Draft Water Quality Management Plan
Lower Columbia-Sandy Subbasin
Total Maximum Daily Load
Temperature

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DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

State of Oregon
Department of Environmental Quality

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1. Introduction

DEQ developed this draft Water Quality Management Plan to guide implementation of the Lower Columbia-Sandy River Subbasin temperature Total Maximum Daily Load. A WQMP is an element of a 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 prepared by persons responsible for TMDL implementation.

In March 2005, Oregon Department of Environmental Quality issued a US Environmental Protection Agency approved TMDL and associated WQMP for temperature and bacteria in the Sandy River Basin. In 2013, EPA disapproved the Natural Conditions Criterion contained in Oregon's water quality standard for temperature due to the 2012 U.S. District Court decision for Northwest Environmental Advocates v. EPA. On October 4, 2019, the U.S. District Court issued a judgment in the lawsuit requiring EPA and DEQ to reissue 15 Oregon temperature TMDLs that were based on the Natural Conditions Criterion, including the Lower Columbia-Sandy Subbasin.

This Lower Columbia-Sandy Subbasin WQMP will be proposed for adoption by Oregon's Environmental Quality Commission, by reference, into rule as OAR 340-042-0090(xx). This WQMP is intended to provide comprehensive information for implementation of the temperature TMDL, so this WQMP replaces those elements of the 2005 WQMP. This WQMP will be amended, as needed, upon issuance of any future developed or revised TMDLs within the Lower Columbia-Sandy Subbasin.

1.1 Condition assessment and problem description

The first element of the WQMP, per OAR 340-042-0040(l)(A), is an assessment of water quality conditions in the Lower Columbia-Sandy Subbasin and a problem description. There are assessment units in the Lower Columbia-Sandy WQMP listed as impaired (category 5 or 4A) for temperature in Oregon's 2022 Integrated Report, which was approved by US Environmental Protection Agency on September 1, 2022. As required by Section 303(d) of the federal Clean Water Act, DEQ developed Total Maximum Daily Loads for pollutants causing temperature water quality impairments of waters within the Lower Columbia-Sandy Subbasin., These pollutants are solar radiation and heat from various sources and conditions, which contribute to impairments of the temperature criteria established to support aquatic life beneficial uses.

1.2 Goals and objectives

OAR 340-042-0040(4)(l)(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 Lower Columbia-Sandy Subbasin.

The primary objectives of this WQMP are to describe: responsibilities for implementing the TMDLs; management strategies and actions necessary to reduce excess pollutant loads in

order to meet the TMDL allocations; and, a strategy to evaluate progress towards attaining water quality standards throughout the Lower Columbia-Sandy Subbasin.

2. Proposed management strategies

As required by OAR 340-042-0040(l)(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 Lower Columbia-Sandy Subbasin 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.”

Table 2.0 includes proven strategies (and practices within the strategies) summarized by pollutant source. The majority of the strategies and practices are supported in published sources, including US Department of Agriculture Natural Resources Conservation Service. DEQ used the categories and language 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 2.0 are supported by Oregon Department of Agriculture, Oregon State University Extension Service and other publicly available published sources. DEQ identified the strategies in Table 2.0 as appropriate for the conditions and sources within the subbasin. Therefore, these are considered priority strategies and practices that should receive special focus during implementation plan development. Additional information specific to implementation of these strategies within the Lower Columbia-Sandy Subbasin is provided in the text of this section of the WQMP.

DEQ expects that entities identified in Section 5.1 will develop implementation plans that incorporate strategies and practices in Table 2.0 and the text of Section 2 subsections. 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 gaging their effectiveness.

Table 2.0: Management strategies by sources

Pollutant	Source or activity	Management strategies
Solar Radiation	Insufficient height and density of riparian vegetation; altered bank and channel topography	Riparian tree planting (conifer and hardwood); riparian vegetation planting (shrub or herbaceous cover); riparian vegetation management (invasive thinning, removal or other treatment); voluntary riparian tree retention; riparian invasive plant control; riparian fencing (or other livestock riparian exclusion or management methods) 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.

Pollutant	Source or activity	Management strategies
		Develop, update and/or enforce riparian 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 riparian areas
Heat	Water withdrawals	Pursue instream water right transfers and leases; 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 morphology and hydromodification	Conduct whole channel restorations (e.g. enhance channel, wetlands, and floodplain interactions, reduce width to depth channel ratios, bank stabilization, large wood placement, create/connect side channels, etc.); riparian road re-construction/obliteration activities; riparian fencing or water gap development (or other livestock exclusion or management methods); protect and enhance cold water refuges; develop dam management strategies for temperature; remove in-channel ponds or modify pond structures to reduce temperature increases downstream

2.1 Streamside vegetation management strategies

DEQ's water quality analysis and modeling concluded that riparian vegetation planting and management are the strategies necessary to improve temperature and meet water quality criteria in the impaired sections of the streams in the Lower Columbia-Sandy Subbasin. This is because protecting and restoring streamside overstory vegetation reduces solar radiation loads to the streams by providing the effective shade necessary to achieve the TMDL surrogate measure allocations. More information about the physical and ecological factors affecting effective shade and associated management strategies can be found in Section XX of the draft TMDL Technical Support Document.

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

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

- 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 full site potential shade can only be achieved with additional growth. Protecting and maintaining existing vegetation ensures that it can grow and mature, enhancing vegetation success and survival and provide for optimal ecological conditions.

- Vegetation thinning and management: This strategy addresses streamside areas that might need vegetation density reduction to achieve optimal benefits of shade. Current site conditions are overly dense with trees and need thinning to promote development of

a healthy mature riparian forest or are dominated by invasive species that inhibit a healthy riparian community. This strategy recognizes that riparian plant communities may require that these activities be routinely conducted to ensure survival, health and optimal growth of the desired vegetation.

2.2 Channel morphology and hydromodification strategies

The size and shape of a stream, or channel morphology, can impact stream temperature. For example, streams with high width to depth ratios (i.e. wide, shallow streams) can allow solar radiation to increase heating of waterbodies compared to channels that are narrow and deep. Wide, shallow streams can occur due to uncontrolled livestock access to streams, or lack of riparian vegetation to reduce bank erosion. Streams that have been disconnected from floodplains due to activities such as urban development or road construction are not able to slow and store floodwaters during the rainy season in the Northwest and recharge groundwater during the hot, dry summers.

Hydromodification alters the hydrologic characteristics of a waterbody, such as construction and operation of dams and impoundments for flood control, power generation, irrigation, navigation, and to create ponds, lakes, and reservoirs for uses such as livestock watering, municipal water supply, fish farming, and recreation. Changes to water temperature from dams are influenced by the size of the dam installed, how much water is released, how often water is released, and at what depth of the dam water is released (EPA, 2007). For more information about hydromodification impacts, see EPA's, *National Management Measures to Control Nonpoint Source Pollution from Hydromodification*.

2.3 Water withdrawal management strategies

Water quality data, modeling and research has shown that 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 heat capacity and cause greater fluctuation in daytime and nighttime stream temperatures.

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 streamflows. Therefore, restoration of streamflows may require establishing instream water rights,. This can be accomplished by donating or purchasing out-of-stream rights and converting these rights to instream uses.

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.

3. Timelines for implementing strategies

OAR 340-042-0040(I)(D) requires a WQMP address 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 are discussed separately. Figure 3.0 presents a typified timeline for TMDL implementation in a five-year increment.

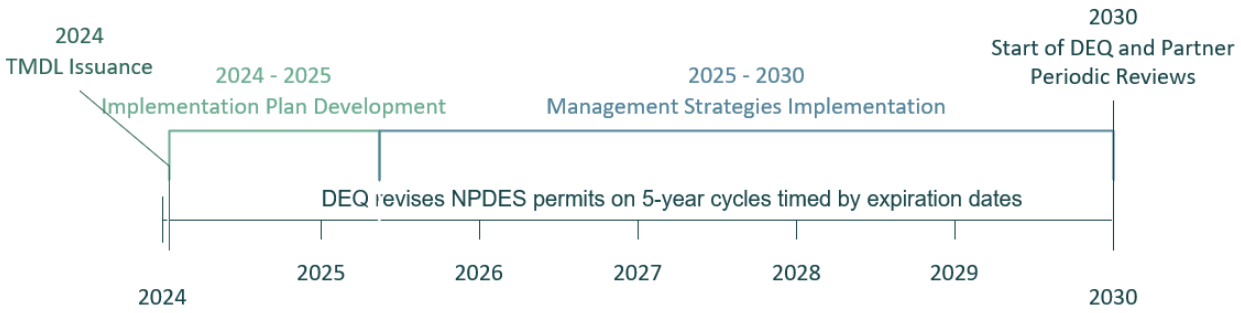

Figure 3.0: Lower Columbia-Sandy Subbasin TMDL implementation timeline

3.1 DEQ Permit revisions

NPDES permits have five year terms. Table 3.1 includes a list of NPDES permittees in the Sandy Basin and their current permit's expiration date and their next expected permit renewal date. DEQ will include any updates to TMDL wasteload allocations in the permittee's next NPDES renewal permit.

Table 3.1 to be included

3.2 Management strategies implemented by responsible persons

Section 3.2 under development

4. Attaining water quality standards

Based on the TMDLs analyses, achieving the excess load reductions identified will result in attainment. Each management strategy identified in this WQMP and in responsible persons' implementation plans 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(l)(E) requires an explanation of how implementing the proposed management strategies will result in attainment of water quality standards.

4.1.1 Implementation of vegetation management strategies for solar radiation reduction

Based on the excess solar radiation and shade deficit calculated along streams within the Sandy Subbasin (see Section xx of the TMDL Technical Support Document), DEQ identified the priority management strategies and specific practices in Table 2.0 and Section 2.1 to increase site effective shade. DEQ focused on the vegetation strategies described in Section 2.1 to estimate reasonable timelines for achieving surrogate effective shade targets, and by extension solar radiation load reductions to meet temperature water quality criteria.

The effective shade curves (Figures xx in the TMDL Technical Support Document) and effective shade allocations table (Table xx in the TMDL Report) identify the relationship between stream width and site potential effective shade for the specific vegetation types and characteristics identified (see Table xx in the TMDL Technical Support Document).

Landowners, foresters, restoration professionals and horticulturists have individual and collective expertise and experience needed to develop site-specific planting prescriptions that will ensure the best combination of species are planted and determine the maintenance activities necessary for trees to become established (free to grow) and produce a fully functioning riparian zone consistent with established literature and practice (e.g., NRCS). DEQ provided a jurisdictional shade gap analysis for specific locations in the draft Technical Support Document to help responsible persons assess and prioritize areas to optimize implementation effectiveness. This analysis is only available for some responsible persons and areas within the Lower Columbia-Sandy Subbasin.

Site-specific riparian planting prescriptions developed by qualified and experienced practitioners will typically contain a higher diversity of shrub and overstory species than the vegetation types used in developing the shade curves. However, the effective shade outcomes for either the conifer or a mix of native hardwood and conifer species are expected to be similar when a buffer zone consistent with either Table xx in the TMDL Report or Appendix x of the Technical Support Document is fully established. This provides streamside vegetation and other functions consistent with the Natural Resources Conservation Service' Conservation Practice Standard - Riparian Forest Buffer, CODE 391, and other published guidelines and literature.

4.2 Timelines for attaining water quality standards

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

Based on DEQ's source assessment and TMDL analyses (DEQ, 2023a), nonpoint sources contribute nearly all of the excess pollutant loading associated with temperature water quality impairments in the Sandy Subbasin. Therefore, it is critical for nonpoint sources to make timely progress toward meeting the TMDL load allocations.

As further explained in Section xx of the TMDL Technical Support Document, DEQ evaluated multiple scenarios and assumptions to estimate reasonable timelines for achieving the needed reductions in solar radiation. DEQ expects persons responsible for developing implementation plans to consider the timeline projections and interim targets presented below in establishing commitments for vegetation management and other actions, in order to identify measurable objectives, milestones and implementation timelines.

Timelines for attainment of water quality standards (i.e., numeric criteria) are based on estimated timelines for excess pollutant load reduction and meeting surrogate targets.

Table 4.2: Projected timelines for solar radiation load reductions to the modeled reaches of the Sandy Subbasin in X-year increments

Section 4.2 under development.

5. Implementation responsibilities and schedule

5.1 Identification of implementation responsibilities

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. OARs 340-042-0040(4)(I)(G) requires identification of persons, including DMAs, responsible for developing and revising implementation plans. OAR 340-042-0040(4)(I)(I) requires a schedule for submittal and revision of implementation plans by responsible persons, including DMAs. And 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 Lower Columbia-Sandy Subbasin WQMP, for implementation of the temperature TMDL, 'responsible person' is defined as any entity responsible for any source of pollution addressed by the TMDL.

Unless otherwise specified, all responsible persons, including DMAs, are required to develop, submit, implement and revise, as needed, an implementation plan specific to the Lower Columbia-Sandy Subbasin TMDL that includes: management strategies; timelines for implementation; a schedule for achieving milestones; and a performance monitoring component with a plan for periodic review and plan revision. Table 5.1 contains the list of these responsible persons, along with summaries of jurisdictional sources and approximate jurisdictional land area percentages within the subbasin.

Table 5.1: Proposed list of responsible persons including designated management agencies

Entity	Jurisdiction	Approximate percentage of total subbasin area	Approximate percentage of acreage within 150' of streams
US Forest Service	USFS managed lands and roads	68.62%	73.44%
Oregon Department of Forestry	Non-federal forestlands: State and private forest operations, practices and activities (including roads)	13.33%	12.68%
US Bureau of Land Management	BLM managed lands and roads	4.42%	4.62%
Oregon Department of Agriculture	Agricultural lands and activities	3.95%	2.81%
Clackamas County	County-owned lands, county roads and rural land use	3.54%	1.93%
Multnomah County	County-owned lands, county roads and rural land use	1.18%	0.63%
City of Portland	City-owned lands, parks, facilities and roads	0.88%	0.95%
Oregon Parks and Recreation Department	State park lands and facilities	0.82%	0.69%
Oregon Department of Transportation	Highways, rights-of-way and facilities	0.77%	0.51%
City of Gresham	City-owned lands, parks, facilities and roads	0.74%	0.37%
City of Troutdale	City-owned lands, parks, facilities and roads	0.50%	0.21%
City of Sandy	City-owned lands, parks, facilities and roads	0.17%	0.12%
Union Pacific Railroad	Rail lines and rights-of-way	0.14%	0.12%
Oregon Department of Fish and Wildlife	State-owned/operated refuges	0.06%	0.07%
Port of Portland	Port-owned/operated facilities and roads	0.03%	0.03%

The Oregon Department of Environmental Quality is the DMA for implementing point source wasteload allocations. DEQ is not included in Table 5.1 because DEQ implements waste load

allocations through issuance of NPDES permits, which does not require preparation of an implementation plan.

Table 5.1 is not an exhaustive list of every individual that bears responsibility for improving water quality in the Lower Columbia-Sandy River Subbasin. It may be necessary for all people that live, work and recreate in the watershed to take steps to reduce pollution and protect or restore water quality to attain standards and designated beneficial uses. Active participation may be needed to achieve long-term water quality improvements throughout the watershed.

Figure 5.1 is a map of the watershed showing areas by land use, ownership or jurisdiction with responsibility for implementation of management strategies by the entities indicated.

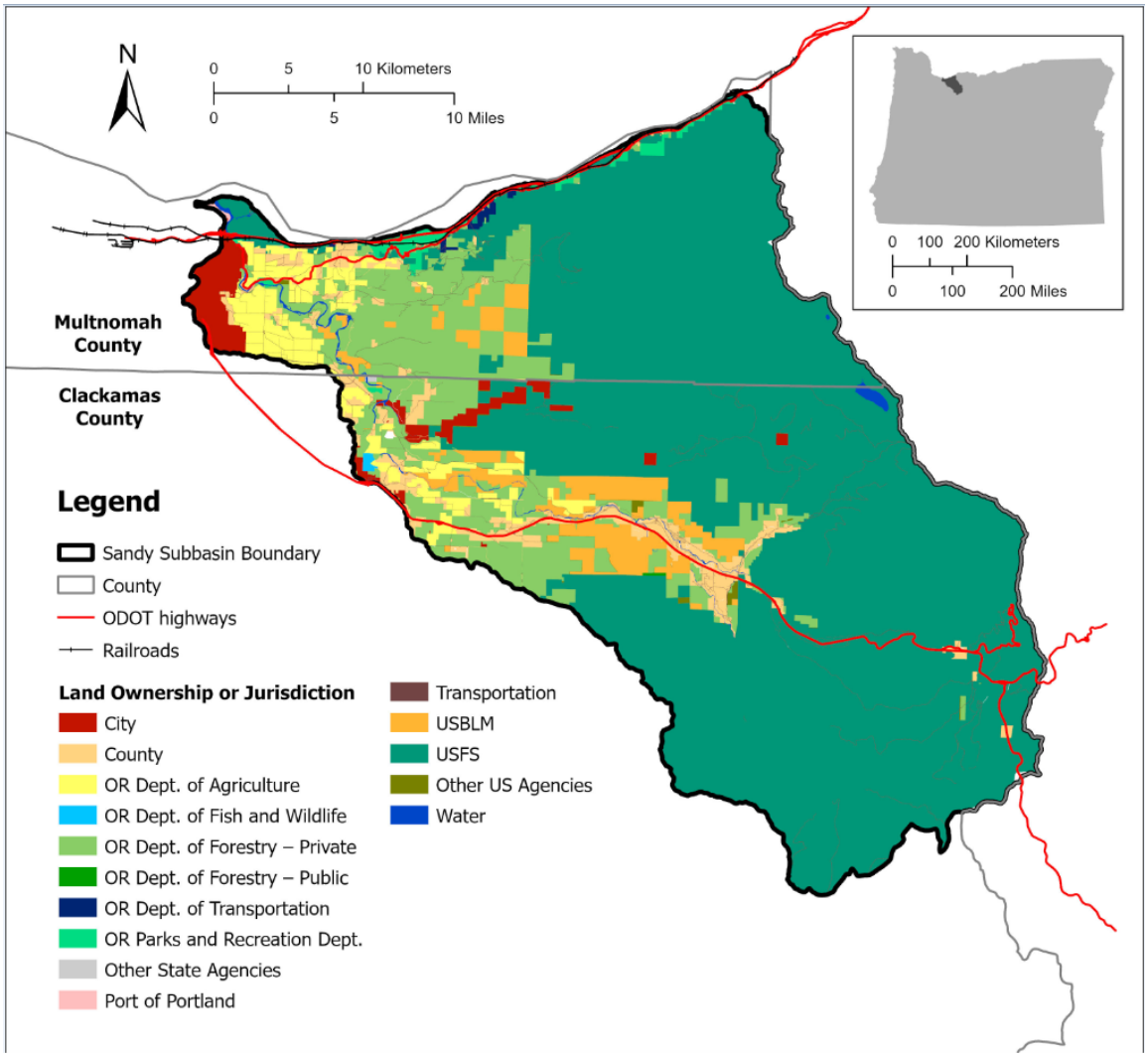

Figure 5.1: Lower Columbia-Sandy Subbasin land ownership or jurisdiction map

Section 5.1 - DEQ is still evaluating which DMAs will be required to submit an implementation plan, as well as any DMA specific plan requirements.

5.2 Existing implementation plans

OAR 340-042-0040(l)(H) requires identification of any source or sector-specific implementation plans available at the time of TMDL issuance. Following issuance of the 2005 Sandy Basin TMDL and Water Quality Management Plan, responsible persons, including DMAs, developed implementation plans that included specific management strategies and reporting requirements. Table 5.2 identifies those entities with existing implementation plans.

Table 5.2 – To Be Inserted

Additionally, certain statewide rules, programs and management plans for the forestry and agricultural sectors are in place and are intended, in part, to reduce or control nonpoint sources of pollution. The programs described in OAR 340-042-0080(2)&(3) represent existing sector-specific implementation plans, and their sufficiency is discussed below.

5.2.1 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 other voluntary measures, are generally considered to be in compliance with water quality standards. However, as provided in OAR 340-042-0080(2), revisions to the Forest Practices Act rules may be required when DEQ determines that these rules are not adequate to implement load allocations in an approved TMDL. Periodic revisions to these rules occurred between the 1990s through 2022, with studies by ODF and DEQ showing that the rules adopted prior to 2022 were not adequate to meet the Oregon temperature criterion for protecting cold water. More information is provided in Section XX of the TMDL Technical Support Document. DEQ determined in this TMDL that the generally applicable Forest Practices Act rules in effect prior to 2022 were not adequate to implement the TMDL load allocations for excess solar radiation loading on small and medium fish-bearing streams to meet the temperature criteria.

With the publication of the Private Forest Accord Report and subsequent passage of Senate Bill 1501, 1502 and HB 4055, Forest Practices Act rule revisions were adopted by the Board of Forestry in October 2022 and additional amendments are anticipated through 2025. Implementation of these rules, which include increased riparian widths and additional tree retention, may be effective at meeting shade allocations. In addition, as revised rules become effective, implementation of more stringent measures to protect water quality on private forestlands are anticipated to be applied, including in the Sandy River Subbasin. These rules are not expected to result in after-the-fact restoration of riparian areas harvested under previous rules. Therefore, effective shade is likely to be deficient for those riparian areas adjacent to small and medium salmon, steelhead and bull trout streams that were harvested prior to implementation of the new rules.The trajectory for providing future riparian shade on these streams is highly variable because it is based on the rules in effect at the time of harvest and the date of replanting. Multiple years will be needed for potential water quality improvements to

be realized so that DEQ can evaluate adequacy of the revised rules in meeting the load allocations and surrogate measures required by the Sandy River Subbasin TMDL.

As agreed to in the 2021 Memorandum of Understanding between DEQ and ODF, DEQ will work with ODF to identify additional regulatory or non-regulatory measures that could be implemented by rule revisions, stewardship agreements, incentive programs or other means to provide reasonable assurance of achieving TMDL solar radiation load allocations. Collaboration on these additional measures will occur during development of ODF's implementation plan.

5.2.2 Under Development

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 plans; and,
- Any other analyses or information specified in the WQMP.

The following subsections provide detail on each component required by this WQMP to be included in implementation plans. DEQ will work with each entity required to develop a TMDL implementation plan to ensure that all required elements are included with sufficient detail for the plan to be approved on the schedule required in Section 5.4

5.3.1 Management strategies

Each entity required to develop a TMDL implementation plan is expected to include applicable priority management strategies from Table 2 and potentially other practices and actions appropriate for activities and landscape conditions specific to the entities' pollutant sources or source sectors.

DEQ expects implementation plans to identify all areas or activities within an entity's jurisdiction or responsibility and identify locations where management strategies should be targeted to prevent or reduce pollutant loading, as well as areas that might not need action beyond protection. Completion of a comprehensive inventory of the area of responsibility serves as an initial step for understanding where management actions are needed and when these can be implemented. This inventory should focus on assessment of landscape and riparian conditions and near-stream activities and practices.

Land condition assessment includes evaluation of infrastructure condition (roads and drainage networks). Riparian condition assessment includes categorizing riparian vegetation presence, type, and condition, along with bank conditions to evaluate the status and trends in effective shade and whether other riparian functions are being provided or are limited. Assessment methods include Oregon Riparian Assessment Framework (OWEB 2004), Stream Function Assessment Method (DSL, EPA 2020), which is used for assessing the functions and values of wadable, non-tidal streams for the purposes of Oregon's Removal-Fill Law, as well as purposes related to Section 404 of the federal Clean Water Act, the Oregon Aquatic Habitat Restoration

and Enhancement Guide (OWEB, 1999), and Stream Visual Assessment Protocol Version 2 (NRCS, 2009), or other appropriate assessment methodologies. Specific shade assessment methods are identified below in Section 5.3.2.

5.3.2 Proposed Shade Assessment Requirement

DEQ expects entities responsible for implementing streamside vegetation management strategies to use one of the following comparisons to prioritize areas for restoration of overstory riparian vegetation to achieve the solar load allocation within their jurisdiction, ownership or project area:

(a) The shade gap, which is the percent difference between current effective shade and site potential effective shade (also referred to as restored condition); or,
(b) Compare current riparian vegetation characteristics to restored riparian condition.

DEQ conducted a shade gap analysis within approximately 150-ft of modeled waterbodies in the Lower Columbia-Sandy Subbasin, as detailed in Section XX of the TMDL Technical Support Document. Although DEQ was not able to conduct a shade gap analysis for the entire subbasin, DEQ expects to develop shade curves for specific unmodeled areas for inclusion in the TMDL Technical Support Document. Entities responsible for implementing strategies to increase effective shade should use the shade gaps and shade curves in the TMDL Technical Support Document to help identify priority areas for restoration.

Responsible persons, including DMAs, that are identified as needing to determine whether effective shade allocations along the temperature impaired Lower Columbia-Sandy assessment units are met, must use location-specific methods to do so. This analysis must be completed within the DEQ-specified timeline after TMDL issuance using one of the following methods:

1. Measure effective shade at the stream surface using standard stream monitoring equipment, such as the Solar Pathfinder™, or advanced methods using hemispherical imagery. Determine vegetation type, canopy density, stream width and stream orientation. Compare these results to Table XX in the temperature TMDL.
2. Confirm and protect or establish overstory, woody vegetation in a 120-foot width zone from the stream bank.
3. Conduct modeling using the Heat Source model (as used in this TMDL) or another method approved by DEQ (through the implementation plan process).

The WQMP does not require responsible persons, including DMAs to establish a 120-foot buffer width from each stream bank. The preferred method for showing compliance with effective shade allocations is measuring the effective shade. The literature review in the draft TMDL TSD in Section XX indicates that a 120-foot buffer of effective shade will not cause stream temperature increases for many waterbodies. Other factors such as channel width may also impact the amount of effective shade needed to reduce solar radiation.

5.3.2 Timeline and schedule

Each implementation plan must include a commitment 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 should develop management strategies using the SMART elements: Specific, Measurable, Achievable, Relevant, Time-bound (Doran, 1981).

Timelines and milestone schedules should be informed by the comprehensive inventory of the area of jurisdiction and control, as described in Section 5.3.1 above, and consideration of all relevant factors of the entity's specific situation. Identification of management strategy implementation timelines that differ from those estimated by DEQ to be effective in achieving load allocations must include an explanation of why the revised timelines are reasonable and how the timelines will be met.

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 a date by which 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 the strategies.

Implementation actions should be tracked by accounting for the numbers, types and locations of projects, best management practices, education activities or other actions taken to improve or protect water quality. Implementation of conservation practices that are listed in the OWEB's OWRI Online List of Treatments should be reported to the OWRI database and noted in annual reports to DEQ in order to demonstrate progress and track implementation over time. Because DEQ utilizes OWRI's database to track implementation of many voluntary management practices, unreported actions may not be able to be credited in evaluating progress on TMDL implementation.

Implementation plans must include periodic assessment of whether implementation activities, which may include structural and non-structural best management practices or BMPs, are effective in improving management practices, land condition or community behaviors. Annual reports must summarize the status and results of these evaluations on the relevant time scale. Reports on year five must summarize implementation and effectiveness over the proceeding four years.

5.3.3.2 Implementation plan review and revision

Implementation plans must be reviewed, revised as appropriate, and approved by DEQ every five years. DEQ will use the annual reports of actions tracked and effectiveness evaluations 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 Implementation public involvement

As required in OAR 340-042-0040(I)(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(I)(M), implementation plans prepared by responsible persons 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(I)(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 or landowners.

OAR 340-042-0040(I)(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. This analysis should be in five-year increments to estimate costs, demonstrate sufficient funding is available to begin implementation and identify potential future funding sources to sustain management strategy implementation. Factors to consider may include:

- Staff salaries, supplies, volunteer coordination, 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)

There are multiple sources of local, state and federal funds available for implementation of pollutant management strategies and control practices. Table 5.3.6 provides a partial list of funding and assistance programs available in Oregon that may be used to support planning and implementation activities that improve water quality in the Lower Columbia-Sandy Subbasin.

Table 5.3.6: Partial list of funding programs available in the Lower Columbia-Sandy Subbasin

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	Oregon Health Authority

Program	General Description	Contact
	other types of incentive-based source water quality protection measures.	
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
Oregon 319 Nonpoint Source Implementation Grants	Fund projects that reduce nonpoint source pollution, 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
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, assessment, monitoring, and education projects, as well as watershed council staff support. 25 percent local match requirement on all grants.	SWCDs, Watershed Councils, OWEB
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

Program	General Description	Contact
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
Forest Stewardship Program	Provides cost share dollars through USFS funds to family forest landowners to have management plans developed.	ODF
Western Bark Beetle Mitigation	ODF administers a cost share program for forest management practices pertaining to bark beetle mitigation for forest health and is funded through the USFS.	ODF, USFS
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
Wetlands Reserve Program (WRP)	Provides cost-sharing to landowners who restore wetlands on agricultural lands.	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	

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 Willamette Basin mainstem TMDL (planned for February 2025), persons, including DMAs, responsible for developing implementation plans must submit implementation plans to DEQ for review and approval.

OAR 340-012-0055(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, DEQ may pursue enforcement under OAR 340-012-0055(e) or identify individual sources (landowners/operators) as persons responsible for developing and implementing TMDL implementation plans to address the load allocations relevant for the sector. DEQ may revise the WQMP or issue individual orders to identify additional responsible persons and notify them of the required schedule for submitting source-specific implementation plans.

Following the issuance of the TMDL and this 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 why a plan is not necessary. 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 scope of these particular TMDLs.

Once approved, DEQ expects implementation plans to be fully implemented according to the timelines and schedules for achieving measurable milestones specified within the plans. As required in Section 5.3 above, reports on tracking and evaluation of implementation progress must be submitted annually on the date specified in the approved implementation plan. 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 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.

With input from partners, DEQ will develop detailed water column sampling and analysis plans to finalize the first iteration of the Lower Columbia-Sandy Subbasin Monitoring Strategy, after the issuance of the TMDLs and WQMP. DEQ will continue to work with partners to implement the sampling and analysis and iteratively refine the strategy as needed

6.1 Persons responsible for monitoring

Section 5.1 identifies the Designated Management Agencies and other persons 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. This required reporting from each responsible entity on tracking of management actions implemented, milestones met and periodic evaluation of performance monitoring, fulfills

the first fundamental component of DEQ's approach and makes up the primary monitoring information DEQ reviews in gaging progress toward meeting TMDL goals.

DEQ also expects some of the responsible persons named in Section 5.1 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. This effort will be progressive, starting with review of existing data and monitoring locations, then adjusted as needed to improve understanding of current water quality status and develop a trend monitoring network.

As guidance for developing a monitoring program in individual implementation plans, the objectives of the monitoring and assessment portion of the implementation plan 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 to characterize water quality status and trends.
5. Provide information integral to an adaptive management approach to inform and adjust management strategies over time.

Some DMAs may also perform certain types of monitoring for administration of its regulatory or voluntary program, separately from activities conducted under elements of a TMDL implementation plan. These DMAs should provide information from those activities in their annual reporting to DEQ that are relevant to the above objectives.

Environmental media and water column monitoring activities conducted by DMAs to meet TMDL objectives, data collection and management must be performed in adherence to Quality Control procedures and Quality Assurance protocols established by U.S. EPA or other appropriate organizations. This requirement will be met through developing or adapting Quality Assurance Project Plans and/or project-specific Sampling and Analysis Plans.

For water column monitoring, QA/QC documentation must be submitted to DEQ for review and approval based on a schedule in the approved TMDL implementation plan. Existing QAPPs or SAPs may be revised as needed. Alternatively, responsible persons can agree to participate in a collaborative monitoring plan under an umbrella QAPP. DEQ staff will coordinate QAPP development with responsible persons 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, 2023).

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 in order to refine implementation. A conceptual representation of the TMDL adaptive management process is presented in Figure 6.2.

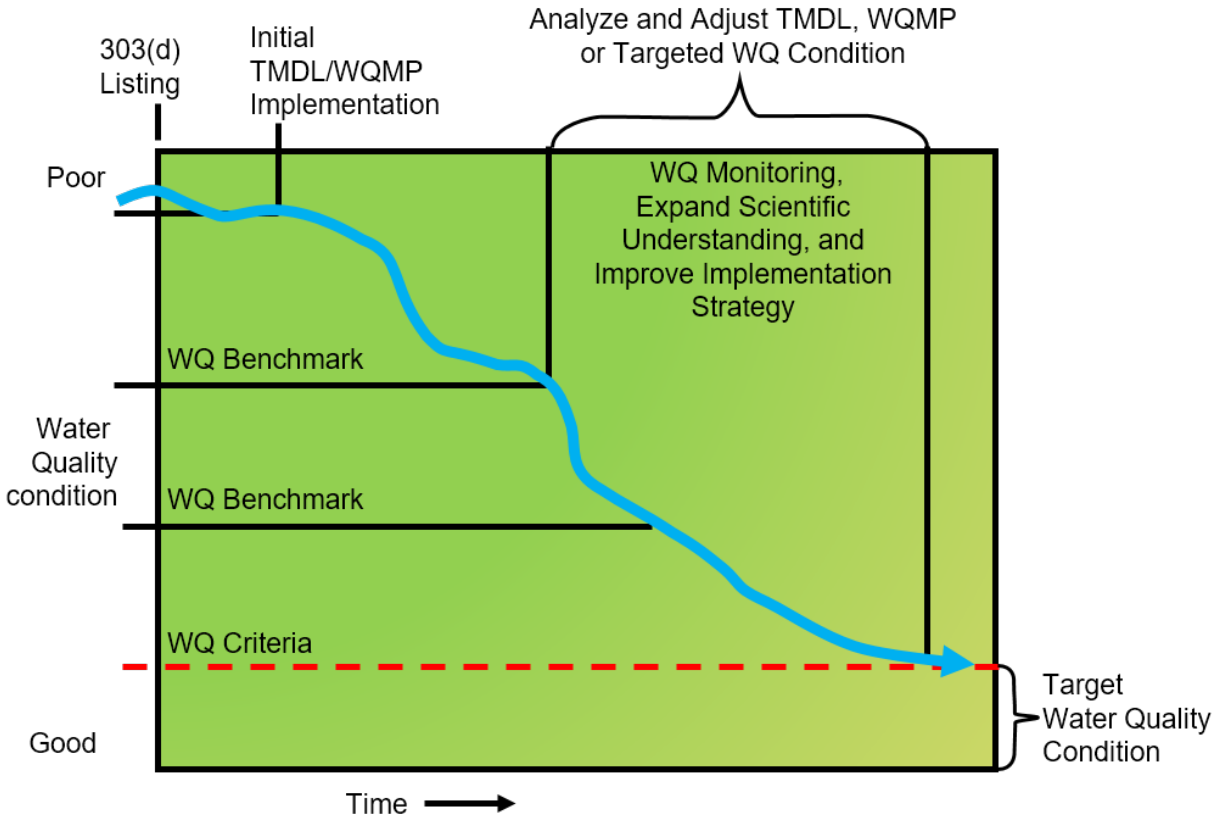

Figure 6.2: Conceptual representation of adaptive management

DEQ considers entities complying with DEQ-approved TMDL implementation plans to be in compliance with the TMDLs. The information generated by each of the DMAs or other entities compiling annual reports and gathering data in the Lower Columbia-Sandy Subbasin will be evaluated individually and collectively to determine whether management actions are supporting progress towards TMDL objectives, or if changes in management actions and/or TMDLs are needed.

Annually, DEQ will review annual reports, participate with DMAs and other responsible persons in review of monitoring information and participate in implementing the Upper Yaquina River Watershed 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.

- Where DEQ determines that implementation plans or effectiveness of management strategies are inadequate, DEQ will require DMAs and responsible persons to revise the components of their implementation plans to address these deficiencies.
- Where progress toward meeting Monitoring Strategy objectives is not being made, DEQ and partners will revise sampling and analysis plans or other aspects of the Monitoring Strategy.
- If DEQ's evaluation of water monitoring data and supporting information indicate that the TMDL load allocations for a given pollutant-impairment combination are insufficient to meet state numeric or narrative criteria or protect the designated beneficial uses DEQ will consider TMDL revisions. Per OAR 340-042-0040(7), DEQ will follow all public participation requirements, including convening a local technical or rulemaking advisory committee to provide input, on TMDL revisions.

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)(l)(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.

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)].

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 and EPA's best professional judgment as to reasonable assurance that the TMDL's load allocations will be achieved. EPA past practice directs that these determinations include consideration of whether 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.

Where there is a demonstration that nonpoint source load reductions can and will be achieved; a determination that reasonable assurance exists and, on the basis of that reasonable assurance, 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 Lower Columbia-Sandy Subbasin TMDLs were developed to address both point and nonpoint sources with load reduction allocations proportional to estimated source contributions and in consideration of 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. Education, outreach, technical and financial assistance, permit administration, permit enforcement, responsible person's 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 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. Figure 7.1 presents the accountability framework elements, which are intended to work in concert to demonstrate reasonable assurance of implementation.

Figure 7.1 Representation of the Reasonable Assurance Accountability Framework Led by DEQ

Pollutant reduction strategies are identified in Section 2 and more specific strategies, practices and actions will be detailed in each required implementation plan, to be submitted per 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 that are already being implemented within the watershed and demonstrate reduced pollutant loading. These strategies are technically feasible at an appropriate scale in order 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.

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 the relevant water quality criteria are provided in Sections 3 and 4.2, respectively. More 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 and actions being implemented and evaluate achievements against established timelines and milestones.

Following up on reviews to track progress of implementation plans, 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 take two tracks, enforcement or engagement in voluntary initiatives. DEQ uses both, as appropriate within the process, to achieve optimal pollutant reductions. In some cases, DEQ can assist in facilitating the availability of incentives for meeting voluntary initiatives or providing education. DEQ will also 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, which include DMAs meeting measurable objectives, effectiveness demonstration of pollutant management strategies, accountability of implementation, discharge monitoring and instream monitoring. DEQ also periodically evaluates water quality data collected through ambient and specific monitoring programs, including monitoring plans developed specifically for the Lower Columbia-Sandy Subbasin, as presented in Section 6. DEQ regularly prepares Status and Trends reports and conducts water quality assessments on status of all waterways with adequate data in Oregon every two years, as required by the Clean Water Act for submittal to EPA for approval as DEQ's Integrated Report. Together, these data and evaluations allow refinement of focus on specific geographic areas or water quality issues and appropriate implementation of adaptive management actions to attain, over time, the objectives of the TMDL.

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 to decrease solar radiation reaching streams. For these reasons, there is some uncertainty about the pace of achieving the needed reductions necessary in the Lower Columbia-Sandy Subbasin to attain water quality criteria. DEQ's WQMP addresses this uncertainty by including an extensive monitoring, reporting, and adaptive component that is designed to match the accountability framework used by EPA in its Chesapeake Bay TMDL (2010).

The rationale described in this document stems from robust evaluations, implements an accountability framework and provides opportunities for adaptive management to maximize pollutant reductions. Together this approach provides reasonable assurance to meet state and federal requirements 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. The EPA delegates many Clean Water Act authorities to the State of Oregon which is administered by the Oregon Environmental Quality Commission through Oregon Revised Statute. 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 been delegated this responsibility by EPA. In Oregon, the responsibility to delegate water quality limited waterbodies rests with DEQ and DEQ's list of water quality limited waters is updated 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 the DEQ Director authority to develop TMDLs and issue them as orders (OAR 340-042-0060). DEQ was granted authority by the commission 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 citizens.

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; and
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 Sandy Basin include OAR 603-095-1300 to 1380.

Local Ordinances

Local governments are expected to describe in their Implementation plans their specific legal authorities to carry out the management strategies chosen to meet the TMDL allocations. Legal authority to enforce the provisions of a city's NPDES permit would be a specific example of legal authority to carry out management strategies.

9. References

DEQ. 2005. Sandy River Subbasin TMDL. Oregon Department of Environmental Quality. March 2005.

DEQ. 2018. Oregon Nonpoint Source Pollution Program 2017 Annual Report. Oregon Department of Environmental Quality. July 2018.

DEQ. 2023a. Draft Lower Columbia-Sandy Temperature TMDL Technical Support Document.

DEQ. 2023b. Draft Lower Columbia-Sandy Temperature TMDL.

DEQ. 2023. Volunteer Monitoring Resources webpage. https://www.oregon.gov/deq/wq/Pages/WQ-Monitoring-Resources.aspx. Accessed January 20, 2023.

Doran, George T. 1981. There's a S.M.A.R.T. way to write management's goals and objectives. Management Review. 70. Pages 35-36. https://community.mis.temple.edu/mis0855002fall2015/files/2015/10/S.M.A.R.T-Way-Management-Review.pdf. Accessed January 20, 2023.

EPA. 2007. National Management Measures to Control Nonpoint Source Pollution from Hydromodification. EPA 841-B-07-002. National Management Measures to Control Nonpoint Source Pollution from Hydromodification (epa.gov)

EPA. 2008. Handbook for Developing Watershed Plans to Restore and Protect Our Waters. https://nepis.epa.gov/Exe/ZyPDF.cgi/P1002U9R.PDF?Dockey=P1002U9R.PDF.

EPA 2010. Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment. https://www.epa.gov/chesapeake-bay-tmdl/chesapeake-bay-tmdl-document

EPA. 2023. Funding Resources for Watershed Protection and Restoration webpage. https://www.epa.gov/nps/funding-resources-watershed-protection-and-restoration. Accessed January 20, 2023.

EPA and DSL. 2020. Stream Function Assessment Methodology. US Environmental Protection Agency and Oregon Department of State Lands. https://www.oregon.gov/dsl/WW/Pages/SFAM.aspx.

OWEB. 2004. Riparian Assessment Framework – The Oregon Plan for Salmon and Watersheds. Oregon Watershed Enhancement Board. https://digital.osl.state.or.us/islandora/object/osl:16642/datastream/OBJ/view.