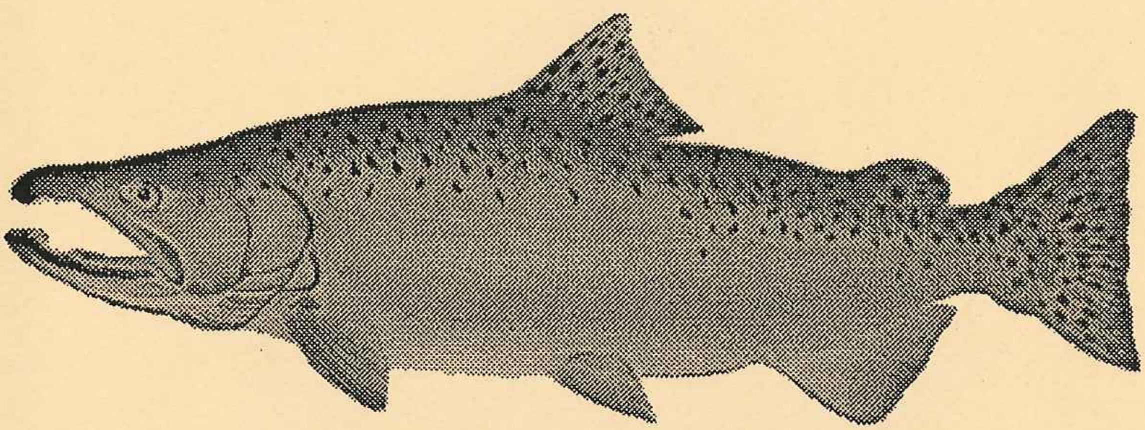
ALSEA RIVER BASIN
FISH MANAGEMENT PLAN



Oregon Department of Fish and Wildlife

November 1997

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INTRODUCTION

The Fish Management Policy of the Oregon Department of Fish and Wildlife (ODFW) requires that management plans be prepared for each basin or management unit. The Alsea River Basin Fish Management Plan (hereafter referred to as the Alsea Plan) was developed to direct management of the fish resources of the Alsea River Basin. The scope of the plan includes the main stem Alsea River and its tributaries and publicly accessible lakes, ponds and reservoirs in the basin.

The Alsea Plan is one of several Oregon mid-coast basin plans developed by ODFW. Other plans have been developed for the Salmon River, Siletz River, Yaquina River, Yachats River, and Siuslaw River basins and for small ocean tributary streams along the mid-coast.

ODFW is committed to the planning process as an integral part of all current and future management by the agency. Species plans for coho, coastal chinook, steelhead, trout and warmwater game fish have been adopted. These statewide plans guide the development of more localized plans for individual river basins and subbasins.

These plans serve several needed functions. They present a logical, systematic approach to conserving our aquatic resources. They establish management priorities and direct attention to the most critical problems affecting our fisheries so that the Department's funds and personnel can be used accordingly. They inform the public and other agencies about the Department's management programs and provide them with the opportunity to help formulate those programs.

The Alsea Plan was jointly developed by ODFW staff and a public steering committee. The steering committee included individuals who represented federal land management agencies, state and local government, private land owners, and fishing and conservation groups. The function of this committee was to help identify management direction and strategies for fish resources in the Alsea River Basin. The steering committee helped develop management policies, objectives and actions, and reviewed drafts of the plan. Alsea River Basin Steering Committee members were:

Member	Affiliation
Gary Blanchard	*Starker Forests, Inc.*
Fred Briggs	*Northwest Steelheaders Albany Chapter*
David Compton and Elizabeth Daly	*Lincoln County Watershed Watch*
Tim Farrell	*Taylor's Landing*
Gaylord Gilmour	*Alsea River Fish Enhancement Association*
Herb Goblirsch	*Commercial Fisher*
Dick Hanson	*Oregon Federation of Fly Fishers*
Clyde Jefferson	*Alsea Valley Alliance*
Scarlett Kier	*Central Coast Guide Service*
Andy Landforce	*Izaak Walton League*
Steve Lucas and Paul Thomas	*Siuslaw National Forest*
Fran Recht	*Oregon Shores Conservation Coalition*
Jim Reid	*Waldport Chamber of Commerce*
Mac Zirges	*Realtor*

The plan is divided into sections that deal with habitat, the major fish species or groups of species, and angling access. Each of these sections contains:

1. Background and Status—historical and current information on the topic of the section.

2. Management Considerations—important issues to consider in formulating management policies, objectives, and actions.

3. Policies—mandatory operating principles developed specifically for management activities in the basin related to that species or topic.

4. Objectives—what is intended to be accomplished.

5. Actions—means of achieving the objective.

Legal Considerations

Besides the statewide species plans, the Alsea Plan must also conform to other established constraints such as federal acts (e.g., Wild and Scenic Rivers, Wilderness, Endangered Species), state statutes, administrative rules, memoranda of understanding and other policies. These include:

1. Legislation—Oregon Revised Statutes.

2. Oregon Administrative Rules (OAR)—Goals and policies for commercial and sport fishing regulations, fish management, and salmon hatchery operation, including the Wild Fish Management and Habitat Mitigation policies.

3. Procedures developed by ODFW—Manual for Fish Management (1977); A Department Guide for Introductions and Transfers of Finfish into Oregon Waters (1982).

4. Agreements with other agencies—e.g., U.S. Forest Service (USFS), Bureau of Land Management (BLM), and the state Water Resources Department (WRD).

5. Rules and regulations of other federal, state, and local jurisdictions—e.g., Oregon Department of Environmental Quality (DEQ), Oregon Department of Forestry (DOF), Oregon Department of Land Conservation and Development (DLCD).

The Oregon Plan

Subsequent to the initial writing of this plan, the State of Oregon began developing a plan for restoring salmon populations along the entire length of the Oregon coast. The culmination of this effort is called the Oregon Plan. The Alsea Plan, for the most part, provides more basin specific direction for salmonid recovery efforts than found in the Oregon Plan. The Alsea Plan, however, did require minor editing to make it consistent with the objectives and actions identified in the Oregon Plan. The wording of some objectives and actions may be different than what was developed with the steering committee, but the intent has remained the same. As new information is gathered and actions to address steelhead recovery are developed, objectives and actions in the Oregon Plan, and consequently the Alsea Plan, will be revised.

ALSEA RIVER BASIN MANAGEMENT OVERVIEW

Perhaps Oregon's best opportunity for recovery of productive native anadromous fish species exists in rivers and streams in the Oregon Coast Range, including the Alsea River Basin. These watersheds typically have vast contiguous expanses of streams that retain their inherent capacity to be very productive for an array of anadromous species. These streams have few dams, limited water withdrawals and large blocks of forested landscape. Most of this habitat has been impacted by human activities, but can be recovered through a combination of natural processes and well thought out artificial restoration projects. Viable wild populations of all native salmonid species are still present so the potential for utilization of existing and recovered habitat is high.

Fishery management in the Alsea River Basin will focus on multiple fish species and the restoration of habitat conditions that benefit the entire array of fish species (Lichatowich et al. 1995). This multi-species approach is taken because most Alsea River Basin stream reaches support co-existing populations of at least four kinds of highly valued anadromous salmonids (coho and chinook salmon, steelhead and cutthroat trout) as well as a variety of non-salmonid species. Management actions including efforts to influence habitat conditions, release of hatchery fish, or angling regulations will unavoidably affect multiple fish species, not simply the single target fish species. Alsea River Basin fishery management will be based on the assumption that overall fish production and benefits will be maximized by creating conditions that are favorable for the array of fish species, and letting natural processes function to determine the production of individual species.

The current status of salmonid species in the Alsea River Basin is variable (Table 1). Fall chinook and resident cutthroat appear healthy while spring chinook and chum salmon continue to sustain as small populations. Coho salmon, winter steelhead and searun cutthroat including both hatchery and wild stocks are very depressed within the Alsea River Basin. These depressed species have the common life history characteristics that they spend at least a year in freshwater before smolting, and migrate to the ocean during the spring. The three species also all have long-term hatchery programs in addition to wild runs. These species are depressed in other adjacent coastal basins, but some recent recovery is evident in these other areas while the Alsea has continued to decline even with closure of all directed fisheries. Mortality of smolts during spring out-migration appears to be particularly severe in the Alsea River Basin. Further discussion of this is included in the later chapter dealing specifically with coho salmon.

Table 1. Status of Alsea River Basin salmonid stocks.

Species	Status	Comments
Chum salmon	Depressed	Near southern edge of range of chum salmon; present in only a few tributaries in the lower basin.
Fall chinook	Healthy	Stable or increasing trend similar to other north and central coast fall chinook stocks.
Spring chinook	Depressed	Influenced by habitat conditions, hatchery salmon strays, competition with fall chinook.
Coho salmon	Depressed	Multiple factors responsible for depressed status: hatchery strays, over-harvest, loss of habitat, El Nino ocean conditions, survival of smolts during out-migration appears very low.
Winter steelhead	Depressed	Multiple factors responsible for depressed status; limited inventory information.
Cutthroat trout	Searun depressed, Resident healthy	Complex biology with multiple life history types.

Harvest management of wild fish will emphasize achieving adequate spawner escapement of all species to allow stocks to rebuild. Angling regulations will be designed to provide harvest opportunities for healthy species such as fall chinook while protecting sensitive species such as coho salmon. Harvest reductions for several species including winter steelhead and coho salmon will be achieved by fin clipping hatchery fish and implementing angling regulations requiring the release of all non-finclipped fish (Table 2). This will allow some harvest opportunities while also recovering depressed wild stocks. These regulations have been in place since 1992 for steelhead and are expected by 1998 for coho salmon. Appendix A table A-1 summarizes fishing opportunities in the Alsea.

Hatchery fish will play a primary role in providing for consumptive fisheries for winter steelhead, trout in lakes, and potentially coho in the future. New hatchery broodstocks from native Alsea stock will be developed. The volume of hatchery smolts released into the Alsea will be reduced, and smolts will be released from the hatchery facility at which they were raised. Fish that are not caught in fisheries should have good homing to the hatchery which will allow them to be removed from natural spawning areas (Table 3). Genetic impacts and interactions with wild fish in freshwater rearing and estuarine areas will be reduced. Increased survival of hatchery fish may be an added benefit from new broodstocks, direct releases from hatchery facilities, and reduced smolt volume. Development of new hatchery broodstocks from native Alsea stock will also improve options to use hatchery fish to re-establish or supplement wild runs where they are severely depressed or extirpated.

Habitat management will emphasize recovery of natural conditions on a watershed scale. Disturbance such as forest fires, landslides or other events that affect the landscape and aquatic habitats are recognized as a part of the natural system. It is assumed that the variety of fish species in the Alsea River Basin has developed the capacity to adapt and thrive in the face of these disturbances. It is only when systematic and excessive disturbance creates conditions outside the range of natural variability that native fish stocks are not likely to persist. Priority for habitat restoration activities will be given to watershed characteristics that are outside the range of natural variability and that are important to fish production (see Appendix B).

Table 2. Approximate total harvest rate (ocean and in-river) on wild anadromous salmonids returning to the Alsea River Basin since 1980, and harvest rates with recent or proposed management adjustments.

Species	Harvest rate since 1980	Harvest rate with recent or proposed adjustments
Fall chinook	~ 50 - 65%	~50 - 65%
Chum salmon	~ 5%	~ 0
Spring chinook	unknown	unknown
Coho salmon	average = 56%	~ 10 - 20% *
Winter steelhead	~ 40%	< 10% *
Searun cutthroat	unknown	moderate reduction

* Denotes that harvest rate reduction on wild fish will be achieved by finclipping all hatchery fish and having selective fisheries for fin clipped fish.

Individual species that are severely depressed will also be targeted for specific management activities to reduce the risk of extinction in the short term. This is necessary because recovery through a generalized watershed-fish assemblage approach will be gradual over an extended period of time. This may not be adequate to address immediate threats to the continued viability of severely depressed species such as coho salmon.

Table 3. Estimated proportion of salmonids spawning in natural production areas of the Alsea River Basin that are of hatchery origin.

Species	Proportion hatchery from 1980-94	Projected hatchery proportion with recent or proposed adjustments
Fall chinook	~ 10	~ 0
Chum salmon	< 0%	< 0%
Spring chinook	0 to 50% Rogue stock	~ 0
Coho salmon	< 20%	< 10%
Winter steelhead	~ 50% Alsea stock	< 10% most areas < 30% overall
Searun cutthroat	~ 50% Alsea stock	~ 0

Marine mammal and bird predation on Alsea River Basin anadromous fish is a widespread concern. Harbor seals and birds are sometimes observed preying on salmonids primarily in tidewater areas. Increases in seal abundance (Figure 1 and Figure 2) correspond to declines in several species of anadromous fish. Information is not available to determine predation on anadromous fish in the Alsea River Basin.

It would be beneficial to determine predation levels in the Alsea River Basin. Understanding marine mammal and bird predation would also be helpful in gaining perspective on other factors influencing anadromous fish abundance. The only action this plan will propose is to determine current levels in the Alsea River Basin. A study during the spring, when coho, steelhead and searun cutthroat smolts are migrating through tidewater areas is the highest priority.

Figure 1. Trends in Alsea River Basin anadromous salmonids with spring smolt out migration.

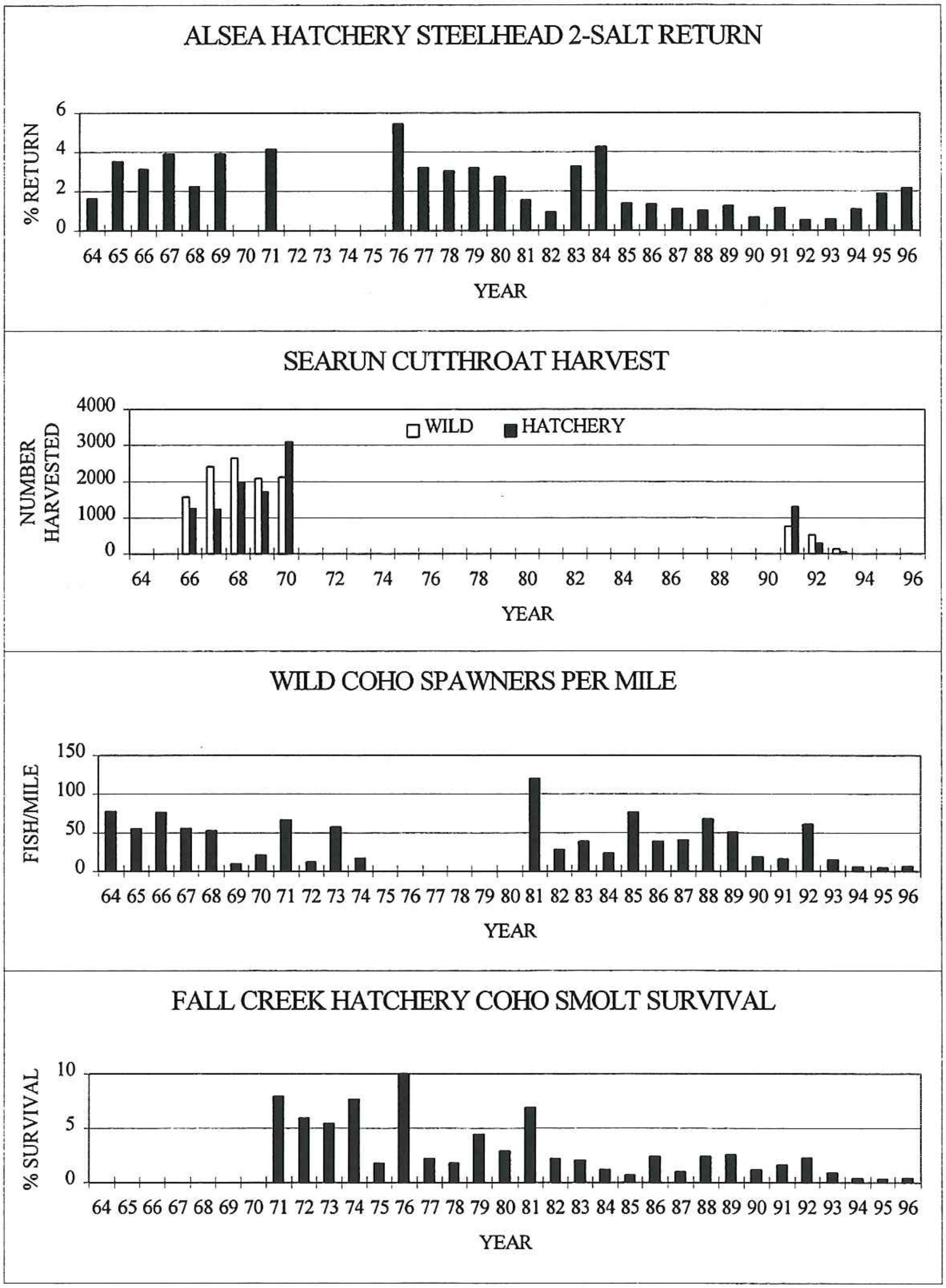
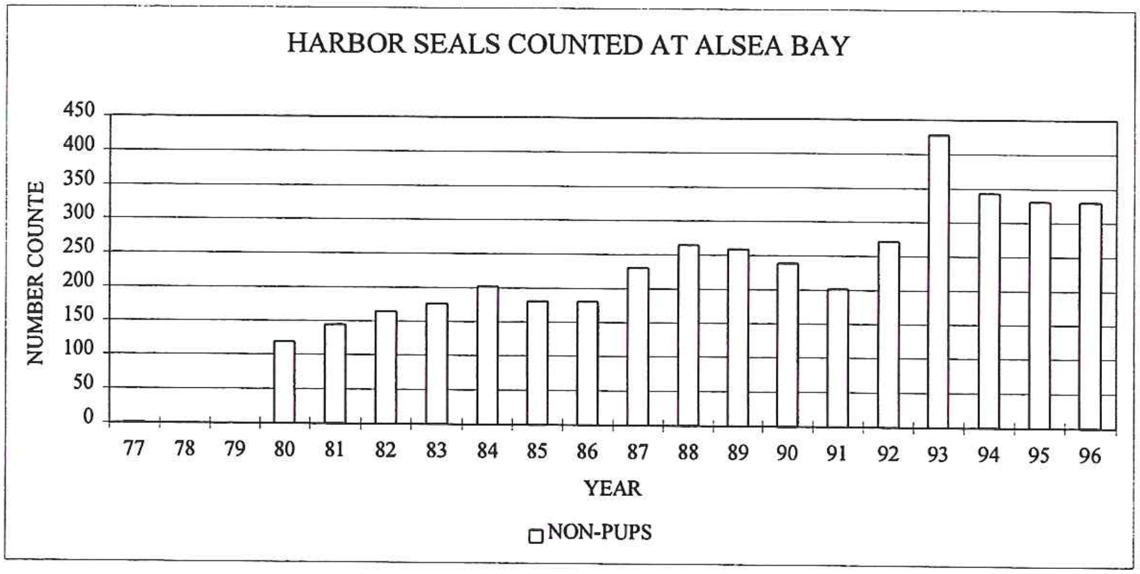


Figure 2. Trends in marine mammal abundance in Alsea Bay.



The following policies, objectives, and actions pertain to management of all fish species in the Alsea River Basin.

Policies

Policy 1. Fish management in the Alsea River Basin shall be directed at protecting and restoring self-sustaining populations of all fish species native to the basin.

Policy 2. Management of individual fish populations and their habitat shall only be emphasized when remedial actions are needed to address critical stocks or species, or when a population is the cause of constraints placed on mixed-stock fisheries or land use activities.

Policy 3. Permanent natural barriers to fish migration shall not be altered to allow fish passage and fish will not be transplanted above these barriers.

Policy 4. Conservation objectives take priority over harvest objectives.

Policy 5. Introduction of non-native fin fish species into flowing waters of the Alsea River Basin shall be prohibited.

Objectives

Objective 1. Restore and maintain productive populations of all species of salmonids native to the Alsea River Basin.

Assumptions and Rationale

1. Maximum production and the availability for harvest of valuable salmonid species will be achieved by focusing management on restoring and maintaining a functional ecosystem.

2. The Alsea River Basin has viable wild populations of all salmonids native to the basin.

3. Habitat within the Alsea River Basin is still largely suitable for production of native salmonids.

4. Focusing management on multiple species will be more efficient and have a higher probability of success than addressing single species.

5. The reaction of any single depressed fish population within the Alsea River Basin to management actions is difficult to predict. If an overall array of self-sustaining wild salmonids is restored, the relative abundance of individual species will be different from historic levels and largely unpredictable.

6. ODFW lacks resources for specific management of non-salmonid species. It is assumed that the needs of non-salmonid fish species in the Alsea River Basin that are not monitored will be provided for by maintaining and restoring the full compliment of indigenous salmonids.

Actions

1.1 Achieve the habitat objectives described in this plan.

1.2 Bring the level of hatchery fish in natural spawning areas of the Alsea to less than 10% of the total natural spawning population for each species except in areas in the immediate vicinity of Alsea or Fall Creek hatcheries.

1.3 Control fish harvest in the Alsea River Basin for each species so production is at levels approaching maximum potential.

1.4 Institute remedial recovery programs for fish species that are now severely depressed within the Alsea River Basin.

1.5 Work with federal agencies to develop information on the relationship between marine mammals and salmonids in the Alsea River Basin. This information may be developed by studying predation in the Alsea or a basin with similar characteristics such as the Siletz or Nestucca.

HABITAT

Basin Description

The Alsea River Basin is 466 square miles in size and contains about 950 miles of stream. The mainstem Alsea River is 43.5 miles long. Major tributaries include the North and South Forks of the Alsea River, Fall Creek, the Five Rivers system including Lobster Creek, and Drift Creek. The Alsea River enters the Pacific Ocean at Waldport, Oregon (Figure 3). Table 4 gives the approximate amount of fish habitat in the basin.

Table 4. Alsea River Basin size and approximate amounts of fish habitat. Preliminary draft analysis (ODFW 1994).

Basin area	466 square miles
Estuary area at high tide	2,146 acres
	Stream Habitat
Large mainstem reaches: spawning by chinook only	31 miles
Medium and large tributaries: [a] coho, steelhead and chinook, cutthroat above barriers	322 miles
Small tributaries: [b] cutthroat only in most cases	393 miles
Total	746 miles

[a] Includes streams on ODFW coho salmon data base, medium and large streams above barriers, and streams extending downstream to the confluence with the mainstem Alsea River or the head of tidewater.

[b] Estimates of small stream habitat were based on the Oregon Department of Forestry 1993 study of stream miles with fish in townships near Toledo and Seaside.

Land Use

Land in the Alsea River Basin is primarily federal ownership (Table 5). Federally owned land in the basin is concentrated in U.S. Forest Service (USFS) holdings in the lower drainage and Bureau of Land Management (BLM) ownership in the upper watershed (Figure 3).

Table 5. Land ownership in the Alsea River Basin.

Basin area		Percent of total area		
(square miles)	BLM	USFS	State	Private
466	26.5	37.1	0.2	36.3

The dominant land use in the Oregon mid-coast is forestry (Table 6). Areas managed as forest contain, or are used to produce, coniferous and deciduous trees. Rural wood lots, land regenerating from cuts and burns, as well as mixed and pure stands of merchantable or non-merchantable timber are included. Most forest land in the lower part of the basin is managed by the U.S. Forest Service as part of the Siuslaw National Forest. Forest lands in the upper watershed are managed mostly by the Bureau of Land Management and private owners.

Table 6. Land use in the Oregon mid-coast (Oregon Water Resources Department, 1980).

		Non-irrigated		Irrigated			
	Forest	Range	Agriculture	Agriculture	Urban	Water[a]	Other[b]
Total acres	1,392,765	33,093	21,745	1,249	10,966	14,199	25,510
% of total	92.9	2.2	1.4	0.1	0.7	1.0	1.7

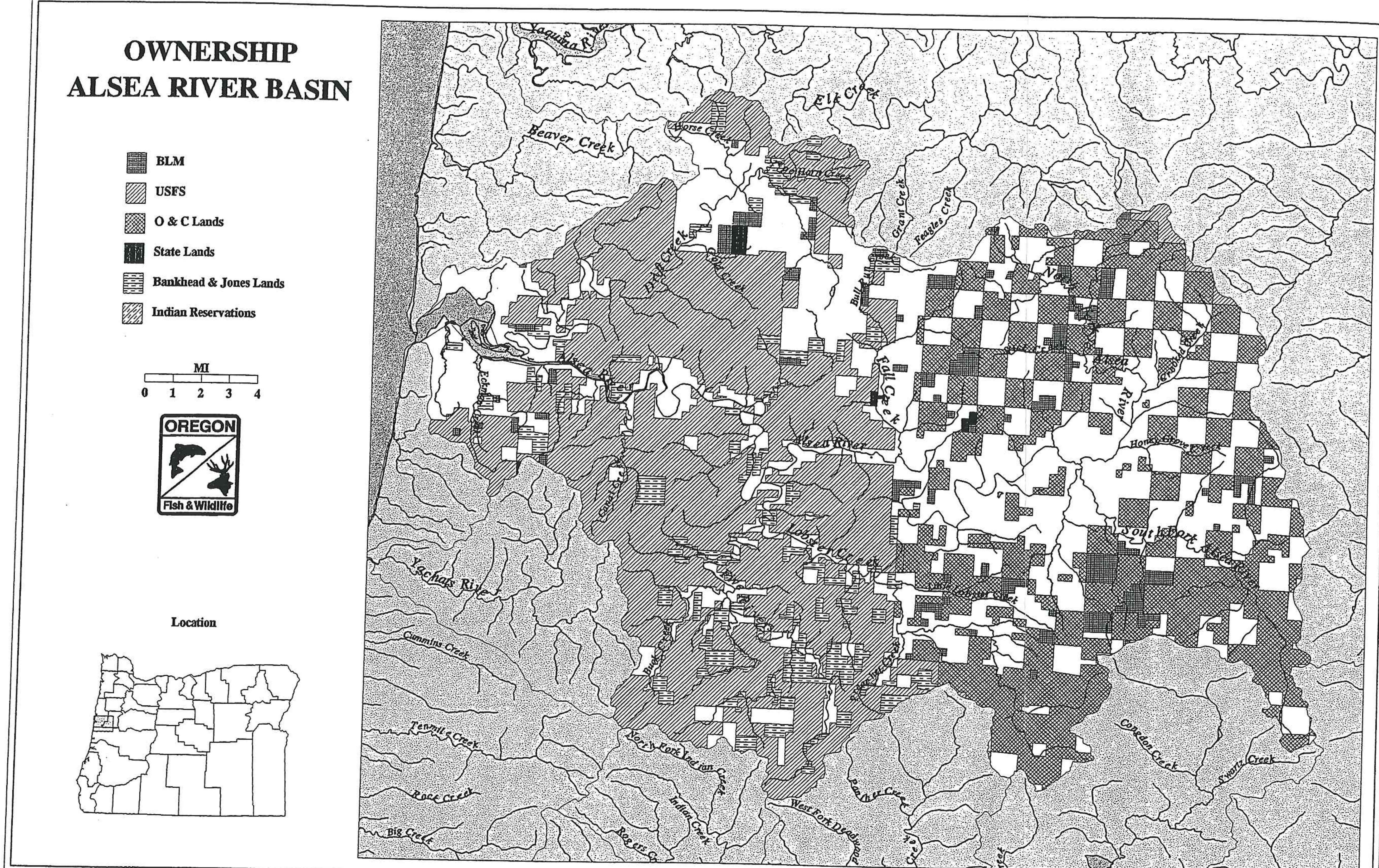
[a] Includes natural and human-made lakes and impoundments.

[b] Includes highway interchanges, airstrips, cemeteries, and other developed areas not adjacent to urban centers.

Secondary uses of land in the Alsea River Basin include range, agriculture, and residential use. Range land includes areas characterized by grasses, shrubs, meadows, unimproved pasture and scattered trees. In the Alsea River Basin, areas managed for range are found primarily along water courses. Pasture and hay production for livestock is the primary agricultural activity in the Alsea River Basin.

Urban land use pertains to residential, commercial, and industrial developments, including airports, schools, parks, and golf courses. Urban development in the Alsea River Basin

Figure 3. Land Ownership in the Alsea River Basin



is found primarily in or near the city of Waldport which has a population of about 1,700 (Center for Population Research and Census 1995).

ODFW Role in Habitat Management

The ODFW plays an important role in habitat management by acting as fishery experts for land management agencies with control over land use decisions. The ODFW, however, does not have regulatory control over most land management activities affecting fish habitat.

The ODFW plays a lead role in advising on fish habitat needs in land management decisions developed by State of Oregon land management agencies including the Oregon Department of Forestry, the Division of State Lands, the Oregon Water Resources Department, Department of Environmental Quality and the Department of Geology and Mineral Industries. ODFW also plays an advisory role in local and county land use planning activities. Overall activities within this category represent the majority of land management activities affecting fish habitat in privately owned lands in the Alsea River Basin.

Federal land management agencies have their own fishery biologists who play a lead role in providing consultation concerning fish habitat on federal lands. The ODFW consults with USFS and BLM staff in an advisory role and will work to coordinate direct fish management activities with the USFS and BLM habitat protection efforts on federal land.

The ODFW also works with land owners to implement cooperative fish habitat enhancement efforts in areas where there is a desire to do habitat improvement projects or where deviation from general regulations is needed to address a particular situation.

Goals for Habitat Conditions

A long-term goal for fish habitat within the Alsea River Basin is to return the watershed to more natural conditions which will allow fish production levels approaching those prior to human disturbance. This long-term goal recognizes that complete habitat recovery is not likely in some areas due to established allocation of land and water to other uses that are sometimes in conflict with providing complete habitat recovery. It also recognizes that the Alsea River Basin has very little fish habitat that is irreversibly lost so a high level of recovery is achievable. Progress toward this long-term goal can occur relatively quickly for some habitat attributes, but will take an extended time period for others.

The short-term goal for fish habitat within the Alsea River Basin is to reverse the declining condition of habitat so that measurable improvement or at least stabilization can be achieved in key aspects of watershed conditions that are reflective of the basin's capacity to produce fish. These include:

1. Maintenance or, in a few instances, increases in stream flows during summer low flow periods.
2. Reduction in summer stream temperatures where artificial warming occurs.

3. Increased instream structure such as large woody debris, beaver dams and other natural material.
4. Decreased sediment input into the waterway.
5. Maintenance of water quality.
6. Restoration of natural fish passage conditions throughout the watershed.
7. Increased habitat area available to anadromous and resident fish.

Management to Achieve Goals

Actions in this plan will focus efforts on the short-term goal of achieving measurable improvements or stabilization in watershed conditions that are reflective of the basin's capacity to produce fish. Consideration will be given to improving watershed conditions by protecting habitat from detrimental effects of land use, allowing natural recovery to progress, and undertaking specific targeted restoration projects where natural recovery is not likely to occur in a timely manner. Management issues and approaches for each aspect of watershed condition are as follows:

Instream Flows

Stream flow within the Alsea River Basin does not appear to be substantially altered from flow regimes that have existed since 1940 (Figures 4-6). Relatively stable flows indicate that the cumulative effect of existing water withdrawals is small compared to the overall flow.

The mechanism for maintaining instream flows will be enforcement of existing instream water rights (Table 7). Potential for increased summer flow will be dependent on conservation efforts or shifting water users away from summer withdrawals and toward use of water stored during winter high flow periods. The instream water rights do not have priority over some water uses. It is likely withdrawals will increase gradually unless the instream water right is modified to cap exempt withdrawals or existing water users are switched to the use of stored water.

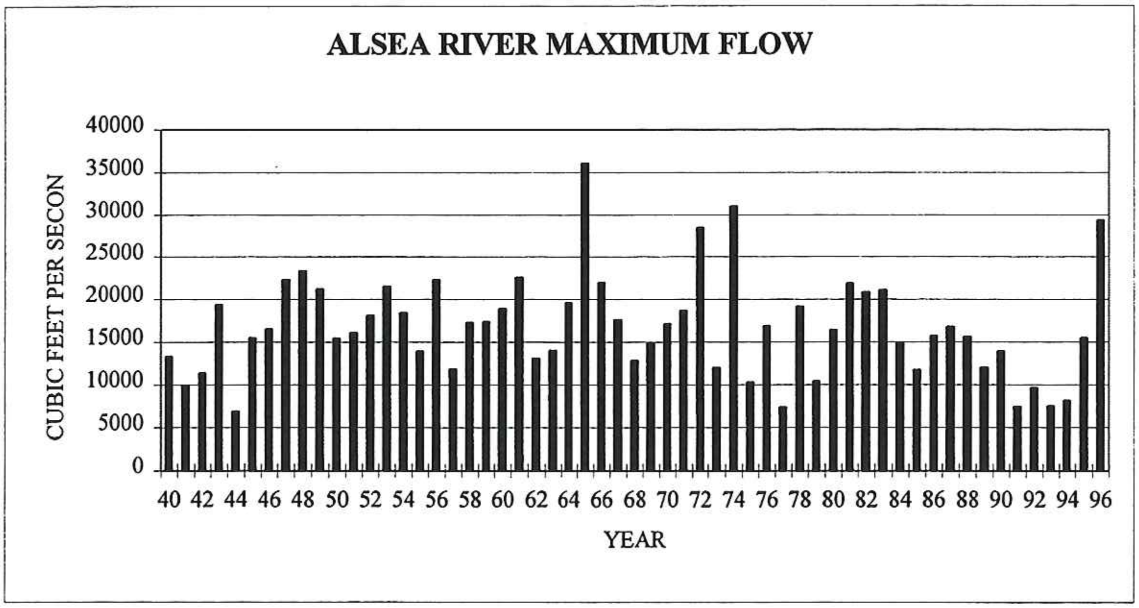
In the Alsea River Basin, 11 additional IWR applications have been filed with the Water Resources Department for consideration. These applications are listed in Table 8.

By law, the Water Resources Department is responsible for monitoring streamflows and regulating junior users in times of shortage. In reality, the Water Resources Department is currently not staffed at the field level with sufficient personnel to adequately monitor instream flows. If instream water rights are to be of value, district personnel will need to assist the Water Resources Department in prioritizing important sites to be monitored or procuring funding for additional staff.

Water Temperature

Altered stream temperatures can result from a variety of land use activities and can have major ramifications for salmonids. Altered water temperatures have been linked to changes in fish survival, growth, reproductive success, migration, interspecific competition, resistance to disease and parasites and overall system productivity (Boechler and McAllister 1992). Elevated temperatures during summer low flow periods are the principal concern identified in mid-coast rivers and streams.

Figure 4. Alsea River annual maximum flow near Tidewater, Oregon. From USGS Tidewater gauge.



Water temperatures in the Alsea River Basin have been monitored intermittently at locations spread throughout the basin. Monitoring at the head of tidewater during 1980 and 1981 documented maximum temperatures of 75° and 77° F for the two years respectively with an average of 21 days over 70° F each summer. Monitoring higher in the mainstem has indicated water temperatures are near the upper threshold level for salmonids in the mainstem from the start of major agricultural lands downstream to the estuary where a cooling marine influence is felt. Preliminary results from 1994 summer temperature monitoring indicates that temepratures regimes are similar to 1980-81 findings. During 1994, the summer maximum stream temperatures were greater than 70 F for extended time periods in the mainstem Alsea and the lower sections of major tributaries.

Figure 5. Alsea River annual mean flow near Tidewater, Oregon. From USGS Tidewater gauge.

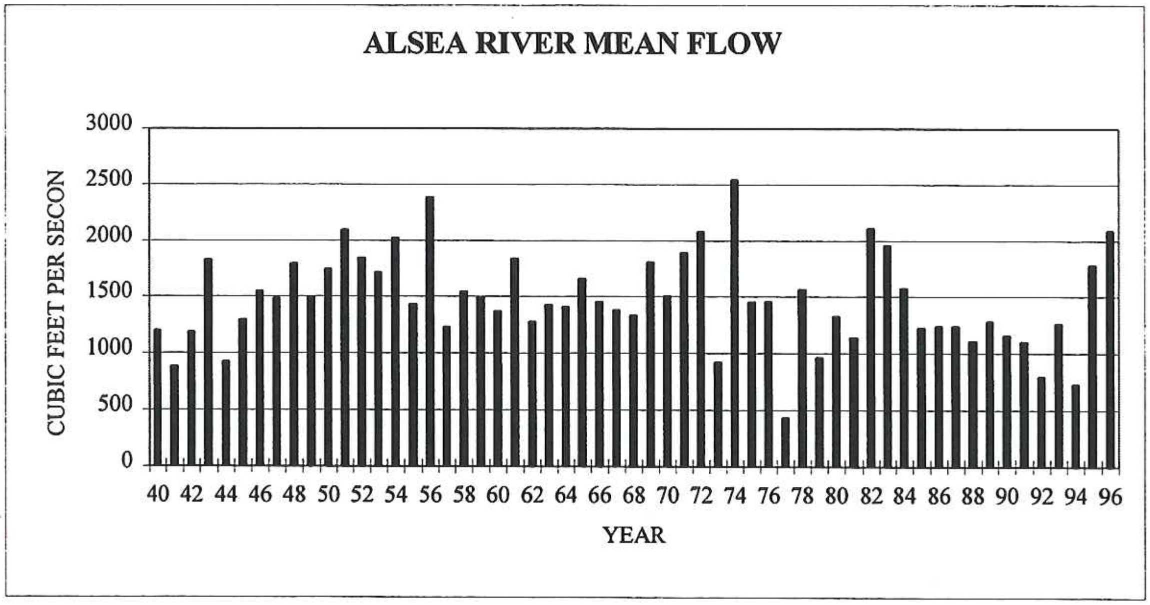
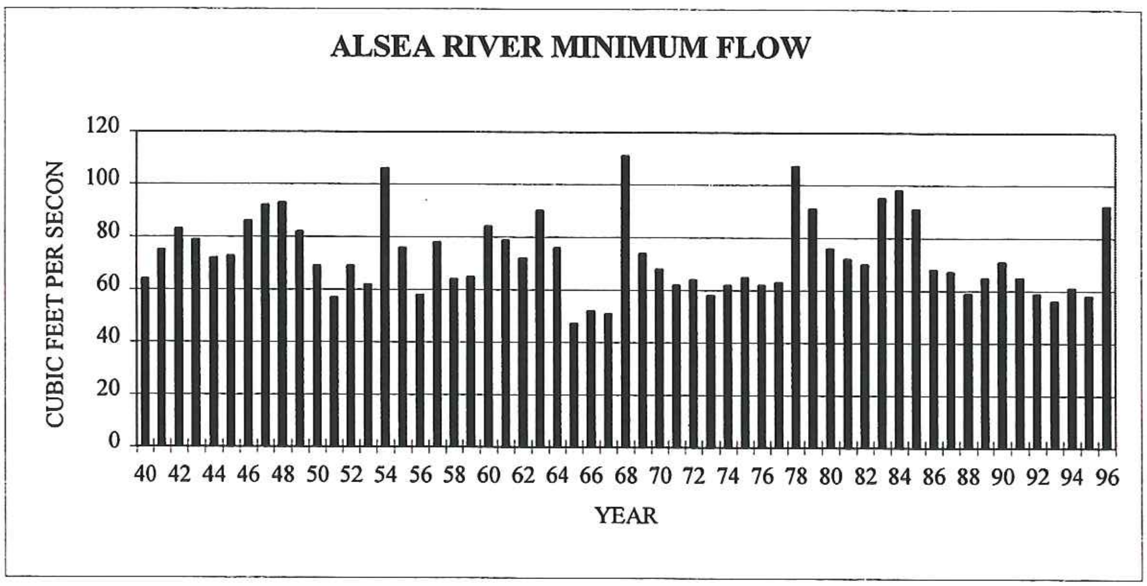


Figure 6. Alsea River annual minimum flow near Tidewater, Oregon. From USGS Tidewater gauge.



Water temperatures during the spring, winter, and fall have probably also been altered due to reduction in the riparian canopy. These alterations can impact fish by affecting life history characteristics such as egg incubation time. It will be very difficult, however, to understand and control these impacts, so in the Alsea we will focus on providing riparian conditions needed to insulate against summer temperature increases and hope this is sufficient to address temperature alteration during other time periods.

Tributaries also have elevated temperatures in areas where the riparian canopy has been lost. These larger tributaries contain fish communities dominated by non-salmonids such as dace which have an advantage at higher water temperatures. These larger tributaries have the potential for substantial salmonid production if water temperatures are reduced due to better riparian vegetation in buffer strips. Tributaries in forested lands are usually within preferred temperature ranges for salmonids.

Water temperatures throughout the Alsea River Basin will be monitored using automated temperature recorders during the next few years. This will be affordable because recent developments in technology have produced continuous temperature monitoring devices that cost less than a hundred dollars and can fit in a film canister. This temperature monitoring will complement existing records and will be used to pinpoint stream reaches where excessive warming is occurring and will be used to provide a baseline to evaluate effectiveness at providing cooler summer water temperatures in the future.

Research has identified that increased water temperatures in small and medium size streams result primarily from exposure of the water surface to the sun (Chamberlin et al 1991). Water temperatures in small and medium sized streams are affected to a greater extent by removal of streamside vegetation because a greater proportion of the stream surface is exposed to solar radiation and because the shallower water can be heated more quickly. Water temperatures in large streams such as the Alsea mainstem or tidewater areas are not substantially affected by streamside shading because of the large surface area that is exposed to the sun regardless of streamside vegetation and the large volume of water involved. These large streams have water temperatures that are primarily dictated by average air temperature.

Efforts to prevent excessive summer water temperature will focus on maintaining aquatic shade, or increasing stream shading where needed. Another probable cause of increased stream temperatures is channel widening that results from increased sediment deposition in the stream channel. Sediment deposition in the stream channel forces the flow toward the stream banks which erode, thereby resulting in a wider channel. This can be addressed by controlling the input of sediment into the basin.

Agricultural lands are where the most severe depletion of riparian shading has occurred. Efforts will be made to cooperatively work with land owners to increase stream-side shading and to develop standards for agricultural lands that provide waterway protection that is consistent with other land uses in the basins.

In forest lands, commercial forest activities are regulated for the purpose of meeting state water quality standards. The FPA water protection rules require vegetation retention buffers designed to maintain aquatic shade to meet this goal.

Table 7. Instream water rights in the Alsea River Basin from converted minimum perennial streamflows.

Location	Priority date	Exempt uses [a]	Summer minimum (cfs)
Alsea River			
mouth to Mike Bauer Park	7-12-66	D, L, M	90
Mike Bauer Park to So. Fk.	3-26-74	H, L, M	25
Drift Creek			
mouth to Wheelock Cr.	7-12-66	D, L	15
mouth to Wheelock Cr.	3-26-74	H, L	15
mouth to Meadow Cr.	7-12-66	D, L	5
Five Rivers			
mouth to Lobster Cr.	7-12-66	D, L	14
mouth to Lobster Cr.	3-26-74	H, L	25
Lobster Cr. to Green R.	3-26-74	H, L	10
Lobster Cr.			
at mouth	7-12-66	D, L	9
at mouth	3-26-74	H, L	10
Green River			
at mouth	3-26-74	H, L	5
Fall Cr.			
at mouth	7-12-66	D, L	8
at mouth	3-26-74	H, L	8
So. Fk. Alsea			
at mouth	7-12-66	D, L	10
at mouth	3-26-74	H, L	10
Bummer Cr.			
at mouth	3-26-74	H, L	4
No. Fk. Alsea			
at mouth	7-12-66	D, L	18
at mouth	3-26-74	H, L	18

[a] H = human consumption, D = domestic use, L = livestock use, M = municipal use.

Table 8. Instream water right applications in the Alsea River Basin.

Stream	Reach (river miles)	Date
Alsea River	12.1-20.9	3-25-91
	20.9-43.2	3-25-91
Five Rivers	0-3.3	11-19-91
	3.3-14.3	11-19-91
	14.3-22.4	11-19-91
Lobster Cr.	0-9.9	11-19-91
Green R.	0-9.9	11-19-91
Fall Cr.	0-6	11-19-91
So. Fk. Alsea R.	0-9.1	11-19-91
Bummer Cr.	0-2.2	10-16-92
No. Fk. Alsea R.	0-4.3	10-16-92

Loss of stream shade from residential development will be addressed through requesting the county enforce its setbacks that require a 50 foot setback of undisturbed vegetation along the waterway. Efforts will be made to bring residences that are not in compliance into compliance and all new development will be expected to be consistent with the 50 foot setback. ODFW will also provide consultation to counties as necessary to refine riparian setbacks based on characteristics of individual streams.

Instream Structure

A primary factor that has reduced fish production in coastal basins is the loss of instream habitat provided by large woody material. Instream large woody debris (LWD) is an essential habitat element for a number of reasons. LWD creates pools and backwater areas that provide slack water refuges during winter high flows and rearing habitat during the summer. LWD also provides nutrient input and storage sites, and traps sediment, including gravel required for spawning.

Instream structure has been lost because it was removed from stream channels to prevent fish passage problems following logging operations and to prevent jams that trigger floods, damage bridges, or interfere with boat traffic. Additionally, logging of large trees from riparian areas has cut off the primary source of continued recruitment of large woody structure to the stream channels. The situation is aggravated because riparian areas are now dominated by alder rather than conifers which provide a much better and more durable source of instream structure.

Table 9 shows reduced LWD volumes in commercial timberlands compared to old-growth and mature forest areas over broad areas of western Oregon. Surveys in the Alsea River Basin in recent years have verified that LWD volume is very low in most areas (Tables 10 and 11).

Research on the importance of instream structure is being conducted on Lobster Creek, an Alsea River tributary (ODFW 1995). The research has verified that increased channel complexity will increase production of coho, winter steelhead, and probably cutthroat trout (Figure 7).

Table 9. Large woody debris in managed and old-growth forest streams in the Oregon coast range (Boechler and McAllister 1992).

Stream	Large woody debris Frequency (number/mile)	 Volume (m^3/mile)	Comments
Old-Growth			
Coos/Coquille tributaries	928	783	Ursitti (1990)
South Fork Drift Creek	-	1,475	Schwartz (1990)
Lobster Creek	317	-	Sedell et al. (1988)
Cummins Creek	352-405	-	Sedell et al. (1988)
Average	541	1,129	
Managed			
Clatskanie River	49	48	
Coast Creek	89	57	
Elliot Creek	112	145	
So. Fk. Wilson River	50	176	
Edwards Creek	80	256	
L. No. Fk. Wilson River	134	402	Good riparian
East Creek	168	485	Beaver activity
Devils Lake Fork	148	627	Debris jam
Deyoe Creek	275	886	Beaver activity
Knowles Creek	18-53	-	Sedell et al. (1988)
Lobster Creek	18-35	-	Sedell et al. (1988)
Average	122	342	

Table 10. Alsea River Basin large woody debris situated below the average high water level in number of pieces per 100m and volume per 100m.

Alsea River Basin		
	Woody Debris	
Stream	Pieces[1] #/100m	Volume m^3/100m
Bear	12.9	31.5
Cherry	3.8	2.2
Deer	6.3	4.7
E. Fk. Lobster	10.2	15
E. Fk. Swamp	31.8	14.8
Flynn	8.9	0.4
Garland	22.5	38.4
Horse	6.9	4.9
Meadow	3.4	3
N. Fk. Salmonberry	10.3	13.7
Needlebranch	15.7	9.7
Racks	18.5	42.3
Yew	27.9	60.7

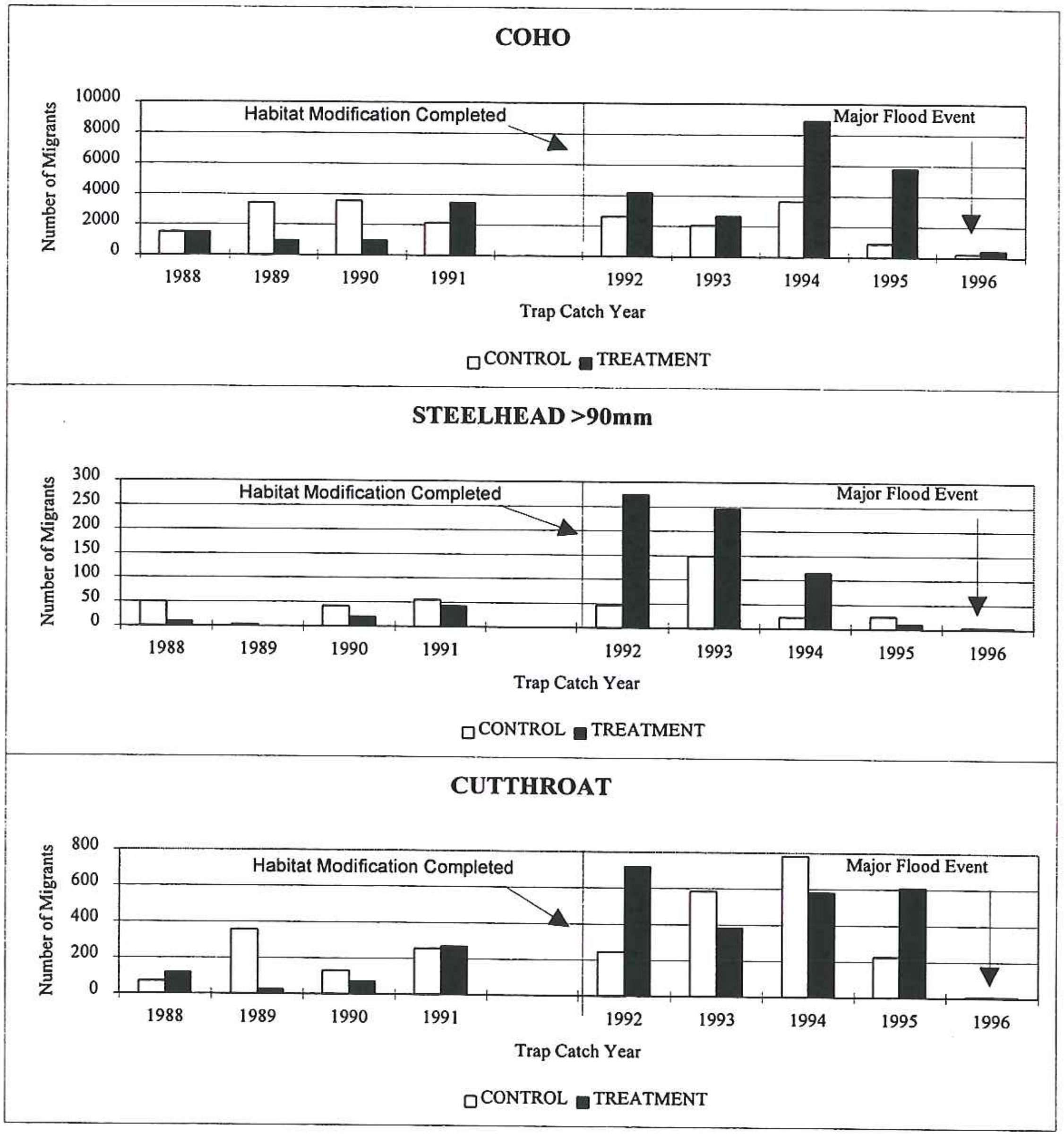
[1] Pieces 6 inches or greater in diameter and 10 feet or longer in length.

Table 11. Number of conifers within 30 meters of the active channel on either side of the stream per 1000 feet of stream, Alsea River Basin tributaries.

Alsea River Basin		
	Riparian Conifers[1]	
Stream	# > 20in DBH	# > 35in DBH
Bear	0	0
Cherry	0	0
Deer	0	0
E. Fk. Lobster	0	0
E. Fk. Swamp	9.4	0
Flynn	0	0
Garland	6.6	0
Horse	0	0
Meadow	0	0
N. Fk. Salmonberry	17	0
Needlebranch	0	0
Racks	62.1	0
Yew	69.6	0

[1] Conifers that are within a 30 meter long by 5 meter wide transect that is perpendicular to the stream channel. Transects are conducted once every 30 habitat units.

Figure 7. Pre- and post-treatment production levels for coho, winter steelhead, and cutthroat trout. The treatment consisted of adding large woody material to the stream and building backwater areas.



A key action to increase LWD recruitment is the recent revisions to the Oregon Forest Practices Act (FPA). The FPA should increase conifer retention in buffer strips several fold which will ultimately provide more instream LWD. Recovery will be slow, however, because most conifers in buffer strips are small or riparian zones are dominated by brush and hardwoods. The FPA will also provide flexibility to landowners to convert brush and alder dominated riparian zones to conifers which may result in better recruitment of LWD for fish habitat in the long-term. Hardwoods do provide valuable LWD, but they decay quickly and are not large enough to set up in bigger tributaries.

At the local level, ODFW will request notification of all forestry activities on private or state land, and provide comment on the importance of conifer retention in buffer strips bordering important streams for fish production. The ODFW will also coordinate with Oregon Department of Forestry and private landowners to artificially place LWD in streams with high potential for coho salmon production. This artificial structure placement will not be done as an alternative to natural recruitment of LWD, but will be undertaken to improve fish habitat in the interim until streamside trees mature and are recruited naturally.

The effectiveness of increasing instream channel complexity will be evaluated using on going habitat surveys by ODFW, private timber managers and the USFS. Measurements of vegetation in riparian areas will also be continued to see if conifers and other large trees are becoming more prevalent. This will provide a more immediate indication that we are moving in the desired direction.

Beaver Dams

Beaver dams provide a primary source of instream structure and pool habitat in many small and medium streams within the Alsea River Basin. Ponds created by beaver dams are an important habitat for juvenile coho salmon and cutthroat trout. Juvenile coho are particularly dependent on beaver ponds during winter months (Nickelson et al, 1992). Stream reaches where fish habitat benefits from beavers are greatest are thought to be where beaver dams remain intact through winter freshets.

While beaver activity is strongly beneficial to fish habitat in some situations, under other conditions it appears to have a neutral effect and in a few cases may have a negative effect. In larger streams, beaver dams tend to wash out during high water events with reduced benefits. In these same larger streams, beavers may cut down or prevent re-establishment of streamside trees that provide shade and a future source of LWD. Spawning gravel could be reduced to very low levels by continuous stair-stepped beaver dams, but this is thought to be rare because a relatively small amount of spawning gravel is necessary to seed large areas of rearing habitat. Beavers could also potentially have a negative effect by causing excessive summer water temperatures. This again is thought to be rare because beaver ponds tend to occur in smaller streams with naturally cool water, and because the water in beaver ponds tends to stratify with localized areas of cooler water even if surface temperatures are excessive (Gard, 1961). Fish migration over beaver dams is a frequent concern, but does not appear to be a substantial problem based on extensive observations in the mid-coast and literature citations (Bryant, 1983).

Beaver activity can have negative economic consequences and be a general nuisance for some landowners. They plug culverts increasing road maintenance and contribute to flooding. On commercial forest lands they sometimes eliminate conifers a hundred feet or more from the water's edge.

Beaver management is one of the most important considerations in maintaining and improving fish habitat in the Alsea River Basin. ODFW will give consideration to beaver management on a case by case basis because of the variable effects on fish habitat and consequences for landowners. In areas where beavers provide stable dams that contribute to juvenile coho winter habitat, recommendations will tend toward accommodating high beaver numbers. In other areas where beavers do not create stable dams, ODFW will defer to considerations other than fish habitat in beaver management.

Sedimentation

Land use activities have generally increased the rate of erosion and sediment input into coastal waterways. In steep country such as the North Fork Alsea, erosion can take the form of torrential landslides that scour stream channels and deliver large amounts of sediment and in some cases large woody debris to downstream areas in a single event. These slides particularly impact fish habitat in small streams. They may also create instability in spawning bars and channel widening in larger stream channels with secondary erosion as sediment flows downstream.

In gentle topography, large slides are less prevalent, but flushing rates are low. Surface erosion of fine sediments from roads and exposed soils can degrade spawning areas and pool habitat, resulting in reduced egg-to-smolt survival. Fish habitat is frequently lost due to the accumulation of sediment in pool areas from the headwater to the estuary. The degree to which fish habitat has been impacted by the increased input of sediment into the Alsea River Basin has not been quantified.

Erosion and increased sediment input from multiple sources spread throughout a watershed act in combination to impact fish habitats downstream (Chamberlin et al 1991). Regulatory mechanisms are currently not available to address these cumulative effects. It is assumed that the application of "best management practices" (BMP'S) on a site specific basis will be sufficient to control additive effects of multiple activities in a watershed. The 1991 legislature directed the Oregon Department of Forestry to develop methods to address cumulative effects. These efforts will hopefully provide a basis to assure that multiple small sources of sediment input do not contribute to an overall degradation of fish habitat. A research priority within the Alsea River Basin should be an investigation of cumulative effects from increased erosion and methods that can be employed to control detrimental impacts.

Forestry related roads are the primary source of increased sediment input into waterways (Sidle et al., 1985). Accelerated erosion can also occur from clearcuts or other land clearance activities including aggregate mining, agriculture and urban development. Erosion from land clearing is particularly severe on steep slopes.

There is currently limited monitoring specifically for sediment in the Alsea River Basin. Sediment composition is visually estimated in physical stream surveys which have been conducted in many tributaries to the Alsea River Basin. This sampling characterizes existing conditions. It will probably have limited value in quantifying changes over time because of the subjective nature of the estimates.

Mass failures on state and private timberlands are evaluated by Oregon Department of Forestry geo-technical specialists and summarized in a report on an annual basis (Runyon, 1993). The purpose of this report is to evaluate the effectiveness of Forest Practices Rules at reducing mass failures on forest lands.

Efforts to reduce sediment input into waterways must focus first on the road system. This includes both preventive maintenance on existing roads, and careful consideration of erosion potential in design of new roads. Examples of beneficial actions to reduce risk include pulling back sidecast, replacing undersized or deteriorated culverts, water-barring abandoned cat roads from past logging activities, putting non-essential roads to bed, and avoiding construction in high risk sites. Other beneficial actions to control erosion associated with roads are described in the Oregon Forest Practices Act and other publications (Oregon Department of Forestry, 1995; Furniss et al, 1991).

An immediate investigation of anomalously turbid water can in some cases help correct sediment problems. Muddy water at times will occur from a natural event such as a slide, but in other cases a correctable source can be identified.

Construction activity in a stream such as culvert placement or laying underground cables can also generate sediment. The ODFW generally discourages in-water work because such work may impact fish and wildlife habitat, degrades water quality, and interferes with water-oriented recreation. The ODFW also recognizes that some in-water projects are necessary to meet human needs and that many activities can be conducted with minimal disturbance to the environment; therefore, the ODFW has recommended time periods for in-water work that will result in the least damage to fish and wildlife. Preferred time periods may vary in different areas due to different fish populations that could be affected. The type of activity and method of operation may also influence the preferred work period. The recommended time period for in-water work in a particular area in the Alsea River Basin is available from the ODFW District office in Newport.

Monitoring strategies should be developed as necessary to understand the effects of increased sediment input on Alsea River Basin fish habitat and the effectiveness of programs to control it. Based on current understanding, this monitoring should include a continuation of the Oregon Department of Forestry mass failure assessment on private and state timberlands. These programs should perhaps be expanded to include land in other ownerships. It would also improve understanding of sediment effects on fish habitat to examine bedload movement in larger streams such as the upper Alsea mainstem that are important spawning areas for anadromous fish. This could be evaluated using methods described by Nawa et al, 1988. Sampling to determine existing sediment condition should also be considered following methods used by Georgia Pacific in the Siletz River Basin (Roberts, 1995). This monitoring consists of taking sediment core samples from standardized, representative sites. It is used to characterize existing conditions and determine changes over time. Other methods to understand and determine trend over times in sediment input and its effects on fish production should be considered if appropriate.

Water Quality

Fish habitat in the Alsea River Basin can be influenced by factors such as chemical spills, herbicide spraying and the use of fertilizers. In some cases, a clear link has not been established between the water quality variable and impacts to fish production. Impacts of water quality problems on fish production in the Alsea River Basin will be controlled by existing water quality laws.

The ODFW will work with the Oregon DEQ to refine tolerances for potential water quality contaminants that could impact aquatic productivity. The ODFW will also work with the DEQ and other agencies to monitor water quality to assure that standards are met.

Fish Passage

The general objective for fish passage in the Alsea River Basin is to restore and maintain natural passage conditions. This will allow for productive anadromous fish habitats and also protect resident fish populations and overall biological systems in areas above natural barriers.

The only major area of Alsea River Basin that is artificially blocked to anadromous fish passage is the area above Alsea Hatchery. This situation will be corrected so that anadromous fish can access reaches above the hatchery.

Impassable culverts delay or prevent adult anadromous fish from reaching a percentage of the small streams in the basin. Obstructions to the upstream movement of juveniles is more frequent because of their lower ability to pass through culverts during high flows. Juvenile steelhead, coho and cutthroat all have seasonal upstream migration patterns, so juvenile passage problems may reduce overall production. The Oregon Forest Practices Act requires that all new stream crossings be maintained so they are passable by both adult and juvenile salmonids.

Passage problems at culverts or other structures can be addressed through the SEI program, cooperative efforts on non-forest lands, or by evoking fish passage laws that require that fish passage be maintained at all artificial structures.

Natural blockages to upstream migration of anadromous fish exist in the North and South Forks of the Alsea River, upper Drift Creek, and other areas of the Alsea River system. Strong resident cutthroat trout populations usually exist above these barriers. It is unknown how other aspects of stream ecology in these areas compare with stream reaches that are accessible to anadromous fish. A conservative approach to management will be taken in these areas. Remaining natural barriers will not be altered to allow anadromous fish passage.

Existing fish ladders on streams in the Alsea River Basin are listed in Table 12. The ODFW will periodically check these ladders to assure they are functioning properly.

Water diversions can also impact fish that are removed from the stream along with the diverted water. Large water diversions that are now active in the Alsea River Basin are adequately screened to prevent loss of fish. ODFW will continue to work with the Oregon Water Resources Department (WRD) and those responsible for water diversions to assure that adequate screening is maintained or installed on these and other diversions that may occur in the future.

Table 12. Fish ladders on streams in the Alsea River Basin.

Stream	Name	Type	Height (ft.)	Year built
Eckman Creek	Eckman Creek Falls	Rock cut	13	1975
Drift Creek	Lower Bohannon Falls Fwy.	Weir	10	1964
	Upper Bohannon Falls Fwy.	Rock cut-conc. weir	8	1964
Five Rivers	Five Rivers Fwy.	Weir	20	1957, 1963
Cascade Creek	Cascade Creek Falls	Denille	15	1967
Fall Creek	Fall Creek Hatch. Intake	Denille	8	
	Fall Creek Fwy.	Weir	12	1948

Aquatic Habitat Area

Habitat area can be reduced by channelization, diking or by filling. Major areas of loss are diked estuarine areas and sloughs in floodplains used for agriculture. These areas are very productive and contribute to the ability of juvenile salmonids to survive winter flow conditions. Estuarine losses can sometimes be remedied by breaching dikes. Further loss of habitat area from diking and filling is now controlled by strong laws on filling wetlands and waterways.

Aerial photos can be used to evaluate changes in aquatic habitat area over time. The availability of historic aerial photos and time schedules for future photos has not been investigated.

Policies

Policy 1. The Department shall actively pursue and promote habitat protection and improvement necessary to achieve the objectives for management of the basin's aquatic resources.

Policy 2. The Department shall coordinate with and advise land owners and management agencies of the Alsea River Basin.

Policy 3. Habitat protection shall be emphasized over habitat restoration and enhancement.

Policy 4. Potential losses of fish production from habitat alteration shall be prevented or reduced to the extent possible.

Objectives

Objective 1. Maintain or increase instream flows during summer low flow periods in the Alsea River Basin.

Assumptions and Rationale

1. Adequate instream flows are necessary for fish passage, spawning, and rearing.

2. The ODFW acts as an advisory agency to the WRD, which is responsible for water use regulations.

3. The USGS gauge at the town of Tidewater will be the principal method for measuring stream flows in the Alsea River Basin. Other gauges could be developed as needed.

Actions

1.1 Evaluate the effectiveness of maintaining stream flows using flow monitoring at the town of Tidewater and other locations if necessary.

1.2 Follow through on securing IWR from existing applications and apply for instream water rights on additional streams which exhibit high fish and wildlife values.

1.3 Attempt to acquire water rights that are abandoned for instream use.

1.4 Request the WRD to monitor water diversions and strictly enforce ODFW's instream water rights.

1.5 Track the cumulative volume of water withdrawals in the Alsea River Basin in cooperation with the WRD.

1.6 Recommend that new irrigation rights or extended domestic rights not use summer flows below instream water rights.

1.7 Support reservoir storage as an alternative to existing water withdrawals.

Objective 2. Reduce summer water temperatures where artificial warming occurs that is detrimental to fish.

Assumptions and Rationale

1. Water quality concerns in the basin are primarily related to high water temperatures in the mainstem Alsea and its large tributaries.
2. Lack of shading from riparian vegetation has increased water temperatures in the basin.
3. Water temperatures can be monitored using automated temperature recorders that are affordable.
4. Temperature monitoring will complement existing records and will be used to pinpoint stream reaches where excessive warming is occurring.
5. Temperature monitoring will provide a baseline to evaluate effectiveness at providing cooler summer water temperatures in the future.

Actions

2.1 Implement a comprehensive program to measure stream temperatures throughout the basin in collaboration with private landowners and other agencies.

2.2 Monitor stream temperatures on a long-term basis in key areas.

2.3 Encourage riparian shading in forested lands where beneficial reductions in stream temperature will occur.

2.4 Increase riparian shading in agricultural lands by working cooperatively with landowners and agencies to increase stream-side shading.

2.5 Work with regulatory agencies and the counties to give emphasis to increase riparian shading along important fish production streams in residential or developed areas through enforcement of county setbacks which require 50 feet of undisturbed vegetation.

2.6 Recommend actions that will result in the reduction of inputs of sediments into stream channels which result in channel widening and greater exposure of the stream channel to warming.

2.7 Collaborate to share stream temperature data between public and private entities.

Objective 3. Increase instream channel complexity in the Alsea River Basin.

Assumptions and Rationale

1. Instream channel complexity in freshwater is necessary for restoring productive populations of coho salmon, winter steelhead, and cutthroat trout.

2. Estuarine channel complexity is beneficial to all andromous salmonids populations in the basin.

3. Instream channel complexity has been severely reduced from historic levels.

Actions

3.1 Measure instream levels of natural channel complexity and vegetation in the streamside riparian zone in collaboration with other agencies and landowners.

3.2 Recommend that existing trees in buffer strips that are likely to be recruited to stream channels as large woody debris be maintained during comment on land use activities.

3.3 Identify areas with high potential for benefiting from artificial input of LWD.

3.4 Coordinate with Oregon Department of Forestry and private landowners to artificially place LWD in streams on state and private forest lands.

3.5 Encourage beaver activity in stream reaches where beaver dams benefit fish habitat.

3.6 Coordinate with Oregon Department of Forestry and private landowners where brush and alder riparian areas are being converted to conifers. Make recommendations on these conversions based on a consideration of the long-term benefits of riparian zone conifers and potential short-term detrimental consequences to fish habitat including loss of shade and LWD recruitment from existing hardwoods, and beaver trapping needed for conifer regeneration.

3.7 Promote retention of LWD in estuaries.

Objective 4. Reduce artificially accelerated erosion rates and inputs of sediments into waterways in the Alsea River Basin.

Assumptions and Rationale

1. The principal source of artificially induced sediment input is from the road system.

2. Sedimentation of spawning and rearing habitat reduces fish production.

Actions

4.1 Identify standardized methods to measure and monitor sedimentation rates in stream channels in collaboration with other agencies and landowners.

4.2 Measure and monitor sedimentation rates in stream channels.

4.3 Consider cumulative sediment input when providing recommendations on land use activities.

4.4 Make recommendations to correct road system problems that contribute to increased erosion and sedimentation of waterways.

4.5 Report all mass failures on state or private forest lands to ODF and review the ODF report on failures as a basis to improve understanding of mechanisms causing failures. Develop methods to report and summarize mass failures on other landownerships.

4.6 When anomalously turbid water is observed, investigate causative factors and correct if feasible.

Objective 5. Prevent chemical contaminants from degrading fish habitat in the Alsea River Basin.

Assumptions and Rationale

1. The Oregon Forest Practices Act's "Application of Chemical" rules are adequate to protect fishery habitat from detrimental impacts during herbicide applications on forest lands.

2. The Alsea River Basin Fish Management Plan will not be a forum to refine standards for chemical applications on forest lands.

Actions

5.1 Recommend that land management agencies or private landowners measure water quality parameters that are important to fish in areas where problems may occur.

5.2 Work in a consulting capacity with DEQ to enforce the existing chemical application rules and water quality standards where detrimental impacts to fishery resources are a concern.

Objective 6. Restore natural fish passage conditions in the Alsea River Basin.

Assumptions and Rationale

1. The fish assemblage in the Alsea River Basin will be the most productive if natural passage conditions exist in the basin.

2. Natural barriers to fish migration will not be altered.

Actions

6.1 Re-establish passage above Alsea Hatchery.

6.2 Inventory culverts and other artificial obstructions that impede passage of juvenile and adult fish in collaboration with other agencies and landowners.

6.3 Pursue measures to correct passage problems associated with culverts, dams, tide gates, and other artificial obstructions where benefits exceed costs.

Objective 7. Increase habitat area available to fish in the Alsea River Basin.

Assumptions and Rationale

1. Fish habitat can be lost due to channelization, diking or filling of natural waterways.

Actions

7.1 Evaluate historic, existing, and future aquatic habitat areas based on stream surveys, aerial photographs, etc.

7.2 Identify high priority habitats (spawning areas, etc.) which should be protected from waterway alterations.

7.3 Make recommendations to prevent channelization of streams and rivers.

7.4 Make recommendations to prevent the diking and filling of wetlands and estuaries.

7.5 Pursue measures to restore historic habitat areas lost due to channelization or diking where fishery benefits will occur.

Objective 8. Coordinate with other agencies and landowners to implement habitat protection and restoration activities.

Assumptions and Rationale

1. ODFW has authority for direct fish management activities, but must coordinate with land managers to integrate fish management activities with habitat management.

2. Most mid-coast basins have land management responsibility that is controlled by multiple jurisdictions.

3. Watershed councils provide a forum for coordination of activities

Actions

8.1 Communicate with land management entities so habitat and fish management activities are integrated.

8.2 Participate in and provide technical assistance to Watershed Councils within the Alsea River Basin.

CHUM SALMON

Background

Currently, the central Oregon coast is the southern extent of self-sustaining chum populations. While chum salmon occur in greater numbers in coastal streams to the north, few are observed in streams and river systems south of the Alsea River. Small runs occur in lower tributaries of the Alsea River (Table 13, Figure 8). There are no hatchery releases of chum salmon in the Alsea River Basin.

Table 13. Alsea River Basin chum salmon observations during intensive spawning area surveys, 1986-88. Survey areas without chum are not listed.

	Peak Count		
Survey area	1986	1987	1988
Canal Creek	15	14	52
Bear Creek	2	0	2
Grass Creek	2	0	1

Status

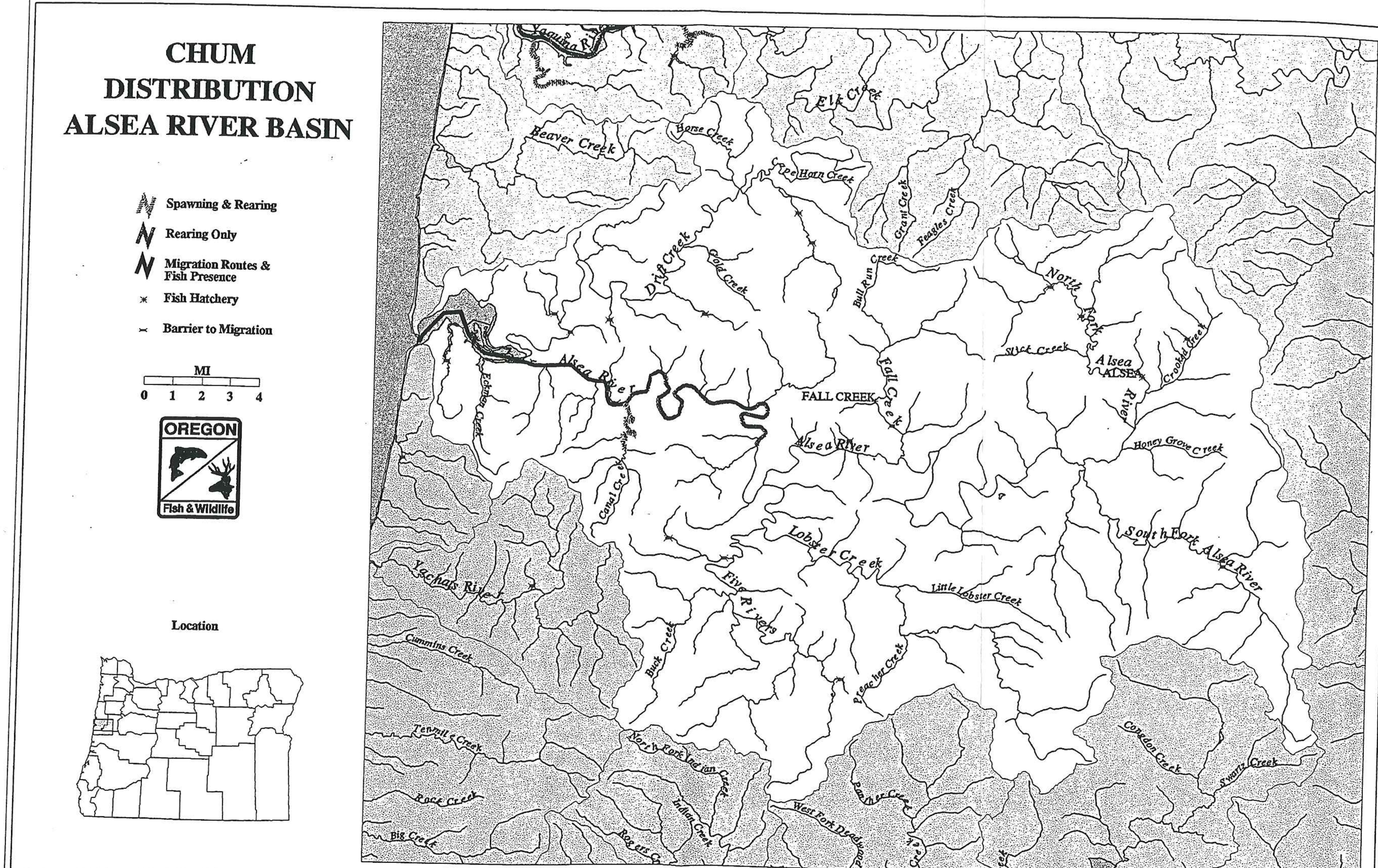
Chum salmon are listed by the state of Oregon as a sensitive species because of small run sizes and statewide declines in abundance.

The current Alsea River Basin chum salmon run is thought to average a few hundred fish or less annually. Records from commercial net fisheries in the Alsea River Basin from 1923 to 1940 report an average of about 900 chum landed per year. Along the entire Oregon coast, chum salmon commercial catch during this period indicate the Alsea River Basin was the southern most stream with appreciable chum returns (Figure 9).

Life History Characteristics and Habitat Needs

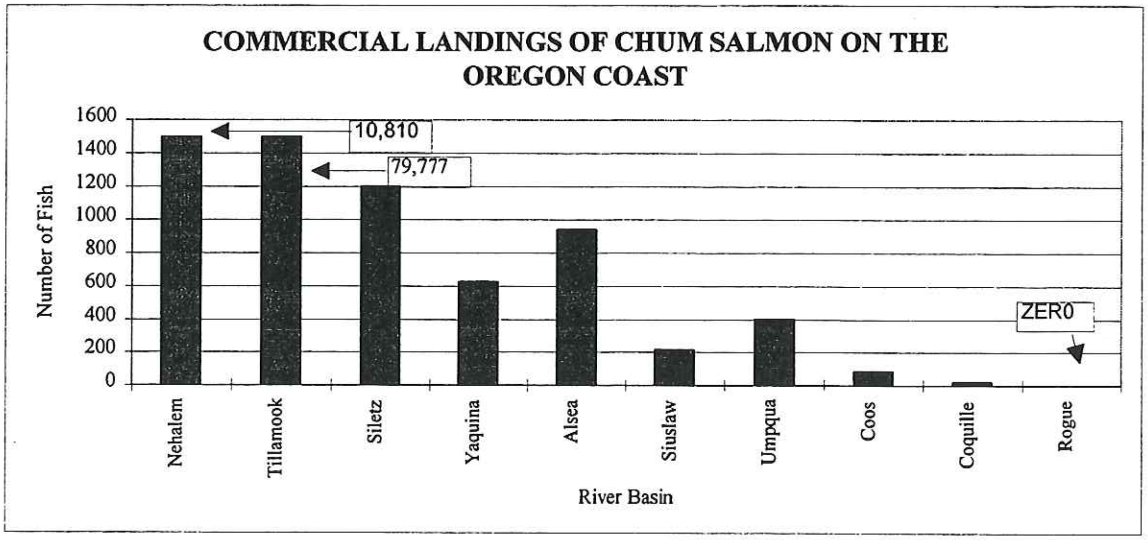
Adults generally return to spawn from October to December (Henry 1954). Chum salmon are not very adept at passing barriers so maintaining easy upstream passage for adults is essential.

Figure 8 Distribution of Chum Salmon in the Alsea River Basin



Chum salmon spawn in lower portions of stream systems where gravel from upstream areas tends to settle out. Increased erosion in upstream areas can contribute sediment that is deposited or creates instability on gravel bars used by spawning chum.

Figure 9. Chum salmon landed in commercial fisheries in Oregon Rivers from 1923-40.



Juvenile chum salmon rear only a very short period of time in freshwater before migrating downstream into the brackish water of the estuary. Estuarine rearing areas include shallow side channels, many of which have been lost due to dikes and tidegates. Juveniles smolt, migrate to the ocean in late spring or early summer.

Habitat Restoration Activities

Because of the limited distribution and sensitive status of chum salmon, habitat restoration efforts targeted at tributary streams containing chum are a priority in the Alsea River Basin. Proposed habitat restoration activities include:

1. Survey all road crossings that could be blockages to adult migration and correct those that may be a problem. This action should be targeted at streams where chum are now present or streams in immediate proximity to present chum runs where re-colonization would be likely if passage were improved. This is a priority because chum salmon are the weakest migrators of all anadromous fish on the central coast and thereby easily impacted by situations that would not usually be considered a problem.

2. Identify and correct sources of accelerated sediment input into tributary systems that are important for chum salmon.

Angling and Harvest

All angling for chum salmon is prohibited in the Alsea River Basin. It is unlikely that runs will increase to the point that a fishery can be supported.

Management Considerations

Chum salmon within the Alsea River Basin will be managed for wild production only. Chum salmon are listed as a sensitive species statewide. Land management activities that may threaten Alsea River Basin chum salmon will be avoided where possible. Protection of chum habitat will focus on maintaining upstream passage for adults, preventing siltation in drainage areas upstream from spawning grounds, and protecting or restoring estuarine rearing areas for juveniles. Achieving habitat objectives outlined in the Habitat chapter will generally provide habitat for chum salmon. Targeted habitat protection and restoration efforts will be directed at Canal Creek which is the principal tributary where chum salmon have been identified in the Alsea River Basin. In-river fisheries for chum will remain closed.

Policies

Policy 1. The Alsea River Basin shall be managed for naturally produced chum salmon except for hatchery releases designed specifically to assist in the recovery of the wild population.

Objectives

Objective 1. Achieve an annual chum salmon spawning escapement of at least 300 adults.

Assumptions and Rationale

1. A minimum of 300 adults are needed to maintain genetic fitness in the population.

2. Fish populations at the edge of their species range have an increased risk of extinction.

3. Accomplishing habitat protection and restoration objectives will generally provide the habitat necessary to support chum salmon populations.

4. Targeted habitat protection and restoration directed at Canal Creek will help assure the continued viability of Alsea River Basin chum salmon.

Actions

1.1 Conduct chum salmon spawning surveys annually in Canal Creek to monitor trends in escapement.

1.2 Conduct exploratory surveys to look for other Alsea River tributaries with consistent chum returns.

1.3 Advise private landowners and the U.S. Forest Service of chum populations in Canal Creek and other areas where chum may be found and recommend provisions that will protect their habitat.

1.4 Implement habitat restoration efforts for chum production in collaboration with other agencies and land managers.

1.5 Maintain closure of all angling for chum salmon.

FALL CHINOOK SALMON

Background

Fall chinook are native to the Alsea River Basin. Important spawning habitat for fall chinook is found in all major tributaries including Drift Creek, Five Rivers, the North Fork and South Fork Alsea River. Extensive fall chinook spawning also occurs in the upper mainstem Alsea River between the town of Alsea and the mouth of Fall Creek (Figure 10). There was a small hatchery program for fall chinook in the basin.

Status

The Alsea River Basin contains a healthy wild fall chinook population which is supplemented by a comparatively small hatchery program. The wild fall chinook run is thought to average about 10,000 fish per year.

Fall chinook harvest in Alsea River Basin commercial net fisheries from 1882 through 1935 suggest historic run sizes were similar to the runs today. Counts of fall chinook in spawning areas indicate the run is stable or has been increasing since 1952 (Figure 11). Most other fall chinook stocks on the central and north Oregon coast also appear healthy.

Life History Characteristics and Habitat Needs

Fall chinook adults enter the basin from August through November and spawn primarily during November.

Juvenile fall chinook rear for only a short time in the vicinity of spawning, then move downstream to the mainstem and estuary where the bulk of the juvenile rearing occurs. High stream temperatures in the mainstem Alsea River limit use by juvenile chinook during the summer. During these mid summer periods juvenile rearing is primarily in tidewater areas where a marine influence cools the air and water. It appears that juvenile chinook are relatively abundant throughout estuarine rearing areas during summer months (Nicholas and Hankin 1988). Juveniles enter the ocean in their first year of life from mid-summer through October.

The healthy status of fall chinook indicates that habitat requirements for this species are currently being provided. Concern exists that timber management activity in upland areas could create siltation and land slides which reduce gravel bar quality and stability in spawning areas used by fall chinook. Care is needed to assure that land use activities do not result in cumulative impacts to spawning habitat.

Figure 10 Distribution of Fall Chinook Salmon in the Alsea River Basin

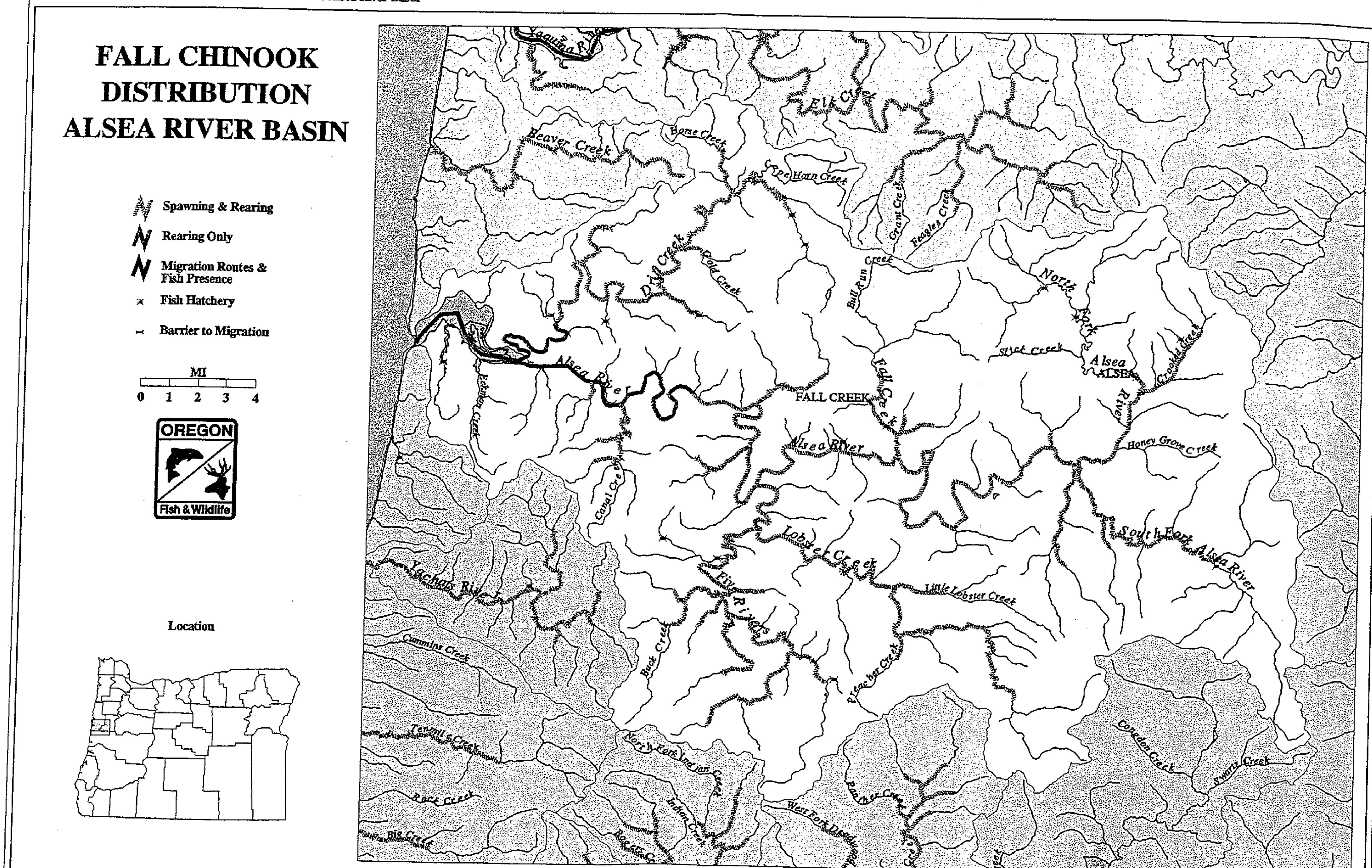
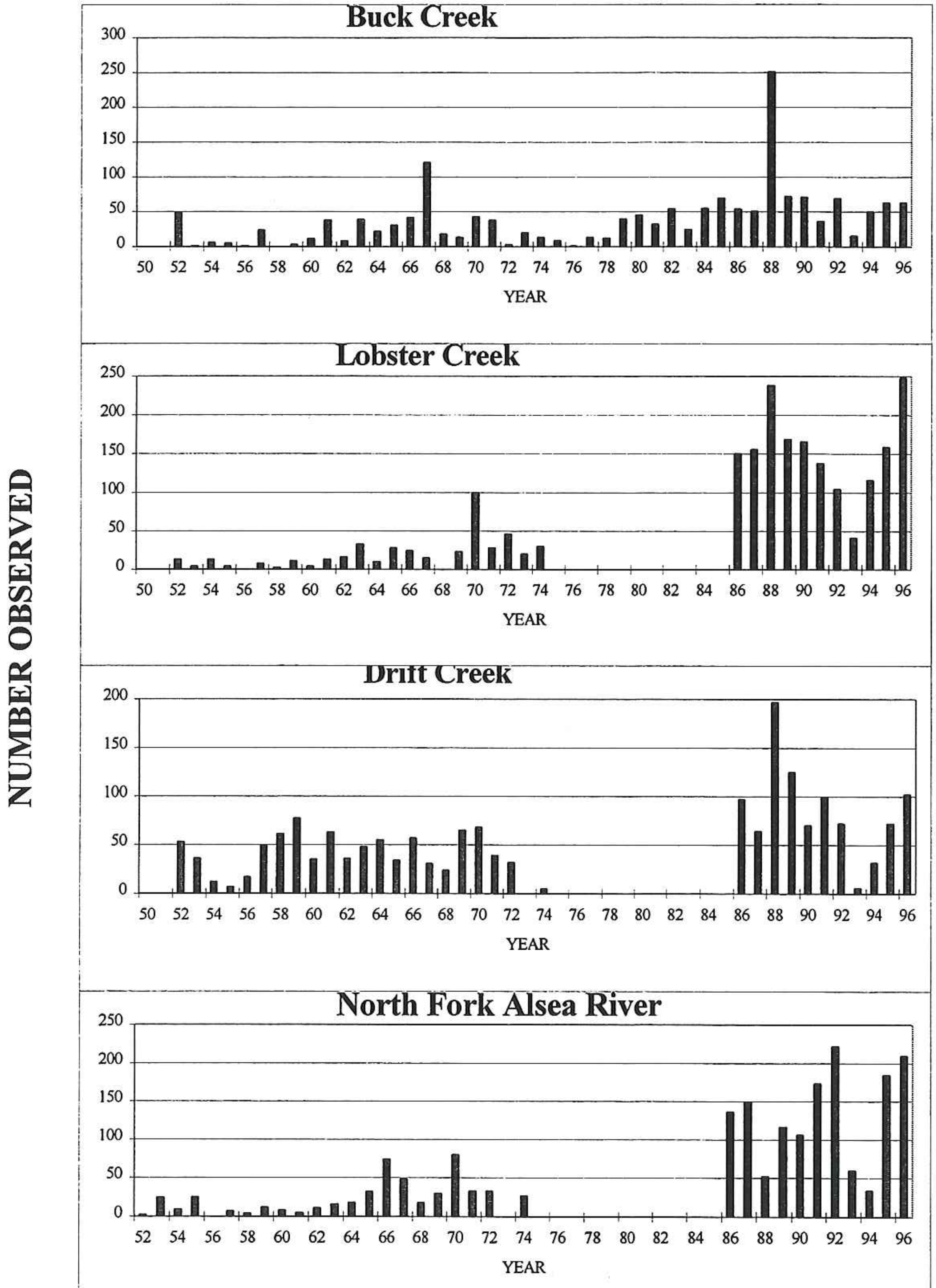


Figure 11. Fall chinook spawning surveys peak counts, Alsea River Basin.



Hatchery Production

Hatchery stocking of fall chinook in the Alsea River Basin began around 1916 and continued through the mid-1970s using a variety of stocks and release strategies.

These programs are not thought to have provided significant returns to fisheries. A more consistent program using Alsea stock was initiated in 1978. In recent years, about 100,000 smolts have been released annually from Fall Creek Hatchery (Table 14). Smolt survival has averaged less than one percent. A factor thought to contribute to low survival of hatchery smolts is poor migration conditions in Fall Creek and the Alsea River in late summer when smolts are released. British Columbia and Alaskan fisheries are the primary beneficiaries of the Alsea fall chinook hatchery program.

Table 14. Hatchery releases and returns to Fall Creek Hatchery.

	Brood Year		Returns	
Year	Fingerlings	Smolts	Adult	Jacks
1973	0	97889	0	0
1974	0	102	0	0
1975	0	85614	0	0
1976	0	43726	182	7
1977	0	47920	206	28
1978	58622	100726	63	0
1979	0	130850	81	79
1980	0	182947	68	15
1981	0	147000	51	2
1982	0	72599	240	7
1983	79987	208526	555	4
1984	24941	151299	252	4
1985	50070	105400	253	17
1986	0	151827	131	8
1987	0	36702	924	75
1988	0	NA	347	6
1989	0	100635	537	6
1990	0	125100	331	18
1991	0	100291	537	6
1992	0	101587	288	16
1993	0	103583	6	0
1994	0	No Releases	316	36
1995	0	103214	578	0
1996	0	100278	327	5

Creel sampling from 1990-93 indicates that less than 5% of the catch in the Alsea River Basin consists of hatchery fish (Table 15). The program is in compliance with Wild Fish Management Policy standards for straying because the hatchery program is small compared to the wild run size. There is concern, however, about the impact of hatchery chinook smolts on wild juvenile salmonids in Fall Creek and the Alsea River. During out-migration of hatchery fall chinook smolts, the low flows and high water temperatures in these areas increase the sensitivity of wild fish to detrimental interactions.

Table 15. Finclipped hatchery fall chinook observed during creel checks in the Alsea River Basin. Most, but not all age classes of hatchery fall chinook returning these years were fin-clipped so hatchery contribution figures represent minimal estimates.

Year	Number of chinook sampled	Fin-clips observed	% of catch marked
1990 (Sept.-Nov.)	41	3	7% (Ad, 1LV)
1991 (Aug.-Oct.)	41	1	2% (RV)
1992 (Jul.-Oct.)	82	2	2.5% (Ad, LV)
1993 (Jul.-Oct.)	72	3	4% (RV, 2LV)
Total	236	9	3.8%

Angling and Harvest

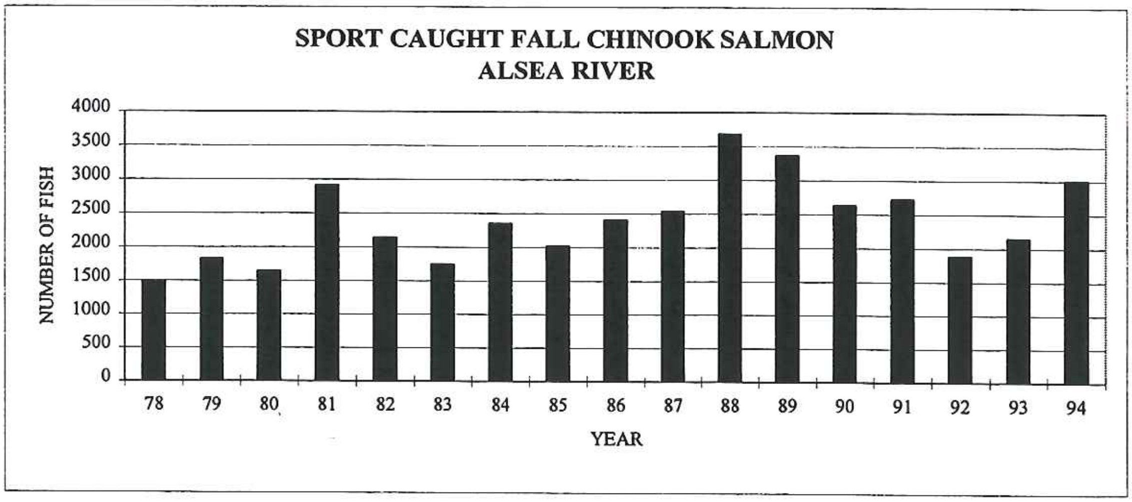
Of the total Alsea River Basin fall chinook production, about 40% is caught in Canadian and Alaskan ocean fisheries, 20% is caught in the in-river fishery, and 40% escape to spawning grounds. The catch of fall chinook in recreational fisheries within the Alsea River Basin as measured by angler catch cards has averaged about 2,500 fish in recent years and appears to have increased over time (Figure 12).

The main stem Alsea River and its tributaries are closed to angling for chinook salmon upstream from Five Rivers Bridge during May 23 through October 31. This closure is designed to protect spring chinook.

Management Considerations

Fall chinook salmon in the Alsea River Basin will be managed for wild production only. The wild fall chinook population is healthy and relatively abundant. Management will emphasize maintaining the current favorable situation. The hatchery program has been discontinued because it was not needed to maintain the fishery and because of ecological concerns associated with releasing hatchery smolts high in the basin during late summer.

Figure 12. Sport caught fall chinook salmon, Alsea River Basin. Catch estimates derived from angler punchcards.



Policies

Policy 1. Fall chinook in the Alsea River Basin shall be managed for wild production only.

Objectives

Objective 1. Achieve an average annual peak count of 80 adult and jack fall chinook per mile in spawning survey index areas in the Alsea River Basin.

Assumptions and Rationale

1. The Alsea River Basin is producing fall chinook smolts at levels approaching the full capacity of the habitat. Natural production can be expected to increase only slightly if at all in the near future.

2. The average peak count in the four index areas since 1980 had been 79 adults and jacks per mile (Cooney and Jacobs 1993).

3. The escapement objective is based on the assumption that ocean survival of wild fall chinook smolts will be similar to past year's averages.

4. The escapement objective is based on the assumption that harvest rate on fall chinook in ocean and freshwater fisheries will remain similar to recent years. Lower or higher harvest rates will cause escapement to deviate from the objective.

5. Accomplishment of watershed habitat protection objectives will be successful.

6. Estuarine habitat is critical to fall chinook production in the Alsea River Basin.

Actions

1.1 Monitor fall chinook spawning escapement on standard index trend surveys.

1.2 Maintain existing angling regulations except for more refinements to the angling regulations to protect concentrations of holding or spawning adult fall chinook or to protect spring chinook. Implement new regulations through the bi-annual regulation setting process.

1.3 Propose more conservative angling regulations within the Alsea River Basin during the bi-annual regulation process if escapement shows a consistent downward trend.

1.4 Implement emergency angling regulation modifications if anomalous environmental conditions such as an extended drought make fish excessively vulnerable. Prior to implementation of emergency regulations hold a public meeting in Waldport to take public input on options.

Objective 2. Provide an annual average in-river harvest of 2,500 wild fall chinook.

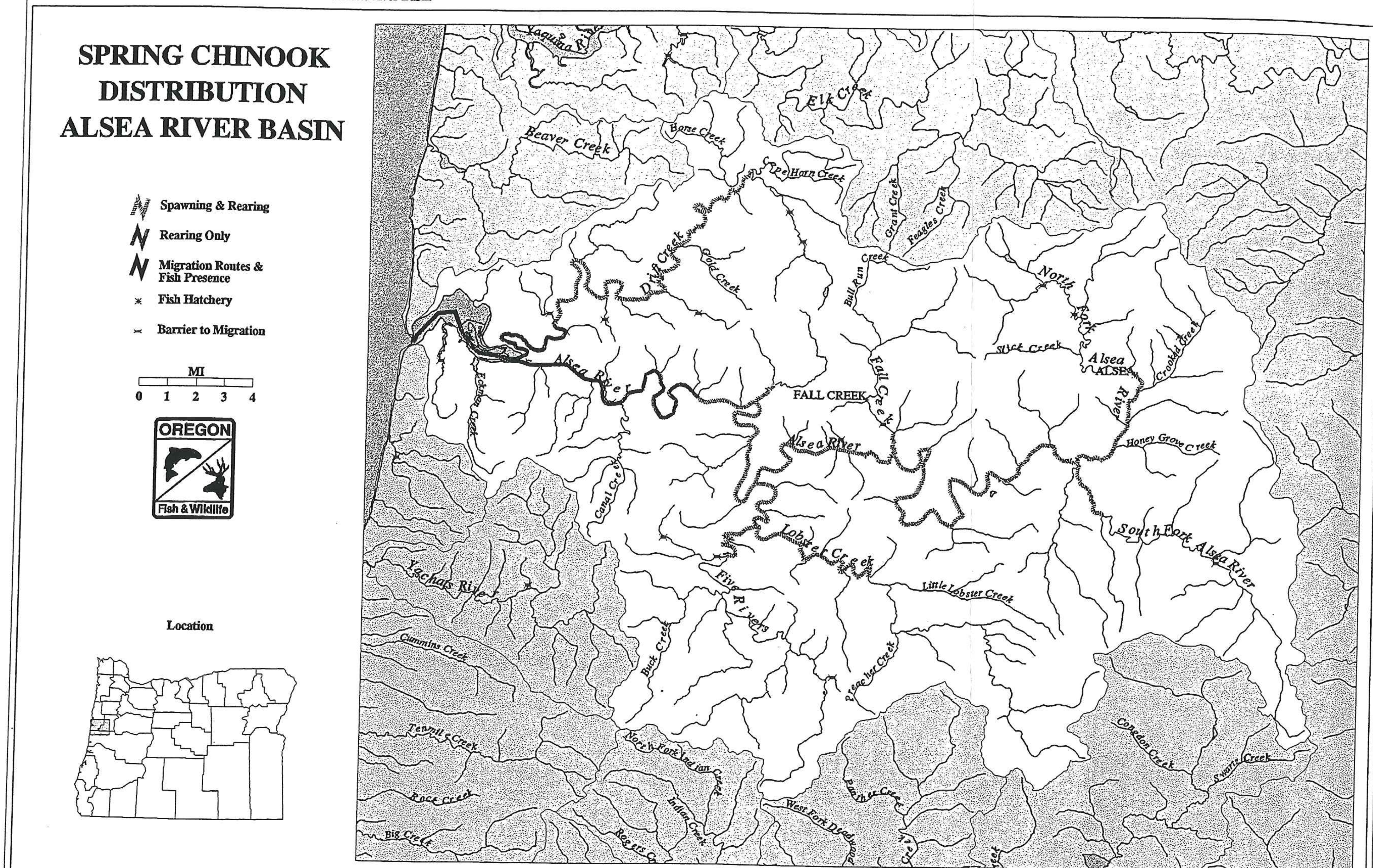
Assumptions and Rationale

1. Favorable conditions for fall chinook production will continue.
2. Spring chinook conservation concerns may force closure of fisheries that harvest fall chinook in limited areas.
3. The average annual catch of wild and hatchery fall chinook in the Alsea River Basin during 1985-92 based on punch-card estimates was 2,686.
4. About 100-200 fish in the annual catch are estimated to be of hatchery origin.
5. Harvest will continue to be monitored through annual punch-card estimates.

Actions

2.1 Maintain existing angling regulations if escapement is stable except in areas where snagging or harassment of holding or spawning fish is excessive, or spring chinook conservation concerns may dictate more conservative regulations.

Figure 13 Distribution of Spring Chinook Salmon in the Alsea River Basin



SPRING CHINOOK SALMON

Background

The Alsea River Basin supports populations of both spring and fall chinook. Important spring chinook spawning habitat in the Alsea River Basin is found in the main stem Alsea River above Fall Creek, Five Rivers and Drift Creek (Figure 13). There are no hatchery programs for spring chinook in the basin.

Status

Spring chinook runs appear to be self-sustaining but at a low level. Based on catch records from commercial net fisheries during the early 1900s, the Alsea spring chinook run was at least several thousand fish per year. Currently, numbers of returning spring chinook are very low as indicated by low abundance in spawning areas and low catch in sport fisheries (Figure 14 and 15). Spring chinook escapement to the Alsea River Basin is estimated to average only a few hundred fish annually. The apparent increase in escapement and angler harvest during recent years may be due to spring chinook straying from private hatchery releases made at Newport.

Specific factors limiting spring chinook abundance are not known. Possible factors are lack of suitable holding water for adults, disturbance of adults in holding and spawning areas, and competition with fall chinook during juvenile rearing. Cooler water temperatures in the mainstem Alsea River would benefit rearing juvenile chinook and adult spring chinook that hold in the mainstem throughout the summer.

Life History Characteristics

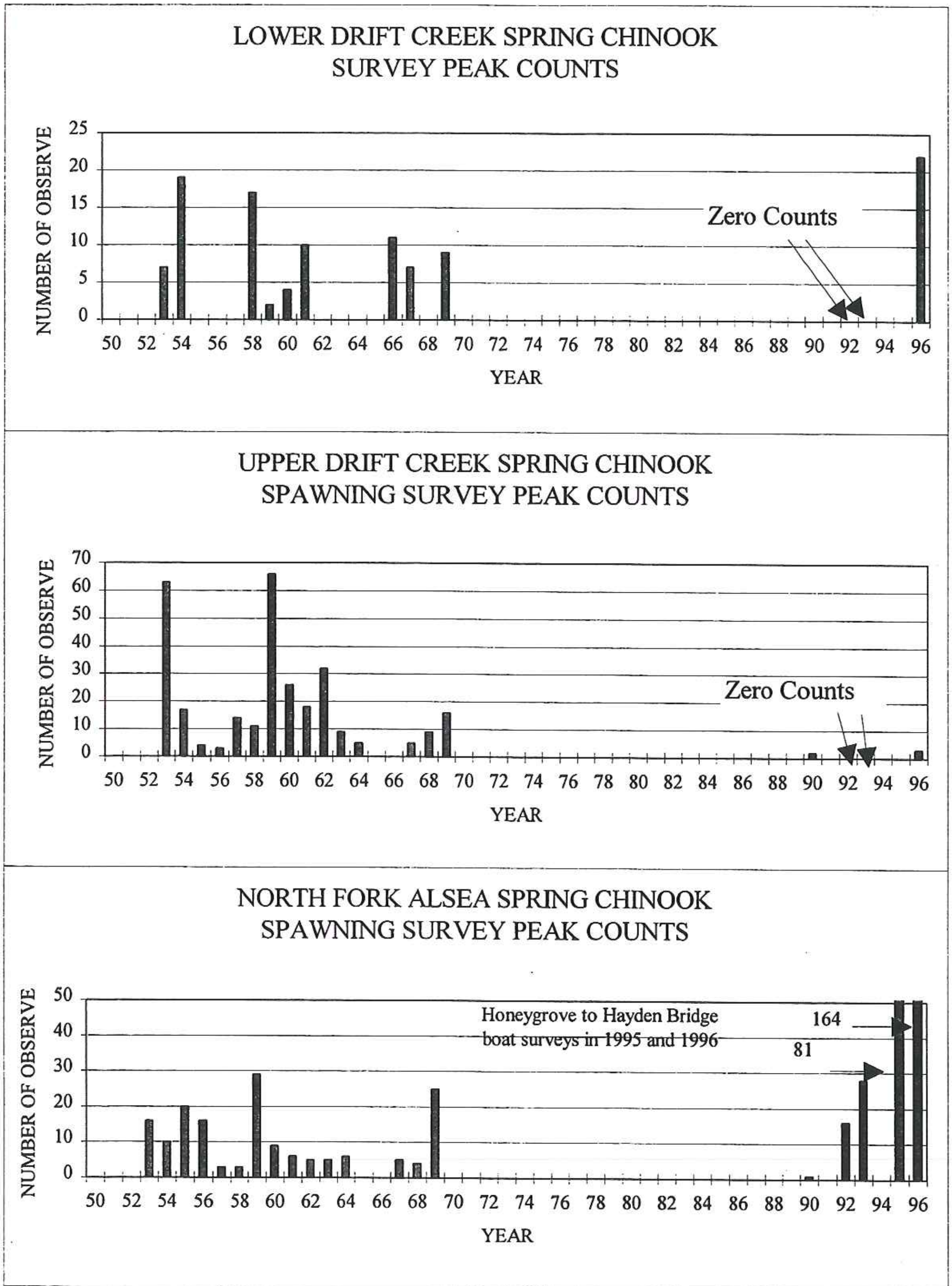
Spring chinook adults enter the Alsea River Basin in May through July. Spawning occurs in September and October in the mainstem Alsea River and its larger tributaries.

Spring chinook juveniles cannot be distinguished from fall chinook juveniles. Based on scale patterns of known spring and fall chinook adults, it appears juveniles from both races have similar juvenile rearing patterns. Increasing fall chinook runs may be displacing spring chinook through competition during juvenile rearing.

Angling and Harvest

The sport catch of spring chinook in the Alsea River Basin averages about 50 fish per year. The increased catch during recent years has most likely resulted from straying of Rogue River stock hatchery spring chinook from the private hatchery at Newport. The release of spring chinook at the private hatchery has been discontinued. Future programs for spring chinook at this facility are prohibited in the Yaquina River Basin (ODFW 1991).

Figure 14. Spring chinook spawning surveys peak counts, Alsea River Basin.

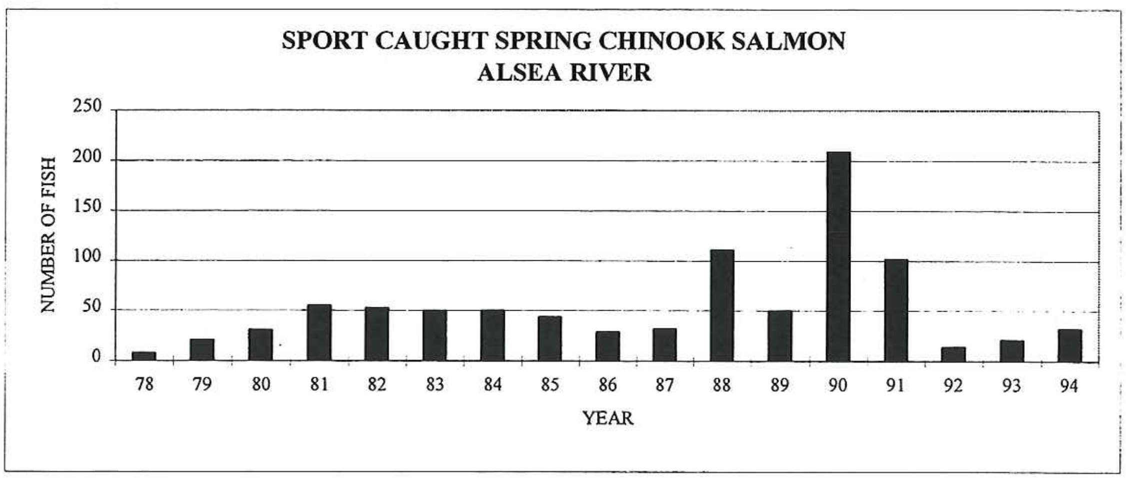


Existing fishing regulations for spring chinook in the Alsea River Basin are designed to provide an angling opportunity in the bay, mainstem, and larger tributaries where snagging or harassment of spawning fish is not excessive. Areas where snagging or harassment of spawners frequently occur are generally closed to chinook angling. To protect spring chinook, angling for chinook is currently closed from May 23 through October 31 in the Alsea Drainage upstream from Five Rivers. Additional angling regulations to eliminate any directed spring chinook harvest are warranted because of the apparent small, precarious run.

Management Considerations

Spring chinook salmon within the Alsea River Basin will be managed for wild production only. Angling regulation proposals will be submitted to eliminate any spring chinook harvest except for incidental catch during the early part of the fall chinook fishery. The spring chinook population in the basin may be able to sustain some level of consumptive harvest in the future, if the population increases. Achieving habitat objectives outlined in the Habitat chapter may increase the productivity of spring chinook salmon.

Figure 15. Estimated angler harvest of spring chinook within the Alsea River Basin. Harvest estimates derived from angler punchcards.



Policies

Policy 1. Spring chinook in the Alsea River Basin shall be managed for wild production only except for hatchery programs specifically designed to recover the wild population.

Objectives

Objective 1. Achieve an annual spring chinook escapement of at least 300 adults with population components in both the lower and upper parts of the basin.

Assumptions and Rationale

1. Extensive surveys of spring chinook spawners will provide a basis to estimate run size and to identify survey sections for monitoring escapement trends.

2. Fall chinook inhabit the same adult spawning and juvenile rearing areas. Spring chinook in the Alsea will be able to persist in the system in the face of large fall chinook runs.

3. Achieving habitat protection objectives will provide the habitat needed to support a self-sustaining wild spring chinook population.

Actions

1.1 Develop and implement surveys for spawning spring chinook in likely habitats within the basin. Based on findings in comprehensive surveys, refine annual trend surveys to provide a representative annual sample of the overall spawning population.

1.2 Propose angling regulations to prevent targeted spring chinook harvest, or harvest of spring chinook in areas where there will not be substantial impacts on fisheries targeting fall chinook.

1.3 Accomplish basin habitat protection and restoration objectives.

Objective 2. If escapement levels are achieved, provide an opportunity to angle for spring chinook in the mainstem Alsea River below Five Rivers.

Assumptions and Rationale

1. All fisheries targeting spring chinook in the Alsea River Basin will be closed in the near future.

Actions

2.1 Re-open spring chinook angling in the mainstem Alsea River and bay below Five Rivers if the population is documented to be secure.

COHO SALMON

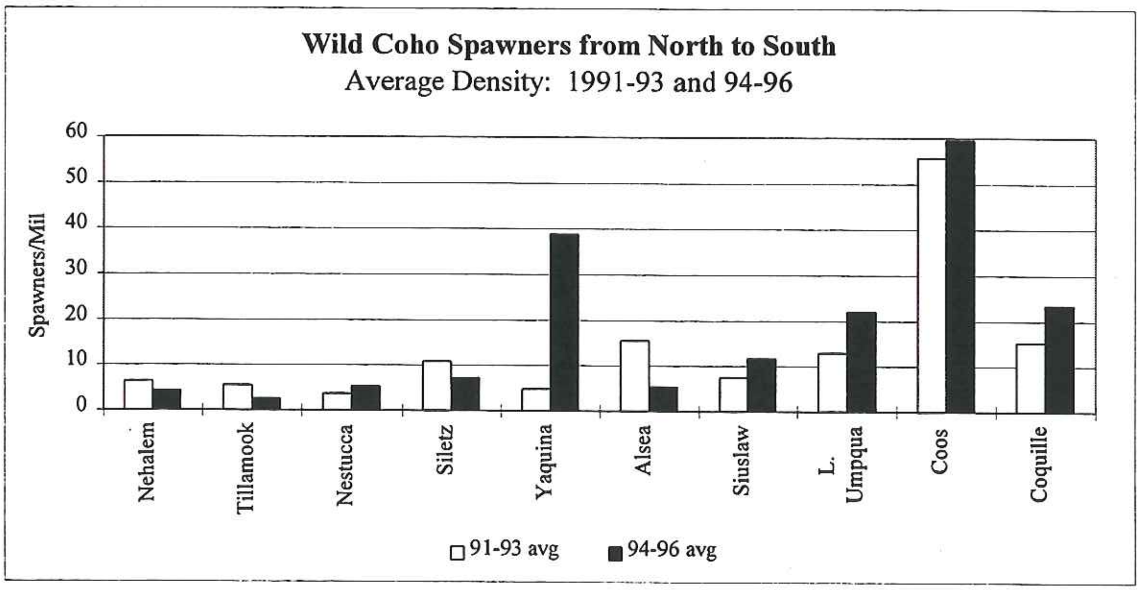
Background

The Alsea River Basin contains an important wild coho run and a hatchery coho production facility. Coho salmon are widely distributed in medium-size, low to moderate gradient tributary streams throughout the basin (Figure 16).

Status

Wild coho are currently a major conservation concern along the entire Oregon coast, particularly in mid and north coast basins including the Alsea. Alsea River Basin coho have declined the last few years in spite of closure of directed fisheries while most other coastal coho have stabilized or are increasing (Figure 17).

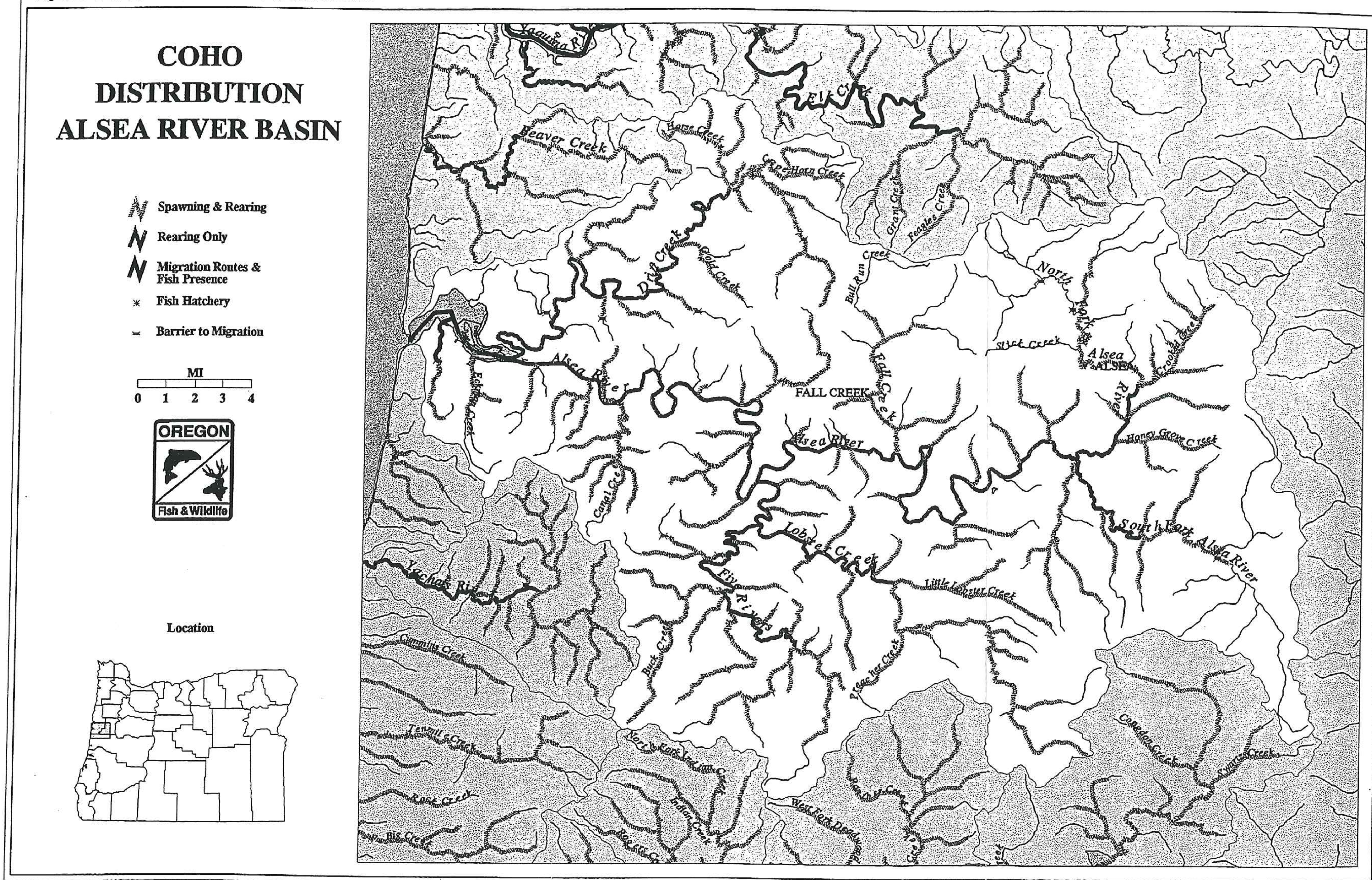
Figure 17. Estimated Oregon coastal wild spawner abundance.



Wild coho production in the Alsea River Basin was historically very high. The 1951 run size to the Alsea River was estimated at 80,000 returning adults (Morgan and Cleaver 1954). Of the total run, 14,000 were caught in the commercial fishery, 3,000 in sport fisheries, and 63,000 escaped to spawning areas.

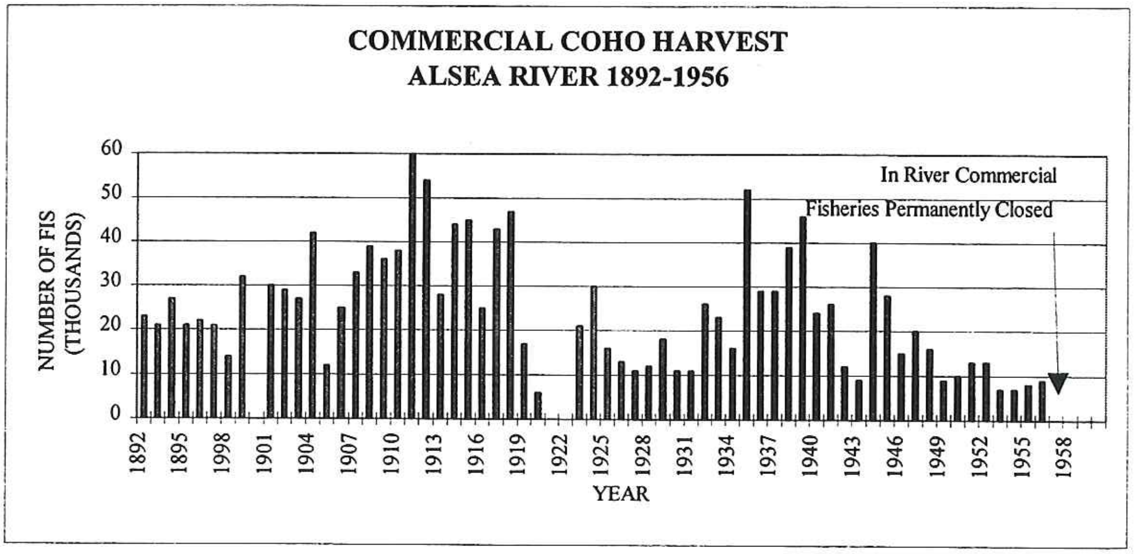
Catch in commercial net fisheries in years from 1923 through 1950 averaged about 22,000 adults per year. Total returns during this period were most likely in the range of 50,000 per year based on assumptions on harvest rates in the in-river net fisheries (Mullins, 1981). The period of low catches from 1919 until the early 1930's may have resulted from a barrier across the Alsea at Tidewater in conjunction with a hatchery operation. From 1952 until 1956, the last

Figure 16 Distribution of Coho Salmon in the Alsea River Basin



year commercial fisheries were allowed in the Alsea, catch declined to an average of 9,000 adults per year (Figure 18).

Figure 18. Number of fish harvest in commercial fisheries in the Alsea River Basin from 1892 to 1960 (Mullen 1981).



Annual peak counts in spawning area surveys that have been conducted since 1951 (Figure 19) indicate a gradual decline in wild coho spawners. During the last seven years (1990-96) spawning area surveys for adult coho salmon have been intensified. The expanded surveys have been randomly situated throughout coho habitat in coastal basins including the estimated 221 miles of high potential coho spawning habitat in the Alsea. Based on these surveys, the estimated average annual spawning escapement to the Alsea has been 2,100 adult coho (Table 16). One year (1992) had comparatively high escapement, but the other five years had spawner abundance of less than 2,000. The low wild coho spawning escapement the last four years is a particular concern. During this time period fisheries were almost completely closed yet wild coho numbers were still at record low levels.

Table 16. Estimated wild coho spawning escapement based on randomized spawning area surveys. Assumes 221 miles of coho habitat.

Year	Miles surveyed	Fish/Mile	Est. Total Spawners
1990	13.99	5.4	1189
1991	13.50	7.1	1561
1992	17.69	32.0	7029
1993	15.03	4.9	1071
1994	23.1	5.8	1279
1995	16.3	3.0	681
1996*	19.92	7.4	1637

* 1996 coho population estimate will be subject to revision following further analysis.

Figure 19. Coho spawning surveys peak counts, Alsea River Basin.

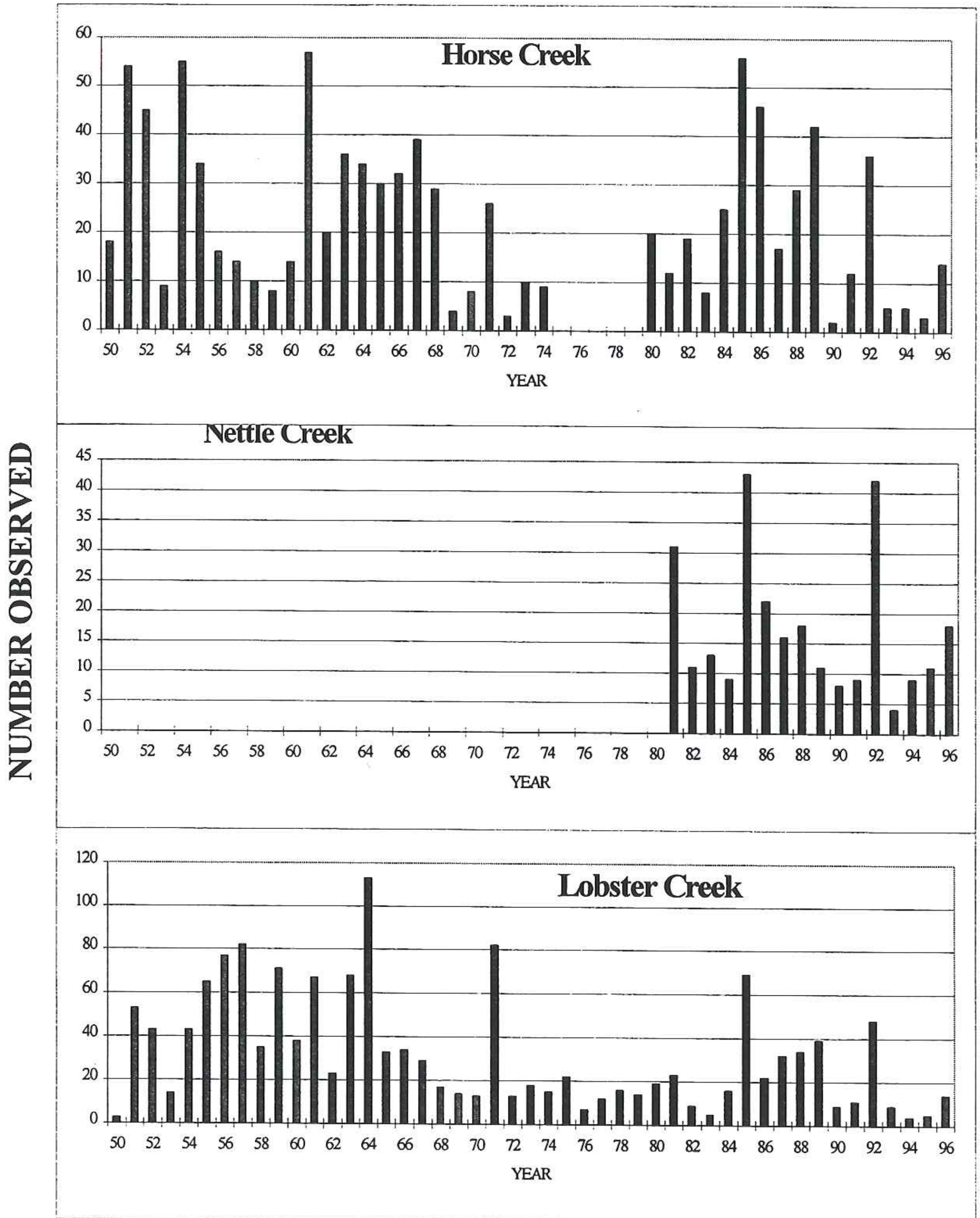
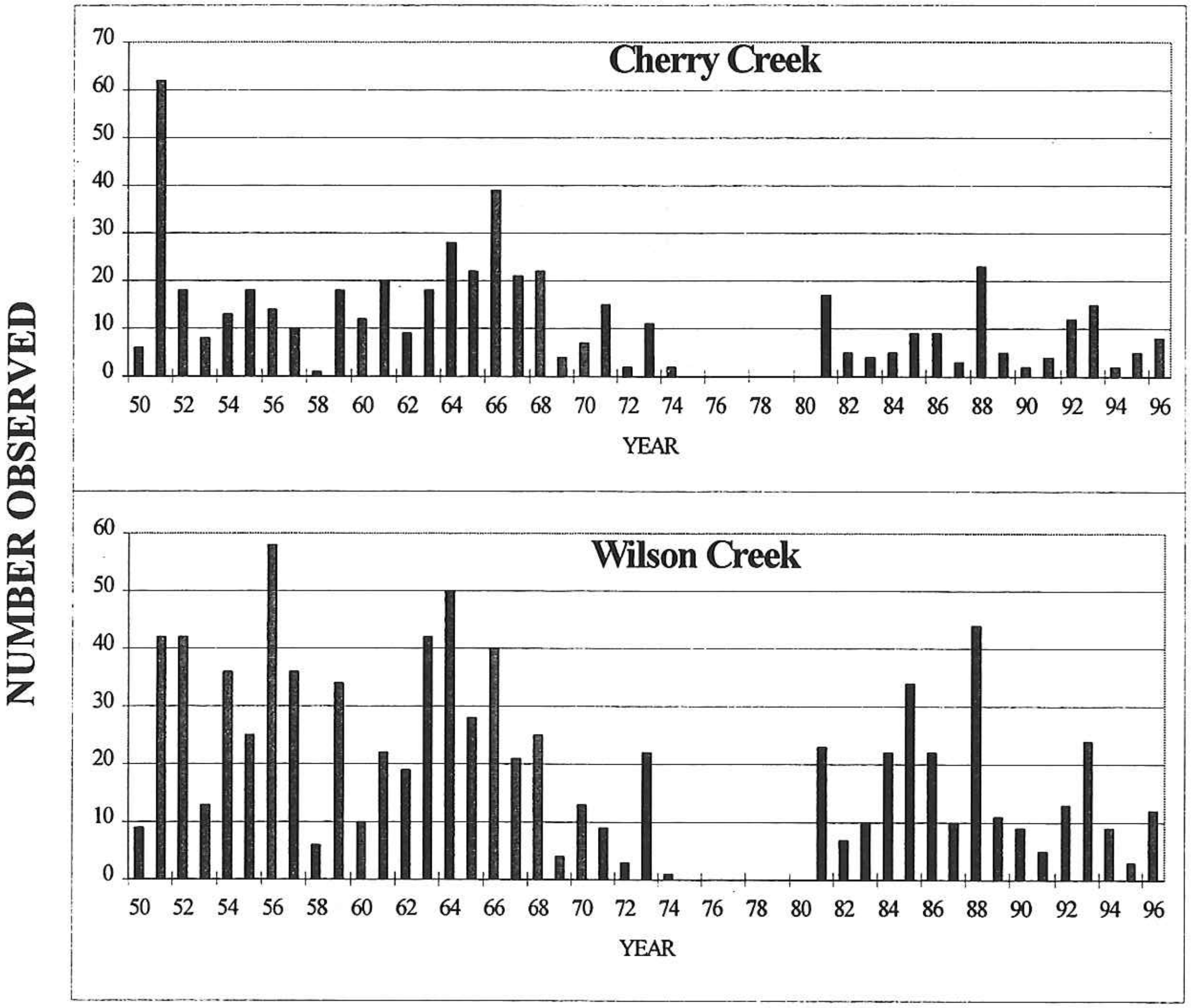


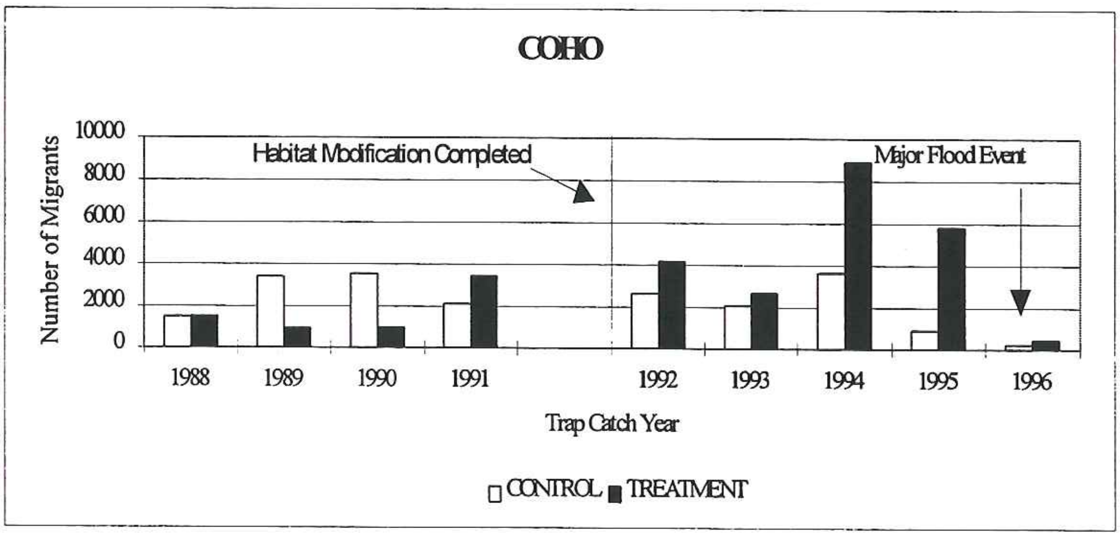
Figure 19. Continued.



Many of the factors responsible for the depressed status of Alsea wild coho are similar to those along the entire Oregon coast and are thought to include unfavorable ocean conditions, over-harvest in fisheries and habitat deterioration. These general factors, however, do not provide a basis for the low abundance of Alsea wild coho during the last few years when fisheries have been essentially closed. During this time period, coho escapement has increased strongly in the Yaquina to the north and moderately in the Siuslaw to the south.

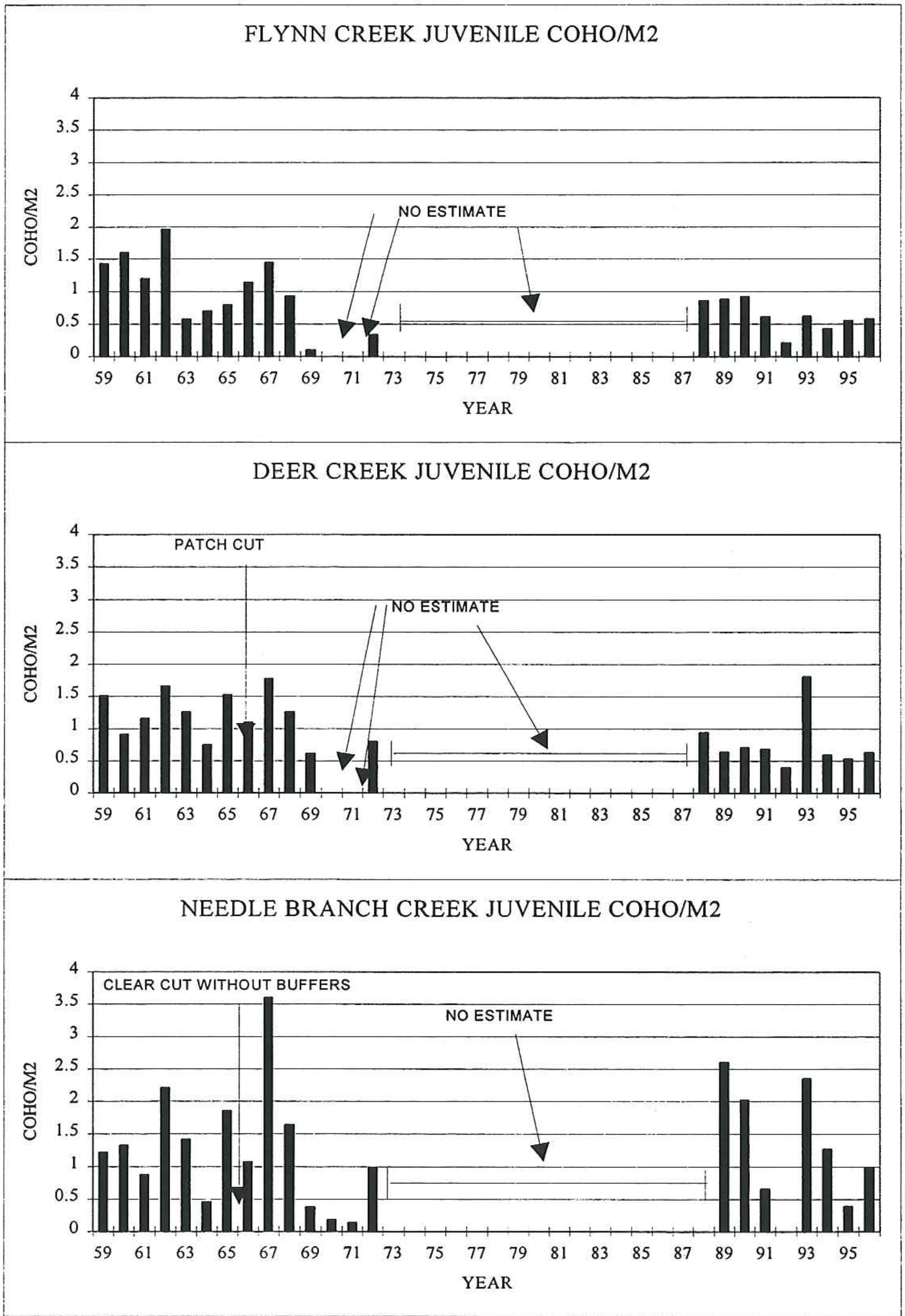
Reductions in juvenile coho production from the Alsea do not explain the recent decline. The two available data sets on freshwater coho production in the Alsea (Figure 20 and 21) indicate that freshwater production has not declined severely and the 1992 brood which contributed to the extremely low 1995 adult returns was a good freshwater production year. This indicates that problems after freshwater rearing are causing the recent declines in Alsea coho. A strong correlation between the annual Alsea wild returns and Fall Creek Hatchery coho returns collaborates the hypothesis that these coho are being affected by a parallel factor after wild and hatchery smolts are mixed. It seems unlikely that it is an open ocean problem given the concurrent increases in returns to adjacent basins to the north and south. This suggests that there is very high mortality of Alsea coho smolts during out-migration from the system.

Figure 20. Coho smolt out-migrant estimates from East Fork Lobster Creek and upper mainstem Lobster Creek.



Apparent factor that could cause low survival of out-migrant coho smolts from the Alsea River Basin are competition with hatchery coho smolts and heavy predation by birds, harbor seals, or other predators. It is hypothesized that predation may be particularly severe in the Alsea because there are large, long-term hatchery programs in the basin which attract concentrations of predators. Based on this hypothesis, and the decline of other Alsea anadromous species with spring smolt out-migration timing, an investigation of predation during this time period is being initiated.

Figure 21. Coho summer rearing densities in Drift Creek study streams.



Anadromous fish passage above North Fork Alsea Hatchery is currently blocked due to the concern that anadromous fish above the hatchery could spread disease into the hatchery water system. Passage will be provided at Alsea Hatchery to allow coho to re-establish a population above the hatchery. Since few hatchery coho are likely to stray to the upper North Fork Alsea, it should be possible to re-establish a sustaining wild coho run above North Fork Alsea Hatchery by reconstructing a fish ladder at the barrier dam and allowing natural re-colonization. Approximately 4 miles of high potential coho habitat exist upstream from the hatchery.

Life History Characteristics and Habitat Needs

Coho smolts migrate to the ocean in the spring after rearing one year in freshwater. After the first summer in the ocean, a small proportion of the males attain sexual maturity and return to spawn as 2 year old jacks. Most of the coho remain an additional year at sea before returning to freshwater to spawn at age 3 and an average size of about 8 pounds.

Coho salmon return to spawn in the Alsea River Basin primarily from September through November. Spawning occurs in tributary streams in November through February.

Fry emerge in the spring and rear in backwater areas and stream margins (Nickelson et al. 1992). During the summer, juvenile coho are spread through a variety of pool habitats. In the winter months, juvenile coho concentrate in pools such as beaver dams or alcoves that maintain low current velocity in spite of high stream flows It is thought that coho productivity in many Oregon coastal streams is limited by the amount of protected pool habitats required by juveniles in winter months.

Excessive summer water temperatures limit use by juvenile coho salmon in some agricultural areas where riparian shading is limited.

Habitat Protection and Restoration Activities

Much of the coho habitat within the Alsea River Basin is on private or state timberlands where stream protection standards are determined by the recently revised Forest Practices Act (FPA). Coastal coho habitat needs were a primary consideration in these coastwide revisions. It is uncertain if the new rules will result in improved coho habitat. Where conifers already exist in riparian areas, protection should improve. However, FPA rules require minimal buffer strips in riparian areas where conifer stocking is low. The buffer strip requirements are low in these areas to allow conifer regeneration which may improve habitat when these streamside conifers mature and are recruited to the stream as large woody debris. However, for the next several decades, regeneration of conifers in riparian areas necessitates heavy beaver trapping, which can be very detrimental to coho habitat.

Coho habitat protection measures on private timberlands must consider the specific characteristics of each stream as well as plans and desires of the landowners. ODFW will review notices of commercial forest operations and, in coordination with the Oregon Department of Forestry, make recommendations on a site specific basis.

The highest priority for projects to restore fish habitat in the Alsea River Basin is coho salmon. The Alsea Basin has some of the best potential habitat for wild coho remaining within Oregon. The following activities are recommended for restoration of coho salmon in the Alsea River Basin:

1. Establish riparian buffers on agricultural land bordering tributary streams where there is currently an absence of riparian tree cover. Benefits include shading the stream and cooling the water, stabilizing banks, increasing productivity, as well as ultimately providing a source of large woody debris to the stream.

2. Increase structure and resulting pool habitat in free flowing stream reaches. Stream surveys in Alsea River tributaries indicate a general lack of instream structure. Increased instream structure will provide winter habitat, a likely factor limiting coho production. Instream structure should be placed in stream reaches in low gradient floodplain areas to get the most benefit. These sites could be identified from stream habitat surveys and topographic maps. Projects of this type are currently being implemented in conjunction with private forest companies, the USFS, BLM and small private landowners. The most concentrated effort to date has been with private timber companies in the upper basin (Seeley, Honey Grove, Hayden, and Swamp Creeks). Instream structure can also be restored by allowing beaver activities which results in beaver dams that provide excellent juvenile coho habitat. Landowners are being requested to consider coho habitat benefits provided by beavers prior to trapping on their ownership.

   Instream structure placement may also benefit cutthroat trout and in some cases winter steelhead.

3. Sedimentation control by waterbarring and/or decommissioning roads.

4. Improve passage for both adults and juveniles. This includes correcting culverts that are currently creating passage problems and correcting culverts that are chronically plugged by beavers.

Hatchery Production

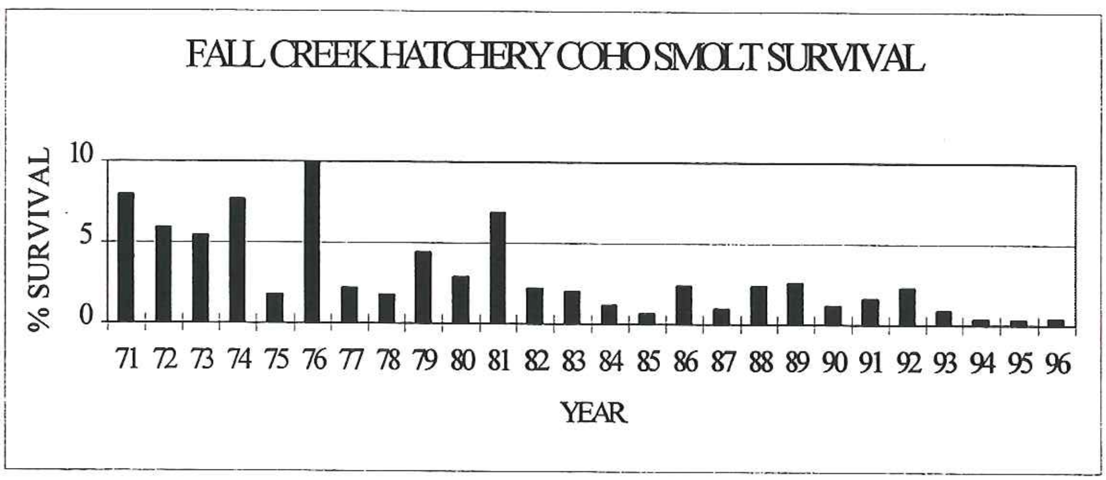
Hatchery coho have been released into the Alsea River Basin since about 1908 (Wallis, 1963). Several hatchery sites were attempted from 1902 thru 1915 with little perceived success due to difficulty in trapping enough fish for an egg supply. In 1915, the hatchery site was shifted to "Tidewater", a site along the mainstem Alsea near the head of tidewater. To assure an adequate egg supply, a near complete dam was placed across the Alsea in 1916. This stayed in place until 1929 at which time it was reportedly blown up by fishermen from the upper river. Early programs released large numbers of unfed fry in the lower river which probably produced very low returns. Fish culturalists gradually learned that returns could be greatly increased if hatchery fish were reared until they smolted and were ready to migrate to the ocean at about the same time as wild coho.

The "Tidewater" hatchery site was operational until 1952, when the need for an improved water supply prompted the relocation of the hatchery to the present site on Fall Creek. By the early 1960s Fall Creek Hatchery began releasing large numbers of smolts on a consistent basis (Table 17). The hatchery program has had a production target of one million smolts per year which was the highest coho smolt release in any Oregon coastal basin. The hatchery coho smolts are released from March until early June at a size avaraging about 38 grams. This is about three times the size of wild smolts.

The primary purpose of Fall Creek Hatchery in the Alsea River Basin is to provide coho salmon for ocean fisheries along the Oregon coast. A secondary purpose is to contribute to fisheries within the Alsea.

Fall Creek Hatchery has had returns ranging from 2 to 12 thousand adult coho in the recent past (Table 17). In recent years Fall Creek Hatchery coho have had declining survival which is typical of most other coastal and Columbia River coho production facilities (Figure 23). Survival of Fall Creek Hatchery smolts has been particularly low the last four years. This may be due to a combination of unfavorable ocean conditions and increased predation.

Figure 23. Fall Creek hatchery coho smolt survival from 1971-1996.



Substantial numbers of coho from the Ore-Aqua private hatchery operation at Newport strayed into lower parts of the Alsea during the 1980s (Table 19). The private hatchery coho were of Puget Sound origin and have different life history characteristics compared to the Alsea River stock. It is not possible to determine the impact these strays had on native Alsea coho. Puget Sound stock tend to spawn earlier than Alsea wild coho so they did not impact the later portions of the wild run. Homing of Fall Creek Hatchery coho is very strong. For all years and areas combined, it is estimated that Fall Creek Hatchery coho made up about 6% of the natural spawners, excluding private hatchery strays and excluding areas in the immediate vicinity of the hatchery.

Table 17. Fall Creek hatchery coho smolt releases and adult returns.

Year	Smolts Released	Adult Return	Jack Return
1970	809,000	13,028	2,135
1971	786,000	10,914	1,145
1972	1,079,000	7,004	2,307
1973	1,044,000	9,986	4,877
1974	1,140,000	12,953	466
1975	797,000	3,822	8,809
1976	1,015,000	18,699	3,012
1977	728,000	2,303	1,146
1978	1,050,000	2,251	3,774
1979	1,090,000	10,284	461
1980	988,000	7,975	1,531
1981	1,058,000	11,596	849
1982	1,076,000	8,250	1,174
1983	831,000	4,381	289
1984	747,000	6,487	185
1985	867,000	2,630	1,975
1986	818,000	12,472	608
1987	596,000	2,941	463
1988	1,059,000	6,017	538
1989	1,363,000	11,242	561
1990	1,251,000	4,830	296
1991	1,089,000	9,897	1,178
1992	1,498,000	12,010	940
1993	978,000	8,030	55
1994	1,022,000	3,209	107
1995	1,055,000	3,016	178
1996	1,010,036	3,829	226

Angling and Harvest

Alsea River Basin wild and hatchery coho salmon contribute most heavily to ocean fisheries from the central Oregon Coast to northern California. They also are harvested to a lesser extent in fisheries within the Alsea River Basin. The overall harvest rate on these coho has averaged about 80% from 1970-83 and 50% in years from 1983-93. Starting in 1994, fisheries that harvest substantial numbers of Alsea wild coho were essentially closed. The vast majority of the catch has occurred in ocean fisheries. Sport catch in the Alsea River Basin based on angler punchcards had averaged about 2,000 adults prior to the closures first implemented in 1994 (Table 20).

Table 19. Origin of coho salmon carcasses recovered in spawning areas of Drift Creek and Five Rivers based on assessment of scale samples.

	Drift Creek			Five Rivers		
Year	Wild	Public hatchery	Private hatchery	Wild	Public hatchery	Private hatchery
1985	80	0	64	57	1	2
1986	58	5	36	20	8	7
1987	31	0	6	32	2	0
1988	11	0	0	23	5	0
1989	7	1	1	24	1	0
1990	3	0	0	6	0	0
1991	7	0	0	7	2	0
1992	74	4	0	70	0	0
1993	0	0	0	5	3	0
1994	3	0	0	2	2	0
1995	8	2	0	22	1	0

a Wild means the fish was reared in natural stream habitat. Public hatchery means the fish is probably from Fall Creek Hatchery. Private hatchery indicates the coho were most likely from the private hatchery at Newport.

Coho Spawner Goals

The ODFW Coho Plan gives direction that coho salmon in Oregon coastal streams will be primarily managed to maximize natural production (ODFW, 1982). This intent was maintained in the recently completed Oregon Plan. The Oregon Plan included refined analysis of adult coho spawner abundance required to maximize use of freshwater habitat by juvenile coho salmon. This refined analysis is used in this plan. It estimates spawners needed for each major coastal basin based on habitat surveys from that specific basin and recognizes that marine survival of coho smolts influenced spawner requirements. During low marine survival, spawner requirements were reduced because wild coho would not be viable in lower quality habitat. Conversely, if marine survival improved, this improved marine survival would compensate for low quality freshwater habitat, resulting in wild coho viability over a much broader area and a need for more overall spawners in a basin. Because of the influence of marine survival, wild coho spawner abundance targets are presented as a range.

Table 20. Coho salmon harvested in the Alsea River Basin sport fishery from punchcard data, 1978-95. 1994 through 1996 assumed to be zero due to a complete closure of in-basin coho fisheries.

Year	Drift Creek	Five Rivers	Fall Creek	No. Fk. Alsea	So. Fk. Alsea	Mainstem & bay	Total
1978	32	12	207	19	3	342	583
1979	0	0	90	3	0	180	273
1980	62	112	1,044	37	30	717	1,940
1981	66	11	3,371	28	37	1,488	4,935
1982	88	29	989	68	16	1,593	2,695
1983	47	19	31	3	6	1,388	1,447
1984	71	60	612	23	6	1,592	2,293
1985	118	169	12	32	24	1,074	1,311
1986	102	85	62	37	65	2,211	2,460
1987	38	15	0	15	44	655	729
1988	118	43	108	24	8	1,689	1,872
1989	67	42	67	38	30	2,656	2,833
1990	38	6	44	12	6	404	472
1991	42	45	18	15	12	1,760	1,850
1992	219	90	107	26	39	1,820	2,301
1993	4	4	34	45	8	1,911	2,006
1994	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0

An estimated 15,100 to 21,500 adult coho spawners are required for near complete utilization of Alsea River Basin freshwater habitat. The lower and higher values corresponds to spawners needed with low and moderate marine survival respectively. It is recognized that there will be high variability in escapement among different stream reaches and between years. Some areas will have more spawners because they contain concentrations of spawning gravel or because they are associated with above average rearing habitat. Other areas will have fewer because they have rearing habitat with a lower capacity, or in some cases adult returns will be below levels needed for full seeding because of low survival from the egg to smolt stage. Full seeding in most streams, most years, is the expectation if the adult spawner targets are realized.

This spawning escapement objective is seven to ten times higher than escapement observed in recent years.

This Alsea River Basin escapement objective will be a consideration, but not a singular constraint on mixed stock ocean fisheries. Selective ocean fisheries for finclipped hatchery coho will be an option by 1998. These fisheries could potentially occur based on achievement of spawner targets for each of three Oregon coastal wild coho population sub-aggregates. These fisheries would also require that all major basins including the Alsea do not constitute a severe conservation problem.

Fisheries within the Alsea will be managed as follows dependent on progress in achieving wild coho production and escapement increases.

Situation	In-basin fishery management
Wild coho escapement decreases or remains at very depressed levels observed in recent years.	Any fishing mortality will be undesirable. Fisheries on other species may be modified to prevent incidental wild coho hooking mortality.
Wild coho escapement increases, but is less than 15,100 adult spawners.	Efforts made to allow reasonable utilization of still healthy species like fall chinook or finclipped targeting wild coho.
Wild coho adult spawners are expected to meets or exceeds 15,100 adults	Initiate a process to open in-basin fisheries on wild coho salmon.

A freshwater juvenile abundance objective of 1.5 juvenile coho salmon per square meter of pool habitat is also proposed. A density of 1.5 coho/m2 is generally considered to be an approximate density indicative of full juvenile seeding. At higher densities, territorial conflicts occur among the juveniles and some fish are pushed out. The juvenile objective will serve as a check on habitat quality and appropriateness of the adult escapement objective. It will be measured during late summer in surveys for multiple salmonid species in tributary streams.

Management Considerations

Coho salmon in the Alsea River Basin will be managed for wild production with an option for a hatchery program. For the near future (next 5 years), all hatchery coho smolt releases will be discontinued. Any hatchery coho program will be shifted from providing fish for harvest to a conservation mission. A future option will be maintained to restore hatchery coho smolt production with a new broodstock from Alsea wild coho if wild coho recover sufficiently to allow fisheries, and if a smolt program can be developed consistent with minimal impacts to wild coho. A primary reason is that the break in hatchery smolt releases may substantially improve survival of wild coho smolts.

A high priority will be given to protecting and restoring coho habitat. Coho habitat will be systematically surveyed throughout the Alsea River Basin to identify protection and restoration needs and provide baseline information to evaluate the effectiveness of these efforts. Predation, disease or other factors contributing to the low Alsea wild coho returns will be investigated. A short-term fishery objective will be to avoid constraints on fisheries for other healthy species due to incidental wild coho hooking mortality. A longer term fishery objective will be to return to consumptive fisheries on wild coho.

Policies

Policy 1. The Alsea River Basin will be managed for wild coho production with an option for a hatchery program.

Policy 2. Coho hatchery stocks that can be used in the Alsea River Basin are limited to a new broodstock developed from wild Alsea River Basin coho.

Objectives

Objective 1. Achieve an average benchmark for wild coho spawner abundance in the Alsea River Basin between 15,100 adult coho spawners during poor marine survival conditions, and 21,500 adult coho during more moderate marine conditions.

Assumptions and Rationale

1. This spawner abundance goal is consistent with estimates of spawners needed to fully utilize freshwater habitat with moderate smolt survival.

2. The Alsea River Basin adult coho spawner abundance objective may be modified due to new technical information and analysis or due to coast-wide review of coho escapement objectives.

3. Coho salmon in the Alsea River Basin are severely depressed from historic levels.

4. Alsea River Basin wild coho status will be considered in ocean fisheries based on the harvest management procedure established in the Oregon Plan.

5. Incidental wild coho mortality in fisheries targeting other species (chinook, hatchery steelhead) will be acceptable if progress is being made at building toward the escapement objective.

6. The absence of instream habitat complexity created by large woody material, and the lack of large conifers in riparian areas necessitate that large woody structure be artificially placed in some stream reaches to provide productive coho habitat.

7. Beaver populations will continue to provide habitat that is essential for over-winter survival of juvenile coho salmon in some stream reaches.

8. Termination of hatchery coho smolt releases in the Alsea River Basin may result in substantial improvement in wild coho smolt survival.

9. The production level that Alsea River Basin coho salmon will achieve given improved habitat conditions, reduced interaction with hatchery fish, and adequate fishery escapement cannot be accurately predicted. Given that the Alsea River Basin currently has coho production that is less than 5% of historic levels, it is probable that substantial recovery can be achieved.

Actions

1.1 Continue to monitor spawner abundance annually in randomized survey areas and in the five standard trend survey areas in the Alsea River Basin.

1.2 Terminate all hatchery coho smolt production within the Alsea basin for at least five consecutive years.

1.3 Restrict all recreational angling for coho salmon within the Alsea River Basin until spawner abundance increases substantially (note objective 3).

1.4 Potentially develop a small conservation hatchery program by capturing and spawning limited numbers of wild adult coho and releasing their offspring into tributaries where wild coho are absent or present in extremely low levels.

1.5 Allow wild coho adult passage into the area above the hatchery on the North Fork Alsea River.

1.6 Systematically survey likely coho habitat throughout the Alsea River Basin to assist in prioritizing protection and restoration needs and provide baseline information to evaluate the effectiveness of these efforts.

1.7 In review of land use activities, emphasize activities that may impact important habitats for coho salmon.

1.8 Implement habitat restoration projects designed primarily to increase coho production in collaboration with other agencies and land managers.

1.9 Recommend to landowners that beavers be managed so habitat benefits for coho salmon are achieved.

Objective 2. Achieve an average summer juvenile coho salmon seeding level of at least 1.5 fish per meter squared of pool habitat in streams suitable for coho production.

Assumptions and Rationale

1. Juvenile coho densities averaging 1.5 fish per meter squared of pool habitat are indicative of full habitat utilization.

2. An adult spawning escapement, as stated in Objective 1, should achieve summer juvenile rearing densities of 1.5 fish per meter squared of pool habitat.

3. Initially, the juvenile coho density objective will be applied to the 221 miles of stream habitat identified as high potential adult coho spawning habitat. This estimate will be refined based on new information.

Actions

2.1 Conduct annual surveys of juvenile coho salmon to determine density and distribution in the basin.

2.2 Based on the results from coho adult spawning surveys and juvenile surveys, evaluate the appropriateness of the adult spawner goal and refine if warranted.

2.3 If coho juveniles are less abundant than 1.5 fish per meter squared, given adequate spawning escapement, evaluate habitat limitations and correct deficiencies if feasible.

2.4 Promote the evaluation of coho salmon population dynamics by using fish traps to measure the smolt production and subsequent adult coho returns from representative sub-basins. Develop the evaluation to improve understanding of post tributary coho smolt survival and the relationship between smolt production and habitat conditions or adult escapement levels.

Objective 3. Recover Alsea River Basin wild coho salmon sufficiently to prevent restrictions on fisheries targeting other species or finclipped hatchery coho, and sufficiently to provide for future harvest in the Alsea River Basin.

Assumptions and Rationale

1. Resumption of coho fisheries will be dependent on recovery of Alsea River Basin wild coho salmon.

2. Fisheries for coho salmon in the Alsea River Basin may occur on wild coho or finclipped hatchery coho.

Actions

3.1 Consider opening fisheries for wild coho salmon in the Alsea River Basin if wild coho spawner abundance is anticipated to be at least 15,100 adults as measured in random spawning surveys.

3.2 Consider starting a new hatchery program to supplement fisheries if wild coho recover sufficiently to allow in-basin and ocean harvest of the hatchery coho (based on criteria in the Oregon Plan), and the program is likely to have minimal impacts on wild fish.

WINTER STEELHEAD

Background

Winter steelhead are native to all major basins along the Oregon coast, including the Alsea. Important habitat for winter steelhead in the Alsea River Basin is not well documented, but is thought to exist in high gradient sections of large tributaries including Drift Creek, Scott Creek, Five Rivers, and the North and South Forks Alsea River.

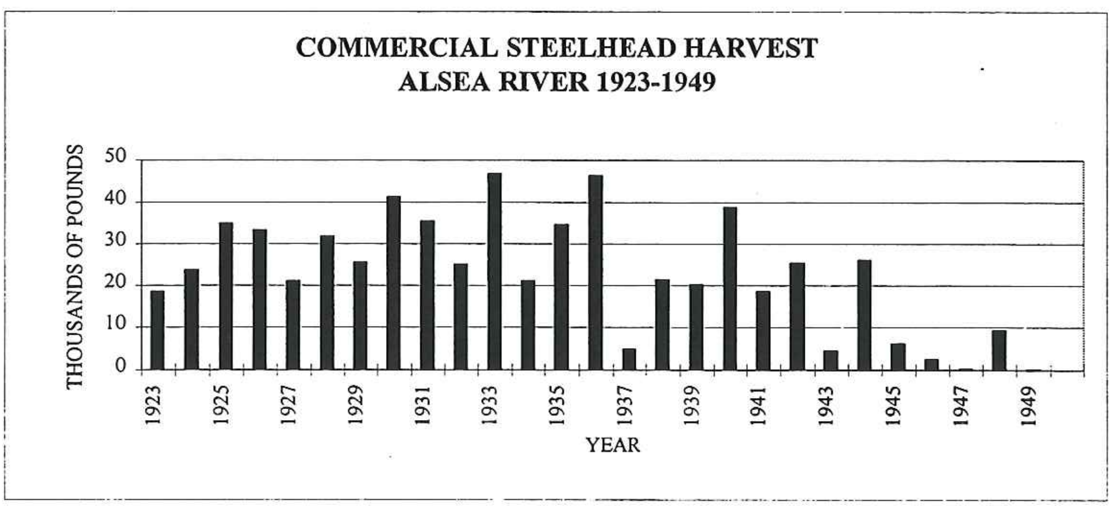
The Alsea River Basin has been stocked with hatchery winter steelhead since at least the 1930s.

Status

Wild winter steelhead in the Alsea River Basin are very depressed and are currently being reviewed along with other coastal steelhead for listing under the Endangered Species Act.

Commercial net fisheries provide the earliest record of Alsea winter steelhead run sizes. From 1923-40 catch averaged about 3,200 fish per year (Figure 23). It is uncertain what proportion of the run was caught in the commercial fishery. The total run size was probably at least twice and perhaps several times larger than the estimated catch.

Figure 23. Catch of winter steelhead in commercial net fisheries on the Alsea River from 1923 to 1948 (Oregon Department of Fish and Wildlife 1986).

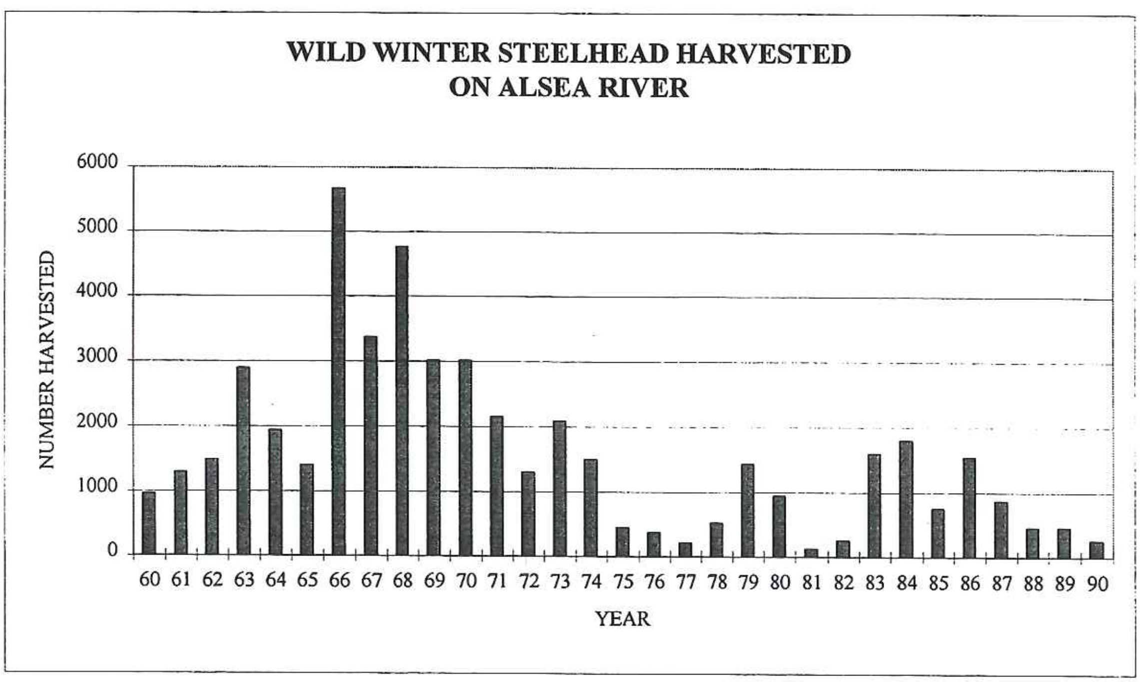


The best current status assessment of wild Alsea River Basin winter steelhead is based on estimated catch in sport fisheries from punchcards multiplied by the estimated proportion of the total fish that were wild (Figure 24). Data to make estimates for individual years were sometimes limited and harvest rate may have been variable between years, so the figure should be used to make general assessment of long-term trends rather than results from individual years. The declining catch of wild fish depicted in the figure is a strong indicator that wild runs have declined since the 1970s. Wild steelhead returns in other streams stocked with Alsea Hatchery smolts generally show trends that are similar to that for the Alsea.

Factors that potentially contributed to the decline in the returns of wild steelhead include:

1. Unfavorable ocean conditions for smolt survival in recent years.
2. Increased predation by marine mammals or birds.
3. Past high seas net fisheries.
4. Excessive in-river sport harvest.
5. Freshwater habitat deterioration.
6. Genetic alteration of wild steelhead due to breeding with hatchery steelhead.
7. Competition in freshwater with juveniles from hatchery spawners.

Figure 24. Estimates of wild winter steelhead harvested in the Alsea River. Estimates derived by multiplyng catch estimates from punchcards by the percentage wild fish estimated from scale samples. Year designation corresponds to year at beginning of return-i.e. 1990 means 1990-91 return year.



Life History Characteristics and Habitat Needs

Winter steelhead generally return to freshwater to spawn beginning in November, with the majority returning in December through March. Spawning of wild fish is thought to occur in large, high gradient tributary streams primarily during February through May. Generally after 2 years of freshwater residence, juveniles smolt and migrate to the ocean in the spring. Steelhead usually remain in the ocean 1-3 years before returning to freshwater to spawn.

Compared to other salmonids in the basin, juvenile steelhead prefer stream reaches with high gradient and velocity. Young-of-the-year fry are usually found along the edges of pools and riffles while older juveniles are found in the deeper pools and pocket water (Barnhart 1986). Yearling steelhead juveniles require enough cover to avoid predation and enough current velocity to supply drifting food items. Yearling and adult steelhead often use white water and turbulence as cover.

Large woody debris is an important component in steelhead habitat in some areas, both from the standpoint of serving as cover and of creating pools. In other areas, rock based structure creates instream channel complexity required by juvenile steelhead.

Habitat Restoration Activities

Extensive habitat restoration activities directed specifically at winter steelhead have not been given a high priority in the Alsea River Basin at this time because of the limited ability to improve habitat in the large, high gradient streams normally used by steelhead. At present, these areas frequently have habitat in fair condition due to cover provided by large instream rocky structure. Habitat restoration projects could be carried out in critical steelhead spawning and rearing habitats. Potential restoration projects could include;

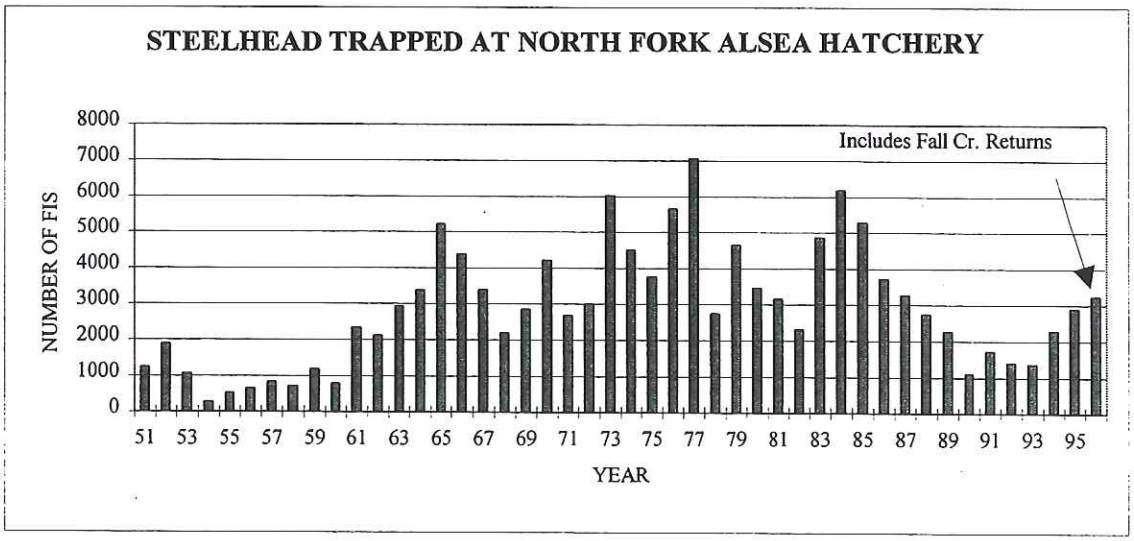
1. In large streams, creating an edge effect with large woody debris and boulders in pools to provide cover from predators and high winter flows.
2. In small or medium steelhead streams, use large wood or boulders for instream structures.
3. Improving shading along streams to maintain or decrease summer water temperatures. This restoration action is particularly necessary in agricultural lands where stream-side shading is minimal.

Hatchery Production

The Alsea River Basin has been stocked with about 120,000 smolts at a target size of 6 fish per pound in recent years (Table 21). These smolts are produced from the Alsea hatchery stock which has been in use since the late 1930s. Of the 120,000 released each year, 80,000 are released at the hatchery and 40,000 are released in the lower river. Surplus adult steelhead returning to Alsea Hatchery are transferred to the South Fork Alsea (spawned out females) or lakes and reservoirs.

Hatchery steelhead releases within the Alsea River Basin have had poor survival in recent years resulting in the decline in one of Oregon's premier coastal winter steelhead fisheries. North Fork Alsea Hatchery steelhead returns have declined (Figure 25). Overall returns to Alsea Hatchery are difficult to interpret because smolt production and release location has varied through time.

Figure 25. Winter steelhead trapped at North Fork Alsea Hatchery. Year designation corresponds to year at the beginning of the run- I. E. 1990 means 1990-91 run year.



A more precise indicator of recent declines in hatchery survival is provided in Figure 26 which isolates the return rate for releases made directly from the North Fork Hatchery.

The specific factors responsible for the reduced return of hatchery steelhead cannot be quantified. Factors that could potentially be responsible for declines in hatchery smolt survival include:

1. Unfavorable ocean conditions for smolt survival since about 1985.
2. Increased predation by marine mammals or birds.
3. High seas net fisheries by foreign boats in the North Pacific.
4. Deterioration in the genetic fitness of the Alsea hatchery stock.

5. Increases in disease organisms in the hatchery environment or decreased resistance of hatchery fish to disease organisms present in the natural environment.

Some factors potentially responsible for reduced survival are beyond human control or must be addressed in broader forums. Factors that can be addressed locally include those related to the quality of the hatchery smolt that are produced.

Alsea Hatchery steelhead have been extensively studied in research projects from 1960 to the present. Key findings from this research are:

1. Hatchery smolts will survive better if they are released at a larger size. Survival is best if hatchery smolts are released in the spring at the same time wild juveniles are smolting.

2. Hatchery smolts stocked in the lower Alsea tend to contribute better to lower river fisheries and less to the upper river. Overall fishery contribution was variable for releases at different river locations. Returns to the hatchery are highest for releases made directly from the hatchery. Straying into natural habitats is thought to be lowest for smolts released directly from the hatchery and higher for releases made in the lower river.

Table 21. Hatchery steelhead releases in the Alsea River.

Release Year	Smolts	Number of Fingerling	Fry
1969	127,200	0	0
1970	100,300	273,300	0
1971	97,170	51,290	0
1972	130,500	24,300	0
1973	121,575	75,115	0
1974	122,920	0	0
1975	162,670	327,100	0
1976	137,747	0	0
1977	110,104	0	0
1978	120,863	0	0
1979	117,230	207,340	0
1980	137,332	0	0
1981	129,959	0	0
1982	118,733	0	0
1983	129,144	0	0
1984	138,860	0	0
1985	121,188	0	58,390
1986	121,883	0	108,880

Table 21. Continued.

Release Year	Smolts	Number of Fingerling	Fry
1987	118,357	0	174,430
1988	127,808	0	181,050
1989	121,866	0	261,800
1990	125,812	0	282,642
1991	122,853	0	139,531
1992	127,976	0	134,038
1993	131,396	0	269,912
1994	120,697	0	2,574
1995	128,546	0	3,120
1996	121,326	0	0
1997	125,958	0	0

3. Characteristics of returning adult hatchery steelhead, including spawning time and age at return, can be altered by selective breeding at the hatchery. Time of steelhead return from the late 1930s to 1980 demonstrates this (Figure 27).

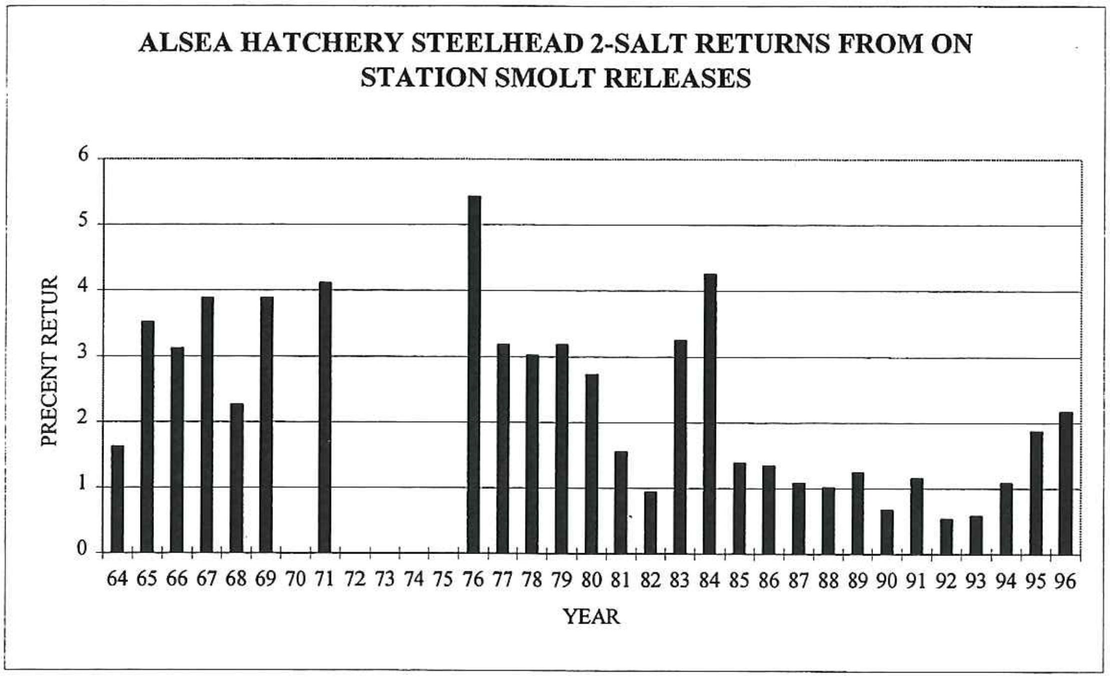
4. Alsea steelhead smolts that are transferred to other streams have a tendency to home back to the Alsea River Basin. The smolt releases in the Siuslaw stray back to the Alsea River Basin at 4 to 5 times the rate of other out-of-system releases.

Adult steelhead traps on a tributary to Five Rivers, upper Drift Creek, and Fall Creek identified that about half the spawners the last three years were of hatchery origin (Table 22). Most of these hatchery steelhead were from out of system Alsea stock smolt releases which stray back to the Alsea. Strays from the Siuslaw release were particularly abundant. Strays from smolts released directly from the Alsea Hatchery were rare.

Stray hatchery steelhead tend to return earlier than wild steelhead (Figure 28), however, there is still overlap through most of the run. The wild steelhead returning and spawning during April and May are the only segment of the wild run that is not heavily influenced by hatchery strays.

The ODFW Commission modified hatchery steelhead programs in coastal streams to achieve compliance with the Wild Fish Management Policy in February 1994. The only adjustment to releases in the Alsea include shifting the lower river release (40,000) to Fall Creek Hatchery.

Figure 26. Winter steelhead 2-salt returns from on station smolt releases, Alsea Hatchery.



The Siuslaw River hatchery steelhead program is also closely related to the Alsea River Basin because many of the returning adults stray back to the Alsea. It is thought that this straying occurs because Siuslaw smolts were raised at Alsea Hatchery This program has been recently modified. The Siuslaw hatchery steelhead will either be raised at a hatchery in the Willamette or Siuslaw Basins. This is expected to reduce the straying back to the Alsea River Basin.

Angling and Harvest

Alsea winter steelhead catch from punchcards and hatchery smolt releases is given in Figure 29. Following expansion of the hatchery program in the early 1960s, catch increased dramatically, but since then has declined to levels comparable to that before the hatchery build up. Alsea hatchery winter steelhead smolts are stocked into several other streams where they provide the bulk of the catch. Fisheries in these basins have declined in recent years in a similar manner. Other Oregon coastal streams that have hatchery programs using different stocks and raising fish at different hatcheries have declined, but not so much as that experienced in the Alsea River Basin.

A creel survey has been conducted on the Alsea River during most years from 1960 through 1986 (Table 23). Estimates of steelhead catch in the creel surveys were generally about 30% less than estimates from punchcards for the same year. It is thought that the creel survey estimates are more accurate, but punchcard estimates have been used to show trends since they are available for all years and since they show the same trends as the creel surveys.

Table 22. Origin of adult winter steelhead captured in traps in the Alsea River Basin, 1991-95.

	Number of adult steelhead captured									
	1991-92		1992-93		1993-94		1994-95		1995-96	
Location	H[a]	W	H	W	H	W	H	W	H	W
Drift Creek	46	36	22	46	20	27	16	25	29	21
Cascade Creek	9	7	4	9	7	1	13	9	2	2
Fall Creek	4	7	11	14	15	9	0	8	0	6

[a] H=hatchery origin, W=wild origin.

Figure 27. Monthly distribution of winter steelhead returning to the North Fork Trap at Alsea Hatchery.

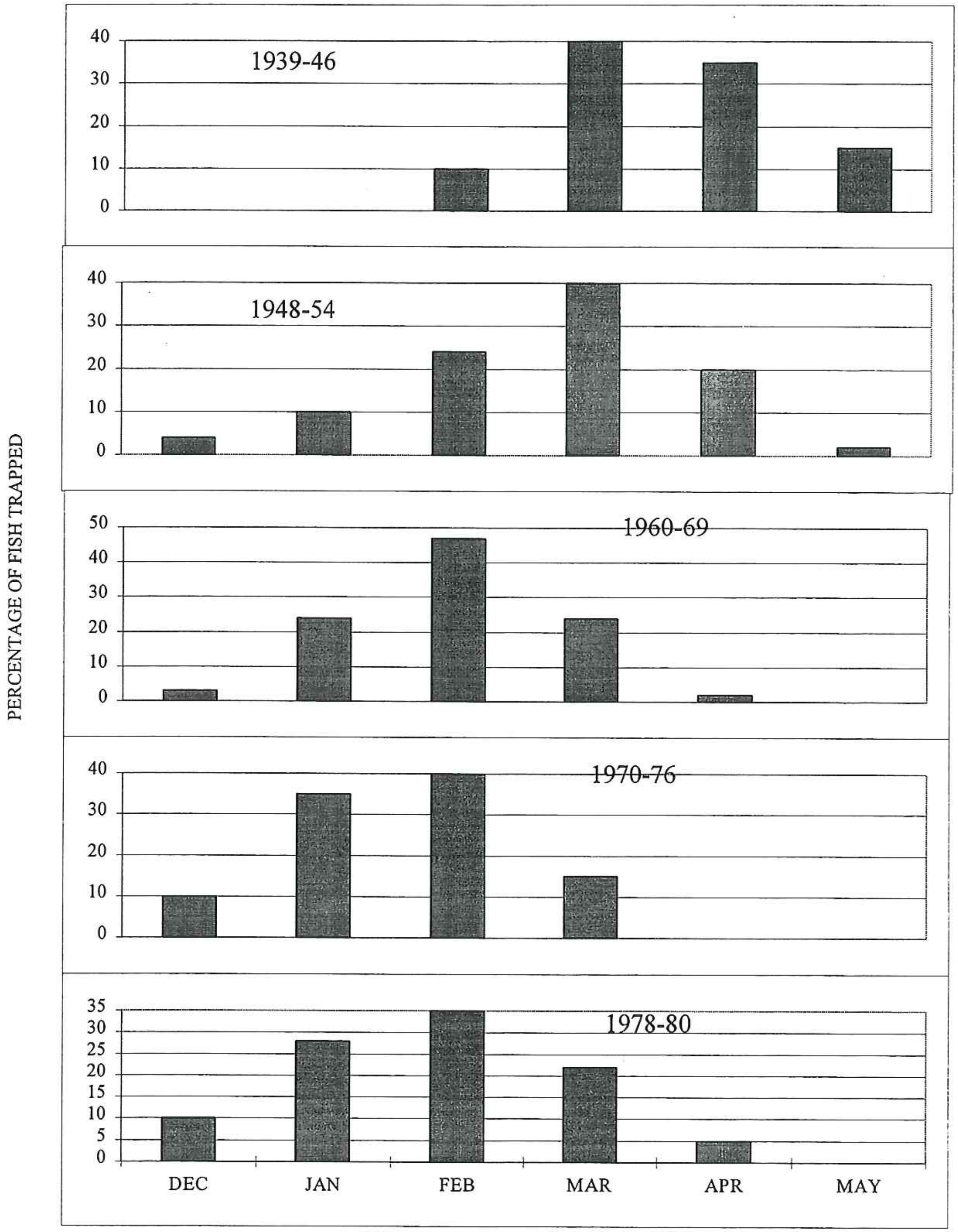


Figure 28. Winter steelhead captured at Bohannan Falls fish trap, Alsea River tributary.

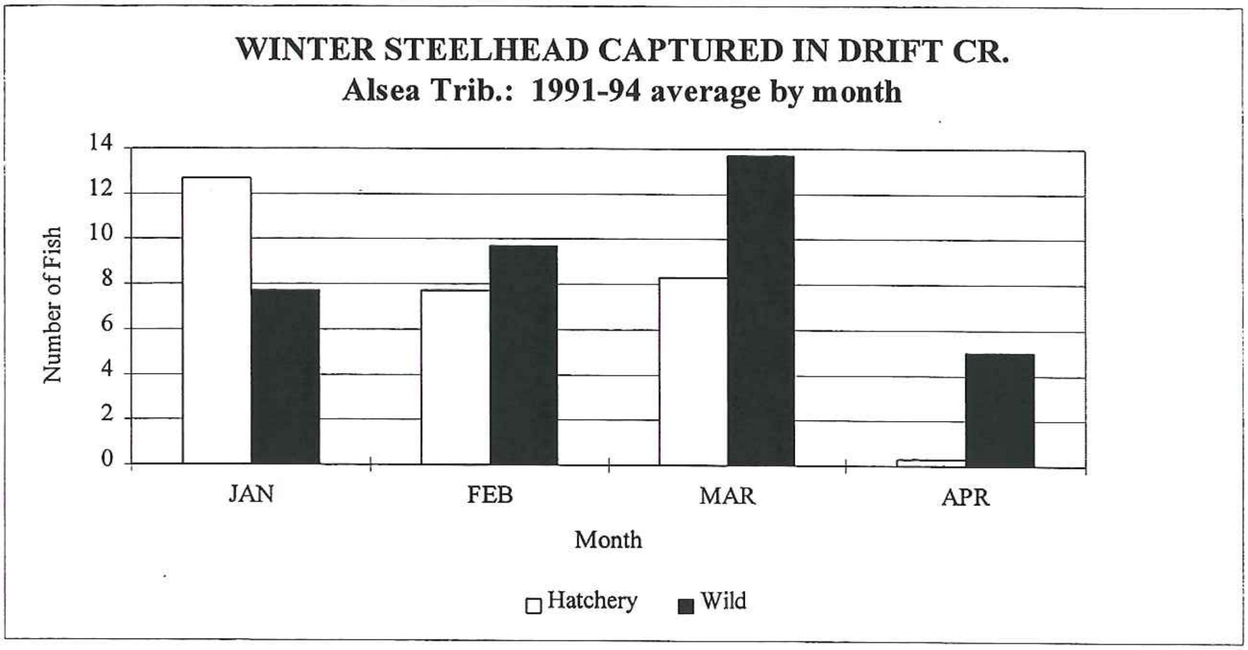


Figure 29. Winter steelhead harvest and corresponding smolt release in hundreds, Alsea River. Harvest estimates are from punch cards. Year designation corresponds to year at beginning of return- I. E. 1990 means 1990-91 return year.

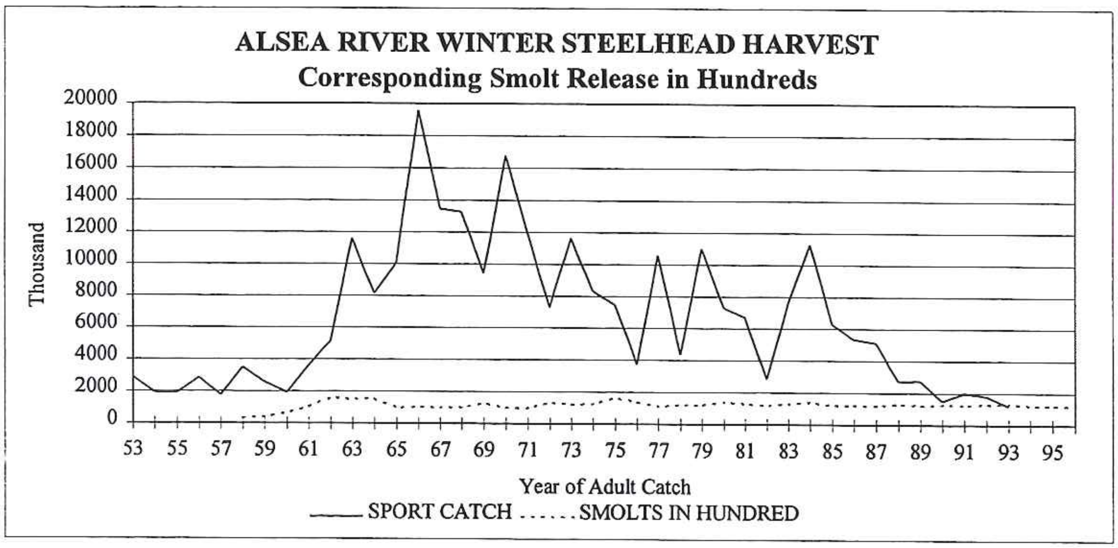


Table 23. Estimates of angler effort, catch, and catch rate in the Alsea River winter steelhead fishery, 1961-87.

Season	Angler days	Hours fished	Total steelhead caught	Hatchery steelhead caught	Wild steelhead caught	Hours per fish	Percentage hatchery fish
1960-61	4,168	16,158	614	307	307	26.3	50
1961-62	8,156	37,000	2,035	1,295	740	18.2	64
1962-63	10,394	45,397	2,860	2,043	817	15.9	71
1963-64	18,413	85,220	6,562	4,943	1,619	13.0	75
1964-65	22,957	90,008	4,595	3,514	1,081	19.6	76
1965-66	26,717	131,038	6,945	6,028	917	18.9	86
1966-67	26,100	114,523	5,038	3,576	1,462	22.7	71
1967-68	21,282	106,289	4,783	3,614	1,169	22.2	75
1968-69	18,434	90,382	4,971	3,164	1,807	18.2	64
1969-70	13,889	70,140	3,016	2,050	966	23.3	68
1970-75[a]	---	---	---	---	---	---	---
1975-76	15,276	79,277	4,465	4,197	268	17.8	94
1976-77	10,394	39,551	1,930	1,737	193	20.5	90
1977-78	22,876	96,125	5,961	5,813	148	16.1	98
1978-79	17,201	68,962	3,575	3,149	426	19.3	88
1979-80	26,623	115,726	8,913	7,755	1,158	13.0	87
1980-81	16,177	83,788	3,089	2,672	417	27.1	87
1981-82	15,546	82,407	3,213	2,573	640	25.6	80
1982-83	11,491	55,848	1,531	1,392	139	36.5	91
1983-84	21,294	98,686	5,158	4,086	1,072	19.1	79
1984-85	30,142	152,903	13,381	11,266	2,115	11.4	84
1985-86	24,749	130,297	5,387	4,713	674	24.2	88
1986-87	26,493	104,596	4,734	3,357	1,378	22.1	71

[a] No estimates.

Management Considerations

Winter steelhead in the Alsea River Basin will be managed for wild and hatchery production. The depressed status of wild fish will be addressed by protecting and restoring habitat, as outlined in the Habitat chapter. Efforts will made to re-establish a self-sustaining run above Alsea Hatchery. Angling regulations that require the release of all non-finclipped steelhead will continue at least until wild runs recover. The current hatchery program will be maintained at about its present size, but will be modified to bring it into compliance with the Wild Fish Management Policy. Major actions to reduce hatchery steelhead spawning in the wild include:

1. Shift the lower river release (40,000 smolts) from the main stem near Five Rivers to Fall Creek Hatchery.

2. Discontinue out-planting of surplus juvenile or adult hatchery steelhead to natural production areas except for a limited number of spawned out adult females stocked in the South Fork Alsea.

3. Discontinue raising Siuslaw River hatchery steelhead smolts at Alsea Hatchery.

A new Alsea River Basin hatchery steelhead broodstock will be developed from naturally produced Alsea fish. This wild broodstock development program will be done after wild steelhead are established upstream from Alsea Hatchery.

Policies

Policy 1. Winter steelhead in the Alsea River Basin shall be managed for wild and hatchery production.

Policy 2. Winter steelhead hatchery stocks that can be used in the Alsea River Basin are limited to the Alsea Hatchery broodstock or a broodstock developed from native Alsea winter steelhead.

Objectives

Objective 1. Increase production of wild winter steelhead.

Assumptions and Rationale

1. Insufficient information is available to establish accurate production and escapement objectives of wild winter steelhead in the Alsea River Basin. If the Oregon Plan adopts interim escapement goals they will be used until sufficient information is available to establish accurate production and escapement objectives for the basin.

2. Catch-and-release angling regulations for wild winter steelhead will increase escapement and production.

3. Accomplishing habitat protection and restoration objectives will improve stream conditions for winter steelhead and result in increased production.

4. Bringing mid-coast hatchery programs into compliance with the Wild Fish Management Policy will protect the genetic resources of wild winter steelhead in the basin and result in increased productivity.

5. The area above Alsea Hatchery will sustain an annual run of several hundred wild winter steelhead.

Actions

1.1 Accomplish the habitat management objectives in this plan.

1.2 When reviewing proposals for land use activities and development, give emphasis to important winter steelhead production areas.

1.3 Continue angling regulations requiring the release of all non-finclipped naturally produced steelhead in the Alsea River Basin.

1.4 Reduce hatchery steelhead spawning in the wild to <10% of the total steelhead except in the immediate vicinity of the hatchery release site. Measures to accomplish this include reducing the number of stray hatchery fish from out-of-basin releases, reducing strays from in-basin releases, and not releasing surplus hatchery fish into the wild.

1.5 Establish a self-sustaining wild steelhead run above Alsea Hatchery by transferring wild steelhead from other parts of the basin into the area above the hatchery. Trap all steelhead at the barrier above the hatchery and pass wild steelhead upstream while removing hatchery fish from the river.

Objective 2. Develop an information base and methodology for measuring and monitoring natural production of winter steelhead in the Alsea River Basin over the next five years.

Assumptions and Rationale

1. Comprehensive information on wild Alsea winter steelhead is not available.

2. Estimating escapement of wild steelhead using angler creel data may no longer be possible because of wild fish release regulations.

Actions

2.1 Implement adult winter steelhead spawning surveys in likely high spawning density areas.

2.2 Conduct inventories for juvenile steelhead throughout the Alsea River Basin.

2.3 Establish standardized methods to measure trends in escapement of wild steelhead using juvenile and/or adult surveys.

2.4 Approximate wild adult winter steelhead run size based on adult and juvenile surveys.

2.5 Continue evaluation of hatchery strays in natural production areas using fish traps in upper Drift Creek and a Five Rivers tributary. Develop expanded evaluation as determined necessary.

2.6 Compile steelhead inventory information annually and make it available to anyone who desires it.

Objective 3. Provide an average annual catch of 2,400 hatchery winter steelhead in the Alsea River Basin.

Assumptions and Rationale

1. Survival of steelhead smolts from Alsea Hatchery will be intermediate between the better survival prior to 1980 and poorer survival in recent years.

2. For hatchery steelhead smolts released in the Alsea River Basin from 1969-84, fishery contribution based on punchcard estimates averaged 3.8%. Recent year fishery contribution averaged 1.4%.

3. It is anticipated in the future that an average of 2.0% of the smolts released will be caught in fisheries. The 2.0 percent return represents an intermediate value between the better returns prior to 1984 and the poorer returns after that year.

4. Multiplying this catch rate by a total release of 120,000 smolts gives a potential catch of 2,400 in the Alsea River Basin.

5. Hatchery steelhead returns to the Alsea River Basin will decrease by about one-third due to decreased straying of Siuslaw releases back to the Alsea River Basin.

6. Using an adipose finclip only rather than other more functional fins on the 80,000 smolt release from the North Fork Alsea Hatchery will increase survival of these smolts by 20-30%.

Actions

3.1 Release 80,000 hatchery winter steelhead smolts from Alsea Hatchery and 40,000 from Fall Creek Hatchery following full term rearing of the smolts at the hatchery where they will be released. The 40,000 smolts raised and released from Fall Creek Hatchery will replace the 40,000 smolts released directly into the lower river.

3.2 Differentially mark smolts from Fall Creek Hatchery and compare their survival and fishery contribution to the steelhead smolts raised and released from Alsea Hatchery.

3.3 Develop a new hatchery broodstock from Alsea River Basin naturally produced steelhead. Use this broodstock to produce up to an additional 40,000 smolts released directly from Alsea Hatchery if it appears the program will not create excessive straying.

3.4 Differentially mark hatchery smolts produced from the wild broodstock and compare their survival and contribution to fisheries with the existing steelhead broodstock.

3.5 Use an adipose finclip only for the 80,000 smolts released from the North Fork Alsea Hatchery and volitionally release them.

3.6 Remove all adult hatchery steelhead (except spawned out females) returning to hatchery facility from the system to reduce hatchery fish from spawning in the wild.

3.7 Transfer limited numbers of spawned out female steelhead from the North Fork Alsea Hatchery to the South Fork Alsea River. Transfer the remainder of the surplus hatchery winter steelhead to closed lakes or reservoirs to supplement trout fisheries, to food share programs, or to tributary streams(as carcasses) to supplement nutrients.

3.8 If hatchery strays comprise less than 10% of the total spawners in natural habitats in areas removed from the smolt release site and less than 30% of the overall steelhead spawning in the wild, consider increasing smolt releases. If hatchery strays comprise more than 10% of the natural spawners in areas removed from the smolt release site, or more than 30% of the overall steelhead spawning in the wild, decrease smolt releases or modify procedures

3.9 Evaluate the level of marine mammal and bird predation on steelhead in the Alsea River Basin.

Objective 4. Provide angling opportunities for wild winter steelhead in the Alsea River Basin.

Assumptions and Rationale

1. Catch-and-release angling opportunities will complement consumptive fisheries targeting hatchery steelhead in the mainstem Alsea River.

2. Catch-and-release fisheries will be the primary winter steelhead angling opportunity in Drift Creek and Five Rivers until wild fish recover sufficiently to warrant consumptive harvest.

Actions

4.1 Maintain angling regulations providing for catch-and-release fisheries for non-finclipped steelhead.

CUTTHROAT TROUT

Background

Cutthroat trout are distributed widely throughout all Oregon coastal basins, including the Alsea River Basin. The Alsea River Basin also had a hatchery program for cutthroat trout which was terminated following the 1996 release.

Status

The status of cutthroat trout can be assessed based on observations of cutthroat trout made during fish sampling in tributary streams. These observations show that multiple age classes of cutthroat trout are consistently present in a vast network of Oregon coastal streams. Numerous independent cutthroat populations exist upstream from impassable barriers to migration. This wide distribution and consistent presence indicate that, overall, cutthroat trout are very secure in Oregon coastal streams. However, it is uncertain if cutthroat trout observed in tributary streams downstream from migration barriers are juvenile searuns, fluvial juveniles, or resident cutthroat. Conservation concerns exist that the searun life history type has declined substantially since about 1970.

Oregon Department of Forestry (ODF) studies were conducted during the summer of 1993 to determine the upstream distribution of gamefish. In coastal streams, cutthroat trout are consistently the gamefish species with the widest distribution. This evaluation indicated that based on townships near Toledo and Seaside there was an 80% chance that cutthroat trout would be present in a stream channel with a drainage area of greater than 100 acres. The study also determined that there are about 1.6 miles of stream containing cutthroat trout per square mile of drainage area. Using this information, the Alsea River Basin, which has a drainage area of 468 square miles, contains about 750 miles of stream with cutthroat trout.

Since 1962, the density of cutthroat in three small tributary streams has been monitored through the Alsea Watershed Study and other follow up investigations (Moring and Lantz, 1974, Schwartz, 1990). These data sets indicate cutthroat trout abundance has been generally stable (Figure 30).

Fisheries for resident cutthroat in Slide and Klickitat Lakes have been monitored since 1979 (Figure 31). The stable catch in both fisheries indicates stable, sustainable production.

The abundance of searun cutthroat trout in the Alsea River Basin has declined sharply since 1970 based on creel survey results (Table 24). The factors causing this decline are unknown. It is suspected that poor ocean conditions, increased predation by marine mammals or predatory birds, or the influence of hatchery cutthroat trout may be contributing to the decline.

Life History Characteristics

Cutthroat trout exhibit several life history patterns (Trotter, 1989). Resident cutthroat spend their entire life history in tributary streams and mature at a small size, usually less than 10 inches. They do not migrate within or out of the basin. There are 8 identified resident cutthroat trout populations above barriers in the Alsea River Basin in addition to resident cutthroat trout populations in streams accessible to anadromous fish (Table 25).

Fluvial cutthroat trout spawn and rear as juveniles in small streams. They migrate to larger stream reaches and rivers where they attain greater size prior to returning to headwater streams to spawn. Fluvial cutthroat will frequently attain a size of 12 to 16 inches before spawning.

Searun or anadromous cutthroat trout spawn and rear for 2 to 4 years in freshwater before smolting and migrating to the ocean (Giger, 1972). They typically remain in the ocean for one summer and then return to headwater streams to spawn at a size of 12 to 20 inches. Ocean distribution is in near-shore areas in proximity to the stream of origin.

It is uncertain if cutthroat trout with different life history patterns represent distinct breeding groups, or if they are life history variations within the same breeding group.

Figure 30. Cutthroat trout abundance in three small tributaries to Drift Creek, Alsea River Basin.

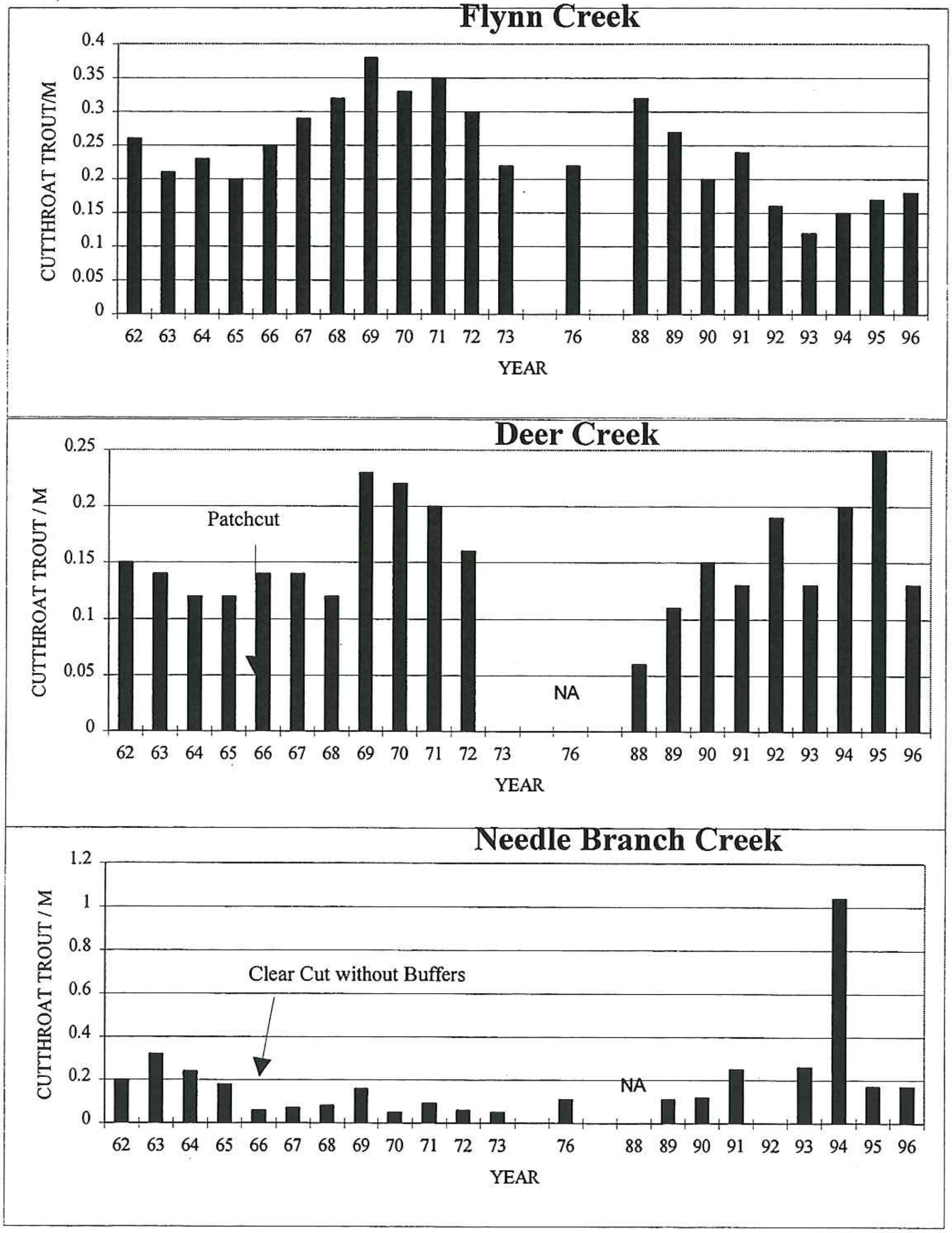
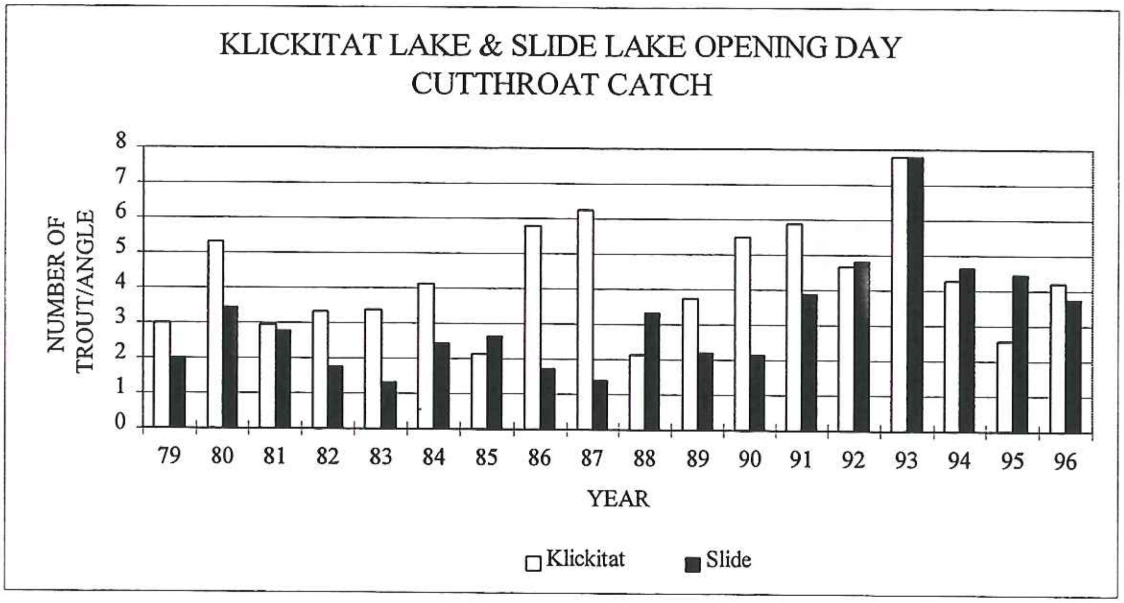


Figure 31. Sport catch of cutthroat trout on opening day, 1979-1995.



Hatchery Production

The Alsea River Basin had been stocked with hatchery searun cutthroat produced at Alsea Hatchery since the late 1930s until 1996 (Table 26). The hatchery program had released 35,000 trout per year at a size of 3 fish per pound. The program was designed to provide for both a spring put-and-take fishery and supplement the searun cutthroat trout fishery. The program has been discontinued because of low contribution to angler harvest and potential risk to wild cutthroat trout. The hatchery production capacity previously used for this program has been shifted to lakes and reservoirs where angler benefits are higher and risk to wild fish is reduced.

All cutthroat trout released in the Alsea River Basin had been trucked to areas downstream from the hatchery and released into the North Fork or main stem Alsea River. There are no recapture facilities for returning adults. The broodstock used for the hatchery program was obtained from native Alsea cutthroat and is maintained by raising fish to maturity at the hatchery rather than by capturing returning anadromous adults. The brood was developed during the late 1930s or 1940s.

The contribution of Alsea hatchery cutthroat trout to fisheries was substantially below desired levels. An estimated 11% of the cutthroat trout released into the basin are caught in the spring fishery soon after release. About 1% are caught as returning searun adults (ODFW 1991-93 creel results). The target contribution rate for trout stocked at the size of 3 fish per pound is 40% of the number released.

It is not known if the recently terminated hatchery program was in compliance with the Wild Fish Management Policy.

Table 24. Comparisons of 1966-70 and 1991-93 studies for spring and searun cutthroat trout fisheries on the Alsea River.

Spring Fishery

Years	Angler Hours	Total Catch	Hatchery Cutthroat	Wild Cutthroat	Percent Wild
1966	14,885	9,810	8,026	1,784	18
1967	17,887	13,555	10,822	2,733	20
1968	7,996	5,777	3,778	1,999	35
1969	13,862	8,936	7,795	1,141	13
1970	13,554	10,594	8,756	1,838	17
1991	11,075	6,473	5,138	1,335	21
1992	6,095	2,565	2,059	506	20
1993	11,968	5,504	3,181	1,752	36

Searun Fishery

Years	Angler Hours	Total Catch	Hatchery Cutthroat	Wild Cutthroat	Percent Wild
1966	35,741	2,835	1,258	1,577	56
1967	37,179	3,651	1,232	2,419	66
1968	46,487	4,623	1,970	2,653	57
1969	36,156	3,809	1,727	2,082	55
1970	42,139	5,210	3,092	2,118	41
1991	10,537	2,079	1,303	776	37
1992	7,765	828	294	534	64
1993	3,348	196	56	140	71

Angling and Harvest

Prior to 1997, consumptive angling for cutthroat trout was allowed throughout the Alsea River Basin from late May until the end of October. Beginning in 1997, all fisheries for cutthroat trout were placed under catch and release regulations due to concern for wild searun cutthroat.

The cutthroat trout catch in the spring fishery has decreased to a 1991-93 average of about 5,000 fish per year (Table 24). This is about half the catch realized during the late 1960s. Angler hours expended in the spring fishery decreased from an average of 14,000 angler hours per year in the late 1960s to a recent average of 10,000 angler hours per year. Hatchery fish have consistently contributed about 80% to the total catch. The catch on opening weekend of the trout season comprises over 80% of the total catch for the season.

The catch in the searun cutthroat trout fishery has decreased from an average of about 4,000 in the late 1960s to an average of about 800 per year during 1991-93. The decrease in catch was comparable for both wild and hatchery cutthroat trout. Wild and hatchery fish have each consistently contributed about 50% to the total catch. Angler effort decreased from about 40,000 angler hours per year in the late 1960s to about 6,000 angler hours in recent years.

Fisheries for wild resident cutthroat trout have been monitored at two natural lakes in the Alsea River Basin. Creel results show stable angler effort and catch (Figure 31).

Table 25. Identified resident cutthroat trout populations above barriers, Alsea River Basin.

Location	Comments
Five Rivers	Fish ladder put around barrier in late 1960's
Fall Creek	Fish ladder put around barrier in late 1950's
Parker Creek	Verified above bedrock falls
Racks Creek	Verified above bedrock falls
North Fork Alsea includes Klickitat Lake	Verified above bedrock falls
Peak Creek	Verified above bedrock falls
S. Fk. Alsea R.	Verified above bedrock falls
Drift Creek	Fish ladder put around barrier in late 1950's
Cape Horn Creek	Verified above bedrock falls
Gopher Creek	Verified above bedrock falls
Slide Lake	Isolated lake population

Table 26. Cutthroat stocking history, Alsea River Basin.

Release Year	Yearling	Fingerling	Fry
1962	16,559	0	0
1963	11,132	0	0
1964	44,662	137,913	0
1965	14,002	0	0
1966	20,004	0	0
1967	25,002	0	0
1968	19,900	0	0
1969	25,200	0	0
1970	25,000	78,600	0
1971	30,000	0	0
1972	33,140	0	0
1973	36,986	0	0
1974	27,960	0	0
1975	29,315	0	0
1976	32,217	0	0
1977	28,214	13,770	0
1978	36,607	0	0
1979	22,015	106,500	0
1980	35,461	0	0
1981	36,466	0	0
1982	35,111	0	0
1983	23,748	0	32,235
1984	34,936	0	15,000
1985	37,009	0	54,227
1986	35,089	0	146,645
1987	35,325	0	158,950
1988	35,047	0	260,090
1989	34,678	0	145,034
1990	38,179	0	17,003
1991	29,754	0	148,465
1992	32,185	0	153,000
1993	35,419	0	0
1994	22,620	0	0
1995	10,031	0	0
1996	8,085	0	0
1997	0	0	0

Management Considerations

Cutthroat trout in the Alsea River Basin will be managed for wild production only. This is consistent with the ODFW coastwide management direction to discontinue searun cutthroat hatchery programs in streams. Other areas where hatchery searun cutthroat programs have been terminated include Tillamook Bay tributaries, Nehalem Basin, Necanicum Basin, Nestucca Basin, Umpqua Basin, lower Columbia tributaries and south coast tributaries. The public generally has not opposed these hatchery program modifications.

The hatchery space that had been used to raise searun smolts will be used to produce catchable size trout for stocking in lakes or reservoirs. Stocking of these standing waters will involve an increased number of fish, will be spread into the fall and will include regular stocking of larger size fish. It is expected that this will greatly increase angler return from the hatchery program.

Risk to wild cutthroat trout should decrease due to shifting hatchery releases from streams to lakes and reservoirs. Hatchery fish will no longer draw anglers to streams where they also catch wild fish, and interbreeding or competition between hatchery and wild cutthroat will no longer be a concern.

Objectives for cutthroat trout angling in this plan target a resumption of consumptive fisheries if the searun population recovers.

Policies

Policy 1. Cutthroat trout in stream reaches of the Alsea River Basin shall be managed for wild production only. Hatchery programs for trout shall be confined to lakes and reservoirs without substantial wild cutthroat trout production.

Objectives

Objective 1. Maintain at least the existing distribution, density and genetic diversity of wild cutthroat trout in the Alsea River Basin.

Assumptions and Rationale

1. Cutthroat trout are found in about 750 miles of stream habitat in the Alsea River Basin.

2. The differences between resident, fluvial, and anadromous cutthroat trout and the factors determining the relative abundance of the different life history types are not understood.

3. The future abundance of cutthroat trout with different life history types currently can not be predicted.

4. Baseline information on cutthroat trout densities is available from fish sampling associated with research on coho salmon and the Alsea Watershed Study on tributaries to Drift Creek.

5. Information on the genetic diversity of Alsea River Basin cutthroat trout can be obtained by measuring biochemical and phenotypic characteristics.

Actions

1.1 Measure cutthroat trout densities in tributary streams during sampling for multiple salmonid species and compare to historic abundance.

1.2 Systematically document cutthroat trout distribution as necessary to implement the Oregon Forest Practices Act. Use this information to determine changes in overall cutthroat trout distribution.

1.3 Continue annual angler surveys for cutthroat trout on the opening day of the spring trout season.

1.4 Accomplish habitat protection and restoration objectives.

Objective 2 Increase the searun cutthroat component of the cutthroat trout resource to levels comparable to those during 1966-70.

Assumptions and Rationale

1. It is assumed that to accomplish this objective ocean conditions will be conducive to improved searun cutthroat trout smolt survival.

2. It may not be possible to accomplish this objective if searun cutthroat trout smolt survival has decreased since the 1966-70 base period.

3. It is assumed that habitat within tributary streams will support a mix of cutthroat trout with resident and anadromous life history forms comparable to the 1966-70 base period. Increased utilization of freshwater habitat by resident or fluvial cutthroat may reduce searun production.

Actions

2.1 Continue non-consumptive angling regulations until popuation status warrants a return to consumptive fisheries.

2.2 Encourage research to determine mortality factors on searun cutthroat smolts and adults.

2.3 Measure angler catch of searun cutthroat trout in tidewater fisheries as an indices of changes in abundance over time.

Objective 3. Re-establish a spring, summer and early fall consumptive angling opportunities for cutthroat trout in Alsea River Basin streams when populations warrant.

Assumptions and Rationale

1. A broad opportunity for an introductory fishing opportunity make these fisheries desirable.

Actions

3.1 Re-instate angling regulation allowing a consumptive fishing opportunity for cutthroat trout in most areas of the Alsea River Basin if populations status warrants.

Objective 4. Provide additional angler opportunity to catch hatchery trout under the intensive use management alternative for trout in Thistle Pond and Eckman Lake.

Assumptions and Rationale

1. The Trout Plan (ODFW 1987) sets management options for trout, one of which is Intensive Use. These waters attract intensive angler use. They may be used heavily by anglers for short periods of time. Natural production is supplemented with hatchery production to provide for consumptive fisheries.

2. Thistle Pond is landlocked. A hatchery program here will not impact wild trout populations in rivers and streams.

3. Wild cutthroat trout in Eckman Lake will not be substantially impacted by a hatchery program using domesticated rainbow trout.

Actions

4.1 Stock Thistle Pond with legal size trout each spring.

4.2 Stock Eckman Lake with legal size rainbow trout each spring.

WHITE AND GREEN STURGEON

Background

White and green sturgeon are found in the Alsea River estuary. White sturgeon in the Alsea River Basin are probably fish that were spawned in the Columbia River, migrated to the ocean, moved southward along the coast, and entered the Alsea estuary. The origin of green sturgeon in the basin is unknown. However, natural production of sturgeon in the Alsea River Basin is not thought to occur.

Life History Characteristics and Habitat Needs

Little is known about the life history of the green sturgeon. It spends more time in the ocean than the white sturgeon. Like all sturgeon, it enters rivers to spawn. The green sturgeon reaches a maximum size of about 350 pounds (Scott and Crossman 1973).

The white sturgeon is the largest freshwater fish in North America, capable of reaching a weight of 1,800 pounds (Scott and Crossman 1973). White sturgeon are slow growing and very long lived. The largest individuals may be over 100 years old. A 36 inch sturgeon from the Columbia River will be about 9 years old (Hess 1984). Females mature at 15 to 20 years of age, while males may be younger at first spawning (Bajkov 1951).

Mature adults spawn in the spring or early summer in the freshwater portion of large rivers in continuous swift current (Scott and Crossman 1973). The Alsea River Basin is not thought to have suitable conditions for white sturgeon spawning.

Sturgeon may spawn many times during their lives but do not spawn every year. The time between spawning gets greater with age. Fecundity also increases with age.

Angling and Harvest

The recreational fishery for sturgeon is of low intensity and appears to be sufficiently supported by sturgeon migrating into the Alsea River from other river systems.

Regulations allow the taking of one sturgeon between 42 and 48 inches in length and one sturgeon between 48 and 66 inches in length during daylight hours during the entire year in tidewater. Above tidewater, sturgeon can only be taken when the stream is open to salmon and steelhead angling. A valid sturgeon tag or daily angling license must be in possession when angling for sturgeon.

Management Considerations

Both green and white sturgeon in the Alsea River Basin will be managed for wild production only. Successful reproduction of sturgeon probably does not occur in the Alsea River Basin. Independent populations of white and green sturgeon are not present.

Policies

Policy 1. Management of white and green sturgeon in the Alsea River Basin shall be consistent with management in the lower Columbia River and other coastal estuaries.

Policy 2. There shall be no hatchery program or transplants of sturgeon in the Alsea River Basin.

Objectives

Objective 1. Provide angling opportunities for sturgeon in the Alsea River.

Assumptions and Rationale

1. Green and white sturgeon in the Alsea River Basin depend on production and immigration of sturgeon from other river systems.

2. White sturgeon is the target species.

Actions

1.1 Monitor harvest of legal-size sturgeon through angler punchcard information.

PACIFIC LAMPREY

Background

Pacific lamprey (*Lampetra tridentata*) are found along the Pacific coast of North America from Unalaska Island, Alaska, south to southern California. Pacific lamprey migrate into all major river systems, often moving substantial distances upstream to headwaters.

Status

Pacific lamprey have been designated as a sensitive species by the state of Oregon. Pronounced declines in Pacific lamprey numbers have been noted statewide. Factors responsible for the decline of Pacific lamprey are not understood. Potential factors include degradation of spawning and larval rearing habitat, ocean conditions, marine mammal predation, and passage problems.

Life History Characteristics

Like salmon and steelhead, Pacific lamprey are anadromous, although numerous landlocked populations are known. Adults, 12 inches and greater in length, migrate into freshwater from July to September and spawn the following spring (Scott and Crossman 1973). Mature adult Pacific lamprey have also been identified to enter freshwater during the spring immediately prior to spawning (Wydoski 1979). Their moderately strong swimming ability and their capacity to cling to rocks, dams, and fish ladders by means of a disc-shaped mouth enables them to overcome many passage barriers.

Nest building and spawning occur from April to July in sandy gravel at the upstream edge of riffles. Females lay from 30,000 to 100,000 eggs. Adults die soon after spawning.

Eggs hatch in two to three weeks. The larvae, or ammocoetes, burrow into the fine substrates along the margin of streams downstream from their nest. The filter feeding ammocoetes spend 5 to 6 years in freshwater.

Toward the end of their freshwater period, the ammocoete transforms into the adult form. They migrate downstream in the late summer or fall with increasing flows. In the ocean they adopt a parasitic life, and prey upon soft scaled fish and other marine vertebrates. Lampreys live one to two years at sea before returning to freshwater to spawn. Diet studies indicate marine mammals are natural predators of lampreys (Roffe and Mate 1984).

Harvest

Indians throughout the northwest have used the lamprey for food for centuries. Lamprey are managed for tribal harvest in the Columbia River. There is a limited commercial harvest of lamprey at Willamette Falls, in the Willamette Basin. Lamprey have not been managed for commercial, sport or tribal harvest in the Alsea River Basin.

Management Considerations

Pacific lamprey in the Alsea River Basin will be managed for wild production only. Management activities for lamprey will focus on habitat protection and restoration. It is assumed that efforts to recover habitat for salmonids will also benefit lamprey.

Policies

Policy 1. The Alsea River Basin shall be managed for wild production of Pacific lamprey.

Objectives

Objective 1. Maintain or increase Pacific lamprey production in rivers and streams in the Alsea River Basin where they naturally occur.

Assumptions and Rationale

1. The habitat required by Pacific lamprey will be provided by accomplishing basin wide habitat objectives.

Actions

1.1 While conducting routine inventory for other fish species, collect and summarize information for lampreys.

1.2 Accomplish basin habitat protection and restoration objectives.

1.3 Support and seek funding for research on Pacific lamprey life history, habitat requirements and factors responsible for declining abundance.

CRAYFISH

Background

Crayfish are the most important freshwater invertebrate to Oregon's fisheries. They provide a small fishery and are also important fish forage in the Alsea River Basin.

Status

Three species of crayfish are native to Oregon (Hobbs 1976). These species, their subspecies and intergrades are spread statewide, with overlapping distributions.

There are no quantitative estimates of population size or status of crayfish in the Alsea River Basin. Crayfish appear abundant in many areas of the Alsea River Basin. Recreational crayfish harvesters sometimes report localized depletion, but these occurrences have not been verified.

Life History Characteristics

Crayfish breed in the summer, with the first egg-bearing females appearing as early as September. Eggs are carried over the winter and hatch from late April to late June. The young are attached to the female by a thread-like material for a short time. Size achieved by zero-age crayfish during the first summer is quite variable due to the long period over which eggs hatch. Age determination by the length-frequency method is extremely difficult.

Females mature at about 18-30 months. Fecundity increases with size and perhaps age. There is evidence to suggest that some or perhaps all females do not breed each year.

Hatchery Production

There is no hatchery production of crayfish in the Alsea River Basin. No commercial crayfish culture operations have yet been successful in the state.

Harvest

Crayfish have been fished commercially in Oregon since before 1893 when records were first kept. Markets for bait and for restaurant food dictate the size of landings. Most of the Alsea River Basin harvest occurs during June through September (ODFW, unpublished data). There are no estimates of commercial landings specifically for the Alsea River Basin. Lincoln County landings, which may or may not be from the Alsea River Basin, have been zero during the past five years.

The commercial crayfish season is open from April 1 through October 31. Crayfish may be taken only by crayfish pots or ring nets. Only crayfish 3-5/8 inches or longer in length may be taken. Undersized crayfish must be returned unharmed to the water. Any crayfish caught with eggs attached must be returned unharmed to the water. Gear must be labeled with an identification number issued by ODFW.

Recreational use of the resource is widespread for bait and direct consumption. No license is required to take crayfish. The daily bag limit is 100 per person. The season is open the entire year at all hours. Estimates of sport harvest levels in the Alsea River Basin are unavailable.

Management Considerations

Habitat deterioration is the most serious threat to crayfish populations. Local populations may be subject to overharvesting.

Crayfish in the Alsea River Basin will be managed for wild production only.

Objectives

Objective 1. Maintain natural production of crayfish in the Alsea River Basin.

Assumptions and Rationale

1. Quantitative information is not available for crayfish distribution, abundance, and population characteristics in the Alsea River Basin.

2. Information on crayfish could be collected during routine surveys for other species.

3. Protection and enhancement of crayfish populations can be achieved principally through habitat protection.

4. Recreational and commercial harvest of crayfish in the Alsea River Basin is not excessive at this time.

Actions

1.1 While conducting routine inventory for juvenile salmonids or creel surveys, record and file observations of crayfish in a standardized format.

1.2 Monitor commercial crayfish landings in Polk, Benton and Lincoln County. If substantial landings occur, investigate if they are from the Alsea River Basin.

1.3 Accomplish basin habitat protection and restoration objectives.

Objective 2. Determine the size and importance of the recreational crayfish harvest in the Alsea River Basin.

Assumptions and Rationale

1. There are no estimates of current harvest or effort.

2. Recreational harvest is widespread and may be increasing.

3. Recreational harvest could be described and monitored through time by counting and checking fishermen during peak use periods in mid summer following a consistent procedure.

Actions

2.1 Conduct annual creel surveys in key areas during peak time periods to evaluate harvest and effort.

Objective 3. Maintain recreational crayfish harvest opportunity in the Alsea River Basin.

Assumptions and Rationale

1. Recreational harvest of crayfish in the Alsea River Basin is not excessive at this time.

Actions

3.1 Maintain existing crayfish angling regulations.

ANGLER ACCESS

Background

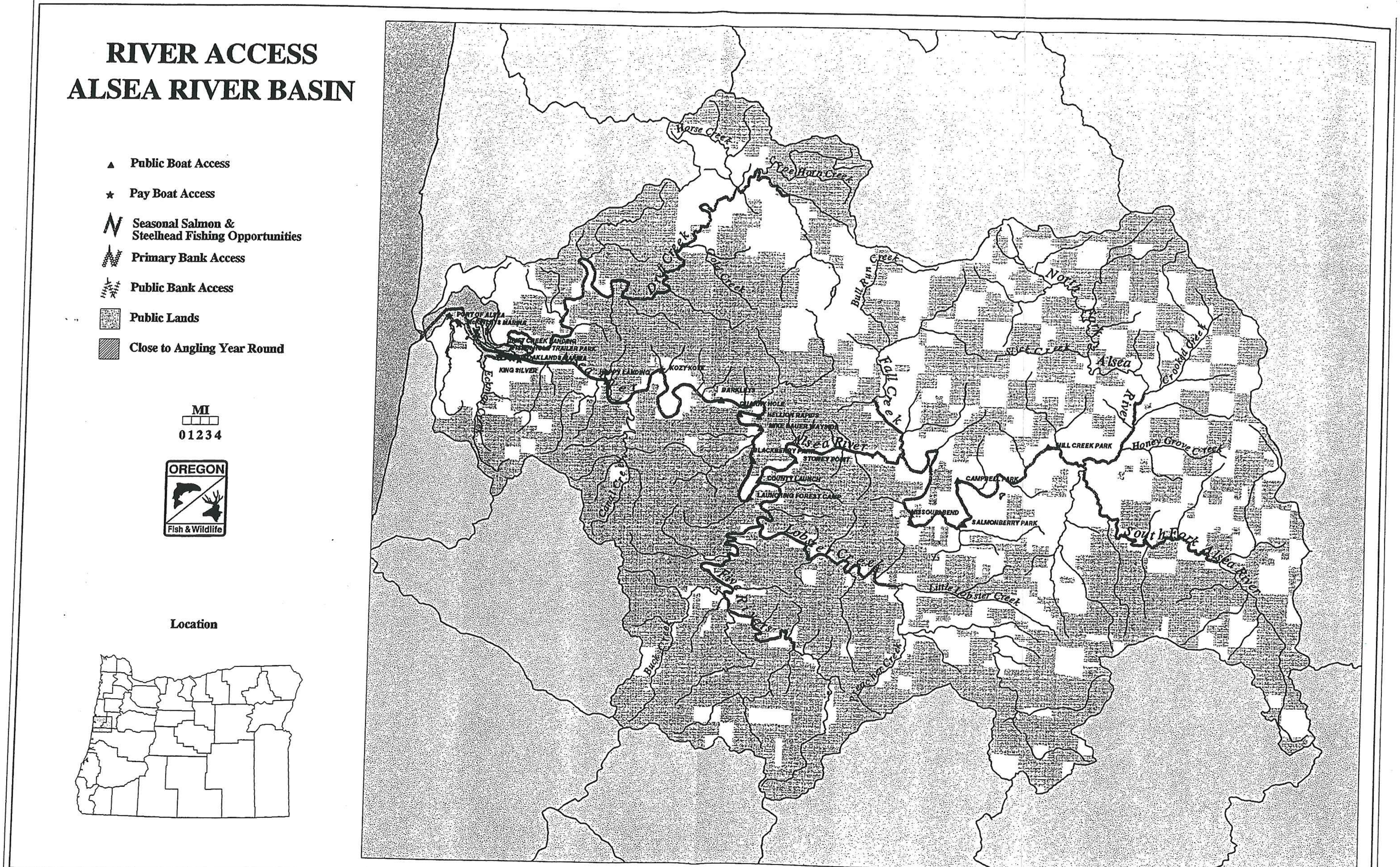
The Alsea River Basin generally has adequate access for a variety of boat and bank fishing opportunities (Figure 32).

Drift boat and other non-motorized boat access is good in the free-flowing section of the Alsea River from Mill Creek (river mile 42) downstream to the head of tidewater (river mile 10). There are at least 15 sites where boats can be launched within this 32 mile section of river (Table 27). Some of these sites are improved ramps that are maintained by government agencies while others are non-improved slides that are maintained by users on an as needed basis. ODFW periodically works with angler organizations or agencies to conduct maintenance or other needed improvements on these ramps. The Alsea River above Mill Creek is closed to angling from a floating device.

Table 27. Maintained boat launches on the Alsea River above tidewater.

Facility	Location (river mile)	Ownership
Cox's	10.0	Private
Barklys	12.0	Highway Dept.
Hellion Rapids	15.0	USFW
Mike Bauer	17.3	USFS
Blackberry Campground	18.5	USFS
Maples	20.0	USFS
Five Rivers	21.5	County
Stoney Point	24.0	County
River Bend	26.0	USFS
Swinger Bridge	27.0	Private
Private Fee Park	27.5	Private
Fall Creek	27.5	Highway Dept.
Missouri Bend	33.0	BLM
Salmonberry Park	35.0	County
Campbell Park	37.0	County
Mill Creek	42.0	County

Figure 32. River Access in the Alsea River Basin



Good access to tidewater fisheries is provided by a City of Waldport ramp and several private moorages. These launch sites are suited to both motorized and non-motorized boats and are spread throughout the Alsea tidewater. Maintenance of these access points is generally provided by the private moorages or the City of Waldport with minimal involvement of ODFW.

Bank angler access to tidewater and the Alsea main stem below Mill Creek is spotty due both to private land and the difficulty in reaching most of the better water from the bank. In some cases, bank access can provide very high quality fishing in this area. Capitalizing on these good bank angling opportunities is dependent on the knowledge individual anglers have of timing of fish runs, flows, or tides appropriate for different locations, and land ownership. The ODFW generally has not specifically pursued bank angling opportunities in the navigable reaches of the Alsea River.

Bank angler opportunities in the Alsea main stem above Mill Creek and North Fork Alsea River are better because the river is smaller and there is no competition from boat anglers. Access to this area is sometimes limited because of privately owned property. The ODFW places a priority on working with anglers and landowners to allow access in this area. Bank angler access is also a priority on lower Fall Creek because of concentrated fisheries for hatchery fish. Most importantly, anglers must recognize that access on private property is a privilege that will be granted only if they do not cause problems for the landowner.

Access to the many small tributaries, beaver ponds and natural lakes in the Alsea River Basin is extensive due to federal ownership and cooperative private landowners. Due to the dispersed nature of fishing in these locations, ODFW generally does not make a concerted effort to help procure access. The only locations with concentrated fisheries are Slide Lake and Klickitat Lake. Private timber companies have allowed access to these sites on a consistent basis. If in the future concern develops over access to these two lakes, ODFW will work with the timber companies to help maintain access.

Management Considerations

Overall, angler access in the Alsea River Basin is good. Much of the access is secure due to numerous boat launches and easily navigable waters, and extensive federal land ownership.

Significant bank angling opportunities occur on private land. Conflicts between anglers and landowners primarily involve trespass, littering, and damage to vegetation. Anglers must police their ranks to assure all anglers respect private property.

Policies

Policy 1. The Department shall seek to provide access for boat and bank angling that will satisfy public need for a variety of angling opportunities and a dispersion of angling effort throughout the basin.

Policy 2. Acquisition and development of angler access sites shall be consistent with guidelines and objectives for management of fish species and habitat.

Objectives

Objective 1. Maintain sufficient boat launches to allow anglers access to areas from Mill Creek downstream to the mouth of Alsea Bay.

Assumptions and Rationale

1. Private moorage operators will continue to maintain boat launches throughout tidewater areas.
2. Lincoln County, Benton County, the USFW, and BLM will continue to maintain most boat launches between Mill Creek and the head of tidewater.
3. Additional effort by angler groups, ODFW or others may be required to maintain some of the small boat launches between Mill Creek and the head of tidewater.

Actions

1.1 Stay apprised of the condition of boat launches between Mill Creek and the head of tidewater and seek to organize repair through cooperative ventures, if needed.

Objective 2. Maintain or improve bank angling opportunities along the mainstem Alsea River above Mill Creek and the North Fork Alsea River, and Fall Creek below the hatcheries.

Assumptions and Rationale

1. These areas have premier bank fishing opportunities for hatchery fish.
2. Angler access to these areas is frequently dependent on cooperative private landowners.

Actions

2.1 Encourage the pubic to be good stewards of the land when given the privilege of accessing private land.

2.2 Continue dialogue with private landowners to maintain or improve bank angler access in these areas.

Objective 3. Maintain access to Slide Lake and Klickitat Lake.

Assumptions and Rationale

1. These lakes are heavily fished for wild cutthroat trout.
2. Public access is now allowed through private timber lands.

Actions

3.1 Encourage the pubic to be good stewards of the land when given the privilege of accessing private land.

3.2 Encourage private timber companies to maintain access to these locations.

PRIORITIES

The following are considered the highest priorities in the Alsea River Basin. Emphasis is given to new activities that are necessary and to existing actions that need increased attention.

Table 28. Priority fishery management actions in the Alsea River Basin.

Section	Action
Overview	
	Action 1.1. Overall habitat
	Action 1.4. Recovery programs for severly depressed species.
	A. Coho salmon
	B. Winter steelhead
	C. Searun cutthroat
	Action 1.5. Investigation of predation.
Coho salmon	
	Action 1.1 Monitor spawners
	Action 1.7 Comment on land use
	Action 1.8 Restore habitat
	Action 1.9. Beaver benefits
Winter steelhead	
	Action 1.4. Re-introduction above Alsea Hatchery.
	Action 2.1. Adult spawning surveys.
	Action 2.2. Juvenile surveys.
	Action 3 3. Development of new hatchery broodstock from Alsea wild steelhead.

The management priorities and their funding status for habitat, each of the species or species groups, angler access, and general management needs are listed in table 29. These priorities are ranked on the basis of the importance of the objective, the likelihood that the objective can be accomplished or substantial progress can be made during the next six years, and availability of funding.

Table 29. Funding status for actions identified in this plan.

Action	Requires action by other jurisdictions	Currently funded	Requires additional funding Short term	Long term
Overview				
Obj. 1, Fish assemblage,				
1.1 : Overall habitat	X	X	X	X
1.2 : Hatchery strays		X	X	
1.3 : Harvest of fish		X		
1.4 : Recovery programs	X		X	X
1.5 : Predation study	X	X	X	
Habitat				
Obj. 1, Summer stream flow				
1.1 : Flow measurement	X			
1.2 : Instream water rights	X	X		
1.3 : Abandoned WR's	X		X	
1.4 : Enforcement of WR's	X	X		
1.5 : Cumulative WR's	X	X		
1.6 : Review of new WR's	X	X		
1.7 : Recommend reservoirs	X	X		
Obj. 2, Summer temperatures				
2.1 : Temp. monitors	X		X	
2.2 : Temp. monitors	X			X
2.3 : Forest shade	X	X		X
2.4 : Agriculture shade	X	X		X
2.5 : Residential shade	X	X		X
2.6 : Channel widening	X	X		X
2.7 : Data availability	X	X		
Obj. 3, Instream structure				
3.1 : Measure	X	X	X	X
3.2 : Comment on buffers	X	X		X
3.3 : ID restoration sites	X	X		
3.4 : Implement restoration	X	X	X	X
3.5 : Beaver benefits	X	X		X
3.6 : Riparian conifers	X	X		X
3.7 LWD in estuaries	X	X		X
Obj. 4, Sediment				
4.1 : Monitoring techniques	X		X	
4.2 : Monitor	X			X
4.3 : Cumulative effects	X	X		X
4.4 : Road sediments	X	X		X

Action	Requires action by other jurisdictions	Currently funded	Requires additional funding Short term	Long term
4.5 : Mass failure reports	X	X		
4.6 : Turbid streams	X	X		
Obj. 5, Water Quality				
5.1 : Recommend measuring	X	X		
5.2 : Consult with DEQ	X	X		
Obj. 6, Passage				
6.1 : Re-establish passage			X	X
6.2 : Inventory culverts	X		X	
6.3 : Correct passage	X		X	
Obj. 7, Aquatic area				
7.1 : Evaluate change	X	X	X	X
7.2 : ID priority areas	X	X		
7.3 : Prevent channelization	X	X		
7.4 : Prevent diking/filling	X	X		
7.5 : recover lost areas	X	X	X	X
Obj. 8, Communication				
8.1 : Communicate	X	X		
8.2 Watershed Councils	X			X
Chum Obj. 1,				
1.1 : Spawning surveys	X			X
1.2 : Exploratory surveys			X	
1.3 : Advise landowners	X	X		
1.4 : Habitat protection	X	X	X	X
1.5 : Angling regulations		X		
Fall Chinook Obj. 1,				
1.1 : Monitor escapement		X		
1.2 : Angling regulations		X		
1.3 : Conservative regulations		X		
1.4 : Emergency regulations		X		
Obj. 2,				
2.1 : Angling regulations		X		
Spring Chinook Obj. 1,				
1.1 : Spawning surveys	X			X
1.2 : Angling regulations		X		

Action	Requires action by other jurisdictions	Currently funded	Requires additional funding Short term	Long term
1.3 : Habitat protection	X	X	X	X
Obj. 2,				
2.1 : Angling regulations		X		
Coho Obj. 1,				
1.1 : Monitor escapement		X		X
1.2 Terminate hatchery		X		
1.3 Angling regulations		X		
1.4 Conservation hatchery				X
1.5: Passage above Alsea hatchery			X	
1.6 : Survey habitat	X		X	
1.7 Land use activities	X	X		
1.8 Habitat restoration prjects	X	X	X	X
1.9 Beaver benefits	X	X		
Obj. 2,				
2.1 : Juvenile surveys	X			X
2.2 : Adult spawner goal		X		
2.3 : Habitat limitations	X	X	X	X
2.4 : Population dynamics	X	X	X	X
Obj. 3,				
3.1 : Angling regulations		X		
3.2 : Re-instate hatchery		X		X
Winter Steelhead Preferred option, Obj. 1,				
1.1 : Overall habitat	X	X	X	X
1.2 Land use comments	X	X		X
1.3 : Angling regulations		X		
1.4 : WFMP		X		
1.5 : Establish run		X		X
Obj. 2,				
2.1 : Spawning surveys			X	
2.2 : Juvenile surveys			X	
2.3 : Trends in escapement		X		X
2.4 : Run size		X		
2.5 : Hatchery strays		X		X
2.6 Compile / report data				X

Action	Requires action by other jurisdictions	Currently funded	Requires additional funding Short term	Long term*
Obj. 3,				
3.1 : Angling regulations		X		
3.1 : Hatchery releases		X		
3.2 : Fin clipped smolts			X	
3.3 : New broodstock			X	
3.4 : Differentially marked smolts			X	
3.5 : Alsea hatchery smolts		X		
3.6 : Remove steelhead		X		
3.7 : Transfer steelhead		X		
3.8 : Adjust based on WFMP		X		
3.9 : Predation study		X	X	
Obj. 4,				
4.1 : Angling regulations		X		
Cutthroat Obj. 1,				
1.1 : Meaasure freshwater density		X		X
1.2 : Measure distributation	X	X	X	
1.3 : Creel survey		X		
1.4 : Habitat protection	X	X	X	X
Obj. 2,				
2.1 : Angling regulations		X		
2.2 Mortality research			X	
2.3 Measure searun catch			X	
Obj. 3				
3.1 Re-instate harvest		X		
Obj. 4,				
4.1 : Thistle pond		X		
4.2 : Eckman lake		X		
Sturgeon Obj. 1,				
1.1 : Monitor harvest		X		
Pacific Lamprey Obj. 1,				
1.1 : Collect information		X		
1.2 : Habitat protection	X	X	X	X
1.3 Support research	X			

Action	Requires action by other jurisdictions	Currently funded	Requires additional funding Short term	Long term
Crayfish Obj. 1,				
1.1 Recreational fishery	X			
1.2 : Commercial fishery	X			
1.3 : Habitat protection	X	X	X	X
Obj. 2,				
2.1 : Creel surveys		X		
Obj. 3,				
3.1 : Angling regulations		X		
Angler Access Obj. 1,				
1.1 : Boat launches	X	X	X	
Obj. 2,				
2.1 : Public stewardship	X	X		
2.2 : Improve access	X	X		
Obj. 3,				
3.1 : Public stewardship	X	X		
3.2 : Maintain access	X	X		

IMPLEMENTATION AND REVIEW

This plan is intended to provide both short-term and long-term direction for management of the fisheries in the basin. A separate "Action Plan" will be prepared by the Department that contains the actions from the basin plan that will be funded and undertaken during each biennium. Progress made implementing those actions will be reported by the Department every two years. At that time implementation priorities will also be re-examined and adjustments made where necessary.

Upon adoption by the Oregon Fish and Wildlife Commission, the policies and objectives will become Oregon Administrative Rules. As conditions for the resources and desires of the public change and as new information is obtained, the plan must be responsive and evolve as well. The entire plan, including policies and objectives, will be formally reviewed and revised every ten years. Interim changes in administrative rules can be made by the Commission in accordance with the Administrative Procedures Act when needed.

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APPENDICES

Appendix A Table A-1
Angling and fish viewing opportunities in the Alsea River Basin
Verify open seasons based on fishing regulation pamphlets

Fishing Opportunities

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Bay												
Crabbing	○	○	○	○	◍	◍	●	●	●	●	◍	○
Chinook								◍	●	●		
Coho												
Cutthroat							◍	◍	◍			
Main River and Forks												
Winter Steelhead	●	●	◍								○	◍
Cutthroat trout					●	●	●	●	◍	○		
Chinook salmon									◍	●	●	
Crayfish	○	○	○	◍	◍	●	●	●	●	◍	◍	○
Tributaries												
Cutthroat trout					●	●	●	●	◍	○		
Crayfish	○	○	○	◍	◍	●	●	●	●	◍	◍	○
Lakes and Reservoirs												
Cutthroat	○	○	◍	◍	●	●	●	●	◍	○	○	○
Rainbow	○	○	◍	●	●	◍	◍	◍	◍	○	○	○

Appendix A Table A-1 continued

Viewing/Educational Opportunities

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Spawning Chinook Salmon												
Site #1 North Fork Alsea											●	○
Site #2 Mainstem Alsea River above Fall Cr.										●	●	○
Spawning Coho Salmon												
Site #1. Fall Cr. Hatchery											●	○
Site #2 Upper Lobster Cr. and other tribs.	●											●
Steelhead												
Site #1. Alsea Fish Hatchery	●	●	●									
Juvenile salmon and trout												
Site #1. Alsea Fish Hatchery	●	●	●	●	●	●	●	●	●	●	●	●
Site #2. Fall Cr. Hatchery	●	●	●	●	●	●	●	●	●	●	●	●

Appendix tabl continued

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Site #3. Tributary Streams						●	●	●	●			

Fishing and viewing opportunities.

- ● Excellent
- ◍ Fair
- ○ Poor

APPENDIX B

Habitat Restoration Activities

Habitat protection measures, such as land use laws, the Forest Practices Act, and fill and removal laws, are necessary to maintain habitat conditions that currently support fish stocks and will continue to do so in the long term. Habitat restoration activities are intended to improve degraded habitats which have potential for increased production of depressed fish populations in the near term.

Areas in the Alsea River Basin were identified that have the greatest potential for benefiting fish stocks that are at risk. Restoration activities that have the greatest chance of producing measurable improvements in the status and abundance of fish stocks in the short term were identified for these areas. Priorities were developed based on current knowledge of the habitat needs of a species and the ability to artificially modify habitat to provide for these needs in an ecologically sound manner. Additional information on biology of fish runs, their habitat needs, and the condition of the existing habitat will in all probability lead to the identification of additional restoration opportunities. Restoration actions are targeted at improving conditions for a single species although it is recognized that other species will frequently benefit from the restoration efforts.

High priority areas are listed Table B-1. More detailed descriptions of specific restoration activities for each species are provided in the species chapters in this document.

Table B-1. High priority areas and associated activities for habitat restoration in the Alsea River Basin.

Key species	Secondary species	Area	Activities
Coho salmon	Winter steelhead Cutthroat trout	Five Rivers Drift Creek Upper basin	Improve riparian buffers on agricultural land; increase instream structure; sedimentation control; passage improvement; increase instream structure
Chum salmon	Coho salmon Winter steelhead Cutthroat trout	Alsea River tide-water tributaries	Improve riparian buffers on agricultural land; sedimentation control; passage improvement

All species	Undetermined	Increase productivity by transferring hatchery salmon carcasses to stream reaches

APPENDIX C

Lakes, Ponds and Reservoirs

Table C-1. Management of lakes, ponds and reservoirs in the Alsea River Basin.

Water body	Management Location	Ownership	Species present[a]	alternative
Klickitat Lake	No. Fk. Alsea	Willamette Ind.	Wild Ct	Wild only
Slide Lake	Upper Drift Cr.	Georgia Pacific	Wild Ct	Wild only
Thistle Pond only	Fall Creek	Willamette Ind.	Hatchery Rb	Hatchery
Eckman Lake	Near Waldport	Multiple	Hatchery Rb, WW, Wild Ct	Wild plus hatchery

[a] Ct=cutthroat trout, Rb=rainbow trout, WW=warmwater gamefish