# Malheur Agricultural Water Quality Management Area Plan

**January 21, 2021**

**Developed by the**

**Oregon Department of Agriculture**

and the

**Malheur 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
**CNPCP** – Coastal Nonpoint Pollution Control Program
**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 603-095-0900). 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).

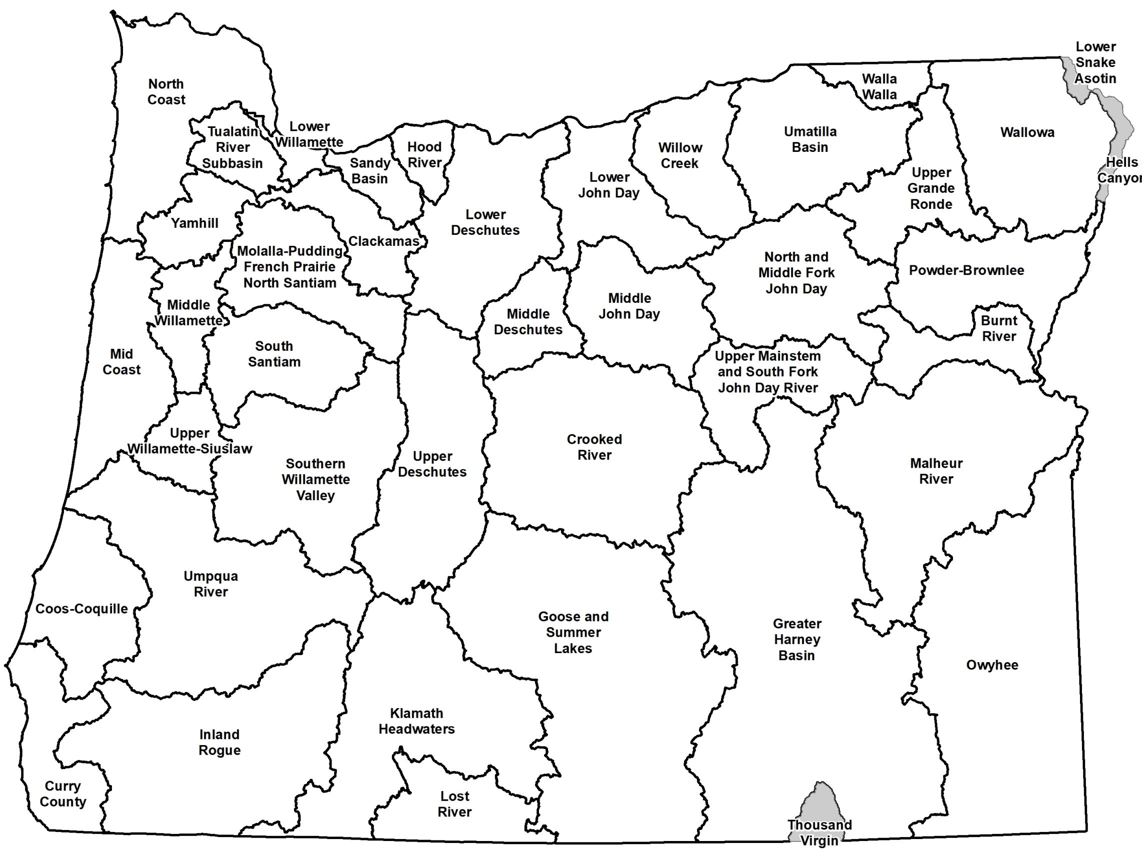
## 1.2 History of the Ag Water Quality Program

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).

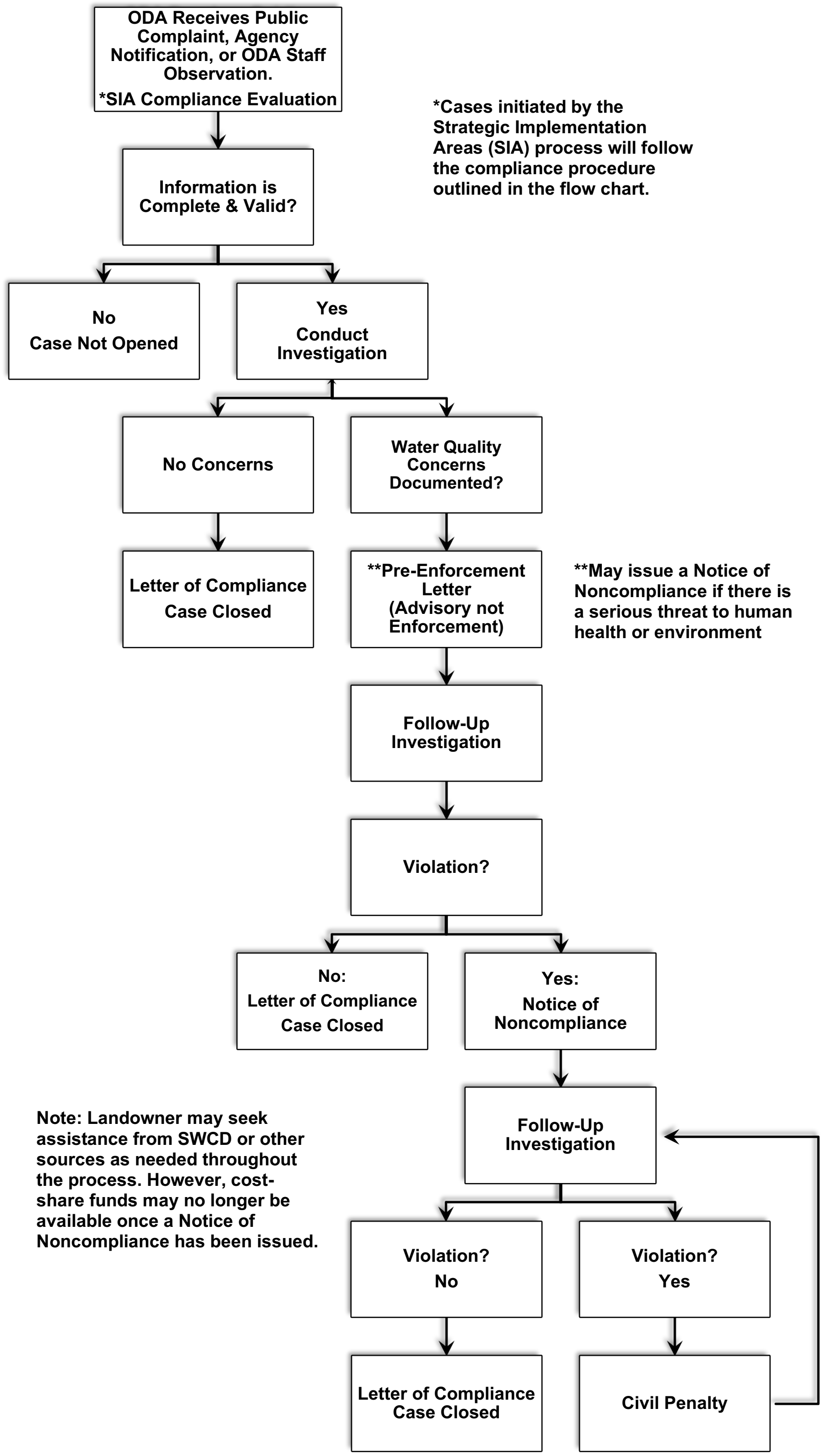
ODA bases Area Plans and Area Rules on scientific information (ORS 568.909). ODA works in partnership with SWCDs, LACs, DEQ, and other partners to implement, evaluate, and update the Area Plans and Area Rules. If and when other governmental policies, programs, or rules conflict with the Area Plan or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

If there is a GWMA in this Management Area, it is described in Chapter 2.

### 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 (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.

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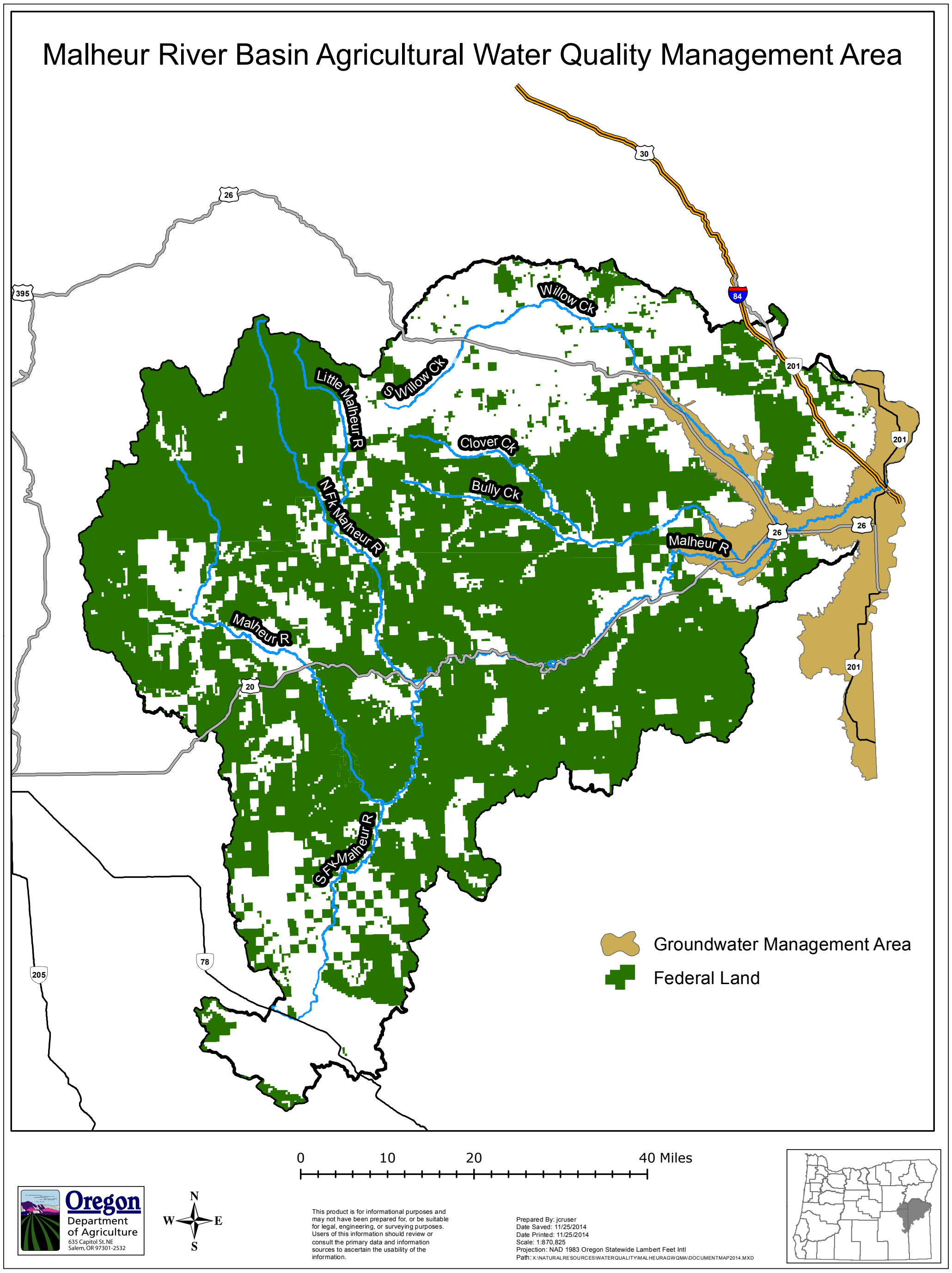
# Chapter 2: Local Background

The Management Area consists of the Malheur River Basin as defined by the United States Geologic Survey. The area includes the entire drainage of the Malheur River plus areas draining to the Snake River between the Burnt River and one mile south of Ontario, including Birch Creek, Moore's Hollow, and Jacobsen Gulch (Figure 3).

**Figure 3. Map of Management Area**



## 2.1 Local Roles

This Area Plan was developed by ODA with assistance from volunteer members of the LAC and the Malheur County SWCD, in consultation with members of the community. All entities involved in this Area Plan are committed to maintaining and improving the economic viability of agriculture in the Management Area. Productive and profitable agriculture is the cornerstone of the local economy. Social well-being is directly tied to this agricultural activity and the value-added processed goods provided. The income from these enterprises is indispensable.

The agricultural community of the Management Area has a sincere desire to protect the natural resources that everyone depends on. Most farmers and ranchers in the area have demonstrated that concern by applying environmentally friendly practices on their property. Many have implemented conservation projects to improve water quality and protect wildlife. Local growers and agencies have shown by implementing the Northern Malheur County Groundwater Protection Plan (Anon., 1991) that they can protect natural resources and maintain profitable agriculture.

### 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 |
|---|---|---|
| Doug Maag (Chair) | Jamieson | Cattle and Row Crops |
| Jim Bentz | Drewsey | Cattle |
| Herb Futter | Ontario | Retired NRCS |
| Les Ito | Ontario | Row Crops |
| Bob Moore | Ontario | Environmental Community |
| Marvin Rempel | Vale | Dairy |
| Bill Romans | Westfall | Rancher |
| Marc Suyematsu | Ontario | Row Crops |
| Loren Weideman | Vale | Hobby Farmer |
| Vacant | | |
| Vacant | | |
| Vacant | | |

### 2.1.2 Local Management Agency

Implementation of the Area Plan is accomplished through an Intergovernmental Grant Agreement between ODA and the Malheur County and Harney SWCDs. These Intergovernmental Grant Agreements define the SWCDs as the LMAs for implementation of the Ag Water Quality Program in this Management Area. The SWCDs were also involved in development of the Area Plan and Area Rules.

The LMAs implement 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

The Malheur River Basin lies in east-central Oregon and covers 4,610 square miles. About 63 percent of the area is in Malheur County, 27 percent in Harney County, and small areas in Grant and Baker counties. The Malheur River is 190 miles long, and its headwaters are in the Strawberry Range at an elevation of about 9,000 feet. Principal tributaries are the North Fork, the Middle Fork, and the South Fork. The Middle Fork originates in a federally designated wilderness area.

High Lake is the only natural lake of significant size in the basin and is a popular recreation area. However, there are several reservoirs; the largest are Warm Springs, Beulah, Bully, and Malheur. The South Fork has only minor dams.

**Climate**
The climate is semi-arid with hot, dry summers and cold winters. Summer high temperatures average between 85-95°F and can be higher than 100°F. Winter high temperatures average in the 20s and can dip to -45°F. Precipitation averages 8 to 40-inches annually, depending on location and elevation. Most precipitation falls during the winter as snow; this mountain snowpack is an important source of water for irrigation, fish, wildlife, livestock, domestic water supply and other uses.

The area is prone to sudden, short but intense storms. These storms can cause erosion and high amounts of runoff. Despite the dams in the watershed, flooding occurs in the Vale and Ontario areas. Flooding also occurs higher up in the basin. For example, the town of Drewsey experiences floods as often as every 10 years. A primary cause of flooding is rain-on-snow events, when rain falls on snow, exceeds soil water infiltration rates, and water quickly reaches streams and rivers. Soil water infiltration rates are extremely low when the soil is wet and frozen. This occurred during the rain-on-snow event that caused the flood of 1993. Floodwaters can scour stream banks and damage riparian vegetation.

**Topography/Geology**
Most of the basin consists of gently sloping plateau uplands separated by river canyons or valleys. Elevations range from around 2,000 feet near the Malheur River's confluence with the Snake River to mountainous plateaus above 5,000 feet and isolated peaks above 9,000 feet. The Management Area is divided into three main geographic divisions: (1) low elevation terraces and floodplains in the irrigated eastern part, (2) grass-shrub uplands comprising the majority of the basin, and (3) forested uplands in the northwestern portion. These divisions generally correspond to the Snake River plain, Sagebrush steppe, and Blue Mountain provinces.

The low-elevation terraces and flood plains that parallel the Snake River and extend up the valleys of the Malheur River and Willow Creek are important agricultural areas. These irrigated areas are intensively managed for wheat, sugar beets, onions, potatoes, corn, mint, grain, alfalfa seed, vegetable seed, irrigated pasture, and hay.

The grass-shrub uplands consist mainly of rolling, hilly terrain underlain by old sediments, volcanic basalt, and ash deposits. Sagebrush and native bunchgrass communities at higher elevations dominate the Malheur River Basin. Sagebrush/bunchgrass communities are the most widespread types in southeastern Oregon. Sagebrush/annual grass communities are common at lower elevations. Perennial grasslands dominate for long periods following fire due to the reduction of overstory canopy and subsequent release of the grasses. Many of the upper sagebrush steep areas are being invaded by western juniper.

The forested uplands are located in the northwest corner of the basin. Prior to fire suppression, open ponderosa pine stands dominated. Presently, understory conifers and shrubs crowd the forests. More frequent, low intensity fires could reduce this crowding. Forested areas are used for livestock summer range, and are important for deer and elk habitat. Some native hay is produced by flooding the meadow basins at intermediate elevations.

The build-up of fuels in both forests and rangelands is of great concern to watershed health and water quality. This build-up encourages hot destructive fires that burn down to mineral soil and make thousands of acres of land susceptible to erosion to local rivers.

**Water Resources**

The Malheur River system can be categorized into three separate zones: (1) the upper zone, above all major reservoirs, (2) a middle zone, below the reservoirs to the irrigation diversion dam at Namorf, and (3) a lower zone, from Namorf to the mouth.

Flow in the upper zone is controlled by precipitation and snowmelt patterns that result in natural cycles of high spring flows and low summer flows. Flows on the Middle Fork at Drewsey ranged from 12,000 cubic feet per second (cfs) at peak flood stage to zero during dry years between 1921 and 2012. On the North Fork above Beulah Reservoir, flows ranged from 4,000 cfs to 8.5 cfs between 1914 and 2012.

Flow in the middle zone is managed according to irrigation water demand in the lower agricultural valley during the irrigation season (April to mid-October). During the winter months, however, flows are greatly reduced to store water in reservoirs for the following irrigation season. Winter flows are limited to leakage from the reservoirs, natural springs and flows from the undammed South Fork. During the spring, water may be released from the reservoirs in accordance with the rate of snowmelt and inflow into the reservoir. Normally during the irrigation season, water released from Beulah Dam averages between 75 and 300 cfs.

Occasionally, the area experiences winter or spring floods despite the control provided by the reservoirs. This happens after heavy rains or fast snowmelt. These floods can erode streambanks and damage riparian vegetation.

Building a new dam in the Vines Hill area is one way to improve the efficiency of this system. Currently, irrigators must request water from Warm Springs Reservoir four days in advance. This causes several water quality problems. One example is if in that four-day period a storm occurs, it could cause flows beyond what the channel can safely handle. A dam at Vines Hill would reduce the travel time of irrigation water to 12 hours. This greater control would reduce the chances of unexpected high flows and match water deliveries to crop needs. This dam would also capture and store more water for later in the season and keep sediment from continuing down the Malheur River. Another advantage of this proposed dam is to provide irrigation water if minimal pool levels are maintained in Beulah Reservoir to support bull trout.

The lower zone is characterized by several irrigation diversion dams and is a mixing zone for irrigation return flows from several drain canals and from Bully Creek and Willow Creek. The summer flows vary according to irrigation water demand, amount of water diverted into the various canals, and amount of return flow.

John Fremont described Willow Creek as the “dry fork of the Malheur” in 1843, a wash that his group followed until they cut over the hills toward Farewell Bend (Fremont, 1843). During the summer months, Willow Creek was ordinarily a dry wash from Brogan to the Malheur River until irrigation projects were developed. The natural channel has been modified to facilitate farming, and the creek serves as an important drainage and irrigation canal for farmland in the area. Willow Creek, between Brogan and Malheur Reservoir, was placer-mined and dredged for gold and silver in the past. The flow in this reach of Willow Creek is controlled by water released from Malheur Reservoir. Above the reservoir, water flow is determined by natural cycles and irrigation demand.

Bully Creek is another tributary to the Malheur River. Above the reservoir, water flow is determined by natural cycles and irrigation demand. Much like Willow Creek, the lower reaches of Bully Creek have been straightened to facilitate farming and serves as an important drainage and irrigation canal for farmland in the area.

On October 14, 2016, the Oregon Water Resources Commission approved a request by ODA to extend the term of the Malheur Reservations of Unappropriated Water (OAR 690-510-0110) an additional 20-years so that they expire on January 7, 2037. The total reservation, which has a priority date of November 6, 1992 is comprised of: (a) 35,000 ac-ft of the Malheur River and tributaries, excluding the North Fork and South Fork Malheur rivers; and (b) 13,200 acre-feet of the South Fork Malheur River. Water from the reservations is to be stored in a surface or subsurface multipurpose reservoir; used for future economic development in agriculture, including irrigation and stockwater; agricultural, municipal or commercial use; recreation and hydropower generation.

### Agriculture's Economic Importance to the Management Area

Agriculture and its related industries are the largest sector of the Malheur County economy. When measured by the percentage of total sales, food crop procurement, and processing, it was the largest industry, followed by crop production; livestock production, procurement and feeding; wholesale and retail trade. Oregon State University (OSU) estimated Malheur County’s gross agricultural income in 2017 at $353,326,000. Cattle and onions were the top agricultural commodities, bringing in about $154,000,000. Part of the income is generated in the Owyhee Watershed.

The 2017 Census of Agriculture estimated that Malheur County had 964 farms on 1,093,362 acres.

### Irrigation

Irrigation practices in the Management Area, particularly in the row crop areas, differ from those in most areas in Oregon.

Furrow irrigation is the primary technique and is a desirable and viable method of irrigation when managed properly. It consists of placing water in furrows and allowing the water to flow downhill by gravity. When the water reaches the end of the field, it is collected in a small ditch, which could direct it to a variety of places. Usually the water is returned to an irrigation ditch and reused by another farmer down the line. By the time the water is returned to the Malheur or the Snake River, it has been used up to seven times. As a consequence of water reuse, the cumulative efficiency of the cooperative system of furrow irrigation is vastly more efficient than calculations of furrow irrigation based on isolated fields.

The Bureau of Reclamation and private companies developed the irrigation system with this reuse of return flow in mind. The system consists of diverting water from a reservoir or from the river to a main canal then to smaller canals and laterals and finally to individual farms. The main canals are arranged one below the next to catch the return flow. During the latter part of the irrigation season, the water in many of these ditches can be largely return flow. For example, by the middle of June in most years, all the water in the Nevada Ditch has been used for irrigation at least once if not many times.

In many ways, this reuse of water is efficient. It helps increase the length of the irrigation season. This system would be difficult to change because of the complexity of its design and the need for groundwater recharge and incidental wetlands.

However, landowners are converting their furrow irrigation systems into more efficient systems where possible. Sprinklers and drip technology apply water more efficiently to crops and result in less soil, fertilizer, and manure runoff to ground and surface water.

## 2.4 Agricultural Water Quality

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

Producers and agencies in the Malheur Watershed have a history of very high voluntary cooperative action to improve water quality. Substantial voluntary cooperative progress has resulted in steep declines in groundwater contamination by the residues of Dacthal and steady declines in groundwater nitrate (Richerson, P.M., 2014; Shock et al., 2001; Shock and Shock, 2012). Voluntarily adopting practices that protect surface and groundwater quality are widespread (Foley, 2013).

The LAC is committed to the rational use of natural resources for income and social welfare of the residents of Malheur County. The LAC is committed to conducting production practices consistent with the preservation of the natural resources of the county including water quality. In keeping with these principles, it is essential that all rules and regulations be based on sound science. Malheur County has low per capita income and high unemployment in comparison with the remainder of Oregon. As a matter of fairness, all aspects of this Plan must be sound and contribute to income and employment.

### 2.4.1 Water Quality Issues

#### 2.4.1.1 Beneficial Uses

Fish and aquatic life are considered some of the most sensitive beneficial uses in the basin. The fish-use designation for the lower 65 miles of the Malheur River, along with the lower portions of Willow and Bully creeks, is Cool Water Species (no salmonid use). The headwaters of the mainstem Malheur River, North Fork Malheur River, and Little Malheur River are designated either Bull Trout Spawning and Rearing or Core Cold-Water habitat. The remaining streams in the basin are designated redband or Lahontan Cutthroat Trout habitat, however, Lahontan Cutthroat are not known to exist in the basin.

The native fish that use the Snake River include bull trout and redband trout, northern pike minnow, large-scale and bridgelip suckers, mountain whitefish, and white sturgeon. Adult bull trout use the river and reservoirs in and below Hells Canyon Reservoir. Bull trout are listed as threatened under the Endangered Species Act (ESA). The river and its tributaries below Hells Canyon Dam also provide habitat for the Snake River fall and spring/summer Chinook as well as steelhead, all of which are listed as threatened under the ESA.

In addition, many people receive their drinking water from wells. Well monitoring studies detected nitrate and Dacthal di-acid contamination in the shallow aquifer within the Lower Willow Creek and irrigated portion of the main Malheur River Basin. This area of the Malheur River Basin was designated a Groundwater Management Area in 1989 by Oregon DEQ for nitrate residue levels.

#### 2.4.1.2 WQ Parameters and 303(d) list

Data indicate that moderate-to-high nutrient and bacteria loading starts in the upper Malheur River above Warm Springs and Beulah reservoirs. Significant increases in bacteria, phosphorus, nitrate, and chlorophyll occur in the lower river below Bully and Willow creeks. Similar dramatically increasing patterns of bacteria and nutrient loading occur in Bully Creek below Bully Reservoir and Willow Creek below Malheur Reservoir.

In December 2018, the EPA approved Oregon's 303(d) list of impaired waterbodies (www.oregon.gov/deq/wq/Pages/epaApprovedIR.aspx). Stream temperatures and bacteria are the major concerns in multiple tributary watersheds to the Malheur River. The Malheur River and its major tributaries are also on the 303(d) list (Table 2.4.1.2). And, methylmercury has been detected above water quality standards in several reservoirs.

Table 2.4.1.2 303(d) listings for various reaches of the Malheur River and its main tributaries.

| | |
|---|---|
| Malheur River | Chlorophyll-a; bacteria, metals, some pesticides, temperature |
| Stinkingwater Creek | Temperature |
| Willow Creek | Chlorophyll-a; metals; *E. coli*, Biocriteria |
| Pine Creek | Temperature |
| Bully Creek | Metals, bacteria |
| North Fork Malheur River | Temperature, Fecal Coliform; Dissolved Oxygen |
| South Fork Malheur River | Temperature |
| Little Malheur River | Temperature |
| Basin Creek | Biocriteria, Temperature |
| Cottonwood Creek | Temperature |

Most non-compliance with water quality standards, e.g. temperature and chlorophyll *a*, relate to the beneficial use of resident fish and aquatic life. In addition, excessive levels of bacteria (*E. coli*), nitrates, and toxics can cause problems for people (human contact recreation and drinking water).

Elevated stream temperatures can stress aquatic organisms and deplete oxygen from water. Low dissolved oxygen creates problems for fish and other aquatic life. The LAC believes that much of the elevated temperatures in the watershed are naturally occurring.

Excessive nutrients, such as nitrogen and phosphorus, can increase plant growth, which in turn can increase pH and reduce dissolved oxygen through daily respiration and photosynthesis processes. The nitrate drinking water standard is 10 mg/L.

Nitrates are primarily carried into surface and groundwater dissolved in water. Phosphorus can be either dissolved or attached to soil particles. Sediment carried in streams can also impair aquatic life by reducing light penetration and visibility, reducing water infiltration through stream substrate (harming incubating fish eggs), and irritating gill filaments.

Toxics such as arsenic have been found in drinking water wells. The source is likely naturally occurring arsenic within the volcanic rocks of the region (Phil Richerson (DEQ), personal communication, 2014). Of 42 locations (40 wells and two surface drains) sampled by DEQ, 93 percent have average arsenic concentrations exceeding the 10 mg/L drinking water standard.

"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 actually limiting factor (e.g. sediment, excessive nutrients, temperature).

#### 2.4.1.3 TMDLs and Agricultural Load Allocations

The TMDL was finalized by DEQ in September 2010 and submitted to the US EPA for approval. The TMDL focuses primarily on phosphorus, bacteria, and temperature and contains load allocations for these pollutants. The goal is to meet these load allocations, however, the LAC questions whether the 1) phosphorus target is achievable due to naturally occurring phosphorus in local volcanic-based soils, and 2) shade targets are based on sound science.

#### Agricultural Load Allocations

**Total phosphorus in the Malheur River at Ontario needs to be reduced by 81-87 percent** to meet standards in the Snake River, primarily through reduction in sediment in irrigation return flows. Cleaner return flows will also reduce bacteria levels.

**The TMDL sets a goal of reducing bacteria in the Malheur River at Ontario by 83% during low flows and 34% during high flows. Bacteria at the mouths of Jacobson and Shepherd Gulch must be reduced by 89-99%.** The load allocations are assigned to nonpoint sources of bacteria collectively including agriculture, wildlife, urban, and residential land uses. Large bacteria contributions to the Lower Malheur River occur in Vale where Bully Creek and Willow Creek discharge to the Malheur River, along with significant contributions from irrigation return drains in the area. The bacteria load from Willow Creek actually exceeds the load capacity for the Malheur River in Ontario, and Bully Creek had a bacteria load approximately half the load capacity of the Malheur River.

**The TMDL states that high water temperatures are to be moderated primarily through improvements in riparian vegetation.** The goal of the TMDL is to reduce the amount of solar radiation that reaches the waterway to natural levels. The amount of "load" of solar radiation is measured by DEQ in langleys per day. For the non-scientist, these loads have been translated into 'percent effective shade' targets. The LAC questions whether the temperature and shade targets are achievable due to naturally occurring heat load and historic scarcity of tall riparian vegetation capable of shading streams (Clark and Keller, 1966).

The TMDL contains Percent Effective Shade Targets for the Management Area. **Landowners may use these targets as a guide to determine if they have sufficient riparian vegetation.** DEQ does not expect the potential target to be met at all locations due to natural vegetation disturbance.

Percent effective shade is the amount of shade that reaches the stream. For example, 70 percent effective shade means that topography (hillsides) and canopy cover have kept 70 percent of the sunshine on an August day from reaching the stream. DEQ developed these targets by evaluating the solar radiation load associated with native riparian communities that have not been altered by human activities.

DEQ modeled current and potential percent effective shade along 100 miles of the upper portions of the Malheur River and North Fork Malheur River. DEQ also created shade targets for 'non-modeled' stream reaches. The targets are presented in 25 'shade curves' based on expected native vegetation in different eco-regions.

Historic vegetation is not required along streams, although the shade and function provided by historic vegetation should be targeted. 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.

**TMDL Water Quality Management Plan**

Excerpts from the *Malheur River Basin TMDL Water Quality Management Plan (WQMP), September 2010* are italicized below:

*4.2 Condition Assessment and Problem Description*

*The Malheur River system is characterized by high levels of nutrients, which trigger algae blooms and depressed oxygen levels that are particularly acute downstream in the Snake River. The lower portion of the river and its tributaries also contain elevated levels of bacteria and the legacy pesticides, dieldrin, and DDT. The upper portions of the Malheur River system do not meet water quality standards for temperature.*

*4.3 Goals and Objectives*

*The goal of this WQMP is to reduce nonpoint source pollution in the form of nutrient, bacteria, pesticide, and solar heating to the Malheur River and its tributaries. This goal will be achieved through the implementation of best management practices in agricultural as well as urban areas, and the implementation of riparian vegetation restoration projects. With regard to riparian vegetation restoration, land managers should use the information in the TMDL and referenced documentation as a resource but defer to site-specific conditions when establishing site potential vegetation.*

*4.4 Proposed Management Strategies*

*DEQ recognizes that restoration efforts have been underway in the Malheur River Basin for many years. It is also widely recognized that much more work is needed and that success depends on a united pro-active approach that involves all stakeholders in the basin. DEQ is reliant upon Designated Management Agencies for programs and projects that will address sources of non-point pollution. The following is a list of conditions that need to be addressed by TMDL implementation plans:*

- *Healthy riparian vegetation,*

- *Stable and natural stream channels along with increases in sinuosity and functioning floodplains,*
- *Upland land management that will support the development of natural stream channels,*
- *Reductions in nutrient loading (particularly phosphorus) throughout the basin,*
- *Reductions in bacteria loading,*
- *Reductions in sediment loading, which will lead to reductions in bacteria, phosphorus, and toxics (legacy pesticides) loading,*
- *A less "flashy" hydrograph with a reduction in storm-induced runoff along with increased summer base flows above the major reservoirs, and winter base flows below the major reservoirs.*

*<u>4.5 Timeline for Implementing Management Strategies</u>*
*DEQ recognizes that it may take from several years to several decades after full implementation of the TMDL before management practices identified in a TMDL implementation plan become fully effective in reducing and controlling forms of pollution such as heat loads from lack of riparian vegetation.*

*<u>4.9 Identification of Existing Sector-Specific Implementation Plans</u>*
*Providing information, education, technical assistance, and grant writing assistance to landowners is the primary strategy for ODA and the Soil and Water Conservation Districts to achieve water quality improvement in the Malheur River Basin. The Malheur County and Harney SWCDs, acting as the Local Management Agencies, are the lead organizations responsible for implementing this strategy of education and assistance.*

*<u>4.11 Reasonable Assurance</u>*
*TMDL implementation plans are not required for irrigation districts within the Malheur River Basin as long as the districts agree to participate in the implementation of the Malheur River Basin [Area Plan].*

*An implementation plan for the Malheur River Basin TMDL is not required as long as the City of Ontario agrees to support the implementation of the TMDL while conducting activities, which have the potential to impact water quality.*

*TMDL implementation plans are not required…[from Harney and Malheur counties…at this time as long as the counties agree to support implementation of the TMDL and the Malheur River and Harney [Area Plans].*

*<u>4.12 Monitoring and Evaluation</u>*
*It is anticipated that monitoring efforts will consist of some of the following types of activities:*
- *Reports on the numbers, types and locations of projects, BMPs [Best Management Practices] and educational activities completed;*
- *Water quality monitoring for parameters such as temperature, sediment, nutrients, bacteria and pesticides;*
- *Monitoring of riparian condition, percent effective shade, channel type, and channel width/depth to assess progress toward achieving system potential targets established in the temperature TMDL.*

*<u>5.1 Nutrient, Bacteria and Sediment Load Reduction Activities</u>*
*Best Management Practices for irrigated agriculture have been developed and implemented on a wide scale. In addition, irrigation systems have been improved by installing concrete-lined*

*irrigation ditches, and piped water delivery systems. Wetlands and sediment ponds have been constructed to trap sediment and reduce nutrient and bacteria concentrations. As described in Section 4.0 of the TMDL document, these actions have resulted measurable reductions in sediment and bacteria concentrations. Reductions in nutrient concentrations have been difficult to document, but the work continues.*

*Examples of Best Management Practices for Flood Irrigated Lands are listed below (Shock, 2011):*

- *Irrigation Schedule Optimization*
- *Sediment Basin and Tail Water Recovery (Pump-Back Systems)*
- *Polyacrylamide (PAM)*
- *Mechanical Straw Mulching*
- *Water Conservation Methods*
- *Filter Strips*
- *Gated Pipe*
- *Surge Irrigation*
- *Laser Leveling*
- *Turbulent Fountain Weed Screens*
- *Underground Outlets for Field Tail Water*
- *Nutrient Management*
- *Improved Confined Animal Feeding Operation (CAFO) Practices*

*It is unlikely that the 81-87% reduction in total phosphorus calculated for the Lower Malheur River can be practically achieved without very significant commitments of resources to BMP implementation throughout the basin over several decades. However, incremental progress toward the goal will likely have significant benefits to water quality for not only phosphorus but also sediment, pesticides, riparian condition, shade and stream habitat. The goal can be reassessed during 5-year review cycles and modified if deemed appropriate.*

*<u>5.2 Temperature and Flow Related Mitigation Activities</u>*

*Possible public and private land non-point source temperature TMDL implementation activities might include some of the following actions:*

- *Development of alternative forage for livestock displaced by changes in management strategies for riparian recovery and/or fire recovery;*
- *Development of water reservoirs using reserved water rights;*
- *Integration of fuel management strategies with riparian vegetation restoration projects;*
- *In-stream flow restoration related to projects, which increase irrigation system efficiency;*
- *Aquifer storage projects, which allow the beneficial release of water in late irrigation season;*
- *Juniper management as a component of watershed restoration;*
- *Invasive Species Management;*
- *Feral Horse Management.*

#### 2.4.1.4 Drinking Water

Twenty-three public water systems obtain domestic drinking water from groundwater in the Management Area. All public nine public water systems that have had alerts for *E. coli* or nitrates in the last ten years are in the lower Malheur River Valley and many overlap with the Groundwater Management Area.

There are also numerous private groundwater wells for domestic use. The Domestic Well Testing Act database (real estate transaction testing data) for 1989-2018 indicates 88 significant detections of nitrate (>7mg/L) out of 530 wells. Of those private wells, 55 had nitrate concentrations ≥10mg/L. Most of the results are from Ontario and Vale.

Nitrates and *E. coli* are often related to animal and cropland agriculture as well as on-site septic systems. Nitrate from fertilizers, manure, and septic systems can readily penetrate to the 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.

Attention may be needed to well depth, well construction, nitrate leaching potential of local soils, and proximity to nutrient sources such as septic systems, fertilizer use sites, and high concentrations of livestock.

**2.4.1.5 GWMA**

DEQ developed the Northen Malheur County Groundwater Mangement Area Action Plan to reduce nitrate concentrations to 7 mg/L (https://www.oregon.gov/deq/FilterDocs/gw-nmcgwma-bmpimplrpt.pdf).

Nitrate concentrations found in the groundwater are strongly influenced by agricultural fertilization, shallow depth to water table, large amounts of irrigation water applied, permeable soil types, and direction of ground water flow. Nitrates were detected in the majority of 25 wells in the Management Area that have been sampled regularly since 1991. Results through December 2012 show that 80 percent exceeded the 10 mg/L standard at least once, 64 percent had an average nitrate concentration above the 7 mg/L target, and 44 percent had an average that exceeded the 10 mg/L standard. The highest nitrate levels were around Vale and Annex.

In 2014, DEQ concluded in their DRAFT Fourth Northern Malheur County Groundwater Management Area Nitrate Trend Analysis Report that:

- The decrease in nitrate concentrations from 1991 through 2012 is statistically significant, even though some wells show increasing trends.
- The Action Plan goal of an area-wide nitrate concentration of 7 mg/L has not yet been met. Area-wide mean and median concentrations are 12.5 and 9.9, respectively.
- Continued and perhaps expanded best management practices implementation is needed.

Dacthal was a commonly used herbicide in onions for decades. It is no longer an issue because growers stopped using it in 1995-1998.

The contamination of nitrates and Dacthal di-acid is believed to have occurred over decades of irrigation.
Best management practices to reduce groundwater contamination include (Action Plan; Appendix D):

- Soil, plant tissue, and water testing for precise nutrient management,
- Applying nutrients at agronomic rates specific to each crop,
- Pest management with products with short half-lives,
- Conservation cropping sequence,
- Continuing sound crop rotation,
- Mulching and polyacrylamide (PAM),
- Irrigation water management, including irrigation scheduling,

- Piping or lining irrigation delivery systems,
- Conversion to more efficient systems of irrigation,
- Capturing and reusing field runoff for irrigation.

Additional information is available on the Malheur Experiment Station website (http://www.cropinfo.net/BestPractices/).

Groundwater moves an estimated 0.4 miles per year in the Cairo Junction area, and it may take over 11 years for water in the Cairo Junction area to discharge to surface water. Other estimates have indicated it will take 20 years for the groundwater to move from the upper reaches of the aquifer to the lower discharge areas.

Due to this slow movement of groundwater, it will take decades to realize the full benefit of improved agronomic practices.

## 2.5 Regulatory and Voluntary Measures

This Area Plan provides farmers, ranchers, and other agricultural land users in the Management Area a tool to achieve the following conditions on the land they occupy and manage:

1. Minimize delivery of sediment, nutrients, and bacteria to streams.
2. Minimize delivery of nitrates and pesticides to groundwater.
3. Sediment in irrigation return flows within acceptable levels.
4. Stream bank erosion within acceptable levels.
5. Adequate riparian vegetation for bank stability and stream shading consistent with vegetative site capability.
6. Sufficient vegetation on rangelands and pastures to filter sediment, utilize nutrients, control soil erosion, optimize infiltration of water into the soil profile, and minimize the rate and maximize the duration of runoff from precipitation.

Voluntary efforts are the focus of the ODA, Malheur County SWCD and LAC. However, a landowner may refuse to take advantage of voluntary compliance opportunities. In this case, ODA has enforcement authority to ensure pollution control. According to the Management Area Regulations (OAR 603-095-0940), “A landowner shall be responsible for only those conditions caused by agricultural activities conducted on land controlled by the landowner. A landowner is not responsible for prohibited conditions resulting from actions by another landowner. Conditions resulting from unusual weather events (equaling or exceeding a 25-year storm event) or other exceptional circumstances are not the responsibility of the landowner. Limited duration activities may be exempted from these conditions subject to prior approval by the department.”

### 2.5.1 Area Rules and Voluntary Measures

**#1 - Pollution Control and Waste Management**
Agricultural activities can affect surface water nutrient concentrations in many ways. Improper application of fertilizer can contaminate shallow groundwater, which in turn can pollute domestic wells and surface water. Surface water can be polluted directly by irrigation return flows carrying high levels of nutrients or bacteria. Improper management of accumulated manure can contribute bacteria and nutrients to surface water.

Objective: Reduce waste discharge to the maximum extent practicable.

Performance Criteria

1. Runoff is diverted away from accumulated waste or areas of high animal usage.
2. Accumulated manure is placed on low-permeability surfaces, such as concrete, clays, or compacted silts where water does not pond.
3. Animals are confined where there is little chance of transporting pollutants to waters of the state.
4. Crop nutrients are applied at agronomic rates.
5. Irrigation water is cleaned or captured before it enters streams.

Prohibited Condition (OAR 603-095-0940(2)

**Effective upon adoption: No person subject to these rules shall violate any provision of ORS 468B.025 or ORS 468B.050.**

**#2 – Sediment in Irrigation Return Flows**

Sediment is defined as soil particles, both mineral and organic, that are in suspension, are being transported, or have been moved from the site of origin by flowing water or gravity. Excessive levels of sediment in tailwater discharges can harm aquatic life and can carry nutrients, particularly phosphorus, into streams and rivers.

The LAC and ODA worked hard to develop a reasonable approach to controlling sediment levels in irrigation return flows. This is a particular concern in the Management Area because of the existing primarily furrow irrigation system.

Objective: Control irrigation surface water return flows so they minimize degradating water quality on the stream into which they flow.

Performance Criterion

Sediment is captured from irrigation runoff before it enters rivers and streams.

Prohibited Condition (OAR 603-095-0940(3)

**(a) After January 1, 2006, irrigation surface water return flow to waters of the state shall not cause an excessive, systematic, or persistent increase in sediment levels already present in the receiving waters, except where the return flows do not cause the receiving waters to exceed established sediment standards.**

**(b) A landowner conducting irrigation activities in accordance with a plan approved in writing by the department or its designee shall be deemed to be in compliance with this rule.**

**#3 - Riparian Area Management**

Vegetation, both in the uplands and in the riparian area, plays a critical role in water quality. Generally, healthy plant communities:

- Hold soil in place,
- Protect streambanks,
- Capture, store, and safely release precipitation,
- Filter nutrients from both the groundwater and surface runoff, and
- Provide shade to moderate water temperatures.

Stable streambanks reduce sedimentation and nutrient inputs into streams. They help moderate water temperatures because average water depth is greater, and banks in good condition provide cover and resting places for fish as well.

In addition to the water quality benefits, healthy terrestrial vegetation contributes to improved fish habitat. Riparian vegetation protects spawning, rearing, and holding areas by trapping sediment that could smother eggs and by improving the recruitment of large woody debris. This debris helps to create pools for fish to rest in, provides hiding cover, and habitat diversity. Vegetation provides organic debris to feed aquatic insects, which are an essential element in the diets of many fish.

Riparian vegetation, consistent with site capability, is a cost-effective means of reducing stream bank erosion and heating from solar radiation. Research and practical examples have shown that land managers can maintain riparian health and conduct agricultural activities as well.

<u>Objectives:</u> Riparian vegetation provides 1) sufficient root mass for stream bank stability, and 2) shading to reduce the solar heating rate of surface water. Riparian systems withstand a 25-year event.

<u>Performance Criteria</u>
An effort to systematically assess current conditions and determine vegetative site capability in the planning area will be done at a future date.

Technical criteria to determine attainment of this condition include but are not limited to:

1. Ongoing natural recruitment of riparian vegetation is evident.
2. Management activities minimize the degradation of established native vegetation.
3. Management activities maintain at least 50% of each year's growth of woody vegetation; both trees and shrubs.
4. Management activities maintain streambank integrity through 25-year flood events.

Prohibited Conditions (OAR 603-095-0940(4) and (5)

**(4)(a) By January 1, 2006, no person may cause active streambank erosion beyond the level that would be anticipated from natural disturbances given existing hydrologic characteristics.**
**(5)(a) By January 1, 2006, no conditions are allowed that prevent the establishment and development of adequate riparian vegetation consistent with vegetative site capability to control water pollution by providing control of erosion, filtering of sediments, moderation of solar heating and infiltration of water into the soil profile.**

**#4 - Rangeland and Pasture Management**
Desirable upland native vegetation functions as a water trap and filter, where rain and snowmelt are captured and incorporated into the sub-surface soil layers. Any decline in range condition, as measured by the NRCS's site guides, affect water infiltration rates into the sub-soil where surface runoff may supersede infiltration. Reducing infiltration rates lead to damaging floods, erosion, and lower late season flows. Although riparian areas are vital to water quality, they comprise only a small percentage of the landscape. It is important for water quality purposes to maintain and improve the condition of all vegetation in the watershed.

<u>Objective:</u> Protect and improve range conditions.

Performance Criteria

1. Plant community is dominated neither by invasive annual plant species nor by overgrowth of native woody species.
2. Plant cover (plants plus plant litter) is adequate to protect site.
3. Distribution and amount of bare ground does not exceed what is expected for site.
4. Livestock utilization patterns do not exhibit excessive, sustained use in key areas.
5. Plant vigor levels and regeneration are sufficient to protect long-term site integrity.

Prohibited Condition (OAR 603-095-0940(6)

**(a) By January 1, 2006, vegetative condition on rangelands and pasturelands shall be managed such that the functionality of the watershed is not impaired. Watershed function includes the ability of vegetation to filter sediment, utilize nutrients, control soil erosion, optimize infiltration of water to the soil profile, and minimize the rate and maximize the duration of runoff from precipitation.**
**(b) A landowner conducting range and pasture management activities in accordance with a plan approved in writing by the department or its designee shall be deemed to be in compliance with this rule.**

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.

The LAC established these objectives to achieve the Area Plan goal:

1. Keep soil in place on both crop and rangelands
2. Keep streambanks vegetated

The following conditions on agricultural lands contribute to good water quality in this Management Area:

1. Sufficient site-capable vegetation is established along streams to stabilize streambanks, filter overland flow, and moderate solar heating,
2. Crop lands are covered throughout the year with either production crops, crop residues, or cover crops,
3. Pastures have minimal bare ground,
4. Irrigation runoff does not deliver sediment, nutrients, or chemicals to streams,
5. Leachate and residues from livestock manure are not entering streams or groundwater.

## 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

ODA is working with SWCDs and LACs throughout Oregon toward establishing long-term measurable objectives to achieve desired conditions. Currently, ODA and the Malheur County SWCD are using Focus Area measurable objectives and the Upper North Fork Malheur River and Malheur River (Drewsey) SIAs to show progress in this Management Area. These are described below.

### 3.1.2 Focus Aeas

The Malheur County SWCD is selecting Focus Areas that consist of ‘drain-sheds’: irrigated lands that contribute runoff to specific water quality monitoring locations in agricultural drains. The Malheur County SWCD assesses each field for likelihood to contribute pollutants via irrigation runoff (Table 3.1.2) and sets measurable objectives for improved farming practices for the drain-shed. Local partners are currently working to refine the methodology to take other conservation practices, such as reduced tillage, into account.

| Table 3.1.2: Categories for assessing farm fields for the likelihood of contributing sediment and total phosphorus to irrigation drains | | |
|---|---|---|
| | **Likelihood of pollutants in field runoff** | **Irrigation System** |
| **Class 1** | None or minimal | Pivot, swipe, linear |
| **Class 2** | Some | Other sprinkler: Wheel line, solid set, big gun, hand lines, etc. |
| **Class 3** | Very likely | Flood |
| **Class 4** | Likely at some times | Drip in annual crop |

At the same time, the Malheur County SWCD measures total suspended solids and total phosphorus in the drain. Annual median values will be compared over time to hopefully show improved water quality as a result of changes in field management.

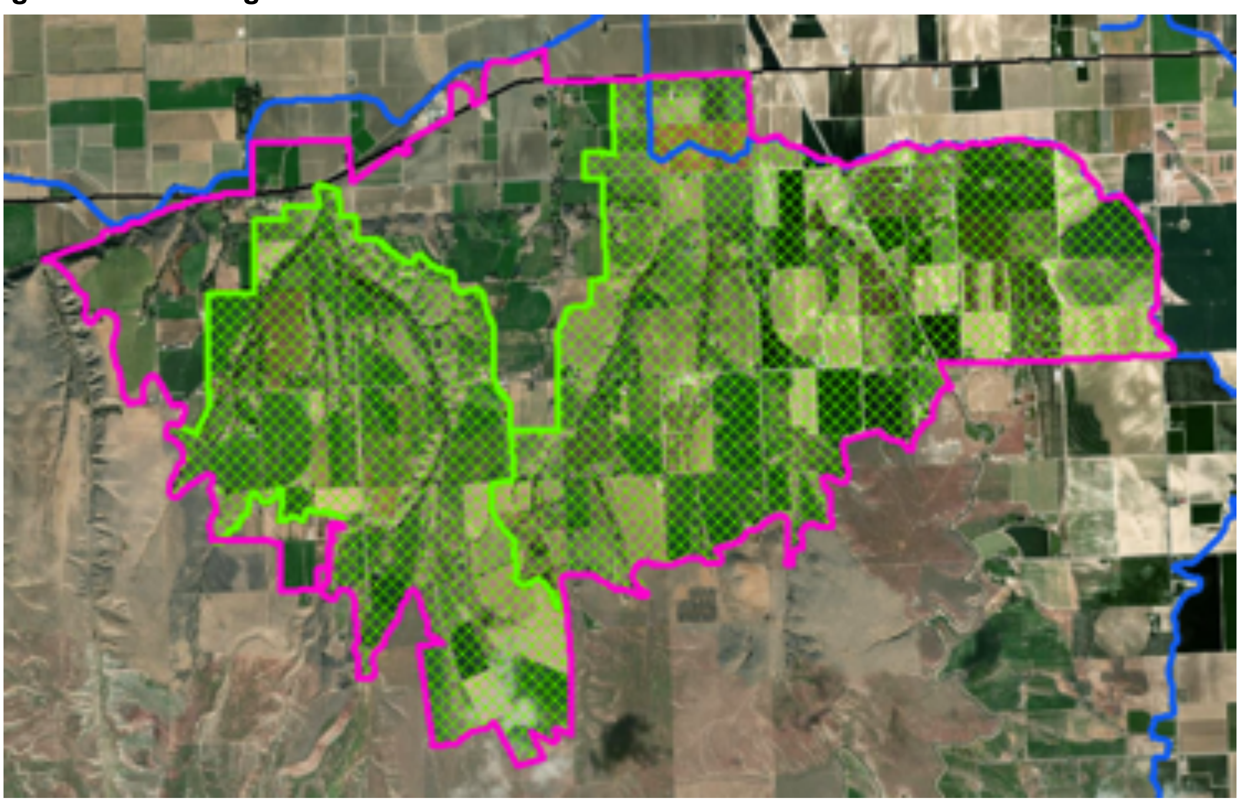
**3.1.2.1 Sheperd and New Coyote Focus Areas**

After the biennial review meeting and before the Area Plan was finalized, the Malheur County SWCD decided to terminate the Sheperd and New Coyote Focus Area. NRCS had moved their efforts to other areas and the SWCD did not plan to seek other funding opportunities for this area.

**3.1.2.2 Morgan Bench Focus Areas**

The Morgan Bench Focus Area (pink outline) consists of about 13,356 acres that drain to the Malheur River via Lee Drain and Shoestring Canal (green crosshatch) and the Nevada/Blanton Ditch. It is hoped that work in the entire Focus Area will be completed in about 10 years.

**Figure 3.1.2.2 Morgan Bench Focus Area**



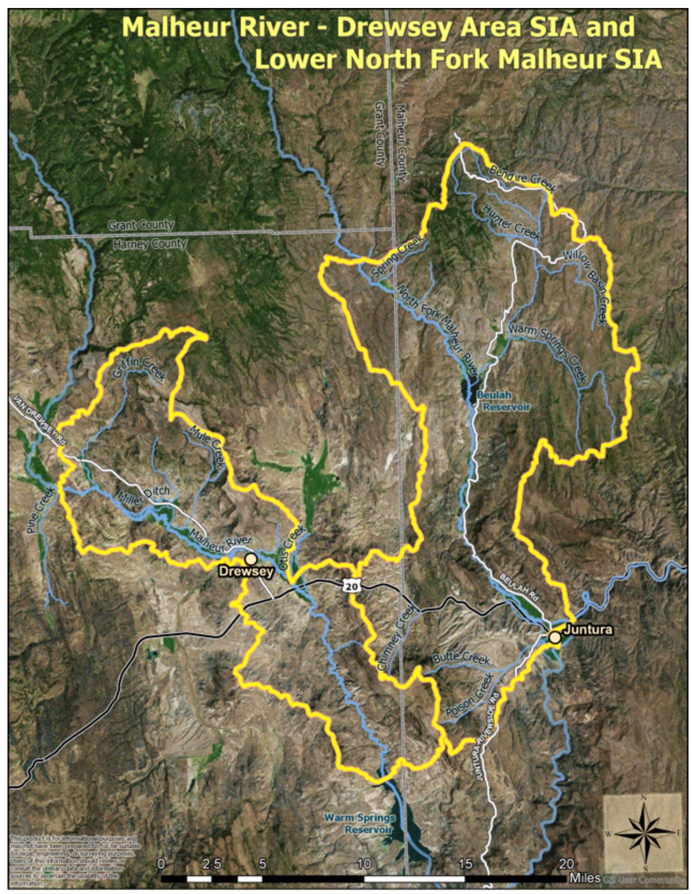
Assessment Method:
Table 3.1.2 and annual medians of total phosphorus and total suspended at four monitoring locations.

Measurable Objectives and Associated Milestones:
By June 30, 2022: Increase Class 1 to 1,400 acres (33%); reduce Class 3 to 1,750 acres (40%)

By June 30, 2030: Increase Class 1 to 2,375 acres (55%); reduce Class 3 to 1,500 acres (35%)

#### **3.1.2.3 Willow Creek Special Emphasis Area (Malheur Watershed Council)**
Measurable Objective: Complete all the piping of laterals that is possible

### **3.1.3 Strategic Implementation Areas**




In 2018, ODA selected the Lower North Fork Malheur River and Malheur River (Drewsey) SIAs in the Management Area. The Lower North Fork Malheur River SIA consists of 49,508 private agricultural acres (grazed rangelands and irrigated pastures) and 218 stream miles. ODA staff evaluated 173 tax lots, of which only three were classified as potential violations, and two as opportunities for improvement. The Malheur River (Drewsey) SIA consists of 53,586 private agricultural acres (grazed rangelands and irrigated pastures) and 149 stream miles. ODA staff evaluated 129 tax lots, of which only three were classified as potential violations, and two as opportunities for improvement.

In both SIAs, ODA identified insufficient streamside vegetation due to excessive livestock use and runoff from heavy use areas entering irrigation ditches as the primary water quality concerns. ODA held informational Open Houses for landowners in December 2018. The Malheur SWCD has been working with landowners in the Lower North Fork Malheur River SIA, and Harney SWCD staff are working with landowners in the Malheur River (Drewsey) SIA.

SIA Compliance Evaluation Method:
ODA completed a compliance evaluation of 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.

Categories for evaluation are:

- **Limited Opportunity for Improvement (L):** ODA identified that there are likely no regulatory concerns,
- **Low Opportunity for Improvement (LL):** ODA identified that there are likely no regulatory concerns, but there may be an opportunity for improvement (uplift) to reach the ecological goals of the Area Plan,
- **Opportunity for Improvement (OFI):** ODA identified that agricultural activities may be impairing water quality, or evaluation was inconclusive using remote and field verifications,
- **Potential Violation (PV):** ODA identified during the remote evaluation and verified during the field evaluation from a publicly accessible location, that a potential violation of the Area Plan Rules exists.

Measurable Objective:
By October 24, 2022, 100% of evaluated agricultural tax lots in the North Fork Malheur River and Malheur River (Drewsey) SIAs will be in compliance with the streamside vegetation and water pollution (waste) Area Rules.

#### 3.1.4 Groundwater Management Area

The goal of the GWMA Action Plan is to reduce nitrate concentrations to 7 mg/L. No milestones have been set by DEQ.

### 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 2020-2024.**

| Activity | 4-year Target | Description |
|---|---|---|
| **Community and Landowner Engagement** | | |
| # active events target landowners/managers (workshops, demonstrations, tours) | 12 | Field Days and Irrigation District meeting working with irrigation changes |
| # landowners/managers participating in active events | 100 | Field Days and Irigation District meeting working with irrigation changes |
| **Technical Assistance (TA)** | | |
| # landowners/managers provided with TA (via phone/walk-in/email/site visit) | 60 | |
| # site visits | 30 | Field Visits for Planning and Completion |
| # conservation plans written* | 13 | |
| **On-the-ground Project Funding** | | |
| # Management area funding applications submitted | 11 | Upland Projects including Juniper removal and stream bank protection |
| # Focus Area Projects submitted | 2 | Buried open ditch to Pivots |
| * 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

DEQ monitors six sites in the Management Area as part of their ambient monitoring network (Malheur River at Ontario, Little Valley, and Drewsey; Willow Creek at Vale and Jamieson; and Bully Creek at Hwy 20).

ODA staff worked with the Malheur Watershed Council, Malheur Co SWCD, DEQ, OSU Experiment Station, Idaho Power, and Bureau of Reclamation to gather all flow and water quality data collected in the Management Area through 2016. The result is almost 11,000 samples collected from over 150 locations since 1960. The data have been analyzed and looked at to determine:

- Long-term water quality trends,
- Priority areas for on-the-ground projects,
- Background levels of nutrients and sediment,
- Data gaps
- Future monitoring activities.

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# Chapter 4: Progress and Adaptive Management

## 4.1 Measurable Objectives and Strategic Initiatives

The following tables provide the assessment results and progress toward measurable objectives and milestones in the last four years. See Chapter 3.1 for background and assessment methods.

### 4.1.1 Management Area

### 4.1.2 Focus Areas and Other Focused Efforts in Small Watersheds

#### 4.2.1.1 Sheperd/New Coyote Focus Area

This Focus Area has been discontinued.

#### 4.1.2.2 Morgan Bench Focus Area

**Table 4.1.2.2 Morgan Bench and Shepperd/New Coyote Focus Areas**

| **Measurable Objective** |
|---|
| By June 30, 2030: Increase Class 1 to 2,375 acres (55%); reduce Class 3 to 1,500 acres (35%) |
| **Milestones** |
| By June 30, 2022: Increase Class 1 to 1,400 acres (33%); reduce Class 3 to 1,750 acres (40%) |
| **Current Conditions** |
| **Progress Toward Measurable Objectives and Milestones**<br>The first milestone has just been set. |
| Assessment Results:<br>Class 1 = 1,150 acres (27%), Class 3 = 2,010 acres (47%) |
| **Activities and Accomplishments** |
| • April – June 2020: 48 samples were collected in Morgan Bench |
| **Adaptive Management Discussion** |
| • Too early in process to discuss adaptive management |

#### 4.1.2.3 Willow Creek Special Emphasis Area (Malheur Watershed Council)

**4.1.2.3 Willow Creek Special Emphasis Area**

| **Measurable Objective** |
|---|
| Complete all the piping of laterals that is possible |
| **Progress Toward Measurable Objective:** Achieved |
| **Activities and Accomplishments** |
| • 179 acres of flood irrigation converted to sprinklers<br>• 9,450 feet of streambank restoration (occurring above the reservoir)<br>• 5,313 feet of fencing for controlling livestock<br>• 2 active events held (reduced number due to Covid restrictions)<br>• 20 landowner participated in active events<br>• Technical Assistance provided to 23 patrons includiong 17 project designs and 6 technical assistance grants applied for.<br>• Participated in over 20 landowner site visits for recommendations |

### 4.1.3 Strategic Implementation Areas

**Table 4.1.3 Lower North Fork Malheur River and Malheur River (Drewsey) SIAs**

**Measurable Objective (ODA)**

By 10/24/22, 100% of evaluated agricultural tax lots in the Lower North Fork Malheur River and Malheur River (Drewsey) SIAs are evaluated at the Low and Limited opportunity levels.

**Local Partner Objectives**

**Lower North Fork Malheur River**

- Engage landowners regarding SIA and project opportunities
- Develop an area action plan for future restoration implementation
- Identify and implement conservation and restoration measures
- Develop and implement a monitoring plan
- Increase staff capacity by providing monetary support for a project watershed technician

**Malheur River (Drewsey)**

- Bring all landowners in the SIA to at least zero potential violations. From there, we will do uplift projects to improve the watershed environmental conditions.
- Improve the watershed environmental conditions. Develop and implement ag water quality monitoring plan, including riparian enhancement monitoring, water quality parameters, riparian vegetation make up and levels and reporting type and intervals, etc.

**Current Conditions (ODA Field Evaluations)**

**Lower North Fork Malheur River**

Opportunities as of 10/24/18:
98% of 173 evaluated agricultural tax lots are evaluated at the Low and Limited opportunity levels. 2% of 173 evaluated agricultural tax lots are opportunities for water quality improvement.
L = 158, LO = 11, OPP = 1, PV = 3

**Malheur River (Drewsey)**

Opportunities as of 10/24/18:
96% of 129 evaluated agricultural tax lots are evaluated at the Low and Limited opportunity levels. 4% of 129 evaluated agricultural tax lots are opportunities for water quality improvement.
L = 112, LO = 12, OPP = 2, PV = 3

**Activities and Accomplishments (ODA)**

**North Fork Malheur River**

- Evaluated 173 agricultural tax lots (49,508 agricultural acres, 218 stream miles)
- Provided 94 copies of the Area Pan and Area Rule Summary to landowners
- Provided 94 copies of the Landowner Self-Assessment Tool to landowners
- Conducted 1 Open House with 23 landowners attending on 12/18/18
- Conducted 3 inspections, resulting in 3 Water Quality Advisories

**Malheur River (Drewsey)**

- Evaluated 129 agricultural tax lots (53,586 agricultural acres, 149 stream miles)
- Provided 28 copies of the Area Pan and Area Rule Summary to landowners
- Provided 28 copies of the Landowner Self-Assessment Tool to landowners
- Conducted 1 Open House with 21 landowners attending on 12/20/18
- Conducted 1 inspection, resulting in 1 Water Quality Advisory
- ODA worked with 1 landowner to bring their agricultural activities into compliance
  - 1 landowner was encouraged to develop an off-stream water source for cow/calf pairs to minimize potential livestock impact on streamside vegetation; temporarily exclude livestock from fish/wildlife fence project to determine if streamside herbaceous and shrub vegetation would increase/provide greater bank stability; increase the setback distance from the streambank when haying the meadow pastures. (Note: ODA scheduled no follow-up in this case because the investigator was unable to determine if active streambank erosion was the result of ice dams and flooding or was the result of agricultural activities.)

**Adaptive Management Discussion**

| |
|---|
| The North Fork Malheur and Malheur River-(Drewsey) SIAs are open and SIA work is continuing. Adaptive management discussion will be available upon the closing and post analysis of the North Fork Malheur and Malheur River-Drewsey SIAs and reported at the next biennial review. |

## 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 2016-2020 Malheur County SWCD and Malheur Watershed Council**

| Activity | 4-year results | Description |
|---|---|---|
| **Community and Landowner Engagement** | | |
| # active events that target landowners/ managers (workshops, demonstrations, tours) | 13 | Soil Health Symposium, NRCS/SWCD Landowner Demonstration Tours |
| # landowners/managers participating in active events | 61 | Juniper Mountain Tour, RCPP, Idaho Power Planning for Snake River permitting |
| **Technical Assistance (TA)** | | |
| # landowners/managers provided with TA (via phone/walk-in/email/site visit | 34 | Juniper Mountain Tour, RCPP, Idaho Power Planning for Snake River permitting |
| # site visits | 34 | Upland projects, Irrigation projects |
| # conservation plans written* | 2 | Pipeline, Irrigation system,-Sprinkler |
| | | |
| **On-the-ground Project Funding** | | |
| # funding applications submitted | 19 | OWEB Restoration & Monitoring |
| # funding applications awarded | 9 | OWEB Restoration & Monitoring |
| North Fork Malheur River SIA | 1 | North Fork Malheur River SIA Monitoring Plan |
| Northern Malheur County Scope of Work Monitoring Plan | 1 | Parameters being tracked: Total P, Ortho P, TSS, *E.coli*, on-farm irrigation system |
| | | |

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.

**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 | BOR | Vale Oregon Irrigation District | Orchard Water District | All other sources* | TOTAL |
|---|---|---|---|---|---|---|---|---|
| $7,030,537 | $10,804,589 | $147,165 | $598,276 | $331,900 | $2,661,446 | $239,718 | $1,732,813 | $23,399,279 |

*includes city, county, tribal, 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** | 27 | 920 | - | Riparian shrubs or herbaceous vegetation planted/reseeded |
| **Fish Passage** | 50 | - | 3 | Stream bank stabilized: bioengineering |
| **Instream** | 3 | - | - | Flow deflector installed: rock/boulder |
| **Wetland** | - | 77 | - | Constructed wetland for wastewater treatment or water quality improvement |
| **Road** | | - | | |
| **Upland** | - | 75,638 | - | Irrigation system improved: converted from flood to sprinkler irrigation, Upland treated for juniper by clearing, burning, thinning, or removal |
| **TOTAL** | 80 | 76,635 | | |

* # of hardened crossings, culverts, etc.

## 4.3 Water Quality and Land Condition Monitoring

### 4.3.1 Water Quality

DEQ analyzed data 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. www.oregon.gov/deq/wq/programs/Pages/wqstatustrends.aspx). The analysis is incomplete because it excludes some of the phosphorus and total suspended solids data collected by the Malheur County SWCD and Malheur Watershed Council due to timing issues with receiving data from federal labs.

The results clearly showed significant improvements at many locations in the watershed, likely due to landowner efforts to improve the quality and reduce the amount of irrigation runoff. Unfortunately, the mouth shows increasing concentrations of total suspended solids. DEQ has not calculated loads using available stream gages, so this analysis does not show whether the pounds of pollutants delivered to the Malheur River and Snake River have decreased over time.

**Table 4.3.1. Attainment of water quality standards (2016-2019) and trends (2000-2019) at selected river sites in the Management Area. The sites were selected because they had enough data for both trend and attainment analyses.**

| Site Description | *E. coli* | pH | Dissolved Oxygen | Total Phosphorus[1] | Total Suspended Solids[2] |
|---|---|---|---|---|---|
| | Attaining water quality standard? | | | Attaining TMDL target *or* 2016-2019 median (mg/L) | |
| Malheur River @ Ontario | No | Yes | Yes ↓ | No | No ↓ |
| Malheur River near Little Valley | Almost ↑ | Yes | Yes ↑ | No ↑ | Median = 17 ↓ |
| Malheur River @ Drewsey | Yes | Yes | Yes | No ↓ | Median = 5 ↑ |
| Willow Creek @ Vale | No | Yes | Yes ↑ | No | Median = 88, barely ↓ |
| Willow Creek @ Jamieson | Almost | Yes | Yes | No ↑ | Median = 24 ↑ |
| Bully Creek @ Hwy 20 | Almost | Yes | Yes ↑ | No ↑ | Median = 22 ↑ |

1Malheur River TMDL target = 0.07 mg/L total phosphorus concentration May-September; applies throughout Management Area

[2] Snake River TMDL target = 50 mg/L total suspended solids concentration; applies only to mouth of Malheur River

↑ Statistically significant improving trend

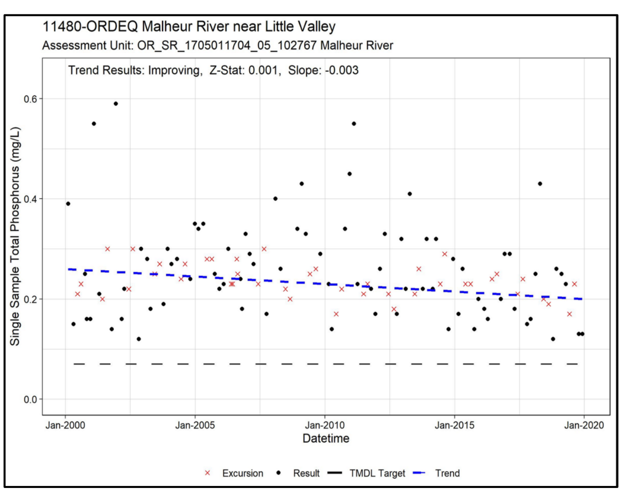
↓ Statistically significant degrading trend

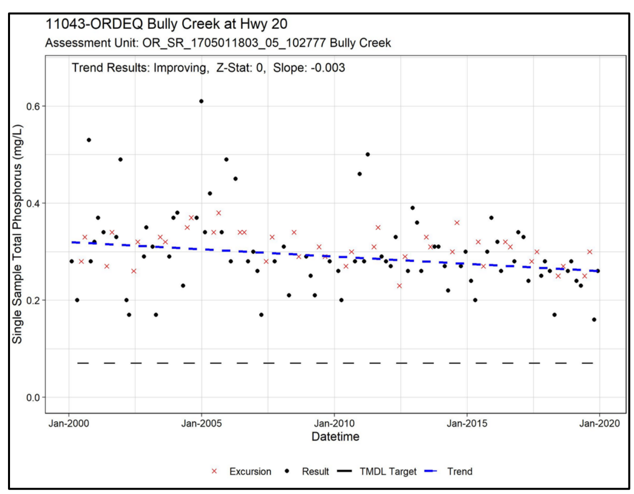
*E. coli:* Concentrations are mostly below the standard for single samples, except at the mouths of Malheur River and Willow Creek. Willow Creek is a significant contributor of *E. coli* to the Malheur.

Dissolved oxygen: Unlike much of the state, dissolved oxygen was of little concern in this analysis. The criterion in the Malheur watershed is the lowest in the state (6 mg/L), because the Malheur River is classified as the only warm water fishery in the state. Even so, dissolved oxygen at the mouth of the Malheur River has decreased over 1 mg/L in the last 20 years.

Total Phosphorus: as expected, this was the parameter of greatest concern, with values increasing as one moves downstream and no values meeting the TMDL target. However, levels have been improving significantly over time at several locations (see graphs 4.3.1a).

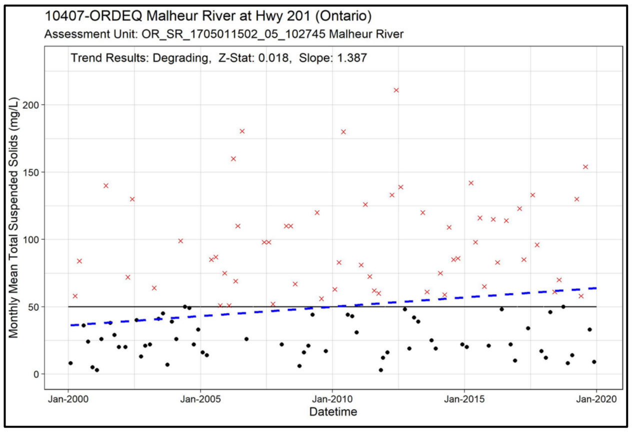
**Graphs 4.3.1a. Total Phosphorus concentrations over 20 years. Left = Malheur River near Little Valley; right = Bully Creek at Hwy 20. Dashed line is TMDL target.**

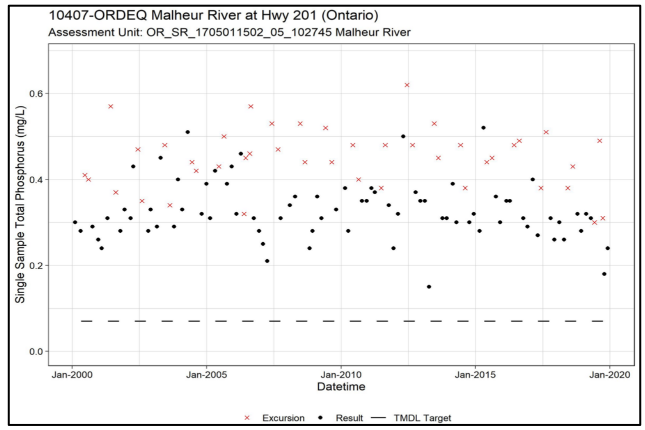


Total Suspended Solids: this parameter too was of concern, with values increasing as one moves downstream. Concentrations have been improving at all locations except the mouth of the Malheur River, although not as dramatically as total phosphorus. The concentrations of total suspended solids have been steadily increasing at the mouth while total phosphorus has shown no trend (graphs 4.3.1b).

**Graphs 4.3.1b. Total suspended solids (left) and total phosphorus (right) concentrations over 20 years at mouth of the Malheur River.  Solid line on left and dashed line on right are TMDL targets.**




Upper Malheur Phosphorus Study

The MWC collected 118 samples from six sites in the upper portion of the Malheur watershed. The purpose was to determine phosphorus levels prior to irrigated agricultural influences.

Most of the values were below the TMDL target of 0.07 mg/L. Median values from Wolf Creek, Little Malheur River, and North Fork Malheur River were around 0.03to 0.05 mg/L. However, most of the values from Calamity and Beaver Dam Creek exceeded the target and their median values were approximatley 0.11 mg/L. Values were consistent year-to-year.

## 4.4 Biennial Reviews and Adaptive Management

ODA, the LAC, the LMAs, and other partners met on January 21, 2021 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** |
|---|
| The Malheur LAC was happy with the progress that has been made over the past twenty years. The water column in the Malheur River has continued to improve with the change in irrigation practices and upgrades to the delivery systems. The LAC also feels that the Malheur Soil & Water Conservation District along with the Malheur Watershed Council continue to provide educational opportunites to landowners addressing both riparian functions and upland watershed process. The local LAC continues to work with the local agencies to better document the changes happening in the water column by establishing a Local Irrigation Monitoring Work Group to begin to establish future drainsheds in the Malheur watershed. The LAC would still like to see more funding to be directed towards real time flow data located in all irrigation delivery systems within the management area. The COVID pandemic has also made it more difficult for local entities to work with partners within this past year, (2020). |

| Recommended Modifications and Adaptive Management |
|---|
| The only modifications that are being made are establishing consistent measurable objectives and outcomes across the watershed. The local monitoring work group will continue to fine tune what those parameters may look like and present them to the LAC at the next biennial meeting. |

**Table 4.4b Number of ODA compliance actions in 2016-2020.**

| Location | Letter of Compliance | Pre-Enforcement Notification | Notice of Noncompliance | Civil Penalty |
|---|---|---|---|---|
| **Outside SIA(s)** | 1 | 0 | 0 | 0 |
| **Within SIA(s)** | 0 | 4 | 0 | 0 |