Klamath Headwaters Agricultural Water Quality Management Area Plan

Developed by

The Oregon Department of Agriculture

with assistance from the

Klamath Headwaters Local Advisory Committee
and the
Klamath Soil and Water Conservation District

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Acronyms

Area Plan	Agricultural Water Quality Management Area Plan
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand
CAFO	Confined Animal Feeding Operation
CBOD	Carbonaceous Biochemical Oxygen Demand
CFS	Cubic Feet Per Second
CRP	Conservation Reserve Program
CREP	Conservation Reserve Enhanced Program
DEQ	Department of Environmental Quality
DO	Dissolved Oxygen
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
FLT	Federally Listed Threatened
FOTG	Field Office Technical Guide
LAC	Local Advisory Committee
NBOD	Nitrogenous Biochemical Oxygen Demand
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Services
OAR	Oregon Administrative Rules
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
OWEB	Oregon Watershed Enhancement Board
RUSLE	Revised Universal Soil Loss Equation
SLS	State Listed Sensitive
SOD	Sediment Oxygen Demand
SWCD	Soil Water Conservation District
TMDL	Total Maximum Daily Load
USLE	Universal Soil Loss Equation
WRD	Water Resources Department

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An Open Letter to the Klamath Basin Landowners and Readers of this Plan

Before you get into the legal language and references to arcane rules and statutes, we want you to know that we, the Klamath Headwaters Local Advisory Committee (LAC), are your neighbors and friends. We are affected by the same things that are happening in this basin as you are. We chose to be involved in this statewide process to speak up for our interests and our livelihoods.

The state of Oregon is under court order to control and prevent water pollution wherever it occurs and by whatever source. The Oregon Department of Environmental Quality (DEQ) is required to generate a list of streams, or stream segments, which do not meet the state standards for protecting the "beneficial uses" of those waters. We have a mandate from the Oregon legislature and the Oregon Department of Agriculture (ODA) to develop a plan that is based on reason, common sense, and peer-reviewed science to explain how our agriculture might potentially impact water quality and how we can reduce or eliminate any negative impact.

However, the mandate is not just from some government bureaucrats. We have taken this task for ourselves. We in agriculture need to be proactive to let the urban public know that we are doing our part. We honestly feel that we are the true environmentalists and have a deep connection with the resources we use and the land that we love. We believe we have a good opportunity of answering critics of agriculture about the scope and scale of our contribution. This is a great opportunity to show them what we have done and are doing for the land. There is also recognizable stewardship showing long-term voluntary landowner commitment. Private interests have a number of partnerships with the Oregon Department of Fish and Wildlife (ODFW) on fish screens, fish ladders, and extensive riparian fencing.

We have tried to make this plan as locally based and achievable as possible. We included language that takes local conditions and climate into account. We are even recommending that the Klamath Soil and Water Conservation District (SWCD) take a proactive role in the implementation of this plan and the associated rules by setting up a local "appeals board" to help resolve conflicts with ODA. The point being, we want our input and advice to go on beyond the development of the plan. We want to have a forum for you to voice your thoughts about implementation as well.

The 468B language is current law. This has been inserted into our plan and rules by ODA. A majority of the LAC members voted against the insertion of the language into the rules.

This plan is a "living document" appointed, by law, to be reviewed by us, the LAC, for adequacy every two years. It has the capacity to change over time to meet any problems we missed or to reflect a change in our priorities. As you read this, we hope you will be able to see the amount of time and effort that went into this product. We are eager for your input and ready to hear your comments.

Sincerely,
The members of the Klamath Headwaters Local Advisory Committee

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Legality

This Agricultural Water Quality Management Area Plan (Area Plan) provides guidance for addressing agricultural water quality issues in the Klamath Headwaters basin. The purpose of this Area Plan is to identify strategies to reduce water pollution from agricultural lands through a combination of educational programs, suggested land treatments, management activities, and monitoring. The provisions of this Area Plan do not, by themselves, establish legal requirements or prohibitions. ODA will exercise its enforcement authority for the prevention and control of water pollution from agricultural activities under administrative rules for the Klamath Headwaters and Oregon Administrative Rules (OAR) 603-090-0080 through 603-090-0110.

The administrative rules for the Klamath Headwaters management area set forth the requirements and/or prohibitions that ODA will use in exercising its enforcement authority for the prevention and control of water pollution from agricultural activities. In addition, OAR 603-090-0060 through 603-090-0120 describes the enforcement actions that may be triggered upon the finding of a violation by ODA.

Applicability

This Area Plan applies to all non-federal and non-tribal sovereign agricultural, rural, and forestlands drained by the Klamath River and its tributaries outside of the Lost River. It applies to agricultural lands in current use and those lying idle or on which management has been deferred. It applies to agricultural operations within incorporated city boundaries, to agricultural activities that result in soil disturbance of more than 10,000 square feet, and to rural lands not in agricultural use but which affect agricultural lands, such as roadways.

This Area Plan recognizes that planning for water quality is only part of a successful plan for overall management of agricultural and rural lands and that other, broader objectives must also be considered in total farm or resource management planning. Sustaining agricultural production capacity for future generations is one of those broader objectives that conserving water and soil resources will help achieve.

ODA Legislative Authority

In 1995, the Oregon legislature recognized the conflicting authorities that belonged to both ODA and the DEQ. While SB1010, codified at Oregon Revised Statute (ORS) 568.900-568.933, gave ODA the authority to address agricultural water quality issues, the DEQ under ORS 468B still had authority to regulate any water quality problems. SB502, adopted in 1995 and codified at ORS 561.191, clarified the legislature's intent that ODA should have the responsibility for all water quality regulation on lands used for agriculture.

ORS 468B.010 to 468B.050 lay out a broad framework under which pollution is defined as both point and non-point sources which degrade water quality so as to be detrimental to beneficial uses. State water quality standards (*e.g.,* 64° temperature criteria, 406 colonies of *E. coli* bacterial standard) are based on those beneficial uses. ODA's water quality planning and rule-making seeks to limit the responsibility of the agriculture community by working with LACs to develop land conditions that describe to both ODA and the landowner what the land looks like that has a potential to cause a 468B violation. In this scenario, ODA retains its full authority to interact with agricultural landowners for water protection. Landowners address the conditions on their lands while not being individually responsible for water quality standards not being met in their particular watershed.

ORS 468B.025 is the statute that was developed to address water pollution caused by activities that allow wastes to escape into waters of the state by any means. As stated earlier, ORS 561.191 provides that ODA is the state agency responsible for regulating farming activities for the purpose of protecting water quality. To implement this directive, the department

incorporated ORS 468B.025 and 468B.050 into all of the plan rules in the state. ORS 468B.025 and 468B.050 have been incorporated for the purposes of this Area Plan by including the language in the box below in the rules that effectuate this Plan.

Existing Statute Addressing Waste Management

The unacceptable conditions written in this Area Plan interpret, in laymen's terms and understandable by landowners, foreseeable agricultural violations of ORS 468B in a manner enforceable by ODA. ODA also requires that the following text be included in the rules of the management area.

> OAR 603-095-3840
> (4) Effective upon adoption, no person subject to these rules shall violate any provision of ORS 468B.025 or ORS 468B.050.

ORS 468B.025(1) states:
...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.

ORS 468B.050 identifies the conditions when a permit may be required. In agriculture, under state rules, these are referred to as Confined Animal Feeding Operations (CAFO) and are operations that confine animals for more than four months on prepared surfaces or in buildings, have wastewater treatment works, discharge any wastes into waters of the state, or meet the federal definition of a Concentrated Animal Feeding Operation (40 CFR §122.23). Permitted facilities are inspected at least annually by ODA.

Definitions

"Pollution" has the meaning given in ORS 468B.005(3) which states: 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.

"Wastes" has the meaning given in ORS 468B.005(7) which states: 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. Other substances that will or may cause pollution include commercial fertilizers, soil amendments, composts, animal wastes, and vegetative materials.

Introduction

Oregon's Agricultural Water Quality Management Program was designed to maintain as much flexibility in farming and ranching as possible and achieve state water quality goals and objectives. The objective of this plan is not to tell anyone how to farm, ranch, or otherwise utilize his or her natural resources. The Natural Resource Conservation District (NRCS) along with Soil and Water Conservation District (SWCD) personnel in local offices can provide technical assistance to help farmers, ranchers, and other agricultural land users to meet all of the

requirements set forth in the plan rules, and also, based on landowners desires, to go beyond rule requirements. For detailed information relating to the rule requirements, please refer to the "Unacceptable Conditions" section.

Geographic Area and Physical Setting

Located in the south central part of Oregon, the Klamath Headwaters Subbasin includes all tributaries to Klamath/Agency Lakes and the Klamath River to the Oregon border with the exception of the Lost River Subbasin. Geographic boundaries are consistent with Klamath Headwaters "Total Maximum Daily Load" (TMDL) completed in August of 2002 by the DEQ. Principal urban centers include Klamath Falls, Keno, Beavermarsh, Pinehurst, Chiloquin, Sprague River, Rocky Point, Bly, Beatty, and Fort Klamath. Elevation above sea level ranges from 4,050 to over 9,000 feet and averages about 4,500 feet.

Klamath Falls' long-term records from the official National Oceanic and Atmospheric Administration (NOAA) weather station show average annual precipitation of about 13.5 inches with about one-third occurring during the April through October growing season and two-thirds occurring from November through March. Since the establishment of an NOAA station at Klamath Falls in 1949, total annual precipitation has ranged from 6.72 inches in 1959 to 23.91 inches in 1996. Higher elevation areas receive considerably more precipitation. Annual average snowfall at 7,000 feet elevation at Crater Lake National Park exceeds 450 inches with over 600 inches recorded in 1998-99.

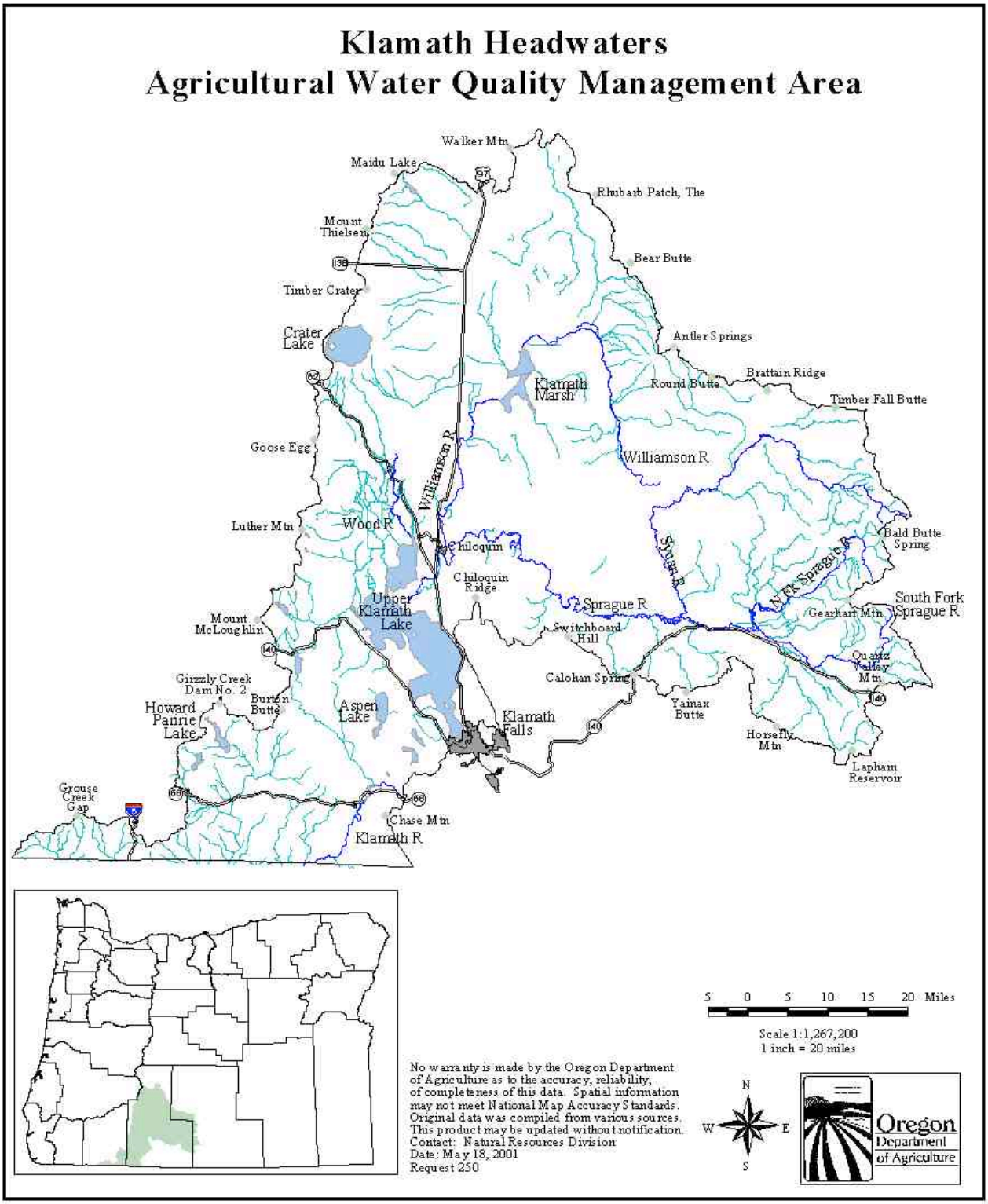
Average annual air temperature at Klamath Falls is about 46^{o} F with daily highs averaging 61^{o}F and lows averaging 32^{o}F. The daily maximum air temperature in July and August averages 82^{o}F, while the daily minimum temperatures in January and February average 19^{o}F. Lower temperatures are generally experienced in higher elevation areas.

Principal water bodies include:

- Klamath/Agency lakes with surface area of approximately 80,000 acres.
- Williamson River including major tributaries of Sprague and Sycan rivers.
- Wood River, Seven Mile and minor streams west side of the lake.
- Lake Ewauna and the Klamath River within Oregon.
- Spencer Creek, Jenny Creek, Cottonwood Creek, and Beaver Creek.
- Major wetlands at Sycan Marsh, Klamath Forest National Wildlife Refuge, and Upper Klamath National Wildlife Refuge.

Refer to the map of the Klamath Headwaters on the following page.

Map – Klamath Headwaters Agricultural Water Quality Management Area



Klamath River Area [a]

With the opening of the Applegate trail in 1846 and the subsequent arrival of substantial numbers of Euro-Americans, the land and water uses in the Klamath River watershed were changed forever. Just twenty years later, in 1866, the McCornack family began running cattle on part of what is now the Running Y Ranch and built the first dike for water control and irrigation in 1890.

Areas such as the Spencer Creek, Jenny Creek, and Aspen Lake watersheds as well as Long and Round lakes were grazed in an uncontrolled and excessive fashion.

As early as 1869, water users diverted water out of Spencer Creek to sustain irrigation, milling, and mining. Water was diverted from Aspen Lake for catfish farming and raising muskrat. Water was lifted into ditches out of the Klamath River south of Linkville to be used for agricultural purposes at about this same time. Most of these diversions have been discontinued or highly modified in light of modern agricultural practices. Grazing on private as well as public lands in this area is strictly controlled not only to restore the grazed grasses and shrubs but also to protect and restore the riparian areas. The reduction of sedimentation is a prime concern from a water quality standpoint.

Reclamation projects in the form of dikes on the west side of Klamath Lake and upper Klamath River occurred mostly following World War I and in the 1920's. These diking systems drained marshes and swamps to create pastures, hay fields, and a limited acreage of row crops.

Soils

Most of the soil is of volcanic origin, which equates to high clay. The following well-drained soil series are located in the Klamath River area: Bly, Capona, Deter, Lobert, Lorella, Ponina, and Woodcock. Poorly drained soil series in this area include Dilman, Klamath, Lather, Ontko, Pit, and Tulana. For more information on soil series and climate see the Soil Survey of Klamath County. The soils in the Colestine Valley/Cottonwood Creek are all fairly young soils, moderate to well drained. The agricultural lands in the bottoms generally consist of soils from the Carney-Coker series, which is deep, cobbley to gravelly clays. These soils can be quite droughty during the hot, dry summer months and so require irrigation during the growing season. These soils are best suited to native pasture as the alluvium parent material makes the soils hard to till. The area outside the relatively flat bottoms include the more severe sloped, sandy and rocky soils like the Heppsie-McMullin-McNull complex which is very well drained, shallow to moderately deep, and on slopes ranging from 20 to 60 percent. The south-facing slopes typically have grasses such as tall fescue, shrubs such as manzanita and hardwoods such as black oak as the dominant plant species. The north-facing slopes typically support Douglas fir and Ponderosa pine. This section of the Klamath Basin, which is in Jackson County, averages between 18 and 35 inches of annual precipitation (USDA 1976).

Fish

Fish populations present in the Klamath River area include non-game fish and warm water game fish. The Klamath River and its tributaries support the following warm water game fish: largemouth bass, white crappie, black crappie, Sacramento perch, bluegill perch, pumpkinseed sunfish, green sunfish, yellow perch, and brown bullhead. The Klamath River and tributaries support the following non-game fish: Lost River sucker, shortnose sucker, Klamath large-scale sucker, Klamath small scale sucker, Klamath speckled dace, blue chub, Tui chub, marbled sculpin, Pacific lamprey, Klamath lamprey, and fathead minnow. Although shortnose and Lost River suckers are currently listed under non-game species due to endangered species status, they were historically harvested and used commercially. Cold water species in the Klamath River and its tributaries include brown trout, brook trout, and State Listed Sensitive (SLS) redband trout. These watersheds also exhibit Jenny Creek suckers. Cottonwood Creek contains steelhead. The

fish species present vary from site to site. For more detailed information on fish populations and habitat, see the Klamath River Basin, Oregon Fish Management Plan (ODFW 1999).

Sprague River Area [b]

The Sprague River Valley consists of 1,580 square miles in Klamath County in lower southeastern Oregon. The North and South Forks of the Sprague River originate in the Gearhart Mountain Wilderness Area discharging into the Williamson River below the town of Chiloquin. Because the Sprague River descends only 65 feet from the town of Bly to Cave Rock (a few miles east of the town of Chiloquin), this section is a very slow moving body of water. Precipitation in this area is approximately 14 to 18 inches annually. Peak river flows normally occur in the spring with high elevation snowmelt and diminish throughout the summer to their low points in August or September. Elevations range from 4,000 to 5,000 feet.

Soils

Characteristics of the soil and the materials from which it formed are described in detail in the Soil Survey of Klamath County, Oregon. Climate information by soil type is also listed. Deep, well-drained soils in the Sprague River area include the Bly and Crume series. Also present is the shallow, well-drained Choptie series and the very deep, moderately well drained, Chiloquin series (USDA 1976).

Fish

The Sprague River supports warm water game fish including largemouth bass, yellow perch, and brown bullhead. The North Fork supports brown bullhead; whereas, the Lower South Fork supports brown bullhead and yellow perch. The Sprague and Sycan rivers support populations of non-game fish including Lost River sucker, shortnose sucker, Klamath large-scale sucker, Klamath speckled dace, blue chub, Tui chub, marbled sculpin, Pacific lamprey, Klamath lamprey, and Klamath-Pit brook lamprey. Cold-water species include SLS redband trout, brown trout, brook trout and Federally Listed Threatened (FLT) bull trout. Historically, shortnose and Lost River suckers were harvested and used commercially. The fish species present vary from site to site. For more detailed information on fish populations and habitat, see the Klamath River Basin, Oregon Fish Management Plan (ODFW 1999).

Land Use

The Sprague River Valley consists mainly of rangeland and small farms surrounded by mountains and wooded areas. Historically (1843-1880), early settlers arrived to mountains covered with forests and native grasses covering the plateau lands. These early settlers pursued an agrarian lifestyle, primarily raising livestock, with limited crop production. During the 1860s, these early settlers obtained adjudicated water rights for flood irrigating in creek valleys. While not all adjudications on the Sprague River are completed, everything east of Ivory Pine Road has been adjudicated.

Approximately 40 percent of the Sprague River Valley is in private ownership by 150 ranching families. Based on a survey of ranchers in October 1999, there are about 28,000 cattle, 70 sheep, and 400 horses. Approximately 8,000 tons of hay, including grass-hay, alfalfa, and grain-hay are harvested annually.

The Sprague River area includes recreation areas at Campbell Reservoir, Obenchain Reservoir, Sprague River Park, and Drews Park. Historically, there have been numerous dams at various points along the Sprague River. Some channelization of the Sprague River also occurred.

Sycan Marsh Watershed[c]

The Upper Sycan Watershed Council was organized in October of 1998 and was formally recognized as such by the Lake County Commissioners in February of 1999. The Sycan Marsh encompasses approximately 30,000 acres of wet meadow and irrigated native pasture in private

ownership. The surrounding upland bluegrass and mixed conifer lands make up another 209,300 acres in the watershed with the majority managed by the Fremont/Winema National Forest and the remainder owned by private timber companies. From May through October, cattle are rotationally grazed on the marsh and uplands. Approximately 8,200 head of beef cattle visit the watershed every year, which is a decline from the 12,000 head in historic times. J.M. Small homesteaded the area in the early 1900's grazing sheep, cattle, horses, and pigs. Many other ranching families utilized the forage available on much of what is now managed by the Fremont Forest Service. The ZX ranch of Paisley, Oregon developed the irrigation system in the marsh from 1910 to 1920, creating the capability to harvest and preserve forage for winter-feeding. During the 1940s, Frederick Weyerhaeuser moved into the Sycan watershed and began logging activities along with constructing a railroad along the Indian treaty boundary through the marsh itself to transport logs to the towns of Bly and Klamath Falls. The Nature Conservancy and US Timberlands are now the major private landowners in the watershed.

The Upper Sycan watershed receives approximately 20-25 inches of precipitation a year with the majority of moisture in the form of snow. The average high temperature is 59° F while the average low is 29° F. The elevation ranges from 6,800 feet above sea level at Winter Rim to 4,982 feet in the Sycan Marsh. The non-forested lowland areas of the watershed consist of the following vegetative communities: blue grass dry meadow, hair grass sedge moist meadow, sedge wet meadow, low sage brush\blue grass – one spike oat grass, juniper\low sage brush\fescue, low sage brush\fescue – squirrel tail, mountain big sage brush\bunch grass. The forested areas of the uplands in the watershed consist of the following vegetative communities: lodge pole pine\strawberry – fescue, lodge pole pine\squirrel tail – long stolen sedge, ponderosa pine\bitter brush\fescue, ponderosa pine\mountain big sage\blue grass, ponderosa pine – quaking aspen\bluegrass, white fir – lodge pole pine\long stolen sedge – needle grass.

The following wildlife are found in the upper Sycan watershed: elk, mule deer, brown bear, cougars, bobcat, antelope, big horn sheep, and many waterfowl species. SLS redband trout, FLT bull trout, and brook trout inhabit Sycan, Coyote, and Long creeks in the watershed. Recreational activities in the area include hunting, fishing, hiking, snow mobiling, cross country skiing, hang gliding, and bird watching.

Logging by US Timberlands, salvage logging by Fremont/Winema National Forest and cattle grazing are the major renewable economic resources in the watershed. The Fremont/Winema Forest operates numerous gravel pits to maintain the roads in the area and the Bonneville Power Administration has a major electric transmission line that runs through the upper Sycan. Prescribed burning by the Fremont Forest is used as a tool to manage understory vegetation to prevent a devastating wildfire and to promote beneficial vegetation growth. The Nature Conservancy has constructed a research facility in the Sycan Marsh and is researching topics such as native plant communities, grazing impacts and benefits, fish habitat and movements, surface and groundwater hydrology, water temperatures, wildlife, and macroinvertebrates.

Williamson River Area [d]

The Williamson River Basin is located east of the Cascade Mountain Range in Klamath County in south central Oregon. The Williamson River is the largest single 'in-flow' into Upper Klamath Lake. The soils vary from high organic matter soils near the mouth of the river to coarse, well-drained soils in the mountains. All of these soils are influenced by volcanic ash. The elevation varies from 4,150 feet to more than 7,000 feet in the mountains.

Annual precipitation ranges from 10 to 35 inches. The growing season varies considerably in this basin. The warmer parts of the basin around Modoc Point have a growing season of about 90 to 120 days and are suited for such irrigated crops as alfalfa, grass, wheat, oats, barley, potatoes, and sugar beets. The northern part of the basin has a shorter growing season of about

50 to 70 days. The primary crops are grass hay and pasture. In the early 1860s, sheep and cattle grazing were the initial agricultural endeavors as in most of Eastern Oregon.

Land Management Allocation
Lands included in the Williamson River Basin presently comprise a patchwork of different ownerships and managements including federal, state, private, city, and tribal lands. Lands under federal management include those managed by the Freemont/Winema National Forest (532,316 acres), which accounts for most of the federal lands in the basin (59 percent of the total basin lands), wildlife refuge (37,906 acres), and Crater Lake National Park (51,574 acres). State lands account for only 8,079 acres and include those managed by Collier State Park and those located within Sun Pass State Forest. Private lands comprise a significant percentage (30 percent) of the area within the basin, with 275,552 acres total, distributed among private logging companies, notably US Timberlands (formerly Weyerhaeuser) and Cavenham (formerly Crown Pacific), several large ranches and numerous small residential parcels. Recent purchases of Tulana and Goose Bay Farms by The Nature Conservancy have taken the majority of the farming area of the Williamson River Delta out of individual private ownership. The incorporated town of Chiloquin is located in the basin.

The combined flow of the Williamson and Sprague rivers below the confluence ranges from about 400,000 to 1,000,000 acre feet annually with a mean flow of about 650,000 acre feet. In 1903, the Modoc Point Irrigation system was established with a flow of 56 to 60 cubic feet per second (cfs) currently covering 5,222 acres with 80 different individuals irrigating. There are countless private irrigation systems throughout this basin.

Water-related recreational usage in the Williamson River basin includes angling in the Williamson River and Spring, Larkin, Sunnybrook, Scott, and Sand creeks. Most of the active fisheries upstream from the Klamath Marsh are on private lands. Public access for recreational uses is available through Freemont/Winema National Forest lands. Below Klamath Marsh, access is permitted through Collier State Park as well as county parks and private marinas.

Waterfowl hunting occurs in wetland areas and on grain lands, as well as around ponds, drains, and streams. Boating is limited to small boats and canoes. Usually only electric motors are used on the watercraft, except in the wider, deeper water at the mouth of the Williamson River. Numerous other recreational activities take place including big game hunting, cross-country skiing, hiking, and camping.

Soils
The following moderate-to-very-deep, well-drained soil series are located in the Williamson River area: Shanahan-Lapine-Steiger and Maset-Yawhee. Soil series in this area, which are shallow-to-very-deep and excessively drained on terraces and low hills, include Fordney-Calimus and Lobert-Bly. Poorly drained soil series in this area include Henley-Poe-Laki, Tulana-Algoma-Teeters, Kirk-Chock, and Lathero-Histosols. For more information on soil series and climate, see the Soil Survey of Klamath County (USDA 1976).

Fish
The Williamson River below the falls exhibits non-game species including Klamath large-scale sucker, Klamath speckled dace, blue chub, Tui chub, marbled sculpin, slender sculpin, Pacific lamprey, Klamath lamprey, and fathead minnow. Below the confluence with the Sprague River, the Williamson River also contains Lost River and shortnose suckers. The game fish present in the Williamson River above the falls include trout, while below the falls, largemouth bass, yellow perch, brown bullhead and trout are present. The Lost River and shortnose suckers, currently non-game fish due to endangered species status, historically were harvested and used commercially. Cold-water fish species in the Williamson River include SLS redband trout, brook trout, and brown trout. The fish species present vary from site to site. For more detailed

information on fish populations and habitat, see the Klamath River Basin, Oregon Fish Management Plan (ODFW 1999).

Upper Klamath Lake Area[e]

Upper Klamath Lake, the largest in Oregon at approximately 130 square miles, receives the waters of an area of almost 3,800 square miles. Even so, Upper Klamath Lake is a shadow of its former self. Ancient Lake Modoc was vastly larger and deeper (up to 200 feet). Upper Klamath Lake now averages eight feet in depth and is classified as eutrophic or hypereutrophic due to the high nutrient loading from the mobile volcanic soils in the watershed and the huge sediment deposits in the lake itself which, due to its shallow nature, are often re-suspended in the water column by wind and wave action.

This nutrient loading has contributed to massive summer algae blooms for decades, if not centuries, and volumes of technical data and studies document various aspects of the lake's hydrology, biology, etc. Only recently has the algae been studied for its benefits and now supports a $100,000,000 annual health supplement industry for the harvested and dried algae.

Historically surrounded by marshes, about 35,000 acres are being restored to wetlands. Precipitation is limited, averaging 12 inches per year and can be localized. The north end of the lake due to the proximity of Crater Lake has a more severe climate than the south end, only 30 miles away. Most productive lands are flood irrigated, with some being converted to wheel or center pivot irrigation.

The production of native grass hay and alfalfa supports a summer stocking cattle industry of 35,000 head including the Fort Klamath area. Much of the land adjacent to the lake is in State and Federal Wildlife refuges and State and National Forests; county and private land account for the rest of the property.

The Klamath Tribes, who have lived in the region of Upper Klamath Lake for thousands of years, retain traditional hunting, gathering and fishing rights and are interested in acquiring some of their former land base to augment their cultural and economic self-sufficiency.

The waters of Upper Klamath Lake have been utilized for agriculture since the mid 1800s. With the development of the Klamath Project by the Bureau of Reclamation in 1905 and the construction of the Link River Dam in the 1920s, this use increased dramatically for both irrigation and hydropower. The result of the dam and diversion at the “A” canal is a lake which no longer functions in its natural state but is managed at various artificial levels for agriculture and hydropower and recovery of endangered species.

Upper Klamath Lake is used extensively for recreation. One can enjoy bird watching, sport fishing, and some of the finest sailing found in the Northwest due to the size of the lake and the fair winds.

Soils

Soils in these drained wetlands are very productive and a limited amount of row crop agriculture including important seed potato ground is located on the east side of Upper Klamath Lake. However, climate limits the crops grown and most commercial agriculture is south of Upper Klamath Lake. The predominant land use is forestry, followed by ranching. The area is ideal for irrigated pasture and hay. Well-drained soil series in this area include Lorella and Woodcock-Nuss-Royst. Poorly drained soil series in this area include Tulana-Algoma-Teeters, Klamath-Ontko-Yonna, and Lather-Histosols. For more information on soil series and climate, see the Soil Survey of Klamath County (USDA 1976).

Fish
Crystal, Thomas, and Recreation Creeks have yellow perch present. These three creeks also have non-game fish including Lost River sucker, shortnose sucker, blue chub, Tui chub, marbled sculpin, slender sculpin, Klamath Lake sculpin, and Pacific lamprey. Upper Klamath Lake and Agency Lake contain Lost River suckers, shortnose suckers, Klamath small and large-scale suckers, Klamath speckled dace, blue chub, Tui chub, marbled and slender sculpin, Pacific and Klamath lamprey, and fathead minnow. Game fish in these two lakes include largemouth bass, pumpkinseed sunfish, yellow perch, brown bullhead, and SLS redband trout. FLT bull trout are present in Three-Mile Creek on the west side of Upper Klamath Lake**.** Lost River and shortnose suckers were historically harvested and used commercially, but due to their endangered species status they are currently listed as non-game fish. The fish species present vary from site to site. For more detailed information on fish populations and habitat, see the Klamath River Basin, Oregon Fish Management Plan (ODFW 1999).

Wood River Area[f]
Over 7,700 years ago, Mt. Mazama (now known as Crater Lake National Park) erupted, spewing volcanic ash and pyroclastic debris[1] in all directions. One of the larger glacial valleys, presently referred to as Annie Creek Canyon, filled to the brim with volcanic sediment then spilled several hundred feet of phosphorous rich material over the ancient forests of the Wood River Valley. Mountain springs joined to form Annie Creek. The stage was set for an annual infusion of thousands of tons of very fertile sediment to the valley below and the lake beyond. Since that time, Annie Creek has conveyed a portion of melt water every spring from the 533 inches of average annual snow fall though a drop in elevation of over 3,500 feet into the Wood River which then flows to Agency Lake.

As a result of these combined factors, the Wood River Valley has become a unique and diverse ecosystem that contributes significantly to the economy. It is also an example of holistic compatibility between nature and livestock grazers. This valley provides the forage for 35,000 head (ODA 2003) of cattle (including the Upper Lake Klamath area herds) for six months every year. These cattle provide a ripple effect on the local economy of well over $30,000,000. This livestock grazing creates jobs, supports the tax base, and stimulates related businesses. Furthermore, cattle benefit the ecosystem because of their ability to extract phosphorous from the watershed in an environmentally sound manner. Animal nutrition data indicate that 35,000 head of cattle grazing on these unfertilized pastures for 6 months and gaining 250 pounds per head will remove over 200 tons of phosphorus from the Wood River Valley annually (Rykbost, 1998). Livestock organic wastes are dispersed throughout the expanse of grazing land. Natural dispersal by cattle is further facilitated by mechanical dragging of pastures. Much of the nitrogen content from manure and urine is lost through volatilization. High organic matter content of the soils absorbs much of the phosphorus. Nutrient contributions to waterways are primarily associated with particle movement in surface flows or direct deposition in waterways. Landowners in the Wood River Valley have recently constructed extensive riparian fencing, reducing direct access to waterways by cattle. Other long-term voluntary landowner stewardship is evident in partnerships with the ODFW on installation of fish screens and fish ladders.

On a different note, the origins of nutrient background levels are the subject of intense debate. Measurements by Martin and Rice (1981) indicate the sedimentation rate dramatically increased in parts of Agency-Klamath Lake between 100 and 200 years ago due to climate change prior to any agricultural presence. Other natural phenomenon such as wind speeds and air temperature contribute to more background impacts. Harrison (1967) determined that owing to the shallow depth in the lake even moderate wind speeds of 10 mph are capable of moving extremely rich upper sediments into the water column supporting the excessive algae blooms. Water

[1] Rock debris blasted into the air during volcanic eruption; such as magma bombs, cinder, and ash.

temperature was influenced largely by air temperature; the lakes did not appear to warm or cool more slowly at higher lake levels (Harrison, 1967).

Rykbost (1998) provides additional data on effects from background sources. Several major springs and numerous artesian wells that feed tributaries to Agency Lake, including the Wood River, Fort Creek, and Crystal Creek, were sampled at their source. All were at a level of phosphorus that exceeds standards established for other regions. These levels were more than adequate to support algae blooms according to data reported by Miller and Tash (1967) and represent additional background nutrient loading to Agency-Klamath Lake. Over 30,000 acres of government wetlands and refuge "buffer zone" separates private property from Agency Lake (though the Sevenmile Canal is a direct connection). Recent retirement of properties adjacent to Upper Klamath Lake from agricultural use and conversion to wetlands and/ or water storage have undoubtedly reduced the potential for agricultural contributions of sediments and nutrients to the lake (though pumping from the wetlands is still practiced). The Wood River Valley enjoys a unique system of gravity flow flood irrigation on untilled, unfertilized, managed meadows.

Soils
The soils in this area are both well drained and poorly drained series. The poorly drained series in the Wood River Valley include Henley-Poe-Laki, Tulana-Algoma-Teeters, and Lather-Histosols. The moderately to well -drained soil series include Lobert-Bly, Shanahan-Lapine-Steiger, and Maset-Yawhee. For more information on soil series and climate, see the Soil Survey of Klamath County (USDA 1976).

Fish
Lost River and shortnose suckers are present in the Wood River. Lost River and shortnose suckers were historically harvested and used commercially, but due to their endangered species status they are currently listed as non-game fish. The Wood River does not contain warm water game fish. The Wood River exhibits cold-water fish species including SLS redband trout, brook trout, and brown trout. World-class trout have been present since the 1800s. The fish species present vary from site to site. The Wood River and adjacent wetlands offer an assortment of macroinvertebrates estimated at over 300 species by Anderson (1993). This diverse habitat is indicative of a healthy ecosystem. For more detailed information on fish populations and habitat, see the Klamath River Basin, Oregon Fish Management Plan (ODFW 1999)

Water Quality Issues
The Clean Water Act requires that each state designate beneficial uses, decide which parameters to measure to determine whether beneficial uses are being met, and set standards for those parameters. The Environmental Protection Agency (EPA) delegates Section 303(d) of the Clean Water Act responsibilities to the state to develop a list of water quality limited streams, i.e.: streams that violate federal water quality standards and do not support their beneficial uses.

Beneficial Uses
Beneficial uses of water in the Klamath Basin include drinking water, irrigation, livestock watering, aquatic life, boating and fishing, water contact recreation, and aesthetics.

There are 12 beneficial uses listed in the Klamath Basin as identified in the chart below. After each stream's beneficial uses are identified, its water quality is evaluated against the standards set for these particular uses and the 303(d) listing criteria by DEQ. The condition and availability of water in the Klamath Headwaters Area is affected by both natural and human activities.

Beneficial Uses of water in the Klamath Basin (OAR 340-041-0180)

Beneficial Use
Public Domestic Water Supply[1]
Private Domestic Water Supply[1]
Industrial Water Supply
Irrigation
Livestock Watering
Fish & Aquatic Life
Hydro Power
Wildlife & Hunting
Fishing
Boating
Water Contact Recreation
Aesthetic Quality

[1] With adequate pretreatment (filtration & disinfectant) and natural quality to meet drinking water standards.

303(d) Listed Streams

Currently, the most prevalent water quality issue in the Klamath Basin is the violation of the water temperature criteria for the rearing of anadromous fish. The table below is a summary of water quality limited Klamath Basin stream segments, including Upper Klamath Lake, listed on the 2004/2006 Integrated Report that exceed the federal Clean Water Act standards for temperature and other parameters for which valid data sets are available. The table includes both 303(d) listed streams and those streams removed from the 303(d) list after the EPA approved the 2002 Klamath Headwaters TMDL. 303(d) listed streams addressed in the Upper Klamath and Lost River Subbasins TMDL will be removed from the list when the EPA approves the TMDL. A full listing of water quality limited streams, their affected parameter and their status can be found in Appendix E.

Watershed	Parameter	# of Streams on 303(d) List	# of Streams with TMDL Approved
Sprague	Temperature		19
Sprague	Dissolved Oxygen		2
Sprague	PH		1
Sprague	E Coli	1	
Williamson	Temperature		3
Williamson	Dissolved Oxygen	1	
Upper Klamath Lake	Temperature		2
Upper Klamath	Temperature	13	2
Upper Klamath	Sedimentation	3	
Upper Klamath	Biological Criteria	1	
Upper Klamath	pH	1	
Upper Klamath	Chlorophyll-a	1	
Upper Klamath	Ammonia Toxicity	1	
Upper Klamath	Dissolved Oxygen	1	

The above table accomplishes two purposes. First, it is a guide for the LAC and residents of the area to understand that temperature is the main reason for a stream being listed in the planning area. The more reduction efforts are focused on the contributors to temperature, the sooner these streams can be taken off the list. Second, it is intended to show that there are very few other listings aside from temperature. With some concentrated effort on the part of the agriculture community, the potential contributions from our activities can be easily eliminated. Agriculture is not responsible for all the contribution to water pollution so agriculture meeting its responsibilities will not entirely solve the problem. This plan is a reasonable attempt to address a realistic goal.

DEQ is not developing a TMDL for a number of stream segments impaired by sedimentation or for biological criteria. The LAC has concerns about the development of the TMDL for sedimentation in the Upper Klamath Lake based on Eihlers' 2001 study using only one core sample from Upper Klamath Lake (See Appendix K).

Completed TDMLs for Temperature and Phosphorus

For the Williamson, Sprague, and Upper Klamath Lake watersheds, Total Maximum Daily Loads (TMDLs) were established by Oregon DEQ in early 2002. In December 2010, DEQ submitted the Upper Klamath and Lost River Subbasins TMDLs to EPA for approval. Upper Klamath River TMDLs are included in this Area Plan because the Klamath Headwaters management area includes portions of the Upper Klamath subbasin. It is the responsibility of ODA, through the Agricultural Water Quality Management Program, to address the parameters listed in the TMDL document and implement an action plan for agricultural and rural lands to achieve TMDL targets. **This action plan does not establish numeric targets of water column parameters but instead facilitates the development of conditions on the land that, according to the best available research, will reduce loads identified in the TMDL.**

One of the most widely applicable TMDLs developed by DEQ addresses high stream temperatures. The goal of the TMDL is to reduce the amount of solar radiation that reaches the waterway. The amount of "load" of solar radiation is measured by DEQ in langleys per day. For the non-scientist, these loads have been translated into a surrogate, or substitute, measure called percent effective shade targets. Landowners will not be required to exceed pre-1900 densities.

The TMDL contains percent effective shade targets for the management area. Landowners may use these targets as a guide to determine if they have sufficient riparian vegetation. Percent Effective Shade is the amount of shade that reaches the stream. For example, 30 percent Effective Shade means that shade has kept 30 percent of the sunshine on an August day from reaching the stream.

Historic vegetation is not required along streams. Native trees such as pine, which may have historically lined management area streams, may not be desirable in some areas. Smaller native vegetation, such as willow, sedges, and cattails may provide sufficient shade along smaller streams to attain the shade targets. Also, there will be some sites where woody vegetation will not establish at all. This is to be expected. As a general guideline, maintain the most effective band or buffer of vegetation along the stream that you can tolerate because of the many corollary benefits to the landowner. Streamside vegetation buffers also absorb manure runoff, reduce streambank erosion, and filter sediment during high flow events, additionally reducing potential phosphorus loading as an indirect benefit.

ODA will monitor progress towards meeting shade targets. It is recommended that the Klamath SWCD provide reference sites and photographic examples to landowners who wish to visualize these targets.

All interested parties must understand that these targets may not be appropriate for all areas. For instance, streams at road crossings and road right-of-ways may not be shaded for visibility/safety reasons. Site capability will restrict or enhance the species, structure, and density of vegetation communities expected on Klamath Headwaters streambanks. A landowner is not subject to enforcement of the temperature standard if they are in compliance with area rules and are meeting the goals of the Area Plan. It is the intent of this water quality management plan to help landowners become aware of the targets and manage their agricultural activities so as to prevent unintentional suppression of self-recruiting riparian plant communities.

TMDLs were also developed for parameters that are generally phosphorus-driven listings. Lack of dissolved oxygen, excessive chlorophyll-a populations, and excessive pH are identified in the management plans. While DEQ acknowledges extremely high background loads of phosphorus in the Upper Klamath Lake watershed, 40 percent of the load over the standard is attributed to anthropogenic sources. The LAC believes that background loading exceeds these loads due to the natural process of erosion of the high phosphorus parent materials in the upper reaches of the Upper Klamath Lake watershed. Agricultural activities are identified as the primary non-point source contributors. The majority of the LAC disputes that percent allocation and that agricultural activities are the primary non-point source contributors and asks the DEQ to reconsider the load. The LAC draw this conclusion from peer reviewed work by Rykbost and Charlton (2001) and studies by Shapiro and Associates (2000) that deal either directly (Shapiro in the Wood River) or indirectly (Rykbost in the Klamath Project and adjacent lands) with agriculture's net gain or loss of nutrients from the system into waters of the state.

Even so, the management measures outlined in the plan will provide a significant reduction in potential agricultural contributions of phosphorus (P). The very high background levels of P in native soils is exacerbated in surface waters with extensive introductions of sediments from eroding banks or sheet wash off the uplands. The riparian and sediment rules in this plan will reduce or eliminate the agricultural component of the P introduction. There remains, however, other drivers of the P levels from Upper Klamath Lake tributaries that are beyond the scope or authority of this plan.

An expanded description and explanation of the TMDLs in the Klamath Headwaters Management Area are available in Appendix F.

Contributors To Water Pollution

Point and non-point sources of pollution in the area include runoff and erosion from agricultural and forest lands, eroding stream banks, and runoff from roads and urban areas. Re-routing of runoff via road building, construction, and land surfacing such as parking areas can lead to excessive erosion or pollutant transport. Pollutants from non-point sources can be carried to the surface water or groundwater through the actions of rainfall, snowmelt, irrigation returns, urban runoff, and seepage. A major nonpoint source of water quality impairment is increased heat input due to vegetation removal, seasonal flow reduction, changes in channel shape, and alteration to the floodplain. Channelization and bank instability may alter gradient, width to depth ratio, and sinuosity, causing undesirable changes in sediment transport regime, erosional and depositional characteristics, and temperature.

In October 2003, an independent multidisciplinary science team (jointly appointed by the Oregon Governor, President of the Senate, and the Speaker of the House per ORS 541.409) issued a report related to management in the Klamath Reclamation Project (IMST 2003). In this report, the team concluded that the nutrient loading into the lake from human actions in the watershed and destruction of wetlands around the lake directly and indirectly increased the potential and extent of phytoplankton blooms. Pinpointing the numeric contributions from non-point sources,

however, is difficult. The accumulation of non-point source pollution contributes to water quality impairments. The DEQ has not yet assigned non-point sources a numeric target for reduction in pollutants (e.g. degrees of temperature or tons to acre of sediment). Water Quality Plans, such as this one for agriculture, are intended to assume responsibility to manage non-point source contributions to help meet water quality goals and objectives.

Purpose, Goals, and Objectives

Purpose
The purpose of this Area Plan is to establish a framework to reduce agriculture's affect on water quality within the Klamath Headwaters agricultural water quality management area. The Plan establishes procedures to identify and control factors that contribute to pollution originating on agricultural and rural lands and to support beneficial uses in the Klamath Basin. It also describes a program designed to achieve the goals of this Area Plan.

Goal
The goal is to prevent and control potential water pollution from agricultural activities and to work towards achieving water quality standards.

Objectives
Improved Water Quality:

- Control pollution as close to the source as possible.
- Promote improvement of health of aquatic system.
- Promote water use efficiency.

Education and Public Involvement:

- Describe existing water quality issues.
- Promote education regarding water quality in the Klamath Basin.
- Identify conditions related to agricultural management activities that adversely affect water quality.
- Identify management practices leading to improvement of water quality.

Funding:

- Identify sources of funding for on-the-ground projects and to implement the plan.

Legislative Mandate

OAR 603-90-003: Create an area plan that comprehensively outlines measures that will be taken to prevent and control pollution from agricultural activities...
OAR 603-90-024(b): Recommend strategies necessary to achieve water quality goals and objectives...
OAR 603-90-030: Describe a program to achieve water quality goals and standards necessary to protect beneficial uses related to water quality, as required by state and federal law. An area plan shall include but not be limited to the following:

- Description of the geographic area to which the plan applies.
- A listing of water quality issues of concern.
- A listing of current beneficial uses being adversely affected.
- A statement that the goal is to prevent and control water pollution from agricultural activities and to achieve water quality standards.
- A statement of water quality objectives of the plan.

- A description of the pollution prevention and control measures deemed necessary to achieve the goal.
- A schedule for implementation adequate to meet dates described by law.
- Guidelines for public participation.
- Implementation and enforcement strategies.

Strategies to Achieve Goals and Objectives

To achieve clean water, an effective strategy must increase awareness of the problem and the range of potential solutions, motivate appropriate voluntary action, and provide for technical and financial assistance to plan and implement effective conservation practices. The following strategies will be employed at the local level by the SWCD in cooperation with landowners, and other agencies and organizations:

1. Work to improve the quality of water in the management area through planning and implementation of technically sound and economically feasible conservation practices which contribute to meeting plan objectives.

    A. Limit soil erosion and pollution caused by agricultural activities, as close to the source as possible, by achieving soil erosion and sediment control.

    B. Show progress in reducing point and nonpoint sources of pollution from agricultural and rural lands through periodic surveys of stream reaches and associated lands.

    C. Implement successful practices for stream bank stabilization, reduction in high summer water temperatures, restoration and enhancement of wetlands and riparian areas, and avoid adverse fish habitat modification.

    D. Implement conservation practices to improve irrigation water use and conveyance efficiency to reduce the impact of seasonal flow modifications on streams resulting from water withdrawals.

2. Create a high level of awareness and an understanding of water quality issues among the agricultural community and rural public in a manner that minimizes conflict and encourages cooperative efforts through education and technical assistance activities.

    A. Promote implementation of the Area Plan by incorporating implementation as a priority element in the SWCD's Annual Work Plan and Long-Range Plan with support from partner organizations.

    B. Showcase successful practices and systems and conduct annual tours for landowners and media.

    C. Recognize successful projects and practices through appropriate media and newsletters.

    D. Promote cooperative on-the-ground projects to solve critical problems identified by landowners/operators and in cooperation with partner organizations.

    E. Conduct educational programs to promote public awareness of water quality issues and their solutions.

3. Encourage active participation by the agricultural community and rural public in the process of solving our water quality problems.

   A. Encourage development of individual conservation plans by providing planning and implementation assistance.

   B. Promote the continued development, evaluation, and adoption of practices and technologies that enhance water quality in an efficient, effective, economic manner, by reviewing research and development needs with agriculture assistance agencies and consultants.

   C. Promote incentive and cost-share programs to assist implementation of conservation plans and related practices, by annually identifying water quality funding needs with agencies providing cost-share and technical assistance to agricultural operations.

4. Encourage adequate funding and administration of the program to achieve plan goals and objectives by systematic, long-range planning and focusing of coordinated efforts on full-scale, watershed-based approaches, identifying needs, developing projects, actively seeking funding, and ensuring successful implementation of funded projects.

In addition to these voluntary strategies, regulatory measures are included as a possible implementation strategy. ODA will use enforcement where appropriate and necessary to gain compliance with unacceptable conditions. Any enforcement action will be pursued only when reasonable attempts at a voluntary solution have failed. (See Resolution of Complaints and Enforcement Action sections)

Conservation Plans and Best Management Practices

Conservation Plans
A Conservation Plan is a comprehensive management plan that addresses site-specific problems through the selection of individual management practices or systems of practices. In order to adequately address water quality issues, conservation plans should outline specific measures necessary to limit soil erosion and pollution of streams.

Conservation Plans may contain any of the following elements or additional elements not listed here, depending on the site and the condition for which preventive or corrective measures are being implemented:

- Soil Erosion and Sediment Control
- Nutrient Management
- Streamside Area Management
- Irrigation Management
- Livestock Management
- Channel and Drain Management

Landowners have flexibility in choosing management approaches and practices to address water quality issues on their lands. They may develop management systems to address problems on their own or they may choose to develop a Conservation Plan to address applicable water quality issues that affords them limited "safe harbor" protection against immediate enforcement action by ODA if prevention and control measures are not yet fully in place.

Landowners are encouraged to develop and implement Conservation Plans and have the option of seeking planning assistance from their conservation district, NRCS, or any other agency. Conservation Plans developed by SWCD or NRCS personnel may be reviewed by the appropriate SWCD. These plans can provide limited assurance against regulation if they address potential water quality problems on the site.

Best (or Better) Management Practices (BMPs)
Agricultural Best Management Practices (BMPs) for pollution control are those management practices and structural measures which are determined to be the most effective, practical and economical means of controlling and preventing pollution from agricultural activities. BMPs are actions taken by individual agricultural operations for the achievement of production and water quality goals.

The appropriate BMP for an individual farm may vary with the specific cropping, topographical, environmental, and economic conditions existing at a given site. There is no uniform or universal BMP for all areas or all agricultural activities within the management area. BMPs are most effective when implemented as integral parts of a comprehensive resource management plan and are based on natural resource inventories and an assessment of management practices. The conservation planning process used by the NRCS and by SWCDs should produce an effective, systems approach to resource management tailored for a specific land area and type of operation.

As examples, a list of BMPs typically used in the management area for effective prevention and control of soil erosion, sediment delivery to streams, and water pollution from agricultural activities is included in Appendix B.

A detailed listing of specific practices that can be employed to control or reduce the risk of agricultural pollution is contained in other documents such as the NRCS Field Office Technical Guide (FOTG). The standards in the FOTG will be used throughout this Area Plan. The FOTG is available for reference at the USDA Service Center. Copies of sections of the FOTG can be requested from the NRCS or the SWCD.

Irrigation and Drainage Systems:
Diversion of water from a water body to be applied on land to grow crops is a recognized beneficial use of water. Irrigation water use is regulated by the Oregon Water Resources Department (WRD) in the form of water rights, which specify the rate and amount of water that can be diverted for application on a particular parcel of land. Water rights are not addressed in this Area Plan; they are under the jurisdiction of the WRD (refer to WRD rule OAR 690-300-0010(26) for more details).

Irrigation in this management area is primarily by flooding and sprinkler application. Water usually is diverted from a surface source (stream or pond) but may also be from groundwater sources. Irrigation water is often used more than once as it returns to the stream and is available for instream uses or by other irrigators.

Irrigation management that results in extensive surface return flows to waters of the state can lead to degradation of water quality as a result of the transport of nutrients and bacteria, and increased temperature. Extensive return flows can occur from activities such as not changing irrigation sets in a timely manner. It is possible to manage both flood irrigation and sprinkler irrigation and to avoid extensive surface return flows.

Characteristics of an irrigation system that has minimal effect on water quality include:
- Delivery of water efficiently to the land within legal water rights

- Minimal overland return flows that do not carry sediment, farm chemicals, or excess nutrients to a stream
- Scheduling of water application appropriate to the site including consideration of soil conditions, crop needs, climate and topography
- Applied nutrients do not leach to groundwater in unacceptable amounts.

Constructed irrigation delivery systems, borrow pits, and drainage ditches that have no hydraulic connection to live streams are not expected to support riparian vegetation. Also, an irrigator is not required to improve the quality of the water above the background condition at the source of the diversion.

Unacceptable Conditions
(Text in boxes will appear verbatim in associated rules)

OAR 603-095-3840
(1) All landowners or operators conducting activities on lands in agricultural use will comply with the following criteria. A landowner is responsible for only those conditions resulting from activities caused by the landowner. A landowner is not responsible for conditions resulting from actions by another landowner on other lands. A landowner is not responsible for conditions resulting from unusual weather events or other exceptional circumstances that could not have been reasonably anticipated. A landowner is not responsible for natural increases in nutrient or temperature loading. Limited duration activities may be exempt from these conditions subject to prior written approval by the department.

Conditions which are part of natural or background conditions or which result from unusual weather events or other exceptional circumstances or which could not have been reasonably anticipated are not the responsibility of the landowner. Typically, for optimum cost-effectiveness and practicality, structural conservation practices are designed to handle the 10-year, 24-hour weather event. It should be noted that the 10-year event has a 10 percent probability of occurring in any given year. Most agronomic practices can handle a 2-to 5-year event. An unusual weather event is considered an event equaling or exceeding the 10-year storm event. Climatological data enables determination of 2-, 5-, 10-, 25-, 50- and 100-year events. Riparian systems in healthy condition are expected to withstand the 20-year event with minimal damage. For purposes of this plan, events exceeding the 20-year event or 5 percent probability level will be considered unusual.

The quality criteria target as identified in the FOTG (Section III) for streambank erosion is: The land user's management activities do not contribute to the streambank erosion problem.

Conditions to be addressed under this plan may be initially monitored by photographic record. Video and/or still photography with time log taken at representative photo points will provide baseline data of current conditions, and indicate changes over time. (See Oregon Watershed Enhancement Board (OWEB) publication titled "Photo Plots" for photo plot monitoring guidance). More detailed and site specific monitoring may be designed and implemented with the help of the Klamath Watershed Council's Technical Assistance Committee, which draws on the expertise of many of the Klamath Basin's agencies, institutions and landowners, to assist local people in restoration activities requiring more professional help.

Violations of the unacceptable conditions are least likely to occur where an effective program for the identification and control of those conditions is in place. One such effective program is an individual farm Conservation Plan designed to reduce pollution by incorporating and actively applying resource management systems. Violation of the conditions listed below is unlikely if the affected landowner has made a good faith effort to develop and implement an effective

pollution control program. An effective pollution control program shall provide assurance that within five years after the adoption of the plan reasonable steps have been taken to lessen and control unacceptable conditions which may include application for grants, development of a farm or conservation plan, or active consultation with experts (for example): the SWCD, the NRCS, or the Watershed Council's Technical Assistance Committee. As new problems arise, a reasonable amount of time will be allowed for the landowner to address them.
Following are Oregon Administrative Rules for this basin.

Sheet and Rill Erosion (excluding streambank erosion)

OAR 603-095-3840
(2) Excessive Sheet and Rill Erosion: Effective January 1, 2007. Combined sheet, rill and wind erosion of soil averaged through a crop rotation period shall not be greater than the soil-loss tolerance value (T).

Intent: Minimize soil and waste movement into listed waters of the state to reduce nutrient and sediment loading.

Degraded Riparian Vegetation

OAR 603-095-3840
(3) Nonfunctional Riparian Conditions: Effective January 1, 2007
(a) Agricultural activities must not create riparian conditions that are downward-trending according to Technical Reference 1737-15, 1998, United States Department of Interior, Bureau of Land Management (Proper Functioning Condition) guidelines or that degrade stream shading consistent with site capability.
(b) Agricultural activities must not prevent riparian areas rated as non-functional by Proper Functioning Condition Guidelines from improving consistent with site capability.
(c) Exemptions from OAR 603-095-3840 3(a) and (b).
(A) Limited duration agricultural activities such as pump installation or livestock crossings provided they do not compromise achieving the conditions described in 603-095-3840(3)(a) and (b).
(B) Constructed irrigation delivery systems, dikes, borrow pits, drainage ditches, and ponds not hydraulically connected to waters of the State.
(d) This rule is not intended to prohibit riparian grazing where it can be managed to meet water quality standards.

Intent: Riparian areas shall be managed to minimize any negative effects of solar radiation, soil loss, and nutrient input. Riparian grazing is not prohibited where it can be managed to meet water quality objectives. Properly Functioning Conditions guidelines in Literature Citation (see Appendix D).

How the Klamath Headwaters Agricultural Water Quality Management Area Plan addresses the Temperature Criterion.

The intent of the plan's riparian zone recommendations is to draw attention to the multiple beneficial functions of healthy and diverse riparian zones. A variety of activities can take place within riparian zones if those activities are carefully managed to protect the beneficial functions of the vegetation and soil structure.

There are many discernable factors that influence surface water temperature including elevation, air temperature, aspect, exposure to solar radiation, channel shape, and volume of flow. The undesirable conditions for both riparian vegetation and irrigation return flows in this Area Plan are designed to address the few physical factors landowners have any control over.

Exposure to Solar Radiation
The two major agriculturally related conditions that contribute heat to surface waters are inadequate shading from riparian vegetation and inflows of warmed irrigation surface returns.

Agricultural activities that eliminate the possibility of natural regeneration of trees and shrubs are to be avoided. Limiting near-stream riparian management to seasons and practices that enhance growth of native grasses, shrubs, and trees, canopy vegetation is encouraged. The increased shade reduces direct solar exposure of stream water and irrigation return flows through the riparian area. Any irrigation surface return flowing through a properly sized and functioning riparian area has a greater opportunity for infiltration and sub-surface return to the stream. The conditions described in this Area Plan are designed to encourage appropriate management of riparian areas to facilitate healthy riparian structure and function and to minimize surface irrigation returns.

Channel Shape
Some channel morphology processes that are not within the control of the land manager are high flow events, bed material composition, and off-property upland/upstream conditions. However, some channel morphology factors are within the control of the land manager. Riparian buffers act as sediment traps from adjacent lands and for stream suspended sediments during high water. A well-managed riparian area, whether excluded or properly grazed, will enhance stream bank stability and will contribute to improved over-all riparian condition. The conditions outlined in this Area Plan describe riparian conditions known to increase age, species, and structural diversity of the riparian vegetation for the purpose of limiting bank loss, adding large woody debris where appropriate, and encouraging a narrower and deeper channel profile.

Volume of Flow
Simple management activities such as tailwater capture and recycling, and improved irrigation application efficiency can enhance water quality and reduce overuse of irrigation water decreasing the detrimental impacts of surface return flows. The conditions described in this Area Plan are designed to encourage appropriate application of irrigation waters and water conservation by the landowners to minimize inputs of temperature, sediment, and nutrients carried into the waters of the state by surface irrigation returns. Several innovative Klamath Headwaters producers are experimenting with tailwater capture and recycling which will virtually eliminate any surface returns, accentuating the subsurface return influence, potentially cooling local waterways. We encourage funding for this type of work.

Also, properly functioning riparian areas act as sponges with the capacity to store water from high flow events and release it slowly back to the stream during low flow times. Riparian management focuses on seasons and practices that reduce consumption and trampling of grasses, shrubs, and trees and will enhance the function of the riparian area to capture, store and release cool groundwater in the summer.

How the Klamath Headwaters Agricultural Water Quality Management Plan addresses the Nutrient Related Standards

Nutrients from agricultural sources may enter the surface waters of the State through the introduction of animal waste into the stream or from sources through shallow groundwater flow and surface runoff. The unacceptable conditions related to the nutrient related standards are designed to reduce movement of waste by surface water from the uplands. Nutrient related standards in the Klamath Headwaters include limits on pH, Chlorophyll-a, Dissolved Oxygen and Ammonia Toxicity.

Direct Deposition
Livestock that loaf in riparian areas or constructed water conveyances are likely to defecate directly into the waterway or onto adjacent riparian areas. By encouraging practices that move livestock through riparian pastures quickly, direct animal introduction of manure will be minimized. Manure spreading designed to distribute feedlot and dairy manure should never be done near waters of the state. Harrowing larger pastures to distribute concentrations of manure is

recommended. Disposing of dry manure directly into or placing it where it is likely to enter waters of the state is already prohibited under ORS 468b: Waste Discharge.

Indirect Deposition
Improper storage of livestock manure can be an agricultural source of nutrients into the water. Precipitation on a manure pile or surface flows contacting the manure can carry nutrients and bacteria. Overland flows can transport animal wastes from upland or heavily stocked areas, especially if the slope is poorly vegetated or highly erodible. Filter strips or flow controls can effectively prevent nutrient-laden sediments from reaching waterways. Streamside areas planted to dense grass or properly functioning riparian areas can act as filters preventing contaminated surface flows from reaching vulnerable waterways.

High Background Phosphorus Levels
Based on geologic history and recent quantification as cited in the TMDL, the Klamath Headwaters LAC is convinced that much phosphorus loading into upper Klamath Lake tributaries is related to phosphorus rich sediments rather than animal waste. The riparian rule proposed in this plan will greatly reduce but not eliminate the streambank instability associated with uncontrolled animal access.

Schedule for Implementation

The following is the schedule for implementing this Area Plan:

1. Plan Period: Avoidance of Unacceptable Conditions (except for 468B.025 and .050, which was effective upon adoption) was required by January 1, 2005.
2. Monitoring: Monitoring shall begin immediately upon approval and adoption of this plan with cooperation and assistance from the SWCD, the LAC, and the DEQ as funds are available.
3. Amendment: This Area Plan will be reviewed at two-year intervals and amended as necessary.

Public Participation

ODA and the SWCD intend to encourage public participation in this water quality improvement program by:

- Providing educational programs to raise public awareness and understanding of water quality issues and solutions.
- Providing incentives for the development and implementation of Conservation Plans.
- Offering technical assistance for the development and implementation of Conservation Plans.
- Encouraging funding sources to prioritize on-the-ground projects on agricultural lands.
- Inventory and survey of the watershed for potential water quality problems.
- Following up on any water quality complaints to offer assistance in solving identified problems.

Administrative Roles and Responsibilities

Total Maximum Daily Loads (TMDLs)

As EPA's designate and by legislative mandate, DEQ is required by federal law to establish formal TMDLs for pollutants in waters designated as "water quality limited." A TMDL describes the maximum amount of each pollutant a water body can receive and still not violate water quality standards. This loading capacity is calculated to achieve water quality standards. Each jurisdiction (local, state or federal agency responsible for land use) in the Upper Klamath Basin will be allotted a portion of the TMDLs representing the maximum amount of pollutant that may be discharged daily into the various streams. This amount is the jurisdiction's Load Allocation.

Designated Management Agency

As EPA's designation and by legislative mandate, ODA is the Designated Management Agency for water pollution control activities on agricultural and rural lands in the Klamath Headwaters water quality management area. ODA is authorized to develop and carry out water quality management plans for any agricultural or rural lands where state or federal law requires such a plan.

The SWCD is designated by ODA as the Local Management Agency for development and implementation of the Area Plan and projects in the management area. Implementation priorities

will be established on a periodic basis through annual work plans developed jointly by the SWCD and ODA with input from partner agencies.

The director of ODA, in consultation with the Board of Agriculture, appointed an LAC to represent local agricultural producers, local landowners, the Indian tribes, local agencies, and the SWCD for the purpose of assisting with the development of this Area Plan and the associated Oregon Administrative Rules in order to implement core elements of the plan.

Technical and Financial Assistance
(Refer to Appendix C)

As resources allow, the SWCD and the NRCS staff are available to assist landowners in evaluating effective practices for reducing runoff and soil erosion on their farms and to help incorporate these practices into Conservation Plans. Personnel in these offices can also design and assist with implementation of practices and assist in identifying sources of cost-sharing funds for the construction and/or use of some of these practices.

Technical and cost-sharing assistance for installation of certain management practices may be available through current USDA conservation programs such as EQIP and Continuous CRP, EPA's non-point source implementation grants, or state programs such as OWEB and CREP. Other agencies, such as the U.S. Fish and Wildlife, may also be available to provide technical assistance or financial assistance to private landowners.

Milestones & Timelines
To implement the strategies of the Area Plan ODA will work with the LAC and Klamath SWCD to develop appropriate milestones and timelines during each biennial review. The Klamath SWCD annual Scope of Work will be based on the milestones and timelines. Progress on the milestones and timelines will be reported during each biennial review. The milestones and timelines can be found in Appendix H.

Priority Areas
The purpose of defining priority areas is to define a limited though useful area in which to focus efforts and resources to show improvement in water quality. Priority areas are an opportunity for agriculture to show success in improving water quality. The prioritization process (selecting the priority areas) will be conducted by ODA and the Klamath SWCD with participation from the LAC, local landowners, DEQ, and others. Prioritization parameters may include current water quality, agricultural influence on water quality, the ability to accomplish work in a given area and others. Once a priority area has been identified, the Klamath SWCD, through their scopes of work, may conduct education and outreach, develop water quality improvement projects and implement BMPs over a two to three year period. Water quality and landscape conditions may be monitored to show any improvement over the two to three-year period. Work in the priority area will be included in the Milestones and Timelines. A workflow chart of a pilot prioritization process can be found in Appendix I.

Plan Evaluation
The progress and success of implementation efforts will be assessed through determination of changes in land management systems and the measurement of water quality improvement over time.

Within two years of plan adoption, ODA, with the cooperation and assistance of the SWCD, the LAC, and the DEQ, will review the progress of plan implementation toward achievement of plan goals and objectives. Input will be sought from other organizations, partners, agencies, and the general public. The review will include:

- An accounting of the numbers and acreage of operations with approved Conservation Plans and the calculated amount of soil erosion and/or pollution prevented.
- Identification of additional sources of sediment, nutrients, and other contributors to non-attainment of all applicable water quality standards.
- An evaluation of available current water quality monitoring data.
- An evaluation of outreach and education programs designed to provide public awareness and understanding of water quality issues.
- A summary of reports, projects, demonstrations, and tours used to showcase successful management practices and systems.
- An evaluation of the adequacy of technical and financial assistance sources available to the agricultural community.
- Evaluation of load allocations as found in management area TMDL and effectiveness of this Area Plan in meeting load allocations as described in the TMDL for the management area.

Based on the review, ODA, the SWCD, the LAC and the State Board of Agriculture will consider making appropriate modifications to the Area Plan and/or the associated Oregon Administrative Rules.

Two years after plan adoption, it is anticipated that ODA, along with the SWCD, will conduct a random survey of a statistically significant number of anonymous agricultural holdings in the Klamath Headwaters Basin. This survey will establish a baseline of compliance upon which the LAC can reconvene to set benchmark compliance targets. The benchmarks will not have any regulatory impact. They are only to be used as guidelines for prioritizing educational activities and incentives.

Resolution of Complaints
ODA will investigate complaints against landowners or operators who are alleged to be out of compliance with this plan. The complaint must relate to a specific site and contain a thorough description of the problem. The complaint must be filed with ODA in writing and be signed by the complainant. ODA will determine if a violation of the rules exists and based on this determination, appropriate action will be taken to remedy the condition. Enforcement procedures and constraints are listed in Appendix J.

Enforcement Action
If a Conservation Plan exists for a site which has been determined to have a rule violation, and the plan is being implemented on schedule, the operator and/or landowner will be given an

opportunity to refine or modify the plan, or to develop an updated implementation schedule to remedy the condition within a time frame specified by ODA. ODA may conclude that the Conservation Plan should continue to be implemented as scheduled.

If a Conservation Plan does not exist, or is not being implemented according to the schedule for a site that has been determined to have a rules violation, the operator and/or landowner will be issued a Notice of Noncompliance and will be directed in writing by ODA to remedy the condition under provisions in OAR 603-90-0060 through 603-90-0120. Authority for any enforcement action rests solely with ODA. An enforcement procedure flow chart can be viewed in Appendix J.

Monitoring

Evaluation of the Area Plan's success is important. Two types of monitoring will be conducted: implementation monitoring and effectiveness monitoring.

Implementation Monitoring
Implementation monitoring tracks activities that implement the Area Plan. Such activities include, but are not limited to:

- Number of restoration/conservation projects implemented
- Number of calls for assistance with complying with area rules
- Attendance at workshops
- Compliance investigations
- Enforcement actions
- Conservation plans written
- Grant funding applied for and/or received

The Klamath SWCD tracks implementation activities and reports them quarterly to ODA. These implementation activities are reported in the Biennial Review of the Area Plan and to the Board of Agriculture and DEQ every two years. Copies of the Biennial Review can be obtained from the Klamath SWCD and ODA website.

Effectiveness Monitoring
Effectiveness monitoring evaluates changes in land condition and its effect on water quality. Currently, ODA relies on monitoring data from DEQ, other agencies, and third parties. Monitoring of priority areas should provide new data to evaluate land condition and its effect on water quality changes on an appropriate scale. Monitoring results will be reported in the Biennial Review of the Area Plan and to the Board of Agriculture and DEQ every two years.

Future involvement of the Klamath Headwaters Local Advisory Committee and Local Management Agency

ODA, SWCD, the Klamath Headwaters LAC, and the Oregon Board of Agriculture will consider making appropriate modifications to the plan and to the associated Oregon Administrative Rules

on a biennial basis. At that time, the LMA and the LAC will review the plan implementation progress, goals, and results. Upon ODA finding that there are potential violations outside the scope of listed unacceptable conditions, the LAC will be promptly notified. At that time the LAC may reconvene to address the new listed conditions.

Part of the LACs responsibilities as outlined in OAR 603-090-0020(4) includes the review of enforcement actions taken and requests for alternate measures that the department has granted or denied. The review of enforcement actions acts as a check on the interpretation of the area rules between the department and the intent of the LAC. The LAC could recommend a review of the evidence if an appeal was justified.

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APPENDIX A - Area Water Quality Plan Glossary

Agricultural Use: the use of land for the raising or production of livestock or livestock products, poultry or poultry products, milk or milk products, fur-bearing animals; or for the growing of crops such as, but not limited to, grains, small grains, fruit, vegetables, forage grains, nursery stock, Christmas trees; or any other agricultural or horticultural use or animal husbandry or any combination thereof. Wetlands, pasture, and woodlands accompanying land in agricultural use are also defined as in agricultural use. (OAR 603-095-0010(4)).

Channel Morphology: shape of the stream channel. (Example: wide and shallow vs. narrow and deep).

Field Office Technical Guide (FOTG): The localized document currently used by the soil and water conservation district and developed by the United States Department of Agriculture, Natural Resources Conservation District that provides:

- soil descriptions
- sound land use alternatives
- adequate conservation treatment alternatives
- standards and specifications of conservation practices
- conservation cost-return information
- practice maintenance requirements
- soil erosion procedures and
- a listing of local natural resource related laws and regulations

Formal Complaint: a complaint against a landowner or operator alleging a violation of a requirement of any agricultural water quality management area plan adopted pursuant to ORS 568.900 through 568-933 at a specific site. The complaint shall be submitted in writing stating the nature and location of the violation and shall be filed with the department, or by agreement with the department, with the Local Management Agency with jurisdiction over the site in question. (OAR 603-095-0010(19)).

Macroinvertebrates: aquatic insects that spend part of their life cycle on the bottom of a stream or perennial waterway.

Non-point source: pollutants discharged from diffuse sources such as runoff from a farm. Diffuse pollution sources (i.e., without a single point of origin or not introduced into a receiving stream from a specific outlet).

Point source: pollutants discharged from any discernible, confined, and discrete conveyance such as a pipe.

Riparian Vegetation: plants and plant communities dependent upon or tolerant of saturated soil near the soil surface for a least part of the year. (Example: Willows, sedges and rushes can grow in saturated soils).

Riparian Setback: the purposefully designated or protected area away from the stream's normal flow mark back to a point where riparian functions for that site will not be adversely affected by land management practices.

Sinuosity: how much a stream meanders-calculated by dividing stream length by valley length.

"T" or soil loss tolerance factor: the maximum average annual amount of soil loss from erosion, as estimated by the Universal Soil Loss Equation (USLE) or the Revised Universal Soil Loss Equation (RUSLE), and expressed in tons per acre per year, that is allowable on a particular soil. This represents the tons of soil (related to the specific soil series) that can be lost through erosion annually without causing significant degradation of the soil or potential for crop production. (OAR 603-095-0010(45)).

Streambank: the boundary of protected waters and wetlands. Or the land abutting a channel at an elevation delineating the highest water level that has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For perennial streams or rivers, the streambank shall be at the ordinary high-water mark. (OAR 603-095-0010(46)).

Volatilization: pass off as a vapor; evaporate quickly.

Waters of the state: ORS 468B.005(8): "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 effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.

APPENDIX B - Some Recommendations of Study by Shapiro & Associates

Provide alternatives to streams and canals for stock watering
Alternate stock watering **is included** as another activity that will improve water quality. For this reason, ranchers in the valley have installed many artesian wells. Excluding cattle from sources of water in streams and canals means providing alternative water sources. Limited and restricted stream or canal entry for cattle watering has been associated with fencing projects in Eastern Oregon to minimize damage to riparian areas. The availability of groundwater in the valley makes artesian well development perhaps more attractive than limited and restricted stream entry, and funding for these projects could stimulate an increased interest in fencing.

Increase dispersion of cattle in pastures
Discourage cattle from gathering in one place; provide multiple loci for insecticide application, scratching devices, and watering locations. It is more desirable to have cattle dispersed and randomly defecating and urinating on the pastures. This is more beneficial to pasture grasses and reduces the potential for wintertime movement of waste products off the site.

Allow grazing units to be rested
In the valley, the pastures are rested from late fall through early spring when cattle are not on the pastures. Resting grazing units is a valley practice now. After cattle reduce grass height in one area through grazing, they are moved to other areas, and the grazed area is irrigated. This practice is valuable in a variety of ways. For example, as vegetation quality increases, fiber content in manure decrease, which speeds manure decomposition and reduces pollution potential. In view of potential runoff during winter from pasture lands transporting wastes into waters of the state, ending the grazing season with pasture areas on the lowest areas of private grazing lands with healthy stands of pasture grasses would provide filtering through winter. This strategy may be as effective as terminal wetland interception basins.

Manage irrigation practices more carefully to minimize water quality impacts
1. Review irrigation practices to develop measures to minimize water use.
2. Move cattle to high ground before flooding; let water saturate soil before reintroducing cattle if feasible.
3. Observe flood irrigation to eliminate movement of waste off the site.
4. Develop provisions for drought years regarding water withdrawals that leave water in the streams to satisfy in-stream water rights.

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APPENDIX C – Technical and Financial Assistance

Many agricultural landowners are living on a very narrow margin. Financial incentives are essential to encourage basin-wide adoption of sound and sustainable management practices. Watershed Council Working Groups and the Klamath Soil and Water Conservation District should be your primary resources for technical and financial assistance.

Technical Assistance

Klamath Soil and Water Conservation District 2316 South 6th Street Suite C Klamath Falls, OR 97601	(541) 883-6932, Ext. 117
Klamath Watershed Partnership 205 Riverside Dr. Suite C Klamath Falls OR 97601	(541) 850-1717
Jackson Soil and Water Conservation District 573 Parsons Dr. Suite 102 Medford, OR 97501	(541) 776-4270
Natural Resources Conservation Service 2316 S. Sixth Street Klamath Falls, OR 97601	(541) 883-6932, Ext.113
Oregon Department of Fish & Wildlife 1850 Miller Island Road W. Klamath Falls, OR 97603	(541) 883-5732

Financial Assistance Programs

CRP—Conservation Reserve Program (541-883-6932) is a broad USDA based funding program focused on cropland conservation with an emphasis on sites with Highly-Erodible Lands designation. Eligible land is taken out of production and leased for conservation on a yearly basis.

CREP—The Conservation Reserve Enhanced Program (541-883-6932) is also a USDA program with a similar objective to the CRP program described above. The emphasis in this program, however, is on pasturelands and riparian corridors. Over 250 million dollars has been made available to the state of Oregon for CREP contracts.

EPA—The EPA administers the 1972 Clean Water Act section 319 grants through the DEQ (541-388-6146) to help meet their water quality mandates. Projects the EPA likes to fund are those with directly measurable benefits for water quality and endangered species. Check out the EPA's Ag Info Center website- http://es.epa.gov/oeca/ag/index.html.

EQIP—Environmental Quality Incentives Program (541-883-6932) pays landowners a majority cost-share for on-farm projects that protect natural resources and improve wildlife (including fish) habitat. EQIP information can be obtained from the Farm Service Agency in Klamath Falls.

Freshwater Trust (503-222-9091 in Portland) offers lease and buy-out options for abandoned or unused water rights. This market-based approach to increasing stream flow may also be used to fund irrigation system changes in watersheds identified as priorities for Freshwater Trust.

Klamath Falls Fish and Wildlife Office—(541-885-8481) offers grants in their watershed restoration program. Many on-the-ground projects have been accomplished to date in the Klamath Basin with money from this program.

OWEB—Oregon Watershed Enhancement Board (541-923-7353) provides funding for watershed enhancement projects under the general categories of education/public awareness, monitoring, management, and assessment/action planning.

OSU Cooperative Extension—(882-7131 in Klamath County) Oregon State University offers a wide variety of levels of technical assistance and planning help. OSU has been instrumental in the Oregon Cattlemen's Association's extremely successful WESt Program. Since its inception, it has grown into several distinct natural resource-related workshops that are offered to ranchers and farmers free of charge. The WESt Program workshops help ranchers and farmers understand their watersheds and stream function better through assessments and monitoring. OSU has also been providing Proper Functioning Condition (PFC) workshops and assessments with landowners. PFC assessment should be a major component of a conservation plan. Website address: http://osu.orst.edu/extension/klamath.

ODFW—Oregon Department of Fish & Wildlife (541 883-5732 in Klamath County) processes applications available at the ODFW offices for the Access & Habitat (A&H) and Restoration & Enhancement (R&E) funding programs. Call your local office for assistance with these programs.

APPENDIX D - Literature Cited

a. Contributed by Jim Creswell, Don Hagglund, Martin Kerns, Chris Sokol, Bev Wampler, and John Ward
b. Contributed by Bill Rust, Bob Sanders, Tom Mallams
c. Contributed by The Upper Sycan Watershed Council
d. Contributed by Linda Long, John Hyde, Sue Mattenberger, Jim Gallagher
e. Contributed by Jim Carpenter
f. Contributed by Ambrose McAullife

Anderson, N. OSU. 1993-1994. Dr. Norman Anderson, professor of Entomology OSU retired, privately funded study by landowners of Ft. Klamath.

Field Office Technical Guide. NRCS http://www.nrcs.usda.gov/technical/efotg/

IMST. 2003. IMST Review of the USFWS and NMFS 2001 Biological Opinions on Management of the Klamath Reclamation Project and Related Reports.

Klamath River Basin, Oregon Fish Management Plan. 1997. ODFW.

Martin and Rice. USGS. 1981. Klamath Lake setting sediments and nutrients, file 111D Klamath Geology setting HTM.

Miller & Tash–Upper Klamath Lake Studies, USGS. 1967. OSU Agriculture Experiment Station research in the Klamath Basin 1998 Annual Report.

Oregon Department of Agriculture, Brand Department. 2003. Brand Inspection Department, Oregon Department of Agriculture, Les Barlow, Klamath Falls, Personal Communication.

Rykbost, K.A., OSU, Klamath Experiment Station. 1998. Nutrient Loading in Klamath Agency Lakes and background sources.

Rykbost, K.A. and B. A. Charlton. 2001 nutrient loading of surface waters in the upper Klamath basin: agricultural and natural sources. Agricultural Experiment Station. Oregon State University. Special Report 1023.

Shapiro & Associates, (2nd draft, Sept. 2000), Sevenmile Canal-Wood River Watershed, Klamath County, Oregon: Evaluation of Nutrient Loading Sources and Options for Water Quality Improvement on Private and Selected Public Lands.

Soil Survey of Klamath County, Oregon. 1976. USDA

U.S Department of the Interior, Bureau of Land Management, TR 1737-15 1998, Riparian Area Management, A User Guide to Assessing the Proper Functioning Condition and the Supporting Science for Lotic Areas.

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APPENDIX E - Water Quality Limited Streams, Affected Parameters/Status

Watershed	Name and River Mile	Parameter	Season	Affected Parameters	Status
Sprague	Boulder Creek 0 to 4.8	Temperature	Summer	Bull Trout: 53.6 F	TMDL Approved
Sprague	Brownsworth Creek 0 to 3.2	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Sprague	Brownsworth Creek 3.2 to 8.8	Temperature	Summer	Bull Trout: 53.6 F	TMDL Approved
Sprague	Buckboard Creek 0 to 5	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Sprague	Calahan Creek 0 to 7	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Sprague	Coyote Creek 0 to 10.4	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Sprague	Deming Creek 0 to 6.7	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Sprague	Deming Creek 6.7 to 12.5	Temperature	Summer	Bull Trout: 53.6 F	TMDL Approved
Sprague	Fishhole Creek 0 to 25.6	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Sprague	Fivemile Creek 0 to 19.3	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Sprague	Leonard Creek 0 to 3.1	Temperature	Summer	Bull Trout: 53.6 F	TMDL Approved
Sprague	Long Creek 0 to 15.6	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Sprague	North Fork Sprague River - 0 to 33.5	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Sprague	Paradise Creek 0 to 8.6	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Sprague	Pothole Creek 0 to 6.1	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Sprague	South Fork Sprague River – 0 to 27.7	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Sprague	Sprague River 0 to 79.2	Dissolved Oxygen	Summer	Cold water; not less than 8.0 mg/l or 90% of saturation	TMDL Approved
Sprague	Sprague River 0 to 45.7	Dissolved Oxygen	Year Round	Cold water; not less than 8.0 mg/l or 90% of saturation	TMDL Approved
Sprague	Sprague River 0 to 79.2	pH	Summer	pH 6.5 to 9.0	TMDL Approved
Sprague	Sprague River 0 to 79.2	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Sprague	Sycan River 0 to 64.1	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Sprague	Trout Creek	Temperature	Summer	Rearing	TMDL

				64.0 F	Approved
Sprague	South Fork Sprague River – 0 to 31.3	E Coli	Summer	30 day log mean of 126 E. Coli organisms per 100 ml.	303(d) Listed
Williamson	Williamson River 0 to12.5	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Williamson	Williamson River 12.5 to 35.6	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Williamson	Williamson River 35.6 to 94.6	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Williamson	Williamson River 0 to 94.6	Dissolved Oxygen	January 1 – May 15	Spawning: not less than 11.0 mg/L or 95% of saturation	303(d) Listed
Upper Klamath	Four Mile Creek 0 to 1	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Upper Klamath	Rock Creek 0 to 5.7	Temperature	Summer	Rearing: 64.0 F	TMDL Approved
Upper Klamath	Beaver Creek 0 to 5.5	Temperature	Year Round	Redband/Lahontan 68.0 F	303 (d) Listed
Upper Klamath	Clover Creek 0 to 8.4	Sedimentation	Undefined	Formation of appreciable bottom or sludge deposits deleterious to fish and aquatic life	303(d) Listed
Upper Klamath	Grizzly Creek 0 to 3	Temperature	Summer	Rearing: 64.0 F	303 (d) Listed
Upper Klamath	Hoxie Creek 0.8 to 4.4	Temperature	Summer	Rearing: 64.0 F	303 (d) Listed
Upper Klamath	Jenny Creek 0 to 17.8	Temperature	Summer	Rearing: 64.0 F	303(d) Listed
Upper Klamath	Johnson Creek 0 to 9.4	Temperature	Summer	Rearing: 64.0 F	303 (d) Listed
Upper Klamath	Keene Creek 0 to 7.2	Temperature	Summer	Rearing: 64.0 F	303 (d) Listed
Upper Klamath	Keene Creek 7.5 to 9.7	Temperature	Summer	Rearing: 64.0 F	303 (d) Listed
Upper Klamath	Mill Creek 0 to 3.9	Temperature	Summer	Rearing: 64.0	303(d) Listed
Upper Klamath	Miners Creek 0 to 4.3	Sedimentation	Undefined	Formation of appreciable bottom or sludge deposits deleterious to fish and aquatic life	303 (d) Listed
Upper Klamath	South Fork Keene Creek – 0 to 3.1	Temperature	Summer	Rearing: 64.0 F	303(d) Listed
Upper Klamath	Spencer Creek 0 to 18.9	Biological Criteria	Undefined	Insufficient quality to support aquatic species	303 (d) Listed
Upper Klamath	Spencer Creek	Sedimentation	Undefined	Formation of appreciable bottom or sludge deposits deleterious to fish and aquatic life	303 (d) Listed
Upper Klamath	Spencer Creek 0 to 18.9	Temperature	Year Around	Redband/Lahontan 68.0 F	303(d) Listed

Upper Klamath	Klamath River Upper Klamath Lake to Keno Reservoir 250 - 251	pH	Summer	pH 6.5 to 9.0	303(d) Listed
Upper Klamath	Klamath River Upper Klamath Lake to Keno Reservoir 250 - 251	Chlorophyll-a	Summer	0.015 mg/l	303(d) Listed
Upper Klamath	Klamath River Upper Klamath Lake to Keno Reservoir 250 - 251	Temperature	Summer	Under EPA review	303(d) Listed
Upper Klamath	Klamath River Keno Reservoir 231-250	Ammonia Toxicity	Winter Summer	pH and temperature dependent	303(d) Listed
Upper Klamath	Klamath River Keno Reservoir 231 – 250	Dissolved Oxygen	Spring Summer Fall	> 6.5 mg/l	303 (d) Listed
Upper Klamath	Klamath River Keno Reservoir 231 – 250	Temperature	Summer	Under EPA review	303(d) Listed
Upper Klamath	Klamath River Keno Dam to Stateline	Temperature	Summer	Redband/Lahontan 68.0 F	303(d) Listed

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APPENDIX F - TMDLS IN THE KLAMATH HEADWATERS MANAGEMENT AREA

It is the responsibility of the Oregon Department of Agriculture, through the Agricultural Water Quality Management Program, to address the parameters listed in the TMDL document and implement an action plan for agricultural and rural lands to achieve TMDL targets. This action plan does not establish numeric targets of water column parameters but instead facilitates the development of conditions on the land that, according to the best available research, will reduce loads identified in the TMDL.

UPPER KLAMATH LAKE DRAINAGE TMDLS

For the Williamson, Sprague, and Upper Klamath Lake watersheds, TMDLs were established by DEQ in early 2002.

UPPER KLAMATH LAKE AND AGENCY LAKE NUTRIENT TMDL

Upper Klamath Lake and Agency Lake are hypereutrophic - high nutrient loading promotes correspondingly high production of algae. This modifies physical and chemical water quality characteristics that can directly diminish the survival and production of fish populations. Year to year variations in the timing and development of algal blooms during late spring and early summer are strongly water temperature dependent. The Upper Klamath Lake and Agency Lake TMDL examines total phosphorous loading targets as the primary method of improving lake water quality. Statistical analysis and deterministic modeling demonstrates that pH levels are reduced to levels that benefit aquatic life when total phosphorus loading rates are reduced.

STREAM TEMPERATURE TMDL

The stream temperature TMDL targets the defined thermal pollutant: heat from human sources. There are two sources of pollutants: increased solar radiation heat loading and heat from point source warm water discharge. Other factors considered in the analysis of stream heating are land cover type and condition, channel morphology and instream flows. The loading capacity is the total allowable daily heat loading. Load allocations are developed for human and background nonpoint sources of heat. Waste load allocations are developed for all point sources. There is no explicit numeric margin of safety provided in the temperature TMDL. Effective shade and channel morphology targets are used as a surrogate measure for nonpoint source pollutant loading offering straightforward parameters to monitor and measure. Attainment of TMDL surrogate measures (i.e. effective shade and channel morphology targeted conditions) ensures attainment of the nonpoint source allocations. A landowner is not subject to enforcement of the temperature standard if they are in compliance with Area Rules and are meeting the Goals of the Area Plan.

SPRAGUE RIVER DISSOLVED OXYGEN TMDL

The Sprague River is listed as impaired due to insufficient concentrations of dissolved oxygen (DO). Dissolved oxygen in water bodies may fall below healthy levels for a number of reasons including carbonaceous biochemical oxygen demand (CBOD) within the water column, nitrogenous biochemical oxygen demand (NBOD, also known as nitrification), algal respiration, zooplankton respiration and sediment oxygen demand (SOD). Increased water temperatures will also reduce the amount of oxygen in water by decreasing its solubility and increasing the rates of nitrification, respiration rates and the decay of organic matter. Depth of streambed, sediments, algal populations, phosphorus, and turbidity can impact levels of DO. DO fluctuation is directly related to the changes in any of these parameters, either individually or in combination. It was determined by the DO modeling of the Sprague River that achieving the load allocations and temperature reductions established in the stream temperature TMDL would reduce periphyton growth and lead to the attainment of the water quality standards.

SPRAGUE RIVER PH TMDL

Algae production is the principle cause of wide pH fluctuations in the Sprague River. The algae of concern are periphyton. As periphyton obtains carbon dioxide for cell growth the bicarbonate present in the water is decreased. Removal of the bicarbonate from the water will generally increase the pH. High pH is stressful to fish. This daily increase in pH is associated with algal photosynthesis, which is maximized by mid-day light and warmth. The pH standard has been exceeded during the warmest part of the day from about river mile 50.1 to the mouth. It was determined by pH modeling of the Sprague River that achieving the load allocations established for stream temperature will reduce periphyton growth and lead to the attainment of the water quality standards for pH.

SUMMARY OF NONPOINT SOURCE ALLOCATIONS

PHOSPHORUS

Load Allocations (Non-Point Sources): 107,510 kg external total phosphorus per year, which represents a 40 percent reduction from 2002 conditions.

While DEQ acknowledges extremely high background loads of phosphorus in the management area, 40 percent of the load over the standard is attributed to human sources. Agricultural activities are identified as the primary non-point source contributors. The majority of the LAC disputes that percent allocation and asks the DEQ to reconsider the load. The LAC draw this conclusion from peer reviewed work by Rykbost and Charlton (2001) and studies by Shapiro and Associates (2000) that deal either directly (Shapiro in the Wood River) or indirectly (Rykbost in the Klamath Project and adjacent lands) with agriculture's net gain or loss of nutrients from the system into waters of the state.

Even so, the management measures outlined in the Plan will provide a significant reduction in potential agricultural contributions of phosphorus. The very high background levels of

phosphorus in native soils is exacerbated in surface waters with extensive introductions of sediments from eroding banks or sheet wash off the uplands. The riparian and sediment rules in this Plan will reduce or eliminate the agricultural component of the phosphorus introduction. There remains, however, other drivers of the phosphorus levels from Upper Klamath Lake tributaries that are beyond the scope of this Plan.

TEMPERATURE

Load Allocations (Nonpoint Sources): The temperature standard targets system potential (i.e., no measurable temperature increases from human sources). To meet this requirement the system potential solar radiation heat load (46,025,933,728 kcal/day) is allocated to background nonpoint sources.

Site specific effective shade surrogates are developed to help translate the nonpoint source solar radiation heat loading allocations. Effective shade is defined as the percent reduction of potential solar radiation load delivered to the water surface. For example, 30 percent effective shade means that shade has kept 30 percent of the sunshine on an August day from reaching the stream. Landowners may use these targets as a guide to determine if they have sufficient riparian vegetation. Attainment of the effective shade surrogate measures is equivalent to attainment of the nonpoint source load allocations.

Historic vegetation may not be required along streams. Native trees such as pine, which may have historically lined management area streams, may not be desirable in some areas. Smaller native vegetation, such as willow, sedges, and cattails may provide sufficient shade along smaller streams to attain the shade targets. Also, there will be some sites where woody vegetation will not establish at all. This is to be expected. As a general guideline, maintain the band or buffer of vegetation along the stream that is consistent with site capability. Site capability is the ability of a site to provide for the development of potential structural and functional properties. Structural properties include, among other things, vegetation and soil characteristics. Functional properties include processes such as energy and nutrient flow. Capabilities to produce and sustain these properties are not the same for all sites, but are site specific. Streamside vegetation buffers also absorb manure runoff, reduce streambank erosion, and filter sediment during high flow events, additionally reducing potential phosphorus loading as a direct benefit.

ODA will monitor progress towards meeting shade targets. It is recommended that the Klamath SWCD provide reference sites and photographic examples to landowners who wish to visualize these targets.

All interested parties must understand that these targets may not be appropriate for all areas. For instance, streams at road crossings and road right-of-ways may not be shaded for visibility/safety reasons. Site capability will enhance the species, structure, and density of vegetation communities expected on Klamath Headwaters stream banks. It is the intent of this water quality

management plan to help landowners become aware of the targets and manage their agricultural activities so as to prevent unintentional suppression of self-recruiting riparian plant communities. TMDLs were also developed for parameters that are generally phosphorus-driven listings. Lack of dissolved oxygen, excessive chlorophyll-a populations, and excessive pH are identified in the management plans.

Upper Klamath and Lost River Subbasins TMDLs

In December 2010, DEQ submitted the Upper Klamath and Lost River Subbasins TMDLs to EPA for approval. EPA approval is expected in 2011. Upper Klamath River TMDLs are included in this Area Plan because the Klamath Headwaters management area includes portions of the Upper Klamath subbasin.

Klamath River TMDLs

The Klamath River TMDL includes impoundents and riverine sections of the Klamath River from the outlet of Upper Klamath Lake to the state border with California. Pollutants responsible for water quality impairments included phosphorus, nitrogen, biochemical oxygen demand and temperature. Because these TMDLs (and their load and waste load allocations) are being developed by Oregon as part of a comprehensive multistate analysis of pollutant loadings to the Klamath River, they are also being designed to meet California water quality standards at the state line.

The TMDL indicates that reductions in phosphorus, nitrogen and biochemical oxygen demand loading from point and nonpoint sources are necessary to attain water quality standards in Oregon waterbodies and California's water quality standards at the state line.

Temperature TMDLs for Lost River and Klamath River tributaries

The temperature TMDLs for Lost River and Klamath River Tributaries include all perennial and intermittent streams and rivers within Oregon in the Upper Klamath River and Lost River subbasins, with the exception of the Klamath and Lost Rivers. Human caused temperature increases are associated with excessive thermal inputs of solar radiation due to the removal or reduction in streamside vegetation. Reservoirs, irrigation districts and dam operations are considered nonpoint sources that influence the quantity and timing of heat delivery to down stream river reaches. Nonpoint source load allocations use effective shade as a surrogate measure of reduced solar radiation.

Summary of Non-Point Source Allocations

Temperature

The Klamath River temperature allocation for agricultural sources discharging to the Klamath River is no additional thermal input greater than 0.01 degrees Centigrade above ambient river temperatures. The temperature allocation for all other nonpoint sources in the Upper Klamath Subbasin is attainment of system potential effective shade.

NUTRIENTS

The Klamath River nonpoint source TMDL allocations for nutrients are: 0.035 mg/L total phosphorus, 0.45 mg/L nitrogen, and 2.2 mg/L biochemical oxygen demand (BOD). This represents a 92 percent reduction in phosphorus, 87 percent reduction in nitrogen and 92 percent reduction in BOD).

BOD is a response to compounds that consume water column dissolved oxygen (DO), including the decomposition of organic matter in the water column and sediment and the nitrification of ammonia. Oxidation of organic material is the most important type of biochemical oxygen demand. In the most general sense, carbon in organic material is oxidized to its lowest energy state, CO2, through the metabolic action of microorganisms (principally bacteria). This is termed carbonaceous-BOD (CBOD). When nitrogen in the form of ammonia is introduced to natural waters, the ammonia may "consume" dissolved oxygen as nitrifying bacteria convert the ammonia into nitrite and nitrate. This process is called nitrification. The consumption of oxygen during this process is called nitrogenous biochemical oxygen demand (NBOD). To what extent this process occurs, and how much oxygen is consumed, depends on several factors, including residence time, water temperature, ammonia concentration in the water, and the presence of nitrifying bacteria.

Lands used for agriculture can contribute nutrients in a variety of ways. Soil erosion can carry nutrients with it, particularly phosphorus. Animal manure is another potential source of nutrients and particulate organic matter. Particulate organic matter settles to the streambed causing an increase in sediment oxygen demand (SOD) on the receiving water body. Finally, fertilizers run off and contribute nutrients to the stream. Riparian buffers, where they exist, help to intercept and retain both sediments and nutrients.

There are a number of natural processes that add nutrients to the river: leaching from the soil, degradation of plant material, and fish returning to spawn from the ocean. In the Klamath Basin, springs can contribute significant amounts of phosphorus because of the volcanic origins of the rock and soil.

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APPENDIX G – Point Sources

The following sections, 2.8.1 and 3.3.2, are quoted from the Upper Klamath Lake TMDL, DEQ, 2002. Along with the point sources described below, there are many unquantified sources such as residential and commercial areas in Modoc Point, Rocky Point, Forest Service cabins around the lake, and the town of Chiloquin.

2.8.1 Point Sources

There are two point sources of phosphorus that discharge to waters that drain to Upper Klamath Lake: the Chiloquin Sewage Treatment Plant and the Crooked Creek Fish Hatchery. The phosphorus loads that result from discharge are calculated by multiplying the year discharge volume by the yearly discharge phosphorus concentration. **The waste load allocation targets a 40% loading rate reduction, which matches the 40% reduction in external loading as specified in Section 2.6 Phosphorus Reductions Necessary to Meet Water Quality Standards. In the event that background condition concentrations prevent attainment of a 40% loading reduction, the background condition becomes the target.** The allowable phosphorus loads that result from discharge are calculated by multiplying the year discharge volume by the yearly-targeted phosphorus concentration. Equations used in this analysis are presented below. Terms are defined in **Table 2-8**, where flow volume data, phosphorus concentrations, and calculated loading rates are presented.

3.3.2 Point Sources of Heat

The Oregon Department of Environmental Quality maintains a database for point source information. This data was used to place point sources within the Upper Klamath Lake drainage. Five point sources discharge to waters within the Upper Klamath Lake drainage:

Crooked Creek Hatchery discharges into Crooked Creek at RM 5.6.

Chiloquin Sewage Treatment Plant discharges into Williamson River at RM 11.8.

Specialty Fiber Products discharges non-contact cooling water and storm water in Upper Klamath Lake.

Jeld-Wen also discharges into Upper Klamath Lake.

Waste load allocations are developed for point sources that discharge to temperature impaired waterbodies or discharge into waterbodies that drain to temperature impaired waterbodies. Chiloquin's wastewater treatment plant is the only point source where effluent is discharged into temperature-impaired waterbodies. Simulated system potential stream temperatures during the critical condition in August are estimated by removing anthropogenic sources of heat throughout the Upper Klamath Lake drainage. These system potential temperatures are developed using computer modeling (**see the Upper Klamath Lake Drainage Stream Temperature Analysis-Attachment 1**) and used to assign the waste load allocations to the point sources. Often, there are a number of point sources in a subbasin, some on segments that would be below the numeric criteria at system potential and some for which system potential would be above the numeric criteria. On some small streams, there would likely be complete mix of effluent and the stream

within the mixing zone. On larger streams, the mixing zone would be a portion of the river (e.g. 25% or as described through a mixing zone policy).

Heat loading from point sources occurs when waters with differing temperatures are mixed. The temperature standard specifies that point sources cannot produce a temperature increase of greater that 0.250F at the edge of the mixing zone. For computational purposes, ODEQ has defined the zone of dilution as ¼ of the 7Q10 low flow. The design condition for point source is the heat from effluent that produces a 0.25ºF increase (or more) in the zone of dilution. The equations for calculating the heat load from point sources are provided below. Table 3-6 (within the TMDL document) displays the calculated parameters for point source heat loading analysis. Figure 3-7 (within TMDL document) displays the heat loading limits as they apply to the Chiloquin WWTP. The current condition is well below heat limits for standard compliance. There is no reasonable potential that this facility will violate stream temperature standards.

APPENDIX H – Milestones and Timelines

Note: As of the 2011 Biennial Review, Milestones and Timelines have not been established.

Objective	Strategy	Measure	Milestone	Timeline

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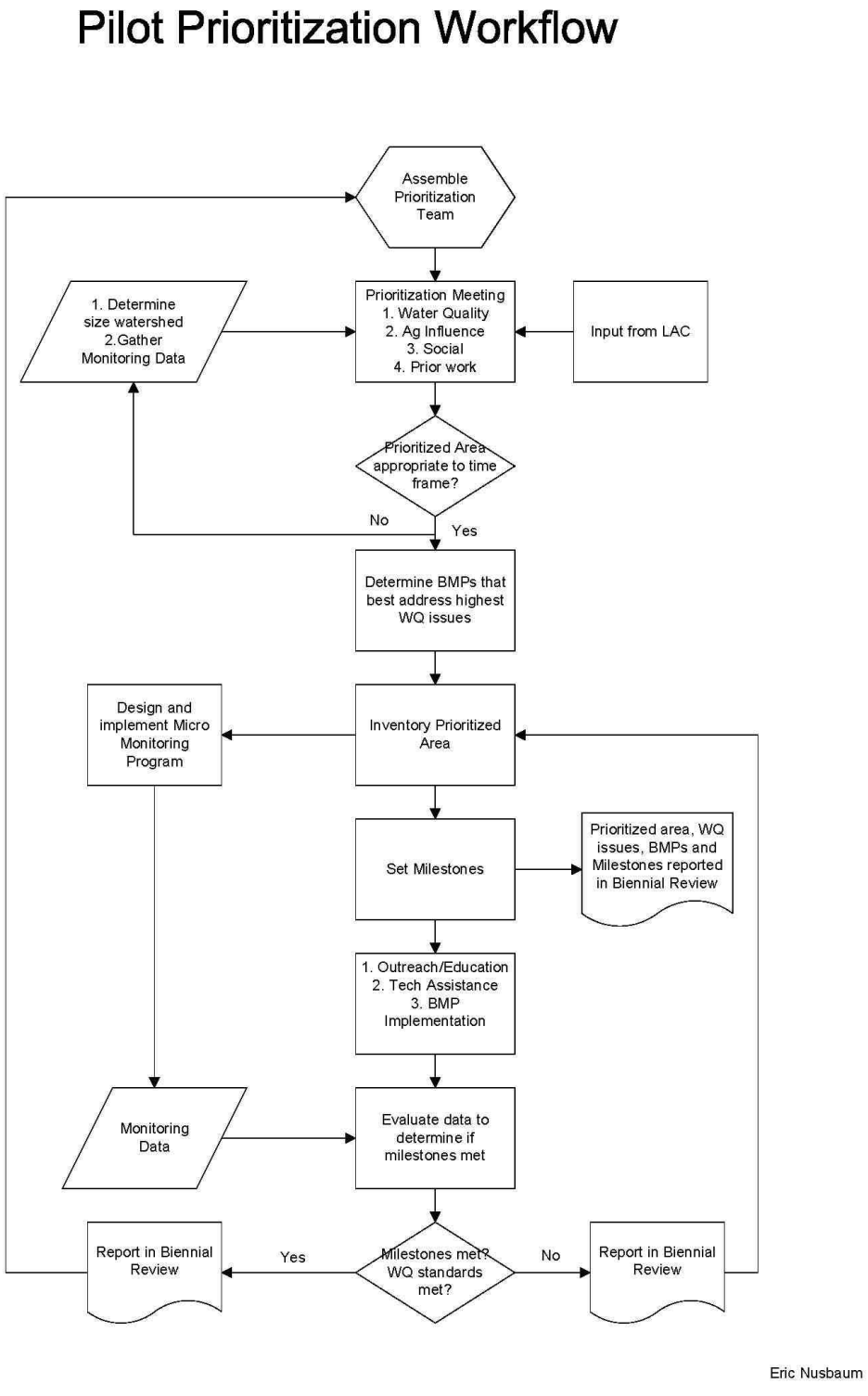
APPENDIX I – Pilot Prioritization Workflow



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APPENDIX J - Compliance Program Overview

One of the main goals of the area plan is to proactively educate landowners about the area rules and provide conservation assistance to landowners who wish to improve water quality, eliminating concerns in a voluntary and cooperative way. At the same time, ODA has developed compliance investigation procedures to evaluate compliance with area rules in the event of a potential water quality concern. In developing the compliance program, ODA has followed guidance from the Oregon State Board of Agriculture and Oregon Administrative Rules for the Agricultural Water Quality Program. This guidance includes:

- Provide flexibility for landowners to achieve water quality goals and requirements;
- Focus on voluntary conservation;
- Use enforcement mechanisms only when cooperative efforts fail; and
- Work closely with Soil and Water Conservation Districts whenever possible.

As provided in the area rules, ODA may investigate a potential water quality concern if it receives a complaint, is notified by another agency, or observes a problem (OAR 603-095-3860 (1)). The area rules also state that ODA will investigate a complaint filed by a person if it is in writing, signed and dated by the complainant and includes specific information about the problem (OAR 603-095-3860 (4)).

Once ODA determines an investigation is needed, staff contact the landowner and operator to schedule a site visit. During the investigation, staff obtain permission to enter the property, then collect information to help evaluate whether the site is in compliance with the area rules. SWCD staff often participate in investigations to monitor the visits and offer voluntary technical assistance. After the investigation, the landowner receives one of the following letters from ODA documenting their compliance status.

Letter of Compliance
A Letter of Compliance tells the owner/operator that at the time of the inspector's site visit, the property was in compliance with all area rules and there were no conditions observed during the investigation, such as manure piles near drainages or heavily grazed areas, that are likely to cause a water quality problem in the future

Water Quality Advisory
A Water Quality Advisory means that conditions on the property have the potential to violate area rules in the future, but the property was in compliance with area rules at the time of the site visit. The letter may refer the landowner to sources of technical assistance, and summarize other issues discussed during the investigation.

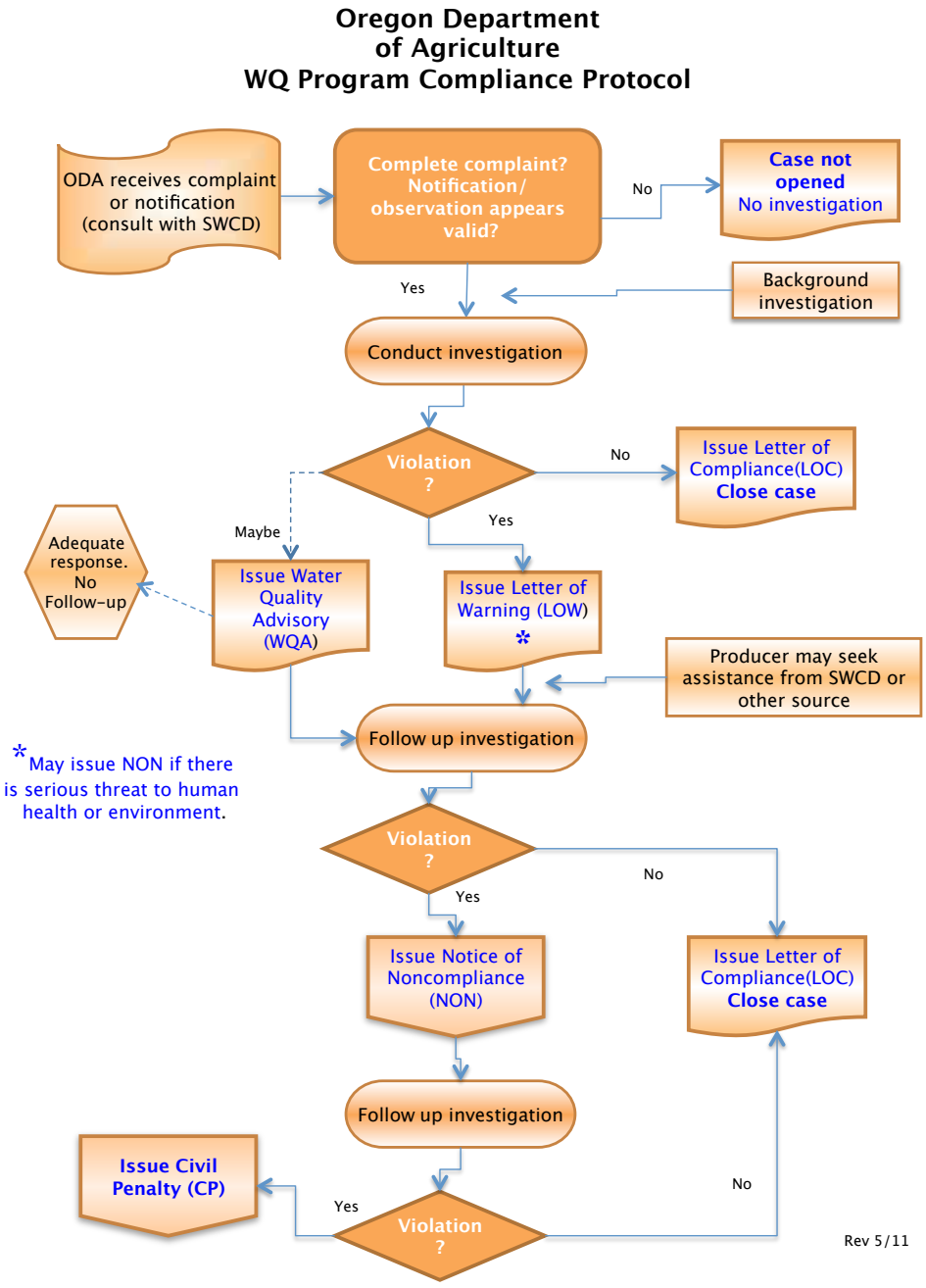
Letter of Warning
A Letter of Warning means the property is in violation of area rules. This letter is an unofficial compliance action that gives the landowner or operator at least one voluntary opportunity to correct the problem before he/she receives a formal enforcement action (Notice of Noncompliance). Letters of Warning refer the landowner to other sources of technical assistance and recommend possible options to correct the problem. After a reasonable time frame, ODA

staff conduct follow-up visits with landowners who receive Letters of Warning to ensure the problem has been addressed.

Notice of Noncompliance/Plan of Correction
A Notice of Noncompliance (NON) means ODA found a violation of area rules during the investigation. Notices of Noncompliance describe the violation and include a schedule of required corrective actions. A Plan of Correction usually accompanies a Notice of Noncompliance if the corrective actions require more than 30 days. An inspector will follow up to confirm the landowner completed the required corrective actions and effectively addressed the violation.

Part of the LACs responsibilities as outlined in OAR 603-090-0020(4) include the review of enforcement actions taken and requests for alternate measures that the department has granted or denied. The review of enforcement actions acts as a check on the interpretation of the area rules between the department and the intent of the LAC. The LAC could recommend a review of the evidence if an appeal was justified.

Civil Penalty
A Civil Penalty is a fee that is assessed to a landowner whose agricultural activities caused either a willful and intentional violation of area rules, or who failed to take steps to correct a violation. Oregon Department of Agriculture's Division 90 rules include a matrix for calculating the value of civil penalties for the Water Quality Program.
The process is designed to be fair to the landowner and to allow enforcement of the Klamath Headwaters agricultural water quality administrative rules.


Oregon Department
of Agriculture
WQ Program Compliance Protocol
ODA receives complaint or notification (consult with SWCD)
Complete complaint? Notification/ observation appears valid?
No
Case not opened
No investigation
Yes
Background investigation
Conduct investigation
Violation ?
No
Issue Letter of Compliance(LOC)
Close case
Yes
Maybe
Adequate response. No Follow-up
Issue Water Quality Advisory (WQA)
Issue Letter of Warning (LOW)
*
Producer may seek assistance from SWCD or other source
Follow up investigation
*May issue NON if there is serious threat to human health or environment.
Violation ?
No
Yes
Issue Notice of Noncompliance (NON)
Issue Letter of Compliance(LOC)
Close case
Follow up investigation
Issue Civil Penalty (CP)
Yes
Violation ?
No
Rev 5/11