

Fishery Management Report No. 94-1

**1993 Area Management Report for the Recreational
Fisheries of the Central Gulf Management Area**

by

**Kelly Hepler
and
Doug Vincent-Lang**

July 1994

Alaska Department of Fish and Game

Division of Sport Fish



FISHERY MANAGEMENT REPORT NO. 94-1

1993 AREA MANAGEMENT REPORT
FOR THE RECREATIONAL FISHERIES
OF THE CENTRAL GULF OF ALASKA

by

Kelly Hepler
and
Doug Vincent-Lang

Alaska Department of Fish and Game
Division of Sport Fish
Anchorage, Alaska

July 1994

The Fishery Management Reports series was established in 1989 for the publication of an overview of Division of Sport Fish management activities or management goals in a specific geographic area. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Distribution is to state and local publication distribution centers, libraries and individuals and, on request, to other libraries, agencies, and individuals. This publication has undergone editorial and peer review within Region II, Division of Sport Fish.

The Alaska Department of Fish and Game administers all programs and activities free from discrimination on the basis of sex, color, race, religion, national origin, age, marital status, pregnancy, parenthood, or disability. For information on alternative formats available for this and other department publications, contact the department ADA Coordinator at (voice) 907-465-4120, or (TDD) 907-465-3646. Any person who believes s/he has been discriminated against should write to: ADF&G, PO Box 25526, Juneau, AK 99802-5526; or O.E.O., U.S Department of the Interior, Washington, DC 20240.

PREFACE

This report is divided into two sections. *Section I* presents an introductory overview of the Central Gulf Management Area. Included in this section are a general geographic and organizational description of the management area; an overview of the Alaska Board of Fisheries processes and schedules for the management area; an inventory of the available fishery resources of the management area; an historical perspective of recreational angler effort and harvest within management area waters; an approximation of the economic value of the recreational fisheries of the management area; a general description of stocking, research, management, partnership, aquatic education, viewing, and access activities being conducted in the management area; and a summary of the major fishery and social issues that presently occur in the Central Gulf Management Area as well as any recommendations for solving them including, but not limited to, research, management, access, regulatory changes, aquatic education, partnership, stocking, or habitat options.

Section II provides a more detailed summary of all the major fisheries that occur in the Central Gulf Management Area. Included in this section are a description and historical perspective of each fishery; the objective governing the management of each fishery; a description of the recent performance of each fishery; a description of recent Board of Fisheries actions with respect to each fishery; a description of any social or biological issues surrounding each fishery; and a description of any ongoing or recommended research or management activities directed at each fishery.

TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES.....	v
LIST OF FIGURES.....	vii
SECTION I: MANAGEMENT AREA OVERVIEW.....	1
Management Area Description.....	1
Alaska Board of Fisheries Activities.....	1
Fisheries Resource Inventory.....	2
Recreational Angler Effort.....	2
Commercial and Subsistence Salmon Harvests.....	3
Economic Value of Sport Fisheries.....	3
Stocking Program Inventory.....	4
Prince William Sound Regional Planning Team.....	4
Access Programs.....	4
Allison Point Access Project.....	5
Seward Harbor Boat Ramp.....	5
Fleming Spit Access Project.....	6
Whittier Shoreline Access Project.....	6
Management Area Fishery Objectives.....	6
Management Plans Affecting Sport Fisheries in the CGMA..	7
Major Biological and Social Issues for the CGMA.....	9
Lingcod Stocks.....	9
Yelloweye and Black Rockfish Stocks.....	9
Cutthroat Trout in Prince William Sound.....	10
Coghill and Eshamy Lakes Sockeye Salmon	
Escapement.....	10
Stocking Program.....	10
SECTION II: MAJOR FISHERIES OVERVIEW.....	21
Valdez Area Fisheries.....	21
Cordova Area Fisheries.....	21
Whittier Area Fisheries.....	21
Seward Area Fisheries.....	22
Prince William Sound Coho Salmon Fishery.....	32
Recent Fishery Performance.....	33
Management Objective.....	33
Recent Board of Fisheries Actions.....	34
Current Issues.....	34
Ongoing Research and Management Activities.....	35
Recommended Research and Management Activities.....	35

TABLE OF CONTENTS (Continued)

	<u>Page</u>
Resurrection Bay Coho Salmon Fishery.....	38
Recent Fishery Performance.....	39
Management Objective.....	39
Recent Board of Fisheries Actions.....	40
Current Issues.....	40
Ongoing Research and Management Activities.....	40
Recommended Research and Management Activities.....	40
Prince William Sound Chinook Salmon Fishery.....	42
Recent Fishery Performance.....	42
Management Objective.....	43
Recent Board of Fisheries Actions.....	43
Current Issues.....	43
Ongoing Research and Management Activities.....	43
Recommended Research and Management Activities.....	43
Resurrection Bay Chinook Salmon Fishery.....	45
Recent Fishery Performance.....	45
Management Objective.....	45
Recent Board of Fisheries Actions.....	46
Current Issues.....	46
Ongoing Research and Management Activities.....	46
Recommended Research and Management Activities.....	46
Prince William Sound Pink Salmon Fishery.....	48
Recent Fishery Performance.....	48
Management Objective.....	49
Recent Board of Fisheries Actions.....	49
Current Issues.....	49
Ongoing Research and Management Activities.....	49
Recommended Research and Management Activities.....	49
Resurrection Bay Pink Salmon Fishery.....	52
Recent Fishery Performance.....	52
Management Objective.....	52
Recent Board of Fisheries Actions.....	52
Current Issues.....	52
Ongoing Research and Management Activities.....	53
Recommended Research and Management Activities.....	53
Prince William Sound Sockeye Salmon Fishery.....	55
Recent Fishery Performance.....	55
Management Objective.....	56
Recent Board of Fisheries Actions.....	56
Current Issues.....	56
Ongoing Research and Management Activities.....	57
Recommended Research and Management Activities.....	57

TABLE OF CONTENTS (Continued)

	<u>Page</u>
Resurrection Bay Sockeye Salmon Fishery.....	59
Recent Fishery Performance.....	59
Management Objective.....	60
Recent Board of Fisheries Actions.....	60
Current Issues.....	60
Ongoing Research and Management Activities.....	61
Recommended Research and Management Activities.....	61
Central Gulf Management Area Lingcod Fisheries.....	63
Management Objective.....	63
Management Approach.....	64
Stock Status.....	64
Management Issues.....	64
Ongoing Research and Management Activities.....	64
Central Gulf Management Area Dolly Varden Fisheries.....	66
Recent Fishery Performance.....	66
Management Objective.....	66
Recent Board of Fisheries Actions.....	67
Current Issues.....	67
Ongoing Research and Management Activities.....	67
Recommended Research and Management Activities.....	67
Prince William Sound Cutthroat Trout Fisheries.....	72
Recent Fishery Performance.....	72
Management Objective.....	72
Recent Board of Fisheries Actions.....	72
Current Issues.....	73
Ongoing Research and Management Activities.....	73
Recommended Research and Management Activities.....	73
Central Gulf Management Area Halibut Fishery.....	75
Management Authority.....	76
Management Objective.....	76
Management Approach.....	76
Stock Status.....	77
Management Issues.....	77
Recent Board of Fisheries Actions.....	79
Ongoing Research and Management Activities.....	79
Central Gulf Management Area Rockfish Fisheries.....	83
Management Objective.....	84
Recent Board of Fisheries Actions.....	84
Current Issues.....	84
Ongoing Research and Management Activities.....	86

TABLE OF CONTENTS (Continued)

	<u>Page</u>
Other Fisheries.....	88
Chum Salmon.....	88
Rainbow Trout and Arctic Grayling.....	88
Clams and Shellfish.....	88
Management Objective.....	89
Recent Board of Fisheries Actions.....	89
Current Issues.....	89
Ongoing Research and Management Activities.....	89
Recommended Research and Management Activities.....	89
LITERATURE CITED.....	94

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Number of angler-days of effort expended sport fishing in the Central Gulf Management Area (CGMA) from 1977-1992.....	12
2. Number of angler-days of effort expended sport fishing in the major ports of the Central Gulf Management Area, 1977-1992.....	14
3. Estimated economic value of Central Gulf Management Area sport fisheries during 1991.....	17
4. Hatchery releases in PWS 1988-1993, and expected 1994 returns from these releases.....	18
5. Hatchery releases in Resurrection Bay 1988-1993, and expected 1994 returns.....	20
6. Harvest and effort expended sport fishing in Valdez from 1977 through 1992.....	25
7. Harvest and effort expended sport fishing in Cordova from 1977 through 1992.....	27
8. Harvest and effort expended sport fishing in Whittier from 1977 through 1992.....	29
9. Harvest and effort expended sport fishing in Seward from 1977 through 1992.....	31
10. Sport harvests of coho salmon in Prince William Sound, 1977-1992.....	36
11. Sport harvests of coho salmon in Cordova area of Prince William Sound, 1977-1992.....	37
12. Sport harvests of coho salmon in the Resurrection Bay, 1977-1992.....	41
13. Sport harvests of chinook salmon in Prince William Sound, 1977-1992.....	44
14. Sport harvests of chinook salmon in Resurrection Bay, 1977-1992.....	47
15. Sport harvests of pink salmon in Prince William Sound, 1977-1992.....	50

LIST OF TABLES (Continued)

<u>Table</u>	<u>Page</u>
16. Sport harvests of pink salmon in Valdez Arm, 1977-1992.....	51
17. Sport harvests of pink salmon in Resurrection Bay, 1977-1992.....	54
18. Sport harvests of sockeye salmon in Prince William Sound, 1977-1992.....	58
19. Sport harvests of sockeye salmon in Resurrection Bay, 1977-1992.....	62
20. Sport harvests of Dolly Varden in Prince William Sound, 1977-1992.....	68
21. Components of the sport harvest of Dolly Varden in Valdez area, 1977-1992.....	69
22. Components of the sport harvest of Dolly Varden in Cordova area, 1977-1992.....	70
23. Sport harvests of Dolly Varden in Resurrection Bay, 1977-1992.....	71
24. Sport harvests of cutthroat trout in Prince William Sound, 1977-1992.....	74
25. Harvests of halibut by recreational fishing in the Central Gulf Management Area waters from 1977 through 1992.....	80
26. Harvests of halibut by recreational fishing near Seward in the Central Gulf Management Area from 1986-1992.....	82
27. Harvests of rockfish by recreational fishing Central Gulf Management Area waters from 1977 through 1992.....	87
28. Sport harvest of chum salmon in Prince William Sound, 1977-1992.....	90
29. Sport harvest of chum salmon in Resurrection Bay, 1977-1992.....	91
30. Sport harvests of shellfish from Central Gulf Management Area, 1977-1992.....	93

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Map of Central Gulf Management Area and regulatory area components.....	11
2. Angler-days of effort expended sport fishing in the Central Gulf Management Area, 1977-1992.....	13
3. Major components of the sport fishing effort in the Central Gulf Management Area from 1977-1992.....	15
4. Expansion of the area fished by the sport fleet based in Seward between 1973 and 1991.....	16
5. Map of the major ports in the Central Gulf Management Area.....	23
6. Map of the Valdez area.....	24
7. Map of the Cordova area.....	26
8. Map of the Whittier area.....	28
9. Map of the Seward area.....	30
10. Sport harvests of coho salmon in Prince William Sound, 1977-1992.....	36
11. Sport harvests of coho salmon in Cordova area of Prince William Sound, 1977-1992.....	37
12. Sport harvests of coho salmon in the Resurrection Bay, 1977-1992.....	41
13. Sport harvests of chinook salmon in Prince William Sound, 1977-1992.....	44
14. Sport harvests of chinook salmon in Resurrection Bay, 1977-1992.....	47
15. Sport harvests of pink salmon in Prince William Sound, 1977-1992.....	50
16. Sport harvests of pink salmon in Valdez Arm, 1977-1992.	51
17. Sport harvests of pink salmon in Resurrection Bay, 1977-1992.....	54
18. Sport harvests of sockeye salmon in Prince William Sound, 1977-1992.....	58

LIST OF FIGURES (Continued)

<u>Figure</u>	<u>Page</u>
19. Sport harvests of sockeye salmon in Resurrection Bay, 1977-1992.....	62
20. Sport harvests of Dolly Varden in Prince William Sound, 1977-1992.....	68
21. Components of the sport harvest of Dolly Varden in Valdez area, 1977-1992.....	69
22. Components of the sport harvest of Dolly Varden in Cordova area, 1977-1992.....	70
23. Sport harvests of Dolly Varden in Resurrection Bay, 1983-1992.....	71
24. Sport harvests of cutthroat trout in Prince William Sound, 1977-1992.....	74
25. Harvest of halibut by recreational fishing in the Central Gulf Management Area waters from 1977-19920.....	81
26. Harvest of halibut in Prince William Sound, 1977-1992..	82
27. Harvests of rockfish by recreational fishing Central Gulf Management Area waters from 1977 through 1992.....	87
28. Sport harvest of chum salmon in Prince William Sound, 1977-1992.....	90
29. Sport harvest of chum salmon in Resurrection Bay, 1986-1992.....	91
30. Sport harvest of rainbow trout and Arctic grayling in Prince William Sound, 1985-1992.....	92

SECTION I: MANAGEMENT AREA OVERVIEW

Management Area Description

The Central Gulf Management Area (CGMA) includes all waters of the Gulf of Alaska and its drainages west of the longitude of Cape Suckling (143° 53' W. longitude), and east of the longitude of Gore Point (150° 57' 30" N. longitude), excluding the Copper River drainage upstream of a line crossing the Copper River between the south bank of the confluence of Haley Creek and the south bank of the confluence of Canyon Creek in Wood's Canyon (Figure 1). This management area is comprised of the Prince William Sound (PWS) Regulatory Area and portions of the Resurrection Bay-Cook Inlet Regulatory Area¹.

Central Gulf Management Area includes the communities of Valdez, Cordova, Whittier, and Seward. Additionally, included in the area are two native villages, Chenega and Tatitlek. Only Valdez and Seward are accessible by the Alaska Highway system. The Alaska Marine Highway ferries travelers to Whittier, Cordova, Seward, and Tatitlek while Chenega is reachable only by plane or boat. Whittier and Seward are additionally serviced by the Alaska Railroad. With the exception of the road accessible streams, virtually all sport fisheries in the CGMA are remote and relatively difficult to travel to. Principal land managers in the CGMA include the National Park Service, U.S. Forest Service, various native corporations, and the State of Alaska.

Management and research functions for the CGMA are handled from the Anchorage regional office. The Division of Sport Fish staff assigned to the CGMA include two permanent full time Fisheries Biologist III's (Kelly Hepler and Douglas Vincent-Lang) and a Fisheries Biologist II (Andrew Hoffmann). The Fisheries Biologist III positions act as area management biologists and the Fisheries Biologist II position acts as an assistant area biologist and project leader for area research projects in conjunction with another regional research biologist (Scott Meyer). There are several supporting permanent seasonal technicians.

Alaska Board of Fisheries Activities

The Alaska Board of Fisheries is responsible for promulgating regulations in state waters. Public input concerning regulation changes and allocation issues is provided through various means including direct testimony to the Board of Fisheries and participation in local fish and game advisory committees. These advisory committees have been established throughout Alaska to assist the Boards of Fish and Game in assessing proposed fisheries and wildlife issues and regulation changes. Most committees meet at least once each year, usually in the fall prior to the Board meetings. Staff from the Division of Sport Fish and other divisions of the Alaska Department of Fish and Game (ADF&G) often attend the committee meetings. Advisory committee meetings allow for direct public interaction with staff involved with local

¹ The Central Gulf Management Area contains two regulatory areas. The Prince William Sound Regulatory Area represents Area J of the Statewide Harvest Survey and the Resurrection Bay Regulatory Area represents a portion of Area P of the Statewide Harvest Survey (Mills 1992).

resource issues. Within the CGMA there are five Fish and Game Advisory Committees: Anchorage, Valdez, Whittier, Cordova (Copper River/Prince William Sound), and Seward.

Under its current schedule, the Board of Fisheries reviews regulations for each area on a 3-year cycle. Proposals regarding the Resurrection Bay-Cook Inlet Regulatory Area were considered during the November 1992 Board meetings and proposals for the PWS Regulatory Area will be heard during February and March 1994 Board meetings.

Fisheries Resource Inventory

Sport anglers fishing CGMA waters can target all five species of north Pacific salmon (pink *Oncorhynchus gorbusha*, coho *O. kisutch*, sockeye *O. nerka*, chum *O. keta*, and chinook *O. tshawytscha*). In addition, there are major saltwater sport fisheries for halibut (*Hippoglossus stenolepis*), rockfish (*Sebastes*), and lingcod (*Ophiodon elongatus*). There are also fisheries for Dolly Varden (*Salvelinus malma*) and cutthroat trout (*O. clarki*) as well as fisheries for rainbow trout (*O. mykiss*) and Arctic grayling (*Thymallus arcticus*) in stocked lakes. Dungeness crab (*Cancer magister*), Tanner crab (*Chionoecetes bairdi*), king crab (*Paralithodes camtschatica*), shrimp (Pandalidae), and razor clams (*Siliqua patula*) are harvested in limited numbers.

The Division of Sport Fish classifies sport fisheries into one of three levels based on a combination of yield (harvest) and angler-cost criteria. Level I fisheries are defined as high yield, low angler-cost fisheries. These fisheries are typically entry level fisheries that anglers can participate in at little direct cost. Level III fisheries are defined as low yield, high cost fisheries. These fisheries are typically remote and have a high cost associated with participation. Level II fisheries fall between Level I and Level III fisheries and are defined as basic yield, intermediate-cost fisheries.

The CGMA offers diverse fishing opportunities for recreational anglers. Road-accessible salmon, Dolly Varden, and cutthroat trout fisheries and stocked lakes provide Level I fisheries for the residents of the major communities. The remaining waters of the CGMA which are accessible by boat or plane offer Level III fisheries. Examples of Level III fisheries include a sockeye salmon fishery on Eshamy Bay located in PWS and halibut fishing around the Chiswell Islands located near Seward.

Recreational Angler Effort²

From 1977 through 1991, an average of 117,379 angler-days have been expended by recreational anglers fishing CGMA waters (Table 1). Recreational angler effort was relatively stable from 1977 through 1983 and has been increasing

² Most CGMA fisheries are not monitored by onsite creel surveys. For this reason, the statewide harvest survey, compiled annually since 1977 by Mills (1979-1992), serves as the basic reference for effort and harvest for most fisheries in the area. It is not possible, because of the nature of the harvest survey, to determine the amount of effort expended on a species-specific basis.

annually since 1983. The estimated sport effort of 215,604 angler-days for the CGMA during 1992 was 84% above the historical average effort for the area and represented 6% and 9% of the total statewide and southcentral region sport angling effort, respectively (Table 1 and Figure 2).

Historically, nearly 55% of the total recreational angler effort from the CGMA has occurred in PWS. From 1977 through 1991, PWS has supported an average of 65,482 angler-days of sport fishing effort (Table 1). In comparison, average sport effort for Resurrection Bay from 1977 through 1991 has been 51,898 angler-days.

The most popular fishing ports in the CGMA in terms of recreational angling effort expended have been Seward and Valdez (Table 2 and Figure 3). In 1992, anglers from these ports accounted for nearly 66% of the recreational angling effort expended in the CGMA. The majority of the angling effort in both ports was expended by saltwater boat anglers. Information is not available to delineate exact locations where all anglers are fishing in the marine waters, but anglers are traveling further from these ports in recent years as is demonstrated by data from Seward between 1973 and 1991 (Figure 4). From Seward, popular destinations include saltwater areas within Resurrection Bay and near the Chiswell and Granite islands.

Cordova and Whittier are next most popular fishing ports in the CGMA. In 1992, anglers expended 17,605 days fishing the marine and fresh waters in the vicinity of Cordova and 6,743 days in the Whittier area (Table 2). Other popular fisheries in the CGMA include saltwater fishing along the shoreline of Eshamy Bay, and Hinchinbrook, Hawkins, and Montague islands located in PWS.

Commercial and Subsistence Salmon Harvests

Salmon returning to the CGMA are harvested extensively by various commercial fisheries. For most species, commercial harvests are significantly larger than corresponding recreational harvests. Exceptions are the fisheries for coho and chinook salmon that occur out of Seward. The recreational harvests of these two salmon species are managed under Board direction for a recreational priority (refer to the Resurrection Bay Salmon Management Plan 5 AAC 21.366). Lingcod and rockfish harvests from Seward area fisheries are also larger than corresponding commercial harvests; however these fisheries are not granted a similar recreational priority.

Fish stocks of the CGMA are also harvested in various subsistence and personal use fisheries. Harvests in these fisheries are generally small.

Economic Value of Sport Fisheries

There are no direct estimates of the economic value of the recreational fisheries of the CGMA. However, Jones and Stokes' 1987 survey of southcentral sport fisheries estimated expenditures and net willingness to pay for resident and nonresident anglers in Resurrection Bay. In 1986, the Seward area coho salmon fishery was estimated to be valued at 1.9 million dollars. A rough approximation of the economic value of all the sport fisheries of the CGMA can be made by applying the direct expenditures per angler-day estimated for southcentral Alaska resident and nonresident sport anglers to the estimated sport effort of the CGMA (Table 3). Based on this method, the economic value

of all of the sport fisheries of the CGMA during 1986 was approximately 15 million dollars. This compares to an estimated value of 127 million dollars for southcentral Alaska sport fisheries during 1986 (Jones and Stokes 1987). Since 1986, the number of angler days expended in the CGMA has increased by approximately 40%, therefore direct expenditures by anglers participating in the fisheries of the CGMA less any inflation are estimated to be at least 22 million dollars.

Stocking Program Inventory

Stocking has been used to increase and diversify the opportunities available to anglers in CGMA. Various species and life stages have been stocked including all five species of salmon, rainbow trout catchables and fingerlings and Arctic grayling fry (Tables 4 and 5). All of the salmon releases contribute to the common property fisheries. The releases of resident species, while common property, are more directed towards increasing opportunity for sport anglers. For PWS, the releases of coho and chinook salmon at Shakespeare Creek in Whittier, Fleming Spit in Cordova, and at the Valdez Fisheries Development Association (VFDA) Hatchery and 6.5 Mile Creek in Valdez are primarily intended to provide fish for the sport fisheries. The remaining salmon releases (which include releases of pink, chum, and sockeye salmon at various locations and coho and chinook salmon at Lake Bay) in PWS were intended to provide fish primarily for the commercial fishery and the sport catch would be incidental. In Resurrection Bay, the coho and chinook salmon releases are intended exclusively for the sport fishery, whereas the sockeye release is intended primarily for the commercial fishery.

Prince William Sound Regional Planning Team

Under Title 16, Sec. 16.10.380 stipulates that the commissioner will establish regions and regional planning teams (RPT) for the purpose of developing comprehensive salmon management plans for various regions of the state. A regional planning team has been established for Prince William Sound. The team is comprised of six members; one representative from the regional private nonprofit hatchery corporation (Prince William Sound Aquaculture), two commercial fishers, and three fisheries divisions. The RPT develops and recommends regional comprehensive salmon plans for approval by the Commissioner of ADF&G, solicits public input and arranges for public review of the plans throughout the region, reviews and comments on hatchery permit applications and other proposed enhancement and nonregulatory rehabilitation projects, and reviews and comments on proposed hatchery permit suspensions and/or revocations.

The Prince William Sound RPT is in the process of finalizing a Phase III plan for salmon production in PWS. Key components in the plan include proposed salmon production numbers for each hatchery in PWS and criteria for evaluating remote releases.

Access Programs

The Federal Aid program stipulates that at least 10% of the federal funds passed on to states be used to increase angler access to sport fisheries. There are several access projects currently underway in the CGMA. These include:

Allison Point Access Project:

There is an ongoing access project at Allison Point near Valdez. Allison Point is the most popular shore fishing site in the Valdez area and draws large numbers of anglers and tourists each year, many arriving by motor home. Anglers harvested approximately 23,000 pink salmon and expended 25,000 angler-days at Allison Point in 1990. Allison Point is actually the only location in the Valdez area where shore-based anglers can effectively harvest pink and coho salmon. Despite its popularity, access to the beach at Allison Point is crude and hazardous. The large boulders forming the embankment that parallels the beach near Allison Point are difficult and dangerous to traverse. Limited sanitation facilities and garbage receptacles are currently provided during the summer by the City of Valdez.

The access project for Allison Point will provide developed trails to the beach for shore anglers, upgrade the existing parking area, and provide permanent rest room facilities and garbage receptacles. Trails, rest rooms, and parking spaces will be provided to accommodate handicapped anglers. The Allison Point access project is a cooperative agreement between the City of Valdez, Alaska Department of Fish and Game, and Alaska Department of Transportation and Public Facilities. The total cost of the project is estimated to not exceed \$140,000 and should be completed by June 1994.

Three other potential access projects have been identified in the CGMA. A prioritized listing of these projects are:

1. Construction of an additional boat ramp in the Seward boat harbor.
2. The purchase of land to develop a parking area and construction of rest rooms at Fleming Spit in Cordova.
3. Shoreline development for Whittier.

Seward Harbor Boat Ramp:

The City of Seward has requested assistance from the department in constructing an additional boat ramp for the Seward Boat Harbor. Because of Seward's proximity to Anchorage and recreational fishing potential of the area, boaters are overwhelming the existing facilities. Effort has increased approximately twofold in the last 6 years from approximately 30,000 angler-days in 1986 to over 60,000 angler-days in 1991. With the increase in use, especially during the coho salmon derby, the harbor is extremely congested. The impact of the congestion at the existing boat ramp causes long delays in launching of vessels due to the difficulty in finding parking which is often in excess of one-half mile from the ramp. The City of Seward does not have the financial capability to meet all the increasing demands for public use.

The plan is to construct an additional boat ramp on the east side of the harbor. This would split the traffic flow from the existing ramp and open up new parking areas adjacent to the newly constructed ramp. The advantage of having adequate parking adjacent to the ramp is reduction in time required for the boat owner to return and remove his rig from the ramp floats thereby improving traffic flow on the facility. The estimated cost of the project is \$250,000. Construction is scheduled to be completed by December 1994.

Fleming Spit Access Project:

Fleming Spit is located just outside Cordova. This area is a popular sport fishing site during June and August. The Fleming Spit fishery is a terminal fishery for hatchery produced chinook and coho salmon. In 1991, anglers harvested approximately 3,000 coho salmon at Fleming Spit and harvest and effort are expected to increase in 1993 when 10,000 coho salmon are forecasted to return. At the present time, anglers wishing to fish this area are forced to park on the shoulder of the road. This road receives heavy use by logging trucks to access a log transfer facility located near Fleming Spit. During periods of high use a dangerous pedestrian vs. traffic situation develops. The goal of this project is to utilize land currently owned by SeaAlaska Corporation located on the upland side of the road to construct a parking area adequate for approximately 30 vehicles. Additionally, handicap accessible rest rooms and garbage receptacles would be constructed. The Department of Fish and Game is currently negotiating with SeaAlaska Corporation for the purchase of the land. The main impediment to the successful completion of this project is how to resolve the displacement of squatters who reside on the land. Fleming Spit area is one of the few camping areas in Cordova and has been used for a number of years by a few year-round residents and numerous seasonal cannery workers. Until the City Council is willing to take necessary steps to remove the squatters from Fleming Spit, the project is on hold. One possible alternative is to scale down the project and negotiate with SeaAlaska to purchase only the land immediately adjacent to the road which still leaves some land for the cannery workers to camp on.

Whittier Shoreline Access Project:

The Whittier area is a popular sport fishing site June through August when the hatchery produced chinook and coho salmon return. At the present time there are limited support facilities for anglers in the Whittier area. The goal of this project would be to provide better access for anglers along the breakwaters surrounding the small boat harbor and to provide sanitation facilities at Cove and Shakespeare creeks, two of the most popular fishing sites. Additionally, an information kiosk would be developed to inform anglers of fishing opportunities in western PWS, management concerns of the local fisheries such as rockfish, and general life history information of fishes in PWS. There is a possibility that anglers will be able to drive to Whittier by the late 1990s. With an aggressive enhancement program and improved access, the Whittier area has the greatest potential of all the ports in PWS to provide increased fishing opportunities. The estimated cost of this project is approximately \$50,000.

Management Area Fishery Objectives

To date, few specific fishery objectives have been developed for CGMA sport fisheries. The only fishery objectives that have been developed are for the sport fisheries supported by hatchery releases of coho and chinook salmon in Resurrection Bay and at the ports of Valdez, Cordova, and Whittier. These objectives can be found in Section II of the report. It is anticipated that additional objectives will be developed in the near future.

Although not all the specific fishery objectives have been established to date, an assumption of past and current fisheries management has been to

assure for the sustained yield of the various fisheries stocks that occur within the CGMA while assuring for continued, and where possible, expanded opportunity to participate in fisheries targeting these stocks.

Management Plans Affecting Sport Fisheries in the CGMA

The Board of Fisheries has established several management plans and policies to guide the fisheries of the CGMA. These plans provide for the sustained yield of the area's fisheries as well as establishing allocations and management actions and guidelines for department fisheries managers. Management plans and policies established for the CGMA include:

Bear Lake Management Plan 5 AAC 21.375

This management plan establishes guidelines for the enhancement of coho and sockeye salmon in Bear Lake near Seward. In essence, the plan provides for the enhancement of sockeye salmon in Bear Lake to provide for a commercial sockeye salmon fishery in Resurrection Bay given that the enhancement not cause a net loss of coho salmon smolt production from Bear Lake.

Resurrection Bay Salmon Management Plan 5 AAC 21.376

This management plan provides allocation and management guidelines for the salmon fisheries of Resurrection Bay. In essence, the plan stipulates that the coho and chinook salmon fisheries of Resurrection Bay be managed exclusively for recreational uses and provides for a commercial fishery for other salmon species insofar as the prosecution of these fisheries does not interfere with the recreational fishery in Resurrection Bay.

Lower Cook Inlet Seine Fishery Management Plan 5 AAC 21.369

This management plan stipulates that the seine fishery in Lower Cook Inlet waters be managed so that its efforts be directed primarily on Lower Cook Inlet salmon stocks and not Upper Cook Inlet salmon stocks.

Copper River District Salmon Management Plan 5 AAC 24.360

This management plan provides for a limited chinook salmon commercial fishery during years when the Copper River District commercial salmon fishery is closed. The plan also provides department fishery managers with specific management guidelines for this fishery.

Port San Juan Salmon Hatchery Management Plan 5 AAC 24.365

This plan stipulates that the department, in consultation with the hatchery operator, shall manage the Point Elrington and Port San Juan fishing subdistricts to achieve Prince William Aquaculture Corporation's (PWSAC) escapement goal for the Port San Juan Salmon Hatchery.

Solomon Gulch Salmon Hatchery Management Plan 5 AAC 24.366

This plan stipulates that the department, in consultation with the hatchery operator, shall manage the Valdez Narrows fishing subdistrict to achieve the VFDA's pink salmon escapement goal for the Solomon Gulch Salmon Hatchery. The plan further stipulates the department may manage those waters of Valdez Arm south to the latitude of Rocky Point to assist meeting this goal. The plan also defines a terminal harvest area for the Solomon Gulch Hatchery.

Main Bay Salmon Hatchery Management Plan 5 AAC 24.367

The purpose of this management plan is to provide an equitable distribution of harvest opportunity and to reduce conflicts between users in the vicinity of the Main Bay Salmon Hatchery. The plan also provides Department fishery managers with specific management guidelines to accomplish this goal.

Esther Island Hatchery Management Plan 5 AAC 24.368

This plan stipulates that the department, in consultation with the hatchery operator, shall manage the Esther fishing subdistrict to achieve PWSAC's escapement goal for the Esther Island Salmon Hatchery. The plan also provides department fishery managers with specific management guidelines to accomplish this goal.

Prince William Sound Pot Shrimp Fishery Management Plan 5 AAC 31.260

This management plan provides department fishery managers with specific management guidelines and harvest strategies for the pot shrimp fishery in Prince William Sound.

Copper River Subsistence Salmon Fisheries Management Plan 5 AAC 01.647

The purpose of this management plan is to ensure that an adequate escapement of salmon in the Copper River occurs and that subsistence uses, as described under AS 16.05.251 and 5 AAC 99.010, are accommodated. The plan also provides department fishery managers with specific management guidelines for this fishery.

Prince William Sound Subsistence Salmon Fisheries Management Plan 5 AAC 01.648

This management plan provides department fishery managers with specific management guidelines for the Prince William Sound subsistence salmon fishery.

Prince William Sound Herring Management Plan 5 AAC 27.365

The purpose of this management plan is to describe management strategies for all Prince William Sound herring fisheries and to provide for an optimum sustained yield and an equitable allocation for all user groups. The plan also provides department fishery managers with specific management guidelines for this fishery.

Private Nonprofit Salmon Hatchery Special Harvest Area 5 AAC 40 Article 2

This article provides for special harvest areas for private nonprofit salmon hatcheries. Included are:

Prince William Sound Aquaculture Cooperation Special Harvest Area-San Juan 5 AAC 40.035

Solomon Gulch Special Harvest Area-Valdez 5 AAC 40. 038

North Gulf Coast (5 AAC 28.465), Prince William Sound (5 AAC 28.265), and Cook Inlet (5 AAC 28.365) Rockfish Management Plans

These management plans establish trip limits for allowable rockfish landings during a 5-day period for the North Gulf Coast, Prince William Sound, and Cook Inlet areas. The plans also establish harvest quotas for each area (150,000 pounds) after which the fishery in an area reverts to bycatch only.

Major Biological and Social Issues for the CGMA

Following is a summary of the major biological issues surrounding the CGMA sport fisheries:

Lingcod Stocks:

Data indicate recruitment of young lingcod into populations in Gulf of Alaska coastal areas between Cape Puget and Nuka Bay is declining. The portion of the sport harvest consisting of lingcod under 27 inches in length has decreased from about 19% in 1987 to 1.5% in 1991. This decline is accompanied by increasing sport landings of lingcod in Seward. Lingcod are territorial, inhabiting rocky reefs that are easily overfished. Charter boat operators indicate that lingcod populations within range from the Port of Seward are severely depressed and anglers are having to travel further from port to maintain high catch rates. The Board of Fisheries adopted regulatory proposals in November 1992 that addresses many of these biological concerns. These Board actions will be reviewed in the lingcod fisheries chapter in Section II of this report.

Yelloweye and Black Rockfish Stocks:

Concern for rockfish stocks arises from their inherent susceptibility to overexploitation. Most rockfishes are territorial for much of the year, inhabiting high-relief, rocky areas easily found and exploited by sport and commercial users. Over a dozen rockfish species are caught by sport anglers and many of these species are long-lived, with high natural mortality rates. Most species do not recruit to sport or commercial fisheries until maturity, at age 7-15. For these reasons, recovery from overharvest can take many years. Limited data from commercial test fishing and sport fishing near Resurrection Bay suggest that the abundance of older black rockfish has declined since the early 1980s (Vincent-Lang 1991). To date, resource agencies have not been able to design strategies to manage rockfish on a sustained yield basis. One suggestion is to set aside sanctuaries where all

bottom fishing is prohibited. These sanctuaries would then act as the possible brood or reseeding source for surrounding areas that have been overharvested.

Cutthroat Trout in Prince William Sound:

Prince William Sound is at the most northern and western extreme of the natural range for cutthroat trout. As a result, the populations of this species are small in size and distribution. Populations of fish on the outer extremes of their distribution tend to be more susceptible to environmental changes and their survival rates are highly variable. Cutthroat trout are also subject to incidental catch in the commercial fisheries which adds further risk to these small stocks. The department has concerns on whether even the present small harvest is sustainable. Select cutthroat trout stocks in the Pacific northwest have been selected as candidates as threatened species under the Endangered Species Act. The department has submitted a proposal to the BOF for the 1993-1994 meeting that would establish a spring spawning season closure from April 15 through June 14.

Coghill and Eshamy Lakes Sockeye Salmon Escapement:

Historically, Coghill and Eshamy lakes have produced the highest sport harvest of sockeye salmon in PWS. These two systems accounted for slightly over 60% of the total PWS sport harvest for sockeye in 1978 and this percentage decreased drastically to less than 7% in 1990. In 1991, both of these systems were closed to harvest of sockeye salmon by emergency order and the escapement goal was once again not met for Coghill Lake in 1992. The department's current response is to rehabilitate these systems with sockeye salmon smolt produced at PWSAC's Main Bay hatchery. There are extensive concerns about these releases that will be addressed in the final draft of the Main Bay Hatchery Basic Management Plan.

Stocking Program:

Greater education of the fishing public is recommended to increase utilization of stocked fish returning to terminal areas, especially in trying to develop troll fisheries for chinook salmon in Resurrection Bay and coho and chinook salmon returning to the Wally Noerenberg Hatchery in PWS.

CENTRAL GULF MANAGEMENT AREA

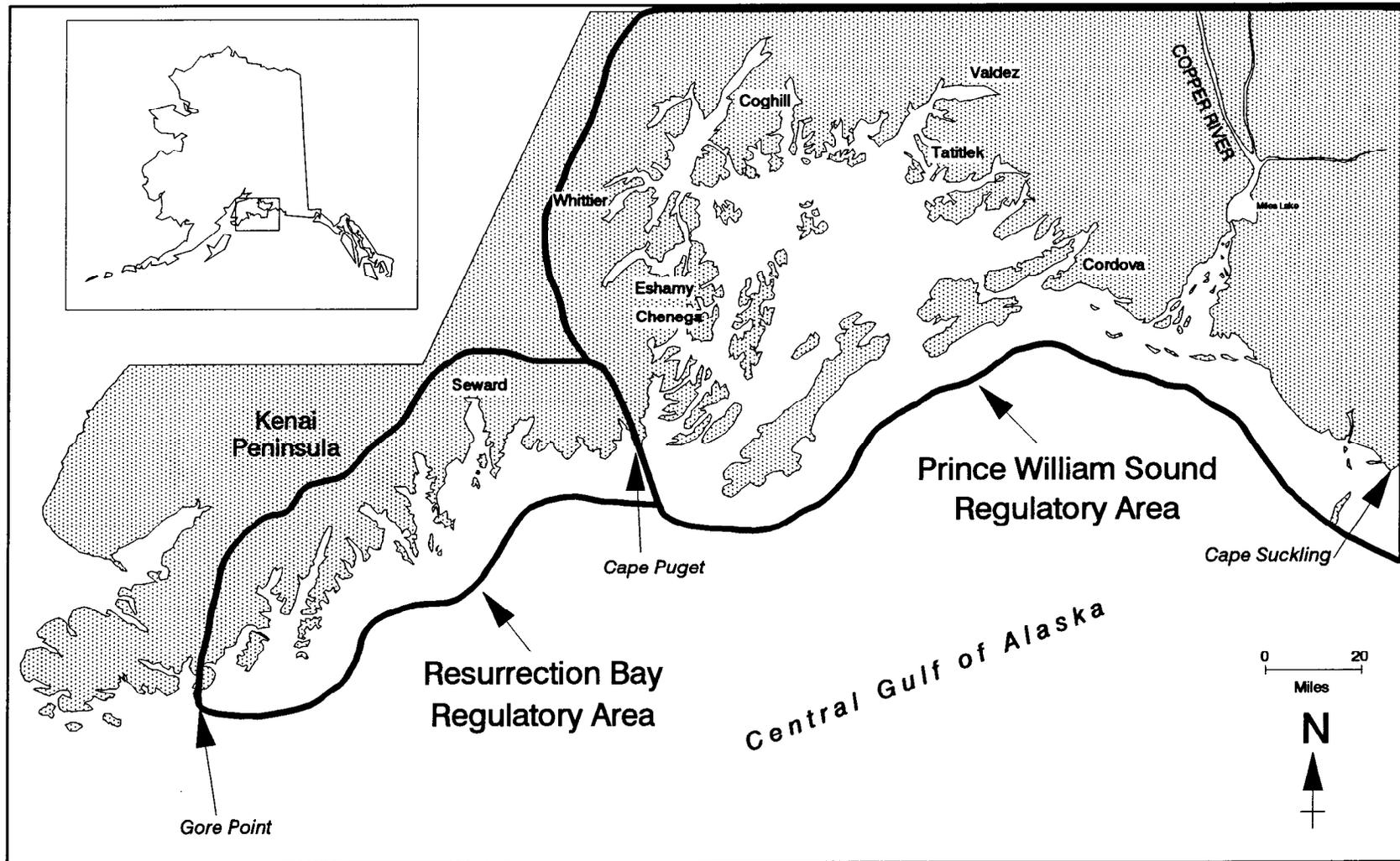


Figure 1. Map of Central Gulf Management Area and regulatory area components.

Table 1. Number of angler-days of effort expended sport fishing in the Central Gulf Management Area (CGMA) from 1977 - 1992.

YEAR	TOTAL STATEWIDE EFFORT	SOUTH CENTRAL EFFORT	CENTRAL GULF EFFORT	TOTAL PWS EFFORT	TOTAL RES BAY EFFORT	PERCENT OF STATEWIDE FROM CGMA	PERCENT OF S. CENTRAL FROM CGMA
1977	1,198,486	828,351	90,166	48,369	41,797	8%	11%
1978	1,285,063	913,417	88,401	35,046	53,355	7%	10%
1979	1,364,739	1,014,018	90,170	46,594	43,576	7%	9%
1980	1,488,962	1,072,384	96,091	46,468	49,623	6%	9%
1981	1,420,172	1,016,731	99,144	42,734	56,410	7%	10%
1982	1,623,090	1,131,358	89,735	40,568	49,167	6%	8%
1983	1,732,528	1,212,916	87,758	47,614	40,144	5%	7%
1984	1,866,837	1,341,658	102,837	57,548	45,289	6%	8%
1985	1,943,069	1,406,419	127,538	72,662	54,876	7%	9%
1986	2,071,412	1,518,712	118,418	64,280	54,138	6%	8%
1987	2,152,886	1,556,050	126,208	81,221	44,987	6%	8%
1988	2,311,291	1,679,939	137,103	84,971	52,132	6%	8%
1989	2,264,079	1,583,547	145,349	95,295	50,054	6%	9%
1990	2,453,284	1,745,110	176,854	105,739	71,115	7%	10%
1991	2,456,328	1,782,055	184,919	113,115	71,804	8%	10%
1992	2,540,374	1,889,730	215,604	113,443	80,814		
1977-1991 MEAN	1,842,148	1,320,178	117,379	65,482	51,898	6%	9%
% CHANGE of 1992 FROM MEAN	38%	43%	84%	73%	56%		

EFFORT (Angler-days)

3,000,000

2,500,000

2,000,000

1,500,000

1,000,000

500,000

0

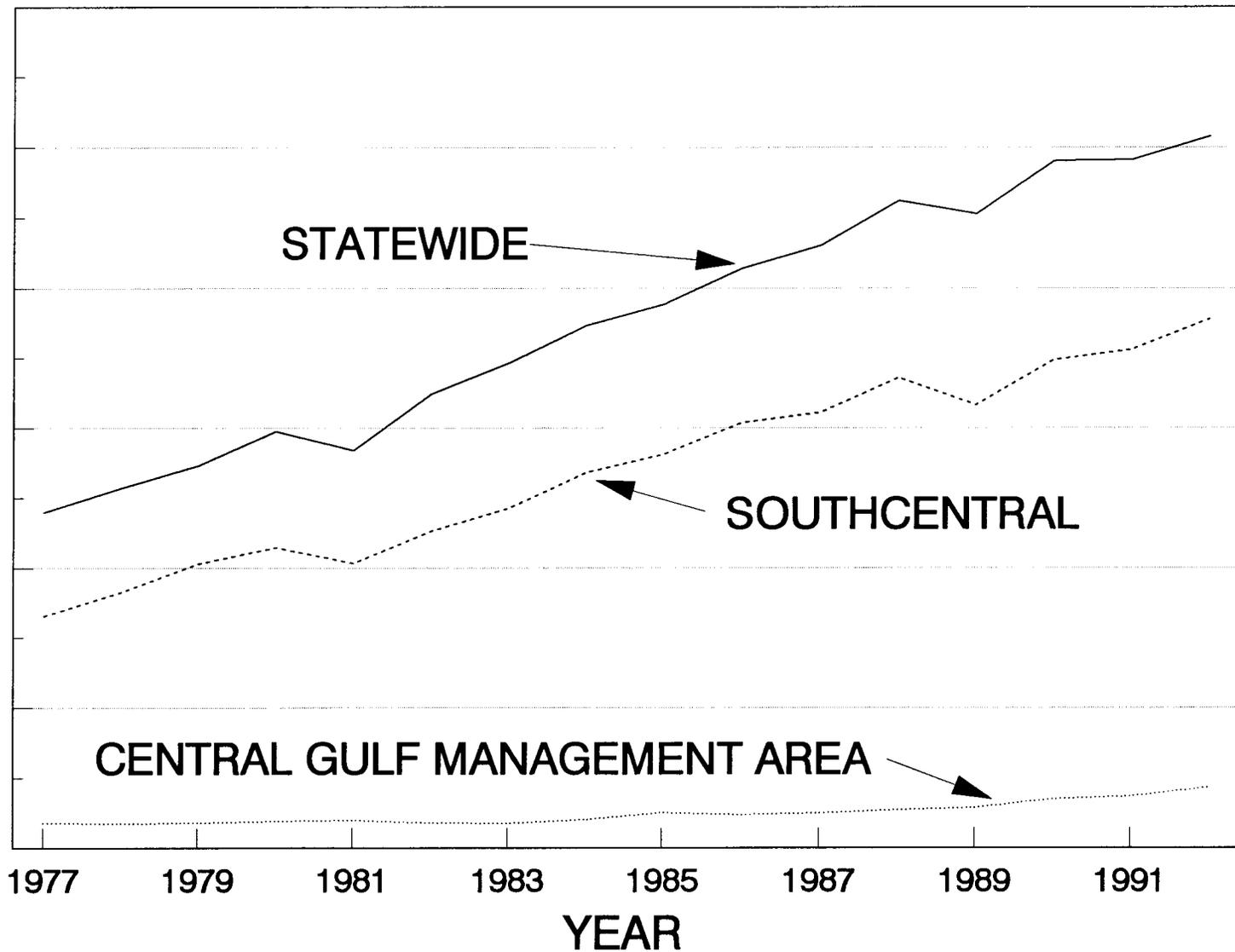


Figure 2. Angler-days of effort expended sport fishing in the Central Gulf Management Area, 1977-1992.

Table 2. Number of angler-days of effort expended sport fishing in the major ports of the Central Gulf Management Area, 1977 - 1992.

YEAR	SEWARD AREA EFFORT	VALDEZ AREA EFFORT	CORDOVA AREA EFFORT	WHITTIER AREA EFFORT	OTHER AREAS EFFORT	TOTAL CGMA EFFORT
1977	41,797	19,423	3,544	-	25,402	90,166
1978	53,355	12,687	2,003	-	20,356	88,401
1979	43,576	19,068	4,653	4,134	18,739	90,170
1980	49,623	18,707	6,954	3,756	17,051	96,091
1981	56,410	18,716	3,910	4,875	15,233	99,144
1982	49,167	13,904	4,043	4,520	18,101	89,735
1983	40,144	16,035	7,014	6,103	18,462	87,758
1984	45,289	23,053	9,166	4,166	21,163	102,837
1985	54,876	51,652	2,229	7,789	10,992	127,538
1986	52,506	31,472	9,316	10,794	14,330	118,418
1987	43,592	48,029	11,116	9,725	13,746	126,208
1988	51,342	51,744	7,833	10,114	16,070	137,103
1989	47,755	49,274	17,378	7,153	23,789	145,349
1990	69,802	71,797	9,653	9,078	16,524	176,854
1991	71,332	62,571	11,287	12,697	26,560	184,919
1992	80,814	60,442	17,605	6,743	50,000	215,604
1977-1991 MEAN	51,371	33,875	7,340	7,300	18,435	117,379
%CHANGE 1992 FROM MEAN	57%	78%	140%	-8%	171%	84%

EFFORT (Angler-days)

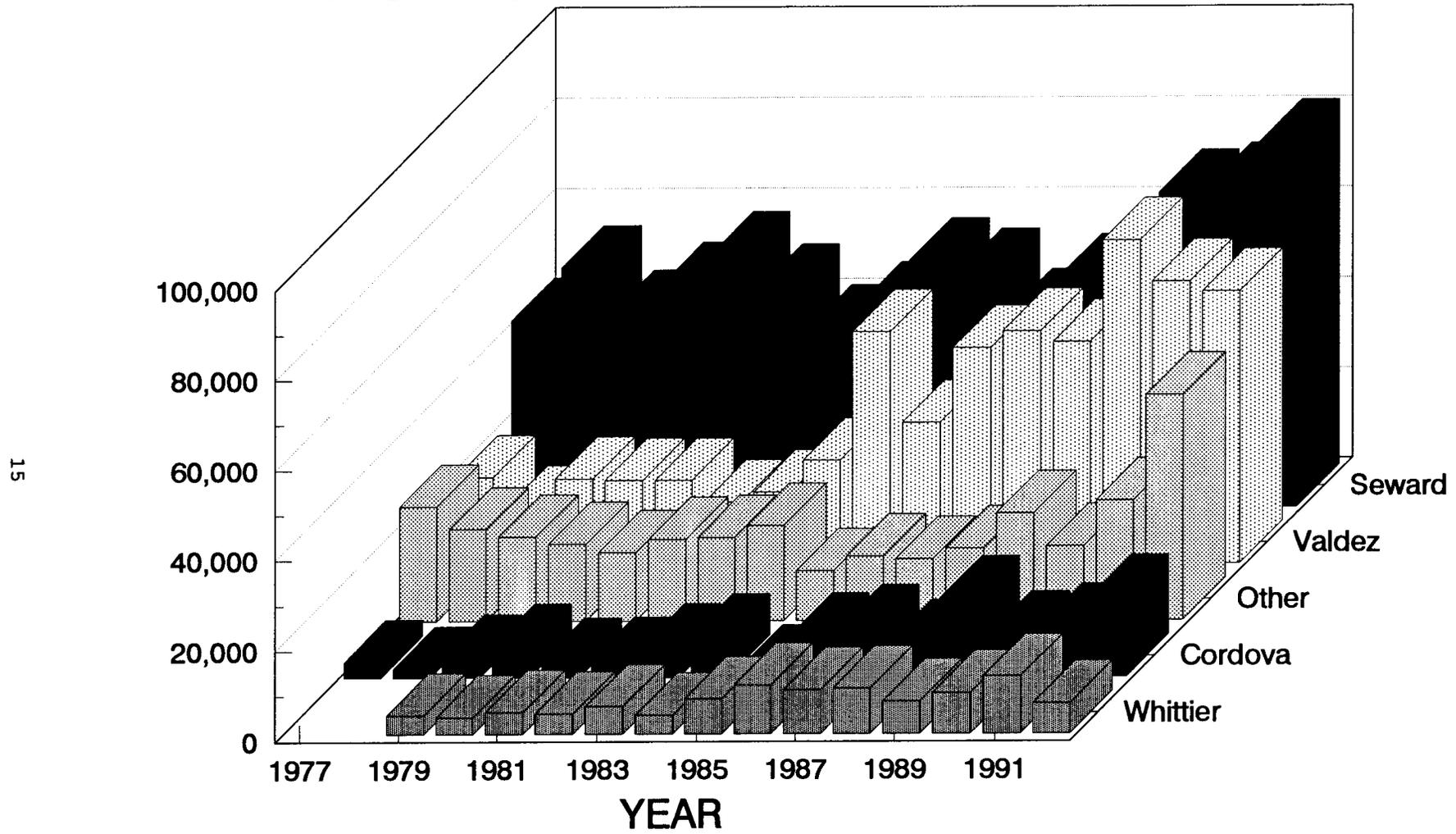


Figure 3. Major components of the sport effort in the Central Gulf Management Area from 1977-1992.

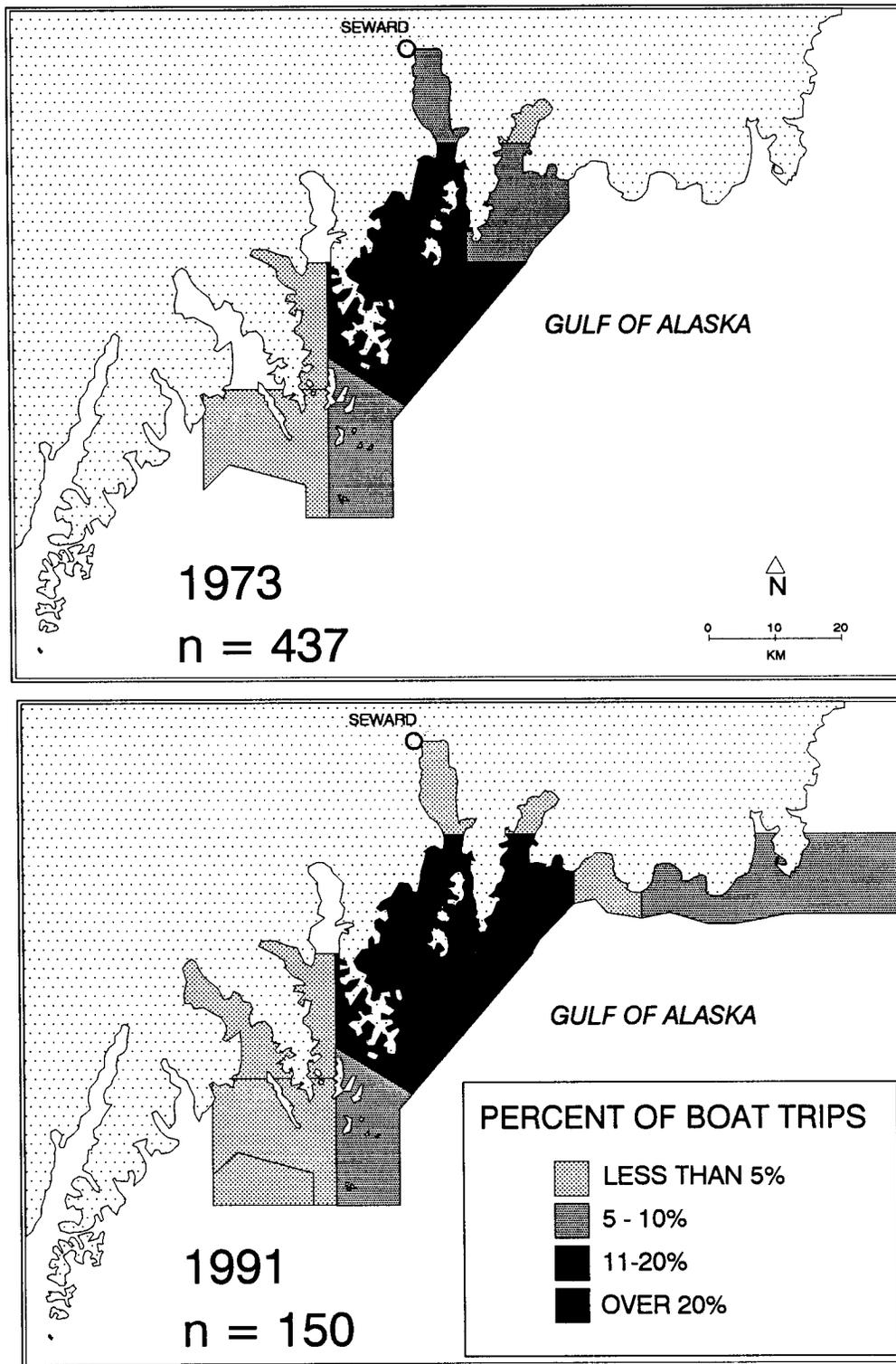


Figure 4. Expansion of the area fished by the sport fleet based in Seward between 1973 and 1991.

Table 3. Estimated economic value of Central Gulf Management Area sport fisheries during 1991.

Angler Type	Southcentral Alaska			Central Gulf Management Area		
	Number of Angler Days ^a	\$ Angler-Day ^b	Expenditures	Number of Angler-Days ^a	\$ Angler-Day ^b	Expenditures
Resident	1,270,319	\$ 64.29	\$ 81,668,809	131,847	\$ 64.29	\$ 8,476,444
Non-Resident	511,736	\$ 262.51	\$ 134,335,817	53,072	\$ 262.51	\$ 13,931,931
Total	1,782,055	N/A	\$216,004,626	184,919	N/A	\$22,408,375

^a From Mills 1992.

^b From Jones and Stokes 1987.

Table 4. (Page 2 of 2).

Stocking location	1988	Number of fish released					1,993	Broodstock			Expected 94 return
		1989	1990	1991	1992	Hatchery *		Original	Current		
ARCTIC GRAYLING											
Mile 28.5 Lake	10,000	-	10,000	10,000	10,000	10,000	Clear	Moose Ck.	Moose Ck.	NA	
Aleganik Slough Lake	-	-	10,000	10,000	-	-	Clear	Moose Ck.	Moose Ck.	NA	
Pipeline Lake # 1	-	-	1,100	10,000	10,000	10,000	Clear	Moose Ck.	Moose Ck.	NA	
Pipeline Lake # 2	-	10,000	-	-	-	-	Clear	Moose Ck.	Moose Ck.	NA	
Pipeline Lake # 4	-	-	-	10,000	10,000	10,000	Clear	Moose Ck.	Moose Ck.	NA	
Sheridan Dike Pond # 1	10,000	-	10,000	10,000	-	-	Clear	Moose Ck.	Moose Ck.	NA	
Sheridan Dike Pond # 2	10,000	-	10,000	10,000	10,000	10,000	Clear	Moose Ck.	Moose Ck.	NA	
Thompson Lake	10,000	10,000	-	10,000	-	10,000	Clear	Moose Ck.	Moose Ck.	NA	
RAINBOW TROUT											
Crater Lake - fingerlings	5,762	-	5,009	-	-	-	Ft. Rich	Swanson R.	Swanson R.	NA	
Pipeline Lake # 4 - emergents	-	-	5,200	-	-	-	Ft. Rich	Swanson R.	Swanson R.	NA	
Granite Bay 171 - fingerlings	-	-	6,677	-	-	-	Ft. Rich	Swanson R.	Swanson R.	NA	
Ruth Pond - catchables	545	1,002	728	1,052	1,021	504	Ft. Rich	Swanson R.	Swanson R.	NA	
Blueberry Lake - fingerlings	2,463	-	2,000	-	2,000	-	Ft. Rich	Swanson R.	Swanson R.	NA	

SGH - Solomon Gulch Hatchery
 WNH - Wally Noerenberg Hatchery
 a - total expected returns from WNH
 '-' = not stocked

Table 5. Hatchery releases in Resurrection Bay 1988 – 1993, and expected 1994 returns.

Stocking location	Number of fish released						Hatchery	Brood stock	Expected 94 Return
	1988	1989	1990	1991	1992	1993			
COHO SALMON									
Bear Lake – fry (0)	347,173	491,350	333,211	390,060	–	–	Elmendorf	Bear Lake	
– smolt	–	–	93,694	–	203,800	452,723	Trail Lakes	Bear Lake	
Bear Creek – fry	–	–	–	–	–	167,865	Trail Lakes	Bear Lake	
Lowell Ck. – smolt (1)	63,806	66,606	63,733	30,400	–	64,361	Elmendorf	Bear Lake	
Seward Lagoon – smolt (0)	–	93,353	88,777	84,057	–	40,635	Elmendorf	Bear Lake	
– smolt (1)	118,741	58,808	56,842	35,000	–	118,480	Elmendorf	Bear Lake	a
CHINOOK SALMON									
Lowell Creek – smolt (0)	95,673	122,870	216,220	93,200	–	104,870	Elmendorf	Crooked Cr.	
Seward Lagoon – smolt (0)	109,020	109,464	112,831	99,665	–	107,230	Elmendorf	Crooked Cr.	
– smolt (0)	–	–	–	273,500	–	–	Crooked Cr.	Kasilof River	
Spring Creek – smolt (0)	–	75,063	–	–	–	–	Elmendorf	Crooked Creek	b
SOCKEYE SALMON									
Bear Lake – fry	–	–	–	–	–	44,400	Trail Lakes	Bear Lake	
	–	–	2,239,087	1,533,843	917,100	–	Trail Lakes	Upper Russian	
	–	–	–	–	878,429	1,765,861	Trail Lakes	Big River	
Bear Creek – smolt	–	–	158,816	74,922	565,489	–	Trail Lakes	Big River	

a – Assume a 5 % marine survival rate.

b – Assume a 2.5 % marine survival rate and a return rate by age class of (age 0.1., 10%; age 0.2, 25%; age 0.3, 50%; age 0.4, 10%; age 0.5, 5%).

c – Assume a 10% marine survival rate and a return rate by age class of (age X.1, 30 %; age X.2, 65 %; age X.3, 5 %).

'–' = not stocked

SECTION II: MAJOR FISHERIES OVERVIEW

Following is an overview of the fisheries associated with the major ports of CGMA (Figure 5).

Valdez Area Fisheries

The waters of the Valdez area (Figure 6) support the most popular fisheries in the PWS Regulatory Area in terms of recreational angling effort expended since 1985 (Figure 3). Sport fish effort in the Valdez area has been steadily increasing since 1977. In 1977, the Valdez area fisheries accounted for 21% of the total effort expended in the CGMA and in 1992 this had increased to 28% of total effort (Table 2). The Valdez Chamber of Commerce sponsors fishing derbies throughout the fishing year on pink and coho salmon and halibut which contribute to the growing popularity of these fisheries. On average, approximately 96% of angler effort in Valdez is expended in marine waters. In 1992, 59,450 angler-days were expended in the marine waters which represents a 78% increase from the historical mean (Table 6). Approximately 55% of the effort expended in marine waters is by anglers using boats. These anglers use the Valdez harbor to access marine waters throughout PWS from Hinchinbrook Entrance to Esther Island. It is not possible to delineate exact fishing locations from the Statewide Harvest Survey.

There are seven major fisheries that occur in the Valdez area. These fisheries target all five species of salmon, bottomfish, and Dolly Varden. In terms of numbers of fish harvested, the most popular fisheries are those that target pink and coho salmon (Table 6). In terms of angler preference, however, the most popular fisheries are those that target coho salmon and halibut.

Cordova Area Fisheries

The waters of the Cordova area (Figure 7) support the second most popular fisheries in PWS in terms of angling effort expended since 1985 (Figure 3). These waters on average have accounted for 7% of the angling effort expended in the CGMA (Table 2). On average, approximately 60% of the effort in Cordova is expended in fresh water which is essentially the reverse of the distribution of effort in Valdez (Table 7). In 1992, effort was evenly divided between salt water and fresh water. The 19,195 angler-days were expended in salt water which represents a 151% increase from the historical mean. This increase can probably be attributed to the growing popularity of trolling for salmon in Orca Inlet and increased interest in coho fishing along the Cordova road system.

Sport fisheries target salmon, bottomfish, Dolly Varden, cutthroat trout, and Arctic grayling. In terms of numbers of fish harvested, the most popular fisheries are those that target coho salmon and Dolly Varden (Table 7). In terms of angler preference, coho salmon fisheries are most popular.

Whittier Area Fisheries

The waters of the Whittier area (Figure 8) support the third most popular fisheries in PWS in terms of angling effort expended since 1985 (Figure 3). These waters on average have accounted for slightly less than 6% of the

recreational angling effort expended in the CGMA (Table 2). All the angling effort is expended in marine waters since there are limited opportunities to fish in fresh water (Table 8). In 1992, 6,743 angler-days were expended in Whittier which was an 8% decrease from the historical mean. This decline is most likely a result of the poor returns of chinook salmon and coho salmon to the Whittier area in 1992.

Sport fisheries target salmon, bottomfish, and Dolly Varden. In terms of numbers of fish harvested, the most popular fisheries are those that target pink salmon and rockfish (Table 8).

Seward Area Fisheries

The most popular port in the CGMA in terms of fishing effort has been Seward (Figure 9). These waters on average have accounted for 44% of the recreational angling effort expended in the CGMA (Table 2). The majority of the angling effort is expended in marine waters since there are limited opportunities to fish in fresh water (Table 9). In 1992, 80,814 angler-days were expended in the marine waters which is a 59% increase from the historical mean.

Sport fisheries target salmon, bottomfish, and Dolly Varden. In terms of numbers of fish harvested, the most popular fisheries are those that target coho salmon and rockfish (Table 9).

Following are descriptions of specific fisheries by species.

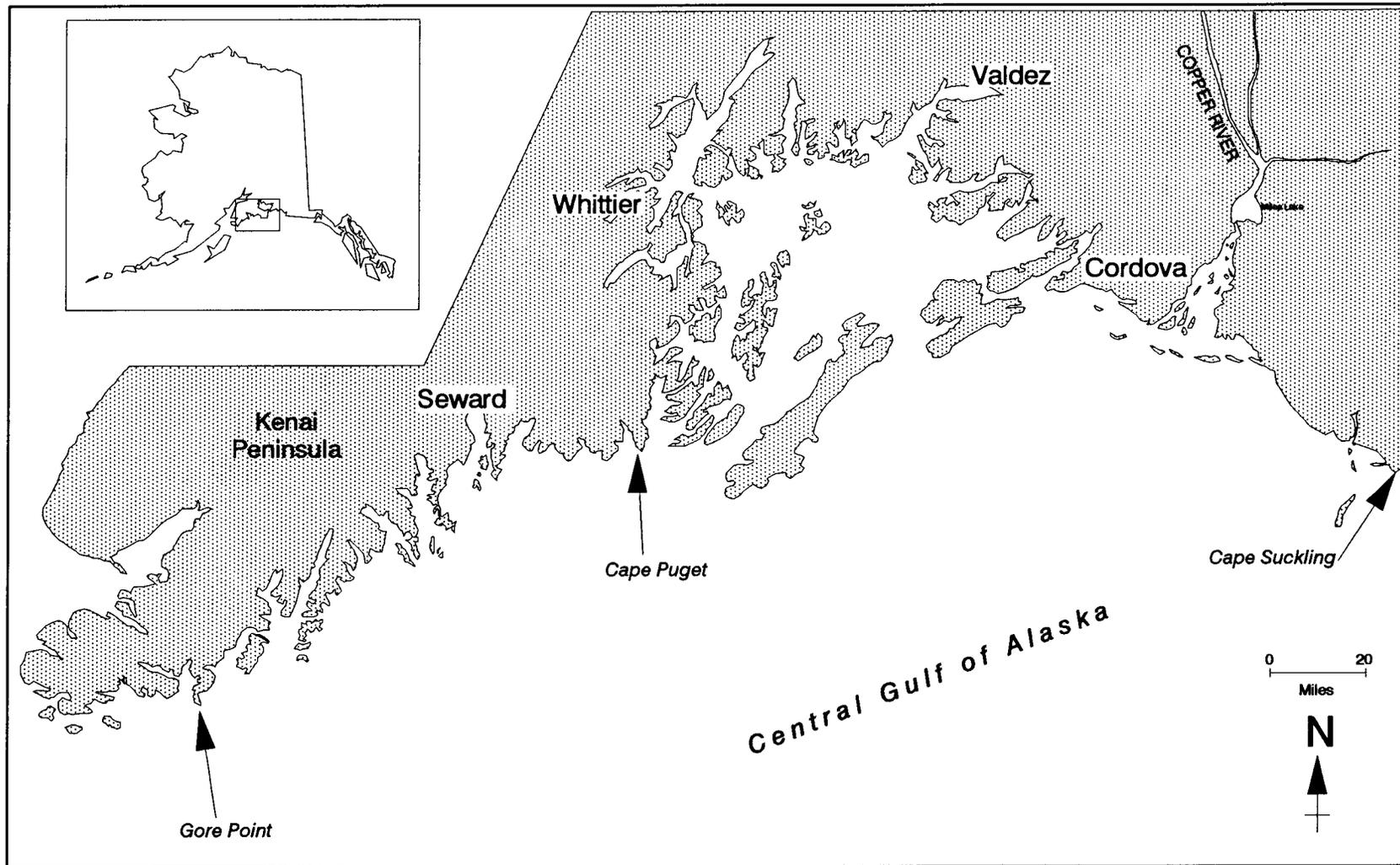


Figure 5. Map of the major ports in the Central Gulf Management Area.

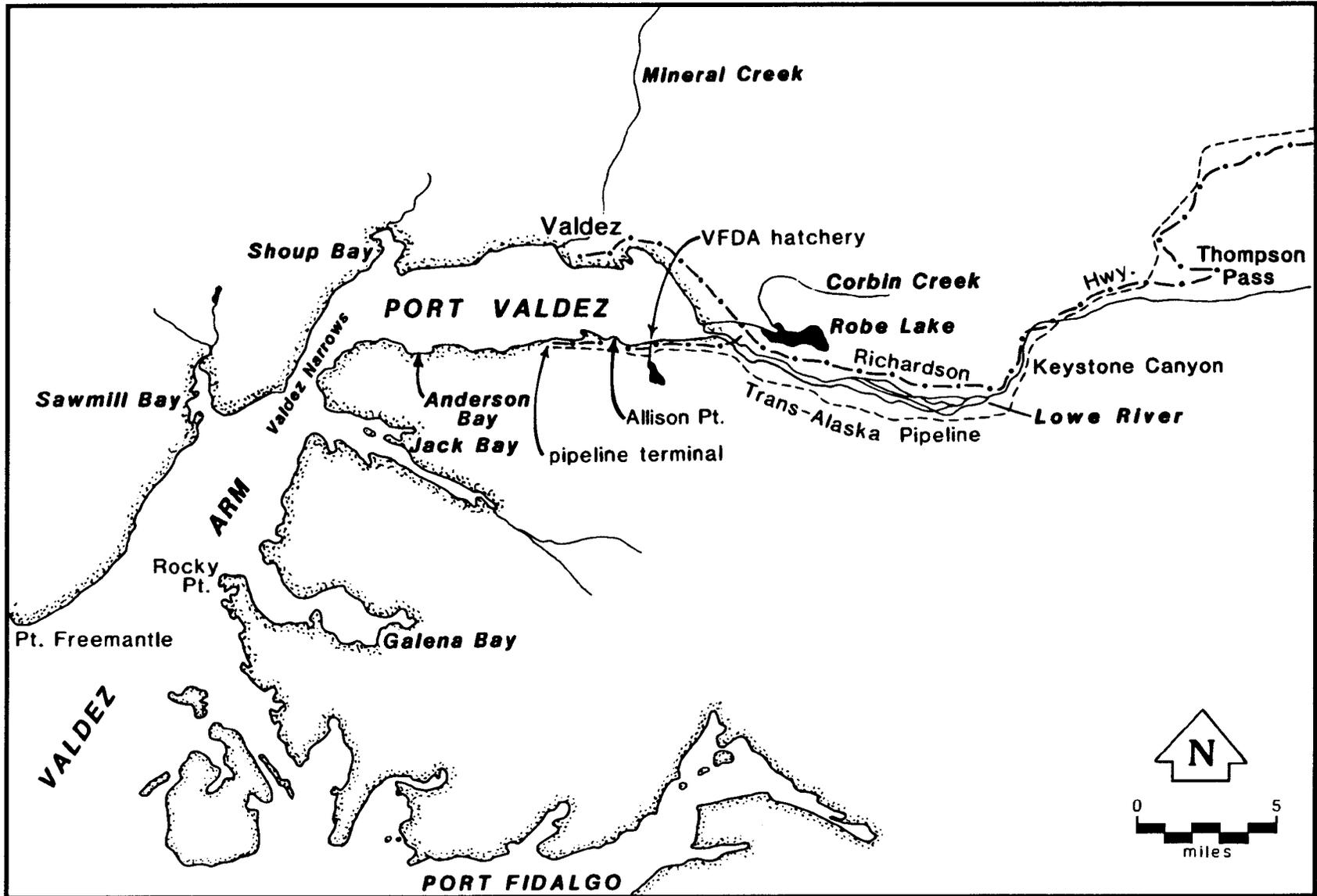


Figure 6. Map of the Valdez area.

Table 6. Harvest and effort expended sport fishing in Valdez from 1977 through 1992.

YEAR	VALDEZ AREA EFFORT	SALTWATER EFFORT	FRESHWATER EFFORT	COHO SALMON HARVEST	CHINOOK SALMON HARVEST	PINK SALMON HARVEST	SOCKEYE SALMON HARVEST	CHUM SALMON HARVEST	HALIBUT HARVEST	ROCKFISH HARVEST	LINGCOD HARVEST	DOLLY VARDEN HARVEST
1977	19,423	-	-	5,277	247	12,020	557	219	528	1,895	-	594
1978	12,687	-	-	3,582	58	7,910	78	1,444	339	1,103	-	877
1979	19,068	19,068	-	6,402	88	13,217	141	845	719	2,782	-	691
1980	18,707	18,707	-	5,545	121	11,606	568	913	1,688	3,272	-	1,128
1981	18,716	18,716	-	4,018	76	11,686	367	572	1,134	6,534	-	97
1982	13,904	13,904	-	4,014	210	6,634	241	639	849	2,810	-	356
1983	16,035	15,764	271	4,710	241	8,696	343	976	1,846	3,703	-	976
1984	23,053	18,720	4,333	5,138	125	9,651	811	1,397	1,322	4,402	-	9,566
1985	51,652	50,127	1,525	7,705	326	27,375	1,085	1,389	3,310	6,304	-	4,803
1986	31,472	29,427	2,045	6,911	168	22,170	413	1,865	3,669	6,366	-	5,077
1987	48,029	47,546	483	8,884	360	27,023	1,756	1,525	2,185	3,175	-	1,049
1988	51,744	51,096	648	10,241	227	26,685	1,582	4,201	4,575	6,983	-	983
1989	49,274	48,487	787	18,134	0	32,759	881	2,736	4,179	6,844	-	1,141
1990	71,797	71,481	316	17,962	180	46,672	1,669	1,292	6,022	4,176	-	1,341
1991	62,571	62,571	0	10,379	353	48,609	1,471	838	6,122	3,979	1,122	956
1992	60,442	59,450	992	17,580	317	28,587	2,153	804	8,379	7,625	1,476	1,515
1977-1991 MEAN	33,875	37,505	1,140	7,927	185	20,848	798	1,390	2,566	4,289	1,299	1,976
%CHANGE 1992 FROM MEAN	78%	59%	-13%	122%	71%	37%	170%	-42%	227%	78%	14%	-23%

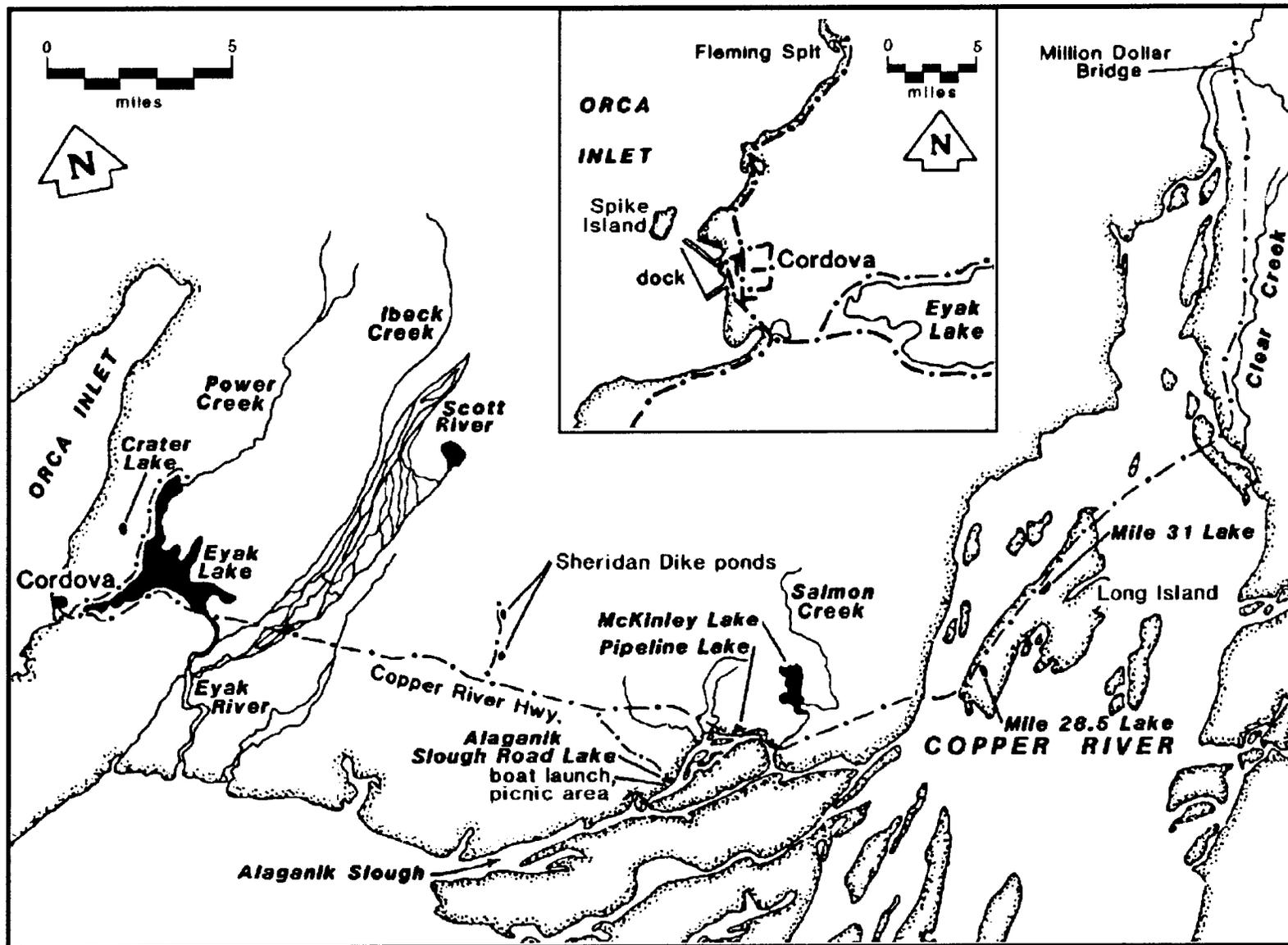


Figure 7. Map of the Cordova area.

Table 7. Harvest and effort expended sport fishing in Cordova from 1977 through 1992.

YEAR	CORDOVA AREA EFFORT	SALTWATER EFFORT	FRESHWATER EFFORT	COHO SALMON HARVEST	CHINOOK SALMON HARVEST	PINK SALMON HARVEST	SOCKEYE SALMON HARVEST	CHUM SALMON HARVEST	HALIBUT HARVEST	ROCKFISH HARVEST	LINGCOD HARVEST	DOLLY VARDEN HARVEST	CUTTHROAT TROUT HARVEST	ARCTIC GRAYLING HARVEST
1977	3,544	-	3,544	1,229	-	-	209	-	-	-	-	854	93	-
1978	2,003	-	2,003	704	-	-	127	-	-	-	-	866	90	-
1979	4,653	-	4,653	2,633	-	-	362	-	-	-	-	2,863	282	-
1980	6,954	-	6,954	4,822	-	-	69	-	-	-	-	3,057	319	-
1981	3,910	-	3,910	2,948	-	-	43	-	-	-	-	1,577	130	-
1982	4,043	-	4,043	2,096	-	-	0	-	-	-	-	2,348	136	-
1983	7,014	-	7,014	2,139	21	-	630	84	-	-	-	2,632	1,436	-
1984	9,166	1,806	7,360	2,506	0	149	112	0	237	37	-	1,245	873	-
1985	2,229	553	1,676	564	0	55	130	0	33	380	-	662	188	-
1986	9,316	2,955	6,361	3,440	11	549	321	15	596	145	-	978	901	321
1987	11,116	5,053	6,063	2,351	0	641	507	10	253	0	-	1,268	1,050	54
1988	7,833	4,342	3,491	5,202	9	364	600	236	963	217	-	1,309	218	182
1989	17,378	5,161	12,217	4,144	0	627	661	64	809	270	-	1,840	611	58
1990	9,653	4,683	4,970	3,879	34	162	466	45	486	146	-	621	311	114
1991	16,047	11,287	4,760	4,875	47	747	825	143	1,977	647	220	997	116	0
1992	19,195	9,485	9,710	5,085	313	37	1,348	30	2,297	879	196	1,015	632	8
1977-1991 MEAN	7,657	4,480	5,268	2,902	14	412	337	66	669	230	208	1,541	450	122
1992 FROM MEAN	151%	112%	84%	75%	2209%	-91%	299%	-55%	243%	282%	-6%	-34%	40%	-93%

- Lingcod harvest data were only available since 1991.

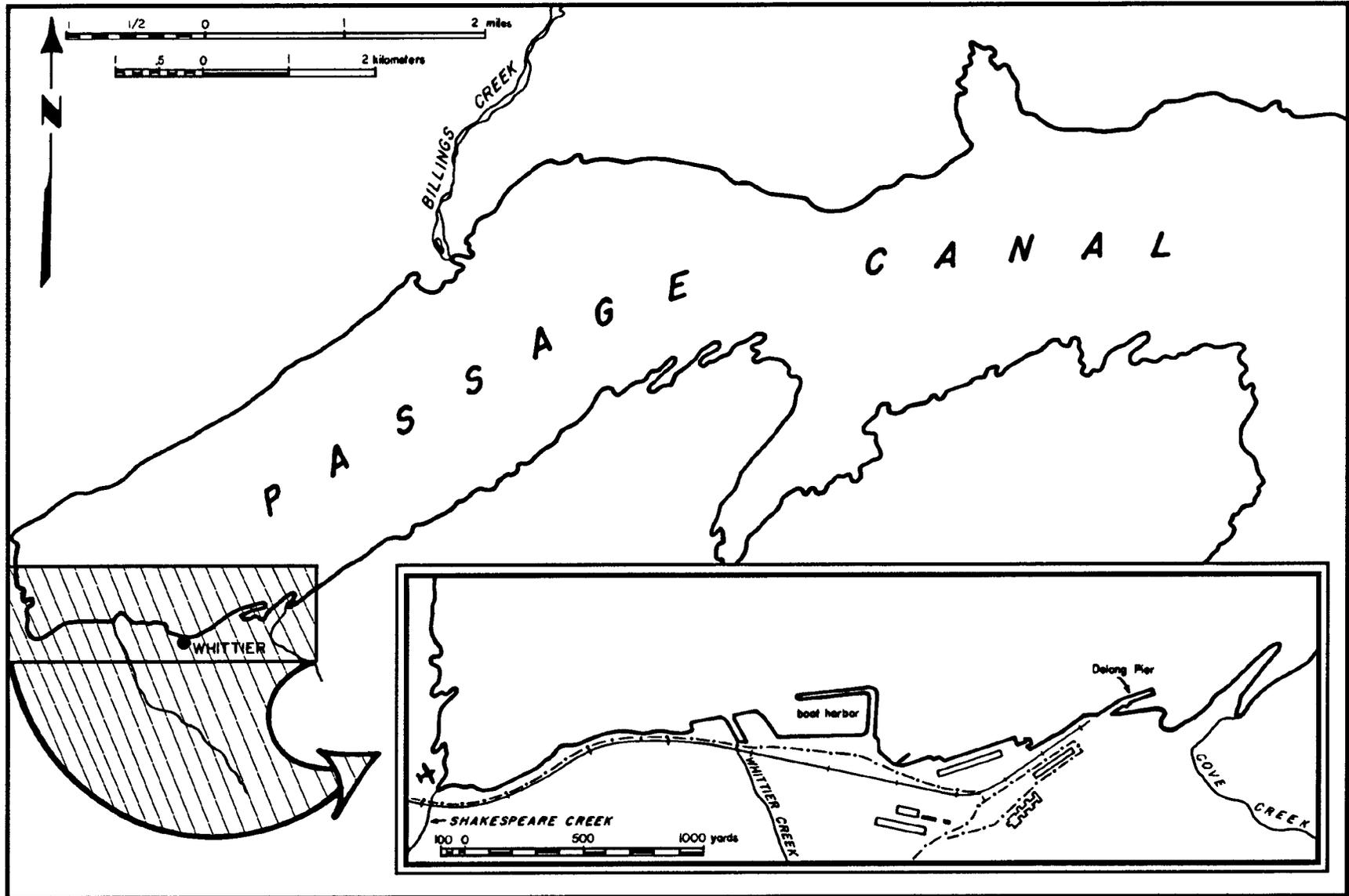


Figure 8. Map of the Whittier area.

Table 8. Harvest and effort expended sport fishing in Whittier from 1977 through 1992.

YEAR	WHITTIER AREA EFFORT	SALTWATER EFFORT	COHO SALMON HARVEST	CHINOOK SALMON HARVEST	PINK SALMON HARVEST	SOCKEYE SALMON HARVEST	CHUM SALMON HARVEST	HALIBUT HARVEST	ROCKFISH HARVEST	LINGCOD HARVEST	DOLLY VARDEN HARVEST
1977	-	-	-	-	-	-	-	-	-	-	-
1978	-	-	-	-	-	-	-	-	-	-	-
1979	4,134	4,134	761	29	573	-	-	78	400	-	191
1980	3,756	3,756	1,541	26	1,343	-	-	69	870	-	26
1981	4,875	4,875	32	0	691	-	-	216	1,339	-	0
1982	4,520	4,520	1,635	42	2,065	-	-	199	199	-	63
1983	6,103	6,103	294	0	2,014	41	-	284	1,112	-	42
1984	4,166	4,166	549	212	935	62	-	387	711	-	0
1985	7,789	7,789	1,389	22	1,768	119	217	575	1,703	-	0
1986	10,794	10,794	2,614	22	1,590	1,193	596	1,040	1,620	-	291
1987	9,725	9,725	2,137	321	2,039	1,159	194	494	1,437	-	996
1988	10,114	10,114	946	151	1,292	291	1,655	1,035	1,866	-	55
1989	7,153	7,153	719	152	935	352	156	684	1,898	-	87
1990	9,078	9,078	844	62	870	126	113	938	952	-	82
1991	12,697	12,697	1,907	47	1,440	360	205	1,127	2,386	227	27
1992	6,743	6,743	397	315	879	978	91	1,019	1,353	252	16
1977-1991 MEAN	7,300	7,300	1,182	84	1,350	411	448	548	1,269	240	143
%CHANGE 1992 FROM MEAN	-8%	-8%	-66%	277%	-35%	138%	-80%	86%	7%	5%	-89%

-Lingood harvest data were only available since 1991.

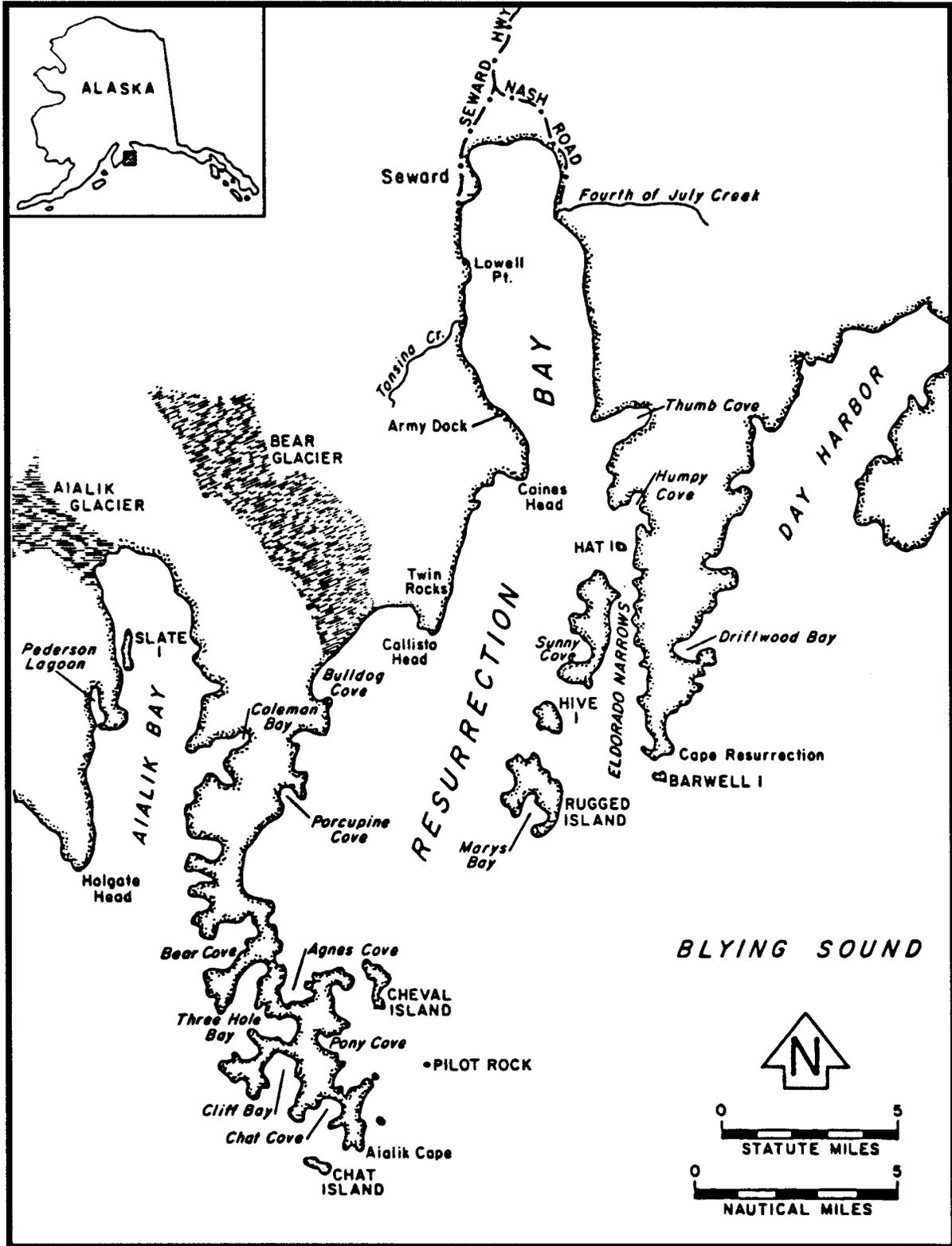


Figure 9. Map of the Seward area.

Table 9. Harvest and effort expended sport fishing in Seward from 1977 through 1992.

YEAR	SEWARD AREA EFFORT	SALTWATER EFFORT	FRESHWATER EFFORT	COHO SALMON HARVEST	CHINOOK SALMON HARVEST	PINK SALMON HARVEST	SOCKEYE SALMON HARVEST	CHUM SALMON HARVEST	HALIBUT HARVEST	ROCKFISH HARVEST	LINGCOD HARVEST	DOLLY VARDEN HARVEST
1977	41,797	41,797	-	14,528	515	1,595	6	63	1,674	12,783	-	1,720
1978	53,355	53,355	-	16,731	501	6,610	0	39	2,642	17,438	-	1,248
1979	43,576	43,576	-	14,315	156	2,100	0	100	2,838	21,752	-	973
1980	49,623	49,623	-	19,665	198	12,614	0	276	2,936	27,948	-	878
1981	56,410	56,410	-	14,721	162	7,776	0	194	3,337	19,516	-	5,335
1982	49,167	49,167	-	18,518	335	9,328	0	458	2,809	22,878	-	1,562
1983	40,144	39,098	1,046	11,277	199	4,909	0	923	2,225	17,990	-	7,751
1984	45,289	45,004	285	9,764	24	11,597	1,305	2,569	3,242	22,845	-	1,908
1985	54,876	54,599	277	11,736	187	7,205	1,335	634	5,486	17,068	-	1,161
1986	52,506	51,375	1,131	14,418	207	11,008	337	1,958	9,648	37,574	-	1,912
1987	43,592	42,143	1,449	24,220	633	3,368	815	1,974	6,620	12,333	2,142	1,866
1988	51,342	50,251	1,091	17,626	2,058	2,031	418	3,947	11,423	34,906	4,661	728
1989	47,755	47,431	324	19,184	976	4,856	624	1,696	6,852	24,334	5,505	1,193
1990	69,802	69,506	296	29,761	1,004	6,193	418	427	9,278	18,632	6,673	238
1991	71,332	71,332	-	30,964	1,547	4,714	983	757	12,961	19,376	6,015	524
1992	80,814	80,814	-	27,904	2,925	4,277	1,135	1,321	17,544	28,031	7,868	376
1977-1991 MEAN	51,371	50,978	737	17,829	580	6,394	416	1,068	5,598	21,825	4,999	1,933
% CHANGE 1992 FROM MEAN	57%	59%	-	57%	404%	-33%	173%	24%	213%	28%	57%	-81%

Prince William Sound Coho Salmon Fishery

The coho salmon fisheries in PWS are supported by both wild and hatchery fish, although the majority of the harvest is hatchery fish. Coho salmon smolt have been stocked at Valdez, Cordova, and Whittier and returns from these stocking efforts have established major sport fisheries at all three locations.

Wild and stocked coho salmon return to PWS streams from mid-August through October. Peak immigration typically occurs during mid-September and spawning occurs in streams beginning in October.

The majority of PWS is open to the taking of coho salmon year round. The bag and possession limit for coho in marine waters is 6 fish per day and 12 fish in possession and 3 fish per day and in possession in fresh water. There are some waters that are not open to coho salmon fishing. These waters include Eccles Creek, Eyak Lake, and Hartney Creek (all near Cordova), and all fresh-water drainages of Valdez Arm except for Robe River and Solomon Gulch Creek.

From 1977-1991, the mean harvest of coho salmon from PWS has been 14,881 accounting for 44% of the historical mean harvest of coho salmon in the CGMA over this period (Table 10). Just over 58% of this harvest has been from Valdez Arm (Figure 10). Since 1988, the majority of the harvest of coho salmon in Valdez Arm is from fish produced by the nonprofit Valdez Fisheries Development Association (VFDA) hatchery located on Solomon Gulch Creek. Coho sport fishing in Port Valdez takes place from boats and the shoreline since by regulation most of the freshwater drainages of Port Valdez are closed to fishing for salmon.

The Cordova road system is another popular coho fishery in PWS. Anglers fishing this area have accounted for 23% of the PWS historical mean harvest from 1977-1991 (Table 10). As in Port Valdez, the sport harvest of coho salmon is comprised of both wild and hatchery fish. The wild stock component of the harvest takes place on the clearwater tributaries accessible from the Copper River Highway between Eyak River and the Million Dollar Bridge. Eyak River is the most popular fishing location for coho salmon along the Cordova road system and has accounted for 57% of the historical mean harvest (Table 11 and Figure 11). The next largest coho salmon fishery that occurs along the highway is in the clearwater streams entering Alaganik Slough. Since 1987, there has been a sport fishery targeting hatchery coho salmon returning to Fleming Spit in Orca Inlet, located near downtown Cordova. Anglers harvested approximately 1,700 coho on average, between 1987-1991, from waters adjacent to Fleming Spit.

The Whittier area sport fishery for coho salmon completely depends on returning hatchery fish. The coho salmon smolt release program has produced annual returns that have ranged from approximately 50 to 4,000 adult coho. Since the adult returns have been highly variable, the sport harvest has also fluctuated. The harvest has ranged from 32 to 2,614 coho salmon from 1977-1990 (Table 10). This fishery takes place in and around the Whittier boat harbor, near the mouths of Shakespeare and Cove creeks. Both shoreline and boat anglers participate in this fishery.

Twenty-one percent of the PWS harvest of coho salmon comes from sites other than the three major ports (Table 10). These fisheries occur primarily on

wild stocks of coho salmon throughout the non road-accessible areas of PWS, although there is a growing fishery that targets coho returning to PWSAC's Wally Noerenberg Hatchery located at the southern end of Esther Island.

Recent Fishery Performance:

The sport harvest of coho salmon from PWS waters during 1992 (25,259) was the third highest ever recorded and was 70% above the historical mean harvest for the area since 1977 (Table 10). This harvest accounted for just over 47% of the total coho salmon harvest from CGMA waters during 1991, a figure that is similar to the average contribution of this area since 1977 (46%). As was the case in the past, Valdez Arm supported the largest harvest of coho salmon in PWS, followed by fisheries in the Cordova road system and non road-accessible areas (Other) (Figure 10). There was an overall increase of approximately 7,000 coho salmon harvested from 1990 to 1991. Whereas Valdez Arm harvest of hatchery coho salmon increased, harvest at the two other terminal harvest areas in PWS were similar to the harvest in 1990. In Cordova at Eyak River, the 1991 harvest (2,996 coho salmon) was the second highest ever recorded and represented a 69% increase from the historical mean harvest (Table 11 and Figure 11). In Whittier, the sport harvest of coho salmon in 1991 was 66% less than the historical average and was the third lowest harvest recorded since 1977. This decrease in harvest at Whittier is in direct response to the low returns of hatchery produced coho salmon and chinook salmon.

Overall, coho salmon returns to streams along the Copper River Highway between Eyak Lake and the Million Dollar Bridge had increased from the 1991 escapement levels. However, there were concerns in mid-September that some of the smaller spawning streams, in particular 18 Mile Creek in the Alaganik drainage, were not receiving sufficient escapement. Because of this and a directed sport fishery, an emergency order (No. 2-SS-6-34-92) was issued that prohibited sport fishing on 18 Mile Creek. The escapement slowly built in Mile 18 Creek and by the end of September the escapement guideline was met. In contrast, Eyak River, which is a major spawning stock for the Copper River delta, had a strong return of coho salmon which resulted in a sharp increase of effort and a successful fishery.

Although harvest and catch figures are not yet available for 1993, it is anticipated that the harvest will be above historic levels for this area.

Management Objective:

For hatchery produced coho salmon stocked at Whittier and Cordova (Orca Inlet) the management objectives are to: (1) produce, through supplemental hatchery production, an annual return of 5,000 coho salmon at each location; (2) provide 10,000 angler-days of fishing opportunity annually at each location; and (3) promote diverse sport fishing opportunity by providing coho salmon to both boat and shore-based anglers.

For hatchery produced coho salmon stocked at Valdez, the management objectives are to: (1) produce, through supplemental hatchery production, an annual return of 25,000 coho salmon; (2) provide 50,000 angler-days of fishing opportunity annually; and (3) promote diverse sport fishing opportunity by providing coho salmon to both boat and shore-based anglers.

For the wild stocks of coho salmon on the Copper River Delta, the management objective is to meet the minimum escapement guidelines while providing for at least 4,000 angler-days of effort annually. The biological escapement goal for the Copper River delta is 53,800 coho salmon.

No specific fishery objectives for the remaining coho salmon fisheries in PWS have been established to date. An assumption of past and current fisheries management, however, has been to assure for the sustained yield of the various wild coho salmon stocks that occur within PWS while assuring for continued and, where possible, expanded opportunity to participate in area-wide coho salmon fisheries.

Recent Board of Fisheries Actions:

In 1990, the Board opened Solomon Gulch Creek, adjacent to the VFDA Hatchery, to sport fishing for salmon 300 feet downstream of the VFDA weir. Additionally, the Board established a "traditional fly-fishing-only-area" on Eyak River in response to concerns voiced by the Copper River/Prince William Sound Advisory Committee. The committee felt that anglers were snagging fish in Eyak River and gear restrictions were necessary to reduce this practice.

Current Issues:

The main issue with this resource at the present time is over the developing sport fishery along the Copper River Delta. In 1992, a large number of locals and the Commissioner of Fish and Game expressed concern at the large numbers of boats participating in the sport fishery near the mouth of Eyak River and bank anglers along the various streams along the Delta. The common concern was that these targeted sport fisheries were efficient enough that there would not be sufficient escapement to meet the minimum escapement guidelines. These concerns were further exacerbated by anglers participating in a coho derby sponsored by the Chamber of Commerce. The original intent of the derby was to target on the hatchery produced coho salmon returning to Fleming Spit, but since the returns to Fleming Spit were poor, anglers directed their effort on the wild stocks along the Delta.

The department does not feel there are any major conservation concerns with the Copper River Delta coho stocks. Staff believe the necessary tools to manage these fisheries, including both sport and commercial, on a sustained yield basis exists. The biweekly escapement surveys and commercial fishery openers provide data necessary to manage these fisheries. If any of the streams are not meeting the minimum escapement guidelines, the department can respond with an emergency order as was issued in 1992. The streams along the Copper River Delta were reopened to sport fishing for salmon in 1988 after they were shut down in response to conservation concerns in the early 1970s. It should always be stated or at least implied that when a fishery is restricted for conservation reasons that the restrictions would be removed when there was no longer any conservation concerns. These streams should have been reopened before 1988 since there had not been any major conservation concerns with these stocks in the 1980s.

This division measures the success of its programs in part by the level of participation in each fishery. In particular, the expanding sport fishery in Eyak River is not viewed as detrimental as long as escapement guidelines are

met. Any proposal to unduly restrict these fisheries will be viewed by the department as allocative in nature.

Ongoing Research and Management Activities:

The only ongoing management activities are escapement surveys of the clearwater streams along the Copper River Highway which are conducted by Division of Commercial Fisheries Management and Development.

Recommended Research and Management Activities:

No specific new research or management activities for this fishery are recommended other than to assist Commercial Fisheries Division where possible to conduct escapement surveys.

Table 10 and Figure 10. Sport harvests of coho salmon in Prince William Sound, 1977 - 1992.

YEAR	TOTAL PWS HARVEST	VALDEZ ARM HARVEST	PERCENT PWS HARVEST	CORDOVA AREA HARVEST	PERCENT PWS HARVEST	WHITTIER AREA HARVEST	PERCENT PWS HARVEST	OTHER HARVEST	PERCENT PWS HARVEST
1977	8,829	5,277	60%	1,229	14%	-	-	2,323	26%
1978	9,125	3,582	39%	704	8%	-	-	4,839	53%
1979	13,964	6,402	46%	2,633	19%	761	5%	4,168	30%
1980	15,309	5,545	36%	4,822	31%	1,541	10%	3,401	22%
1981	8,499	4,018	47%	2,948	35%	32	0%	1,501	18%
1982	10,994	4,014	37%	2,096	19%	1,635	15%	3,249	30%
1983	10,405	4,710	45%	2,233	21%	294	3%	3,168	30%
1984	10,363	5,138	50%	2,718	26%	549	5%	1,958	19%
1985	11,633	7,705	66%	1,283	11%	1,389	12%	1,256	11%
1986	16,098	6,911	43%	3,776	23%	2,614	16%	2,797	17%
1987	16,680	8,884	53%	3,254	20%	2,137	13%	2,405	14%
1988	19,262	10,241	53%	5,693	30%	946	5%	2,382	12%
1989	25,631	18,134	71%	4,144	16%	719	3%	2,634	10%
1990	26,639	17,962	67%	4,097	15%	844	3%	3,736	14%
1991	19,783	10,379	52%	4,875	25%	1,907	10%	2,622	13%
1992	25,259	17,580	70%	4,243	17%	397	2%	3,039	12%
1977-91 MEAN	14,881	7,927	58%	3,100	23%	1,182	7%	2,829	21%
%CHANGE FROM MEAN									
1992	70%	122%		37%		-66%		7%	

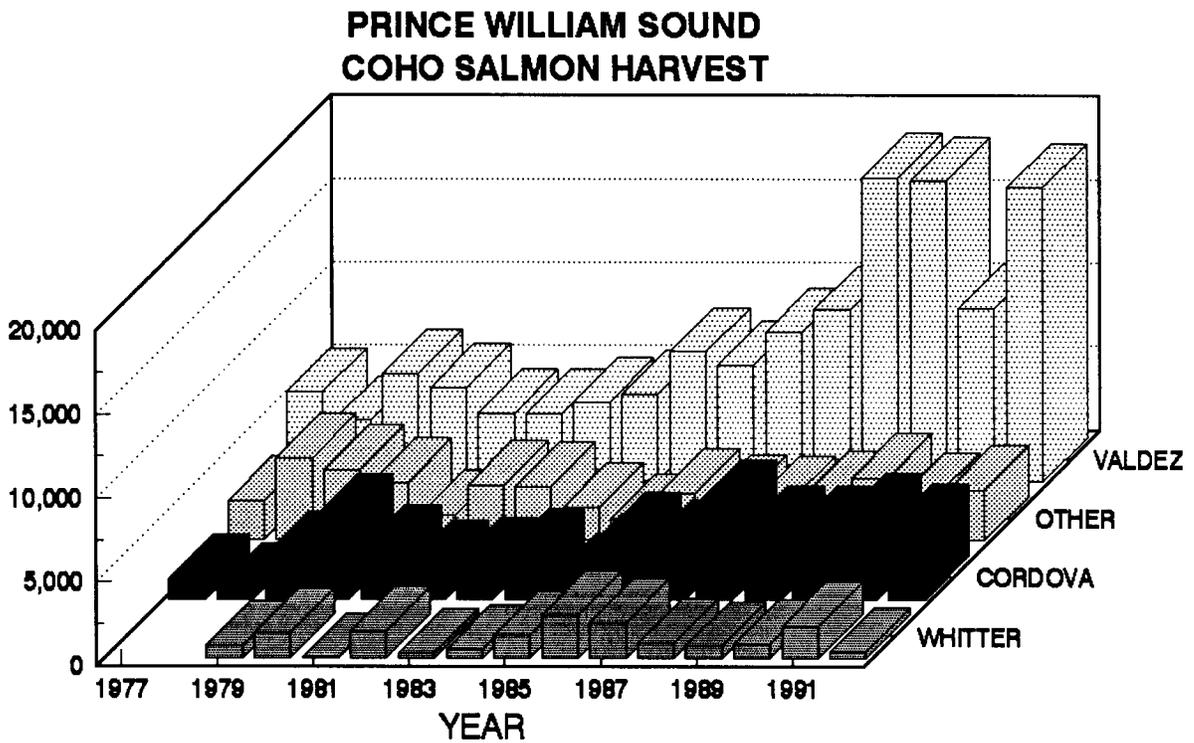
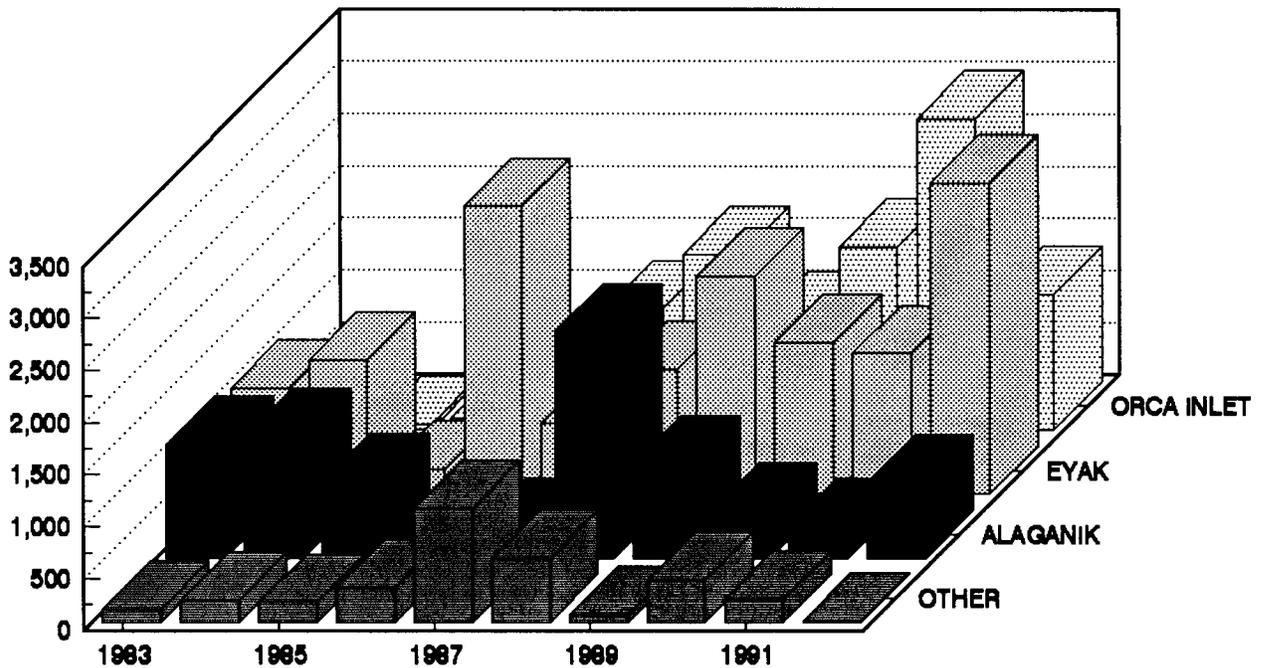


Table 11 and Figure 11. Sport harvests of coho salmon in Cordova area of Prince William Sound, 1977–1992.

CORDOVA AREA YEAR	CORDOVA AREA HARVEST	ORCA INLET	PERCENT CORDOVA HARVEST	ALAGANIK	PERCENT CORDOVA HARVEST	EYAK	PERCENT CORDOVA HARVEST	OTHER SITES	PERCENT CORDOVA HARVEST
1977	1,229	-	-	-	-	1,229	100%	-	-
1978	704	-	-	-	-	704	100%	-	-
1979	2,633	-	-	-	-	2,633	100%	-	-
1980	4,822	-	-	-	-	4,822	100%	-	-
1981	2,948	-	-	-	-	2,948	100%	-	-
1982	2,096	-	-	-	-	2,096	100%	-	-
1983	2,233	-	-	1,091	49%	1,017	46%	125	6%
1984	2,719	50	2%	1,172	43%	1,294	47%	212	8%
1985	1,283	108	8%	742	58%	239	19%	194	15%
1986	3,776	474	13%	199	5%	2,767	73%	336	9%
1987	3,254	1,166	36%	311	10%	680	21%	1,097	34%
1988	5,693	1,691	30%	2,183	38%	1,201	21%	619	11%
1989	4,144	1,060	26%	908	22%	2,100	51%	76	2%
1990	4,097	1,764	43%	457	11%	1,462	36%	414	10%
1991	4,875	2,989	61%	306	6%	1,355	28%	225	5%
1992	5,053	1,312	26%	729	14%	2,996	71%	16	0%
1977-91 MEAN	3,100	1,163	38%	819	23%	1,769	57%	366	10%
%CHANGE FROM MEAN	63%	13%		-11%		69%		-96%	

COHO SALMON HARVEST IN THE CORDOVA AREA



Resurrection Bay Coho Salmon Fishery

Resurrection Bay and surrounding marine waters support the largest coho sport fishery in CGMA. From 1977-1991, the mean harvest of coho salmon from these waters has been 17,916 fish, accounting for 61% of the historical mean harvest of coho salmon in CGMA during this period (Table 12 and Figure 12). Most effort expended on these stocks takes place in marine waters by private boats; however, a growing shore-based fishery targeting these stocks has also developed in recent years. This fishery is highlighted by the 9-day Seward Silver Salmon Derby which has been held each August since 1956. Recognizing the importance of this sport fishery, the Board of Fisheries developed a management plan for the salmon fisheries in Resurrection Bay in 1966 which gave the sport fishery the exclusive use of the Bay's coho salmon. In 1976, the Board modified the plan to stipulate that the commercial fishery for other salmon species be managed so that it does not interfere with the recreational fishery.

An ongoing enhancement program was initiated in 1964 in Bear Lake, which flows into Resurrection Bay, to supplement wild stock production of coho salmon. The enhancement program included stocking hatchery-reared coho fingerlings and eradicating major competitors. Initial results of the program resulted in increased smolt production (Vincent-Lang 1987). However, the lake gradually became reinfested with competitor species and the lake was again rehabilitated in 1971. Subsequently, survival of stocked fingerlings to smolt in some years has exceeded 50%. This, coupled with correspondingly high adult survival rates, has increased harvests in the recreational fishery. Recognizing the importance of the contribution of this enhancement program to the sport fishery, the Board of Fisheries adopted a management plan for Bear Lake in 1971. This plan stated that Bear Lake be managed primarily for the production of coho salmon and in accordance with this objective placed restrictions on the number of sockeye salmon that could be passed into Bear Lake.

In 1988, the Board revised the management plan for Bear Lake. The revised plan allowed for lifting the restrictions placed on the numbers of sockeye salmon which could be placed into the lake and allowed for the enhancement of sockeye salmon in Bear Lake. The purpose of this change in the management plan was to allow for the development of a commercial sockeye salmon fishery in Resurrection Bay. Bear Lake was considered to be the only viable location for such enhancement in the Resurrection Bay area. In making this change, however, the Board recognized the importance of Bear Lake in producing coho salmon for the recreational fishery and stipulated that (1) any enhancement of sockeye salmon must not cause a net loss of coho salmon smolt production from Bear Lake and (2) that any commercial fishery developed as a result of this enhancement effort must be prosecuted with minimal conflict with the recreational fishery. With this change, the Cook Inlet Aquaculture Association took over control of the Bear Lake weir and its operations in 1989. This weir had been operated by the Division of Sport Fish since the early 1960s.

Another component of the coho salmon enhancement in Resurrection Bay began in 1969 with annual plants of hatchery-reared smolts at a variety of local release sites. Although survival rates have varied between sites and years, smolt to adult survivals have been as high as 15%. The contribution of these fish to the sport fishery has also been significant, up to 51% (Vincent-Lang 1987; Vincent-Lang et al. 1988; Carlon and Vincent-Lang 1989, 1990).

The current bag and possession limits for salmon other than chinook salmon in Resurrection Bay is 6 fish per day and in possession. All freshwater drainages of Resurrection Bay are closed to salmon fishing.

Recent Fishery Performance:

The sport harvest of coho salmon from Resurrection Bay waters during 1991 (27,904) was the third highest ever recorded and was 56% above the historical mean harvest for the area since 1977 (Table 12). This harvest accounted for just over 53% of the total coho salmon harvest from CGMA waters during 1992, a figure that was similar to the average contribution of this area since 1977 (54%). As was the case in the past, private boat anglers accounted for the largest portion of the sport harvest (57%), followed by shoreline anglers (24%). The harvest by charter boat anglers is the most rapidly expanding component of the Resurrection Bay coho fishery.

The Bear Lake Fish Facility was operated by CIAA during 1992. The coho smolt outmigration was 112,852 fish in 1992. A total of 3,055 adult coho salmon returned to the weir of which 1,234 fish were sold for corporate cost recovery.

Data are not yet available to assess the coho fishery in Resurrection Bay in 1993, but all indications are that there will be a record harvest. Anglers found excellent fishing for coho salmon in the outer waters of Resurrection Bay starting in late June which is extraordinarily early. The coho salmon were thought to be feeding on the abundant schools of bait fish in the area. Abundant numbers of coho salmon were available for harvest all the way through the annual coho salmon derby which led to a successful salmon derby. The coho did not show up on the beach until early September which is later than normal but there were sufficient numbers available to support a viable fishery.

Management Objective:

For coho salmon smolt releases the management objectives are to: (1) produce, through supplemental hatchery production, an annual return of 9,000 coho salmon; (2) provide 18,000 angler-days of fishing opportunity annually; and (3) promote diverse sport fishing opportunity by providing coho salmon to both boat and shore-based anglers.

Cook Inlet Aquaculture Association is projecting a return of over 100,000 sockeye salmon to Bear Lake in 1994. This return is large enough to initiate a sockeye salmon fishery in Resurrection Bay and to provide fish for brood source for future Bear Lake releases and cost recovery for the stocking program. By regulation, any commercial fishery that occurs must be prosecuted with seine gear and all coho and chinook salmon caught incidentally must be released immediately. Also, this fishery must be prosecuted in a manner to minimize conflict with the recreational fishery.

No escapement goals have been established for coho salmon returns in Resurrection Bay. An escapement goal for sockeye salmon to Bear Lake is 1,000 fish.

No other specific fishery objectives have been formally established for Resurrection Bay coho salmon fisheries to date other than management

objectives outlined in the Bear Lake and Resurrection Bay Management Plans. An assumption of past and current fisheries management, however, has been to assure for the sustained yield of the various wild coho salmon stocks that occur within the CGMA while assuring for continued and, where possible, expanded opportunity to participate in hatchery-supported coho salmon fisheries in the area.

Recent Board of Fisheries Actions:

There was not any regulatory action in this fishery in 1990 or 1992.

During its 1992 meeting, the Board entertained several proposals regarding the management of Resurrection Bay commercial fisheries. These proposals center on reintroducing gill net gear to the commercial fishery in anticipation of the sockeye salmon return from the Bear Lake enhancement effort. The Board failed to enact any changes to the current management plans for Bear Lake or Resurrection Bay.

During the 1992 meeting, the BOF voted against a proposal suggested by United Cook Inlet Drift Association to reinstitute drift gill nets into Resurrection Bay. There was very little discussion before the vote. All of the peninsula advisory committees voted against the proposal except Port Alexander.

Current Issues:

The only major issue with this fishery is how the developing commercial fishery on sockeye salmon returning to Bear Lake will impact the recreational fishery. This issue will be addressed in the section entitled "Resurrection Bay Sockeye Salmon Fishery."

Ongoing Research and Management Activities:

There are no ongoing research and management activities to report for this fishery.

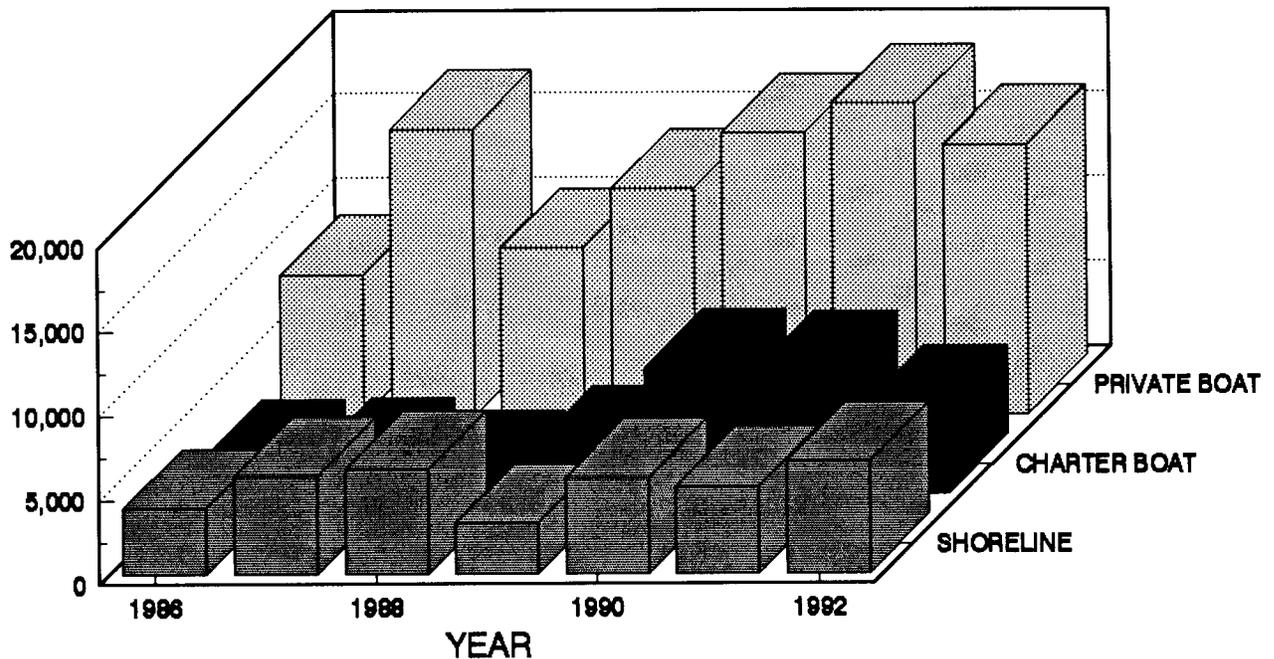
Recommended Research and Management Activities:

No research activities for this fishery are recommended at present other than to continue to collect heads from coho salmon with clipped adipose fins and analyze the tag information.

Table 12 and Figure 12. Sport harvests of coho salmon in the Resurrection Bay, 1977 - 1992.

YEAR	TOTAL RES BAY HARVEST	CHARTER BOAT	PERCENT RES BAY HARVEST	PRIVATE BOAT	PERCENT RES BAY HARVEST	SHORELINE	PERCENT RES BAY HARVEST
1977	14,528	-	-	-	-	-	-
1978	16,731	-	-	-	-	-	-
1979	14,315	-	-	-	-	-	-
1980	19,665	-	-	-	-	-	-
1981	14,721	-	-	-	-	-	-
1982	18,518	-	-	-	-	-	-
1983	11,277	-	-	-	-	-	-
1984	10,014	-	-	-	-	-	-
1985	11,736	-	-	-	-	-	-
1986	14,418	2,125	15%	8,364	58%	3,929	27%
1987	24,985	2,209	9%	16,958	68%	5,818	23%
1988	17,626	1,473	8%	9,932	56%	6,221	35%
1989	19,344	2,889	15%	13,444	69%	3,011	16%
1990	29,905	7,487	25%	16,703	56%	5,715	19%
1991	30,964	7,335	24%	18,452	60%	5,177	17%
1992	27,904	5,263	19%	15,976	57%	6,665	24%
1977-91 MEAN	17,916	3,920	17%	13,976	61%	4,979	22%
%CHANGE 1992 FROM MEAN	56%	34%		14%		34%	

**COMPOSITION OF COHO SALMON
HARVESTED IN RESURRECTION BAY**



Prince William Sound Chinook Salmon Fishery

There is limited wild production of chinook salmon in PWS and the sport fishery is supported primarily by hatchery produced fish with a limited harvest of feeder chinook. Chinook salmon smolt have been stocked at Valdez, Cordova, and Whittier and returns from these stocking efforts have established sport fisheries at Whittier and Cordova. Chinook salmon return to hatchery release sites from mid-May through June and anglers can harvest feeder kings throughout the year but the winter months are the best producers.

The waters of PWS are open to the taking of chinook salmon year round and the bag and possession limit is 2 fish per day and 4 fish in possession. There are some waters that are not open to chinook salmon fishing. These waters include Eccles Creek, the Eyak Lake drainage, and Hartney Creek, all near Cordova, and in all freshwater drainages of Valdez Arm except for Robe River and Solomon Gulch Creek.

From 1977-1991, the mean harvest of chinook salmon from marine waters of PWS has been 468 fish, accounting for 44% of the historical mean harvest of chinook salmon for the CGMA during this period (Table 13 and Figure 13). Just over 47% of this harvest has been from Valdez Arm. The next largest harvest occurs in the non road-accessible areas (Other) of PWS which account for 36% of the historical mean harvest. The fishery on the Robe River accounts for the majority of the chinook harvest in Valdez Arm and is the only sport fishery in PWS that is supported by wild stocks. Since 1988 in Valdez, wild stock production has been supplemented by hatchery produced smolt. The first release of chinook salmon at Anderson Bay, which is accessible only by boat, did not prove to be productive in providing additional fishing opportunities and was cancelled after only one year. Since 1991, chinook salmon smolt were released at 6.5 Mile Creek, a tributary of Lowe River, to establish a marine fishery near Allison Point.

The Whittier area sport fishery for chinook salmon is supported primarily on returning hatchery fish. The chinook salmon smolt release program has produced variable returns to the Whittier area and correspondingly the sport harvest has also fluctuated. The harvest has ranged from 0 to 321 chinook salmon from 1977-1991 (Table 13). This fishery takes place in and around the Whittier boat harbor and near the mouths of Shakespeare and Cove creeks. Both shoreline and boat anglers participate in this fishery.

Recent Fishery Performance:

The sport harvest of chinook salmon from PWS waters during 1992 (1,116) represented a 138% increase from the historical mean harvest for the area since 1977 (Table 13). The majority of this increase can be attributed to the increased harvest in the non road-accessible (Other) areas which supported the largest harvest of chinook salmon. The harvest of 673 chinook salmon in the non road-accessible areas was the largest recorded and represented a 294% increase from the historical average.

Harvest and catch figures are not yet available for the 1993 fishery, but it is anticipated that the harvest will be above historic levels for this area due to the first year returns of the hatchery releases at Whittier, Orca Inlet and Valdez Arm.

Management Objective:

For hatchery produced chinook salmon at Whittier, Valdez Arm, and Orca Inlet the management objectives for each location are to: (1) produce through supplemental hatchery production an annual return of 3,000 chinook salmon; (2) provide 6,000 angler-days of fishing opportunity annually; and (3) promote diverse sport fishing opportunity by providing early-run chinook salmon to both boat and shore-based anglers.

No other specific fishery objectives have been formally established for PWS chinook salmon fisheries to date. An assumption of past and current fisheries management, however, has been to assure for the sustained yield of the various wild chinook salmon stocks that occur within the CGMA while assuring for continued and, where possible, expanded opportunity to participate in hatchery-supported chinook salmon fisheries in the area.

Recent Board of Fisheries Actions:

There has not been any recent regulatory action on this fishery.

Current Issues:

The main issue, with regard to chinook salmon fisheries in PWS, is to increase the numbers of returning adults to terminal areas to improve and expand fishing opportunities. This could be accomplished by increasing the survival rate of smolts by holding and feeding the smolts in net pens at the release locations for approximately a week before they are released. Additionally, it may be necessary to increase stocking levels to offset the commercial interception of returning adult fish.

Ongoing Research and Management Activities:

There are no ongoing research or management activities for this fishery.

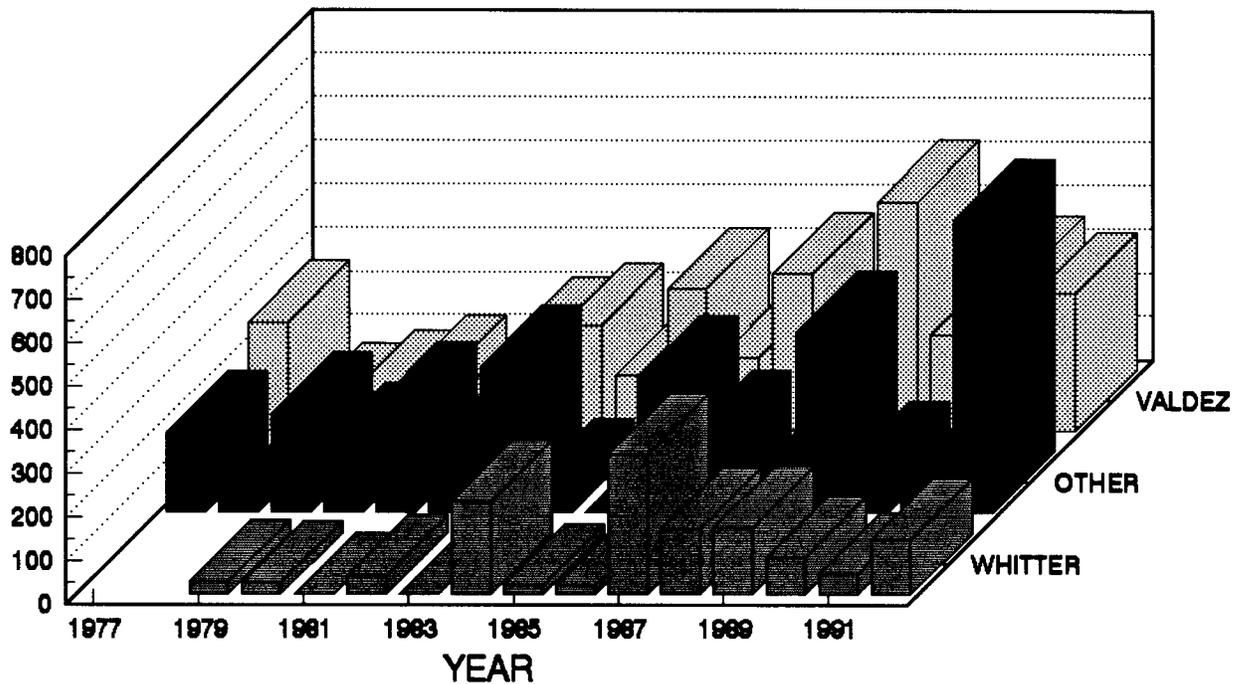
Recommended Research and Management Activities:

No new research activities or regulation changes for this fishery are recommended.

Table 13 and Figure 13. Sport harvests of chinook salmon in Prince William Sound, 1977-1992.

YEAR	TOTAL	VALDEZ	PERCENT	WHITTIER	PERCENT	OTHER	PERCENT
	PWS		PWS		PWS		PWS
	HARVEST	HARVEST	HARVEST	HARVEST	HARVEST	HARVEST	HARVEST
1977	428	247	58%	-	-	181	42%
1978	93	58	62%	-	-	35	38%
1979	342	88	26%	29	8%	225	66%
1980	302	121	40%	26	9%	155	51%
1981	324	76	23%	0	0%	248	77%
1982	399	210	53%	42	11%	147	37%
1983	576	241	42%	0	0%	335	58%
1984	411	125	30%	212	52%	74	18%
1985	348	326	94%	22	6%	0	0%
1986	502	168	33%	22	4%	312	62%
1987	865	360	42%	321	37%	184	21%
1988	443	227	51%	151	34%	65	15%
1989	1,093	526	48%	152	14%	415	38%
1990	418	220	53%	85	20%	113	27%
1991	477	353	74%	47	10%	77	16%
1992	1,116	317	28%	126	11%	673	60%
1977-91							
MEAN	468	223	48%	85	17%	171	37%
%CHANGE							
1992	138%	42%		48%		293%	
FROM MEAN							

CHINOOK SALMON HARVESTED IN PRINCE WILLIAM SOUND



Resurrection Bay Chinook Salmon Fishery

Resurrection Bay does not support any natural (wild) returns of chinook salmon and the sport fishery for chinook salmon in and near Resurrection Bay is supported primarily by hatchery produced fish with a limited harvest of feeder chinook salmon. Chinook salmon smolt with early run timing (May and June) have been stocked in the marine waters adjacent to Lowell Creek and in Seward Lagoon since 1984. These releases have averaged approximately 247,000 smolts since 1985 (Table 5). Starting in 1991, chinook salmon smolt with late-run timing (July) were also stocked in Seward. These releases were intended to diversify and extend fishing opportunities in the Bay.

The marine waters of Resurrection Bay are open to the taking of chinook salmon year round. The bag and possession limit for chinook salmon in marine waters is 2 fish per day and 2 fish in possession. All freshwater drainages of Resurrection Bay are closed to salmon fishing.

From 1977-1991, the mean harvest of chinook salmon from marine waters of Resurrection Bay has been 584 fish, accounting for 56% of the historical mean harvest of chinook salmon in CGMA over this period (Table 14 and Figure 14). The majority of the harvest is caught by shore anglers.

Recent Fishery Performance:

The sport harvest of chinook salmon in Resurrection Bay during 1992 (2,925) was 401% above the historical mean harvest for the area since 1977 (Table 14). Anglers fishing on the shoreline accounted for the largest proportion of the harvest followed by the private boat anglers. Anglers fishing from private boats showed the largest increase of the different angler groups in Resurrection Bay during 1992. The chinook harvest from private boats increased 229% from the historical mean and was the largest recorded harvest to date. The harvest (1,377) of chinook salmon from shoreline-based anglers also increased significantly from 1991 to 1992 and was a record high harvest.

Harvest and catch figures are not yet available for the 1993 fishery, but it is anticipated that the harvest will be at or above historic levels for this area.

Management Objective:

For hatchery produced early run chinook salmon, the management objectives are to: (1) produce, through supplemental hatchery production, an annual return of 6,000 early-run chinook salmon; (2) provide 9,000 angler-days of early run chinook salmon fishing opportunity annually; and (3) promote diverse sport fishing opportunity by providing early-run chinook salmon to both boat and shore-based anglers.

For hatchery produced late-run chinook salmon the management objectives are to: (1) produce, through supplemental hatchery production, an annual return of 3,000 late run chinook salmon; (2) provide 9,000 angler-days of late run chinook salmon fishing opportunity annually; and (3) promote diverse sport fishing opportunity by providing early-run chinook salmon to both boat and shore-based anglers.

Recent Board of Fisheries Actions:

There were no Board actions for this fishery in 1990 or 1992.

Current Issues:

In order to meet the objectives stated above (participation and diversity for both shore and boat anglers), it will be necessary to continue to work with local charter operators and private boat owners to establish a troll fishery on returning adult chinook salmon. A troll fishery would distribute the effort and catch between anglers. At the present time, the majority of the catch is still from shoreline anglers although the percent of harvest from private boats increased significantly in 1992. It is expected as anglers become more familiar with this resource and the numbers of returning adult chinook increase, that a troll fishery will continue to develop.

Ongoing Research and Management Activities:

There are no ongoing research or management activities for this fishery.

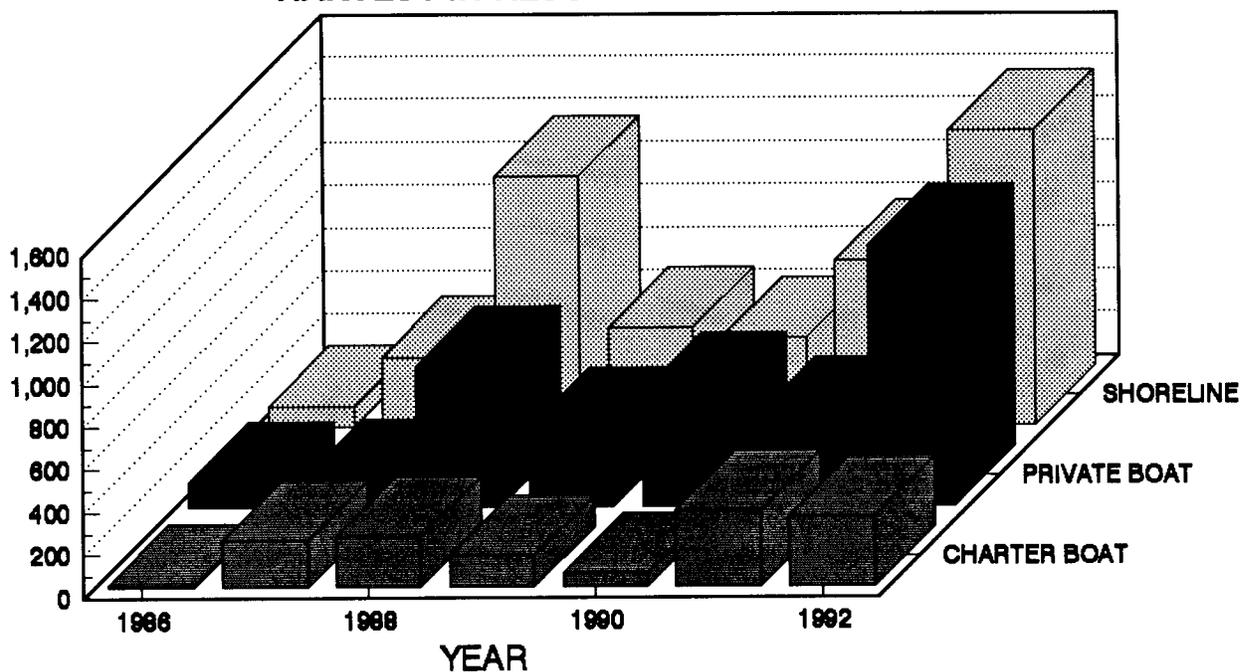
Recommended Research and Management Activities:

No new research activities or regulation changes for this fishery are recommended at present.

Table 14 and Figure 14. Sport harvests of chinook salmon in Resurrection Bay, 1977-1992.

YEAR	TOTAL RES BAY HARVEST	CHARTER BOAT	PERCENT RES BAY HARVEST	PRIVATE BOAT	PERCENT RES BAY HARVEST	SHORELINE	PERCENT RES BAY HARVEST
1977	515	-	-	-	-	-	-
1978	501	-	-	-	-	-	-
1979	156	-	-	-	-	-	-
1980	198	-	-	-	-	-	-
1981	162	-	-	-	-	-	-
1982	335	-	-	-	-	-	-
1983	199	-	-	-	-	-	-
1984	24	-	-	-	-	-	-
1985	187	-	-	-	-	-	-
1986	226	13	6%	116	51%	97	43%
1987	669	217	32%	127	19%	325	49%
1988	2,058	238	12%	655	32%	1,165	57%
1989	976	147	15%	371	38%	458	47%
1990	1,004	62	6%	532	53%	410	41%
1991	1,547	358	23%	420	27%	769	50%
1992	2,925	329	11%	1,219	42%	1,377	47%
1977-91 MEAN	584	173	16%	370	34%	537	50%
%CHANGE 1992 FROM MEAN	401%	91%		229%		156%	

COMPOSITION OF CHINOOK SALMON HARVEST IN RESURRECTION BAY



Prince William Sound Pink Salmon Fishery

There are over 200 streams in PWS that support wild returns of pink salmon. In addition, there are four private nonprofit hatcheries that produce pink salmon. Pink salmon return to PWS from mid-June through late August with the peak of the return occurring in late July.

The sport fishing season is open all year and the bag and possession limit for salmon other than chinook is 6 fish per day and 12 in possession except in the freshwater drainages crossing the Copper River Highway and the Robe River near Valdez, where the bag and possession limits are 3 and 3, respectively. There are some waters that are not open to pink salmon fishing. These waters include Eccles Creek, Eyak Lake drainage, and Hartney Creek all near Cordova, and all freshwater drainages of Valdez Arm except for Robe River and Solomon Gulch Creek.

The pink salmon sport harvest fishery in PWS has been the largest in the state since 1985 (Mills 1991). The average harvest of pink salmon in PWS has been 26,241 fish from 1977 through 1991 which accounted for an average of 80% of the total CGMA pink salmon harvest over this period (Table 15 and Figure 15). Seventy-nine percent of this harvest has been from Valdez Arm. The fishery in Valdez Arm targets early-run pink salmon returning to the VFDA Solomon Gulch Hatchery. The pink salmon return to Solomon Gulch Hatchery has numbered as high as 6 million salmon but the past 2 years the returns have been less than a million salmon. The returning pink salmon are intended primarily for the commercial fishery and cost recovery at the Solomon Gulch Hatchery. From 1977-1991, the average harvest of pink salmon from Valdez Arm has been 20,848 fish (Table 15). Shore-based anglers fishing at Allison Point have accounted for 58% of the average harvest from 1985 through 1990 (Table 16 and Figure 16). Other significant fisheries for pink salmon in PWS occur in non road-accessible areas and in Whittier.

Recent Fishery Performance:

The sport harvest of pink salmon from PWS waters decreased from 1991 to 1992 and the 1992 harvest (32,011) was only 22% above the historical mean harvest for the area (Table 15). This harvest accounted for just over 88% of the total pink salmon harvest from CGMA waters during 1992, a figure well above the average (73%). As was the case in the past, the Valdez Arm supported the largest harvest of pink salmon, even though the 1992 harvest was 20,000 fish less than in 1991. In 1992, there were mediocre pink returns to the hatcheries and poor wild stock returns. These factors combined to produce an exceedingly poor season for pink salmon overall. This is compared to 1991 and the now infamous "humpy-dump" of surplus pink salmon in Montague Straits and donations of whole and canned fish to the needy in Anchorage and Russia.

In 1993, the pink salmon forecast was for 28 million hatchery fish and 1.5 million wild fish to return to PWS but less than 6 million hatchery fish returned. This low hatchery return will probably keep the sport harvest in Valdez Arm near the historical average.

Management Objective:

For hatchery produced pink salmon returning to Valdez Arm the management objectives are: (1) produce through supplemental hatchery production a sport harvest of 50,000 pink salmon; (2) provide 25,000 angler-days of pink salmon fishing opportunity annually; and (3) promote diverse sport fishing opportunity by providing pink salmon to both boat and shore-based anglers.

No other specific fishery objectives have been formally established for PWS pink salmon fisheries to date. An assumption of past and current fisheries management, however, has been to assure for the sustained yield of the various wild pink salmon stocks that occur within the area while assuring for continued and, where possible, expanded opportunity to participate in fisheries targeting hatchery stocks.

Recent Board of Fisheries Actions:

In 1990, the Board opened Solomon Gulch Creek, adjacent to the VFDA hatchery in Valdez, to salmon fishing 300 feet downstream of the VFDA weir.

Current Issues:

The large commercial harvest drives the management of the PWS pink salmon sport fishery. The magnitude of sport harvest will likely remain inconsequential towards achieving escapement goals or determining harvest strategies.

Ongoing Research and Management Activities:

The Division of Sport Fish does not conduct any research on pink salmon stocks in PWS but the Division of Commercial Fisheries conducts an extensive research program in PWS.

Recommended Research and Management Activities:

No additional research or management activities are recommended for this fishery at present. At this time, no changes in regulation are recommended with respect to this fishery.

Table 15 and Figure 15. Sport harvests of pink salmon in Prince William Sound, 1977 - 1992.

YEAR	TOTAL PWS HARVEST	VALDEZ AREA HARVEST	PERCENT OF PWS	WHITTIER AREA HARVEST	PERCENT OF PWS	CORDOVA AREA HARVEST	PERCENT OF PWS	OTHER AREA HARVEST	PERCENT OF PWS
1977	25,425	12,020	47%	-	-	-	-	13,405	53%
1978	16,300	7,910	49%	-	-	-	-	8,390	51%
1979	17,972	13,217	74%	573	3%	-	-	4,182	23%
1980	16,807	11,606	69%	1,343	8%	-	-	3,858	23%
1981	14,774	11,686	79%	691	5%	-	-	2,397	16%
1982	12,923	6,634	51%	2,065	16%	-	-	4,224	33%
1983	14,696	8,696	59%	2,014	14%	-	-	3,986	27%
1984	14,488	9,651	67%	935	6%	149	1%	3,753	26%
1985	32,670	27,375	84%	1,768	5%	55	0%	3,472	11%
1986	25,272	22,170	88%	1,590	6%	549	2%	963	4%
1987	31,382	27,023	86%	2,039	6%	641	2%	1,679	5%
1988	31,470	26,685	85%	1,292	4%	364	1%	3,129	10%
1989	37,994	32,759	86%	935	2%	627	2%	3,673	10%
1990	49,146	46,672	95%	870	2%	162	0%	1,442	3%
1991	52,290	48,609	93%	1,440	3%	774	1%	1,467	3%
1992	32,011	28,587	89%	879	3%	37	0%	2,508	8%
1977-91 MEAN	26,241	20,848	79%	1,350	5%	255	1%	4,001	15%
%CHANGE FROM MEAN	1992	22%	37%	-35%	-86%	-37%			

PINK SALMON HARVEST IN PRINCE WILLIAM SOUND

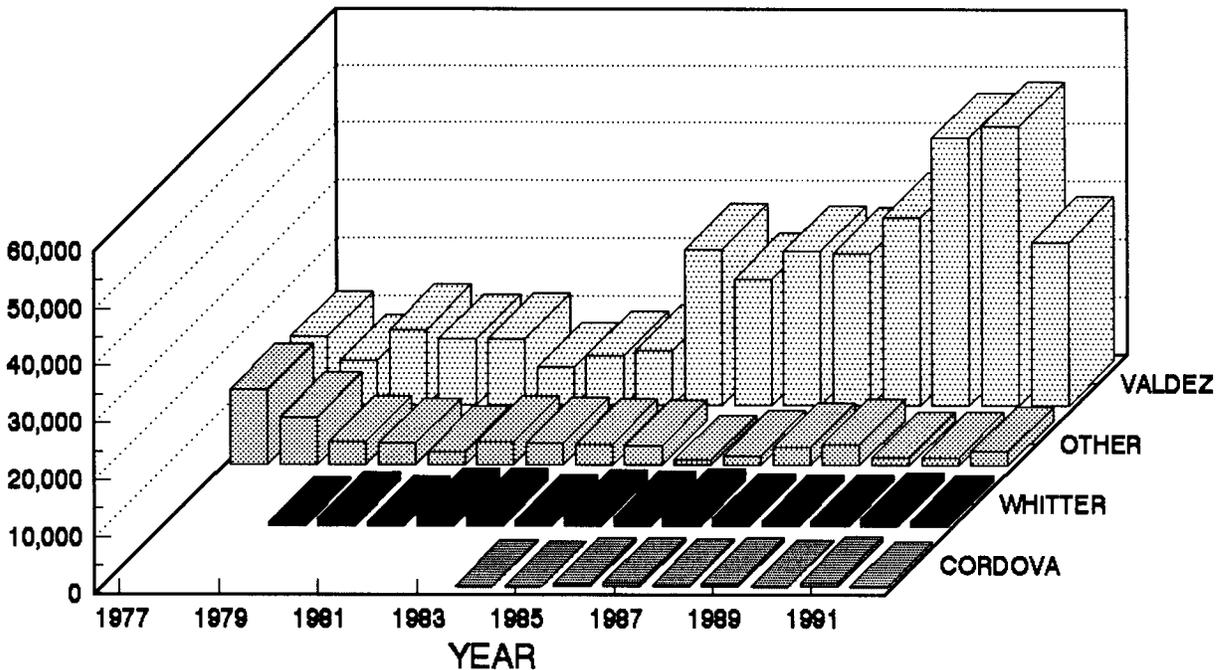
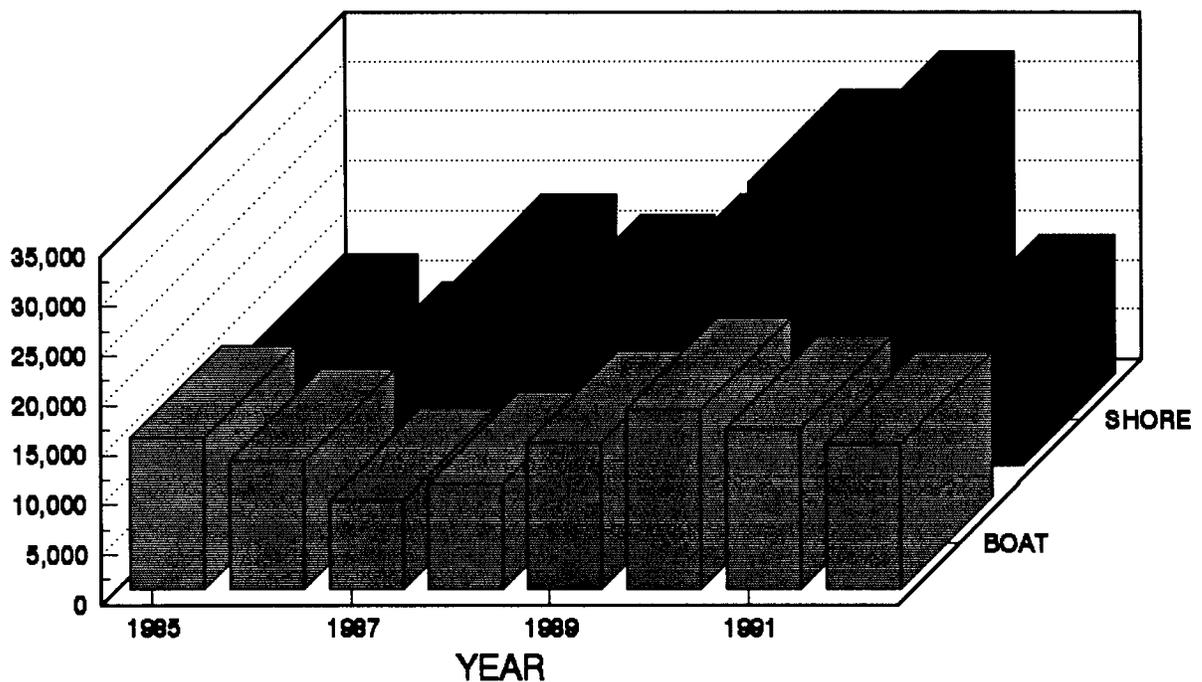


Table 16 and Figure 16. Sport harvests of pink salmon in Valdez Arm, 1977 - 1992.

YEAR	TOTAL	VALDEZ	PERCENT OF FWS	PERCENT BOAT	PERCENT VALDEZ	SHORE	PERCENT VALDEZ
	FWS HARVEST	ARM HARVEST					
1977	25,425	12,020	47%	-	-	-	-
1978	16,300	7,910	49%	-	-	-	-
1979	17,972	13,217	74%	-	-	-	-
1980	16,807	11,606	69%	-	-	-	-
1981	14,774	11,686	79%	-	-	-	-
1982	12,923	6,634	51%	-	-	-	-
1983	14,696	8,696	59%	-	-	-	-
1984	14,488	9,651	67%	-	-	-	-
1985	32,670	27,375	84%	15,223	56%	12,152	44%
1986	25,272	22,170	88%	12,858	58%	9,312	42%
1987	31,382	27,023	86%	8,807	33%	18,216	67%
1988	31,470	26,685	85%	10,568	40%	16,117	60%
1989	37,994	32,759	86%	14,620	45%	18,139	55%
1990	49,146	46,672	95%	18,019	39%	28,653	61%
1991	52,290	49,609	93%	16,128	33%	32,481	67%
1992	32,011	28,587	89%	14,518	51%	14,069	49%
1977-91 MEAN	26,241	20,848	79%	13,746	42%	19,296	58%
%CHANGE 1992 FROM MEAN	22%	37%		6%		-27%	

COMPOSITION OF PINK SALMON HARVEST IN VALDEZ ARM



Resurrection Bay Pink Salmon Fishery

The Resurrection Bay pink fishery is supported by wild stocks that spawn in five streams at the head of the bay. Pink salmon return to Resurrection Bay mid-July through late August with the peak of the return occurring in late July.

The sport fishing season is open all year and the bag and possession limit is 6 salmon other than chinook per day and 6 in possession.

The average harvest of pink salmon in Resurrection Bay has been 5,362 fish from 1977 through 1991 which accounted for an average of 20% of the total CGMA pink salmon harvest over this period (Table 17 and Figure 17). Since 1986, the average harvest of pink salmon for shoreline anglers has been 2,627 fish which represents 50% of the total pink salmon harvest for the time period. Private and charter boats accounted for 29% and 22% of the historical mean harvest for 1986 through 1991, respectively.

Recent Fishery Performance:

The sport harvest of pink salmon from Resurrection Bay during 1992 (4,277) was 20% below the historical mean harvest for the area and the second lowest harvest on an even year since 1977 (Table 17). This harvest accounted for 11% of the total pink salmon harvest from CGMA waters during 1991, a figure well below the average (21%). Shoreline anglers harvested the largest proportion of the total harvest, followed by private boat anglers and charter boat anglers (Figure 17).

Harvest and catch figures are not yet available for the 1993 fishery, but it is anticipated that the harvest will be at or above historic levels for this area.

Management Objective:

No specific fishery objectives have been formally established for Resurrection Bay pink salmon fisheries to date. An assumption of past and current fisheries management, however, has been to assure for the sustained yield of the various pink salmon stocks that occur within the area while assuring for continued and, where possible, expanded opportunity to participate in fisheries targeting these stocks.

Recent Board of Fisheries Actions:

There were no Board actions regarding this fishery in 1990 or 1992.

Current Issues:

There are currently no issues regarding this fishery.

Ongoing Research and Management Activities:

The Division of Sport Fish does not conduct any research on pink salmon stocks in Resurrection Bay but the Division of Commercial Fisheries conducts aerial escapement surveys of pink salmon in the lower Cook Inlet area including Resurrection Bay.

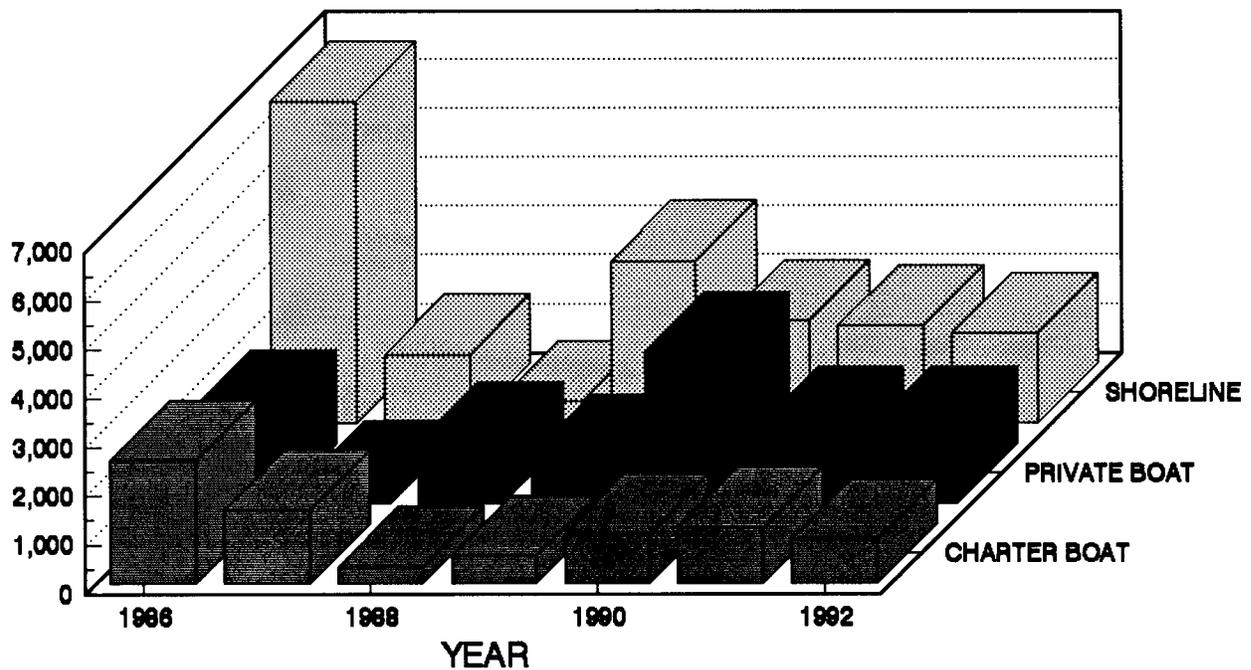
Recommended Research and Management Activities:

No additional research or management activities are recommended for this fishery at present. At this time, no changes in regulation are recommended with respect to this fishery.

Table 17 and Figure 17. Sport harvests of pink salmon in Resurrection Bay, 1977 - 1992.

YEAR	TOTAL RES BAY HARVEST	CHARTER BOAT	PERCENT RES BAY HARVEST	PRIVATE BOAT	PERCENT RES BAY HARVEST	SHORELINE	PERCENT RES BAY HARVEST
1977	1,595	-	-	-	-	-	-
1978	6,610	-	-	-	-	-	-
1979	2,100	-	-	-	-	-	-
1980	12,614	-	-	-	-	-	-
1981	7,776	-	-	-	-	-	-
1982	9,328	-	-	-	-	-	-
1983	4,909	-	-	-	-	-	-
1984	11,597	-	-	-	-	-	-
1985	7,205	-	-	-	-	-	-
1986	11,008	2,538	23%	1,911	17%	6,559	60%
1987	3,368	1,503	45%	471	14%	1,394	41%
1988	2,031	346	17%	1,255	62%	430	21%
1989	4,856	557	11%	990	20%	3,309	68%
1990	6,193	1,027	17%	3,086	50%	2,080	34%
1991	4,714	1,157	25%	1,569	33%	1,988	42%
1992	4,277	897	21%	1,548	36%	1,832	43%
1986-91 MEAN	5,362	1,188	22%	1,547	29%	2,627	49%
%CHANGE 1992 FROM MEAN	-20%	-24%		0%		-30%	

COMPOSITION OF PINK SALMON HARVESTED IN RESURRECTION BAY



Prince William Sound Sockeye Salmon Fishery

Sockeye salmon return to PWS streams from June through August with peak immigration varying by stream. Spawning occurs from mid-July through September.

Current bag and possession limits governing the sport fishery for salmon other than chinook are 6 and 12 fish, respectively, except in all freshwater drainages crossed by the Copper River Highway, including Clear Creek, where the bag and possession limit is 3 fish; in Eshamy Creek drainage the limits are 3 fish per day and 6 in possession; and in Robe River, near Valdez, the bag and possession limit is 1 fish.

From 1977 through 1991, the average harvest of sockeye salmon from PWS has been 4,209, accounting for an average of 84% of the total CGMA sockeye salmon harvest over this period (Table 18 and Figure 18). Just over 44% of this harvest has been from non road-accessible areas (Other) of PWS. Since 1977, the average harvest of sockeye salmon from non road-accessible areas has been 1,855 fish. Other significant fisheries for sockeye salmon in this area occur at Eshamy Bay, Valdez Arm, and Coghill River.

Recent Fishery Performance:

The sport harvest of sockeye salmon from PWS during 1992 (8,358) was the highest on record, 99% above the historical mean harvest for the area since 1977 (Table 18). This harvest accounted for 88% of the total sockeye salmon harvest from CGMA waters during 1992. The harvest of sockeye from non road-accessible areas represented 53% of the total PWS harvest and was the highest recorded harvest from any one area of PWS since 1977. The majority of the harvest in the remote area occurred at Davis Lake. Sockeye smolt were released into Davis Lake in 1990 in an attempt to build a brood source for Coghill Lake egg takes and to possibly create another off-station release location for the commercial fishery. Because of concerns for wild stocks of sockeye returning to Coghill Lake in 1992, the commercial fishery was able to operate in the vicinity of Golden Lagoon and anglers were afforded an excellent opportunity to harvest hatchery produced sockeye salmon. The fishery proved to be successful and popular with not only private boat owners but also aircraft charter operators based in Anchorage. Valdez Arm supported the second largest harvest of sockeye salmon from PWS in 1992. The harvest of 2,153 sockeye from Valdez Arm represented a 173% increase from the historical mean and was the highest on record.

In 1992, the department issued emergency orders that closed both the sport (Sport Fish E.O. Number 2-RS-6-17-92) and commercial fishery targeting sockeye salmon stocks returning to Coghill Lake. These actions were apparently successful; the final escapement for Coghill Lake sockeye exceeded 31,000, which is 6,000 fish over the interim escapement goal of 25,000. Additionally, Eshamy Lake received a strong return of sockeye salmon and escapement actually exceeded the minimum escapement goal. This return provided excellent opportunities for recreational anglers and resulted in some of the best fishing anglers have seen in years for Eshamy.

The 1993 harvest and catch estimates are not yet available for the other sockeye salmon fisheries in PWS, however, they are expected to be above 1991

levels due to the return of hatchery fish and a strong return of wild stocks to Eshamy Lake. However, Coghill Lake once again did not meet the minimum escapement goal and the sport harvest will correspondingly be low.

In 1994, the anticipated total return for Coghill Lake sockeye salmon is only 30,000, which is in excess of the interim escapement goal of 25,000. Therefore directed commercial and sport fisheries will probably not be closed. Eshamy Lake is also forecast to exceed the minimum escapement goal of 35,000 fish.

Management Objective:

For sockeye salmon returning to Eshamy and Coghill lakes, the management objective is to meet the minimum escapement goals (35,000 Eshamy and 25,000 Coghill) while providing for at least 2,000 angler-days of effort annually at each location.

No other specific fishery objectives have been formally established for PWS sockeye salmon fisheries to date. An underlying assumption of past and current fisheries management, however, has been to assure for the sustained yield of the various wild sockeye salmon stocks that occur within PWS while assuring for continued and, where possible, expanded opportunity to participate in fisheries targeting these stocks.

Recent Board of Fisheries Actions:

No specific actions were taken by the Board with respect to this fishery during their 1991 meeting.

Current Issues:

Coghill Lake has produced total adult returns of sockeye salmon as high as one million. The department manages the fishery to achieve an escapement of 40,000-60,000 spawners. From 1987-1992, despite management efforts (including closures of both sport and commercial fisheries targeting Coghill Lake sockeye), the sockeye escapement into Coghill Lake declined. In 1992, the interim escapement goal was met. Edmundson et al. (1991) suggested that Coghill Lake received overescapements in the 1980s and the lake is an excellent candidate for fertilization.

Eshamy Lake has an escapement goal of 30,000 fish and this escapement goal has been obtained only six times since 1967. Whereas Coghill Lake may have been a victim of overescapement, Eshamy Lake salmon are considered a depressed stock due to overexploitation in the commercial fishery. The largest harvest (approximately 50%) takes place in the Southwestern purse seine district and the remaining commercial harvest occurs in the Eshamy and Coghill gill net districts.

Prince William Sound Aquaculture Corporation, a regional private nonprofit hatchery association, has released sockeye smolt in both Coghill and Eshamy lakes to rehabilitate the lakes and provide additional fish to the common property fisheries. These fish will be produced from the Main Bay Hatchery. Sockeye salmon returning to Coghill have the same run timing as chum salmon returning to Wally Noerenberg Hatchery. Enhancement of Coghill Lake has the

potential to exacerbate the mixed stock fishery that already exists in the Esther Subdistrict. There are also parallel concerns for the release of smolt into Eshamy Lake.

At the present time there is not a basic management plan for the Main Bay facility. The department has undertaken extensive discussions with staff from PWSAC in an attempt to draft a Basic Management Plan for the Main Bay Hatchery facility that not only addresses all the department's concerns but also the user's concerns.

Also in the interest of capturing the corporate memory, there is an additional agreement with the Division of Commercial Fisheries that governs how the fisheries are prosecuted on Eshamy Lake sockeye stocks. Management strategy for a projected escapement less than 35,000 into Eshamy Lake is to:

1. close the eastern shore of Chenega Island to commercial purse seine fishing,
2. close the Crafton Island Subdistrict of the Eshamy District to drift and set gill net fishing, and
3. close the Eshamy drainage to sport fishing.

Ongoing Research and Management Activities:

No specific research or management activities are directed at this fishery by Division of Sport Fish although the Division of Commercial Fisheries conducts an extensive research and management program.

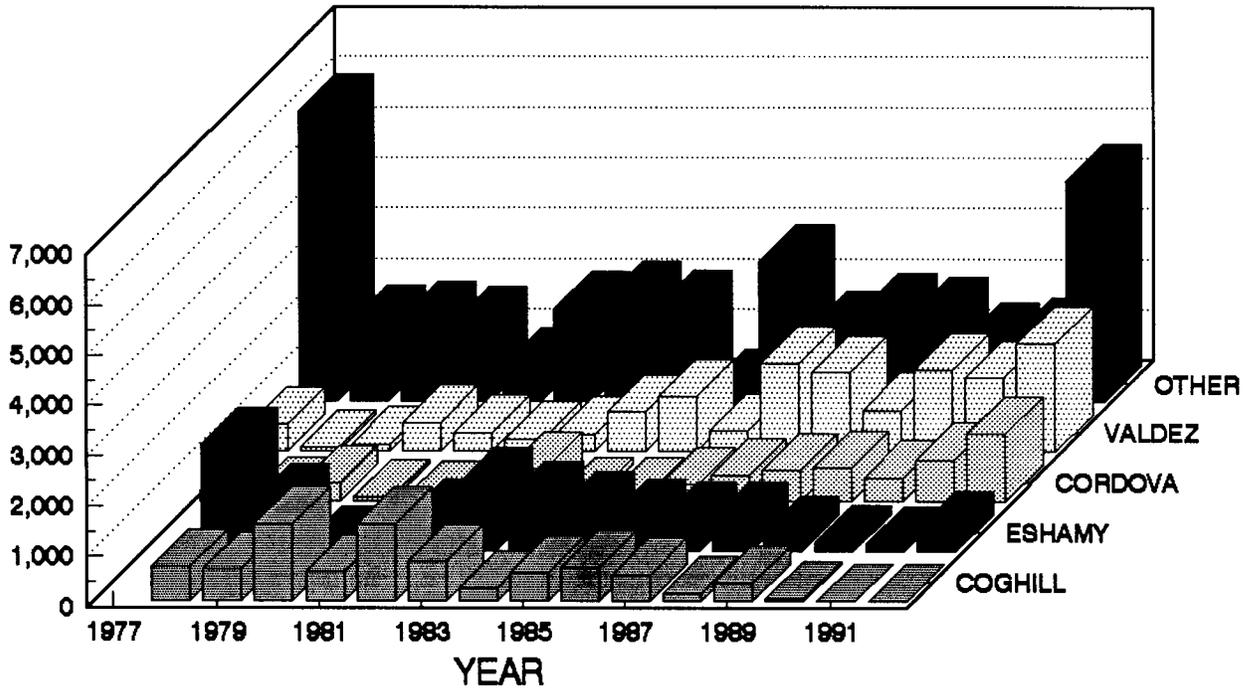
Recommended Research and Management Activities:

No additional research or management activities are recommended for this fishery at present.

Table 18 and Figure 18. Sport harvests of sockeye salmon in Prince William Sound, 1977 - 1992.

YEAR	TOTAL PWS HARVEST	COGHILL SYSTEM	PERCENT PWS HARVEST	ESHAMY SYSTEM	PERCENT PWS HARVEST	CORDOVA AREA	PERCENT PWS HARVEST	VALDEZ ARM	PERCENT PWS HARVEST	OTHER PWS AREAS	PERCENT PWS HARVEST
1977	6,512	-	-	-	-	209	3%	527	8%	5,776	89%
1978	4,575	690	15%	2,099	46%	127	3%	78	2%	1,581	35%
1979	3,772	629	17%	990	26%	362	10%	141	4%	1,650	44%
1980	3,849	1,524	40%	198	4%	69	2%	568	15%	1,550	40%
1981	2,182	572	26%	465	21%	43	2%	367	17%	735	34%
1982	4,286	1,520	35%	671	16%	0	0%	241	6%	1,854	43%
1983	5,124	781	15%	1,315	26%	630	12%	343	7%	2,055	40%
1984	4,077	249	6%	1,048	26%	112	3%	786	19%	1,882	46%
1985	2,908	554	19%	836	29%	130	4%	1,085	37%	303	10%
1986	4,878	657	13%	688	14%	321	7%	413	8%	2,799	57%
1987	4,889	515	11%	634	13%	507	10%	1,756	36%	1,477	30%
1988	4,783	146	3%	637	13%	600	13%	1,582	33%	1,818	38%
1989	3,939	344	9%	352	9%	661	17%	828	21%	1,754	45%
1990	3,562	49	1%	175	5%	466	13%	1,630	46%	1,242	35%
1991	3,792	0	0%	152	4%	825	22%	1,471	39%	1,344	35%
1992	8,358	0	0%	460	6%	1,348	16%	2,153	26%	4,397	53%
1977-91 MEAN	4,209	588	15%	729	18%	337	8%	788	19%	1,855	44%
%CHANGE 1992 FROM MEAN	99%	-100%		-37%		299%		173%		137%	

SOCKEYE SALMON HARVESTED IN PRINCE WILLIAM SOUND



Resurrection Bay Sockeye Salmon Fishery

Sockeye salmon return to Resurrection Bay streams from June through July with peak immigration varying by stream. Spawning occurs in mid-July through September.

Current limits governing the sport fishery for salmon other than chinook in marine waters are 6 per day and in possession. Salmon fishing in Resurrection Bay drainages is closed.

Resurrection Bay has historically been managed primarily for the recreational coho fishery and the sport harvest of sockeye salmon has been incidental and has targeted Bear Lake sockeye stocks. The Board of Fisheries developed a management plan for the salmon fisheries in Resurrection Bay in 1966 which gave the sport fishery the exclusive use of the Bay's coho salmon. In 1976 the Board modified the plan to stipulate that the commercial fishery for other salmon species be managed so that it does not interfere with the recreational fishery. After a successful coho salmon enhancement program was established in Bear Lake, the Board of Fisheries adopted a management plan for Bear Lake in 1971. This plan stated that Bear Lake be managed primarily for the production of coho salmon and in accordance with this objective placed restrictions on the number of sockeye salmon entering Bear Lake.

Bear Lake is considered the only viable candidate for sockeye salmon enhancement in Resurrection Bay. The Board adopted a new management plan for Bear Lake in 1988. This plan rescinded the restrictions on the escapement of sockeye salmon to Bear Lake. Sockeye salmon dip net fisheries were no longer permitted in Bear Creek. The plan further directed the department to establish a sockeye salmon escapement goal for Bear Lake. The plan also stipulated that if enhancement of the sockeye salmon occurs, the early run timing of the native stock is to be maintained. The Board further specified that enhancement should not cause a net loss of coho smolt production from Bear Lake. Should enhancement of sockeye salmon create a viable commercial fishery, it was the Board's intent that this fishery be conducted "with minimal conflict with the sport fishery." This plan was a major departure from previous policy in that Bear Lake is now managed for both coho and sockeye salmon production.

In the spring of 1990, 2.24 million early-run sockeye salmon fry of Big River origin were released into Bear Lake. In addition, 158,000 age-0 smolt of Russian River early-run origin were released at the Bear Lake Fish Facility. These smolt contributed to the first sockeye salmon returns in 1992. The first significant return from the 1990 fry release will occur in 1994 when fish return as 2-ocean adults.

From 1986 through 1991, the average harvest of sockeye salmon from Resurrection Bay has been 651 accounting for an average of 12% of the total CGMA sockeye salmon harvest over this period. Just over 50% of this harvest has been from shoreline anglers (Table 19 and Figure 19). Private boat and charter boat anglers account for the remaining harvest.

Recent Fishery Performance:

The sport harvest of sockeye salmon from Resurrection Bay during 1992 (1,135) was the highest on record, being 74% above the historical mean harvest for the

area since 1986 (Table 19). This harvest accounted for 12% of the total sockeye salmon harvest from CGMA waters during 1991. The 1992 harvest (526) for the shoreline anglers represents a 55% increase from the historical mean harvest from 1986 through 1991.

In 1992, the sockeye salmon smolt outmigration from Bear Lake was 133,787 fish and 1,925 adult sockeye returned to the weir. An additional 202,292 immature sockeye salmon emigrated.

The 1993 harvest and catch estimates are not yet available for the sockeye salmon fishery in Resurrection Bay but they are expected to be similar to 1990 levels since it appears that the returns from the fry and smolt releases have had poor survival to date.

Management Objective:

A biological escapement goal of 1,000 sockeye salmon has been established for Bear Lake. No other specific fishery objectives have been formally established for Resurrection Bay sockeye salmon fisheries to date other than management objectives outlined in the Bear Lake and Resurrection Bay Management Plans. An assumption of past and current fisheries management, however, has been to assure for the sustained yield of the wild sockeye salmon stocks that occur within the CGMA while assuring for continued and, where possible, expanded opportunity to participate in hatchery-supported sockeye salmon fisheries in the area.

Recent Board of Fisheries Actions:

No specific actions were taken by the Board with respect to this fishery during their 1992 meetings.

During its 1992 meeting, the Board entertained a proposal regarding the management of Resurrection Bay commercial fisheries. The proposal centered on reintroducing gill net gear to the commercial fishery in anticipation of the sockeye salmon return from the Bear Lake enhancement effort. The Board did not pass this proposal and did not want to enact any changes to the current management plans for Bear Lake or Resurrection Bay.

Current Issues:

In anticipation of an enhanced sockeye salmon return to Bear Lake in 1992, the Division of Commercial Fisheries and the Cook Inlet Seiners Association jointly developed a management plan that will attempt to provide for adequate escapement while still allowing for an orderly commercial harvest of surplus fish. The plan calls for the commercial fishery to operate on the capes outside of Resurrection Bay to minimize the impact on the recreational fishery. There is no information available on the likely entry pattern for sockeye salmon returning to Bear Lake and staff have concerns about creating a mixed-stock fishery on the capes. The Lower Cook Inlet Seine Fishery Management Plan stipulates that all seine fisheries conducted in Lower Cook Inlet be managed so that their efforts are directed primarily on Lower Cook Inlet stocks. If a significant mixed-stock fishery on other stocks develops as a result of this interim management, the cape fishery can be closed under this plan.

Ongoing Research and Management Activities:

No specific research or management activities are directed at this fishery by Division of Sport Fish.

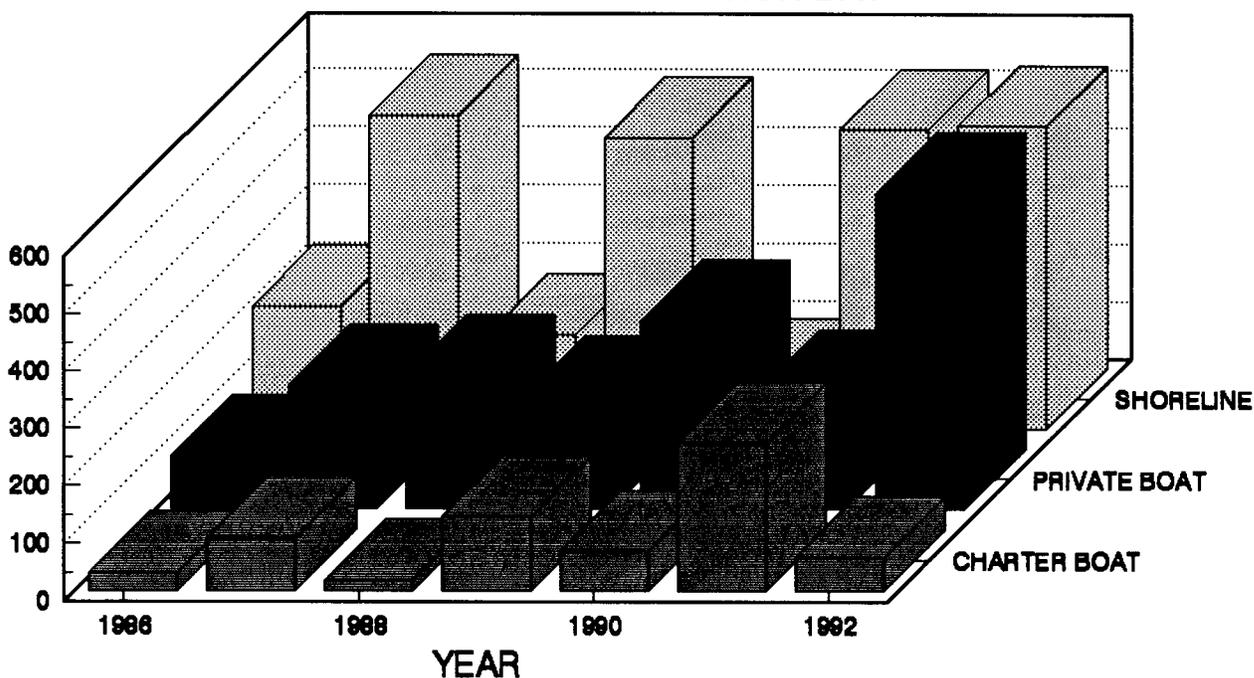
Recommended Research and Management Activities:

It is imperative that a department approved coded wire tagging and recovery program is conducted for the Bear Lake sockeye salmon program. This program will provide data on fishery contribution, timing, and success of the smolt and fry releases of sockeye salmon from Bear Lake.

Table 19 and Figure 19. Sport harvests of sockeye salmon in Resurrection Bay, 1977 – 1992.

YEAR	TOTAL RES BAY HARVEST	CHARTER BOAT	PERCENT RES BAY HARVEST	PRIVATE BOAT	PERCENT RES BAY HARVEST	SHORELINE	PERCENT RES BAY HARVEST
1977	-	-	-	-	-	-	-
1978	-	-	-	-	-	-	-
1979	-	-	-	-	-	-	-
1980	-	-	-	-	-	-	-
1981	-	-	-	-	-	-	-
1982	-	-	-	-	-	-	-
1983	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-
1986	337	31	9%	92	27%	214	64%
1987	851	91	11%	217	25%	543	64%
1988	418	18	4%	236	56%	164	39%
1989	831	128	15%	198	24%	505	61%
1990	486	68	14%	330	68%	88	18%
1991	983	256	26%	208	21%	519	53%
1992	1,135	58	5%	551	49%	526	46%
1986-91 MEAN	651	99	15%	214	33%	339	52%
%CHANGE 1992 FROM MEAN	74%	-41%		158%		55%	

COMPOSITION OF SOCKEYE SALMON HARVESTED IN RESURRECTION BAY



Central Gulf Management Area Lingcod Fisheries

A complete history of the recreational and commercial fisheries for lingcod in the north Gulf of Alaska through 1992 is provided in Vincent-Lang and Bechtol (1992), Meyer (1993), and Hepler et al. (1993). These reports also summarize the actions taken by the Board of Fisheries to manage these stocks for sustained yield and the rationale the Board used towards taking these actions.

Current regulations governing recreational lingcod fisheries in the CGMA are:

- Resurrection Bay, enclosed from a line extending from Cape Aialik to Cape Resurrection, is closed to the commercial and recreational harvest of lingcod. All lingcod caught in these waters must be released immediately. (This regulation was put in place in 1993 to protect and help rebuild severely depressed lingcod stocks in these waters.)
- The bag and possession limit for sport caught lingcod in the area between Cape Puget and Gore Point is one (1). (This regulation was put in place in 1993 to protect and help rebuild depressed lingcod stocks in these waters.) The bag and possession limit for all other waters of the CGMA are 2 and 4, respectively.
- Lingcod may only be retained from July 1 through December 31. (The closed period was put in effect in 1993 to protect spawning and nest guarding lingcod.)
- Only lingcod 35 inches or more in total length or 28 inches or more with their head off may be retained. (This regulation was established in 1993 to assure lingcod could spawn at least once prior to being subject to harvest.)
- All sport caught lingcod may be landed only by hand or net. (This regulation was put in place in 1993 to increase the survival of released lingcod.)

Harvest estimates for the 1993 CGMA recreational lingcod fishery are unavailable at present. It is believed, however, that the 1993 harvest will be significantly below historical levels. Based on proportional sampling conducted during an ongoing port sampling program, preliminary estimates of harvest are believed to range from 2,500 to 3,000 lingcod. The decrease in harvest during 1993 is believed to be the result of restrictions placed on Central Gulf of Alaska lingcod fisheries to protect depressed stocks in and near Resurrection Bay and to assure for the sustained yield of currently healthy stocks in other CGMA waters. As has been the case in the past, most of the harvest occurred in the waters outside, but near to, Resurrection Bay (notably the Chiswell Islands).

Management Objective:

Management of Central Gulf of Alaska lingcod stocks is directed towards assuring for the sustained yield of the various lingcod stocks that occur within the area while assuring for continued and, where possible, expanded opportunity to participate in fisheries targeting these stocks.

Management Approach:

In the marine waters of the CGMA, insufficient data are currently available to estimate exploitable biomass. No research is currently being conducted, nor planned, to collect these data in the near future. Thus, recreational lingcod fisheries in the CGMA are managed using a conservative approach aimed at assuring optimal sustained yield. Given that lingcod recruitment has been shown to be highly variable, the current management approach is to assure that sufficient fish are present in the spawning population to assure for future recruitment. This is done in three ways: (1) protect spawning and nest guarding fish - the sport and commercial season is closed from January 1 through June 30, (2) allow fish to spawn at least once before being subject for harvest - a 35 inch minimum size limit for both sport and commercial fisheries, and (3) restrictive catch limits - the sport fishery is currently restricted to a 2 fish daily, 4 fish in possession limit in areas of healthy stock status, in areas of less healthy stock status, the daily bag and possession limit is reduced. The commercial fishery is restricted by catch limits and bycatch quotas.

Stock Status:

Most lingcod stocks in the CGMA are currently healthy. However, stocks in and near to Resurrection Bay are currently depressed. To rebuild severely depressed stocks in Resurrection Bay, the sport and commercial fishery inside Resurrection Bay is currently closed. Catch rate and size information collected during the summer of 1993 during fishery-independent sampling indicate that these stocks remain severely depressed and recruitment has yet to occur in these stocks. Based on this, these waters will remain closed as currently regulated. To rebuild depressed stocks outside Resurrection Bay, the daily bag limit and possession limit has been reduced to one from Cape Puget to Gore Point. These actions are expected to remain in effect until the stocks recover to permit a sustainable harvest, likely many years to come. A preliminary review of size data collected during fishery independent sampling conducted during 1993 indicates recruitment has yet to occur in these stocks. Thus, the reduced bag and possession limits will remain in effect for these waters.

Management Issues:

There are currently no major issues facing this fishery. Depressed stocks are being monitored to evaluate their recovery. Recovery of stocks is being evaluated through collection of fishery-independent age and size statistics to evaluate time-series trends in recruitment. Healthy stocks are being monitored through the port sampling program to evaluate trends in age and size compositions.

Ongoing Research and Management Activities:

A research program aimed at estimating the age, sex, and length compositions of the recreational lingcod harvests from Central Gulf of Alaska waters has been annually conducted since 1987. Managers recommend continuation of this sampling program. In addition, a fishery-independent sampling program was implemented during 1993 to monitor the recruitment of depressed lingcod stocks in the Resurrection Bay area. With the implementation of minimum size limits,

the ability to assess recruitment to these stocks was lost. Staff recommend that fishery-independent estimates of the age, sex, and size compositions of the lingcod stocks in Resurrection Bay be collected for the next 2-4 years.

Central Gulf Management Area Dolly Varden Fisheries

Dolly Varden are available to anglers throughout the year in the CGMA, however, peak fishing opportunities typically occur as the fish migrate to and from overwintering and spawning areas. Peak harvest typically occurs in May and from mid-July through September. Spawning begins in September and lasts into November.

All streams in the CGMA are open year long to fishing for Dolly Varden. The daily bag and possession limit for PWS is 10 Dolly Varden with no size limit and for Resurrection Bay the bag and possession limit is 5 fish.

The average harvest of Dolly Varden has been 5,775 for 1977 through 1991 for the waters of the CGMA (Table 20). Sport fisheries for Dolly Varden in PWS have accounted for an average of about three-quarters of the CGMA total Dolly Varden harvest. Within PWS, the remote areas (Other) have supported the largest fishery for Dolly Varden. The average harvest of Dolly Varden from 1977 through 1991 for the remote areas has been 2,258 fish (Table 20 and Figure 20). Other significant fisheries for Dolly Varden in PWS include Robe River near Valdez and Eyak River near Cordova (Table 21, Figure 21 and Table 22, Figure 22).

Resurrection Bay also supports a sport fishery for Dolly Varden. The average harvest has been 1,077 fish for 1977 through 1991 (Table 23). The majority of the harvest has occurred in the marine waters by anglers using private boats and by shoreline anglers (Figure 23).

Recent Fishery Performance:

The sport harvest of Dolly Varden from the CGMA during 1992 (3,758) was 52% below the historical mean harvest for the area (Tables 20 and 23). As was the case in the past, the PWS fisheries supported the largest harvest of Dolly Varden. In 1992, the fisheries in Valdez Arm accounted for 45% of the PWS harvest of Dolly Varden (Table 20). Other significant fisheries include Cordova road system and non road-accessible area. The fishery for Dolly Varden in the marine waters represented 61% of the total harvest for Valdez in 1992 (Table 21). In Cordova, the freshwater streams other than Eyak River accounted for the majority of the harvest and had the highest recorded harvest since 1983 (Table 22). The harvest of Dolly Varden in Resurrection Bay in 1992 was 376 fish which was the second lowest recorded since 1977 and represented a 65% decrease from the historical mean (Table 23 and Figure 23).

Management Objective:

No specific fishery objectives have been formally established for CGMA Dolly Varden fisheries to date. An assumption of past and current fisheries management, however, has been to assure for the sustained yield of the various Dolly Varden stocks that occur within the CGMA while assuring for continued and, where possible, expanded opportunity to participate in fisheries targeting these stocks.

Recent Board of Fisheries Actions:

During the 1991 Board meeting, the PWS bag and possession limit for Dolly Varden was reduced from a daily bag and possession limit of 15 fish per day and 30 in possession to 10 fish daily and in possession.

Current Issues:

The major concern for Dolly Varden in the CGMA is the rapidly declining harvest in the freshwater drainages of Valdez Arm. In 1984, the freshwater drainages of Valdez Arm supported a harvest of 8,755 Dolly Varden and by 1991 the harvest had declined to zero fish (Table 21 and Figure 21). There are limited data on Dolly Varden stocks in the Valdez area but it is assumed that Robe Lake is the major overwintering site for various spawning stocks in the Valdez Arm since it is the only large lake in the area. The Robe River drainage supported the largest harvest of Dolly Varden in the CGMA in the mid-1980s but only accounted for slightly over 3% of the CGMA harvest in 1990 and that dropped to zero in 1991. It is hypothesized that the reason for the decline in harvest is that Robe Lake is rapidly becoming an eutrophic lake which is leading to a degradation of critical overwintering habitat.

Ongoing Research and Management Activities:

There are no ongoing research projects for this fishery since funding for the damage assessment and restoration projects has been denied by the Trustee Council.

Recommended Research and Management Activities:

No new research is currently recommended for PWS or Resurrection Bay Dolly Varden stocks.

Table 20 and Figure 20. Sport harvests of Dolly Varden in Prince William Sound, 1977 – 1992.

YEAR	TOTAL PWS HARVEST	PERCENT VALDEZ	PERCENT OF PWS CORDOVA	PERCENT OF PWS	REMOTE HARVEST	PERCENT OF PWS	
1977	6,302	594	9%	854	14%	4,854	77%
1978	3,462	877	25%	866	25%	1,719	50%
1979	9,517	691	7%	2,963	30%	5,963	63%
1980	8,086	1,128	14%	3,057	38%	3,901	48%
1981	5,218	97	2%	1,577	30%	3,544	68%
1982	6,236	356	6%	2,348	38%	3,532	57%
1983	4,697	976	21%	2,632	56%	1,089	23%
1984	11,707	9,566	82%	1,245	11%	896	8%
1985	6,504	4,803	74%	662	10%	1,039	16%
1986	7,295	5,077	70%	978	13%	1,240	17%
1987	4,598	1,049	23%	1,268	28%	2,281	50%
1988	2,619	983	38%	1,309	50%	327	12%
1989	4,336	1,141	26%	1,840	42%	1,355	31%
1990	2,698	1,341	50%	621	23%	736	27%
1991	3,354	956	29%	997	30%	1,401	42%
1992	3,382	1,515	45%	1,163	34%	704	21%
1977-91 MEAN	5,775	1,976	34%	1,541	27%	2,258	39%
%CHANGE FROM MEAN 1992	-41%	-23%		-25%		-69%	

DOLLY VARDEN HARVESTED IN PRINCE WILLIAM SOUND

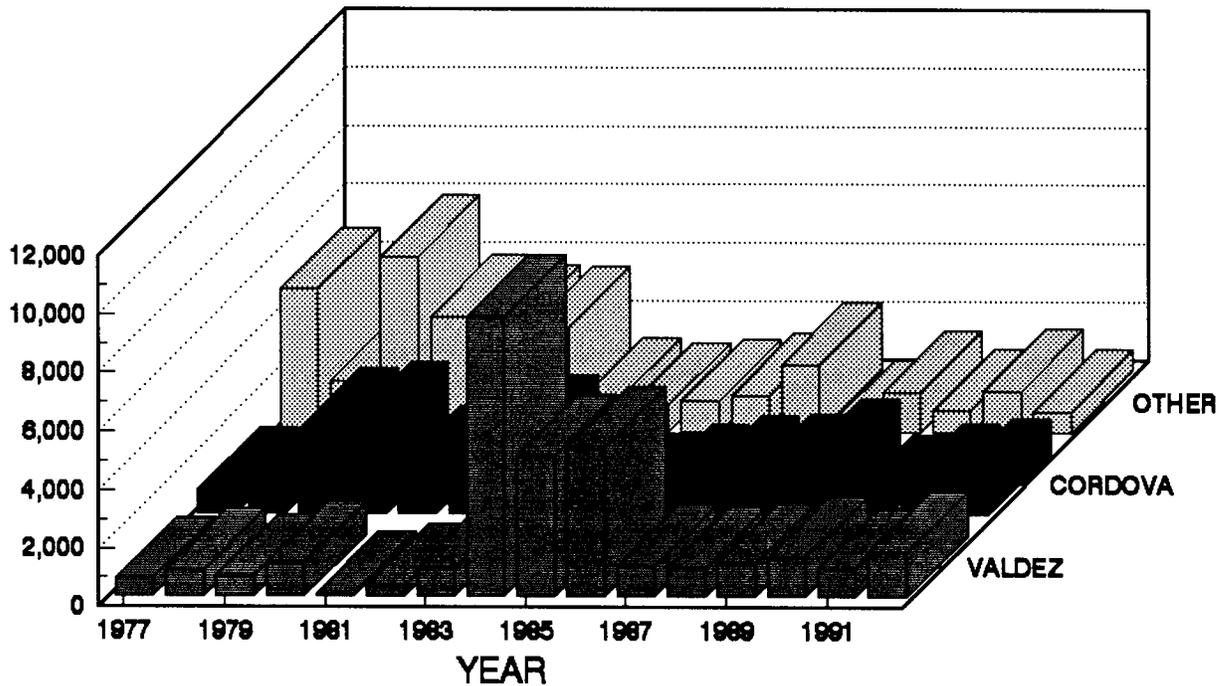


Table 21 and Figure 21. Components of the sport harvest of Dolly Varden in Valdez area, 1977 - 1992.

YEAR	VALDEZ VALDEZ	SALTWATER	PERCENT VALDEZ HARVEST	ROBE RIVER	PERCENT VALDEZ HARVEST	OTHER FRESHWATER	PERCENT VALDEZ HARVEST
1977	594	594	100%	-	-	-	-
1978	877	877	100%	-	-	-	-
1979	691	691	100%	-	-	-	-
1980	1,128	1,128	100%	-	-	-	-
1981	97	97	100%	-	-	-	-
1982	356	356	100%	-	-	-	-
1983	976	262	27%	399	41%	315	32%
1984	9,566	811	8%	6,098	64%	2,657	28%
1985	4,803	1,300	27%	3,225	67%	278	6%
1986	5,077	276	5%	4,755	94%	46	1%
1987	1,049	434	41%	525	50%	90	9%
1988	983	346	35%	455	46%	182	19%
1989	1,141	735	64%	387	34%	19	2%
1990	1,341	1,243	93%	98	7%	0	0%
1991	956	956	100%	0	0%	0	0%
1992	1,515	925	61%	590	39%	0	0%
1977-91 MEAN	1,976	674	34%	1,771	62%	399	14%
%CHANGE 1992 FROM MEAN	-23%	37%		-67%		-100%	

DOLLY VARDEN HARVEST IN THE VALDEZ AREA

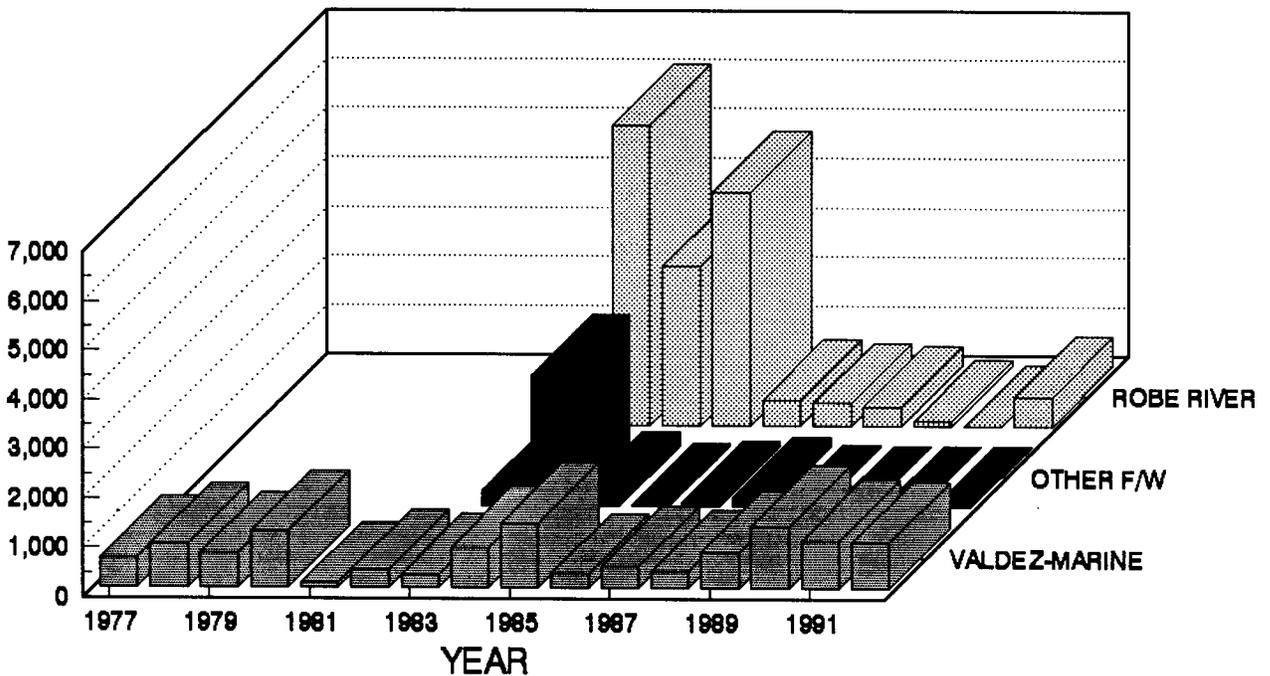


Table 22 and Figure 22. Components of the sport harvest of Dolly Varden in Cordova area, 1977 – 1992.

YEAR	CORDOVA	CORDOVA SALTWATER	PERCENT CORDOVA HARVEST	EYAK SYSTEM	PERCENT CORDOVA HARVEST	OTHER FRESHWAT	PERCENT CORDOVA HARVEST
1977	854	-	-	854	100%	-	-
1978	866	-	-	866	100%	-	-
1979	2,863	-	-	2,863	100%	-	-
1980	3,057	-	-	3,057	100%	-	-
1981	1,577	-	-	1,577	100%	-	-
1982	2,348	-	-	2,348	100%	-	-
1983	2,632	-	-	692	26%	1,940	74%
1984	1,245	75	6%	723	58%	447	36%
1985	662	35	5%	575	87%	52	8%
1986	978	138	14%	642	66%	198	20%
1987	1,268	706	56%	290	23%	272	21%
1988	1,309	364	28%	836	64%	109	8%
1989	1,840	368	20%	813	44%	659	36%
1990	621	0	0%	458	74%	163	26%
1991	997	202	20%	512	51%	283	28%
1992	1,163	25	2%	434	37%	704	61%
1977-91 MEAN	1,541	236	21%	1,140	74%	458	36%
%CHANGE 1992 FROM MEAN	-25%	-89%		-62%		54%	

DOLLY VARDEN HARVEST IN THE CORDOVA AREA

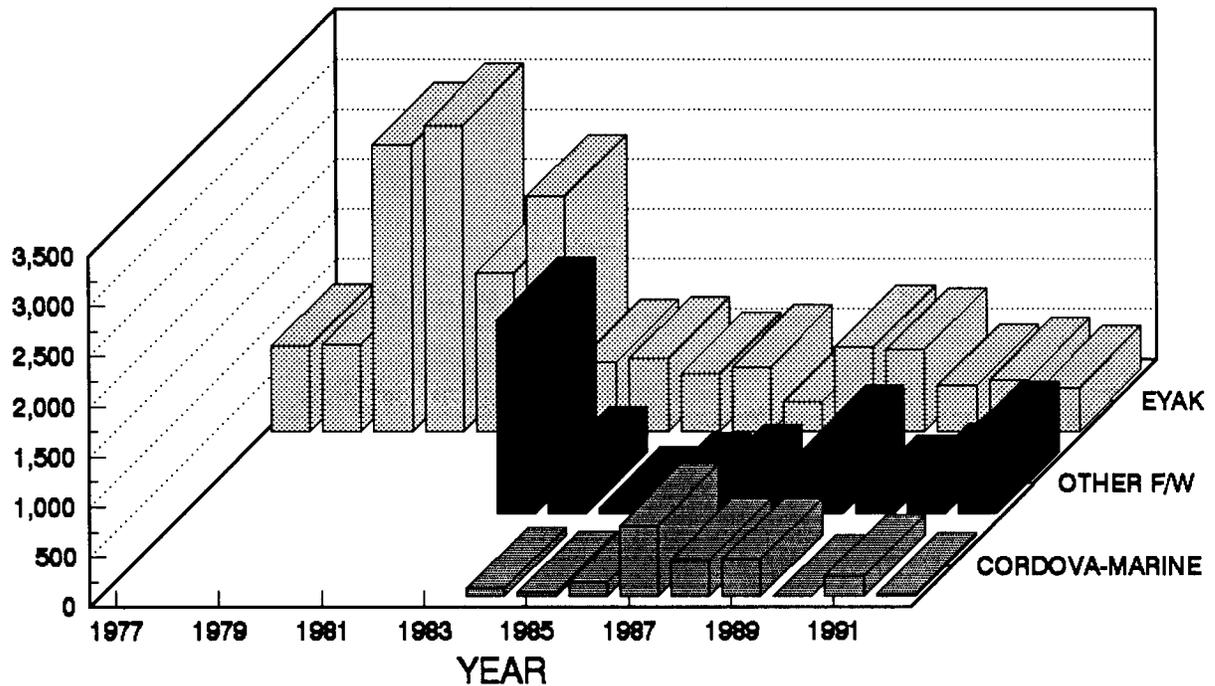
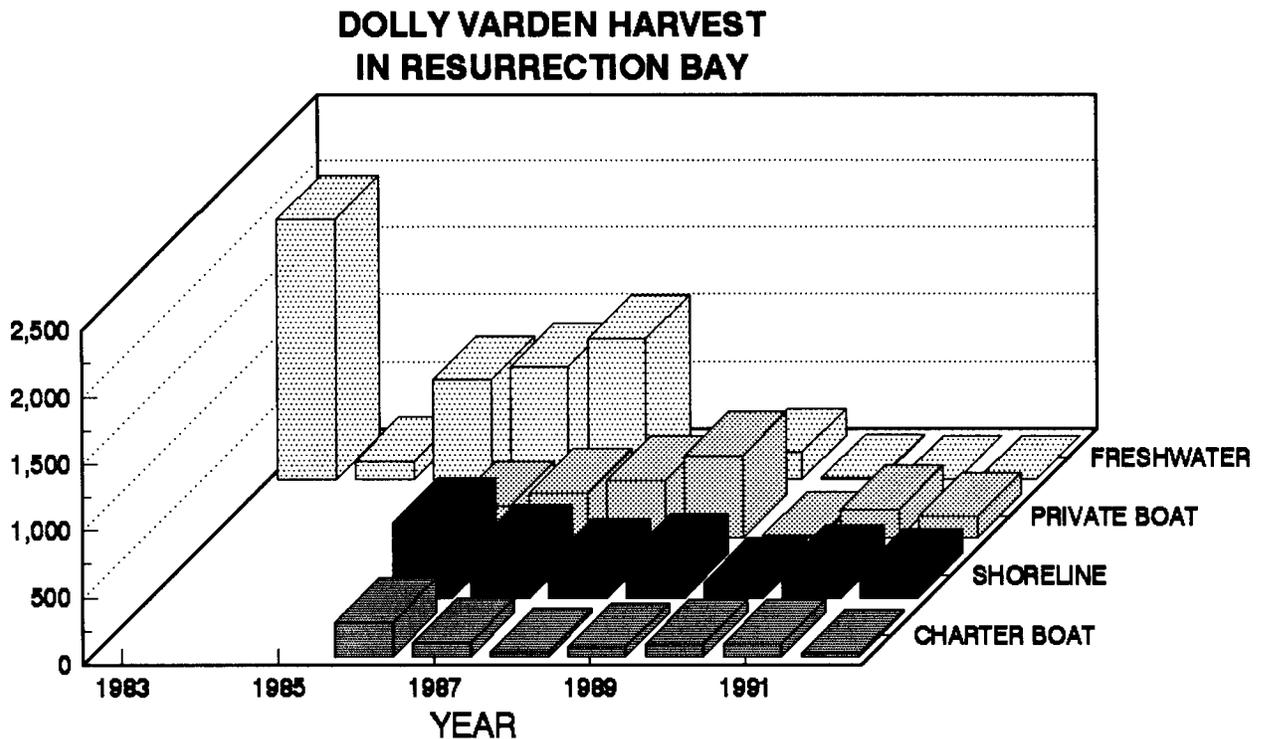


Table 23 and Figure 23. Sport harvests of Dolly Varden in Resurrection Bay, 1977 – 1992.

YEAR	TOTAL RES BAY HARVEST	TOTAL SALTWATER HARVEST	TOTAL FRESHWATER HARVEST	CHARTER BOAT	PERCENT RES BAY	PRIVATE BOAT	PERCENT RES BAY	SHORELINE	PERCENT RES BAY
1977	1,720	1,720	-	-	-	-	-	-	-
1978	1,248	1,248	-	-	-	-	-	-	-
1979	973	973	-	-	-	-	-	-	-
1980	878	878	-	-	-	-	-	-	-
1981	5,335	5,335	-	-	-	-	-	-	-
1982	1,562	1,562	-	-	-	-	-	-	-
1983	7,751	5,811	1,940	-	-	-	-	-	-
1984	1,908	1,771	137	-	-	-	-	-	-
1985	1,161	416	745	-	-	-	-	-	-
1986	1,912	1,071	841	260	14%	245	13%	566	30%
1987	1,866	815	1,051	109	6%	344	18%	362	19%
1988	728	728	0	36	5%	437	60%	255	35%
1989	1,193	993	200	75	6%	618	52%	300	25%
1990	238	228	10	94	39%	21	9%	113	47%
1991	524	524	0	97	19%	220	42%	207	40%
1992	376	376	0	24	6%	164	44%	188	50%
1986-91 MEAN	1,077	727	350	112	10%	314	29%	301	28%
%CHANGE 1992 FROM MEAN	-65%	-48%	-100%	-79%		-48%		-37%	



Prince William Sound Cutthroat Trout Fisheries

Cutthroat trout are available to anglers throughout the year in the CGMA, however, peak fishing opportunities typically occur as the fish migrate to and from overwintering and spawning areas. Peak harvest typically occurs in May and from mid-July through September. Spawning begins in April and lasts into June.

All streams in the CGMA are open year long to fishing for cutthroat trout. The daily bag and possession limit for PWS is 2 cutthroat trout with no size limit except for the freshwater drainages crossed by the Copper River Highway. In these road accessible areas, the bag and possession limit is 5 of which no more than 1 can be over 10 inches in length.

The average harvest of cutthroat trout in PWS has been 1,211 for 1977 through 1991 (Table 24 and Figure 24). The non road-assessable areas (excluding Eshamy River drainage) (Other) have supported the largest fishery for cutthroat trout in PWS. Since 1977, the average harvest of cutthroat trout from the non road-accessible areas has been 576 fish which represents 48% of the historical mean harvest (Table 24). The cutthroat fishery in the Cordova area accounted for 37% of the average harvest from 1977 through 1991. The majority of the cutthroat fishery for Cordova occurs in the Eyak River drainage. Another significant fishery for cutthroat occurs in the Eshamy River drainage (Table 24 and Figure 24).

Recent Fishery Performance:

The sport harvest of cutthroat trout from PWS during 1992 (1,015) was 16% below the historical mean harvest for the area (Table 24). In 1992, fisheries at Cordova and non road-accessible areas had comparable harvests of approximately 500 fish each.

Eshamy Creek drainage and Green Island Creek were closed by emergency order (2-CT-6-02-92) in 1992 during the spawning season. Information collected by the Natural Resource Damage Assessment program following the *Exxon Valdez* oilspill indicated that cutthroat in the oil impacted area had reduced survival and growth. There was concern that the stocks may be unable to sustain historical levels of harvest, especially during spawning season. This emergency order reduced the harvest to zero in these areas. A similar emergency order was also written in 1993.

Management Objective:

The management objective for cutthroat trout is to stabilize the harvest of cutthroat trout to 500 fish while still providing 2,000 angler-days of fishing effort. This harvest level represents approximately an overall 10% fishing mortality on PWS cutthroat trout and should aid in the recovery of stocks impacted by the Exxon Valdez oil spill.

Recent Board of Fisheries Actions:

During the 1991 Board meeting, the PWS bag and possession limit for cutthroat trout was reduced from a daily bag and possession limit of 5 fish per day and 10 in possession of which only 1 per day and 2 in possession can be over

20 inches in length to a 2 fish daily bag and possession limit with no size limit except for the freshwater drainages crossed by the Copper River Highway. In these road accessible areas, the bag and possession limit is 5 of which no more than 1 can be over 10 inches in length.

Current Issues:

Prince William Sound is the most northern and western extreme of the natural range for cutthroat trout and the populations are small in size and distribution. Populations of fish on the outer extremes of their distribution tend to be more susceptible to environmental changes and their survival rates are highly variable. Cutthroat trout are also subject to incidental catch in the commercial fisheries which adds further risk to these small stocks. The department has concerns on whether even the present small harvest is sustainable. Select cutthroat trout stocks in the Pacific northwest have been selected as candidates as threatened species under the Endangered Species Act.

Information collected by the Natural Resource Damage Assessment program following the Exxon Valdez oil spill documented injury to cutthroat trout in western PWS (Hepler et al. *In prep*). Mortality rates of sea-run cutthroat trout from oiled areas (Green Island and Eshamy creeks) were significantly higher than from sites in the nonoiled areas of eastern PWS. There was also a significant reduction in growth in oiled sites. Both Green Island and Eshamy creeks are popular sport fishing sites supporting small populations of sea-run cutthroat trout numbering less than 200 fish. Given the additional mortality due to oil effects, available information suggests that oil impacted stocks may be unable to sustain historical levels of harvest. Reduction in growth due to oil perturbation may result in lowered reproductive potential. Each of these possible repercussions causes immediate concerns for the cutthroat stocks of Green Island and Eshamy creeks.

Ongoing Research and Management Activities:

There are no ongoing research projects for this fishery since funding for the Dolly Varden/cutthroat trout damage assessment and restoration projects has been denied by the Trustee Council.

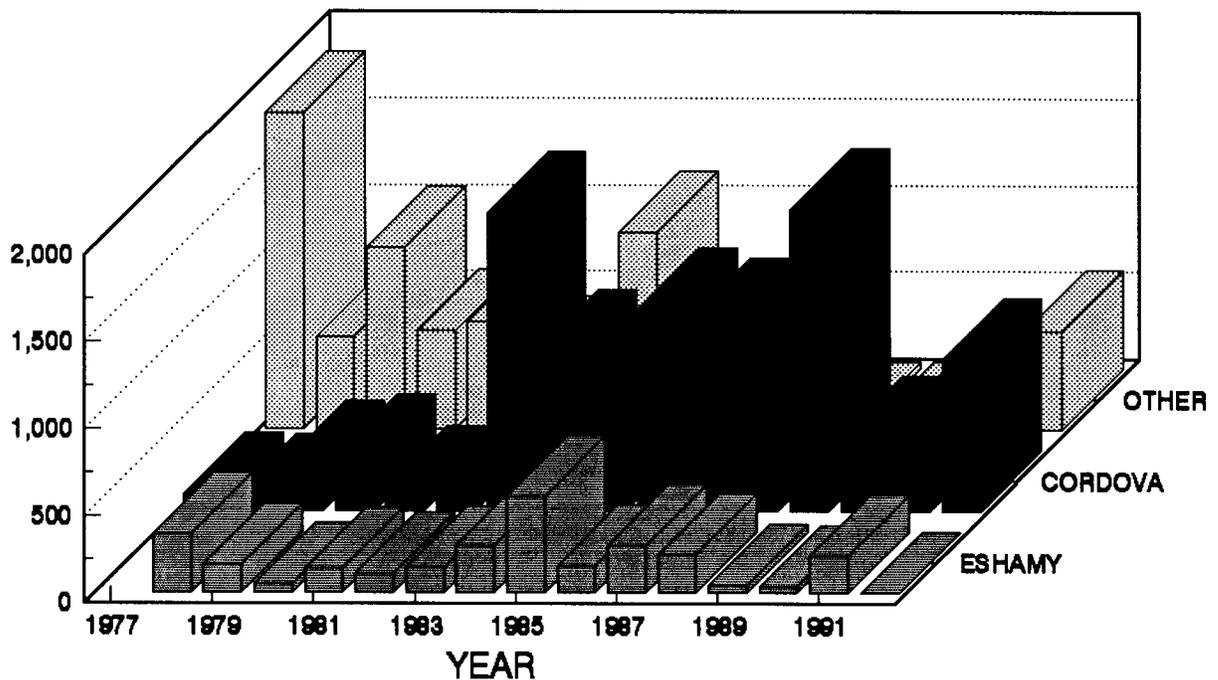
Recommended Research and Management Activities:

Cutthroat trout spawn from April through June and fishing for cutthroat during their critical spawning period, even if the trout is released, places additional stress on the fish. This stress increases fishing related mortality and further impacts the reproductive potential of this resource. Even though the department only has information on the impact of oil from two sites, data suggest that these sites are overwintering populations that are comprised of a number of different spawning stocks and the only way to effectively reduce fishing mortality on these stocks is to enact areawide restrictions. Based on this information, the department submitted a proposal to prohibit fishing for cutthroat trout during the spawning season from April 16 through June 15. The proposal will be considered by the BOF during the February 1994 meeting. If the BOF does not adopt the proposal, the department will continue to issue an emergency order on an annual basis that would prohibit the retention of cutthroat trout during the spawning season.

Table 24 and Figure 24. Sport harvests of cutthroat trout in Prince William Sound, 1977 - 1992.

YEAR	TOTAL PWS HARVEST	CORDOVA AREA HARVEST	PERCENT OF PWS	ESHAMY AREA HARVEST	PERCENT OF PWS	OTHER AREA HARVEST	PERCENT OF PWS
1977	1,912	93	5%	-	-	1,819	95%
1978	957	90	9%	334	35%	533	56%
1979	1,491	282	19%	163	11%	1,046	70%
1980	939	319	34%	52	6%	568	60%
1981	886	130	15%	140	16%	616	70%
1982	654	136	21%	105	16%	413	63%
1983	1,824	1,436	79%	147	8%	241	13%
1984	2,542	873	34%	274	11%	1,395	55%
1985	915	188	21%	554	61%	173	19%
1986	1,620	901	56%	153	9%	566	35%
1987	1,358	1,050	77%	272	20%	36	3%
1988	619	218	35%	219	35%	182	29%
1989	1,511	611	40%	39	3%	861	57%
1990	523	311	59%	33	6%	179	34%
1991	416	116	28%	290	70%	10	2%
1992	1,015	522	51%	0	0%	493	49%
1977-91 MEAN	1,211	450	37%	198	17%	576	48%
%CHANGE 1992 FROM MEAN	-16%	16%		-100%		-14%	

CUTTHROAT TROUT HARVEST IN PRINCE WILLIAM SOUND



Central Gulf Management Area Halibut Fishery

Halibut are one of the most popular targets of recreational anglers fishing the marine waters of the CGMA. Of the 82,000 days recreational anglers spent fishing for groundfish in the CGMA during 1991, about 50,000 angler-days were spent targeting halibut. In comparison, recreational anglers spent only about 25,000 angler-days fishing halibut in the CGMA during 1987. The majority of halibut are harvested from May through early September. The limits for halibut are 2 fish per day and 4 fish in possession. The fishery is open year round with the exception of January which is closed to protect spawning halibut.

The average sport harvest of halibut from CGMA area waters from 1977 through 1992 has been about 12,500 (Table 25). Over this period, harvests have risen annually, from about 2,900 halibut in 1977 to nearly 35,000 halibut in 1992 (Figure 25). The 1992 harvest was a record for the CGMA.

Seward area fisheries have supported about half of the total harvest of halibut from CGMA waters from 1977 through 1992 (Table 25). Most of the halibut harvest in the Seward area has historically been by private boat anglers (Table 26). However, since 1991, most of the harvest has been by chartered anglers (Table 26). The number of halibut harvested by charter anglers in the Seward area has more than doubled since 1990 (Table 26). Waters fished out of Seward extend from the entrances of Prince William Sound west to Gore Point with most of the effort occurring from Cloudy Cape to Cape Junken.

Prince William Sound has historically supported sport harvests of about 6,100 halibut (Table 25). These harvests have represented about half of the total harvest of halibut from CGMA waters over this period. Waters fished in PWS include all inside waters as well as the entrances to PWS, with most of the effort occurring at the entrances. As has been the case for overall CGMA harvests, PWS halibut harvests have also increased near annually, from about 1,000 halibut in 1978 to about 18,000 halibut in 1992. The majority of the PWS halibut harvest has been by anglers returning to Valdez (Figure 26). From 1977 through 1992, anglers returning to Valdez have harvested an average of 2,500 halibut.

The sport harvest of halibut from the CGMA during 1992 (34,746) was the highest on record and nearly triple the historical mean harvest from 1977 through 1992 (Table 25). As has been the case in the past, nearly half the halibut harvest has come from Seward area waters, with the remaining harvest coming from PWS waters (Table 25). Harvests in both PWS and the Seward area were records. As in the past, Valdez harvest accounted for the majority of the total PWS halibut harvest (Figure 26). Considerable expansion in both the charter and private fleets has occurred in recent years in both PWS and the Seward areas. Harvest and catch estimates for halibut are not yet available for the 1993 season; however, observations indicate that effort and harvest during 1993 approximated 1992 levels.

The halibut sport fishery is of major importance to the economy of southcentral Alaska. In 1986, anglers spent 18.5 million dollars in southcentral Alaska in the pursuit of halibut, and indicated a willingness to pay an additional 25 million dollars to ensure the availability of halibut fishing

opportunities. In 1985, the Homer halibut charter industry generated over 9 million dollars in gross income for the Homer economy as well as an equivalent of 64 full-time, year-round jobs. In addition, proceeds from halibut derbies are often donated to support a variety of community projects and organizations.

Management Authority:

Halibut and their fisheries are managed under an international treaty, the Halibut Convention of 1953 and its 1979 Protocol. Under this treaty, the International Pacific Halibut Commission (IPHC) was formed to assure for the optimal sustained yield of the North Pacific halibut resource. For purposes of management, the IPHC has divided the North Pacific halibut fishery into 10 regulatory areas, stretching from northern California to Alaska. The CGMA falls in regulatory area 3A. Each year, the IPHC establishes separate catch quotas for each of these regulatory areas that assures for the halibut stock's optimal sustained yield. These catch quotas represent the maximum number of halibut that can be harvested from each area annually and, under the treaty, total harvest by all users groups cannot exceed these quotas. The IPHC does not, however, have the authority to allocate the catch quota amongst the various fisheries exploiting the halibut stock in United States (U.S.) waters. In U.S. waters, the responsibility for allocation of the catch quota amongst fisheries falls to the North Pacific Fishery Management Council (NPFMC) via the Magnuson Fisheries Conservation and Management Act of 1976. The Alaska Department of Fish and Game, Division of Sport Fish, provides technical data and other information to both the IPHC and the NPFMC to aid in making management and allocation decisions. The State of Alaska does not have direct management authority over halibut and halibut fisheries off Alaska.

Management Objective:

Under treaty, North Pacific halibut stocks are to be managed for optimum sustained yield. Currently, the North Pacific halibut stock is fully utilized.

Management Approach:

A constant exploitation strategy is used to manage North Pacific halibut stocks. The IPHC meets annually in January to calculate the exploitable biomass (yield) available for harvest in each of the 10 regulatory areas. Constant exploitation yield (CEY) is calculated for each regulatory area as the estimated exploitable biomass available times a 0.30 exploitation rate. Each CEY thus represents the total allowable harvest (in pounds) for each regulatory area. Under treaty, total harvest by all user groups cannot exceed this figure. The IPHC then estimates the sport (based on a 2 fish daily bag limit and 4 fish possession limit and February 1 through December 31 open season) and personal-use/subsistence harvests and wastage and bycatch mortalities for each regulatory area. These are subtracted from the CEY on a regulatory area basis. The remainder is then "allocated" to the directed commercial halibut fishery. This factoring of the catch has, to the present, been done by the IPHC and the final numbers "approved" by the NPFMC on an annual basis. Under this management approach CEY changes annually, reflective of the estimated biomass of exploitable halibut present (i.e., quotas are lower

during years of low exploitable biomass and higher during years of high exploitable biomass).

Stock Status:

Halibut stocks are currently in decline in the North Pacific Ocean. Exploitable biomass is currently declining at about 10% per year. This decline does not endanger the stock's health, but results in fewer fish being available for harvest. However, recruitment may have reached its low point and exploitable biomass should begin growing by the latter part of the 1990s. This will result in more fish being available for harvest.

Management Issues:

The Alaska Longline Fishermen's Association (ALFA) has submitted a proposal to the NPFMC to establish a quota for the sport charter industry in Alaska. The proposal was submitted to address what the ALFA perceives to be "rapid, uncontrolled growth of the guided sport halibut charter industry" in Alaska. The ALFA believes that further growth of the sport fishery, in particular the guided sport industry, is inevitable and that without some type of restriction, this growth will result in a reallocation of halibut from the traditional directed longline fishery, given that the resource is currently fully utilized. The ALFA believes this will result in economic and social costs to their traditional fisheries. The objective of their proposal is to minimize such impacts.

There are currently no catch quotas for the recreational halibut fishery in Alaska. Although not done off Alaska, there is precedence for establishing an allocation for the sport fishery. In regulatory area 2A (off the coasts of Washington, Oregon, and California) the sport fishery has been allocated an annual catch quota. This catch quota applies to the overall sport fishery, both guided and unguided.

Although growing, sport removals in Alaska still represent a relatively small proportion of the total halibut removals in Alaska. Both removals by the directed longline fishery and by-catch and wastage in the directed and other non-directed fisheries (notably the trawl fishery) outnumber sport removals. For example, in 1992, total sport removals in Area 3A totaled about 4 million pounds (of which about half was caught by chartered anglers). This compared to a commercial catch of about 25 million pounds and a bycatch and wastage of slightly more than 8 million pounds.

The ALFA's proposal was initially discussed at the NPFMC meeting scheduled for September 20, 1993 in Anchorage. The NPFMC decided to take no specific action at this meeting with respect to the proposal, choosing rather to form a work group of industry and agency staff to study this issue and come up with some recommendations as to how the Alaskan guided halibut industry should be regulated. The work group met on November 6, 1993 to initially discuss this issue. Overall, this meeting represented the first opportunity for the work group to meet one another and flush out positions. Considerable time (about 3 hours) was spent taking public testimony from the numerous charter boat operators who showed up. A common theme amongst the sport charter people was a questioning for the need for regulation of their industry at this time given the current bycatch and wastage in the commercial fishery and the fact the

sport charter fishery is not presently growing at the rate it has over the past decade. There was a general reluctance to state positions on specific alternatives until these issues were addressed. The chairwoman tried to focus group discussion away from bycatch and wastage, but nevertheless it remained an issue with the sport charter people.

There was also considerable testimony questioning the accuracy and adequacy of present data with respect to making a decision regarding this issue. Staff stated what they believed the accuracy of the data to be, its limitations, and that we felt the Council was likely to judge the available data as sufficient with respect to making a decision regarding the need for regulation. There was common agreement that data are weak in two areas: (1) economic data comparing the sport charter and commercial fishery, and (2) individual vessel landing data for the sport charter industry. The industry asked staff to conduct these analyses. Industry expressed a desire to institute a mandatory logbook recording program.

Given their questioning of the need for regulation of their industry, the sport charter members of the group were reluctant to discuss positions regarding specific regulatory options at the meeting. They did, however, all agree that IFQ's were not an acceptable regulatory option and decided that this regulatory option should not be pursued further by the work group. The main reason against the IFQ's was that operators believed there would be pressure to land small halibut to assure for maximum length of operating season, given that their total landings would be regulated under an IFQ. This could jeopardize industry credibility. There was an overall agreement reached by the work group with respect to this option.

The sport charter industry also stated that they did not wish to see a cap instituted, as this would restrict "opportunity with the expectation to catch fish," a requirement of their industry. They also stated a need for the present length of the season to remain economically viable and felt a cap could endanger this during years of low biomass. Although the sport charter industry members of the group all were opposed to a cap, the commercial representatives remained in favor of at least discussing this option further at future meetings.

Many of the sport charter representatives of the work group questioned the fairness of being treated differently than the remaining part of the sport user group. They stated that they provide nothing more than a service for sport anglers to catch their bag/possession limit. Based on this, they stated a desire to be managed under the same bag/possession limit as the non-guided fishery and questioned whether people would still charter with them if these were to change.

All in all, the meeting was an excellent first opportunity for the working group members to become familiar with one another and the issues and data associated with regulation of the sport charter industry. The meeting ended with a continued desire to work towards a common solution to the perceived problem. Another meeting is scheduled for December 20. Public testimony and staff reports on the proposal will occur at this meeting.

The work group is scheduled to present its recommendations to the NPFMC during their January 1994 meeting in Anchorage. It is likely this issue will

eventually be given to NPFMC staff to research and prepare a report on. Final action on this proposal is not expected prior to 1995.

Recent Board of Fisheries Actions:

The Alaska Board of Fisheries has no management authority over halibut in Alaska and has therefore taken no actions with respect to this fishery.

Ongoing Research and Management Activities:

A research program to evaluate the age and size compositions of the recreational halibut harvests from Area 3A waters will continue during 1994. Area 3A ports currently being sampled include Valdez and Seward in the CGMA and Kodiak and Homer. Findings from this research program are provided to the IPHC annually in a report summarizing the characteristics of the sport harvest from Area 3A waters. This information is inputted by the IPHC scientific staff to a constant exploitation yield model which is used annually to compute the exploitable halibut biomass by area. Secondary objectives of the study are to provide fishery managers with information regarding characteristics of the fishing fleet operating out of study ports. These data are needed to evaluate proposed regulatory options for the sport charter industry in Alaska. Staff recommend continuation of the above described research for the immediate future.

Table 25. Harvests of halibut by recreational fishing in Central Gulf Management Area waters from 1977 through 1992.

Year	Prince William Sound	Outer Gulf Coast (Seward)	Total
1977	1,247 (43%)	1,674 (57%)	2,921
1978	933 (26%)	2,642 (74%)	3,575
1979	1,691 (37%)	2,838 (63%)	4,529
1980	3,143 (52%)	2,936 (48%)	6,079
1981	2,495 (43%)	3,337 (57%)	5,832
1982	2,735 (49%)	2,809 (51%)	5,544
1983	3,493 (61%)	2,225 (39%)	5,718
1984	4,428 (58%)	3,242 (42%)	7,670
1985	4,527 (45%)	5,611 (55%)	10,138
1986	8,331 (46%)	9,648 (54%)	17,979
1987	4,379 (40%)	6,520 (44%)	10,899
1988	9,845 (46%)	11,423 (54%)	21,268
1989	8,697 (56%)	6,852 (44%)	15,549
1990	10,851 (54%)	9,278 (46%)	20,129
1991	12,733 (50%)	12,961 (50%)	25,694
1992	17,855 (51%)	16,891 (49%)	34,746
Total	97,383 (49%)	100,887 (51%)	198,270
Mean	6,086 (49%)	6,305 (51%)	12,391

NUMBER OF HALIBUT HARVESTED

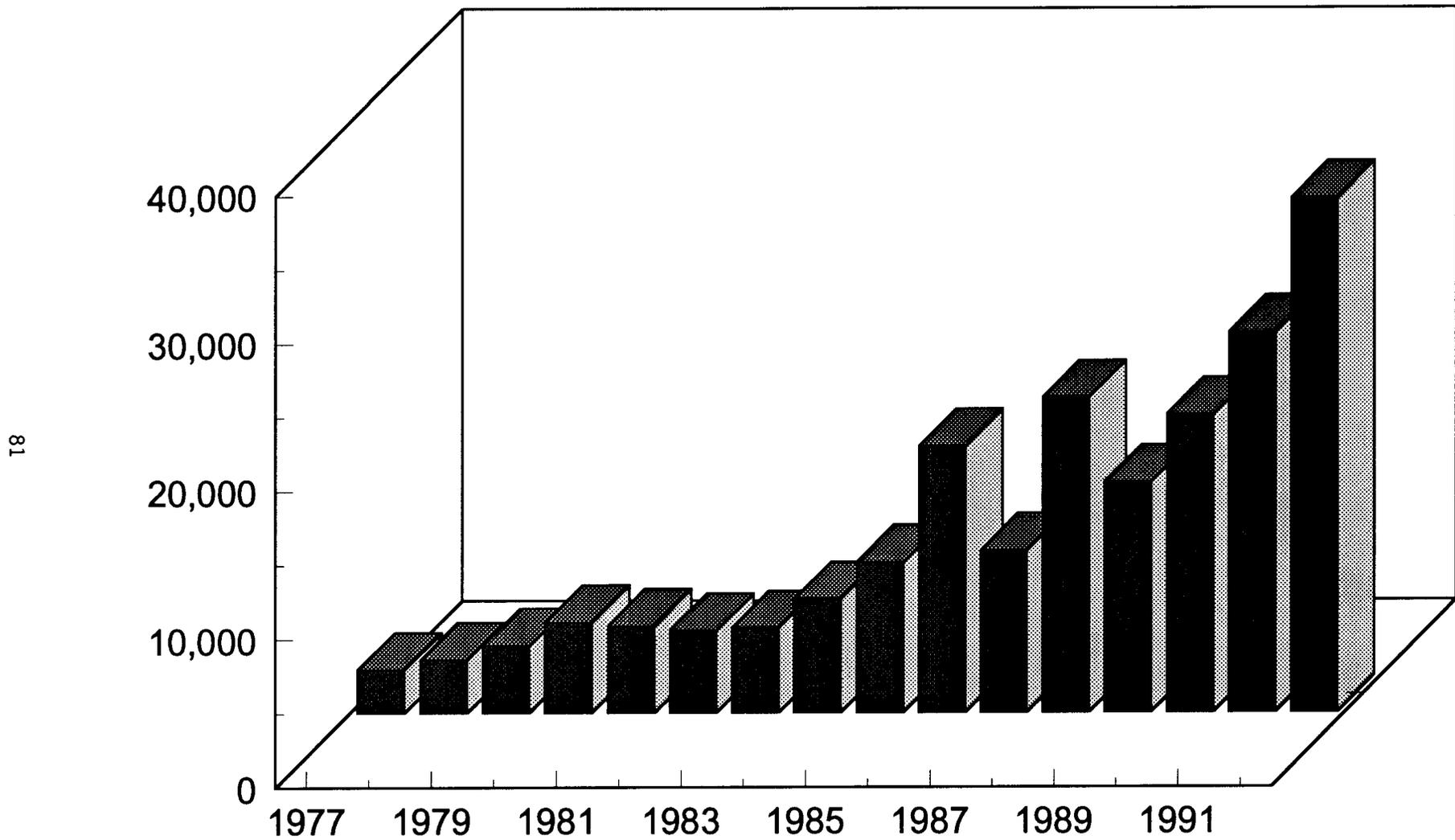
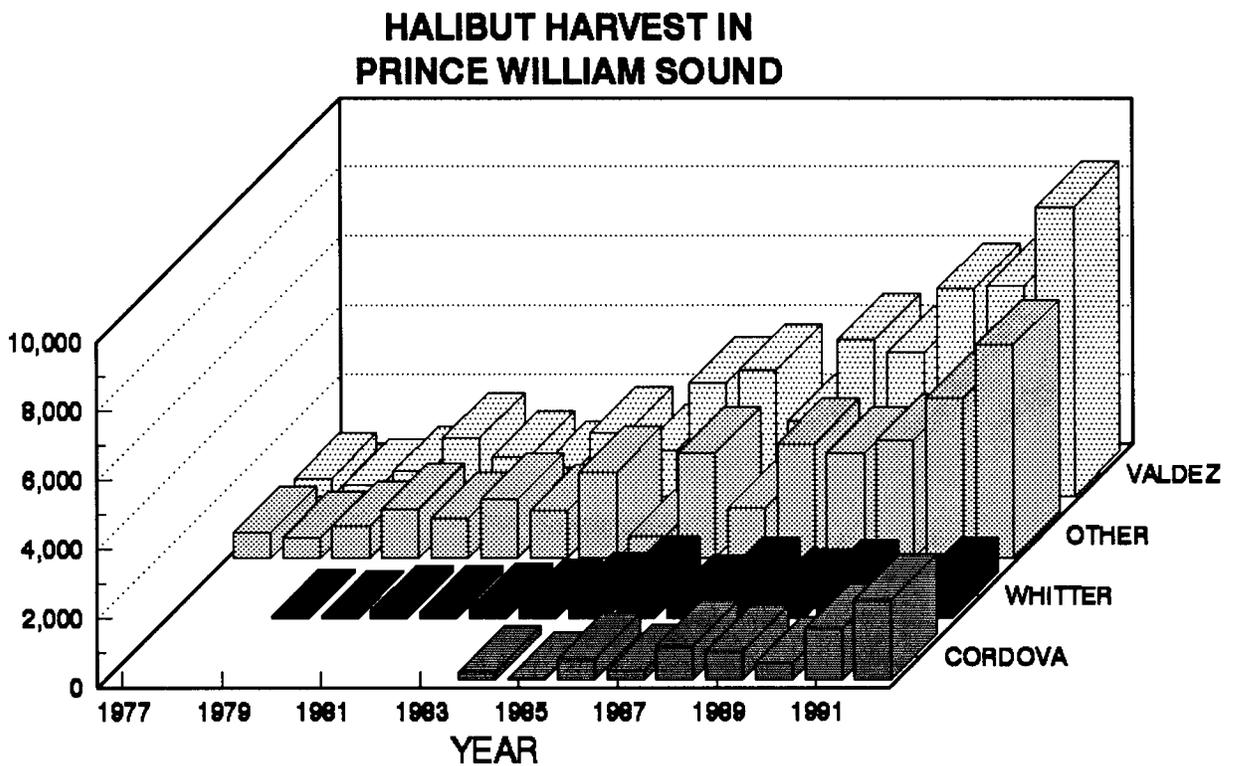


Figure 25. Harvest of halibut by recreational fishing in the Central Gulf Management Area waters from 1977 - 1992.

Table 26. Harvests of halibut by recreational fishing near Seward in Central Gulf Management Area from 1986 through 1992.

Year	Total	Private	Charter
1986	9,648	5,306 (55%)	4,342 (45%)
1987	6,520	3,803 (58%)	2,717 (42%)
1988	11,423	7,094 (62%)	4,329 (38%)
1989	6,852	4,262 (62%)	2,590 (38%)
1990	9,278	5,188 (56%)	4,090 (44%)
1991	12,961	5,446 (42%)	7,515 (58%)
1992	16,891	8,413 (46%)	9,131 (54%)

Figure 26. Harvest of halibut in Prince William Sound, 1977-1992.



Central Gulf Management Area Rockfish Fisheries

A variety of rockfishes inhabit the marine waters of the CGMA, including species of the genera *Sebastes* and *Sebastolobus*. For management purposes, these rockfishes are usually categorized into the following groups: slope rockfish, demersal shelf rockfish, and pelagic shelf rockfish. The recreational fishery primarily targets the demersal shelf and pelagic shelf rockfish groups, with slope rockfish only occasionally being harvested. Although many species of rockfish have been identified in the CGMA, the most commonly harvested rockfish in the CGMA are the demersal shelf yelloweye rockfish (*Sebastes ruberrimus*), the pelagic shelf black (*S. melanops*), and dusky (*S. ciliatus*) rockfishes.

Although available year-round, most recreational rockfish are harvested from May through early September. The limits for rockfish in PWS are 5 per day and 10 in possession from May through September and 15 and 10 per day and in possession from September 16 through April 30. Also, all rockfish which are removed from the water must be retained as part of the bag limit of the person originally hooking it. The rockfish limits for the Outer Gulf Coast (Seward area) are 5 per day and 10 in possession year-round.

Rockfish are a popular target of recreational anglers fishing CGMA marine waters. During 1992, recreational anglers expended about 25,000 angler-days fishing rockfish in CGMA waters. In comparison, anglers expended only about 15,000 angler-days targeting this species in 1987. Most of this effort is expended in waters accessible from Seward.

The average sport harvest of rockfish from CGMA waters from 1977 through 1992 has been about 31,000 (Table 27, Figure 27), making this fishery one of the largest for rockfish in Alaska. Outer Gulf Coast waters accessible from Seward have accounted for 72% of the total rockfish harvest from CGMA waters. The Seward area rockfish fishery is one of the largest recreational rockfish fisheries in Alaska (Mills 1991). Areas fished near Seward include waters from the entrances to Prince William Sound to Gore Point; however, most of the fishery occurs in the vicinity of the capes and islands near the entrance to Resurrection Bay.

Since 1977, PWS has supported an average sport harvest of about 8,800 rockfish (Table 27). This harvest has represented about 28% of the total harvest of rockfish from CGMA waters. Waters fished in PWS include all inside waters as well as the entrances to PWS, with most of the effort occurring at the entrances.

Commercial fishermen also harvest CGMA rockfish. Commercial harvests in PWS generally exceed those of recreational harvests. In contrast, recreational and commercial harvests in Outer Gulf Coast waters are more equal. During some years, recreational harvests from the marine waters near Seward have exceeded commercial harvests.

The sport harvest of rockfish from CGMA waters during 1992 (43,509) was 60% above the historical mean harvest from 1977 through 1991 (Table 27). As in the past, Seward area waters accounted for the majority (64%) of total rockfish harvest from CGMA. The 1992 harvest of 28,031 rockfish from Seward area

waters was the third highest on record and the largest harvest since 1988 (Table 27). The increase in harvest from Seward area waters is believed due to a shift in effort from depressed lingcod stocks towards rockfish stocks. The harvest of rockfish from Prince William Sound in 1992 was the largest on record and nearly twice the average harvest since 1977. Most of the increase in harvest was landed at Valdez and appeared to be due to increased charter effort at this port.

In addition to the harvest of 43,509 rockfish from CGMA waters during 1992, an additional 18,119 rockfish were estimated to have been caught and released by sport anglers fishing CGMA during 1992 (Mills 1993). Mortality on released rockfish is considered to be high.

Harvest and catch estimates for rockfish are not yet available for the 1993 season. Observations of the fishery during 1993 suggest, however, that rockfish harvests may be higher than average due to restrictions placed on CGMA recreational lingcod to assure for the stock's long-term sustained yield. It appears that many anglers redirected effort they would have expended on lingcod towards rockfish, especially in Seward area waters.

Management Objective:

Due to a lack of stock assessment data, no specific fishery objectives have been formally established for recreational rockfish fisheries of the CGMA. An assumption of past and current fisheries management, however, has been to assure for the sustained yield of the various rockfish stocks that occur within the area while assuring for continued and, where possible, expanded opportunity to participate in fisheries targeting these stocks.

Recent Board of Fisheries Actions:

In 1991, the Board reduced the limits for rockfish in PWS from 20 per day and in possession to 5 per day and 10 in possession from May through September 15, and 10 per day and in possession from September 16 through April 30. Additionally, the Board mandated that all rockfish which are removed from the water must be retained as part of the bag limit of the person originally hooking them. These actions were taken to assure harvests would remain sustainable.

Current Issues:

There has been a great deal of concern voiced by federal and state managers over the past decade regarding the status of North Pacific rockfish stocks and the validity of current practices and approaches used to manage these stocks. Specifically, managers are concerned that many rockfish stocks in the North Pacific Ocean are being overharvested and that current management strategies are not protecting rockfish stocks from overharvest and not allowing depressed stocks to rebuild.

Historically, rockfish have been managed based on sustained yield principles using yield or production models based on relatively short-lived and fast-cycling species (less than 15 years). The validity of applying these models to longer-lived species like rockfish which exhibit extreme longevity is questionable, especially given the documented declines in many rockfish stocks

over the past decade. Also, due to a lack of species-specific life history information for many rockfish species, rockfish are often grouped into species assemblages which are managed based on assumed or average life history characteristics of the species assemblage. This often leads to more susceptible species in an assemblage being overexploited at the cost of harvesting the less susceptible species in that assemblage.

Much of concern for rockfish arises from the inherent susceptibility of rockfishes to overexploitation. Rockfish tend to be slow growing and long lived. Many rockfish do not mature until at least 10 years of age with some rockfish not maturing until age 20. Most rockfish also live to be over 50 years, however, some rockfish can live to over 100 years. Rockfish also display high survival rates. Most rockfish have annual survival rates exceeding 80%, with some rockfish having rates exceeding 95%. Lastly, juvenile survival is often at the mercy of marine environmental conditions. Given these life history characteristics, many rockfish have very low sustained yields. For some species, the acceptable fishing mortalities may be limited to bycatch mortality only, given that survival of released rockfish is low. Additionally, there is a lack of species-specific life history information for many rockfish species and an inability to obtain accurate biomass or abundance estimates for many rockfish species.

Commercial and recreational landings of rockfish have increased over the past decade as many traditional fisheries, such as salmon and crab, have experienced biological or economic declines. Stock composition data to assess the North Gulf of Alaska rockfish resources are limited. While stock data are being collected, efforts to control harvest levels and protect the rockfish resources of this area have involved adopting federal management strategies and inseason closures. However, this approach has not offered sufficient protection to some heavily exploited nearshore stocks. Limited data from commercial test fishing and sport fishing in marine waters in and near Resurrection Bay suggests that the abundance of older black rockfish has declined since the early 1980s (Vincent-Lang 1991).

In past years, the Board of Fisheries has promulgated regulations that have increasingly restricted the bag and possession limits for recreational anglers along the North Gulf coast in an attempt to maintain the sustained yield of these stocks. Given the high mortality associated with released rockfish and their high incidental catch during other bottomfish fisheries, managers feel that further reductions in bag and possession limits in the recreational fishery may lead to wastage. However, harvests have grown under the more restrictive regulations raising the specter of stock conservation concerns.

During their 1992 meeting, the Board established a series of management plans for Central Gulf of Alaska commercial rockfish fisheries. These management plans (North Gulf Coast 5 AAC 28.465, Prince William Sound 5 AAC 28.265, and Cook Inlet 5 AAC 28.365 Rockfish Management Plans) establish trip limits for allowable rockfish landings during a 5-day period for the North Gulf Coast, Prince William Sound, and Cook Inlet areas. The plans also establish harvest quotas for each area (150,000 pounds) after which the fishery in an area reverts to bycatch only.

If these measures are not sufficient to protect nearshore rockfish, it may be necessary to adopt an even more restrictive management strategy. One such

strategy being considered is setting aside rockfish sanctuaries where no harvest of rockfish is allowed. This strategy has been suggested by several managers in the literature.

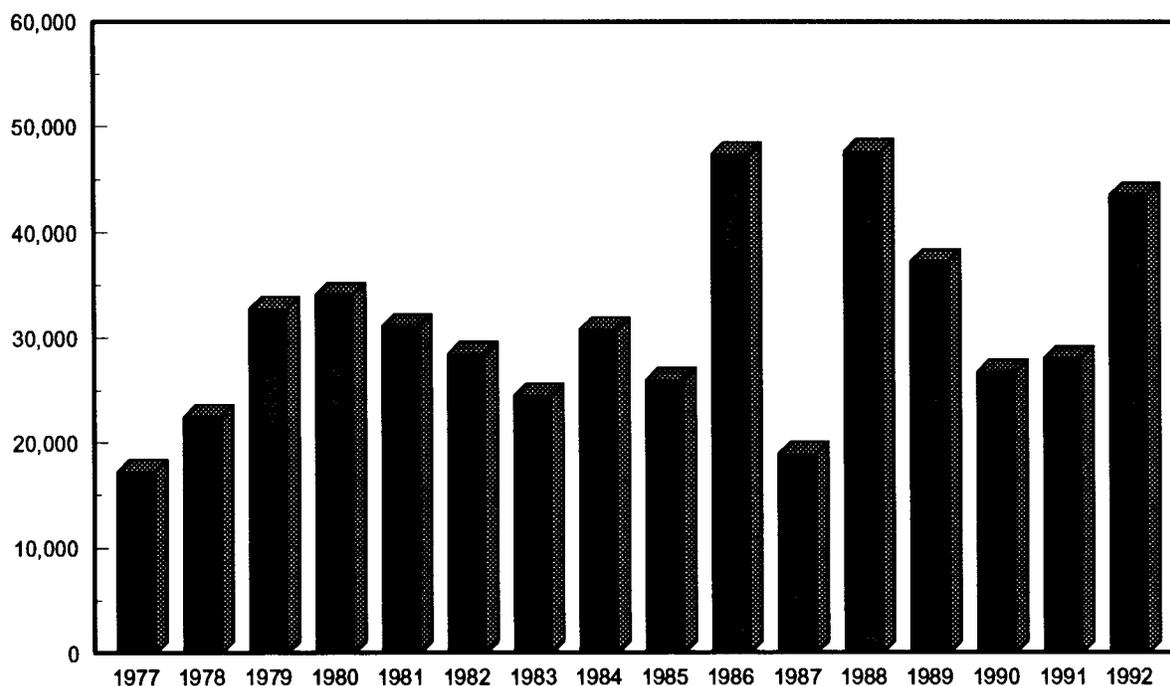
Ongoing Research and Management Activities:

A research program to evaluate rockfish stocks in North Gulf of Alaska is currently underway. The objectives of this program are to collect age, sex, and length composition data and to obtain species composition statistics for the sport harvest of rockfish in this area. These data will be used to determine selected life history characteristics of the commonly harvested rockfish species and to evaluate stock status and validity of current management strategies. Staff recommend continuation of the current research program. Additionally, staff recommend that an aging validation study for rockfish be implemented to determine the validity and magnitude of errors associated with current aging practices. A stock assessment report on rockfish in the North Gulf of Alaska is due to be published during the summer of 1994.

Table 27 and Figure 27. Harvests of rockfish by recreational fishing Central Gulf Management Area waters from 1977 through 1992.

Year	Prince William Sound	Outer Gulf Coast (Seward)	Total
1977	4,401 (26%)	12,783 (74%)	17,184
1978	5,035 (22%)	17,438 (78%)	22,473
1979	11,018 (34%)	21,752 (66%)	32,770
1980	6,174 (18%)	27,948 (82%)	34,122
1981	11,610 (37%)	19,516 (63%)	31,126
1982	5,608 (20%)	22,878 (80%)	28,486
1983	6,514 (27%)	17,990 (73%)	24,504
1984	7,993 (26%)	22,845 (74%)	30,838
1985	8,853 (34%)	17,142 (66%)	25,995
1986	9,762 (21%)	37,574 (79%)	47,336
1987	6,563 (35%)	12,333 (65%)	18,896
1988	12,711 (27%)	34,906 (73%)	47,617
1989	12,919 (35%)	24,334 (65%)	37,253
1990	8,157 (30%)	18,632 (70%)	26,789
1991	8,733 (31%)	19,376 (69%)	28,109
1992	15,478 (36%)	28,031 (64%)	43,509
Total	141,529 (28%)	355,478 (72%)	497,007
Mean	8,846 (28%)	22,217 (72%)	31,063

NUMBER OF ROCKFISH HARVESTED



Other Fisheries

Several smaller fisheries for other species also occur in the CGMA. These include fisheries for stocked rainbow trout and Arctic grayling, chum salmon, clams, and shellfish. Because these fisheries are generally small, little specific management or research is directed towards them nor have specific management or fishery objectives been set for the fisheries. A brief summary of these fisheries is provided below.

Chum Salmon:

Chum salmon have not been typically targeted by recreational anglers in the CGMA, however, some have been taken incidental to other salmon species. An average of 3,254 chum salmon have been harvested by sport anglers from CGMA waters from 1977 through 1991 (Tables 28 and 29). Most (61%) of the annual chum salmon harvest from CGMA has occurred in PWS. Since 1977, an average of 65% of the chum harvest in PWS occurred at Valdez (Table 28 and Figure 28). Anglers have harvested an average of 1,793 chum salmon from Resurrection Bay from 1977 through 1991 with the majority of the harvest from shoreline anglers (Table 29 and Figure 29).

Rainbow Trout and Arctic Grayling:

There are no indigenous stocks of rainbow trout or Arctic grayling in the CGMA but these fish have been stocked in landlocked lakes near Valdez and Cordova in PWS to diversify opportunities for sport anglers.

Regulations governing the stocked lakes vary by species. The limit for rainbow trout is 5 fish per day and 10 in possession, only 1 per day and 2 in possession over 20 inches. Daily bag and possession limits for Arctic grayling are 10 fish with no size limits.

The average harvest of rainbow trout from stocked lakes from 1985 through 1991 was 233 fish. The harvest has generally been increasing (Figure 30). The majority of this harvest was from Ruth Lake located in Valdez. Ruth Lake is the only lake stocked with catchable sized rainbows whereas the remaining two lakes in PWS (Blueberry and Crater lakes) have been stocked with rainbow trout fingerlings (Table 4).

Arctic grayling have been stocked in six lakes along the Copper River Highway between Cordova and the Million Dollar Bridge since 1984. The average harvest of Arctic grayling from 1986 through 1991 has been 251 fish and has ranged from a low of 54 fish in 1987 to a high of 497 in 1991 (Figure 30). Only 46 Arctic grayling were harvested in 1992.

Clams and Shellfish:

From 1977 through 1991, the average harvest of clams was 7,008 (Table 30). Nearly 85% of the harvest has occurred in PWS. There has been a limited harvest of crab from 1977 through 1991 from Resurrection Bay, with Dungeness crabs accounting for the majority of the harvest.

Management Objective:

No specific fishery objectives have been formally established for these fisheries to date. An assumption of past and current fisheries management, however, has been to maximize the opportunity to fish for hatchery supported stocks of fish that occur along the Valdez and Cordova road systems.

Recent Board of Fisheries Actions:

In 1991, the Board of Fisheries reduced the limit for Arctic grayling from 15 fish per day and 30 fish in possession to 10 fish per day and in possession for all PWS waters. This action brought the PWS regulatory area in conformity with the surrounding regulatory areas.

Current Issues:

There has been concern voiced by the department in recent years on the strength of the crab populations in Resurrection Bay waters. The department has placed restrictions on fisheries targeting those stocks in response to this concern including a complete closure of the king crab fishery. Surveys conducted during the winter of 1992 have identified several strong year classes of Tanner crab and the population is expected to remain strong in subsequent years. A single strong year class of Dungeness crab which has gone through two mating seasons has been identified. While survey techniques have been unsuccessful in identifying the strength of younger year classes of Dungeness crab, there is a harvestable surplus of this single year class. Survey results also indicate that many of the crab remain in a soft shelled condition longer than previously thought prompting a mid-April to mid-July closure to protect crab in this condition. Careful handling of the nonlegal segment of the catch should aid in assuring that these populations continue to increase. King crab stocks remain depressed so this fishery will remain closed until further notice.

Additionally, there is some concern on how accurate the harvest reporting is from the personal use and sport fish shellfish fisheries. The Homer Fish and Game Advisory Committee has submitted a proposal for BOF consideration that would require all personal use or sport fish participants in shellfish fisheries in Lower Cook Inlet (includes Resurrection Bay and outer gulf coast) to obtain a permit for recording harvest. The department has not finalized a position on this proposal yet but area staff in Homer are supportive.

Ongoing Research and Management Activities:

There are no major research or management activities regarding these fisheries at present.

Recommended Research and Management Activities:

Greater education of the fishing public is recommended to increase utilization of stocked fish. The staff will submit a proposal to the Board of Fisheries that recommends that all users regardless of whether they are personal use, sport, or commercial, use the same type gear for shrimp and Dungeness pots. No other specific research or management activities are recommended for this fishery at present.

Table 28 and Figure 28. Sport harvest of chum salmon in Prince William Sound, 1977 – 1992.

YEAR	TOTAL PWS HARVEST	VALDEZ HARVEST	PERCENT PWS HARVEST	OTHER HARVEST	PERCENT PWS HARVEST
1977	740	219	30%	521	70%
1978	2,985	1,444	48%	1,541	52%
1979	1,527	845	55%	682	45%
1980	1,025	913	89%	112	11%
1981	972	572	59%	400	41%
1982	1,204	639	53%	565	47%
1983	1,353	976	72%	377	28%
1984	1,907	1,397	73%	510	27%
1985	1,628	1,389	85%	239	15%
1986	2,858	1,865	65%	993	35%
1987	1,894	1,525	81%	369	19%
1988	7,237	4,201	58%	3,036	42%
1989	3,635	2,736	75%	899	25%
1990	1,945	1,292	66%	653	34%
1991	1,622	838	52%	784	48%
1992	964	804	83%	160	17%
1977-91 MEAN	1,970	1,274	65%	696	35%
%CHANGE 1992 FROM MEAN	-51%	-37%		-77%	

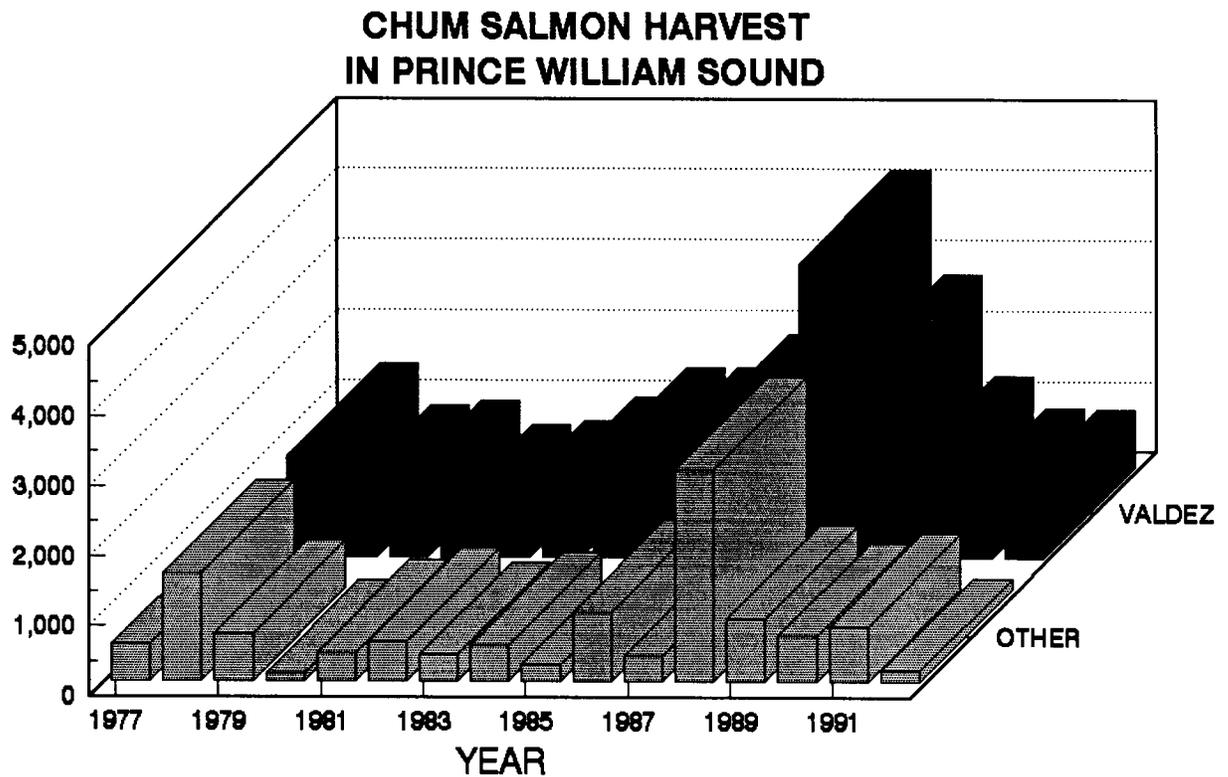
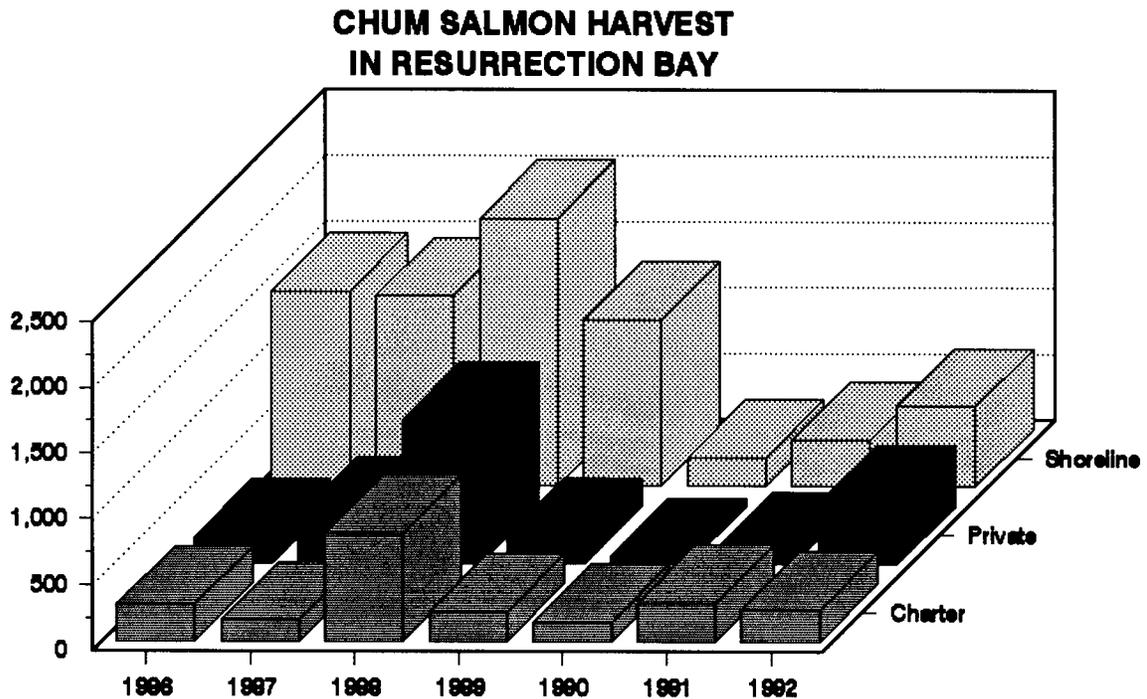


Table 29 and Figure 29. Sport harvest of chum salmon in Resurrection Bay, 1977 – 1992.

YEAR	TOTAL RES BAY HARVEST	CHARTER BOAT	PERCENT RES BAY HARVEST	PRIVATE BOAT	PERCENT RES BAY HARVEST	SHORELINE	PERCENT RES BAY HARVEST
1977	63	-	-	-	-	-	-
1978	39	-	-	-	-	-	-
1979	100	-	-	-	-	-	-
1980	276	-	-	-	-	-	-
1981	194	-	-	-	-	-	-
1982	458	-	-	-	-	-	-
1983	923	-	-	-	-	-	-
1984	2,644	-	-	-	-	-	-
1985	820	-	-	-	-	-	-
1986	1,958	275	14%	199	10%	1,484	76%
1987	1,974	163	8%	362	18%	1,449	73%
1988	3,947	819	21%	1,091	28%	2,037	52%
1989	1,696	222	13%	207	12%	1,267	75%
1990	427	148	35%	56	13%	223	52%
1991	757	294	39%	106	14%	357	47%
1992	1,321	243	18%	463	35%	615	47%
1986-1991 MEAN	1,793	320	18%	337	19%	1,136	63%
%CHANGE 1992 FROM MEAN	-26%	-24%		37%		-46%	



**Rainbow Trout and Arctic Grayling Harvest
In the Central Gulf Coast Management Area**

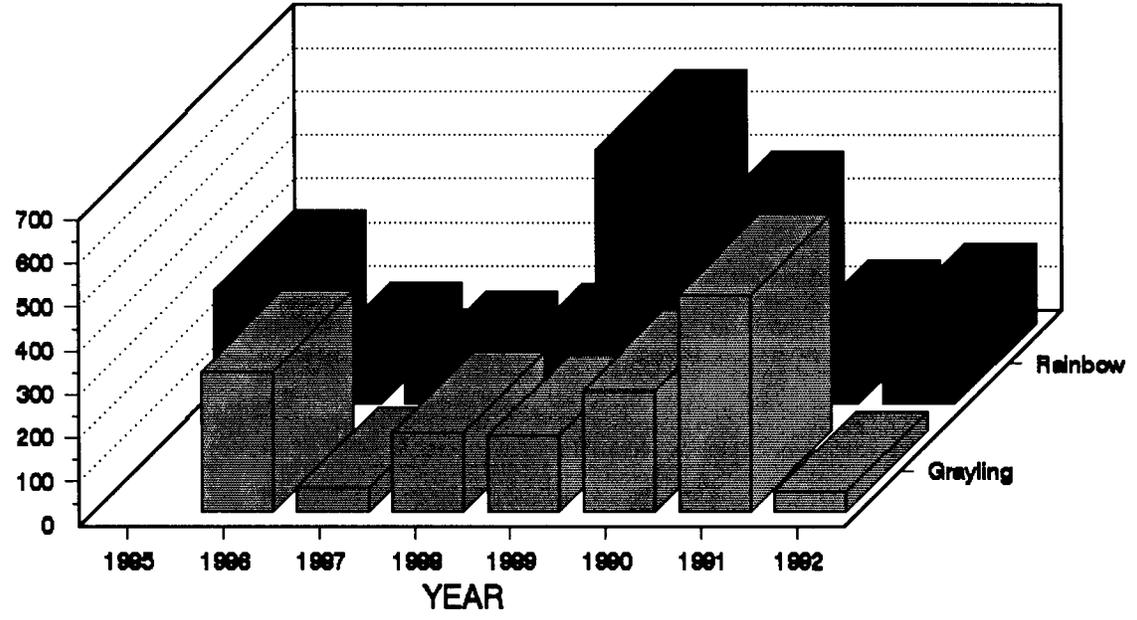


Figure 30. Sport harvest of rainbow trout and Arctic grayling in Prince William Sound, 1985 - 1992.

Table 30. Sport harvests of shellfish from Central Gulf Management Area, 1977-1992.

Central Gulf Management Area						Resurrection Bay					Prince William Sound
YEAR	KING CRAB	TANNER CRAB	DUNGENESS CRAB	SHRIMP (gal)	CLAMS	KING CRAB	TANNER CRAB	DUNGENESS CRAB	SHRIMP (gal)	CLAMS	CLAMS
1977	-	-	-	-	-	-	-	-	-	-	-
1978	-	-	-	-	-	-	-	-	-	-	-
1979	-	-	-	-	-	-	-	-	-	-	-
1980	-	-	-	-	-	-	-	-	-	-	-
1981	54	140	173	65	162	54	140	173	65	162	-
1982	167	419	314	0	398	167	419	314	0	398	-
1983	52	2,098	0	63	16,997	52	2,098	0	63	357	16,640
1984	12	0	12	50	43,435	12	0	12	50	7,432	36,003
1985	-	35	1,127	0	1,749	-	35	1,127	0	69	1,680
1986	-	26	205	103	7,100	-	26	205	103	51	7,049
1987	-	185	616	92	9,388	-	185	616	92	0	9,388
1988	-	-	516	0	6,323	-	-	516	0	868	5,455
1989	-	-	257	14	2,443	-	-	257	14	0	2,443
1990	-	-	81	16	11,913	-	-	81	16	6,678	5,235
1991	-	-	-	-	5,206	0	0	0	0	214	2,692
1992	-	-	-	-	-	-	-	-	-	-	26,307
MEAN	20	207	236	29	7,008	19	194	220	27	1,082	5,772

LITERATURE CITED

- Carlson, J. A. and D. S. Vincent-Lang. 1989. Stockings, migrations, and age, sex, and length compositions of coho, sockeye, and chinook salmon in Resurrection Bay, Alaska, during 1988. Alaska Department of Fish and Game, Fishery Data Series No. 82, Juneau.
- _____. 1990. Stockings, migrations, and age, sex, and length compositions of coho, sockeye, and chinook salmon in Resurrection Bay, Alaska, during 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-14, Anchorage.
- Edmundson, J. A., G. B. Kyle, and M. Willette. 1991. Limnological and fisheries assessment of Coghill Lake relative to sockeye salmon (*Oncorhynchus nerka*) production. Alaska Department of Fish and Game, Division of Fisheries Rehabilitation, Enhancement, and Development, Juneau.
- Hepler, K., P. Hansen, and D. Bernard. *In prep.* Impact of oil spilled from the *Exxon Valdez* on survival and growth of Dolly Varden and cutthroat trout in Prince William Sound, Alaska. Alaska Department of Fish and Game, Division of Habitat and Restoration, Anchorage.
- Hepler, K., D. Vincent-Lang, and B. Lafferty. 1993. 1992 area management report for the recreational fisheries of the Central Gulf Management Area. Alaska Department of Fish and Game, Division of Sport Fish, Anchorage.
- Jones & Stokes Associates, Inc. 1987. Southcentral Alaska sport fishing economic study. Final research report. November 1987. (JSA86-0413.) Sacramento, CA. Prepared for Alaska Department of Fish and Game, Sport Fish Division, Research and Technical Services Section, Anchorage, AK.
- Meyer, S. C. 1993. Assessment of the recreational harvest and fishery for lingcod in southcentral Alaska. Alaska Department of Fish and Game, Division of Sport Fish, Fishery Data Series No. 93-33, Anchorage.
- Mills, M. J. 1979. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1978-1979, Project F-9-11, 20 (SW-1-A), Juneau.
- _____. 1980. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1979-1980, Project F-9-12, 21 (SW-1-A), Juneau.
- _____. 1981a. Alaska statewide sport fish harvest studies (1979). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-13, 22 (SW-I-A), Juneau.
- _____. 1981b. Alaska statewide sport fish harvest studies (1980). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-13, 22 (SW-I-A), Juneau.

LITERATURE CITED (Continued)

- _____. 1982. Alaska statewide sport fish harvest studies (1981). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1981-1982, Project F-9-14, 23 (SW-1-A), Juneau.
- _____. 1983. Alaska statewide sport fish harvest studies (1982). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1982-1983, Project F-9-15, 24 (SW-1-A), Juneau.
- _____. 1984. Alaska statewide sport fish harvest studies (1983). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1983-1984, Project F-9-16, 25 (SW-1-A), Juneau.
- _____. 1985. Alaska statewide sport fish harvest studies (1984). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1984-1985, Project F-9-17, 26 (SW-1-A), Juneau.
- _____. 1986. Alaska statewide sport fish harvest studies (1985). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1985-1986, Project F-10-1, 27 (RT-2), Juneau.
- _____. 1987. Alaska statewide sport fisheries harvest report 1986. Alaska Department of Fish and Game, Fishery Data Series No. 2, Juneau.
- _____. 1988. Alaska statewide sport fisheries harvest report 1987. Alaska Department of Fish and Game, Fishery Data Series No. 52, Juneau.
- _____. 1989. Alaska statewide sport fisheries harvest report 1988. Alaska Department of Fish and Game, Fishery Data Series No. 122, Juneau.
- _____. 1990. Harvest and participation in Alaska sport fisheries during 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-44, Anchorage.
- _____. 1991. Harvest and participation in Alaska sport fisheries during 1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-58, Anchorage.
- _____. 1992. Harvest and participation in Alaska sport fisheries during 1991. Alaska Department of Fish and Game. Fishery Data Series No. 92-40, Anchorage.
- _____. 1993. Harvest and participation in Alaska sport fisheries during 1992. Alaska Department of Fish and Game. Fishery Data Series No. 93-42, Anchorage.
- Vincent-Lang, D. S. 1987. Biological statistics for coho (*Oncorhynchus kisutch*) and sockeye (*O. nerka*) salmon in Resurrection Bay, Alaska, 1962-1986. Alaska Department of Fish and Game, Fishery Manuscript Series No. 1, Anchorage.

LITERATURE CITED (Continued)

- _____. 1991. Age, length, and species compositions of ground-fish harvested in the marine sport fisheries of Resurrection Bay, Alaska, 1988-1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-28, Anchorage.
- Vincent-Lang, D. S. and W. Bechtol. 1992. Current status and recommendations for the future management of the lingcod stocks of the Central Gulf of Alaska. A report to the Alaska Board of Fisheries: Anchorage, Alaska; November, 1992. Alaska Department of Fish and Game, Division of Sport Fish, Anchorage.
- Vincent-Lang, D. S., R. H. Conrad, and E. T. McHenry. 1988. Migrations and age, sex, and length compositions of coho and sockeye salmon in Resurrection Bay, Alaska, during 1987. Alaska Department of Fish and Game, Fishery Data Series No. 40, Juneau.