



**OREGON
DEPARTMENT OF
AGRICULTURE**

Hood River Agricultural Water Quality Management Area Plan

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Developed by the

Oregon Department of Agriculture

and the

Hood River Local Advisory Committee

with support from the

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Acronyms and Terms

Ag Water Quality Program – Agricultural Water Quality Program
Area Plan – Agricultural Water Quality Management Area Plan
Area Rules – Agricultural Water Quality Management Area Rules
CAFO – Confined Animal Feeding Operation
CNPCCP – Coastal Nonpoint Pollution Control Program
CTWS – Confederated Tribes of Warm Springs
CWA – Clean Water Act
CZARA – Coastal Zone Act Reauthorization Amendments
DEQ – Oregon Department of Environmental Quality
GWMA – Groundwater Management Area
LAC – Local Advisory Committee
LMA – Local Management Agency
Management Area – Agricultural Water Quality Management Area
NPDES – National Pollution Discharge Elimination System
NRCS – Natural Resources Conservation Service
OAR – Oregon Administrative Rules
ODA – Oregon Department of Agriculture
ODF – Oregon Department of Forestry
OHA – Oregon Health Authority
ORS – Oregon Revised Statute
OWEB – Oregon Watershed Enhancement Board
OWRI – Oregon Watershed Restoration Inventory
PMP – Pesticides Management Plan
PSP – Pesticides Stewardship Partnership
SIA – Strategic Implementation Area
SWCD – Soil and Water Conservation District
TMDL – Total Maximum Daily Load
USDA – United States Department of Agriculture
US EPA – United States Environmental Protection Agency
WPCF – Water Pollution Control Facility
WQPMT – Water Quality Pesticides Management Team

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Foreword

This Agricultural Water Quality Area Plan (Area Plan) provides guidance for addressing water quality related to agricultural activities in the Agricultural Water Quality Management Area (Management Area). The Area Plan identifies strategies to prevent and control water pollution from agricultural lands.

The Area Plan is neither regulatory nor enforceable (Oregon Revised Statute (ORS) 568.912(1)). The Area Plan refers to associated Agricultural Water Quality Management Area Rules (Area Rules). The Area Rules are Oregon Administrative Rules (OARs) and are enforced by the Oregon Department of Agriculture (ODA).

Required Elements of Area Plans

Area Plans must describe a program to achieve the water quality goals and standards necessary to protect designated beneficial uses related to water quality as required by federal and state law (OAR 603-090-0030(1)).

Plan Content

Chapter 1: Agricultural Water Quality Program Purpose and Background. Presents consistent and accurate information about the Ag Water Quality Program.

Chapter 2: Local Background. Provides the local geographic, water quality, and agricultural context for the Management Area. Describes the water quality issues, Area Rules, and potential practices to address water quality issues.

Chapter 3: Implementation Strategies. Presents goal(s), measurable objectives, strategic initiatives, proposed activities, and monitoring.

Chapter 4: Progress and Adaptive Management. Describes progress toward achieving the goal of the Area Plan and summarizes results of water quality and land condition monitoring.

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Chapter 1: Agricultural Water Quality Program

1.1 Purpose of Agricultural Water Quality Program and Applicability of Area Plans

As part of Oregon's Agricultural Water Quality Program (Ag Water Quality Program), the Area Plan guides landowners and partners such as Soil and Water Conservation Districts (SWCDs) in addressing water quality issues related to agricultural activities. The Area Plan identifies strategies to prevent and control "water pollution from agricultural activities and soil erosion" (ORS 568.909(2)) on agricultural and rural lands within the boundaries of this Management Area (OAR 603-090-0000(3)) and to achieve and maintain water quality standards (ORS 561.191(2)). The Area Plan has been developed and revised by ODA and the Local Advisory Committee (LAC), with support and input from the SWCD and the Oregon Department of Environmental Quality (DEQ). The Area Plan is implemented using a combination of outreach, conservation and management activities, compliance with Area Rules, monitoring, evaluation, and adaptive management.

The provisions of the Area Plan do not establish legal requirements or prohibitions (ORS 568.912(1)).

Each Area Plan is accompanied by Area Rules that describe local agricultural water quality regulatory requirements. ODA will exercise its regulatory authority for the prevention and control of water pollution from agricultural activities under the Ag Water Quality Program's general regulations (OAR 603-090-0000 to 603-090-0120) and under the Area Rules for this Management Area (OAR 603-095-1100). The general regulations guide the Ag Water Quality Program, and the Area Rules for the Management Area are the regulations with which landowners must comply. Landowners are encouraged through outreach and education to implement conservation and management activities.

The Area Plan and Area Rules apply to all agricultural activities on non-federal and non-Tribal Trust land within this Management Area including:

- Farms and ranches,
- Rural residential properties grazing animals or raising crops,
- Agricultural lands that lay idle or on which management has been deferred,
- Agricultural activities in urban areas,
- Agricultural activities on land subject to the Forest Practices Act (ORS 527.610).

Water quality on federal land in Oregon is regulated by DEQ and on Tribal Trust land by the respective tribe, with oversight by the United States Environmental Protection Agency (US EPA).

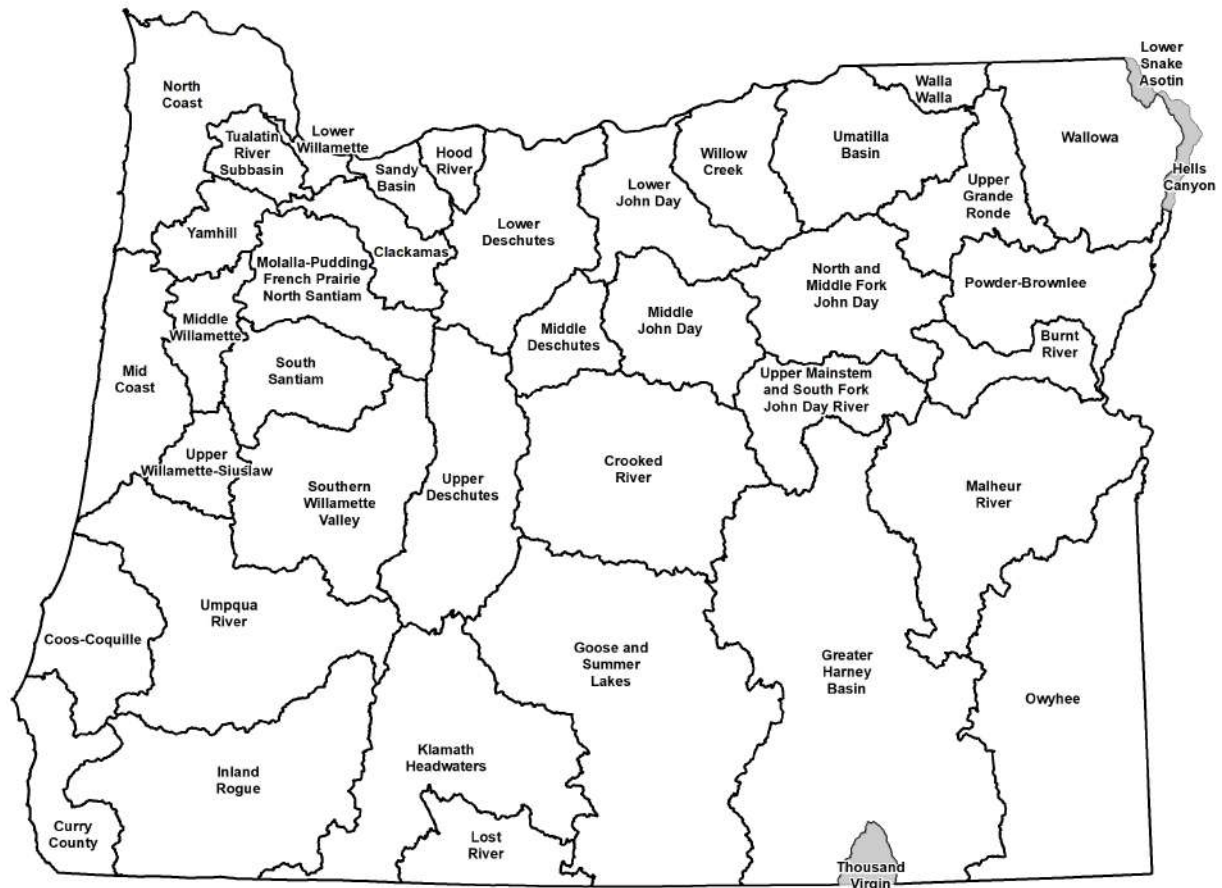
1.2 History of the Ag Water Quality Program

In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion and to achieve water quality standards (ORS 568.900 through ORS 568.933). The Oregon Legislature passed additional legislation in 1995 to clarify that ODA is the lead agency for regulating agriculture with respect to water quality (ORS 561.191).

Between 1997 and 2004, ODA worked with LACs and SWCDs to develop Area Plans and Area Rules in 38 watershed-based Management Areas across Oregon (Figure 1.2). Since 2004, ODA, LACs, SWCDs, and other partners have focused on implementation including:

- Providing education, outreach, and technical assistance to landowners,
- Implementing projects to improve agricultural water quality,
- Investigating complaints of potential violations of Area Rules,
- Conducting biennial reviews of Area Plans and Area Rules,
- Monitoring, evaluation, and adaptive management,
- Developing partnerships with state and federal agencies, tribes, watershed councils, and others.

Figure 1.2 Map of 38 Agricultural Water Quality Management Areas*



*Gray areas are not included in Ag Water Quality Management Areas

1.3 Roles and Responsibilities

1.3.1 Oregon Department of Agriculture

ODA is the agency responsible for implementing the Ag Water Quality Program (ORS 568.900 to 568.933, ORS 561.191, OAR 603-090, and OAR 603-095). The Ag Water Quality Program was established to develop and implement water quality management plans for the prevention and control of water pollution from agricultural activities and soil erosion. State and federal laws that drive the establishment of an Area Plan include:

- State water quality standards,

- Load allocations for agricultural or nonpoint source pollution assigned under Total Maximum Daily Loads (TMDLs) issued pursuant to the federal Clean Water Act (CWA), Section 303(d),
- Approved management measures for Coastal Zone Act Reauthorization Amendments (CZARA),
- Agricultural activities detailed in a Groundwater Management Area (GWMA) Action Plan (if DEQ has established a GWMA in the Management Area and an Action Plan has been developed).

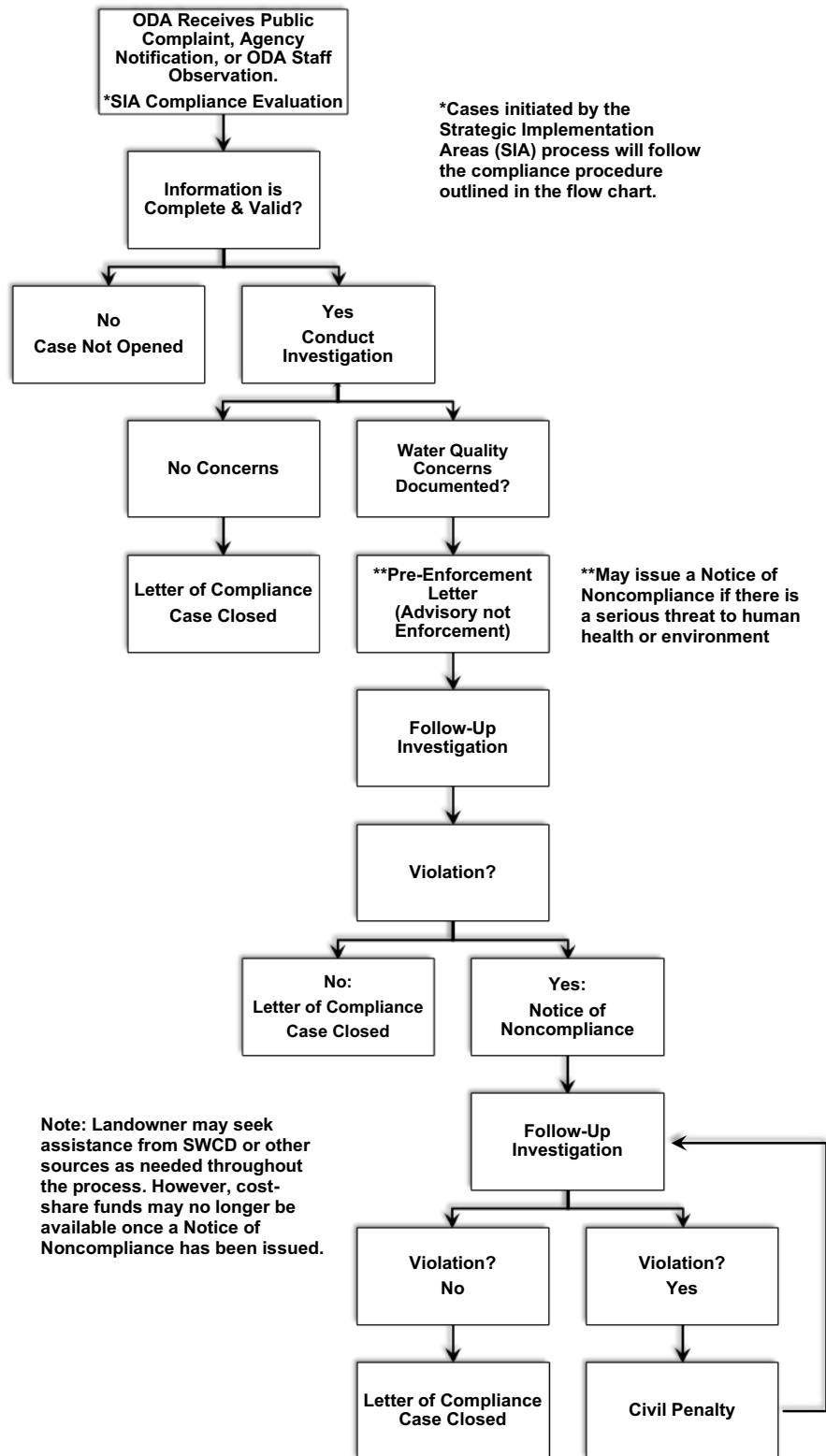
ODA bases Area Plans and Area Rules on scientific information (ORS 568.909). ODA works in partnership with SWCDs, LACs, DEQ, and other partners to implement, evaluate, and update the Area Plans and Area Rules. If and when other governmental policies, programs, or rules conflict with the Area Plan or Area Rules, ODA will consult with the appropriate agencies to resolve the conflict in a reasonable manner.

ODA is responsible for any actions related to enforcement or determination of noncompliance with Area Rules (OAR 603-090-0080 through OAR 603-090-0120). ORS 568.912(1) and ORS 568.912(2) give ODA the authority to adopt rules that require landowners to perform actions necessary to prevent and control pollution from agricultural activities and soil erosion.

The Area Rules are a set of standards that landowners must meet on all agricultural or rural lands. "Landowner" includes any landowner, land occupier, or operator per OAR 603-95-0010(24). All landowners must comply with the Area Rules. ODA will use enforcement where appropriate and necessary to achieve compliance with Area Rules. Figure 1.3.1 outlines ODA's compliance process. ODA will pursue enforcement action only when reasonable attempts at voluntary solutions have failed (OAR 603-090-0000(5)(e)). If a violation is documented, ODA may issue a pre-enforcement notification or an enforcement order such as a Notice of Noncompliance. If a Notice of Noncompliance is issued, ODA will direct the landowner to remedy any conditions through required corrective actions under the provisions of the enforcement procedures outlined in OAR 603-090-060 through OAR 603-090-120. If a landowner does not implement the required corrective actions, ODA may assess civil penalties for continued violation of the Area Rules.

Any member of the public may file a complaint, and any public agency may file a notification of a potential violation of the Area Rules. ODA also may initiate an investigation based on its own observation or from cases initiated through the Strategic Implementation Area process (See Figure 1.3.1).

Figure 1.3.1 Compliance Flow Chart



1.3.2 Local Management Agency

A Local Management Agency (LMA) is an organization designated by ODA to assist with the implementation of an Area Plan (OAR 603-090-0010). The Oregon Legislature intended that SWCDs be LMAs to the fullest extent practical, consistent with the timely and effective implementation of Area Plans (ORS 568.906). SWCDs have a long history of effectively assisting landowners to voluntarily address natural resource concerns. Currently, all LMAs in Oregon are SWCDs.

The day-to-day implementation of the Area Plan is accomplished through an Intergovernmental Grant Agreement between ODA and each SWCD. Every two years, each SWCD submits a scope of work to ODA to receive funding to implement the Area Plan. Each SWCD implements the Area Plan by providing outreach and technical assistance to landowners. SWCDs also work with ODA and the LAC to establish implementation priorities, evaluate progress toward meeting Area Plan goals and objectives, and revise the Area Plan and Area Rules as needed.

1.3.3 Local Advisory Committee

For each Management Area, the director of ODA appoints an LAC (OAR 603-090-0020) with up to 12 members. The LAC serves in an advisory role to the director of ODA and to the Board of Agriculture. The role of the LAC is to provide a high level of citizen involvement and support in the development, implementation, and biennial reviews of the Area Plan and Area Rules. The LAC's primary role is to advise ODA and the LMA on local agricultural water quality issues as well as evaluate the progress toward achieving the goals and objectives of the Area Plan. LACs are composed primarily of agricultural landowners in the Management Area and must reflect a balance of affected persons.

The LAC is convened at the time of the biennial review, however, the LAC may meet as frequently as necessary to carry out its responsibilities, which include but are not limited to:

- Participate in the development and subsequent revisions of the Area Plan and Area Rules,
- Recommend strategies necessary to achieve the goals and objectives in the Area Plan,
- Participate in biennial reviews of the progress of implementation of the Area Plan and Area Rules,
- Submit written biennial reports to the Board of Agriculture and the ODA director.

1.3.4 Agricultural Landowners

The emphasis of the Area Plan is on voluntary action by landowners to control the factors affecting water quality in the Management Area. In addition, each landowner in the Management Area is required to comply with the Area Rules. To achieve water quality goals or compliance, landowners may need to select and implement an appropriate suite of measures. The actions of each landowner will collectively contribute toward achievement of water quality standards.

Technical assistance, and often financial assistance, is available to landowners who want to work with SWCDs or other local partners, such as watershed councils, to achieve land conditions that contribute to good water quality. Landowners may also choose to improve their land conditions without assistance.

Under the Area Plan and Area Rules, agricultural landowners are not responsible for mitigating or addressing factors that are caused by non-agricultural activities or sources, such as:

- Hot springs, glacial melt water, unusual weather events, and climate change,
- Septic systems and other sources of human waste,
- Public roadways, culverts, roadside ditches, and shoulders,
- Dams, dam removal, hydroelectric plants, and non-agricultural impoundments,
- Housing and other development in agricultural areas,
- Impacts on water quality and streamside vegetation from wildlife such as waterfowl, elk, and feral horses,
- Other circumstances not within the reasonable control of the landowner.

However, agricultural landowners may be responsible for some of these impacts under other legal authorities.

1.3.5 Public Participation

ODA, LACs, and LMAs conduct biennial reviews of the Area Plan and Area Rules. Partners, stakeholders, and the general public are invited to participate in the process. Any revisions to the Area Rules will include a formal public comment period and a formal public hearing.

1.4 Agricultural Water Quality

The federal CWA directs states to designate beneficial uses related to water quality, decide on parameters to measure to determine whether beneficial uses are being met, and set water quality standards based on the beneficial uses and parameters.

1.4.1 Point and Nonpoint Sources of Water Pollution

There are two types of water pollution. Point source water pollution emanates from clearly identifiable discharge points or pipes. Point sources are required to obtain permits that specify their pollutant limits. Agricultural operations regulated as point sources include permitted Confined Animal Feeding Operations (CAFOs), and all permitted CAFOs are subject to ODA's CAFO Program requirements. Irrigation return flow from agricultural fields may drain through a defined outlet, but is exempt under the CWA and does not currently require a permit.

Nonpoint-source water pollution originates from the general landscape and is difficult to trace to a single source. Nonpoint water pollution sources include runoff from agricultural and forest lands, urban and suburban areas, roads, and natural sources. In addition, groundwater can be polluted by nonpoint sources including agricultural amendments (fertilizers and manure).

1.4.2 Beneficial Uses and Parameters of Concern

Beneficial uses related to water quality are defined by DEQ for each basin. The most sensitive beneficial uses usually are fish and aquatic life, water contact recreation, and public and private domestic water supply. These uses generally are the first to be impaired because they are affected at lower levels of pollution. While there may not be severe impacts on water quality from a single source or sector, the combined effects from all sources can contribute to the impairment of beneficial uses in the Management Area. Beneficial uses that have the potential to be impaired in this Management Area are summarized in Chapter 2.

Many waterbodies throughout Oregon do not meet state water quality standards. The most common water quality concerns statewide related to agricultural activities are temperature, bacteria, biological criteria, sediment and turbidity, phosphorous, nitrates, algae, pH, dissolved oxygen, harmful algal blooms, pesticides, and mercury. Water quality impairments vary across the state; they are summarized for this Management Area in Chapter 2.

1.4.3 Impaired Waterbodies and Total Maximum Daily Loads

Every two years, DEQ is required by the CWA to assess water quality in Oregon, resulting in the “Integrated Report.” CWA Section 303(d) requires DEQ to identify waters that do not meet water quality standards. The resulting list is commonly referred to as the “303(d) list” (www.oregon.gov/deq/wq/Pages/WQ-Assessment.aspx). In accordance with the CWA, DEQ must establish TMDLs for pollutants on the 303(d) list. For more information, visit www.oregon.gov/deq/wq/tmdls/Pages/default.aspx.

A TMDL includes an assessment of conditions (based on water quality data, land condition data, and/or computer modeling) and describes a plan to achieve water quality standards. TMDLs specify the daily amount of pollution a waterbody can receive and still meet water quality standards. TMDLs generally apply to an entire basin or subbasin, not just to an individual waterbody on the 303(d) list. In the TMDL, point sources are assigned waste load allocations that are then incorporated into National Pollutant Discharge Elimination System (NPDES) permits. Nonpoint sources (agriculture, forestry, and urban) are assigned a load allocation.

As part of the TMDL process, DEQ identifies Designated Management Agencies and Responsible Persons, which are parties responsible for submitting TMDL implementation plans. TMDLs designate ODA as the lead agency responsible for implementing the TMDL on agricultural lands. ODA uses the applicable Area Plan(s) as the implementation plan for the agricultural component of the TMDL. Biennial reviews and revisions to the Area Plan and Area Rules must address agricultural or nonpoint source load allocations from relevant TMDLs.

The 303(d) list, the TMDLs, and the agricultural load allocations for the TMDLs that apply to this Management Area are summarized in Chapter 2.

1.4.4 Oregon Water Pollution Control Law – ORS 468B.025 and 468B.050

In 1995, the Oregon Legislature passed ORS 561.191. This statute states that any program or rules adopted by ODA “shall be designed to assure achievement and maintenance of water quality standards adopted by the Environmental Quality Commission.”

To implement the intent of ORS 561.191, ODA incorporated ORS 468B.025 and 468B.050 into all 38 of the Area Rules in Oregon.

ORS 468B.025 (prohibited activities) states that:

“(1) Except as provided in ORS 468B.050 or 468B.053, no person shall:

- (a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.
- (b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.

(2) No person shall violate the conditions of any waste discharge permit issued under ORS 468B.050.”

ORS 468B.050 identifies the conditions when a permit is required. A permit is required for CAFOs that meet minimum criteria for confinement periods and have large animal numbers or have wastewater facilities. The portions of ORS 468B.050 that apply to the Ag Water Quality Program state that:

“(1) Except as provided in ORS 468B.053 or 468B.215, without holding a permit from the Director of the Department of Environmental Quality or the State Department of Agriculture, which permit shall specify applicable effluent limitations, a person may not:

(a) Discharge any wastes into the waters of the state from any industrial or commercial establishment or activity or any disposal system.”

Definitions used in ORS 468B.025 and 468B.050:

‘ “Pollution” or “water pollution” means such alteration of the physical, chemical, or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state, which will or tends to, either by itself or in connection with any other substance, create a public nuisance or which will or tends to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses or to livestock, wildlife, fish or other aquatic life or the habitat thereof.’ (ORS 468B.005(5)).

‘ “Water” or “the waters of the state” include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or affect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.’ (ORS 468B.005(10)).

‘ “Wastes” means sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive or other substances, which will or may cause pollution or tend to cause pollution of any waters of the state.’ (ORS 468B.005(9)). Additionally, the definition of “wastes” given in OAR 603-095-0010(53) ‘includes but is not limited to commercial fertilizers, soil amendments, composts, animal wastes, vegetative materials or any other wastes.’

1.4.5 Streamside Vegetation and Agricultural Water Quality

Across Oregon, the Ag Water Quality Program emphasizes streamside vegetation protection and enhancement. Streamside vegetation can provide three primary water quality functions: shade to reduce stream temperature warming from solar radiation, streambank stability, and filtration of pollutants. Other water quality functions from streamside vegetation include: water storage in the soil for cooler and later season flows, sediment trapping that can build streambanks and floodplains, narrowing and deepening of channels, and biological uptake of sediment, organic material, nutrients, and pesticides. In addition, streamside vegetation provides habitat for numerous species of fish and wildlife. Streamside vegetation conditions can be monitored to track progress toward achieving conditions that support water quality.

Site-Capable Vegetation

The Ag Water Quality Program uses the concept of “site-capable vegetation” to describe the streamside vegetation that can be expected to grow at a particular site, given natural site factors (e.g., elevation, soils, climate, hydrology, wildlife, fire, floods) and historical and current human influences that are beyond the program’s statutory authority (e.g., channelization, roads, modified flows, previous land management). Site-capable vegetation can be determined for a specific site based on: current streamside vegetation at the site, streamside vegetation at nearby reference sites with similar natural characteristics, Natural Resources Conservation Service (NRCS) soil surveys and ecological site descriptions, and/or local or regional scientific research.

The goal for Oregon’s agricultural landowners is to provide the water quality functions (e.g., shade, streambank stability, and filtration of pollutants) produced by site-capable vegetation along streams on agricultural lands. The Area Rules for each Management Area require that agricultural activities allow for the establishment and growth of streamside vegetation to provide the water quality functions equivalent to what site-capable vegetation would provide.

Occasionally, mature site-capable vegetation such as tall trees may not be needed along narrow streams. For example, shrubs and grass may provide shade, protect streambanks, and filter pollutants. However, on larger streams, mature site-capable vegetation is needed to provide the water quality functions.

In many cases, invasive, non-native plants, such as introduced varieties of blackberry and reed canarygrass, grow in streamside areas. This type of vegetation has established throughout much of Oregon due to historic and human influences and may provide some of the water quality functions of site-capable vegetation. ODA’s statutory authority does not require the removal of invasive, non-native plants, however, ODA encourages landowners to remove these plants voluntarily. In addition, the Oregon State Weed Board identifies invasive plants that can impair watersheds. Public and private landowners are responsible for eliminating or intensively controlling noxious weeds, as described in state and local laws. For more information, visit www.oregon.gov/ODA/programs/weeds.

1.4.6 Soil Health and Agricultural Water Quality

An increasingly important concept in Oregon and across the United States is soil health. The Ag Water Quality Program promotes soil health to reduce erosion and keep sediment out of surface waters, thereby helping to maintain and improve water quality. Healthy soils have relatively high organic matter and well-formed soil structure. These characteristics may resist erosion and increase water infiltration, leading to less surface runoff and greater groundwater recharge; the resultant groundwater flows in some cases can help moderate stream water temperatures. According to the NRCS and others, there are four Soil Health Principles that together build highly productive and resilient soils: minimize disturbance and maximize cover, continuous living roots, and diversity above and below the surface.

Healthy soils make farms and ranches more resilient. The western United States is experiencing higher temperatures, more weather variability, and greater storm intensity. Forecasts predict continued high-intensity storms in the winter and spring, combined with more frequent droughts, which may result in more erosion, especially on bare ground. Building soil health increases resiliency to extreme weather, protects water quality, and helps keep farms and ranches viable. Incorporating soil health practices can help landowners adapt and reduce risks. For more information, visit www.nrcs.usda.gov/wps/portal/nrcs/detail/or/soils/health.

1.5 Other Water Quality Programs

The following programs complement the Ag Water Quality Program and are described here to recognize their link to agricultural lands.

1.5.1 Confined Animal Feeding Operation Program

ODA is the lead state agency for the CAFO Program, which was developed to ensure that operators do not contaminate ground or surface water with animal manure or process wastewater. The CAFO Program coordinates with DEQ to issue permits. These permits require the registrant to operate according to a site-specific, ODA-approved, Animal Waste Management Plan that is incorporated into the CAFO permit by reference. For more information, visit oda.direct/CAFO.

1.5.2 Groundwater Management Areas

Groundwater Management Areas (GWMA) are designated by DEQ where groundwater is polluted from, at least in part, nonpoint sources. After designating a GWMA, DEQ forms a local groundwater management committee comprised of affected and interested parties. The committee works with and advises the state agencies that are required to develop an action plan to reduce groundwater contamination in the area.

Oregon DEQ has designated three GWMA because of elevated nitrate concentrations in groundwater: Lower Umatilla Basin, Northern Malheur County, and Southern Willamette Valley. Each GWMA has a voluntary action plan to reduce nitrates in groundwater. After a scheduled evaluation period, if DEQ determines that voluntary efforts are not effective, mandatory requirements may become necessary.

1.5.3 The Oregon Plan for Salmon and Watersheds

In 1997, Oregonians began implementing the Oregon Plan for Salmon and Watersheds, referred to as the Oregon Plan (www.oregon-plan.org). The Oregon Plan seeks to restore native fish populations, improve watershed health, and support communities throughout Oregon. The Oregon Plan has a strong focus on salmonids because of their great cultural, economic, and recreational importance to Oregonians, and because they are important indicators of watershed health. ODA's commitment to the Oregon Plan is to develop and implement Area Plans and Area Rules throughout Oregon.

1.5.4 Pesticide Management and Stewardship

ODA's Pesticides Program holds the primary responsibility for registering pesticides and regulating their use in Oregon under the Federal Insecticide Fungicide Rodenticide Act. ODA's Pesticide Program administers regulations relating to pesticide sales, use, and distribution, including pesticide operator and applicator licensing as well as proper application of pesticides, pesticide labeling, and registration.

In 2007, Oregon formed the interagency Water Quality Pesticide Management Team (WQPMT) to expand efforts to improve water quality in Oregon related to pesticide use. The WQPMT facilitates and coordinates activities such as monitoring, analysis and interpretation of data, effective response measures, and management solutions. The WQPMT relies on monitoring

data from the Pesticides Stewardship Partnership (PSP) program and other federal, state, and local monitoring programs to assess the possible impact of pesticides on Oregon's water quality. Pesticide detections in Oregon's streams can be addressed through multiple programs and partners, including the PSP.

Through the PSP, state agencies and local partners work together to monitor pesticides in streams and to improve water quality (www.oregon.gov/ODA/programs/Pesticides/Water/Pages/PesticideStewardship.aspx). ODA, DEQ, and Oregon State University Extension Service work with landowners, SWCDs, watershed councils, and other local partners to voluntarily reduce pesticide levels while improving water quality and crop management. Since 2000, the PSPs have made noteworthy progress in reducing pesticide concentrations and detections.

ODA led the development and implementation of a Pesticides Management Plan (PMP) for the state of Oregon (www.oregon.gov/ODA/programs/Pesticides/water/pages/AboutWaterPesticides.aspx). The PMP, completed in 2011, strives to protect drinking water supplies and the environment from pesticide contamination, while recognizing the important role that pesticides have in maintaining a strong state economy, managing natural resources, and preventing human disease. By managing the pesticides that are approved for use by the US EPA and Oregon in agricultural and non-agricultural settings, the PMP sets forth a process for preventing and responding to pesticide detections in Oregon's ground and surface water.

1.5.5 Drinking Water Source Protection

Oregon implements its drinking water protection program through a partnership between DEQ and the Oregon Health Authority (OHA). The program provides individuals and communities with information on how to protect the quality of Oregon's drinking water. DEQ and OHA encourage preventive management strategies to ensure that all public drinking water resources are kept safe from current and future contamination. For more information, visit www.oregon.gov/deq/wq/programs/Pages/dwp.aspx.

1.6 Partner Agencies and Organizations

1.6.1 Oregon Department of Environmental Quality

The US EPA delegated authority to DEQ to implement the federal CWA in Oregon. DEQ is the lead state agency with overall authority to implement the CWA in Oregon. DEQ works with other state agencies, including ODA and the Oregon Department of Forestry (ODF), to meet the requirements of the CWA. DEQ sets water quality standards and develops TMDLs for impaired waterbodies, which ultimately are approved or disapproved by the US EPA. In addition, DEQ develops and coordinates programs to address water quality including NPDES permits for point sources, the CWA Section 319 grant program, the Source Water Protection Program (in partnership with OHA), the CWA Section 401 Water Quality Certification, and Oregon's Groundwater Management Program. DEQ also coordinates with ODA to help ensure successful implementation of Area Plans.

A Memorandum of Agreement between DEQ and ODA recognizes that ODA is the state agency responsible for implementing the Ag Water Quality Program. ODA and DEQ updated the Memorandum of Agreement in 2012 and reviewed and confirmed it in 2018

(<http://www.oregon.gov/ODA/shared/Documents/Publications/NaturalResources/DEQODAmoa.pdf>).

The Environmental Quality Commission, which serves as DEQ's policy and rulemaking board, may petition ODA for a review of part or all of any Area Plan or Area Rules. The petition must allege, with reasonable specificity, that the Area Plan or Area Rules are not adequate to achieve applicable state and federal water quality standards (ORS 568.930(3)(a)).

1.6.2 Other Partners

ODA and SWCDs work in close partnership with local, state, and federal agencies and other organizations, including: DEQ (as described above), the United States Department of Agriculture (USDA) NRCS and Farm Service Agency, watershed councils, Oregon State University Agricultural Experiment Stations and Extension Service, tribes, livestock and commodity organizations, conservation organizations, and local businesses. As resources allow, SWCDs and local partners provide technical, financial, and educational assistance to individual landowners for the design, installation, and maintenance of effective management strategies to prevent and control agricultural water pollution and to achieve water quality goals.

1.7 Measuring Progress

Agricultural landowners have been implementing conservation projects and management activities throughout Oregon to improve water quality for many years. However, it has been challenging for ODA, SWCDs, and LACs to measure progress toward improved water quality. ODA is working with SWCDs, LACs, and other partners to develop and implement strategies that will produce measurable outcomes. ODA is also working with partners to develop monitoring methods to document progress.

1.7.1 Measurable Objectives

A measurable objective is a numeric long-term desired outcome to achieve by a specified date. Milestones are the interim steps needed to make progress toward the measurable objective and consist of numeric short-term targets to reach by specific dates. Together, the milestones define the timeline and progress needed to achieve the measurable objective.

The Ag Water Quality Program is working throughout Oregon with SWCDs and LACs toward establishing long-term measurable objectives to achieve desired conditions. ODA, the LAC, and the SWCD will establish measurable objectives and associated milestones for each Area Plan. Many of these measurable objectives relate to land conditions and primarily are developed for focused work in small geographic areas (section 1.7.3). ODA's longer-term goal is to develop measurable objectives, milestones, and monitoring methods at the Management Area scale.

The State of Oregon continues to improve its ability to use remote-sensing technology to measure current streamside vegetation conditions and compare these to the conditions needed to meet stream shade targets. As the State's use of this technology moves forward, ODA will use the information to help LACs and LMAs set measurable objectives for streamside vegetation. These measurable objectives will be achieved through implementing the Area Plan, with an emphasis on voluntary incentive programs.

At each biennial review, ODA and its partners will evaluate progress toward measurable objectives and milestone(s) and why they were or were not achieved. ODA, the LAC, and LMA

will evaluate whether changes are needed to continue making progress toward the measurable objective(s) and will revise strategies to address obstacles and challenges.

The measurable objective(s) and associated milestone(s) within the Management Area are in Chapter 3 and progress toward achieving the measurable objective(s) and milestone(s) is summarized in Chapter 4.

1.7.2 Land Conditions and Water Quality

Land conditions can serve as useful surrogates (indicators) for water quality parameters. For example, because shade blocks solar radiation from warming the stream, streamside vegetation, or its associated shade, generally is used as a surrogate for water temperature. In some cases, sediment can be used as a surrogate for pesticides or phosphorus, which often adhere to sediment particles.

The Ag Water Quality Program focuses on land conditions, in addition to water quality data, for several reasons:

- Landowners can see land conditions and have direct control over them,
- Improved land conditions can be documented immediately,
- Water quality impairments from agricultural activities are primarily due to changes in land conditions and management activities,
- It can be difficult to separate agriculture's influence on water quality from other land uses,
- There is generally a lag time between changes on the landscape and the resulting improvements in water quality,
- Extensive monitoring of water quality would be needed to evaluate progress, which would be expensive and may not demonstrate improvements in the short term.

Water quality monitoring data will help ODA and partners to measure progress or identify problem areas in implementing Area Plans. However, as described above, water quality monitoring may be slower to document changes than land condition monitoring.

1.7.3 Focused Implementation in Small Geographic Areas

Focus Areas

A Focus Area is a small watershed with water quality concerns associated with agriculture. The Focus Area process is SWCD-led, with ODA oversight. The SWCD delivers systematic, concentrated outreach and technical assistance. A key component is measuring conditions before and after implementation to document the progress made with available resources. The Focus Area approach is consistent with other agencies' and organizations' efforts to work proactively in small watersheds.

Focus Areas have the following advantages: a proactive approach that addresses the most significant water quality concerns, multiple partners that coordinate and align technical and financial resources, a higher density of projects that may lead to increased connectivity of projects, and a more effective and efficient use of limited resources.

The current Focus Area for this Management Area is described in Chapter 3.

Strategic Implementation Areas

Strategic Implementation Areas (SIAs) are small watersheds selected by ODA, in consultation with partners, based on a statewide review of water quality data and other available information. ODA conducts an evaluation of likely compliance with Area Rules and contacts landowners with the results and next steps. The Oregon Watershed Enhancement Board (OWEB) and other partners make funding and technical assistance available to support conservation and restoration projects. These efforts should result in greater ecological benefit than relying solely on compliance and enforcement. Landowners have the option of working with the SWCD or other partners to voluntarily address water quality concerns. ODA follows up, as needed, to enforce the Area Rules. Finally, ODA completes a post-evaluation to document progress in the SIA.

Any SIAs in this Management Area are described in Chapter 3.

1.8 Progress and Adaptive Management

1.8.1 Biennial Reviews

The ODA, LAC, LMA, and partners evaluate progress of Area Plan implementation through the biennial review process. At each biennial review, they discuss: 1) progress toward meeting measurable objectives and implementing strategies, 2) local monitoring data from other agencies and organizations, including agricultural land conditions and water quality, and 3) ODA compliance activities. As a result of these discussions, ODA and partners revise implementation strategies and measurable objectives in Chapter 3 as needed.

ODA provides information from the Oregon Watershed Restoration Inventory (OWRI) on restoration project funding and accomplishments at biennial reviews and uses the information for statewide reporting. The majority of OWRI entries represent voluntary actions of private landowners who have worked in partnership with federal, state, and local groups to improve aquatic habitat and water quality conditions. OWRI is the single largest restoration information database in the western United States. For more information, visit www.oregon.gov/oweb/data-reporting/Pages/owri.aspx.

1.8.2 Water Quality Monitoring

In addition to monitoring landscape conditions, ODA relies on water quality monitoring data where available. These data may be provided by other state or federal agencies or local entities; ODA seldom collects water quality samples outside of compliance cases.

As part of monitoring water quality status and trends, DEQ regularly collects water samples every other month throughout the year at over 130 sites on more than 50 rivers and streams across the state. Sites are located across the major land uses (forestry, agriculture, rural residential, and urban/suburban). Parameters measured include alkalinity, biochemical oxygen demand (BOD), chlorophyll a, specific conductance, dissolved oxygen (DO), DO percent saturation, bacteria (*E. coli*), ammonia, nitrate and nitrite, pH, total phosphorus, total solids, temperature, and turbidity.

DEQ provides status and trends reports for selected parameters in relation to water quality standards. ODA will continue to work with DEQ to summarize the data results and how they apply to agricultural activities.

Water quality monitoring efforts in this Management Area are described in Chapter 3, and the data are summarized in Chapter 4.

2.1 Local Roles

2.1.1 Local Advisory Committee

The Area Plan was developed with the assistance of the LAC. The LAC was formed to assist with the development of the Area Plan and Area Rules and with subsequent biennial reviews. Table 2.1.1 lists the current members of the LAC.

Table 2.1.1 Current LAC members

Name	Geographic Representation	Agricultural Product or Interest Representation
N/A (Chair)		
Bruce Decker (Vice-Chair)	Odell	Wilbur-Ellis Fieldman
Chris Brun	Parkdale	Tribal Fish Program Coordinator
John Buckley	All *EFID lands	East Fork Irrigation District
Steve Castagnoli	Hood River	OSU Extension
Mike Doke	Odell	Columbia Gorge Fruit Growers
Steve Hunt	Dee	Orchard
Brian Nakamura	Willow Flat	Orchard
Jim Wells	Pine Grove	Orchard
Ben Saur	Parkdale	Community Supported Agriculture Vegetable Farm
Leonard Aubert	Parkdale	Orchard and Livestock
Alex Johnson	Parkdale	Orchard, The Freshwater Trust

*East Fork Irrigation District

2.1.2 Local Management Agency

Implementation of the Area Plan is accomplished through an Intergovernmental Grant Agreement between ODA and the Hood River SWCD. This Intergovernmental Grant Agreement defines the SWCD(s) as the LMA(s) for implementation of the Ag Water Quality Program in this Management Area. The SWCD(s) was/were also involved in development of the Area Plan and Area Rules.

The LMA implements the Area Plan by conducting the activities detailed in Chapter 3, which are intended to achieve the goals and objectives of the Area Plan.

2.2 Area Plan and Area Rules: Development and History

The director of ODA initially approved the Area Plan and Area Rules in 2001.

Since approval, the LAC has met biennially to review the Area Plan and Area Rules. The biennial review process includes an assessment of progress toward achieving the goals and objectives in the Area Plan.

2.3 Geographical and Physical Setting

2.3.1 Location

The Management Area encompasses approximately 450 square miles in north-central Oregon and includes the communities of Cascade Locks, Hood River, Pine Grove, Odell, Dee, and

Parkdale. Approximately one third of the land is county or privately owned. Almost all the remaining lands are federally owned and managed by the USFS. Elevations in the Management Area range from 74 feet to 11,245 feet above sea level.

The Management Area is located in the transition zone between weather dominated by wet marine airflow to the west and the dry continental climate of eastern Oregon¹. About two-thirds of the Hood River drainage is within the Cascades ecoregion and has a moist temperate climate. The northeast portion is in the dry Eastern Cascades slopes and foothills ecoregion. Mean annual precipitation ranges from 130-inches on the upper west boundary in the Cascade Range to less than 30-inches in the lower east valley.

2.3.2 Hydrology¹

One quarter of the Management Area consists of tributaries to the Columbia that flow almost exclusively through federal lands managed by the USFS.

The Hood River drains 339 square miles (217,340 acres) of the Management Area and consists of three main forks (West, Middle, and East) that converge into the mainstem Hood River near River Mile 12.0. The drainage contains approximately 400 miles of perennial stream channel of which an estimated 100 miles is accessible to anadromous fish.

Five tributaries of the three forks are fed by glacial sources that drain approximately one-third of the total glacial ice on Mt. Hood. During high flows, large amounts of bed load and sediment are transported in these tributaries and in the mainstem. Glacial melt increases water turbidity in the form of suspended silt and glacial flour during summer and early fall. Glacial sediment is more prevalent in the Middle and East Forks and Hood River mainstem, while glacial sediment in the West Fork is contributed by a single small tributary; Ladd Creek. Natural disturbances that contribute significant amounts of sediment to stream channels include landslides and debris torrents that originate on glacial moraines and steep slopes of Mt. Hood.

The majority of stream channels in the Management Area are moderate to high gradient and confined by terraces or narrow v-shaped valleys with limited floodplain area. Notably, much of the mainstem Hood River, the East Fork, and portions of the West Fork consist of low gradient reaches of two and one-half percent or less. Forty-one percent of the total stream length consists of habitat types classified as a sediment source, 36 percent as sediment transport, and 23 percent as sediment deposition zones.

Typical of many Cascade mountain streams, the hydrology of the Management Area is characterized by highly variable streamflow and rapid storm runoff. The mean annual flow in the Hood River is 1,079 cfs (cubic feet per second) at Tucker Bridge (River Mile 6.1). The record flood is reported as 33,000 cfs (December 1964), while the minimum seven-day average was 155 cfs (September 1994). Mean monthly flows range from 392 cfs in September to a high of 1,747 cfs in January. Snowmelt generally begins during April. Many tributaries have very low summer flows, while tributaries with glacial sources maintain higher flows.

Natural disturbances occurring in the Management Area include floods, fires, mudflows, landslides, and insect and botanical disease epidemics. Rain-on-snow floods are common disturbance events. Periodically, natural dams created by terminal moraines at receding glaciers on Mt. Hood break and cause floods and debris flows; many of these events are triggered by intense rainstorms. Landslides are common but not frequent events.

2.3.3 Hydrologic Modifications

The natural flow regime of the Hood River drainage has been modified by irrigation and domestic water withdrawals and hydropower diversions. Low summer stream flows due to irrigation withdrawals are identified in the Lower Columbia Recovery Plan as the primary factor inhibiting recovery of fish populations in the Management Area.

Consumptive water use between July and September is estimated at 40 percent (296 cfs) of natural flow at the Hood River mouth. Reservoir storage is limited to 4,600 acre-feet, or less than one percent of mean annual discharge. Laurance Lake at Clear Branch Dam is the largest reservoir with a volume of 3,550 acre-feet storage for irrigation. Water rights held by five irrigation districts total 588 cfs. The three major irrigation districts have invested significant funds to conserve water and decrease operation and management costs by replacing open ditch, canal segments, and low-efficiency pipe with pressurized pipe.

Municipal diversions include the cities of The Dalles and Hood River. Four water districts serve rural areas or towns, and instream water rights are established at seven locations but are consistently met at only two of these due to senior water rights. The Management Area is closed to new surface water withdrawals from April 15 to September 30, although exceptions are made in the administrative rules for some projects such as off-stream watering facilities for livestock.

2.3.4 Land Use

Historical¹

Native Americans maintained huckleberry fields and trails later used by non-native settlers and collected plants, hunted game, and fished in tributaries and forks of the Hood River. Native houses were located at the Hood River mouth and vicinity. The Management Area was included in the one million acres of land ceded to the U.S. in the 1855 Treaty with the Tribes of Middle Oregon by ancestors of the CTWS.

Sheep herding and cattle grazing were common on the upper slopes of the East Fork in meadow areas during early settlement prior to 1900. Around 1880, orchards and strawberry fields began to progress up the valley as the natural landscape pattern of coniferous forest and riparian habitat networks was transformed into pasture and fruit crops. Wet areas were drained for agriculture and other land uses throughout much of the valley. Many wetlands and stream channels were drained or diverted to reduce saturated soil conditions, and roads were constructed adjacent to and across streams. Possibly the biggest factor altering the vegetative pattern in the lower Hood River drainage was the growth of the fruit industry, where orchards have replaced coniferous forest and riparian habitat networks.

Water-powered sawmills, dams, and mill ponds operated in Neal and Green Point creeks and the lower East Fork and mainstem Hood River as early as 1861. Logs were transported in rivers or by flumes, horse teams, and later railroads. Before 1900, streams were diverted into hand-dug canals and ditches for irrigation.

Historic timber practices have resulted in riparian corridors and stream channels lacking the large woody debris needed to build and maintain high quality fish habitat. Extensive use of splash dams occurred through the 1940s. During the 1960s and 1970s, stream cleanout was encouraged and believed to benefit fish passage. The present deficiency of instream large wood debris has reduced the amount and quality of pool habitat, side channels and slow water areas, hiding cover, and limits retention of spawning-size gravel within low water stream channels.

Current^{1,7}

The economy is based on agriculture (primarily pear, cherry, and apple orchards), forestry, recreation and tourism, the latter having overtaken forest products as the second largest economic contributor. Approximately 15,000 acres of orchard and 2,000 acres of pasture are actively irrigated. An estimated 59 percent of agricultural land is irrigated with low-flow irrigation systems, which can achieve up to 70 percent water savings over the hand line and impact sprinklers they replaced. An estimated five percent to 10 percent of Hood River valley orchardists use soil moisture sensors to improve orchard water efficiency. The Integrated Fruit Production (IFP) program promotes environmentally sustainable orchard practices including reduced pesticide, fertilizer, and water use.

The majority of livestock operations occur on small acreage farms of less than 20 acres, with approximately 1,000 head of cattle in the county. Forestry continues to be an important economic activity. Hood River County owns approximately 30,000 acres or 15 percent of the Hood River drainage, which is managed as industrial forest. Weyerhaeuser owns 22,000 acres in the Neal Creek drainage, the West Fork Hood River, and along Tony Creek. About two-thirds of the Management Area is within the Mt. Hood National Forest where timber harvest is guided by the Northwest Forest Plan.

The Hood River County population is growing approximately 0.7 percent per year. Land use is governed by the 1984 County Comprehensive Land Use Plan, which established urban growth boundaries for the cities of Hood River and Cascade Locks and the towns of Parkdale, Odell, and Mt. Hood. Conversion of forest and pasture to single-family residential development is increasing in rural lands outside of the urban growth areas. Visitor use of the Management Area has multiplied due to regional population growth and the increasing popularity of outdoor recreation and tourism. These trends are expected to continue.

2.4 Agricultural Water Quality

2.4.1 Water Quality Issues

This Area Plan addresses sediment, nutrient, bacteria, toxics, temperature, pH, and flow concerns related to agricultural activities.

This Area Plan addresses conditions affecting water quality that result from agricultural management of:

- Streamsides
- Livestock
- Cultivated lands
- Agricultural wastes
- Nutrients, farm chemicals, and pesticides
- Irrigation water and surface drainage

Salmonids and Lamprey

Because aquatic species are so sensitive to a variety of pollutants, they are often viewed as indicators of water quality.

Table 2. Distribution and status of salmonids and lamprey in the Hood River drainage (Source: ODFW and CTWS.)		
SPECIES	PRIMARY SPAWNING, HOLDING AND REARING AREAS	STATUS OF WILD POPULATION
Pacific Lamprey	Mainstem Hood River East Fork Hood River Middle Fork Hood River Punchbowl Falls (West Fork)	State Sensitive species (ODFW). Formerly extirpated. Recolonizing Hood basin after removal of Powerdale
ANADROMOUS SALMONIDS		
Spring Chinook salmon	Elk Creek McGee Creek Tony Creek East Fork Hood River Dog River West Fork Hood River Lake Branch Creek Middle Fork Hood River Mainstem Hood River	Native stock extirpated. Hatchery reintroduction ongoing to re-establish spring Chinook.
Summer steelhead	West Fork and tributaries East Fork and tributaries Mainstem Hood River	Threatened Species - listed by National Oceanic and Atmospheric Administration (NOAA) Fisheries Service.
Winter steelhead	East Fork and tributaries West Fork and tributaries Neal Creek Green Point Creek Middle Fork and tributaries Mainstem Hood River	Threatened Species - listed by NOAA's Fisheries Service. Hatchery supplementation ongoing to strengthen wild run and support fisheries.
Fall Chinook salmon	Mainstem Hood River East Fork Hood River West Fork Hood River	Threatened Species - listed by NOAA's Fisheries Service.
Coho salmon	East Fork and tributaries Middle Fork and tributaries Mainstem Hood River Green Point Creek West Fork Hood River Neal Creek and tributaries	Threatened Species - listed by NOAA's Fisheries Service.
Sea-run cutthroat trout	East Fork and tributaries Middle Fork and tributaries Mainstem Hood River Neal Creek and tributaries	State Sensitive species (ODFW). Severely depressed (less than 100 spawners).
RESIDENT SALMONIDS		
Rainbow trout	Entire Hood River drainage	
Cutthroat trout	Entire Hood River drainage	
Bull trout	Middle Fork Hood River Mainstem Hood River West Fork Hood River Clear Branch Coe Branch and tributaries Pinnacle Creek Compass Creek	Threatened Species – listed by USFWS.
Mountain whitefish	Hood River	

The abundance and range of anadromous fish in the Hood River Watershed has declined compared to historical conditions. Native spring Chinook are extirpated and Coho and fall Chinook stocks are at low levels. Bull trout and steelhead were listed as Threatened in 1998 under the federal Endangered Species Act. Sea-run cutthroat trout are listed as a state-sensitive species. However, with the removal of Powerdale Dam and ongoing habitat restoration and hatchery supplementation projects, the downward trends appear to have stabilized and, in the case of spring Chinook salmon, are increasing.

State law, as provided by ORS 509.585, requires fish passage “in all waters of this state in which native migratory fish are currently or have historically been present.” The elimination of

fish passage barriers is one goal of the Hood River Watershed Action Plan, a guidance document for the Hood River SWCD.

2.4.1.1 Beneficial Uses

The following are beneficial uses in the Hood River Basin (340-41-0160):

Beneficial Uses	Hood River Basin Streams
Public Domestic Water Supply	X
Private Domestic Water Supply	X
Industrial Water Supply	X
Irrigation	X
Livestock Watering	X
Fish and Aquatic Life	X
Wildlife and Hunting	X
Fishing	X
Boating	X
Water Contact Recreation	X
Aesthetic Quality	X
Hydro Power	X
Commercial Navigation and Transportation	

2.4.1.2 WQ Parameters and 303(d) list

Water quality data have been collected since 1998 in the Management Area. There are also streams and times of year for which data have never been collected so their water quality status is unknown. Monitoring efforts since 1998 include: Pesticide Stewardship Partnership monitoring done by the CTWS, the Hood River Watershed Group, DEQ, and Columbia Riverkeepers.

Table 3 consists of water quality limited streams from DEQ’s 2018/2020 Integrated Report. DEQ also has documented concerns about flow and habitat modification.

Table 3. 303d listed hydrological areas in the Management Area

Hydrologic Area	303d list	Delisted	Notes
Watersheds (6th field HUC)			
Indian Creek – Hood River	E coli, Pesticides (DDT, DDE, DDD, Dieldrin, Heptachlor), Temperature*	Chlorpyrifos	Bisected by Hood River
Lower Middle Fork Hood River	Biocriteria, Temperature*		
Upper Middle Fork Hood River	Biocriteria, Temperature*		
Grays Creek-Columbia River	E coli, Biocriteria		Tribs to the Columbia between Cascade Locks & Hood River
Lower East Fork Hood River	Biocriteria, Copper		
Middle East Fork Hood River	Biocriteria		

Upper East Fork Hood River	Zinc, Temperature*	Temperature-Spawning	
Dog River	Iron		
Neal Creek	Iron, Arsenic, Pesticides (DDT, Dieldrin, Heptachlor, DDD, DDE), Temperature*	pH; Silver; Guthion; Chlorpyrifos; Dissolved Oxygen-Spawning; Dissolved Oxygen- Year Round; BioCriteria	
Odell Creek – Hood River	Pesticides (Guthion, Dieldrin, DDT, DDD, DDE)	Chlorpyrifos	Bisected by Hood River
Upper West Fork Hood River	Temperature*	pH	
Waterbodies			
Hood River	Iron, Thallium, Dissolved oxygen, DDE, Temperature*	Copper; Lead	Mouth to East/West Forks
West Fork Hood	Silver, Thallium, Temperature*	pH	Mouth to McGee Ck
Middle Fork Hood River	Iron, Biocriteria, Temperature*		Mouth to Coe/Clear confluence
East Fork Hood River	Copper, Iron, Thallium, Biocriteria		Mouth to Cold Spring Ck

*Waterbodies or watersheds with temperature listings addressed by the TMDL.

- 1. Water temperatures** are critical to salmonid growth and survival at all life stages. Warm stream temperatures increase stress and disease, raise metabolism and lower growth rates, and enhance conditions for introduced non-native predators. Temperature affects the dissolved oxygen potential in water; the warmer the water, the less dissolved oxygen it can hold. Temperature controls the rate of many chemical reactions including the equilibrium between ammonium (NH₄) and un-ionized ammonia NH₃ (toxic form). Lethal temperatures for adult salmonids vary according to a variety of factors, but are generally reported in the range of 70 to 77°F.

Salmonid eggs and juveniles are much more sensitive to high temperatures. Generally, water temperatures above 55°F inhibit salmonid spawning, egg incubation, and fry emergence from the gravel. However, salmonids have successfully survived in some areas where natural water temperatures are higher. Egg development and the subsequent timing of emergence are closely associated with stream temperatures. Temperatures greater than 64°F may impair juvenile rearing and growth. Optimal water temperature for bull trout is less than 50°F but some life stages commonly are found in temperatures in the mid-50s.

The temperature standard was revised in 2004. It assigns a temperature criterion (50°, 53.6°, 55.4°, 60.8°, or 64.4°F) to each water body depending on its use by fish (species, life stage, and time of year). If the water temperature exceeds the criterion, human activities cannot further increase the temperature. The natural water temperature temperatures exceeding the criteria would be in violation.

The Department of Environmental Quality, in conjunction with fisheries agencies, has defined the salmonid spawning and rearing periods and locations in the Management Area. There are reaches throughout the Management Area where the core spawning (55.4°F), cold-water habitat (60.8°F), and/or rearing (64.4°F) criteria are exceeded at certain times of the year.

The 50.0°F and 53.6°F bull trout temperature criterion is exceeded in the Middle Fork Hood River and Clear Branch below Laurance Lake.

Even though US EPA approved the temperature TMDL in 2018, elevated stream temperatures are still a concern. The approval recognized that plans, such as the Area Plan, would be implemented by the different jurisdictions to meet load allocations and improve stream temperatures. The Western Hood Subbasin TMDL includes shade targets that are to be met on Management Area streams². These targets are discussed further in Section 4. The TMDL applies to all perennial and intermittent streams in the Management Area, including those listed in Table 3.

2. Extremes in water **pH** and low levels of **dissolved oxygen** can harm fish and other aquatic life. Both conditions can be stimulated by the availability of **nutrients**, warm temperatures, and light, all of which stimulate aquatic plant or algae growth. Aquatic plants can invade gravel bars creating conditions that are no longer suitable for salmonid spawning. Excessive aquatic plant growth can increase water pH, which may harm fish. The death and subsequent decomposition of aquatic plants can consume large quantities of dissolved oxygen, which can kill fish and other aquatic animals. These conditions are usually aggravated by low stream flow as well as lack of riparian vegetation and warm water.

Elevated **nitrogen and phosphorous** (nutrient) concentrations exceeding recommended criteria were measured in 1998 in Odell, McGuire, Neal, Lenz, Trout, Wishart, Whiskey, Baldwin, and Indian creeks, and in 2001 and 2002 in Baldwin, Graham, Rhoades (tributary to Lenz Creek), Tieman and Odell creeks. The Oregon Watershed Assessment Manual recommends using a value of 0.3 mg/L for nitrogen (as total nitrate) to evaluate water quality³; scientific literature reports that concentrations greater than 0.3 mg/L can trigger algal blooms⁴. The value of 0.3 mg/L does not have any regulatory standing, as Oregon currently does not have nitrogen standards for surface water in the Management Area. The maximum nitrate concentration measured in 1998 was 4.0 mg/L in McGuire Creek and 4.84 in Rhoades Creek in 2001. Nitrogen concentrations generally increased in a downstream direction in response to adjacent land uses. See Section 2.3.4 for a discussion of nitrate levels.

Oregon currently does not have phosphorus standards for the Management Area. The expected natural concentration of total phosphorous in forested streams is less than 0.02 mg/L⁵. To prevent nuisance algal growth in cold-water streams that do not discharge directly to a lake or reservoir, USEPA recommends a total phosphorous concentration of 0.10 mg/L or less⁶. The maximum concentration measured in the 1998 sampling was 1.2 mg/L in Odell Creek. Phosphorous concentrations tended to increase in a downstream direction; for example, samples taken in the upper Neal Creek system were close to expected natural levels.

Based on 1998 DEQ monitoring study results, **dissolved oxygen** concentrations in the Hood River drainage¹ ranged from 8.3-11.7 mg/L in June, 7.8-10.7 mg/L in August, and 8.0-11.8 mg/L in October. Dissolved oxygen standards are set to protect both salmonid

spawning and rearing. See <https://www.oregon.gov/deq/wq/Pages/WQ-Standards.aspx> for locations of criteria and designations of spawning seasons.

3. **Bacteria** are used to determine the safety for “water contact recreation.” High levels of *E. coli* bacteria can cause severe gastric illness and even death in humans. In 1998, DEQ sampling showed exceedances of the state standard at sites on Wishart, Baldwin, Odell, McGuire, Whiskey, Spring, and Indian creeks. In 2008, sampling by Columbia Riverkeepers showed exceedances of the state standard at sites on Indian, Whiskey, and Phelps creeks. These data resulted in 303(d) listings for Indian Creek and two of its tributaries. A more comprehensive study would be needed to identify contamination sources and the degree of the contamination problem.
4. **“Biological Criteria”** listings indicate waters that don’t adequately support aquatic insects and similar invertebrates (benthic macroinvertebrates). These organisms are important as the basis of the food chain and are very sensitive to changes in water quality. To assess a stream’s biological health, the community of benthic macroinvertebrates is sampled and compared to the community expected if the stream were in good shape (“reference community”). If the difference is too great, the stream section is designated as ‘water quality limited.’ This designation does not identify the actual limiting factor (e.g. sediment, excessive nutrients, temperature).
5. The Hood River Water Quality Technical Committee identified **Pesticide** use on agricultural, forest, right-of-way, and residential properties as a potential concern. A preliminary study conducted in cooperation with the CGFG and DEQ in spring and summer of 1999 found that concentrations of the organophosphate pesticides chlorpyrifos and/or azinphos methyl exceeded the state standard in Neal Creek, Indian Creek, and the mouth of Hood River¹. Further stream monitoring studies by OSU, DEQ, and United States Geological Survey (USGS) have continued since 2000. Most recent PSP data can be found in Section 3.3.1 and 4.3.1.
6. Some **metals** exceeded water quality standards when sampled by DEQ in 1998-2000. The source of these metals in the water is unknown and could be natural or due to human activities. According to ODA Hydrologist, Paul Measeles, the metals identified in the Management Area probably are mostly natural in origin and are likely to enter streams from erosion. Reducing sediment loads to the streams would reduce their concentrations. Source assessment will be part of future TMDL development.
7. **Sediments** carried in streams can adversely affect aquatic life by reducing light penetration and visibility, reducing water infiltration through stream substrate (harming incubating fish eggs), and irritating gill filaments. Sediment also decreases primary production and the abundance of macroinvertebrates, which are a primary food source for salmonids. Several Hood River tributaries are seasonal conduits for glacial silt and sediment, while other tributaries have no glacial influence.

Oregon currently does not have numeric sediment standards. Only one of 34 sites (Wishart Creek) sampled during the 1998 DEQ intensive study exceeded¹ the turbidity guideline of 50 Nephelometric Turbidity Units (NTUs) recommended by the Oregon Watershed Enhancement Board³ (OWEB). However, this study was conducted during the dry season when there were no rain events. It is unknown what proportion of suspended sediment in the Management Area occurs naturally as glacial silt and how much has been introduced by

human activity. Some glacial silt has been transferred to non-glacial streams by irrigation systems but this source is being reduced as irrigation districts pipe their systems.

8. **Stream-flow modifications** in the form of reduced flow can contribute to warmer water, increased pH, reduced dissolved oxygen, a general reduction in available habitat, and, in extreme cases, interferes with fish migration. Slow-moving streams are more susceptible to warming and they are less turbulent, all of which can contribute to reduced oxygen levels. A number of streams in the basin have flow modifications as irrigation districts divert water for irrigation and/or power generation. In some reaches in late summer-early fall, diversions reduce instream flows to an estimated 25 percent of normal (US Forest Service Hood River Basin Aquatic Habitat Restoration Strategy, 2006).
9. **Modification of physical habitat** can have direct adverse effects on all aquatic life. Channelization reduces the amount of habitat (stream length is usually reduced as meanders are eliminated), as well as the instream habitat complexity such as the normal mixture of pools, riffles, and runs. Channelization also prevents river water from accessing its floodplain in high flows, resulting in increased bank erosion and reduced storage of water in the soil profile. Loss of riparian vegetation often destabilizes streambanks, which results in increased erosion, increased stream sedimentation, loss of instream habitat complexity and cover, and the loss of future large woody debris that naturally falls into streams. Loss of riparian vegetation may also cause increased stream temperatures.

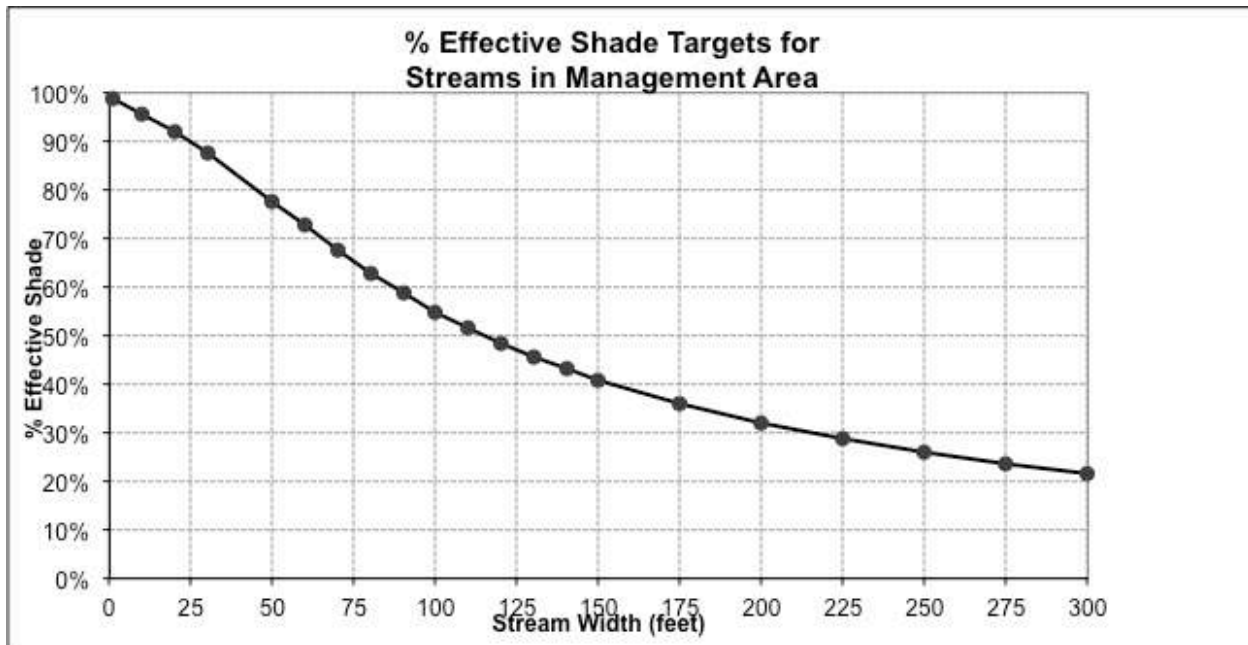
2.4.1.3 TMDLs and Agricultural Load Allocations

A TMDL for temperature was developed for the Management Area and was approved by the US EPA in January 2002¹. In June 2018, EPA approved DEQ's revision of the Temperature TMDL.

The TMDL developed by DEQ addresses high stream temperatures. The goal of the TMDL is to bring waterbodies in the Western Hood Subbasin into compliance with the temperature standard. The TMDL uses shade as a surrogate means to reduce stream heating. Shade reduces the amount of solar radiation that reaches the waterway to natural levels. The amount of "load" of solar radiation is measured by DEQ in Langley's per day. For the non-scientist, these loads have been translated into 'percent effective shade' targets, while acknowledging that flow and channel modifications also affect stream temperatures.

The TMDL contains Percent Effective Shade Targets for the Management Area. These targets were developed by evaluating the solar radiation load associated with native riparian communities that have not been impacted by human activities. **Landowners may use these targets as a guide to determine if they have sufficient riparian vegetation.** Percent effective shade is the amount of shade that reaches the stream. For example, 70 percent effective shade means that canopy cover has kept 70 percent of the sunshine on an August day from reaching the stream.

The following graph approximates these shade targets. For example, shade should intercept approximately 99 percent of the sunlight reaching a five-foot wide stream on an August day, and 89 percent of the sunlight reaching a 30-foot wide stream on an August day. The graph is a composite of multiple graphs in DEQ's TMDL.



Historic vegetation is not required along streams, although the shade and function provided by historic vegetation should be targeted. Native trees such as fir and pine, which historically lined the Management Area streams, may not be desirable in some areas. Smaller native trees and shrubs, such as willow and dogwood, may provide sufficient shade along smaller streams to attain the shade targets. As a general guideline, landowners are encouraged to maintain the widest possible band or buffer of native vegetation along the stream. Streamside vegetation buffers also absorb fertilizer and manure runoff, reduce flood erosion, filter sediment, provide habitat for birds and other wildlife, and may help protect streams from pesticide drift.

The Oregon Department of Agriculture provides reference sites and photographic examples for landowners who wish to visualize these targets.

All interested parties must understand that these targets may not be appropriate for all areas. For instance, streams at road crossings and road right of ways may not be shaded for visibility/safety reasons.

2.4.1.4 Drinking Water

Drinking water in the Management Area is from both public and private systems, and the majority of drinking water is from groundwater. Twenty-four public water systems obtain domestic drinking water from primarily groundwater sources and two systems use primarily surface water in the Management Area. Surface water and groundwater sources serve approximately 39,132 persons regularly.

Drinking water contaminants of concern that are potentially sourced from agriculture within this Management Area are: bacteria and nitrates.

The two community public water systems in the Management Area have recent alerts for bacteria that are not likely related to agriculture.

OHA rated some of the public water system wells in the Management Area for contaminant susceptibility for land use impacts to drinking water sources based on Source Water Assessments, aquifer characteristics, and well locations and construction. The Management Area has a mix of low, moderate, and high susceptibility wells. The nitrate and other contamination issues described above and the ready movement of nitrogen into aquifers in the area verify this susceptibility. Many of the wells are in high and medium leaching potential soils. Nitrate from fertilizers and septic systems can readily penetrate to aquifers used for drinking water when leaching potential is high or very high, and bacteria removal through soil filtration can be less effective in sandy soils. Measures to reduce leachable nitrate in soils would reduce risk to groundwater sources of drinking water.

Nitrate alerts (generated when nitrate exceeds 5 mg/L) were recently recorded at Odell Water Company. There were no recent violations for nitrate MCL (generated when nitrate exceeds 10 mg/L) recorded in the Management Area.

DEQ only addresses drinking water issues identified for PUBLIC water systems. Oregon Water Resources' water rights database identified 40 private domestic water rights in the area. There are also private groundwater wells for domestic use. The Domestic Well Testing Act database for 1989-2018 indicates that out 16 wells, two wells had nitrate concentrations over 3 mg/L and one well had nitrate concentrations above 5 mg/L.

It is difficult to determine how much of an impact agriculture is having on groundwater sourced for drinking in this Management Area. Landowners should always properly manage manure and fertilizer to minimize leaching of nitrates and *E. coli* to groundwater.

2.4.2 Sources of Impairment

Potential contributors to pollution in the Management Area include runoff and erosion from agricultural and forest lands, eroding streambanks, runoff from roads and urban areas, waste discharges from pipes, municipal and irrigation withdrawals, sewage treatment plants, urban storm water, recreational use, and landslides. Rerouting of runoff via road building, construction, and land surfacing such as parking areas may lead to excessive erosion or pollutant transport. Pollutants may be carried to the surface water or groundwater through the actions of rainfall, snowmelt, irrigation, and leaching. Increased heat input due to vegetation removal, seasonal flow reduction, changes in channel shape, and floodplain alteration is a source of water quality impairment. Channelization and bank instability may alter gradient, width/depth ratio, and sinuosity, thereby causing undesirable changes in sediment transport regime, erosional and depositional characteristics, and temperature. Sediment input into streams due to human activity is primarily related to roads, undersized culverts at road crossings, and irrigation ditches¹.

Land conditions associated with the following agricultural activities were identified by the LAC as potential contributors to water quality concerns:

- Removal or reduction of vegetation along streams,
- Livestock grazing and areas of concentrated livestock,
- Irrigation water use and drainage,
- Application and storage of crop nutrients and farm chemicals,
- Agricultural roads,
- Cultivation,
- Channelization.

2.5 Regulatory and Voluntary Measures

Water pollution will be minimized through a combination of landowner education and implementation of appropriate management measures. Management measures include both recommended management practices and the regulations.

This section outlines the intent of those measures, lists some voluntary recommended management practices, and presents the regulations. These management measures address the objectives of the Area Plan.

2.5.1 Management Intent

To help achieve water quality standards in the Management Area, an effective strategy must:

1. Maintain adequate vegetation along streams;
2. Minimize streambank erosion;
3. Minimize potential pollutants in streams;
4. Maximize irrigation efficiency.

Voluntary efforts are the primary means to prevent and control agricultural sources of pollution. Local, state, and federal agencies and organizations provide information and technical and financial assistance. The Hood River SWCD, NRCS, and OSU Extension are the main support agencies at the local level.

Landowners have flexibility in choosing management approaches and practices to address water quality issues on their lands. Landowners may choose to develop management systems to address problems on their own, or they may choose to work with natural resource agencies to address applicable resource issues. Landowners may seek planning assistance from any agency or a consultant.

Regulations are included in addition to voluntary strategies. ODA pursues enforcement to gain compliance with the regulations only when reasonable attempts at a voluntary solution have failed.

2.5.2 Recommended Management Practices

Appropriate management practices for individual farms may vary with the specific cropping, topographical, environmental, and economic conditions that exist at a given site. Because of these variables, it is not possible to recommend uniform management practices for all farms or ranches in the Management Area.

The following Recommended Management Practices (Table 4) generally are accepted as effective, economical, and practical on a site-specific basis for the Management Area, and they address water quality issues. They are not required. Widespread adoption of these practices will address the water quality parameters of concern in the Management Area. These practices should also maintain the economic viability of agriculture in the area.

Table 4. Some recommended management practices for the Hood River Management Area.		
INTENT	RECOMMENDED MANAGEMENT PRACTICES	OBJECTIVES
<p>Maintain Adequate Vegetation Along Streams</p> <p><i>Adequate riparian vegetation:</i></p> <ol style="list-style-type: none"> 1. Provides shade 2. Has diverse species & age structure 3. Is dense enough to filter out/trap excess nutrients, bacteria and sediment in overland or shallow subsurface flow 4. Has roots capable of withstanding high stream flows 	<ul style="list-style-type: none"> • Where manageable, preserve at least a 20-foot streamside buffer of native riparian vegetation as measured by slope distance from the high-water mark. • Plant native vegetation in riparian areas where lacking; desired species include conifer trees, willow, red osier dogwood (contact agencies or SWCD for other native species). • Control noxious weeds that compete with native vegetation. Noxious weeds include: Himalayan blackberries, Scotch broom, knapweed, purple loosestrife, Japanese knotweed, and others. Contact the SWCD for more information. • Plant or encourage low growing woody species for erosion control and shade where the need for cold air drainage conflicts with tall trees. • Limit livestock access within riparian areas by fencing off streambanks and wetlands and use water gaps or off-channel watering methods (stock tank, nose pumps, etc.). • Maintain riparian fences and other structures over time. • Control the timing and intensity of livestock access to streams by using a grazing strategy that limits livestock distribution and the duration and season of riparian area use. (Note: This strategy requires large acreage.) • Use buffers, dense ground cover, and efficient irrigation management to increase water infiltration and to prevent soil runoff. 	<ul style="list-style-type: none"> • Prevent or control increases in summer stream temperatures • Improve late season stream flows by increasing the capacity of adjacent soils to store water during spring runoff • Filter out excess nutrients, bacteria, pesticides, and sediment that could pollute streams • Maintain streambank stability and minimize erosion
<p>Minimize Streambank Erosion</p>	<ul style="list-style-type: none"> • Maintain adequate riparian vegetation (see above). • Avoid or minimize channelization and ditching of streams and wetlands. • Properly place, design, and maintain culverts, bridges, stream crossings (contact Oregon Department of State Lands (DSL), ODFW, or ODF). • Don't remove leaning trees, snags, or woody debris from streams, as they provide important habitat for fish. Check with ODFW first if there is a flood damage concern. • Use vegetation to stabilize streambanks instead of using structural methods. If vegetation alone seems inadequate, contact ODFW, DSL, or ODF. 	<ul style="list-style-type: none"> • Increase stream bank stability • Reduce sediment input to streams • Reduce channel width and increase channel depth, which in turn reduces stream temperature • Increase floodplain connectivity • Reduce storm water velocities
<p>Minimize Runoff Containing Potential Pollutants</p>	<p style="text-align: center;">Cultivated Lands</p> <ul style="list-style-type: none"> • Minimize time of soil exposure between cultivation and planting. • Use contour cultivation where applicable. • Maintain cover crops. • Use sediment basins or barriers to reduce downslope erosion. • Establish vegetative buffer strips to trap or filter sediment and/or contaminants. • Eliminate long runs when applying gopher bait, especially on hill slopes. • Reduce potential of diesel or petroleum spills from entering streams or water table by: 1) Using automatic shutoff on pressurized systems, 2) Maintaining equipment, or 3) Installing alternative frost protection methods such as orchard fans. • Keep machinery away from streams where oil or fluids can leak. • Locate filling areas away from streams and off porous soils. • Avoid over-applying fertilizer, manure, or sludge by using soil/leaf analyses to determine appropriate rates. • Do not apply fertilizer or herbicides inside the stream buffer. • Do not apply fertilizer or herbicides when expecting heavy rain, ground is frozen, or ground is too dry or when it is windy. • To avoid soil compaction, minimize machinery operations on wet soils in the rainy season. <p style="text-align: center;">Livestock Management</p> <ul style="list-style-type: none"> • Locate feedlots and corral areas on high ground where possible, away from streams and wetlands. • Limit livestock access within riparian areas by fencing off streambanks and wetlands and use water gaps or off-channel watering methods (stock tank, nose pumps, etc.). • Know the livestock carrying capacity of your farm and stay within it. 	<ul style="list-style-type: none"> • Reduce soil erosion • Reduce and capture runoff • Reduce potential pollutants in runoff

	<ul style="list-style-type: none"> • Plant dense vegetation buffer, or site pasture downslope from and adjacent to animal containment areas to filter runoff and nutrients from wastes. • Build a covered manure storage compost system. • Cover manure pile or storage area to keep rain off. • Divert clean water away from manure storage or manure-contaminated areas. • Install gutters and downspouts on livestock shelters, barns, and stables to channel stormwater away from manure and exposed soils. • Drag pastures prior to the rest period to break up manure and increase absorption of nutrients. • Use pasture rotation and good grazing management to produce more feed, fewer weeds, and a minimum of bare ground. • Allow irrigated soils to dry before grazing. • Place salt licks and supplemental feeding stations away from water supplies to encourage even grazing. • Install hardened paddock footings in heavy use areas to reduce concentrations of mud and manure. • During winter, corral animals and feed hay to avoid compacting saturated soils unless well drained and pasture is actively growing. • Subdivide large pastures into smaller ones and implement rotational grazing. Ideally, begin grazing when pasture is 6-inches tall, move when grass is 3-inches tall. Thirty days are needed for irrigated pasture regrowth, and up to three months for non-irrigated pasture. • Allow long rest periods or use a high intensity, short-duration grazing to rejuvenate a pasture in poor condition. 	
<p>Minimize Pesticides in Streams</p>	<ul style="list-style-type: none"> • Always follow the container label, apply properly, and avoid over-application. • Rinse and dispose of pesticide containers properly. • Use Integrated Fruit Production (IFP) orchard management or Integrated Pest Management (IPM) practices, e.g., insect pheromone disrupters to reduce the need for pesticides, beneficial insect populations, alternative “softer” pesticides (contact OSU Extension Agent or Experiment Station). • Monitor pest populations to document need, location, and timing of sprays. • Voluntarily reduce application amounts or number of sprays. • Maintain/service spray equipment to avoid leaks and improper calibration. • Build and maintain proper mixing facilities on less permeable soils away from wells and waterways. • Provide training for field employees in proper pesticide use and handling. • Build and maintain safe chemical storage that is away from creeks and ditches, covered, elevated, contained, and secured. • Establish and maintain vegetative buffers to reduce runoff and protect streams from accidental drift and direct application. • Where small, non-fish bearing creeks cross through orchard, pipe creek only if buffer strip or another alternative is not feasible. On-site consultation with Oregon’s DSL is recommended to avoid noncompliance with state and federal wetland conservation rules. • Do not fill tanks directly from creeks or waterways if possible – use back flow devices if you do. • Apply spray tank rinse water back onto orchard – do not drain out onto ground in one spot. • Apply aquatic herbicides correctly and sparingly, in strict accordance with label. • Minimize air drift in ground <u>and</u> aerial application: 1) Avoid spraying in wind, 2) Use tower sprayer or other directed applicator, 3) Use spray additives to reduce drift, 4) Practice one-direction spraying: spray only the outside of the outer two rows, spray inward at a lower speed for good coverage, and 5) Turn nozzles off at end of each row. • Spills: prepare a spill response plan; mix and load sprayers in areas where runoff to streams and ditches <u>cannot</u> occur; and use anti-foaming additives. • Use pesticides less prone to leaching; select and use pesticides based on your soil type. Contact OSU Extension for red-flag list of high leach soils and pesticides. 	<ul style="list-style-type: none"> • Minimize air drift of pesticides • Reduce runoff and pesticides in runoff • Minimize leaching to groundwater • Minimize chances for spills to enter streams

Maximize Irrigation Efficiency	<ul style="list-style-type: none"> • Line or pipe irrigation ditches to reduce leakage. • Adhere to your existing water rights in terms of timing and amount. • Schedule irrigation based on crop needs, soil type, climate, topography, and infiltration rates. • Monitor irrigation applications to avoid overwatering and subsequent leaching of pollutants. • Improve irrigation efficiency by replacing worn nozzles and using more precise systems. • For private diversions: locate, maintain and screen properly and provide fish passage. • Minimize return flows and impacts to streams. • Replace “big gun” pasture sprinklers with lower volume sprinklers to reduce runoff. • Irrigate pastures immediately after grazing to get plants growing again. • Reduce irrigation end loss. 	<ul style="list-style-type: none"> • Increase instream flows to reduce water temperatures • Minimize potential pollutants • Reduce soil erosion • Protect natural resources
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2.5.3 Area Rules

All landowners conducting agricultural activities on non-federal and non-Tribal Trust lands (including timber lands) must comply with OAR 603-095-1100 through 603-095-1160.

In addition to meeting requirements of existing state laws, landowners are required to manage:

- Vegetation along streams
- Soil-disturbing activities
- Manure and other wastes

Stream systems in healthy condition are expected to withstand a 25-year flood with minimal damage. Structural conservation practices generally are designed to withstand different levels of storms or floods. For instance, underground outlets and grassed waterways typically are designed for a 10-year, 24-hour storm, while drop structures, streambank protection, and larger dams are designed for at least a 25-year flood.

Requirements may become more specific over time as information becomes available on land conditions and water quality.

Oregon Administrative Rules 603-095-1140

Requirements

(1) Landowners must comply with OAR 603-95-1140(2) through (3) within the following imitations:

(a) A landowner is responsible for only those conditions resulting from activities controlled by the landowner. A landowner is not responsible for conditions resulting from activities by landowners on other lands. A landowner is not responsible for conditions that: are natural, could not have been reasonably anticipated, or that result from unusual weather events or other exceptional circumstances.

(2) Streamside Vegetation

(a) Effective upon adoption of these rules, agricultural activities must allow the establishment, growth, and maintenance of vegetation along streams. Vegetation must be sufficient to control water pollution by moderating solar heating, minimizing streambank erosion, filtering sediments and nutrients from overland flows, and improving the infiltration of water into the soil profile. The streambank should have sufficient vegetation to resist erosion during high streamflows, such as those reasonably expected to occur once every 25 years.

(3) Waste Management

(a) Effective on rule adoption, no person subject to these rules shall violate any provision of ORS 468B.025 or ORS 468B.050.

"Streams" in Rule (2) refers to natural waterways such as streams, creeks, and rivers that were created through natural processes. They may have been altered by human activities, such as channelized creeks, but not created by human activities such as irrigation ditches.

The TMDL developed by DEQ helps determine when streambank vegetation is sufficient to control water pollution.

The following regulations provide for resolution of complaints.

Complaints and Investigations (OAR 603-095-1160)

(1) When the department (ODA) receives notice of an apparent occurrence of agricultural pollution through a written complaint, its own observation, through notification by another agency, or by other means, the department may conduct an investigation. The department may, at its discretion, coordinate inspection activities with the appropriate Local Management Agency.

(2) Each notice of an alleged occurrence of agricultural pollution will be evaluated in accordance with the criteria in ORS 568.900 to 568.933 or any rules adopted thereunder to determine whether an investigation is warranted.

(3) Any person allegedly being damaged or otherwise adversely affected by agricultural pollution or alleging any violation of ORS 568.900 to 568.933 or any rules adopted thereunder may file a complaint with the department.

(4) The department will evaluate or investigate a complaint filed by a person under section OAR 603-095-1160(3) if the complaint is in writing, signed and dated by the complainant and indicates the location and description of:

(a) The waters of the state allegedly being damaged or impacted; and

(b) The property allegedly being managed under conditions violating criteria described in ORS 568.900 to 568.933 or any rules adopted thereunder.

(5) As used in section OAR 603-095-1160(4), "person" does not include any local, state, or federal agency.

(6) Notwithstanding OAR 603-095-1160, the department may investigate at any time any complaint if the department determines that the violation alleged in the complaint may present an immediate threat to the public health or safety.

(7) If the department determines that a violation of ORS 568.900 to 568.933 or any rules adopted thereunder has occurred, the landowner may be subject to the enforcement procedures of the department outlined in OARs 603-090-0060 through 603-090-0120.

Chapter 3: Implementation Strategies

Goal

Prevent and control water pollution from agricultural activities and soil erosion, and achieve applicable water quality standards.

Minimize agriculture's contribution to the following water quality concerns:

Temperature: maintain adequate vegetation along streams and sufficient instream flows; enhance natural channel morphology and minimize instream releases of warm water from ponds and reservoirs.

- Nutrients: keep nutrients on site and out of streams by applying nutrients at appropriate rates and times; minimize amount of nutrient-laden runoff; maintain adequate streamside vegetation and limit soil erosion.
- Pesticides: keep pesticides on site and out of streams by applying, handling, and storing pesticides appropriately; minimize runoff and aerial drift; maintain adequate streamside vegetation.
- Bacteria: keep livestock waste on the land and out of streams by managing pastures, watering sites, and holding facilities to control runoff; maintain adequate streamside vegetation.
- Sediment: keep soil on the land and out of streams by minimizing soil erosion and amount of soil-laden runoff; maintain adequate vegetation along streams; eliminate inter-basin water transfers.
- Petroleum products: avoid spills and clean up spills appropriately; store properly.

Achieve the following land conditions on agricultural lands throughout the management area:

- Sufficient streamside vegetation to stabilize streambanks, filter overland flow, moderate solar heating, and intercept pesticide drift.
- No visible sediment loss from cropland through precipitation or irrigation-induced erosion.
- No significant bare areas within 50 feet of streams on agricultural lands.
- Active gullies have healed or do not exist on agricultural lands.
- Stored livestock manure is under cover during the winter and in a location that minimizes risk to surface and groundwater.

The LAC expects that recommended and required actions are cost-effective and that funding is available from private and public sources to assist landowners with implementing projects.

Education is the key to the success of this Area Plan. The Hood River SWCD, NRCS, ODA, OSU-MCAREC, CTWS, and the Columbia Gorge Fruit Growers work together to provide agricultural landowners in the Management Area with information about water quality goals and requirements.

3.1 Measurable Objectives and Strategic Initiatives

Measurable objectives allow the Ag Water Quality Program to evaluate progress toward meeting water quality standards and TMDL load allocations. Any measurable objectives are stated here. Progress is reported in Chapter 4.

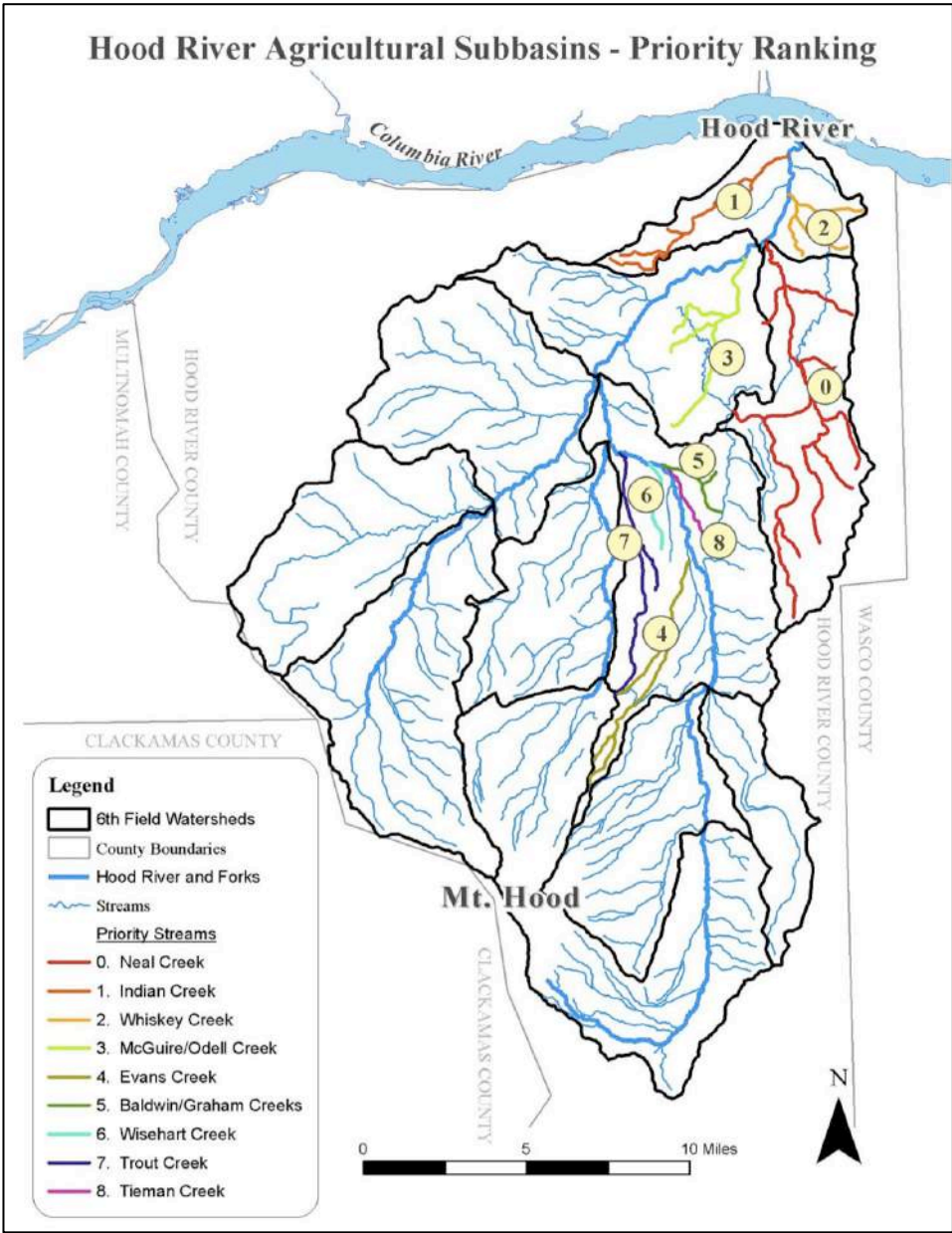
3.1.1 Management Area

The primary water quality issue in the Management Area is elevated stream temperature due to low flows because of irrigation withdrawals and also lack of riparian vegetation. For almost all landowners, irrigation water is provided by irrigation districts, so individual landowners cannot control how much water is withdrawn. While improving on-farm irrigation efficiency is an important activity to reduce overall irrigation water needs, maintaining sufficient vegetation to reduce additional heating of water is an activity that landowners can do to directly improve water quality. This vegetation will also help improve water quality by filtering out bacteria and pesticides from overland flows and intercepting pesticide drift. Therefore, the SWCD and LAC agreed that riparian vegetation conditions would be the focus on any measurable objectives developed for the Management Area.

To be strategic, the SWCD prioritized watersheds (ranked from 0-8) in the Management Area (map) using the following criteria:

- Documented water quality concern;
- High percentage of agricultural land base in Subbasin;
- Suspected water quality concerns;
- Anadromous waterways;
- Size of stream matches capacity of SWCD to address resource issues in a reasonable time frame.

Figure 3.1.1 Prioritized Watershed Ranking



3.1.2 Focus Area

The Whiskey Creek Focus Area is part of ODA’s Focus Area strategic initiative. The 2019-2021 Whiskey Creek Action Plan was developed and approved by ODA outlining the key components of the process:

- Conduct a pre-assessment of current riparian conditions and irrigation systems;
- Identify areas of concern;
- Conduct education and outreach to landowners;
- Offer technical assistance to landowners and financial assistance, if needed;
- Conduct a post-assessment after project implementation;
- Report progress to ODA and the LAC.

Results are presented in Section 4.1.2.

Riparian Condition Assessment Method: Riparian conditions are classified based on functionality. Is the vegetation sufficient to moderate solar heating, stabilize the streambank, prevent spray drift, and filter out pollutants, consistent with site capability?

To determine riparian conditions, the Hood River SWCD uses a three-step process. First, aerial photos are used to map the waterways and do a broad classification from I-IV, as defined in Table 5, below. Second, the mapped classifications are ground-truthed by stopping at all roads and public access points along mapped waterways to visually assess the ground and canopy cover along the waterway. Many of the minor tributaries in the area have been channelized, captured by irrigation ditches, or piped. Piped drainages are included in Class I as subcategory 1a, since the water is protected from solar heating, streambank erosion, and other pollutants. After ground-truthing, maps are adjusted to accurately depict piped, channelized, or captured waterways. The third step happens after contacting landowners who have riparian buffers classified as II or III. If the landowner agrees, a site visit is made to walk the length of the waterway and visually assess the riparian vegetation conditions. In all cases, a buffer of 35-feet on either side of the waterway is assessed.

To be categorized as Class I, the buffer of riparian vegetation has at least 75 percent ground cover and the stream has at least 75 percent canopy cover. To be categorized as Class II, the vegetated buffer will have at least 50 percent ground or canopy cover. Those riparian buffers categorized as Class III have either ground or canopy cover of less than 50 percent due to agricultural activities. While there are some spots where the site is not capable of growing ground or canopy cover, most lands in Hood River County are capable of growing vegetation that can function to protect water quality from agricultural pollution.

Table 5. Streamside condition classifications in the Hood River Management Area				
Class I	Class Ia	Class II	Class III	Class IV (non-ag)
Vegetation on agricultural lands likely sufficient to moderate solar heating, stabilize streambanks, and filter out pollutants consistent with site capability.	Piped drainages.	Agricultural activities allowing plant growth, but vegetation likely insufficient to moderate solar heating, stabilize streambanks, or filter out pollutants consistent with site capability.	Agricultural activities likely not allowing vegetation to moderate solar heating, stabilize streambanks, or filter out pollutants consistent with site capability.	Non-agricultural land, e.g. roads, rural residential, forest land.

Irrigation System Assessment Method: The SWCD is assessing temperature and reductions in any excess runoff due to irrigation inefficiency. The SWCD determined the acres of upgraded and non-upgraded irrigation acres in the Whiskey Creek Focus Area. For those acres, they estimated the potential water savings. To track progress they will compare this amount over time to the amount computed and used as landowners upgrade irrigation systems to micro sprinklers and use flow meters. Metric tracked are acres of orchard upgraded.

Table 6. Assessment Class	
Class A	Class B
Acres with upgraded irrigation systems	Acres with non-upgraded irrigation systems

Riparian Condition Measurable Objectives and Associated Milestones:

The LAC would like 100 percent of streambanks on agricultural lands to be in Class I throughout the Management Area. However, they believe it will take more than voluntary measures to achieve that due to the large number of small parcels, scattered rural residential properties, landowner turnover, and the small but persistent number of landowners who need the threat of regulation to make changes.

- Maintain the percentage of Class III at <0.5% by June 30, 2021, and work to reduce that status.
- Maintain the percentage of streammiles in Class II and III to <11.2% and work to reduce that status and maintain the percentage of streammiles in Class I at 88.2% or more by June 30, 2021

Irrigation Systems Measurable Objectives and Associated Milestones:

The LAC would like 100 percent of irrigation systems on agricultural lands to be in Class A throughout the Management Area. However, they believe it will take more than voluntary measures to achieve that due to the large number of small parcels, scattered rural residential properties, landowner turnover, and the small but persistent number of landowners who aren't interested in making changes or don't have the financial means to do so.

- Reduce the percentage of Class B to <64% by June 30, 2021, and work to reduce that status.

This objective has been challenging due to the characteristics noted above.

3.1.3 Strategic Implementation Area(s)

The ODA selected Odell Creek as an SIA in the Management Area for 2016-2017.

SIA Compliance Evaluation Method: ODA completed compliance evaluations related to agricultural activities and potential concerns related to surface and ground water. The evaluation considered the condition of streamside vegetation, bare ground, and potential livestock impacts (including manure piles). The process involved both a remote evaluation and field verification from publicly accessible areas. Concern levels for each property were identified:

- None = No water quality concerns related to agricultural activities were observed.
- Low = Minimal potential for agricultural activities to impact surface or groundwater OR vegetation along streams is inadequate, but unable to determine if agricultural activities are limiting vegetation.
- Moderate = Likely potential for agricultural activities to impair surface or ground water OR agricultural activities may be preventing adequate vegetation along streams.
- Significant = Field-verified likely potential for agricultural activities to impair surface or ground water OR agricultural activities may be preventing adequate vegetation along streams.
- Serious = Field-verified pollution of surface or ground water or removal of vegetation along streams.

Results are presented in Section 4.1.3.

Measurable Objective:

By May 1, 2021, all 10 tax lots identified as a moderate and significant will be downgraded to Low or None levels.

3.2 Proposed Activities

ODA, the LAC, the LMA, and other partners have identified the following priority activities, described in Table 3.2, to track progress toward meeting the goal and objectives of the Area Plan.

Table 3.2 Planned Activities for 2021-2024.

Activity	4-year Target	Description
Community and Landowner Engagement		
# active events that target landowners/managers (workshops, demonstrations, tours)	12	Pollinator workshops, irrigation efficiency, pasture management, wetlands, riparian management, livestock management, land use planning, irrigation water management
# landowners/managers participating in active events	400	This includes presenting at Winter Hort. Not all events are hosted by the SWCD. Some will be virtual due to Covid-19
Technical Assistance (TA)		
# landowners/managers provided with TA (via phone/walk-in/email/site visit)	700	More phone and email due to Covid-19 restrictions.
# site visits	70	Slightly lower due to Covid-19 restrictions
On-the-ground Project Funding		
# funding applications submitted	16	OWEB small grants, OWEB restoration, OWEB landowner engagement, DEQ 319, or other alternate sources of funding
* Definition: any written management plan to address agricultural water quality. Can include NRCS-level plans. Can include: nutrients, soil health, grazing, riparian planting, forest thinning to improve upland pastures to reduce livestock pressure on riparian areas, etc. Cannot include projects with no or weak connection to agricultural water quality (weed eradication not for riparian restoration, fuels reduction, alternative energy, rain gardens/rain harvesting, non-agricultural culvert replacement, and instream habitat enhancement that does not also improve water quality)		

3.3 Water Quality and Land Condition Monitoring

3.3.1 Water Quality

PSP: The Hood River PSP has been in existence since 2000. During that time, significant progress has been made in the reduction of organophosphate pesticide residues detected in fish-bearing streams in the watershed. These pesticides were among those that spurred the establishment of the PSP. As part of the PSP program, water quality is monitored for pesticide residues beginning in March and continuing through June and again in September and continuing through November. Water quality samples are collected from ten locations. Water samples were taken at Upper Neal Creek, Lower Neal Creek, Lenz Creek, Odell Creek, and the mainstem Hood River. The program collects data from five routine sites 11972, 13141, 13183, 13249, and 32464. The remaining sampling sites were used to collect water quality data when

sediment samples were collected as part of DEQ's Hood River sediment study. Results are presented in Section 4.3.

County Groundwater Monitoring: The Hood River SWCD, in conjunction with Hood River County and OWRD, has completed its fifth year of groundwater monitoring in Hood River County. Water levels below land surface depth are routinely measured in 51 wells throughout the county. Wells are located on agricultural lands as well as rural residential properties. Currently, groundwater is not heavily utilized for agricultural or municipal purposes in the valley. It is estimated that the use of groundwater resources will increase in future years. The goal of monitoring efforts is to develop baseline data for groundwater levels and identify any emerging trends. It usually takes about 10 years of data to identify long-term trends that are or are not climate related.

Confederated Tribes of Warm Springs: To ensure compliance with the EFID / CTWS MOA developed with the implementation of the 2013 EFID headgate upgrade, CTWS has been monitoring flows on the East Fork Hood River in the reach just downstream of the EFID head gate. As per the MOA, EFID must maintain at least 15 cfs within the 0.6mi bypass reach (this is the amount of water the fish ladder needs to properly operate).

DEQ: DEQ monitors two sites in the Management Area as part of their ambient monitoring network (Hood River at footbridge downstream of I-84 and Neal Creek at Fir Mountain Road).

DEQ retrieved data from DEQ, EPA, and USGS databases. Their report is summarized in Chapter 4 and can be found at

<https://www.oregon.gov/deq/wq/programs/Pages/wqstatustrends.aspx>.

For a description of monitoring and evaluation results, see Chapter 4.

Chapter 4: Progress and Adaptive Management

4.1 Measurable Objectives and Strategic Initiatives

4.1.1 Management Area

There are currently no management area-wide Measurable Objectives. Conservation partners have agreed to address landscape conditions throughout the management area one Focus Area at a time.

4.1.2 Whiskey Creek Focus Area

Measurable Objective			
Riparian Condition: Reduce the percentage of Class III to 0% by June 30, 2021. Riparian Condition: Reduce the percentage of stream miles in Class II and III to <4% and maintain the percentage of stream miles in Class I at 88.2% or more by June 30, 2021 Irrigation Systems: Reduce the percentage of Class B to <64% by June 30, 2021, and work to reduce that status.			
Milestones			
Riparian Condition: Reduce the percentage of Class III to <.2% by December 31, 2020, and work to reduce that status. Riparian Condition: Reduce the percentage of streammiles in Class II and III to <5% and maintain the percentage of stream miles in Class I at 88.2% or more by December 31, 2020 Irrigation Systems: Reduce the percentage of Class B to <64% by December 31, 2020, and work to reduce that status.			
Current Conditions			
Progress Toward Measurable Objectives and Milestones			
Assessment Method	Progress in each category by year		
	2019	2020	2021
Riparian Condition: class III stream feet	0.2%	0 %	TBD
Riparian Condition: class II stream feet	5.1%	0 %	TBD
Irrigated System: Class B (non-upgraded)	69.8%	64.4%	TBD
Assessment Results			
Riparian Condition:			
Class	2019: Pre-Assessment (or Conditions at Beginning of Biennium)	2021: Post-Assessment (or Conditions at End of Biennium)	
I	39.9%	TBD	
Ia	26.9%	TBD	
II	5.1%	TBD	
III	0.2%	TBD	
IV (Not Ag)	27.9%	TBD	
Total (I-IV)	100%	TBD	
Total Ag Area Assessed (= Total minus "Not Ag" and "piped")	45.2%	TBD	

Irrigated Systems:		
Class	2019: Pre-Assessment (or Conditions at Beginning of Biennium)	2021: Post-Assessment (or Conditions at End of Biennium)
A	30.2%	TBD
B	69.8%	TBD
Total (A+B)	100%	TBD
Activities and Accomplishments		
Community and Landowner Engagement		
# active events that target landowners/ operators		0
# landowners/operators participating in active events		0
Technical Assistance (TA)		
# landowners/operators provided with TA		11
# site visits		5
# conservation plans written		0
# funding applications written		3
Ag Water Quality Practices Implemented in the Focus Area		
Micro-irrigation systems		3
Irrigation pipeline		1
Irrigation water management		1
Comments: The SWCD sent out postcards to 65 landowners in the Whiskey Creek Focus Area to solicit interest in riparian and irrigation upgrade projects. No in-person events were held due to Covid-19 restrictions. NRCS continued efforts in the area through the RCPP for East Fork Irrigation District.		
Adaptive Management Discussion		
<ul style="list-style-type: none"> • COVID-19 restrictions are limiting outreach and technical assistance. For example, the SWCD has not been able to hold an open house that would most likely result in on the ground projects. • Riparian conditions in the Focus Area indicate riparian vegetation is in good condition thus the vegetation classes are unlikely to change. • RCPP funding supports the Focus Area. 		

4.1.3 Strategic Implementation Area(s)

Table 4.1.3 Odell Creek Strategic Implementation Area

Measurable Objective (ODA)		
By May 1, 2021, all 10 tax lots identified as a moderate and significant will be downgraded to Low or None levels.		
Current Conditions		
Compliance Evaluation Results		
Total Parcels in Assessment Area	=	1,175
		- 732 (N/A) (Federal Land, Not Ag, Less than 1 Acre, etc.)
		443 Parcels Evaluated
<u>Evaluation Categories</u>		<u>Pre-evaluation</u>
<u>6/6/2018</u>		<u>Post-evaluation as of</u>
No Concern	=	404 parcels
Low Concern	=	29 parcels
Moderate Concern	=	8 parcels
Significant Concern	=	2 parcels
Serious Concern	=	0 parcels
Total	=	443 Parcels
		413 parcels
		30 parcels
		0 parcels
		0 parcels
		0 parcels
		443 Parcels

<p>Compliance Actions</p> <ul style="list-style-type: none"> • Each property owner was sent an invitation to an ODA led Open House; (February 21, 2017; 257 landowner invitations were sent). • ODA held Open House (February 21, 2017; 28 landowners attended). • For landowners with parcels evaluated with Moderate, Significant, or Serious Concern, ODA initiated 16 compliance cases (March 2017). Five cases were closed with no investigation after further evaluation with landowners and partners.
<p>Activities and Accomplishments</p> <ul style="list-style-type: none"> • Secured OWEB funding to improve conditions at the two (2) “significant” ranked properties in the Odell SIA. • Staff collaborated with ODA Water Quality Specialist to send a follow-up outreach email to twenty-three (23) Odell SIA landowners. • Harvested plant material from the Port of Klickitat with CTWS staff and planted ~600 dogwood and willow stakes and seeded ~ 1/3 acre with native swale mix at one of the Odell SIA project sites. • Worked with the CTWS to secure fencing materials for livestock fencing projects in the SIA. • Worked with both landowners to fence riparian areas and develop hardened livestock crossings. Restored a degraded section of streambank. Planted native vegetation.
<p>Adaptive Management Discussion</p> <ul style="list-style-type: none"> • ODA met their measurable objective. Tax lots in the Odell Creek SIA were determined to be in compliance with the streamside and waste Area Rules in November 2019, although restoration work continued until May 2021. • Funding for compliance cases should not require landowner match if possible because it is difficult to get buy in when the landowner is not on board and projects can stall. • SWCD is voluntary and doesn’t want to be perceived as regulatory. • SIA might benefit from prioritizing the areas that would benefit the most from shade and riparian improvements. • Bottom-up approach, led by the farmers might help with the SIAs. • Partnerships with Irrigation Districts and others are key.

4.2 Activities and Accomplishments

ODA, the LAC, the LMA, and other partners identified the following priority activities to track progress toward meeting the goal and objectives of the Area Plan. ODA will review the four-year results and then provide a report at the end of the 2021-2023 Biennium.

Future Area Plans will compare results and targets in Table 4.2a.

Table 4.2a Activities conducted in 2017-2020 by Hood River SWCD, Hood River Watershed Group, Dee Irrigation District, East Fork Irrigation District, NRCS

Activity	4-year results	Description
Community and Landowner Engagement		
# active events that target landowners/managers (workshops, demonstrations, tours)	6	IWM, soil moisture monitoring, winter hort meetings, PSP, Farm succession, soil health. Low active events due to COVID-19.
# landowners/managers participating in active events	186	186 in 2019-20. Low active event participation due to COVID-19.
HRWG Watershed 2040 outreach event	30	Launched the new Action Plan
Technical Assistance (TA)		
# landowners/managers provided with TA (via phone/walk-in/email/site visit)	1,127	887 from 2017-19. 240 so far from 2019-20
# site visits	136	87 from 2017-19. 49 so far from 2019-20.

# conservation plans written*	-	SWCD does not write CP. NRCS writes CP.
CIS written for EFID's Dukes Valley patrons for irrigation upgrades	1	
On-the-ground Project Funding		
# funding applications submitted	30	23 from 2017-19. 7 so far from 2019-20
# funding applications awarded	29	22 from 2017-19. 7 so far from 2019-20.
Dee Irrigation District pipeline project	1	Funding secured for pipeline, completed 2020
EFID eastside lateral pipeline project	1	Funding secured for pipeline, construction to start late 2020
NRCS – acres completed from 2017 - 2020	853	irrigation system, micro, irrigation water management, irrigation pipeline
* Definition: any written management plan to address agricultural water quality. Can include NRCS-level plans or simpler plans. Can include: nutrients, soil health, water quality, irrigation, grazing, riparian planting, forest thinning to improve upland pastures to reduce livestock pressure on riparian areas, etc. Cannot include projects with no or weak connection to ag water quality (weed eradication that is not for riparian restoration, fuels reduction, alternative energy, non-ag rain gardens/rain harvesting, non-ag culvert replacement, and instream habitat enhancement that does not also improve water quality)		

Table 4.2b and 4.2c summarize information from the OWRI on restoration project funding and accomplishments on agricultural lands in the Management Area. The majority of OWRI entries represent voluntary actions of private landowners who have worked in partnership with federal, state, and local groups to improve aquatic habitat and water quality conditions. OWRI results are provided annually in January after a year of proofing and GIS management. *Note that NRCS EQIP funded projects are not reported in OWRI and were queried from NRCS

Table 4.2b Implementation funding (cash and in-kind) for projects on agricultural lands reported 1997-2018 (OWRI data include most, but not all projects, implemented in the Management Area)

Landowners	OWEB	DEQ	NRCS	BPA	Irrigation Districts	CTWSR	All other sources*	TOTAL
\$589,049	\$4,103,820	\$261,600	\$14,450,678	\$2,952,888	\$3,224,619	\$3,036,533	\$2,066,659	\$30,685,846

*includes city, county, and other state and federal programs, and non-profit organizations. There were too many entities to list.

Table 4.2c Miles and acres treated on agricultural lands reported 1997-2018 (OWRI data include most, but not all projects, implemented in the Management Area)

Activity Type	Miles	Acres	Count*	Activity Description
Riparian	4	12	-	Various riparian improvement projects
Fish Passage	58	-	10	20 miles for EFID Push Up Dam Removal and 21.5 miles for Dee ID Piping
Instream habitat	1	-	-	
Instream flow	13			6.4 for EFID Push Up Dam Removal and 6.3 miles for Dee ID Piping
Wetland	-	0	-	
Road	0	-	1	
Upland	-	15,482	-	Irrigation Improvement Projects. 13,256 from NRCS for irrigation, pipeline, IWM, CSP
TOTAL	75	17,772	11	

* # of hardened crossings, culverts, etc.

4.3 Water Quality and Land Condition Monitoring

4.3.1 Water Quality

Representatives of the CTWS, Hood River Watershed Group, irrigation districts, DEQ, and other state and federal agencies are currently monitor various water quality parameters in the Management Area including stream temperature, bacteria, turbidity, pesticides, nutrients, and riparian vegetation.

PSP: Only one benchmark exceedance was noted in the PSP area during the 2017-19 Biennium that being one detection of imidacloprid. No detections of that insecticide were observed in either 2018 or 2019. Other than the imidacloprid no benchmark exceedances were observed during the biennium.

Diuron (a persistent herbicide) declined in both median concentration and frequency of detection. Frequency declined from 82% in 2017 to 45% in 2019.

Table 4.3.1a Hood River PSP data table 2017-2019

Pesticide	Pesticide Type	Detection Frequency	Detections Above 50% Acute ALB	Detections Above 50% Chronic ALB
Imidacloprid	Insecticide	0.8%	1	-
2,6-Dichlorobenzamide	Metabolite	73%	-	-
Deisopropylatrazine	Metabolite	36%	-	-
Diuron	Herbicide	47%	-	-

With the exception of imidacloprid (insecticide and one detection) there were no pesticides of high concern. The Aquatic Life Benchmark (ALB) for imidacloprid is so low that when it is detected, it usually exceeds the chronic ALB.

County Groundwater Monitoring – Water levels in all wells have been stable (no sign of declines) and seasonal water level fluctuations are small. The SWCD will continue monitoring wells for the next 6 years.

Confederated Tribes of Warm Springs: As a response to the 2015 drought year, CTWS monitoring of flows on the East Fork Hood River in the reach just downstream of the EFID head gate showed that EFID maintained at least 15 cfs within the channel throughout the 2015-2020 irrigation seasons. CTWS will continue to monitor flows into the future as needed.

DEQ: DEQ analyzed data from 2001 through 2019 for dissolved oxygen, *E. coli*, pH, total phosphorus, temperature, and total suspended solids in the Management Area. (DEQ. 2020 Oregon Water Quality Status and Trends Report. <https://www.oregon.gov/deq/wq/programs/Pages/wqstatustrends.aspx>).

Of 271 stations, 33 had sufficient data to evaluate water quality status from 2016-2019 and 2000-2019 trends. Table 4.3.1 focuses on Hood River and its tributaries downstream of the national forest.

Site Description	Parameter					
	<i>E. coli</i>	pH	Dissolve d Oxygen	Temperature	Total Phosphorus (mg/L)	Total Suspended Solids (mg/L)
	Attainment Status and Trend				median; maximum ¹	median; maximum ²
Hood River @ mouth	Yes	Yes ↓	Yes	No ↓	0.025; 0.13	6; 92
Indian Ck @ Union Ave (RM ~0.5)	-	↓	-	-	-	-
Indian Creek @ CGCC (RM 0.97)	No	-	-	-	-	-
Neal Ck @ mouth	-	↓	↑	↓	-	↑
West Fk Neal Ck	-	-	-	Yes	-	↑
Lenz Ck @ mouth	-	↓	-	-	-	-
Neal Ck @ Fir Mountain Rd	Yes	Yes ↓	Yes	-	0.04; 0.19	6.5; 124
WF Neal Ck @ USFS boundary	-	-	-	-	-	-
East, West, and Middle Forks Hood River blw National Forest	-	-	-	No ↓	-	-
9 sites on the National Forest	-	-	-	4 Yes, 5 No	-	-

¹ DEQ has no benchmark for total phosphorus in this Management Area; ODA benchmark for potential water quality concerns = 0.08 mg/L

² DEQ has no benchmark for total suspended solids in this Management Area

↑ Statistically significant improving trend

↓ Statistically significant degrading trend

Stream temperatures and pH are the greatest concerns in this analysis. Stream temperatures do not meet the standard at most of the stations below the national forest, where the majority of agricultural activities occur, and temperatures are increasing. pH is and has been attained at sites throughout the watershed in the last 20 years, however, all trends are degrading (increasing). Total suspended solids are improving in Neal Creek, where projects to address irrigation end spills are ongoing.

4.4 Biennial Reviews and Adaptive Management

ODA, the LAC, the LMA, and other partners met on December 9, 2020, to review implementation of the Area Plan and provided recommendations for the future (Tables 4.4a and 4.4b).

Table 4.4a Summary of biennial review discussion

Summary of Progress and Impediments
<ul style="list-style-type: none"> • SIA projects are successful and improving agricultural water quality; • Hard to get small projects funded for willing landowners without having to write grants; • In cases where the landowner did not volunteer to do the project, try to fund the entire project and don't rely on landowner to use their time implementing the project as match; • Hard to quantify the work that has already been completed and how that benefits/improves water quality; • Alternate sources for water are needed in the Management Area (groundwater storage, reservoir, etc).
Recommended Modifications and Adaptive Management
<ul style="list-style-type: none"> • The Area Plan was modified to include new 303d listings and drinking water section. Updates were provided for Focus Area, SIAs, and most recent water quality data.

- ODA and the SWCDs may benefit from taking a closer look at the The Freshwater Trust shade and riparian modeling when it overlaps with SIAs or Focus Areas. Modeling may be able to capture change over time related to reductions in N loading and temperature reductions.

Table 4.4b Number of ODA compliance actions in 2018-2020

Location	Letter of Compliance	Pre-Enforcement Notification	Notice of Noncompliance	Civil Penalty
Outside SIA(s)	0	0	0	0
Within SIA(s)	2	0	0	0

CITED SOURCES

- ¹ Hood River Watershed Group and H. Coccoli. Hood River Watershed Assessment Report. Hood River, OR. 1999.
- ² Oregon Department of Environmental Quality. Western Hood Subbasin Total Maximum Daily Load (TMDL). December 2001. This document can be viewed at:
<http://www.deq.state.or.us/wq/tmdls/Hood/HoodTMDLFinal.pdf>
- ³ Watershed Professionals Network. Oregon Watershed Assessment Manual. Prepared for the Governor's Watershed Enhancement Board, Salem, OR. 1999.
- ⁴ Cline, C. The effects of forest fertilization on the Tahuya River, Kitsap Peninsula, Washington. Washington State Department of Ecology. 1973.
- ⁵ MacDonald, L.H., A.W. Smart, and R.C. Wissmar. Monitoring Guidelines to Evaluate Effects of Forestry Activities on Streams in the Pacific Northwest and Alaska. EPA 910/9-91-001. 1991.
- ⁶ United States Environmental Protection Agency. Quality Criteria for Water.
- ⁷ Oregon Agripedia (<https://www.oregon.gov/ODA/agriculture/Pages/Statistics.aspx>).