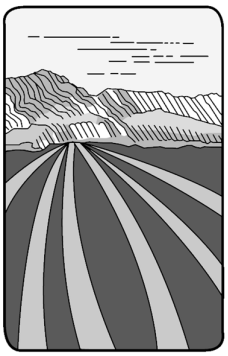

Oregon
Department
of Agriculture

Owyhee Agricultural Water Quality Management Area Plan

January 2015

Developed by the

Owyhee Local Advisory Committee

Oregon Department of Agriculture

With support from the

Malheur County Soil and Water Conservation District

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http://www.oregon.gov/ODA/programs/NaturalResources/Pages/AgWaterQuality.aspx

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Acronyms and Terms Used in this Document

Ag Water Quality Program – Agricultural Water Quality Management Program
Area Plan – Agricultural Water Quality Management Area Plan
Area Rules – Agricultural Water Quality Management Area Rules
BLM – Bureau of Land Management
CAFO – Confined Animal Feeding Operation
cfs – cubic feet per second
CNPCP – Coastal Nonpoint Pollution Control Program
CREP – Conservation Reserve Enhancement Program
CTWS – Confederated Tribes of the Warm Springs Reservation
CWA – Clean Water Act
CZARA – Coastal Zone Act Reauthorization Amendments
DEQ – Oregon Department of Environmental Quality
DSL – Oregon Department of State Lands
EQIP – Environmental Quality Incentives Program
GWMA – Groundwater Management Area
HUC – Hydrologic Unit Code
IPM – Integrated Pest Management
LAC – Local Advisory Committee
Management Area – Agricultural Water Quality Management Area
MOA – Memorandum of Agreement
NOAA – National Oceanic and Atmospheric Administration
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
ODFW – Oregon Department of Fish and Wildlife
ORS – Oregon Revised Statute
OSU – Oregon State University
OWEB – Oregon Watershed Enhancement Board
PMP – Pesticides Management Plan
PSP – Pesticides Stewardship Partnership
Regulations – Agricultural Water Quality Management Area Regulations
RUSLE – Revised Universal Soil Loss Equation
SWCD – Soil and Water Conservation District
T – Soil Loss Tolerance Factor
TMDL – Total Maximum Daily Load
USDA – United States Department of Agriculture
USEPA – United States Environmental Protection Agency
USFS – United States Forest Service
WQPMT – Water Quality Pesticides Management Team

Foreword

This Agricultural Water Quality Management Area Plan (Area Plan) provides guidance for addressing agricultural water quality issues in the Agricultural Water Quality Management Area (Management Area). The purpose of this Area Plan is to identify strategies to prevent and control water pollution from agricultural lands through a combination of educational programs, suggested land treatments, management activities, compliance, and monitoring.

The provisions of this Area Plan do not establish legal requirements or prohibitions, as described in Oregon Revised Statute (ORS) 568.912(1).

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 state and federal law (Oregon Administrative Rule (OAR) 603-090-0030(1)). At a minimum, an Area Plan must:

- Describe the geographical area and physical setting of the Management Area.
- List water quality issues of concern.
- List impaired beneficial uses.
- State that the goal of the Area Plan is to prevent and control water pollution from agricultural activities and soil erosion and to achieve applicable water quality standards.
- Include water quality objectives.
- Describe pollution prevention and control measures deemed necessary by the Oregon Department of Agriculture (ODA) to achieve the goal.
- Include an implementation schedule for measures needed to meet applicable dates established by law.
- Include guidelines for public participation.
- Describe a strategy for ensuring that the necessary measures are implemented.

Plan Content

Chapter 1: Agricultural Water Quality Management Program Purpose and Background. The purpose is to have consistent and accurate information about the Agricultural Water Quality Management Program.

Chapter 2: Local Background. Provides the local geographic, water quality, and agricultural context for the Management Area. Describes the water quality issues, regulations (Area Rules), and available or beneficial practices to address water quality issues.

Chapter 3: Local Goals, Objectives, and Implementation Strategies. Chapter 3 presents goal(s), measurable objectives and timelines, and strategies to achieve the goal(s) and objectives.

Chapter 4: Local Implementation, Monitoring, and Adaptive Management. ODA and the Local Advisory Committee (LAC) will work with partners to summarize land condition and water quality status. Trends are summarized to assess progress toward the goals and objectives in Chapter 3.

Chapter 1: Agricultural Water Quality Management Program Purpose and Background

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

As part of Oregon's Agricultural Water Quality Management Program (Ag Water Quality Program), this Area Plan guides landowners and partners such as Soil and Water Conservation Districts (SWCDs) in addressing local agricultural water quality issues. The purpose of this Area Plan is to identify strategies to prevent and control water pollution from agricultural activities and soil erosion (ORS 568.909(2)) on agricultural and rural lands for the area within the boundaries of the Management Area (OAR 603-090-0000(3)) and to achieve and maintain water quality standards (ORS 561.191(2)). This Area Plan has been developed and revised by ODA, the LAC, with support and input from the SWCD and the Oregon Department of Environmental Quality (DEQ). Throughout the development and revision processes, the public was invited to participate. This included public comment at meetings and public hearings during the Area Plan approval process. This Area Plan is implemented using a combination of outreach and education, conservation and management activities, compliance, monitoring, evaluation, and adaptive management.

The provisions of this Area Plan do not establish legal requirements or prohibitions (ORS 568.912(1)). Each Area Plan is accompanied by OAR regulations 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 (OARs 603-090-0000 to 603-090-0120) and under the regulations for this Management Area (OARs 603-095-1100). The Ag Water Quality Program's general OARs guide the Ag Water Quality Program, and the OARs for the Management Area are the regulations that landowners must follow.

This Area Plan and its associated regulations apply to all agricultural activities on non-federal and non-Tribal Trust land within the Management Area, including:

- Large commercial farms and ranches.
- Small rural properties grazing a few 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).

1.2 History of the Ag Water Quality Program

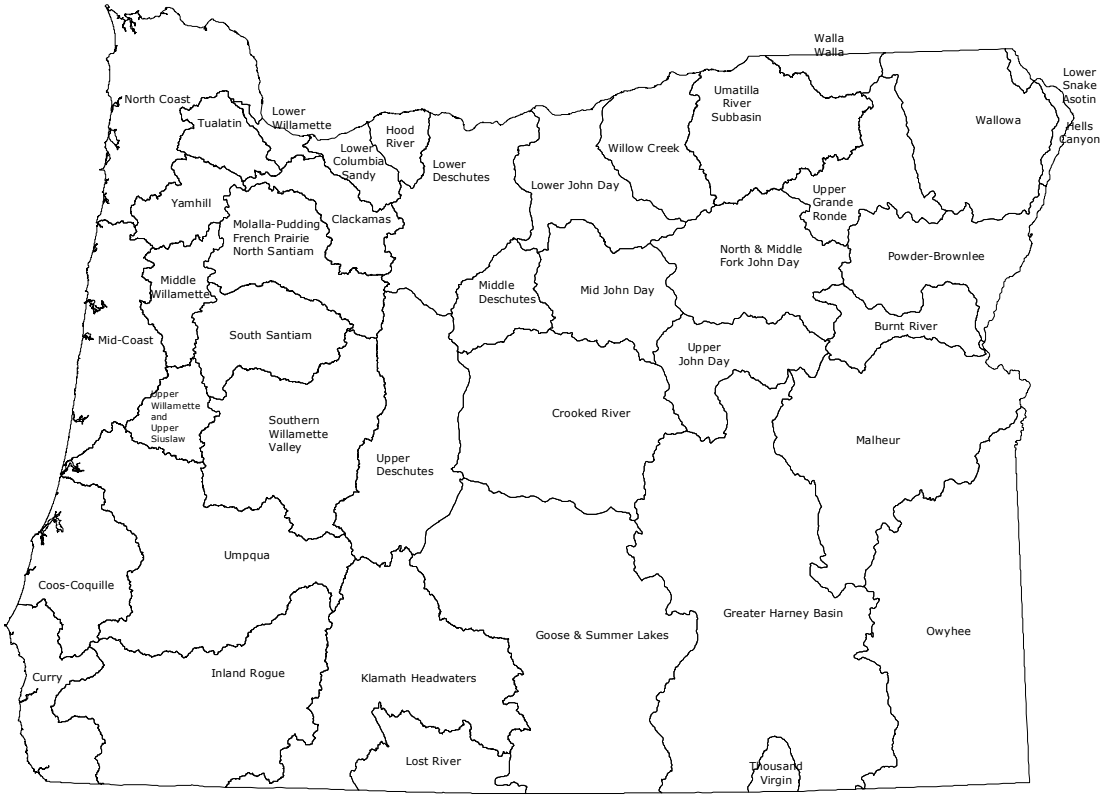
In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act, directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion, and to achieve water quality standards (ORS 568.900 through ORS 568.933). Senate Bill 502 was passed in 1995 to clarify that ODA regulates agriculture with respect to water quality (ORS 561.191). This Area Plan and its associated regulations were developed and subsequently revised pursuant to these statutes.

Between 1997 and 2004, ODA worked with LACs and SWCDs to develop Area Plans and associated regulations in 38 watershed-based Management Areas across Oregon (Figure 1). 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 regulations.
- Conducting biennial reviews of Area Plans and regulations.
- Monitoring, evaluation, and adaptive management.
- Developing partnerships with SWCDs, state, federal, and tribal agencies, watershed councils, and others.

Figure 1: Map of 38 Agricultural Water Quality Management Areas



1.3 Roles and Responsibilities

1.3.1 Oregon Department of Agriculture (ODA)

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 is intended to meet the needs and requirements related to agricultural water pollution, including:

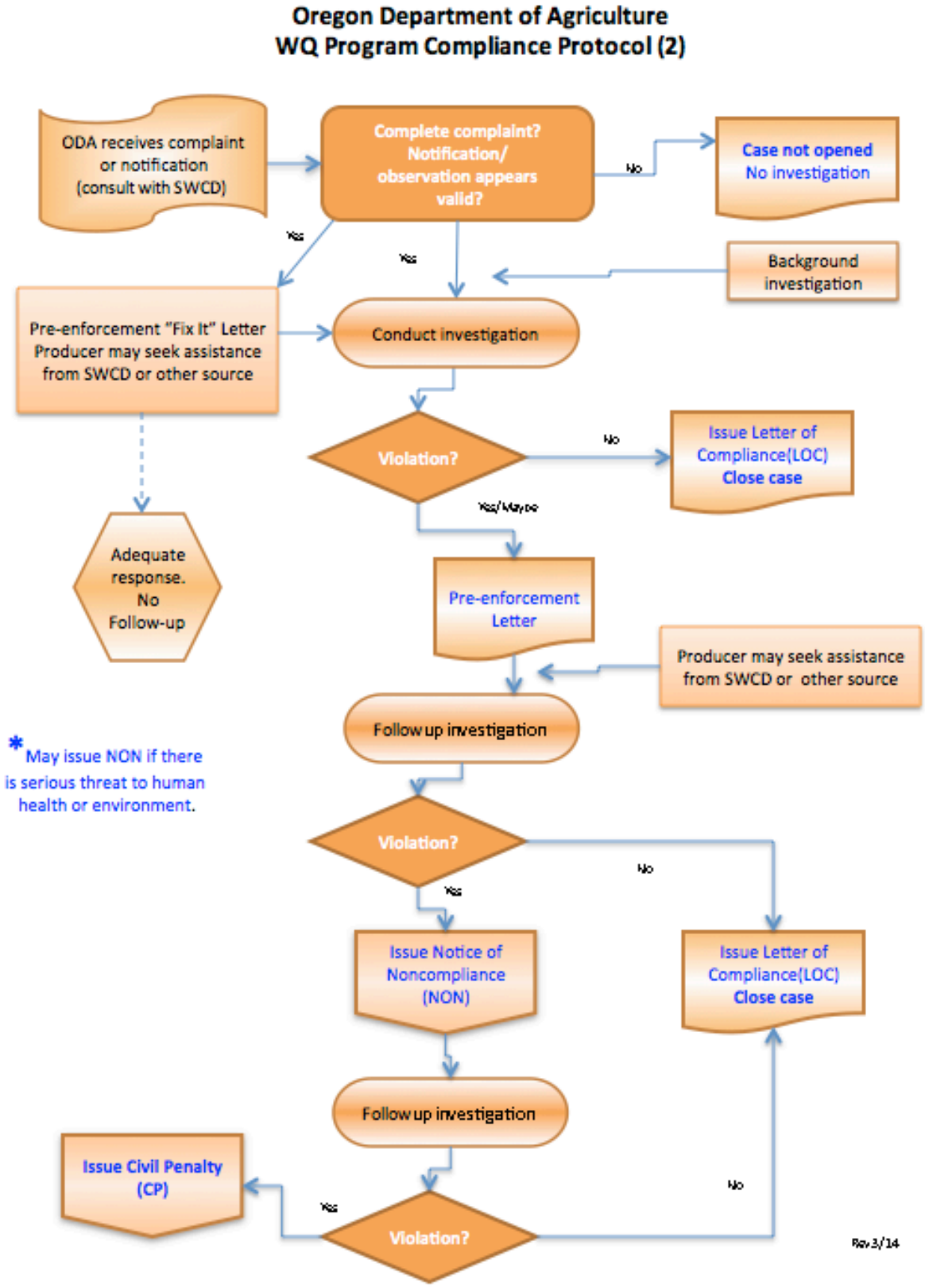
- State water quality standards.
- Load allocations for agricultural nonpoint source pollution assigned under Total Maximum Daily Loads (TMDLs) issued pursuant to the Clean Water Act (CWA), Section 303(d).
- Approved management measures for Coastal Zone Act Reauthorization Amendments (CZARA).
- Agricultural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

ODA has the legal authority to develop and implement Area Plans and associated regulations for the prevention and control of water pollution from agricultural activities and soil erosion, where such plans are required by state or federal law (ORS 568.909 and ORS 568.912). ODA will base Area Plans and regulations 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 associated regulations. ODA has responsibility for any actions related to enforcement or determination of noncompliance with regulations (OAR 603-090-0080 through OAR 603-090-0120). ORS 568.912(1) and ORS 568.912(2) give authority to ODA to adopt regulations that require landowners to perform actions necessary to prevent and control pollution from agricultural activities and soil erosion.

The emphasis of this Area Plan is on voluntary action by landowners or operators to control the factors effecting water quality in the Management Area. The regulations are outlined as a set of minimum standards that must be met on all agricultural or rural lands. Landowners and operators who fail to address these regulations may be subject to enforcement procedures, which are outlined below.

Enforcement Action—ODA will use enforcement mechanisms where appropriate and necessary to gain compliance with water quality regulations. Any enforcement action will be pursued only when reasonable attempts at voluntary solutions have failed. If a violation is documented, ODA may issue a pre-enforcement notification or an Order such as a Notice of Noncompliance. If a Notice of Noncompliance is issued, the landowner or operator will be directed by ODA to remedy the condition 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, civil penalties may be assessed for continued violation of the regulations. See the Compliance Flow Chart for a diagram of the compliance process. If and when other governmental policies, programs, or regulations conflict with this Area Plan or associated regulations, ODA will consult with the agency(ies) and attempt to resolve the conflict in a reasonable manner.

Figure 2: Compliance Flow Chart



1.3.2 Local Management Agency

A Local Management Agency is an organization that ODA has designated to implement an Area Plan (OAR 603-090-0010). The legislative intent is for SWCDs to be Local Management Agencies 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 who voluntarily address natural resource concerns. Currently, all Local Management Agencies in Oregon are SWCDs.

The day-to-day implementation of the Area Plan is accomplished through an intergovernmental agreement between ODA and each SWCD. 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 associated regulations as needed.

1.3.3 Local Advisory Committee (LAC)

For each Management Area, the director of ODA appoints an LAC (OAR 603-090-0020) with up to 12 members, to assist with the development and subsequent biennial reviews of the local Area Plan and regulations. The LAC serves in an advisory role to the director of ODA and to the Board of Agriculture. LACs are composed primarily of landowners in the Management Area and must reflect a balance of affected persons.

The LAC may meet as frequently as necessary to carry out their responsibilities, which include, but are not limited to:

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

1.3.4 Agriculture's Role

Each individual landowner or operator in the Management Area is required to comply with the regulations, which set minimum standards. However, the regulations alone are not enough. To achieve water quality standards, individual landowners also need to attain land conditions that achieve the goals and objectives of the voluntary Area Plan. Each landowner or operator is not individually responsible for achieving water quality standards, agricultural pollution limits, or the goals and objectives of the Area Plan. These are the responsibility of the agricultural community collectively.

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

Area regulations only address impacts that result from agricultural activities. A landowner is responsible for only those conditions caused by activities conducted on land managed by the landowner or occupier. Conditions resulting from unusual weather events or other circumstances not within the reasonable control of the landowner or operator are considered when making compliance decisions. Agricultural landowners may be responsible for some of the above impacts under other legal authorities.

Under the Area Plan and associated regulations, agricultural landowners and operators are not responsible for mitigating or addressing factors that do not result from agricultural activities, such as:

- Hot springs, glacial melt water, extreme or unforeseen 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.

1.3.5 Public Participation

The public was encouraged to participate when ODA, LACs, and SWCDs initially developed the Area Plans and associated regulations. ODA and the LAC in each Management Area, held public information meetings, a formal public comment period, and a formal public hearing. ODA and the LACs modified the Area Plans and regulations, as needed, to address comments received. The director of ODA adopted the Area Plans and regulations in consultation with the Board of Agriculture.

ODA, LACs, and SWCDs conduct biennial reviews of the Area Plans and regulations. Partners, stakeholders, and the general public are invited to participate in the process. Any future revisions to the regulations will include a public comment period and a public hearing.

1.4 Agricultural Water Quality

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. Significant 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 pesticide applications in, over and within three feet of water. Many CAFOs are regulated under ODA's CAFO Program. Irrigation water discharges may be at a defined discharge point, but does not currently require a permit.

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

1.4.2 Beneficial Uses and Parameters of Concern

Beneficial uses of clean water include: public and private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, hydropower, and commercial navigation and transportation. The most sensitive beneficial uses are usually fish and aquatic life, water contact recreation, and public and private domestic water supply. These uses are generally the first to be impaired as a water body is polluted, 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 contribute to the impairment of beneficial uses in the Management Area. Beneficial uses that have the potential to be impacted in this Management Area are summarized in Chapter 2.

Many water bodies throughout Oregon do not meet state water quality standards. These water bodies may or may not have established water quality management plans documenting needed reductions. The most common water quality concerns related to agricultural activities are temperature, bacteria, biological criteria, sediment and turbidity, phosphorous, algae, pH, dissolved oxygen, harmful algal blooms, nitrates, pesticides, and mercury. These parameters vary by Management Area and are summarized in Chapter 2.

1.4.3 Impaired Water Bodies and Total Maximum Daily Loads (TMDLs)

Every two years, the DEQ is required by the federal Clean Water Act (CWA) to assess water quality in Oregon. CWA Section 303(d) requires DEQ to identify a list of waters that do not meet water quality standards. The resulting list is commonly referred to as the 303(d) list. DEQ, in accordance with the CWA, is required to establish TMDLs for pollutants on the 303(d) list.

A TMDL includes an assessment of water quality data and current conditions and describes a plan to restore polluted waterways to conditions that meet water quality standards. TMDLs specify the daily amount of pollution that a water body can receive and still meet water quality standards. Through the TMDL, point sources are assigned pollution limits as "waste load allocations" in permits, while nonpoint sources (agriculture, forestry, and urban) are assigned pollution limits as "load allocations." TMDLs are legal orders issued by the DEQ, so parties assigned waste or load allocations are legally required to meet them. The agricultural sector is responsible for meeting the pollution limit (load allocation) assigned to agriculture specifically, or to nonpoint sources in general, as applicable.

TMDLs generally apply to an entire basin or subbasin, and not just to an individual water body on the 303(d) list. Once a TMDL is developed for a basin, the basin's impaired water bodies are removed from the 303(d) list, but they remain on the list of impaired water bodies. When data show that water quality standards have been achieved, water bodies will be identified on the list of water bodies that are attaining water quality standards.

As part of the TMDL process, DEQ identifies the Designated Management Agency or parties responsible for submitting TMDL implementation plans. TMDLs designate that the local Area Plan is the implementation plan for the agricultural component of the TMDLs that apply to this Management Area. Biennial reviews and revisions to the Area Plan and regulations must address agricultural or nonpoint source load allocations from TMDLs.

The list of impaired water bodies (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 Water Pollution Control Law – ORS 468B.025 and ORS 468B.050

Senate Bill 502 was passed in 1995, authorizing ODA as the state agency responsible for regulation of farming activities for the purpose of protecting water quality. A Department of Justice opinion dated July 10, 1996, states that "...ODA has the statutory responsibility for developing and implementing water quality programs and rules that directly regulate farming practices on exclusive farm use and agricultural lands." In addition, this opinion states, "The program or rule must be designed to achieve and maintain Environmental Quality Commission's water quality standards."

To implement Senate Bill 502, ODA incorporated ORS 468B into all of the Area Plans and associated regulations in the state. A Department of Justice opinion, dated September 12, 2000, clarifies that ORS 468B.025 applies to point and nonpoint source pollution.

ORS 468B.025 states that:

"(1) ...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."

The aspects 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 (ORS 468B.005)

"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. Additionally, OAR 603-095-0010(53) includes but is not limited to commercial fertilizers, soil amendments, composts, animal wastes, vegetative materials, or any other wastes.

"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.

"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.

1.4.5 Streamside Vegetation and Agricultural Water Quality

Across Oregon, the Ag Water Quality Program emphasizes streamside vegetation protection and enhancement to prevent and control agricultural water pollution. Streamside vegetation provides three primary water quality functions: shade for cooler stream temperatures, streambank stability, and filtration of pollutants. Other water quality functions include: water storage for cooler and later season flows, sediment trapping that builds streambanks and floodplains, narrowing and deepening of channels, and biological uptake of sediment, organic material, nutrients, and pesticides.

Additional reasons for the Ag Water Quality Program's emphasis on streamside vegetation include:

- Streamside vegetation improves water quality related to multiple pollutants, including: temperature (heat), sediment, bacteria, nutrients, toxics, and pesticides.
- Streamside vegetation provides fish and wildlife habitat.
- Landowners can improve streamside vegetation in ways that are compatible with their operation.
- Streamside vegetation condition can be monitored readily to track the status and trends of agriculture's progress in addressing water quality concerns.

The Ag Water Quality Program uses the concept of "site-capable vegetation" to describe the vegetation that agricultural streams can provide to protect water quality. Site-capable vegetation is the 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 (e.g., channelization, roads, invasive species, modified flows, past 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 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 all streams flowing through agricultural lands. The agricultural water quality regulations for each Management Area require that agricultural activities provide water quality functions consistent with what the site would provide with site-capable vegetation.

In some cases, for narrow streams, mature site-capable vegetation may not be needed. For example, shrubs and grass may provide shade, protect streambanks, and filter pollutants. However, on larger streams, mature vegetation is important. Limited exceptions include:

- Junipers are mature site-capable vegetation in central and eastern Oregon, but they reduce bank stability and increase erosion
- Upland species (such as sagebrush) can be the dominant site-capable vegetation along streams with erosional down-cutting, but they do not improve water quality

1.5 Other Water Quality Programs

1.5.1 Confined Animal Feeding Operation (CAFO)

ODA is the lead state agency for the CAFO Program. The CAFO Program was developed to ensure that operators and producers do not contaminate ground or surface water with animal manure. Since the early 1980s, CAFOs have been registered to a general Water Pollution Control Facility permit designed to protect water quality, while allowing the operators and producers to remain economically viable. A properly maintained CAFO does not pollute ground or surface water. To assure continued protection of ground and surface water, ODA was directed by the 2001 Oregon State Legislature to convert the CAFO Program from a Water Pollution Control Facility permit program to a federal National Pollutant Discharge Elimination System (NPDES) program. ODA and DEQ jointly issued a NPDES CAFO Permit in 2003 and 2009. The 2009 permit will expire in May 2014, and it is expected that a new permit will be issued at that time. The NPDES CAFO Permit is compliant with all Clean Water Act requirements for CAFOs; it does allow discharge in certain circumstances as long as the discharge does not violate Water Quality Standards.

Oregon NPDES CAFO Permits require the registrant to operate according to a site-specific, ODA approved, Animal Waste Management Plan that is incorporated into the NPDES CAFO Permit by reference. CAFO NPDES Permits protect both surface and ground water resources.

1.5.2 Drinking Water Source Protection

Oregon implements its drinking water protection program through a partnership between DEQ and the Oregon Health Authority. The program provides individuals and communities with information on how to protect the quality of Oregon's drinking water. DEQ and the Oregon Health Authority encourage community-based protection and preventive management strategies to ensure that all public drinking water resources are kept safe from future contamination. For more information see: www.deq.state.or.us/wq/dwp/dwp.htm. Agricultural activities are required to meet those water quality standards that contribute the safe drinking water.

1.5.3 Groundwater Management Areas (GWMAs)

Groundwater Management Areas are designated by DEQ when groundwater in an area has elevated contaminant concentrations resulting, at least in part, from nonpoint sources. Once the GWMA is declared, a local groundwater management committee comprised of affected and interested parties is formed. The committee then works with and advises the state agencies that are required to develop an action plan that will reduce groundwater contamination in the area.

Oregon has designated three GWMAs because of elevated nitrate concentrations in groundwater. These include the Lower Umatilla Basin GWMA, the Northern Malheur County GWMA, and the Southern Willamette Valley GWMA. Each GWMA has a voluntary Action Plan to reduce nitrate concentrations in groundwater. If after a scheduled evaluation point DEQ determines that the voluntary approach is not effective, then mandatory requirements may become necessary.

1.5.4 Pesticide Management and Stewardship

The ODA 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, the interagency Water Quality Pesticide Management Team (WQPMT) was formed to expand efforts to improve water quality in Oregon related to pesticide use. The WQPMT includes representation from ODA, Oregon Department of Forestry, DEQ, and the Oregon Health Authority. 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 monitoring programs to assess the possible impact of pesticides on Oregon's water quality. Pesticide detections can be addressed through multiple programs and partners, including the PSP Program described above.

Through the PSP Program, state agencies and local partners work together to monitor pesticides in streams and to improve water quality (www.deq.state.or.us/wq/pesticide/pesticide.htm). DEQ, ODA, 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. There has been noteworthy progress since 2000 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/PEST/water_quality.shtml). 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. The PMP sets forth a process for preventing and responding to pesticide detections in Oregon's ground and surface water resources by managing the pesticides that are currently approved for use by the USEPA and Oregon in both agricultural and non-agricultural settings.

1.5.5 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 salmon, because they have such 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 associated regulations throughout Oregon.

1.6 Partner Agencies and Organizations

1.6.1 Oregon Department of Environmental Quality (DEQ)

The USEPA has delegated authority to DEQ under the CWA authority for protection of water quality in Oregon. In turn, DEQ is the lead state agency with overall authority to regulate for water quality in Oregon. DEQ coordinates with other state agencies, including ODA and Oregon Department of Forestry, to meet the needs of the CWA. DEQ sets water quality standards and develops TMDLs for impaired waterbodies. In addition, DEQ develops and coordinates programs to address water quality including National Pollution Discharge Elimination Permits (for point sources), 319 program, Source Water Protection, 401 Water Quality Certification, and GWMAs. DEQ also coordinates with ODA to help ensure successful implementation of Area Plans as part of its 319 program.

DEQ designated ODA as the Designated Management Agency for water pollution control activities on agricultural and rural lands in the state of Oregon to coordinate meeting agricultural TMDL load allocations. A Memorandum of Agreement (MOA) between DEQ and the ODA recognizes that ODA is the agency responsible for implementing the Ag Water Quality Program established under ORS 568.900 to ORS 568.933, ORS 561.191, and OAR Chapter 603, Divisions 90 and 95. The MOA between ODA and DEQ was updated in 2012 and describes how the agencies will work together to meet agricultural water quality requirements.

The MOA includes the following commitments:

- ODA will develop and implement a monitoring strategy, as resources allow, in consultation with DEQ.
- ODA will evaluate Area Plans and regulation effectiveness in collaboration with DEQ.
    - ODA will determine the percentage of lands achieving compliance with Management Area regulations.
    - ODA will determine whether the target percentages of lands meeting the desired land conditions, as outlined in the goals and objectives of the Area Plans, are being achieved.
- ODA and DEQ will review and evaluate existing information with the objective of determining:
    - Whether additional data are needed to conduct an adequate evaluation.
    - Whether existing strategies have been effective in achieving the goals and objectives of the Area Plan.

- Whether the rate of progress is adequate to achieve the goals of the Area Plan.

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 its associated regulations. The petition must allege with reasonable specificity that the Area Plan or associated regulations 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 organizations, including: DEQ (as indicated above), the United States Department of Agriculture (USDA) NRCS and Farm Service Agency, watershed councils, Oregon State University Extension Service, 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.

1.7 Measuring Progress

Agricultural landowners and operators have implemented effective 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 this progress. ODA is working with SWCDs, LACs, and our partners to develop and implement objectives and strategies that will produce measurable outcomes for agricultural water quality.

1.7.1 Measurable Objectives

Measurable objectives allow the Ag Water Quality Program to better evaluate progress toward meeting water quality standards and load allocations where TMDLs have been completed. Many of these measurable objectives relate to land condition and are mainly implemented through focused work in small geographic areas (section 1.7.3). The measurable objectives for this Area Plan are in Chapter 3, and progress toward achieving the objectives is summarized in Chapter 4.

At a minimum, the measurable objectives of the Ag Water Quality Program and this Area Plan are to:

- Increase the percentage of lands achieving compliance with the regulations.
- Increase the percentage of lands meeting desired land conditions outlined in the Area Plan.

1.7.2 Land Condition and Water Quality

Land conditions can serve as useful surrogates (indicators) for water quality parameters. For example, streamside vegetation is generally used as a surrogate for water temperature, because shade blocks solar radiation from warming the stream. In addition, sediment can be used as a surrogate for pesticides and nutrients, because many pesticides and nutrients 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.
- It can be difficult to separate agriculture's influence on water quality from other land uses.

- It requires extensive monitoring of water quality at an intensive temporal scale to evaluate progress; it is expensive and may fail to demonstrate short-term improvements.
- Improved land conditions can be documented immediately, but there may be a significant lag time or a need for more extensive implementation before water quality improves.
- Agricultural improvements in water pollution are primarily through improvements in land and management conditions.

Water quality monitoring data may help ODA and partners to measure progress or identify problem areas in implementing the Area Plan; although, as described above, it may be less likely to evaluate the short-term effects of changing land conditions on water quality parameters such as temperature, bacteria, nutrients, sediment, and pesticides.

1.7.3 Focused Implementation in Small Geographic Areas

Focus Areas

A Focus Area is a small watershed with significant water quality or land condition concerns that are associated with agriculture. ODA's intent in selecting Focus Areas is to deliver systematic, concentrated outreach and technical assistance in small geographic areas ("Focus Areas") through the SWCDs. A key component of this approach is measuring conditions before and after implementation to document the progress made with available resources. The focused implementation approach is consistent with other agencies' and organizations' efforts to work proactively in small geographic areas, and is supported by a large body of scientific research (e.g., Council for Agricultural Science and Technology, 2012).

Systematic implementation in Focus Areas can provide the following advantages:

- Measuring progress is easier in a small watershed than across an entire Management Area.
- Water quality improvement may be faster since small watersheds generally respond more rapidly.
- A proactive approach can address the most significant water quality concerns.
- Partners can coordinate and align technical and financial resources.
- Partners can coordinate and identify the appropriate source specific conservation practices and demonstrate the effectiveness of these conservation practices.
- A higher density of projects allows neighbors to learn from neighbors.
- A higher density of prioritized projects leads to greater connectivity of projects.
- Limited resources are used more effectively and efficiently.
- Work in one Focus Area, followed by other Focus Areas, will eventually cover the entire Management Area.

SWCDs choose a Focus Area in cooperation with ODA and other partners. In some cases, a Focus Area is selected because of efforts already underway or landowner relationships already established. The scale of the Focus Area matches the SWCD's capacity to deliver concentrated outreach and technical assistance, and to complete (or initiate) projects over a biennium. The current Focus Area for this Management Area is described in Chapter 3.

Working within a Focus Area is not intended to prevent implementation within the remainder of the Management Area. The remainder of the Management Area will continue to be addressed through general outreach and technical assistance.

Strategic Implementation Areas

Strategic Implementation Areas are small watersheds selected by ODA, in cooperation with partners, and after review of water quality and other available information. ODA leads the assessment of current conditions and the landowner outreach. Strategic Implementation Areas and Focus Areas are both tools to

concentrate efforts in small geographic areas to achieve water quality standards. As with Focus Areas, SWCDs and partners work with landowners to improve conditions that may impact water quality. However, Strategic Implementation Areas also have a compliance evaluation and assurance process that allows ODA to proactively gain compliance with Ag water quality regulations.

1.8 Implementation, Monitoring, Evaluation, and Adaptive Management

Implementation of the Area Plan and associated regulations will be assessed by evaluating the status and trends in agricultural land conditions. Measurable objectives will be assessed across the entire Management Area and within the Focus Area. ODA conducts land condition and water quality monitoring at the statewide level and will analyze this and other agencies' and organizations' local monitoring data. The results and findings will be summarized in Chapter 4 for each biennial review. ODA, DEQ, SWCDs, and LACs will examine these results during the biennial review and will revise the goal(s), objectives, and strategies in Chapter 3, as needed.

1.8.1 Statewide Aerial Photo Monitoring of Streamside Vegetation

Starting in 2003, ODA began evaluating streamside vegetation conditions using aerial photos acquired specifically for this purpose. ODA focuses on land condition monitoring efforts on streamside areas because these areas have such a broad influence over water quality. Stream segments representing 10 to 15 percent of the agricultural lands in each Management Area were randomly selected for monitoring. ODA examines streamside vegetation at specific points in 90-foot bands along the stream from the aerial photos and assigns each sample stream segment a score based on ground cover. The score can range from 70 (all trees) to 0 (all bare ground). The same stream segments are re-photographed and re-scored every five years to evaluate changes in streamside vegetation conditions over time. Because site capable vegetation varies across the state, there is no one correct riparian index score. The main point is to measure positive or negative change. The results are summarized in Chapter 4 of the Area Plan.

1.8.2 Agricultural Ambient Water Quality Monitoring Assessment

ODA currently evaluates water quality data from monitoring sites in DEQ's water quality database that reflects agricultural influence on water quality. These data are also published in the DEQ water quality database and evaluated at the statewide level to determine trends in water quality at agricultural sites statewide. Results from monitoring sites in the Management Area, along with local water quality monitoring data, are described in Chapter 4.

1.8.3 Biennial Reviews and Adaptive Management

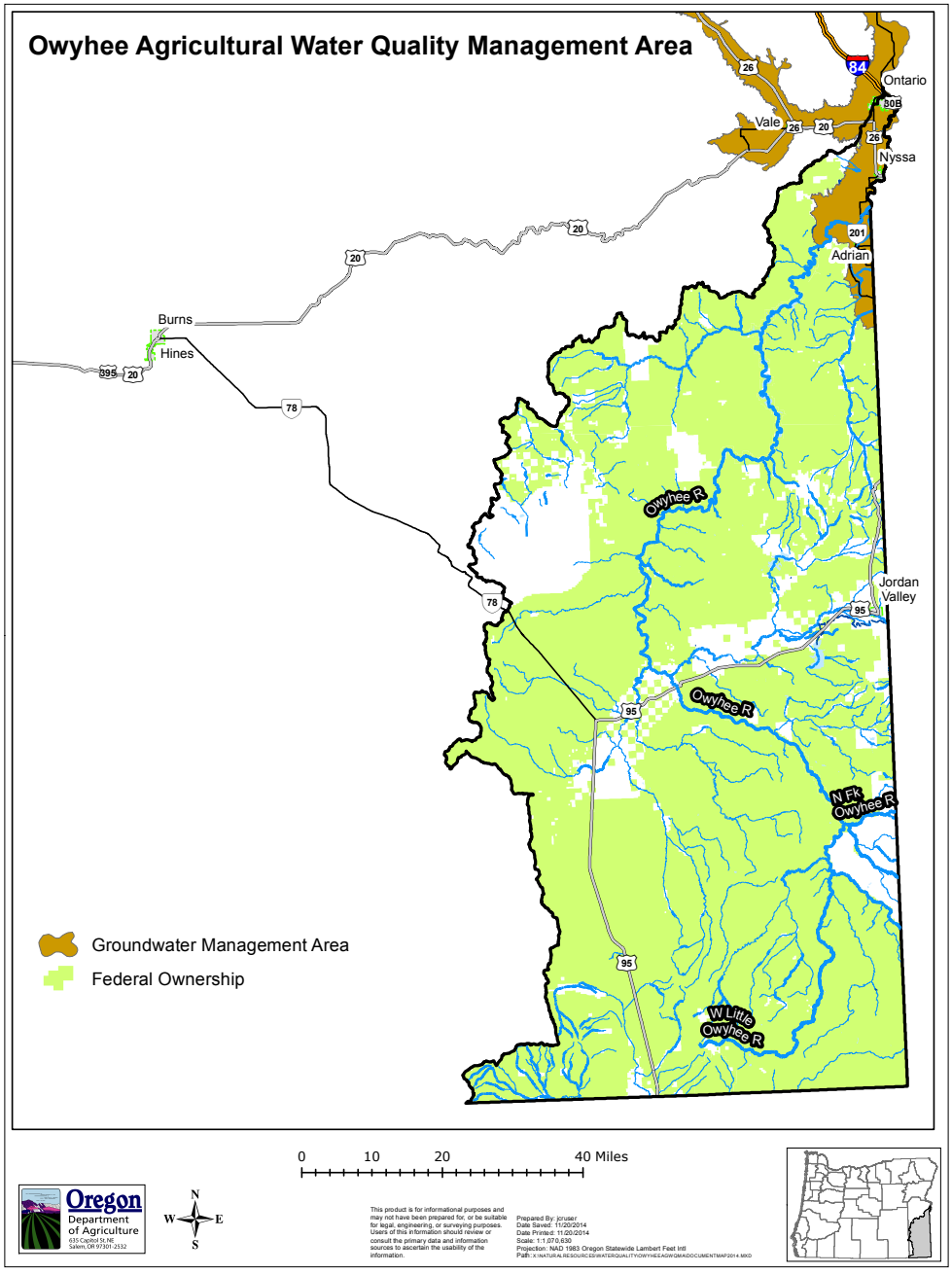
The Area Plan and associated regulations undergo biennial reviews by ODA and the LAC. As part of each biennial review, ODA, DEQ, SWCDs, and the LAC discuss and evaluate the progress on implementation of the Area Plan and associated regulations. This evaluation includes enforcement actions, landscape and water quality monitoring, and outreach efforts over the past biennium across the Management Area and for the Focus Area. In addition, progress toward achieving agricultural load allocations may be documented (if a TMDL has been established). As a result of the biennial review, the LAC submits a report to the Board of Agriculture and the director of ODA. This report describes progress and impediments to implementation, and recommendations for modifications to the Area Plan or associated regulations necessary to achieve the purpose of the Area Plan. The results of this evaluation will be used to update the goal(s), measurable objectives, and strategies in Chapter 3.

Chapter 2: Local Background

The Area Plan covers the Owyhee Basin, which includes the following subbasins (Figure 3):

- Lower Owyhee
- Middle Snake – Succor
- Crooked Rattlesnake
- Jordan
- Southern portion of Middle Snake – Payette
- Middle Owyhee
- South Fork Owyhee
- East Little Owyhee
- Upper Quinn

Figure 3. Map of Management Area



2.1 Local Roles and Responsibilities

This Area Plan was developed by the ODA with assistance from volunteer members of the Owyhee Agricultural Water Quality Local Advisory Committee (LAC) and the Malheur County Soil and Water Conservation District (SWCD), in consultation with members of the community.

All entities involved in developing this Area Plan are committed to maintaining and improving the economic viability of agriculture in the Owyhee Basin. Productive and profitable agriculture is the cornerstone of the local Owyhee Basin 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 Owyhee Basin 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.

2.1.1 Local Advisory Committee (LAC)

The LAC was formed in 2000 to assist with the development of the Area Plan and regulations and with subsequent biennial reviews. Members of the LAC represent local agricultural producers, local landowners, local environmental interests, local recreation interests, and the Malheur County SWCD (Table 1).

Table 1. Current Local Advisory Committee (LAC) members.

Rod Frahm, **Chair**: Ontario, row crops	Mike Hanley: Jordan Valley, cattle
Reid Saito, Vice Chair: Nyssa, row crops	Vikki Price: Adrian/Nyssa, row crops
Martin Andre: Arock, cattle	Bob Skinner: Jordan Valley, cattle
Charles Barlow: Nyssa, row crops	Ray Waldo: Nyssa, small acreage, recreation
Norm Bennett: Nyssa, dairy	Lou Wettstein: retired County Commissioner, row crops
Dave Bunker: Nyssa, row crops	

2.1.2 Local Management Agency

The Malheur County SWCD is the Local Management Agency for implementing the Area Plan. They provide meeting administration, outreach, and technical assistance to landowners.

The day-to-day implementation of this Plan is accomplished through Memoranda of Agreement between the Malheur County SWCD and ODA. The Malheur County SWCD acts as the Local Management Agency under such agreements.

2.2 Management Area Description

The Owyhee River rises in northern Nevada and flows northwesterly through a small portion of Idaho and enters Oregon near the southeast corner of the state. Thereafter, it flows mostly to the north until it joins the Snake River just upstream from Nyssa, Oregon. The total length of the Owyhee River is 280 miles, and drains approximately 11,000 square miles; 6,200 of which are in Oregon. Major tributaries are the North, South, and Middle Forks of the Owyhee, the Little Owyhee, and Jordan Creek.

The Management Area contains several streams that are not tributaries to the Owyhee River. Succor Creek, for example, flows directly into the Snake River. At the far southern end of the management area,

several small, intermittent streams, such as McDermitt Creek, flow into the Quinn River, and the Quinn River is a closed basin that is mostly in Nevada.

Climate

As with most areas in eastern Oregon, it is hot and dry in the Management Area during the summer. Weather in this semi-arid area is the result of maritime air moving eastward from the Pacific Ocean over the Coast and Cascade Mountain ranges. As air masses rise to cross these mountains, much of the moisture in the air condenses and falls to the ground, making the air relatively dry by the time it reaches southeastern Oregon. There is an abundance of sunshine and a wide range between maximum and minimum daily temperatures.

Average annual precipitation in the region is between 8 and 14 inches, with some isolated areas receiving up to 30 inches or more. Most of the precipitation occurs from November through February and May, with about one-third falling as snow. The amount of precipitation in a particular location depends on topography —the higher the elevation, the greater the precipitation.

Thunderstorms, occasionally accompanied by hail, typically occur each year over virtually every part of the planning area. High-intensity thunderstorms occur between April and September; storms during June or July are typically drier than those in August or September. At elevations below 6,000 feet, the snow pack usually melts by April, but at higher elevations some snow remains until mid-June. Localized flooding often follows late winter or spring snowmelt. Flooding can occur as often as once every five years in the Jordan Valley area. These high flows can cause severe bank erosion and can rip out existing riparian vegetation. The sediment the stream receives from this erosion carries a significant portion of the nutrients found in the streams and rivers downstream. In contrast to these high spring flows, many streams run dry late in the summer because the area receives low amounts of precipitation and most of it falls in the winter.

Reservoirs

The most prominent man-made features of the Owyhee area is the Owyhee Dam, which is located about 11 miles southwest of Adrian, Oregon. It stores about 1.1 million acre-feet of water, most of which farmers use for irrigation. Construction of the Owyhee Dam began in 1928 and finished in 1932. Antelope Reservoir, located south west of Jordan Valley, Oregon, is another important water storage facility, with a capacity of about 70,000 acre-feet. Upper and Lower Cow lakes, which are natural lakes found a few miles northwest of Jordan Valley, are managed for irrigation and flood control. Succor Creek Reservoir holds about 6,000 acre-feet of water and serves a water improvement district. Other substantial reservoirs have been built in the Owyhee Basin in Nevada.

These larger reservoirs were constructed with the intention of opening up new land for crops or improving existing irrigation facilities. After constructing the Owyhee Reservoir, the government recruited farmers to settle in the region. For example, the U.S. Department of the Interior had a sign-up to assign 33 farm units in 1937. Applicants had to have $2,000, farm equipment and farming experience. Ex-servicemen were given preference.

Reservoirs have led to many benefits besides irrigation. The Bureau of Reclamation estimates that the Owyhee Reservoir has provided an accumulated $33,000,000 in flood control benefits from 1950 to 1998. Water released from the bottom of the reservoir is cold. The area immediately below the reservoir supports a productive fishery that is well known by local fishermen. The lake behind the reservoir provides many recreational opportunities as well. The Bureau of Land Management (BLM) estimates that the reservoir provides about 5,000 angler days a year, and many people use the reservoir and lands around it for boating, camping and hunting.

Land Use

The public owns the majority of the land in the Owyhee basin in Oregon. The BLM manages approximately 3.3 million acres (80 percent of the basin), and there are about 232,000 acres of state owned land (6 percent). Private lands total approximately 480,000 acres (12 percent).

The majority of the acres in this basin are rangeland, and most ranchers are cow/calf producers. Most row crops are raised below the Owyhee Reservoir. Farmers there grow a great variety of crops, and all of them depend on irrigation. Crops include:

- Onions
- Potatoes
- Sugar beets
- Alfalfa for hay and seed
- Grains
- Corn
- Irrigated pasture

Economic Importance of Agriculture to Malheur County

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 was the largest industry, followed by crop production, livestock production, procurement and feeding, and wholesale and retail trade. Malheur County's gross agricultural income for 2012 is estimated by Oregon State University (OSU) at $373,397,000. Cattle and onions were the top agricultural commodities, bringing in about $233,000,000.

The 2012 Census of Agriculture estimated that Malheur County had 1,113 farms on 1,076,768 acres.

Legacy Issues

One of the legacy issues affecting water quality in this Management Area is mining. Gold was discovered in the Silver City, Idaho area in 1863, and many mines were active in Idaho until the 1920s. Some mining activity has continued. Miners used mercury to amalgamate the gold and silver at these Idaho mining sites, and it is still present in mining tailings and around old Idaho mining sites. A plume of mercury contamination from mining around Silver City, Idaho flows down Jordan Creek into Oregon and on into Antelope Reservoir, the Owyhee River, the Owyhee Reservoir, and the Snake River affecting the Brownlee Reservoir. No attempt has been made to clean up these sources.

Geological formations, such as Cinnabar Mountain south east of Silver City, Idaho near Jordan Valley, and other geological sources of mercury also contribute to mercury levels in streams in this area. In fact, much of the mercury used for mining was obtained from nearby deposits in Nevada, south and west of McDermitt. Arsenic is also found throughout the Management Area from the natural breakdown of volcanic rock.

Several creeks have been altered in the management area. Some of the alterations have been beneficial and some have not. One example of a detrimental change occurred in the mid-1980s when the U.S. Corps of Engineers straightened Jordan Creek upstream of the bridge at Dinwitty Lane. Soon after the straightening, high flows eroded a channel 12 to 15 feet deep in places. The streambanks have been slow to recover from this event.

The Lower Owyhee is on the 303(d) list for legacy levels of DDT and dieldrin. Both of these chemicals were banned in the United States in the early 1970s. However, they are very slow to break down and they

accumulate in the fatty tissues of fish and other animals. These facts explain why they are still found in the Management Area.

Dimethyl Tetrachloroterephthalate (DCPA) residues are present in groundwater as a legacy of past use of Dacthal for weed control. Growers voluntarily stopped using Dacthal between 1995 and 1998.

Heavy nitrogen fertilizer use by farmers before 1990 resulted in high nitrates in groundwater and in the vadose zone.

Irrigation

Most meadows and pastures are not irrigated. Flood irrigation is most often used on the few irrigated pastures and meadows. The system of dikes and levees maintained by ranchers mimic what beavers did historically by storing and dispersing spring floodwaters. The return flow from this irrigation helps augment water availability for use lower in the basin.

Irrigation practices in the row crop areas below the reservoir differ from those in most areas in Oregon. Furrow irrigation is the primary technique farmers use, and it consists of placing water in furrows and allowing the water to proceed across the field 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 Owyhee or the Snake River, it has been used several times. As a consequence of water reuse, the cumulative water-use efficiency of the cooperative systems of furrow irrigation are vastly more efficient than calculations of furrow irrigation based on individual 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 later part of the irrigation season, the water in many of these ditches can be largely return flow. In many ways, this reuse of water is efficient. It helps spread the amount of water longer in the season. The reuse of water, when properly managed, may also reduce pollutants in drain water.

This system would be difficult to change because of the complexity of its design and many other considerations. Some of these considerations include:

- The potential to lower groundwater levels to the point where wells dry up if farmers eliminate furrow irrigation. This could reduce late season stream flows too.
- The system of canals and ditches are not designed to accommodate all water users at one time. The system depends on return flow to meet crop water needs in adjoining fields.
- The investment in the current system is very high. Restructuring this system would need another large investment. The competitive nature of the agricultural economy makes the conversion from the current system to a new system cost-prohibitive.

A critical barrier to conversion from furrow irrigation is the cost of electrical power to run water pumps. With low commodity prices and high expenses, many farmers cannot afford the added costs of pumping irrigation water. Not only are the electrical usage rates high, but also the expense and time required to construct facilities to deliver power to the fields is not cost-effective. Farmers would also have to invest in pipe, sprinklers, and other irrigation equipment, which would add greatly to the cost of converting from furrow irrigation.

Fisheries

Streams, lakes and reservoirs in the planning area provide habitat for at least 15 native fish species and several nonnative trout, sunfish, and bass species. Oregon Department of Fish and Wildlife (ODFW) periodically stocks a coastal strain of hatchery rainbow trout in reservoirs. In addition to rainbow trout fingerlings, brown trout were planted by ODFW in the Owyhee River below Owyhee Dam to provide a popular catch-and-release fishery.

Although ODFW no longer routinely stocks warm water fish species, smallmouth bass, black crappie, channel catfish, and black bullhead have become established from previous introductions in the Owyhee River above the Owyhee Reservoir and in Cow lakes.

Lahontan cutthroat trout inhabit two basins in the Trout Creek Mountains, and a small number live in Sage Creek and Line Canyon Creek in the Quinn River Basin. The BLM reports annually to the US Fish and Wildlife Service for grazing authorization on allotments where Lahontan cutthroat trout are present. Initial consultation concluded that current grazing practices are not likely to jeopardize the continued existence of the trout.

2.3 Agricultural Water Quality in the Management Area

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

The LAC is committed to the rational use of natural resources for income and social welfare for the residents of Malheur County. The LAC is committed to foster production practices consistent with the preservation of natural resources of the county. 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 compared to the rest of Oregon. As a matter of fairness, all aspects of this plan must be sound and contribute to income and employment.

2.3.1 Local Issue of Concern

Many people receive their drinking water from wells. Well monitoring studies detected nitrate and Dacthal di-acid contamination in the shallow aquifer within the irrigated portion of the lower Owyhee River Basin. This area was designated the Northern Malheur County Groundwater Management Area in 1989 by Oregon DEQ for nitrates.

2.3.2 Water Quality Parameters of Concern

Table 3 consists of water quality limited streams from DEQ's 2010 303(d) list. The LAC seriously doubts that the contents of Table 3 are based on sound science.

Most of the water quality violations, e.g. temperature and chlorophyll a, relate to the beneficial use of 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). Mercury is a concern for fish consumption.

Table 3. Water-quality limited streams in the Owyhee Management Area.		
Waterbody Name	**Boundaries**	**Parameters**
Alkali Creek	River Mile 0-8.3	Bacteria
Antelope Reservoir/Jack Creek	Reservoir	Mercury
Cottonwood Creek	RM 0-9	Temperature
Fletcher Gulch	RM 0-1.4	Arsenic, Copper, Lead, Manganese, Mercury, Thallium
Indian Creek	RM 1.9-7.1	Temperature
Jordan Creek	RM 0 – 54.4	Mercury
Jordan Creek	RM 0 – 94.7	Arsenic
McDermitt Creek	RM 0-12.3	Temperature
Mine Creek	RM 0-4.5	Temperature
Overstreet Drain	Drain	Copper, Iron, Lead, Manganese
Owyhee River	RM 0-18	Bacteria, chlorophyll *a,* DDT, dieldrin
Owyhee River	RM 16.8 – 200.4	Temperature
Owyhee River	RM 28.7 – 124.2	Mercury
Owyhee River	RM 71-200.4	Arsenic
Owyhee River, North Fork	RM 0-33.7	Temperature
Riser Creek	0-0.6	Temperature
Sage Creek	RM 0-5.2	Temperature

Elevated stream **temperatures** can stress aquatic organisms and deplete oxygen from water. 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. When aquatic plants die, they drop to the stream bottom and are broken down by bacteria, which uses up oxygen in the process. The breakdown of aquatic plants can use up large amounts of the oxygen needed by other aquatic life for survival. Dissolved oxygen levels can also be reduced in slow moving waters, as most oxygen dissolved in water comes from contact with air.

Nitrates are primarily carried into surface and groundwater as molecules dissolved in water. **Phosphorus** can be either dissolved or attached to soil particles. **Sediment** carried in streams can impair aquatic life by reducing light penetration and visibility, reducing water infiltration through stream substrate (harming incubating fish eggs), and irritating gill filaments. Sediment also decreases the abundance of aquatic insects, which are a primary food source for fish.

Heavy metals are naturally found in Management Area soils. Toxics such as arsenic have been found in drinking water wells at levels exceeding the drinking water standard. The source is likely naturally occurring arsenic within the volcanic rocks of the region (Phil Richerson (DEQ), personal communication, 2014).

2.3.3 Groundwater

DEQ, in conjuction with stakeholders, developed the Northern Malheur County Groundwater Management Area Action Plan to reduce nitrate concentrations to 7 mg/L (http://www.deq.state.or.us/wq/groundwater/nmcgwma.htm).

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 have been tracked in eleven wells in the Management Area starting in July 1991. Results through December 2012 showed that eight of the wells exceeded the standard at least once, and the average nitrate concentration of eight wells exceeded 7 mg/L and seven excxeeded 10 mg/L. The highest nitrate levels were around Cairo Junction and Nyssa.

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 until 1995-1998 when growers stopped using it. Dacthal residue levels ranged from no detection to several hundred parts per billion. A lifetime health advisory level of 70 parts per billion has been established by the EPA for Dacthal and its breakdown products.

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. Therefore, it may take over 11 years for water in the Cairo Junction area to discharge. 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.

2.3.4 Basin TMDLs and Agricultural Load Allocations

The Snake River - Hells Canyon TMDL was adopted in 2004 and is a joint effort among the Idaho DEQ, the Oregon DEQ, and the US Environmental Protection Agency (EPA). This TMDL addresses temperature, bacteria, chlorophyll a (a product of excessive algae growth), sediment, pesticides, and dissolved oxygen in the Snake River from where it enters Oregon near Adrian to immediately upstream of the inflow of the Salmon River.

In the temperature TMDL, the pollutant is heat. Human activities can both decrease and increase water temperature. The bacteria TMDL addresses *E. coli*. The chlorophyll TMDL focuses on phosphorus,

which, in addition to natural sources, moves to streams via irrigation-induced erosion in the Management Area. The TMDL target of 0.07 mg/L total phosphorus in the Snake River will require significant reductions (72%) from current levels, which the LAC does not consider achievable due to the natural delivery of phosphorus to Owyhee Reservoir.

For temperature, agricultural land managers are expected to promote and protect riparian vegetation. Shade targets are not provided in the TMDL. Minimizing livestock waste in water and irrigation-induced erosion are also required by the TMDL. TMDL targets for sediment include a 27 percent reduction in suspended sediment at the mouth of the Owyhee River.

2.4 Prevention and Control Measures

The strategy of the ODA, Malheur County SWCD and watershed councils for controlling pollution on agricultural and rural lands relies on existing and expanded programs and practical and feasible projects, while focusing on proactive planning activities for those conditions which are the most significant and controllable sources of nutrients, sediment, bacteria, and other sources of pollution arising from agricultural use.

Some specific guidance about the water quality issues of this Area Plan are:

Streamside Conditions

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 stream banks
- Capture, store and safely release precipitation
- Filter nutrients from both the ground water and surface runoff
- Provide shade to moderate water temperatures

In addition to the water quality benefits, healthy vegetation improves fish habitat. Riparian vegetation protects spawning, rearing and holding areas by trapping sediment that could smother eggs. Vegetation improves 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.

Healthy riparian vegetation benefits farmers and ranchers too. Benefits include increased forage production, less stream bank erosion, increased late season flows and stable stream channels. Techniques that improve riparian area management can lead to economic benefits as well. Many research projects and practical on-farm examples have shown this to be true. Riparian vegetation, consistent with site capability, is a cost effective means of reducing stream bank erosion and heating from solar radiation.

In recent years, the state and federal governments have developed several cost-share programs to aid landowners in improving their management of riparian areas. These programs will help pay for fencing to establish riparian pastures, pay an annual rental fee for planting woody vegetation along streams, assist in developing off-stream watering sources that will help keep cattle out of the riparian area and many other options. Some of the programs available include:

- Conservation Reserve Enhancement Program (CREP)
- Oregon Watershed Enhancement Board (OWEB)
- Environmental Quality Incentives Program (EQIP)

- DEQ Nonpoint Source 319 Grant Program

Each riparian area is different and will only support vegetation communities adapted to that area. This is known as site capability. Capability in this instance is defined as the highest ecological status an area can attain given political, social, or economic constraints, which are often referred to as limiting factors. Capability does not apply to uses such as grazing, farming, recreation and timber practices, which can be changed. While these uses can affect the condition of a riparian area, they do not prevent it from achieving potential. Capability only applies to constraints that the land manager cannot eliminate or change through a management action.

Stream Temperature Considerations

There are many important factors to consider when discussing stream temperature in the Owyhee area. As discussed in the Climate section of this Plan, air temperatures are high and stream flows are low during the summer in southeastern Oregon. This limits the ability to have cool water. Other natural factors such as the numerous hot springs in the area, the north-to-south orientation of the main stem, and the heat radiating from rocky canyon walls have a profound heating effect on stream temperatures. Wide channels of the main stem of the Owyhee and of some tributaries due to flooding minimize stream shading by riparian vegetation. Thus, the moderating influence of shade is limited in these situations. Low stature riparian vegetation such as coyote willow, grasses, and sedges becomes established spontaneously. Natural cycles of flooding along most Owyhee tributaries makes it difficult to retain tall riparian vegetation because it is scoured out.

Another consideration is that large areas of the Owyhee River (roughly 186 river miles) have no agricultural activities occurring near them. This is because the mainstem, West Little, and North Fork of the Owyhee rivers are designated National Wild and Scenic Rivers. An Order of Modified Injunction was filed in the District Court of Oregon on April 28, 2000. The order directed the elimination of grazing at "areas of concern" identified in the 1993 "Main, West Little, and North Fork Owyhee National Wild and Scenic Rivers Management Plan." Before this court order, cattle had access to only 12 miles of the river.

Agricultural Waste

The aim of agricultural waste control is to minimize the transport of nutrients, pathogens, and sediment into waters of the state. Numerous conservation strategies may be taken to minimize waste inputs into waters of the state. A discussion of these strategies, broken down by waste component, follows:

Nutrients

Crop nutrients are elements taken in by a plant that are essential to its growth, and which are used by the plant in the production of its food and tissue. Over-application of crop nutrients may result in nutrient runoff and leaching into waters of the state. This may cause nuisance algal growth, which leads to fluctuating pH, and low dissolved oxygen levels. Landowners and operators are encouraged to adopt sound agronomic strategies to guide crop nutrient applications.

Sound agronomic strategies include: use of generally accepted fertilizer guidelines; setting realistic yield goals; regular calibration of fertilizer application equipment; appropriate application timing; periodic soil testing and plant tissue analysis; periodic nutrient analysis of manure and/or compost products that are applied; managing irrigation to prevent nutrient loss through leaching and/or surface runoff; carefully managing nutrient applications; and accounting for "non-fertilizer" sources of nutrients such as manure, compost bio-solids and crop residues.

Livestock Waste

Manure is an important nutrient source for crop and pasture production. Proper livestock waste management can decrease nutrient and bacteria contamination of water resulting from agricultural

activities. Livestock are not responsible for all the bacteria found in creeks and rivers; many bacteria detected in streams are from waterfowl and other wildlife.

A landowner or operator can use many different conservation strategies to help minimize animal waste reaching waters of the state. Harrowing pastures after livestock have been moved off helps to incorporate the manure into the soil so the crop will take up the nutrients. This also greatly reduces the chances bacteria and nutrients will runoff into a stream. Vegetative buffer strips can minimize the effects of runoff, by catching pollutants before reaching a stream. Examples of waste management include the diversion of clean water away from potential pollutants; waste collection, storage, and utilization; and facilities operation and maintenance. If applying manure to cropland, it is important to apply at rates that do not exceed agronomic needs for nitrogen and phosphorus based on soil and/or tissue tests for the crop to be grown. Pasture management and/or prescribed grazing can help maintain the integrity of pastures, thus decreasing waste runoff. Through the management of livestock access to riparian areas, the effects of animal waste can be reduced. Some examples of techniques to achieve this may be off stream watering, seasonal grazing (riparian pastures), and/or exclusion (temporary or permanent).

Animal Feeding Area Management

Management of animal waste from Animal Feeding Operations is a local and national priority. The LAC encourages livestock operators to assess their feeding area management for any discharges of pollution to the waters of the state. If operators think they might have a problem, the LAC recommends they contact local, county, state, and federal agencies for technical assistance.

When assessing their management, the LAC suggests operators consider the following:

- Animal waste collection, storage, and disposal at agronomic rates,
- Excluding waters of the state from confinement areas,
- Control of surface runoff to and from the waste storage and confinement areas,
- Off-stream water development.

Sediment in Irrigation Return Flow

Excessive levels of sediment in tailwater discharges can harm aquatic life and can carry nutrients, particularly phosphorus, into streams and rivers. It should be noted that 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.

This is a particular concern in some parts of the Owyhee Basin because of the existing irrigation system. Most crop fields are furrow irrigated. Normally, the irrigation tailwater is returned to a ditch and reused by another farmer down the line. By the time the water is returned to the Owyhee or the Snake River, it has been used several times. The irrigation water can pick up sediment and other substances as it travels down the furrow. This effect is compounded when the water is reused.

It is important to note that most soils in the planning area consist of very fine particles. These soils are the silts that were the last material to settle out of the water from the Lake Bonneville Flood[1]. Once they are in water, they stay suspended for a long time. Long-time residents, many of whom were the first farmers to irrigate crops, describe the soils as having the consistency of baby powder. In the early days of irrigation, water moving down a furrow could kick up a small dust cloud. Thus, the nature of the soils makes it difficult to control irrigation-induced erosion.

[1] This massive flood occurred about 14,000 years ago when water from a 20,000 square mile lake broke loose. This flood greatly affected the Snake River and the region around it. Floodwaters carved out new canyons and deposited huge amounts of soil and boulders. When the flood came through the area around the mouth of the Owyhee River, the water backed up and the silt settled out over several years.

Many farmers have been reducing soil loss from furrow irrigation. Some of the methods they use include:

- Laser leveling,
- Straw mulching,
- Polyacrylamide,
- Filter strips,
- Gated pipe,
- Cement ditches,
- Sediment ponds,
- Water control structures,
- Pump back systems,
- Surge irrigation,
- Bubblers (eliminate trash in irrigation water, which helps to reduce water applied to a field),
- Conservation tillage,
- Conservation crop rotations,
- Irrigation management (soil moisture monitoring, proper scheduling etc.),
- Sprinkler and drip irrigation in place of surface furrow irrigation where technically and economically feasible.

Conversion from furrow to sprinkler irrigation can have many water quality benefits, including use of less water for irrigation and creation of less tail water. However, as noted previously, the conversion to sprinkler and its reliance on electrical power can be very expensive. And, there is a concern that the application of less irrigation water will reduce groundwater recharge and lower people's wells.

Researchers at the Malheur Experiment Station have worked on many methods to maximize water use efficiency. Producers in the area have adopted many of the practices recommended from the results of this work.

Many ranchers who flood irrigate their hay meadows have installed berms to redirect the surface flow back onto the meadow. This improves control of their irrigation, and reduces surface return flow to rivers.

Voluntary efforts are the focus of the ODA, the Malheur County SWCD, the watershed councils and the LAC. However, situations may arise when a particular landowner refuses to correct the conditions on his or her property. In this case, the ODA has enforcement authority to ensure pollution control. At the same time, the ODA does not want to mandate or prohibit any specific agricultural activity. To maintain this flexibility, this Plan and its associated administrative rules describe prohibited conditions.

Readers should note that this Area Plan is only a guidance document. By itself it is not regulatory. However, it does refer to administrative rules that set requirements for landowners. To help distinguish between this Area Plan and its associated rules, all rule language is separated from the rest of the text by solid lines.

OAR 603-095-2740
Prohibited Conditions
(1) A landowner shall be responsible for only those conditions caused by activities conducted on land managed by the landowner. Criteria do not apply to conditions resulting from unusual weather events or other exceptional circumstances that could not have been reasonably anticipated.

(2) Pollution Control and Waste Management

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

(3) Streamside Conditions
By January 1, 2008, no person may contribute to conditions that preclude establishment and development of adequate riparian vegetation for streambank stability and shading, consistent with site capability.

(4) Irrigation Surface Water Return Flow
(a) After January 1, 2008, 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.

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: Goals, Objectives, and Strategies

3.1 Area Plan Goal

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

The goal of this Area Plan is to improve water quality by reducing sediment, nutrient, and bacteria loading and improving riparian vegetation.

It is important to remember that if society is to be realistic in its environmental goals, it cannot ignore economics. People cannot maintain what they cannot afford, and conservation can be expensive. It is because of this expense and the low long-term average earnings in agriculture that the pace of change is often slow. The non-agricultural community must provide time, patience, and help to have agriculture achieve environmental objectives.

This Area Plan assumes that human society cannot go backwards to a time before modern agriculture because we cannot feed, clothe, house, and warm today's population with yesterday's technology. Today's agricultural producers, especially those in industrialized countries, work to provide these goods so that the vast majority of people can be involved in other activities. Because of the efficiency of modern agriculture, society benefits because people do not have to spend all their time scratching a living from the earth.

This Area Plan provides farmers, ranchers, and other agricultural land users in the Plan area a guide to maintain and improve in the following areas:

1. Sediment in irrigation return flows.
2. Stream bank erosion.
3. Placement, delivery, or sloughing of wastes into streams.
4. Riparian vegetation for bank stability and stream shading consistent with vegetative site capability.

Farmers, ranchers, and other agricultural land users are not expected to achieve any or all of the above conditions immediately. Landowners are expected to take current action in adapting their management techniques so that they can improve the conditions on their property.

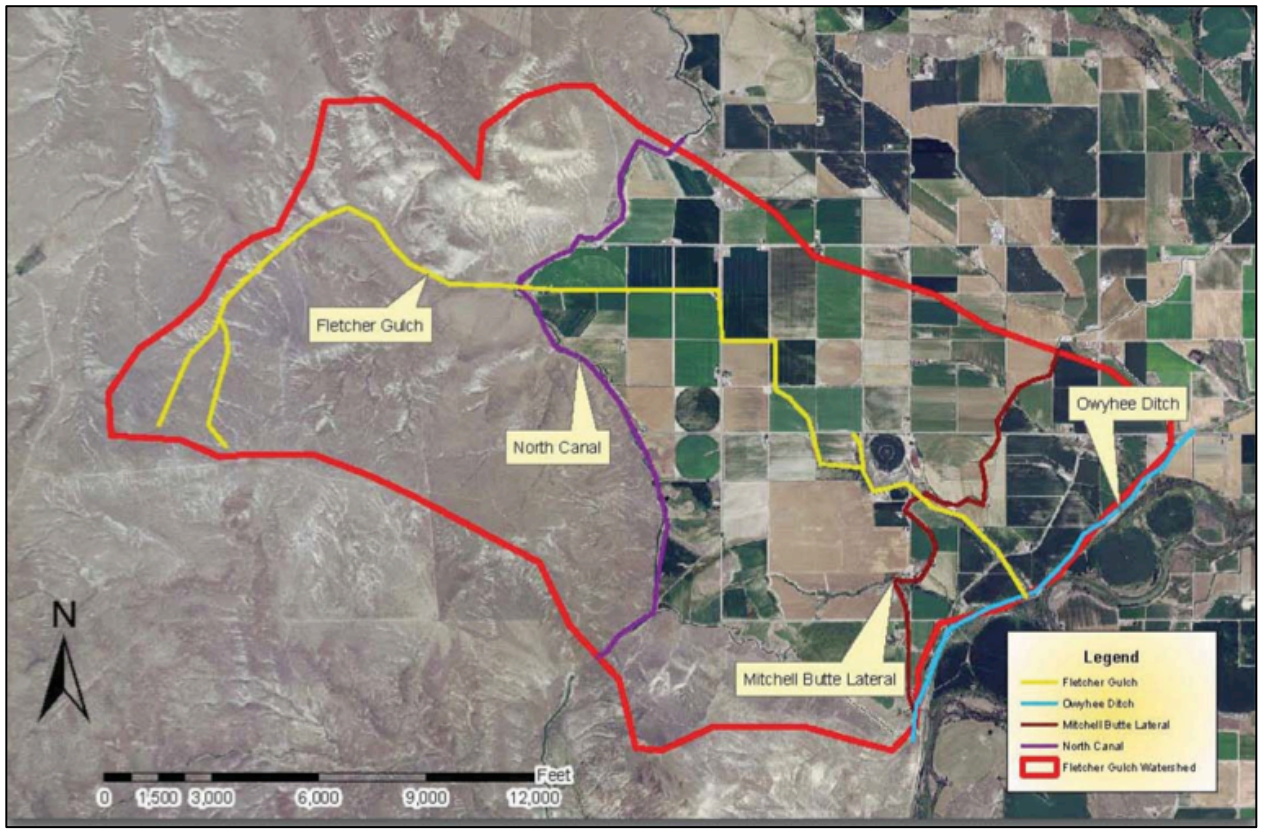
3.2 Measurable Objectives

To measure progress, ODA, in consultation with the LAC, DEQ, and the Malheur County SWCD will identify timelines and interim benchmarks for agriculture to strive for over designated time periods and at a scale suitable for measuring progress. The benchmarks will be documented in the Area Plan and reported in the biennial reports prepared for the Board of Agriculture. ODA will consult with DEQ on the adequacy of the Area Plan for making significant progress toward meeting the pollutant reduction targets set in the TMDLs.

Measurable objectives have been identified for the Focus Area (see section 3.3); these objectives will be refined over time. Measurable Objectives for the Management Area will be determined at the 2017 biennial review; those too will be refined over time.

3.3 Focus Area: Fletcher Gulch

The Fletcher Gulch Watershed is about 20 miles southwest of Ontario and consists of approximately 6,500 acres, of which 2,906 acres are irrigable land and 3,600 acres are rangeland. The North Canal divides the cropland to the east from the rangeland to the west. Landownership includes approximately 3,000 acres of private land (east of the canal) and about 3,500 acres of federal land managed by the Bureau of Land Management west of the canal. Most of the private land is in irrigated row crops, but there are also some fields with grazing cattle.



Fletcher Gulch is a 6½-mile ephemeral drainage that empties into the Old Owyhee Ditch. The drainage water moves along the Old Owyhee Ditch to downstream water users and eventually the Owyhee River. Sediments and nutrients that wash off fields in the Fletcher Gulch Watershed are passed downstream. In addition, the water flowing out of Fletcher Gulch also contains sediment eroded from the banks maintained by the Owyhee Irrigation District.

Prior to 1998, the majority of the cropland in Fletcher Gulch was irrigated with furrow-irrigation through a series of old concrete and earth ditches, resulting in low on-farm irrigation efficiencies of 20% to 40%. The NRCS estimates composite annual furrow irrigation erosion for the typical crop rotation at 34 tons per acre per year.

The major cause of erosion and low irrigation efficiency is the irrigation of relatively long furrow runs on steep slopes. More than half the irrigated acreage in the watershed has slopes exceeding 1.5%. Fields with 1.5% or less have been leveled or smoothed to put the fields at a milder grade.

This area was selected as a Focus Area because of concerns about poor water quality due to sediment-induced erosion. The SWCD's drain monitoring work identified Fletcher Gulch as a high priority for focused work.

All irrigated acreage are assessed and categorized by SWCD staff as indicated in Tables 4 and 5. Results of the assessments and targeted assistance are reported to the LAC at the Biennial Review and are summarized in Chapter 4.

Table 4. Classifications of irrigated acreage based on potential for pollution from sediment.

	Characteristics to evaluate		
	Visible signs of field irrigation-induced erosion	**Irrigation water leaving the control of the landowner and/or entering commingled water**	**Notes**
Class 1	None or minimal	None	
Class 2	Yes	Clear or none	
	None	Dirty	Water entering field from neighbor
Class 3	Yes	Dirty	

Table 5. Classifications of irrigated acreage based on potential for pollution from manure deposition and transport.

	Characteristics to evaluate		
	Vegetated buffer zone	**Timing of grazing in relation to wet periods (rain and irrigation)**	**Bare areas in pasture within 50 feet of water body**
Class 1	Yes	Timed to avoid runoff of potential pollutants	No
Class 2	Yes	Shortly before wet periods, resulting in potential runoff	No
Class 3	No	During wet periods resulting in runoff	Yes

Focus Area Measureable Objectives:

By 2016,

1. Move all Class 3 acreage to Class 2.
2. Reduce nitrogen, sediment, orthophosphate, and total phosphorus loads by at least 20%.
3. Reduce *E. coli* concentration below 406 colonies/100 mL

Additional Measurable Objectives will be determined at the 2017 biennial review.

3.4 Strategies for Area Plan Implementation

The LAC would like to see water quality enhanced or maintained through the promotion of agricultural activities that are technically and economically feasible.

- Promote productivity, profitability, and freedom of producers to implement voluntary stewardship.
- Secure adequate funding for the implementation of this Area Plan to achieve its mission, goals, and objectives.
- Use the media and other educational methods to increase awareness of agriculture's efforts to maintain and improve water quality.
- Minimize conditions on agricultural lands that might contribute to a reduction in water quality.

- Promote the use of state tax credits for landowners who are implementing good stewardship practices on their land.
- Encourage the federal government to allow tax credits for landowners who are implementing good stewardship practices on their land.
- Promote the coordination of water quality protection efforts among the federal and state agencies, landowners, and all residents of the Owyhee Basin.
- Monitor and evaluate the effectiveness of the Area Plan and update as funded over and above current levels of support.

The LAC recommends that irrigation and drainage districts and their members work together to develop comprehensive and systematic measures to reduce sediment that reaches creeks and rivers from irrigation return flow. The committee thought that examining the entire system as a whole would be an efficient approach to the problem. Once the districts and the landowners have identified the problems and potential solutions, they could apply for grant monies as a unit to implement the solutions. The SWCD is working with the irrigation districts to look at irrigation in northern Malheur County in an integrated manner.

Please note the LAC is not suggesting new landowner fees to fund this activity. They are only suggesting everyone work together to develop strategies to help reduce sediment levels. The LAC thinks this will be a more successful approach. This does not exempt individuals from doing their part in controlling sediment leaving their fields. It is still important that individuals continue to do their best to control sediment losses.

The Malheur County SWCD works with partner agencies and groups such as Oregon State University Extension Service, Malheur Experiment Station, USDA NRCS, ODA, Owyhee Watershed Council, BLM, local school agriculture and science programs, and community college natural resource classes to carry out the following education strategies.

1. Conduct education programs to promote public awareness of water quality issues and their solutions.
   - Hold workshops on water quality issues and the conservation practices that will help improve water quality and agricultural operation efficiency.
   - Develop demonstrations to highlight successful conservation practices and systems in conjunction with local educational institutions.
   - Organize tours of demonstration projects for agricultural managers and producers.
   - Produce and distribute brochures about water quality issues.
   - Focus educational efforts on small acreage/hobby farmers.

2. Develop an ongoing media program to inform agricultural operators and the public of conservation issues and events.
   - Include updates on the status of the Area Plan and water quality data in the SWCD newsletter and in local newspapers/media.
   - Develop and implement a newsletter to be sent to all agricultural producers in the Owyhee Management Area.
   - Submit news articles and public service announcements to area newspapers, radio stations and newsletters.
   - Invite media to conservation tours and workshops.

3. Involve the agricultural and rural community in conservation education.
   - Create and maintain a list of experienced agricultural operators willing to share their best management practices with other interested people by speaking, leading tours and providing tour sites.

4. Build partnerships with agriculture businesses to promote conservation.
   - Co-sponsor workshops and tours with the SWCD.
   - Share education materials with agribusiness field representatives and with feed stores, and retail agricultural suppliers to target small farm operations.

5. Involve educational institutions in conservation, education and research. For example, places such as Oregon State University Extension, Malheur Experiment Station, the community college and high school science and agricultural programs are high potential partners. The focus of the educational effort will be:
   - Prevention, restoration and enhancement using sound agricultural management strategies.
   - Management of small acreages for water quality protection.
   - Riparian areas – issues and considerations.

Chapter 4: Implementation, Monitoring, and Adaptive Management

As DEQ indicates in their TMDL, improvements in water quality may take years to document.

Monitoring activities are integral components of Area Plans. When effectively used, monitoring activities can provide valuable information on how much effect a plan is having, how extensively it is being implemented, and where more efforts are needed in a basin.

Before initiating the design of a monitoring program, problem definition, monitoring goals, and monitoring objectives must be determined. Questions to be answered by the monitoring program need to be clearly and carefully articulated.

4.1 Implementation and Accomplishments

In 2013/2014, the Owyhee Watershed Council partnered with landowners and irrigation districts in the Owyhee watershed to implement a number of water quality improvement projects.

Activities related to OWEB's large and small grant programs 2013/2014

- 566 acres of cropland were converted from flood to sprinkler irrigation,
- 12,800 feet of open ditch was replaced with buried pipelines,
- 37,886 feet of open lateral irrigation delivery systems were piped to provide pressurized irrigation water delivery to landowners,
- 96 acres were converted from flood to border/basin irrigation,
- 80 acres were converted from flood to gated pipe irrigation.

The following activities have received funding and will be implemented in 2015/2016:

- 1,056 acres cropland converted to sprinkler irrigation,
- 5 acres from flood to gated pipe,
- 3,425 feet of riparian fencing,
- 2 off stream livestock watering facilities,
- 1,700 feet of stream bank stabilization and riparian plantings.

The Council is also working through a grant with DEQ to plant filter strips. The Council purchased a 10-foot seeder for landowner use to plant filter strips in their fields. Last year one landowner used the seeder to plant approximately 3 acres of filter strips. A new phase of this grant will involve outreach to local landowners on PAM (polyacrylamide) use and application methods. We will be looking at a PAM cost share program in the spring of 2015 to encourage the use of PAM and other water quality improvement BMPs.

The Malheur County SWCD has focused more of their efforts in the last two years in the Malheur Basin. However, they are continuing work in their Fletcher Gulch Focus Area, with a project that will pipe 420 feet of the Fletcher Drain through a feedlot, and piping and on-farm irrigation water management in the Twilight Drain portion of the Fletcher Gulch drain shed. The Malheur County SWCD is also installing a large project to control livestock access to the Owyhee River near Crowley with a solar livestock water system, multiple troughs, and two spring developments. SWCD staff will continue to monitor twelve drains as part of the Owyhee River Improvement Project.

More than 1,000 5th graders participated in the annual Owyhee Field Day sponsored by the Owyhee Watershed Council. This event included a water quality station staffed by the SWCD.

4.2 Monitoring—Status and Trends

4.2.1 Water Quality

Staff from the Malheur Watershed Council, Malheur County SWCD, DEQ, and ODA have worked for the last two years to gather all flow and water quality data collected in the Management Area. The result is almost 4,000 samples collected from almost 100 locations since 1960. These data are in the process of being analyzed 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.

These data will be evaluated and presented to the LAC at their 2017 biennial review.

With this knowledge, the LAC, the SWCD, and ODA will refine and improve this plan in the future. We need the means to determine where our problems are and what we can do to correct them. This is part of our adaptive management strategy.

4.2.2 Land and Water Conditions

Since 2008, landowners have implemented the following projects:

- Converted 679 acres from flood irrigation to sprinkler:
  - Five pivots were installed between 2008 and 2011.
  - One linear sprinkler and two wheel lines were added in 2012.
- In 2013 and 2014, the SWCD focused on landowner recruitment for additional projects, resulting in piping a lateral that ran through a feedlot and upcoming work in the Twilight Water Quality Improvement portion of Fletcher Gulch.

The SWCD has adopted two methods for evaluating land conditions on irrigated lands (see Section 3.3). As a result of the activities implemented by landowners, the number of acres in Class I has more than doubled.

	Land Condition: % of acreage				
	2008	**2011**	**2013**	**2015**	**2017**
Class 1	15	24	41		
Class 2	22	21	15		
Class 3	62	55	44		

The SWCD has also taken water samples at the mouth of Fletcher Gulch 1-2 times per month from April through November starting in 2008. These data are in the process of being analyzed for improving water quality trends.

4.3 Aerial Photo Monitoring of Streamside Vegetation

Aerial photographs from 2007 and 2012 were analyzed for seven stream reaches per the methodology presented in Section 1.8.1. The higher the score, the more trees and shrubs compared to grass and bare ground. The length of each reach varied from about three to four miles.

TABLE 7. Riparian index scores from analysis of aerial photographs, 2007 and 2012.			
Stream	Scores		Comments About Analyzed Reach
	2007	2012	
Crooked Creek	40.2	40.0	Channelized by a catastrophic flood years ago, but now has regained meanders. The channel was extended to make the stream flow around a butte, resulting in a lengthened channel. Overall, channel appears stable. Some point bars suggest past high sediment loads. Bottom ten percent of the reach drops into a narrow canyon with limited access for livestock.
Jordan Creek	30.9	32.2	Mostly stable channel with one large diversion present. Lower ten percent shows excess sediment load with mostly bare point bars.
Mahogany Creek	31.1	31.2	Mostly stable channel but has a large density of algae or some other aquatic vegetation. Some short reaches of the stream have been channelized.
Oregon Canyon Creek	36.3	36.5	About 80 percent of this reach has multiple channels, with up to five visible. Stream was dry during time of photos. Very uniform vegetation. In 2012 most of the reach examined had been burned in a range fire, which did not affect the riparian score.
Owyhee River	37.3	37.5	Stable reach of river. Downstream section has some large sandbars that may be the result of past sediment problems.
Stockade Creek	36.0	37.1	Narrow channel, stable. Live flow visible.
Succor Creek	29.9	30.6	Most of this reach has indication of excess sediment loads. About half the length has eroding banks. At least two diversions are present, as well as nearby flooded fields.

Riparian index scores in 2007 ranged from a high for Crooked Creek to a low for Succor Creek. None of the streams had tree cover over 13 percent in any band, and most had one percent or less. The greatest percentage of trees was found along Stockade Creek. The Owyhee River had the greatest percentage of bare land (27 percent in one band), but this was due to large sand bars. Crooked Creek had the highest percentage of bare/agriculture land with one band at seven percent.

The 2012 data showed no significant changes (generally, ODA considers a five percent change as significant). Jordan Creek was closest to an important change. Ground-truthing showed that riparian vegetation became denser along some sections of the creek, and the riparian index scores confirmed this. Mahogany Creek had a drop in bare/agricultural land, explaining the two percent increase in score. Stockade Creek riparian score improved by three percent, due to an increase in shrub and shrub/agricultural cover and a decrease in grass/agricultural.

4.4 Biennial Reviews and Adaptive Management

The January 14, 2015, biennial review consisted mostly of a discussion of ODA's proposed changes to the Area Plan and activities in the Fletcher Gulch Focus Area. There were no enforcement actions in the last biennium.

Impediments identified by the LAC:

- Landowners are interested in doing projects but cost-share funds are insufficient to help them implement projects,
- Conservation partners lack sufficient staff to respond to landowner desires to make changes,
- There is low interest in solutions such as sediment basins because they take high-value cropland out of production and are very expensive,
- There may be some landowners that don't see themselves as part of the problem,
- Landowners who do work on their own don't get credit for the improvements they have made so it appears to outsiders that progress is slow,

- Landowners and local partners have concerns that water quality and land condition data will be used in ways that inhibit progress,
- Some cropping systems make it difficult to use some of the technological solutions that improve water quality, e.g. drip irrigation,
- Some solutions conflict with management practices on adjoining lands, e.g. return flows used by a neighbor for irrigation,
- Federal lands are a source of pollutants and noxious weeds but litigation and Federal policies make land management changes difficult,
- BLM is a major landowner but is not effectively involved in finding and implementing solutions in the near-term,
- Catastrophic wildfires disrupt watershed functions: sediment eroded from burned areas is entering rivers and streams; wildfires are eliminating upland and riparian vegetation and displacing wildlife,
- Phosphorus and arsenic enter the Owyhee River from naturally occurring deposits, e.g. ash layers in the upper watershed, not just anthropogenic activities such as farming,
- Idaho DEQ is not actively addressing legacy mercury contamination from mining,
- Aquatic and terrestrial weed infestations (including juniper) can reduce water quality.

Recommendations from the LAC:

- More public education on land management practices,
- Continued interaction among partners so all know what they are working on,
- Continue to meet every January to discuss agricultural water quality issues and activities,
- Develop goals common to all partners about watershed management,
- Ribotype *E. coli* to determine sources of bacteria,
- Figure out monitoring needs and how to answer them,
- Figure out how to show our progress with numbers and do it,
- Provide more support and funding to irrigation districts to be part of the solution, e.g. provide GIS,
- Involve more volunteers with monitoring and other activities,
- ODA provide more information on riparian conditions, monitoring, and Rules,
- Control invasive species and manage grass fuel loads on Federal range lands to control wildfires.

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