Total Maximum Daily Loads for the Snake River

Draft Water Quality Management Plan: Temperature

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State of Oregon
DEQ Department of Environmental Quality

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Table of contents

List of tables

List of figures

1 Introduction

The Oregon Department of Environmental Quality developed this Water Quality Management Plan, or WQMP, to guide implementation of the Snake River temperature Total Maximum Daily Load. A WQMP is an element of a Total Maximum Daily Load, or TMDL, as described by OAR 340-042-0040(4)(l), which provides the framework for management strategies to attain and maintain water quality standards and is designed to work in conjunction with detailed implementation plans.

In June 2004, DEQ issued a TMDL and associated WQMP for nutrients, dissolved oxygen, pesticides, sediment, temperature and total dissolved gas for the Snake River. The U.S. Environmental Protection Agency approved the TMDL and WQMP in September 2004. In response to a 2012 court ruling, EPA disapproved Oregon's Natural Conditions Criterion for temperature in 2013. Then, in 2019, a federal court ordered EPA and DEQ to reissue 15 temperature TMDLs—including the Snake River—that had relied on that disapproved criterion.

This Snake River temperature WQMP will be proposed for adoption by Oregon's Environmental Quality Commission, by reference, into rule as OAR 340-042-0090(7)(b). This WQMP is intended to provide consolidated information for implementation of the temperature TMDL. The WQMP replaces the temperature elements from the 2004 WQMP for the Designated Management Agencies, or DMAs, identified in the 2004 WQMP as responsible for implementing temperature management strategies. This WQMP only replaces the temperature portions of the 2004 WQMP and will be amended, as needed, upon issuance of any future new or revised TMDLs within the Snake River basin.

1.1 Condition assessment and problem description

The first element of the WQMP according to OAR 340-042-0040(4)(l)(A) is an assessment of water quality conditions in Snake River with a problem description. There are assessment units in the Snake River listed as impaired (category 5 or 4A) for temperature in Oregon's 2022 Integrated Report (approved by the U.S. Environmental Protection Agency on Sep. 1, 2022) as well as in the draft 2024 Integrated Report which has been submitted to EPA for approval.

DEQ must develop TMDLs for pollutants causing temperature impairments of waters within the Snake River, as required by Section 303(d) of the federal Clean Water Act. These pollutants are solar radiation and heat from various sources and conditions that cause water temperatures to exceed criteria established to support aquatic life beneficial uses.

The public policy of the State of Oregon is to protect, maintain, and improve the quality of waters of the state for beneficial uses and to provide for prevention, abatement, and control of water pollution. Temperature impairments of waters of the state pose risks of temperature-sensitive, beneficial uses, including specific salmonid life cycle stages (OAR 340-041-0028). Information about the risks associated with elevated temperatures is described in Section 4 of the Snake River Temperature TMDL document (DEQ, 2025a).

1.2 Goals and objectives

OAR 340-042-0040(4)(I)(B) requires identification of the goals and objectives of the WQMP.

The goal of this WQMP is to provide the framework for TMDL implementation to achieve and maintain the temperature water quality standards within the Snake River.

The primary objectives of this WQMP are to describe:

- Responsibilities for implementing the TMDL.
- Management strategies and actions necessary to reduce excess pollutant loads to meet the TMDL allocations.
- A strategy to evaluate progress towards attaining relevant water quality standards throughout the Snake River.

2 Proposed management strategies

As required by OAR 340-042-0040(4)(I)(C), the following section presents proposed management strategies, by pollutant source or category, that are designed to meet the load and wasteload allocations required by the Snake River temperature TMDL.

OAR 340-042-0030(6) defines management strategies as “measures to control the addition of pollutants to waters of the state and includes application of pollutant control practices, technologies, processes, siting criteria, operating methods, best management practices or other alternatives.”

2.1 Streamside vegetation management strategies

DEQ’s water quality analysis and modeling concluded that streamside vegetation planting and management are strategies conducive to meeting water quality standards in the temperature impaired sections of streams in the Snake River basin. This is because streamside overstory vegetation reduces solar radiation loads to streams by providing shade. Protecting and restoring streamside overstory vegetation is important to achieving water quality standards.

The primary streamside vegetation planting and management strategies are summarized as follows:

1. **Vegetation planting and establishment:** This strategy addresses locations that have little or no shade producing overstory vegetation and are therefore important locations for streamside tree and shrub planting projects. These sites may currently be dominated by invasive species.

2. **Vegetation protection (enhancement, maintenance, and growth):** This strategy addresses streamside areas that have existing vegetation that needs to be protected from removal to maintain current shade levels. In some cases, protection is needed

because effective shade can only be achieved with additional growth. Protecting and maintaining existing vegetation ensures that it can grow and mature, enhances vegetation success and survival, and provides for optimal ecological conditions.

3. **Vegetation thinning and management:** This strategy addresses streamside areas that may need vegetation density reduction to achieve optimal benefits of shade in the long term. Current site conditions at some riparian areas have been shown to be overly dense with trees or dominated by invasive species that inhibit a healthy streamside community. In these situations, thinning may be an option to promote development of a healthy mature streamside forest. However, it must be ensured that riparian thinning and management actions will result in limited (i.e., quantity, duration, and spatial extent).

2.2 Flow management strategies

Water withdrawals decrease the capacity of streams to assimilate pollutant loads. Because temperature is a flow-related parameter, water withdrawals can result in increased pollutant concentrations and warmer stream temperatures. In waterbodies where temperatures are already known to exceed standards, further withdrawals from the stream will reduce the stream's assimilative capacity and cause greater fluctuation in daytime and nighttime stream temperatures.

Water conservation is a best management practice that directly links the relationship between water quantity and water quality. Leaving water instream functions as a method to protect water quality from flow-related parameters of concern, such as temperature. Under state law, the first person to file for and obtain a water right on a stream is the last person to be denied water in times of low stream flows. Therefore, restoration of stream flows may require establishing instream water rights. One way this can be accomplished is by donating or purchasing out-of-stream rights and converting these rights to instream uses.

2.3 Hydromodification management strategies

Hydromodification refers to alterations of natural hydrological processes which affect characteristics of a waterbody and impact water quality. Examples of hydromodification include the construction of dams and levees and modifying stream channel morphology. Hydromodification can affect the loading, timing, and delivery of nonpoint source pollutants, including temperature (EPA, 2007).

Altering channel morphology can impact stream temperature (Galli and Dubose, 1990). For example, streams with high width to depth ratios (i.e., wide, shallow streams) can allow solar radiation to increase stream temperature compared to channels that are narrow and deep (Larson and Larson, 1996). Activities that make streams more prone to bank erosion, such as uncontrolled livestock access, can also result in shallower streams and increased stream temperatures. Channelization can impact stream morphology by disconnecting streams from their floodplains due to activities such as urban development or road construction. Streams that have been disconnected from floodplains are not able to slow and store floodwaters during the rainy season or recharge groundwater to support summer flows (EPA, 2017).

Hydromodification management strategies can include streamside restoration, livestock fencing, flow augmentation, and reservoir operations, as well as channel or floodplain restoration projects. Note that permits are often needed to conduct stream restoration work involving

removal and fill activities, and to ensure activities occur during the in-water work period to avoid harming fish. In addition, responsible persons, including DMAs need to conduct site-specific evaluations of streams to determine what specific channel modifications are appropriate to meet the desired future condition. For more information about hydromodification sources and impacts, see EPA's National Management Measures to Control Nonpoint Source Pollution from Hydromodification (EPA, 2007).

2.3.1 Large dam owners and reservoir management

There are three dams and associated reservoirs (Hells Canyon, Brownlee, Oxbow) located within the Snake River temperature TMDL project area.

Dams can increase stream temperatures, depending on factors that include dam and stream characteristics, location, and density of dams in a watershed. For these reasons, DEQ expects all dam owners to manage their reservoirs to meet water quality standards, including standards for temperature. Idaho Power Company (IPC) owns and manages all three large dams and reservoirs in the Snake River temperature TMDL project area. For details on reservoir operator implementation requirements, see Section 5.1.3.

2.4 Summary of nonpoint source priority management strategies

Table 1 includes proven strategies (and practices within the strategies) summarized by pollutant source. These strategies and practices are adapted from published sources. DEQ used the categories and terminology from Oregon Watershed Enhancement Board's Oregon Aquatic Habitat Restoration and Enhancement Guide and Oregon Watershed Restoration Inventory Online List of Treatments. Additional strategies included in Table 1 are supported by Oregon Department of Agriculture, U.S. Department of Agriculture Natural Resources Conservation Service, Oregon State University Extension Service, and other publicly available published sources. DEQ identified the strategies in Table 1 as appropriate for the conditions and sources within the Snake River. Therefore, these are considered priority strategies and practices that should receive special focus during implementation plan development.

DEQ expects that entities identified in Section 5.1 will develop implementation plans that incorporate strategies and practices from Table 1 that are applicable to their jurisdiction. Implementation plans must include specifics on where and when priority and other strategies and practices will be applied, along with measurable objectives and milestones for documenting their implementation and gauging their effectiveness.

Table 1: Priority temperature management strategies by source

Source or activity	Management Strategies
Insufficient height, density, or width of riparian vegetation	The primary goal is to increase site effective shade (combination of vegetation height, buffer width and canopy density) through streamside vegetation management strategies using regulatory programs and voluntary activities, including incentive-based projects. Streamside tree planting (conifer and hardwood); streamside vegetation planting (shrub or herbaceous cover); streamside vegetation management (invasive thinning, removal or other treatment); voluntary streamside tree retention; streamside invasive plant control; streamside fencing (or other livestock streamside exclusion or management methods); identify and protect cold water refuges Increase site effective shade (combination of vegetation height, buffer width and canopy density) through streamside vegetation management strategies using regulatory programs and voluntary activities, including incentive-based projects; maintain plants until free to grow; monitor survival rates Develop, update and/or enforce streamside code/ordinance to ensure streamside native vegetation and intact bank conditions are protected or restored following site development; purchase, acquire, or designate conservation easements along streamside areas
Water withdrawals and flow alteration	Pursue new instream water rights, as well as transfers and leases of existing water rights; water right application reviews; irrigation conservation and management; repair or replace leaking pipes and infrastructure; provide incentives for water conservation; implement water consumption restrictions during the summer months, such as lawn watering
Channel modification and hydromodification	Conduct riparian and tributary restorations (e.g., enhance channel, wetlands, and floodplain interactions, reduce width to depth channel ratios in tributaries, bank stabilization, large wood placement, create/connect side channels, etc.); streamside road re-construction/obliteration activities; streamside fencing or other livestock exclusion or management methods; protect and enhance cold water refuges; remove in-channel ponds or modify pond structures to reduce temperature increases downstream; protect areas that do not require restoration actions
Dam and reservoir management	Modifications to the quantity and nature of water releases to meet water quality standards for temperature

2.5 Point source priority management strategies

Point sources may be assigned wasteload allocations and/or other requirements under the TMDL. These point sources are required to have National Pollutant Discharge Elimination

System (NPDES) permits for any wastewater discharges. Under federal rules, effluent limits within NPDES permits are required to be consistent with the assumptions and requirements of any available wasteload allocation. Applicable wasteload allocations for point sources are available in the TMDL document (DEQ, 2025a).

The primary way DEQ addresses numeric wasteload allocations is by including effluent limits in permits (though different mechanisms may be used if they are consistent with the TMDL). There are many ways to achieve compliance with these limits and requirements, which can be incorporated into NPDES permits during renewal or issuance. These include, but are not limited to, immediate compliance with the limits, the use of compliance schedules, water quality trading, and other pathways allowed under state and federal rules.

2.6 Water quality trading opportunities

Water quality trading is a well-established feature of TMDL implementation in Oregon that is designed to achieve water quality goals more efficiently and with enhanced outcomes. Trading is allowed statewide so long as the requirements of OAR 340-039 are met. Trading is based on a more holistic understanding that pollutant sources are distributed throughout a watershed, and that eliminating these pollutant sources benefits the entire watershed. Trading programs allow facilities to meet their regulatory obligations by exchanging environmentally equivalent (or greater) pollution reductions from sources elsewhere in a watershed. Trading in Oregon includes the use of green infrastructure, which has the additional benefits of enhancing the resilience of natural systems to the effects of climate change. Many trading plans can achieve higher levels of heat load reduction at a lower cost. For more information, please refer to DEQ's web page on water quality credit trading.

3 Timelines for implementing strategies

OAR 340-042-0040(4)(l)(D) requires schedules for implementing management strategies including permit revisions, achieving appropriate incremental and measurable water quality targets, implementing control actions and completing measurable milestones. DEQ's water quality permitting program has responsibility for revising permits to comply with TMDLs. Timelines for implementation of management strategies by responsible persons including DMAs is discussed separately.

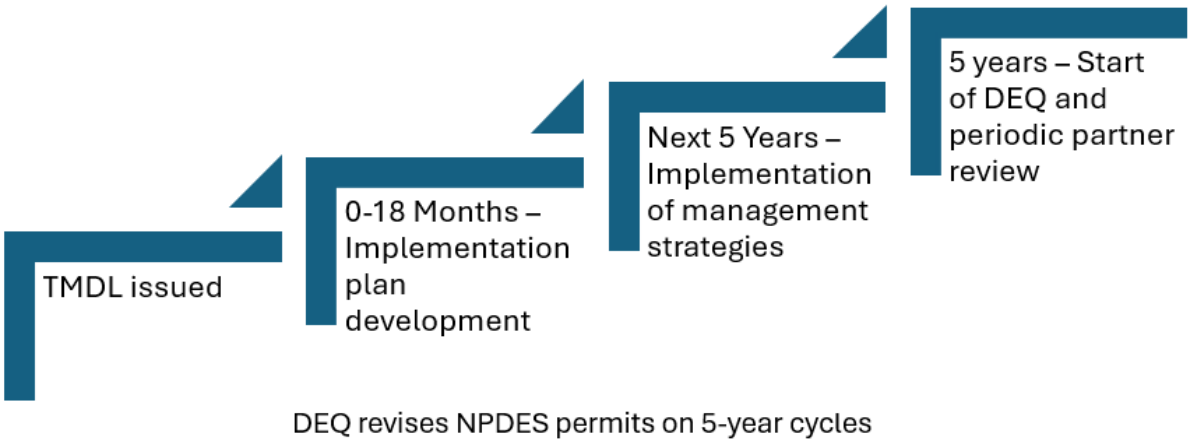

Figure 1: TMDL implementation timeline

3.1 DEQ permit revisions

NPDES permits have five-year terms. DEQ incorporates any required TMDL wasteload allocations into NPDES permits when the permit is renewed. NPDES permittees with assigned wasteload allocations are available in the TMDL document (DEQ, 2025a).

3.2 Management strategies implemented by responsible persons

Based on analyses, DEQ estimated timelines to attain temperature water quality standards. These are presented in Section 4.2 as the schedule for achieving appropriate incremental and measurable water quality targets. DEQ expects DMAs to consider these timelines when establishing commitments for management strategies and actions in TMDL implementation plans. As discussed in Section 5.3.3.1, DEQ evaluates completion of implementation schedules and measurable milestones during review of annual reports. DEQ periodically evaluates progress toward TMDL goals, typically in five-year increments, by evaluating all available monitoring data and other relevant information.

4 Attaining water quality standards

Based on TMDL analyses, achieving the excess load reductions identified will result in attainment of water quality standards. Each management strategy identified in this WQMP, and in implementation plans provided by responsible persons including DMAs, represents part of a system of measures and practices that collectively reduce pollutant loads and improve water quality.

4.1 How management strategies support attainment of water quality standards

OAR 340-042-0040(4)(I)(E) requires an explanation of how implementing the management strategies will result in attainment of water quality standards.

DEQ identified priority implementation management strategies and specific practices in Table 1 and Section 2.

Landowners, land managers, foresters, restoration professionals and horticulturists have expertise and experience needed to develop site-specific planting prescriptions that will ensure that the best combination of streamside species are planted. These site-specific planting prescriptions will typically contain a higher diversity of shrub and overstory species than the vegetation types used in developing the shade curves. The overall goal is to establish and protect streamside vegetation to meet effective shade targets established for that site. Maintenance activities, such as removal of invasive species and watering newly established trees and shrubs will be important for trees to become fully established (free to grow).

In addition to streamside shading strategies, significant water quality benefits will be achieved through implementation of stream restoration and flow augmentation management strategies.

4.2 Timelines for attaining temperature water quality standards

OAR 340-042-0040(4)(I)(F) requires an estimated timeline for attaining water quality standards through implementation of the TMDL, WQMP, and required TMDL implementation plans.

The timeline for water quality standard attainment will vary across the project area. Some areas will require different management strategies and greater efforts to reduce loads. Many improvement projects have been funded and implemented since the 2004 TMDL. Continuation of these efforts will move closer toward meeting attainment goals.

The 2004 TMDL utilized a “Public Action Team” consisting of numerous interested parties in the basin to advise and give collective understanding to the project. These members with the participation of other research groups, concluded that a timeframe of 50-70 years will be required to implement all necessary control strategies to attain TMDL targets. This numerical target was based on the complexity and size of the basin and the numerous control measures required to improve water quality.

Utilizing this previous target and crediting more than 20 years of implementation in the basin, it is expected that attainment is feasible in the next 30-50 years. To reach this goal efforts must be made across all sectors and jurisdictions to continue to make progress toward water quality improvement and reduce loading from background and anthropogenic sources identified in this TMDL. Continued implementation of the Idaho 2004 Water Quality Management plan by the State of Idaho, and further coordination with EPA to assist both states to work within our respective jurisdictions will be required to collaboratively improve water quality and meet attainment goals in the Snake River.

5 Implementation responsibilities and schedule

5.1 Identification of implementation responsibility

OARs 340-042-0040(4)(I)(G) and 340-042-0080(1) require identification of persons, including Designated Management Agencies, responsible for implementing management strategies and preparing and revising implementation plans.

OAR 340-042-0030(2) defines Designated Management Agency as a federal, state or local governmental agency that has legal authority over a sector or source contributing pollutants and is identified as such by DEQ in a TMDL.

The TMDL rule provides numerous mentions of the term ‘responsible person’ with associated requirements. OAR 340-042-0025(2) indicates that responsible sources must meet TMDL load allocations through strategies developed in implementation plans. OAR 340-042-0030(9) defines ‘reasonable assurance’ as a demonstration of TMDL implementation by governments or individuals. OAR 340-042-0040(4)(I)(I) requires a schedule for submittal and revision of implementation plans by responsible persons including DMAs. OAR 340-042-0080(4) reiterates the requirement for persons, including DMAs, responsible for development, submittal and revision of implementation plans, along with the required elements of those plans. For purposes of this Snake River Temperature WQMP, for implementation of the temperature TMDLs, ‘responsible person’ is defined as any entity responsible for any source of pollution addressed by the TMDL.

Responsible persons including DMAs are organized by DMA type in the following subsections. A complete list of responsible persons including DMAs for the Snake River Temperature TMDL is in Table 2 Below. There are 21 responsible persons including DMAs such as cities, counties, federal and state agencies, and other entities.

Table 2 is not an exhaustive list of every individual that bears responsibility for improving water quality in the Snake River Basin. It may be necessary for all people that live, work, and recreate in the basin to take steps to reduce pollution and protect or restore water quality to attain standards and protect the designated beneficial uses.

As shown in Figure 2 three DMAs manage or own the bulk of the land area referenced in the Snake River Temperature TMDL. Figure 2 illustrates the estimated land area owned or managed by these entities within a minimum of 150 feet of land adjacent to the wetted edge of the Snake River.

Table 2: Entities responsible for development and implementation of management strategies

Responsible Persons including Designated Management Agencies	Area of Jurisdiction
US Forest Service	Wallowa-Whitman National Forest managed lands
US Dept of Interior, Bureau of Land Management	BLM Vale District managed lands
Oregon Department of Agriculture	Agricultural lands and activities
Oregon Department of Fish and Wildlife	ODFW managed lands and activities
Oregon Department of Forestry*	Non-federal forest lands
Oregon Department of Environmental Quality*	NPDES and WPCF permits implementation and enforcement. Statewide Onsite Wastewater Program.
Oregon Department of Transportation	Stormwater and other nonpoint sources from highways, rights-of-way, and facilities
Oregon Parks and Recreation Department	OPRD managed lands and activities
Counties- Malheur, Baker, Wallowa	Construction, operation and maintenance of county roads and county storm sewer system, land use planning/permitting, maintenance, construction and operation of parks and other county owned facilities and infrastructure, riparian area management
City of Ontario	Construction, operation, and maintenance of the municipal separate storm sewer system within the city limits, land use planning/permitting, maintenance, construction and operation of parks and other city owned facilities and infrastructure, riparian area management
Idaho Power Company	Hells Canyon Dam Complex

*DEQ and ODF will not prepare implementation plans. DEQ will incorporate waste load allocations into NPDES permit requirements and ODF will implement the Forest Practices Act.

In addition to the DMAs and responsible persons listed in Table 2, all people who live, work, and visit the basin can take steps to protect and restore water quality. Achievement of long-term water quality improvements in the basin will only be accomplished with leadership from local communities.

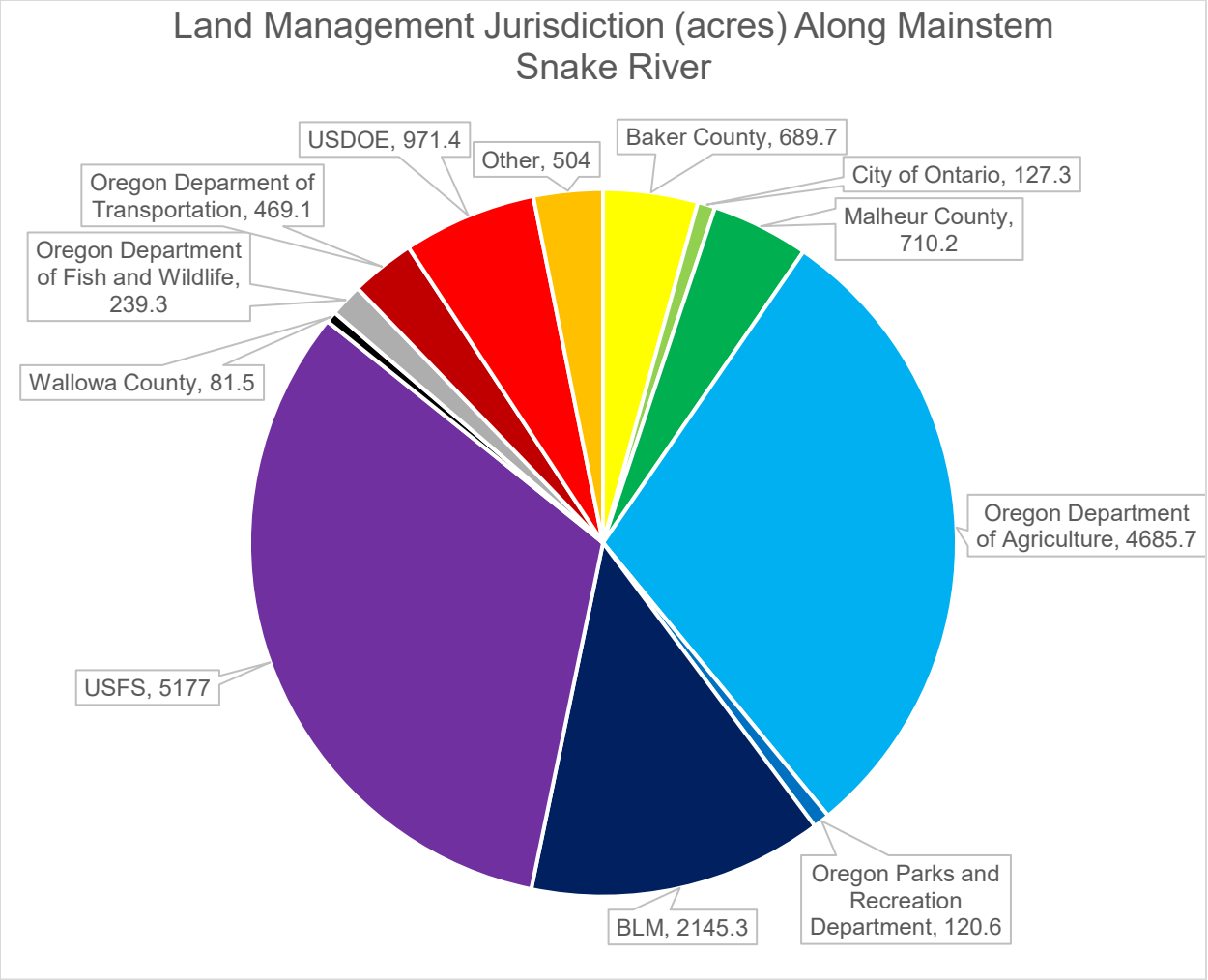

Figure 2: Areas of land use, ownership, and jurisdiction in the Snake River

5.1.1 Land management and land use agencies

5.1.1.1 Oregon Department of Agriculture

The Oregon Department of Agriculture (ODA) regulates agricultural activities on private lands that can affect water quality in Oregon surface waters. ODA has jurisdiction over 4685 acres of private agricultural lands in the Snake River Basin. In addition to ODA's implementation of the Oregon Agricultural Water Quality program (Area Rules and Area Plans for the Powder/Brownlee, Burnt, Wallowa, Malheur, and Owyhee), DEQ expects ODA to submit a TMDL implementation plan for the Snake River. The implementation plan must include the required elements described in Section 5.3 and be submitted according to the schedule in Section 5.4. The plan may include management strategies from Tables 1 and 3, and others selected by ODA for TMDL implementation. Strategies or timelines selected as alternative to those presented in Table 3 must be documented in the implementation plan. Management strategies and practices to address gaps in pollution controls or prevention may be documented in revisions to the Area Rules or Area Plan as needed.

Table 3: ODA management strategies for TMDL Implementation

Source or activity	Management Strategy
Domestic livestock - grazing	Utilize rotational grazing and other techniques to minimize overgrazing near streams Provide off-channel livestock water to protect riparian areas Conduct livestock management training/ education and outreach related to protecting riparian areas Minimize direct livestock stream access (livestock exclusion through fencing or other practices) Ensure adequate riparian vegetation
Agricultural runoff	Implement irrigation system improvements and modernize water conservation practices to reduce or prevent runoff.
Reduction of riparian areas	Maintain and expand riparian buffers for effective shade management

5.1.1.2 Oregon Department of Forestry

The Oregon Department of Forestry (ODF) has jurisdiction over forest operations on private forested lands in the Snake River Basin. ODF ensures water protection through the Forest Practices Act. DEQ's analysis does not suggest that private forestry activities are a major contributing source of temperature loading to surface waters of the Snake River. ODF must meet the waterway protection measures identified in the Oregon Forest Practices Act, the associated administrative rules, and any amendments (see Section 5.2.1). DEQ considers ODF to be meeting the requirements of a TMDL implementation plan for temperature by following the Oregon Forest Practices Act and any amendments.

5.1.1.3 Oregon Department of Fish and Wildlife

Oregon Department of Fish and Wildlife (ODFW) owns and manages 239 acres in the Snake River project reach. This includes Rogers Wildlife Area and three islands (Patch, Porter, and Hoffman) along the mainstem Snake River. The islands were originally purchased by IPC to mitigate the effects that the hydroelectric project construction had on waterfowl. IPC conveyed the title for all three islands to ODFW to manage (FERC, 2007). Upon issuance of the updated Federal Energy Regulatory Commission (FERC) license IPC will provide annual funding to support habitat enhancement projects on these islands.

ODFW must develop a TMDL implementation plan for all land owned in the basin that includes the required elements described in Section 5.3 and is submitted according to the schedule in Section 5.4. The implementation plan may include strategies listed in Tables 1 and 4, or other strategies selected by ODFW. Strategies or timelines selected as alternative to those presented in Table 4 must be documented in the implementation plan.

Table 4: ODFW management strategies for TMDL Implementation

Source or activity	Management Strategy
Management of ODFW lands	Protect and enhance riparian areas to maximize shade and reduce thermal loading
Hunting, fishing, other ODFW managed recreation	Education and outreach to public
Hatcheries and other ODFW managed facilities	Follow best management practices to reduce thermal inputs

5.1.1.4 Oregon Department of Transportation

The Oregon Department of Transportation is responsible for managing runoff from highways under a statewide Phase I Municipal Separate Storm Sewer System (or MS4) permit. According to calculations made for this TMDL, ODOT has jurisdiction over 469.1-acres as roadway rights-of-way in the Snake River. Implementation of ODOT's statewide MS4 permit, and statewide TMDL implementation plan will be adequate to meeting the requirements of a TMDL.

5.1.1.5 Oregon Parks and Recreation Department

Oregon Parks and Recreation Department manages 121 acres in the Snake River project area as State Parks and for conservation and recreation purposes. Specifically, OPRD owns and manages the Ontario state recreation site and Farewell Bend State recreation area.

OPRD must develop an implementation plan for all land owned in the basin that includes the required elements described in Section 5.3 and is submitted according to the schedule in Section 5.4. The implementation plan may include strategies listed in Tables 1 and 5, or other strategies selected by OPRD. Strategies or timelines selected as alternative to those presented in Table 5 must be documented in the implementation plan.

Table 5: OPRD management strategies for TMDL Implementation

Source or activity	Management Strategy
Management of OPRD lands	Protect and enhance riparian areas to maximize shade and reduce thermal loading Follow best management practices to reduce thermal inputs
OPRD managed recreation	Education and outreach to public

5.1.1.6 US Bureau of Land Management and US Forest Service

The US Department of the Interior Bureau of Land Management (BLM) and US Department of Agriculture Forest Service (USFS) are responsible for management and regulation of certain forest and range lands owned by the federal government. BLM supervises 2145 acres along the mainstem of the Snake River. The U.S. Forest Service manages 5177 acres of the land area in the Snake River. Livestock graze on BLM and USFS lands through a fee-based permit system that may impact riparian conditions.

BLM and USFS must develop implementation plans that include the required elements described in Section 5.3 and be submitted according to the schedule in Section 5.4. The plans may include management strategies from Tables 1 and 6, or practices selected by the respective agency. The plan may reference any relevant resource management and water quality restoration plans as discussed in Sections 5.2.3 and 5.2.4. If additional assessment of land conditions or current practices is needed to determine details of the plan, the process to complete the assessment will be identified in the implementation plan, the annual report, or other agreed-upon mechanism.

Table 6: BLM and USFS management strategies for TMDL Implementation

Source or activity	Management Strategy
Riparian Area Management	Protect and restore riparian vegetation and canopy cover to minimize excess solar radiation.
Pasture use – livestock grazing and manure management	Identify locations and assess patterns of livestock access to streams in the basin and ensure BMPs to prevent erosion and runoff are in place Utilize rotational grazing and other techniques to minimize overgrazing Provide off-channel livestock water Minimize direct livestock stream access (livestock exclusion through fencing or other practices) Ensure adequate riparian vegetated filter strip and buffer zone
Education and Outreach	Conduct livestock management training

5.1.2 Counties and municipalities

Baker County, Wallowa County, Malheur County and City of Ontario are identified as DMAs that each must develop a Snake River temperature TMDL Implementation Plan.

Increased stream heating results directly or indirectly from activities under county and local jurisdiction. These activities may include roads, utility corridors, industry, airports, golf courses,

OHV parks, recreation areas, unincorporated cities and rural residential where not addressed through agricultural/private forestry planning.

Implementation plans must include management strategies listed in Tables 1 and 7 or other strategies selected by the county or municipality. Each implementation plan must include the required elements described in Section 5.3 and be submitted according to the schedule in Section 5.4.

Table 7: County and municipality management strategies for TMDL implementation

Source or activity	Management Strategy
Land use/ development and land management Local codes and ordinances; municipal operations	Fully enforce local land use, development, and building codes and plans that require best management practices to ensure setbacks and riparian protections are in place to provide adequate shade and minimize erosion and sediment delivery to waters of the state from land development and building activities. Develop or revise codes or voluntary programs as needed to prevent thermal pollution Evaluate activities in municipal/county owned and managed parks, roads and rights-of-way for potential sources of thermal pollution and identify strategies and actions to mitigate water pollution from these sources through compliance with local codes.
New Development and Construction	Planning, permitting, and design procedures, education and outreach, construction and post construction control procedures, and storm drain system construction to minimize thermal loading
Existing Development	Storm drain system operation and maintenance and retrofitting, street/road/parking lot sweeping and maintenance.
Riparian Area Management	Revegetation, streambank stabilization, parks, public buildings and facilities management to improve riparian shading.
Public Awareness/Education	General and targeted education and outreach activities

5.1.3 Idaho Power Company

Idaho Power Company owns and operates three hydroelectric developments located on the Snake River, including Brownlee, Oxbow, and Hells Canyon Dams and associated reservoirs, that together comprise the Hells Canyon Complex (HCC) Hydroelectric Project (FERC Project No. 1971) (“the Project”).

As part of FERC’s relicensing of the HCC Project, currently pending before the Federal Energy Regulatory Commission, Oregon DEQ and Idaho DEQ issued Clean Water Act Section 401 Water Quality Certifications to ensure Project activities and operations are protective of water quality. Pursuant to the Clean Water Act, IPC is responsible for complying with any revised

temperature TMDL load allocation. To the extent that the previously issued certification conditions are insufficient to meet its load allocation, ODEQ may modify the HCC's certification if determined necessary to ensure compliance with the revised temperature TMDL.

5.1.4 Responsible persons including DMAs not required to develop a TMDL implementation plan

Some responsible persons including DMAs will not be required to submit implementation plans at this time for the following reasons:

- DMA has de minimis land jurisdiction.
- DMA with no or de minimis land jurisdiction and has de minimis ability to take action to protect water quality.
- DMA has implementation responsibilities in another TMDL, and no additional strategies are required.
- DMA discharges directly (not through tributaries) to a waterbody which is managed under a different TMDL.
- Land is managed by a Tribe.
- DMA can't take actions to protect water quality because of state and federal requirements to prioritize safety and security.
- DMA implements an approved statewide TMDL Implementation plan.
- DMA has other implementation pathways:
    - Area is managed by other authorities already required to develop a plan.
    - Water protection actions are implemented through permits

Table 8 identifies the entities that are named as responsible persons including DMAs in this TMDL that are not required to develop and submit an implementation plan at this time. DEQ may require implementation plans from these entities in the future if ownership or jurisdiction of streamside areas increases, or other data or information indicates a TMDL implementation plan is needed to achieve temperature standards identified in this TMDL.

Table 8: List of responsible persons for which no TMDL implementation plan is required.

Responsible Persons including Designated Management Agencies	DMA Type
City of Adrian	Municipality
City of Nyssa	Municipality
Irrigation Districts	Special District
Oregon Department of Geology and Mineral Industries	Mining
Oregon Department of State Lands	Land Management
U.S. Fish and Wildlife Service	Fisheries
Union Pacific Railroad	Utility

5.2 Evaluation of Existing implementation plans

5.2.1 Oregon Department of Forestry: Adequacy of Forest Practices Act to meet TMDL load allocations

Waterway protection measures were established in 1994 for state and private forest practices in Oregon, as codified in Oregon Revised Statutes 527.610 through 527.992, Oregon's Forest Practices Act, OAR 629-600 through 629-665, and Oregon's Plan for Salmon and Watersheds (Executive Order 99-01). As provided in ORS 527.770, forest operations conducted in accordance with the Forest Practices Act and administrative rules along with voluntary measures, are generally considered to be compliant with water quality standards. Private forestry activities have not been identified as a significant source of thermal loading to surface waters in the Snake River Basin. As such, additional implementation measures beyond carrying out activities outlined in Oregon's Forest Practices act are not required.

5.2.2 Oregon Department of Agriculture: Adequacy of agricultural water quality management programs in attaining TMDL load allocations and water quality standards

The Oregon Legislature passed the Agricultural Water Quality Management Act in 1993, which directed Oregon Department of Agriculture to adopt rules as necessary and to develop plans to prevent water pollution from agricultural activities (ORS 568.900 to 568.933 and ORS 561.191 and OAR chapter 603, divisions 90 and 95). Subsequently, ODA worked with Local Advisory Committees and Soil and Water Conservation Districts to develop Agricultural Water Quality Area Rules and Area Plans for 38 watershed-based management areas across the state.

The Snake River TMDL includes portions of five ODA Agricultural Water Quality Management Areas that each have an Area Plan. DEQ participates in ODA's Area Plan review process by providing water quality status and trends for each management area, as well as assessments of land conditions, agricultural activities, and implementation gaps that likely contribute to water quality impairments. The Area Plans for the five management areas included in this TMDL were reviewed by DEQ within the last two years, however not all reviews resulted in Area Plan revisions. There are two geographic areas (Lower Snake Asotin and Hells Canyon) within this TMDL project scope where the Agricultural Water Quality Program does not apply.

Snake River TMDL project area waters continue to be identified as impaired on Oregon's Section 303(d) list for temperature in part due to agriculturally influenced streamside areas. DEQ's assessments of Area Plans/Biennial Review Reports identified protecting, maintaining and establishing streamside vegetation and preventing runoff of agricultural wastes as high priorities to achieve TMDL load allocations. However, DEQ finds that ODA's Area Plans are inconsistent in planning or implementing activities to meet measurable goals related to

streamside conditions that will achieve TMDL water quality standards. ODA has not demonstrated that voluntary landowner implementation of Area Plans will bridge the gap between current conditions and what is needed to meet TMDL goals.

As agreed, in the 2023 Memorandum of Agreement between DEQ and ODA, ODA will either adapt the Area Plan and Area Rules to act as the TMDL implementation plan or develop a separate TMDL implementation plan. Which approach to take will be decided as part of the TMDL process. In the case of the Snake River TMDL, DEQ has concluded that current ODA WQ program Area Rules combined with implementation of Area Plan's voluntary measures are not adequate in all locations to achieve TMDL temperature water quality standards. Therefore, ODA is required to develop a TMDL implementation plan to be submitted to DEQ for review and approval. DEQ will assist ODA in developing an approvable TMDL implementation plan that includes appropriate measurable objectives and timelines to address identified water quality priorities and allocations (surrogate measures). In addition, DEQ will work with ODA to identify additional regulatory measures that could be implemented by rule revisions, incentive programs, and resources that may be available to help with program and project implementation to provide reasonable assurance of achieving TMDL targets.

5.2.3 U.S. Bureau of Land Management: Adequacy of streamside management strategies in attaining TMDL load allocations and water quality standards

BLM develops geographically specific Resource Management Plans and amendments, project-level plans, and historically, Water Quality Restoration Plans (WQRPs) to meet applicable water quality standards. Streamside vegetation on BLM managed lands in the Snake River basin are currently managed based on BLM's Baker and Southeastern Oregon Resource Management Plan (BLM, 1989, BLM, 2000, amend. 2024). Per previous Memoranda of Understanding between BLM and DEQ, Resource Management Plans and Water Quality Restoration Plans have served as BLM's method to meet TMDL requirements for specific geographic areas.

The updated Memorandum of Understanding between BLM and DEQ (2024) states that *"In managing the public lands, the BLM will incorporate site-specific Best Management Practices (BMP), as specified in standards, guidelines, design features, and mitigation developed in Resource Management Plans (RMP), RMP amendments, project-level plans, and Total Maximum Daily Load (TMDL) Implementation Plans (IPs, formerly referred to as Water Quality Restoration Plans, or WQRPs), to meet applicable water quality standards."*

Currently WQRPs for BLM managed lands in the Snake River TMDL project area do not exist. BLM must develop and implement a TMDL implementation plan to meet temperature water quality standards. See Section 5.4 for schedule. This plan may be incorporated into a statewide TMDL implementation plan.

5.2.4 U.S. Forest Service: Adequacy of streamside management strategies in attaining TMDL load allocations and water quality standards

Streamside vegetation on USFS lands in the Snake River TMDL project area is currently managed based on direction from the Land Resource Management Plan for the Wallowa-Whitman, National Forest (USDA, 1990b) and the Hells Canyon Comprehensive Management

Plan (USDA, 2003). Direction on management of riparian areas is further guided by the Interim Strategies for Managing Anadromous Fish-Producing Watersheds on Federal Lands in Eastern Oregon and Washington, Idaho, and portions of California, (PACFISH, USDA and USDI, 1995). The strategy provided standards and guidelines for land management activities and directed the Forests to designate and protect riparian habitat conservation areas (RHCAs). Strategies are also proposed in the Preliminary Draft Proposed Malheur, and Wallowa-Whitman National Forest Land Management Plans but are designated as Riparian Management Areas (RMAs) instead of RHCAs (USFS, 2025).

USFS signed a MOU with DEQ that defines how water quality rules and regulations regarding TMDLs will be met. USFS generally responds to TMDLs by developing and implementing WQRPs, which have served as the equivalent of TMDL implementation plans.

Currently WQRPs for USFS managed lands in the Snake River TMDL project area do not exist. For these reasons, USFS is required to develop a TMDL implementation plan to be submitted to DEQ for review and approval. See Section 5.4 for schedule.

5.3 Implementation plan requirements

As required in OAR 340-042-0080(4)(a)(A-E), implementation plans must include:

- Management strategies that the entity will use to achieve load allocations and reduce pollutant loading
- Timeline for strategy implementation and a schedule for completing measurable milestones
- Performance monitoring and a plan for periodic review and revision of implementation plan
- To the extent required by ORS 197.180 and OAR chapter 340, division 18, provide evidence of compliance with applicable statewide land use requirements.
- Any other analyses or information specified in the WQMP

The following subsections provide detail on each component required by this WQMP that must be included in an implementation plan. Some implementation requirements may vary depending on the responsible person or DMA.

DEQ will work with each entity required to develop an implementation plan to ensure that all required elements are included with sufficient detail for their plan to be approved on the schedule required in Section 5.4.

TMDL implementation plans and annual reports must be posted to each DMA's website for public transparency. If a DMA does not have a website, these documents must be made available to the public in another manner.

5.3.1 Management strategies

Each entity required to develop a TMDL implementation plan must include applicable priority management strategies from Table 1, management strategies described in Section 5.1, and/or other practices and actions appropriate for activities and landscape conditions specific to the

entities' pollutant sources or source sectors. Implementation plans must identify all streamside areas or streamside activities within an entity's jurisdiction or responsibility.

5.3.2 Timeline and schedule

Each implementation plan must include commitments to enact specific management strategies on a reasonable timeline with a schedule specified for meeting measurable milestones to demonstrate progress. To meet the intent of this requirement and be useful for the requirement to track and report progress, entities may develop management strategies using the SMART elements: Specific, Measurable, Achievable, Relevant, Time-bound (Doran 1981).

Timelines and milestones may be informed by the inventory of the area of jurisdiction (Section 5.3.1). Each entity must consider of all relevant factors. Selection of management strategy implementation timelines that differ from those put forth by DEQ must include an explanation justifying the choice. See specific timeline in Section 5.4.

5.3.3 Reporting of performance monitoring and plan review and revision

5.3.3.1 Reporting on performance monitoring

Each implementation plan must include a commitment to prepare annual reports on performance monitoring and specify a day of the year they will be submitted to DEQ. These reports must include implementation tracking for each of the identified management strategies, progress toward timelines and measurable milestones specified in the implementation plan, and evaluation of the effectiveness of each strategy.

DMAs should track and report implementation actions including the number, type and location of projects, best management practices, education activities, or other actions taken to improve or protect water quality. Most DMAs will track implementation actions they are directly responsible for completing, and some may need to track and report on actions that they implement through their support of other land managers- for example, private landowners.

Oregon Watershed Restoration Inventory Reporting Requirement

Projects designed to control thermal pollution that use practices listed in OWEB's Oregon Watershed Restoration Inventory (OWRI) Online List of Treatments must be reported by responsible persons including DMAs to the OWRI database (OWEB 2023, OWEB 2023a) upon project completion. DEQ utilizes OWRI's database to track implementation activities statewide and within watersheds for various reporting metrics. Responsible persons including DMAs must also report BMP implementation annually to DEQ to document progress and track actions over time.

Other publicly accessible databases may be used to document restoration activities when approved by DEQ.

Adaptive Management

Implementation plans must include a commitment to use adaptive management to evaluate the effectiveness of implementation activities in improving streamside conditions. Annual reports must summarize the status and results of these evaluations on the relevant time scale. At a

minimum, reports in year five must summarize implementation and effectiveness over the preceding four years.

5.3.3.2 Implementation plan review and revision

Implementation plans must be reviewed by each responsible person including DMAs, revised to incorporate lessons learned, and approved by DEQ every five years. At a minimum, plans must be revised to reflect updated timelines for the continuation of implementation activities for the next five years. DEQ will use implementation and effectiveness evaluations from annual reports for this review. If implementation plan revisions are needed to correct deficiencies or otherwise ensure the plan is effective following the year five review, DEQ will identify a date for submission of the revised plan for DEQ approval.

5.3.4 Public involvement

As required in OAR 340-042-0040(4)(l)(L), implementation plans prepared by designated management agencies must include a plan to involve the public in implementation of management strategies. Public engagement and education must be included to meet this requirement.

5.3.5 Maintenance of strategies over time

As required in OAR 340-042-0040(4)(l)(M), implementation plans prepared by responsible persons including DMAs should include discussion of planned efforts to maintain management strategies over time.

5.3.6 Implementation costs and funding

As required in OAR 340-042-0040(4)(l)(N), this section provides a general discussion of costs and funding for implementing management strategies. Implementation of management strategies to reduce and prevent pollution into waters of the state may incur financial capital or operating costs. These costs vary in relation to pollutant sources and loading, proximity to waterways and type or extent of preventative controls already in place. Certain management practices, such as preventative infrastructure maintenance, may result in long-term cost savings to responsible persons, including DMAs, or landowners.

OAR 340-042-0040(4)(l)(N) also indicates that sector-specific or source-specific implementation plans may provide more detailed analyses of costs and funding for specific management strategies in the plan. DEQ requires each DMA to provide a fiscal analysis of the resources needed to develop, execute, and maintain the programs and projects described in implementation plans to the extent that these costs can be accounted for or estimated. DEQ recommends that all responsible persons prepare the following level of economic analysis:

- Staff salaries, supplies, volunteer coordination costs, regulatory fees
- Installation, operation and maintenance of management measures
- Monitoring, data analysis and plan revisions
- Public education and outreach efforts
- Ordinance development (if needed to implement a management strategy)

This analysis should be in five-year increments to estimate costs, demonstrate sufficient funding is available to begin implementation or that there is a plan for obtaining the necessary funding,

and identify potential future funding sources to sustain management strategy implementation. DMAs may include actual costs spent on implementation activities as part of annual TMDL reporting. This information may help DEQ estimate actual costs associated with implementing current and future temperature TMDLs.

There are multiple sources of local, state and federal funds available for implementation of pollutant management strategies and control practices. Table 9 provides a partial list of financial incentives, technical assistance programs, grant funding, and low interest loans for public entities available in Oregon that may be used to support implementation of assessment, pollution controls, and watershed restoration actions or land condition improvements that improve water quality in the Snake River basin. The table below reflects current available funding sources that are likely to change over time. Communication by DMAs with DEQ and other basin partners will help inform current available funding opportunities. Soil and water conservation districts and watershed councils are additional resources that may support responsible persons and DMAs in implementation of pollutant management strategies and control practices through the programs listed in Table 9.

Table 9: Partial list of funding programs available in the Snake River Basin

Program	General Description	Contact
Clean Water State Revolving Fund	Loan program for below-market rate loans for planning, design, and construction of various water pollution control activities.	DEQ
Conservation Reserve Enhancement Program (CREP)	Provides annual rent to landowners who enroll agricultural lands along streams. Also cost-shares conservation practices such as riparian tree planting, livestock watering facilities, and riparian fencing.	NRCS, SWCDs, ODF
Conservation Reserve Program (CRP)	Competitive CRP provides annual rent to landowners who enroll highly erodible lands. Continuous CRP provides annual rent to landowners who enroll agricultural lands along seasonal or perennial streams. Also cost-shares conservation practices such as riparian plantings.	NRCS, SWCDs
Conservation Stewardship Program (CSP)	Provides cost-share and incentive payments to landowners who have attained a certain level of stewardship and are willing to implement additional conservation practices.	NRCS, SWCDs
Drinking Water Source Protection Fund	These funds allow states to provide loans for certain source water assessment implementation activities, including source water protection land acquisition and other types of incentive-based source water quality protection measures.	Oregon Health Authority

Program	General Description	Contact
Emergency Watershed Protection Program (EWP)	Available through the USDA-Natural Resources Conservation Service. Provides federal funds for emergency protection measures to safeguard lives and property from floods and the products of erosion created by natural disasters that cause a sudden impairment to a watershed.	NRCS, SWCDs
Emergency Forest Restoration Program (EFRP)	Available through the USDA-Natural Resources Conservation Service. Helps owners of non-industrial private forests restore forest health damaged by natural disasters.	USDA, ODF
Environmental Protection Agency Section 319 Grants	Fund projects that improve watershed functions and protect the quality of surface and groundwater, including restoration and education projects.	DEQ, SWCDs, Watershed Councils
Environmental Quality Incentives Program (EQIP).	Cost-shares water quality and wildlife habitat improvement activities, including conservation tillage, nutrient and manure management, fish habitat improvements, and riparian plantings.	NRCS, SWCDs
Agriculture Water Quality Support Grant	Provides capacity to support voluntary agricultural water quality work in small watersheds and to meet the goals of the Agricultural Water Quality Management Area Plans and the SIA initiative.	ODA
Farm and Ranchland Protection Program (FRPP)	Cost-shares purchases of agricultural conservation easements to protect agricultural land from development.	NRCS, SWCDs, ODF
Federal Reforestation Tax Credit	Provides federal tax credit as incentive to plant trees.	Internal Revenue Service
Grassland Reserve Program (GRP)	Provides incentives to landowners to protect and restore pastureland, rangeland, and certain other grasslands.	NRCS, Farm Service Agency, SWCDs
Landowner Incentive Program (LIP)	Provides funds to enhance existing incentive programs for fish and wildlife habitat improvements.	U.S. Fish and Wildlife Service, ODFW
Oregon Watershed Enhancement Board (OWEB)	Provides grants for a variety of restoration, technical assistance, monitoring, and engagement.	SWCDs, Watershed Councils, OWEB

Program	General Description	Contact
Oregon Watershed Enhancement Board Small Grant Program	Provides grants up to $10,000 for priority watershed enhancement projects identified by local focus group.	SWCDs, Watershed Councils, OWEB
Partners for Wildlife Program	Provides financial and technical assistance to private and non-federal landowners to restore and improve wetlands, riparian areas, and upland habitats in partnership with the U.S. Fish and Wildlife Service and other cooperating groups.	U.S. Fish and Wildlife Service, NRCS, SWCDs
Public Law 566 Watershed Program	Program available to state agencies and other eligible organizations for planning and implementing watershed improvement and management projects. Projects should reduce erosion, siltation, and flooding; provide for agricultural water management; or improve fish and wildlife resources.	NRCS, SWCDs
Resource Conservation & Development (RC & D) Grants	Provides assistance to organizations within RC & D areas in accessing and managing grants.	Resource Conservation and Development
ODF Small Forestland Investment in Stream Habitat (SFISH) Grants	Provides funding for Small Forestland Owners (SFO's) to improve road conditions and stream crossings as part of forest operations	ODF, ODFW
State Forestation Tax Credit	Provides for reforestation of under-productive forestland not covered under the Oregon Forest Practices Act. Situations include brush and pasture conversions, fire damage areas, and insect and disease areas.	ODF
Stewardship Program	Provides cost share dollars through USFS funds to family forest landowners to have management plans developed.	ODF
State Tax Credit for Fish Habitat Improvements	Provides tax credit for part of the costs of voluntary fish habitat improvements and required fish screening devices.	ODFW

Program	General Description	Contact
Stewardship Incentive Program (SIP)	Cost-sharing program for landowners to protect and enhance forest resources. Eligible practices include tree planting, site preparation, pre-commercial thinning, and wildlife habitat improvements.	NRCS, SWCDs, ODF
Wetlands Reserve Program (WRP)	Provides cost-sharing to landowners who restore wetlands on agricultural lands.	NRCS, SWCDs
Wildlife Habitat Incentives Program	Provides cost-share for wildlife habitat enhancement activities.	NRCS, SWCDs
Wildlife Habitat Tax Deferral Program	Maintains farm or forestry deferral for landowners who develop a wildlife management plan with the approval of the Oregon Department of Fish and Wildlife.	ODFW, SWCDs, NRCS
Funding Resources for Watershed Protection and Restoration	EPA's Funding Resources for Watershed Protection and Restoration (EPA, 2023) contains links to multiple funding sources.	Various
Water Project Grants and Loans	This program provides grants for water projects to evaluate, plan, and develop instream and out-of-stream water projects that have economic, environmental and social/cultural benefits.	OWRD
Irrigation Modernization Funding	Provides funding for irrigation modernization projects that improve water use efficiency of irrigation systems on currently irrigated agricultural lands	OWRD

5.4 Schedule for implementation plan submittal

OAR 340-042-0040(4)(l)(I) specifies that the WQMP contain a schedule for submittal of implementation plans. As stated in OAR 340-042-0080(4)(a), entities identified in the WQMP with responsibility for developing implementation plans are required to prepare and submit an implementation plan for DEQ approval according to the schedule in the WQMP.

Within 18 months of EPA's approval of the upcoming Snake River Mercury TMDL persons, including DMAs, responsible for developing implementation plans must submit implementation plans to DEQ for review and approval.

OAR 340-012-0055(2)(e) identifies failure to timely submit or implement a TMDL implementation plan, as required by DEQ order or rule, as a Class II violation. OAR 340-012-0053(1) identifies

failure to report by the reporting deadline, as required by DEQ order or rule, as a Class I violation.

Should a sector or sector-wide DMA fail to submit an approvable TMDL implementation plan or fail to timely implement the plan, DEQ may pursue enforcement under OAR 340-012-0055(2)(e). DEQ may revise the WQMP to identify additional responsible persons including DMAs and notify them of the required schedule for submitting source-specific implementation plans.

Following the issuance of this TMDL and WQMP, DEQ may determine that nonpoint source implementation plans are not necessary for certain entities identified in the WQMP based on available information or new information provided by those entities. For these entities, DEQ will provide a written determination for why a plan is not required. This determination could be based on a variety of factors, such as inaccurate identification within the geographic scope of the TMDLs, or documentation that an entity is not a source of pollution or does not discharge pollutants to a waterbody within the geographic scope of a TMDL.

Once approved, DEQ expects implementation plans to be fully implemented according to the timelines and schedules for achieving measurable milestones specified within the plans. Implementation plans must be reviewed and revised as appropriate for DEQ approval every five years and submitted on the date specified in DEQ's approval letter for an implementation plan.

6 Monitoring and evaluation of progress

OAR 340-042-0040(4)(l)(K) requires that the WQMP include a plan to monitor and evaluate progress toward achieving the TMDL allocations and associated water quality standards for the impairments addressed in the TMDL. Additional objectives of monitoring efforts are to assess progress towards reducing excess pollutant loads and to better understand variability associated with environmental or anthropogenic factors. This section summarizes DEQ's approach, including the required elements of identification of monitoring responsibilities and the plan and schedule for reviewing monitoring information to make TMDL revisions, as appropriate.

There are two fundamental components to DEQ's approach to monitoring and evaluating TMDL progress:

1. Tracking the implementation and effectiveness of activities committed to by responsible persons including DMAs in DEQ-approved implementation plans, and

2. Periodically monitoring the physical, chemical and biological parameters necessary to assess water quality status and trends for the impairments that constitute the basis for this TMDL.

All responsible persons including DMAs are responsible for tracking the implementation and effectiveness of their actions and meeting milestones where established. DEQ acknowledges that it will take decades for restored streamside areas to provide mature, overstory woody vegetation that shades streams, so DEQ will rely on tracking implementation compliance through DEQ approved implementation plans, annual reports, and comprehensive year five reviews in the coming years.

With input from partners, DEQ will assist in developing overarching water column sampling and analysis plans after the issuance of the Snake River Temperature WQMP. DEQ will continue to work with partners to implement the sampling and analysis plans and periodically refine the strategy as needed. Although DEQ encourages responsible persons including DMAs to conduct physical, chemical or biological monitoring to better evaluate how implementation actions may impact water quality conditions, DEQ is only requiring the DMAs listed under Section 6.1 to conduct water column monitoring associated with this TMDL.

6.1 Persons responsible for water quality monitoring

Section 5.1 identifies responsible persons including DMAs that are responsible for developing TMDL implementation plans and implementing the management strategies described on the timelines committed to in approved plans. Section 5.3 details the content required in implementation plans and annual reports, as well as the schedules for their submittal.

DEQ is requiring ODA, BLM, and USFS to undertake monitoring actions in areas within their jurisdiction or ownership to help determine the status of instream water quality and landscape conditions associated with water quality. These three agencies have jurisdiction over approximately 75 percent of streamside areas in the Snake River TMDL. For this reason, DEQ considers it appropriate for these large agencies to collaborate with DEQ on the Monitoring Strategy. DEQ encourages and invites other DMAs to collaborate with DEQ on collecting water quality data, especially DMAs that have been collecting temperature data as part of TMDL implementation or other related programs.

The objectives for monitoring and assessment will be described in DMA implementation plans and will include, but are not limited to:

1. Provide information necessary to determine locations for applying management strategies or to assess the effectiveness of those strategies.

2. Refine information on source-specific or sector-specific pollutant loading.

3. Provide information necessary to demonstrate progress towards meeting load allocations.

4. Provide information used to identify roles and participate in collaborative effort among responsible persons including DMAs to characterize water quality status and trends.

5. Provide information integral to an adaptive management approach to inform and adjust management strategies over time.

Environmental media and water column monitoring activities conducted by ODA, BLM, USFS, or other DMAs to meet TMDL objectives, data collection and management must be performed in adherence to Quality Control procedures and Quality Assurance protocols established by DEQ, U.S. EPA or other appropriate organizations. This requirement will be met through developing or adapting Quality Assurance Project Plans or project-specific Sampling and Analysis Plans, and submitting to DEQ for review and approval based on a schedule determined by DEQ once development of the Monitoring Strategy has been initiated. ODA, BLM, USFS or other DMAs can also agree to participate in a collaborative monitoring plan under an umbrella QAPP. DEQ staff will coordinate QAPP development with ODA, BLM, and USFS upon request in advance of submission. Resources for developing quality assurance project plans and sampling and analysis plans are available on DEQ's water quality monitoring website (DEQ, 2023a).

At a minimum, ODA, BLM, and USFS must acknowledge in their implementation plans their responsibility in collaborating with DEQ to develop Snake River Temperature Monitoring Strategies. DEQ encourages these agencies to begin evaluating their existing temperature monitoring networks, if any, and explore opportunities to establish future long-term monitoring sites. Data collected by DMAs participating in the monitoring strategy must be in a format accessible to DEQ

6.2 Plan and schedule for reviewing monitoring information and revising the TMDL

DEQ recognizes that it will take time before management practices identified in a WQMP are fully implemented and effective in reducing and controlling pollution. DEQ also recognizes that despite best efforts, natural events beyond the control of humans may interfere with or delay attainment of the TMDL. Such events include, but are not limited to, floods, fire, insect infestations, and drought. In addition, DEQ recognizes that technology and practices for controlling nonpoint source pollution will continue to develop and improve over time. As implementation, technology and knowledge about these approaches progress, DEQ will use adaptive management to refine implementation.

Adaptive management is a process that acknowledges and incorporates improved technologies and practices over time to refine implementation. A conceptual representation of the TMDL adaptive management process is presented in Figure 2.

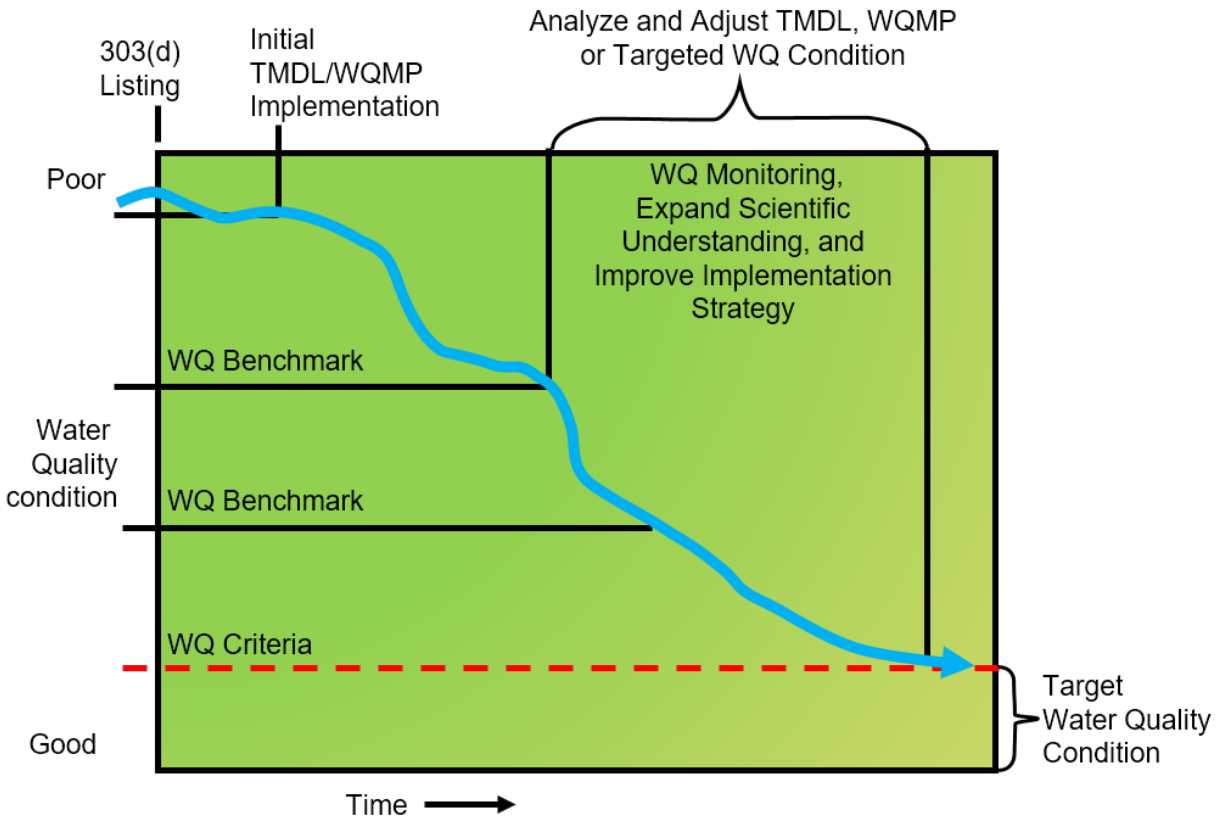

Figure 33: Conceptual representation of adaptive management

DEQ considers entities complying with DEQ-approved TMDL implementation plans to be in compliance with their respective requirements contained in the TMDL. The annual reports and five-year reviews submitted to DEQ by each of the responsible persons including DMAs in the Snake River will be evaluated individually and collectively. DEQ will use this information to determine whether management actions are supporting progress towards TMDL objectives, or if changes in management actions and/or TMDLs are needed.

DEQ will review annual reports, participate with responsible persons including DMAs in review of monitoring information, and may provide assistance in implementing a Snake River Monitoring Strategy.

Every five years, DEQ will collectively evaluate annual reports and all available monitoring data and information to assess progress on meeting the goals of the TMDLs and WQMP.

- DEQ will require responsible persons including DMAs to revise their implementation plans to address deficiencies where DEQ determines that implementation plans or effectiveness of management strategies are inadequate.

- DEQ and partners will revise sampling and analysis plans or other aspects of the Monitoring Strategy where progress toward meeting Monitoring Strategy objectives is not being made.

- DEQ will consider TMDL revisions if DEQ's evaluation of water monitoring data and supporting information indicate that the TMDL load allocations for a given pollutant-impairment are insufficient to meet state numeric criteria or narrative criteria, or insufficient to protect the designated beneficial uses.

- DEQ will follow all public participation requirements, including convening a local technical or rulemaking advisory committee to provide input on TMDL revisions per OAR 340-042-0040(7)

7 Reasonable assurance of implementation

OAR 340-042-0030(9) defines Reasonable Assurance as "a demonstration that a TMDL will be implemented by federal, state or local governments or individuals through regulatory or voluntary actions including management strategies or other controls." OAR 340-042- 0040(4)(J) requires a description of reasonable assurance that management strategies and sector-specific or source-specific implementation plans will be carried out through regulatory or voluntary actions. As a factor in consideration of allocation distribution among sources, OAR 340-042-0040(6)(g) states that "to establish reasonable assurance that the TMDL's load allocations will be achieved requires determination that practices capable of reducing the specified pollutant load: (1) exist; (2) are technically feasible at a level required to meet allocations; and (3) have a high likelihood of implementation." This three-point test is consistent with EPA past practice and supports federal antidegradation rules and Oregon's antidegradation policy (OAR 340-041-0004).

The Clean Water Act Section 303(d) requires that a TMDL be "established at a level necessary to implement the applicable water quality standard." Federal regulations define a TMDL as "the sum of the individual wasteload allocations for point sources and load allocations for nonpoint sources and natural background" [40 CFR 130.2(i)]. For TMDL approval, EPA guidance documents and memos on the TMDL process requires determinations that allocations are appropriate to implement water quality standards and reasonable assurance that nonpoint source controls will achieve load reductions, when WLAs are based on an assumption that nonpoint source load reductions will occur (EPA, 1991, 2002 and 2012).

Although TMDL implementation is anticipated to improve rather than lower water quality, federal antidegradation rules at 40 CFR 131.12(a)(2), require states to "assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and cost-effective and reasonable best management practices for nonpoint source control," when allowing any lowering of water quality.

When a TMDL is developed for waters impaired by point sources only, the existence of the NPDES regulatory program and the issuance of NPDES permits provide the reasonable assurance that the wasteload allocations in the TMDL will be achieved. That is because federal regulations implementing the Clean Water Act require that water quality-based effluent limits in

permits be consistent with “the assumptions and requirements of any available wasteload allocation” in an approved TMDL [40 CFR 122.44(d)(1)(vii)(B)].

Where a TMDL is developed for waters impaired by both point and nonpoint sources, it is the state’s best professional judgment as to the three-point test in OAR 340-042-0040(6)(g) on reasonable assurance that the TMDL’s load allocations will be achieved.

Where there is a demonstration that nonpoint source load reductions can and will be achieved; a determination that reasonable assurance exists and allocation of greater loads to point sources is appropriate. Without a demonstration of reasonable assurance that relied-upon nonpoint source reductions will occur, reductions to point sources wasteload allocations are needed.

The Snake River Temperature TMDL was developed to address both point and nonpoint sources with TMDL load allocations set at levels that will attain the applicable temperature criteria. Allocations were developed with consideration of source contributions and opportunities for effective measures to reduce those contributions. There are several elements that combine to provide the reasonable assurance to meet federal and state requirements, including for antidegradation. Education, outreach, technical and financial assistance, permit administration, permit enforcement, responsible persons’ including DMAs’ implementation and DEQ enforcement of TMDL implementation plans will all be used to ensure that the goals of this TMDL are met.

7.1 Accountability framework

Reasonable assurance that needed load reductions will be achieved for nonpoint sources and antidegradation requirements and narrative water quality criteria will be met is based primarily on an accountability framework incorporated into the WQMP, together with the implementation plans of persons responsible for implementation. This approach is similar to the accountability framework adopted by EPA for the Chesapeake Bay TMDL, which was adopted in 2010 (EPA, 2010). Figure 4 presents the accountability framework elements, which are intended to work in concert to demonstrate reasonable assurance of implementation.

Figure 4: Representation of the Reasonable Assurance Accountability Framework

Pollutant reduction strategies are identified in Section 2 and more specific strategies will be detailed in each required implementation plan to be submitted according to the timelines in Section 5.4. These strategies and actions are comprehensively implemented through a variety of regulatory and non-regulatory programs. Many of these are existing strategies and actions already being implemented within the basin and demonstrate reduced pollutant loading. These strategies are technically feasible at an appropriate scale to meet the allocations. A high likelihood of implementation is demonstrated because DEQ reviews the individual implementation plans and proposed actions for adequacy and establishes a monitoring and reporting system to track implementation and respond to any inadequacies.

In Oregon, forestry and agricultural related nonpoint source best management strategies are implemented through the state Forest Practices Act and agricultural Water Quality Management Area Plans and Rules. In Sections 5.2.1 and 5.2.2 DEQ determined that due to the limited non-federal forestry lands in the basin ODF will fulfill TMDL implementation by continuing to implement the Forest Practices Act while ODA must develop and implement a TMDL implementation plan that describes strategies specific to the Snake River Temperature TMDL. This adds to the accountability for implementation of cost-effective and reasonable best management and further assures that antidegradation requirements and narrative criteria will be met.

The persons, including Designated Management Agencies, responsible for implementation of pollutant reduction strategies are identified in Section 5. General timelines for implementing management strategies and attaining relevant water quality criteria are provided in Sections 3 and 4, respectively. Specific timelines, milestones, and measurable objectives will be specified

in each required implementation plan. These elements support timely action by both DEQ and other entities responsible for implementation so that enforcement and adaptive management actions can be triggered and evaluation of attainment of TMDL goals occurs.

DEQ periodically reviews reporting by persons and agencies responsible for implementing pollutant reduction strategies to track the management strategies being implemented and evaluate achievements against established timelines and milestones.

Following implementation plan reviews, DEQ will take appropriate action if the DMAs or responsible persons fail to develop or effectively implement their implementation plan or fulfill milestones. DEQ's actions can include enforcement or engagement in voluntary initiatives. DEQ uses both, as appropriate within the process, to achieve optimal pollutant reductions. DEQ will take enforcement actions where necessary based on authorities listed in Section 8 or raise issues to the Environmental Quality Commission, as provided in OAR 340-042-0080.

DEQ tracks water quality status and trends concurrently with implementation of management strategies. DEQ relies on a system of interconnected evaluations that include DMAs meeting measurable objectives, demonstration of effective pollutant management strategies, accountability of implementation, periodically assessing progress on Oregon's Nonpoint Source Program Five-Year Plan Goals (approved by EPA), discharge monitoring, and instream monitoring. DEQ also periodically evaluates water quality data collected through its ambient and project-specific monitoring programs. DEQ periodically prepares Status and Trends reports and conducts water quality assessments on status of all waterways in Oregon approximately every two years, as required by the Clean Water Act for submittal to EPA for approval as Oregon's Integrated Report. Together, these data and evaluations allow refinement of focus on specific geographic areas or pollutants and appropriate implementation of adaptive management actions to attain, over time, the objectives of the TMDL.

Climate change is altering precipitation, streamflow, and temperature patterns in Oregon. These shifts increase thermal loading risks and can slow stream recovery. The Office of Greenhouse Gas Programs within DEQ leads state efforts to reduce greenhouse gas emissions through policies such as the Greenhouse Gas Reporting Program, the Clean Fuels Program, and the Climate Protection Program. The CPP, re-adopted in November 2024, establishes enforceable declining caps on fossil-fuel emissions, with goals of reducing statewide emissions about 50 percent by 2035 and 90 percent by 2050. The State Agency Climate Change Adaptation Framework further guides agencies and local partners in building resilience. While not enforceable under this WQMP, these initiatives complement local riparian and watershed actions by reducing long-term stressors, supporting adaptation, and reinforcing the likelihood of attaining temperature standards.

7.2 Reasonable assurance conclusions

DEQ's implementation approach is multi-faceted and requires many targeted management practices across the entire basin to reduce anthropogenic pollutants, regardless of source origination.

The management strategies and practices that must be employed to reduce excess solar radiation loading are spatially distributed and involve multiple responsible persons. Also, highly variable lag times are anticipated following the establishment of shade-producing vegetation and other management strategies to decrease solar radiation reaching streams. For these reasons, there is some uncertainty about the pace of achieving the needed reductions

necessary in the Snake River basin to attain water quality criteria. DEQ's WQMP addresses this uncertainty by including an extensive monitoring, reporting, and adaptive component.

The rationale described in this document stems from robust evaluations, implements an accountability framework and provides opportunities for adaptive management to maximize pollutant reductions. In addition, DMAs and other groups have been continuing to implement on-the-ground actions since the establishment of the 2004 Snake River-Hells Canyon TMDL. Together this approach provides reasonable assurance to meet state and federal requirements, including for antidegradation, and attain the goals of the TMDL.

8 Legal authorities

As required in Oregon Administrative Rule 340-042-0040(4)(l)(O), this section cites legal authorities relating to implementation of management strategies.

Clean Water Act, Section 303(d)

The DEQ is the Oregon state agency responsible for implementing the Clean Water Act in Oregon. Section 303(d) of the 1972 Federal Clean Water Act, as amended, requires states to develop a list of rivers, streams and lakes that cannot meet water quality standards without application of additional pollution controls beyond the existing requirements on industrial sources and sewage treatment plants. These waters are referred to as "water quality limited." Water quality limited waterbodies must be identified by the EPA or by a state agency which has this authority. In Oregon, the responsibility to delegate water quality limited waterbodies rests with DEQ. DEQ updates the list of water quality limited waters every two years. The list is referred to as the 303(d) list. Section 303 of the Clean Water Act further requires that TMDLs be developed for all waters on the 303(d) list. The Oregon Environmental Quality Commission granted DEQ authority to implement TMDLs through OAR 340-042, with special provisions for agricultural lands and nonfederal forestland as governed by the Agriculture Water Quality Management Act and the Forest Practices Act, respectively. The EPA has the authority under the Clean Water Act to approve or disapprove TMDLs that states submit. When a TMDL is officially submitted by a state to EPA, EPA has 30 days to take action on the TMDL. In the case where EPA disapproves a TMDL, EPA must issue a TMDL within 30 days. A TMDL defines the amount of pollution that can be present in the waterbody without causing water quality standards to be violated. A WQMP is developed to describe a strategy for reducing water pollution to the level of the load allocations and waste load allocations prescribed in the TMDL, which is designed to restore the water quality and result in compliance with the water quality standards. In this way, the designated beneficial uses of the water will be protected for all users.

Endangered Species Act, Section 6

Section 6 of the 1973 federal Endangered Species Act, as amended, encourages states to develop and maintain conservation programs for federally listed threatened and endangered species. In addition, Section 4(d) of the ESA requires the National Marine Fisheries Service to list the activities that could result in a "take" of species they are charged with protecting. With

regard to this TMDL, NMFS' protected species are salmonid fish. NMFS also described certain precautions that, if followed, would preclude prosecution for take even if a listed species were harmed inadvertently. Such a provision is called a limit on the take prohibition. The intent is to provide local governments and other entities greater certainty regarding their liability for take. NMFS published their rule in response to Section 4(d) in July of 2000 (see 65 FR 42421, July 10, 2000). The NMFS 4(d) rule lists 12 criteria that will be used to determine whether a local program incorporates sufficient precautionary measures to adequately conserve fish. The rule provides for local jurisdictions to submit development ordinances for review by NMFS under one, several or all of the criteria. The criteria for the Municipal, Residential, Commercial and Industrial Development and Redevelopment limit are listed below:

1. Avoid inappropriate areas such as unstable slopes, wetlands, and areas of high habitat value
2. Prevent stormwater discharge impacts on water quality
3. Protect riparian areas
4. Avoid stream crossings – whether by roads, utilities, or other linear development.
5. Protect historic stream meander patterns
6. Protect wetlands, wetland buffers, and wetland function
7. Preserve the ability of permanent and intermittent streams to pass peak flows (hydrologic capacity)
8. Stress landscaping with native vegetation
9. Prevent erosion and sediment run-off during and after construction
10. Ensure water supply demand can be met without affecting salmon needs
11. Provide mechanisms for monitoring, enforcing, funding and implementing
12. Comply with all other state and federal environmental laws and permits.

Oregon Revised Statute Chapter 468B

DEQ is authorized by law to prevent and abate water pollution within the State of Oregon. Particularly relevant provisions of this chapter include:

ORS 468B.020 Prevention of pollution

(A) Pollution of any of the waters of the state is declared to be not a reasonable or natural use of such waters and to be contrary to the public policy of the State or Oregon, as set forth in ORS 468B.015.
(B) In order to carry out the public policy set forth in ORS 468B.015, the Department of Environmental Quality shall take such action as is necessary for the prevention of new pollution and the abatement of existing pollution by:
    a) Fostering and encouraging the cooperation of the people, industry, cities and counties, in order to prevent, control and reduce pollution of the waters of the state; and
    b) Requiring the use of all available and reasonable methods necessary to achieve the purposes of ORS 468B.015 and to conform to the standards of water quality and purity established under ORS 468B.048.

ORS 468B.110 provides DEQ and the EQC with authority to take actions necessary to achieve and maintain water quality standards, including issuing TMDLs and establishing wasteload allocations and load allocations.

NPDES and WPCF Permits

DEQ administers two different types of wastewater permits in implementing Oregon Revised Statute (ORS) 468B.050. These are: the NPDES permits for waste discharge into waters of the United States; and Water Pollution Control Facilities permits for waste disposal on land. The NPDES permit is also a federal permit and is required under the Clean Water Act. The WPCF permit is a state program.

401 Water Quality Certification

Section 401 of the CWA requires that any applicant for a federal license or permit to conduct any activity that may result in a discharge to waters of the state must provide the licensing or permitting agency a certificate from DEQ that the activity complies with water quality requirements and standards. These include certifications for hydroelectric projects and for 'dredge and fill' projects. The legal citations are: 33 U.S.C. 1341; ORS 468B.035 – 468B.047; and OAR 340-048-0005 – 340-048-0040.

USACE Dam Operation and Management

In association with other federal statues, including House Document No. 531 Volume V, the River and Harbor Act, the Flood Control Act, and the Water Resources Development Act, the USACE is charged with operating its projects in compliance with the federal Clean Water Act, and in accordance with all federal, State, interstate and local requirements, administrative authority, and process and sanctions respecting the control and abatement of water quality pollution as per Title 1 Section 313 (33 U.S.C. 1323).

Oregon Forest Practices Act

The Oregon Department of Forestry is the designated management agency for regulating land management actions on non-federal forestry lands that impact water quality (ORS 527.610 to 527.992, and OAR 629 Divisions 600 through 665). The Board of Forestry has adopted water protection rules, including but not limited to OAR Chapter 629, Divisions 625, 630, and 635-660, which describe best management practices for forest operations. The Oregon Environmental Quality Commission, Board of Forestry, DEQ, and ODF have agreed that these pollution control measures will primarily be relied upon to result in achievement of state water quality standards. Statutes and rules also include provisions for adaptive management that provide for revisions to FPA practices where necessary to meet water quality standards. These provisions are described in ORS 527.710, ORS 527.765, OAR 629-035-0100, and OAR 340-042-0080.

Agricultural Water Quality Management Act

The Oregon Department of Agriculture is responsible for the prevention and control of water pollution from agricultural activities as directed and authorized through the Agricultural Water Quality Management Act, adopted by the Oregon legislature in 1993 (ORS 568.900 to ORS

568.933). It is the lead state agency for regulating agriculture for water quality (ORS 561.191). The Agricultural Water Quality Management Plan Act directs the ODA to work with local communities to develop water quality management plans for specific watersheds that have been identified as violating water quality standards and have agriculture water pollution contributions. The agriculture water quality management plans are expected to identify problems in the watershed that need to be addressed and outline ways to correct the problems. Water Quality area rules for areas within the Snake River basin include OAR 603-095-1800 to 1860, OAR 603-095-3600 to 3660, OAR 603-095-3200 to 3260, OAR 603-095-0900 to 0960 and OAR 603-095-2700 to 2760.

Local Ordinances

Local governments are expected to describe in their implementation plans their specific legal authorities to carry out the management strategies necessary to meet the TMDL allocations. If new or modified local codes or ordinances are required to implement the plan, the DMA will identify code development as a management strategy. Legal authority to enforce the provisions of a city's NPDES permit would be a specific example of legal authority to carry out specific management strategies.

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