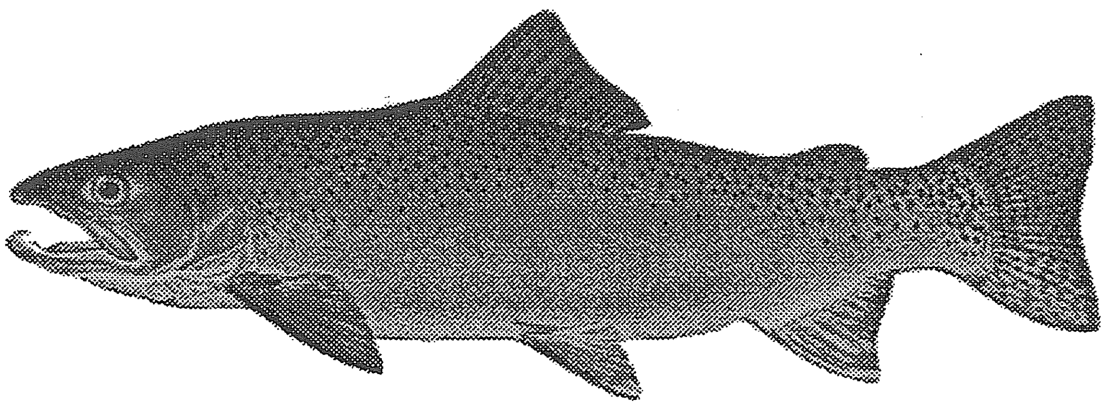
MID-COAST SMALL OCEAN TRIBUTARY STREAMS FISH MANAGEMENT PLAN



Oregon Department of Fish and Wildlife

November 1997

TABLE OF CONTENTS

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 Mid-Coast Small Ocean Tributary Streams Fish Management Plan (hereafter referred to as the Ocean Tributaries Plan) was developed to direct management of the fish resources of Beaver Creek, Cummins Creek, Bob Creek, Tenmile Creek, Rock Creek, Big Creek, Cape Creek, and all other mid-coast small ocean tributary streams except those systems containing lakes or reservoirs (Table 1).

Table 1. Mid-Coast Basin tributaries excluded from this plan.

Basin	Reason For Exclusion
Salmon River	Separate plan
"D" River	Lake system (Devils Lake)
Siletz River	Separate plan
Depoe Creek	Depoe Bay reservoir
Big Creek (Newport)	Newport reservoirs
Yaquina River	Separate plan
Alsea River	Separate plan
Yachats River	Separate plan
Sutton Creek	Lake system
Siuslaw River	Separate plan
Siltcoos River	Lake system
Takhenitch Creek	Lake system

The Ocean Tributaries 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, Alsea River, Yachats River and Siuslaw River basins.

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 sub-basins.

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 Ocean Tributaries 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 ocean tributary basins. The steering committee helped develop management policies, objectives and actions, and reviewed drafts of the plan. Ocean Tributaries Plan Steering Committee members were:

Member	Affiliation
Gary Brain	*Yachats businessman*
Dike Dame	*Oregon Trout*
Paul Englemeyer	*Audubon Society and Tenmile Creek Association*
Hans Radtke	*Fisheries Economist*
Steve Raymond	*Oregon Salmon Commission*
Gary Smith	*Diamond Wood Products*
Matt Spangler	*Lincoln County Planning Department*
Ron Taves	*Yachats Valley Resident*
Paul Thomas	*Siuslaw National Forest*

The plan is divided into sections that deal with habitat, ecological considerations, 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 that section.

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

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

3. Objectives—what is intended to be accomplished.

4. Actions—means of achieving the objective.

Legal Considerations

Besides the statewide species plans, the Ocean Tributaries 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 Ocean Tributaries Plan, for the most part, provides more basin specific direction for salmonid recovery efforts than found in the Oregon Plan. The Ocean Tributaries 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 Ocean Tributaries Plan, will be revised.

OCEAN TRIBUTARY STREAMS MANAGEMENT OVERVIEW

Mid-coast ocean tributary streams are similar in many ways to other watersheds in the Oregon coastal mountain range extending from the Nehalem to the Coquille. Streams in these watersheds generally occur in a forest dominated landscape and have moderate gradients. There are few dams that substantially affect anadromous fish runs. Water withdrawals impact only a small portion of the total miles of stream habitat. Water quality and temperatures are suitable for salmonids for the entire year in most areas. Rainfall throughout the area is heavy, resulting in a high density of streams relative to watershed area.

Mid-coast small ocean tributary streams have several hundred miles of stream suitable for salmonids. These streams have traditionally been managed for production of wild salmonids. Few hatchery fish have been stocked in these streams historically.

Fishery management in mid-coast small ocean tributary streams will focus on multiple fish species and the restoration of habitat conditions that benefit the entire fish assemblage (Lichatowich et al. 1995). This multi-species approach is taken because most mid-coast small ocean tributary stream reaches support co-existing populations of at least three kinds of highly valued anadromous salmonids (coho salmon, steelhead and cutthroat trout) as well as non-salmonid species. In addition, some of the small ocean tributaries have small populations of chinook salmon. Management actions including efforts to influence habitat conditions and angling regulations will unavoidably affect all fish species, not simply the single target fish species. Fishery management in mid-coast small ocean tributary streams will be based on the assumption that overall fish production and benefits will be maximized by creating conditions that are favorable for the assemblage of fish species, and letting natural processes function to determine the production of individual species.

All the major salmonid species in mid-coast small ocean tributary streams are at depressed levels (Table 2). The depressed status of fish stocks has resulted from human induced factors including habitat degradation, excessive harvest, and hatchery influence in combination with natural events such as droughts, floods and El Niño ocean conditions. As human induced factors are controlled and corrected, it is expected that fish abundance will increase substantially, but it is not possible to accurately forecast the shape recovery will take. In addition to the confounding effects of natural environmental variation, the recovery of individual fish species due to reduction in human impacts can only be loosely surmised. For this reason, this management plan will treat specific management targets for individual species as secondary to recovery of the entire basin and assemblage of fish species.

Table 2. Status of salmonid stocks in mid-coast small ocean tributary streams.

Species	Status	Comments
Fall chinook	Naturally small salmon populations when present	Most coastal fall chinook populations are stable or increasing.
Coho salmon	Depressed	Multiple factors responsible for depressed status: over-harvest, loss of habitat, El Niño ocean conditions, hatchery strays.
Winter steelhead	Depressed	Multiple factors responsible for depressed status; limited inventory information.
Cutthroat trout	Searun depressed,	Complex biology with multiple life history resident stable 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 allow harvest of healthy species while protecting sensitive species or stocks of concern.

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 assemblages of fish species in mid-coast small ocean tributary streams have 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 A).

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.

The following policies, objectives, and actions pertain to management of all fish species in mid-coast small ocean tributary streams.

Policies

Policy 1. **Fish management in mid-coast small ocean tributary streams 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 shall not be stocked above these barriers. However, existing fish ladders shall be maintained.**

Policy 4. **Conservation objectives take priority over harvest objectives.**

Objectives

Objective 1. **Restore and maintain productive populations of all species of salmonids native to mid-coast small ocean tributary streams.**

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. Mid-coast small ocean tributary streams have wild populations of all salmonids native to the basin.

3. Habitat within mid-coast small ocean tributary streams is still largely suitable for production of native salmonids.

4. Some fish populations within mid-coast small ocean tributary streams will require remedial action to attain self-sustaining status in the near future if severe constraints on fisheries or land use practices are to be avoided.

5. Focusing management on the assemblage of species will be more efficient and have a higher probability of success than addressing single species.

6. The reaction of any single depressed fish population within mid-coast small ocean tributary streams to management actions is difficult to predict. If an overall assemblage of self-sustaining wild salmonids is restored, the relative abundance of individual species will be different from historic levels and largely unpredictable.

7. ODFW lacks resources for specific management of non-salmonid species. It is assumed that the needs of non-salmonid fish species in mid-coast small ocean tributary streams that are not monitored will be provided for by maintaining and restoring the full assemblage of indigenous salmonids.

8. ODFW management focused on the assemblage of native species will be consistent with the management direction for federal land management agencies within the basin.

Actions

1.1 Achieve the habitat objectives described in this plan.

1.2 Bring the level of hatchery fish in natural spawning areas of mid-coast small ocean tributaries to less than 10% of the total natural spawning population for each species.

1.3 Control fish harvest so that each species in mid-coast small ocean tributary streams is able to produce to its maximum potential.

1.4 Institute remedial recovery programs for fish species that are now severely depressed within mid-coast small ocean tributary streams.

1.5 Develop information to determine if marine mammal predation is a primary constraint preventing the recovery of one or more native salmonid species in mid-coast small ocean tributary streams.

HABITAT

Habitat Description

Small ocean tributary basins along the mid-coast have a combined size of about 371 square miles. Important small ocean tributary streams include Beaver, Big (Lincoln County), Cummins, Bob, Tenmile, Rock, Big (Lane County) and Cape creeks. Together, they have about 574 miles of stream (Figure 1).

Land Use

About one-half of the land in the basins of tributary streams is in private ownership (Table 3). The U.S. Forest Service (USFS) is also a major land owner. The Bureau of Land Management (BLM) has small holdings in the basin (Figure 1).

Table 3. Land ownership in mid-coast small ocean tributary basins.

Total basin area (square miles)	Percent of total area			
	BLM	USFS	State	Private
359	1.7	44.8	1.6	52.0

The dominant land use in the Oregon mid-coast is forestry (Table 4). 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.

Table 4. Land use in the Oregon mid-coast (Oregon Water Resources Department, 1980). *(Do this for small ocean tributary basins only on GIS.)*

	Forest	Range	Non-irrigated Agriculture	Agriculture	Irrigated 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 tributary streams basins include range, agriculture, and residential use. Range land includes areas characterized by grasses, shrubs, meadows, unimproved pasture and scattered trees. Areas managed for range are found primarily along water courses.

Livestock grazing is the primary agricultural activity in tributary streams basins. Most agricultural lands are not actively irrigated and are located adjacent to rivers and streams.

Urban land use pertains to residential, commercial, and industrial developments, including airports, schools, parks, and golf courses. Urban development along the Oregon mid-coast is found in and around the cities of Lincoln City, Newport, Waldport, Yachats, and Florence.

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 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 on privately owned lands in the basins of small ocean tributary streams.

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 a deviation from specific legal standards is needed to address a particular situation.

Goals for Habitat Conditions

A long-term goal for fish habitat within mid-coast small ocean tributary streams is to return the watershed to natural conditions that 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 mid-coast small ocean tributary streams have very little fish habitat that is irreversibly lost so a high level of recovery is achievable. Accomplishing this long-term goal will take hundreds of years.

The short-term goal for fish habitat within mid-coast small ocean tributary streams is to reverse the declining condition of habitat so that measurable improvement 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 increases in stream flows during summer low flow periods.
2. Reduction in summer stream temperatures where artificial warming occurs.
3. Increased in-stream structure.
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 in watershed conditions that are reflective of the basins' 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.

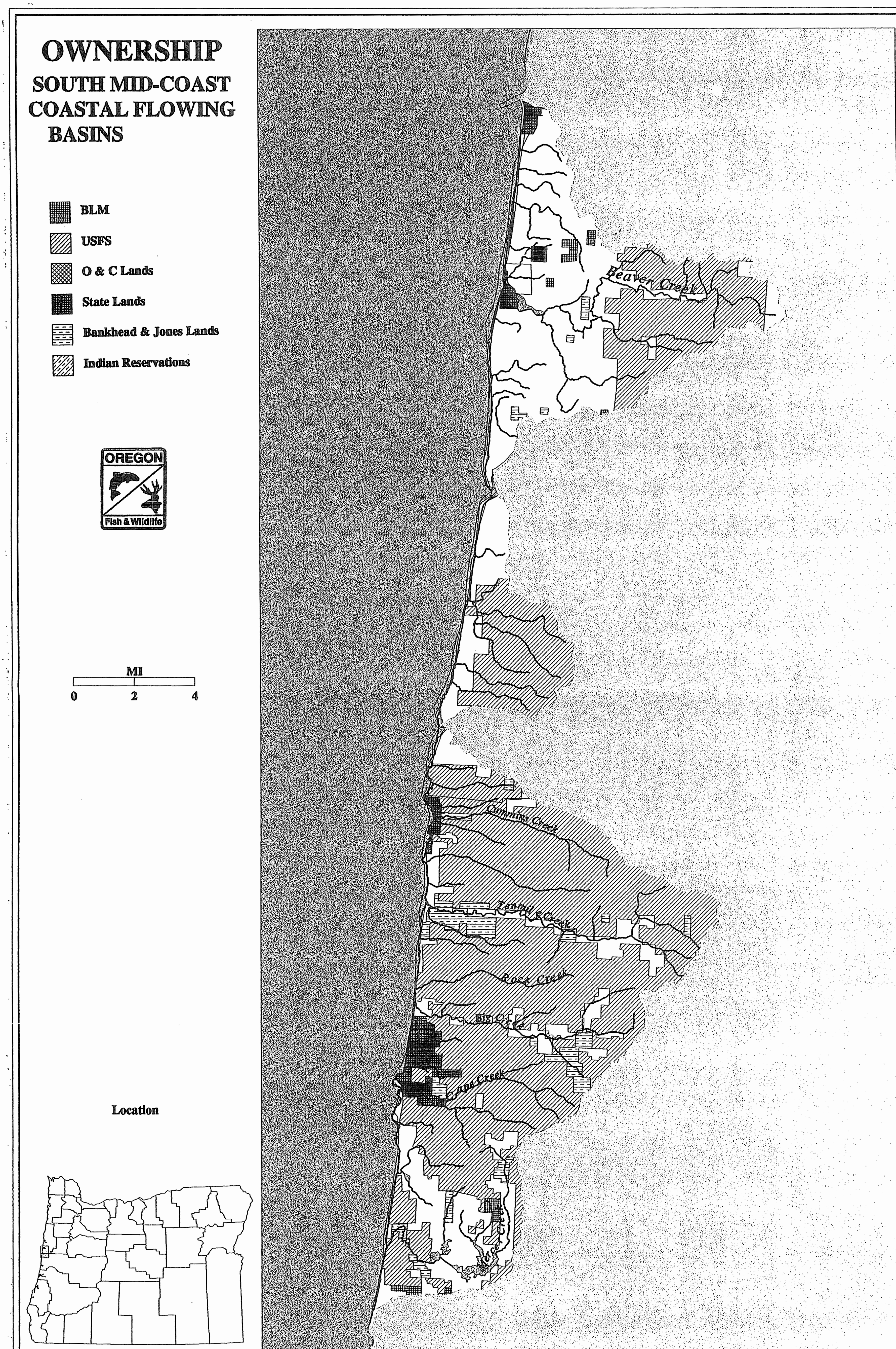


Figure 1. Land Ownership in the South Mid-Coast Basin

In-stream Flows

At the present time the only active gauging station to monitor in-stream flows on mid-coast small ocean tributary streams is on Big Creek (Lane County). Gauges could be developed on other small ocean tributary streams if it is determined necessary to monitor stream flows.

Peak flows during winter floods may increase if a watershed has extensive roads or cleared land. Intensified flood events will disrupt salmonid habitat by scouring spawning redds, and reducing channel stability. Concerns about increased winter peak flow from cleared lands have been addressed in part by limits on clear-cut sizes on state and private lands.

The mechanism for maintaining in-stream flows will be enforcement of existing in-stream water rights (Table 5). 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 in-stream water rights do not have priority over some water uses. It is likely withdrawals will increase gradually unless the in-stream water right is modified to cap exempt withdrawals or existing water users are switched to the use of stored water.

Table 5. In-stream water rights in small ocean tributary streams from converted minimum perennial streamflows.

Location	Priority dates
Tenmile Creek at mouth	3-26-74
Big Creek (Lane County) at mouth	3-26-74
Cape Creek at mouth	3-26-74

An additional 3 IWR applications have been filed with the Water Resources Department for consideration. These applications are listed in Table 6.

Table 6. In-stream water right applications in mid-coast small ocean tributary basins.

Stream	Reach (river miles)	Date
Tenmile Creek		
Wildcat Creek	0	3-25-91
Big Creek (Lane County)		
unnamed tributary	0	3-25-91
Cape Creek		
unnamed tributary	0	3-25-91

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 in-stream flows. If in-stream 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.

Water temperatures in mid-coast ocean tributary streams have been monitored intermittently at various locations. High summer water temperatures are sometimes a major limiting factor in lower Beaver Creek. Research has shown that the best salmonid production occurs in streams that remain constantly below 64° F. While salmonids can survive occasional higher peaks of 70° or more, best production is attained in streams that remain consistently below 64° F. The Department of Environmental Quality standard for the Mid-coast Basin is 64° F. Figures 2 and 3 show water temperature data from selected stream reaches.

Research has determined that increased water temperatures result primarily from exposure of the water surface to the sun. Efforts to prevent excessive summer water temperature will focus on increasing stream shading. In forest lands, the buffer requirements designed to provide large woody debris recruitment should generally be effective at providing stream shading. Loss of stream shade from residential development will be addressed through enforcement of county 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.

Agricultural lands appear to be 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.

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 drainage.

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, however, be very difficult to understand and control these impacts, so focus will be on providing riparian conditions needed to insulate against summer temperature increases. Hopefully this will be sufficient to address temperature alteration during other time periods.

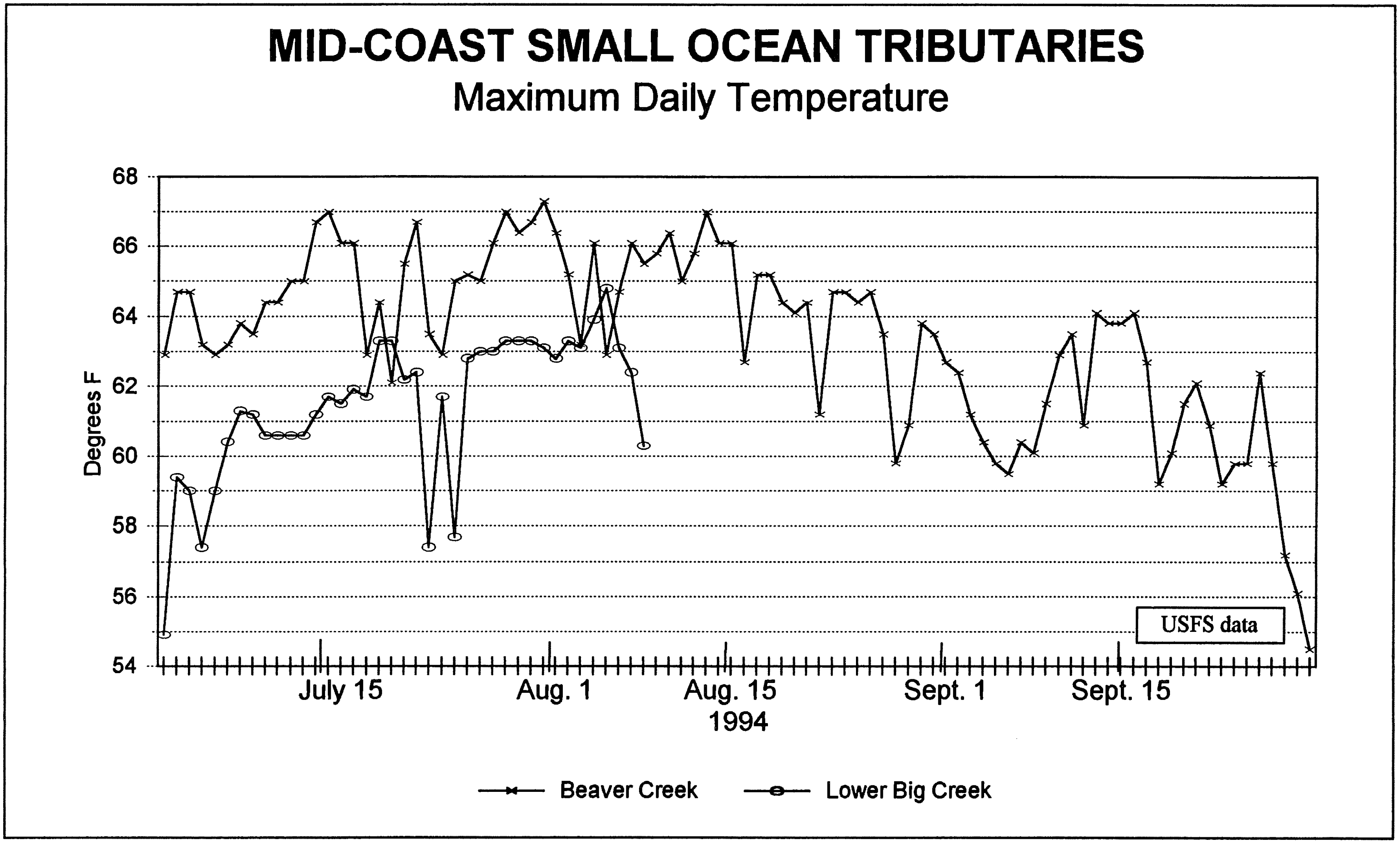


Figure 2. Beaver and Lower Big Creeks maximum daily temperatures.

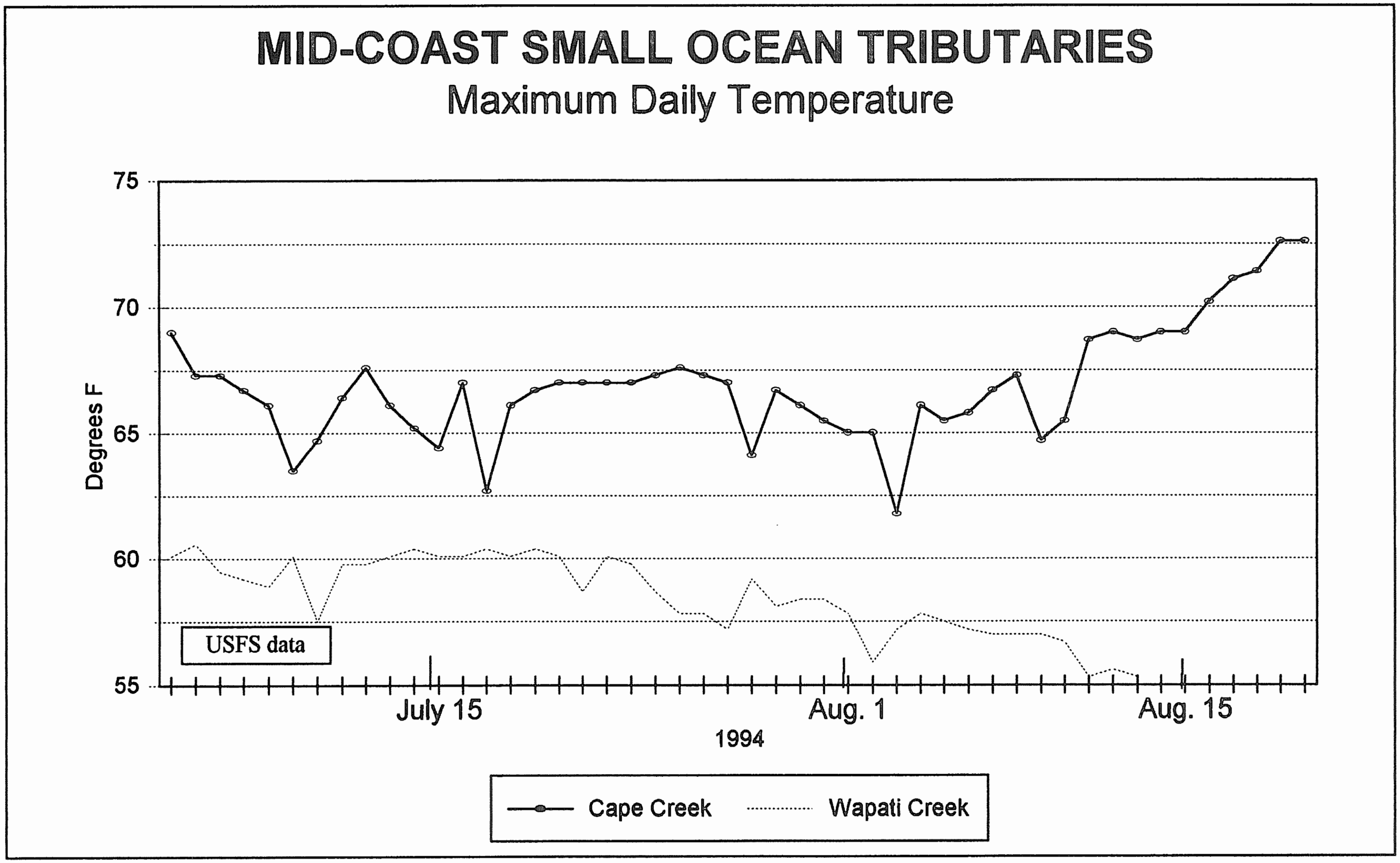


Figure 3. Cape & Wapati Creeks maximum daily temperatures.

In-stream Structure

A primary factor that has reduced fish production in all coastal basins is the loss of in-stream habitat provided by large woody material. In-stream 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 traps sediment, including gravel required for spawning.

In-stream structure has been lost because it was removed from stream channels to prevent fish passage problems following logging operations, 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 in stream structure.

Table 7 shows reduced LWD volumes in commercial timberlands compared to wilderness areas over broad areas of western Oregon. Surveys in mid-coast tributary basins in recent years have verified that LWD volume is very low in most areas.

Table 7. 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 (1990)	-	1,475	Schwartz
Lobster Creek (1988)	317	-	Sedell et al.
Cummins Creek (1988)	352-405	-	Sedell et al.
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 (1988)	18-53	-	Sedell et al.
Lobster Creek (1988)	18-35	-	Sedell et al.
Average	122	342	

A key action to increase LWD recruitment is the recent Oregon Forest Practices Act (FPA). The FPA should increase conifer retention in buffer strips several fold, which will ultimately provide more in-stream 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 fish habitat in the long-term. Hardwoods do provide valuable LWD, but they decay quickly and are not large enough to remain stable 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 coho salmon. 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 where logging operations are taking place. These cooperative efforts will be undertaken under the Stream Enhancement Initiative (SEI), a program to encourage cooperative fishery improvement projects on private timberlands. 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 stream side trees mature and are recruited naturally.

The effectiveness of increasing in-stream channel complexity will be evaluated using ongoing 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 provide a rapid fix to the deficiencies in protected pool habitat that is essential for over-winter survival of juvenile coho salmon. Due to their beneficial influence on fish habitat, beaver populations will be encouraged. Some control may still be necessary where damage to road crossings is unavoidable or where plantation damage is severe. The ODFW will recommend that problems with beavers blocking culverts be addressed by modifying the road crossing rather than by trapping the beavers in areas utilized by important fish resources. The ODFW will also recommend that hardwood-to-conifer conversions are not undertaken in stream reaches where important fish populations are found and beaver activity is likely. ODFW will participate in cooperative beaver management planning with forest landowners. The number of pools created by beaver dams is included in most stream surveys.

Sedimentation

Land use activities have generally increased the rate of erosion and sediment input into coastal waterways. Sedimentation can take the form of torrential landslides that scour stream channels and deliver large amounts of sediment in a single event. These slides destroy fish habitat in small streams. They create instability of spawning bars and channel widening with secondary erosion as the sediment flows downstream. In gentle topography, large slides are less prevalent, but flushing rates are low. Surface erosion of fines from roads and exposed soils can degrade spawning areas. The accumulation of sediment in pool habitats results in reduced egg-to-fry survival.

Forestry related roads are the primary source of increased sediment input into waterways. It is essential that roads are managed so they do not induce slides or contribute to surface erosion if fish habitat is to be improved. The degree to which road induced sediment has impacted salmonid habitat in small ocean tributary streams is not well understood. It may range from moderate to severe.

Erosion and increased sediment input from multiple sources spread throughout a watershed act in combination to impact fish habitats downstream. Regulatory mechanisms are currently not available to address these cumulative effects. The 1991 legislature directed the Oregon Department of Forestry to develop methods to address cumulative effects by 1995. These efforts will hopefully provide a basis to assure that multiple small source of sediment input do not contribute to an overall degradation of fish habitat.

Monitoring to determine if sediment input is being effectively controlled is needed. The methods to do this are currently being developed. Measurement of sediment input from natural and artificial sources should be a top priority for funding.

Evaluation and correction of erosion problems resulting from road systems is an activity that would be beneficial if private forest landowners desire to do cooperative fish enhancement projects. Beneficial actions to reduce risk could include pulling back sidecast, replacing undersized or deteriorated culverts, water-barring cat roads, and putting non-essential roads to bed.

The ODFW generally discourages in-water work because such work frequently destroys 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.

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 impacted. 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 small ocean tributary streams is available from the ODFW District offices in Newport and Florence.

Water Quality

Fish habitat in small ocean tributary basins 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 small ocean tributary basins 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

There are no major areas in small ocean tributary basins that are inaccessible to anadromous fish due to artificial blockages. Impassable culverts may prevent adult anadromous fish from reaching a percentage of the small streams. Obstructions to the upstream movement of juveniles is more frequent because of their poor ability to pass culverts with high velocities. Juvenile steelhead, coho and cutthroat all make 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. A systematic survey of culverts to identify fish passage problems is proposed.

There is an existing fish ladder on Little Cummins Creek, tributary to Cummins Creek. It will be checked periodically to ensure it is functioning properly.

Water diversions can also impact fish that are removed from the stream along with the diverted water. There are no known unscreened diversions on mid-coast ocean tribs. 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.

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 basins' aquatic resources.**

Policy 2. **The Department shall coordinate with and advise landowners and management agencies of mid-coast small ocean tributary basins.**

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 in-stream flows during summer low flow periods in mid-coast small ocean tributary basins.**

Assumptions and Rationale

1. Adequate in-stream 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.

Actions

1.1 Use flow monitoring to evaluate the effectiveness of maintaining stream flows.

1.2 Establish in-stream water rights on additional streams which exhibit fish and wildlife values.

1.3 Attempt to acquire abandoned water rights for in-stream use.

1.4 Request the WRD to strictly enforce ODFW's in-stream water rights.

1.5 Request the WRD to monitor water diversions.

1.6 Track the cumulative volume of water withdrawals in mid-coast small ocean tributary basins.

1.7 Recommend that new irrigation rights or extended domestic rights not use summer flows below in-stream water rights.

1.8 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.

2. Lack of shading from riparian vegetation has increased water temperatures in the basin.

3. Water temperatures can be monitored using automated temperature recorders.

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 basins in collaboration with private landowners and other agencies.

2.2 Monitor stream temperatures in key areas.

2.3 Increase riparian shading in forested lands through implementation of the Forest Practice Act rules.

2.4 Increase riparian shading in agricultural lands by working cooperatively with land owners to increase stream-side shading.

2.5 Develop standards for agricultural lands that provide waterway protection that is consistent with other land uses in the basins.

2.6 Increase riparian shading in residential or developed areas through enforcement of county setbacks which require 50 feet of undisturbed vegetation.

2.7 Reduce inputs of sediments into stream channels which result in channel widening and greater exposure of the stream channel to warming.

Objective 3. Increase in-stream channel complexity in mid-coast small ocean tributary streams.

Assumptions and Rationale

1. In-stream channel complexity is necessary for restoring productive populations of coho salmon, winter steelhead, and cutthroat trout.

2. In-stream channel complexity has been severely reduced from historic levels.

Actions

3.1 Measure in-stream 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 that show high potential for benefiting from input of large woody debris.

3.4 Coordinate with Oregon Department of Forestry, private landowners, and federal agencies to artificially place LWD in streams.

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

3.6 Re-establish conifers in riparian areas where it is possible to do so without removing existing alder and softwood species or trapping beavers to the extent that other beneficial values from the buffer strip are compromised.

3.7 Institute a program to inform landowners about the benefit of leaving LWD in streams.

Objective 4. Reduce artificially accelerated erosion rates and inputs of sediments into waterways in mid-coast small ocean tributary basins.

Assumptions and Rationale

1. The principal source of artificially induced sediment input is 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.

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.

Objective 5. Prevent chemical contaminants from degrading fish habitat in mid-coast small ocean tributary basins.

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 Ocean Tributary Basins 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 Recommend enforcement of existing water quality standards where detrimental impacts to fishery resources are a concern.

Objective 6. Protect natural fish passage conditions in mid-coast small ocean tributary streams.

Assumptions and Rationale

1. The fish assemblages in mid-coast small ocean tributary streams will be most productive if natural passage conditions exist in the basins.

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

Actions

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

6.2 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 mid-coast small ocean tributary basins.

Assumptions and Rationale

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

Actions

7.1 Evaluate historic and existing aquatic habitat areas.

7.2 Implement programs to measure changes in aquatic habitat areas over time.

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

7.4 Make recommendations to prevent channelization of streams and rivers.

7.5 Make recommendations to prevent diking of wetlands and estuaries.

7.6 Make recommendations to prevent the filling of estuaries.

7.7 Pursue measures to restore historic habitat areas lost due to channelization or diking where fishery benefits are high.

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.

Actions

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

8.2 ODFW will participate as a technical advisor to the local watershed council.

FALL CHINOOK SALMON

Background

Fall chinook salmon are native to all larger river basins in the Oregon mid-coast. Fall chinook are occasionally observed in small numbers in some of the larger ocean tributary streams such as Beaver, Tenmile, and Big creeks, but they represent a small proportion of the salmonids in these streams.

Fall chinook in small ocean tributary streams have not been supplemented with hatchery production.

Status

Fall chinook populations on the northern and central Oregon coast show increasing trends over the past 15 years. For most stocks this trend appears to have peaked in 1988 and may now be declining.

At the present time there is no method of monitoring escapement of fall chinook in small ocean tributary streams other than punchcard catch statistics.

A fish trap operated by ODFW research on Tenmile Creek collects 0+ age fish in the spring (Siuslaw National Forest 1994). During 1992-95, the number of age 0+ chinook caught ranged from 234 to 699. Since the trap runs only during the spring, the juvenile count is probably an underestimation of the basin population.

Life History Characteristics and Habitat Needs

Adults enter mid-coast river systems primarily during September and October. Peak spawning occurs during November.

Concern exists that increased timber management activity in the upper basin 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.

Juvenile fall chinook rear primarily in the main stem reaches and estuaries. Juveniles enter the ocean in their first year of life from mid-summer through October.

Angling and Harvest

Fall chinook from small ocean tributary streams are caught in ocean fisheries. Coded wire tag data indicate that most of the ocean catch of mid-coast fall chinook catch occurs in British Columbia and Alaska.

Punchcard data provide an estimate of total in-river catch in mid-coast small ocean tributary basins (Figure 4). Annual harvest in individual streams has ranged from 0 to 73 fish over the past 15 years. However, punchcard catch estimates are probably inflated due to miscoded punchcards. Anglers can easily miscode their cards by entering data from other streams of the same name, such as Big Creek and Rock Creek.

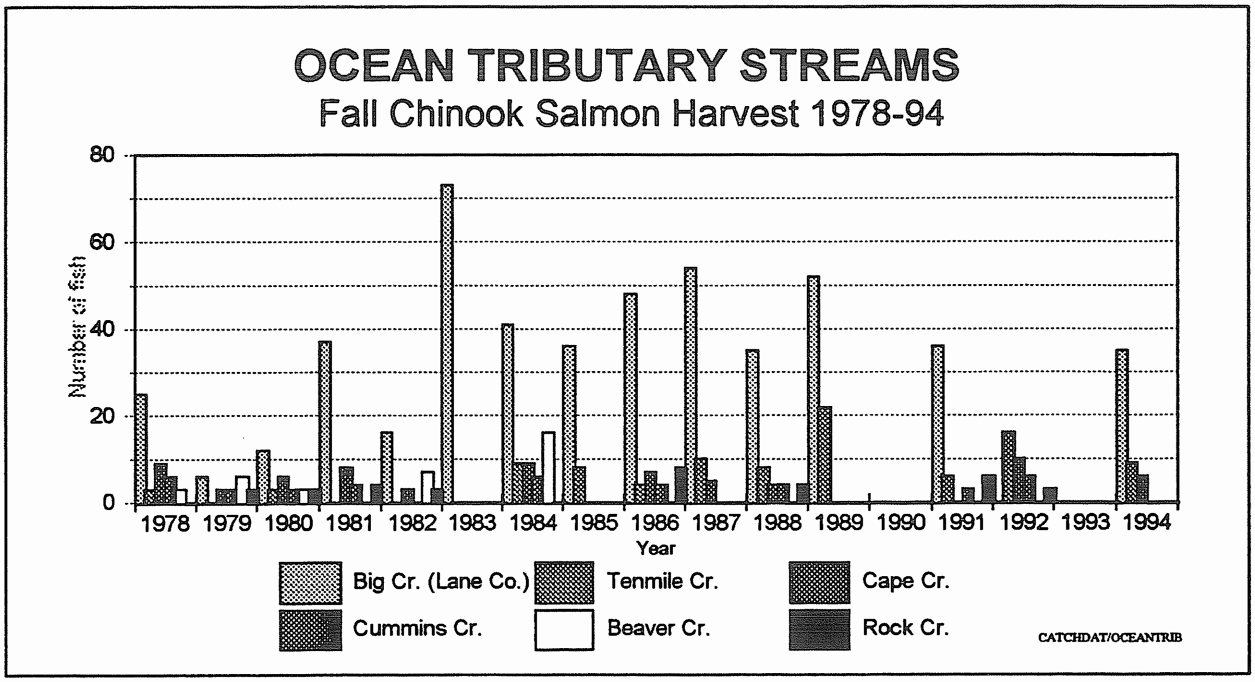


Figure 4. Estimated fall chinook salmon harvest in small mid-coast ocean tributary streams, 1978 - 1992.

Management Considerations

Fall chinook salmon in mid-coast small ocean tributary streams will be managed for wild production only, as specified in the Coastal Chinook Salmon Plan (ODFW 1991). Management activities are directed toward habitat protection and enhancement, and improvement of inventory and monitoring methods and data. It is recommended that current angling regulations be modified to protect chinook salmon in small ocean tributary streams.

Policies

Policy 1. Fall chinook in mid-coast small ocean tributary streams shall be managed for wild production only.

Objectives

Objective 1. Develop an information base and methodology for measuring and monitoring the status of fall chinook salmon in mid-coast small ocean tributary streams.

Assumptions and Rationale

1. Insufficient information is available to establish specific production and escapement objectives for fall chinook in mid-coast ocean tributary streams.

2. Habitat in mid-coast small ocean tributary streams is generally not suitable for chinook salmon. Populations are naturally small. Mid-coast small ocean tributary streams are 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.

3. The chinook populations in mid-coast ocean tributaries are below the minimum size threshold to allow harvest as defined by the Wild Fish Management Policy.

Actions

1.1 Collect and compile all available data and information on chinook observed in mid-coast ocean tributaries.

1.2 Propose closure of existing fisheries on fall chinook in mid-coast ocean tributaries until it has been determined that harvest does not constitute a threat to the genetic resources and a harvestable surplus exists.

COHO SALMON

Background

Coho salmon are native to mid-coast small ocean tributary streams. Coho are widely distributed in low and medium gradient streams throughout the basins (Figure 5). Table 8 lists the approximate miles of stream utilized by coho in each of the major basins addressed in this plan. The total miles of habitat represents about 2% of the total coho salmon habitat on the Oregon Coast (4,423 miles).

Table 8. Miles of stream used by coho salmon in mid-coast small ocean tributary basins.

Stream	Miles
Beaver Creek	29.9
Big Creek (Lincoln Co.)	3.4
Cummins Creek	7.9
Bob Creek	5.5
Tenmile Creek	18.7
Rock Creek	2.2
Big Creek (Lane Co.)	13.5
Cape Creek	8.5
Total	89.6

There are no hatchery programs for coho in mid-coast small ocean tributary streams. Stocking of hatchery coho has occurred only in Cape Creek during 1979-80.

Status

Wild coho are currently a major concern because they are severely depressed in some coastal areas and are being petitioned for coastwide listing under the Endangered Species Act. The concern over conservation of wild coho has created the necessity to sharply restrict ocean and freshwater salmon fisheries and has been a major consideration in developing revisions to the Oregon Forest Practices Act.

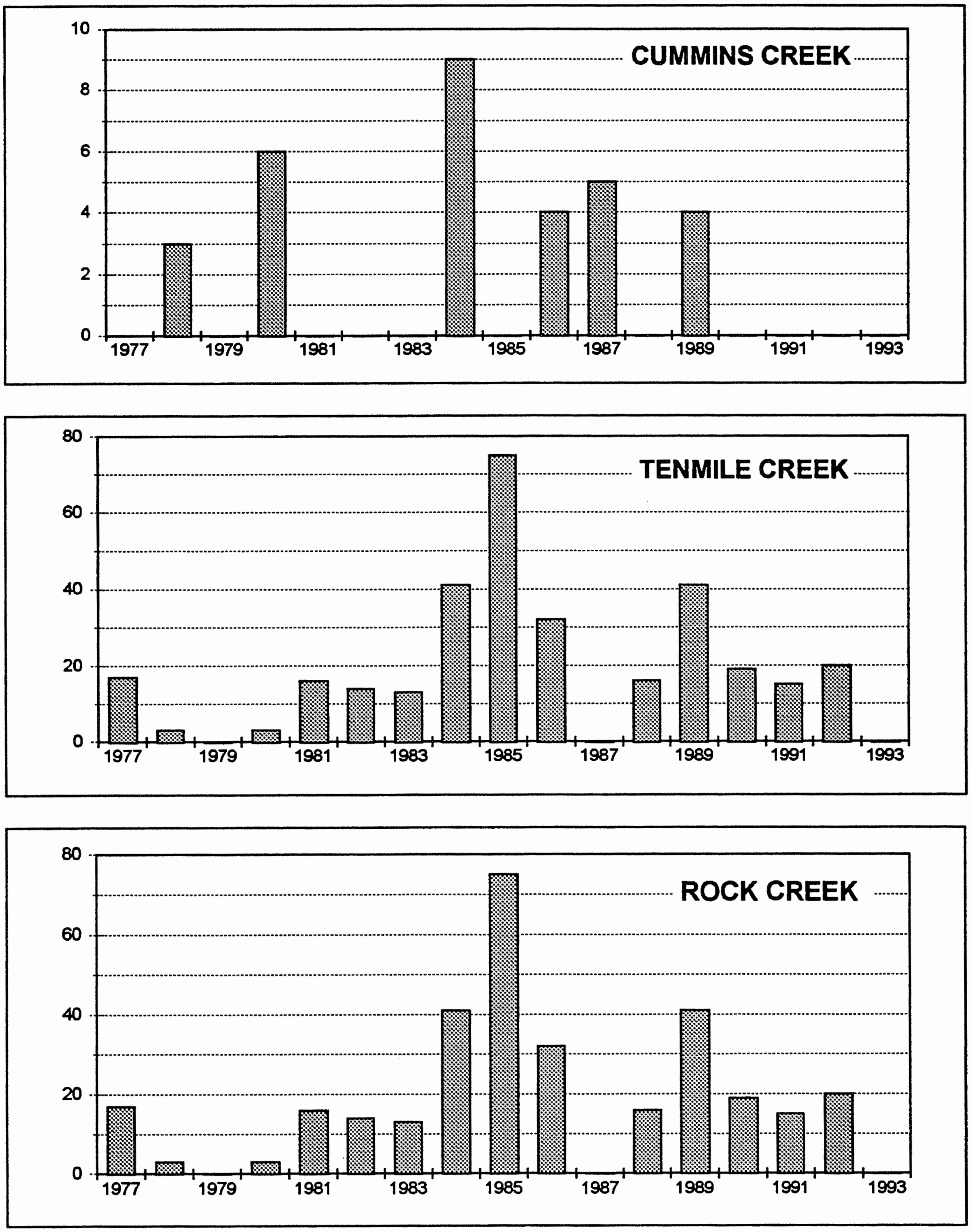


Figure 6. Coho Catch

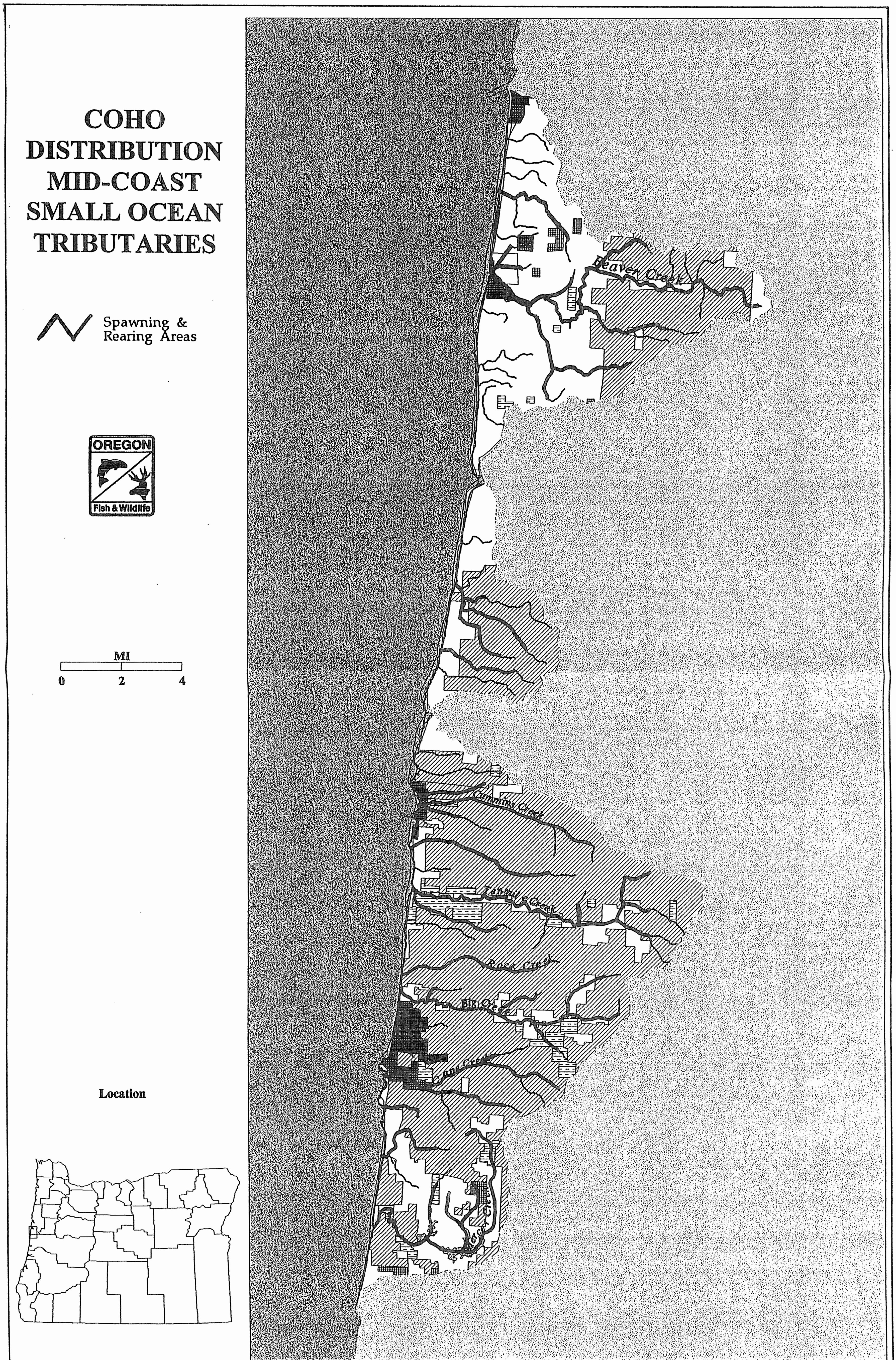
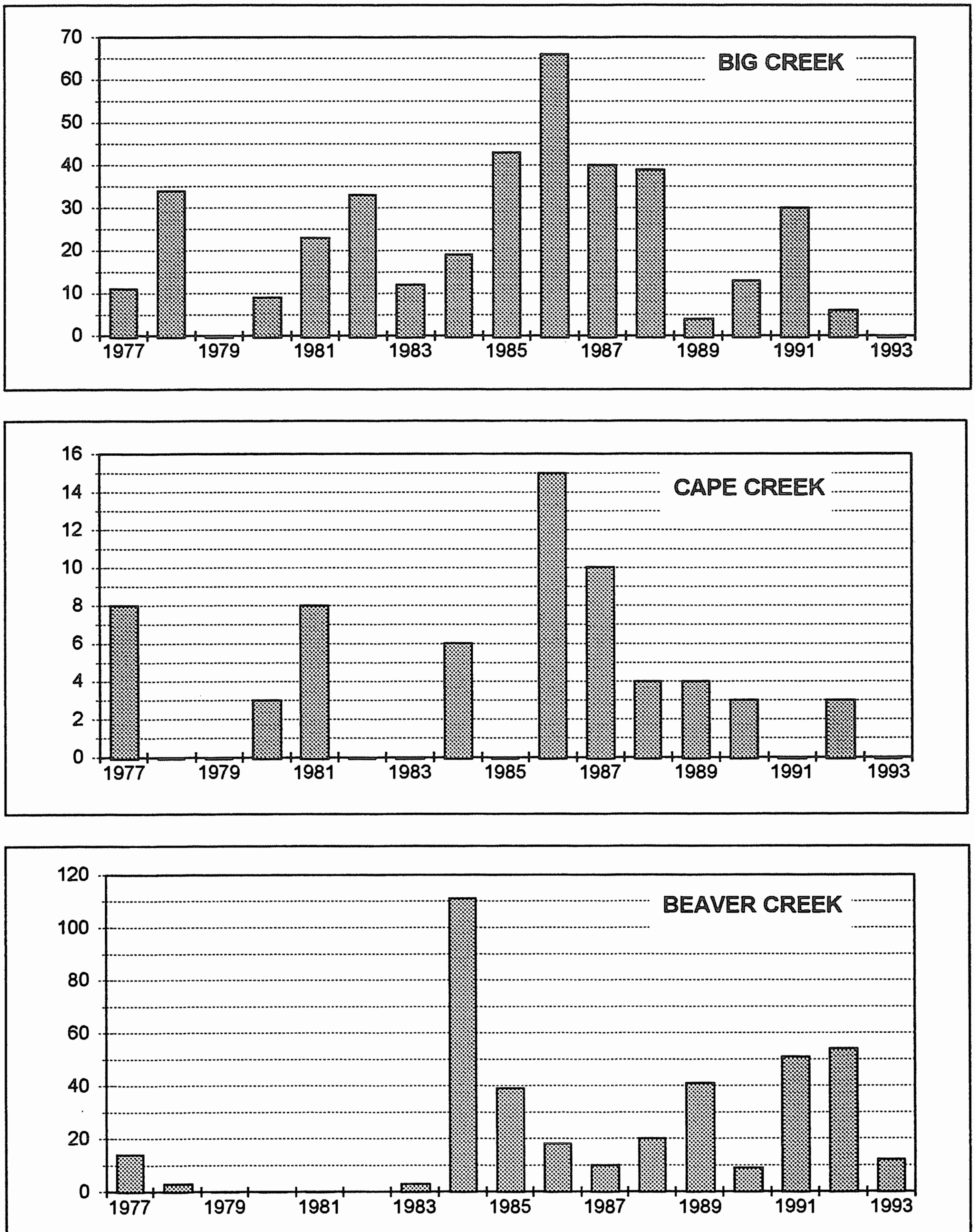


Figure 5. Distribution of Coho Salmon in Mid-Coast Small Ocean Tributary Streams



CATCHDATA/PUNCH

Figure 6. (continued)

ODFW monitors spawning escapement of wild coho salmon through a system of 53 standard spawning fish surveys located throughout Oregon coastal basins. One standard coho survey is located in North Fork Beaver Creek. For the past 4 years ODFW has been surveying randomly selected reaches of streams to evaluate bias in the standard index.

These surveys show low densities of coho salmon spawning in most small ocean tributaries. However, much of the habitat in these streams is steeper gradient than coho typically prefer for spawning.

Table 9.

Year	Survey	Survey length (mi)	# Times Surveyed	Total Coho Observed
1990-91	Big Cr.	1.20	14	none
	Big Cr. S. FK.	0.83	12	7 Adults
	Tenmile (Miller Cr.)	0.80	12	3 Adults
	Tenmile	1.20	11	none
1991-92	Big Cr. - Lower	1.20	11	none
	Big Cr. - Upper	1.10	10	none
	Cape Cr.	1.50	11	1 Adult, 1 Jack
	Cummins Cr.	1.40	9	none
1992-93	Big Cr.	0.83	11	3 Adults
	Rock Cr.	1.50	12	none
	Tenmile (Miller Cr.)	0.80	11	none
	Cape Cr. (Wapiti Cr.)	1.40	8	none
1993-94	Bob Cr.	1.10	12	2 Adults
	Big Cr. (Panther)	0.85	11	none
	Tenmile - Lower	1.30	13	none
	Tenmile - Middle	1.30	12	none
	Tenmile - Upper	1.20	13	none
1994-95	Cape Cr.	1.30	9	7 Adults
	China Cr.	0.73	9	none
	Big Cr.	0.50	9	1 Adult
	Big Cr.	1.01	9	1 Adult
	Cummins Cr.	1.40	9	8 Adults
1995-96	Cape Cr.	1.30	9	5 Adults
	Tenmile (S. Fk.)	0.48	9	2 Adults
	Bob Cr. - Lower	1.10	9	none
	Bob Cr. - Upper	1.10	9	none
	Tenmile Cr.	0.78	9	2 Adults
1996-97	Cape Cr.	1.40	12	19 Adults
	Big Cr. (Fryingpan Cr.	0.58	13	none
	Tenmile Cr.	1.04	13	15 Adults, 1 Jack
	Cummins Cr.	1.23	12	none
	Cummins Cr.	1.44	12	16 Adults, 2 Jacks

Observations of age 0+ coho by USFS and ODFW in mid-coast ocean tributary streams show wide fluctuations (Table 10). Overwinter survival when abundance of juveniles is high has been estimated to be about 30%. When abundance is low, survival is estimated to be about 70%. The low abundance and relatively high survival of juvenile coho suggest these basins are under-seeded. Observations by USFS staff of underutilized habitat also suggest that escapement is limiting coho production. Table 10 shows the estimated numbers of smolts and the number of 0+ juvenile in Tenmile and Cummins creeks. These numbers of smolts are far below the estimated potential for these streams which has been estimated at 9,500 smolts for Cummins Creek and 17,000 to 29,000 for Tenmile Creek.

Table 10. Estimated numbers of coho salmon in Cummins and Tenmile Creeks. 1991 - 1996

	Tenmile Creek		Cummins Creek	
Year	Smolts	0+	Smolts	0+
1991	-	8,003	-	1,292
1992	5,442	7,799	1,023	1,316
1993	5,260	30,663	738	1,079
1994	9,234	3,294	1,435	1,015
1995	1,729	4,369	1,076	913
1996	2,230	3,800	475	1,100

Coho populations in small ocean tributary basins may not be in compliance with the Wild Fish Management Policy because populations may number fewer than 300 fish. No hatchery coho have been stocked in any of these streams in recent years, although Beaver Creek had large numbers of stay hatchery coho from a private hatchery on Yaquina Bay in the mid-1980s.

Life History Characteristics and Habitat Needs

Coho salmon return to spawn in mid-coast small ocean tributary streams in the fall and winter. Spawning occurs in low and medium gradient tributary streams in November through February. Coho require clean gravel for spawning.

Fry emerge in the spring and rear in backwater areas and stream margins (Nickelson et al. 1992). Juvenile coho need streams of low gradient and velocity. They are found mostly in pools. Research has shown that beaver ponds and complex pools with large quantities of wood hold the highest number of juvenile fish.

Winter habitat is a critical factor for coho. Winter habitat must provide refuge for juveniles from high stream velocities. Typical refuge areas include backwaters behind beaver ponds, log jams, sheltered side channels and backwaters. Winter habitat also must provide food and cover from predators.

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.

Habitat Restoration Activities

Coho salmon are a high priority for habitat restoration in mid-coast small ocean tributary streams. Stream reaches that should be targeted for habitat restoration work include areas in Beaver Creek (Appendix Table A-1). Specific sites and activities for restoration should be targeted in cooperation with private timber owners. Habitat surveys will provide information to determine where habitat restoration should occur and baseline information to determine the effectiveness of these efforts.

The following activities are recommended for restoration of coho salmon.

1. ***Provide in-stream structure.*** Stream surveys have shown that large stretches of many Siuslaw River tributaries are characterized by a general lack of structure that is normally provided by logs and boulders. As a consequence, large portions of many streams are scoured to bedrock and are generally lacking in pools and escape cover for juvenile coho.

2. ***Develop winter habitat***. Research has shown that winter habitat is critical to the over-winter survival of pre-smolt coho. Providing in-stream structure by judicious placement of large logs and boulders provides benefits for over-winter survival. Other activities include development of side channels and sheltered backwater areas.

   Another way to provide over-wintering habitat is to encourage beaver populations. Beaver dams have been shown to provide excellent over-wintering habitat for juvenile coho. Beaver populations can be encouraged by restricting or discouraging trapping. Much of the beaver trapping that occurs is in response to damage from culverts that are chronically plugged by beavers. By correcting these culverts, the need to trap beavers is eliminated.

3. ***Plant conifers in riparian areas***. This is especially important in riparian areas that are presently devoid of trees. The benefits include shading the stream and cooling the water, increasing nutrients and food into the stream, and providing a source of future woody structure for the stream.

4. ***Correct fish passage problems.*** Surveys of culverts being conducted by the Siuslaw District have shown that there are numerous small tributaries that are partially or completely blocked to migrating coho by improperly installed culverts. The cumulative

effect of these small blockages is significant. The Lake Creek Falls and Hult Reservoir fish ladders also need modification to restore proper function.

5. *Control sedimentation.* These activities include waterbarring and/or decommissioning roads to prevent landslides, proper grading and maintenance of roads and ditches, and re-sloping and revegetating eroding banks.

Angling and Harvest

Figure 6 shows the estimated harvest of coho salmon in mid-coast ocean tributary streams during 1977-93 based on punchcard returns. Data for Tenmile, Big, and Rock Creeks are suspect because of possible miscoding of punchcards for catch on other streams having the same names.

Mid-coast ocean tributary streams were open to harvest of coho salmon under standard winter regulations. However, in 1993 emergency regulations closed coho harvest on these and most other coastal rivers and streams to increase spawning escapement.

Management Considerations

Coho salmon in mid-coast small ocean tributary streams will be managed for wild production only. Hatchery coho can be used only for specific restoration objectives. Spawning populations will continue to be monitored. Achieving the habitat objectives outlined in the Habitat chapter will enhance the productivity of coho salmon. Natural production may provide for ocean and in-river fisheries in the future.

Policies

Policy 1. Mid-coast small ocean tributary streams shall be managed for production of wild coho salmon.

Objectives

Objective 1. Increase natural production of coho salmon.

Assumptions and Rationale

1. Almost all stream reaches that produced coho historically still have the potential to produce coho.
2. The extremely low escapement of wild coho during recent years may threaten the long term viability of wild coho populations.
3. Recovery actions directed specifically at coho salmon are warranted.
4. Beaver populations will continue to provide habitat that is essential for over-winter survival of juvenile coho salmon in some stream reaches.
5. The absence of in-stream 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.
6. Achieving minimum escapement levels specifically for small ocean tributary streams will be a consideration, but not a singular constraint, on mixed-stock ocean fisheries.

Actions

1.1 Maintain annual trend counts of wild coho escapement in the one standard spawning survey area in Beaver Creek.

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

1.3 Maintain the closure of the in-river fisheries for coho in mid-coast small ocean tributary streams.

1.4 Systematically survey potential coho habitat throughout mid-coast small ocean tributary basins to prioritize protection and restoration needs and provide baseline information to evaluate the effectiveness of these efforts. Use this information to refine estimates of stream miles that are suitable habitat for coho salmon.

1.5 While reviewing land use activities in mid-coast small ocean tributary basins, give high priority to review and comment on land use activities that may impact important habitat for coho salmon.

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

1.7 Implement habitat restoration projects designed to increase coho production. These projects may include restoration of passage, development of backwater areas to provide winter habitat for juvenile coho, placement of in-stream structures, and control of sedimentation.

1.8 Recommend that land managers in areas adjacent to coho streams conduct their activities in a manner which will protect coho habitat from degradation, consistent with the best scientific information available.

WINTER STEELHEAD

Background

Winter steelhead are native to all major basins along the Oregon coast, including mid-coast small ocean tributary basins. Good production areas are found in large, high gradient streams with good water quality. Cummins, Rock, Tenmile, and Bob creeks are considered by ODFW to be important production areas for wild winter steelhead in the central Oregon coast.

There are no hatchery programs for winter steelhead in mid-coast small ocean tributary basins.

Status

Wild winter steelhead in mid-coast small ocean tributary basins are depressed and are currently being reviewed along with other coastal steelhead for listing under the Endangered Species Act.

Factors that have contributed to the decline in the returns of wild steelhead include unfavorable ocean conditions for smolt survival since about 1985. Other factors are increased predation by marine mammals or birds and high seas net fisheries. Inland sport fisheries also could have contributed to the decline. Freshwater habitat conditions have deteriorated. Genetic alteration of wild steelhead due to interbreeding with hatchery steelhead as well as competition in freshwater with juveniles from hatchery spawners may also be contributing to the decrease in wild runs.

Kenaston (1989) estimated that the average annual run size of wild winter steelhead during 1981-85 was 300-500 fish in Tenmile, Big and Cape creeks, and less than 100 fish in Beaver, Cummins, and Rock creeks (Figure 7). Although hatchery fish have not been stocked directly in mid-coast ocean tributary streams, 34-47% of the total run size into these streams has been stray hatchery fish. Data indicate that most of the stray hatchery fish were Alsea stock fish which were stocked in the Siuslaw Basin.

The high stray rate puts small ocean tributary steelhead in jeopardy of interbreeding with potentially less fit non-native Alsea stock hatchery fish. Because of the high stray rate of hatchery fish, some of the small ocean tributary populations of winter steelhead may be out of compliance with the Wild Fish Management Policy.

Life History Characteristics and Habitat Needs

Winter steelhead generally return to freshwater to spawn beginning in November, with the majority returning in January through March. Winter steelhead spawn mostly in tributary streams, primarily from January through April. Steelhead prefer clean gravel for spawning.

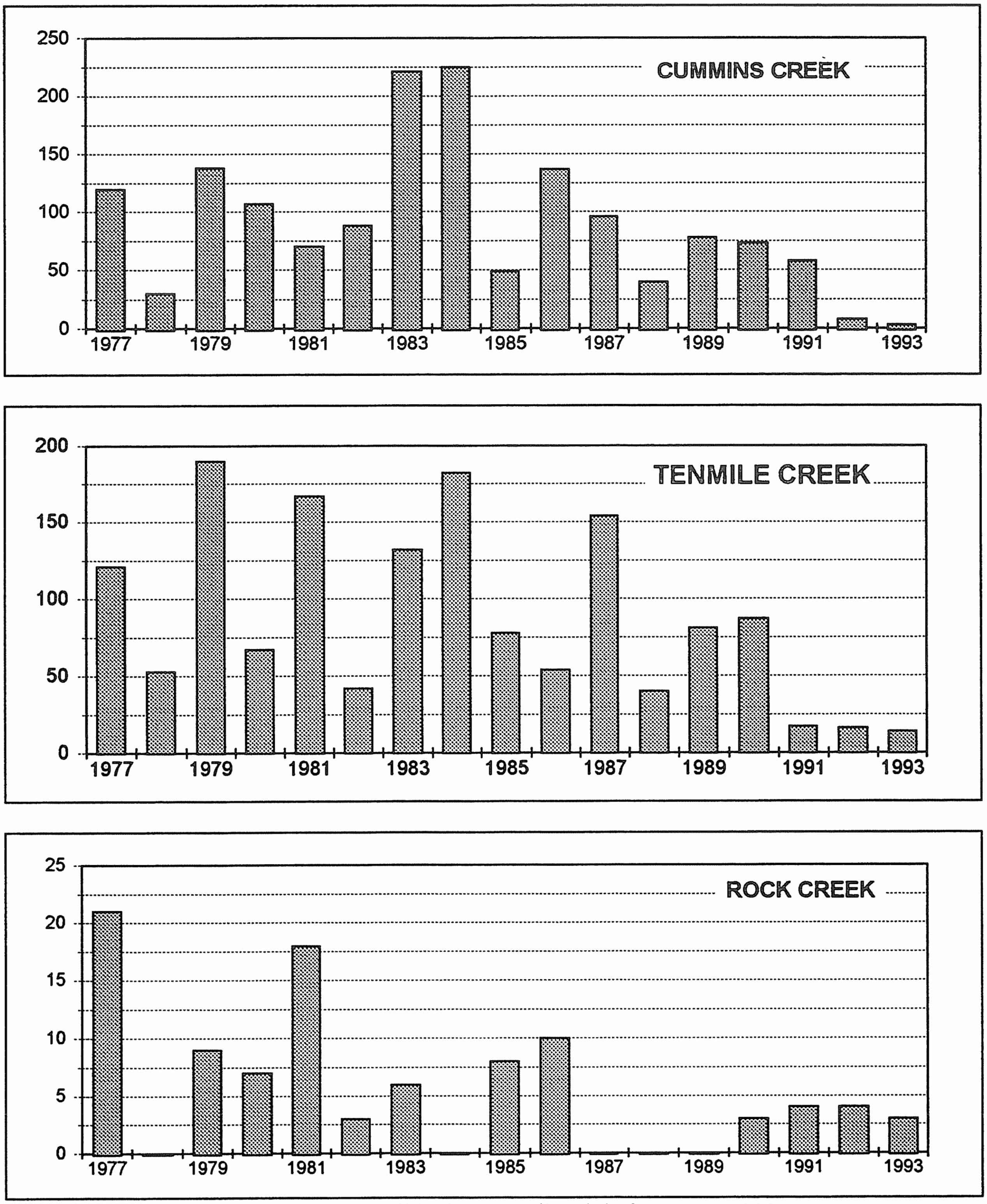
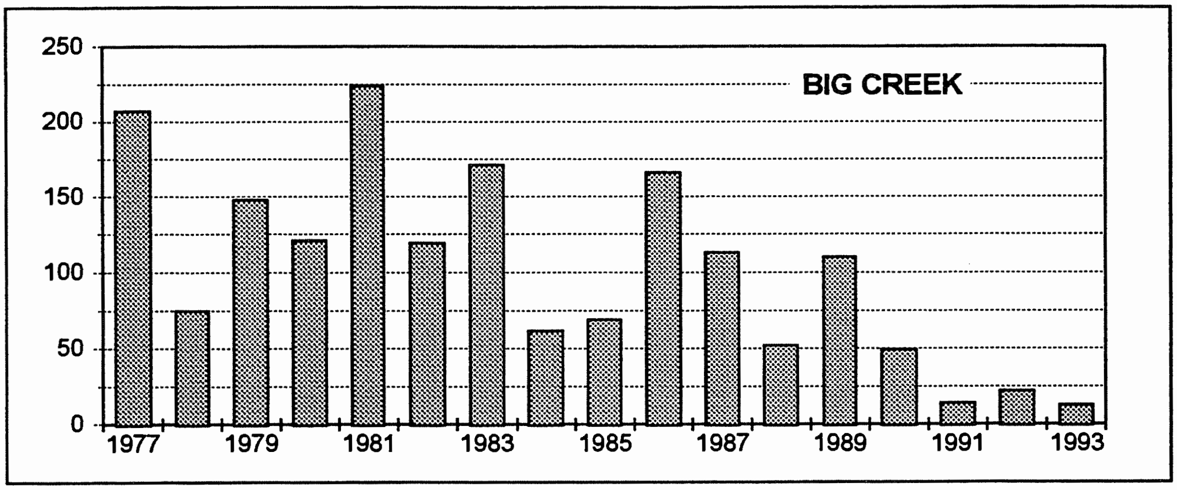
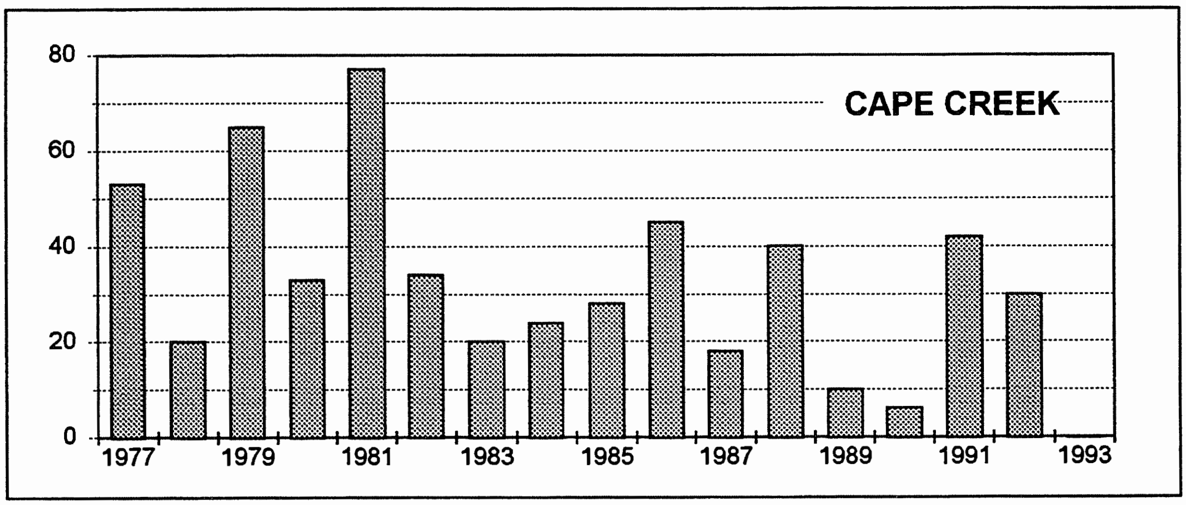


Figure 7. Average annual run size of wild winter steelhead during 1977-1993.





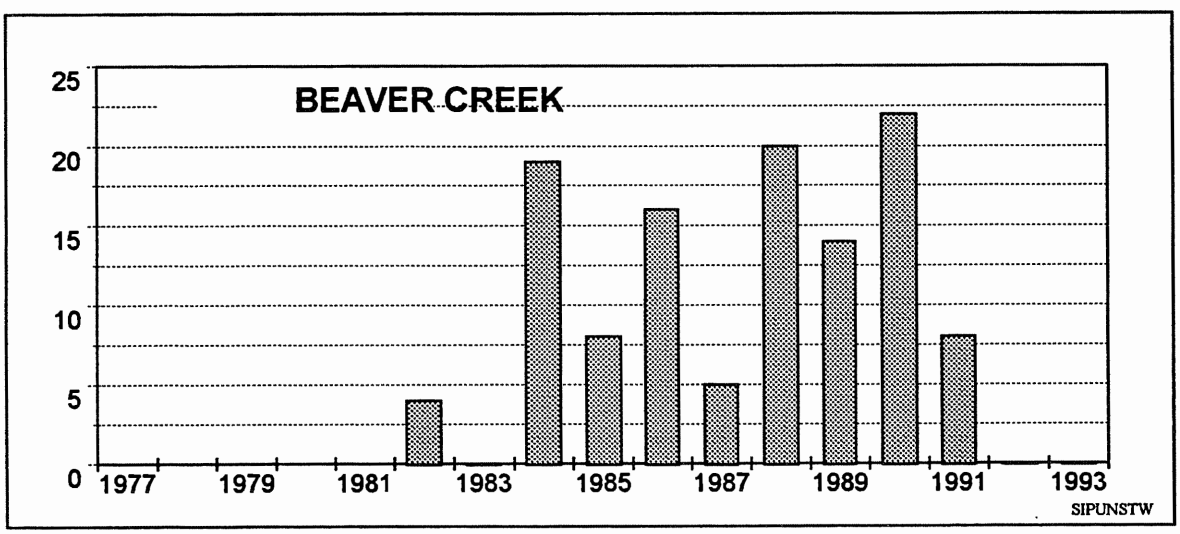


Figure 7. (continued)

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 in riffles or in pools near the base of riffles (Barnhart 1986).

Yearling steelhead require deeper pools with 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.

Another important habitat requirement of juvenile steelhead is winter refuges where the fish can avoid being swept downstream by winter floods. Large woody debris is an important component in steelhead habitat, both from the standpoint of serving as cover and of creating pools.

Generally after 2-3 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. Steelhead may survive their first spawning migration and spawn a second or third time, although repeat spawning is relatively rare.

The abundance of age 1+ juvenile steelhead and smolts has remained relatively constant from year to year in Cummins and Tenmile creeks (Siuslaw National Forest 1994). Overwinter survival has ranged from 30-50%. Age 1+ juveniles were found to be distributed in proportion to the available habitat in Cummins Creek during 1987 and 1988. The consistent abundance, survival, and distribution suggest that winter steelhead populations in these streams may be limited by suitable habitat.

Habitat Restoration Activities

The second highest priority for habitat restoration in mid-coast ocean tributary streams is winter steelhead. Stream reaches that should be targeted for habitat restoration work include Tenmile Creek (Appendix Table A-1). Specific sites and activities for restoration should be targeted in cooperation with private timber owners. Customized restoration measures to fit the particular needs of individual tributaries will be developed after on-site inspections and surveys are completed. Habitat surveys will provide information to determine where habitat restoration should occur and baseline information to determine the effectiveness of these efforts.

The following activity is recommended for restoration of winter steelhead in Tenmile Creek.

1. Winter habitat development by placing structure in bedrock areas. Increased in-stream structure will provide winter habitat. In-stream 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 could frequently be implemented cooperatively during logging operations.

The overall benefits provided by in-stream structure placement could be evaluated by comparing amounts of in-stream structure identified in recent habitat surveys with amounts measured during similar surveys in the future. In-stream structure placement would also benefit coho salmon and to a lesser degree cutthroat trout.

Angling and Harvest

Punchcard catch estimates for 1976-92 show a declining trend in winter steelhead harvest in mid-coast ocean tributary basins. The decline in catch is probably indicative of a comparable decline in overall run size.

Table 11. Estimated numbers of steelhead smolts emigrating from three mid-coast ocean tributaries.

	Tenmile Creek	Cummins Creek	Big Creek
1992	6,312	786	-
1993	7,817	1,424	-
1994	5,420	1,623	-
1995	2,342	1,167	1,103
1996	4,652	2,303	-

Big Creek (Lane County) generally had the highest annual catch (about 105 fish) over this period of time, followed closely by Tenmile Creek (about 90 fish). The average annual catch for Cape Creek was about 30 fish. For Beaver, Cummins and Rock creeks, the average annual catch was about 5-10 fish.

Current angling regulations state that all non-finclipped steelhead must be released.

Management Considerations

Winter steelhead in mid-coast small ocean tributary streams will be managed for wild production only. The large proportion of hatchery strays found in the streams should be reduced to bring them into compliance with the Wild Fish Management Policy by modifications to the hatchery program for winter steelhead in the Siuslaw Basin. Habitat protection and enhancement measures, outlined in the Habitat chapter, will enhance the productivity of winter steelhead in the basin. Angling regulations that require the release of all non-finclipped steelhead have been implemented.

Policies

Policy 1. Mid-coast small ocean tributary streams shall be managed for wild production of 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 for wild winter steelhead in the mid-coast small ocean tributary basins. 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. Accomplishing habitat protection and restoration objectives will improve stream conditions for winter steelhead and result in increased production.

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

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

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.

1.2 Continue angling regulations requiring the release of all naturally produced steelhead in the mid-coast small ocean tributary streams.

Objective 2. Develop an information base and methodology for measuring and monitoring natural production of winter steelhead in mid-coast small ocean tributary streams over the next five years.

Assumptions and Rationale

1. Comprehensive information on wild winter steelhead in small ocean tributary streams is not available.

2. Estimating escapement of wild steelhead using angler creel data will 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 Establish standardized methods to measure trends in escapement of wild steelhead.

2.3 Conduct inventories for juvenile steelhead in areas throughout the mid-coast small ocean tributary basins.

2.4 Consider measuring juvenile winter steelhead production as a method for monitoring wild production.

2.5 Make estimates of winter steelhead spawning escapement based on results from adult and juvenile surveys.

Objective 3. Provide catch-and-release angling opportunities for wild winter steelhead in mid-coast small ocean tributary basins.

Assumptions and Rationale

1. Catch-and-release angling opportunities will complement consumptive fisheries targeting hatchery steelhead in other areas.

Actions

3.1 Maintain angling regulations providing for catch-and-release fisheries.

3.2 Determine the level of mortality associated with catch-and-release angling for winter steelhead.

3.3 Determine the level of marine mammal predation on steelhead in mid-coast small ocean tributary basins.

CUTTHROAT TROUT

Background

Cutthroat trout are distributed widely throughout all Oregon coastal basins, including the mid-coast ocean tributaries. In coastal streams, cutthroat trout are consistently the gamefish species with the widest distribution. In 1993 the Oregon Department of Forestry (DOF) conducted studies to determine the upstream distribution of limits of gamefish. The evaluation indicated that 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, it is estimated there are about 594 miles of streams in the mid-coast ocean tributary containing cutthroat trout.

Both resident and anadromous forms of cutthroat trout exist in the mid-coast tributary streams. For management purposes cutthroat trout populations with access to the ocean are considered anadromous. Isolated populations of resident cutthroat are know to exist in Horse, Cape (Lincoln Co.), Squaw, and Rocky Creeks.

Status

Observations of cutthroat trout made during fish sampling in mid-coast tributary streams show that multiple age classes of cutthroat trout are present in almost all streams. Their wide distribution and stable age class structure suggests the status of freshwater cutthroat trout populations is stable. However, available information from adjacent areas (Siuslaw and Alsea) suggests that there has been a substantial decline in run size of searun cutthroat trout over the last 20 years. This is assumed to be true for the mid-coast ocean tributaries as well. Anadromous (searun) cutthroat trout populations in these streams, and generally all along the Oregon coast, are considered to be depressed compared to historical levels.

The cause of the decline in abundance of wild sea run cutthroats on the Oregon Coast is not well understood. However, we believe the cause lies within the marine environment because hatchery cutthroat smolts (in the Siuslaw and Alsea) have experienced a similar decline in survival rate over the last two decades. Also, other anadromous stocks of steelhead and coho have experienced significant declines in survival over the same time frame.

Potential factors that may be contributing to the poor survival of sea run cutthroat included:

1. Poor ocean conditions
2. Predation by marine mammals, birds, fish
3. Angling
4. Hatchery fish influences
5. Habitat deterioration

Cutthroat trout are listed as a stock of concern by ODFW because of the lack of data on stock abundance and recent declines in anadromous cutthroat stocks. They are also being petitioned for listing under the Federal Endangered Species Act.

The ODFW (unpublished data) has estimated that summer populations of age 1+ cutthroat trout have ranged from 500 - 1,500 in Cummins Creek and 3,000 - 4,000 in Tenmile Creek in recent years.

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.

The mid-coast ocean tributaries have a number of unique resident cutthroat trout populations isolated above water falls. These include Horse Creek, Cape Creek (Lincoln Co.) and Squaw Creek.

Fluvial cutthroat trout spawn and rear as juveniles in small streams. They migrate to larger stream reaches and rivers where they attain greater size and mature. They return 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 3 years in headwater streams. They migrate to the ocean in the spring after reaching a size of 7-10 inches. They remain in the ocean during the summer and then return to the estuary or freshwater in late summer or fall. Some searun cutthroats are not sexually mature on their first return from the ocean and do not spawn. Spawning occurs in small tributary streams in late winter or spring, after which the adults usually migrate to saltwater again. Cutthroat trout can spawn repeatedly, and may attain a size of more than 20 inches.

The mid-coast ocean tributaries contain both resident and anadromous cutthroat trout populations. 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. For management purposes, cutthroat trout in areas accessible to the ocean are considered to be anadromous.

Habitat Restoration Activities

Habitat restoration activities directed specifically at cutthroat trout have not been given a high priority in mid-coast small ocean tributary basin at this time because the network of small streams where they are dominant is so vast that achieving meaningful habitat improvement would be difficult. However, cutthroat trout benefit from restoration efforts directed at coho salmon and steelhead.

Angling and Harvest

There is a low level fishery for resident cutthroat trout in mid-coast small ocean tributary streams. The general trout season in mid-coastal streams extends from the fourth Saturday in May to October 31. The bag limit is 5 trout over 8 inches in length. Cape, Cummins, Big, Rock, and Tenmile Creeks have a special trout season of September 1 to October 31. This special regulation was designed to protect juvenile steelhead.

There is concern that trout fisheries in coastal streams are resulting in overharvest of cutthroat trout or high mortality of juvenile salmonids of other species. There is little information available to confirm or refute these concerns.

It is the opinion of local ODFW staff that there is not an overharvest of wild resident cutthroat trout and that incidental hooking mortality of other species is low during the trout season. This assessment is based on the observation that fishing pressure is very low in the majority of the small and medium size streams containing resident cutthroat trout. These streams are not fished heavily because the streams are small and access is difficult. The only area where ODFW staff feel cutthroat trout harvest may be significant is in the main stem and tidewater where more anglers are attracted by the larger wild fish. These fisheries tend to be self-regulating, with pressure dropping off when cutthroat trout numbers become low, or other species of anadromous fish are available.

Management Considerations

Cutthroat trout in mid-coast small ocean tributary streams will be managed for wild production only. Habitat protection and enhancement measures, outlined in the Habitat chapter, will enhance the productivity of wild cutthroat trout in the streams. Natural production would be monitored.

It is proposed that the special trout season on Cape, Cummins, Big, Rock, and Tenmile Creeks be dropped in favor of the general coastal trout season in an effort to simplify angling regulations. However, a complete closure of trout fishing is proposed on Tenmile and Cummins Creeks for the duration of the fish habitat research project there.

Subsequent to the initial writing of this plan, the ODFW Commission decided to close all coastal streams to consumptive harvest of cutthroat trout due to the depressed status of the searun cutthroat trout population. Retention of all cutthroat trout will remain closed until population data warrants resumed harvest. However, angling opportunity for cutthroat trout remains an objective of this plan, with consumptive harvest potential considered in the future if population status warrants.

Policies

Policy 1. Cutthroat trout in stream reaches of mid-coast small ocean tributary streams shall be managed for wild production only.

Objectives

Objective 1. Maintain the existing distribution and density of cutthroat trout in mid-coast small ocean tributary streams.

Assumptions and Rationale

1. Cutthroat trout are found in over 594 miles of stream habitat in mid-coast small ocean tributary basins.
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.

Actions

1.1 Measure cutthroat trout abundance in tributary streams 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 Accomplish habitat protection and restoration objectives.

Objective 2. Re-establish spring, summer and early fall consumptive angling opportunities for cutthroat trout in small ocean tributary streams, when populations warrant.

Assumptions and Rationale

1. The fishing opportunity will continue as a catch-and-release fishery unless population status warrants a resumption of consumptive harvest.

2. A broad opportunity for an introductory fishing opportunity makes these fisheries desirable.

Actions

2.1 Continue existing catch-and-release angling opportunity throughout mid-coast small ocean tributary streams.

2.2 Close Tenmile and Cummins to fishing during summer season until the completion of the current habitat research on these streams.

2.3 Re-instate angling regulations allowing a consumptive fishing opportunity for cutthroat trout in most mid-coast small ocean tributary streams, if population status warrants.

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. The decline of Pacific lamprey is suspected to be due to 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 (Scott and Crossman 1973). Their moderately strong swimming ability and their capacity to cling to rocks, dams, and fish ladders by means of a disc-shaped mouth enable them to overcome many passage barriers. They continue migrating upstream into headwater spawning areas.

They do not spawn until the following spring. 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 mud 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 amocoete transforms into the adult form. They migrate downstream in the late summer or fall with increasing flows. The following spring or summer 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. Marine mammals are believed to be the principal natural predators of lampreys (personal communication from Hal Weeks, ODFW).

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 Oregon mid-coast basins.

Management Considerations

Pacific lamprey in mid-coast small ocean tributary streams 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. Mid-coast small ocean tributary basins shall be managed for wild production of Pacific lamprey.

Objectives

Objective 1. Maintain Pacific lamprey production in rivers and streams in mid-coast small ocean tributary streams 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 information and data for lampreys and summarize this information.

1.2 Accomplish basin habitat protection and restoration objectives.

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 mid-coast small ocean tributary streams.

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 small mid-coast ocean tributary streams. Crayfish are frequently observed in moderate numbers during surveys for other species.

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 mid-coast ocean tributary streams. 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 mid-coast harvest occurs during June through September (ODFW, unpublished data). There are no estimates of commercial landings specifically for mid-coast basins.

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 mid-coast basins are unavailable.

Management Considerations

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

Crayfish in mid-coast small ocean tributary basins will be managed for wild production only to provide for commercial and recreational fisheries.

Objectives

Objective 1. Maintain natural production of crayfish in mid-coast small ocean tributary streams.

Assumptions and Rationale

1. Quantitative information is not available for crayfish distribution, abundance, and population characteristics in small mid-coast ocean tributary streams.

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 and improvement.

Actions

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

1.2 Accomplish basin habitat protection and restoration objectives.

Objective 2. Monitor the size and importance of the commercial crayfish harvest in mid-coast small ocean tributary streams.

Assumptions and Rationale

1. Presently, commercial catch information is reported only by date and county.

2. The absence of crayfish landings in Lincoln and Polk counties during the recent four years indicates commercial operations have not been active in small mid-coast ocean tributary streams.

3. Commercial fisheries could start if markets improve.

4. Data on crayfish catch by basin can be collected from commercial operators.

Actions

2.1 Require commercial harvesters to use a logbook (or a fish ticket?) to record effort and catch by water body for all crayfish harvest.

Objective 3. Determine the size and importance of the recreational crayfish harvest in mid-coast small ocean tributary streams.

Assumptions and Rationale

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

2. Recreational harvest is widespread and may be increasing.

Actions

3.1 Conduct harvest studies in key areas to evaluate harvest and effort.

ANGLER ACCESS

Background

The majority of angling in mid-coast small ocean tributary streams occurs in lower reaches of the streams.

There is 1 boat access site located at Ona Beach on Beaver Creek. Because of their small size, mid-coast ocean tributaries are generally not conducive to boat angling.

Management Considerations

Conflicts between anglers and landowners primarily involve trespass, littering, and damage to vegetation. Incentives need to be developed to encourage private landowners to allow public access and to encourage anglers to respect property rights and to minimize disturbance to wildlife.

Policies

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

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. Increase bank angling access in mid-coast small ocean tributary streams.

Assumptions and Rationale

1. Additional bank angling access would increase angling opportunities.
2. Much of the shoreline along streams is privately owned.
3. Private landowners often attempt to prevent public access on their property.

Actions

1.1 Develop incentives to encourage private landowners to allow public access.

1.2 Develop incentives to encourage anglers to respect property rights and minimize disturbance to wildlife.

MID-COAST SMALL OCEAN TRIBUTARIES

Action		Requires action by other jurisdictions	Currently funded	Requires additional funding Short term	Requires additional funding Long term
MANAGEMENT OF SPECIES					
Objective 1. Restore and maintain productive populations of all species of salmonids native to mid-coast small ocean tributary streams.					
1.1	Achieve the habitat objectives described in this plan.	X	X	X	X
1.2	Bring the level of hatchery fish to less than 10% of the total natural spawning population.		X	X	
1.3	Control fish harvest.		X		
1.4	Institute remedial recovery programs.	X	X	X	X
1.5	Determine if marine mammal predation prevents the recovery of one or more native salmonid species.				
HABITAT					
Objective 1. Maintain or increase in-stream summer flows during summer.					
1.1	Monitor & evaluate flows.	X		X	
1.2	Establish in-stream water rights.	X	X		
1.3	Acquire abandoned water rights.	X	X		
1.4	WRD to enforce in-stream water rights.	X			
1.5	WRD to monitor water diversions.	X			
1.6	Track cumulative water withdrawals.	X			
1.7	Oppose new water rights below in-stream.	X	X		
1.8	Support reservoir storage.	X	X		
Objective 2. Reduce summer water temperatures where artificial warming occurs.					
2.1	Measure stream temperatures.		X		
2.2	Monitor stream temperatures in key areas.		X		
2.3	Increase riparian shading in forested lands.	X			
2.4	Increase riparian shading in agricultural lands.	X			
2.5	Develop protection standards for agricultural lands.	X		X	
2.6	Increase riparian shading in residential or developed.	X		X	
2.7	Reduce inputs of sediments into stream channels.	X	X	X	X
Objective 3. Increase in-stream channel complexity.					
3.1	Measure levels of channel complexity & vegetation.			X	X
3.2	Recommend & maintain existing trees in buffer strips.	X			

Action		Requires action by other jurisdictions	Currently funded	Requires additional funding Short term	Long term
3.3	Identify areas that would benefit from input of LWD.		X	X	
3.4	Coordinate placement of LWD.	X	X	X	
3.5	Encourage beaver populations.		X		
3.6	Re-establish conifers in riparian areas.	X	X	X	X
3.7	Inform landowners about the benefit of leaving LWD.		X	X	
Objective 4.	**Reduce erosion rates & inputs of sediments.**				
4.1	Standardized methods to measure & monitor sedimentation rates.	X			
4.2	Measure & monitor sedimentation rates in stream channels.	X	X		
4.3	Consider cumulative sediment input.	X			
4.4	Recommendation correction to road system.	X			
4.5	Report mass failures to ODF.		X		
Objective 5.	**Prevent chemical contaminants from degrading fish habitat.**				
5.1	Land management agencies or private landowners measure water quality parameters.	X			
5.2	Enforcement of existing water quality standards.	X			
Objective 6.	**Protect natural fish passage conditions.**				
6.1	Inventory culverts & other artificial obstructions.		X	X	
6.2	Pursue correction of passage problems.	X		X	
Objective 7.	**Increase habitat area available to fish.**				
7.1	Evaluate historic & existing aquatic habitat areas.			X	
7.2	Measure changes in aquatic habitat areas.			X	
7.3	Identify high priority habitats.		X		
7.4	Prevent channelization of streams and rivers.		X		
7.5	Prevent diking of wetlands & estuaries.	X			
7.6	Prevent the filling of estuaries.	X			
7.7	Restore historic habitat areas.			X	X
Objective 8.	**Coordinate habitat protection & restoration activities.**				
8.1	Coordinate habitat & fish management activities.		X		
8.2	ODFW technical advisor to the local watershed council.		X		

Action		Requires action by other jurisdictions	Currently funded	Requires additional funding	
				Short term	Long term
FALL CHINOOK					
Objective 1. Information base & methodology for measuring & monitoring the status of fall chinook salmon.					
1.1	Collect & compile all available data and information.				
1.2	Propose closure of existing fisheries.				
COHO					
Objective 1. Increase natural production.					
1.1	Maintain trend counts of wild coho escapement in Beaver Creek.				
1.2	Conduct surveys of juvenile coho.			X	
1.3	Maintain the closure of the in-river fisheries.				
1.4	Survey potential coho.				
1.5	Comment on land use activities.		X		
1.6	Manage beavers to benefit habitat.				
1.7	Implement habitat restoration projects.	X	X	X	X
1.8	Recommend that land managers protect coho habitat from degradation.				
WINTER STEELHEAD					
Objective 1. Increase production of wild winter steelhead.					
1.1	Accomplish the habitat management objectives.	X	X	X	X
1.2	Emphasis important winter steelhead production areas.				
1.2	Continue angling regulations.		X		
Objective 2. Develop an information base & methodology for measuring & monitoring winter steelhead (5 years).					
2.1	Implement adult spawning surveys.				
2.2	Measure escapement trends.	X			
2.3	Conduct inventories for juvenile steelhead.				
2.4	Measure juvenile winter steelhead production to monitor wild production.			X	X
2.5	Based adult and juvenile surveys estimate winter steelhead spawning escapement.				
Objective 3. Provide catch-and-release angling opportunities for wild winter steelhead.					
3.1	Maintain angling regulations.				
3.2	Determine the level of mortality.				

Action		Requires action by other jurisdictions	Currently funded	Requires additional funding Short term	Long term
3.3	Determine the level of marine mammal predation.				
	CUTTHROAT TROUT				
Objective 1.	**Maintain the existing distribution and density of cutthroat trout.**				
1.1	Measure & compare to historic abundance.			X	
1.2	Document distribution.			X	
1.3	Accomplish habitat protection & restoration objectives.	X	X	X	X
Objective 2.	**Re-establish spring, summer and early fall consumptive angling opportunities when populations warrant.**				
2.1	Continue existing catch-and-release angling regulation.		X		
2.2	Close Tenmile and Cummin to fishing during summer season.				
2.3	Re-instate angling regulations allowing consumptive fishing if population status warrants.				
	PACIFIC LAMPREY				
Objective 1.	**Maintain Pacific lamprey production in rivers and streams in mid-coast small ocean tributary streams where they naturally occur.**				
1.1	Collect data & summarize information.		X	X	
1.2	Accomplish basin habitat protection & restoration objectives.	X	X	X	X
	CRAYFISH				
Objective 1.	**Maintain natural production of crayfish.**				
1.1	Record & file observations of crayfish.		X		
1.2	Accomplish basin habitat protection & restoration objectives.	X	X	X	X
Objective 2.	**Monitor the size & importance of the commercial crayfish harvest.**				
2.1	Use logbooks to record effort & catch by water body for harvest.				X
Objective 3.	**Monitor the size & importance of the recreational crayfish harvest.**				
3.1	Evaluate harvest & effort in key areas.			X	
	ANGLER ACCESS				
Objective 1.	**Increase bank angling access.**				
1.1	Encourage private landowners to allow public access.		X	X	
1.2	Encourage anglers to respect property rights & minimize disturbance to wildlife.		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.

REFERENCES

Barnhart, R. A. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Southwest) -- steelhead. U.S. Fish and Wildlife Service Biological Report 82 (11.60). U.S. Army Corps of Engineers, TR EL-82-4. 21 pp.

Beidler, W.M., T.E. Nickelson and A.M. McGie. 1980. Escapement goals for coho salmon in coastal Oregon streams. Information Report Series, Fisheries, Number 80-10. Oregon Department of Fish and Wildlife. 30 pp.

Boechler, J.L. and D.C. McAllister. 1992. Riparian classification and protection goals to maintain fish and wildlife populations on state and private forest lands in Oregon. Oregon Department of Fish and Wildlife, Habitat Conservation Division, Portland, Oregon.

Groot, C. and L. Margolis, eds. 1991. *Pacific Salmon Life Histories*. University of British Columbia Press, Vancouver, British Columbia. 564 pp.

Kenaston, K.R. 1989. Estimated run size of winter steelhead in Oregon coastal streams, 1980-85. Information Report Number 89-1. Oregon Department of Fish and Wildlife, Fish Division, Portland, Oregon. 18 pp.

Lichatowich, J., L. Mobrand, L. Lestelle and T. Vogel. 1995. An approach to the diagnosis and treatment of depleted Pacific salmon populations in Pacific northwest watersheds. Fisheries 20 (1): 10-18.

Nickelson, T.E., J.D. Rodgers, S.L. Johnson and M.F. Solazzi. 1992. Seasonal changes in habitat use by juvenile coho salmon (*Oncorhynchus kisutch*) in Oregon coastal streams. Canadian Journal of Fisheries and Aquatic Sciences 49(4): 783-789.

Oregon Department of Fish and Wildlife. 1982. Comprehensive plan for production and management of Oregon's anadromous salmon and trout. Part II. Coho salmon plan. Oregon Department of Fish and Wildlife, Fish Division.

Siuslaw National Forest. 1994. Cummins/Tenmile watershed analysis. Draft report. U.S. Forest Service, Siuslaw National Forest, Corvallis, Oregon. 113 pp.

APPENDIX

APPENDIX A

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 mid-coast small ocean tributary streams 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 A-1. More detailed descriptions of specific restoration activities for each species are provided in the species chapters in this document.

Table A-1. High priority areas and associated activities for habitat restoration in mid-coast small ocean tributary streams.

Key species	Secondary species	Area	Activities
Coho salmon	Winter steelhead Cutthroat trout	Beaver Creek Lower North Fork Beaver Creek South Fork Beaver Creek	In-stream structure in bedrock reaches; plantings of conifers in riparian areas
Winter steelhead Cutthroat trout	Coho salmon	Tenmile Creek development	Winter habitat