Appendix F – Fisheries

Table of Contents

List of Tables

List of Figures

1. Fisheries

Fisheries of the Umpqua Basin include anadromous and resident salmonids, other anadromous species such as Pacific lamprey, warm-water species, estuary, and other native non-game fish. Salmonid species tend to be the most sensitive to water quality issues such as temperature and dissolved oxygen, as well as stream habitat conditions. Therefore sampling and analyses often focus on these species. For these reasons, anadromous salmonid species including chinook and coho salmon, and steelhead trout are the primary species summarized in this review.

Fish of the Umpqua Basin are considered a resource that may be caught each year. Maintaining or enhancing fish numbers or distribution throughout the basin often competes with other basin-wide interests. Commercial interests dependent on fish resources include the offshore commercial fishery, fishing guides for sport fish in the ocean and within the basin, and the recreational fishery in the ocean, rivers, and many tributaries.

The ocean and rivers fisheries are highly regulated so that fish harvest does not exceed the ability of the resource to replenish itself. However, supplementation programs by the Oregon Department of Fish and Wildlife are necessary to maintain various species to the levels required to satisfy commercial and recreational interests and still provide for escapement needs. Escapement refers to the number of fish that are not caught by anglers or commercial boats, and either return to the spawning grounds to reproduce, or are collected by the ODFW for artificial spawning at hatcheries. It is important to emphasize that the failure to maintain adequate numbers of fish can, and has been detrimental to fish resources. It may result in decimation of the fisheries to the point that the population is lost forever.

Anadromous fish use the Umpqua Basin for a variety of life cycle needs. These include upstream and downstream passage, adult spawning, and juvenile rearing to the smolt stage. Fish migrate through the waterways to access spawning grounds or may be collected as broodstock for spawning at hatcheries. Rearing of young fish may occur for up to three years in the main river, tributaries, or the estuary. The fish then go through physiological changes to a smolt stage, making them ready for life in a salt-water environment. As this happens, they begin their migration downstream to the ocean. They usually spend 2 to 4 years in the ocean where they grow to adult stage before they begin their migration back to the Umpqua River for spawning.

2. Factors that Influence Fisheries

Factors affecting the abundance and distribution of fish include a multitude of conditions in the ocean such as temperature, food supply, fishing pressure, and predation. In addition, once adults reach the fresh-water stream system, conditions such as water quality, water quantity, and structural habitat are key factors. The interactions of these factors in the stream affect the abundance and distribution of the various life-stages of each species.

2.A. Water Quality

All water quality parameters are important to fish. Most are usually within tolerance ranges for survival and propagation of fish resources. Some parameters such as biochemical oxygen demand (BOD), water temperature, and sediment, are particularly important to the abundance and distribution of fish depending on species and basin characteristics.

Biochemical oxygen demand is an indication of the amount of organic matter in the water. Dissolved oxygen is required by microorganisms to decompose the organic matter. If the biochemical oxygen demand is high due to large amounts of organic matter, higher dissolved oxygen levels are required to decompose the material. If the dissolved oxygen used for decomposition is not replenished, then low dissolved oxygen levels in the water may adversely affect fish.

Water temperature affects the rate of growth and survival of fish. Anadromous salmonid species health may be in jeopardy when water temperatures exceed about 68°F, although warm-water species may thrive in these conditions. Removal of trees and shrubs that provide cover and shade to streams may result in higher water temperatures to sometimes lethal levels for anadromous fish. In addition, warm water below lethal limits can reduce salmonid health and vigor making them more susceptible to disease and less able to tolerate adverse conditions. Although warm-water fish may thrive in the higher water temperatures, the loss of cover may reduce hiding areas for both anadromous and warm-water fish.

Land use practices that cause increases in sediment to streams may have adverse affects on fish. Practices including road building along streams, riparian management, and in-stream work can increase sediment rates. Although all streams have sediment input, levels that exceed the tolerance of a species can be detrimental. Too much sediment can harm fish by clogging gills, covering spawning gravels, and filling pools. Adequate gravels must be present for spawning salmonids. These gravels should be rounded rather than angular, several inches deep, and not embedded or surrounded by silt.

Pool or backwater areas provide rearing and resting areas for juvenile fish during their stay in the streams and rivers. They also provide resting areas for adult salmonids moving up the river to spawn.

2.B. Water Quantity and Physical Habitat

Altered or insufficient streamflow may inhibit salmonid health and survival. Adequate streamflow may help alleviate water quality issues, and influence the physical habitat necessary for survival, reproduction, and growth of different species. Habitat is composed of healthy riparian conditions, complex instream structure, and fish passage.

Instream habitat is created by a combination of adequate water flow and structural features such as large wood, boulders, gravels and/or sinuosity that provide spawning beds, pools, and hiding cover, all essential for healthy fresh-water fisheries. Fish passage is imperative

for fish to move through the system to access habitat. Salmonids require sufficient water depth and velocity to pass through the river or stream to spawning grounds, as well as to meet other life stage needs. The volume of flow necessary to provide suitable depths and velocities varies with the size of the stream and to some extent with the species and the time of year. With insufficient flows, some culverts, side channels, or shallow stream segments may not function to pass fish or allow use of valuable habitat at the required time period; potentially cutting off additional upstream habitat.

Once at the spawning grounds, there must be adequate depth and velocity of water for spawning and incubation of eggs. After the eggs hatch, the small fish must have adequate flows for rearing for 2 to 3 years. Finally, there must be adequate flows for movement of smolts to downstream areas or to the ocean. All of these life cycle phenomena are slightly different for each species. Therefore many different life stages of different species overlap throughout the year with each month requiring a variety of conditions to meet the needs of different fish species for that time of year.

3. Enhancement Programs

Enhancement programs include actions by private companies, public groups, and public agencies with the objective to increase the abundance and distribution of desired fish species. These activities can be simple or complex depending on the level of expertise and goals of the project. The Umpqua Basin is comprised of both abundant public and private land, thus the enhancement activities are undertaken by a combination of these agencies, companies, and groups. Although many of these entities operate independently, coordination between some or all exists when interests overlap, or common priorities have been established within a watershed in the basin.

Douglas County and the following federal and state agencies conduct enhancement programs within the basin:

- U.S. Forest Service
- U.S. Bureau of Land Management
- Oregon Watershed Enhancement Board (OWEB)
- Oregon Department of Fish and Wildlife (ODFW)
- Oregon Department of Environmental Quality (ODEQ)
- Oregon Department of Forestry (ODF)

The Forest Service and Bureau of Land Management receive federal funding for enhancement of fish habitat on streams within their boundaries of management. They also facilitate some shared funding with partners to accomplish work on land adjacent to federal holdings. Work is generally accomplished through contracts administered by the agencies.

The Oregon Watershed Enhancement Board provides funding through grants to local watershed-based citizens groups targeting watershed enhancement. There are three watershed councils within the Umpqua Basin that receive some portion of funding from the Oregon Watershed Enhancement Board, as well as from federal sources, private

landowners, and numerous other grant sources. The councils work with private landowners including local residents and private timber companies, and with federal and state agencies to improve fish passage, create instream habitat, restore riparian vegetation, and monitor water quality.

These councils work cooperatively with public and private entities to achieve restoration and enhancement goals identified in various watershed assessments. The Partnership for the Umpqua Rivers watershed council has completed 18 watershed assessments that identify limiting factors to salmonid health and water quality within most watersheds within the Umpqua Basin. The council recently completed the Umpqua Basin Action Plan which summarizes the limiting factors to fish and water quality and suggests target areas for enhancement in each of the watersheds assessed (Barnes & Associates 2007). The information is a consolidation of the assessments and additional updates since completion of the original assessments.

Partnership for the Umpqua Rivers is currently working in cooperation with several other groups including the Douglas Soil and Water Conservation District toward a prioritization of all fish passage barriers within the Basin. The effort will lead to improving fish passage at the most important locations, some of which have already begun. The Elk Creek and Smith River watershed councils focus their restoration efforts on similar projects within their respective watersheds.

The ODFW provides funding through its Salmon and Trout Enhancement Program (STEP), Restoration and Enhancement Program, and Fish Passage and Screening Program grants. It relies on support from public groups to undertake activities. It also works closely with the watershed councils, the state agencies, and the County providing technical assistance as necessary.

Douglas County has implemented the Salmon Habitat Improvement Program (SHIP) through County Ordinance. The program provides the means of assisting various volunteer groups and landowners in improving the habitat for anadromous fish and wildlife. In addition, the County has a policy of providing 10 percent of the storage capacity of reservoirs within the County to supplement stream flows for fisheries resources. It has worked extensively with the ODFW to provide short-term flow releases at County reservoirs to support anadromous fish.

4. Assessment of Fish Resources

Information contained in this report includes published and unpublished data and information from the Oregon Department of Fish and Wildlife (ODFW), the Oregon Coastal Coho Viability Assessment and associated reports, BLM and Partnership for the Umpqua Rivers Watershed Analyses and Assessments, and from personal communications with Jim Brick, ODFW Habitat Conservation Biologist in Roseburg. Fishery Concerns information also includes information from the Umpqua Basin Action Plan (Barnes & Associates 2007) and the Umpqua Basin Fish Access Team (UBFAT) surveys.

Actual fish counts of anadromous species for much of the Umpqua River Basin are not available for current years. Estimates are made from counting facilities within the basin, spawning ground and redd surveys, and other ODFW district activities. Counting facilities within the Umpqua Basin are found at Winchester Dam, Nonpareil Dam, South Umpqua Falls, Canyon Creek, and Smith River Falls.

The ODFW estimated numbers of spawners on many streams basin-wide in 1976, and additional limited data are available that help characterize the fisheries. Consequently, discussion of the abundance of various species in each sub-basin is delineated into "historical" (1976) and present (early 2000's) time periods. The data are used solely for comparative purposes and do not indicate precise numbers of spawners.

5. Basin Overview

The Umpqua River Basin is one of the largest producers of anadromous fish in Oregon, exclusive of the Columbia River Basin. During 1997-98 an estimated 6,898 salmon and steelhead were harvested. The harvest by recreational anglers was primarily steelhead (65%) with the remainder comprised of 27% chinook and 8% coho. The estimated harvest by species within the basin is shown in Table 5-1 for 1997-98, the last season angler tag surveys have been reported by ODFW. There are several hundred salmon and steelhead that are caught and released by anglers in addition to these harvest numbers, but overall catch numbers are not available for most fisheries.

Sub-basin	Chinook		Coho	Steelhead		Total
	Spring	Fall		Summer	Winter	
Smith River	0	287	0	0	13	300
Mainstem Umpqua	0	934	352	194	319	1,799
North Umpqua	628	9	217	3,761	164	4,779
South Umpqua	6	0	0	0	14	20
Total	634	1,230	569	3,955	510	6,898
Source: ODFW most recent catch data from 1997.						

Table 5-1: Fish harvested during the 1997-98 season in the Umpqua Basin.

The North Umpqua sub-basin accounted for 88% of the harvest of steelhead and 35% of all salmon species. The mainstem Umpqua contributed 11% of steelhead and 53% of all salmon harvested. Smith River accounted for less than 1% of steelhead and 12% of all salmon. The South Umpqua accounted for less than 1% of the total steelhead and salmon harvest.

The lower mainstem Umpqua River serves as a passageway for adult chinook, coho, and steelhead that are migrating to spawning areas in upstream sub-basins.[1] Little spawning by anadromous species occurs in the mainstem Umpqua River below river mile 28, although

[1] Some fish migrating to spawning areas will be caught for spawning use at the Rock Creek Hatchery in the North Umpqua sub-basin.

practically all tributaries are used for spawning. Juvenile anadromous salmonids spend from a few months up to three years rearing in tributaries or the mainstem depending upon species.

Resident rainbow trout are sporadically found throughout the basin, and other species including striped bass, sturgeon (both white and green), shad, and sea-run cutthroat trout. Small-mouth bass is a warm-water species inhabiting the Umpqua basin that was illegally introduced into the South Umpqua River in the 1960s. It has since spread downstream to the lower mainstem Umpqua River where a large population has established.

6. Sub-basin Discussion

The following sections include discussion of fisheries with regard to minimum flows, distribution and abundance, recreational catch, fishery concerns, and enhancement opportunities by sub-basin.

Minimum instream flow water rights to protect aquatic life have been established on many streams or stream segments within the basin. Distribution and abundance refers to the number and locations of spawning salmonids. Recreation catch lists the species typically sought after by anglers in the area. Numbers of fish harvested and sport angler days expended to achieve that catch are also listed where data are available. Fish concerns identify real or perceived problems for maintaining healthy fish resources. Enhancement opportunities present potential projects such as riparian restoration, fencing along a stream to keep livestock from degrading the stream bank, and instream improvement such as construction of pools or placement of gravel directed at improving the habitat for various species. Successful enhancement projects will increase the number of returning adult fish. This in turn contributes to maintaining healthy populations, and provides for recreational or commercial opportunities.

6.A. Coastal / Umpqua River Sub-basins

The Coastal / Umpqua River sub-basins include the mainstem Umpqua River and its tributaries up to Scottsburg (river mile 28), the upper limit of tidewater influence. The most important tributary is Smith River.

6.A.1. Minimum Flows

Water use requirements for aquatic life are expressed by State of Oregon minimum instream flows for selected locations on major streams in the sub-basins. Table 6.A-1 lists some of the primary minimum instream flows by month established within the sub-basin.

Time of year	Umpqua River from the confluence to the mouth (cfs)			Smith River from North Fork to the mouth (cfs)		Mill Creek from Camp Creek to the mouth (cfs)
	10/24/58	3/26/74	4/12/93	10/24/58	3/26/74	3/26/74
October						
1 to 15	525	900	1560	20	30	40
16 to 31	525	1000	1560	20	100	70
November	525	1000	1700	20	180	130
December	525	1000	1700	20	180	100
January	525	1000	1700	20	180	100
February	525	1000	1700	20	180	100
March	525	1000	1700	20	180	100
April	525	1000	1700	20	180	100
May	525	1000	1700	20	150	70
June						
1 to 16	525	1000	1700	20	100	40
17 to 31	525	750	1700	20	100	40
July	525	750	1000	20	50	20
August	525	750	1000	20	30	20
September	525	750	1000	20	30	20
Source: State of Oregon Water Resources Department.						

Table 6.A-1: Minimum instream flow rights for aquatic life (Lower Umpqua River sub-basin).

6.A.2. Distribution and Abundance

Historical

Distribution and abundance of selected species of anadromous spawning fish have been periodically compiled by ODFW. The most recent data from 1976 are shown in Table 6.A-2.

About 9,643 fish spawned in the sub-basin, representing about 21% of the fish spawning in the entire Umpqua Basin. Although there is little or no spawning shown in the mainstem Umpqua River, tributary streams were heavily used. Smith River contributed about 76% of the spawning population in the entire sub-basin. It provided 60% of the fall chinook, 68% of the coho, and 88% of the winter steelhead spawners in the sub-basin. Mill Creek hosted the next highest level of spawners, contributing about 40% and 10% of fall chinook and coho respectively, and 100% of the summer steelhead. About 14% of the coho and 4% of the winter steelhead spawned in Scholfield Creek.

Few anadromous fish rear in the lower mainstem Umpqua River primarily because of seasonal high water temperatures. Rearing generally occurs in tributary streams where the juveniles were spawned, or juveniles may relocate to cooler streams. In addition, rearing of fall chinook and some spring chinook occur in the estuary.

Location	Spring chinook	Fall chinook	Coho	Summer steelhead	Winter steelhead	Total
Umpqua River	---	---	---	---	---	---
Mill Creek	---	200	420	150	---	770
Smith River	---	305	2,855	---	4,180	7,340
Dean Creek	---	---	98	---	50	148
Scholfield Creek	---	---	575	---	190	765
Harvey Creek	---	---	50	---	100	150
Charlotte Creek	---	---	75	---	75	150
Franklin Creek	---	---	50	---	70	120
Luder Creek	---	---	50	---	50	100
Little Mill Creek	---	---	50	---	50	100
Total	---	505	4,223	150	4,765	9,643
Source: ODFW, 1976 unpublished data. From the Douglas County Water Resources Management Plan 1989.						

Table 6.A-2: Distribution and abundance of spawning salmonids (Lower Umpqua River sub-basin).

In addition to salmonids, striped bass and shad spawn in the lower 23 miles of Smith River, while sturgeon use the lower 8 miles. Sturgeon also spawn in the Umpqua between river miles 13 and 25. The Umpqua River also is host to spawning striped bass upstream of river mile 13, and shad above river mile 19. Spawning population estimates are not available for cutthroat trout, resident trout, shad, and striped bass, sturgeon and warm-water game fish. However, most spawning probably occurs in the area where these species are caught. Table 6.A-3 lists recreation sport catch by species from 1976.

Species	Umpqua River	Scholfield Creek	Mill Creek	Smith River	Total
spring chinook	200	---	---	---	200
fall chinook	100	---	25	10	135
coho	1,500	35	---	450	1,985
summer steelhead	25	---	---	---	25
winter steelhead	100	50		1.250	1,400
cutthroat trout	500	300	350	1,300	2,450
resident trout	---	---	300	550	880
shad	500	---	---	100	600
striped bass	3,000	50	---	800	3,850
sturgeon	600	---	---	---	600
warm-water game fish	1,500	---	---	---	1,500
bay & surf fish	---	---	---	---	50
Total	8,025	485	675	5,460	13,675
Source: ODFW 1976 unpublished data. From the Douglas County Water Resources Management Plan 1989.					

Table 6.A-3: Recreation sport catch (1976) by species (Lower Umpqua River sub-basin).

Present

Fall chinook abundance in 2002 was estimated at about 2,400 fish in North Fork Smith River. Above Smith River Falls estimates included 9,800 coho salmon and 1,700 winter steelhead. All winter steelhead above the falls were wild stock. A hatchery program for steelhead, coho, and fall chinook was started in 1972, but currently all hatchery releases have been discontinued in the Smith River. Presently, 62,500 fall chinook presmolts are released into the Winchester Bay to supplement an increasingly popular boat fishery in the area.

Adult coho population estimates for Tahkenitch and Siltcoos lakes are based on traditional spawning ground surveys. Coho populations are somewhat variable by year but have stayed at the same relative stocking levels over the last 10 years, with the exception of a low population in 2000 of only 634 fish in Tahkenitch Lake. Both lakes show an increased population average in the last 10 years compared to the 46 year average. Estimates from 1995 through 2005 are listed in Table 6.A-4.

Year	Siltcoos Lake	Tahkenitch Lake
1995	4,497	1,627
1996	4,775	1,627
1997	2,653	1,858
1998	3,122	2,817
1999	2,819	3,769
2000	3,835	634
2001	5,104	3,526
2002	4,812	3,489
2003	7,225	3,203
2004	8,025	3,496
2005	4,364	1,897
10-year average	**4,657**	**2,540**
46-year average[1]	**3,233**	**1,710**

[1] Data omitted for 1976 and 1981 where values were empty or zero.
Source: ODFW Coastal Salmonid Inventory Project. Coho abundance estimates for Coastal Lake Basins, 4/21/2006.

Table 6.A-4: Adult coho population estimates from spawning ground surveys in the coastal lakes.

6.A.3. Recreation

Recreation catch in the sub-basin is limited to fall chinook, winter steelhead, cutthroat trout, striped bass, and warm-water game fish. In 2001-2002 an estimated 1,876 fall chinook were harvested recreationally in the Umpqua River and Winchester Bay. The ten year average catch from 1992-93 to 2001-02 for this area was 1,984 fish (Moyers et al 2003).

6.A.4. Fishery Concerns

There are a number of factors limiting anadromous fish productivity in the sub-basins. Primary factors include loss of instream and estuarine rearing habitat, water quality concerns, and fish passage barriers. Juvenile production is relatively low because of high temperature, low streamflow, and large amounts of bedrock. Loss of riparian areas on smaller tributary streams influences both water quality and instream habitat. Decreased shade cover may result in increased stream temperatures on small streams. Removal of large trees in these areas results in fewer sources for stream input. These large wood pieces are vital for creating instream habitat on small and medium sized tributaries.

Several specific limiting factors that affect fish and water quality have been identified in the Umpqua Basin Action Plan (Barnes & Associates 2007) for Umpqua River sub-basin.[2] Specific sites and actions to address these concerns have also been identified in the plan. Known and suspected limiting factors are summarized in Table 6.A-5 by watershed within the sub-basin. Refer to the Action Plan for details on the specific streams.

[2] Smith River Watershed is not included in the Umpqua Basin Action Plan.

Limiting Factor	Watershed(s)	
	Lower Umpqua River	**Mill Creek**
Stream morphology	known	known
Fish passage	known	known
Channel modification	suspected	suspected
Riparian	known	inconclusive
Wetlands	suspected	suspected
Temperature	known	known
Sedimentation	not limiting	not limiting
Other water quality	bacteria (known); DO (suspected)	DO, bacteria (inconclusive); nutrients, toxics, pH (not limiting)
Water availability	inconclusive	known
Streamflow, flood potential	suspected	not limiting
Source: Umpqua Basin Action Plan (Barnes & Associates 2007).		

Table 6.A-5: Known and suspected limiting factors to fish and water quality (Lower Umpqua River sub-basin).

The Coho Viability Assessment Final Report (Nicholas et al. 2005) identified stream complexity as the primary life cycle bottleneck in the Lower Umpqua coho population.[3] This complexity can be equated to stream morphology in Table 6.A-5. The secondary bottleneck for this area is water quality. The Lower Umpqua population area has 535 miles available to juvenile coho, of which only 61 miles (11 percent) is considered high quality habitat.

Tahkenitch Lake is also assessed as a separate population in the report with a primary bottleneck of exotic fish species and secondary bottlenecks including both stream complexity and water quality. The lake has an estimated 48 miles available to juvenile coho, of which 33 miles (69 percent) is high quality.

Fish passage is also a significant known limiting factor in the Umpqua River sub-basin. While there are no barriers to passage of anadromous fish on the mainstem Umpqua River, there are locations elsewhere in the sub-basin where obstructions to passage limit use of additional suitable habitat. Fish passage barriers identified in the Umpqua Basin Action Plan in the Lower Umpqua River Watershed include tide gate issues on Dean and Scholfield creeks, and culvert problems on Butler Creek, Charlotte Creek, Luder Creek, and potentially Dean Creek (Barnes & Assoc. 2007). No surveys have been done to date by the Umpqua Basin Fish Access Team (UBFAT) in the sub-basins.

In the Smith River drainage an eighty-foot high barrier exists in the upper drainage. Smith River Falls is a fifteen foot high waterfall located at river mile 30 where passage was provided by construction of a fish ladder several decades ago. In the Mill Creek drainage,

[3] The Lower Umpqua population in the Coho Viability Assessment includes the Umpqua River from the mouth to Elkton.

a 150-foot barrier prevents anadromous fish access to Loon Lake. Camp Creek, a tributary to Mill Creek, is blocked by a 25-foot high falls.

6.A.5. Enhancement Opportunities

Douglas County owns a 651 acre parcel of land south of Reedsport along two unnamed tributaries to Winchester Creek; 884 acres along Joyce Creek (tributary to Smith River at river mile 6), West Fork Joyce Creek, and Pretty Gulch Creek, and 120 acres along Camp Seven Gulch Creek. These areas may have opportunities for riparian and/or in-stream habitat improvement. The unnamed tributary to Winchester Creek, Joyce Creek, and West Fork Joyce Creek are all shown as likely coho spawning and rearing habitat based on surveys and mapping done by ODFW. Joyce and West Fork Joyce creeks are also shown as spawning and rearing habitat by winter steelhead as is Winchester Creek.

The County also owns 19 acres along Smith River and Otter Slough and along the Umpqua River across from Little Mill Creek. These areas may have opportunity for enhancement of estuary habitat. The Partnership for the Umpqua Rivers watershed council is currently working on a comprehensive estuary restoration effort. More detailed information on restoration opportunities of these estuary lands may be obtained from either Partnership for the Umpqua Rivers or Smith River watershed councils.

UBFAT is conducting surveys on all fish passage structures in the basin to determine those that are barriers to fish and rating the significance of each barrier. Surveys have not yet been done in the Coastal Lakes / Umpqua River sub-basins. Contact the Douglas Soil and Water Conservation District in the future to determine where fish passage barriers occur on County-maintained structures, as well as the Smith River Watershed Council for information in the Smith River Watershed.

6.B. Mainstem Umpqua / North Umpqua Sub-basins

The Mainstem Umpqua / North Umpqua sub-basins include the mainstem Umpqua River from Scottsburg (river mile 28) to the confluence with the North and South Umpqua rivers, and all of the North Umpqua River including tributaries. Elk Creek and Calapooya Creek, tributaries to the mainstem Umpqua River, are discussed in Section 6.C. (Elk Creek and Calapooya Creek sub-basins).

6.B.1. Minimum Flows

Water use by aquatic life is expressed by State of Oregon minimum instream flows for selected locations on major streams in the sub-basins. Table 6.B-1 lists some of the primary minimum instream flows by month established within the North Umpqua sub-basin. In addition, minimum flows on the mainstem Umpqua River are shown in Table 6.A-1 as part of the Coastal / Umpqua River sub-basins discussion.

Time of year	N Umpqua River from Little River to Umpqua River (cfs)			Little River from Cavitt Creek to N Umpqua River (cfs)	
	10/24/58	3/26/74	1/10/91	3/26/74	1/10/91
October					
1 to 15	525	800	1,190	30	42.6
16 to 31	525	800	1,350	70	255
November	525	800	1,350	150	255
December	525	800	1,350	150	255
January	525	800	1,350	150	255
February	525	800	1,350	150	255
March	525	800	1,350	150	255
April	525	800	1,350	150	255
May	525	800	1,350	100	150
June					
1 to 16	525	600	1,350	60	100
17 to 31	525	600	1,350	60	100
July	525	600	1,290	40	51.8
August	525	600	996	20	30.2
September	525	750	982	20	27.3
Source: State of Oregon Water Resources Department.					

Table 6.B-1: Minimum instream flow rights for aquatic life (North Umpqua River sub-basin).

6.B.2. Distribution and Abundance

Both anadromous and resident species use the Umpqua and North Umpqua rivers for spawning, passage, and rearing. Most adult anadromous fish use the Umpqua River as a passageway in route to smaller tributaries or to the North or South Umpqua systems, although a few coho and fall chinook salmon, and winter steelhead spawn in the Umpqua River. The North Umpqua sub-basin is the major producer of anadromous fish within the Umpqua Basin. The North Umpqua sub-basin has the majority of spawning habitat for summer steelhead and spring chinook and it is home to the ODFW hatchery on Rock Creek, a tributary of the North Umpqua River.

Anadromous fish use the North Umpqua River up to the Soda Springs Dam, part of the North Umpqua Hydroelectric Project located at river mile 70. A newly constructed fish ladder at the dam is planned for 2010. Fish passage above Soda Springs Dam will allow fish to migrate upstream to Toketee Falls at river mile 74.5 and will allow passage into lower Fish Creek below a series of impassible falls.

Historical

Distribution and abundance of spawning salmonids listed in Table 6.B-2 and Table 6.B-3 are from unpublished estimates of fish populations prepared by ODFW in 1976. The only counting station in the Umpqua basin is located at Winchester Dam on the North Umpqua River, and limited count data are available. In addition, the counts at Winchester Dam do not include fish that have been harvested below the dam or returning to other sub-basins.

Actual counts of anadromous species at Winchester Dam in 1976 are shown in Table 6.B-4 for comparison. The 1976 estimates are close to the 1976 actual count except for spring chinook where the count is substantially higher than the estimate.

Mainstem Umpqua River and tributaries						
Location	**Spring chinook**	**Fall chinook**	**Coho**	**Summer steelhead**	**Winter steelhead**	**Total**
Umpqua River[1]	150	500	4,000	200	300	5,150
Wells Creek			50		25	75
Golden Creek			25		25	50
Burchard Creek			25		25	50
Weatherby Creek			50		150	200
Lutsinger Creek			25		50	75
Paradise Creek			100		100	200
Sawyer Creek			25		25	25
Hart Creek			15		15	30
Elk Creek[2]		50	964		---	1,014
Lane Creek			2		2	4
Heddin Creek			25		25	50
Mehl Creek			50		20	70
Williams Creek			---		4	4
Brads Creek			25		50	75
Martin Creek			10		10	20
Wagonner Creek			75		25	100
McGee Creek			12		20	32
Yellow Creek			50		50	100
Bear Creek			20		20	40
Doe Creek			2		2	4
Little Canyon Creek			2		10	12
Lost Creek			12		20	32
Wolf Creek			50		50	100
Little Wolf Creek			20		25	45
Miner Creek			12		20	32
Rader Creek			20		20	40
Couger Creek			50		50	100
Hubbard Creek			50		100	150
Calapooya Creek[2]			499		812	1,311
Mill Creek			20		20	40
Total	150	550	6,285	200	2,070	9,255

[1] Mainstem Umpqua River from Scottsburg to confluence with the North Umpqua River.
[2] Elk and Calapooya creek numbers are included here for total count on Umpqua River tributaries. However, discussion of these creeks is included in section 6.C.
Source: ODFW, 1976 unpublished data. From the Douglas County Water Resources Management Plan 1989.

Table 6.B-2: Spawning salmonid estimates in 1976 (Umpqua River sub-basin).

North Umpqua River and tributaries						
Location	**Spring chinook**	**Fall chinook**	**Coho**	**Summer steelhead**	**Winter steelhead**	**Total**
North Umpqua River	5,600	26	50	3,500	3,000	12,176
Grubb Creek			8			8
Clover Creek					10	10
Oak Creek			20		20	40
French Creek			30		15	45
Honey Creek			10	4	16	30
Susan Creek					10	10
Fairview Creek					6	6
Wright Creek				14	8	22
Cougar Creek				2	10	12
William Creek				4	16	20
Calf Creek				20	50	70
Dry Creek				6	10	16
Copeland Creek				20	30	50
Boulder Creek				50	20	70
Little River			326	25	564	915
Rock Creek			30	230	1,042	1,302
Steamboat Creek	50			2,642	886	3,528
Limpy Creek				15	30	45
Total	5,650	26	474	6,532	5,743	18,425
Source: ODFW, 1976 unpublished data. From the Douglas County Water Resources Management Plan 1989.						

Table 6.B-3: Spawning salmonid estimates in 1976 (North Umpqua River sub-basin).

Species	Winchester Dam Count	ODFW Estimate
Summer steelhead	6,705	6,532
Winter steelhead	6,012	5,743
Spring chinook	10,697	5,650
Fall chinook	24	26
Coho	347	474
Total	24,329	18,425
Source: ODFW, 1976 unpublished data. From the Douglas County Water Resources Management Plan 1989.		

Table 6.B-4: Comparison of 1976 Winchester Dam fish counts and 1976 ODFW spawner estimates.

According to these estimates, about 27,680 fish spawned in the Umpqua River / North Umpqua River sub-basins. This accounted for about 61% of the spawners in the entire Umpqua Basin. Almost 41% of the total Umpqua Basin spawning was estimated in the North Umpqua sub-basin.

In the Umpqua River sub-basin, there was an estimated 9,255 anadromous salmonid spawners. About 5,150 (56%) of them used the mainstem Umpqua River, while the remainder used tributaries. In the North Umpqua system, about 12,176 fish spawned in the North Umpqua River, while only 6,249 spawned in tributaries.

The majority of all spring chinook (estimated 5,600 fish) spawned in the North Umpqua River. Only 50 spring chinook were estimated to spawn in North Umpqua tributaries, while 150 used the Umpqua River and none used Umpqua River tributaries. Fall chinook is nearly the opposite, with 500 fish using the Umpqua River and only 50 using Umpqua River tributaries. Only 26 fall chinook spawned in the North Umpqua system, all within the main river.

Wild coho also predominately spawned in the Umpqua River. According to the 1976 estimates about 4,000 fish spawned in the mainstem Umpqua River and 2,285 used tributaries. An estimated 50 coho spawned in the North Umpqua River, while 424 spawned in North Umpqua tributaries.

Summer steelhead spawned in a pattern similar to spring chinook. Only 200 fish spawned in the Umpqua River, while 3,500 spawners were estimated to use the North Umpqua River and an additional 3,032 summer steelhead spawned in North Umpqua tributaries. Estimates for winter steelhead show 300 fish used the Umpqua River, while 1,770 used Umpqua River tributaries. In the North Umpqua, 2,743 winter steelhead used tributaries and 3,000 fish spawned in the North Umpqua River.

Present

Since 1976, the counts at Winchester Dam have fluctuated for all species. Actual counts from 1997-2006 are shown in Table 6.B-5. The increases in coho, chinook, and steelhead can be attributed to supplemental stocking, more restrictive harvest regulations, and improved ocean conditions.

Year	Steelhead		Chinook		Coho	Sea-run cutthroat
	winter	summer	spring	fall		
1997	5,107	8,009	5,769	118	3,606	91
1998	6,336	9,139	6,959	52	7,367	159
1999	6,949	5,390	7,393	31	5,643	96
2000	9,536	10,087	12,635	202	15,861	93
2001	11,089	11,331	20,694	247	20,468	110
2002	9,325	9,175	24,202	154	13,809	110
2003	14,507	7,997	20,156	581	16,160	34
2004	7,547	9,157	15,433	267	13,398	62
2005	7,419	6,987	9,013	162	13,260	62
2006	9,631	7,669	6,081	76	11,247	---
ODFW Winchester Dam Fish Counts 2007.						

Table 6.B-5: Actual fish counts from Winchester Dam on the North Umpqua River from 1997 through 2006.

6.B.3. Recreation

The North Umpqua River is nationally renowned for its recreational quality. The river is one of the few in Oregon designated for fly-fishing only. In addition, rafting, canoeing, and drift-boating are "world class" experiences. Lower reaches of the North Umpqua contain popular swimming holes that are heavily used due to the close proximity to the population centers of the County.

The Umpqua River Basin is one of the largest producers of anadromous fish in Oregon, exclusive of the Columbia River Basin. Recreational catch of coho, steelhead, and chinook occurs in the mainstem Umpqua River and the North Umpqua River. During 1997-98 (the last season tag surveys were conducted) an estimated 6,898 salmon and steelhead were caught basin-wide. The North Umpqua sub-basin accounted for 88% of the catch of steelhead and 35% of all salmon species. The mainstem Umpqua contributed 11% of steelhead and 53% of all salmon (Table 6.B-6).

Sub-basin	Chinook		Coho	Steelhead		Total
	Spring	Fall		Summer	Winter	
Mainstem Umpqua[1]	0	934	352	194	319	1,799
North Umpqua	628	9	217	3,761	164	4,779
Total sub-basins	628	943	569	3,955	483	6,578
Total Umpqua Basin	634	1,230	569	3,955	510	6,898
Percent of Basin	99	77	100	95	95	95

[1] Mainstem Umpqua includes the entire Umpqua River from the mouth to the confluence of the North and South rivers.
Source: ODFW most recent catch data from 1997.

Table 6.B-6: Numbers of fish caught during the 1997-98 season in the Umpqua River sub-basin relative to the entire Umpqua Basin.

In 2001-2002 an estimated 1,876 fall chinook were harvested recreationally in the Umpqua River and Winchester Bay, and 134 were harvested from the North Umpqua River. The ten-year average catch from 1992-93 to 2001-02 for the Umpqua River and bay was 1,984 fish and for the North Umpqua River was 48 fish (Moyers et al 2003).

Warm-water game fish are primarily caught in the mainstem Umpqua River, while striped bass, shad, and sturgeon are exclusively caught there. Small-mouth bass are caught in the North Umpqua River below Winchester Dam. Most larger-sized trout are caught in the North Umpqua River, Smith River, and larger Umpqua sub-basin tributaries.

6.B.4. Fishery Concerns

Primary factors limiting production of anadromous species in the Umpqua River/North Umpqua River sub-basins include loss of water quality (primarily stream temperature), manmade barriers to fish passage, lack of pool areas for holding and rearing, and lack of gravels of the proper size distribution and formation for spawning and incubation of eggs. Lack of over-winter habitat is a primary concern in all sub-basins. In addition, there are

natural barriers on various tributaries in the North Umpqua drainage that preclude access by anadromous species to areas with usable habitat. The influence of hatchery fish on wild fish has also been identified as a concern on wild populations of coho. Although smolt releases occurred in the past, hatchery coho or winter steelhead are not directly released into the North Umpqua system at this time. Releases of summer steelhead and spring chinook still occur from the ODFW Rock Creek Hatchery facility.

Several specific known and suspected limiting factors affecting fish and water quality have been identified in the Umpqua Basin Action Plan (Barnes & Associates 2007) for watersheds within the Umpqua River / North Umpqua River sub-basins. Specific sites and actions to address these concerns have also been identified in the plan. See Appendix F for specific factors and locations. Known and suspected limiting factors are summarized in Table 6.B-7. Refer to the Action Plan for details on the specific streams.

The Coho Viability Assessment Final Report (Nicholas et al. 2005) identified separate coho population areas for assessment purposes. The report lists the primary and secondary life cycle bottlenecks to coho populations in these areas. The bottlenecks for each of the population areas within the Umpqua River / North Umpqua sub-basins are listed in Table 6.B-8. The Lower Umpqua population area includes from the mouth to Elkton and the Middle Umpqua includes Elkton to the confluence with the North Umpqua River.

Limiting Factor	Watershed(s)			
	Middle Umpqua River[1]	Upper Umpqua River	Lower North Umpqua River	Rock Creek Region[2]
Stream morphology	known	known	known	known
Fish passage	known	known	known	known
Channel modification	suspected	suspected	suspected	
Riparian	known	known	known	known
Wetlands	suspected	suspected	known	suspected
Temperature	known	known	known	known
Sedimentation			suspected	
Other water quality	bacteria	bacteria, DO, phosphorus	toxics	toxics, DO
Water availability	suspected	suspected		known
Streamflow, flood potential	suspected	known	known	known

[1] Middle Umpqua River Watershed includes the Umpqua River from Mill Creek to Elkton.
[2] Rock Creek Region includes the lower half of the Middle North Umpqua, Rock Creek, and Canton Creek watersheds.
Source: Umpqua Basin Action Plan (Barnes & Associates 2007).

Table 6.B-7: Known and suspected limiting factors to fish and water quality (Umpqua River / North Umpqua River sub-basins).

Population Area	Primary bottleneck	Secondary bottleneck
Lower Umpqua	stream complexity	water quality
Middle Umpqua	water quantity	stream complexity and water quality
North Umpqua	hatchery impacts	stream complexity
Source: Coho Assessment Part 1:Synthesis (Nicholas et al 2005)		

Table 6.B-8: Primary and secondary life cycle bottlenecks for independent coho populations (Umpqua River / North Umpqua River sub-basins).

Stream complexity is listed as a bottleneck in all three areas of the sub-basins. This complexity can be equated to stream morphology in Table 6.B-7. Loss of stream complexity creates a shortage of winter habitat which results in the loss of juvenile fish, especially during peak storm flows. The amount of high quality winter habitat relative to the total miles available to juvenile coho is very low in all three population areas. Table 6.B-9 lists the miles available by population area.

Water quantity is the primary bottleneck identified in the Middle Umpqua population area. Many tributary streams experience very low flows in the hot summer months when precipitation and runoff is low and demand is high. This contributes to higher water temperatures and loss of instream habitat.

Hatchery effects were identified as the primary bottleneck in the North Umpqua population area. In 2006, ODFW estimated coho spawning abundance at 7,665 fish in the North Umpqua sub-basin, of which 39 percent were wild fish.[4] ODFW has modified its hatchery program to discontinue coho releases in the North Umpqua sub-basin.

Population area	Miles available to juvenile coho	Miles high quality habitat	Percent high quality habitat
Lower Umpqua	535	61	11 %
Middle Umpqua	523	35	7 %
North Umpqua	178	10	6 %
Source: Oregon Coast Coho Assessment Habitat Report (ODFW 2005)			

Table 6.B-9: Amount of high quality winter habitat for juvenile coho in the population areas of the Umpqua River / North Umpqua River sub-basins

Fish passage is also a significant limiting factor in the sub-basins. While there are no fish passage barriers on the mainstem Umpqua River, there are locations elsewhere in the sub-basins where obstructions to passage limit use of additional suitable habitat. Fish passage barriers identified in the Umpqua River /North Umpqua sub-basins include dams on

[4] Estimates were based on 8 surveys covering 5.5 miles of stream in the North Umpqua sub-basin.

Golden Creek and Rock Creek, problems with fish ladders on Fairview Creek and Plat I Reservoir, and culverts on the following streams (Barnes & Associates 2007):[5]

Umpqua Sub-basin

- Burchard Creek
- Brad's Creek
- Cole Valley Creek
- Doe Creek
- Hubbard Creek tribs
- Little Canyon Creek
- Mill Creek
- Waggoner Creek (upper)
- Yellow Creek (upper)

North Umpqua Sub-basin

- Bradley Creek
- Dixon Creek
- Chasm Creek
- Oak Creek
- Bogus Creek
- Clay Creek
- Conley Creek
- Fairview Creek
- Fall Creek
- Kelly Creek
- McComas Creek
- Shoup Creek
- Stoney Creek
- Williams Creek

6.B.5. Enhancement Opportunities

Enhancement programs, such as the construction of structures in the stream, are not generally undertaken on the mainstem Umpqua River or North Umpqua River. However, numerous projects are underway on tributary streams. Enhancement work has occurred throughout the sub-basin. The work has been directed at increasing rearing and spawning areas for coho and steelhead, riparian habitat protection and enhancement, and providing improved fish passage. Douglas County has typically worked through the Salmon Habitat Improvement Program in conjunction with ODFW fish biologists to accomplish enhancement work. Potential future opportunities for the County to improve fish habitat are summarized below.

Sutherlin Creek

Douglas County owns land in an industrial park within Sutherlin along Sutherlin Creek. This portion of Sutherlin Creek runs through the City of Sutherlin and is surrounded by development. However, the creek in this area supports both coho and winter steelhead spawning and rearing habitat. Sutherlin Creek has been identified in the Umpqua Basin Action Plan as a target stream to improve instream habitat by placement of large wood. It

[5] Fish passage barriers identified here do not include all barriers within the sub-basins. The list includes those surveyed by the Umpqua Basin Fish Access Team (UBFAT) and other known barriers identified by biologists in the Umpqua Basin Action Plan. Fairview Creek fish ladder is a yearly maintenance issue and is suspect as to whether it even provides fish passage (J. Brick, personal communication, Nov. 2007).

is also identified as limited by riparian, wetlands, streamflow and flood potential, toxics (including arsenic, beryllium, copper, iron, lead, and manganese), and it has a suspected limitation of sediment and turbidity. Review of this area may present opportunities for improving one or more of these limiting factors along County owned land.

Little Paradise Creek

The County owns over 6 acres of right-of-way along Little Paradise Creek, a tributary of Paradise Creek in the Umpqua River sub-basin. Little Paradise Creek supports coho and winter steelhead spawning and rearing habitat and Paradise Creek also supports fall chinook. Little Paradise Creek is identified by ODEQ has having limitations from habitat modification. Although Little Paradise Creek has not been specifically identified in the Umpqua Basin Action Plan for riparian and instream habitat work, both are limiting in the watershed and improvement is desired where applicable. Little Paradise Creek is the size of stream that improvement of these features can be successful in improving coho and steelhead habitat.

Fish Passage Barriers

The Umpqua Basin Fish Access Team (UBFAT) has completed inventories of stream crossings in the Upper Umpqua River Watershed (from Elkton upriver to the confluence of the North Umpqua River), and the following watersheds in the North Umpqua River sub-basin:

- Rock Creek
- Canton Creek
- Steamboat Creek
- Middle North Umpqua River
- Lower North Umpqua River

No surveys have been done below Elkton to Scottsburg. Crossings were given a score on the severity of the fish passage barrier based on many characteristics including the species and ages of fish blocked, timing of barrier (all year or seasonally), and amount of habitat upstream that is no longer accessible, with higher scores representing more severe barriers. The highest possible score is 105. The highest score in the Umpqua Basin to date is 95.

County maintained culverts in the Umpqua River sub-basin with a score of 60 or more are listed in Table 6.B-10 with a description of the structure and the score it received. All five culverts are complete barriers to all juvenile and adult anadromous species. There are no County maintained culverts in the North Umpqua River sub-basin with a score of at least 60. Contact the Douglas Soil and Water Conservation District for current detailed survey and location information on fish passage barriers.

ID number	Location	Sub-watershed (6th field)	Score	Structure type
30108002	Heddin Creek	Mehl Creek	75	CMP, 65 ft long by 11 ft wide
30101009	Cleveland Rapids Road 208	Upper Umpqua River	75	CMP, 27 ft long by 5 ft wide
30103001	Tyee Road	Cougar Creek	60	CMP, 105 ft long by 12 ft wide
30103015	Tyee Road, Rock Creek	Cougar Creek	60	CMP, 90 ft long by 12 ft wide
30105013	Tyee Road, Little Canyon Creek	Lost Creek	83	CMP, 100 ft long by 12 ft wide
Source: UBFAT database as of Oct 2007, Douglas Soil and Water Conservation District.				

Table 6.B-10: Fish passage barriers maintained by Douglas County with a minimum score of 60 in the UBFAT surveys (Umpqua / North Umpqua sub-basins).

6.C. Elk Creek and Calapooya Creek Sub-basins

Elk Creek and Calapooya Creek are tributaries to the mainstem Umpqua River.

6.C.1. Minimum Flows

Water use requirements for aquatic life are expressed by State of Oregon minimum instream flows for selected locations on major streams in the sub-basins. Table 6.C-1 lists some of the primary minimum instream flows by month established within the sub-basin.

Time of year	Elk Creek from Brush Creek to the Umpqua River (cfs)		Yoncalla Creek near Elk Creek (cfs)	Calapooya Creek from Williams Creek to the Umpqua River[1] (cfs)		
	3/26/74	1/10/91	3/26/74	10/24/58	3/26/74	1/10/91
October						
1 to 15	10	23.5	2	12	20	29
16 to 31	50	23.5	10	12	50	29
November	110	0.0	15	12	100	70
December	110	0.0	15	12	100	70
January	110	0.0	15	12	100	70
February	110	0.0	15	12	100	70
March	110	0.0	15	12	100	70
April	110	0.0	15	12	100	70
May	80	0.0	10	12	70	50
June	50	0.0	4	12	40	30
July	15	22.5	2	12	12	20
August	10	10.8	1	12	12	18.6
September	10	13.6	1	12	12	17.5

[1] 1991 rights are for Coon Creek to Oldham Creek, which includes the section from Williams Creek to Coon Creek but does not extend all the way to the mouth.
Source: State of Oregon Water Resources Department database located at http://apps.wrd.state.or.us.

Table 6.C-1: Minimum instream flow rights for aquatic life (Elk Creek and Calapooya Creek sub-basins).

6.C.2. Distribution and Abundance

Historical

The Elk Creek and Calapooya Creek sub-basins are primarily spawning habitat for coho and winter steelhead. Estimated numbers of these species by streams from 1976 within the sub-basins are listed in Table 6.C-2 and Table 6.C-3. Data are from unpublished estimates by ODFW from 1976.

Stream	Coho	Winter steelhead	Stream	Coho	Winter steelhead
Elk Creek	100	300	Buck Creek	15	15
Little Tom Folley Creek	50	25	Pheasant Creek	6	10
Hancock Creek	12	20	Bear Creek	10	10
Big Tom Folley Creek	75	100	Ward Creek	6	6
N Fork Big Tom Folley	25	25	Yoncalla Creek	50	100
Brush Creek	75	120	Hanlon Creek	6	6
Thistle Burn Creek	25	25	Halo Creek	20	40
Parker Creek	20	20	Huntington Creek	12	12
Jack Creek	25	45	Wilson Creek	6	6
Hardscrabble Creek	50	60	Simpson Creek	2	2
Billy Creek	75	100	Salt Creek	6	10
Bear Creek	25	25	Curtis Creek	25	25
Andrews Creek	20	20	Cox Creek	25	25
Flagler Creek	2	2	Lees Creek	25	50
Pass Creek	50	50	Anlauf Creek	25	25
Fitch Creek	12	12	Bennett Creek	40	40
Sand Creek	12	20	Adams Creek	12	20
Little Sand Creek	10	10	Walker Creek	25	25
Rock Creek	25	25	N Fork Walker Creek	10	10
Total Elk Creek sub-basin				**966**	**1,243**
Source: ODFW unpublished 1976 data. From the Douglas County Water Resources Management Plan 1989.					

Table 6.C-2: Estimates of spawning salmonids in 1976 (Elk Creek sub-basin).

Stream	Coho	Winter steelhead	Stream	Coho	Winter steelhead
Calapooya Creek	75	300	Hackflur Creek	20	20
Coon Creek	2	6	Banks Creek	10	20
Dodge Canyon Creek	25	20	Gassy Creek	65	60
Williams Creek	5	5	Hinkle Creek	100	140
Norton Creek	2	6	Coon Creek	85	120
Cabin Creek	0	10	White Creek	30	30
Pollock Creek	10	20	N Fork Calapooya	20	20
Oldham Creek	10	10	S Fork Calapooya	40	75
Total Calapooya Creek sub-basin				**499**	**862**
Source: ODFW unpublished 1976 data. From the Douglas County Water Resources Management Plan 1989.					

Table 6.C-3: Estimates of spawning salmonids in 1976 (Calapooya Creek sub-basin).

In addition to coho and winter steelhead, the mainstem Elk Creek was also estimated to support 50 spawning fall chinook. This relatively small number of fall chinook use the lower 10 miles of the mainstem Elk Creek. Most migration and spawning occur from the mouth to about 2 miles upstream of Big Tom Folley Creek.

Coho salmon and winter steelhead may be found primarily in tributaries and in the upper reaches of Elk Creek. Abundance was reported at about 964 for coho and 1,243 for steelhead in the Elk Creek sub-basin. Approximately 95% of the coho and 92% of the winter steelhead spawners were reported in various tributaries, with only 5% in the mainstem of Elk Creek. Big Tom Folley Creek, Brush Creek, Billy Creek, and Yoncalla Creek appeared to have the largest spawning numbers compared to other tributaries.

Estimates in the Calapooya Creek sub-basin were about 499 coho and 862 winter steelhead according to the 1976 ODFW survey. About 85% of the coho and 65% of the steelhead were found in the tributaries. Other resident species such as cutthroat and rainbow were found throughout the sub-basin. In addition to the large numbers of spawning steelhead using the mainstem Calapooya Creek, significant numbers were also found in Hinkle Creek, Coon Creek, and South Fork Calapooya Creek.

Present

Wild coho abundance in the sub-basins has fluctuated greatly over time. Changes in ocean conditions can play a significant role in these fluctuations but freshwater habitat survival rates are also significant factors in adult returns. Annual estimates of wild coho spawner abundance in the Elk Creek and Calapooya Creek sub-basins combined for the 1994 through 2004 spawning seasons are listed in Table 6.C-4. Numbers of wild returns have generally been higher in the sub-basins since 2000, with a peak return year occurring in 2003.

Season	Total	Season	Total
1994	708	2000	1,864
1995	2,315	2001	2,581
1996	1,709	2002	1,731
1997	196	2003	4,450
1998	379	2004	2,602
1999	434		
Source: ODFW data from the Corvallis Fish Research Lab.			

Table 6.C-4: Wild coho spawner estimates (Elk Creek / Calapooya Creek sub-basins).

Brush Creek and Big Tom Folley Creek, both tributaries to Elk Creek, are annually surveyed for coho salmon spawners. Coho numbers have fluctuated over time, but recently have increased. The mass coho spawning surveys were originally conducted in Brush Creek to determine fish responses to habitat projects. Big Tom Folley was added as a reference stream for comparison where no improvement projects were conducted. Increases in coho numbers in Brush Creek could be attributed to improved ocean conditions, improved fry to smolt survival rate, and an increase in Columbia River strays.

ODFW began operations of a temporary fish trap in 2002 at Nonpareil Dam on Calapooya Creek. The fish trap is being run as part of the Umpqua Coho Pedigree Study.[6] The study is scheduled to run through 2012. Coho and partial steelhead returns have been counted each year and are listed in Table 6.C-5. Since steelhead are not the focus of the study, the trap has been operated for counting steelhead only when ODFW has available staff; thus the steelhead counts are not complete.

Year	Coho	Steelhead[1]
2003	587	641
2004	1,311	266
2005	1,686	239
2006	1,560	406

Source: ODFW Umpqua Coho Pedigree Study data.
[1] Steelhead counts are not complete. The trap is staffed only when personnel are available during the steelhead runs since the focus of the study is coho.

Table 6.C-5: Coho and steelhead counts from Nonpareil Dam on Calapooya Creek.

Abundance estimates for fall chinook are not currently being conducted. Unfed fry releases during the mid-1990s in Calapooya Creek did not return as adults in significant favorable numbers. In 2000 ODFW began releasing pre-smolts as a recovery program for fall chinook. In 2003, 272,000 pre-smolts were released. The program is still in operation and is now an augmentation program for anglers on the mainstem Umpqua River. Spawning ground surveys in Calapooya Creek have ranged from a low of 1 fish per mile to a high of 13 fish per mile from 2004 to 2006.

6.C.3. Recreation

There are no recreational sites with boat launching facilities in either Elk Creek or Calapooya Creek sub-basins. Water based recreation is limited to trout fishing. Although current recreational catch data is not available, historic data showed most of the catch (74%) and recreation days (78%) occurred in the mainstem of Elk Creek.

6.C.4. Fishery Concerns

In both Elk and Calapooya creeks, primary factors that affect anadromous fish are low flows and high water temperatures during summer and early fall months. These conditions affect migration as well as juvenile survival. Although Calapooya Creek has better substrate (gravel) and pools than Elk Creek, both streams lack sufficient pool areas, which adversely effects survival of fry and juveniles.

Several specific known and suspected limiting factors affecting fish and water quality have been identified in the Umpqua Basin Action Plan (Barnes & Associates 2007) for the Calapooya Creek sub-basin.[7] Specific sites and actions to address these concerns have also

[6] The program was previously known as the Conservation Habitat Improvement Program (CHIP).
[7] Elk Creek is not covered by the Umpqua Basin Action Plan.

been identified in the plan. Known and suspected limiting factors are summarized in Table 6.C-6. Refer to the Action Plan for details on the specific streams.

Limiting factor	Calapooya Creek sub-basin
Stream morphology	known
Fish passage	known
Channel modification	suspected
Riparian	known
Wetlands	not limiting
Temperature	known
Sedimentation	suspected
Other water quality	pH, DO, bacteria, toxics[1] (known) nutrients (suspected)
Water availability	known
Streamflow, flood potential	known

[1] Toxic factors include manganese, copper, iron, lead, and beryllium
Source: Umpqua Basin Action Plan (Barnes & Associates 2007).

Table 6.C-6: Known and suspected limiting factors to fish and water quality (Calapooya Creek sub-basin).

The BLM Elk Creek/Umpqua River Watershed Analysis identifies a current and future lack of large wood supply in most tributaries within the Elk Creek watershed. Many of the existing riparian areas are less than 80 years old and are not stocked with very large key pieces necessary for stream complexity. Although difficult to measure, sediment was also recognized as a potential issue in sub-watersheds including Upper Elk Creek, Lower Pass Creek, and Upper Pass Creek.

The Coho Viability Assessment Final Report (Nicholas et al. 2005) identified separate coho population areas for assessment purposes. The report lists the primary and secondary life cycle bottlenecks to coho populations in the Middle Umpqua population area, which includes the Elk Creek and Calapooya Creek sub-basins. These bottlenecks are listed in Table 6.C-7. The Middle Umpqua population area includes the Umpqua River and tributaries from Elkton to the confluence with the North Umpqua and South Umpqua rivers.

Population Area	Primary bottleneck	Secondary bottleneck
Middle Umpqua	water quantity	stream complexity and water quality

Source: Coho Assessment Part 1:Synthesis (Nicholas et al 2005)

Table 6.C-7: Primary and secondary life cycle bottlenecks for the Middle Umpqua coho population area.

Water quantity is the primary bottleneck identified in the Middle Umpqua population area. Many tributary streams experience very low flows in the hot summer months when

precipitation and runoff is low and water user demand is high. This contributes to higher water temperatures and loss of instream habitat, which are part of the secondary bottlenecks of stream complexity and water quality.

Stream complexity can be equated to stream morphology in Table 6.C-6. Loss of stream complexity is not only detrimental under low flow conditions but it creates a shortage of winter habitat that results in large numbers of juvenile fish being washed downstream during peak storm flows. Only 7 percent of the 523 miles available to juvenile coho in the area is considered high quality winter habitat (ODFW 2005).

There are no natural fish passage barriers in either Elk or Calapooya creeks. However, stream connectivity is a significant limiting factor in the sub-basins. The Umpqua Basin Fish Access Team has now completed passage barrier surveys in the Calapooya sub-basin, but has not surveyed in the Elk Creek sub-basin. Contact the Douglas Soil and Water Conservation District for up-to-date inventory information on all barriers surveyed. Passage barriers identified in the Umpqua Basin Action Plan include the following:

Calapooya Creek Sub-basin

- Bachelor Creek
- Banks Creek
- Calapooya Creek
- Dodge Canyon Creek
- North Fork Hinkle Creek
- South Fork Hinkle Creek
- Markham Creek
- Wheeler Canyon Creek

6.C.5. Enhancement Opportunities

Numerous enhancement projects have occurred in the sub-basins primarily on tributary streams. The work has been directed at increasing rearing and spawning areas for coho and steelhead, riparian habitat protection and enhancement, and providing improved fish passage. Douglas County has typically worked through the Salmon Habitat Improvement Program in conjunction with ODFW fish biologists to accomplish enhancement work. Potential future opportunities for the County to improve fish habitat in the Calapooya Creek and Elk Creek sub-basins are summarized below.

Bachelor Creek

A significant potion of Bachelor Creek runs through Mildred Kanipe County Park. The stream supports both coho and winter steelhead spawning and rearing habitat. The Douglas Soil and Water Conservation District has been coordinating a multi-year restoration effort at the park that has included riparian restoration work, bridge and culvert replacements and instream revetments to trap sediment and debris, and understory burning to improve oak woodland habitat. In addition, the project has involved numerous schools for educational purposes. Douglas County has been a significant contributor to this effort by providing a grant through the Salmon Habitat Improvement Program (SHIP), as well as providing equipment use when necessary. Work is still being done and more opportunities are available for additional enhancement work.

Elk Creek

Douglas County owns over 8 acres of land along Elk Creek downstream of Drain near Hardscrabble Creek. This area should be evaluated for possible riparian improvement and side channel work. In the upper portion of Elk Creek, the County has purchased land in preparation for the Milltown Hill Reservoir project that includes a large stretch of Elk Creek. However, the future of the Milltown Hill project is currently uncertain. There are potential areas for habitat improvement on these lands, although the County may want to postpone investment of resources in this area until a final decision is made on the future of the Milltown Hill impoundment project. Both of these areas of Elk Creek currently support coho and winter steelhead spawning and rearing habitat that may benefit from enhancement projects.

Pass Creek

Pass Creek Park is a 23 acre County park located on Pass Creek near Bear Creek. There may be opportunity for instream and riparian enhancement work on Pass Creek which supports both coho and winter steelhead spawning and rearing habitat.

Fish Passage Barriers

UBFAT has completed inventories of stream crossings in the Calapooya Creek sub-basin. Crossings were given a score on the severity of the fish passage barrier based on many characteristics including the species and ages of fish blocked, timing of barrier (all year or seasonally), and amount and quality of habitat upstream that is no longer accessible, with higher scores representing more severe barriers. The highest score to date in the Umpqua Basin is 95.

County maintained culverts in the sub-basin with a score of 60 or more are listed in Table 6.C-8 with a description of the structure and the score it received. Contact the Douglas Soil and Water Conservation District for current detailed survey and location information on fish passage barriers.

ID number	Location	Sub-watershed (6^{th} field)	Score	Barrier type	Structure type
30206021	Cole Road, Coon Creek	Lower Calapooya Creek	72.5	all juvenile and adult species	CMP, 55 ft long by 10 ft wide
30203004	Keybird Lane 314, Foster Creek	Middle Calapooya Creek	70.6	all juveniles, adult cutthroat, coho	CMP, 72 ft long by 6 ft wide
30204013	Hogan Road, Bachelor Creek	Oldham Creek	81.0	all juvenile and adult species	CMP, 50 ft long by 12.5 ft wide
Source: UBFAT database as of Oct 2007, Douglas Soil and Water Conservation District.					

Table 6.C-8: Fish passage barriers maintained by Douglas County with a minimum score of 60 in the UBFAT surveys (Calapooya Creek sub-basin).

6.D. South Umpqua River Sub-basin

The South Umpqua River sub-basin includes the South Umpqua from its confluence with the North Umpqua to its headwaters. It includes the Cow Creek drainage, and all other tributaries except the following: Deer Creek, Lookingglass Creek, North and South Myrtle creeks, and Days Creek. These latter creeks are discussed in sections 6.E. and 7.E. (Lookingglass Creek and Other South Umpqua Tributaries sub-basins).

6.D.1. Minimum Flows

Water use requirements for aquatic life are expressed by State of Oregon minimum instream flows for selected locations on major streams in the sub-basins. Table 6.D-1 and Table 6.D-2 list some of the primary minimum instream flows by month established within the sub-basins with the corresponding priority dates of the rights.

Time of year	South Umpqua River (cfs)				
	Elk Creek to Cow Creek		Brockway to the mouth		
	3/26/74	1/10/91	10/24/58	3/26/74	11/3/83
October					
1 to 15	80	110	60	90	122
16 to 31	180	110	60	300	300
November	300	425	60	400	400
December	250	425	60	350	350
January	250	425	60	350	350
February	250	425	60	350	350
March	250	425	60	350	350
April	250	425	60	350	350
May	180	250	60	275	275
June	140	168	60	225	225
July	90	154	60	150	150
August	60	82.5	60	90	122
September	60	72.9	60	90	122
Source: State of Oregon Water Resources Department database located at http://apps.wrd.state.or.us.					

Table 6.D-1: Minimum instream flows to support aquatic life in portions of the South Umpqua River with priority dates of right.

Time of year	Cow Creek (cfs)				
	Gage 14-3090 (at stream mile 58.2) to Windy Creek		Windy Cr to Middle Cr	Middle Creek to the mouth	
	3/26/74	8/21/90[1]	3/26/74	10/24/58	3/26/74
October					
1 to 15	10	10	30	11	30
16 to 31	30	30	50	11	80
November	60	0	70	11	150
December	60	0	70	11	150
January	60	0	70	11	135
February	60	0	70	11	135
March	60	0	70	11	135
April	60	0	70	11	135
May	40	0	50	11	100
June	20	20	35	11	70
July	10	10	20	11	50
August	10	10	20	11	20
September	10	10	20	11	20

[1] 1990 rights were added with the source being stored water from Galesville Dam released into Cow Creek.
Source: State of Oregon Water Resources Department database located at http://apps.wrd.state.or.us.

Table 6.D-2: Minimum instream flows to support aquatic life in portions of Cow Creek with priority dates of right.

6.D.2. Distribution and Abundance

Anadromous and resident fish species use the mainstem Umpqua River, and the North and South Umpqua rivers for spawning, passage, and rearing. Species of major importance in the South Umpqua River sub-basin include sea run cutthroat trout, fall chinook, spring chinook, coho and winter steelhead. Non-anadromous species such as resident rainbow and cutthroat trout also are present. In addition, small-mouth bass were illegally introduced to the South Umpqua sub-basin in the 1960s and have become an established non-native species that contributes a significant fishery in the lower South Umpqua River during the summer months.

Historical

Estimated historical numbers of fall and spring chinook, coho and winter steelhead are listed in Table 6.D-3 for the sub-basins. Data are from unpublished estimates by ODFW from 1976. About 6,481 anadromous fish spawned in the South Umpqua River sub-basin including all tributaries. Approximately 25% of them spawned in the mainstem South Umpqua River and 75% in its tributaries. Cow Creek, the largest tributary, supported about 33% of the fish spawning in the South Umpqua River sub-basin according to the 1976 estimates.

Species	South Umpqua River and all tributaries[1]	Cow Creek and tributaries
spring chinook	500	0
fall chinook	404	54
coho	1,854	565
winter steelhead	3,723	1,548
Total	6,481	2,167

[1] Numbers include the Cow Creek sub-basin and tributaries discussed in Section 6.E.
Source: ODFW 1976 unpublished data. From the Douglas County Water Resources Management Plan 1989.

Table 6.D-3: Estimates of spawning fish by species (South Umpqua River/Cow Creek sub-basins).

Distribution and abundance varies by area. For example, winter steelhead and coho primarily use tributaries to the South Umpqua River. These two species represent about 75% of the spawning population in the South Umpqua sub-basin. Their distribution in 1976 is shown in Table 6.D-4 and Table 6.D-5. Spring chinook occurs in the South Umpqua River along with most of the fall chinook. Only about 13% of the fall chinook estimate used Cow Creek. By contrast, about 79% of the coho spawn in the tributaries and only 21% in the South Umpqua River. Winter steelhead spawn primarily (87%) in the tributaries. Only about 13% occur in the South Umpqua River.

Stream	Coho	Winter steelhead	Stream	Coho	Winter steelhead
Champagne Creek	20	20	Beals Creek	12	12
Deer Creek	91	208	Shively Creek	15	20
Roberts Creek	10	25	Poole Creek	4	4
Lookingglass Creek	87	146	St Johns Creek	4	4
Kent Creek	12	20	Stouts Creek	20	30
Rice Creek	16	26	Corn Creek	4	4
Willis Creek	12	20	Coffee Creek	4	4
Clark Branch	4	10	Hatchet Creek	6	6
Van Dine Creek	4	6	Elk Creek	48	72
North Myrtle Creek	181	279	Jackson Creek	26	138
South Myrtle Creek	163	227	Deadman Creek		30
Lane Creek	10	10	Dumont Creek		30
Jordan Creek	6	6	Boulder Creek		29
Canyon Creek	32	80	Buckeye Creek		6
O'Shea Creek	12	12	Quartz Creek		25
Morgan Creek	4	4	Skillet Creek		4
Packard Gulch	4	4	Black Rock Fork		6
Stinger Gulch	4	4	Castle Rock Fork		16
Days Creek	78	128			
Total from South Umpqua tributaries (excluding Cow Creek)				**893**	**1,675**

Source: ODFW 1976 unpublished data. From the Douglas County Water Resources Management Plan 1989.

Table 6.D-4: Coho and winter steelhead 1976 spawning distribution (South Umpqua River sub-basin).

Stream	Coho	Winter steelhead	Stream	Coho	Winter steelhead
Cow Creek	80	730	Peavine Creek	4	4
Mitchell Creek	15	25	Gravel Creek	2	0
Shoestring Creek	10	20	Brush Creek	4	0
Russel Creek	10	30	South Fork	4	12
Catching Creek	10	20	Riffle Creek	12	30
Council Creek	10	20	Bonnie Creek	2	2
Island Creek	6	12	Skull Creek	2	6
Iron Mountain Creek	6	10	Rattlesnake Creek	4	10
Table Creek	10	10	McCulloch Creek	6	15
Little Dads Creek	2	8	Windy Creek	50	50
Cattle Creek	6	10	Wood Creek	4	4
Union Creek	6	8	Bear Creek	4	4
Darby Creek	4	8	Lawson Creek	4	4
West Fork Cow Creek	75	200	Woodard Creek	4	4
Bear Creek	4	8	Fortune Branch Cr	4	10
Bobby Creek	4	8	Quines Creek	24	50
Elk Valley Creek	4	8	Bull Run Creek	4	4
Panther Creek	6	8	Little Bull Run Cr	4	0
Gold Mountain Creek	15	30	Tennessee Creek	4	4
Walker Creek	4	4	Starveout Creek	12	30
Wallace Creek	4	6	Hogum Creek	4	4
East Fork	0	12	Whitehorse Creek	12	20
Middle Creek	30	30	Sugar Creek	0	4
Cedar Gulch Creek	2	0	Snow Creek	12	20
Birch Creek	2	0	Fench Creek	4	0
Martin Creek	4	6	Dismal Creek	24	0
Smith Creek	2	2	Applegate Creek	20	20
Total from Cow Creek and tributaries				**565**	**1,548**

Source: ODFW 1976 unpublished data. From the Douglas County Water Resources Management Plan 1989.

Table 6.D-5: Coho and winter steelhead 1976 spawning distribution (Cow Creek sub-basin).

Present

The estimated abundance of various species has increased in some cases dramatically since 1976. Fall chinook are now estimated to number between 10,000 and 11,000 fish with about 50% in the South Umpqua River between Roseburg and Days Creek, and the rest in the Cow Creek sub-basin. The increases are attributed to recovery of habitat conditions by reduced siltation; increased numbers of fish returning from the ocean; and improved flow and temperature conditions within both the South Umpqua River and Cow Creek sub-basins due to the operation of Galesville Reservoir. Redd counts from 1980 to 2001 illustrated in Figure 6.D.1 show that the run is building.

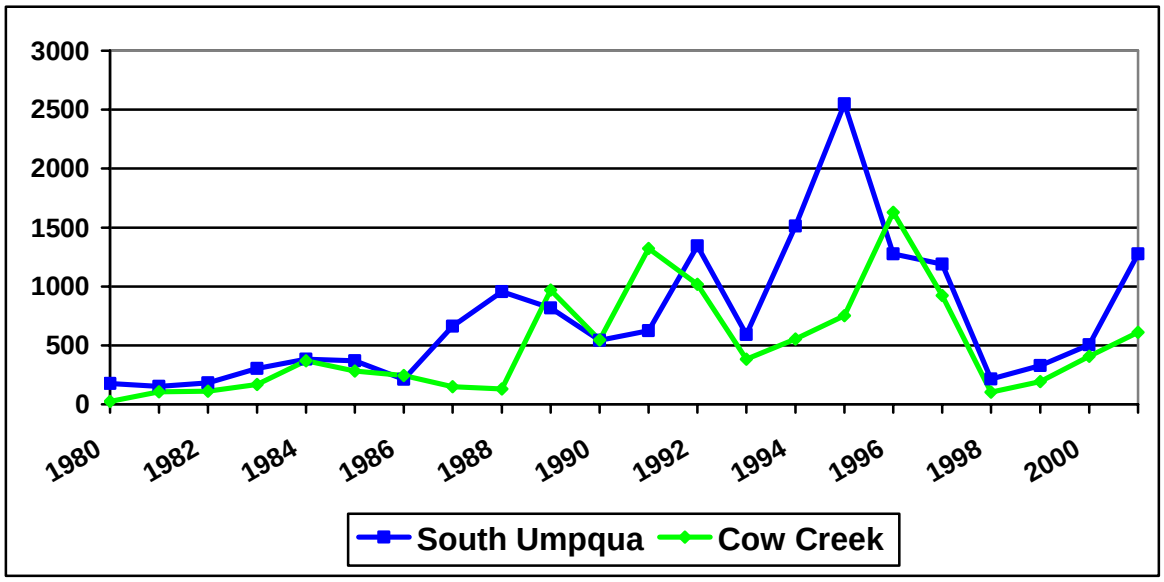

Figure 6.D.1: Fall chinook redd counts from 1980 through 2001 (Moyer et al 2003).

Spring chinook averaged about 152 fish from 2000 to 2002 based on scuba dive counts. They occur primarily in the upper South Umpqua River above Tiller. Winter steelhead numbers currently average about 8,100 fish, of which about 40% are of hatchery origin. About 132,000 smolts are released annually into the South Umpqua River near the confluence with Canyon Creek. The adults use the South Umpqua River above Tiller and a majority of the tributaries in the sub-basin, but do not use the lower South Umpqua except for migration. About 60,000 coho salmon smolts of hatchery origin, and eggs reared in hatch boxes at various locations in the South Umpqua tributaries are released into Cow Creek below Galesville Dam to provide a return adult fishery and to provide broodstock for spawning in tributaries above Tiller. The Galesville Reservoir supports both a trout and warm-water fishery. Excess hatchery coho and winter steelhead are also released into the reservoir to complement the fishery.

Although fish are found in all tributaries, Cow Creek is one of the primary stream systems that support salmonids. However, survey data in Cow Creek is limited. Summer steelhead and spring chinook are not reported, and although coho salmon and winter steelhead are known to use the system, no detailed surveys exist for these species in the Cow Creek sub-basin. About 7,000 fall chinook spawn in Cow Creek.

6.D.3. Recreation

The South Umpqua River sub-basin is limited in angling opportunities to trout, winter steelhead and warm-water game fish species. Warm-water game fish, primarily small-mouth bass, provide a significant fishery in the South Umpqua River.

6.D.4. Fishery Concerns

Inadequate flows and elevated water temperatures especially in the lower mainstem South Umpqua River and most tributaries are primary factors affecting migration and rearing of salmonids. In addition, adequate pools for rearing and gravels for spawning generally are in low supply. Fish passage barriers from inadequate culverts in many areas prevent access to fish habitat for anadromous species.

Several specific known and suspected limiting factors affecting fish and water quality have been identified in the Umpqua Basin Action Plan (Barnes & Associates 2007) for the South Umpqua River and Cow Creek sub-basins. Specific sites and actions to address these concerns have also been identified in the plan. Known and suspected limiting factors are summarized in Table 6.D-6 and Table 6.D-7 by watersheds in the sub-basins. Refer to the Action Plan for details on the specific streams.

Limiting factor	Lower South Umpqua	Middle South Umpqua	South Umpqua River	Tiller Region[1]
Stream morphology	suspected	known	known	known
Fish passage	suspected	suspected	known	inconclusive
Channel modification	inconclusive	suspected	suspected	suspected
Riparian	known	known	known	known
Wetlands	known	known	suspected	suspected
Temperature	known	known	known	known
Sedimentation	inconclusive	not limiting	inconclusive	known
Other water quality	pH, DO, bacteria, toxics, nutrients (known)	pH, DO, bacteria (known)	pH, DO, bacteria (known)	pH (known)
Water availability	known	known	known	known
Streamflow, flood potential	known	known	known	known

[1] Tiller Region includes the smaller 6th field watersheds of Elk Creek-S Umpqua, Jackson Creek, and Middle South Umpqua-Dumont Creek.
Source: Umpqua Basin Action Plan (Barnes & Associates 2007).

Table 6.D-6: Known and suspected limiting factors to fish and water quality (South Umpqua River sub-basin).

Limiting factor	Lower Cow Creek	Middle Cow Creek	Upper Cow Creek	West Fork Cow Creek
Stream morphology	known	known	known	known
Fish passage	known	known	known	suspected
Channel modification	not limiting	suspected	not limiting	not limiting
Riparian	known	not limiting	not limiting	suspected
Wetlands	known	known	not limiting	not limiting
Temperature	known	known	known	known
Sedimentation	inconclusive	suspected	inconclusive	inconclusive
Other water quality	toxics-Formosa Mine (known)	DO, pH (known)	pH, toxics-mercury (known)	inconclusive
Water availability	known	known	known	known
Streamflow, flood potential	known	known	known	known
Source: Umpqua Basin Action Plan (Barnes & Associates 2007).				

Table 6.D-7: Known and suspected limiting factors to fish and water quality (Cow Creek sub-basin).

The Coho Viability Assessment Final Report (Nicholas et al. 2005) identified separate coho population areas for assessment purposes. The report lists the primary and secondary life cycle bottlenecks to coho populations in the South Umpqua population area, which includes the South Umpqua River, Cow Creek, and all tributary sub-basins. These bottlenecks are listed in Table 6.D-8.

Population Area	Primary bottleneck	Secondary bottleneck
South Umpqua	water quantity	stream complexity and water quality
Source: Coho Assessment Part 1:Synthesis (Nicholas et al 2005)		

Table 6.D-8: Primary and secondary life cycle bottlenecks for the South Umpqua coho population area.

Although water quantity has been improved since the operations of Galesville Reservoir started in 1986, low streamflow in the South Umpqua River and most tributaries is still the primary bottleneck to coho productivity in the sub-basin. Streams experience very low flows in the hot summer months when precipitation and runoff is low and water user demand is high. Low flows in the main river contribute to higher water temperatures, slow moving water, and algae blooms. These conditions promote elevated pH and low dissolved oxygen levels creating water quality problems for fish.

Stream complexity, listed as a secondary bottleneck can be equated to stream morphology in the previous table. Insufficient instream structure that provides pools, gravels, and hiding cover causes a decrease in spawning and winter habitat. Insufficient winter habitat results in loss of juvenile fish during peak storm flows. Only 3 percent of the 741 miles

available to juvenile coho in the population area is considered high quality winter habitat (ODFW 2005).

Stream connectivity is a limiting factor in many tributaries in the sub-basins. Passage barriers may block access to all fish, juvenile fish only, or during high or low flow conditions only. Galesville Dam is a complete barrier to anadromous fish in upper Cow Creek. Passage barriers identified in the Umpqua Basin Action Plan include the following:

South Umpqua River Sub-basin

- Newton Creek
- Stockel Creek
- Van Dine Creek
- Willis Creek
- Doe Hollow Creek
- Morgan Creek
- Poole Creek
- Small Creek
- Stinger Gulch
- Coffee Creek
- Corn Creek
- East Fork Shively Creek

Cow Creek Sub-basin

- Buck Creek
- Doe Creek
- Darby Creek
- Mitchell Creek
- Peavine Creek
- Salt Creek
- Shoestring Creek
- Cow Creek
- Fortune Branch
- McCullough Creek
- Panther Creek
- Perkins Creek
- Quines Creek
- Rattail Creek
- Rattlesnake Creek
- Riffle Creek
- Totten Creek
- West Fork Windy Creek
- Wildcat Creek
- Gold Mountain Creek

6.D.5. Enhancement Opportunities

Enhancement projects have been undertaken in many locations within the sub-basins. These efforts have improved fish passage, instream habitat, and riparian conditions for coho, cutthroat, spring chinook, and winter steelhead.

Douglas County owns 36 acres along the junction of Cow Creek and Whitehorse Creek and below Galesville Reservoir. In 2007 the County initiated an instream structure placement project to increase dissolved oxygen levels in Cow Creek. Whitehorse Creek is a tributary just downstream of this area. Whitehorse Creek is known spawning and rearing habitat for coho and winter steelhead and has been identified by ODEQ as having habitat modification concerns. This area along County property may have opportunities for instream and/or riparian work to improve habitat conditions.

Fish Passage Barriers

The Umpqua Basin Fish Access Team has now completed passage barrier surveys in the Lower South Umpqua River, Middle South Umpqua-Rice Creek, South Umpqua River, and the Lower Cow Creek watersheds within the sub-basins. Crossings were given a score on the severity of the fish passage barrier based on many characteristics including the species and ages of fish blocked, timing of barrier (all year or seasonally), and amount and quality of habitat upstream that is no longer accessible, with higher scores representing more severe barriers. The highest score in the Umpqua Basin to date is 95.

Ten County maintained culverts have been surveyed in the South Umpqua River sub-basin and one in Cow Creek with a score of 60 or more. These passage barriers are listed in Table 6.D-9 with a description of the structure and the score it received. All are barriers to all juvenile and adult species with the exception of one that allows chinook to pass. Contact the Douglas Soil and Water Conservation District for current detailed survey and location information on fish passage barriers.

ID number	Location	Sub-watershed (6th field)	Score	Barrier type	Structure type
20905014	County 39A, Russell Creek	Lower Cow Creek	77	all	CON, 26 ft long by 28 ft wide
21303019	Austin Road, Roberts Creek	Roberts Creek	72.5	all	CON, 25 ft long by 66 ft wide
21305025	Melrose Road, Stockel Creek	Lower South Umpqua River	72.0	all	CMP, 100 ft long by 5.5 ft wide
21304003	209 Bronco Drive	Champagne Creek	64.0	all juveniles, adult cutthroat, coho	CON, 53 ft long, by 6.5 ft wide
21001001	Riddle bypass	Judd Creek	73.0	all	CON, 110 ft long by 10 ft wide
21003003	Rice Creek Road	Rice Creek	67.0	all	CMP, 70 ft long by 5.5 ft wide
21002012	Dole Road 6228	Willis Creek	80.0	all	CMP, 60 ft long by 11 ft wide
21002007	Richardson Road	Willis Creek	75.0	all	CMP, 80 ft long by 8 ft wide
21002009	Clarks Branch Rd	Willis Creek	60.0	all	CMP, 80 ft long by 7 ft wide
20504003	County 1 - St. John Creek Park	Saint John Creek	85.0	all	CMP, 100 ft long by 16.5 ft wide
20502001	County 1 - mouth of Corn Creek	Corn Creek	69.0	all	CMP, 90 ft long by 11 ft wide
Source: UBFAT database as of Oct 2007, Douglas Soil and Water Conservation District.					

Table 6.D-9: Fish passage barriers maintained by Douglas County with a minimum score of 60 in the UBFAT surveys (South Umpqua /Cow Creek sub-basins).

6.E. Lookingglass Creek Sub-basin

The Lookingglass Creek sub-basin includes the entire watershed of Lookingglass Creek, a main tributary to the South Umpqua River. Other significant tributaries are discussed in Section 6.F.

6.E.1. Minimum Flows

Water use requirements for aquatic life are expressed by State of Oregon minimum instream flows for selected locations on major streams in the sub-basins. Table 6.E-1 lists some of the primary minimum instream flows by month established within the sub-basin.

Time of year	Lookingglass Creek sub-basin (cfs)				
	Tenmile Creek		Olalla Creek	Lookingglass Creek	
	3/26/74	1/10/91[1]	3/26/74	3/26/74	1/10/91[1]
October					
1 to 15	5	2.1	5	10	4.7
16 to 31	15	2.1	30	40	4.7
November	30	17.1	75	90	43.1
December	40	45.0	75	90	75.0
January	40	40.0	75	90	75.0
February	40	40.0	75	90	75.0
March	40	40.0	75	90	75.0
April	30	40.0	60	60	75.0
May	20	17.0	30	30	41.1
June	10	6.8	20	15	16.1
July	3	2.0	5	10	4.8
August	2	1.4	5	5	2.2
September	2	1.1	5	5	1.3

[1] Values are rounded to the nearest tenth.
Source: State of Oregon Water Resources Department database located at http://apps.wrd.state.or.us.

Table 6.E-1: Minimum instream flows to support aquatic life in portions of the Lookingglass Creek sub-basin with priority dates of right.

6.E.2. Distribution and Abundance

Historical

Distribution and abundance of coho and steelhead from 1976 spawning estimates are listed in Table 6.E-2. Lookingglass Creek, Olalla Creek, and Tenmile Creek had the greatest abundance of spawning fish. Approximately 77% of coho and 78% of steelhead in the Lookingglass Creek sub-basin used these tributaries for spawning.

Stream	Coho	Winter steelhead	Total
Lookingglass Creek	20	20	40
Olalla Creek	25	50	75
Tenmile Creek	22	42	64
Shield Creek	4	6	10
Sucicide Creek	4	10	14
Berry Creek	4	6	10
Byron Creek	2	2	4
Thompson Creek	6	10	16
Total	87	146	233
Source: ODFW 1976 unpublished data. From the Douglas County Water Resources Management Plan 1989.			

Table 6.E-2: Estimated spawning anadromous fish from 1976 by species (Lookingglass Creek sub-basin).

Present

Anadromous fish species in the Lookingglass Creek sub-basin are steelhead, coho salmon, chinook salmon, cutthroat trout, and lamprey. Abundance estimates have not recently been completed for this sub-basin. The following summation is from the Olalla-Lookingglass Watershed Assessment (DeVore and Geyer 2003). Although many medium and large tributaries are within the distribution of one or more salmonid species, ranges have not been verified for each tributary. Largemouth bass and other non-native species may occasionally enter the mouth of Lookingglass Creek, and there is a good small-mouth bass population in the lower several miles. Other non-natives have been accidentally or intentionally introduced to the watershed, but have not established reproducing populations.

Fall chinook supplementation is being considered by ODFW as an alternative through the STEP program. Ben Irving Reservoir provides increased streamflows to Olalla Creek and additional rearing potential for coho and winter steelhead.

6.E.3. Recreation

Rainbow trout catch and recreation days are about equally divided between Lookingglass Creek and Olalla Creek. Total estimated catch is 240 fish in 600 recreation days. The ODFW manages a warm-water lake fishery in Ben Irving Reservoir.

6.E.4. Fishery Concerns

Lookingglass Creek is wide with abundant bedrock and warm summer flows in the lower reaches. Several specific known and suspected limiting factors affecting fish and water quality have been identified in the Umpqua Basin Action Plan (Barnes & Associates 2007) for the sub-basin and are listed in Table 6.E-3. Specific sites and actions to address these concerns have also been identified in the plan. Refer to the Action Plan for details on the specific streams.

Limiting factor	Lookingglass Creek sub-basin
Stream morphology (complexity)	known
Fish passage	known
Channel modification	inconclusive
Riparian	suspected
Wetlands	known
Temperature	known
Sedimentation	inconclusive
Other water quality	toxics (known) DO, bacteria (inconclusive)
Water availability	known
Streamflow, flood potential	known
Source: Umpqua Basin Action Plan (Barnes & Associates 2007).	

Table 6.E-3: Known and suspected limiting factors to fish and water quality (Lookingglass Creek sub-basin).

Fish passage is a limiting factor in many tributaries in the sub-basins. Passage barriers may block access to all fish, juvenile fish only, or during high or low flow conditions only. Although there are no natural barriers to anadromous fish, many manmade barriers have been identified in the Umpqua Basin Action Plan and are listed below.

- Archambeau Creek
- Bushnell Creek
- Upper Tenmile Creek trib
- Irwin Creek (Quarry Creek)
- Olalla Creek
- Porter Creek
- Redding Creek
- Lookingglass Creek tribs (at lower end)

Although water availability and flood potential issues have been improved since the construction of Berry Creek Dam, they are still known limiting factors in Olalla, Lookingglass, Morgan, and Tenmile creeks (Barnes & Associates 2007). Berry Creek Dam (Ben Irving Reservoir) provides additional potential flow to Olalla Creek. About 750 acre-feet of storage was dedicated by Douglas County for fish releases.

Loss of stream complexity is also a significant factor. Insufficient instream structure that provides pools, gravels, and hiding cover causes a decrease in spawning and winter habitat. Insufficient winter habitat results in large numbers of juvenile fish being washed downstream during peak storm flows. Refer to the Action Plan for specific streams where stream complexity, as well as other limiting factors may be enhanced to improve these conditions.

6.E.5. Enhancement Opportunities

Douglas County owns land along Tenmile Creek west of Reston that is spawning and rearing habitat for coho salmon and winter steelhead. Tenmile Creek has been identified as limited by stream complexity, riparian conditions, wetlands, water availability, flood

potential, and possibly sediment. Improvement of stream complexity and riparian conditions on this section of land may improve conditions for both coho and winter steelhead.

Fish Passage Barriers

UBFAT has completed inventories of stream crossings in the Lookingglass Creek sub-basin. Crossings were given a score on the severity of the fish passage barrier based on many characteristics including the species and ages of fish blocked, timing of barrier (all year or seasonally), and amount and quality of habitat upstream that is no longer accessible, with higher scores representing more severe barriers. The highest score in the Umpqua Basin to date is 95.

Two County maintained culverts have been surveyed in the sub-basin with a score of 60 or more. Table 6.E-4 lists these barriers with a description of the structure and the score it received. Both are barriers to all juvenile and adult species. Contact the Douglas Soil and Water Conservation District for current detailed survey and location information on fish passage barriers.

ID number	Location	Sub-watershed (6th field)	Score	Barrier type	Structure type
21205001	Coos Bay Road at Colwell Road junction	Morgan Creek	66	all	CMP, 85 ft long by 6 ft wide
21204004	Reston Road	Tenmile Creek	70	all	CMP, 80 ft long by 6 ft wide
Source: UBFAT database as of Oct 2007, Douglas Soil and Water Conservation District.					

Table 6.E-4: Fish passage barriers maintained by Douglas County with a minimum score of 60 in the UBFAT surveys (Lookingglass Creek sub-basin).

6.F. Other South Umpqua Tributaries

These sub-basins include the drainages of the following major South Umpqua River tributaries:

- Deer Creek
- North Myrtle Creek
- South Myrtle Creek
- Days Creek

Coho and fall chinook as well as winter steelhead are the anadromous species that spawn in these streams. Sea run cutthroat trout may use the upper areas, although numbers of fish are not known. Winter steelhead is the most abundant species (62 percent) in each of these stream systems.

Timing of various activities, such as spawning, fry and juvenile rearing, and smolt emigration and adult migration are basically the same in all tributaries because of proximity of the streams and their sizes.

6.F.1. Minimum Flows

Water use requirements for aquatic life are expressed by State of Oregon minimum instream flows for selected locations on major streams in the sub-basins. Table 6.F-1 lists some of the primary minimum instream flows by month established within the South Umpqua Tributaries sub-basins.

Time of year	Other South Umpqua River tributaries (cfs)						
	Deer Creek		North Myrtle Creek		South Myrtle Creek		Days Creek
	3/26/74	1/10/91[1]	3/26/74	1/10/91[1]	3/26/74	1/10/91[1]	3/26/74
Oct							
1 to 15	4	4.8	6	8.5	5	9.5	5
16 to 31	10	4.8	20	8.5	20	9.5	15
Nov	30	19.9	35	25.8	35	24.9	30
Dec	30	85.0	35	35.0	35	35.0	30
Jan	30	85.0	35	35.0	35	35.0	30
Feb	30	85.0	35	35.0	35	35.0	30
Mar	30	85.0	35	35.0	35	35.0	30
Apr	30	58.7	35	35.0	35	35.0	30
May	15	24.0	20	20.0	20	20.0	20
June	10	10.3	10	10.0	10	10.0	8
July	4	4.5	6	6.0	5	5.0	4
Aug	4	2.7	3	4.6	2	5.0	2
Sept	4	2.9	3	5.2	2	5.0	2

[1] Values are rounded to the nearest tenth.
Source: State of Oregon Water Resources Department database located at http://apps.wrd.state.or.us.

Table 6.F-1: Minimum instream flows to support aquatic life in various tributaries to the South Umpqua River with priority dates of right.

6.F.2. Distribution and Abundance

Historical

Distribution and abundance of spawning coho and steelhead from 1976 are shown in Table 6.F-2. Most of the coho and steelhead used the mainstem in each sub-basin with the exception of Deer Creek. North Fork Deer and South Fork Deer creeks combined to provide 85 % and 86 % of the coho and winter steelhead respectively in the sub-basin.

Stream / Location	Coho	Winter steelhead	Total
Deer Creek	12	25	37
Demonty Bridge	2	4	6
North Fork Deer Creek	25	75	100
South Fork Deer Creek	52	104	156
Total Deer Creek sub-basin	**91**	**208**	**208**
North Myrtle Creek	100	150	250
Bilger Creek	12	25	37
Frozen Creek	12	19	31
Slide Creek	25	40	65
Riser Creek	10	10	20
Lee Creek	10	15	25
Buck Fork Creek	12	20	32
Total North Myrtle sub-basin	**181**	**279**	**460**
South Myrtle Creek	100	150	250
Ben Branch Creek	4	6	10
Louis Creek	25	25	50
Long Wiley Creek	12	15	27
Letitia Creek	4	6	10
Weaver Creek	18	25	43
Total South Myrtle Creek sub-basin	**163**	**227**	**390**
Days Creek	60	100	160
Woods Creek	10	20	30
Fate Creek	8	8	16
Total Days Creek sub-basin	**78**	**128**	**206**
Source: ODFW 1976 unpublished data. From the Douglas County Water Resources Management Plan 1989.			

Table 6.F-2: Estimated numbers of spawning coho and winter steelhead from 1976 (South Umpqua River Tributaries sub-basins).

About 55 % of the coho and 54 % of the steelhead within the North Myrtle Creek sub-basin use North Myrtle Creek mainstem for spawning. The remainder is distributed among Bilge, Slide, Frozen, Riser, Lee, and Buck Fork creeks. Slide Creek has larger numbers of spawners than other tributaries and provides habitat for 14 % each of coho and steelhead. Rainbow and cutthroat trout also are present.

South Myrtle Creek mainstem contributes about 61 % of coho and 66 % of steelhead spawning within the sub-basin. Louis Creek and Weaver Creek make up about 26% for coho and 22 % for steelhead. Ben Branch, Long Wiley, and Leticia creeks contribute the remainder of the habitat. Days Creek provided over 77 % of the coho and 78 % of the steelhead spawners in the sub-basin. Only Woods and Fate creeks also showed spawning estimates within the Days Creek sub-basin.

Present

There are no recent abundance surveys for these sub-basins. The lower reaches of Deer Creek are relatively wide with abundant gravel deposits. There is some potential for fall chinook below the confluence of North and South Myrtle creeks due to the size of the stream and presence of gravel for spawning.

Information from the StreamNet database as of October, 2007, show coho and winter steelhead use portions of all of the sub-basins for spawning and rearing. In addition, Deer Creek is shown as likely spawning and rearing habitat for fall chinook. StreamNet is a cooperative fisheries data project of the Pacific States Marine Fisheries Commission designed to "…create, maintain, and enhance high quality, regionally consistent data on fish and related aquatic resources…" Information in the database is based on the best professional judgment of local fish biologists combined with actual sightings of fish from various surveys.

6.F.3. Recreation

Recreational opportunities are limited to trout fishing in all sub-basins.

6.F.4. Fishery Concerns

Primary concerns are low flows and elevated water temperatures in all sub-basins. However, Days Creek does have abundant gravel deposits, and "potholes" that provide some refuge for coho and steelhead during marginal flows. Continued development along Deer Creek is also a potential concern.

The Umpqua Basin Action Plan lists specific known and suspected limiting factors to fish and water quality in the Deer Creek and Myrtle Creek watersheds. These are summarized in Table 6.F-3.

Limiting factor	Deer Creek	Myrtle Creek[1]
Stream morphology (complexity)	known	known
Fish passage	known	known
Channel modification	suspected	not limiting
Riparian	known	known
Wetlands	known	known
Temperature	known	known
Sedimentation	inconclusive	inconclusive
Other water quality	bacteria (known)	bacteria (known)
Water availability	known	suspected
Streamflow, flood potential	known	suspected

[1] Myrtle Creek Watershed contains both the North and South Myrtle creeks sub-basins combined.
Source: Umpqua Basin Action Plan (Barnes & Associates 2007).

Table 6.F-3: Known and suspected limiting factors to fish and water quality (Deer Creek and Myrtle Creek sub-basins).

Fish passage is a limiting factor in some tributaries in the sub-basins. Passage barriers may block access to all fish, juvenile fish only, or during high or low flow conditions only. Fish passage barriers that have been identified in the Umpqua Basin Action Plan are listed below. See Enhancement Opportunities section for additional County-maintained fish passage barriers inventoried by the Umpqua Basin Fish Access Team (UBFAT).

- tributary to Middle Fork South Fork Deer Creek
- Frozen Creek
- Letitia Creek (irrigation dam)
- Upper Days Creek

Loss of stream complexity and riparian zones are also significant factors. Insufficient instream structure that provides pools, gravels, and hiding cover causes a decrease in spawning and winter habitat. Insufficient winter habitat results in loss of juvenile fish during peak storm flows. Loss of riparian cover eliminates sources of large wood for stream complexity and decreases shade on smaller tributaries. This results in higher solar inputs and increased temperatures on many streams. Refer to the Action Plan for specific streams where stream complexity, loss of riparian areas, as well as other limiting factors may be enhanced to improve these conditions

6.F.5. Enhancement Opportunities

Fish Passage Barriers

UBFAT has inventoried stream crossings in the South Umpqua Tributaries sub-basins. Crossings were given a score on the severity of the fish passage barrier based on many characteristics including the species and ages of fish blocked, timing of barrier (all year or

seasonally), and amount and quality of habitat upstream that is no longer accessible, with higher scores representing more severe barriers. The highest score in the Umpqua Basin to date is 95.

Twelve County maintained culverts have been surveyed in the sub-basin with a score of 60 or more. Table 6.F-4 lists these barriers with a description of the structure and the score it received. All are barriers to all juvenile and adult species, except one in North Myrtle Creek that allows chinook passage. The passage barrier on County Road 18 in Upper South Myrtle Creek has the highest rating of all County maintained fish passage barriers that have been inventoried to date in the Umpqua Basin. This makes it one of the highest priorities for restoration in the County. Contact the Douglas Soil and Water Conservation District for current detailed survey and location information on fish passage barriers.

ID number	Location	Sub-watershed (6th field)	Score	Barrier type	Structure type
21301014	Melton Creek Road	Upper Deer Creek	63	all	CMP, 61 ft long by 5 ft wide
21301004	Strawberry Mountain Lane	Upper Deer Creek	80	all	CMP, 52.7 ft long by 11.3 ft wide
21302011	Buckhorn Road - Dixonville	Lower Deer Creek	78	all	CMP, 100 ft long by 6 ft wide
21101003	County Road 18	Upper South Myrtle Creek	95	all	CON, 25 ft long by 9 ft wide
21101004	County Road 15	Upper South Myrtle Creek	66	all	CMP, 175 ft long by 7 ft wide
21104008	Bilger Creek Road	Lower North Myrtle Creek	69	all juveniles, adult cutthroat, coho	CMP, 60 ft long by 6.5 ft wide
21104007	Bilger Creek Road	Lower North Myrtle Creek	61	all	CMP, 60 ft long by 6 ft wide
21104006	Bilger Creek Road	Lower North Myrtle Creek	61	all	CMP, 60 ft long by 6 ft wide
21104002	North Myrtle Road	Lower North Myrtle Creek	83	all	CMP, 55 ft long by 12 ft wide
21104001	Frozen Creek Road	Lower North Myrtle Creek	61	all	CMP, 40 ft long by 8 ft wide
20505001	Woods Creek Road, 200m junction County Road 34	Days Creek	85	all	CON, 40 ft long by 11 ft wide
20505002	Woods Creek Road, 50m junction 30-4-3.1	Days Creek	80	all	CMP, 50 ft long by 10.5 ft wide
Source: UBFAT database as of Oct 2007, Douglas Soil and Water Conservation District.					

Table 6.F-4: Fish passage barriers maintained by Douglas County with a minimum score of 60 in the UBFAT surveys (South Umpqua Tributaries sub-basins).

7. Discussion

The information included in this report has been compiled from records from the ODFW, publications such as watershed assessments and the Coastal Coho Viability Assessment, and conversations with fish biologists. A review of the information leads to several areas of concern.

7.A. Adequacy of Database

The 1976 database used in the previous report no longer exists. Information on fish abundance is currently collected by several methods, including fish trapping from a number of locations, spawning ground surveys, and other monitoring activities. From this information basin-wide numbers are extrapolated. It is apparent that additional effort could be expended under a systematic sampling approach to better document abundance of fish in various parts of the basin, but is limited by funding and available personnel.

The database for recreational fishing for all species was discontinued by ODFW in 1997. Fishing in Douglas County generates a considerable number of visitor days and expended dollars. The recreational effort is in part estimated through collection of specific fishery creel data, which occurs only as part of special projects. Funding and available personnel also limit this effort. In addition, the potential impacts of warm-water fish on anadromous habitat, fry, and juveniles still need to be documented.

7.B. Factors Affecting Fish

There is not a complete analysis of factors affecting distribution and abundance of fish in each sub-basin. The Partnership for the Umpqua Rivers Watershed Council, Bureau of Land Management, and U.S. Forest Service have completed watershed analyses for most watersheds within the basin, although some may require updating.

In areas without a current watershed analysis, the ODFW has prioritized limiting factors within the watershed that are within its ability to focus enhancement efforts. These limiting factors include: fish passage, instream aggregate, estuary connectivity, and instream habitat. Enhancement activities to address these factors include providing adequate substrate and pools, increasing streamflows, improving water quality including stream temperatures, providing fish passage, and improving or maintaining estuarine habitat.

Once factors affecting fish within each sub-basin are better understood, water development scenarios and enhancement programs can be integrated with resource management plans. The integration could better achieve locating the most favorable sites for projects that concurrently maximize productivity of the resources. Therefore the results of this effort could help guide further water resource development projects, as well as mitigation and enhancement efforts.

7.C. Enhancement Opportunities

Enhancement projects are undertaken by many different groups including private companies, public groups, and public agencies. The projects attempt to increase the abundance and distribution of fish. Many projects have been undertaken throughout the Umpqua Basin and there is no reference source for all of this work. The Oregon Watershed Enhancement Board is now collecting information on all completed enhancement projects statewide to track those accomplished with OWEB money. Reporting is also required as part of the permitting process for some enhancement activities issued through the U.S. Army Corps of Engineers. However, not all projects with local and federal agencies are reported. Because this information is not easily attainable, enhancement project accomplishments are not reported here. However, potential areas are presented where the County may have opportunities to improve habitat that is limiting in a sub-basin.

A coordinated database of accomplishments across all groups would benefit fisheries in the basin by helping to target enhancement work where it is most effective. Although improved coordination and record keeping may be difficult, Douglas County or the State could perform this task in cooperation with other agencies and groups.

7.D. Management Plans

An up-to-date fisheries management plan has not been formerly adopted by ODFW for the entire Umpqua Basin. A plan has been adopted for the North Umpqua River, but needs to be updated. A 2003 ODFW Native Fish Conservation Policy is fostering the creation of conservation and recovery plans that will address fish by species in the future.

A comprehensive plan would require the assistance and participation of all local, state, and federal agencies that have responsibilities in the basin. Since the entire Umpqua River is in Douglas County, the County could undertake sub-basin planning efforts including environmental planning with an emphasis on fisheries resources as a major program. Water resource project scenarios developed by the County for a sub-basin could have a strong natural resource element directed at increasing flows, enhancing water quality, and implementation of programs to increase riparian habitat, and instream habitat to improve fish passage, cover, spawning, rearing, and holding for salmonids and warm-water fish.

8. References

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