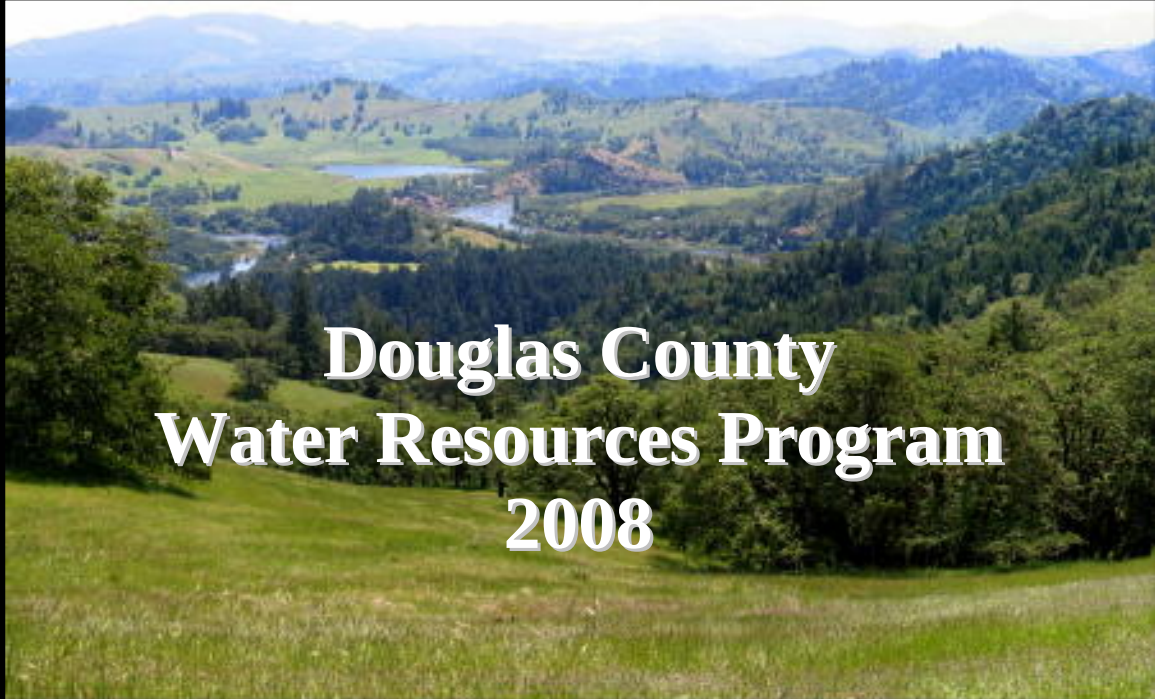
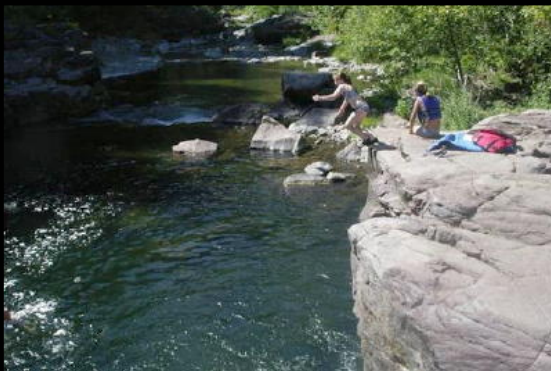




Douglas County Water Resources Program 2008



*Cover photos courtesy
Bureau of Land Management Roseburg*

**Douglas County
Water Resources Program
2008**

**Volume I –
Findings and Implementation**

Volume II - Assessment

Prepared for

**Natural Resources Division,
Public Works Department,
Douglas County, Oregon**

Prepared by

Lisa Winn Consulting

113 NE 8th Street
Oakland, OR 97462
541 459-5233
lawinn@charter.net

Volume I - Table of Contents

1. INTRODUCTION.....	1
1.A. Program Goal and Objectives	1
1.B. History of Water Resources Management	2
1.B.1. Douglas County.....	2
1.B.2. State of Oregon	5
1.C. Summary of Concerns in Douglas County	6
1.D. Summary of Concerns by Sub-basin	7
1.D.1. Umpqua River / Coastal Lakes (Sub-basin A)	7
1.D.2. Umpqua River / North Umpqua River (Sub-basin B).....	8
1.D.3. Elk Creek / Calapooya Creek (Sub-basin C).....	10
1.D.4. South Umpqua River / Cow Creek (Sub-basin D)	12
1.D.5. Lookingglass Creek / South Umpqua River Tributaries (Sub-basin E)	14
1.D.6. Camas Valley (Sub-basin F)	16
2. CURRENT PROGRAM ELEMENTS	17
2.A. Resources Management Element	18
2.A.1. Data Collection	18
2.A.2. Flood Warning	24
2.A.3. Specific Studies and Technical Input.....	24
2.A.4. Coordination	24
2.A.5. Project Operation and Maintenance	26
2.B. Stewardship Element	27
2.B.1. Opportunities.....	27
2.B.2. Programs	28
2.B.3. TMDL Implementation	29
2.B.4. Likelihood of Project Approval.....	30
2.C. Storage Element	30
2.C.1. Dam Safety.....	31
2.C.2. Minimal Impacts	31
2.C.3. Location	31
2.C.4. Project Functions.....	32
2.C.5. Financial Concerns.....	32
3. FUTURE WORK PLAN	32
3.A. Resources Management Element.....	33
3.A.1. Streamflow Data Collection and Flood Warning.....	33
3.A.2. Specific Studies and Technical Input.....	33
3.B. Stewardship Element	33
3.C. Storage Element	35
4. REFERENCES.....	48

List of Tables

Table 2.A-1: List of monitoring stations currently operated within the Umpqua Basin.	21
Table 2.C-1: Impoundment sites most favorable for development in Douglas County.	30
Table 3.C-1: Estimates of additional water use capacity for irrigation and needs for municipal and industrial uses in acre-feet through 2050.	37
Table 3.C-2: Future potential irrigation water use (acre-feet) in South County that may partially be met by existing storage.	38

List of Figures

Figure 2.A.1: Map of monitoring stations currently operated within the Umpqua Basin.	20
Figure 3.C.1: Locations of potential and existing impoundment sites in the County.....	39
Figure 3.C.2: Elk Creek (tributary to the Umpqua River) sub-basin potential future impoundment sites.	41
Figure 3.C.4: Deer Creek sub-basin potential future impoundment site.	46

1. Introduction

The following information outlines a proposed response by Douglas County to the water resources issues identified in the water resources assessment in Volume II.

Implementation of corrective actions to remedy these issues is expected to occur over a long period of time due to the magnitude, distribution, and complexity of the issues, and the dependence on local, State, and/or Federal governments to aid in financing projects. Schedules for the proposed projects typically allow 10 to 15 years for completion.

However, since publication of the previous outline of work in 1989, financial limitations at all levels of government along with stricter environmental regulations have severely limited the ability to implement these projects. Therefore, options for alleviating water issues are presented without a schedule for completion. These options will be implemented over time to address water needs, but only as the funding to finance the work becomes available.

While much has been accomplished to address water quality and quantity limitations in the basin, issues and concerns described in Volume II illustrate the need for continued efforts by Douglas County. The activities necessary to meet the program goal and objectives are described in the sections that follow, as well as a discussion of more specific actions that the Natural Resources Division staff believe may be accomplished in the next several decades to address many of the issues.

1.A. Program Goal and Objectives

Douglas County has made substantial progress in addressing water resources issues throughout the Umpqua Basin. These accomplishments are described in Section 1.B. These efforts reflect the following overall water management program goal:

- **Provide year-round, high quality surface water supplies sufficient to meet current and future needs for all beneficial uses in Douglas County.**

Beneficial uses have been designated by the State and are outlined in the Oregon Administrative Rules (OAR 340-041-0320) on all streams and lakes in the Umpqua Basin. Although beneficial uses vary somewhat by river or stream, they include the following:

- | | |
|----------------------------|--|
| • Domestic water supply | • Aesthetic quality |
| • Fishing | • Fish and aquatic life |
| • Industrial water supply | • Hydropower |
| • Irrigation | • Wildlife and hunting |
| • Water contact recreation | • Commercial navigation and transportation |
| • Livestock watering | |

The program goal is more specifically stated in the following program objectives:

1. Achieve water quantity and quality conditions in all streams and lakes to protect the relevant beneficial uses listed above (from OAR 340-041-0320).
2. Insure available municipal and/or industrial water supplies to fully meet existing needs and to support further population growth and industrial diversification.
3. Insure available irrigation water supplies to fully meet current shortages and to provide for further agricultural intensification and diversification.

1.B. History of Water Resources Management

1.B.1. Douglas County

Douglas County has become increasingly active in water resources management since it established the Water Resources Survey in 1956. The primary focus of the Survey at its inception was collection of hydrologic data. In the last fifty years, the County program of water resources management has evolved into one of the most active in Oregon and is among the leading county programs in the nation. The Water Resources Survey was renamed the Natural Resources Division (NRD) in 1996.

The NRD's water resources responsibilities have expanded to include the operation of Ben Irving and Galesville reservoirs, and planning of additional storage facilities. The NRD partners with the United States Geological Survey, United States Forest Service, Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, Oregon Water Resources Department, Bureau of Land Management, and other agencies in various water-related projects.

In 1956, the County developed the Water Resources Advisory Committee, referred to today as the Water Resources Advisory Board. The current board is composed of nine members that include local citizens from throughout the County familiar with water issues that provide guidance and input to County officials on water issues and needs specific to different regions of the County.

In 1992, the Umpqua Basin Fisheries Restoration Initiative was developed as a subcommittee to the Water Resources Advisory Board. The initial focus of the group was to complete 2,000 miles of aquatic habitat surveys on basin streams. The group was later changed to become an official watershed council and an advisory group to the Douglas County commissioners in 1997. The name was then changed to the Umpqua Basin Watershed Council (UBWC).

The official connection of the watershed council as a subcommittee to the Water Resources Advisory Board was terminated in 2000 when the council was registered as an Oregon non-profit organization. The UBWC received provisional 501(c)(3) status the following year and a final status ruling in 2006. The council changed its name in 2005 and is now known as the Partnership for the Umpqua Rivers. The council now serves as a non-profit watershed council for most of the Umpqua River basin. There are also two other watershed councils operating in the basin, Smith River and Elk Creek watershed

councils. The primary focus of the watershed councils is to improve water quality and fish habitat in the basin streams.

In the western region of the country, major water resources projects have been constructed by federal agencies such as the U.S. Bureau of Reclamation and U.S. Army Corps of Engineers in response to local requests to alleviate the kinds of issues identified in Volume II. These agencies have prepared or contracted studies of potential storage projects in the Umpqua Basin since the early 1950's.

Construction of the Galesville Reservoir is the only County project to date that has received federal funding. The Galesville project was partially funded by the U.S. Bureau of Reclamation's Small Reclamation Projects Program. Although other projects have been identified that met the economic and environmental criteria of the program, no other major federal storage projects have received federal funding in Douglas County.

The County, in recognition of issues and limitations related to water use, first prepared their Water Resources Management Program in 1979. The program was later updated in a 1989 revision. This 2008 revision is the first update authorized by the County since 1989.

In 1979 the County completed the Berry Creek Project. This \$7.5 million (1978 dollars) earth-fill dam serves in-lieu of the United States Bureau of Reclamation's proposed Olalla Project, one of the authorized but not constructed projects in the County. The impoundment, Ben Irving Reservoir, has the storage capacity of 11,250 acre-feet for irrigation, municipal, streamflow augmentation and reservoir recreation purposes. The project was constructed entirely with County funds on a "pay-as-you-go" basis.

A second storage project, jointly sponsored by Douglas County and the City of Canyonville, was completed in 1981. Win Walker Reservoir is a 300 acre-foot impoundment that provides essential storage for the City's water supply. Construction of the \$2.8 million project (1980 dollars) was funded by the City of Canyonville, the County, and a Farmers Home Administration grant.

In 1982, after detailed engineering and environmental studies of four alternative sites, construction began on the 41,870 acre-foot Galesville Project located on Cow Creek near Azalea. Prior to construction, Douglas County citizens passed a ballot measure by over 75 percent approving construction of the project. The project was completed in 1986. Primary project benefits include flood control, irrigation, municipal and industrial water supply, and anadromous fish enhancement. Hydroelectric power is a secondary use that is generated as releases are made for the primary benefits listed above.

Total project costs were \$36 million in 1986 dollars. The project was funded in part, by the Small Reclamation Projects Program (PL 84-984) administered by the U.S. Bureau of Reclamation. About \$15 million in grant funds for flood control, anadromous fish, and recreation costs of the project were received. The County expended about \$10 million during the construction period. The remaining project costs of about \$11 million were to

be repaid as a loan over a 40-year term. In early 1988, the U.S. Bureau of Reclamation offered to discount the loan for a payment of about \$7 million. The County accepted the offer and no further financial obligations exist.

In 1985 the County funded engineering costs for a 100 acre-foot reservoir for the City of Yoncalla. The completed structure is considered an interim measure until a more reliable water supply becomes available.

Douglas County has spent approximately \$12 million between 1997 and 2008 on pre-construction work for the Milltown Hill Project located in the Northern portion of the County. The project was shelved in 1997 when cutthroat trout were listed as threatened on the endangered species list, and the State would not grant a fish passage waiver. A subsequent waiver was allowed with the requirement of substantial fish habitat mitigation work that proved too costly for the County to endure.

Cutthroat trout were later de-listed in 2000, and the County began an update of environmental reports in 2005 in the hope of securing construction funding. The most recent cost estimate update was prepared in 2006, which presented the cost of the project at \$80 million (2006 dollars). Fish passage and mitigation, and water quality have been major issues in the approval of this project. The County suspended the environmental update work in 2008 due to the escalating costs and lack of funding sources.¹

Douglas County Commissioners inaugurated the Stream Habitat Improvement Program (SHIP) by ordinance in September, 1984. This program provides financial assistance to eligible applicants for projects that will increase anadromous fish populations; preserve, enhance, or restore aquatic and riparian habitat; and/or provide educational activities pertaining to fisheries. These projects make a significant contribution to the stream improvement program under the direction of the NRD.

Annual funding levels for the SHIP program are approved by the Board of Commissioners. The program is administered by a five-member Salmon Habitat Advisory Committee, with the advice of representatives from the Oregon Department of Fish & Wildlife (ODFW), Oregon Department of Forestry, U.S. Forest Service, and Bureau of Land Management. The committee is authorized to develop intergovernmental agreements as necessary for implementation of appropriate projects, and to develop priorities.

Applications for projects are reviewed by the NRD and ODFW staff. Action recommendations are made to the advisory committee with regard to specific applications. Project costs are shared by landowners, the County, and other entities.

In 1993, a Southern Pacific freight train derailed near Yoncalla. In 1995, the Yoncalla Creek Diesel Spill fund was established as mitigation for the associated spill. The fund is administered by the SHIP Committee. Since the creation of the SHIP program in 1984,

¹ Refer to Section 3.C Storage Element, Elk Creek sub-basin for a complete history of the Milltown Hill project.

at least 45 projects have been completed with approximately \$422,339 invested between both the SHIP and Yoncalla Diesel Spill funds. There is currently \$8,999 in the SHIP fund and \$269,538 (as of September 2007) in the Yoncalla Diesel Spill fund.

1.B.2. State of Oregon

The waters of the Umpqua Basin belong to the public and their use is regulated by the Oregon Water Resources Department (OWRD). Oregon's water laws are based on the principal of prior appropriation. This means the first person to obtain a water right on a stream is the last to be shut off in times of low streamflows. In water-short times, the water right holder with the oldest date of priority can demand the water specified in their water right regardless of the needs of junior users. If there is a surplus beyond the needs of the senior right holder, the water right holder with the next oldest priority date can take as much as necessary to satisfy needs under their right and so on down the line until there is no surplus or until all rights are satisfied.

In Oregon, the appropriation doctrine has been law since February 24, 1909, when passage of the first unified water code introduced state control over the right to use water. In recent years, OWRD, while supportive, has not taken a direct role in development of water resources projects, but has confined itself to establishing water use policies and administration of water law.

The Water Resources Commission, the policy setting body of the OWRD, has prepared a program of water use for the Umpqua Basin (OR Administrative Rules, Chapter 690, Division 516, Umpqua Basin Program). The program identifies beneficial uses, withdraws some streams from further appropriation, and establishes minimum perennial stream flows for instream uses or instream water rights at strategic locations throughout the basin.

In 2007, the Oregon Legislature approved the Oregon Water Supply and Conservation Initiative (OWSCI). The initiative provides \$750,000 for the State to take a broad look at water needs and water availability throughout the State, and to strategically develop the tools, methodologies, and budgets required to ensure that those who need water – both in-stream and out-of-stream – will have access to the resource for generations to come. The initiative has the following five main components:

1. A compilation of already-existing information regarding water demands and needs in Oregon
2. A statewide inventory of already-identified, potential conservation projects
3. A statewide inventory of potential water storage sites
4. Match funding for community-based and regional water supply planning
5. Completion of a state investigation of basin yield estimates.

In the short-term, OWSCI will collect much of the baseline data that policymakers need to better understand the status of Oregon's water resource. In the longer term, OWSCI will house the databases that allow the state to update and add information as it becomes available. As this information is ever-changing, the Water Resources Department intends

to deposit it into an on-line system that can be updated and managed to accommodate new data.

The Oregon Department of Environmental Quality (ODEQ) has adopted water quality standards for the basin, which regulate the discharge of wastes into basin streams. ODEQ identified Douglas County as a Designated Management Agency in its Umpqua Basin Total Maximum Daily Load (TMDL) Water Quality Management Plan, approved by EPA in April, 2007 (ODEQ 2006). The County's designation is due to its legal ability to enforce regulations that effect water quality (see TMDL Implementation 2.B.3).²

1.C. Summary of Concerns in Douglas County

There are inadequate flows in nearly all streams within the sub-basins during the low-flow season to meet current needs for out-of-stream and instream uses. Water supplies of a number of communities and industries are curtailed during late summer and early fall. New water rights are unavailable during these low flow seasons on most streams in the basin, jeopardizing continued growth and economic diversification. Several smaller South Umpqua River tributary sub-basins cannot meet instream water requirements 80 percent of the time throughout the year. This does not allow for new water rights at any time of the year in those sub-basins.³ Agricultural endeavors cannot intensify nor diversify without more dependable water supplies. Increases in potential water use resulting from future population growth and/or diversification of cropland and industry can only be fully met from development of stored water sources.

Flooding is also a frequent occurrence in many County areas with significant events occurring about 2 to 3 times per decade in most sub-basins. Years with significant flooding since 1950 occurred in 1950, 1953, 1955, 1961, 1964, 1971, 1974, 1981, 1983, 1996, and 2005. Although some flooding is expected in floodplain areas and is important for overall stream function, extreme flooding particularly into municipal areas may cause damage by destroying community infrastructure and causing excessive eroding of streambanks.

In addition, water quality conditions deteriorate during low streamflow periods, exemplified by high water temperatures, excessive algae growth, high pH and low dissolved oxygen. Section 303(d) of the Clean Water Act requires states to list waters for which technology-based limits alone do not ensure attainment of applicable water quality standards. The *Umpqua Basin Water Quality Management Plan* prepared in October, 2006 by the Oregon Department of Environmental Quality (ODEQ) lists 1,669 miles of stream in the Umpqua Basin with one or more water quality impairments. There are also about 224 miles of stream listed for sedimentation and toxic substances that are not currently addressed in the 2006 plan. Poor water quality conditions may adversely impact municipal and domestic water supplies, fish resources, and recreational and

² State water quality standards and the Umpqua Basin TMDL Water Quality Management Plan can be found on the ODEQ website.

³ Storage rights may be obtained when flows meet the current needs 50 percent of the time, therefore some streams may still allow storage water rights while no new consumptive use rights are permitted.

aesthetic enjoyment. Volume II contains a comprehensive inventory of water resources issues and concerns in the Umpqua Basin and Camas Valley.

1.D. Summary of Concerns by Sub-basin

The following are summaries of potential water quantity, water quality, flooding, and aquatic life concerns by sub-basin. The information is from the sub-basin assessments in Volume II.

Most stream water quality issues will be addressed through implementation of the Umpqua Basin TMDL. The Little River TMDL also addresses water quality issues in the Little River drainage of sub-basin B. However, listings for sediment and toxic substances are not addressed by the Umpqua Basin TMDL along with a few isolated stream segments for other parameters. These are listed in the following sections.

1.D.1. Umpqua River / Coastal Lakes (Sub-basin A)

Quantity

The quantity of water resources in major streams and from identified aquifers in the sub-basin appears adequate for meeting all future out-of-stream needs. However, there probably will be shortages for increased irrigation use in August and September on smaller tributary streams. There also will be continued risk of water shortage with development of wells to supply water for individual rural residences. Development of facilities to meet specific needs, such as for municipal/industrial uses, may be accomplished on a local scale.

For anadromous fish, seasonal low streamflows generally are tolerable. However, low streamflows facilitate higher stream temperature that can exceed healthy limits for salmonids on smaller tributaries. Low flows can also cause impairment of fish passage at some locations on tributaries. One example located at river mile 29 in Smith River; a "bedrock apron" exists where flows are too shallow in late summer. Exposed bedrock also prevents spawning.

Quality

Water quality conditions in the sub-basin are adequate for all perceived present and future out-of-stream uses. However, a concern exists for the potential loss of water quality in Clear Lake from pollution hazards. US Highway 101 borders the western shore of Clear Lake providing opportunity for accidental spills of hazardous cargo that may be contained in vehicles traveling this route.

Several instream water quality issues exist in the sub-basins. Tahkenitch and Siltcoos Lakes have eutrophication problems that can limit fishing, water-contact recreation, and aesthetic value.

High water temperatures in the Umpqua River and many tributaries in late summer limit its use for rearing by adult anadromous salmonids. Warm stream temperatures can increase diseases and health problems for salmonids. When temperatures exceed 68°F, they can also cause mortality of salmonids. However, warm water temperatures are optimal for the small-mouth bass population.

Fecal coliform levels in the estuary and portions of Smith River, Umpqua River, Winchester Creek, and Scholfield Creek pose a problem for shellfish harvest. Further up the Umpqua River, both fecal coliform and *E. coli* bacteria levels also pose a problem for water-contact recreation. These levels tend to increase with peak flows in the winter.

Flooding and Urban Drainage

Flooding has occurred in Reedsport and Gardiner during periods of peak flows in the Umpqua River coupled with high tides. Major flooding in the City of Reedsport has been alleviated by construction of a dike by the Corps of Engineers and pumps used by the City to remove water. At times when high flows in Scholfield Creek coincide with high tides and flood stages in the Umpqua River, minor flooding occurs within Reedsport. Flooding of the business district of Gardiner occurs frequently, as that community is unprotected. For example, high tides and peak flows in 2005 produced flood water in Reedsport and Gardiner. However, Reedsport was able to prevent water from entering the town by use of the dike and pumps while Gardiner was flooded.

1.D.2. Umpqua River / North Umpqua River (Sub-basin B)

Quantity

Unregulated water supplies in the Umpqua River may not be adequate to meet expanded future industrial and irrigation needs.

Unregulated discharge in the North Umpqua River may become inadequate as reliable municipal and industrial surface water sources for the increasing population.

Surface water supplies are inadequate to meet future irrigation potential in Sutherlin Creek.

Quality

The main Umpqua River has elevated bacteria levels primarily in the fall, winter, and spring when runoff is higher.

There are 50 streams (or stream portions) that do not currently meet the State standards for stream temperature within the Umpqua River/North Umpqua River sub-basins, including the entire mainstem Umpqua River. Most of these streams are within the North Umpqua River sub-basin.

Elevated temperatures during the summer in Rock Creek have been a problem with regard to operation of the Rock Creek Hatchery. However, the hatchery currently draws water from the North Umpqua River during this period to alleviate the problem.

Cooper Creek and Cooper Creek Reservoir, Sutherlin Creek, and the North Umpqua River have elevated levels of various toxic substances that may affect aquatic life and human health. These streams are not currently addressed by the Umpqua Basin TMDL. Toxic levels that may have effects on human health are of particular concern where residents use the stream as a primary water source as well as regularly consume fish from the stream.

Eight streams within the North Umpqua River sub-basin are considered water quality impaired for pH during the summer. All but one of these listings will be addressed through either the Little River or Umpqua Basin TMDLs. The one mile section listed on the North Umpqua River is not addressed in a TMDL but is expected to be addressed through other processes related to the relicensing agreement for the North Umpqua Hydroelectric Project.

Canton Creek is listed for sediment and is not currently addressed in the Umpqua Basin TMDL.

There are 49 streams in these sub-basins listed for habitat modification and 22 listed with flow modification impairment. Most of those listed for flow modification are within the Umpqua River sub-basin, while those listed for habitat modification are distributed throughout both sub-basins. These modifications are usually caused by physical changes to the stream environment and can affect other pollutant levels such as sediment and dissolved oxygen.

Cooper Creek Reservoir has high mercury and iron levels throughout the year. Some sampling has also shown impaired levels of arsenic, beryllium, and manganese throughout the year, although sample sizes were insufficient to add to the 303(d) list. Plat I was listed as water quality impaired for mercury in 2002. Both reservoirs are drawn down each year to flush some of these contaminants out and provide room for more new runoff to help reduce these levels.

Diamond Lake has been listed for algae, pH, and dissolved oxygen. It has also showed some high alkalinity and ammonia levels. However, this sampling was before the draining of the lake and application of rotenone for removal of the tui chub. The lake has subsequently been refilled and the fish stocking levels are increasing. Future sampling of Diamond Lake should show reductions in these pollutants.

Flooding and Urban Drainage

During periods when flows in the North Umpqua River exceed the 2 percent probability, or 50-year recurrence, flood damage occurs in communities and residences. However, the construction of Cooper Creek Reservoir has alleviated flooding problems for the City of Sutherlin.

The Umpqua River near Elkton station measured flooding in almost 20 percent of recorded years. This frequency of flooding was far more than areas on the North Umpqua River where less than 10 percent of the years recorded flooding.

Other Perceived Concerns

In the North Umpqua River below Glide there is increasing seasonal algae growth, as evidence of the increasing water temperatures in the low flow season. The recent relicensing agreement for the North Umpqua Hydroelectric Project will increase minimum flow releases and may help improve this condition.

The lack of riparian cover on numerous tributary streams exacerbates high water temperature conditions and decreases available large wood for instream structure development. This creates long-term fish habitat concerns.

1.D.3. Elk Creek / Calapooya Creek (Sub-basin C)

Quantity

Elk Creek

Unregulated flows in Elk Creek and tributary streams frequently reach zero in the low-flow season. Mean flows in July and August on Elk Creek near Elkhead are less than 2 cfs. Conversely rainy season flooding frequently occurs in portions of the City of Drain and on agricultural lands along Yoncalla Creek.

During the low flow period water quality conditions are adverse to aquatic life, recreational use, and are aesthetically not pleasing.

Adams Creek is not a reliable direct supply of water for the City of Yoncalla during the summer months. The existing reliable water supply from Adams, Wilson, and North Fork Wilson creeks, combined with the current storage in Yoncalla Reservoir is not adequate to meet future anticipated water demands by the City of Yoncalla. However, these sources would be adequate to meet the growth needs of Yoncalla if additional storage capacity is created to store water produced during the winter months from Adams Creek.

Development in the areas outside of the City of Yoncalla, the Rice Hill area in particular, would benefit from a better water supply. Further study is needed to identify appropriate sources.

There is no opportunity for expanded irrigation development in the sub-basin without storage.

Without augmentation from stored water and instream or riparian enhancement, aquatic habitat will not support additional anadromous fish populations, nor will instream recreational opportunities be increased.

Calapooya Creek

During the low flow season, water quality conditions in Calapooya Creek are adverse to aquatic life, instream recreation, and are aesthetically not pleasing.

The expected increase in population of Sutherlin will require additional water supplies be made available to provide a reliable water supply. Alternatives include:

1. Storage sites in the Calapooya Creek sub-basin, or
2. Development of a diversion from the North Umpqua River. This alternative is currently being explored by the City of Sutherlin and the Umpqua Basin Water Association.

There is no opportunity for expanded irrigation development in the sub-basin, without storage.

Without augmentation from stored water and instream or riparian enhancement, aquatic habitat will not support additional anadromous fish populations, nor will opportunities for in-stream recreational uses be increased.

Quality

Water temperatures during low flow periods are intolerable to anadromous species in portions of many streams in both sub-basins.

Calapooya Creek, Elk Creek, and Yoncalla Creek all fail to meet state standards for bacteria in the high flow season presumably due to increased runoff. During these periods, bacteria levels pose a health threat to people using the river for water contact recreation.

Calapooya Creek and Elk Creek are water quality impaired during the summer for dissolved oxygen. Low levels occur when anadromous fish are passing through and rearing in these streams. Calapooya Creek is also listed during the spawning period (Oct 15 to May 15) from the mouth to approximately river mile 25 near Nonpareil. This fall, winter, and spring listing is not addressed in the Umpqua Basin TMDL.

Calapooya Creek and Cook Creek are listed as impaired for various toxic substances. Calapooya Creek is high in iron and Cook Creek is impaired for beryllium, copper, iron, lead, and manganese. These levels create potential problems for both human health and aquatic life. In addition, Cook Creek may affect drinking water and fishing.

Calapooya Creek is also listed as impaired for pH which can cause problems for aquatic life.

There are eight streams in these sub-basins listed for habitat modification and ten listed with flow modification impairment. Most of those listed for flow modification are within the Calapooya Creek sub-basin, while those listed for habitat modification are distributed throughout both sub-basins. These impairments can affect other parameters including sediment, dissolved oxygen, and temperature by increasing erosion and streamflow velocity, and decreasing shade. Loss of floodplain vegetation can also increase the rate of streamflow and decrease filtering of sediment and toxics. Efforts to improve fish passage and riparian conditions can help to improve these impairments.

Flooding and Urban Drainage

Surface flooding occurs frequently in the City of Drain. The low-lying riparian agricultural lands along Yoncalla Creek experience flooding that occasionally overflows the main road and threatens some homes.

Other Perceived Concerns

Some analyses indicate that Elk Creek and Calapooya Creek may not meet alkalinity standards due to high CaCO_3 which can create health problems for aquatic life.

Calapooya Creek potentially does not meet phosphate phosphorus standards. When nutrient levels get too high, they may affect related parameters such as dissolved oxygen or excessive algae growth, which in turn may negatively impact beneficial uses of that stream such as fish and aquatic life. Calapooya Creek has been found to have high algae growth during the low flow season.

Neither sub-basin has opportunities for growth without adequate water supplies.

1.D.4. South Umpqua River / Cow Creek (Sub-basin D)

Quantity

Future population growth is estimated to create a need for an additional 1,408 acre-feet of water within the South Umpqua River sub-basin beyond what is currently under water right or purchased from reservoirs. This can be met by available allocations of municipal water stored in Galesville Reservoir.

There is a potential for increased irrigation water use of 15,225 acre-feet over and above Galesville reservoir capabilities in the sub-basins. The estimated potential total future capacity of irrigation use in both sub-basins is 23,170 acre-feet. Galesville Reservoir currently has 7,945 acre-feet available for irrigation. Of the total estimated capacity of use, 7,549 acre-feet is in the Cow Creek sub-basin, and 15,621 acre-feet in the South Umpqua River sub-basin. Approximately 8,894 acre-feet of estimated use is not accessible by Ben Irving Reservoir. This area between Cow Creek and Brockway in the

South Umpqua River sub-basin would need to be supplied by either Galesville Reservoir or a new source of storage. Since Galesville is the only site able to serve upper Cow Creek, it is possible that some of the present contemplated Galesville service area will need to acquire water from future storage projects.

Quality

Water temperatures during low flow periods in portions of many streams are intolerable to anadromous species in both sub-basins. Although temperatures have improved on Cow Creek since flow regulation began, the effects are diminished by the time Cow Creek reaches the South Umpqua River. Most problems occur in the summer months during salmonid rearing and migrating and are being addressed by the current Umpqua Basin TMDL. A few stream segments also have elevated temperatures during the spawning season, which is not addressed by the current TMDL.

Water quality conditions are unacceptable in the South Umpqua River during periods of the year. During the summer, bacteria levels pose a health threat to people using the South Umpqua River for water contact recreation in the areas near Days Creek, Canyonville, Riddle, Myrtle Creek, Dillard, Winston, and Green.

The South Umpqua River has low dissolved oxygen levels that are correlated in some areas to problem pH levels. The summer flows in the South Umpqua River are low, temperatures high, and algae bloom is a problem. This likely increases CO₂ consumption and elevates pH. Cow Creek, Jackson Creek, and Black Canyon Creek also have elevated pH levels. Nutrient levels in the South Umpqua River are also a potential problem that contribute to the pH and dissolved oxygen impairments.

The South Umpqua River and Cow Creek are both considered water quality impaired for chlorine. In addition, the lowest 16 miles of the South Umpqua River below Green is listed for cadmium and arsenic. Several other stream segments are a potential concern for other toxic substances as well. These are not addressed by the current TMDL.

The upper portion of the South Umpqua River is considered impaired for sediment from river mile 80 to 102. West Fork Cow Creek has a potential sediment problem from the mouth to stream mile 22.2. These are not addressed in the current TMDL.

Increasing streamflow significantly in the South Umpqua River during the low flow months would accomplish the following:

- minimize the needs for tertiary treatment;
- decrease coliform bacteria counts to levels acceptable for swimming; and
- provide flows adequate for boating/rafting.

Douglas County should include these considerations as objectives in its water resources planning efforts.

Flooding and Urban Drainage

Flooding will continue to occur in the South Umpqua sub-basins even with Galesville Reservoir in operation. Occasional flooding in the Cow Creek sub-basin may occur but the levels and frequency are substantially reduced with regulation of flows from Galesville Reservoir. Flooding is more likely along the lower end of Cow Creek near Riddle.

Aquatic Life

Primary habitat parameters for all salmonids in the sub-basin are water quality (primarily stream temperatures), pool areas for holding and rearing, and gravel areas for spawning and incubation of eggs. Primary factors limiting production in the sub-basin generally can be attributed to a lack of gravel and large wood, and high summer water temperatures in the mainstem South Umpqua River and tributaries. Low summer flows in the South Umpqua River can adversely affect migrating adults and juveniles.

Numerous efforts are being undertaken in the tributaries by various agencies, public groups, and private landowners to improve instream and riparian habitat, and to improve fish passage to areas currently restricted by improper culverts and other obstructions.

Other Perceived Concerns

In the lower portions of both the Cow Creek and South Umpqua sub-basins, unregulated development on riparian lands has adversely affected water quality, particularly water temperatures. Loss of healthy wetland function has also contributed to flooding and water quality problems in these areas.

1.D.5. Lookingglass Creek / South Umpqua River Tributaries (Sub-basin E)

Quantity

In all sub-basins, streamflows during June through December are inadequate to meet existing needs.⁴ Many sub-basins have insufficient flows for most of the year. Without augmentation from storage, potential additional irrigation use and instream minimum flow requirements will not be met.

A total future potential irrigation use of 30,919 acre-feet is projected in all sub-basins. Of the total, 23,448 acre-feet is in the Lookingglass Creek sub-basin. Ben Irving Reservoir currently has 5,410 acre-feet available for irrigation. The potential future capacity of irrigation water use would require 18,038 acre-feet over and above Ben Irving Reservoir capabilities in the Lookingglass Creek sub-basin assuming the 5,410 acre-feet can supply irrigation land downstream of the reservoir within the sub-basin.

⁴ Based on expected streamflows 80 percent of the time.

The remaining potential future water use for irrigation is estimated at 7,471 acre-feet in the South Umpqua Tributaries sub-basins. Deer Creek has the majority with 6,266 acre-feet of potential use for irrigation. Days Creek and South Myrtle Creek have 910 and 295 acre-feet of potential irrigation use respectively.

Ground water supplies should be monitored to ensure that future supplies for increased populations are adequate. Over the last 25 years, all sub-basins except Deer Creek show substantial increases in the percent of wells with less than 1 gpm flow.

Quality

Water temperatures during low flow periods are intolerable to anadromous species in portions of many streams in all sub-basins. The low flow periods generally occur in the summer when salmonids are rearing and migrating through the streams. Four streams in the Lookingglass Creek sub-basin and twenty other streams in the South Umpqua Tributaries sub-basins have segments that exceed State water temperature standards during this period.

Segments of Deer Creek, Canyon Creek, West Fork Canyon Creek, and an unnamed tributary in Canyon Creek also exceed temperature standards during the rest of the year when salmonids are spawning. Stream temperature listing during this portion of the year are not addressed by the Umpqua Basin TMDL but remedies that address temperatures in the summer months will likely improve conditions year around as well.

During the summer, bacteria levels pose a threat to people using Deer Creek, North Fork Deer Creek, Myrtle Creek, and Rice Creek for water contact recreation. Deer Creek and North Fork Deer Creek also have elevated levels during the rest of the year.⁵

Low dissolved oxygen levels are associated with warm stream temperatures, and high bacteria levels. In addition to the listings for temperature and bacteria, the first 9.6 miles of Deer Creek is also listed for inadequate dissolved oxygen levels during the spawning season (October 15th to May 15th). This can cause eggs, smolts, and other aquatic organisms to die when levels are too low.

Olalla Creek is considered water quality impaired for iron from the mouth to stream mile 21.8. The impairment may adversely affect both aquatic life and human health. Toxic impairments are not addressed by the current Umpqua Basin TMDL.

The first 25 miles of Jackson Creek and the lowest 2.1 miles of Beaver Creek, a tributary to Jackson Creek are considered high in sediment that may affect aquatic life. Sediment listings are not addressed in the current TMDL.

There are 20 streams listed for habitat modification impairments, and 20 listed for flow modifications. These impairments are usually caused by physical changes to the stream

⁵ Rice Creek was found to be water quality limited during sampling for the TMDL analysis but is not yet on the 303(d) list.

environment. They can be related to stream crossings that restrict or change flow patterns, streambank modification, vegetation changes or losses, and loss of streambed material from flooding, dredging, or historic logging practices with log flumes.

Flooding and Urban Drainage

Flooding of riparian agricultural lands occurs frequently in these tributary sub-basins. Although regular flooding is expected in the floodplain areas, excessive frequent flooding can erode streambanks and contribute to siltation problems in streams and in the South Umpqua River. In addition, flooding of some residences is a recurring problem along Deer Creek.

Aquatic Life

Inadequate flows, elevated water temperatures, lack of pool areas for holding and rearing, and lack of gravel areas for spawning and incubation of eggs adversely affect aquatic habitat in all sub-basins.

Numerous efforts are being undertaken in many tributaries by various agencies, public groups, and private landowners to improve instream and riparian habitat, and to improve fish passage to areas currently restricted by improper culverts and other obstructions.

1.D.6. Camas Valley (Sub-basin F)

Quantity

Stream flows during June through October are inadequate to meet existing needs. Without augmentation from storage, future potential irrigation use and instream flow requirements will not be met.

Ground water supplies should be monitored to ensure that future supplies for increased populations are adequate. Consideration of community well development may be necessary to help meet area domestic needs.

Quality

Some ground water well testing from the 1970s showed some wells with potentially high boron levels that may warrant additional monitoring.

Elevated stream temperatures during low flow summer months may negatively affect aquatic life during rearing and migrating. Known areas of concern are on the lower reaches of Battle, Boulder, and Dice creeks, and the lower 10 miles of Twelvemile Creek all within the Twelvemile Creek watershed. The Middle Fork Coquille River from about river mile 11 to 40 (through the Camas Valley) is also a known concern.

Habitat modification on Panther Creek and the Middle Fork Coquille River may also be a result of physical changes to the stream habitat for aquatic life that can increase sediment to spawning grounds.

2. Current Program Elements

Douglas County has alleviated many water resources issues. However, additional concerns identified in Volume II and summarized in Section 1.D, illustrate the need for continued efforts to meet the program goal and objectives. While water storage projects are a primary tool for mitigation of many of the issues identified in the basin, other actions are necessary to more completely meet all water resources needs in the County.

The activities necessary to meet the goal and objectives are delineated into three primary program elements:

- Resources Management
- Stewardship
- Storage

The activities within each element are described below, followed by suggested specific actions the NRD staff may accomplish in the coming decades provided adequate funding sources are identified for the necessary work.

The Resources Management element includes work assigned to and previously carried out by the NRD water resources staff, such as data collection, flood warning, and specific studies. This element includes operating newly completed storage projects to meet as much of the downstream needs as possible, while maintaining safe and efficient operating conditions.

Many resources management efforts involve the interests of agencies at all levels of government requiring a program emphasis on coordination. Implementation of the County's programs must proceed in concert with Federal and State agency authorities and policies. As work is completed toward meeting County objectives, there will be occasions when State policies will need to be adjusted to better apply to improving conditions in Douglas County, and such changes will need to be initiated by the County. Some new activities of County agencies, suggested in subsequent paragraphs, will need to be inaugurated and coordinated to assist in achieving the goal and objectives.

The Stewardship element is designed to help meet the goal and objectives in areas where storage facilities are not appropriate or possible. As water resources are put to use, they must be cared for and conserved, both in concert with storage facilities and independently. Efforts can be made by landowners and County residents to reduce water quality degradation in the lakes, streams, and groundwater in the County. Conservation may be improved through education of County water users.

County criteria and specific concerns related to development of new storage facilities are discussed under the Storage element.

2.A. Resources Management Element

2.A.1. Data Collection

The NRD has a data collection system throughout Douglas County to allow acquisition of hydrologic and other data for use in sound project planning decisions as well as for meeting other needs. The data collection system includes the following programs:

- cooperative stream gaging with the U.S. Geological Survey, Bureau of Land Management, U.S. Forest Service, State of Oregon Water Resources Department, and local units of government
- cooperative snow surveys with the U.S. Department of Agriculture Natural Resources Conservation Service
- cooperative rain gage network with the U.S. Department of Commerce National Weather Service
- Douglas County stream gaging program

NRD, U.S. Geological Survey (USGS), and OWRD currently operate and maintain 34 stream gaging stations distributed throughout the basin. NRD collects data from 23 of these stations including 20 that are exclusively operated and maintained by NRD and 3 that are shared with USGS. Of these, 14 measure water temperature and discharge, 6 measure temperature only, 2 measure gage height only, and 1 measures gage height and precipitation. Included in these are stations on both Galesville and Ben Irving Reservoirs. The USGS operates another 10 stations in addition to the 3 stations shared with NRD. The USGS collects discharge data from 11 of the stations, temperature from 2 stations, reservoir levels from one on Galesville Reservoir, and water quality parameters including turbidity and dissolved oxygen from at least 3 stations. The Oregon Water Resources Department (OWRD) monitors one station on Calapooya Creek for temperature and discharge. Data collected by both the OWRD and USGS are also shared with Douglas County. Figure 2.A.1 shows the location of monitoring stations currently operated in the basin, and Table 2.A-1 lists these stations with specific information on each station.

In 2007, the NRD implemented the Water Resources Information System Kisters (WISKI) for stream gaging station data acquisition and water database management. Eleven of the County monitored stations have gage calling dial-up for remote data acquisition. All stations data, whether collected by dial-up or manually via a data card or data logger, are entered into the WISKI system software for storing, managing, and analyzing stream flow, water quality and flood gage data. Ten USGS stations are also on a dial-up system. Data collected at USGS, NRD, or Bureau of Land Management (BLM) gaging stations are shared between the agencies.⁶ Galesville Reservoir has been

⁶ BLM has several stations that are monitored by Douglas County.

integrated into the data collection system and plans to incorporate Berry Creek are underway.

Stream gage data serve a broad range of purposes including daily reservoir operation, streamflow distribution, seasonal reservoir operational planning, specific reservoir project planning and formulation, bridge and culvert designs, water withdrawal management, historical trends, and comprehensive water planning purposes. Snow survey and precipitation data are used for reservoir operation planning, statistical analyses for special studies, and for flood forecasting.

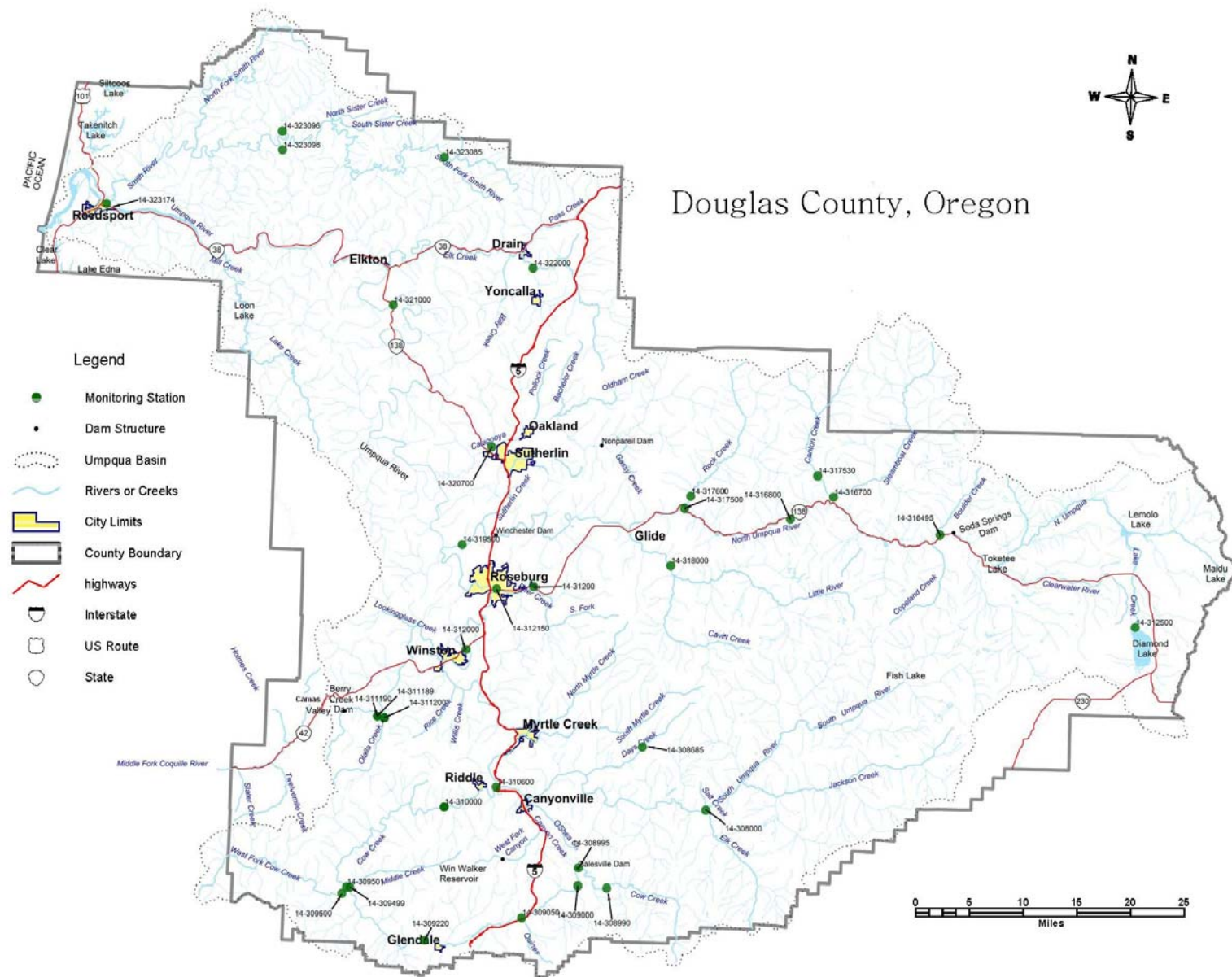


Figure 2.A.1: Map of monitoring stations currently operated within the Umpqua Basin.

Station #	Name	Latitude	Longitude	Monitoring agency	Parameters	Remote data collection
14-308000	South Umpqua River @ Tiller	42 55'50"	122 56'50"	USGS	discharge	yes
14-308685	Days Creek abv May Creek nr Days Creek	43 00'42"	123 04'02"	NRD	temperature, discharge	no
14-308990	Cow Creek abv Galesville Reservoir nr Azalea	42 49'24"	123 07'29"	USGS	temperature, discharge, turbidity	yes
14-308995	Galesville Reservoir nr Azalea	42 50'56"	123 10'40"	NRD	temperature	no
	Galesville Reservoir nr Azalea	42 50'56"	123 10'40"	USGS	reservoir levels	yes
	Galesville Reservoir nr Azalea	42 50'56"	123 10'40"	NRD	afterbay temperature	yes
14-309000	Cow Creek nr Azalea	42 49'30"	123 10'40"	NRD	temperature	yes
	Cow Creek nr Azalea	42 49'30"	123 10'40"	USGS	discharge, turbidity	yes
	Cow Creek nr Azalea	42 49'30"	123 10'40"	USGS	dissolved oxygen	no
14-309050	Cow Creek blw Quines Creek nr Azalea	42 46'49"	123 16'44"	NRD	temperature	no
14-309220	Cow Creek blw McCullough Creek nr Glendale	42 44'45"	123 27'20"	NRD	temperature, discharge	yes
14-309499	Cow Creek blw Middle Creek nr Glendale	42 48'46"	123 35'44"	NRD	temperature	no
14-309500	West Fork Cow Creek nr Glendale	42 48'15"	123 36'35"	USGS	discharge	yes ¹
14-309501	Cow Creek blw West Fork Cow Creek nr Glendale	42 48'46"	123 36'06"	NRD	temperature	no

Table 2.A-1: List of monitoring stations currently operated within the Umpqua Basin.

Station #	Name	Latitude	Longitude	Monitoring agency	Parameters	Remote data collection
14-310000	Cow Creek nr Riddle	42 55'25"	123 25'40"	NRD	temperature	yes
	Cow Creek nr Riddle	42 55'25"	123 25'40"	USGS	discharge	yes
14-310600	South Umpqua River nr Riddle	42 57'08"	123 20'00"	NRD	discharge, temperature	yes
14-311189	Ben Irving Reservoir nr Tenmile	43 02'26"	123 33'23"	NRD	discharge, temperature	yes
14-311190	Berry Creek nr Tenmile	43 02'26"	123 33'23"	NRD	discharge, temperature	no
14-311200	Olalla Creek nr Tenmile	43 02'19"	123 32'37"	NRD	discharge	no
	Olalla Creek nr Tenmile	43 02'20"	123 32'35"	NRD	temperature	no
14-312000	South Umpqua River nr Brockway	43 08'00"	123 23'50"	USGS	discharge	yes
14-312150	South Umpqua River at Roseburg			NRD	gage height	yes
14-312200	Deer Creek nr Roseburg	43 13'10"	123 16'35"	NRD	gage height	yes
14-312500	Lake Creek nr Diamond Lake	43 11'12"	122 09'55"	USGS	discharge	no
14-316495	Boulder Creek nr Toketee Falls	43 18'13"	122 31'45"	USGS	discharge, temperature	no
14-316700	Steamboat Creek nr Glide	43 21'00"	122 43'40"	USGS	discharge	yes
14-316800	North Umpqua blw Steamboat Creek nr Glide	43 19'10"	122 48'23"	NRD	discharge, temperature	yes
14-317500	North Umpqua River nr Glide abv Rock Creek			USGS		no ²
14-317530	Canton Creek nr Glide	43 22'40"	122 45'29"	NRD	discharge, temperature	no

Table 2.A-1: List of monitoring stations currently operated within the Umpqua Basin (continued).

Station #	Name	Latitude	Longitude	Monitoring agency	Parameters	Remote data collection
14-317600	Rock Creek nr Glide	43 20'45"	122 59'30"	NRD	discharge, temperature	no
14-318000	Little River at Peel	43 15'10"	123 01'30"	NRD	discharge, temperature	no
14-319500	North Umpqua River at Winchester	43 16'20"	123 24'40"	USGS	discharge	yes
14-320700	Calapooya Creek nr Oakland	43 24'10"	123 21'45"	OWRD	discharge	no
14-321000	Umpqua River nr Elkton	43 35'10"	123 33'15"	USGS	discharge	yes
14-322000	Elk Creek nr Drain	43 38'30"	123 17'50"	NRD	discharge, temperature	yes
14-323085	Smith River nr Drain	43 47'02"	123 28'08"	NRD	discharge, temperature	no
14-323096	West Fork Smith River nr Scottsburg	43 48'39"	123 46'20"	NRD	discharge, temperature	no
14-323098	Vincent Creek nr Scottsburg	43 47'09"	123 46'14"	NRD	discharge, temperature	no
14-323174	Umpqua River at Reedsport	43 42'19"	124 05'38"	NRD	gage height, precipitation	yes
¹ Data collection platform for satellite telemetry.						
² BLM water quality monitoring station.						

Table 2.A-1: List of monitoring stations currently operated within the Umpqua Basin (continued).

2.A.2. Flood Warning

The NRD works with the National Weather Service Northwest River Forecast Center offices in Portland and Medford to provide flood warning services to the citizens of Douglas County.⁷ The National Weather Service has not had an office located in the County since the mid-1950's. During times of high flows in basin streams, the National Weather Service and Douglas County's Emergency Management Division monitor the data from NRD's gaging stations via gage calling programs. The National Weather Service recently began accessing County dial-up stations every hour for up-to-date analysis and flood forecasting. The hydrographs produced are in turn published in real-time on the Douglas County website for citizen viewing.

2.A.3. Specific Studies and Technical Input

NRD personnel also prepare and maintain floodplain maps for use by County and local planning agencies. As storage projects are constructed with flood control capabilities, floodplain maps will be revised and updated to reflect the altered conditions resulting from the completed projects. Development of the information necessary to properly prepare floodplain maps requires completion of detailed and complex specialized hydraulic studies of the stream reaches to be mapped.

NRD prepares and/or coordinates preparation of specific studies as needed to answer questions concerning water related issues. Studies are usually initiated in response to questions from local citizens, or to provide technical background for testimony to State or Federal agencies as their policies, rules, or guidelines are in the process of change.

During formulation of a storage project, staff assess whether adequate streamflows exist to meet the required storage, while fulfilling all downstream more senior water rights. NRD staff work with the State local Watermaster to determine if the available water is sufficient to supply enough water to the project to meet the needs of all the existing and potential water users of that stream. NRD works with many other County staff, as well as State and Federal agencies to evaluate the feasibility of the projects. Some of this effort is described in the Coordination section below.

2.A.4. Coordination

Douglas County is an active participant with Federal agencies in project formulations. Capabilities employed by the County in these cooperative efforts involve not only NRD staff, but professional and technical staffs from several other County departments. The Watermaster and NRD staff work together to assess the feasibility of potential storage projects prior to an application for a permit being filed with the State Water Resources Department. Once a potential site determination is made by the County, assessment of water availability within the project stream to meet storage needs while still fulfilling all other senior water rights downstream must be determined. Coordination is required with

⁷ The National Weather Service is a component of the National Oceanic and Atmospheric Association.

the Douglas County Public Works Engineering Division with regard to road and utility relocation; the Douglas County Surveyor in acquisition of project rights-of-way; the Douglas County Planning Department for planning and zoning compliance; and the Douglas County Parks Department for assistance in location, planning, and design of reservoir recreation facilities.

Upon completion of the coordinated evaluation, an application for a storage permit is then filed with the State. In conjunction with this effort, the County works closely with the ODFW in negotiating possible mitigation for fish passage. In many cases, storage allocations for fisheries are negotiated in lieu of fish passage to meet downstream flow targets for fish habitat. To assure these functions all contribute to meet project needs and are compatible with Federal agency criteria, NRD staff will continue to monitor and coordinate these efforts.

Coordination with Federal, State and local water resources agencies is essential to successfully fulfilling Douglas County's goal and objectives. Federal water resources agencies have been involved in Douglas County in the recent past. The US Bureau of Reclamation (USBR) participated with the County in formulating a Reclamation project at the Milltown Hill site on Elk Creek. Their work included land classification, evaluation of alternative projects, and evaluation of the project based on required complex economic criteria and procedures.

The Milltown Hill project was an example of coordination work necessary to meet County water resources objectives in line with the processes and procedures of outside agencies. County staff actively participated with USBR in formulation of the project. Hydrology, flood damage surveys, fish enhancement potential, preliminary foundation exploration, preliminary facility sizing and cost estimating had all been accomplished or were underway for review by the USBR and for incorporation into the project reports. Care was also taken to insure the project would be acceptable to the State of Oregon. It is conceivable the project may be considered at a future date. Should that occur, good documentation of the process, coordination, and completed reports will be essential.

Oregon water law and State agency rules and policies define conditions under which water resources in the Umpqua Basin are managed and used. For example, the Oregon Water Resources Department classifies the types of beneficial uses, amount of water that may be diverted for the different uses, and seasons of use allowed in the basin. The Department may withdraw certain sources from future appropriations. As rules change, either in reaction to new legislation, proposed updated criteria, or as conditions in the County change affecting the application of existing rules, work under the County's Water Resources Management program will be affected. Thus the County must remain informed of ongoing State agency affairs, as those pertain to Douglas County and frequent contacts must be maintained with those agencies having policy responsibilities and authorities over the water resources of the basin.

Additionally, needs exist for coordination of local governmental agencies to further progress toward meeting the County goal and objectives. Work described under the

Stewardship Element identifies the needs for participation in riparian vegetation protection and enhancement by local Planning Commissions. NRD staff will provide information to these local bodies, in coordination with the County Planning Department.

2.A.5. Project Operation and Maintenance

Operation and maintenance work of completed storage projects is necessary for the life of the project. NRD staff now operate and maintain the Berry Creek and Galesville projects. As new projects are constructed, these facilities will be included in the operational system.

The primary concern is for maintaining dam structures in safe conditions. All County structures are thoroughly instrumented and are frequently monitored by NRD personnel to assure maximum safety conditions. Although the Oregon Water Resources Department is responsible for inspecting Plat I, and Win Walker dams, NRD personnel routinely monitor Galesville, Berry Creek, and Cooper Creek for dam safety. Annual inspections at Galesville by the Federal Energy Regulatory Commission (FERC), USBR, Oregon Department of Water Resources (OWRD), and Douglas County through use of hired consultants on dam safety and construction are scheduled to assure the structure remains safe. An Emergency Action Plan has been prepared for Galesville Dam. Similar plans will be developed and maintained for Berry Creek Dam and all new storage projects completed.

Annual scheduled maintenance inspections and repair also occur for mechanical features at the projects such as outlet works. Projects that include hydrologic facilities have annual inspections and maintenance of electrical gear, including periodic complete tear-downs and detailed inspections of both hydraulic and electrical generator components. Control system and communications equipment have scheduled runs through the system diagnostic routines to assure continuously reliable operation of the projects.

Projects that incorporate flood control operations, such as Galesville, are managed to limit storage amounts during the appropriate period of the year. A "flood control pool" is kept available at Galesville during November through April. In March and April, storage amounts are allowed to increase as the flood potential decreases, and full pool elevations may be reached on the first of May. During November through February, releases will be equal to reservoir inflows to maintain a specified reservoir water surface elevation. During the remainder of the year, the minimum release will be either the minimum flow specified for that time, or reservoir inflow, whichever is less. Actual releases during May through October will depend upon downstream needs, determined by downstream temperature, flow conditions, and requirements for consumptive uses. Frequent coordination with ODFW will continue to insure that releases will satisfy downstream aquatic life needs.

2.B. Stewardship Element

The Stewardship Element of the Water Management Program is designed to encourage and support individual and group activities that address conservation of water quantity and maintain or improve water quality in Umpqua Basin streams. This may include instream or riparian projects as well as educational programs.

2.B.1. Opportunities

Most water users are aware of the importance of water conservation and practice conservation measures. As stored water becomes available to alleviate shortages, it is essential that conservation practices be continued and improved where possible. Leakage of delivery systems should be reduced so that diversions from streams are at the minimum possible amounts to meet needs. The County should continue to encourage strong delivery system maintenance programs by all water system operators. Irrigation diversion schedules and amounts should be derived from measurement of root zone moisture content to achieve maximum efficiency of water use.

Maintaining and improving water quality is equally important to water quantity in attaining the water management goal and objectives of Douglas County. Water temperature increases, particularly in smaller low elevation streams, may be reduced by increasing shade from riparian areas through tree planting, protection and enhancement of wetlands, as well as increases in streamflow from regulation. Turbidity and nutrient loads in streams may be held to a minimum through efforts toward reducing erosion and excessive nutrient inputs from upland areas. Other water quality issues such as excessive algae, pH and dissolved oxygen are interrelated to nutrient loads and stream temperature.

In many streams there is little to no large wood structures to provide adequate pools and gravel beds. Placement of large wood structures that develop pools and accumulate gravels will result in improvement of spawning and winter rearing habitat. The increased spawning beds can also increase dissolved oxygen levels. The introduction of harmful chemicals to the stream system can be reduced through resident education, and effective spill response program and an effective chemical disposal program. Contamination from fertilizers and pesticides can be further reduced by careful application, proper disposal, and the use of alternative control methods.

Highways, roads and other transportation routes run parallel to stream channels in many locations in the County. Road or railroad embankment slopes frequently comprise one or more banks of the streams, and the stream's tributaries commonly pass under the transportation routes in culverts. Where conditions permit, vegetation to provide shade and reduce potential erosion should be introduced on the embankments, and existing shade producing trees should be protected. In many cases the configuration of culvert installations has impaired or prevented passage of anadromous fish to upstream habitat in many tributaries.

2.B.2. Programs

Significant increases in restoration money have been spent in the Umpqua basin since 1999. According to the Oregon Plan for Salmon and Watersheds Biennial Report 2005-2007, between \$4 million and \$6.5 million (in 2005 dollars) was spent annually between 1999 and 2005 on restoration projects by all reporting agencies and groups in the basin (OWEB 2007). In the last two years reported (2004-2005) a total of over \$9 million was spent in the Umpqua Basin on 230 completed restoration projects. Almost 74 percent of the funding was from federal sources, 9.6 percent was from local/city/county sources, and 4.9 percent was from the State, including the Oregon Watershed Enhancement Board (OWEB). Most money (over \$5.6 million) went toward improving fish passage, followed by instream structure work (\$1.8 million) and road work (\$1.4 million). Continued funding support on the part of these agencies is essential, and the County should encourage and cooperate with these agencies to complete further projects.

Both the Bureau of Land Management (BLM) and US Forest Service (USFS) have active programs in watershed management and stream rehabilitation on lands within their management jurisdiction. In addition, technical and financial assistance programs for stewardship activities are available for use on non-federal land through a number of sources. Programs are administered by several different government agencies and departments including the BLM and USFS. Other grants administered by non-profit groups are also available to provide additional support.

The Natural Resource Conservation Service (NRCS) administers the Conservation Riparian Enhancement Program (CREP). The program provides technical and financial assistance to rural farmland owners to improve and maintain healthy riparian areas along many streams in the basin. CREP representatives work closely with the Oregon Department of Forestry to implement projects in forested areas.

On the State level, the Watershed Enhancement Program was initiated in 1987 to facilitate a broad range of activities through providing technical and financial assistance in project implementation. In 1998, Oregon voters approved a ballot measure that set aside 15 percent of all lottery revenues for restoring Oregon's salmon, watersheds, and state parks. Under the program, half of the funds are used to enhance watersheds and salmon habitat. The State agency is run by a board of directors known as the Oregon Watershed Enhancement Board (OWEB) to administer those funds.

Three Watershed Councils that operate within the basin and two Soil and Water Conservation Districts have received numerous grants from OWEB and many other sources on behalf of landowners in the basin. These groups help private landowners improve stream conditions on their property. The councils and districts frequently partner with Federal, State, and local agencies, private companies, and individual landowners to accomplish projects. Private landowners contribute time, money and/or equipment to projects that improve conditions within streams on their property. Projects include stream channel stabilization, fish habitat improvements, alleviating fish passage issues, enhancement of riparian areas for shade and future large wood supplies to

streams, wetland enhancement, education, noxious weed removals, monitoring, and watershed assessments.

The ODFW Salmon and Trout Enhancement Program (STEP) is directed toward projects for enhancement of aquatic habitat, although related features on riparian lands may be included. In 2006, the STEP program in the Umpqua basin completed 70 projects with assistance of volunteers that put in nearly 17,700 hours (ODFW 2007). STEP volunteer efforts range from educational projects and assistance with stocking of high lakes, to enhancing winter steelhead and fall chinook fisheries.

Douglas County's SHIP program, described in the Background section (Section 1.B), has provided financial assistance for projects designed to enhance riparian conditions as well as to make aquatic habitat improvements. Since the program began, at least 45 projects have been completed with over \$422,000 invested.

Periodically, changes in the use or further development of privately owned riparian lands will be proposed to the County Planning Commission. Criteria for approval should include protection of water quality through prevention of erosion and through protection, preservation and/or enhancement of riparian vegetation. Requirements to achieve these ends should be included in approval conditions. The NRD should work with the Planning Department on the criteria to meet these objectives.

2.B.3. TMDL Implementation

Douglas County and six other agencies are identified as “designated management agencies” for implementation of the Total Maximum Daily Load (TMDL) assessment for the Umpqua Basin, which was completed by ODEQ in 2007. Designated management agencies are recognized by the State of Oregon as having legal authority to ensure that targets identified in the TMDL are met. The County has authority for regulating the TMDL on rural and urban/non-resource land in the County. Land uses on these areas include the following:

- all non-agricultural, non-forestry-related land uses including transportation uses (road, bridge, and ditch maintenance and construction practices)
- designing and siting of housing/home, commercial, and industrial sites in urban and rural areas
- golf courses and parks
- operation of Galesville Dam/Reservoir and Berry Creek Dam/Ben Irving Reservoir
- riparian protection
- other land uses as applicable to the TMDL

An implementation plan for the TMDL will be created. The information from the implementation plan will assist in review of corrective work being funded by the County and various agencies, as well as with activities under the Stream Habitat Improvement Program, the Salmon and Trout Enhancement Program, and other related programs.

2.B.4. Likelihood of Project Approval

As public perceptions on environmental issues develop, there appears to be a trend toward opposing land-use projects perceived as “unnatural.” As a result, obtaining the necessary permitting may result in exorbitant expenses and significantly extended timelines.

2.C. Storage Element

Water resources issues within the County are identified in Volume II by sub-basin. There are inadequate flows in nearly all streams during the low-flow season to meet current needs for out-of-stream and instream uses. Increases in potential water use resulting from future population growth and/or diversification of cropland and industry can only be fully met from stored water sources. Water quality issues represented by high water temperatures during summer are exacerbated by low streamflows. Some improvement of high stream temperatures may be accomplished by augmentation of flows from releases of stored water.

One of the products of policy investigations by the Oregon Water Resources Department, in the early 1970's, was an inventory of potential storage sites. The inventory included 105 sites, identified by numerous Federal and other agencies during investigations within Douglas County over the years (1989 Douglas County Water Resources Management Plan). The sites were screened over time as more site specific information became available, to identify those most favorable for further evaluation. The Soil Conservation Service (now known as the Natural Resources Conservation Service), Oregon Department of Water Resources, NRD and engineering firms retained by the County participated in the evaluations of the sites.

At present, eight storage sites remain as the most favorable to develop. These sites are subject to further, more specific evaluation. The eight sites are listed in Table 2.C-1 with their estimated storage at normal pool, and their locations are shown on the map in Figure 3.C.1.

Site name	Tributary to	Storage at normal pool (acre-feet)
Milltown Hill ¹	Umpqua River	25,000
Bachelor Creek	Oldham Creek	9,600
Gassy Creek	Calapooya Creek	9,200
South Fork Deer Creek ²	South Fork Deer Creek	10,000
North Myrtle Creek	Myrtle Creek	10,000
Weaver Creek	South Myrtle Creek	5,700
May Creek	Days Creek	16,000
Lower Elk Creek	South Umpqua River	36,000
¹ Located on Elk Creek.		
² Located on Middle Fork South Fork Deer Creek		
Source: Douglas County Comprehensive Plan, 2006.		

Table 2.C-1: Impoundment sites most favorable for development in Douglas County.

Updates of the environmental reports for the Milltown Hill Project were recently suspended by the County in 2008 due to project construction costs and lack of funding sources. Discussions of this project and additional potential impoundments in the Elk Creek sub-basin are included in the Future Work Plan Section (3.C).

The screening guidelines used to select the sites listed in Table 2.C-1 are the same as those that will be used in making final decisions regarding project implementation. These guidelines are described in the following sections.

2.C.1. Dam Safety

Dam safety is the overriding consideration in site selection. Douglas County will not select sites with doubtful structural integrity. During project planning, formulation, design, construction and operation, geologic and related investigations and evaluations will be made as needed to ensure that all structures are safe and will remain so during each project's life.

2.C.2. Minimal Impacts

Preference will be given to sites where development will result in the least adverse impacts. Specific impacts to be considered include effects on wildlife and aquatic habitat, scenic and aesthetic conditions, archeological resources, and effects on residents within the project area.

The effects on project area residents are considered from two primary impacts. First, preference will be given to sites with the fewest residents that would require relocation to provide adequate area for construction of the project. Second, during the usually substantial time period required for site selection and detailed project planning, residents within a project area may be hampered in implementing their own personal decisions. For example, if a resident had a need or desire to sell real estate holdings in the project area, the probability that the parcel would be subject to subsequent acquisition if the site were selected, could forestall the willingness of potential buyers to make commitments. Thus the County must have procedures to identify needed rights-of-way and to allow for property acquisition as soon as possible upon selection of the site.

2.C.3. Location

Preference will be given to sites in upper watershed areas, provided hydrologic conditions are adequate to achieve efficient use of the site. Galesville Reservoir is located about sixty stream miles above the mouth of Cow Creek. The majority of the project's service area is near the mouth of Cow Creek and along the South Umpqua River. Releases made from the project for use in the service area remain in Cow Creek for nearly its entire length providing improved instream conditions. Selection of alternative sites at downstream locations would have improved instream conditions for far fewer miles of stream. Potential sites located further upstream from Galesville were

less desirable due to either watershed outflow or site configuration, and would have resulted in less stored water for meeting needs in the sub-basins.

2.C.4. Project Functions

In review and selection of sites, Douglas County will consider the capability of a site to regulate runoff for meeting primary functions including instream, municipal, industrial, and irrigation needs. Once a site is selected on that basis, the site will be evaluated with regard to secondary uses including:

- reducing flood damage in downstream reaches
- producing hydroelectric energy for meeting primary needs
- providing facilities for water-based recreational use of the reservoir

2.C.5. Financial Concerns

Finally, preference will be given to the site with the most favorable financial conditions. The costs of an alternative must be within the County's ability to finance the project. Financial evaluations will pertain to the costs of construction, operation, maintenance, and repayment of any loans or other financial obligations incurred to finance construction.

In some financing programs, such as that formerly obtainable through the USBR Small Reclamation Project program, project costs associated with selected project functions (not construction) are grant eligible. However, the loan amounts are only for that portion of costs excluding those covered by grants. Therefore, in a case where the total construction costs of one project are lower than for a second, where both have equal potential for meeting needs, preference would be given to the second site, should the amount of loan be less due to grants obtained for non-construction costs.

3. Future Work Plan

Material in this report updates that found in the 1989 Douglas County Water Resources Management Program. Since 1989 the Galesville and Berry Creek projects have been successfully operated, providing water for supplementation of existing unreliable water rights and for new water rights for both instream and out-of-stream uses. Operation of Galesville has increased flows on Cow Creek during the summer and improved stream temperature conditions. Berry Creek has done the same for Olalla Creek and to a lesser extent on the lower portion of Lookingglass Creek. Both projects contribute to instream aquatic habitat needs by providing flows to help meet the minimum instream requirements on these streams as well as on the South Umpqua River. These increased flows also contribute to improving water quality in these systems. Studies to document these improvements are planned in the near future.

NRD is currently reviewing the effects on aquatic life in Cow Creek from operation of the Galesville Dam in order to provide statistical results of impacts. This information will become necessary in the review for relicensing of the project in 2034.

The following section contains descriptions of the actions recommended in the foreseeable future by the Douglas County NRD.

3.A. Resources Management Element

3.A.1. Streamflow Data Collection and Flood Warning

To maintain the current capability of flood forecasting, NRD and the National Weather Service should continue to monitor all existing precipitation and streamflow gages. These gages are an important source of information for immediate flood forecasting as well as long-term assessment of basin climate and streamflow conditions. If money were available, equipping additional gages with telemetering devices could allow for "real time" calculation of flooding probabilities for sub-basins where only manual data collection gages now exist.

3.A.2. Specific Studies and Technical Input

The needs of NRD for competent technical staff are apparent from previous discussions of ongoing activities. NRD relies upon ODFW staff for advice and guidance on fishery related aspects of the County's program. This brief outline of work planned for the future indicates the continued need for professional assistance in aquatic biology and water quality planning.

Expansion of the County workforce is not a financial option. Continuing a cooperative relationship with ODFW is necessary to the program. In addition, assistance from Partnership for the Umpqua Rivers Watershed Council may be sought to help in water quality assessment and monitoring of specific stream segments and projects.

Incorporating professional technical input is needed to help with decision-making on projects regarding anadromous fish habitat conditions that result from operation of existing projects, to participate in formulation of additional storage projects, and to assist in definition, planning and construction of SHIP and other aquatic habitat improvement projects. This expertise is essential in the design of projects to alleviate fish passage barriers occurring at many highway cross-drainage structures.

Additional cooperation with other agencies such as the BLM, USFS, watershed councils, water conservation districts, as well as ODFW may help the County with necessary technical input, water quality monitoring, and may help facilitate financial assistance in accomplishing projects.

3.B. Stewardship Element

A primary means of improving conservation of water resources is through education of individual water users. According to the OWRD, "increased conservation is an integral part of meeting the water supply needs of the future.." The State is proposing \$100,000 to support this effort as part of the Oregon Water Supply and Conservation Initiative

(OWSCI). The initiative was recently approved by the 2007 Oregon Legislature. Educational sources of information on water resources conservation are available to landowners from the Natural Resources Conservation District, the OSU Agricultural Extension Service, the Douglas Soil and Water Conservation District, and the Oregon Water Resources Department (OWRD). The County will encourage and participate in any sponsored water conservation publications or seminars sponsored by these agencies to encourage conservation of water resources.

Watershed and stream enhancement projects that may be considered in the next several years include participation in any preconstruction environmental analysis for potential storage sites, completion of instream and riparian enhancement downstream of Galesville Reservoir; and continued stream enhancement work within Mildred Kanipe Park. Other possible areas for enhancement of County-owned riparian lands are described in Volume II by sub-basin (Enhancement Opportunities sections).

The Umpqua Basin TMDL identifies streams with significant non-point source issues (ODEQ 2007). An implementation plan will be prepared to ensure that targets identified in the TMDL are met. The County has authority for regulating the TMDL on rural and urban/non-resource land in the County including land uses listed under TMDL Implementation (Section 2.B.2). The information from the implementation plan would assist in review of corrective work being funded by the County and various agencies, as well as with activities under the Stream Habitat Improvement Program, the Salmon and Trout Enhancement Program, and other related programs.

The Umpqua Basin Action Plan (Barnes & Associates 2007) is a compilation of recommended actions from watershed assessments done throughout the basin. It summarizes the current actions that can be taken on specific streams to improve fish habitat and water quality issues. The County can use this information along with the TMDL to prioritize potential enhancement projects within the basin.

The Umpqua Basin Fish Access Team (UBFAT) has completed fish passage surveys on many sub-basins within the County.⁸ The UBFAT inventory, along with the Action Plan identify fish passage barriers that are significant in restricting anadromous fish from additional habitat including those on County property and County-maintained roads. The County will integrate elimination of fish passage barriers on County-maintained roads into the road maintenance schedule as funding allows, targeting those fish passage barriers of highest priority that are currently listed under Enhancement Opportunities by sub-basin in Volume II.

Coordination with the Douglas Soil and Water Conservation District (DSWCD) for the most up-to-date culvert inventories in the UBFAT effort will provide additional opportunities. Working in cooperation with DSWCD and the watershed councils in the basin can help facilitate additional funding for these efforts. Additionally, the County

⁸ The Umpqua Basin Fish Access Team (UBFAT) inventory is implemented and the data managed by the Douglas Soil and Water Conservation District.

will encourage and assist individuals and groups in implementation of other projects as opportunities are proposed, to the extent that County funds are available.

3.C. Storage Element

Water Needs by Use

The assessment of future water use in Volume II includes projected estimates for municipal, industrial, and irrigation uses. The determination of municipal use is based on projections of growth in the different municipal water system areas and actual water use by those water districts. Industrial use is based on current projections of future industrial development in each sub-basin. These projected water uses are a best estimate of future water needs in each sub-basin by use through the year 2050.

The irrigation water use projections are based on the full potential of irrigation on lands within the sub-basins. Most of the lands considered for irrigation are remote rural lands that are unlikely to be used for other types of industrial, recreational, or tourist development to produce income to the landowners in the foreseeable future. Thus agriculture is their most likely use. However, it is unlikely that all of the potential irrigation land will be fully developed into intensive agricultural land due to the cost of accessing water, pumping and purchasing water, easements that may be required, and lack of interest by many landowners to further develop this option.

Many landowners in recent years have purchased rural property for a “ranchette” style of living. Many are retired or have another form of primary income. Some cannot afford to further intensively develop their property agriculturally. Thus obtaining a minimal agricultural crop to reduce the tax burdens of their property and help manage the vegetation is the extent of their intended development. This is evidenced by the available water in Galesville and Ben Irving reservoirs that has not yet been purchased, even though there is considerable irrigable land that could access water stored in these reservoirs.

For these reasons, the amount of future water projected for irrigation use in each sub-basin is considered a maximum capacity of use existing at this time. There are certainly current water needs for irrigation in many sub-basins where additional available water would be purchased. Quantifying this need verses the total capacity is difficult and changing. Portions of potential irrigation land within sub-basins where existing irrigation water rights are not always currently met such as in Elk Creek, Calapooya Creek, Deer Creek, and the Umpqua River sub-basins, are areas where irrigation water is needed to facilitate current and projected further agricultural development. These are most likely on land that is of the highest productivity and nearest the streams where available water could be obtained without expensive pumping systems across numerous ownerships. A detailed mapping of good, suitable irrigation land that would benefit from the planned impoundments, as well as irrigation use surveys of landowners, would be done prior to final determination of project plans.

South County Overview

Completion of the Berry Creek and Galesville projects has alleviated some of the water shortages in the Lookingglass Creek, South Umpqua River, and Cow Creek sub-basins, although future potential water uses are not likely to be fully met in these areas. The amount of water required to irrigate the total potential irrigation land in these sub-basins exceeds the remaining storage in these reservoirs. In addition, some potential irrigation land in these sub-basins cannot be accessed by the existing storage water due to the distance from the streams and topography of the area.

Municipal and industrial water use projections in South County should be fully met by these existing reservoirs, but only a small percentage of irrigation potential shall be met. In addition to flood mitigation, aquatic life, and water quality needs, the Deer Creek sub-basin will have substantial unmet future irrigation capacity without storage development.

North County Overview

North County has and will continue to have shortages in meeting irrigation capacity along the Umpqua River above Elkton, and in the Sutherlin Creek, Elk Creek and Calapooya Creek sub-basins. Yoncalla will also have difficulty meeting municipal needs in the Elk Creek sub-basin.

Central County Overview

The North Umpqua River is unable to provide reliable municipal water supplies to meet the future needs of Sutherlin, Roseburg and the surrounding areas. These same areas will not have water available for industrial development with the exception of the lower Umpqua River. Seasonal shortages exist in nearly all sub-basins.

Summary of Future Use

Table 3.C-1 lists the estimated amount of future consumptive water use capacity for irrigation and projected municipal and industrial water needs in acre-feet by type of use for each sub-basin through the year 2050. The information is assessed in the Water Resources Management Program Assessment (Volume II) by sub-basin. It is important to note that some of these demands may already be met through unregulated streamflow in many years. However, streamflow is not adequate to meet existing water rights 80 percent of the time. Thus, there are no new available water rights during some portion of the year on any streams in the basin. There may be some water available on specific streams during higher flow months that may be used. However, the bulk of the needs for irrigation occur during these low streamflow months.

Sub-basin area	Irrigation	Municipal	Industrial	Total
North County				
Lower Umpqua	0	0	0	0
Smith River	107	0	0	0
Umpqua R (Scottsburg to Elk Cr)	7,194	0	0	7,194
Umpqua R (Elk Cr to confluence)	8,820	0	0	8,820
Elk Creek	13,493	212	150	13,855
Calapooya Creek	5,109	0	150	5,259
subtotal North County	34,723	212	300	35,128
Central County				
North Umpqua	0	1,400	150	1,550
Sutherlin Creek	4,797	215	0	5,012
subtotal Central County	4,797	1,615	150	6,562
South County				
South Umpqua River	15,621	510	900	15,621 ¹
Cow Creek	7,549	0	150	7,549 ¹
Deer Creek	6,266	0	0	6,266
Lookingglass Creek	23,448	0	0	23,448
South Myrtle Creek	295	0	0	295
Days Creek	910	0	0	910
Camas Valley	2,337			
subtotal South County	56,426	510	1,050	56,426 ¹
¹ Irrigation only since municipal and industrial may be met by purchase of existing storage at Galesville or Ben Irving Reservoir.				

Table 3.C-1: Estimates of additional water use capacity for irrigation and needs for municipal and industrial uses in acre-feet through 2050.

All of the municipal and industrial estimated needs through 2050 in the South County area should be met with available water from either Galesville or Ben Irving reservoirs. In addition, existing irrigation rights in these sub-basins are assumed to be fully met by supplementation from these reservoirs or other sources. There is also water available in each reservoir for new irrigation. However, the amounts available are small compared to the potential irrigation development. Table 3.C-2 lists the acre-feet available in each reservoir as of October 2007 and the additional potential irrigation use in each area that could be supplied with water from these existing storage facilities.

Sub-basin area	Total need	Accessible by	
		Galesville	Ben Irving
Acre-feet available for irrigation		7,945	5,410
South Umpqua River	15,621	15,621	8,894
Cow Creek	7,549	7,549	0
Lookingglass Creek	23,448	0	11,724
Umpqua R (Scottsburg to Elk Cr)	7,194	7,194	7,194
Umpqua R (Elk Cr to confluence)	8,820	8,820	8,820
Other South Umpqua tributaries	7,471	0	0

Table 3.C-2: Future potential irrigation water use (acre-feet) in South County that may partially be met by existing storage.

These projected potential water demands can only be met by development of reservoir storage. Storage alternatives to address the most significant shortages in the Elk Creek, Calapooya Creek, Deer Creek, and South Umpqua River sub-basins are described in the following sections. Figure 3.C.1 shows the alternative storage site locations proposed within the basin as well as the existing impoundments. Available water from these impoundments may also help alleviate some future shortages in the upper Umpqua River and North Umpqua River sub-basins.

Several other potential impoundment sites including Bachelor Creek, North Myrtle Creek, Weaver Creek and May Creek are also shown on the map in Figure 3.C.1. These sites were within the final eight sites of the inventoried 105 sites in the County that are currently the most viable for project consideration. These sites may be incorporated into project planning in the event the proposed projects discussed here are not able to be developed or if additional water needs in the future determine these sites should be considered further.

Schedules outlined for project implementation are dependent on available funding from Federal, State, and County funding sources.

The recent listing of coho salmon as threatened on the Endangered Species List in February 2008 will increase project costs and complexity significantly on nearly all projects. Fish passage on storage projects may have to be explored in order to proceed. Smaller storage projects in upper drainage areas above coho habitat areas may need to be explored further if fish mitigation continues to present cost barriers to these projects.

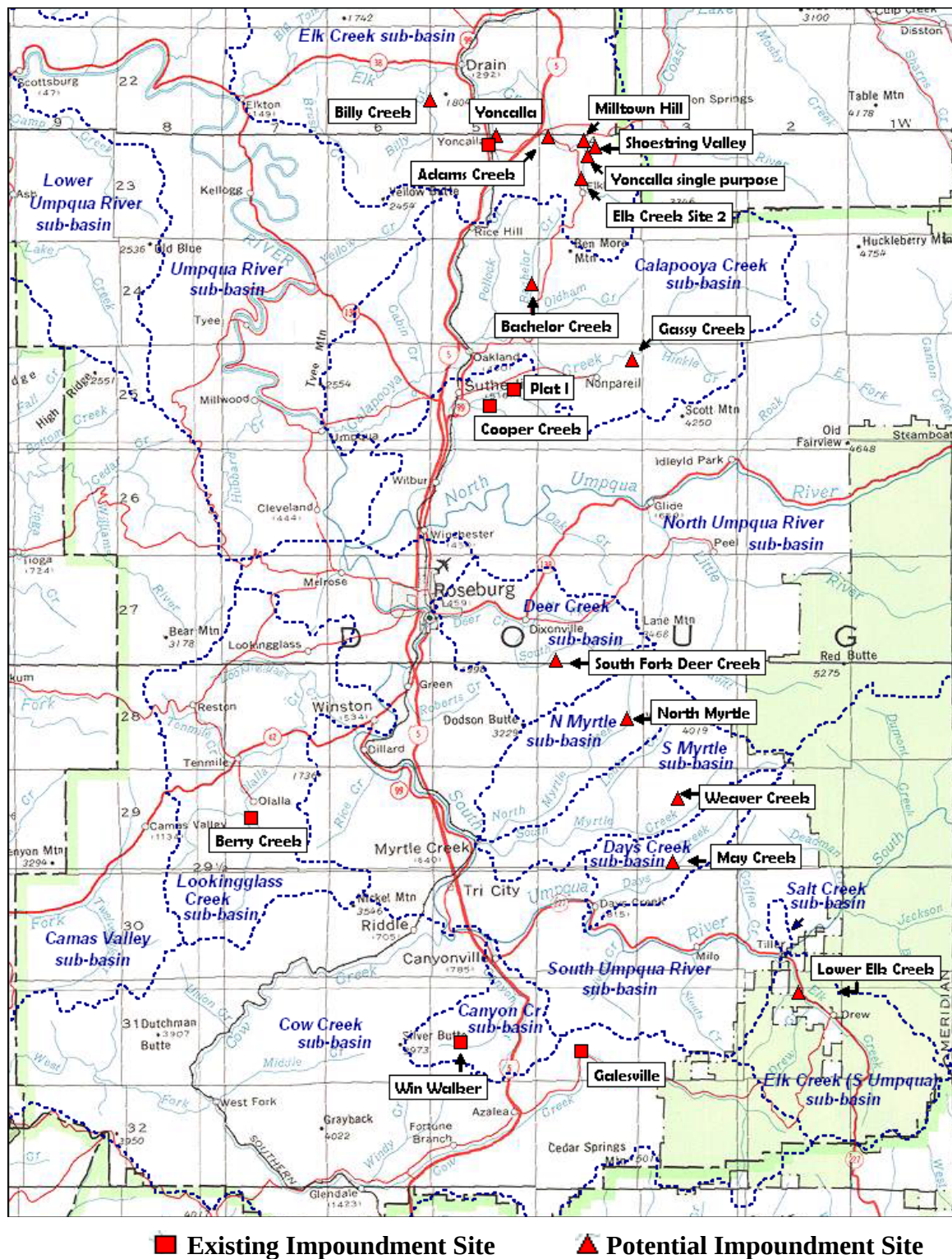


Figure 3.C.1: Locations of potential and existing impoundment sites in the County.

Elk Creek Sub-basin (tributary to Umpqua River)

The total future needs in the Elk Creek sub-basin are estimated to be 13,855 acre-feet. Irrigation comprises 13,493 acre-feet of that need, while 212 acre-feet are for Yoncalla municipal use and 150 for industrial uses. At least 14 potential impoundment sites have been considered in the Elk Creek sub-basin. The following are sites that are no longer viable for consideration due to inadequate geologic and/or safety conditions, and in some cases reservoirs would have flooded the areas intended to irrigate and caused rerouting of Interstate-5. These are considered unacceptable consequences that would not meet the needs of the sub-basin.

- Wise Creek
- Drain (McClintock)
- Scotts Valley (Elk Creek)
- Elk Creek site 6, site 8, site 10, site 14, site 16

Elk Creek site 4 was eliminated due to inadequate water storage capacity. While this site could be revisited, its location is just up from the Milltown Hill project and would likely face the same issues, while providing much less potential capacity. Therefore, it is also eliminated from further consideration.

In addition, inter-basin transfer of water and groundwater pumping were also both considered. These options were ruled out due to inadequate water supplies, institutional constraints, and high pumping costs.

The remaining sites are considered options for further consideration in meeting some or all of the water needs of the Elk Creek sub-basin. Detailed locations of these sites are shown on the following map and descriptions of each are outlined in the following sections.

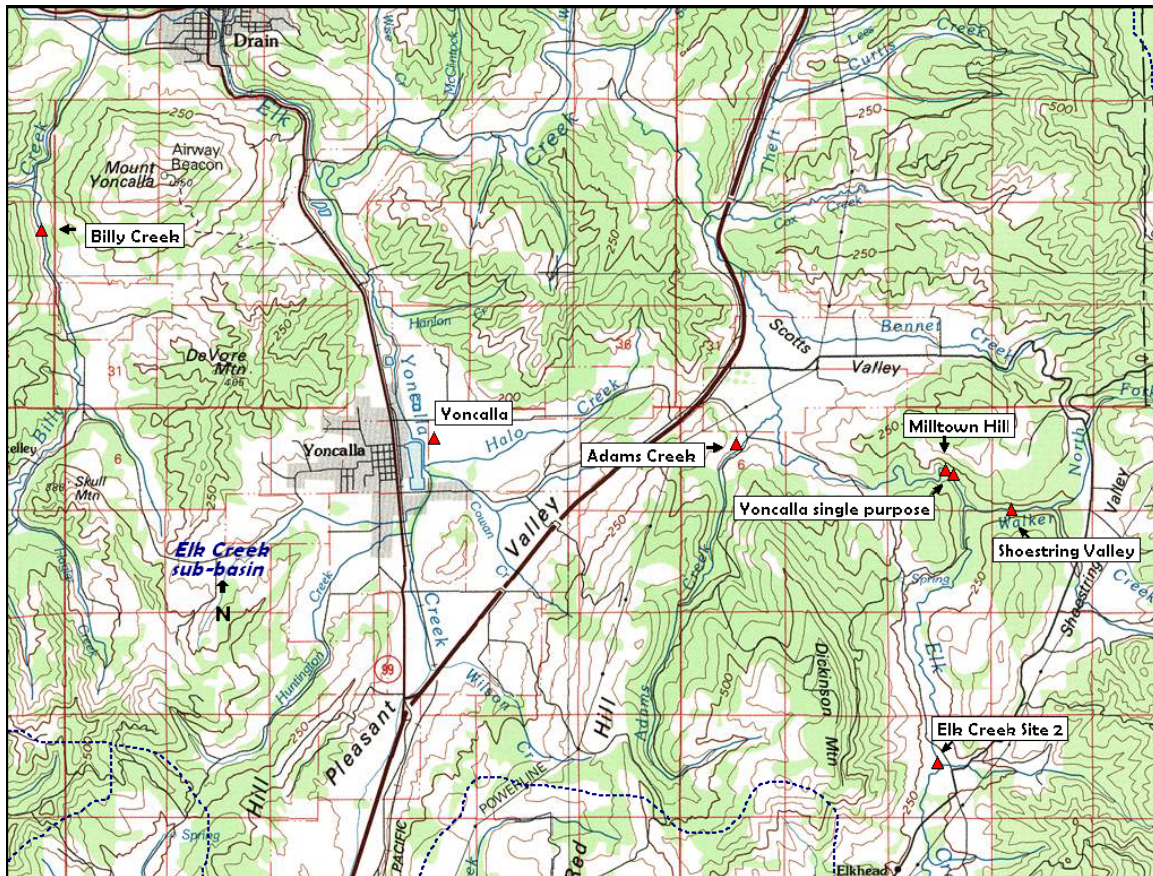


Figure 3.C.2: Elk Creek (tributary to the Umpqua River) sub-basin potential future impoundment sites.

Milltown Hill Project (T23S R4W S04)

The Milltown Hill project is considered by the County as the most desirable project in the sub-basin for meeting all of the water needs into the foreseeable future. The County has expended considerable time and money to develop the Milltown Hill project located on Elk Creek in the Elk Creek sub-basin. Further work on the project was recently suspended by the County in the spring of 2008. The Milltown Hill dam was intended to impound about 25,000 acre-feet of water to provide for irrigation of lands in Scotts and Yoncalla valleys and along Elk Creek to its mouth; for municipal and industrial needs in the cities of Yoncalla and Drain; and for augmentation of flows in Elk Creek to improve aquatic habitat. The operation was also intended to reduce flooding in Elk Creek, and provide recreational uses. The project would fully meet the needs in the sub-basin.

The history of the project is outlined in the following:

1. The County made the decision to pursue the project in 1990 and a Final Environmental Impact Statement (FEIS) was completed in 1992. A loan was approved from the U.S. Bureau of Reclamation for the project in 1994. In 1996, the Umpqua River cutthroat trout was listed as a threatened species. The project

was then dropped due to the requirement at the time to provide fish passage facilities that would have been an excessive cost the County could not endure.

2. The State of Oregon later passed legislation that allows for the waiver of fish passage facilities under certain circumstances. As a result, the County elected to reconsider the project in 1997 when discussions were reinitiated between local, State, and Federal agencies. The County ultimately decided to suspend the project once again because of anticipated high costs associated with fish mitigation primarily for cutthroat trout still listed as threatened under the Endangered Species Act. The mitigation would be required to offset impacts by not providing fish passage facilities.
3. Umpqua cutthroat trout were subsequently de-listed in 2000, resulting in the County once again considering the project. The County believed that it could now provide adequate mitigation to offset impacts for a waiver of fish passage facilities due to the de-listing of cutthroat. Due to the length of time since the 1992 FEIS, a supplemental EIS was initiated in 2005.
4. The requirements and thus costs of the environmental analyses efforts have increased substantially since the project's inception. In addition, the Bureau of Reclamation notified the County that it is not likely to receive any financial assistance from the Bureau at this time for construction of the project due to federal budget limitations. The current financial situation in Douglas County, combined with the elevated costs of the project, and the unlikely Federal financial assistance, has once again resulted in the County suspending the project in 2008.⁹ Compounding the difficulties in moving forward with the project, the National Oceanic and Atmospheric Administration (NOAA) Fisheries announced in February of 2008 the listing of Oregon coastal coho as a threatened species under the Endangered Species Act. Coho are present in Elk Creek and would greatly affect the requirements of this project.

It is conceivable that this project could be reconsidered at a future date, although the foreseeable future does not favor moving forward with the project. Due to the suspension of work on the Milltown Hill project, the following sites are outlined below as possible impoundment locations to review, although the Milltown Hill project may still be the most viable site for future consideration when financial conditions can be met.

City of Yoncalla (T23S R5W S03)

With the recent suspension of the Milltown Hill Project by the County, the City of Yoncalla has begun assessments of other alternatives to meet future municipal demand. The City has rights that currently meet demand in most years. However, future projections show an anticipated shortage of 91 acre-feet annually and potentially 212 acre-feet during exceptionally dry years.

⁹ Douglas County receives over \$52 million annually from the Secure Rural Schools and Self-Determination Act. This legislation recently expired and has not been reenacted as of the date of this document. Loss of these funds will cause a major financial burden to Douglas County.

In addition, residents living just outside the City limits are experiencing inadequate ground water supplies to meet their domestic needs. Certain residents have shown some interest in being included within the City's municipal water system, but are concerned about the cost of services.

The County has begun active involvement in these discussions to find solutions to additional storage for municipal use. The City of Yoncalla has purchased land just northeast of its existing reservoir. The location will be evaluated for potential reservoir development to meet the needs of Yoncalla.

Alternative Storage Sites¹⁰

Numerous investigations for potential storage sites in the Elk Creek sub-basin have been explored (Bureau of Reclamation 1956a, 1956b, 1966; Clair Hill and Associates 1968, 1969, 1971; International Engineering 1978, 1980). The Milltown Hill Project was pursued because it best met all water needs of the area. Other sites that may be reevaluated are listed below with a description and summary of why they were not considered further at the time. Some projects did not fulfill the full water needs of the area and thus were dropped from consideration. The recent interest in developing smaller storage projects and the inability to currently develop the Milltown Hill Project may result in reevaluation of these projects.

Adams Creek (T23S R4W S06)

The potential site is located on Adams Creek approximately 0.5 miles upstream from the confluence with Elk Creek. Potential dam sites that would store 1,500, 3,500, or 6,800 acre-feet were assessed. However, due to the geologic conditions of the area, the dam is estimated to support only 2,000 acre-feet. The City of Yoncalla currently has a water right of 1.5 cfs from Adams Creek that is pumped over to Wilson Creek where it flows into a storage reservoir. Additional water could be pumped from this site on Adams Creek. The new storage would meet the municipal and industrial needs of Yoncalla and some irrigation needs in Scotts Valley or Yoncalla Valley. However, the capacity would not satisfy the potential irrigation needs in the upper Elk Creek sub-basin, and the cost per acre-foot would be high due to the low storage volume. Coho salmon and winter steelhead are believed to use the lower portion of Adams Creek only.

Shoestring Valley (T23S R4W S03, 10)

Located on Walker Creek approximately 0.5 miles from its confluence with Elk Creek, the site has an estimated capacity of 12,500 acre-feet. The project would require an 80 foot dam structure. Construction of a larger reservoir is cost prohibitive due to the physical formation of the area. Water from the reservoir could be used in Scotts and Yoncalla valleys and downstream along Elk Creek. Coho salmon and winter steelhead are not believed to use Walker Creek. This site would meet 90 percent of the estimated future water needs for the Elk Creek sub-basin through 2050.

¹⁰ Additional site evaluation information is from the Milltown Hill Project Final Environmental Impact Statement in 1992 (U.S. Department of Interior 1992).

Billy Creek (T22S R6W S25)

The site is located on Billy Creek approximately 0.5 miles upstream of the confluence with Bear Creek. The potential capacity is estimated at 28,000 acre-feet. Analysis of the project showed pumping costs would be too high to provide water to the Scotts and Yoncalla valleys. This site would only be considered in the future if the need for water outweighed the pumping costs. In addition, fish passage for coho salmon and winter steelhead may be necessary increasing costs of the project.

Yoncalla Single Purpose (T23S R4W S04)

This site is located in the same area as the Milltown Hill Project. However, it would be a much smaller reservoir of only 5,350 acre-feet that would provide water for municipal and industrial uses in the Yoncalla and Rice Hill areas. The dam and footprint would be smaller, indicating the area affected would be less than Milltown Hill. However, the high costs of developing Milltown Hill, and the recent listing of coho salmon as a threatened species under the Endangered Species Act may also prove this site inadequate.

Elk Creek Site 2 (T23S R4W S21)

The site is located on Elk Creek at the upper end of where the Milltown Hill Project was identified near Elkhead. The site was previously dropped from consideration due to its inability to meet all future water needs. The site may be reconsidered to meet partial water needs in the future with a smaller footprint than the Milltown Hill Project. However, cost-benefits of the project and potential fish passage issues would have to be assessed before further consideration.

Summary

The most favorable immediate action in the County is to develop the City of Yoncalla's reservoir to meet municipal and industrial water needs of the City and potentially surrounding domestic users.

Following completion of the new Yoncalla reservoir to meet the City's immediate needs, the County may reconsider the Milltown Hill Project. Should that project be determined not attainable due to fish passage and high costs, consideration of the Shoestring Valley alternative may be the most favorable. The Shoestring Valley project is not expected to block anadromous fish passage and it has the potential to meet most water needs in the sub-basin.

Calapooya Creek Sub-basin

The Calapooya Creek sub-basin has an estimated 5,259 acre-feet of future water use capacity through 2050. Industrial needs are 150 acre-feet and the remaining 5,109 acre-feet is required to develop the full irrigation potential of the sub-basin. In addition, the City of Sutherlin has a future municipal need of 103 acre-feet that may be met by some of the proposed storage sites in the upper portions of the Calapooya Creek sub-basin. The Soil Conservation Service assessed the following nine possible storage sites in the sub-basin:

- Bachelor Creek
- Banks Creek
- Upper Coon Creek
- Gassy Creek
- Oldham Creek
- Pollock Creek
- Rock Quarry
- Williams Creek

Bachelor Creek and Gassy Creek are the two remaining sites for further consideration by the County with Gassy Creek being the most desirable after initial investigations for meeting water needs.

Gassy Creek Project (T25S R4W S12)

The Gassy Creek site was determined to be the best probable site to meet the potential future needs of the sub-basin. The County has plans to pursue development of the site in the future when funding becomes available.

Gassy Creek is a tributary to Calapooya Creek located about 12 stream miles above Oakland and about 11 miles from Sutherlin. Preliminary studies show the Gassy Creek site could impound approximately 9,200 to 12,000 acre-feet. Water will be used to meet the needs for future municipal and industrial supplies in and around Sutherlin and Oakland. Recreational facilities will also be included and some irrigation needs may be met along Calapooya Creek. Some limited irrigation needs may also be met along the Umpqua River between Calapooya Creek and Elk Creek.

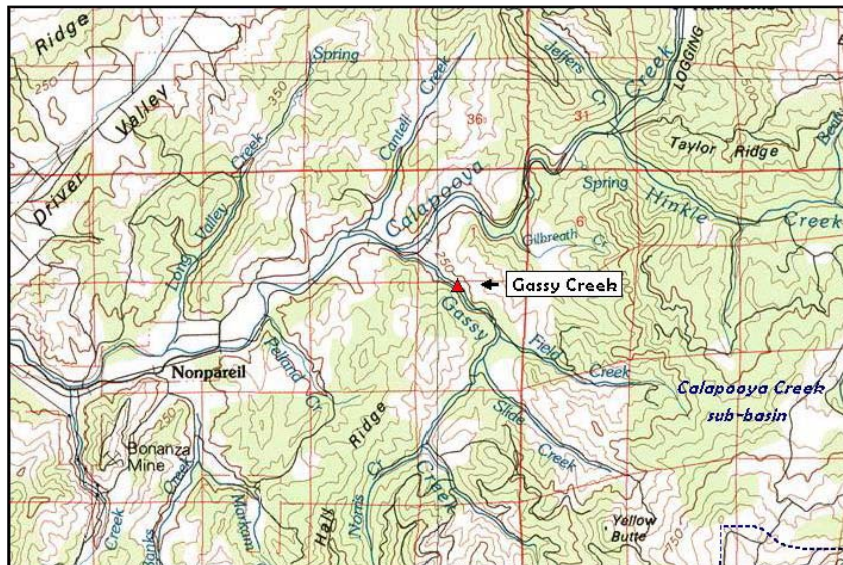


Figure 3.C.3: Calapooya Creek sub-basin potential future impoundment site.

Deer Creek Sub-basin

South Fork Deer Creek Project (T28S R4W S06)

The South Fork Deer Creek project is located on the Middle Fork of the South Fork Deer Creek, southeast of Roseburg.

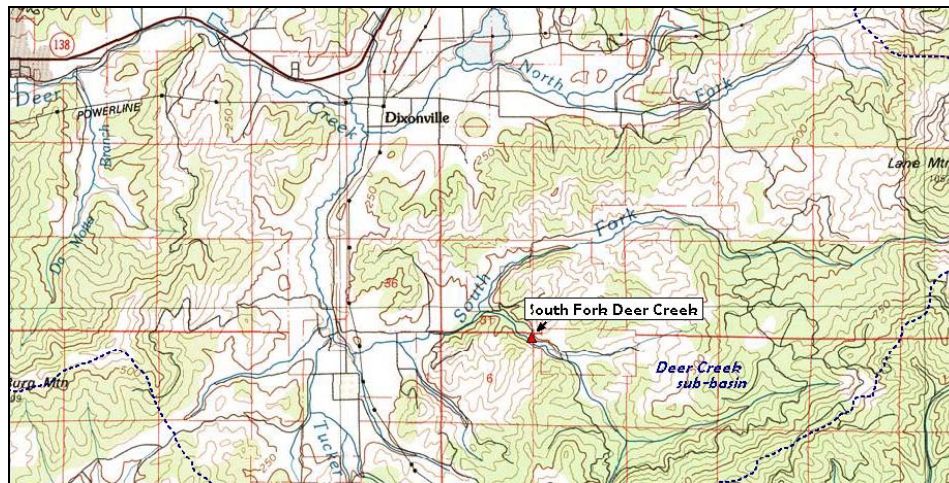


Figure 3.C.4: Deer Creek sub-basin potential future impoundment site.

There is an estimated future use capacity of 6,266 acre-feet to fully develop the irrigation potential of the Deer Creek sub-basin. In addition, flooding, poor water quality, and lack of available water for instream flows to meet aquatic life needs are also issues in the sub-basin.

Preliminary studies show a reservoir of approximately 12,000 acre-feet will meet all future irrigation, municipal and aquatic life water uses through 2050. Recreation facilities will also be included. Municipal and industrial use supplied to the City of Roseburg and surrounding areas would help alleviate shortages from the North Umpqua River sub-basin. Some irrigation needs on the lower South Umpqua River and upper Umpqua River may also be met if extra water were available from the project. Construction of this project is dependent upon the availability of funding.

Elk Creek (tributary to South Umpqua River) Sub-basin

Lower Elk Creek Project (T31S R2W S10)

The project site is on Elk Creek, a tributary to the South Umpqua River near Tiller. The proposed reservoir is expected to store 40,000 acre-feet. The intended uses for the project are instream flows for aquatic life and water quality improvement, irrigation, municipal and industrial water supply, flood control, recreation, and hydroelectric power.

Although there are no consumptive use needs identified in the sub-basin, storage would be used further downriver along the South Umpqua. Water would be available to meet some of the 15,621 acre-feet estimated for future irrigation development along the South Umpqua River.

No funding source has been identified for construction of this project.

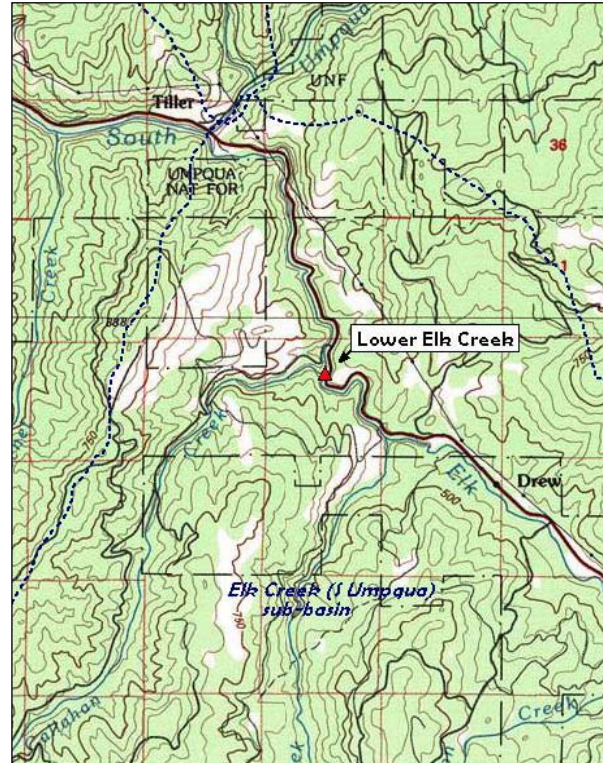


Figure 3.C.5: Elk Creek (tributary to the S. Umpqua River) sub-basin potential future impoundment

Future Considerations

When these storage facilities listed above are developed, most of the future water use capacity through 2050 should be met. A few exceptions are those irrigation lands located in the Lookingglass Creek sub-basin that do not have access to water from Ben Irving Reservoir or the South Umpqua River and in the Cow Creek sub-basin where access to Cow Creek is limited. In addition, the available capacity of Ben Irving Reservoir is not sufficient to meet the full irrigation capacity in the Lookingglass sub-basin. Potential smaller developments in the Tenmile area and West Fork Cow Creek may be considered in the future to meet these uses.

Not all irrigation land in the Sutherlin Creek sub-basin would be able to access water from the Gassy Creek impoundment. Additional surveys in the Sutherlin Creek sub-basin may be warranted if water from the existing Plat I, Cooper Creek, and future Gassy Creek sites is not adequate to meet these irrigation needs.

Groundwater Considerations

The Oregon Water Supply Conservation Initiative (OWSCI) described in the Introduction has been approved by the legislature and is in the beginning of implementation by the Oregon Water Resources Department. In addition to assessing water needs, and surface water inventories of possible storage facilities throughout the State, a portion of the initiative will inventory ground reservoirs of varying sizes and below ground sites such as artificial recharge (AR) and aquifer storage recovery (ASR) projects (Envirotech Publications, Inc. 2007). These ground reservoir systems are not feasible in Douglas County due to the geology of the area. The County is dominated by marine sedimentary rocks which do not hold or transmit much groundwater.¹¹

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¹¹ Personal communication 3/24/08, Dave Williams, Watermaster for Douglas County, Oregon Water Resources Department.

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