodplains - small flood storage capacity flood waters quickly recede -
- Forage - low primary and secondary productivity and poor accumulation of food
- Cover - low level of cover from simple straight banks, poorly developed riparian forests,
- Water Quality - polluted, warm, turbid water
- Water Quantity - controlled flows - regulated high winter and low summer flows with few peak and channel forming flows

At the time that each habitat area was designated as critical habitat, that area contained one or more PCEs within the acceptable range of values required to support the biological processes for which the species use that habitat.

The Willamette-Lower Columbia (WLC) CHART (NOAA Fisheries 2005) has highlighted those features that are particularly important for conservation. The WLC CHART ratings and comments for the one 5th field HUC containing critical habitat within the action area include medium value for UWR steelhead based on this watershed not identified as supporting a historically independent population, yet the relatively widespread habitat making this 5th field HUC potentially more important than other westside 5th field HUC in this subbasin. Critical Habitat in the action area includes the lower section of Gales Creek and section of the Tualatin River between Gales Creek and Dairy Creek.(70 FR 52630) shown in Figure 3 below.

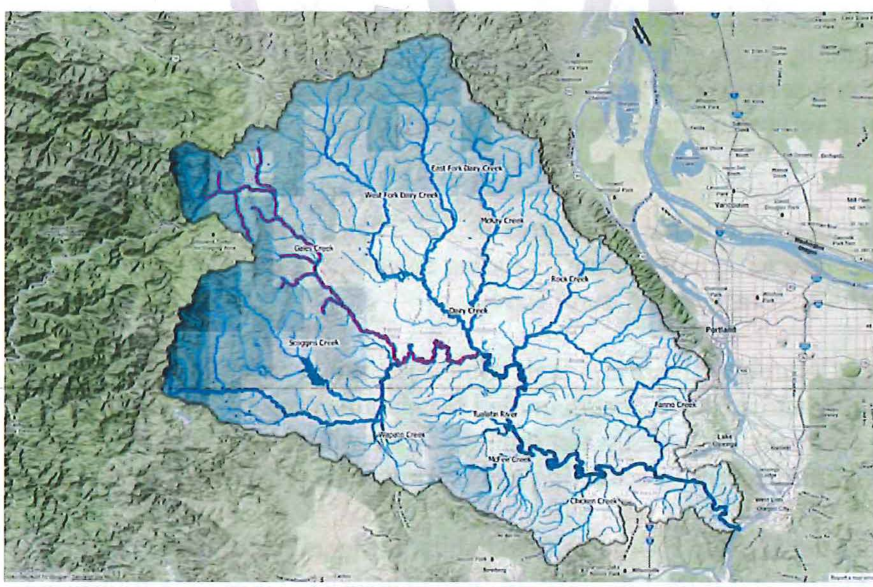


Figure 3. UWR Steelhead Designated Critical Habitat in the Tualatin River Basin

2.3 Environmental Baseline

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 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

The environmental baseline in the action area reflects the overall state and condition of the watershed within the Tualatin River subbasin; past alterations including changes in land use; and habitat access; and capacity of the system to provide resources necessary for ESA-listed steelhead. The existing dam and formation of Henery Hagg Lake, the associated habitat loss, and the operation and maintenance of the project that created a passage barrier for UWR steelhead to streams in the upper Scoggins Creek watershed are included in the environmental baseline.

2.3.1 Watershed State and Condition

The Tualatin subbasin (Figure 4) is one of eight in the Willamette River basin and is the northern most of the three western subbasins. Described in Cass and Miner (1993), this subbasin is approximately 712 square miles in size. It is bounded by the Coast Range to the west, Chehalam Mountains to the south separating the Tualatin from the Yamhill system, and the Tualatin Mountains to the north separating the Tualatin subbasin from the Lower Willamette. The subbasin presents a diverse landscape characterized by the extensive broad central valley bounded by a perimeter of a narrow band of rolling hills and mountainous terrain. The highest elevation within the sub basin occurs in the Coast Range. This area is formed through a complex uplift of marine volcanic and sedimentary rock that erode to form steep highly incised ravines. The foothills that define the north and south boundaries are lower in elevation and are formed in basalt rock that tends to erodes to form rolling terrain. The precipitation within the subbasin varies from high to low from Coast Range to confluence and follows a recurring seasonal pattern; increasing during the fall, peaking in the winter, and tapering off in the spring. The vegetation within the subbasin ranges from mixed forests dominated by conifers in the upper elevations with increasing hardwoods down in the valleys intermixed with wetlands and more open area of shrub/scrub or grasses and herbs.

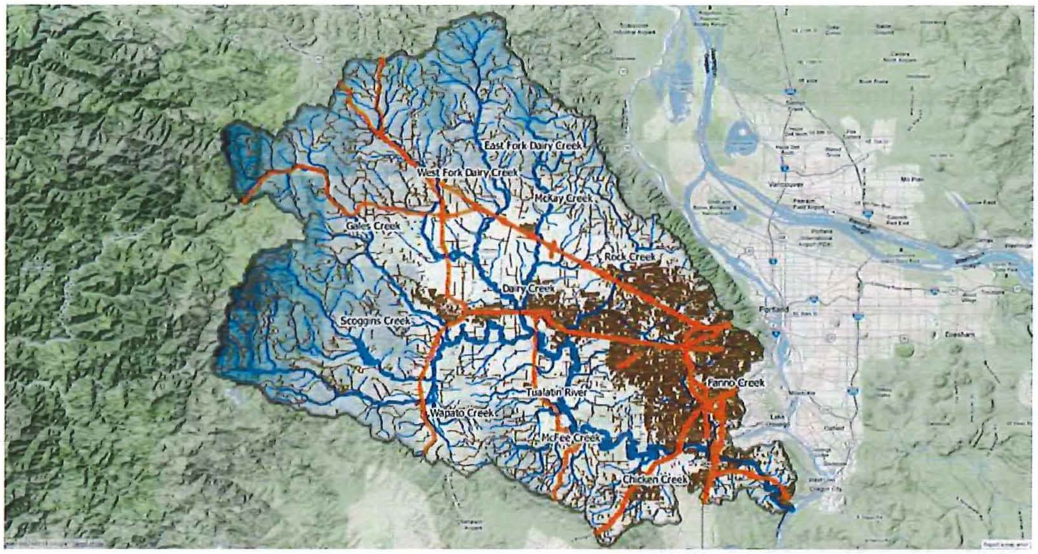


Figure 4. Tualatin Subbasins

There are eight major tributaries within the Tualatin watershed. Each varies by their location within the subbasin and physical environment in which they form. These tributaries include Wapato Creek, Scoggins Creek, Gales Creek, Dairy/McKay Creek, Rock Creek, Fanno Creek, Chicken Creek, and McFee Creek (Figure 4). All tributaries feed into the Tualatin River adding flow from fall and winter precipitation - primarily rainfall - and contribute sediment, wood, nutrients that support primary and secondary productivity. These tributaries demonstrate a typical longitude profile illustrated by Figure 5 below (BLM 2000). Overall, the headwater channels are small, highly constrained, and steep in gradient containing large boulders and coarse sediment deposits. The intermediate stream channels emerge from the mountains into the bounding foothills and are moderately constrained with medium gradient and mixed coarse and fine sediment bed substrate. The valley stream segments take shape within the flat alluvial deposits, are unconstrained, are integrated with floodplain wetland complexes, and meander reworking the fine sediment deposits from recent and past major flooding events.

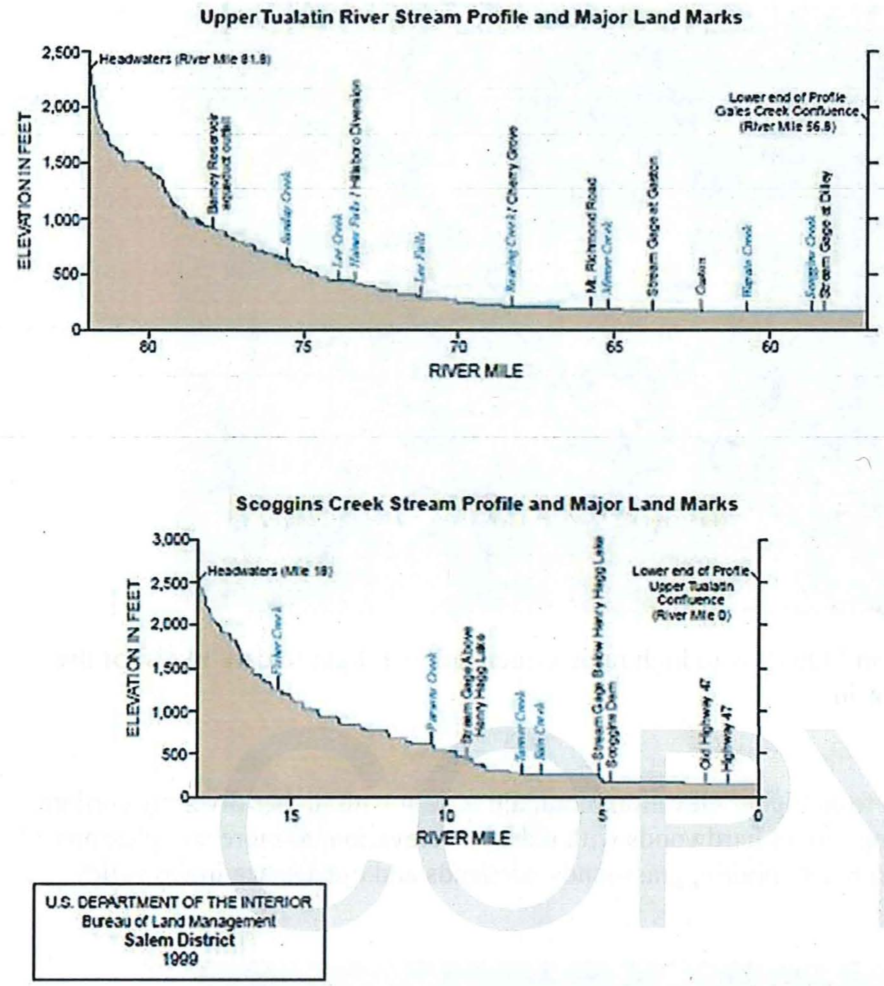


Figure 5. Longitudinal stream profiles of the upper Tualatin River and Scoggins Creek indicating major landmarks between headwaters and confluences.

Across the landscape, the Tualatin subbasin demonstrates the physical processes at work. Based on the underlying geologic history of the basin, erosive forces dictated by the climate conditions, help form the terrain, streams, and promote diverse vegetation growth.

- Precipitation - primarily rain - follows a general trend of high in the Coast range and decreasing to the east. Precipitation is greatest at the higher elevations ranging from 70 - 90 inches at the western edge of the watershed to the 50 - 70 inches in the Tualatin Mountains to the north and the Chahalem Mountains in the south, and 30 - 40 inches in the valleys. Overall, the trend is a general reduction of precipitation from west to east and higher to lower elevation. (Figure 6)

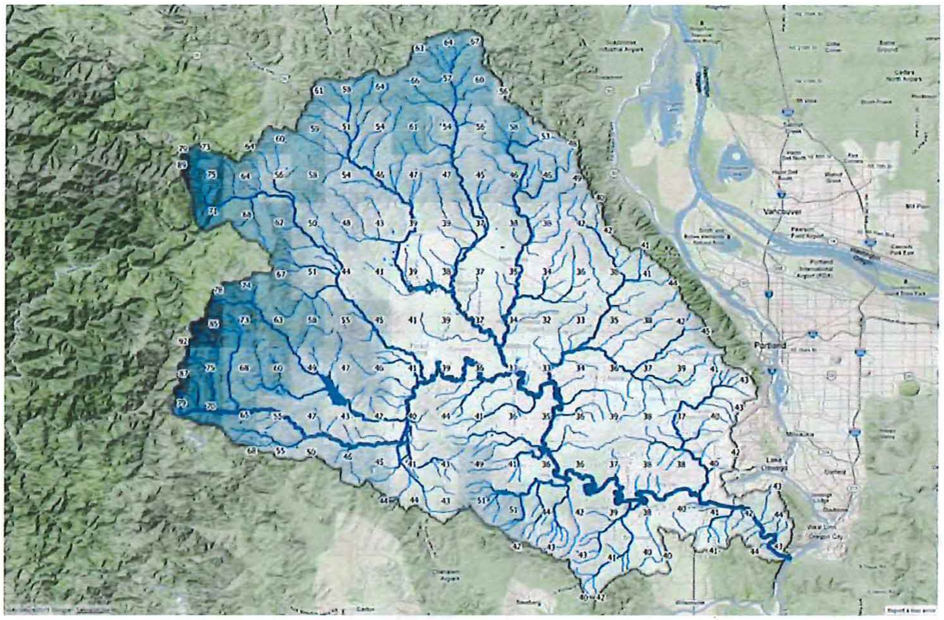


Figure 6. Precipitation Map (low to high rates associated with light to dark blues) of the Tualatin Basin

- Land cover trends from higher elevation mountain terrain with higher diversity conifer forests to increasing mix of hardwoods with a drop in elevation, to more complex mix of forested, shrub/scrub, oak prairie, grass lands, wetlands and open space in the valley bottoms (Figure 7).

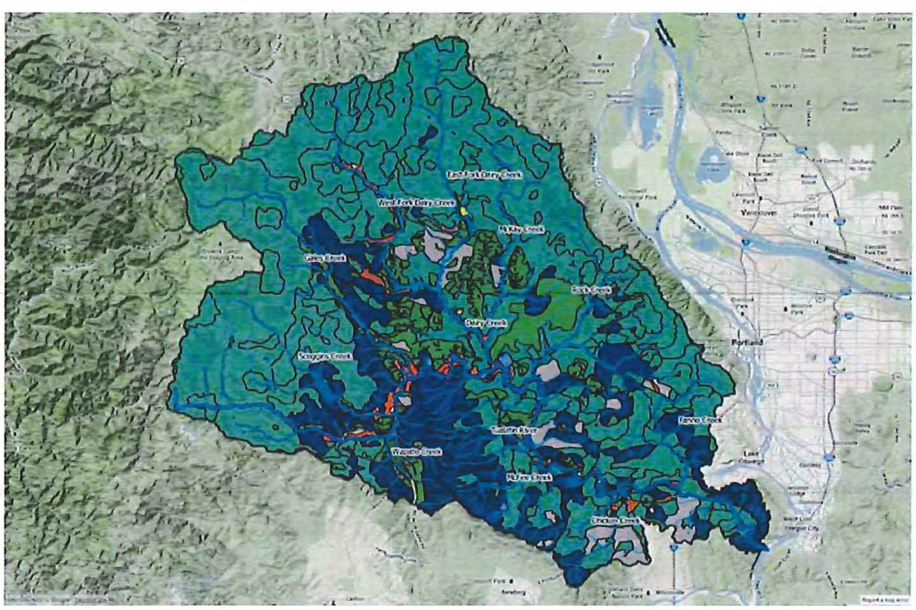


Figure 7. Land Cover Map (Teal - closed forest, purple - mixed woodlands, orange riparian forest, green prairie) of the Tualatin Basin.

These variations show as spatial patterns in the landscape and as presented in EPAs ecological regions. For the Tualatin subbasin there are five level IV ecoregions designated (EPA Level IV Ecoregion Data). The mountains that surround the basin are part of the Coast Range unit that include the Volcanic and Willapa Hills subunit. The intermediate basin slopes and broad valley areas are included in the Willamette Valley - Foothills, Prairie Terraces, and Forest Galleries subunits (Figure 8). These ecoregions are summarized below.

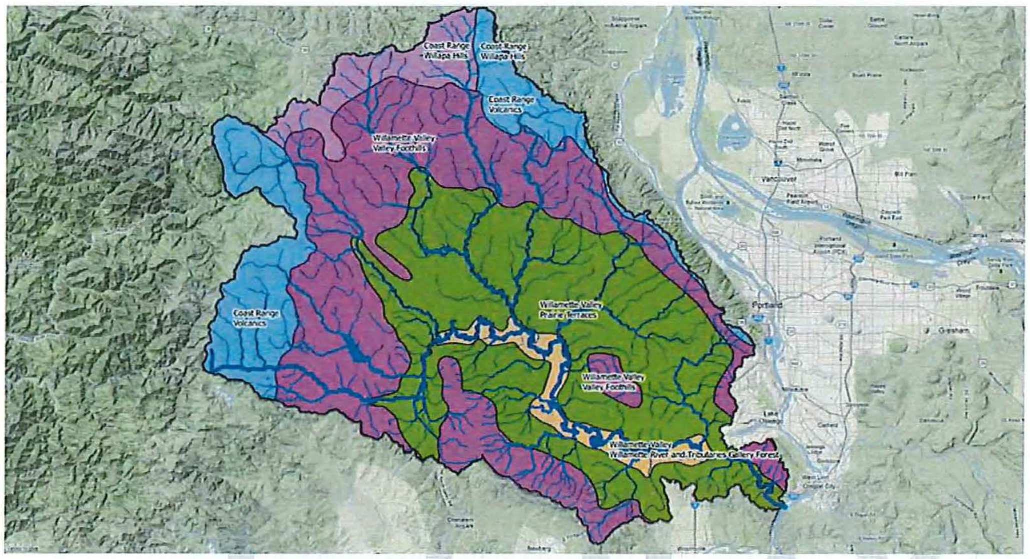


Figure 8. EPA ecoregion Level IV of the Tualatin Basin.

- Volcanic and Willapa Hills - High elevation and rainfall. Capacity for storing water in natural aquifers. Highly incised ravines and steeply sloped canyons create highly constrained small headwater streams of moderate to high gradient. Riparian vegetation is predominately conifers. Stream beds are a mix of bedrock, boulders, cobbles and gravels. Landslides provide sources of coarse sediment and large wood downstream.
- Foothills - moderate elevation and rainfall and rolling hills with moderate sloping forested hillsides, forming medium gradient gravel bed streams partially constrained in open canyons and narrow valleys and limited floodplains. Riparian vegetation is a mix of predominantly conifers and hardwood. Stream bed is a mix of cobbles, gravels and fines, subject to seasonal high water flood events that transport and redeposit sediment and large wood.
- Terraces and Forest Galleries Low lying flat to rolling hills of fine sediment deposits (past geologic flood events) containing a complex of permanent and seasonal wetlands, open prairie and woodlands. Streams are low gradient, somewhat entrenched, highly meandering in wide open valley bottoms and broad floodplains. Riparian vegetation is mixed, predominantly hardwood and conifer trees with intersperse shrub/scrub and grasslands. Stream beds are fine sediment, subject to regular seasonal flooding.

2.3.2 Past Alterations

The Tualatin River subbasin has been subject to substantial alteration. This history of use of the Tualatin subbasin (Cass and Miner 1993) and changes to the landscape (Shively 1993) have been well documented.

With the initial inhabiting of the valley, the clearings, converting wet areas to agriculture, and harvesting of timber - splash dams and all - stream characteristics were changed. Stream flows from agriculture and urban development have been significantly affected. As described by Li and Gregory (1993):

> Agricultural and urban demands for water have resulted in extensive alterations to stream discharge. Lake Oswego, which has a water right of 57.5 cfs diverts most of the river's natural flow during summer months (State Engineer of Oregon, 1959). This water right, one of the oldest on the river, derived from the Oregon Iron and Steel Company in 1906 (Oregon Department of Water Resources, certificate number 29248). This dam was built in 1888 and inundated lowlands from its present location at river mile 3.5 to the town of Tualatin (Farnell, 1978; Benson 1978). Since installation of Scoggins Dam in 1975 reservoir releases maintain flow to reaches below the Lake Oswego diversion and provides an additional 1,000 acre feet per year to Lake Oswego. A smaller reservoir that is a water supply for Forest Grove occurs at Clear Creek on Gales Creek. In addition ODFW reports an illegal dam at Balm Grove on Gales Creek (ODFW 1991).

Removal of instream structure, and increasing percentage of fine sediments entering the streams all tended to reduce the quality of upstream habitats (Li and Gregory 1993).

Increased industry resulted in more effort to improve river navigation and resulted in increased urban development. Log jams were removed and streams channelized (Shively 1993, Farnell 1978, Li and Gregory 1993). In addition, there was increased interest in improving agricultural output, reducing flood impacts, and expanding developable lands. The Tualatin Project significantly altered hydrology - particularly in the upper watershed - as well as channelizing a substantial portion of Scoggins Creek and blocking access to upper Scoggins Creek watershed.

Water management in the subbasin has affected stream flows, flooding regimes, and water quality. Stream flows in the Tualatin River and major tributaries have been affected through diversions and damming. Analysis of gage data from the early 1930s to present at Dilley station on the Tualatin River (http://waterdata.usgs.gov/usa/nwis/uv?site_no=14203500) using the application *Indicators of Hydrologic Alteration* (TNC 2009) indicates that base flows were showing a general reduction before the Tualatin Project (Figure 9). After the Tualatin Project with the construction of the dam, formation of the reservoir, past operation and maintenance the hydrograph flattened with decreasing winter flows and increasing summer flows (Figure 10). The flood regime was changed and the extent and frequency of flooding in the upper Tualatin River was reduced (Figures 11 and 12).

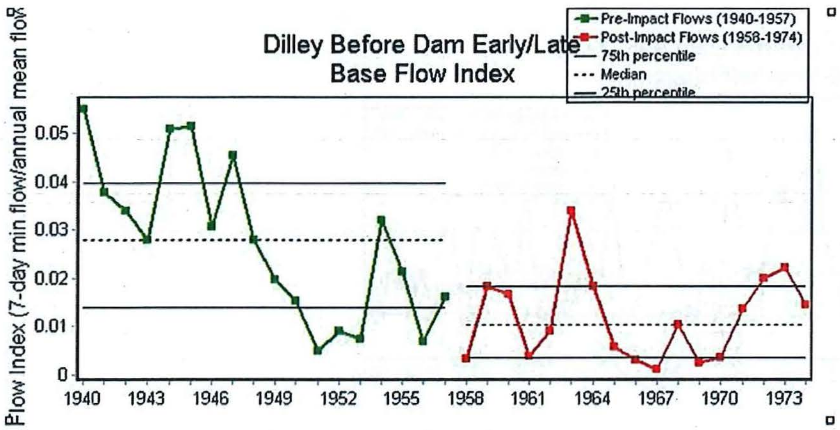


Figure 9. Trend Base Flow Index before Tualatin Project

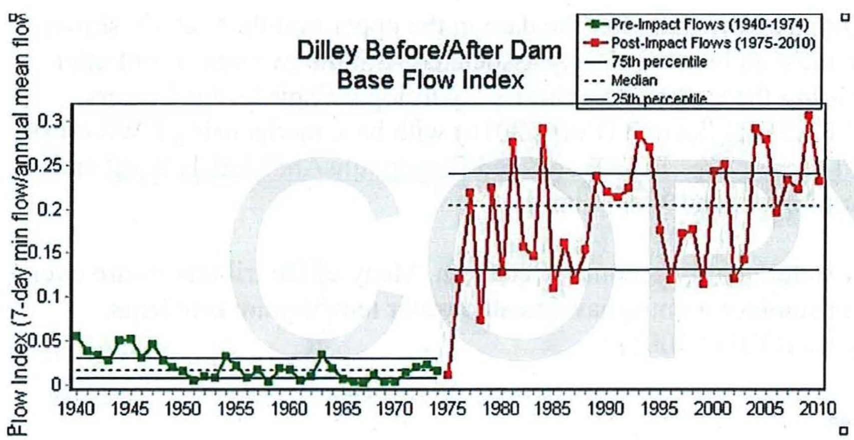


Figure 10. Base Flow Index before and after Tualatin Project

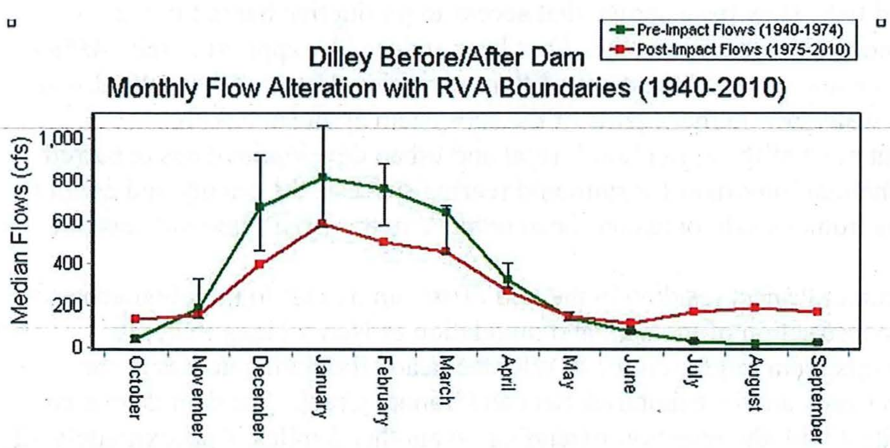


Figure 11. Monthly Flows before and after the Taulatin Project

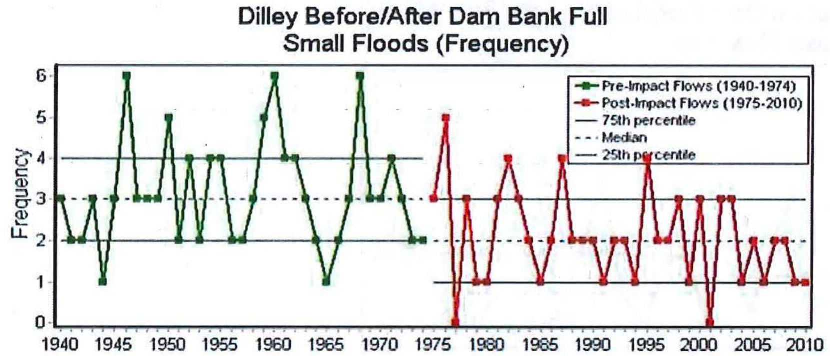


Figure 12. Small flood frequency before and after Tualatin Project

A closer look at the flood patterns before and after the dam in the upper middle Tualatin shows that the one year event before the dam is more closely associated with the two year event after the dam. (Analysis was done using the Corps of Engineers Hydrologic Engineering Centers River Analysis System (HEC-RAS) application (Corps 2010) with base model using CWS cross sections (http://www.cleanwaterservices.org/OurWatershed/FloodplainsAndModels.aspx) and river gage data for Dilley, Farmington, and West Linn).

With these alterations of flow water quality become of concern. Many of the tributaries are over allocated and low flows during summer months have created water temperature problems, nutrient loading, and low oxygen (ODEQ 2001).

2.3.3 Habitat Access

In addition, changes to the landscape have affected habitat and available resources important for anadromous salmonids. Sheer and Steele (2006) have evaluated habitat losses in the Willamette River Basin for ESA-listed fish. They have shown that access to productive habitat in the Tualatin subbasin for Chinook salmon and steelhead has been reduced by approximately 45% - 50% considering distribution and needs of these two different species. Much of this habitat loss is located higher up in the watershed in those parts of the ecosystem associated with spawning. Considering that most of the agricultural, rural and urban development has occurred lower in the watershed in habitat important for salmonid rearing success, the quality and quantity of habitat that supports anadromous salmonids has been reduced in the environmental baseline.

The completion of the Tualatin Project resulted in the loss of stream habitat in middle reaches of Scoggins Creek from the construction of the dam and inundation of Henry Hagg Lake. In addition, the dam blocked upstream migration for UWR steelhead eliminating access to the upper reaches of Scoggins Creek and its tributaries Sain and Tanner Creek. The dam is located approximately on river mile 4 with the reservoir extending up another 5 miles. Approximately 12 miles of stream habitat on Scoggins Creek, Sain Creek, and Tanner Creek exist upstream of the project and remain inaccessible to UWR steelhead. Of this only a few miles demonstrate habitat characteristics and function to support steelhead. Historically, steelhead production in Scoggins Creek watershed was low. Past and current habitat surveys (Parkhust et al. 1949, White 2003) have shown habitat potential, yet indicated that overall physical characteristics of the upper watershed including seasonal low water flows and higher summer and fall water temperatures, and limited spawning and rearing habitat reduce steelhead use. The low potential productivity was highlighted in a technical memo (MWH 2003) concerning fish passage at Scoggins Dam and demonstrated in the first few years of operation of the Tualatin Project when a fish passage program through trap and haul was implemented. What initially involved moving over 150 steelhead upstream above the dam quickly declined to no fish in following few years and in 1984 to less than 10 fish and program was halted (MWH 2003).

2.3.4 Anadromous Salmonid Requirements

It is well known that anadromous salmonids require clear, cool water; predictable water flows; clean, mobile gravel bars; a diversity of aquatic habitat types; complex instream structure from boulder and large wood; intact forested riparian areas; interconnected floodplains; and good sources of forage (Spence *et al.* 1996). ESA-listed UWR steelhead and non-listed coho and Chinook salmon are present in the Tualatin subbasin. Coho salmon are not native to the Tualatin system and Chinook salmon are rare (Myers *et al.* 2006).

In general, adult steelhead enter the Tualatin system during the winter, later than coho or Chinook salmon. The physical characteristics of steelhead have evolved to enable the fish to function in higher velocity flows and allow the steelhead to move into higher gradient, smaller streams than coho (Spence *et al.* 1996, Bisson *et al.* 1988). Steelhead spawn higher in the system than other species, with newly emerged juvenile fish orienting to stream margins preferring more turbulent riffle habitat type then coho (Spence *et al.* 1996). The Tualatin provides extensive floodplains, wetlands, and backwater areas that can benefit both steelhead and coho salmon. While coho salmon tend to be more closely associated with backwater habitat, steelhead do make use of these habitat features to their advantage associated with the high flow environments of the channel margins and during periods of advancing or receding flood waters. Both species gain from the periodic and regular flooding of low gradient streams and associated floodplains from flood pulses (Bayley 1995, Cavallo *et al.* 2003 Colvin *et al.* 2009, Richter and Tomas, 2007).

The relative productivity of UWR steelhead in the Tualatin system varies by tributary. Water quantity and quality, coarse sediment, and large wood tend to be associated with locations that are higher up in the watershed of the western stream reaches of the upper Tualatin River and Gales Creek and to some extent Dairy Creek (BLM 2000, BLM 1999, TRWC 1998). The higher quality and quantity stream flows and stream bed substrate coming off the Coast Range create greater spawning opportunities. These streams contain large wood, instream structure, and sufficient floodplains that tend to support steelhead. Other tributaries lower in the system do not apparently demonstrate the same potential. (BLM 2001, Washington Co., SWCD 2001).

From an ecological perspective, the stream and riparian resources and use by anadromous salmonids vary systematically along the stream continuum from headwaters to valley bottom. Anadromous salmonid use depends on life history stage and resource availability. One way to evaluate the potential value and effects of the proposed action is to consider ecological functional attributes along the river continuum. For the purposes of this opinion, functional roles have been separated by: (1) Habitat source materials, (2) reproduction spawning, and (3) growth and migration further described below.

Habitat Source Material. This area is formed by headwater streams higher up in the watershed. The stream and surrounding landscape provide the source material of water, large wood, and coarse sediment feeding streams lower down. In the Tualatin system, higher precipitation (rain) occurs in upper elevations around the perimeter of the subbasin particularly associated with the Coast Range. This feeds the headwater streams and transports materials downstream. The more complex geologic formation of the Coast Range provides capacity for ground water storage, and erodes to fairly incised ravines and steeply sloped canyons that have diverse but limited conifer riparian forests. Landslides provide source of coarse sediment and large wood downstream. Some spawning potential exists for steelhead. Rearing space is limited by habitat type, diversity and complexity, and forage. Highest value watersheds based on predictable water source of longer duration and quality; geology formations that produce harder more durable gravels, and increasing availability of large wood include the Upper Tualatin River, Scoggins Creek, and Gales Creek.

Reproduction Spawning. Consists of the sections of the streams of the mid-watershed where upstream and riparian resources accumulate and provide spawning and rearing space. In the Tualatin system, this occurs along reaches of the foothills at moderate elevation in rolling hills with moderate sloping forested hillsides. Streams form medium gradient gravel bed reaches partially constrained in open canyons and narrow valleys and limited floodplains. Water flow originates from upstream and surface and ground water from surrounding areas. Riparian vegetation is predominantly conifers. Stream bed is a mix of cobbles, gravels and fines. A diversity of stream resources including large wood, gravel substrate, pools and riffles accumulate in this zone. Spawning habitat features predominate with the higher end used by steelhead during winter months and the lower end used by coho salmon during fall months. This zone is subject to seasonal high water flood events regular erosion, transport, and deposition of sediment and large wood. Highest value steam segments reflecting upstream resource availability and riparian conditions of semi-intact forests and permeable landscape occur in Upper Tualatin River, Gales Creek and to a more limited extent Dairy Creek, McKay Creek, and Chicken Creek.

Growth - Migration. These areas are associated with low profile valley bottom streams providing forage and refuge for juvenile salmonids in preparation for out migration. The streams are formed within extensive fine sediment deposits - past and present - containing a complex of permanent and seasonal wetlands, open prairie and woodlands. Streams are low gradient, somewhat entrenched, highly meandering in wide open valley bottoms and broad floodplains. Riparian vegetation is mixed hardwood and conifer trees with a shrub under layer. Streams are somewhat entrenched in predominantly fine sediment channels. These low lying reaches are connected by tributary systems allowing anadromous salmonids to move between these systems. This zone is subject to regular seasonal flooding connecting the stream with riparian wetlands and floodplains and providing an opportunity for nutrient cycling, settling out of fine sediment, and accumulation of forage for growing juvenile salmonids. The highest value corridors associated with upstream production and out migrating anadromous salmonids and flooding opportunities include upper reaches of main stem Tualatin River and the lower reaches of Scoggins Creek, Gales Creek, and Dairy Creek.

Overall, the Tualatin subbasin potential productivity for UWR steelhead remains low. The source material is limited to a fairly narrow area along the perimeter of the subbasin with highest quality associated in the Coast Range. Spawning and rearing success is limited by habitat space and habitat quality and occurs in a narrow band extending around the subbasin at the break in slope, with highest numbers of steelhead likely coming out of the Upper Tualatin River and Gales Creek (Scoggins Creek prior to the Tualatin Project) with some potential in Dairy and McKay Creek and the other tributaries. High quality rearing and growth potential has declined with the reduction in flooding and loss of wetlands and reduced water quality.

2.4 Effects of the Action on the Species and its Designated Critical Habitat

"Effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

The effects of the proposed action are based on those changes to the physical environment and the potential to adversely affect UWR steelhead or stream conditions that support these fish.

2.4.1 Facilities Maintenance.

The facilities maintenance activity will have limited effect on UWR steelhead. The proposed facilities maintenance consists of routine construction or repair activities to keep project facilities in good working order. These activities are fully contained within facility buildings, are completely isolated from Scoggins Creek or the Tualatin River, or undertaken in a manner that will not otherwise affect water quantity or water quality of these streams. Where facilities maintenance activities may affect ESA-listed fish as determined by Reclamation, a separate request for consultation will be made. Each specific maintenance activity that may affect ESA-listed fish will be reviewed independently as required.

2.4.2 Water Withdrawal and Intake Screening.

The water withdrawal will have a low likelihood of entraining UWR steelhead. The timing of the withdrawal, number of UWR steelhead present, and the design of the intakes are factored into this potential. The proposed action includes Patton Valley and Spring Hill pumping plants and a number of unidentified private diversions.

Patton Valley Pumping Plant. The diversion at Patton Valley is operated during late spring and summer months and diverts approximately less than 5% of project water for irrigation. Adult steelhead would likely have moved through the system to spawning grounds in the upper Tualatin River and would not be present and coincident with this period of use. However, juvenile steelhead may be present during periods that coincide with pumping operations at this facility. Potential numbers of juvenile steelhead in Scoggins Creek is expected to be low, and as a result, fish presence around the pumping plant intake are likely to be low as well. Similarly, outmigrating smolts originating from the upper Tualatin River may be moving downstream during these pumping plant operations but are unlikely to be present at Patton Valley intake during periods of greatest water withdrawal. The Patton Valley intake is fully screened with NMFS compliant 3/32 fish screen mesh as well as a NMFS compliant fish bypass system and will be operated in such a way as to meet our guidelines. As a result, it is not likely that juvenile UWR steelhead or steelhead smolts would become entrained or impinged at the intake.

Spring Hill Pumping Plant. The diversion at Spring Hill is a shared facility. It contains a total of nine pumps – three of which are owned and operated by the JWC - with combined capacity of approximately 150 cfs. The pumping plant facilitates the year round withdrawals of both natural flows (non-project water) and stored water (project water). The Spring Hill point of diversion is used by the TVID for irrigation and JWC for municipal and industrial use. Approximately 75% of project water for irrigation is diverted at this point during the late spring, summer, and fall at the same time that increased withdrawal for municipal and industrial uses occurs. At full allocation of stored water in Hagg Lake, up to 30,000 acre-feet of stored water will pass through the Spring Hill Pumping Plant. In addition there are natural water rights in excess of 50,000 acre feet. The total amount of water that could be diverted, as set by the pumping capacity of the facility, is approximately 80,000 acre-feet (MHW 2003, Bonn 2010). Adult and juvenile UWR steelhead will be present during its operation. Adult steelhead will be moving upstream towards spawning grounds during winter and early spring in the Upper Tualatin River and Gales Creek and will not likely move into the artificial alcove containing the Spring Hill pumping plant water intake. Juvenile steelhead smolts will be moving downstream at the same time and later in spring, coincident with some level of operation of the Spring Hill pumping plant. The Spring Hill facility is screened with a traveling belt fish screen that does not meet current NMFS guidelines. The facilities original traveling fish screen size is 1/8" mesh vs. the 3/32" mesh required under our current guidance (NMFS 2011). Despite not meeting current fish screen mesh size requirements, the 1/8" screen mesh size currently installed at the Spring Hill pumping plant water intake is thought to be sufficient to minimize the potential to entrain all but the smallest size juvenile salmonids. After completing a radio telemetry and electro shocking study in 1999-2000 to determine the presence/absence of fish species in the Spring Hill pumping plant intake channel, the ODFW concluded that very few salmonids were present in the intake channel during periods that coincided with water diversion operations at this facility and that any juvenile salmonids that were found returned to the Tualatin River with no identified major time delays or mortality (Leader and Ward 2000). To confirm the results of the Leader and Ward (2000) study, Reclamation funded another fish investigation study that duplicated the methods used by ODFW in 1999 within the intake channel of the Spring Hill pumping plant (Courter *et al.* 2011). The Courter *et al.* (2011) study indicated that no UWR steelhead fry (or any salmonid fry) were present within the Spring Hill pumping plant intake channel and that larger juveniles that could be present during the spring to early summer months would be sufficiently large to avoid the water intake structure and were not likely to be entrained at the intake. However, despite these findings, there remains a small likelihood that UWR steelhead fry may encounter the intake and become entrained or that steelhead juveniles or smolts would be delayed due to artificial attraction flows in the intake channel associated with the pumping plant withdrawal. Although these flows vary by season, the highest rates of withdrawal at the Spring Hill pumping plant occur during the summer period of time when juvenile fish are less likely to be present.

Various secondary diversions. In addition to primary diversions at Patton Valley and Spring Hill, Separate individual diversions occur throughout the action area. A number of irrigators within the TVID will receive water through private diversions along Scoggins Creek, the Tualatin River, and Gales Creek. Approximately 20% of project water is diverted through these points of diversion. Reclamation has indicated that these diversions are privately owned and operated independently of the project. Separate contracts for Simpson Lumber, Lake Oswego Corporation, Pumkin Ridge, and Reserve Vinyard also deliver water to independent points of diversion. Nevertheless, the effects of withdrawal of project water is included in this opinion because this action is interdependent or interrelated to the proposed action.

Project water is withdrawn on a supplemental basis after rights to natural flows are used, and in years when the supplemental water is used, diversion will occur later in the irrigation season, typically during late summer and/or fall. Adult UWR steelhead are not likely to be present during this time. Furthermore, juvenile UWR steelhead smolts likely will have moved down through the system and not be present at the location of most of the private diversions that use supplemental project water. Finally, juvenile steelhead fry that would be most susceptible to entrainment at private diversion structures would not likely be present in the valley bottom reaches of the Tualatin, Scoggins Creek or Gales Creek system during periods of pump use as stream temperature are typically above preferred temperature for salmonids. Yet, a small likelihood that UWR steelhead fry and juveniles may encounter the undefined private intakes remains, and improperly screened diversions still have potential to entrain UWR steelhead that may be present during water withdrawal activities at these private diversion facilities.

2.4.3 Stream Hydrology.

The changes to stream hydrology including operations for flood control; storing and releasing water for irrigation, municipal and industrial use, and flow augmentation will have limited effects on UWR steelhead.

2.4.3.1 Flood Control

The effects of flood control operations on UWR steelhead will remain unchanged. The reservoir will continue to be managed to maintain capacity to hold flood waters up to a 50 year storm event, and water held within the reservoir when water levels in the Tualatin River at Dilley gage are likely to exceed 16.5 feet according to formal flood control agreements between the Corps of Engineers and Reclamation (Reclamation 1989). Stored water is released in accordance with published guidelines and agreements with the provision to limit raising water levels in Scoggins Creek to less than 2.5 feet per hour or the equivalent of 200 to 400 cfs per hour depending on base flow. The existing practices continue to affect the lower reaches of Scoggins Creek and upper middle reaches of the Tualatin River. The flood control operations affect the frequency, duration, and extent of flooding. Flood control also restricts UWR steelhead access to floodplain habitat for foraging and refuge. While the importance of floodplain habitat and flooding that not only provides habitat access but as a source of food for juvenile salmonids is known (Bayley

1995, Cavallo et al. 2003, and Colvin et al. 2009), it is not clear the extent to which the current management practices would limit salmonids productivity, or distribution. The potential benefits would depend on the numbers of UWR steelhead produced upstream based on available spawning habitat and rearing, and the extent to which the low gradient valley stream/floodplain complex is limiting current production. Spawning occurs in the upper reaches of the Tualatin River and in Gales Creek. These stream sections are affected to some extent or another by past disturbances and spawning and rearing habitat have been adversely affected (ref). There is little information concerning abundance and distribution of UWR steelhead spawners nor spawning success of those fish that do spawn. In addition temperature condition in the Tulatin River and tributaries would tend to hold rearing fish in the upper reaches of the main and tributary streams during much of the year.

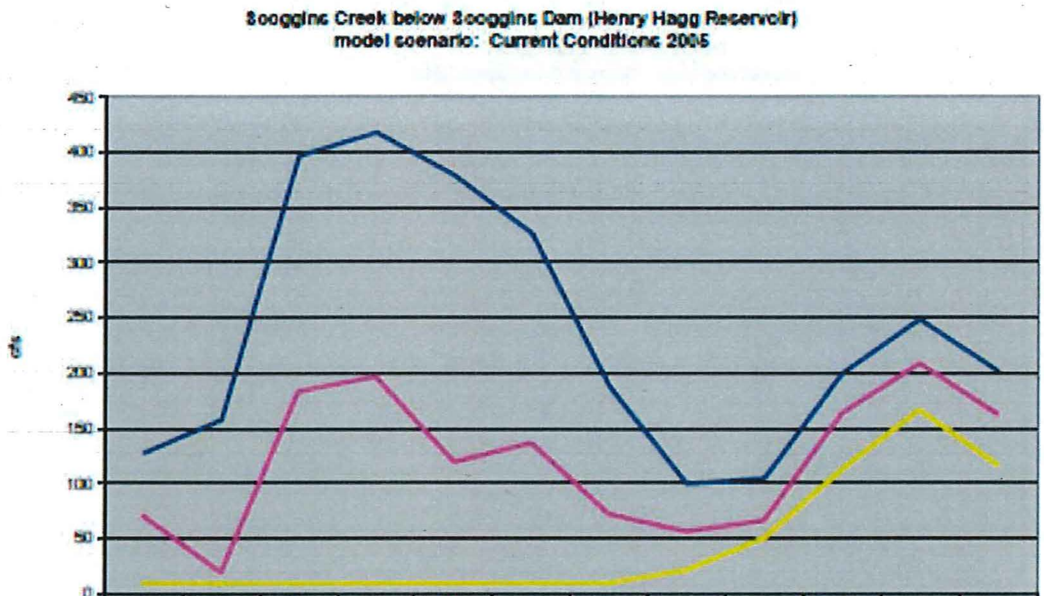
2.4.3.2 Storage, Release, and Delivery of Water

The proposed changes to the storage, release, and delivery of water from the Tualatin Project include altering water quantity and water quality downstream of the dam that is likely to affect stream habitat character and support for UWR steelhead.

Water Quantity. Changes to reservoir filling, water releases, and withdrawal will affect the hydrology for Scoggins Creek and the Tualatin River. Reclamation modeled the results of all anticipated changes comparing conditions from the year 2005 to those conditions in 2020. It is in this time frame that all stored water allocated to various users is anticipated to become fully utilized. Water usage in 2020 represents the full effect of the project as considered in this opinion. Their analysis took into account natural variability in precipitation, variations in quantity and location of withdrawals, and adjustments to reservoir management to accommodate lower reservoir levels in the fall.

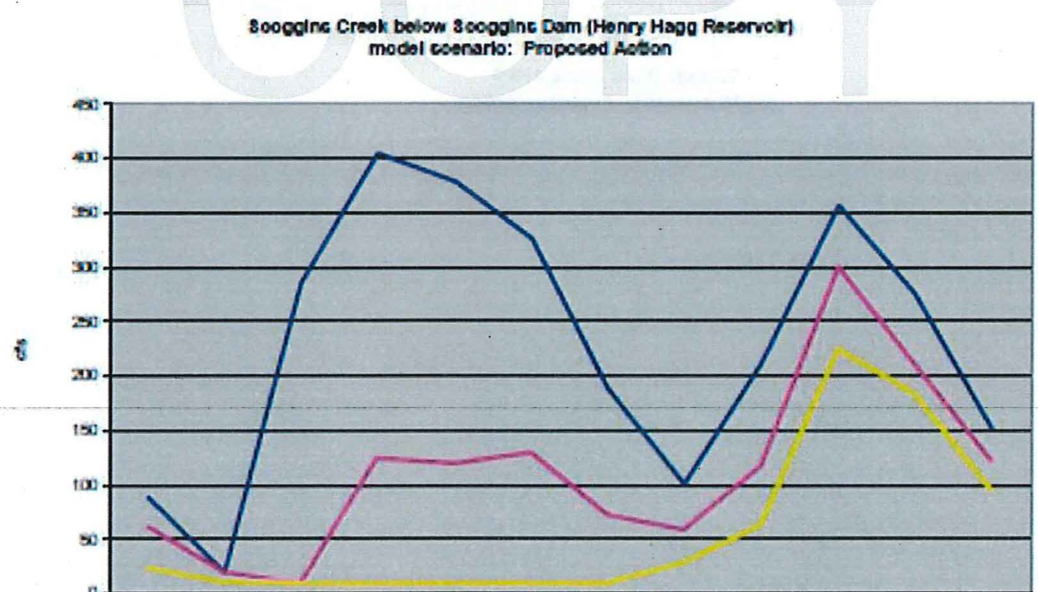
The results showed increasing flows in Scoggins Creek of up to 140% during the summer months and decreasing flows of minus 96% or less during late fall and winter. In the Tualatin River near Dilley, the results were more mixed with a general trend of increase in flows of 96 % or less in the summer months and decreases during fall and extending later into winter to a lesser degree of up to minus 35%. Reclamation's analysis demonstrated the variability that exists within the system depending on the water year and actual water needs. In general, flows increased in the range of 15 to 150 cfs in Scoggins Creek in the summer, and both increases up to 15 cfs and decreases of up to 170 cfs in the fall and winter. In the Tualatin River the trend is similar, equating to a range of potential increase of 20 to 170 cfs during summer months and a range of plus 1 cfs to minus 70 cfs in fall and winter. This trend continues further downstream where change in flows tend to be reduced throughout most of the year.

Reclamation has presented the anticipated changes in flow graphically as for 2005 and 2020 for the 90%, 50%, and 10% exceedance levels in the BA and included below (Figures 13 – 16).



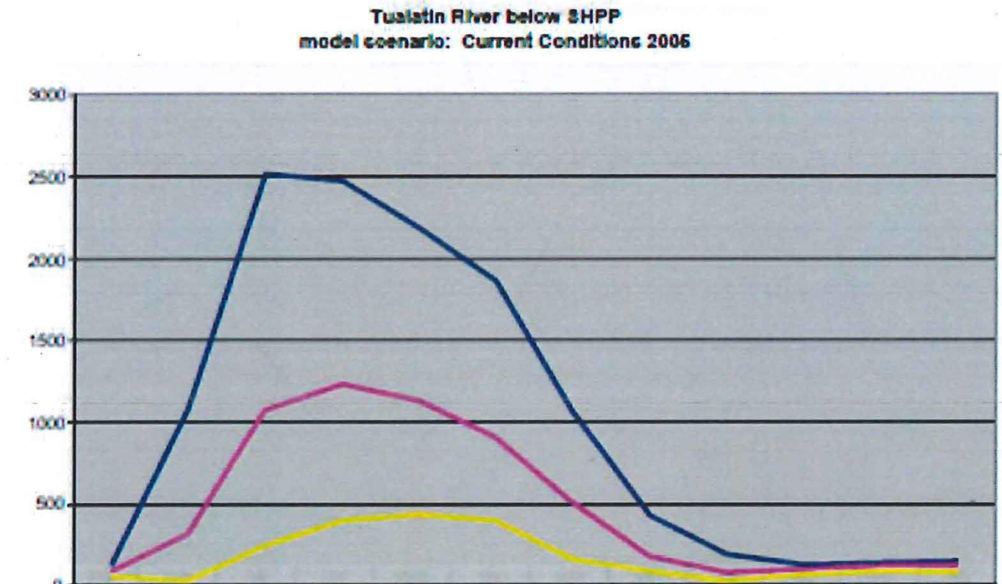
	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep
10%	128	158	397	418	379	327	189	100	105	200	249	202
50%	71	20	184	197	120	137	73	57	67	164	209	163
90%	10	10	10	10	10	10	10	22	51	113	167	117

Figure 13. Exceedance Curves Scoggins Creek 2005



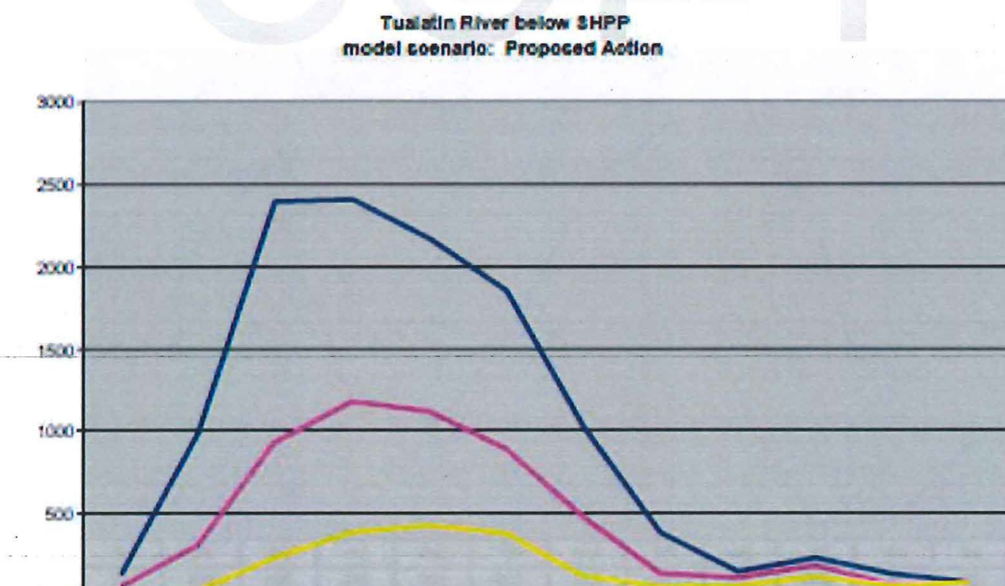
	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep
10%	89	20	288	405	379	327	189	101	212	357	276	152
50%	62	20	10	125	120	130	73	59	118	300	211	122
90%	24	11	10	10	10	10	10	29	64	225	184	96

Figure 14. Exceedance Curves Scoggins Creek 2020



	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep
10%	124	1079	2518	2473	2184	1862	1059	427	187	125	138	147
50%	85	315	1072	1231	1128	905	508	178	77	98	117	117
90%	53	28	241	395	434	395	159	84	25	82	84	81

Figure 15. Exceedance Curves Tualatin River Below Spring Hill 2005



	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep
10%	128	985	2394	2410	2170	1855	1029	381	148	228	129	79
50%	55	304	930	1180	1119	891	481	133	108	180	64	77
90%	25	28	230	385	426	378	120	53	57	113	58	77

Figure 16. Exceedance Curves Tualatin River Below Spring Hill 2020

These changes in flow affect water levels and stream habitat downstream of the dam. In Scoggins Creek, the changes of 100 cfs equates to less than 1 foot in water level (based on the gage rating curve) and less so in the Tualatin River. Considering the general shift in hydrology likely to be caused by climate change towards higher winter flows and lower summer flows, there will be a general increase in depth and wetted area during winter months and a decline in summer The low flows are limited by the minimum flows required in Scoggins Creek of 20 cfs in October and November, with 10 cfs all other times. This general assessment is similar to the results of a stream habitat assessment modeling completed for CWS. Reclamation noted increases in available juvenile habitat in Scoggins Creek in early summer and decreases in late summer and fall – with substantial variation depending on water year. Habitat in the Tualatin River showed more mixed results with both positive and negative values for changes in habitat that were of less magnitude then that experienced in Scoggins Creek.

Water Quality. Changes in hydrology can alter water quality. Temperature, oxygen concentration, nutrients, and bacteria remain a concern in the Tualatin system (ODEQ 2001). Stream water temperature and oxygen is initially set by the upstream sources – the intrinsic temperature and oxygen levels – and affected by absorption of heat downstream and either increased oxygen (increase turbulence and mixing with air) or decreased oxygen (biological processes). Hagg Lake becomes stratified early in the summer, colder water with low oxygen levels tends to be deeper in the lake and associated with the dam outlet structure. Later in the season as lake levels drop, water in the reservoir tends to warm up and is more likely to be discharged through the outlet. As a result, the proposed action will likely result in lower initial water temperatures early in the season with a general increase over the summer months into the fall. In addition, stream channels downstream of the dam tend to be exposed to sunshine and subjected to increase in air temperatures later in the summer months. As flows decrease during late summer and into the fall, there is an increased potential for temperature gain – greater solar radiation and shallower and lower velocity flows. Similarly for oxygen, what starts out as lower concentrations – below saturation – from the reservoir will follow a general downward trend, although the physical process of releasing water and associated turbulence increase oxygen concentrations

Reclamation's analysis of temperature and oxygen concentrations from the proposed action indicates that significant changes to water temperature or dissolved oxygen levels are not likely. Studies of the reservoir stratification show that the outlet for the project is located below a fairly stable thermocline and temperature will remain the same throughout the season. Reclamation noted that while oxygen level in the reservoir depths is low, the act of discharge and turbulence in the outfall does increase levels to just below saturated levels. Overall, the potential change in temperature or oxygen from the proposed action remains small and difficult to calculate. It is more closely associated with the potential change in thermal loading and related to change in flow volume. As such, temperature and oxygen values in Scoggins Creek are mostly influenced by reservoir releases during summer months and will remain as is under the proposed action.

Exposure/Ecological Potential. The effect of changes to water quantity and water quality in Scoggins Creek and the Tualatin River on UWR steelhead are based on potential exposure and consideration of how each individual fish and/or population of fish are likely to respond to these changes and also depends on fish density, life history stages present, and ecological state of the stream system being analyzed.

Exposure. The potential effect of stream flow alterations on UWR steelhead productivity depends on timing of the changes and life history stage of the fish present. Changes to stream hydrology will be most evident during summer and fall. During this period of time, adult steelhead would have moved through the lower reaches of the Tualatin River and up into the upper Tualatin or into the middle reaches of main tributaries. Spawning occurs in spring and adults that will return to the ocean as kelts will leave the system before summer begins. No spawning has occurred in Scoggins Creek since completion of the Tualatin Project. For the upper Tualatin River, upstream of Scoggins Creek and Gales Creek, downstream of Scoggins Creek, juvenile steelhead that would have recently emerged from the spawning beds will remain in close proximity to their spawning gravels after emergence and will be expected to remain in the upper reaches of these streams during the summer and fall periods of their first year and as a result, will not be subject to flow alterations in Scoggins Creek or Tualatin River. Older juveniles are more likely to move throughout the system and between tributaries prior to their out migration as smolts during the winter period. Their movement is based on available rearing habitat that provides food and cover and sufficient flow and cool water temperatures to facilitate access. Juveniles that originate in the upper Tualatin River or Gales Creek may move into the main stem Tualatin River during higher flows in winter or spring. Some use of the lower reach of Scoggins Creek could occur at this time. By summer, water temperatures in the low lying streams in the Tualatin River system begin to warm up, causing juveniles to move into upper reaches of select tributaries to seek temperature refuge before becoming isolated and subject to the higher temperature regime in the mainstem Tualatin River.

Cold water releases from Henry Hagg Lake during the summer will result in cooler water temperatures in Scoggins Creek and in the Tualatin River near the confluence of Scoggins Creek for longer periods into the summer. This may provide some temperature refuge and increase the potential use of these areas by the older juvenile steelhead. By fall, juveniles in these reaches would have moved on or become isolated from more desirable habitats in the upper Tualatin River, Scoggins Creek, or in Gales Creek. Similar patterns of use are likely to occur farther downstream in other tributaries where steelhead spawn.

Overall, the potential increase in stream flow during summer months and decrease in flows during fall and winter in Scoggins Creek and the upper section of the Tualatin River are not likely to affect adult steelhead and minimally affect juveniles. Adult steelhead will not be present during hydrologic changes. And exposure of juvenile steelhead to these changes will be limited to Scoggins Creek and the middle sections of the Tualatin River primarily during winter to early summer period. In addition, juvenile steelhead will not likely be present within the Tualatin River during the August/September period that Reclamation's has indicated some potential for increasing water temperature.

Ecological Potential. The potential effect of stream flow alterations on UWR steelhead productivity depends on location and timing of these changes relative to the primary ecological functional elements – functional zones indicated in the ecological conceptual model presented above. Sections of Scoggins Creek and the Tualatin River that could be potentially affected by the proposed action occur within the production spawning/rearing zone and the growth/migration zone.

The upper sections of Scoggins Creek below the dam are contained within the reproduction spawning/rearing zone that represents those areas where upstream resources accumulate to form habitat features that facilitate spawning and rearing. Scoggins Creek contains habitat elements including gravel bars, large wood deposits, and pools/riffle/glides that indicate some potential for spawning and rearing. Yet the stream gradient, fairly simple channel structure and higher percentage of glide habitat type which is not preferred steelhead habitat, tends to produce habitat conditions that are not suitable for steelhead spawning. The physical disconnect from upstream habitat that historically provided steelhead spawning and is the source of coarse sediment, and large wood further limits Scoggins Creek potential. And previous changes to stream hydrology preclude year round rearing. Increasing flows during summer and decreasing flows in fall are within the current range of flow scenarios for Scoggins Creek and not sufficient to change the channel forming processes or affect habitat formation, nor would it affect habitat access.

The lower reaches of Scoggins Creek and the middle reaches of the Tualatin River are characterized by the low gradient valley bottom stream type and are contained within the growth/migration zone that represents areas where flood pulses and interconnectivity to flood plains provides high quality foraging opportunities and flood refuge. This area provides the opportunity for growth and facilitates movement of juvenile steelhead between stream habitats and prepares the smolts for final outmigration. The change in flows from the proposed action will not result in further affects to floodplain connectivity or impede juvenile migration.

2.4.3.3 Habitat Access

The proposed action will perpetuate the dam into the foreseeable future blocking fish migration and passage to upstream habitat. The current value of the upstream habitat is fair to poor (White 2003) with little or no potential productivity value. While some potential steelhead spawning habitat does exist, rearing opportunities are more limited. And, the balance of spawning and rearing that meet the life history requirements of UWR steelhead and the ability of these fish to migrate freely further limit potential productivity. Scoggins Creek did not historically produce many steelhead (Parkhust et al. 1949) and based on current estimates of numbers of steelhead in the subbasin of 10s of fish might be expected in the Scoggins watershed. As suggested in the initial trap and haul passage program, fish that might access upstream habitat would not have a high likelihood of successful survival or contribute to fish production.

2.4.3.4 Habitat Enhancement

The funding of habitat enhancement and restoration activities in Gales Creek through Reclamation's continued funding of the Tualatin Valley Watershed Council (TVWC) will benefit UWR steelhead. The proposed funding of planning, design, regulatory, and implementation of projects along Gales Creek is intended to offset lost productivity due to the original construction of the Tualatin Project. Reclamation will fund the TVWC to undertake a number of projects over the next two year period including road decommissioning, baseline monitoring, education and outreach, and prioritizing instream projects. After Reclamation's current 2014-15 contract with the TVWC expires, a new 5-year grant agreement will be signed that will allow for similar types of habitat enhancement activities to continue into the future. These enhancements will occur in the reproduction spawning/rearing zone and will likely improve habitat conditions that benefit UWR steelhead. However, since we know so little about the planned restoration actions, we will not factor any specific beneficial impacts of these actions the analysis in this opinion.

2.5 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). 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.

Within the action area, continued diversion of natural stream flows, changes in land use, increasing impervious surface, and reduction of forested riparian areas is reasonably certain to occur. Ongoing agricultural practices and changes in agricultural products will maintain a high demand for irrigation and tax natural flows within the Tualatin system In addition unscreened or inadequately screened diversion will put juvenile ESA-listed steelhead at risk. The population growth within the Tualatin Valley will likely continue as this is a rapidly growing urban area in the lower Willamette Valley. Past growth for Washington County for 2010 was 20%. This rate is likely to continue. Growth will likely be focused in urban centers requiring little changes to landscape, yet some expansion of development will occur with some increase in impervious surface and clearing in riparian areas. Efforts continue to manage storm water with implementation of the Healthy Streams Initiative (CWS 2005) and to implement habitat enhancement projects that will help reduce potential discharge of pollutants and add to riparian forests. Overall there will be some potential for increasing chemical pollution discharges and reduction of shade in streams occupied by UWR steelhead, yet this is likely to be minimal. Since the action area is not occupied by a population that will drive recovery for this species, and the low numbers of fish that might become entrained at points of diversion, these minor cumulative effects are not likely to significantly impact species recovery.

2.6 Integration and Synthesis

The Integration and Synthesis section is the final step of NMFS' 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 2.4) to the environmental baseline (Section 2.3) and the cumulative effects (Section 2.5) to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) result in appreciable reductions in the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated or proposed critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species and critical habitat (Section 2.2).

The proposed operation and maintenance of the Tualatin Project will affect UWR steelhead by making long term changes to stream flow patterns by reducing seasonal peaks for both normal and high flows. These alterations to flow will not substantially change habitat structure and formation or water quality that would reduce rearing opportunity. The number of individual fish affected will be small due to low population numbers. The anticipated alteration to flow affecting UWR steelhead will be limited to summer and fall when these fish are not likely to be present. Nonetheless, those few fish will be exposed to additional stress caused primarily by water withdrawal at points of diversion that do not meet NMFS fish screen guidelines, and some of those fish could be physically injured or killed.

The proposed operation and maintenance of the Tualatin Project will continue to block access to upstream habitat into the foreseeable future. The amount of habitat available is limited and does not effectively meet the requirements of the UWR steelhead and passage would provide little or no benefit. The UWR steelhead in the Tualatin subbasin are not been identified as a population necessary for the recovery of the species.

Due to the limited nature and extent of the proposed changes to flow and the variability associated with magnitude and duration of these changes, and the low number of individual fish affected, and the poor habitat conditions and potential upstream of the project, the proposed action is not likely to change the productivity or factors currently limiting the recovery of the populations needed for recovery of this species. The proposed operation and maintenance of the Tualatin Project will affect West-side Willamette Basin tributary population of UWR steelhead, though the effects on the population will not impair the recovery of the species. The proposed action will cause limited degradation of conditions, including water quality and quantity. The cumulative effects of state and private actions within the watershed area are not reasonably likely to cause any impact on species recovery. Primary factors affecting fish in the action area are lost/degraded floodplain connectivity and lowland stream habitat, degraded water quality, high water temperature, reduced stream flow, and reduced access to spawning/rearing habitat for UWR steelhead. The proposed action is not likely to change the extent or magnitude of these factors. Given the limited extent and duration of habitat degradation, the minimal cumulative effects, and low number of individual fish affected, the effects on the indicated populations whose risk of extinction to the UWR steelhead DPS is not significant.

Due to the limited magnitude and time extent of the proposed changes to flow, and the short-term nature of some of those effects, the critical habitat PCEs in the action area are not expected to be significantly degraded by the proposed action. The proposed action will cause limited degradation of rearing potential (increase temperature in areas not currently meeting temperature guidelines). The cumulative effects of state and private actions within the action area are not reasonably likely to cause any impact on species recovery.

2.7 Conclusion

After reviewing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, any effects of interrelated and interdependent actions, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of UWR steelhead or to destroy or adversely modify its designated critical habitat.

2.8 Incidental Take Statement

Section 9 of the ESA and Federal regulation 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 results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. For purposes of this consultation, we interpret "harass" to mean an intentional or negligent action that has the potential to injure an animal or disrupt its normal behaviors to a point where such behaviors are abandoned or significantly altered.[3] 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 incidental take statement.

2.8.1 Amount or Extent of Take

Actions necessary to implement the proposed operation and maintenance of the Tualatin Project will take place within the active stream channel when juvenile individuals of UWR steelhead are reasonably certain to be present. The proposed action is likely to entrain juvenile UWR steelhead at water intake facilities at the Spring Hill pumping plant located on the Tualatin River at river mile 56. Unlike the other smaller project diversions and the Patton Valley pumping plant, intake screens at Spring Hill do not meet 3/32 inch mesh size specified by NMFS guidelines. While the potential for entrainment will vary throughout the year and NMFS cannot calculate the total number of ESA-listed fish affected. This is because the number of fish near the screens at any one time varies depending on environmental conditions (water flow, water temperature, *etc.*) and UWR seasonal movement patterns. In such cases, we define an extent of take to serve as a surrogate for the amount of take. Here, the total quantity of water (i.e. both stored project water and natural streamflows) that will be pumped through the Spring Hill pumping plant during the period of time that juvenile steelhead are most likely to be in proximity to the intake screens – March through June - of 30,000 acre-feet – serves as an indicator of the extent of take. The 30,000 acre-feet of water represents the anticipated maximum amount of water that would likely be pumped during this period based on anticipated future demand and the capacity of the pumps owned and operated by the Reclamation and the JWC. Pumping at the Spring Hill plant is representative of the activities at the other project facilities, and the amount of water withdrawn

[3] NMFS has not adopted a regulatory definition of harassment under the ESA. The World English Dictionary defines harass as "to trouble, torment, or confuse by continual persistent attacks, questions, etc." The U.S. Fish and Wildlife Service defines "harass" in its regulations as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering," 50 CFR 17.3. The interpretation we adopt in this consultation is consistent with our understanding of the dictionary definition of harass and is consistent with the U.S. Fish and Wildlife interpretation of the term.

is directly proportional to the amount of take. As more water is withdrawn, the chance fish will be entrained or impinged on the screens increases. Although pumps within the Spring Hill facility could theoretically withdraw greater quantities of water, the cumulative withdrawal of more than 30,000 acre-feet during March through June will exceed the analytical scope of this Opinion. Incidental take associated with the withdrawal of water that meets the terms and conditions of this incidental take statement will be exempt from the taking prohibition.

2.8.2 Effect of the Take

In Section 2.7, NMFS determined that the level 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.

2.8.3 Reasonable and Prudent Measures and Terms and Conditions

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

1. Minimize incidental take by applying permit conditions to adequately maintain screen water intake facilities.

2. Ensure completion of a monitoring and reporting program to confirm that the take exemption for the proposed action is not exceeded, and that the terms and conditions in this incidental take statement are effective in minimizing incidental take.

2.8.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and Reclamation or any applicant must comply with them in order to implement the reasonable and prudent measures (50 CFR 402.14). Reclamation 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 incidental take statement (50 CFR 402.14). If the following terms and conditions are not complied with, the protective coverage of section 7(o)(2) will likely lapse.

1. To implement reasonable and prudent measure #1 (screening water intake facilities), Reclamation shall:
    a. Intake Screening. Conduct routine regular maintenance and annually assess the functional state of the intake screen system at the Spring Hill Pumping Plant using criteria as specified by the guidance document - Anadromous Salmonid Passage Facility Design (NMFS 2011)

2. To implement reasonable and prudent measure #2 (monitoring), Reclamation shall ensure that:
    a. Annual Monitoring. An annual monitoring report will be prepared and submitted by December 31 and include

i. A summary of screen maintenance activities and overall functional assessment.
ii. A summary of the total quantity of water diverted through the screens at Spring Hill pumping plant for the period of March through June

b. Monitoring reports will be submitted to :
National Marine Fisheries Service
Oregon State Habitat Office
Attn: NWR-2009-2018
1201 NE Lloyd Blvd., Suite 1100
Portland, Oregon 97232

2.9 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 recommendation is a discretionary measure that NMFS believes is consistent with this obligation and therefore should be carried out by Reclamation:

Intake Screening. Initiate a process working with TVID to ensure all water intake facilities that use Tualatin Project stored water are screened in compliance with NMFS criteria as specified by the guidance document - *Anadromous Salmonid Passage Facility Design* (NMFS 2011)- or otherwise approved by NMFS including:

- Notifying all Tualatin Project water users of the need for fish screens and design criteria.
- Provide references and contact information for technical and financial assistance.
- Complete an assessment of all water intake facilities receiving Tualatin Project water to determine relative compliance with screening criteria or approval by NMFS

Integrated water management and steelhead productivity assessment. NMFS recommends that Reclamation initiate an assessment of flood control and flow management approaches to determine appropriate measures for maximizing steelhead productivity in the Tualatin System. Under current operational parameters for the Tualatin Project, flood plain connectivity is constrained, and the continuity between life history stages of the UWR steelhead is likely disrupted. The value of flooding as a source of food and refuge provide clear benefits to steelhead and other organisms is well understood. As is the importance of maintaining the physical and ecological processes that connect life history stages and improve survival of UWR steelhead. The work would require determining what opportunities exist to change flood and flow patterns in the Tualatin system; what would be feasible when, where, and how; and how to evaluate and measure outcomes and benefits to UWR steelhead. This assessment would be done in cooperation with Reclamation partner agencies and to complement ongoing planning and habitat restoration efforts.

Please notify NMFS if Reclamation carries out any of these recommendations so that we will be kept informed of actions that are intended to improve the conservation of listed species or their designated critical habitats.

2.10 Reinitiation of Consultation

As provided in 50 CFR 402.16, reinitiation of formal consultation is required 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 take 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 agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

2.11 "Not Likely to Adversely Affect" Determinations

In this biological opinion, NMFS concurs with Reclamation that the proposed action is not likely to adversely affect UWR Chinook salmon or their designated critical habitat. UWR Chinook salmon do not spawn in the Tualatin subbasin and no critical habitat has been designated in the action area. Juvenile Chinook that may be present at the mouth of the Tualatin River during short periods of the year will be subject to potential flow variations from the proposed action. However, these flow changes originating in Scoggins Creek are tempered by the numerous other flow inputs throughout the subbasin and effects at the mouth of the Tualatin River are extremely small in magnitude, are anticipated to improve water quality during the summer and fall period, and are otherwise expected to have discountable effects to UWR Chinook salmon. Therefore, the effects of the action on UWR Chinook salmon are insignificant.

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The consultation requirement of section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. The MSA (section 3) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Adverse effects include the direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside EFH, and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH.

This analysis is based, in part, on the EFH assessment provided by the Federal action agency and descriptions of EFH contained in the fishery management plans developed by the Pacific Fishery

Management Council (PFMC) and approved by the Secretary of Commerce for Chinook salmon and coho salmon (PFMC 1999).

3.1 Essential Fish Habitat Affected by the Project

The PFMC has described and identified EFH for Chinook salmon and coho salmon (*Oncorhynchus kisutch*) (PFMC 1999). The proposed action and action area for this consultation are described in the Introduction to this document. Various life-history stages of Pacific salmon occur in their designated EFH in the action area which could be affected by the proposed action.

3.2 Adverse Effects on Essential Fish Habitat

Based on the information provided by Reclamation and described in the ESA section of this opinion, the proposed action will have the following adverse effect on coho salmon.

Reduced flows in Scoggins Creek during the fall and winter periods can restrict access to limited spawning habitat and increases in temperature in the Tualatin River in summer will further restrict rearing potential and could result in displacement of juvenile salmonids to other rearing locations. The anticipated effects of these flow alterations will vary seasonally and annually and are within the current range of existing flow and temperature conditions maintained by minimal flows in Scoggins Creek of 10 cfs during December through September and 20 cfs during October and November. In general, in most years stream discharge in Scoggins Creek are significantly higher than the 10 or 20 cfs minimums mentioned above. More typical flow during the winter months (October through April) in Scoggins Creek range between 20 and 120 cfs under the proposed action.

3.3 Essential Fish Habitat Conservation Recommendations

NMFS expects that full implementation of these EFH conservation recommendations would protect, by avoiding or minimizing the adverse effects described in Section 3.2 above, approximately 1 acre of designated EFH for Chinook and coho salmon. The following two conservation measures are necessary to avoid, mitigate, or offset the impact of the proposed action on EFH:

1. Seek additional efficiencies in delivery, distribution, and use of water to increase flows within Scoggins Creek during fall and winter.
2. Initiate an integrated water management assessment for the Tualatin Project for the purpose of identifying what if any changes to the flow management regime could benefit anadromous salmonids.

3.4 Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, the Federal action agency must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation from NMFS. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH Conservation

Recommendations, unless NMFS and the Federal action agency have agreed to use alternative time frames for the Federal action agency response. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NMFS Conservation Recommendations, the Federal action agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects, 50 CFR 600.920(k)(1).

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

3.5 Supplemental Consultation

Reclamation must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations, 50 CFR 600.920(l).

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (Data Quality Act) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these Data Quality Act (DQA) components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

4.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users are Reclamation.

An individual copy was provided to Reclamation. This consultation will be posted on the NMFS Northwest Region website (http://www.nwr.noaa.gov). The format and naming adheres to conventional standards for style.

4.2 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.

4.3 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 MSA implementing regulations regarding EFH, 50 CFR 600.920(j).

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the Literature Cited section. The analyses in this Opinion/EFH consultation 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 MSA implementation, and reviewed in accordance with Northwest Region ESA quality control and assurance processes.

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