Draft

Grays River Subbasin Summary

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Grays River Subbasin Summary

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Grays River Subbasin Summary

Subbasin Description

General Description

Subbasin Location

The Grays River originates in southeast Pacific County and flows southwest through Wahkiakum County to its confluence with the Columbia River at River Mile (RM) 21. The lower six miles of the river are a slough subject to tidal influence. Dikes have been constructed in this area to protect the low-lying land. The next six miles flow through a wide, flat valley before entering the steep foothills. Most of the upper watershed flows through steep narrow canyons in the rugged Willapa Hills. The entire basin encompasses 124 square miles.

A number of natural and man-made barriers to fish migration were removed in the early 1950s under the Columbia River Fisheries Development Program. Prior to 1952 an 8-foot cascade in a narrow canyon at RM 13 was a barrier to most salmon. Steps were blasted in the falls in 1951 effectively opening the upper watershed to salmon. Falls were also modified on the East Fork Grays River, Mitchell and Hull creeks. Other projects included the removal of log jams and abandoned splash dams and construction of a salmon hatchery on the West Fork of the Grays River in 1960.

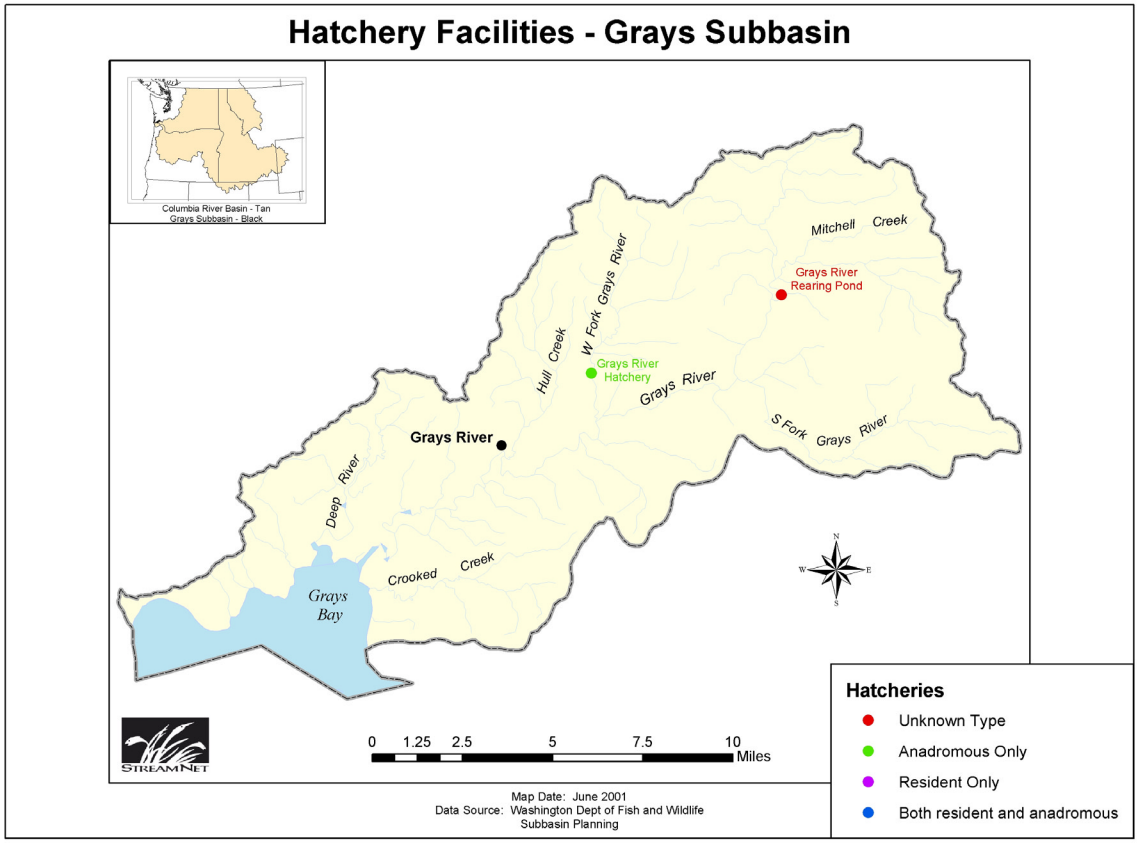

Figure 1. Grays River subbasin.

Drainage Area

The Grays River originates in southeast Pacific County and flows southwest through Wahkiakum County to its confluence with the Columbia River at River Mile 21. The the entire basin encompasses 124 square miles.

Climate

Average annual precipitation in the subbasin is between 90 inches and 110 inches, approximately 80 percent of which falls in the rainy fall and winter months. The climate is dominated by moist Pacific marine air moderating the seasonal extremes. Winters are wet but mild, and summers are cool and relatively dry.

Topography

The Grays River is characterized by the rugged area of the Willapa Hills which occupy a major portion of the subbasin along with, the valley plains along the Columbia River.

Geology

Geology greatly influences the development of soils, slope stability, and dictates the competence of the rock that becomes the typical substrate for the streams within a watershed. The geology in the Grays River subbasin is a mix of sedimentary and volcanics in the western watersheds.

Hydrology

Average annual rainfall is 80 inches per year. Mean temperature ranges from 31-46^{o} in the winter to 50-76^{o} in the summer.

Soils

The "Ocasta" soil association consists of soils along coastal bays in the area. These are very deep, poorly drained soils formed in alluvium deposited in Coastal Bays. Ditching, tiling, and pumping practices have altered soil drainage. The surface is covered with a mat of sedge and grass leaves. The surface layer is silty clay loam. The underlying material to a depth of 60 inches or more is silty clay and clay. This soil is used mainly for hay, pasture, and crops and as habitat for open land and wetland wildlife. It is poorly suited to home site development or as woodland. The main limitation is the high water table.

The Grehalem-Rennie soil association consists of soils along drainageways throughout the area. The well-drained Grehalem soil formed in alluvium derived dominantly from basic igneous and sedimentary rock. The surface layer is silt loam. The underlying material to a depth of 60 inches or more is mainly silty clay loam. The poorly drained Rennie soils are in depression areas. They formed in alluvium derived dominantly from basic igneous and sedimentary rock. The surface layer is silty clay loam. The subsoil and substratum to a depth of 60 inches or more are silty clay and clay. These soils are used for hay, pasture, crops, wildlife habitat, woodland, and home sites. If the soils are used for home site development, the main limitations are the hazard of flooding and a seasonal high water table.

The Lytell-Astoria soil association consists of soils on broad low ridges and uneven side slopes. The deep Lytell soils are on slumps on uplands. They formed in colluvium derived dominantly from marine siltstone and fine-grained sandstone. Slope is 8-90 percent. The surface layer is silt loam. The subsoil is silty clay loam over siltstone, which is at a depth of about 50 inches. The very deep Asotria soils are on uplands. They formed in residuum derived dominantly from siltstone. Slope is 3-65 percent. The surface layer is silt loam. The susoil is to a depth of 60 inches or more and is silty clay. These soils are used mainly as woodland, wildlife habitat, and recreation areas. It is also used for hay, pasture, and rural home sites. If this unit is used for home site development, the main limitations are steepness of slope and the hazard of sliding.

The Zenker-Elochoman soil association consists of soils on sharp ridges and long slopes. The Zenker soils formed in colluvium derived from marine sandstone. Slope is 8-90 percent. The surface layer is silt loam. The subsoil is dominantly loam to a depth of 60 inches or more. The Elochoman soils are on uplands. They formed in residuum derived from sandstone. The surface layer is silt loam. The subsoil is also silt loam to a depth of 60

inches or more. These soils are used mainly as woodland, wildlife habitat, and recreation areas. It is also used for rural home sites. If this unit is used for home site development, the main limitations are steepness of slope and the hazard of sliding.

The Raught-Germany soil association consists of soils on uplands. The Raught soils are on shoulders and back slopes on uplands. Slope is 5-90 percent. The Germany soils are on plateaus, shoulders, and back slopes on uplands. Slope is 1-65 percent. These soils form in residuum and colluvium derived mainly from basic igneous rocks. The surface layer is silt loam and the subsoil is silt loam to a depth of 60 inches or more. These soils are used mainly as woodland and wildlife habitat. It is also used for hay, pasture, and rural home sites. If this unit is used for home site development, the main limitation is steepness of slope.

The Bunker-Knappton soil association consists of soils on side slopes on uplands. Bunker soils have slopes of 5-90 percent. Knappton soils have slope of 8-90 percent. The soils formed in colluvium derived mainly from basic igneous rocks. The Bunker soils surface layer is silt loam and the subsoil is gravelly silt loam. Basalt is at a depth of about 50 inches. The Knappton soils surface layer is silt loam. The subsoil is gravelly silty clay loam. Basalt is at a depth of about 43 inches. This unit is used as woodland and wildlife habitat. It is well suited as woodland.

The Lates-Murnen soil association consists of soils on mountains. The moderately deep Lates soil formed in residuum derived mainly from basic igneous rocks. Slope is 8-90 percent. The surface layer is silt loam and the subsoil is gravelly loam. Basalt is at a depth of 35 inches. The very deep Murnen soil formed in residuum derived mainly from basic igneous rocks. Slope is 5-65 percent. The soils are silt loam to a depth of 60 inches or more. This unit is used as woodland and wildlife habitat. It is well suited as woodland.

Land Uses

There are 80,000 acres of forest and pastureland in the basin. Major landowners are forest product corporations, which own more than 70 percent of the total land area. The state of Washington owns about 15 percent and the remainder is privately owned land mainly located along the river floodplain.

Ninety-five percent of the land is forested and, as expected, the major land use is timber and forest products. Four percent of the land is residential, under cultivation or used for pastureland. Residential development is low with only two unincorporated towns of Grays River and Roseburg.

Impoundments and Irrigation Projects

Streamflow in the Grays River is directly dependent on rainfall and since there are no lakes, reservoirs, or impoundments in the system, effects of precipitation are immediate.

Protected Areas

The Grays River watershed has been a priority area for land acquisitions by several conservation entities, including the Columbia Land Trust. For example, through the

Salmon Recovery Funding Board (SRFB) grant program, the Columbia Land Trust has acquired 116 acres of delta estuarine habitat near the mouth of Grays River, 202 acres of wetlands and associated forested uplands near Grays Bay, 200 acres of floodplain near Devils Elbow, and 125 acres of floodplain near Eden Valley. Proposed "phase 3" SRFB acquisition proposals in 2001 include an additional 183 acres of floodplain habitat adjacent to Grays River and Seal Slough. All of the properties acquired, or proposed for acquisition, are situated along the lower three miles of the watershed. Once proposed acquisition plans are completed, protected areas may include over 1500 acres in the lower Grays River watershed.

The Washington Department of Fish and Wildlife (WDFW) owns and manages a 26-acre parcel adjacent to Miller Point, near the mouth of Grays River. This parcel was acquired to protect unique fish and wildlife habitat, and supports high quality emergent, scrub-shrub and forested wetland communities. Much of the property is dominated by a mature stand of Sitka spruce.

The Washington Department of Natural Resources also manages a 272-acre Natural Area Preserve (NAP) in the Grays River watershed. This preserve is situated along the upper reaches of the Grays River and protects old growth silver fir, western hemlock, and western red cedar, in three distinct forest ecosystem types. This property represents one of the last undisturbed examples of this forest community in southwest Washington. This NAP is known to support a variety of fish and wildlife species, including the Vandyke's salamander, cascade torrent salamander, pacific giant salamander, Cope's giant salamander, coastal cutthroat trout, and marbled murrelets.

Fish and Wildlife Resources

Fish and Wildlife Status

Threatened and Endangered Species

The following table provides a listing of fisheries listed as threatened or endangered for effecting, which includes the Grays River WRIA 25 (NMFS 2001).

Table 1: Threatened or Endangered listing status of anadromous fish

Species	Listing Status	Date of Listing
Chinook Salmon	Threatened	March 24, 1999
Chum Salmon	Threatened	March 25, 1999
Coastal Cutthroat Trout	Proposed-Threatened	April 5, 1999
Coho Salmon	Proposed –Threatened	July 25, 1995
Steelhead	Threatened	March 19, 1998

In addition to fisheries listing, several species of plants and wildlife are identified as threatened or endangered species. Some sources for information regarding threatened and endangered plants and animals include the federally listed species maintained by the United States Fish and Wildlife Service, priority species and habitats listing maintained by the

Washington Department of Fish and Wildlife, and the Heritage database maintained by the Department of Natural Resources.

Fish

Fall Chinook

The size of historical runs of fall chinook in the Grays River are difficult to determine. At the time the first fisheries surveys were conducted in the 1940s, the natural stream habitat had been seriously damaged by logging practices. Records of initial surveys done for the Columbia River Fisheries Development Program in 1948 and 1949 document logjams one-third of a mile in length, splash dams forming complete blockages and logging related landslides, siltation, and erosion. These impacts, coupled with harvest, combined to limit natural production in this period. These early surveys documented few chinook salmon.

In 1951, estimated escapement of fall chinook in the Grays River was 1,000 fish. Log jam removal, splash dam removal, and laddering or blasting of falls restored or extended chinook production to above the West Fork of the Grays River and into the East Fork and Mitchell Creek. Today, the most heavily spawned areas are in the six miles above tidewater (RM 8 to RM 14). Considerable spawning, depending upon annual flow variation, takes place in the 1.5 miles from the mouth of the West Fork to the hatchery. Low seasonal water flows have been a chronic problem for both natural and hatchery chinook production. Water levels in the West Fork Grays often limit the migration of salmon back to the hatchery rack.

Entry of adults into the subbasin occurs from early September to November. Natural escapement estimates for the Grays River has averaged 310 adults from 1987 through 2000 (Table 2). Spawning occurs from late September to mid-November with a peak usually in mid-October. Mark-sampling on the spawning grounds indicates that hatchery origin fish are spawning with the natural fish. A comparison of tag ratios on the spawning grounds with those from the hatchery returns indicates the natural spawners are largely of natural descent. The run is predominately composed of 3-year-old fish and except for 2-year-olds, males and females are equally represented.

Hatchery releases of tule fall chinook began in 1947 when 100,000 fingerlings were released. This supplementation continued until 1960 when the Grays River Salmon Hatchery was constructed under the Lower Columbia River Fishery Development Program. Brood stock for the hatchery was obtained from local stock or from transfers from other hatcheries.

Straying of lower river hatchery (LRH) fall chinook from a number of Oregon and Washington hatcheries is common and contributes to the natural production. The overall result of straying and transferring fall chinook at lower Columbia River hatcheries is the development of a widely distributed, blended hatchery stock.

Depending partly on early fall rains, recruitment to the hatchery is usually greatest during the middle of September. Returns of adults to the hatchery has averaged 326 fish from 1987 through 2000 (Table 2). Juvenile releases in this same period are presented in

Table 3. The last fall chinook released from Grays River Hatchery were from the 1997 brood.

Table 2. Subbasin runsize, catch and escapement for Grays River fall chinook, 1987-2000.

	Sport Catch		Natural Escapement		Hatchery Escapement		Total Return	
Year	Jacks	Adults	Jacks	Adults	Jacks	Adults	Jacks	Adults
1987	21	342	20	1093	42	340	83	1775
1988	24	366	7	1003	90	1357	121	2726
1989	8	447	8	805	17	681	33	1933
1990	9	92	0	287	28	629	37	1008
1991	2	54	12	188	7	143	21	385
1992	2	62	0	4	11	222	13	288
1993	1	12	3	40	4	55	8	107
1994	0	0	0	47	3	28	3	75
1995	0	0	0	29	3	359	3	388
1996	0	0	14	351	1	273	15	624
1997	0	10	2	12	2	32	4	54
1998	0	0	0	93	15	255	15	348
1999	0	2	0	303	1	111	1	416
2000	0	0	8	89	0	73	8	162

Table 3. Hatchery production of fall chinook at the Grays River hatchery, 1986-1999 brood years.

Brood	Number Released		
Year	Fry	Fingerling	Smolt
1986		1470600	
1987	32000	862400	397200
1988	1017000	580000	2799600
1989		162800	1230800
1990			1286600
1991			1265600
1992			1360180
1993			64100
1994			98600
1995			1207300
1996			1204150
1997			0
1998			0
1999			0

Coho

U.S. Fish and Wildlife Service surveys in 1936 and 1937 indicated coho were present in all accessible tributaries of the Grays River, but no population estimates were made. Portions

of the watershed were being logged, and splash dams, log and debris jams, and logging through the streams had probably already adversely affected fish production. Under the Columbia River Fisheries Development Program some of these problems were addressed on an ad hoc basis and production was extended by removing natural and man-made barriers. In 1951, escapement was estimated at 2,500 fish.

A hatchery was built on the West Fork Grays River in 1960 and subsequent harvest management for hatchery productivity in the region has been a dominating factor affecting natural production. Coho are thought to spawn in all available tributaries though escapement figures are unknown. Natural spawning is presumed through anecdotal information to be quite low and subsequent juvenile production well below stream potential.

Early descriptions of coho runs in Columbia River tributaries suggest that time of return and spawning spanned a broad seasonal period in the same watershed. Today's hatchery stocks are generally referred to as early-returning (Type-S) and late-returning (Type-N). Type-S coho are distributed in a more southerly ocean area and contribute to coastal Oregon fisheries more heavily than their more northerly distributed Type-N cohorts. It is possible that the timing of the stocks may be more an artifact of hatchery selection than a stock specific trait since early records from the Toutle River indicate a wide spawning timing for Type-S coho. Both stocks are probably represented on the spawning grounds in the Grays River today.

Type-S coho enter the Columbia River by mid-August and begin entering tributary streams in early September. Spawning activity peaks between October 20 and November 1. The only data collected on natural escapement has been incidental to directed fall chinook surveys and no estimates of annual escapements are available. For purposes of this report and when natural run sizes were required for modeling, natural escapement has been assumed to be 10 percent of the hatchery return. In the absence of any data, this value was selected based on escapement studies from the Cowlitz River (DeVore 1987).

The juvenile life history for subbasin coho is similar to that of other stocks in the region with a spring emergence, followed by a full year of freshwater residence prior to ocean migration the following spring. Specific data on sex ratios and fecundity must be inferred from Grays River hatchery Type-S coho. Approximately 74 percent of the run returns as 3-year-old fish with the l-year-old component exclusively precocious males. The adult return is composed of nearly 48 percent females whose fecundity averaged 2,413 eggs between 1978 and 1982 (WDF, unpublished data). Subbasin natural production potential was estimated to be 125,874 smolts using the Smolt Density Model.

Grays River Hatchery is located 2.5 miles upstream from State Highway 4 on the West Fork Grays River. The hatchery is 21 miles from the mouth of the Columbia River. An earthen rearing pond, the Grays River Salmon Pond (formerly Alder Creek or Weyco Pond) is located approximately 12 miles east of the town of Grays River. Grays River Hatchery is the sixth hatchery constructed under the Columbia River Fisheries Development Program beginning operation in 1961.

The hatchery has 10 standard concrete raceways, two large adult holding ponds that double as juvenile release ponds, and one large earthen juvenile release pond. Incubation

facilities include concrete deep troughs, some vertical incubators, and two concrete shallow troughs. Water is supplied by gravity flow from an intake approximately 0.33 miles upstream from the hatchery on the West Fork Grays River. There is also one well that supplies water to the incubators and four raceways.

Today, production of coho at the Grays River Salmon Hatchery is exclusively for the Select Area Fishery Evaluation (SAFE) program. Adult returns of Type-S coho to the hatchery averaged 2,019 fish between 1987 and 2000 (Table 4). The current program calls for no on-station releases. There is no program to use Grays River Salmon Pond. Table 5 lists recent release numbers.

Table 4. Returns of early stock coho to the Grays River Hatchery, 1987-2000

Year	Jacks	Adults
1987	1,012	376
1988	1,609	3,035
1989	731	3,739
1990	1,175	1,594
1991	60	3,403
1992	9	217
1993	1	102
1994	13	169
1995	133	54
1996	151	1,240
1997	0	659
1998	102	62
1999	276	710
2000	746	12,910

Table 5. Hatchery production of coho at the Grays River Hatchery, 1986-1999 brood years.

Brood	Number Released		
Year	Fry	Fingerling	Smolt
1986	1,143,300	335,900	454,500
1987		132,300	357,300
1988		140,000	352,475
1989			377,100
1990			371,800
1991		555,500	364,000
1992			80,300
1993			236,600
1994			163,300
1995			
1996			158,045
1997			213,696
1998			148,563
1999			

Chum

The Grays River was once noted for its large runs of chum salmon. In 1936, 6,286 spawning or spawned-out chum were counted below the falls at (RM 13), and an additional 1,388 chum were counted in the West Fork of the Grays River (Bryant 1949). Logging of the watershed and the resulting landslides, erosion and channel changes caused serious damage to salmon spawning habitat. Today the Grays River chum run is a fraction of its historic size. Peak fish counts for Grays River chum salmon for 1987 through 1988 ranged from 224 to 2,490 fish (Table 6). Under favorable survey conditions, peak fish counts may account for 80 percent of total escapement (H. Fiscus, pers. commun.).

Survey results from the Grays River indicate a small, but relatively stable population of chum. Recent stream enhancement work by the Washington Fisheries Department in Gorley Springs (RM 12) had been relatively successful until an upstream dike failed and the river changed course and now flows through the Gorley Springs channel. Other areas such as Crazy Johnson Creek can be quite productive if water flows are adequate.

The lack of stable spawning habitat is considered the primary physical limitation on chum production today. Development of other spring-fed spawning areas such as Gorley Springs could improve subbasin chum production. Seasonal low flows sometimes restrict access of chum to preferred off-channel spawning areas, confining them to less stable mainstem reaches. Some mainstem reaches where chum spawn are subject to frequent channel shifts and bedload deposition or scour, all of which reduce intragravel survival.

Adults migrate into the river from mid-October through November with peak spawner abundance occurring in late November. Scale analysis indicates 3- and 4-year-old fish are the dominant age classes. A few fish return as 5-year-olds, but none as a-year-old jacks. Males predominate in the 5-year-old class.

Fecundity for Grays River chum is not available, but the Sea Resources Hatchery on the Chinook River reported fecundity between 2,028 and 2,534 eggs per female between 1980 and 1984, averaging 2,241 eggs per female. Managers have attempted several times to augment natural chum production by releasing fed fry or fry from egg boxes directly into the stream. The Grays River and West Fork Grays have both been recipients of intermittent releases since 1972. The present low numbers of chum in the Columbia River made it necessary to use stock from outside the area. In 1976 approximately 1.1 million 1975 brood chum fry from Hokkaido, Japan (Mokoto stock) were released into the West Fork Grays River. These releases have apparently had little effect on adult returns.

During low flow years, chum spawn primarily in the larger mainstem Grays River; during higher flows they can be found in larger numbers in the smaller tributaries. Table 6 lists the peak live and dead chum counts for the Grays River subbasin. The table should be used with caution, stream survey counts have been made on different stream sections and by a variety of methods.

Table 6. Peak counts of live and dead chum salmon in the Grays River subbasni, 1987-2000

Year	Mainstem	West Fork	Crazy Johnson	Gorley	Fossil	Hull	Klints	Total
1987	711	42	2	3	0	NC	NC	758
1988	342	27	289	712	NC	NC	NC	1,370
1989	176	16	120	21	NC	NC	NC	333
1990	166	0	100	405	2	NC	NC	673
1991	93	13	204	219	NC	NC	NC	529
1992	1,269	289	320	611	1	NC	NC	2,490
1993	704	39	78	256	1	NC	NC	1,078
1994	41	18	90	75	0	NC	NC	224
1995	66	0	413	293	NC	NC	NC	772
1996	415	160	396	348	0	0	NC	1,319
1997	79	55	485	185	NC	NC	NC	804
1998	154	214	145	430	0	0	0	943
1999	69	100	927	496	0	6	NC	1,598
2000	1,124	833	249	NA	NC	NC	0	2,206

Winter Steelhead

Steelhead abundance in the Grays River during the 1920s and 1930s was estimated to be around 2,000 fish (WDG 1936). Bryant (1949) provides reports of several hundred steelhead holding in the pool below the Grays River falls (RM 13) in 1945 and 1946. Steelhead were reported to be able to ascend these falls in high water. During this period there were other numerous blocks to fish migration, both natural and man-made. Log and debris jams, a product of the intense logging occurring in the watershed, as well as splash dams blocked fish migration into many tributaries.

Blasting of the Grays River Falls in 1957 and removal of other obstructions during the 1950s improved steelhead access to upper stream reaches. But by this time the upper watershed had been completely logged and widespread damage to habitat had already occurred.

Winter steelhead migrate upstream from December through May and spawn primarily in April and May. Eggs incubate during the ensuing months with fry recruitment to the stream in June and July. Juveniles rear an average of two years in the streams before migrating to the ocean. Using the Smolt Density Model, planners estimated that the watershed can produce 45,300 smolts.

Today a small, but persistent run of wild winter steelhead returns to the Grays River. The precise distribution of the stock is not known, but the fish do penetrate high into the watershed and it is estimated that the escapement is between 400 and 600 fish annually. Wild release regulations are in effect for the river and an interim escapements goal of 1,400 fish has been set by the Washington Department of Fish and Wildlife.

Hatchery releases began in 1957 with a release of about 20,000 smolts. The river was initially stocked with Chambers Creek fish, but in the mid-1960s the late winter Cowlitz stock was introduced in an attempt to supplement the dwindling wild run. The Chambers Creek stock performed poorly initially, but in more recent years has returned well and created a popular December and January fishery. Releases have averaged about

45,000 smolts from the Beaver Creek Hatchery (Chambers Creek stock) in the neighboring Elochoman River drainage during the last 10 years (Table 7).

Releases of Chambers Creek stock created a new fishery in December and January that exceed the historical March catch of the wild stock. Wild release regulations are intended to intended to promote maximum returns to promote the greatest recreational opportunity.

Table 7. Releases of hatchery winter steelhead smolts in the Grays River, 1990-2000

Release Year	Number Released
1990	29,870
1991	40,171
1992	47,980
1993	44,878
1994	31,621
1995	28,400
1996	49,600
1997	47,000
1998	0
1999	0
2000	43,561

Wildlife

A great number of bird species are associated with or require riparian habitats along the Columbia River and its tributaries. As a subset of this guild, the neotropical migrants (e.g., willow flycatcher, yellow warbler, yellow-breasted chat, red-eyed vireo, Vaux's swift) continually exhibit declining population trends in this region. Lewis' woodpeckers are closely associated with large cottonwoods stands. Historically, they were common in cottonwood habitats of the Columbia River but declines were noted after 1965 and they are now considered absent from Columbia River riparian habitat. The yellow-billed cuckoo is a riparian obligate species that was once found along the Columbia River but has not been confirmed breeding in Washington for more than twenty years. Other species that are marsh obligates include the Virginia rail, sora rail and marsh wren. Loss of riparian-marsh habitat for these birds resulted from the inundation and alteration of habitats in the Columbia River mainstem and tributaries. (Dobler, 2001, personal communication).

Riparian habitats cover a relatively small area yet support approximately 90 percent of Washington's fish and wildlife species. Riparian areas in Washington provide essential food, cover, and water, as well as essential breeding habitat during all times of the year. Riparian areas have moist and mild microclimates that moderate seasonal temperature extremes. Riparian areas provide critical habitat for unique and obligate species, and provide physical features that enhance nearby upland habitats for wildlife. Riparian habitats are essential to healthy, productive aquatic systems and to native fish that inhabit them. Unlike most habitat types, intact riparian habitat can offer natural habitat connections and movement corridors, enabling wildlife to persist in fragmented landscapes.

Riparian habitats support abundant and diverse fish and wildlife populations, offer habitat connectivity across the landscape, and play a vital role in maintaining aquatic systems. To sustain the long term productivity of fish and wildlife resources, riparian habitats in good condition must be preserved and those in degraded condition must be restored to a healthy productive state. Protection efforts for riparian habitat--compared to other habitats--may yield the greatest gains for fish and wildlife

Overwhelming evidence exists to support the retention and restricted use of riparian habitat in order to maintain healthy, productive fish and wildlife habitat (DNR-FEIS, 1996). Desired future conditions (DFC's) for riparian habitat widths in the Grays River watershed are found within WDFW's "Management Recommendations for Washington's Priority Habitats: Riparian (WDFW 1997)". These recommendations are based on an extensive survey and synthesis of the scientific literature (over 400 citations), and present the minimum standards generally needed to retain riparian habitat, protect associated wildlife, buffer streams for fish and other aquatic life, and retain hydrological functions.

Habitat Areas and Quality

The Grays River is very unstable, prone to mass wasting, and very turbid during even modes rainfall events. Native mudstone soils combine with logging activity and road construction/maintenance to release fine sediment ubiquitously throughout high density road networks in the forested reaches. The South Fork Grays River carries a disproportionate abundance of sediment which especially impacts the main stem below this point. High siltation in the basin is also prominent in the lower reaches. Most small agricultural farms in the lower basin are lacking riparian vegetation and nearly all farms have inadequate fencing to protect the stream system from domestic livestock. The direct effects of elevated nitrates and phosphates originating from these farms are unknown. In addition to (non-point) source sediment delivery from these farms, the absence of riparian vegetation has reduced channel stability, exposing stream banks, and decreased large wood inputs. This watershed experiences high in-stream temperatures from June through September. The please refer to the limiting factors discussion below for additional information of habitat areas and quality in the Grays River watershed.

Watershed Assessment

In 1990, the Columbia Basin System Planning Salmon and Steelhead Production Plan was developed to identify options and strategies for increasing steelhead and salmon production in the Columbia River basin (WDFW 1990). The Grays River subbasin plan was one of 31 developed under the Columbia Basin Fish and Wildlife Authority. This plan documented the existing and potential production for winter and summer steelhead, spring and fall chinook, and coho salmon, summarized current management goals and objectives, documented existing management efforts, identified problems and opportunities associated with increasing steelhead and salmon production, and presented preferred and alternative management strategies.

The Washington Conservation Commission is working on completing a watershed assessment of the salmon and steelhead habitat limiting factors in WRIA 25, which

includes the Grays River subbasin (WCC 2001). Channel conditions, passage, water quality, and water quantity were evaluated and projects were ranked based on WCC criteria. The purpose of the report is to provide a habitat impediment inventory in a form and manner that assists local citizen groups in developing functional habitat protection and restoration projects.

Limiting Factors

Section 10 of Engrossed Substitute House Bill 2496 (Salmon Recovery Act of 1998), directs the Washington State Conservation Commission, in consultation with local government and treaty tribes to invite private, federal, state, tribal, and local government personnel with appropriate expertise to convene as a Technical Advisory Group (TAG). The purpose of the TAG is to identify habitat limiting factors for salmonids. Limiting factors are defined as "conditions that limit the ability of habitat to fully sustain populations of salmon, including all species of the family Salmonidae." The bill further clarifies the definition by stating "These factors are primarily fish passage barriers and degraded estuarine areas, riparian corridors, stream channels, and wetlands." It is important to note that the responsibilities given to the Conservation Commission in ESHB 2496 do not constitute a full limiting factors analysis.

This limiting factors reports are based on a combination of existing watershed studies and knowledge of the TAG participants. WRIA 25 is located in Southwest Washington within portions of Lewis, Cowlitz, and Pacific counties. This area encompasses numerous tributaries to the Columbia River including Grays River. The major habitat limiting factors common to most streams within the Grays River subbasin included:

- Access: Fish passage improvement projects continue to be implemented in the subbasin. Several locations were identified that need further assessment including natural barriers and limitations that they may pose to natural fish distribution and habitat utilization.
- Floodplain Connectivity: Floodplain connectivity and access to off channel habitat and floodplain habitat has been affected by management practices including diking, channel hardening and the historic practice of splash damming.
- Side Channel Availability: Similar practices that have affected floodplain connectivity have affected the availability of side channels. A combination of limiting factors has resulted in an overall reduction in channel complexity. Most of the streams in the subasin can be characterized as having a single thread channel.
- Bank Erosion / Stability: Stream surveys identified several areas of active bank erosion considered a concern. These areas are typically associated with alluvial soil with little or no riparian vegetation. Although data was not readily available to assess bank stability, TAG members identified several areas within the Grays subbasin where bank stability is a concern.
- Riparian conditions: Riparian conditions are considered poor within the subbasin. Loss of riparian function affects water quality, erosion rates, streambank stability, and instream habitat conditions.

- Large Woody Debris: Almost throughout the Grays River subbasin, LWD abundance was below habitat standards. Adequate large woody debris in streams, particularly larger key pieces, is critical to developing pools, collecting spawning gravels, and providing habitat diversity and cover for salmonids.
- Pool Frequency: Although isolated areas were identified where pool frequency rated "Fair" to Good", pool frequency was below habitat standards almost throughout the subbasin.
- Water quality: Elevated stream temperatures are a concern for rearing salmonids and resident fisheries during summer months. With the onset of fall freshets, water temperatures appear to quickly return to levels satisfying spawning water quality criteria.
- Water quantity was also identified as a limiting factor in several of the watersheds in the subasin, according to evaluation criteria. Low flows were identified in portions of the mainstem Grays River and West Fork Grays River.

Limiting Factors

Access

Several culvert sites and natural barriers were identified that require additional assessment to determine passage limitation. Low flows were identified as a concern in the lower West Fork Grays River and the section of the main stem Grays River between the Covered Bridge and the Canyon. Low flow concerns may be associated with the accumulation of bedload in the West Fork and main stem Grays River. TAG members also identified potential passage problems over the Grays Bay bar. Shallow water with minimal amounts of cover may increase predation and hinder passage.

Floodplain Connectivity / Side Channel:

Most of the streams within the subbasin have been divorced from their floodplains and development of side channel habitats discouraged by several management practices particularly in the lower reaches of the watersheds. Practices include flood control measures, bank hardening, and channelization to improve agriculture and splash damming. Surveys conducted by the Conservation District indicate that the side channel habitat available is typically short lengths that are highly transient in nature.

Bank Erosion / Bank Stability

Bank erosion concerns are closely tied to areas characterized as alluvial deposits with little or no woody vegetation. Bank Stability is a major concern in the West Fork Grays River and the South Fork Grays River and is associated with the natural instability of the soils and geology.

Riparian Conditions

Although isolated areas considered as "Fair" or "Good" conditions exist, riparian condition is considered "Poor" throughout the subbasin.

Large Woody Debris

Although isolated areas considered as "Fair" or "Good" conditions exist, the presence or large woody debris is considered "Poor" throughout the subbasin.

Pool Frequency

Although isolated areas considered as "Fair" or "Good" conditions exist, pool frequency is considered "Poor" throughout the subbasin. In general, areas of Fair or Good rating for LWD tend to correspond with areas of Fair or Good pool frequency in the upper watershed.

Water Quality

Stream temperature is a concern for rearing juveniles and resident fish. Elevated stream temperature may also affect migrating fish in the early fall. Fall freshets tend to rapidly cool stream temperature to current guidelines for spawning salmonids.
Turbidity was identified as a concern in "Muddy Trib" (tributary to Grays River), West Fork Grays River and South Fork Grays River. Turbidity is elevated due to mass wasting and bank instability.

Water Quantity

Low flows were identified as a concern in Deep River, Seal River, the lower West Fork Grays River, and the section of the main stem Grays River between the Covered Bridge and the Canyon. Low flows were thought to be inherent in the Deep River. Low flow concerns may be associated with the accumulation of bedload in the West Fork and main stem Grays River. Hydrologic maturity of forest cover is a surrogate measure for whether peak flows have been potentially impaired in a watershed. Analysis of conditions in the subbasin indicates that a majority of the subbasin has been impaired hydrologically. Conditions in the South Fork Grays River warranted a "likely impaired" designation.

Existing and Past Efforts

Summary of Past Efforts

Management activities on the Grays River system have occurred over many years. Recent major emphasis has focused on the Salmon and Steelhead Initiative, SAFE program, Limiting Factors Analysis, and the Steelhead Habitat Inventory Assessment Program (SSHIAP) which document barriers to fish passage.

Bonneville Power has funded a series of projects in this basin in the past. They are presented in the following table:

Project	Program Category	Project Focus 1	Project Focus 2	Primary Agency
CODED-WIRE TAG RECOVERY	(A)	Monitoring / Baseline	Adult Mainstem Passage	PACIFIC STATES MARINE FISH COM
SURVEY OF ARTIFICIAL SALMON PRODUCTION FACILITIES	(A)	Monitoring / Baseline	Baseline / Feasibility Efforts	US SMALL BUSINESS ADMIN.
ANADROMOUS FISH HEALTH MONITORING IN WASHINGTON	(A)	Research / Evaluation	Fish Health	WASHINGTON DEPT. of WILDLIFE
ANADROMOUS FISH HEALTH MONITORING (WDF)	(A)	Research / Evaluation	Fish Health	WASHINGTON DEPT of FISHERIES
ANN CD WIRE TAG PROG-MISSING PROD WASHINGTON HATCH	(A)	Monitoring / Baseline	Program Outcome / Impacts	WASHINGTON DEPT of FISHERIES
FISH PASSAGE EVALUATIONS - LOWER COLUMBIA RIVER	(A)	Research / Evaluation	Adult Mainstem Passage	COE (PORTLAND DISTRICT)
AUDIT COLUMBIA BASIN ANADROMOUS HATCHERIES	(A)	Monitoring / Baseline	Facility Design / Construction	MONTGOMERY WATSON

Present Subbasin Management

Existing Management

A number of state, federal and local laws address the protection of fish and wildlife habitats in the Grays River Watershed. These include the Forest Practices Act, Endangered Species Act, the Shoreline Management Act, State Hydraulic Code, the Growth Management Act, and various Wahkiakum County ordinances.

Federal Government

National Marine Fisheries Service

The National Marine Fisheries Service (NMFS) administers the Endangered Species Act (ESA) for anadromous fish. NMFS reviews and comments on activities that affect fishery resources and develop recovery plans for listed species in the Subbasin. Under the ESA's 4(d)rule, "take" of listed species is prohibited and permits are required for handling. Biological Opinions, recovery plans, and habitat conservation plans for federally listed fish and aquatic species help target and identify appropriate watershed protection and restoration measures.

- Federal Caucus All-H Paper (2000). This document provides a framework for basin-wide salmon recovery and identifies strategies for harvest management, hatchery reform, habitat restoration, and hydropower system operations.

- FCRPS BiOp (2000). This is a biological opinion written by NMFS and the Fish and Wildlife Service regarding the operation of the federal hydropower system on the Columbia River, and fulfills consultation requirements with the US Army Corps of Engineers, the Bureau of Reclamation, and the Bonneville Power Administration under Section 7 of the ESA. This recent BiOp also concluded that off-site mitigation in tributaries is necessary to continue to operate the hydropower system.

United States Fish and Wildlife Service

Coastal cutthroat are proposed for a "threatened" listing, and since these are considered as non-anadromous fish they are in the process of being evaluated by the United States Fish and Wildlife Service.

Bonneville Power Authority

The Bonneville Power Authority wholesales hydroelectric power throughout the West. It also provides funding to deal with impacts of the Columbia River Hydrosystem on fish and wildlife.

Tribes

Cowlitz Indian Nation

The Cowlitz tribe has recently been granted tribal status from the Federal Government.

State

Washington Department of Fish and Wildlife

The Washington Department of Fish and Wildlife manages fish and wildlife resources in the subbasin. Fall chinook salmon, chum salmon, and steelhead are listed as "threatened" and coho salmon are listed as a candidate species under the ESA. WDFW management attempts to protect these fish and provide harvest opportunity on hatchery fish through the Fish Management and Evaluation Plan.

The objectives of the Washington Department of Fish and Wildlife's (WDFW) Fish Management and Evaluation Plans (FMEP) are based on the WDFW Wild Salmonid Policy. In that policy, it states that harvest rates will be managed so that 1) spawner abundance levels abundantly utilize available habitat, 2) ensure that the number and distribution of locally adapted spawning populations will not decrease, 3) genetic diversity within populations is maintained or increased, 4) natural ecosystem processes are maintained or restored, and 5) sustainable surplus production above levels needed for abundant utilization of habitat, local adaptation, genetic diversity, and ecosystem processes will be managed to support fishing opportunities (WDFW 1997a). In addition, fisheries will be managed to insure adult size, timing, distribution of the migration and spawning populations, and age at maturity are the same between fished and unfished populations. By following this policy, fisheries' impacts to listed steelhead, chinook salmon, and chum salmon in the Lower Columbia River (LCR) Evolutionary Significant Unit (ESU) will be managed to promote the recovery of these species and not at rates that jeopardize their survival or recovery. The full text of the Fish Management and Evaluation Plan appears in Appendix B.

The Washington Department of Fish and Wildlife also administers the Washington State Hydraulic Code (RCW 75). This law requires that anyone wishing to use, divert, obstruct, or change the natural flow or bed of any waters of the state to first secure a Hydraulic Project Approval (HPA) from WDFW, so that potential harm to fish and fish habitat can be avoided or corrected.

WDFW is presently conducting or has conducted habitat inventories within the subbasin. Ecosystem Diagnosis and Treatment (EDT) compares habitat today to that of the basin in a historically unmodified state. It creates a model to predict fish population outcomes based on habitat modifications. WDFW is also conducting a Salmon Steelhead Habitat Inventory Assessment Program (SSHIAP) which document barriers to fish passage. WDFW's habitat program issues hydraulic permits for construction or modifications to streams and wetlands. This provides habitat protection to riparian areas and actual watercourses within the watershed.

Washington SERF Board

The Salmon Recovery Funding Board's mission is to support salmon recovery by funding habitat protection and restoration projects, and related programs and activities that produce sustainable and measurable benefit for the fish and their habitat.

Joint Natural Resources Cabinet

In May 1997, Governor Gary Locke and thirteen agency heads signed a memorandum of agreement to establish a forum to serve as the ". . . formal and ongoing institutional framework to promote interagency communication, coordination, and policy direction on environmental and natural resource issues. This forum was named the Joint Natural Resources Cabinet (JNRC or Joint Cabinet) and is chaired by Curt Smitch, the Governor's Special Assistant for Natural Resources.

Government Council on Natural Resources

As a way to bring together a wider forum to assist with the review and development of the three-part effort to recover salmon, which includes the Statewide Salmon Recovery Strategy, state and federal budget proposals, and a comprehensive legislative package, the Government Council on Natural Resources (GCNR or Government Council) was developed. This group includes representation from JNRC, the Legislature, tribes, cities, counties, federal government, and ports.

Governors Salmon Recovery Office

To assist the Joint Cabinet and Government Council in accomplishing their mission, the Governor's Salmon Recovery Office was established by the Legislature through the Salmon Recovery Planning Act (Engrossed Substitute House Bill 2496). The Salmon office's role is to coordinate and produce a statewide salmon strategy, assist in the development of regional salmon recovery plans, and submit the strategy and plans to the federal government. The office will also provide the Biennial State of the Salmon report to the Legislature.

Washington Department of Natural Resources

DNR through the Forest Practice Board has developed a Forestry Module. The results are presented in the forest and Fish Rule. The Board has established the following Forestry Module goals: To provide compliance with the Endangered Species Act for aquatic and riparian- dependent species on state and private lands; To restore and maintain riparian habitat on state and private forest lands to support a harvestable supply of fish; To meet the requirements of the Clean Water Act for water quality on state and private forest lands; and To keep the timber industry economically viable in the state of Washington.

Washington Department of Ecology

The Department of Ecology impacts habitat in the subbasin in a variety of ways. Most importantly is the review and/or permitting of projects under the State Environmental Policy Act (SEPA) and the Shoreline Management Act. DOE also participates in the development of county comprehensive plans for growth management and the development of DNR's Forestry Module. DOE also issues municipal and industrial wastewater and storm water permits. It is involved in setting water allocations and instream flow.

Local Government

Wahkiakum County

Wahkiakum County and Pacific County encompasses much of the Grays River watershed. Under the Growth Management Act the each of these counties must identify and protect critical lands, which include streams, wetlands and critical fish and wildlife habitat conservation areas.

Lower Columbia Fish Recovery Board

Established in 1998 by state law, the Lower Columbia Fish Recovery Board encompasses five counties in the Southwest Washington Region. The Board's mission is to recover steelhead and other species listed under the Endangered Species Act through the development and implementation of a comprehensive recovery plan. The 15-member board is responsible for implementing the habitat portion of an approved state and federal recovery plan. To accomplish this, the Board is authorized to establish habitat project criteria, prioritize and approve projects, acquire and distribute funds for projects, enter into contracts on behalf of project sponsor, and assess and monitor project outcomes. The Board holds regular monthly meetings on the first Friday of each month at different locations across the region.

Existing Goals, Objectives, and Strategies

Fish

In the State of Washington's Statewide Salmon Strategy, its goal is to "restore salmon, steelhead, and trout populations to healthy harvestable levels and improve the habitat on which fish rely on." The Washington Department of Fish and Wildlife has a mission statement of "Sound stewardship of fish and wildlife". The WDFW Wild Salmonid Policy goal is to "Protect, restore, and enhance the productivity, production, and diversity of wild salmonids and their ecosystems to sustain ceremonial, subsistence, commercial, and recreational fisheries; non-consumptive fish benefits; and other related cultural and ecological values." (WDFW 1997).

Objective 1: The Draft Endangered Species Act Implementation Plan for the Federal Columbia River Power System has a section on research monitoring and evaluation. It states," the primary objectives of the RM&E component of this Plan are: Track the status of fish populations and their environment relative to required performance standards; identify the physical and biological responses to management actions: and resolve critical uncertainties in the methods and data required for the evaluation of future population performance and needed survival improvements".

Strategy 1. Monitor effects of HGMP's (Appendix B.) It is imperative to be able to monitor the freshwater production of naturally spawning salmon, cutthroat and steelhead in the subbasin in order to understand the potential effects of hatchery stocking. Spawning and rearing areas should be identified and protected. Smolt production should be determined through the use of downstream migrant traps on major tributaries. Wild escapement should be documented through the use of redd surveys and carcass counts.

Strategy 2. Hatchery and wild interactions on spawning grounds need to be monitored. Spatial and temporal differences between hatchery and wild fish of the same species need to be documented. Spawning ground surveys should provide this information. Snorkel surveys could document interactions of hatchery residuals and wild juvenile fry.

Objective 2: Monitor the effect of Fish Management and Evaluation Plans (FMEP).

Strategy 1. The objectives of the Washington Department of Fish and Wildlife's (WDFW) Fish Management and Evaluation Plans (FMEP) are based on the WDFW Wild Salmonid Policy. In that policy, it states that harvest rates will be managed so that 1) spawner abundance levels abundantly utilize available habitat, 2) ensure that the number and distribution of locally adapted spawning populations will not decrease, 3) genetic diversity within populations is maintained or increased, 4) natural ecosystem processes are maintained or restored, and 5) sustainable surplus production above levels needed for abundant utilization of habitat, local adaptation, genetic diversity, and ecosystem processes will be managed to support fishing opportunities (WDFW 1997a). In addition, fisheries will be managed to insure adult size, timing, distribution of the migration and spawning populations, and age at maturity are the same between fished and unfished populations.

Strategy 2. Intensive efforts will be needed to determine the extent of the balance between harvest and escapement to fully seed the available habitat. Commercial and recreational fisheries will be monitored to prevent over harvest and insure comparable and temporal similarities between fished and unfished populations. Coded wire tags will identify the disposition of captured fish. Genetic sampling should be conducted to ascertain wild and hatchery genetic profiles and potential stray rates.

Objective 3: Develop management guidelines for game and nongame species that are endangered, threatened or sensitive (ETS) and identify, map, and update the Priority Habitats and Species (PHS) data.

Strategy 1. Maintaining diversity statewide can best be achieved by maintaining diversity in individual watersheds. The wildlife species in the Washougal are a diverse group of native, game and ETS species. Proper management of these species in the watershed will aide in maintaining diversity.

Objective 4: Conduct and support research to investigate the population status, habitat requirements and the natural ecology of wildlife species of concern and determine abundance, distribution and composition of game populations and incorporate into GIS database.

The Lower Columbia Fish Recovery Board and its Technical Advisory Committee has developed goals and strategies that they will use to:

A. Identify and rank habitat restoration and protection needs; and
B. Evaluate and rank habitat project proposals.

It should be noted that this document is an ***interim*** habitat strategy. The adequacy and sophistication of available information on fish stocks, watershed functions, and habitat

conditions varies significantly across the lower Columbia region. The strategy will be refined, as better information and analytical tools become available. It is anticipated that this strategy will evolve over the next several years to become an integral element in a comprehensive salmonid recovery plan for the lower Columbia.

In the near-term, this strategy will assist the Board and project sponsors to better target limiting factors and habitat protection needs in a way that will help maximize benefits for fish recovery and ensure the most effective use of limited resources.

The strategy provides fish recovery and habitat recovery goals. It prioritizes fish stocks and habitat recovery and protection needs. And, finally, it sets forth the means the Board and TAC will use to evaluate and rank project proposals.

Goals

The Lower Columbia Fish Recovery Board (LCFRB) was established by RCW 77.85.200 to coordinate fish recovery activities in the lower Columbia region of Washington State. The Board's key activities include recovery planning, watershed planning and habitat restoration and protection.

It is the overall habitat goal of the Lower Columbia Fish Recovery Board to provide the habitat necessary to support healthy, harvestable populations of ESA listed fish species in the lower Columbia region of Washington. Specific goals for fish recovery and habitat restoration and protection are:

Fish Recovery Goals of the Lower Columbia River Fish Recovery Board

1. **Support Recovery of ESA listed stocks.**

   First priority in achieving this objective will be given to stocks that are listed under the federal Endangered Species Act (ESA). Four of six lower Columbia salmonid species are currently listed as threatened. These are chinook and chum salmon, steelhead, and bull trout. The ESA defines species as threatened when it is "likely to become endangered within the foreseeable future throughout all or a significant portion of its range." A species is considered endangered when it is "in danger of extinction throughout all or a significant portion of its range."

   Second priority will be given to species that are candidates or are proposed for listing under the ESA. Currently coho salmon are a candidate for listing. Sea-run cutthroat are proposed for listing as a threatened species.

2. **Support biodiversity through recovery of native wild stocks.**

   The maintenance of genetic and life-cycle diversity across the region is critical to the recovery of listed fish species. To help preserve this diversity, priority will be given to habitat projects benefiting naturally spawning, locally adapted fish stocks with minimal hatchery influence. The stock origin and production type classifications used for identifying and prioritizing stocks to achieve this objective are those provided in:

a) The 1993 Washington Department of Fish and Wildlife (WDFW) Salmon and Steelhead Stock Inventory (SASSI);
b) The 1998 Salmonid Stock Inventory for bull trout (SaSI);
c) The 2000 Salmonid Stock Inventory for coho (SaSI); and
d) The Lower Columbia Steelhead Conservation Initiative (LCSCI 1998).

SASSI notes that its stock origin designations should be considered as preliminary until such time as more detailed information confirms or refutes the current origin designations. For this reason, the SASSI data will be augmented by more recent information where and when it becomes available. In developing project proposals, sponsors are encouraged to bring forward any additional information available regarding stock identification, origin, production and status.

Based on the SASSI information, first priority under this objective will be given to stocks that are designated as being of **native** origin and **wild** production. Second priority will be given to stocks of **mixed** or **unknown** origin and **wild** production. Third priority will be given to stocks of **mixed** origin and **cultured** or **composite** production.

SASSI defines a **native** as "an indigenous stock of fish that has not been substantially impacted by genetic interactions with non-native stocks, or by other factors, and is still present in all or part of its original range." **Mixed** stocks are defined as those whose individuals originated from commingled native and non-native parents, and/or by mating between native and non-native fish; or a previously native stock that has undergone substantial genetic alteration." Stocks of **unknown** origin are those "where there is insufficient information to identify stock origin with confidence."

SASSI defines a **wild** production stock as one that "is sustained by natural spawning and rearing in natural habitat, regardless of parentage." A **cultured** stock is defined as one that "depends upon spawning, incubation, hatching, or rearing in a hatchery or other artificial production facility." A **composite** stock is a stock "sustained by both wild and artificial production."

3. Restore or sustain geographic distribution of stocks.

Maintaining multiple stocks across the region is necessary to reduce the risk that changes in environmental conditions, catastrophic events, and disease will result in unacceptable risk of species extinction. Priority will be given to restore or sustaining the historic geographic distribution of stocks. Noteworthy in this regard are listed chum stocks. Currently only three relatively small stocks of chum exist in

the region. They are located in the Grays River, Hardy Creek and Hamilton Creek. Other stocks with limited geographic distribution are summer steelhead and bull trout. Efforts should be made to increase the number and distribution of these stocks throughout their historic range within the region through habitat restoration activities.

4. Maintain healthy stocks of a listed species.

Maintaining healthy stocks of listed salmonid species can substantially reduce the biological risk and costs of species recovery. Rather than allowing habitat conditions to deteriorate to the point that healthy stocks are reduced to depressed or critical levels, priority will be given to projects that protect or restore habitat conditions and habitat –forming processes upon which existing healthy stocks of listed salmonid species depend.

Of the 46 stocks of listed salmonid species in the lower Columbia, 17 are identified as healthy (13 fall chinook, 2 spring chinook, 1 winter steelhead, and 1 chum). The list is based on the WDFW SASSI and SaSI, LCSCI, and Limiting Factor Analysis (LFA, 1999-2001) reports for WRIA's 26 through 29.

5. Support recovery of critical stocks of listed species

SASSI classifies a stock as "critical" if it is "experiencing production levels that are so low that permanent damage to the stock is likely or has already occurred." SASSI further states that these stocks are "in need of immediate restoration efforts to ensure their continued existence and to return them to a productive state."

The loss of a critical stock can reduce genetic and life cycle diversity within the region. For this reason habitat restoration and protection actions needed to support the recovery of critical stocks will be given priority. The SASSI report did not identify any critical stocks in the lower Columbia. However, the LCSCI classified Wind River summer steelhead stocks (Mainstem, Panther Creek, Trout Creek) as being in critical condition. Accordingly, habitat projects benefiting these stocks will be a high priority.

Habitat Protection and Restoration Goals

Recovery of salmonid species requires the restoration and protection of the habitat conditions and processes upon which the fish depend. The following goals are listed in priority order.

Restore access to habitat

Removal of man-made barriers to substantial reaches of good quality habitat provides important benefits to fish in both the near and long term. Actions to improve access can include removal or replacement of blocking culverts and reconnecting isolated habitats,

such as side channel areas. Protecting or restoring properly functioning habitat conditions are only beneficial if fish have the necessary access to the habitat. In assessing the need to remove a barrier consideration must be given to the stocks and life-history stages affected and the type, quality and quantity of habitat that would be made accessible. LFA reports, barrier inventories, and other watershed and habitat assessments will be used in assessing the need to remove or correct a barrier.

Protect existing properly functioning habitat conditions.

Existing high quality habitat is critical to sustaining current fish abundance and productivity. Habitat restoration can be expensive and technically difficult, if not impossible. For this reason, protecting properly functioning habitat from degradation and loss is an important priority. LFA reports, other watershed and habitat assessments, and stock priorities will be used to identify and rank habitats for protection.

The quality and quantity habitat, the potentially affected stocks, and the nature and urgency of the threat to habitat values are key considerations in determining habitat protection needs. Priority will be given to protection of high quality habitat facing serious near-term threats.

Restore degraded watershed processes needed to sustain properly functioning habitat conditions.

Habitat projects should focus on the restoration of watershed functions that will sustain habitat conditions upon which salmon stocks depend over the long-term. Projects that address a habitat need on a temporary or near-term basis may be justified as a critical interim step in a comprehensive effort to restore natural habitat forming processes over the long-term. IFA reports and other technical assessments will be used to help identify and prioritize key watershed functions requiring restoration or protection in each basin.

Support of critical salmonid life-history stages.

Projects may target habitat conditions needed to support critical life-history stage needs. LFA information and other technical assessments should be used to help identify the key habitat needs for each species in a given basin. Sponsors should provide adequate supporting information linking:

1) The habitat requirements of target species and life-history stages.
2) The availability of those habitat conditions relative to historic conditions.
3) The likelihood that the lack of suitable habitat is restricting population abundance.

Consideration will also be given to a project's contribution to critical life-history stages on a regional level. Some basins, such as the Chinook River, play an important role in the life history of fish stocks from outside the lower Columbia region. (Dewberry 1997). Project proposals should clearly identify each species and its life-history stages that will benefit from the proposed action.

Secure near and long-term benefits

Addressing habitat protection and restoration needs that will provide both near-term and sustainable long-term benefits for fish should receive a higher priority than addressing conditions that will provide benefits to fish only in the long-term. Projects that provide only short-term benefits may be justified if they are:

a. Part of a comprehensive effort to restore natural habitat processes over the long-term, and

b. Designed to sustain or protect a stock(s) until natural habitat processes are restored.

Fish Stock Priorities

Stocks for each salmonid species have been categorized into four tiered priority groupings to assist setting habitat priorities within each watershed and across the lower Columbia region. Stocks for each watershed, except the Chinook River, were identified using SASSI. SASSI defines a stock as "the fish spawning in a particular lake or stream(s) at a particular season, which fish to a substantial degree do not interbreed with any group spawning in a different place, or in the same place at a different season."

Since SASSI stock information is not available for the Chinook River, stocks for this watershed were identified using information from Sea Resources (Dewberry 1997), WDFW, and the WRIA 24/25 LFA.

The tiered breakdown integrates goals 1 through 5 discussed in Section 2.A above. It uses stock information taken from SASSI, LFA reports, and LCSCI. SASSI definitions of stock origin, production type, and status are outlined in Section 1.A. The criteria for each of the four tiers is provided below:

A. Tier 1 (Highest Priority)

This Tier includes stocks that are (1) listed as threatened pursuant to the ESA and are (2) classified by SASSI as native, mixed, or unknown in origin and wild in production. It also includes all chum, summer steelhead, and bull trout stocks due to their limited geographic distribution. It may include stocks designated by SASSI as healthy, depressed, or critical if the stocks satisfy the ESA, origin, and production type designations for this Tier.

B. Tier 2

This Tier includes stocks that are (1) listed as threatened pursuant to the ESA and are (2) classified by SASSI as mixed, non-native, or unknown in origin and composite in production. It includes all stocks designated by SASSI as healthy or critical and not included in Tier 1. It may also include a stock designated as depressed if the stock satisfies the ESA, origin, and production type designations for this Tier.

C. Tier 3

Tier 3 includes all stocks that are proposed or are candidates for listing under the ESA. They may be of any stock origin, production type, or status designation.

D. Tier 4 (Lowest Priority)

Tier 4 includes all stocks that are not listed or proposed for listing under the ESA. They may be of any stock origin, production type, or status designation.

Habitat Protection and Restoration Priorities

The number of affected stocks and their importance along with the degree to which correction of a limiting factor or protection of habitat would help achieve or sustain properly functioning habitat conditions are key considerations in determining habitat priorities.

It should be noted that not all stocks will be present throughout the basin. Stocks likely to be present in a given river reach can be determined using the LFA fish presence information and maps.

Limiting factors have been identified using LFA reports. The importance of each limiting factor is ranked as high, medium, or low based on the habitat goals set forth in Section 2.B. It is organized by basin using the LFA sub-basin designations. In addition to ranking limiting factors within a basin, potential restoration and protection actions have been identified for each limiting factor. Finally, fish stocks and their priorities are also listed for each basin.

In general, limiting factors rated as high and affecting multiple high priority (Tier 1 or 2) stocks are a higher priority than limiting factors rated moderate or low and affecting few or lower priority (Tier 3 or 4) stocks.

This information is provided to assist project sponsors in identifying and developing projects that will address the most important habitat protection and restoration needs. It is intended to serve as guidance. It will be refined as additional information on fish stocks and habitat conditions becomes available. It should be further noted that basing a project on a limiting factor that is rated as high and affects high priority fish stocks substantially enhances the likelihood, but does not ensure, that a project will receive a high priority for funding. As discussed in Section 5 below, a project's priority for funding is based on both its benefit to fish and certainty of success. Certainty of success takes into consideration a project's relationship to other limiting factors and restoration efforts as well as project design, cost, and management elements.

Evaluation and Ranking of Habitat Projects

The ranking of habitat project proposals will be done using the same basic approach outlined for establishing habitat priorities but also takes into consideration the degree to which a project addresses an identified habitat priority and factors affecting the level of certainty that a project will produce its intended benefits for fish.

A. Evaluation Criteria

Each proposed habitat project will be evaluated using the following criteria:

1. Benefits to Fish

a. The number of stocks that will be affected and their priorities.

The number of stocks that would benefit from a project and their priority will be determined using the tiered stock listing discussed in Section 3 and the fish presence information contained in the applicable LFA report or other comparable source.

b. The nature and significance of the benefit's the project will have for the affected stocks.

While the benefit for all affected stocks will be considered, greatest weight will be given to the project's potential value to ESA listed species or unique stocks essential for recovery.

c. The degree to which the proposed correction of a limiting factor or protection of habitat would help to achieve and sustain properly functioning habitat conditions.

Factors to be considered include the extent to which a project addresses:

(1) An identified habitat priority as discussed in Section 4 or limiting factors identified in an LFA report or other technical assessment.
(2) Section 2.B habitat goals. These include the value of the project in:
(a) The importance of the project in restoring access to habitat;
(b) Achieving and sustaining properly functioning habitat conditions; and
(c) Providing for critical salmonid life history stages in the reach or basin.

2. Certainty of Success

The level of certainty that the project would produce its intended benefit for fish will be assessed based on the extent to which the proposed project:

a. Complements other habitat protection and restoration programs and projects within a basin.

Habitat projects should be designed, coordinated, and sequenced in concert with other salmon recovery activities with a watershed or basin. This can help to achieve the greatest benefit to fish in the shortest possible time and with the most efficient use of resources.

Specific consideration will be given to whether a project is:

(1) An element of a comprehensive watershed or basin restoration and protection strategy;
(2) Well coordinated and logically sequenced with other habitat projects completed, underway, and planned for a watershed or basin; and/or
(3) Complements and supports other local and state salmon recovery regulations and programs, including land use and development regulations, critical area ordinances, storm water management programs, shoreline master plans, forest management regulations, etc.

b. Has a sound technical basis in addressing habitat forming processes and limiting factors.

The success of a project requires a solid understanding of conditions and watershed processes that cause or contribute to the problem or limiting factor being addressed. For some projects, existing LFA information may be sufficient. More complex problems may require a more thorough assessment of conditions and watershed processes. This information may be available through existing studies and evaluations. In some cases, site-specific assessments and design work may be required. In order to assess whether a project has an adequate supporting technical basis, it will be important that the project proposal addresses considerations listed for its project type contained in the Guidance on Watershed Assessment for Salmon, Part 3 (Joint Natural Resources Cabinet, State of Washington, May 2001).

c. Demonstrates that sponsor experience and capabilities are commensurate with project requirements.

The success of a habitat project is dependent on the project sponsor's ability to design, plan, implement and monitor a project. Ideally, project sponsors should have experience in successfully completing project of similar nature, scope, and complexity. At a minimum, sponsors should indicate how they would acquire needed experience and expertise that they do not possess. Options for doing so could include partnerships with other agencies or organizations, or contracting for needed services.

d. Applies proven methods and technologies.

The certainty of a projects success can be enhanced through the use of proven and accepted methods and technologies. Projects should utilize approaches and technologies that are commensurate with the nature, scope, and complexity of the problem being addressed.

Innovative or experimental approaches may be acceptable if no proven method exists or it can be shown that they will reasonably extend knowledge of restoration methodologies.

e. Has community support. The long-term success of habitat restoration and protection efforts depends on the acceptance and support of local communities. Projects should be designed and implemented in a manner that accommodates local values and concerns.

f. Demonstrates that costs are reasonable for the work proposed and the benefit to be derived.

Given that resources for habitat protection and restoration are limited, projects should be designed and implemented in the most efficient and effective manner possible. Project costs should be commensurate with those for projects of similar nature, scope, and complexity. A project's chance of success can also be enhanced through the use of partnerships that can leverage expertise, contributions of materials and labor, and funding.

g. Demonstrates an effective maintenance and monitoring element.

Monitoring the effectiveness of the project is critical to determining the success of the project in meeting its objectives. Maintenance of a completed project may be critical to the project's performance and long-term effectiveness.

B. Scoring and Ranking of Habitat Project Proposals

Habitat projects will be scored by the TAC using a score sheet that is based on the evaluation criteria discussed in section 4.A. above. Each project will be scored on both its benefits for fish and certainty for success. As discussed above a project's benefit to fish is determined by the affected stocks and their priority and the degree to which the proposed correction of a limiting factor or protection of habitat would help to achieve and sustain properly functioning habitat conditions. Certainty of success is the level confidence that a project will achieve its goals.

The scores for each project will be used to rate its benefit for fish and certainty of success as high, medium, or low. Based on these designations a project will be assigned to a priority using the matrix below. Within each priority category projects will be ranked based on their combined benefit and certainty scores. Projects in categories 1, 2 and 3 will be recommended for funding.

Wildlife

Goal: Maintain the historic statewide diversity of native wildlife species.

Objective: Develop management guidelines for game and nongame species that are endangered, threatened or sensitive (ETS).
Objective: Identify, map, and update the Priority Habitats and Species (PHS) data.
Objective: Support the PHS and ILM programs with data dissemination and management recommendations.

Maintaining diversity statewide can best be achieved by maintaining diversity in individual watersheds. The wildlife species in the Grays River subbasin are a diverse group of native, game and ETS species. Proper management of these species in the watershed will aide in maintaining diversity.

Goal: Determine the ecological needs and population status of wildlife species of concern in WRIA #25.
Objective: Conduct and support research to investigate the population status, habitat requirements and the natural ecology of wildlife species of concern in WRIA #25.

Spotted owls, bald eagles, and Larch Mountain salamanders are all species of concern statewide and in the Grays River subbasin. Whereas the ecological needs and population status of owls and eagles have been well described, little is understood regarding Larch Mountain salamanders. Work being conducted in the watershed will increase our understanding of this species.

Goal: Develop an inventory of the current habitats of wildlife populations in WRIA #25.
Objective: Use Geographic Information System and remote sensing to map habitats.

Mapping and inventorying wildlife habitats is key to protection of the Grays River wildlife. Remote sensing and GIS technologies have been used elsewhere to map current conditions of critical habitat components. WE need to do the same for WRIA #25 for the key species and then model habitat changes and their impacts on wildlife in the future.

Goal: Protect and manage for recovery of all native wildlife classified as endangered, threatened or sensitive in WRIA #25.
Objective: Develop and implement recovery and management plans for ETS species in WRIA #25.

Managing the Grays River subbasin at the landscape scale will aide in protecting all native species, including ETS species. Understanding individual species habitat requirements and interactions with other will improve long-term sustainability of wildlife diversity in the watershed.

Goal: Manage game populations for sustainable natural production where feasible.
Objective: Identify and evaluate acquisition needs for important habitat of game species in WRIA #25.
Objective: Determine abundance, distribution and composition of game populations in WRIA #25.

Objective: Develop management plans for game species in WRIA #25.

Elk, deer, and goose populations in the watershed are-doing well and maintaining themselves through natural production and are not imperiled at this time. However, increased human development and changes in land management practices will affect species distribution and productivity. We must model for habitat changes, foresee problem areas, and initiate management strategies now to meet species objectives in the future.

Research, Monitoring, and Evaluation Activities

The Lower Columbia River Chum Salmon Recovery Project attempts to recover and restore Lower Columbia River Chum. In 1998, a chum recover project was initiated in the Grays River. Brood stock were captured from Gorley Springs, artificially spawned, thermally marked, and reared at the Grays River Hatchery. Over one hundred thousand reared fry were released from the hatchery in March and April of 1999. In addition to this work, extensive stream surveys were done by WDFW to determine if remnant populations of chum salmon existed in tributaries entering the lower Columbia River on the Washington side of the river.

Fisheries

These activities occur in all lower Columbia subbasins:

- Activity 1 Collection of coded wire tags from hatchery returns and fish spawning in river.

~ Activity 1.1 WDFW staff at various Hatcheries collect and process coded wire tags from returning fish. Tags are read at the WDFW laboratory in Olympia.

~ Activity 1.2 PSMFC staff conduct spawning ground surveys, marking redd sites and collecting coded wire tags from returned spawners.

- Activity 2 Creel checks and coded wire tags are recovered through sport check surveys.
- Activity 3 Grays River chum salmon restoration project.

~ Activity 3.1 Adult chum salmon collection for brood stock purposes.

~ Activity 3.2 Spawn, incubate, and rear the offspring at Grays River Hatchery and release the subsequent juveniles into the Grays River.

- Activity 4 SSHIAP (Salmon Steelhead Habitat Inventory Assessment Program) will provide data for the Grays River basin area. This data will include:

~ Activity 4.1 Comprehensive fish barrier coverage.

~ Activity 4.2 Fish Distribution by species, life stages.

~ Activity 4.3 Habitat Typing by segment- breaks stream reaches into small/large tributary, gradients, habitat type (wetlands, etc), and confinement.

~ Activity 4.4 Hydromodifications. SSHIAP will catalogue various hydromodifications in the drainage. Hydromodifications include anthropogenic structures that in some way prohibit natural alluvial processes. These can include riprap banks, bulkheads, roads, and other features present in the active floodplain.

~ Activity 4.5 Other background information such as stream widths and flow will also be added. Habitat typing will be completed by mid November. Hydromodifications

will be completed by Dec. 31, 2001. All of this information will be available in GIS format on the web sometime after Dec. 31.

Wildlife

- Activity 1 Develop management guidelines for game and nongame species that are endangered, threatened or sensitive (ETS) and identify, map, and update the Priority Habitats and Species (PHS) data.
- Activity 2 Conduct and support research to investigate the population status, habitat requirements and the natural ecology of wildlife species of concern and determine abundance, distribution and composition of game populations.
- Activity 3 Develop and implement recovery and management plans for ETS species and develop management plans for game species in the Grays River subbasin.
- Activity 4 Identify and evaluate acquisition needs for important habitat of game species in Grays River subbasin.

Statement of Fish and Wildlife Needs

Evaluate and monitor fisheries for meeting performance indicators identified in the NMFS Fisheries Management and Evaluation Plan (FMEP) for the Lower Columbia River. Rationale: Limited monitoring of fish populations is presently occurring (see existing monitoring activities), but should be expanded to insure populations are not exceeding levels identified in the FMEP. This would allow harvest of surplus population while protecting wild populations.

- Determine abundance, distribution, survival by life-stage, and status of fish and wildlife native to the watershed including steelhead, coastal cutthroat, fall chinook, bull trout, coho salmon, lamprey, crayfish, and others.
  Rationale: Grays River steelhead and chinook salmon are part of the Lower Columbia River ESU and are currently listed under the ESA. Abundance and survival estimates will be needed to determine if habitat restoration programs are working and to determine if these fish can be removed from the Endangered Species list. Coastal cutthroat trout have been proposed for listing under ESA and coho salmon are considered a candidate for listing under ESA because of possible lowered status across their distributional range. Little is known about historical and current distribution and status of these fish in this watershed. The abundance of pacific lamprey have declined and incidental recent observations during fish sampling efforts and comparison of these observations with historical observations suggest that crayfish have disappeared from some of their former range. Crayfish and lamprey are likely an important part of the food chain, and documenting their distribution and status is an important factor for assessment of health of the Grays River ecosystem.

- Determine genetic and life history types of native fish and wildlife and the strength of their current expression relative to historical and desired future conditions.
  Rationale: Maintaining life history and genetic diversity allow fish to be productive under the current and a wide variety of future conditions. Determining these levels of diversity will help develop successful recovery strategies.

- Determine the effectiveness of habitat restoration projects on achieving the desired physical change and measure the response of wild steelhead populations to these changes.
  Rationale: Large-scale monitoring and site-specific monitoring projects are needed to evaluate the effectiveness of habitat restoration projects in the rebuilding of fish populations.

- Conduct routine surveys for chum salmon in the Grays River subbasin. Evaluate seeps and other potential spawning areas for chum production.
  Rationale: Chum are present in the Grays River subbasin. Seeps and springs within the subbasin are important for successful chum spawning.

- Implement restoration actions identified in the watershed assessments that are consistent with recovery of fish and wildlife populations and their habitat.
  Rationale: Restoration projects that are the outcome of watershed assessments and have gone through a review process have addressed factors that limit the recovery of fish and wildlife populations. These projects should have a high probability for success. The above or modified monitoring and evaluation programs should be funded as part of these restoration activities.

- Continue watershed coordination and local stewardship programs.
  Rationale: The land and resource management decision needed to recover fish and wildlife populations and their habitat will impact local residents. Many of these people are knowledgeable about these resources and should be part of the decision process.

- Determine abundance, distribution, survival by life-stage, and status of fish and wildlife native to the watershed including steelhead, coastal cutthroat, chum, chinook, bull trout, coho salmon, lamprey, crayfish, and others.
  Rationale: Grays River steelhead and chinook salmon are part of the Lower Columbia River ESU and are currently listed under the ESA. Abundance and survival estimates will be needed to determine if habitat restoration programs are working and to determine if these fish can be removed from the Endangered Species list. Coastal cutthroat trout have been proposed for listing under ESA and coho salmon are considered a candidate for listing under ESA because of possible lowered status across their distributional range. Little is known about historical and current distribution and status of these fish in this watershed. The

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Grays Subbasin Recommendations

Projects and Budgets

The following subbasin proposal was reviewed by the Lower Columbia and Estuary Province Budget Work Group and is recommended for Bonneville Power Administration project funding for the next three years.

New Projects

Project: 30005 - Grays River Watershed and Biological Assessment

Sponsor: Lower Columbia Fish Recovery Board (LCFRB)
Pacific States Marine Fisheries Commission (PSMFC)
Pacific Northwest National Laboratory (PNNL)

Short Description:

Conduct a watershed and biological assessment of the Grays River watershed to protect and restore chum spawning habitat.

Abbreviated Abstract

The lack of stable spawning habitat is considered the primary physical limitation on Grays River chum production today. Yet, data is lacking on how and where this problem can best be addressed. The Grays River Watershed and Biological Assessment project proposes to conduct a geomorphological and hydrological assessment of the Grays River and its tributaries to gain a better understanding the location, distribution, characteristics and stability of salmonid spawning habitat within the basin, with emphasis on chum and chinook salmon spawning reaches. The project will also include chum and chinook spawning surveys and the collection of data on the physical characteristics of preferred spawning sites to help define critical habitat features within chum and fall chinook salmon spawning areas in the Grays River. Data from this assessment will be used to develop a prioritized list of actions to protect and restore critical chum salmon spawning habitat in the Grays River.

Currently, two genetic enclaves of "threatened" Lower Columbia River chum salmon are recognized, a population in the Grays River and a constellation of stocks just below Bonneville Dam. The stocks below Bonneville are subjected to adverse effects from the operation of the FCRPS and the BOR projects that results in their mortality or impaired fitness and that reduces the likelihood of the survival and recovery of the ESU. In light of these threats it is obviously extremely important to maintain and enhance the productivity of Grays River chum.

The project will provide critical data to address the needs for chum salmon outlined in RPA Action #157. The project will also build on numerous restoration and protection efforts for listed salmonids within the Grays and lower Columbia Rivers. This assessment will become the first significant step of a comprehensive program to ensure the survival

and recovery of Columbia River chum in its most productive system in the lower Columbia.

Relationship to Other Projects

Project ID	Title	Nature of Relationship
199900301	Evaluate Spawning of Fall Chinook and Chum Salmon Just Below the Four Lowermost Mainstem Columbia Dams	One goal of that project is to perform intensive spawning ground surveys for chum salmon habitat and opportunities for restoration. This proposal will complement those efforts.
200001200	Evaluate Factors Limiting Columbia River Gorge Chum Salmon Populations	The primary purpose of that project is to evaluate factors limiting chum salmon production in Hamilton and Hardy creeks plus the mainstem Columbia. This proposal will expand the coverage into the Grays River.
	StreamNet	This proposal will provide information on spawning distribution and habitat use by Grays River chum for the StreamNet database.

Relationship to Existing Goals, Objectives and Strategies

In March 1999, NMFS listed Lower Columbia River chum salmon as a threatened species under the auspices of the Endangered Species Act (ESA). Currently, two genetic enclaves of Lower Columbia River chum salmon are recognized, a population that returns to the Grays River and a constellation of stocks that spawn just below Bonneville Dam (e.g. in Hardy and Hamilton Creeks and also adjacent to Ives Island). Both stocks belong to the Lower Columbia fall chum ESU (Johnson et al.1997).

According to the FCRPS Biological Opinion (2000: Chapter 8.11) the biological requirements of this ocean-type salmonid are not being met either in the FCRPS action area or at the life-cycle level. Individuals of this species are subjected to adverse effects on spawning and rearing habitat in the Hamilton/Hardy creeks/Ives Island complex below Bonneville Dam that result in their mortality or impaired fitness. Continuing the proposed action for the long-term, coupled with the current prospects for survival and recovery across the range and life-cycle of the ESU, is likely to appreciable reduce the likelihood of both its survival and its recovery. In contrast to the situation for LCR chinook, the Columbia River Chum ESU spawns in only two areas, meaning that FCRPS effects on habitat in one of these areas significantly affect the entire ESU (FCRPS 2000). Since the proposed operation of and configuration of the FCRPS and the BOR projects are likely to jeopardize the continued existence of this ESU and to adversely modify its designated critical habitat, it is obviously extremely important to maintain and enhance the productivity of the Grays River chum stock.

The Grays River habitat assessment project will provide critical data to directly address the needs for chum salmon outlined in RPA Action #157 of the NMFS Biological Opinion for the Federal Columbia River Power System (FCRPS), which states "BPA shall fund actions to improve and restore tributary and mainstem habitat for CR chum salmon in the reach between the Dalles Dam and the mouth of the Columbia River." The assessment of the Grays River watershed will provide baseline information that will 1) identify habitat factors limiting the quantity, quality and stability of salmonid spawning and rearing habitat, with emphasis on chum salmon and 2) identify habitat/watershed protection and restoration priorities. This assessment will become the first significant step of a comprehensive

program to ensure the survival and recovery of Columbia River chum through the development of a prioritized list of protective and restorative actions in the most productive chum salmon area in the lower Columbia.

The Grays River project will also directly address needs outlined in the Statement of Fish and Wildlife Needs chapter of the Grays River Subbasin Summary (Roler 2001). The Subbasin Summary identifies the need to "Conduct routine surveys for chum salmon in the Grays River subbasin, and to evaluate seeps and other potential spawning areas for chum production." The monitoring of chum spawning distribution and the associated physical characteristics of spawning sites will provide critical data for the protection of existing productive spawning areas, and will help identify areas with the potential to provide additional spawning habitat.

This proposal is also consistent with the Columbia Basin System Planning Salmon and Steelhead Production Plan for chum salmon in the lower Columbia Subbasin (WDF et al. 1990). Planners recommended that a combination of natural and hatchery production would be the most likely way to produce the most rapid sustainable improvement in chum runs. Specifically, it was assumed that improving habitat conditions would promote efficient natural production. It was also assumed the most rapid way to rebuild the run would be to combine releases of an appropriate stock into the improved habitat (WDF et al. 1990).

The biological and environmental data collected during the course of this assessment and monitoring effort will also be used to assess the success of this type of recovery strategy in the Columbia. WDFW and ODFW staffs are currently surveying the Lower Columbia to ascertain the occurrence and abundance of chum salmon in this part of the river. Additionally, the habitat attributes of the spawning sites found are being recorded. These data will be used to examine the possibility of creating additional protected spawning sites in the Grays River watershed and for other locally adapted chum salmon populations (e.g. in the Elochoman, Lewis, Washougal and Cowlitz rivers plus Skamokawa, Mill, Germany, Abernathy creeks and elsewhere). Hence, this project is a vanguard effort to collect the baseline data necessary to evaluate the use of protected spawning locations and habitat restorations for chum salmon recovery in the Columbia River.

A number of projects related to the Columbia River chum ESU have been funded by the various action agencies implementing the FCRPS BiOp (see the List of Habitat Projects in 2002 Implementation Plan for the FCRPS). All of the previously funded projects have focused on the Columbia River mainstem and the Hamilton/Hardy chum stock near Bonneville Dam. These projects provide important information and/or restoration actions that should benefit chum salmon. However, nothing has been funded through these programs in the Grays River, the most productive system supporting the Columbia River chum ESU. The FCRPS 2002 Implementation Plan (under Habitat Strategy 2) identifies the need to "Improve and restore tributary and mainstem habitat for Columbia River chum salmon." According to the document "Project locations for this substrategy are still to be determined." Considering that the majority of Columbia River chum spawn in the Grays River, it would appear that a productive place to focus assessment and research dollars is within this basin.

Washington State's Guidance on Watershed Assessment for Salmon (JNRC 2001) advises that watershed assessment work for salmon restoration needs to progress in three stages. The guidance suggests a need to answer three key questions pertaining to these stages; 1) what habitat conditions are limiting salmon production? 2) what processes or land uses are causing the habitat conditions? And 3) what linkages exist between salmon and habitat conditions? The Grays River Watershed and Biological Assessment project will gather the appropriate data to answer all three of these questions, and identify specific actions that will benefit salmon in the subbasin. This information will provide the level of confidence Washington State and other agencies need to approve and fund future restoration actions in the Grays.

Review Comments

This project scope and budget should be considered along with all the chum salmon projects. NMFS has identified this project as a BiOp project.

Budget

FY2003	FY2004	FY2005
Rec: $474,734 Category: High Priority	Rec: $325,348 Category: High Priority	Rec: $365,348 Category: High Priority

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