Fishery Management Report No. 00-2

Area Management Report for the Recreational Fisheries of the Prince William Sound Management Area, 1998

by

Andrew Hoffmann

and

Matt Miller

February 2000

Alaska Department of Fish and Game **Division of Sport Fish**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used in Division of Sport Fish Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications without definition. All others must be defined in the text at first mention, as well as in the titles or footnotes of tables and in figures or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
metric ton	mt
milliliter	ml
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
ounce	oz
pound	lb
quart	qt
yard	yd

Spell out acre and ton.

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
hour (spell out for 24-hour clock)	h
minute	min
second	s

Spell out year, month, and week.

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.
All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.
and	&
at	@
Compass directions:	
east	E
north	N
south	S
west	W
Copyright	©
Corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
et alii (and other people)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.,
id est (that is)	i.e.,
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
number (before a number)	# (e.g., #10)
pounds (after a number)	# (e.g., 10#)
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)

Mathematics, statistics, fisheries

alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	F, t, χ^2, etc.
confidence interval	C.I.
correlation coefficient	R (multiple)
correlation coefficient	r (simple)
covariance	cov
degree (angular or temperature)	°
degrees of freedom	df
divided by	÷ or / (in equations)
equals	=
expected value	E
fork length	FL
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
mideye-to-fork	MEF
minute (angular)	'
multiplied by	x
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
standard length	SL
total length	TL
variance	Var

FISHERY MANAGEMENT REPORT NO. 00-2

AREA MANAGEMENT REPORT FOR THE RECREATIONAL FISHERIES OF THE PRINCE WILLIAM SOUND MANAGEMENT AREA, 1998

by

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The Fishery Management Reports series was established in 1989 for the publication of an overview of Division of Sport Fish management activities and 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 regional peer review.

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PREFACE

This report is divided into two sections. *Section I* presents an introductory overview of the Prince William Sound 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 process and schedules for the management area; an inventory of available fishery resources; a historical perspective of recreational angler effort and harvest within management area waters; a discussion of the economic value of recreational fisheries; and a general description of stocking, research, management, partnership, aquatic education, viewing, and access activities being conducted in the management area. Also included are a summary of the major fishery and social issues that presently occur in the Prince William Sound Management Area as well as 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 major fisheries that occur in the Prince William Sound Management Area. Included in this section are a description and historical perspective of each fishery, the management objective(s) for each fishery, a description of recent fishery performance, a description of recent Board of Fisheries actions, a description of any social or biological issues surrounding each fishery, and a description of ongoing or recommended research or management activities for each fishery.

The Prince William Sound area was previously reported in the Area Management Report for the Recreational Fisheries of the Central Gulf Coast Management Area. The Central Gulf Coast Management Area was recently divided into two separate areas and will now be reported in separate reports.

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MANAGEMENT AREA DESCRIPTION

The Prince William Sound Management Area (PWSMA) 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 Cape Puget (148° 26' 30" W 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).

The Prince William Sound Management Area includes the communities of Valdez, Cordova, Whittier and the native villages of Chenega and Tatitlek. Only Valdez is accessible by the Alaska Highway system. The Alaska Marine Highway ferries travelers to Whittier, Cordova, and Tatitlek; while Chenega is reachable only by plane or boat. Whittier is also serviced by the Alaska Railroad. With the exception of some road-accessible streams, virtually all sport fisheries in the PWSMA are remote and relatively difficult to travel to. Principal land managers in the PWSMA include the U.S. Forest Service, various native corporations, and the State of Alaska.

Activities in the Prince William Sound (PWS) area are currently directed by a Fisheries Biologist III area management biologist, Andrew Hoffmann, stationed in Anchorage, and a seasonal Fisheries Biologist, Matt Miller, stationed in Cordova. Groundfish research and management is directed by a Fisheries Biologist, Scott Meyer, stationed in Homer. Groundfish issues are managed on a larger scale, covering the Gulf of Alaska west of Cape Suckling to the Aleutian Islands. Groundfish issues are covered in more detail in the Area Management Report for the North Gulf of Alaska Recreational Fisheries, 1997 (Vincent-Lang 1998) and the reader is referred to that report.

ALASKA BOARD OF FISHERIES ACTIVITIES

The Alaska Board of Fisheries (BOF) is responsible for promulgating regulations in State waters (Appendices C1 and C2). 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 Fisheries and Game in assessing fisheries and wildlife issues and proposed regulation changes. Most advisory 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 committee meetings. Advisory committee meetings allow for direct public interaction with department staff involved with local resource issues. Within the PWSMA there are three Fish and Game Advisory Committees: Valdez, Whittier, and Cordova (Copper River/Prince William Sound).

Under its current schedule, the Board of Fisheries reviews regulations for each area on a 3-year cycle. Proposals regarding the Prince William Sound Regulatory area were last considered during the December 1996 Board meetings. The next meeting will be in winter of 1999-2000 (November 1999). Proposals must be submitted between the time the Board issues a call for proposals, usually in December or January, and the deadline set by that call for proposals, usually in early April.

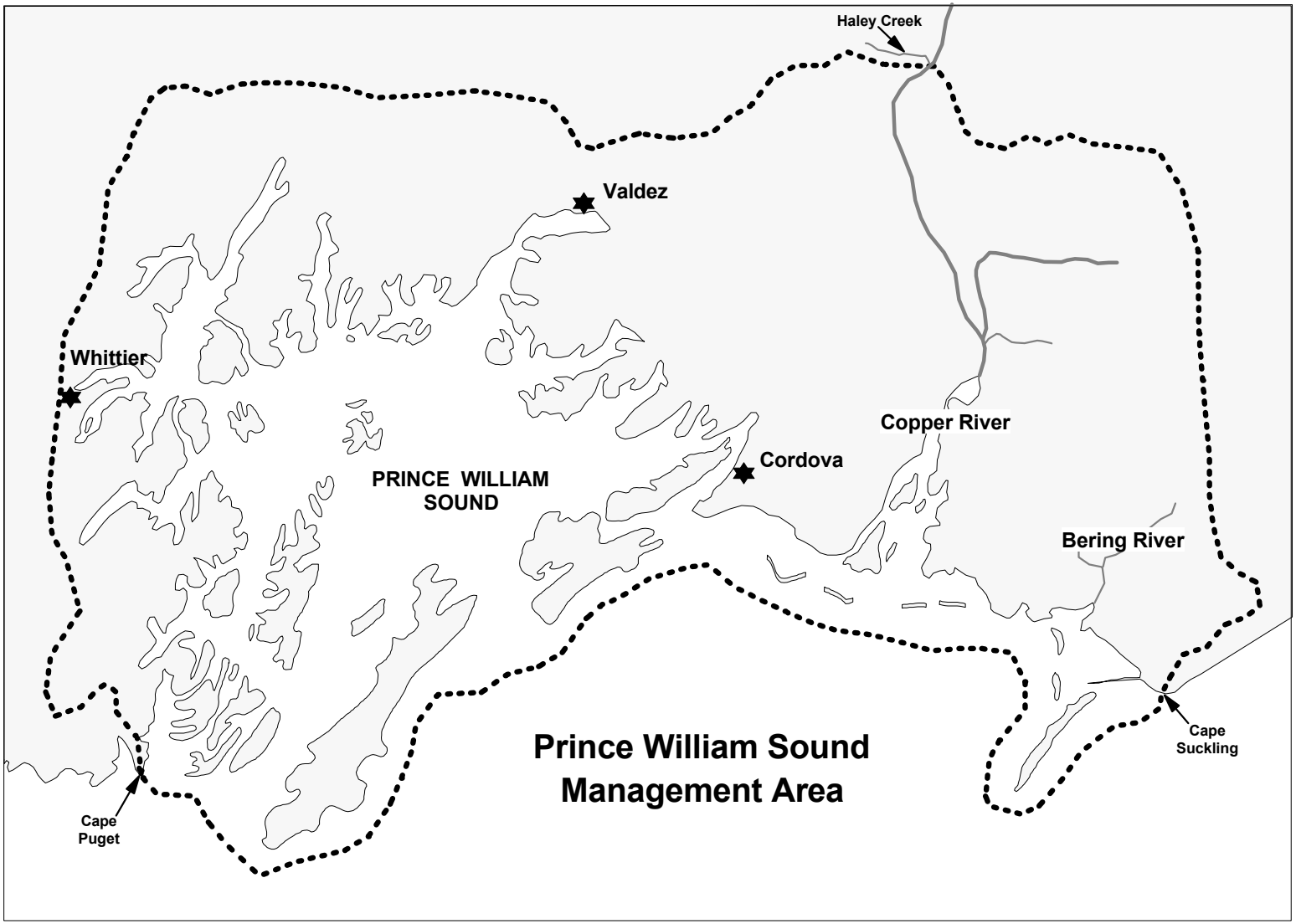


Figure 1.-Map of Prince William Sound Management Area.

FISHERIES RESOURCE INVENTORY

Sport anglers fishing PWSMA waters target five species of Pacific salmon (pink *Oncorhynchus gorbuscha*, coho *O. kisutch*, sockeye *O. nerka*, chum *O. keta*, and chinook *O. tshawytscha*). 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*. The state's stocking program provides fisheries for rainbow trout *O. mykiss* and Arctic grayling *Thymallus arcticus* in several lakes. An anadromous chinook salmon stocking program has also been developed. Two private non-profit hatchery corporations release coho salmon to provide sport fishing opportunities. These same corporations also release pink, sockeye and chum salmon for commercial fisheries, which are also exploited to some degree by sport anglers. Shellfish fisheries consist of shrimp *Pandalidae*, Dungeness crab *Cancer magister,* razor clams *Siliqua patula* and other hard-shelled clams which are harvested in limited numbers. Dungeness crab fishing is currently closed around Orca Inlet. Tanner *Chinoecetes bairdi* and king crab *Paralithodes camtschatica* fisheries are currently closed throughout the sound. A proposal is pending at the BOF and may result in closure throughout the sound for Dungeness crab.

The Division of Sport Fish classifies sport fisheries into three categories 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 II fisheries fall between Level I and Level III fisheries and are defined as basic yield, intermediate-cost fisheries.

Level III fisheries are defined as low yield, high cost fisheries. These fisheries are typically remote and have a high cost associated with participation.

The PWSMA offers primarily Level I and Level III fishing opportunities for recreational anglers. Road-accessible salmon, Dolly Varden, cutthroat trout fisheries and stocked lakes provide Level I fisheries for the residents of the major communities. The remaining waters of the PWSMA, which are accessible by boat or plane, offer Level III fisheries. Examples of Level III fisheries include a sockeye salmon fishery on Eshamy Bay, and halibut fishing on the outside of Montague Island.

RECREATIONAL ANGLER EFFORT[1]

While reviewing the numbers reported for angler effort, it is important to note that during the estimation process for angler effort we discovered that statistically significant nonresponse bias (NRB) correction factors had not been applied for recent previous years' estimates of effort. The factors were appropriately applied for 1998 and we intend to revise earlier effort estimates if possible. This process may take months to complete. We anticipate this may affect 1995-1997 estimates of effort. Although the nonresponse bias of angler effort is statistically significant, the

[1] Most PWSMA fisheries are not monitored by onsite creel surveys. For this reason, the Statewide Harvest Survey by Mills (1979-1994) and Howe et al. (1995-1998, *In prep*) 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.

data are presented here as a tool for looking at trends in the fisheries of PWS. Please note that NRBs were correctly applied to produce estimates of harvest.

From 1983 through 1997, recreational anglers fishing PWSMA waters (Table 1) have expended an average of 97,544 angler-days. Recreational angler effort has generally been increasing since 1983 with slight drops in 1985 and 1993 (Figure 2). The most recent two years, 1996 and 1997, have been slightly lower than the highest estimate of effort in 1995 of 138,194 angler-days. The contribution of angler effort in PWSMA to the total regional and statewide effort has also been increasing. The estimated sport effort of angler-days for the PWSMA represent approximately 4.2% and 5.8% of the total statewide and Southcentral region sport angling effort, respectively (Table 1 and Figure 2).

The most popular fishing port in the PWSMA in terms of recreational angling effort has been in the Valdez area (Table 2 and Figure 3), the only road-accessible port in the area. This demonstrates the influence that road access has on angler participation. Anglers from this port accounted for nearly 54% of the recreational angling effort expended in the PWSMA. Saltwater boat anglers expended the majority of the angling effort in this port. Information is not available to delineate exact locations where all anglers were fishing in the marine waters, but anglers have been traveling further from ports in recent years. Charter operators from the port of Valdez regularly travel to the waters of the northeast shore of Montague Island, and beyond.

Cordova and Whittier are the next most popular fishing ports in the PWSMA. Anglers from each of these ports accounted for over 13% of the recreational angling effort expended in the PWSMA (Table 2). Other popular fisheries in the PWSMA include saltwater fishing along the shoreline of Eshamy Bay, and Hinchinbrook, Hawkins, and Montague islands.

COMMERCIAL AND SUBSISTENCE SALMON HARVESTS

Salmon returning to the PWSMA are harvested extensively by various commercial fisheries. For most species, commercial harvests are significantly larger than corresponding recreational harvests. Commercial harvests of halibut, lingcod and rockfish from PWSMA area fisheries are also larger than corresponding recreational harvests.

Fish stocks of the PWSMA are also harvested to a limited extent in various subsistence fisheries. Harvests in these fisheries are generally small. There are no personal use fisheries for finfish in PWS.

ECONOMIC VALUE OF SPORT FISHERIES

There are no direct estimates of the economic value of the recreational fisheries of the PWSMA. A rough approximation of the economic value of all the sport fisheries of the PWSMA 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 PWSMA (Table 1). Based on this method, the economic value of all of the sport fisheries of the PWSMA during 1986 was approximately 5.3 million dollars. This compares to an estimated value of 127 million dollars for Southcentral Alaska sport fisheries during 1986 (Jones and Stokes Associates, Inc. 1987). From 1986 to 1997, the number of angler-days expended in the PWSMA has increased by approximately 49%, therefore direct expenditures by anglers participating in the fisheries of the PWSMA, less any inflation, are estimated to be at nearly 8 million dollars.

Table 1.-Number of angler-days of effort expended sport fishing in the Prince William Sound Management Area (PWSMA) from 1983-1997.

Year	Effort			Percent of Statewide	Percent of Southcentral
	Statewide	Southcentral	PWS	From PWS	From PWS
1983	1,732,528	1,212,916	47,614	2.7%	3.9%
1984	1,866,837	1,341,658	57,548	3.1%	4.3%
1985	1,943,069	1,406,419	72,662	3.7%	5.2%
1986	2,071,412	1,518,712	64,251	3.1%	4.2%
1987	2,152,886	1,556,050	81,221	3.8%	5.2%
1988	2,311,291	1,679,939	84,971	3.7%	5.1%
1989	2,264,079	1,583,547	95,295	4.2%	6.0%
1990	2,453,284	1,745,110	105,739	4.3%	6.1%
1991	2,456,328	1,782,055	113,115	4.6%	6.3%
1992	2,540,374	1,889,930	113,443	4.5%	6.0%
1993	2,559,408	1,867,233	104,601	4.1%	5.6%
1994	2,719,911	1,966,985	122,330	4.5%	6.2%
1995	2,787,670	1,985,539	138,194	5.0%	7.0%
1996	2,733,008	1,948,892	131,881	4.8%	6.8%
1997	2,654,454	1,803,564	130,290	4.9%	7.2%
MEAN	2,349,769	1,685,903	97,544	4.2%	5.8%

From: Mills 1984-1994, Howe et al. 1995-1998.

Note: Due to an error in the 1995-1997 estimation process, the effort estimates for 1998 are not shown.

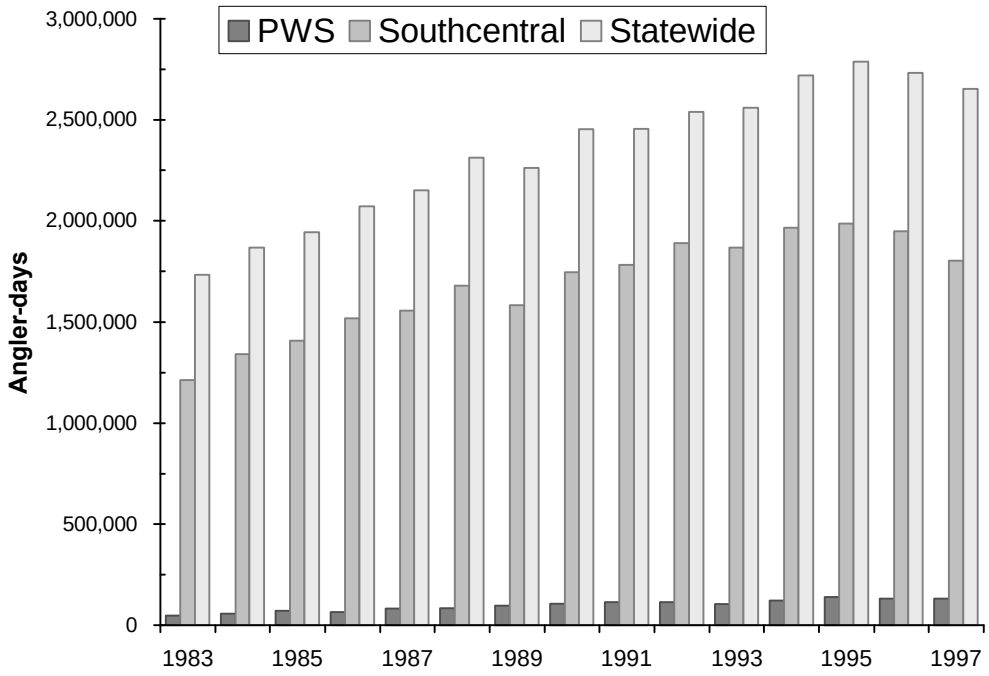


Figure 2.-Relative magnitude of angler effort expended sport fishing in the Prince William Sound Management Area.

Table 2.-Number of angler-days of effort by geographical regions in the Prince William Sound Management Area, 1983-1997.

Year	Outer Islands	Cordova Road System	Copper River Delta	Eastern PWS	Northeast PWS	Northwest PWS (Whittier)	Southwest PWS	Valdez Arm Area	Other sites in PWS	PWS Total
	OI	CR	DT	EA	NE	NW	SW	VZ	OT	
1983	85	6,946	51	151	34	7,519	2,192	16,052	14,584	47,614
1984	450	8,196	368			6,123	2,259	23,605	16,547	57,548
1985	375	1,884	135	329	553	11,064	1,601	51,862	4,859	72,662
1986	1,055	8,394	513	2,721	306	14,176	1,870	32,051	3,165	64,251
1987	1,244	10,451	520	1,015	856	15,028	1,890	48,174	2,043	81,221
1988	1,401	6,994	329	1,249	1,498	13,868	3,867	52,108	3,657	84,971
1989	2,033	16,818	270	1,365	909	10,148	7,746	49,500	6,458	95,247
1990	2,259	9,107	203	1,918	2,833	11,255	3,201	71,909	3,054	105,739
1991	1,627	16,070	1,498	1,903	2,613	13,646	3,021	68,794	3,890	113,062
1992	4,061	19,222	1,172	2,599	3,715	8,980	4,524	60,952	8,193	113,418
1993	3,658	14,943	569	1,535	1,126	16,917	4,354	53,658	7,817	104,577
1994	4,194	19,401	529	2,669	3,179	16,286	6,008	56,329	13,349	121,944
1995	5,121	14,918	378	3,200	1,628	16,548	4,626	76,429	15,346	138,194
1996	3,975	22,172	1,696	3,089	2,917	17,107	3,461	66,999	10,465	131,881
1997	6,286	17,867	840	3,531	2,343	17,922	4,715	63,118	13,668	130,290
MEAN	2,522	12,892	605	1,948	1,751	13,106	3,689	52,769	8,473	97,508

From: Mills 1984-1994, Howe et al. 1995-1998.
Note: Due to an error in the 1995-1997 estimation process, the effort estimates for 1998 are not shown.

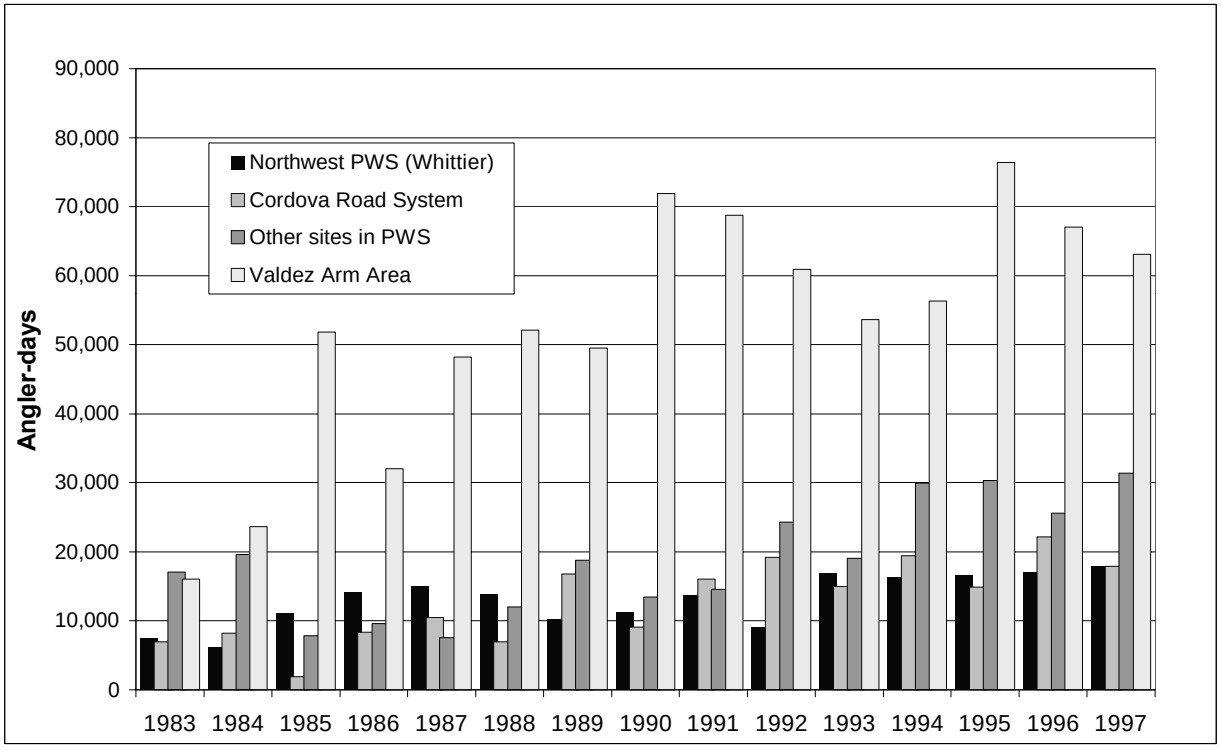


Figure 3.-Major components of angler effort by geographical regions in the Prince William Sound Management Area, 1983-1997.

STOCKING PROGRAM INVENTORY

Stocking of hatchery-raised fish has increased and diversified the opportunities available to anglers in the PWSMA. Five species of salmon, rainbow trout catchables and fingerlings, and Arctic grayling fry have been stocked in various locations in Prince William Sound. These stocking activities consist of two types of programs: those directed specifically toward enhancing the sport fisheries, and stocking programs that are intended to increase the harvest potential of the commercial fisheries but incidentally enhance the availability of fish for the sport angler. All of the salmon releases contribute to the common property fisheries and are thus available to any fishery regardless of the target group. The releases of resident species, while common property, are almost exclusively harvested by sport anglers. A summary of the stocking efforts in PWS are listed in Appendix A.

Those programs directed toward enhancing sport fisheries include the stocking of rainbow trout, grayling and chinook salmon raised at one of the state-operated hatcheries (Fort Richardson or Elmendorf) and the release of coho and pink salmon raised at private nonprofit (PNP) hatcheries. The releases of salmon by the PNP hatcheries for enhancement of sport fisheries consist of pink and coho salmon in Valdez Arm by the Valdez Fisheries Development Association (VFDA), and coho salmon at Whittier and at Fleming Spit in Cordova by the Prince William Sound Aquaculture Corporation (PWSAC). Currently the chinook salmon stocking program is in transition from a PNP program to a state program. The chinook program at PWSAC has been phased out recently with the last releases at Whittier in 1997 and at Cordova in 1998. The first chinook releases by the state were in the spring of 1999 at Whittier, Valdez and Cordova.

The commercial salmon releases include pink, chum, and sockeye salmon at various locations throughout Prince William Sound. Pink salmon are released from three PWSAC hatcheries and one VFDA hatchery in PWS. Sockeye salmon are released from one PWSAC hatchery and several remote sites in PWS. Chum salmon are released from one hatchery and one remote location in PWS by PWSAC.

PRINCE WILLIAM SOUND REGIONAL PLANNING TEAM

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 representatives from the regional private nonprofit hatchery corporation (Prince William Sound Aquaculture Association), commercial fishers, and representatives from two ADF&G 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 has finalized 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 Wallop-Breaux Amendments to the Federal Aid in Sport Fish Restoration program mandate that at least 12.5% of the federal funds passed on to states be used on the development and maintenance of boating access facilities. A broad range of access facilities can be approved for funding if constructed to achieve an ADF&G fishery management objective. These facilities can include boat ramps and lifts, docking and marina facilities, fish cleaning stations, rest rooms and parking areas. The active, proposed, potential, and completed access projects in PWSMA, as of January 1999, are listed below.

Active access projects:

Whittier Boat Launch. The road to Whittier is no longer a "proposal," it's happening. Construction has begun and we should be driving to Whittier, recreational boat in tow, by May 2000. During the development of the Whittier Access Project Environmental Impact Statement (EIS), economists examined the potential growth in the total annual number of visitors to Whittier and the annual number of visitors towing trailered boats with improved road access. The first year the road is open (2000) the total number of visitors annually traveling to Whittier for all purposes (about 900,000 people) is estimated to be 10 times the number who now visit Whittier. The portion of visitors using towed boats may increase 15 times from 3,400 today to 54,000 by the year 2000. In June of 1998 the City of Whittier, the Alaska Department of Transportation and Public Facilities (DOT&PF), and the Alaska Railroad Corporation (ARRC) embarked upon a planning process to identify capital improvements to handle the expected increase in visitors. Through a series of coordination meetings between the DOT&PF, the ARRC, the City of Whittier, and public meetings, a list was developed that identified the most critical needs to be initiated or met before the road opens. Prince William Sound Access (getting boats in the water) made this list of short-term critical needs. In addition, Sport Fish Division is also committed to a chinook salmon stocking program in PWS that will attract additional boat anglers. In FY99 a Whittier Boating Access project for $500,000 was initiated. During this past year a variety of scoping and planning meetings have occurred between ADF&G, the City of Whittier and other involved agencies. At this time, ADF&G and the City of Whittier have signed a Cooperative Agreement covering project planning. A maximum of $100,000 will be spent on this phase of the project. A preliminary project cost estimate was developed for the agency planning study mentioned above. The construction of boating access improvements proposed is estimated to cost between $1.25 and $1.50 million. More than half of the cost would go towards building a breakwater for wave protection. Due to the currently on schedule completion of the road project and the expected surge of demand for trailered boat access to PWS less than 20 months away, to expedite project completion, the balance of the project's estimated construction costs ($1.10 million) from boating access funds was requested for FY00.

Proposed access projects:

1. Whittier Fish Cleaning/Bulletin Board Modules. Cleaning tables and a carcass disposal system are needed at Whittier Harbor. In 1998 two cleaning tables were modified for interim use in the Whittier Harbor. These will need to be replaced or upgraded in the near future and provisions made for the disposal of carcasses at an estimated cost of $10,000.

   The proposed highway to Whittier is expected to increase the waterfront user group by a factor of nine times. A large part of this increase will come from shorebased anglers who

will need improved shoreline access, fish cleaning stations, and access to information that can be provided on bulletin boards and informational kiosks. Several different sites will require these service "modules" for adequate service to be provided at an estimated cost of $40,000.

2. Cordova Boarding Float. In Cordova there are two locations for the public to launch recreational boats into PWS, a double lane ramp in the boat harbor and a single lane ramp north of the ferry terminal and fuel dock. The single lane ramp is not currently used to its full potential because there are no provisions for tying up a boat once launched. Construction of a boarding float adjacent to the single lane ramp would serve as a means to safely and efficiently launch and retrieve boats, and load and unload boaters at this facility and reduce the pressure on the ramps in the boat harbor.

Potential projects

Mooring Buoys: The U.S. Forest Service (USFS) and Alaska State Parks currently maintain a small number of mooring buoys in PWS and along the eastern Kenai Peninsula. ADF&G Sport Fish Division has been working with State Parks to install mooring buoys in the Cook Inlet area and have identified potential sites in PWS. Currently State Parks is evaluating their maintenance program to determine whether they would be able to maintain additional buoys in the PWSMA. If they determine that they could maintain additional buoys, an access project could be developed to work in cooperation with them to identify additional sites or replace lost or damaged buoys. These could be purchased through the access program and turned over to these agencies for installation and maintenance.

Completed projects are:

Allison Point Access Project. An access project at Allison Point near Valdez was completed in the summer of 1994. 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 22,000 pink salmon from Allison Point in 1998. Allison Point is one of only two locations in the Valdez area where shorebased anglers can effectively harvest pink and coho salmon. Prior to this project, access to the beach at Allison Point was crude and hazardous. The large boulders forming the embankment that parallels the beach near Allison Point were difficult and dangerous to traverse. Limited sanitation facilities and garbage receptacles were provided during the summer by the City of Valdez.

The access project for Allison Point provided a developed trail to the beach for shore anglers, upgraded the existing parking area, and constructed permanent rest room facilities and garbage receptacles. The trail, rest rooms, and parking spaces were constructed to accommodate handicapped anglers. The Allison Point access project was 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 was approximately $140,000.

MANAGEMENT AREA FISHERY OBJECTIVES

Fishery objectives for PWSMA sport fisheries continue to evolve as each fishery becomes better understood. The objective of past and current fisheries management is to assure the sustained yield of the various fish stocks that occur within the PWSMA, while assuring continued, and where possible expanded, opportunity to participate in fisheries targeting these stocks. Some

specific fishery objectives, which are described in Section II of this report, have been developed for the sport fisheries supported by hatchery releases of coho and chinook salmon at the ports of Valdez, Cordova, and Whittier.

MANAGEMENT PLANS AFFECTING SPORT FISHERIES IN THE PWSMA

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

1. 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 sockeye salmon fishery is closed by permitting use of large mesh gillnets. The plan also provides department fishery managers with specific management guidelines for this fishery.
2. 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 Sound Aquaculture Corporation's (PWSAC) escapement goal for the Port San Juan Salmon Hatchery.
3. 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 Valdez Fishery Development Association'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.
4. 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.
5. 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 Island 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.
6. 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.
7. 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.

8. 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.
9. 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:

10. Prince William Sound Aquaculture Corporation Special Harvest Area-San Juan: 5 AAC 40.035.
11. Solomon Gulch Special Harvest Area-Valdez: 5 AAC 40. 038.

Rockfish management plans are:

12. North Gulf Coast 5 AAC 28.465.
13. Prince William Sound 5 AAC 28.265.

These two rockfish management plans establish trip limits for allowable commercial fishery rockfish landings during a 5-day period for the North Gulf Coast, and Prince William Sound 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 PWSMA

Following is a summary of the major biological issues surrounding the PWSMA sport fisheries. Groundfish (halibut, rockfish and lingcod) issues are covered in more detail in the North Gulf Coast groundfish annual management report (Vincent-Lang 1998).

Road to Whittier

The Department of Transportation has started construction on road access into Whittier by modification of the current railroad tunnel system. This project is expected to be completed by spring of 2000. In response, the City of Whittier has begun the planning process for the expansion of the harbor to more than double its capacity. These developments have the potential of drastically changing the character of the fisheries in western PWS. The department will continue to examine access and stocking programs to accommodate this increase in participation, as well as evaluating and developing fishery objectives to maintain and protect the current fisheries.

Eastern PWS/Cordova Area Coho Salmon Stocks

The returns of coho salmon to eastern PWS and streams accessible from the Cordova Road system have been low in recent years. Concern for these stocks prompted emergency orders (Appendix C3) in both 1997 and 1998, restricting bag limits and eliminating bait. Some areas were also closed.

Carbon Mountain Road

A 25-mile road from approximately Mile 40 of the Copper River Highway to native corporation inholdings near Carbon Mountain in the Bering River Drainage is being built. The specific route through wetlands has been established and a bridge crossing Clear Creek was erected in 1998. Construction will continue through 1999 and 2000.

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. 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 is concerned whether the present small harvest is sustainable. Some specific cutthroat trout stocks in the Pacific northwest have been selected as candidates for being listed as threatened species under the Endangered Species Act. Careful management is necessary to avoid this possibility for the PWS stocks. The Board will be considering a proposal at the upcoming meetings (December 1999) to create a special management area for trout. Basically this proposal would create a catch-and-release fishery with single-hook, unbaited artificial lures east of the Copper River for those waters accessible from the proposed Carbon Mountain road easement.

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 41% of the total PWS sport harvest for sockeye in 1983 and this percentage decreased drastically to less than 6% 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. Efforts to rehabilitate these systems with saltwater reared sockeye salmon smolt produced at PWSAC's Main Bay hatchery were ineffective and have been discontinued.

The Coghill Lake run, through intensive management actions by the Commercial Fisheries Division (CFD) and lake fertilization efforts funded by *Exxon Valdez* Oil Spill (EVOS) restoration monies, has demonstrated an increase in returns. Escapement has been met in Coghill Lake since 1995 with good runs and an exceptionally strong return in 1999. The wild return at Eshamy Lake continues to be weak.

SECTION II: MAJOR FISHERIES OVERVIEW

Fishing activities in the Prince William Sound area originate primarily out of the three major ports of Valdez, Cordova, and Whittier, as well as by air from Anchorage. For purposes of understanding the distribution of the fisheries within the Sound, Prince William Sound fisheries are divided into eight geographically distinct areas (Figure 4). The discussion of the fisheries that follows will be presented briefly by port, then in more detail by individual fishery. Harvest and effort by fishery will be presented in the detailed discussion by the eight geographic regions. The eight geographic regions for PWS are: Northwest (NW), Northeast (NE), Valdez Area (VZ), Eastern (EA), Outer Islands (OI), Southwest (SW), Cordova Road System (CR) and the Copper River Delta (DT). A final category "Other" (OT) is included for those sites which were reported in the SWHS without adequate information to assign data to a specific region (e.g. PWS boat). In addition groundfish are addressed in more detail in a groundfish management report (Vincent-Lang 1998).

PORT OF VALDEZ FISHERIES

The waters of the Valdez area (Appendix B1) support the most popular fisheries in the PWSMA. In 1983, the Valdez area fisheries accounted for 34% of the total effort expended in the PWSMA and by 1997 had increased to 48% of the total effort (Table 2). On average 97% of angler effort in Valdez is expended in marine waters (Table 3, Figure 5). Although many anglers fish from shore, over 70% of the effort expended in marine waters is by anglers using boats (Howe et al. 1995). 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 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. In terms of angler effort, the most popular fisheries are those that target coho salmon and halibut.

PORT OF CORDOVA FISHERIES

The waters of the Cordova area (Appendix B2) support the most popular freshwater fisheries in PWS in terms of angling effort expended since 1983. On average these waters have accounted for 13% of the total angling effort expended in the PWSMA (Table 2). Historically, 54% of the effort in Cordova is expended in fresh water (Table 4, Figure 6). The harvest and effort in the 1990s has increased over the levels of the 1980s (Figure 6). This increase can be largely attributed to the growing popularity of the Fleming Spit enhancement, trolling for salmon in Orca Inlet, and the growing interest in coho salmon 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 and sockeye salmon, and halibut. In terms of angler effort, the coho salmon and cutthroat trout fisheries are most popular.

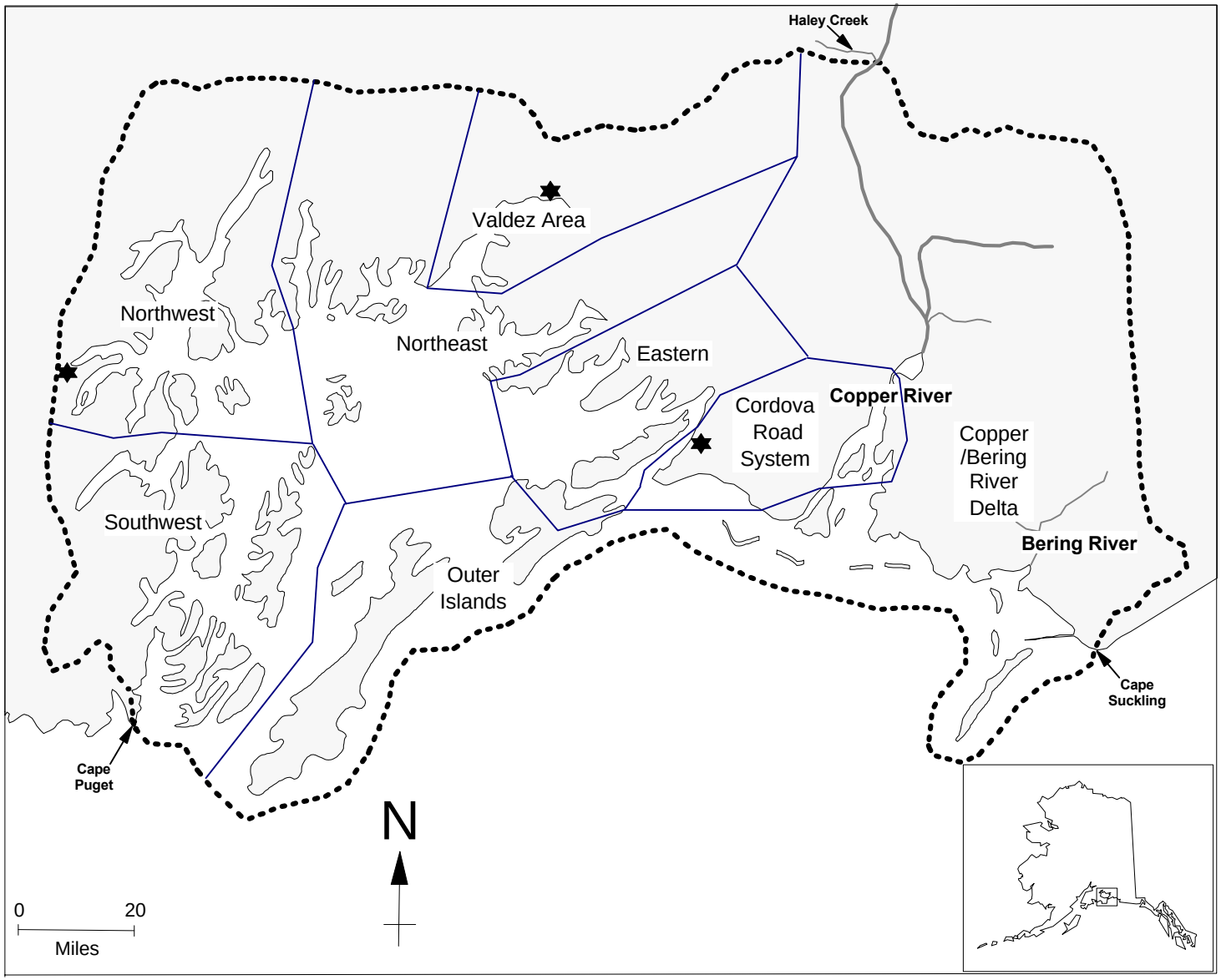


Figure 4.-Map of the geographical regions in the Prince William Sound Management Area.

Table 3.-Harvest and effort expended sport fishing in the Valdez area from 1983 through 1998.

	Effort			Salmon Harvest					Groundfish Harvest			Resident Harvest		
YEAR	Fresh water	Salt water	Total	Chinook	Coho	Pink	Sockeye	Chum	Halibut	Rock fish	Ling cod	Dolly Varden	Arctic Grayling	Cutthroat Trout
1983	288	15,764	16,052	241	4,710	8,696	343	976	1,846	3,703		976	0	0
1984	4,885	18,720	23,605	125	5,138	9,825	811	1,397	1,322	4,402		9,566	0	274
1985	1,735	50,127	51,862	326	8,020	28,450	1,085	1,400	3,310	6,304		4,803	0	0
1986	2,425	29,626	32,051	168	6,911	22,170	413	1,865	3,669	6,366		5,077	352	61
1987	628	47,546	48,174	360	8,884	27,071	1,756	1,525	2,185	3,175		1,049	54	0
1988	1,012	51,096	52,108	227	10,241	26,776	1,582	4,201	4,599	6,983		983	182	36
1989	1,029	48,471	49,500	526	18,143	32,922	881	2,736	4,231	7,072		1,141	58	0
1990	659	71,250	71,909	220	18,630	46,730	1,630	1,258	6,045	4,350		1,341	114	0
1991	903	67,891	68,794	353	10,393	48,618	1,471	838	6,122	3,979	1,122	1,441	331	0
1992	1,552	59,400	60,952	317	17,580	28,596	2,153	804	8,379	7,625	1,476	1,622	0	0
1993	1,073	52,585	53,658	405	12,841	32,479	1,235	873	8,457	4,894	1,117	1,801	249	21
1994	1,599	54,730	56,329	394	18,633	46,494	2,368	767	7,457	5,725	287	404	0	98
1995	1,748	74,681	76,429	333	37,265	41,963	1,358	653	9,087	6,359	1,028	506	95	0
1996	2,527	64,472	66,999	304	34,586	29,453	1,846	904	8,345	3,899	568	626	0	24
1997	1,570	61,548	63,118	1,058	37,950	22,999	1,206	1,256	10,241	5,211	1,025	575	0	147
1998				598	44,274	35,272	663	1,448	10,380	4,834	1,118	516	0	51
MEAN	1,576	51,194	52,769	372	18,387	30,532	1,300	1,431	5,980	5,305	968	2,027	90	45

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .

Note: Due to an error in the 1995-1997 estimation process, the effort estimates for 1998 are not shown.

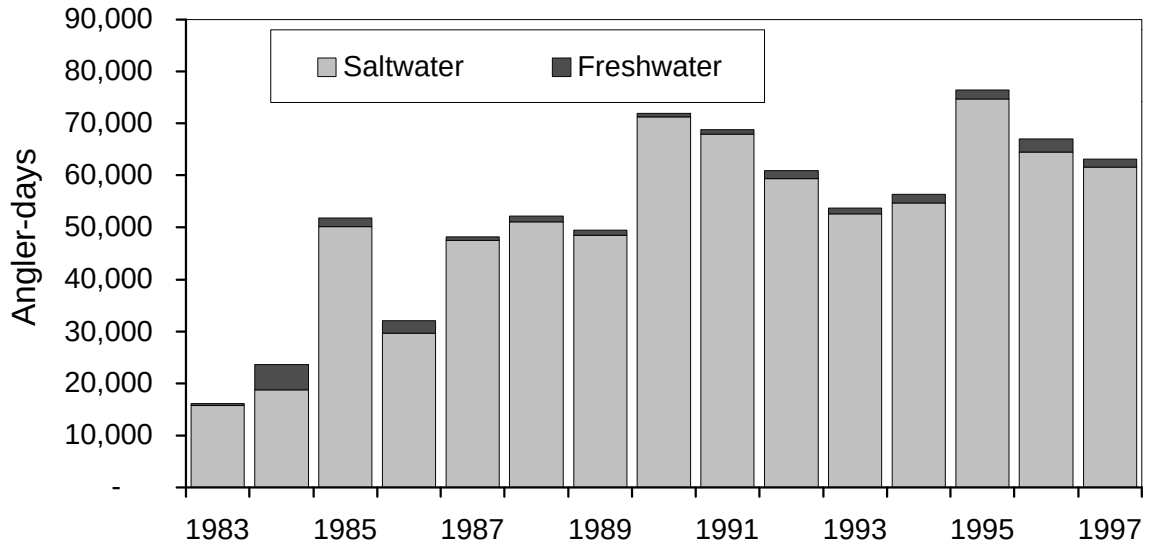


Figure 5.-Effort expended by salt and freshwater anglers sport fishing in the Valdez area from 1983 through 1997.

Table 4.-Harvest and effort expended sport fishing in the Cordova area from 1983 through 1998.

	Effort			Salmon Harvest					Groundfish Harvest			Resident Harvest		
YEAR	Fresh water	Salt water	Total	Chinook	Coho	Pink	Sock eye	Chum	Halibut	Rock fish	Ling cod	Dolly Varden	Arctic Grayling	Cutthroat Trout
1983	6,946	0	6,946	21	2,139	0	1,082	84	0	0		2,632	0	1,436
1984	6,574	1,622	8,196	0	2,506	149	112	0	237	37		1,245	0	873
1985	1,331	553	1,884	0	564	55	130	0	33	380		714	0	188
1986	5,615	2,779	8,394	11	3,440	412	321	15	596	145		902	0	901
1987	5,398	5,053	10,451	0	2,351	641	507	0	253	0		1,268	0	1,050
1988	2,870	4,124	6,994	9	5,311	364	600	236	963	169		1,309	0	218
1989	11,724	5,094	16,818	0	4,248	627	661	64	809	270		1,888	116	853
1990	4,526	4,581	9,107	34	3,900	162	466	45	486	136		670	0	311
1991	5,271	10,799	16,070	59	4,943	747	806	143	1,463	477	157	997	0	116
1992	9,641	9,581	19,222	321	5,150	37	1,578	38	2,305	879	177	1,138	16	632
1993	7,543	7,400	14,943	302	5,056	433	1,321	170	2,165	335	74	586	0	410
1994	10,705	8,696	19,401	764	5,933	487	3,066	134	2,488	1,215	58	611	28	443
1995	6,866	8,052	14,918	303	4,279	444	590	73	2,627	644	65	330	0	88
1996	12,262	9,910	22,172	607	7,666	400	3,124	92	2,819	1,834	120	654	0	189
1997	7,601	10,266	17,867	652	4,928	863	1,126	89	2,710	1,244	154	474	0	313
1998				781	4,284	2,179	3,261	201	6,711	2,824	672	597	0	108
MEAN	6,992	5,901	12,892	242	4,169	500	1,172	87	1,778	662	185	1,001	10	508

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .
Note: Due to an error in the 1995-1997 estimation process, the effort estimates for 1998 are not shown.

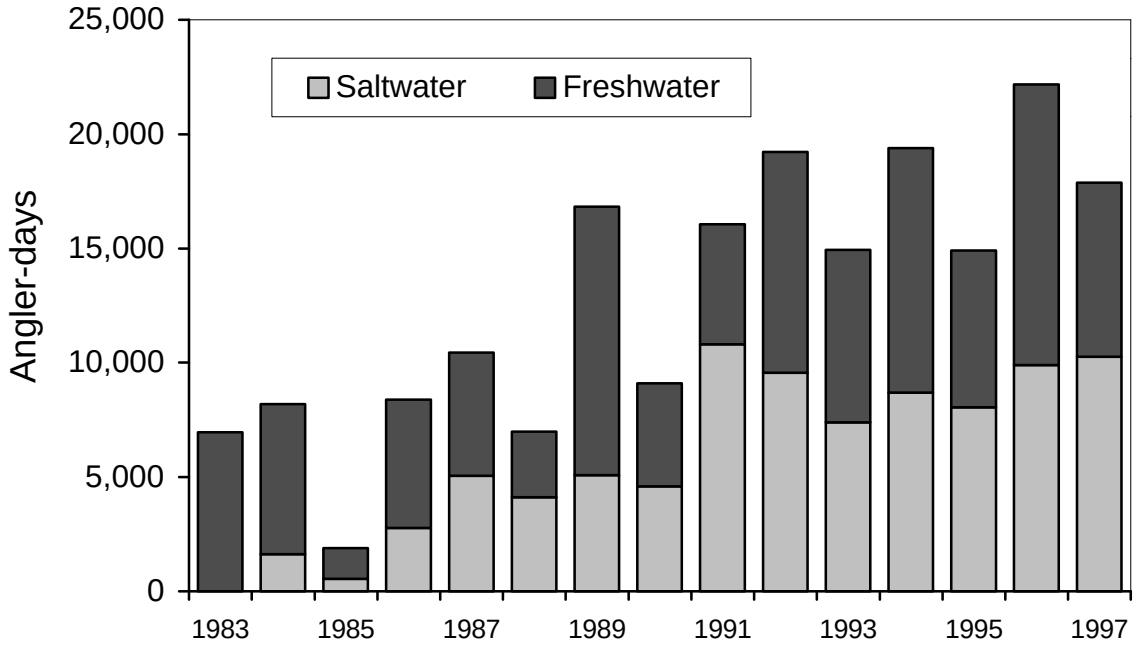


Figure 6.-Effort expended by salt and freshwater anglers sport fishing in the Cordova area from 1983 through 1997.

PORT OF WHITTIER FISHERIES

The waters of the Whittier area (Appendix B3) support the second most popular fisheries in PWS in terms of angling effort expended since 1983. These waters on average have accounted for approximately 14% of the recreational angling effort expended in the PWSMA (Table 2). Nearly all of the angling effort is expended in marine waters (Figure 7) since there are limited opportunities to fish in fresh water. Sport fisheries target salmon and bottomfish. In 1997, angler-days expended in the Whittier area (northwest PWS) were 17,922. This represents an average annual increase in effort of 7% since 1983. Although harvest of coho salmon increased dramatically in 1998, harvests of other salmon species did not vary much from the means. Harvests of halibut, rockfish and lingcod dropped in 1998 by 31%, 27%, and 22%, respectively, from the 1997 harvest levels (Table 5 and Figure 8).

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 limits for coho in marine waters are 6 fish per day and 12 fish in possession, and 3 fish per day and 3 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 freshwater drainages of Valdez Arm except for a portion of Robe River and Solomon Gulch Creek.

The coho harvest for all of PWS has been growing at about 6.25% a year. From 1983-1998, the mean harvest of coho salmon from PWS was 27,623 fish a year (Table 6 and Figure 9). In 1998, 78% of this harvest was from Valdez Arm (Table 6 and Figure 8). Since 1988, the majority of the harvest of coho salmon in Valdez Arm has been from fish produced by the nonprofit Valdez Fisheries Development Association hatchery located on Solomon Gulch Creek. Coho salmon 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 accounted for 16% of the PWS historical harvest through 1998 (Table 6, Figure 9). As in Port Valdez, the sport harvest of coho salmon is composed of both wild and hatchery fish. The wild stock component of the harvest is taken from 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 accounted for 36% of the Cordova area harvest in 1998 (Table 7 and Figure 10). The next largest coho salmon fishery targets hatchery coho salmon returning to Fleming Spit in Orca Inlet, located near downtown Cordova. Anglers harvested an average of 1,229 coho salmon a year between 1983-1998 from waters adjacent to Fleming Spit. Another popular coho fishery occurs along the highway in the clearwater streams entering Alaganik Slough.

Table 5.-Harvest and effort expended sport fishing in the Whittier area from 1983 through 1998.

	Effort			Salmon Harvest					Groundfish Harvest			Resident Species	
YEAR	Fresh water	Salt water	Total	Chinook	Coho	Pink	Sockeye	Chum	Halibut	Rock fish	Ling cod	Dolly Varden	Cutthroat Trout
1983	1,416	6,103	7,519	0	294	2,413	932	31	284	1,112		293	0
1984	1,622	4,501	6,123	212	561	1,422	660	49	387	836		299	12
1985	1,196	9,868	11,064	22	1,725	1,975	759	228	826	1,974		69	0
1986	1,856	12,320	14,176	22	2,981	1,620	2,890	749	1,086	1,810		688	0
1987	3,194	11,834	15,028	321	2,262	2,699	1,884	359	650	1,971		1,593	0
1988	712	13,156	13,868	160	1,600	2,729	728	1,818	1,143	2,371		73	0
1989	823	9,325	10,148	199	1,238	1,681	1,172	257	912	2,374		388	0
1990	835	10,420	11,255	85	2,200	1,033	533	236	1,038	1,398		262	0
1991	255	13,391	13,646	59	2,799	1,647	444	229	1,484	2,497	274	40	29
1992	329	8,651	8,980	367	640	1,025	1,947	91	1,151	1,483	252	89	0
1993	341	16,576	16,917	353	1,558	775	1,152	686	1,705	2,158	150	213	53
1994	337	15,949	16,286	220	2,317	1,335	601	202	2,438	3,158	303	108	0
1995	436	16,112	16,548	161	943	921	739	234	2,639	2,379	243	0	0
1996	1,215	15,892	17,107	208	3,040	1,095	1,616	516	3,545	2,828	343	20	0
1997	769	17,153	17,922	412	1,844	1,047	1,878	310	4,519	3,459	664	140	0
1998				186	5,388	1,266	1,546	401	1,419	947	143	321	201
MEAN	1,022	12,083	13,106	187	1,962	1,543	1,218	424	1,577	2,047	297	287	18

From: Mills 1984-1994, Howe et al. 1995-1998.
Note: Due to an error in the 1995-1997 estimation process, the effort estimates for 1998 are not shown.

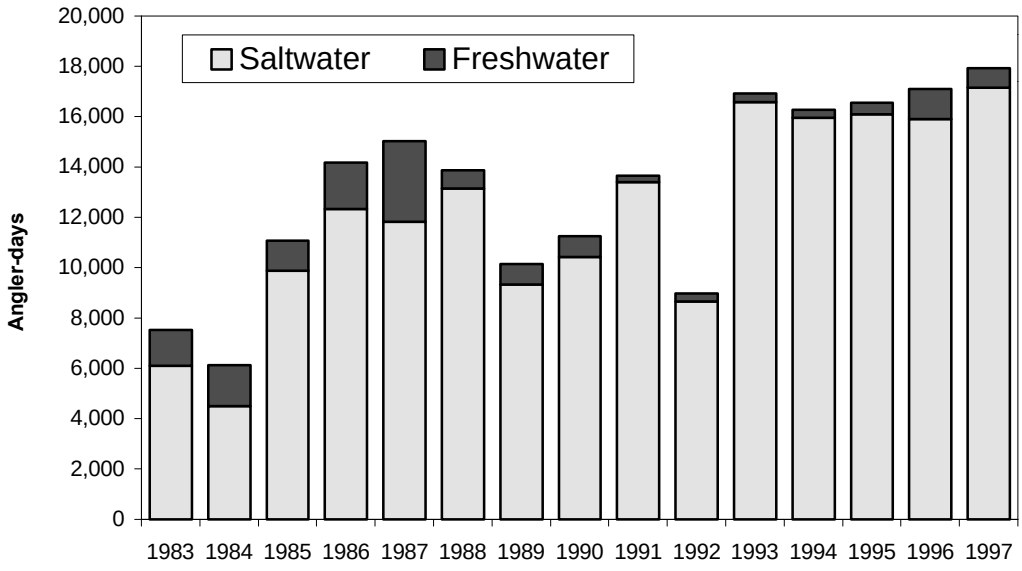
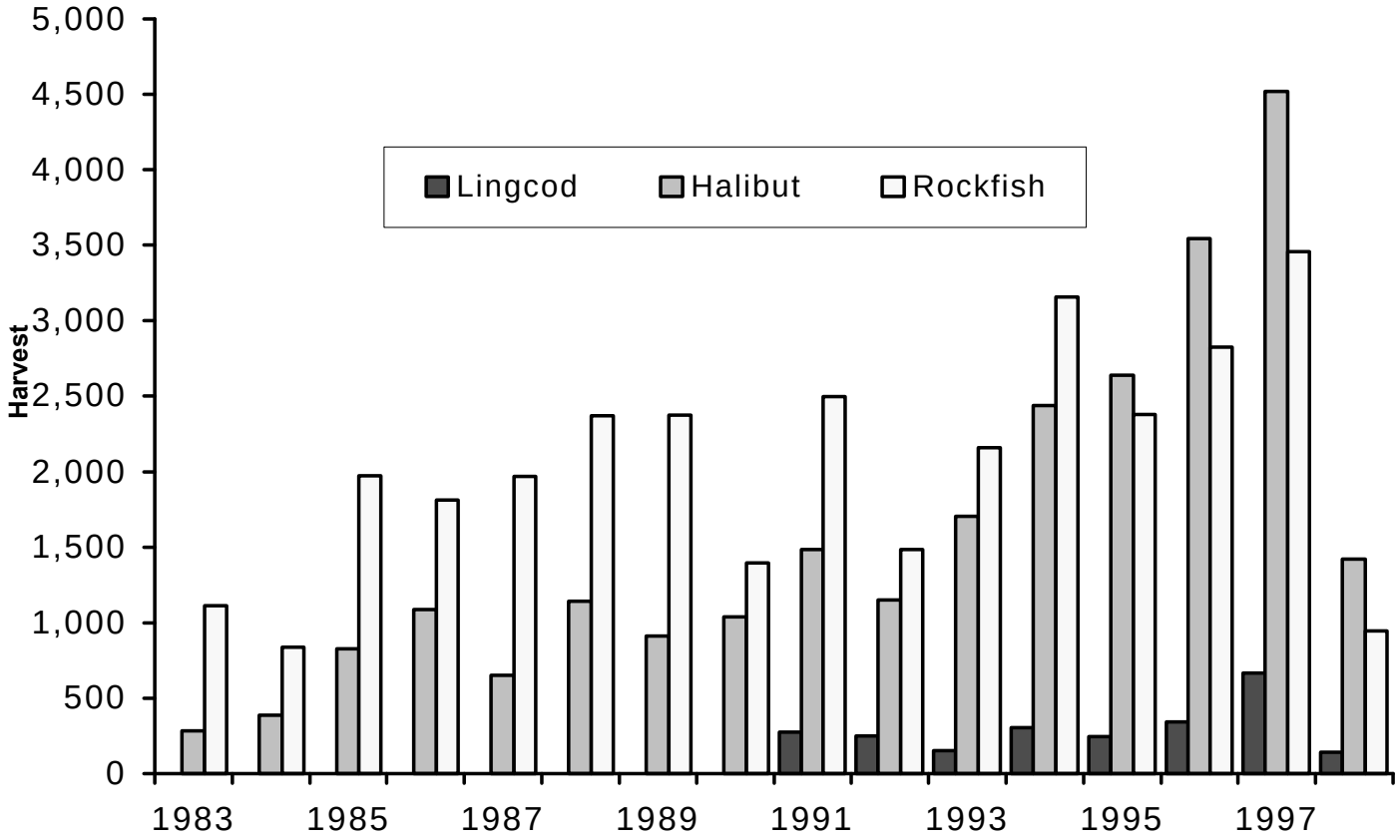


Figure 7.-Effort expended sport fishing in the Whittier area from 1983 through 1997.



From: Mills 1984-1994, Howe et al. 1995-1998, *In prep*. Lingcod harvest not reported in SWHS until 1991.

Figure 8.-Harvest of lingcod, halibut, and rockfish in the Whittier area, 1983-1998.

Table 6.-Coho salmon harvest by geographical regions in the Prince William Sound Management Area, 1983-1998.

YEAR	Outer Islands	Cordova Road System	Copper River Delta	Eastern PWS	Northeast PWS	Northwest PWS (Whittier)	Southwest PWS	Valdez Arm Area	Other sites in PWS	PWS Total
1983	42	2,139	52	63	0	294	0	4,710	3,105	10,405
1984	336	2,506	150			561	137	5,138	1,535	10,363
1985	402	564	76	98	0	1,725	108	8,020	640	11,633
1986	749	3,440	244	428	0	2,981	76	6,911	1,269	16,098
1987	892	2,351	651	359	58	2,262	29	8,884	1,194	16,680
1988	510	5,311	291	618	0	1,600	54	10,241	637	19,262
1989	643	4,248	207	151	0	1,238	245	18,143	756	25,631
1990	962	3,900	14	491	0	2,200	147	18,630	295	26,639
1991	191	4,943	68	286	170	2,799	103	10,393	830	19,783
1992	186	5,150	113	418	211	640	209	17,580	752	25,259
1993	1,065	5,056	78	276	153	1,558	107	12,841	659	21,793
1994	445	5,933	266	758	65	2,317	258	18,633	1,898	30,573
1995	561	4,279	39	417	57	943	670	37,265	2,878	47,109
1996	674	7,666	464	1,390	288	3,040	30	34,586	3,384	51,522
1997	1,100	4,928	409	760	373	1,844	486	37,950	4,379	52,229
1998	423	4,284	154	76	374	5,388	467	44,274	1,552	56,992
MEAN	574	4,169	205	466	117	1,962	195	18,387	1,610	27,623

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .

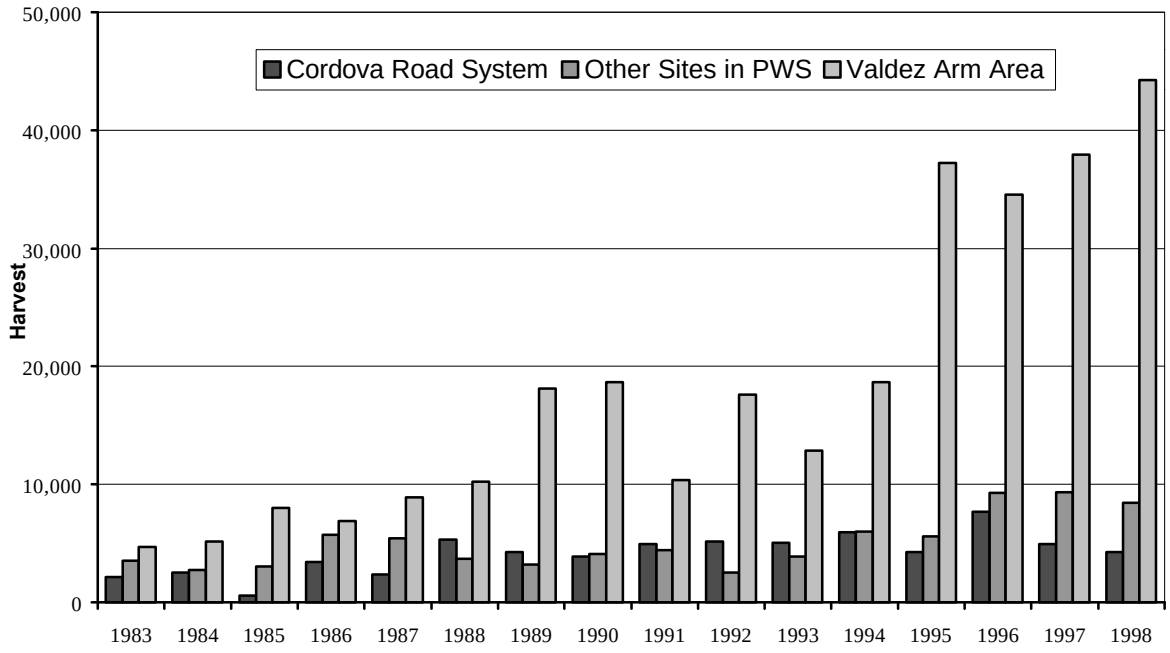


Figure 9.-Coho salmon harvest by geographical regions in the Prince William Sound Management Area, 1983-1998.

Table 7.-Coho salmon harvest in the Cordova area of Prince William Sound, 1983-1998.

Year	Alaganik Slough	Clear Creek	Eyak Drainage[a]	Orca Inlet	Other Sites	Grand Total
1983	566	0	1,017	0	556	2,139
1984	673	0	1,284	50	499	2,506
1985	217	0	239	108	0	564
1986	46	0	2,767	474	153	3,440
1987	311	0	680	1,166	194	2,351
1988	2,183	0	1,201	1,691	236	5,311
1989	908	76	2,100	1,060	104	4,248
1990	316	70	1,462	1,883	169	3,900
1991	306	211	1,355	2,989	82	4,943
1992	729	16	2,996	1,377	32	5,150
1993	1,127	332	2,431	721	445	5,056
1994	433	568	3,083	1,592	257	5,933
1995	177	375	1,831	1,364	532	4,279
1996	1,539	1,466	2,585	2,046	30	7,666
1997	853	429	1,702	1,933	11	4,926
1998	429	1,072	1,563	1,207	13	4,284
MEAN	676	288	1,769	1,229	207	4,169

[a] Eyak Drainage includes Eyak River, Eyak Lake and Power Creek.

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .

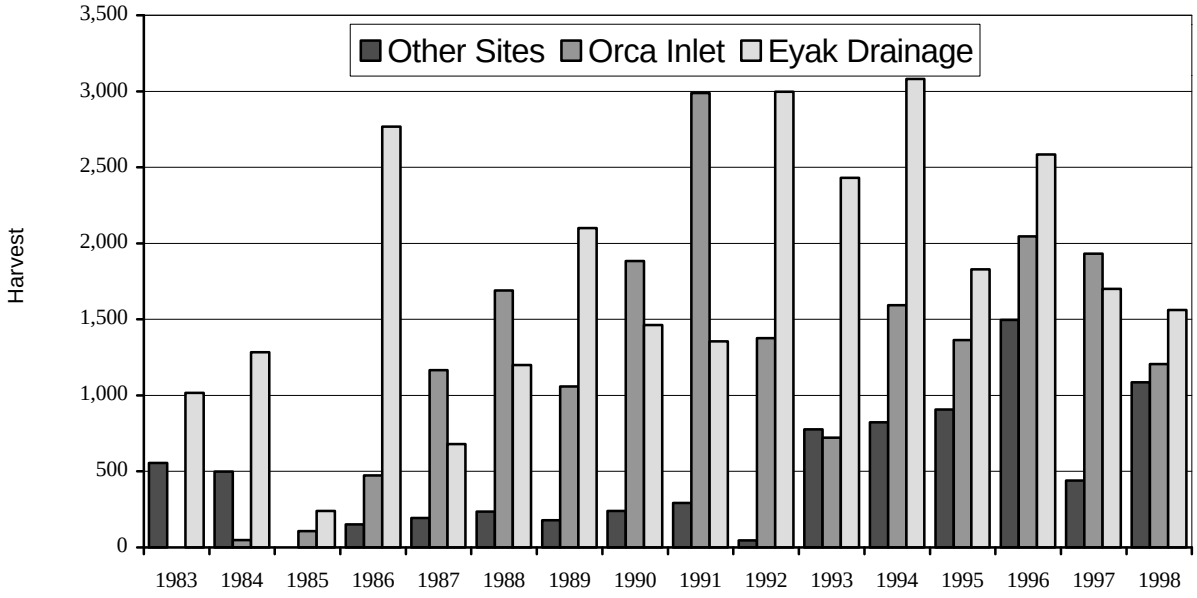


Figure 10.-Coho salmon harvest in the Cordova area of Prince William Sound, 1983-1998.

The Whittier area sport fishery (Northwest PWS) for coho salmon depends entirely on returning hatchery fish. The coho salmon smolt release program has produced annual returns that have ranged from 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 294 to 5,388 coho salmon from 1983-1998 (Table 6). 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.

The remainder of the PWS harvest of coho salmon comes from sites other than the three major ports (Table 6). 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 1998 was 56,992. In these growing fisheries the harvest has been increasing at an average of over 6% a year since 1983. Valdez Arm once again supported the largest harvest of coho salmon in PWS, followed by fisheries in the Cordova road system (Table 6 and Figure 9). As the PWS coho fisheries become more popular, we can expect to see increased effort and harvest.

Management Objective

The stocking of coho salmon in PWS is accomplished entirely by PNP hatcheries, therefore the following specific management goals are stated as ideals for these stocking programs. 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 shorebased 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 shorebased 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 the sustained yield of the various wild coho salmon stocks that occur within PWS while assuring continued and, where possible, expanded opportunity to participate in areawide coho salmon fisheries.

Recent Board of Fisheries Actions

The most recent BOF action for this fishery occurred in 1990 when 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.

No BOF actions relative to this fishery occurred at the 1994 meeting. No proposals were submitted for the 1997 meeting. Proposals for the 2000 meeting (November 1999) would reduce the bag limit from 6 to 3 coho in salt water, except within the defined terminal harvest areas (where angler effort targets hatchery return fish) at Cordova, Valdez, Whittier and Chenega. Another proposal for consideration would close selected spawning reaches of anadromous streams to the taking of coho and sockeye salmon. This proposal is aimed at protecting spawning salmon and spawning habitat.

Current Issues

One issue that has been of concern in recent years is the developing sport fishery along the Copper River Delta. The streams along the Copper River Delta were reopened to sport fishing for salmon in 1988 after being closed for conservation concerns in the early 1970s. The increasing effort on these streams is an ongoing concern. Sites of particular concern are Eyak River, Elsner Creek and Clear Creek. Although escapement goals continue to be met in these systems, in light of weak coho returns, there is concern about increased harvest and angler-related mortality.

The department does not feel there are any major conservation concerns with the Copper River Delta coho stocks. Although effort and harvest continue to increase, staff believe the necessary tools to manage these fisheries, including both sport and commercial, on a sustained yield basis exist. Biweekly escapement surveys and commercial fishery openings provide data necessary to help 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 1998.

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, provided escapement guidelines are met. Proposals to unduly restrict these fisheries will be viewed by the department as allocative in nature.

Another concern that appears to be developing is the increased pressure on the small coho stocks returning to the shorter coastal streams on Hawkins Island and along the shores of Orca Bay and Orca Inlet. An increase in “floating lodges” and charter activity has increased pressure on these streams.

Ongoing Research and Management Activities

Division of Commercial Fisheries currently conducts escapement surveys of the clearwater streams adjacent to the Copper River Highway.

Cordova Area Marine Waters Surveys should continue to measure harvest of groundfish and coho salmon by anglers in the waters of eastern PWS.

Recommended Research and Management Activities

Increased monitoring of the Orca Bay and Orca Inlet coho salmon fisheries should be implemented. A system for monitoring and evaluating the increase in road system fisheries should also be implemented.

PRINCE WILLIAM SOUND CHINOOK SALMON FISHERY

There is very little wild production of chinook salmon in PWS, and the sport fishery is supported almost entirely by hatchery-produced fish. There is a small but growing harvest of feeder chinook (winter kings) by residents in Cordova and Valdez and a few charters target them. 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, with the winter months being most productive.

Most waters of PWS are open to the taking of chinook salmon year-round, with a bag and possession limit of 2 fish per day and 4 fish in possession. Closed waters include Eccles Creek, the Eyak Lake drainage, and Hartney Creek, all near Cordova, and all freshwater drainages of Valdez Arm except for a portion of Robe River and Solomon Gulch Creek.

From 1983-1998, the mean harvest of chinook salmon from marine waters of PWS is 969 fish (Table 8). Just over 39% of this harvest is from Valdez Arm (Figure 11). The next largest harvest occurs in Cordova, which accounts for 25% of the historical mean harvest. The fishery on the Robe River accounts for the majority of the chinook harvest in Valdez Arm. Since 1988 the Valdez area 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 canceled after only one year. Since 1991, chinook salmon smolt have been released at 6.5 Mile Creek, a tributary of Lowe River, to establish a marine fishery near Allison Point. This program was discontinued after 1993 due to problems with bacterial kidney disease in brood stock from Esther Hatchery.

The sharp increase in the chinook harvest in the Cordova area can be largely attributed to the stocking program that began in 1990. The release of hatchery-reared smolt at Fleming Spit has produced a thriving chinook fishery in Orca Inlet. The average chinook harvest from 1983-1991 was 15 fish a year, and jumped to a 533 fish average harvest for 1992-1998 (Table 8 and Figure 11). The stocking program was suspended in 1996 and 1998, but stocking took place in the spring of 1997 and 1999.

The Whittier area sport fishery for chinook salmon is supported primarily by 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 412 chinook salmon from 1983-1998 (Table 8). 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 has varied a great deal since 1983. The 1998 harvest of 1,702 salmon, nearly double the 1983-1997 mean (Table 8).

Table 8.-Chinook salmon harvest by geographical regions in the Prince William Sound Management Area, 1983-1998.

YEAR	Outer Islands	Cordova Road System	Copper River Delta	Eastern PWS	Northeast PWS	Northwest PWS (Whittier)	Southwest PWS	Valdez Arm Area	Other sites in PWS	PWS Total
1983	0	21	0	0	0	0	0	241	314	576
1984	0	0	0	0	0	212	0	125	74	411
1985	0	0	0	0	0	22	0	326	0	348
1986	0	11	0	234	0	22	0	168	67	502
1987	0	0	0	165	0	321	0	360	19	865
1988	0	9	0	0	0	160	9	227	38	443
1989	210	0	0	0	0	199	117	526	41	1,093
1990	56	34	0	23	0	85	0	220	0	418
1991	0	59	0	0	0	59	6	353	0	477
1992	47	321	0	0	0	367	23	317	41	1,116
1993	47	302	47	18	9	353	9	405	154	1,344
1994	0	764	0	29	0	220	0	394	317	1,724
1995	0	303	0	0	0	161	0	333	180	977
1996	0	607	0	0	0	208	0	304	20	1,139
1997	44	652	0	66	0	412	78	1,058	56	2,366
1998	0	781	0	0	0	186	66	598	71	1,702
MEAN	25	242	3	33	1	187	19	372	87	969

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .

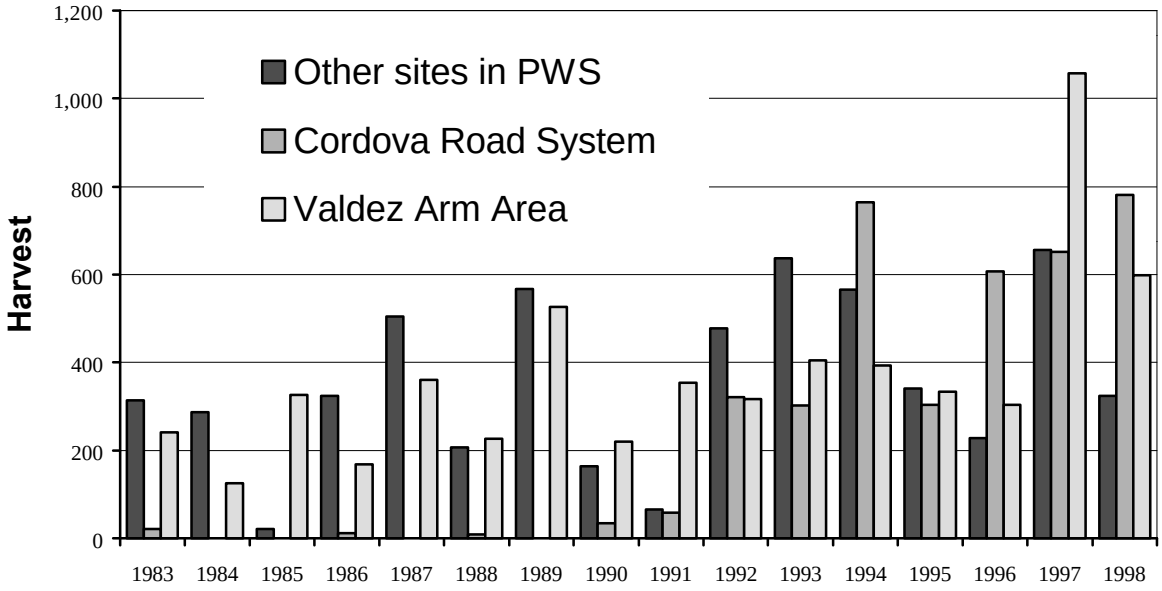


Figure 11.-Chinook salmon harvest by geographical regions in the Prince William Sound Management Area, 1983-1998.

Management Objective

The stocking of chinook salmon in PWS, starting in 1999, has been continued and expanded from the program run by PWSAC starting in the early 1990s. The following specific management goals are stated in the Statewide Stocking Plan for Recreational Fisheries (ADF&G 1999b). 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 5,000 angler-days of fishing opportunity annually; and (3) promote diverse sport fishing opportunity by providing early-run chinook salmon to both boat and shorebased 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 the sustained yield of the few wild chinook salmon stocks, primarily passing through the Copper River, that occur within the PWSMA while assuring 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 first chinook salmon from the state hatchery system were stocked in 1999. Continuation of this program is based on the success of this and the next few years of stocking effort. Fishable returns of the stocking program are not expected until 2002; thus it will take 5 to 7 years to determine the success of the program.

Ongoing Research and Management Activities

The Division of Sport Fish is currently working with the Commercial Fisheries Division on recovering coded wire tags that were placed in wild Copper River stock chinook smolt. This program will also recover tagged fish from this stocking program.

Recommended Research and Management Activities

There is currently no research recommended for this fishery.

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 PNP 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 limits for salmon other than chinook are 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 fishery harvest in PWS has been the largest in the state since 1985 (Howe et al. 1995). Since 1983 the average annual harvest of pink salmon in PWS has been 34,747 fish (Table 9). Nearly 87% of this harvest has been from Valdez Arm (Figure 12). 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 ranged from less than a million to nearly 14 million in 1994. The returning pink salmon are intended primarily for the commercial fishery and cost recovery at the Solomon Gulch Hatchery. From 1983-1998, the average harvest of pink salmon from Valdez Arm was 30,532 fish (Table 9). Shorebased anglers have accounted for about 58% of that harvest (Table 10 and Figure 13). 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 in 1998 (40,286) was an increase of 17% over the mean (Table 9). As was the case in the past, Valdez Arm supported the largest harvest of pink salmon, with 35,532 fish being harvested.

Management Objective

The stocking of pink salmon in PWS is accomplished entirely by PNP hatcheries, therefore the following specific management goals are stated as ideals for these stocking programs. 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 shorebased 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 the sustained yield of the various wild pink salmon stocks that occur within the area while assuring continued and, where possible, expanded opportunity to participate in fisheries targeting hatchery stocks.

Recent Board of Fisheries Actions

The most recent BOF action for this fishery was in 1990 when the Board opened Solomon Gulch Creek, adjacent to the VFDA hatchery in Valdez, to salmon fishing 300 feet downstream of the VFDA weir. No actions relative to this fishery were made during the 1997 meeting and no proposals are slated for the upcoming (November 1999) meeting.

Current Issues

The large commercial harvest drives the management of the PWS pink salmon sport fishery. The magnitude of the sport harvest will likely remain inconsequential towards achieving escapement goals or determining harvest strategies; however, the sport fishery is of great economic importance to the community of Valdez. The Valdez Chamber of Commerce conducts a pink salmon derby and a significant public relations campaign designed to promote fishing-related tourism. Conflicts or perceived conflicts between the sport and commercial fisheries have occurred in the past and are of great concern to the community of Valdez. The area managers for these two divisions have worked together with hatchery managers to develop strategies to minimize further conflicts. These strategies include keeping the commercial fleet primarily in the western portion of Valdez Arm and maintaining an area closed to commercial fishing within 300 feet of the shore around Allison Point. There will likely always be disputes of some sort between these fishing groups; however, these strategies have been effective since 1993 in maintaining an orderly fishery.

Table 9.-Pink salmon harvest by geographical regions in Prince William Sound Management Area, 1983-1998.

YEAR	Outer Islands	Cordova Road System	Copper River Delta	Eastern PWS	Northeast PWS	Northwest PWS (Whittier)	Southwest PWS	Valdez Arm Area	Other sites in PWS	PWS Total
1983	0	0	0	0	0	2,413	157	8,696	3,430	14,696
1984	424	149	0	0	0	1,422	499	9,825	2,169	14,488
1985	108	55	0	54	65	1,975	195	28,450	1,768	32,670
1986	183	412	0	443	0	1,620	291	22,170	153	25,272
1987	87	641	117	19	146	2,699	233	27,071	369	31,382
1988	36	364	0	36	0	2,729	746	26,776	783	31,470
1989	95	627	129	498	454	1,681	962	32,922	626	37,994
1990	198	162	0	46	221	1,033	570	46,730	186	49,146
1991	36	747	0	324	288	1,647	171	48,618	459	52,290
1992	9	37	9	18	540	1,025	202	28,596	1,575	32,011
1993	55	433	0	220	0	775	191	32,479	1,582	35,735
1994	171	487	0	128	189	1,335	272	46,494	2,462	51,538
1995	173	444	0	545	334	921	376	41,963	2,188	46,944
1996	50	400	0	520	131	1,095	194	29,453	886	32,729
1997	85	863	33	187	0	1,047	502	22,999	1,583	27,299
1998	255	2,179	0	107	59	1,266	439	35,272	709	40,286
MEAN	123	500	18	197	152	1,543	375	30,532	1,308	34,747

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .

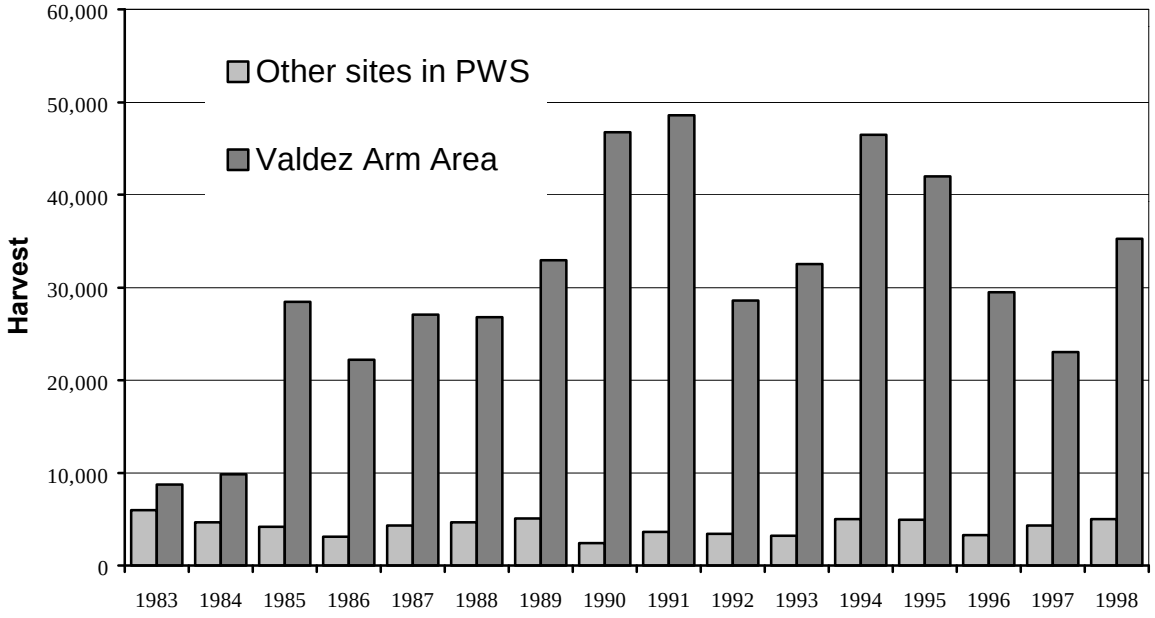


Figure 12.-Pink salmon harvest by geographical regions in Prince William Sound Management Area, 1983-1998.

Table 10.-Pink salmon harvest in the Valdez Arm area of Prince William Sound, 1983-1998.

Year	Boat	Shore	Stream	Total
1983	8,696	0	0	8,696
1984	9,676	12	137	9,825
1985	16,059	12,152	239	28,450
1986	12,858	9,312	0	22,170
1987	8,855	18,216	0	27,071
1988	10,659	16,117	0	26,776
1989	14,740	18,139	43	32,922
1990	18,077	28,653	0	46,730
1991	16,128	32,481	9	48,618
1992	14,518	14,069	9	28,596
1993	13,417	19,062	0	32,479
1994	15,822	30,604	68	46,494
1995	15,332	26,631	0	41,963
1996	8,920	20,503	30	29,453
1997	6,901	16,087	11	22,999
1998	13,410	21,862	0	35,272
MEAN	12,754	17,744	34	30,532

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .

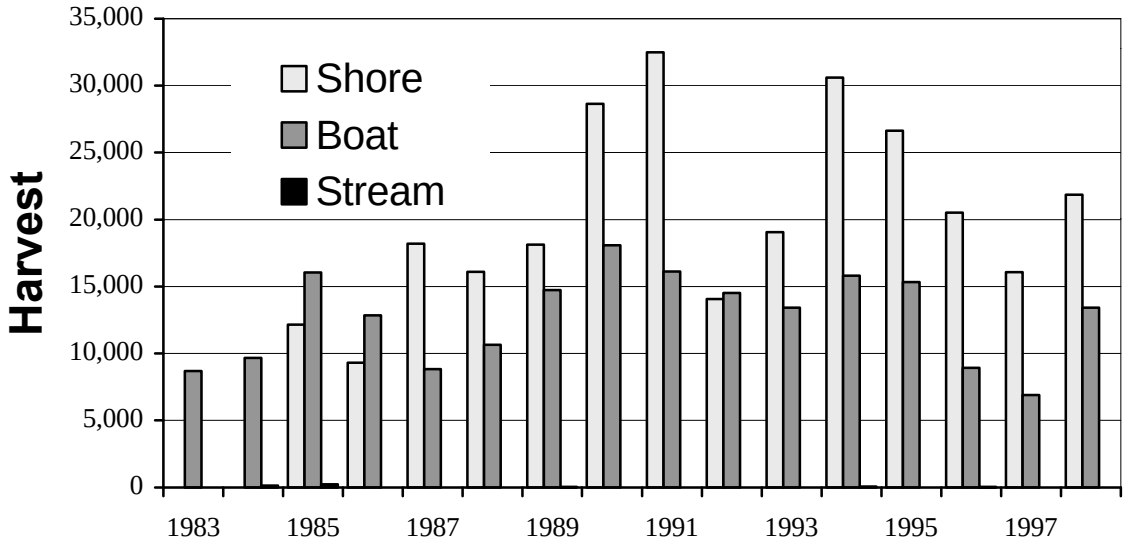


Figure 13.-Pink salmon harvest in the Valdez Arm area of Prince William Sound, 1983-1998.

Ongoing Research and Management Activities

The Division of Sport Fish does not currently conduct any research on pink salmon stocks in PWS, however the Division of Commercial Fisheries conducts extensive research programs in PWS. Area managers for these two divisions should continue to work together to reduce potential conflicts between commercial and sport fisheries.

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.

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 limits are 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 limits are 1 fish.

Historically the major fisheries for sockeye salmon in PWS have occurred at Eshamy, Cordova, Valdez, and Coghill. From 1983 through 1998, the average harvest of sockeye salmon from PWS was 5,314 (Table 11 and Figure 14). Just about 53% of this harvest is from non-road-accessible areas of PWS (Eshamy, Coghill and "Other"). Since 1983, the average harvest of sockeye salmon from non-road-accessible areas has been 2,842 fish. The sockeye fisheries at Coghill and Eshamy have been rebuilding after several years of poor returns. Coghill was closed entirely in 1992, 1993 and 1994, and the seasons at Eshamy were restricted during those same years. Sockeye returns to Coghill increased in 1996 through 1998, meeting escapement goals for those systems, and showed a very strong return in 1999.

Recent Fishery Performance

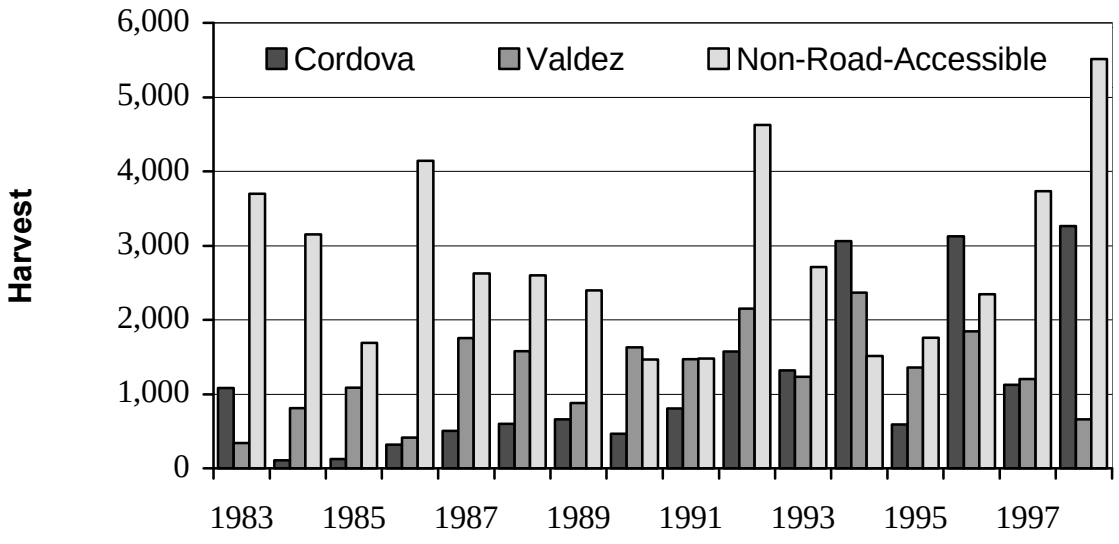
The sport harvest of sockeye salmon from PWS during 1998 (9,438) was 87% above the 1983-1997 mean harvest (Table 11 and Figure 14). The harvest of sockeye from non-road-accessible areas represented 58% of the total PWS harvest in 1998. Harvest numbers at Coghill and Eshamy were down from the historical mean; however, the harvest in streams defined as "Other" was up substantially.

The 1992 record harvest was the result of a large harvest at the remote area near 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 for sport fishing and was popular with not only private boat owners but also aircraft charter operators based in Anchorage. This program was discontinued, however, in 1993 due to continued concerns over Coghill stock interception.

Table 11.-Sport harvest of sockeye salmon in Prince William Sound, 1983-1998.

Year	Coghill	Eshamy	Valdez	Cordova	Other	Grand Total
1983	781	1,315	343	1,082	1,603	5,124
1984	249	1,048	811	112	1,857	4,077
1985	554	836	1,085	130	303	2,908
1986	657	688	413	321	2,799	4,878
1987	417	634	1,756	507	1,575	4,889
1988	146	637	1,582	600	1,818	4,783
1989	344	352	881	661	1,701	3,939
1990	49	175	1,630	466	1,242	3,562
1991	0	152	1,471	806	1,325	3,754
1992	0	649	2,153	1,578	3,978	8,358
1993	79	581	1,235	1,321	2,053	5,269
1994	19	148	2,368	3,066	1,347	6,948
1995	62	350	1,358	590	1,351	3,711
1996	821	268	1,846	3,124	1,254	7,313
1997	1,132	359	1,206	1,126	2,244	6,067
1998	162	298	663	3,261	5,054	9,438
MEAN	342	531	1,300	1,172	1,969	5,314

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .



Note: Non-road-accessible includes Eshamy, Coghill, and other non-road-accessible areas.

Figure 14.-Sport harvest of sockeye salmon in Prince William Sound, 1983-1998.

The 1992, 1994 and 1995 returns of sockeye salmon to Coghill Lake were insufficient to meet escapement goals; consequently the sport and commercial fisheries were closed. Actions by the CFD area managers and lake fertilization efforts have restored returns to Coghill and the 1995 return was strong, providing a good escapement count and a productive sport fishery. During these same years the sockeye fishery at Eshamy was reduced due to low early returns. A result of these low returns was the emergency closure to sport fishing in 1992, 1994 and 1995. The timing of returns to Eshamy appears to be getting later. Whereas escapement goals were met in 1993 and 1994, the timing of the peak returns has shifted from mid-August to late September. Good numbers of sockeye continued to return to Coghill and low numbers to Eshamy from 1996 through 1998; however, escapement goals have been met for Coghill since 1995. Escapement in Eshamy Creek was not met in 1995, 1996, and 1999. No weir was in place in 1998. A very strong return to Coghill in 1999 prompted an emergency order to increase the bag limit from 6 to 12 sockeye salmon per day.

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 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 the sustained yield of the various wild sockeye salmon stocks that occur within PWS while assuring 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 its 1994 meeting.

Current Issues

Eshamy Lake stocks continue to be depressed. Coghill Lake appears to be recovering as a result of management action and lake fertilization efforts. Managers should continue to monitor escapement inseason and take appropriate management action to assure escapement is met. As the road to Whittier opens and angler effort increases, small stocks of sockeye salmon should be monitored to assess escapement.

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.

PRINCE WILLIAM SOUND CUTTHROAT TROUT FISHERIES

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

The daily bag and possession limits for PWS are 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 limits are 5 of which no more than 1 can be over 10 inches in length. Historically all streams in the PWSMA were open year-long to fishing for cutthroat trout. A Board of Fisheries action in 1994 established a spawning season closure from April 15 through June 14.

Although the annual harvest of cutthroat trout since 1983 ranges from 122 to 2,542 the average for PWS is 1,001 fish (Table 12 and Figure 15). There are three major historical harvest areas for cutthroat trout in PWS: Eshamy drainage, Eyak drainage, and other Cordova road-accessible streams. These areas account for 13%, 17%, and 34%, respectively, of the 1998 harvest. Other sites dispersed throughout the northern and eastern portions of the sound account for the remaining 37% of the harvest.

Recent Fishery Performance

The sport harvest of cutthroat trout from PWS during 1998 of 737 was 26% below the 1983-1997 mean harvest for the area (Table 12). The harvests in Eshamy, Eyak, and other Cordova road streams were all well below the historical average, and only accounted for 2%, 0%, and 15% of the total 1998 harvest in PWS. This is likely due to the increased popularity of catch-and-release fishing for this species. The harvest of cutthroat trout in areas outside these locations increased to 612, nearly twice the 1983-1997 mean.

Eshamy Creek drainage and Green Island Creek were closed by emergency order (Emergency Order No. 2-CT-6-02-92) in 1992 during the spawning season. Information collected by the Natural Resource Damage Assessment program following the *Exxon Valdez* oil spill 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. Board of Fisheries actions in 1994 established a spawning closure from April 15 through June 14.

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 limits for cutthroat trout were reduced from 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 limits are 5, of which no more than 1 can be over 10 inches in length. As mentioned earlier, Board of Fisheries actions in 1994 established a spawning closure from April 15 through June 14. In November 1999 the Board will consider a proposal to establish a special management area for trout. In anticipation of increased effort and harvest

Table 12.-Sport harvest of cutthroat trout in Prince William Sound, 1983-1998.

Year	Eyak Drainage	Other Cordova Area	Eshamy Area	Other PWS Areas	Grand Total
1983	356	1,080	147	241	1,824
1984	137	736	274	1,395	2,542
1985	119	69	554	173	915
1986	214	687	153	566	1,620
1987	833	217	272	36	1,358
1988	109	109	219	182	619
1989	300	553	39	619	1,511
1990	164	147	33	179	523
1991	68	48	213	87	416
1992	73	559	0	383	1,015
1993	75	335	11	519	940
1994	154	289	0	169	612
1995	27	61	34	0	122
1996	12	177	47	321	557
1997	20	293	0	394	707
1998	0	108	17	612	737
MEAN	166	342	126	367	1,001

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep*.

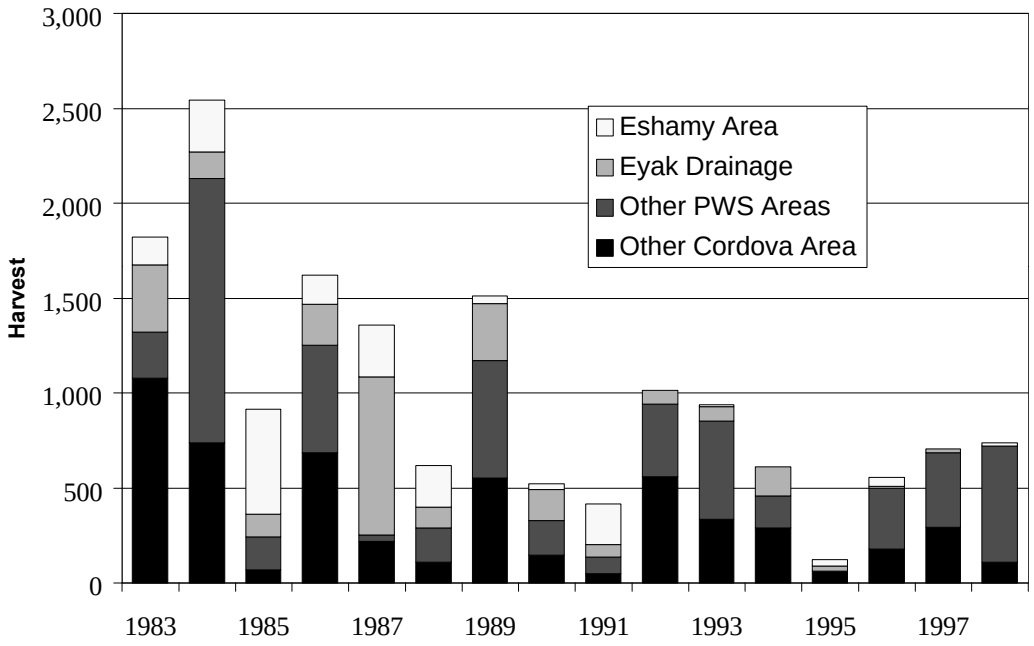


Figure 15.-Sport harvest of cutthroat trout in Prince William Sound, 1983-1998.

along the corridor that will be made accessible by the Carbon Mountain Road, this proposal would create catch-and-release, unbaited, single-hook artificial lure regulations for trout to include those waters.

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 exhibit highly variable survival rates. Cutthroat trout are also subject to incidental catch in the commercial fisheries, increasing the risk to these small stocks. There are concerns regarding the sustainability of even the present small harvest. Some specific cutthroat trout stocks in the Pacific northwest have been selected as candidates for being listed as threatened species under the Endangered Species Act. Careful management is necessary to avoid this possibility for the PWS stocks.

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. 1993a). 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 of fish from 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. The temporary closure of these systems in 1992 and 1993 as well as regulatory action reducing the bag limits and providing a spawning period closure should continue to help in the recovery of these systems.

Ongoing Research and Management Activities

There are no ongoing research projects for this fishery by the department, however, the department has provided support for an oil spill-funded research project being conducted by the Cordova Ranger District of the U.S. Forest Service at Mile 18 on the Copper River Highway. This project monitored the escapement of cutthroat into this system and radio-tracked fish to determine spawning locations for characterization of spawning habitat requirements. Data collected will be used to identify locations for restoration of cutthroat habitat loss due to road construction and logging along the Cordova Road System.

Two other oil-spill funded restoration/enhancement projects are being conducted in western PWS by the Glacier Ranger District of the U.S. Forest Service. One consists of the enhancement of spawning and rearing habitat for cutthroat trout in Otter Creek on the north end of Otter Lake. The other is directed toward the enhancement of rearing habitat at three locations: Gunboat Creek in Eshamy Bay, Billy's Hole in Long Bay, and Red Creek which drains into Esther Passage.

An additional EVOS restoration project directed at cutthroat trout was conducted by the Forest Service's Pacific Northwest Research Station, Forestry Sciences Laboratory in Corvalis, Oregon. This was a genetics project focused on determining if the various anadromous runs in the sound are composed of unique stocks or of one genetic type. This project also looked at the genetic differences between the landlocked and anadromous stocks within a stream system. Otoliths

were also examined to determine the life-history characteristics of these runs. The information gathered from this project could prove valuable for management of cutthroat trout within the sound. Results from this study are still pending.

Recommended Research and Management Activities

Collection of baseline size and length information and distribution of cutthroat trout in the proposed special management area are essential to determine the effectiveness of the special management area if it is established.

In the fall of 1995 the department submitted two proposals for FY97 funding through the EVOS restoration program. One project was to evaluate the recovery of cutthroat and Dolly Varden from the effects of the oil spill. This study consisted of a project similar to that conducted in 1989-1992 which documented the injury by the oil spill. The second project was designed to collect the information required to support the information requests made by the other EVOS restoration projects and to coordinate the EVOS cutthroat projects toward the development of a PWS cutthroat trout restoration management plan. The merit of these projects was recognized, however neither project was funded The department also proposed a cutthroat trout stock evaluation project for PWS through the department's FY97 budget process; however, reductions in funding prohibited the project. The value of these studies in understanding our managing cutthroat trout in PWS still exists.

PRINCE WILLIAM SOUND HALIBUT FISHERY

Halibut are one of the most popular targets of recreational anglers fishing the marine waters of the PWSMA. 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 when the fishery is closed to protect spawning halibut. Management issues and stock status are discussed by Vincent-Lang (1998) in the Area Management Report for the North Gulf of Alaska Recreational Groundfish Fisheries, 1997.

Halibut are caught throughout most of Prince William Sound. The average sport harvest of halibut from PWSMA area waters from 1983 through 1998 was about 14,504 (Table 13). During this period, harvests have risen dramatically from 3,500 halibut in 1983 to over 27,000 halibut in 1998 (Figure 16). This steady increase in halibut harvest indicates a growth of 6% a year for PWS.

The sport harvest of halibut from the PWSMA during 1998 was the second highest on record and indicated a 100% increase over the 1983-1997 mean harvest (Table 13). As in the past, the majority of the PWS halibut harvest (38%) in 1998 was from anglers fishing out of Valdez (Table 13). From 1983 through 1998, anglers returning to Valdez have harvested an average of 5,980 halibut. Seward-based chartered anglers also account for a significant harvest.

Management Authority

Halibut and their fisheries are managed under an international treaty, the Halibut Convention of 1982 and the 1979 Protocol (McCaughran and Hoag 1992). Under this treaty, the International Pacific Halibut Commission (IPHC) was formed to assure the optimal sustained yield of the North Pacific halibut resource. The IPHC does not, however, have the authority to allocate the

Table 13.-Sport harvest of halibut in the Prince William Sound Area, 1983-1998.

YEAR	Outer Islands	Cordova Road System	Copper River Delta	Eastern PWS	Northeast PWS	Northwest PWS (Whittier)	Southwest PWS	Valdez Arm Area	Other sites in PWS	PWS Total
1983	0	0	0	0	0	284	0	1,846	1,363	3,493
1984	0	237	200	0	0	387	0	1,322	2,282	4,428
1985	0	33	0	76	11	826	76	3,310	195	4,527
1986	91	596	0	320	459	1,086	92	3,669	2,018	8,331
1987	78	253	0	155	495	650	232	2,185	331	4,379
1988	649	963	48	193	312	1,143	818	4,599	1,120	9,845
1989	540	809	41	612	268	912	943	4,231	341	8,697
1990	1,075	486	22	340	894	1,038	533	6,045	418	10,851
1991	1,227	1,463	79	159	1,089	1,484	308	6,122	802	12,733
1992	1,553	2,305	125	492	853	1,151	750	8,379	2,247	17,855
1993	2,727	2,165	93	456	725	1,705	691	8,457	2,697	19,716
1994	3,239	2,488	0	764	1,852	2,438	1,390	7,457	3,859	23,487
1995	3,410	2,627	19	844	570	2,639	704	9,087	4,871	24,771
1996	2,801	2,819	22	601	904	3,545	757	8,345	2,992	22,786
1997	5,040	2,710	10	774	359	4,519	1,159	10,241	4,068	28,880
1998	3,205	6,711	369	484	402	1,419	1,063	10,380	3,258	27,291
MEAN	1,602	1,667	64	392	575	1,577	595	5,980	2,054	14,504

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .

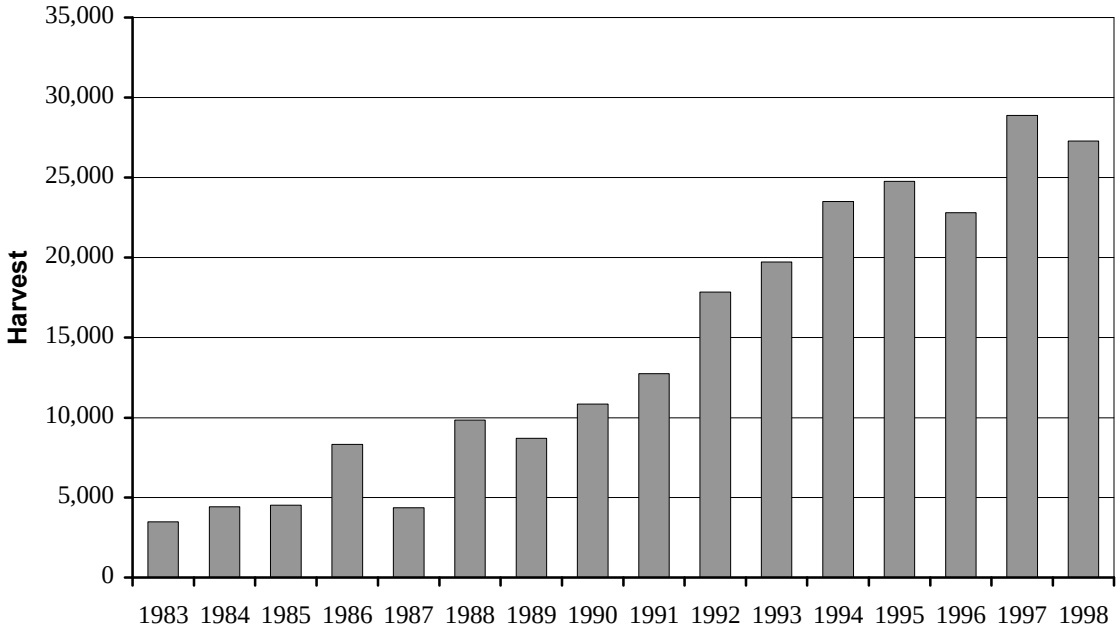


Figure 16.-Sport harvest of halibut in the Prince William Sound Area, 1983-1998.

catch quota amongst the various fisheries exploiting the halibut stock in United States waters. In U.S. waters, the responsibility for allocation of the catch quota among fisheries falls to the North Pacific Fishery Management Council (NPFMC) via the Magnuson-Stevens Fishery Conservation and Management Act of 1996. 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 annually calculates the exploitable biomass available for harvest in each of 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 removals (includes harvest, mortalities and bycatch) for each regulatory area. Under treaty, total removals by all user groups cannot exceed this figure. The IPHC then estimates the sport and subsistence harvests, as well as 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. A proposal before the NPFMC would limit sport halibut harvest by chartered anglers if guideline harvest levels are exceeded in Regulatory Areas 2C (Southeast Alaska) and 3A (Southcentral Alaska).

Ongoing Research and Management Activities

The Sport Fish Division's groundfish research program estimates length and sex composition of the recreational halibut harvests from Area 3A annually. The harvest is currently sampled at Valdez and Whittier in the PWSMA, Seward, Kodiak, Deep Creek, Anchor Point, and Homer. Findings from this research program are provided to the IPHC in a report summarizing the characteristics of the sport harvest from Area 3A waters (Meyer 1996). Estimates of the sport harvest biomass are used by the IPHC scientific staff annually to compute the CEY and commercial quotas for each area. Secondary objectives of the study are to provide fishery managers with information regarding characteristics of the fishing fleet operating out of the major ports. These data are needed to evaluate proposed regulatory options for the sport charter industry in Alaska. Staff recommends continuation of the research for the immediate future.

PRINCE WILLIAM SOUND ROCKFISH FISHERIES

Rockfish are a popular target of recreational anglers fishing PWSMA marine waters. A variety of rockfishes, species of the genera *Sebastes* and *Sebastolobus,* inhabit the marine waters of the PWSMA. For management purposes, these rockfishes are usually categorized into the following groups based on habitat preferences: slope, demersal shelf, and pelagic shelf. 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 PWSMA, the most commonly harvested *Sebastes* species are yelloweye rockfish *S. ruberrimus* (demersal), black *S. melanops* (pelagic), quillback *S. maliger* (demersal), and copper rockfish *S. caurinus* (demersal). Management, current issues and stock status are discussed by Vincent-Lang (1998) in the Area Management Report for the North Gulf of Alaska Recreational Groundfish Fisheries, 1997.

Although available year-round, most rockfish are harvested in the sport fishery from May through early September. The limits for rockfish in PWS are 5 per day and 10 in possession (only 1 per day and 2 in possession may be non-pelagic) from May through September and 10 and 15 per day and in possession (only 2 per day and 2 in possession may be non-pelagic) 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 them.

The average sport harvest of rockfish from PWSMA waters from 1983 through 1998 was 11,664 fish (Table 14, Figure 17). Waters fished in PWS include all inside waters as well as the entrances to PWS, with most of the effort occurring at the entrances. The sport harvest of rockfish from PWSMA waters during 1998 (14,841) was 30% above the 1983-1997 mean harvest (Table 14). Most of the harvest was landed at Valdez and appeared to be due to a popular charter effort at this port.

Management Objective

Due to a lack of stock assessment data, no specific fishery objectives have been formally established for recreational rockfish fisheries of the PWSMA. An assumption of past and current fisheries management, however, has been to assure the sustained yield of the various rockfish stocks that occur within the area while assuring 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. Effective 1997 the Board changed the limits for rockfish so that no more than 1 per day and 2 in possession could be non-pelagic species. The Board will consider a proposal at the December 1999 meeting to amend the rockfish regulation by removing the language that reads "A rockfish that is removed from the water shall be retained and becomes part of the bag limit of the person originally hooking it." Repealing the mandatory restriction would allow persons who have harvested 5 rockfish to continue fishing for other species and make bag limits more consistent with limits in the Cook Inlet-Resurrection Bay saltwater regulatory area. The proposal also revises the wording of the regulation with the intent of clarifying which species are non-pelagic.

Ongoing Research and Management Activities

A research program to evaluate rockfish stocks in the 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

Table 14.-Sport harvest of rockfish in the Prince William Sound Area, 1983-1998.

YEAR	Outer Islands	Cordova Road System	Copper River Delta	Eastern PWS	Northeast PWS	Northwest PWS (Whittier)	Southwest PWS	Valdez Arm Area	Other sites in PWS	PWS Total
1983	0	0	0	0	0	1,112	0	3,703	1,699	6,514
1984	0	37	0	0	0	836	12	4,402	2,706	7,993
1985	0	380	0	0	0	1,974	98	6,304	97	8,853
1986	34	145	0	346	0	1,810	56	6,366	1,005	9,762
1987	0	0	0	388	456	1,971	495	3,175	78	6,563
1988	192	169	0	469	578	2,371	938	6,983	1,011	12,711
1989	125	270	0	290	343	2,374	1,377	7,072	1,068	12,919
1990	378	136	10	156	700	1,398	563	4,350	466	8,157
1991	256	477	0	0	468	2,497	690	3,979	366	8,733
1992	430	879	0	577	1,423	1,483	1,958	7,625	1,103	15,478
1993	1,563	335	18	233	546	2,158	1,008	4,894	1,519	12,274
1994	1,137	1,215	0	429	1,261	3,158	816	5,725	1,641	15,382
1995	930	644	19	495	502	2,379	510	6,359	2,863	14,701
1996	840	1,834	0	543	963	2,828	1,101	3,899	1,780	13,788
1997	1,908	1,244	0	513	525	3,459	1,087	5,211	4,002	17,949
1998	1,021	2,824	0	290	589	947	2,418	4,834	1,918	14,841
MEAN	551	662	3	296	522	2,047	820	5,305	1,458	11,664

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .

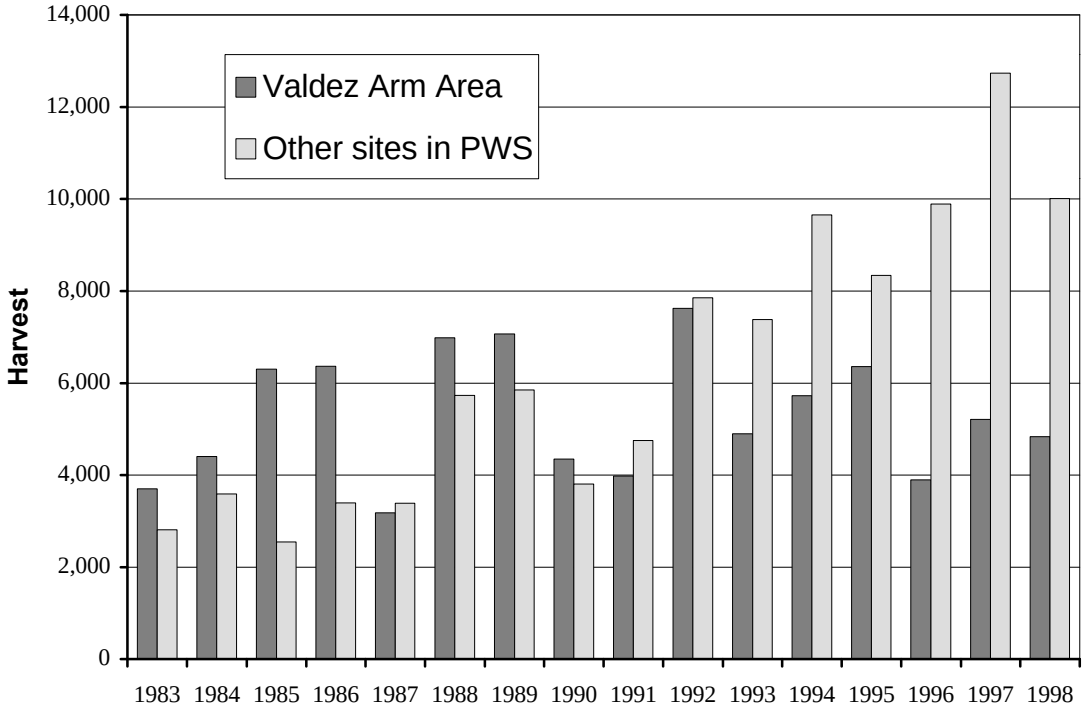


Figure 17.-Sport harvest of rockfish in the Prince William Sound Area, 1983-1998.

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.

PRINCE WILLIAM SOUND LINGCOD FISHERIES

Lingcod are a relatively minor component of the PWSMA sport harvest, but are increasing in popularity in recent years. Lingcod are taken primarily by guided anglers, and most of the harvest is from areas near the entrances of PWS. Harvest estimates from the Statewide Harvest Survey for lingcod were not made until 1991. Since then the average annual harvest for the PWSMA recreational lingcod fishery has been 2,347 fish. The 1998 harvest estimate of 3,047 lingcod was essentially the same as the previous year's harvest but was 35% higher than the 1991-1997 mean (Table 15 and Figure 18).

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. (1993b). Management, current issues and stock status are discussed by Vincent-Lang (1998) in the Area Management Report for the North Gulf of Alaska Recreational Groundfish Fisheries, 1997. 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.

The current regulations governing recreational lingcod fisheries in the PWSMA were enacted in 1993:

- The current limits are 2 fish daily and 4 in possession, with a minimum size limit of 35 inches total length (or 28 inches with the head removed).
- Lingcod may only be retained from July 1 through December 31.
- All sport-caught lingcod may be landed only by hand or net.

Management Objective

Management of Central Gulf of Alaska lingcod is directed towards assuring long-term sustained yield and, where possible, providing for expanded opportunity to participate in lingcod fisheries.

Management Approach

Available data on lingcod are insufficient to estimate exploitable biomass in the PWSMA. No research is currently being conducted, or planned for the near future, that would allow estimation of abundance, biomass, or a sustainable level of harvest. Thus, recreational lingcod fisheries in the PWSMA are managed using a conservative approach. Given that lingcod recruitment has been shown to be highly variable in other areas, the current management approach is designed to maintain the spawning population to assure future recruitment. This is done in three ways: (1) the season closure protects spawning and nest guarding fish, (2) the 35-inch minimum size limit for both sport and commercial fisheries allows all fish the opportunity to spawn at least once prior to harvest, and (3) the conservative bag limit restricts overall harvest. The commercial fishery is restricted by a department-enacted 26,500 pound annual guideline harvest level.

Table 15.-Sport harvest of lingcod in the Prince William Sound Area, 1991-1998.

YEAR[a]	Outer Islands	Cordova Road System	Copper River Delta	Eastern PWS	Northeast PWS	Northwest PWS (Whittier)	Southwest PWS	Valdez Arm Area	Other sites in PWS	PWS Total
1991	142	157	0	0	71	274	95	1,122	118	1,979
1992	337	177	9	37	83	252	83	1,476	121	2,575
1993	343	74	20	27	80	150	148	1,117	49	2,008
1994	383	58	0	51	157	303	224	287	195	1,658
1995	304	65	19	19	65	243	260	1,028	313	2,316
1996	253	120	0	24	22	343	72	568	263	1,665
1997	645	154	0	13	71	664	324	1,025	635	3,531
1998	473	672	0	25	110	110	88	1,118	418	3,047
MEAN	360	185	6	25	82	292	162	968	264	2,347

From: Mills 1992-1994, Howe et al. 1995-1998, *In prep* .

[a] Lingcod harvest not reported in SWHS until 1991.

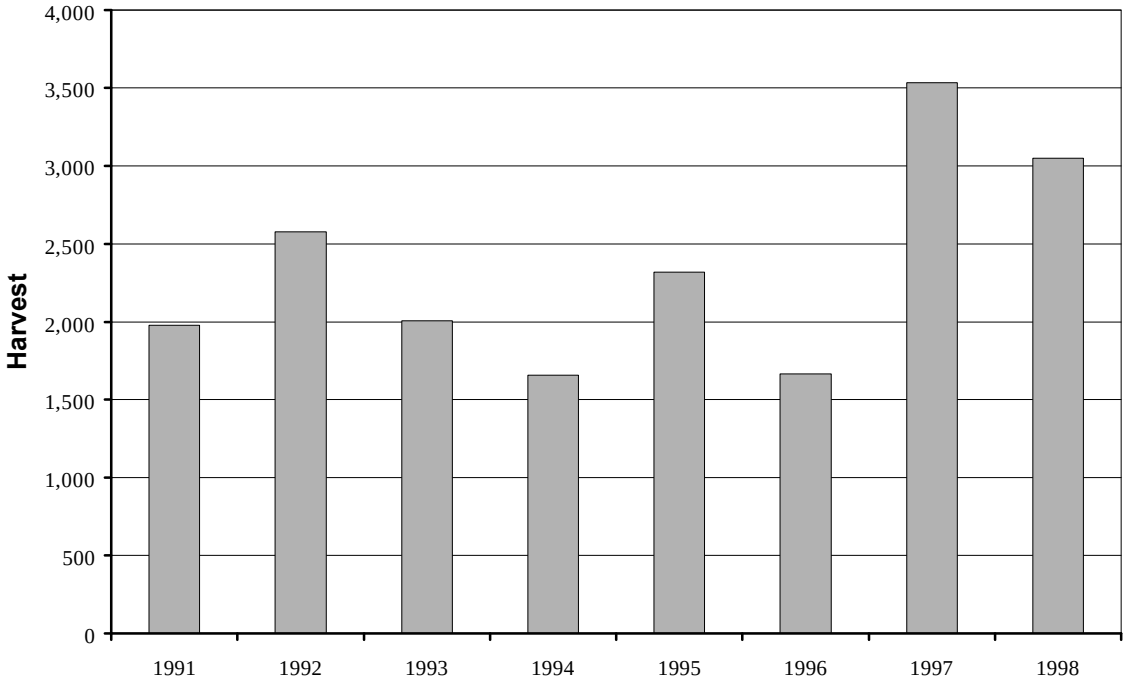


Figure 18.-Sport harvest of lingcod in the Prince William Sound Area, 1991-1998.

Ongoing Research and Management Activities

Research aimed at estimating the age, sex, and length composition of the PWSMA recreational lingcod harvest has been conducted since 1990. It is hoped that the information collected will be useful in formulating management objectives that provide for sustained yield. Managers recommend continuation of this sampling program.

PRINCE WILLIAM SOUND SHARK FISHERIES

The shark fisheries in PWS are relatively new and developing fisheries. The three most common sharks in the PWSMA are the salmon shark *Lamna ditropis*, spiny dogfish *Squalis acanthias*, and the Pacific sleeper shark *Somniosus pacificus*. Although all three species are caught incidentally or as bycatch in commercial gear, there is a growing interest in targeting the salmon shark as a sport fish. The daily bag and possession limits of 1 shark of any species, and an annual limit of 2 sharks were enacted statewide in 1997. In addition, sport harvest of all sharks must be recorded on the license or harvest card.

A few charter operators from Valdez, Cordova, Whittier and Seward target salmon sharks in the waters of the PWSMA. In addition, a small number of unguided anglers target sharks, primarily around Cordova. Most sharks caught in the recreational fishery are released. An estimated 1,723 sharks of all species were caught in PWS in 1997, but only 61 fish were harvested. The estimated harvest in 1998 was 165 sharks. The species composition of the harvest is not estimated through the postal survey, but sampling of recreational harvest in Valdez and Whittier indicated that spiny dogfish made up about 80% of harvested sharks and 87% of released sharks.

Management Objective

Management of Central Gulf of Alaska sharks is directed towards assuring long-term sustained yield and, where possible, providing for expanded opportunity to participate in shark fisheries.

Management Approach

Available data on sharks are insufficient to estimate exploitable biomass in the PWSMA. Although research being considered might eventually allow estimation of abundance, biomass, or a sustainable level of harvest, none of these tools are currently available to managers. Thus, recreational shark fisheries in the PWSMA are managed using a conservative bag limit. Reports from local fisherman suggest that abundance of salmon sharks and spiny dogfish may be increasing in PWS, but management will continue to be conservative. Indeed, if harvests continue to increase, the current bag limit may not provide adequate protection to maintain healthy shark populations.

Although the directed commercial shark fishery was closed in 1998, bycatch is allowed. There remains a substantial commercial bycatch of mostly spiny dogfish and sleeper sharks, and an unknown quantity of unreported discards from groundfish and salmon fisheries.

Ongoing Research and Management Activities

The department initiated a shark tagging program enlisting the aid of shark-charter operators in 1998. In July of 1999, a charter led by The National Marine Fisheries Service brought together biologists from several agencies to conduct shark research in PWS. It is hoped that these collaborations will continue and that the information collected will be useful in formulating management objectives that provide for sustained yield. Managers recommend continuation of these sampling programs.

PRINCE WILLIAM SOUND DOLLY VARDEN FISHERIES

Dolly Varden are available to anglers throughout the year in the PWSMA, 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 PWSMA are open yearlong to fishing for Dolly Varden. The daily bag and possession limits for PWS are 10 Dolly Varden with no size limit.

Within PWS, significant fisheries for Dolly Varden include Valdez Arm area and the Cordova roadside streams (Table 16, Figure 19). The major producer in the Valdez Arm area was historically Robe River and Lake, however changes in the overwintering habitat in Robe Lake have reduced this annual harvest from as much as 5,500 fish in the early 1980s to less than 200 during the last 5 years. The saltwater harvest in Valdez Arm was the dominant producer in recent years (Table 17, Figure 20). Along the Cordova road system the Eyak River drainage has supported the largest Dolly Varden fishery. There is a very popular local fishery at Power Creek, and increasing harvest levels of other species seen at Clear Creek is also reflected in the growing Dolly Varden harvests there (Table 18, Figure 21).

Recent Fishery Performance

The historical trends discussed above continued in 1998 (Tables 16-18 and Figures 19-21).

Management Objective

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

Recent Board of Fisheries Actions

The most recent BOF action in this fishery occurred at the 1991 Board meeting where the PWS bag and possession limits for Dolly Varden were reduced from 15 fish per day and 30 in possession to 10 fish daily and in possession. No proposals were presented for this fishery at the 1994 and 1997 meetings, and no proposals have been submitted for the November 1999 meeting.

Current Issues

The major concern for Dolly Varden in the PWSMA is the rapidly declining harvest in the freshwater drainages of Valdez Arm. In 1984, the freshwater drainages of Valdez Arm supported a harvest of 9,566 Dolly Varden but by 1988 the harvest had declined to 983 fish and has dropped to an average of 525 fish for the last 5 years (Table 16 and Figure 19). 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 PWSMA in the mid-1980s but only accounted for slightly over 4% of the PWSMA harvest in

Table 16.-Sport harvest of Dolly Varden in Prince William Sound, 1983-1998.

YEAR	Outer Islands	Cordova Road System	Copper River Delta	Eastern PWS	Northeast PWS	Northwest PWS	Other sites in PWS	Southwest PWS	Valdez Arm Area	Grand Total
1983	52	2,632	21	0	0	293	660	63	976	4,697
1984	286	1,245	87	0	0	299	137	87	9,566	11,707
1985	0	714	69	0	0	69	832	17	4,803	6,504
1986	123	902	77	46	0	688	214	92	5,077	7,219
1987	0	1,268	688	0	0	1,593	0	0	1,049	4,598
1988	0	1,309	164	0	0	73	36	54	983	2,619
1989	87	1,888	106	542	0	388	145	39	1,141	4,336
1990	81	670	33	0	0	262	311	0	1,341	2,698
1991	0	997	661	27	40	40	135	13	1,441	3,354
1992	99	1,138	41	66	16	89	270	41	1,622	3,382
1993	49	586	9	0	10	213	386	102	1,801	3,156
1994	90	611	18	0	108	108	44	0	404	1,383
1995	153	330	10	0	0	0	201	48	506	1,248
1996	39	654	29	29	0	20	395	61	626	1,853
1997	46	474	24	166	59	140	336	57	575	1,877
1998	42	597	13	0	0	321	225	8	516	1,722
MEAN	72	1,001	128	55	15	287	270	43	2,027	3,897

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .

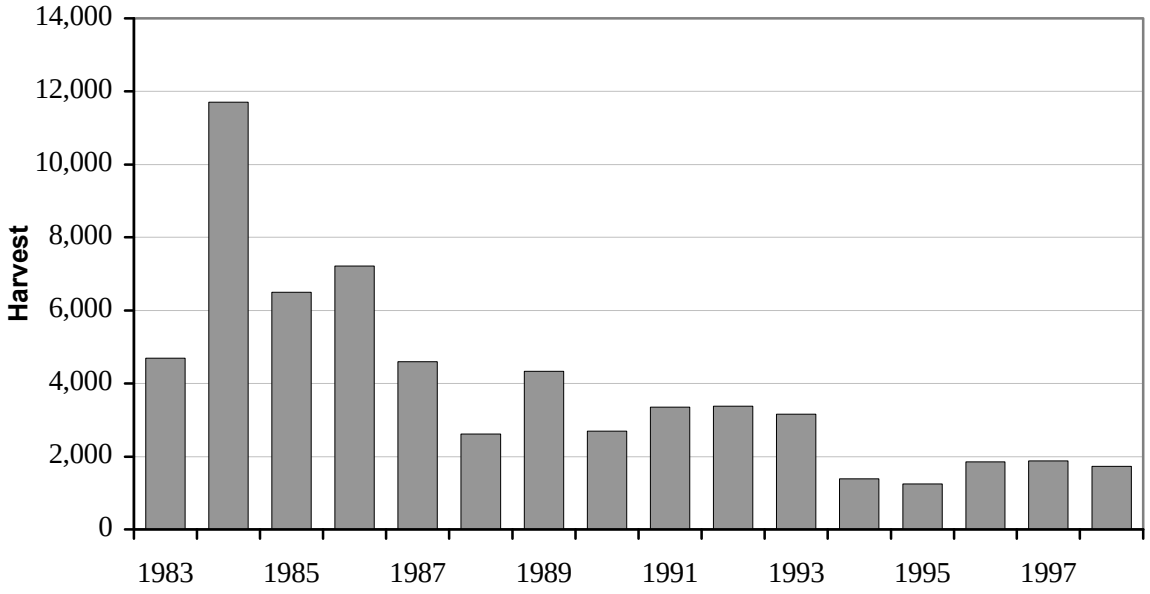


Figure 19.-Sport harvest of Dolly Varden in Prince William Sound, 1983-1998.

Table 17.-Sport harvest of Dolly Varden in the Valdez area of Prince William Sound, 1983-1998.

Year	Saltwater	Lowe River	Robe Lake	Robe River	Tiekel Drainage	Other Freshwater	Grand Total
1983	262	315	84	315	0	0	976
1984	811	1,235	599	5,499	1,023	399	9,566
1985	1,300	139	121	3,104	139	0	4,803
1986	276	0	306	4,449	31	15	5,077
1987	434	36	0	525	54	0	1,049
1988	346	0	91	364	0	182	983
1989	735	0	97	290	0	19	1,141
1990	1,243	0	0	98	0	0	1,341
1991	956	94	0	391	0	0	1,441
1992	925	107	0	590	0	0	1,622
1993	1,256	68	0	370	107	0	1,801
1994	171	36	0	197	0	0	404
1995	170	55	0	194	87	0	506
1996	333	182	0	111	0	0	626
1997	380	126	0	69	0	0	575
1998	311	0		173		32	516
MEAN	619	150	87	1,046	96	40	2,027

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .

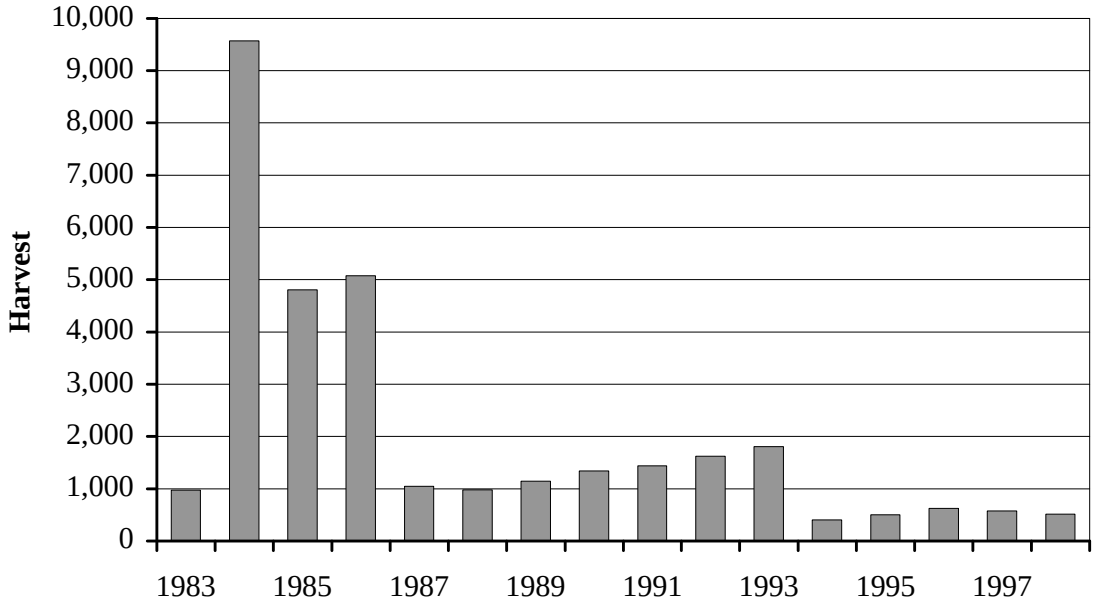


Figure 20.-Sport harvest of Dolly Varden in the Valdez area of Prince William Sound, 1983-1998.

Table 18.-Sport harvest of Dolly Varden in the Cordova area of Prince William Sound, 1983-1998.

Year	Alaganik Slough	Clear Creek	Eyak Drainage[a]	Orca Inlet	Other Sites	Grand Total
1983	63	157	2,140	0	272	2,632
1984	37	62	935	75	136	1,245
1985	0	52	575	35	52	714
1986	15	0	642	138	107	902
1987	0	272	290	706	0	1,268
1988	73	0	872	364	0	1,309
1989	68	136	1,123	368	193	1,888
1990	0	147	474	0	49	670
1991	108	175	512	202	0	997
1992	262	98	434	246	98	1,138
1993	86	57	346	9	88	586
1994	411	36	155	0	9	611
1995	13	0	240	0	77	330
1996	193	300	141	20	0	654
1997	115	171	117	48	23	474
1998	84	232	201	0	80	597
MEAN	96	118	575	138	74	1,001

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .

[a] Eyak drainage includes Eyak Lake, Eyak River and Power Creek.

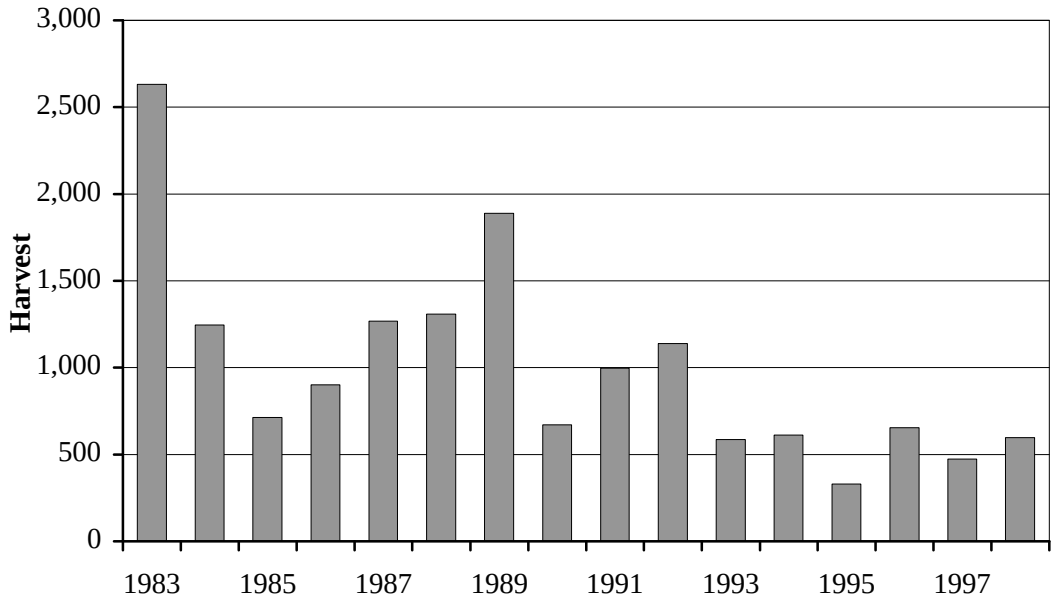


Figure 21.-Sport harvest of Dolly Varden in the Cordova area of Prince William Sound, 1983-1998.

1998. 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.

Another area of concern regarding PWS Dolly Varden stocks is the hydroelectric project on Power Creek near Cordova. As mentioned earlier this is a very popular fishery among the local anglers. The Division of Habitat and Restoration is monitoring construction of the hydroelectric project and its impact.

Ongoing Research and Management Activities

There are no ongoing department research projects for this fishery.

Recommended Research and Management Activities

Sport fish staff will continue to assist in assessment work currently being conducted on Power Creek by private consultants.

OTHER FISHERIES

Several smaller fisheries for other species also occur in the PWSMA. These include fisheries for stocked Arctic grayling and rainbow trout, 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.

Prince William Sound Chum Salmon

Chum salmon have not historically been targeted by recreational anglers in the PWSMA, but some have been taken incidental to other salmon species. In recent years returns of hatchery runs to the hatchery on Esther Island have been targeted. An average of 2,245 chum salmon have been harvested by sport anglers from PWSMA waters from 1983 through 1998 (Table 19 and Figure 22). Since 1983, an average of 64% of the chum harvest in PWS occurred in the Valdez Arm area (Table 19 and Figure 22).

Prince William Sound Arctic Grayling and Rainbow Trout

There are no indigenous stocks of rainbow trout or Arctic grayling in the PWSMA 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 limits for rainbow trout are 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.

Arctic grayling have been stocked in as many as eight lakes along the Copper River Highway between Cordova and the Million Dollar Bridge since 1984, and in Thompson Lake near Valdez. The average annual harvest of Arctic grayling from 1983 through 1998 is 172 fish and has ranged from a low of 52 fish in 1985 to a high of 497 in 1991 (Table 20). The 1998 estimated harvest of 17 grayling is well below the mean. The stocking of grayling in the Copper River Highway lakes has been reduced in recent years and only one lake, Sheridan Dike Pond #2, was stocked in 1993. Due to changes in land ownership, the access to Sheridan Dike Pond is now on Eyak Native Corporation land. Because Eyak Corporation charges an access fee, the department can no longer stock this lake. Although Thompson Lake has not been stocked on a yearly basis, the department plans to continue the stocking program there.

Table 19.-Sport harvest of chum salmon in the Prince William Sound Management Area, 1983-1998.

Year	Outer Islands	Cordova Road System	Copper River Delta	Eastern PWS	Northeast PWS	Northwest PWS (Whittier)	Southwest PWS	Valdez Arm Area	Other sites in PWS	PWS Total
1983	0	84	0	0	0	31	0	976	262	1,353
1984	0	0	0	0	0	49	0	1,397	461	1,907
1985	0	0	0	0	0	228	0	1,400	0	1,628
1986	15	15	0	31	0	749	0	1,865	183	2,858
1987	10	0	0	0	0	359	0	1,525	0	1,894
1988	73	236	0	54	0	1,818	127	4,201	728	7,237
1989	36	64	0	0	0	257	468	2,736	74	3,635
1990	113	45	0	0	57	236	89	1,258	147	1,945
1991	8	143	0	364	0	229	40	838	0	1,622
1992	0	38	0	8	8	91	0	804	15	964
1993	0	170	0	46	0	686	27	873	216	2,018
1994	22	134	0	7	7	202	173	767	15	1,327
1995	9	73	0	112	0	234	0	653	31	1,112
1996	37	92	0	9	0	516	147	904	71	1,776
1997	26	89	0	516	0	310	13	1256	114	2,324
1998	8	201	0	113	0	401	101	1,448	50	2,322
MEAN	22	87	0	79	5	400	74	1,431	148	2,245

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .

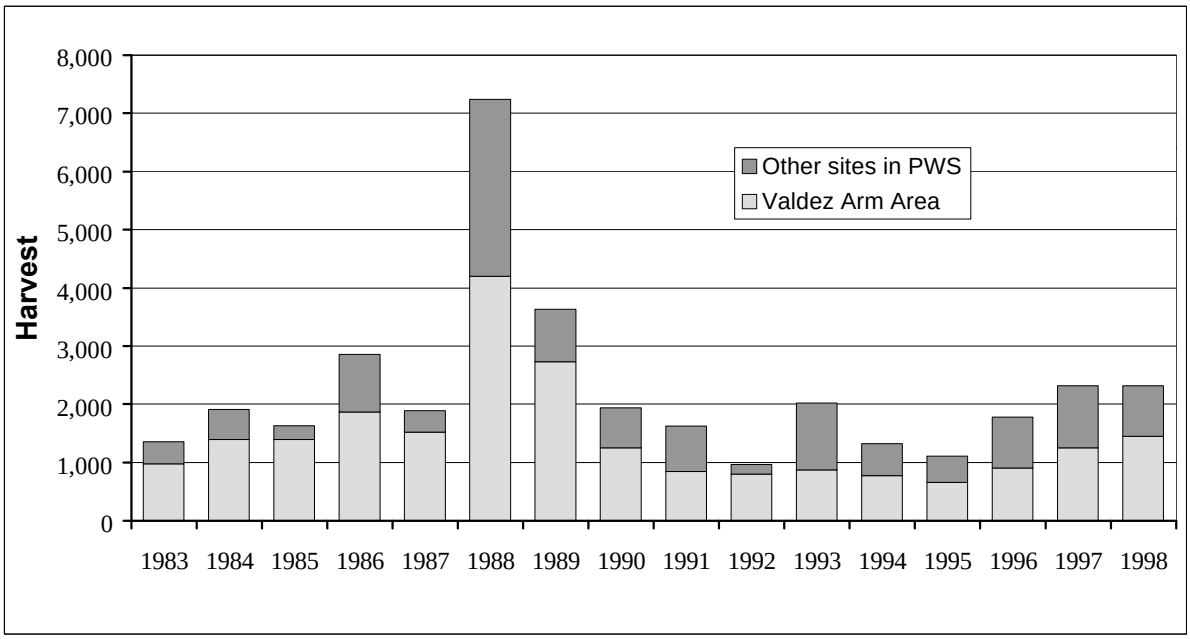


Figure 22.-Sport harvest of chum salmon in the Prince William Sound Management Area, 1983-1998.

Table 20.-Sport harvest of Arctic grayling in the Prince William Sound Management Area, 1983-1998.

YEAR	Outer Islands	Cordova Road System	Copper River Delta	Eastern PWS	Northeast PWS	Northwest PWS (Whittier)	Southwest PWS	Valdez Arm Area	Other sites in PWS	PWS Total
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	52	52
1986	0	0	0	0	0	0	0	352	0	352
1987	0	0	0	0	0	0	0	54	0	54
1988	0	0	0	0	0	0	0	182	0	182
1989	0	116	0	194	0	0	0	58	0	368
1990	0	0	0	0	0	0	0	114	180	294
1991	0	0	0	0	0	0	0	331	166	497
1992	0	16	0	15	0	0	0	0	46	77
1993	0	0	0	0	0	0	0	249	34	283
1994	0	28	0	0	0	0	0	0	188	216
1995	0	0	0	0	0	0	0	95	44	139
1996	0	0	0	0	0	0	0	0	122	122
1997	0	0	0	0	0	0	0	0	98	98
1998	0	0	0	0	0	0	0	0	17	17
MEAN	0	10	0	13	0	0	0	90	59	172

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep*.

The average annual harvest of rainbow trout from stocked lakes from 1983 through 1998 was 337 fish (Table 21). Since 1990, only four lakes in PWS have been stocked with rainbow trout. The majority of this harvest was from Ruth, Blueberry, and Worthington lakes located near Valdez. Ruth Lake had been the only lake stocked with catchable sized rainbows; however, Blueberry and Thompson lakes began receiving catchable-size fish in 1995. The last of the four lakes in PWS (Crater Lake) was last stocked with rainbow trout fingerlings in 1994 (Appendix A1). Worthington Lake has been dropped from the stocking program because it is an open system.

Prince William Sound Eulachon (Smelt)

A small number of eulachon return to PWSMA streams and are harvested. However, as these are subsistence fisheries and not sport or personal use, they will not be detailed here.

Prince William Sound Clams and Shellfish

Limited fisheries occur for shellfish in the PWSMA. Crab fisheries have been closed during most of the 1990s in all fisheries in much of the area. Limited harvests of shrimp and crab species occur in western PWS. Emergency orders have been issued from 1990 to 1999 to close king and Tanner crab fishing in response to shellfish survey findings of depressed stocks. In March of 1999 the king and Tanner crab fisheries were closed by the BOF throughout PWS.

Table 21.-Sport harvest of rainbow trout in the Prince William Sound Management Area, 1983-1998.

YEAR	Outer Islands	Cordova Road System	Copper River Delta	Eastern PWS	Northeast PWS	Northwest PWS (Whittier)	Southwest PWS	Valdez Arm Area	Other sites in PWS	PWS Total
1983	0	31	0	210	0	0	944	0	0	1,185
1984	0	24	0	0	0	0	0	499	0	523
1985	0	0	0	0	0	0	0	87	190	277
1986	0	15	0	0	0	46	0	15	31	107
1987	0	0	54	0	0	0	0	72	0	126
1988	0	18	0	0	0	0	0	91	0	109
1989	0	271	77	0	0	0	0	174	155	677
1990	0	82	16	16	0	0	0	262	16	392
1991	0	29	292	73	0	0	0	88	58	540
1992	32	95	32	0	0	0	0	71	56	286
1993	0	79	0	0	0	0	0	37	20	136
1994	0	56	0	0	0	0	0	84	17	157
1995	0	11	24	0	0	0	0	135	607	777
1996	0	0	28	0	0	0	0	155	59	242
1997	0	0	0	0	0	0	0	287	83	370
1998	0	0	0	0	0	0	0	284	59	343
MEAN	2	44	33	19	0	3	59	146	84	337

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .

Razor clams were at one time commercially harvested in the Cordova area, however environmental changes resulting from the 1964 earthquake have drastically reduced the razor clam populations. Razor clams can now only be harvested in a personal use fishery with permits being issued in Cordova. From 1983 through 1998, the average harvest of clams was 8,278. The majority of the PWS harvest is taken in the eastern sound primarily along the Cordova road system and in the Copper River Delta (Table 22).

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

1991 (finfish meeting)

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.

1994 (finfish meeting)

No actions were taken on these fisheries in the 1994 Board meeting.

1997 (shellfish meeting)

The proposal was approved to require a permit to harvest razor clams on the Copper River Flats.

The Board closed Dungeness crab fishing in the areas of eastern PWS which had been closed by emergency order for the past 5 years.

1999 (shellfish meeting)

The BOF closed PWS to all fishing for Tanner and king crabs.

2000 (shellfish meeting)

There is one proposal to close Dungeness crab throughout the sound and another proposal to reduce the sport, personal use and subsistence pot limits from 5 per person/10 per vessel to 5 per person/5 per vessel.

Current Issues

There are two shellfish proposals for consideration at the next Board meeting. The first is a commercial shellfish proposal to close fishing for Dungeness crab in PWS. As it would restrict commercial and subsistence harvest, a sport fishing closure would also be included. The second proposal would restrict shrimp harvest in parts of the PWS.

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 use of stocked fish. No other specific research or management activities are recommended for this fishery at present.

Table 22.-Sport harvest of razor clams in the Prince William Sound area, 1983-1998.

YEAR	Outer Islands	Cordova Road System	Copper River Delta	Eastern PWS	Northeast PWS	Northwest PWS (Whittier)	Other Sites in PWS	Valdez Arm Area	PWS Total
1983	0	0	0	0	0	0	16,640	0	16,640
1984	0	0	0	0	0	0	36,003	0	36,003
1985	0	1,680	0	0	0	0	0	0	1,680
1986	61	489	4,740	612	0	0	841	306	7,049
1987	0	9,234	0	0	0	0	0	154	9,388
1988	0	0	0	0	0	0	5,428	27	5,455
1989	0	0	3,988	0	0	0	191	64	4,243
1990	0	0	4,908	0	0	0	327	0	5,235
1991	0	769	1,923	0	0	0	0	0	2,692
1992	108	2,347	22,013	0	433	0	292	1,114	26,307
1993	0	2,020	3,491	1,118	0	0	0	0	6,629
1994	0	304	618	0	0	0	587	2,063	3,572
1995	0	0	127	0	0	1,252	601	125	2,105
1996	135	998	788	0	0	0	3,012	0	4,933
1997	0	99	0	0	0	0	0	0	99
1998	360	0	0	0	0	0	0	60	420
MEAN	42	1,121	2,662	108	27	78	3,995	245	8,278

From: Mills 1984-1994, Howe et al. 1995-1998, *In prep* .

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APPENDIX A. SUMMARY OF STOCKING EFFORTS IN PWS

Appendix A1.-Rainbow trout stocking in PWS by year and stocking site.

Release Site:	22 M. Lake	Beaver Lake	Blueberry Lake	Cabin Lake	Cordova Res. # 1	Cordova Res. #2	Crater Lake	Elsner Lake	Granite Bay 171	Island Lake	Lower Beaver L.	Middle Lake	Middleton Is. Lake	Pipeline Lake #1	Pipeline Lake #4	Ruth Lake	Scout Lake	Worthington Lake[a]
Year:									**Fire Lake Hatchery**									
1966	3,700		2,000		930	850												5,000
1967	discon't	3,000	0	2,000	1,000	1,000						1,000						0
1968		0	2,000	0	discon't	0	2,600			650	0	650	500				1,300	5,000
1969		3,000	0	3,000		0	0			0	0	0	500				discon't	0
1970		discon't	3,000	0		0	0			0	0	0	0					5,000
1971			0	1,198		0	0			1,200	1,200	1,198	500					0
1972			3,000	0		0	0			0	0	0	0					7,000
1973			0	0		3,000	4,000	3,000		0	0	0	0					0
1974			3,000	0		discon't	0	discon't		0	0	0	0					7,000
1975			0	11,400			0			0	0	0	0					0
1976			3,000	discon't			0			discon't	discon't	discon't	500 discon't					4,000
									Fort Richardson Hatchery/ Elemendorf Hatchery									
1977			0				3,500											0
1978			0				0											0
1979			0				0											0
1980			1,950				0											3,950
1981			0				0											0
1982			3,000 [b]				0											0
1983			0				0											10,000 [b]
1984			2,100 [b]				5,000 [b]											0
1985			0				0											9,980
1986			1,500				5,000											0
1987			0				0											0
1988			2,463				5,762									545		0
1989			0				0									1,002		7,946
1990			2,000				5,009		6,677					1,056	5,200	728		0
1991			0				0		discon't					discon't	discon't	1,052		8,014
1992			2,000				3,400									1,021		0
1993			0				0									504		8,000
1994			2,000				1,600									518		0
1995			1,038				0									1,710		5,002
1996			980				0									1,028		990
1997			1,000				0									1,500		1,000
1998			500				0									1,596		1,000
1999			480				0									1,481		discon't

Source: ADF&G 1999a.

Note: Unless noted separately, all rainbow releases after 1976 were reared at Ft. Richardson Hatchery.

[a] Stocking efforts in Worthington Lake for rainbow trout and Arctic char began in 1954.

[b] Reared at Elmendorf Hatchery.

Appendix A2.-Arctic grayling stocking in PWS by year and stocking site.

Release Site:		Big Echo Lake	Corser Lake	8.5 M. Creek	22 M. Lake	28.5 M. Lake	Alaganik Sl. Lake	Pipeline Lake #1	Pipeline Lake #2	Pipeline Lake #4	Quarry Lake	Sheridan Dike 1	Sheridan Dike 2	Thompson Lake
						Fire Lake Hatchery								
Year:	1967		10,000						10,000					
	1968	5,000	discon't						10,000		5,000	5,000		
	1969	discon't							0		2,000	3,000		
	1970								7,000		discon't	7,000		
	1971								0			0		
	1972								0			0		
	1973								7,500			7,500		
	1974				2,500				0			2,500		10,000
	1975				0				0			0		0
	1976				0				0			0		0
	1977			2,000	10,000				0			3,000		0
	1978			discon't	discon't				0			discon't		10,000
	1979								0			0		0
	1980								0			0		0
	1981								0			0		11,579
	1982								0			0		0
						Clear Creek Hatchery								
	1983					10,000			0			10,000		9,500
	1984					0			0			0		0
	1985					5,000			0			1,000		10,000
	1986					10,000			0			1,000		0
	1987					0			0			0		10,000
	1988					10,000			0			10,000		10,000
	1989					0			10,000			0	10,000	10,000
	1990					10,000	10,000	1,100	discon't			10,000	10,000	0
	1991					10,000	10,000	10,000		10,000		10,000	10,000	10,000
	1992					10,000	0	10,000		10,000		0	10,000	0
	1993					10,000	0	10,000		10,000		0	10,000	10,000
	1994					10,000	0	10,000		10,000		0	10,000	0
	1995					discon't	discon't	discon't		discon't		15,000	discon't	10,000
	1996											discon't		0
	1997													0
	1998													0
	1999													0

Source: ADF&G 1999a.

Appendix A3.-Chinook salmon stocking in PWS by year and stocking site.

	Elmendorf Hatchery			Solomon Gulch/ Ft. Richardson/ W. Noerenberg Hatcheries								
Year	Cove Creek	Passage Canal	Wells Passage	6.5 M. Richardson Hy[a]	Anderson Bay[b]	Chenega Lake[c]	Fleming Spit	Glacier Cr. Pit[b]	Granite Bay[b]	Logging Camp Cr.[b]	W Noerenberg Hatchery[c]	Shakespeare Creek
1981	109,850											
1982	0											
1983	112,020											
1984	117,590											
1985	61,400	70,757			139,888							
1986	discon't	85,164			113,535				25,072	49,850	115,088	
1987		discon't	50,143		discon't				discon't	discon't	0	
1988			discon't								44,790	
1989											145,000	
1990							19,991 [c]				118,618	
1991				192,465			59,730 [c]				239,624	99,811 [c]
1992				94,748			102,116 [c]				274,754	102,024 [c]
1993				196,947			113,325 [c]				273,429	85,677 [c]
1994				0		50,318	99,334 [c]				539,195	98,311 [c]
1995				0		49,990	89,197 [c]				395,850	102,095 [c]
1996				0		49,900	0				36,515	0
1997				0		49,733	46,111 [c]				0	0
1998				0		43,400	0				35,600	0
1999				0		0	49,723 [b]	49,853			0	49,853 [b]

Source: ADF&G 1999a.

[a] Reared at Solomon Gulch Hatchery.

[b] Reared at Ft. Richardson Hatchery.

[c] Reared at W. Noerenberg Hatchery.

Appendix A4.-Coho salmon stocking in PWS by year and stocking site.

	Cannery Creek/ Elmendorf/ W. Noerenberg/ Ft. Richardson Hatcheries												Solomon Gulch Hatchery	
Year	18 M. Creek	Chenega Lake[c]	Cove Creek	Culross Lake	Fleming Spit	Lake Bay[c]	Otter Lake[a]	Passage Canal	Shakespeare Creek[c]	Surprise Cove #1[d]	Surprise Cove #2[d]	Whittier Sites[e]	Boulder Bay	Solomon Gulch
1979			6,450 [d]									124,795 [b]		
1980			50,057 [d]									0		
1981			84,022 [d]					25,876 [d]				63,333 [d]		
1982			9,750 [b]					0				0		
1983	57,003 [a]		0	95,130 [a]			29,253	93,235 [b]				95,130 [d]		
1984			41,661 [b]	61,261 [d]	0		discon't	0				0		
1985	20,512 [d]		discon't	96,900 [d]	0			108,500 [b]		77,000	66,646	0		94,700
1986	49,990 [d]			99,600 [d]	44,470 [d]	98,778		discon't		20,053	38,698	104,796 [b]		231,538
1987	discon't			42,516 [d]	58,213 [d]	376,000				21,605	40,158	55,546 [b]		86,300
1988				discon't	0	871,000				discon't	discon't	107,428 [b]		822,000
1989					75,113 [d]	2,499,000						82,379 [d]		987,000
1990					54,815 [d]	2,390,000						40,912 [d]	20,000	787,153
1991					40,000 [c]	2,083,292			99,990			0	30,761	962,872
1992					124,000 [c]	1,564,000			143,800			0	19,568	1,206,476
1993					99,848 [c]	1,103,278			99,951			0	0	461,388
1994					98,628 [c]	1,281,837			103,471			0	13,784	901,303
1995					100,260 [c]	1,861,922			101,775			0	20,000	1,305,316
1996					49,845 [c]	176,913			48,648			0	20,000	1,855,823
1997					49,583 [c]	104,944			49,124			0	21,768	1,293,415
1998					102,955 [c]	205,518			99,242			0	16,388	1,732,098
1999		56,500												

Source: ADF&G 1999a.

[a] Reared at Cannery Creek Hatchery.

[b] Reared at Elmendorf Hatchery.

[c] Reared at W. Noerenberg Hatchery.

[d] Reared at Ft. Richardson Hatchery.

[e] Whittier Sites include data from "Whittier Harbor," "Army Dock," and "Wells Passage."

Appendix A5.-Pink salmon stocking in PWS by year and stocking site.

	AFK Hatchery	Cannery Creek/ W. Noerenberg/ Main Bay Hatcheries						Solomon Gulch/ Nerka Hatcheries		
Year	Port San Juan	Eaglek Bay[a]	Cannery Creek[a]	Derickson Bay[a]	Hobo Bay[a]	Lake Bay[b]	Main Bay	Boulder Bay[d]	Perry Island	Solomon Gulch H.[d]
1975										
1976										
1977	11,792,000									
1978	16,940,678									
1979	22,774,595		2,151,432						115,000 [e]	
1980	21,641,757		990,859		1,690,712				250,000 [e]	
1981	69,662,000		14,388,752		6,950,000				113,000 [e]	
1982	70,118,000		13,932,987		discon't		33,700,561 [a]		500,000 [d]	7,400,000
1983	87,384,533		22,184,862				25,751,531 [c]		discon't	5,600,000
1984	76,746,000	1,561,750	29,271,000				41,945,403 [c]			8,390,000
1985	103,531,000	discon't	36,497,996	2,003,800			29,286,498 [c]			51,263,063
1986	112,529,000		58,216,842	2,000,000		34,437,214	32,728,663 [c]			54,630,942
1987	116,177,000		42,653,000	discon't		75,933,000	2,660,000 [c]			59,739,000
1988	110,037,000		95,572,691			195,322,000	0	16,960,000		114,030,000
1989	160,000,000		58,969,539			159,890,000	10,200,000 [c]	14,380,000		114,034,000
1990	113,800,000		143,660,000			233,260,000	0	47,026,093		75,177,816
1991	115,750,000		141,510,000			205,728,876	9,235,154 [b]	48,416,027		82,879,067
1992	112,830,588		132,166,231			163,591,000	discon't	discon't		86,902,415
1993	113,337,400		140,030,396			172,087,494				141,865,235
1994	92,078,951		84,616,614			162,386,766				149,473,648
1995	108,583,112		130,339,451			168,864,536				205,371,130
1996	108,636,977		140,441,172			169,508,993				223,088,327
1997	51,562,609		136,838,852			106,440,456				188,862,094
1998	105,974,000		137,572,000			103,675,000				195,162,063
1999	133,200,000		131,200,000			123,900,000				213,906,642

Source: ADF&G 1999a.

[a] Reared at Cannery Creek Hatchery.

[b] Reared at W. Noerenberg Hatchery.

[c] Reared at Main Bay Hatchery.

[d] Reared at Solomon Gulch Hatchery.

[e] Reared at Nerka (Perry Island) Hatchery.

Appendix A6.-Chum salmon stocking in PWS by year and stocking site.

	AFK Hatchery	Cannery Creek Hatchery		Main Bay Hatchery		W. Noerenberg Hatchery		Solomon Gulch Hatchery
Year	Port San Juan	Cannery Creek	Unakwik Inlet	Lake Bay	Main Bay	Lake Bay	Port Chalmers	Solomon Gulch
1977	10,000							
1978	1,014,000							
1979	247,548	20,309						
1980	395,000	462,849						
1981	745,668	2,448,611						
1982	7,616,000	866,890						400,000
1983	0	0			8,644,179			617,000
1984	7,654,000	1,796,000		7,355,000	7,490,291			900,000
1985	10,944,308	760,000		12,559,082	11,033,065	12,466,732		2,146,017
1986	0	278,900		4,251,497	5,258,175	15,172,261		2,256,291
1987	0	34,800		discon't	76,646,750	36,479,000		3,419,000
1988	0	200,000			discon't	68,388,000		1,614,000
1989	0	discon't	4,487,000			79,845,000		2,900,000
1990	0		discon't			46,980,000		3,100,000
1991	0					76,843,000		1,607,000
1992	0					97,953,492		2,690,414
1993	9,484,200					108,026,724		17,670,620
1994	0					82,029,558	18,078,640	6,088,063
1995	0					72,254,939	24,211,065	1,393,586
1996	0					79,543,524	22,770,999	discon't
1997	8,524,584					77,399,969	17,272,475	
1998	10,121,000					77,839,000	22,106,000	
1999						75,000,000	24,300,000	

Source: ADF&G 1999a.

Appendix A7.-Sockeye salmon stocking in PWS by year and stocking site.

	Main Bay/ W. Noerenberg/ Trail Lake Hatcheries								
Year	Coghill Lake[a]	Davis Lake[a]	Eshamy Lake	Esther Pass Lake[a]	Eyak Lake[a]	Main Bay[a]	Marsha Lake[a]	Pass Lake[a]	Solf Lake[a]
1986			516,000 [c]						
1987			396,000 [b]						
1988		657,287	764,000 [b]	153,031		330,025		594,210	
1989		discon't	2,055,000 [b]	154,644		3,925,357		603,219	
1990			0	25,000		2,616,498		100,121	
1991	443,000		1,279,475 [a]	discon't	47,609	2,363,337		discon't	
1992	720,875		1,043,356 [a]		0	1,914,927	691,405		
1993	806,218		966,750 [a]		0	2,597,284	0		
1994	1,219,354		691,633 [a]		discon't	2,400,666	0		
1995	865,020		discon't			5,348,092	215,944		
1996	discon't					3,227,685			
1997						1,215,716			
1998						2,666,000			109,800
1999						6,970,000			0

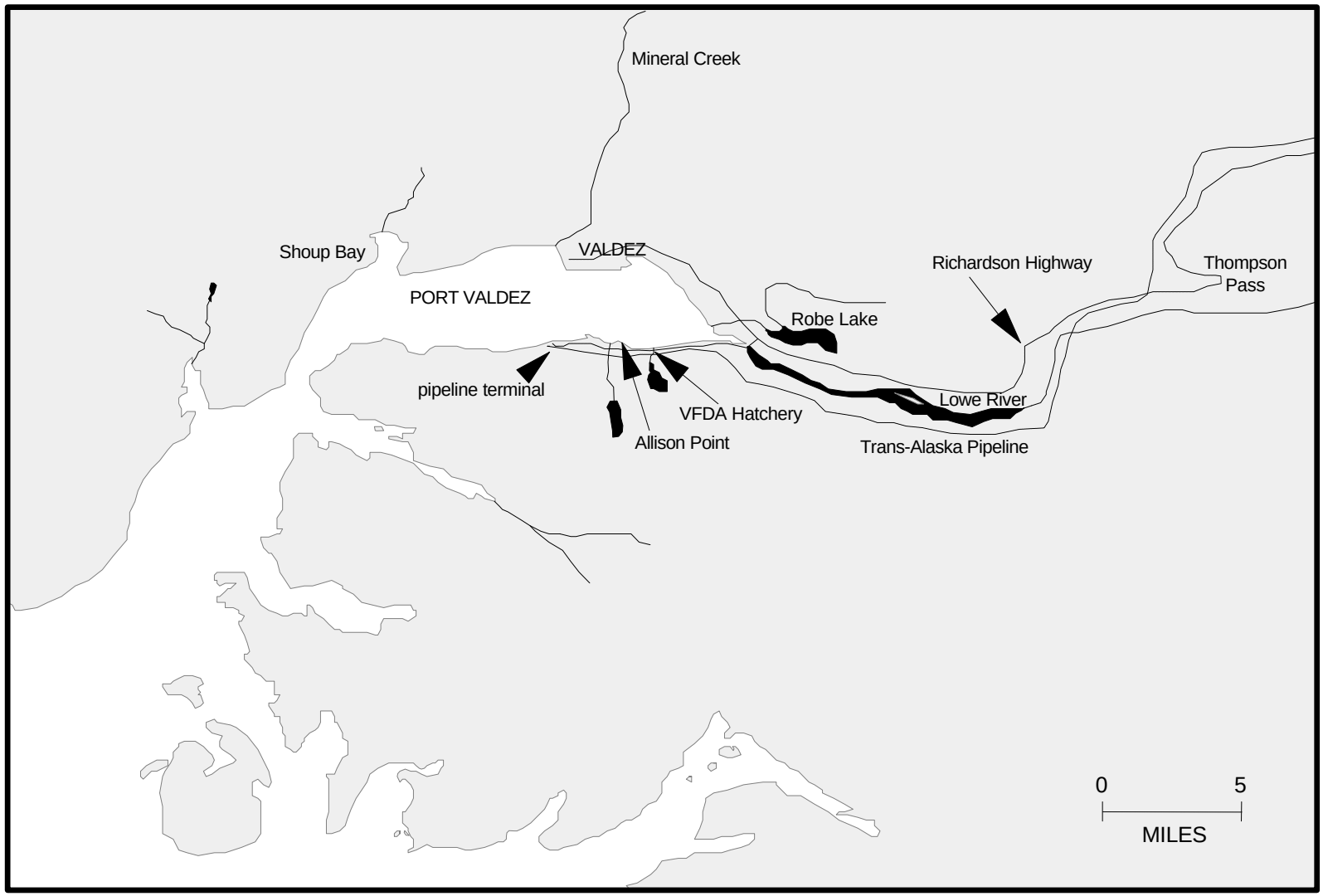
Source: ADF&G 1999a.

[a] Reared at Main Bay Hatchery.

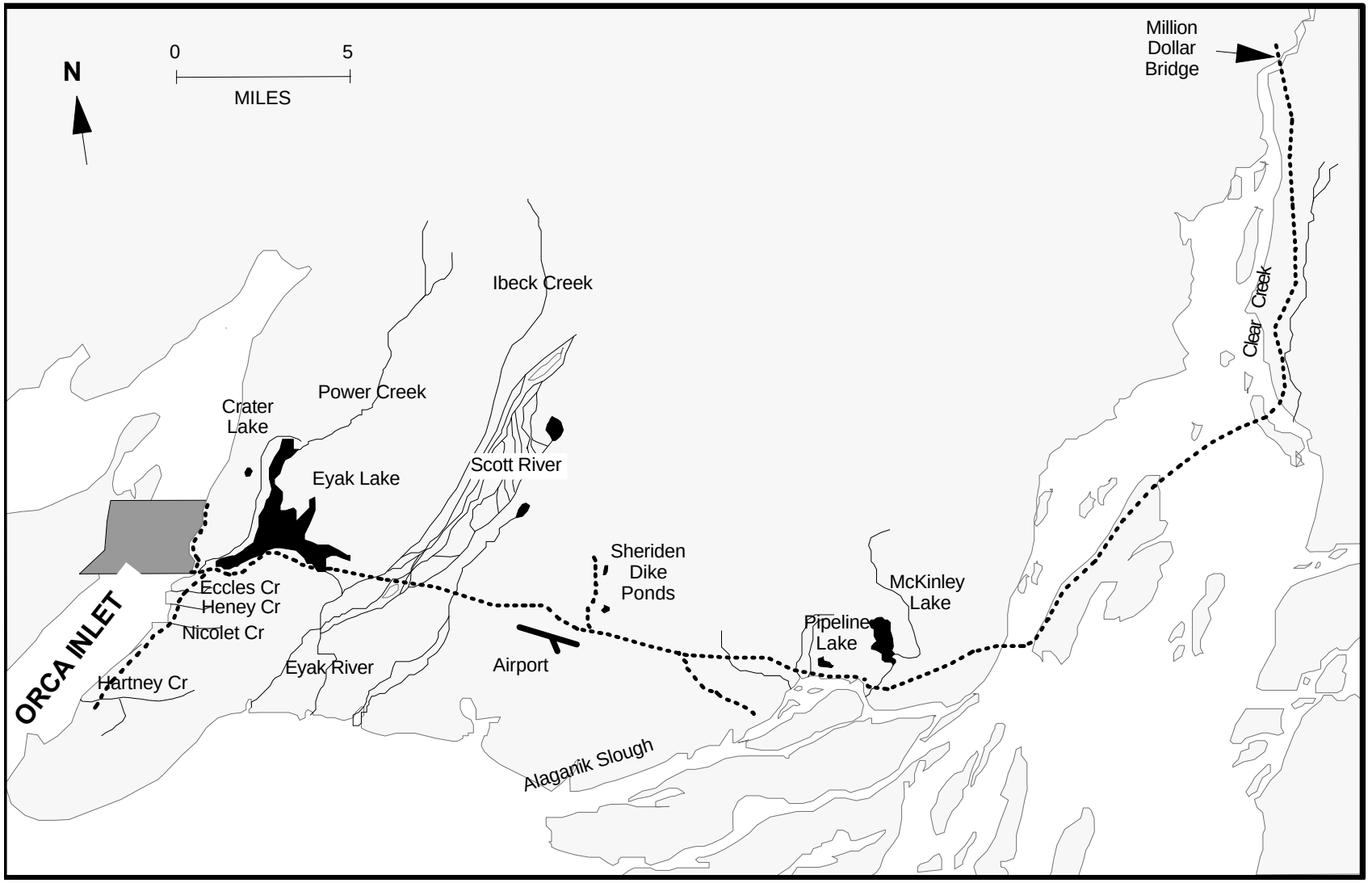
[b] Reared at W. Noerenberg Hatchery.

[c] Reared at Trail Lake Hatchery.

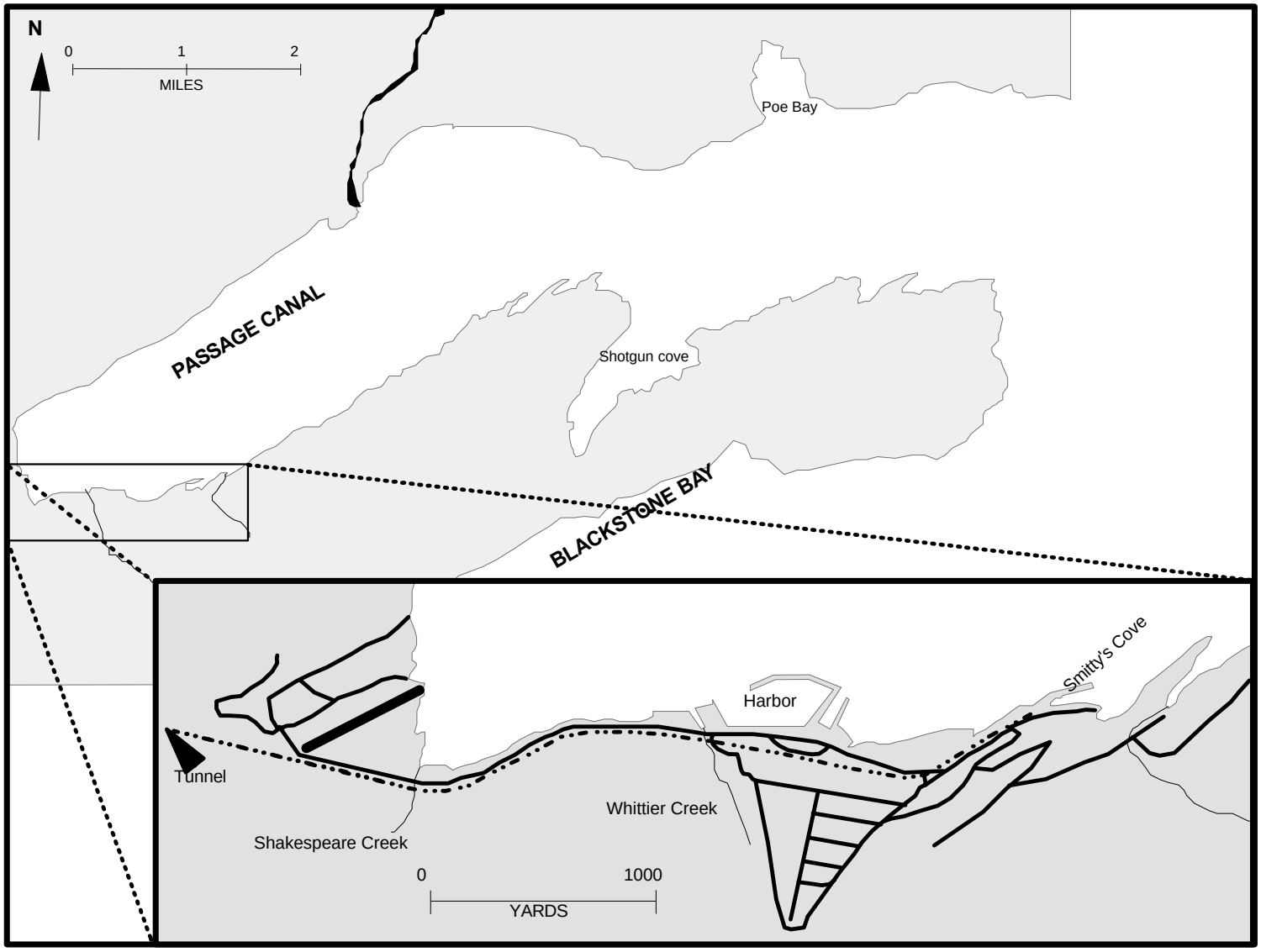
APPENDIX B. MAPS OF THE MAJOR COMMUNITIES IN PWS



Appendix B1.-Map of the Valdez area.



Appendix B2.-Map of the Cordova area.



Appendix B3.-Map of the Whittier area.

APPENDIX C. SUMMARY OF REGULATION CHANGES IN PWS

Appendix C1.-Changes in Prince William Sound finfish sport fishing regulations since 1957.

Note: Underlined text indicates regulations currently in effect.

Areawide regulations

- 1994 - In all fresh waters, only unbaited artificial lures may be used from April 15 through June 14.

Cutthroat Trout

- 1957-1982 - Part of an aggregate freshwater limit of trout, grayling, and lake trout (later "char") of 15/day, 30 in possession with a limit of only 3 over 20 inches. No saltwater limits.
- In 1983, limits for each species were established. The limit for "trout" was set at 3 per day 6 in possession over 20 inches and 15 per day, 30 in possession under 20 inches.
- 1985 - trout limits were set at 5/day, 10 in possession with only 1 over 20 inches.
- 1991 - the bag limits separated from rainbow trout and were set 2 per day and in possession except along the Cordova road system where it is 5 per day and in possession, with only 1 per day and in possession over 10 inches.
- 1994 - a spawning season closure from April 15 through June 14 was put in place.

Rainbow Trout

- Prior to 1991, bag and possession limits included with cutthroat trout as "trout" limits (see cutthroat trout above).
- 1991 - bag and possession limits separated from cutthroat and set at 5 per day, 10 in possession, only 1 per day and 2 in possession over 20 inches.

Dolly Varden/Arctic Char

- In the early 1960s, anglers were allowed 30 char in addition to the trout/grayling limit of 15.
- Mid 60s (before 1969) Dolly Varden and Arctic char were made part of the aggregate limit with trout and grayling.
- In 1983, limits for each species were established. The limit for "char" was set at 3 per day 6 in possession over 20 inches and 15 per day 30 in possession under 20 inches.
- 1991 - bag limits changed to 10 per day and in possession, with no size restrictions.

Grayling

- 1957-1982 - Part of an aggregate freshwater limit of trout, grayling, and lake trout (later "char) of 15/day, 30 in possession with a limit of only 3 over 20 inches. No saltwater limits.
- In 1983, limits for each species were established. The limit for grayling was set at 15 per day, 30 in possession, no size restrictions.
- 1991 - bag limits changed to 10 per day and in possession, with no size restrictions.

Salmon

- There were no salmon limits in fresh or salt water prior to statehood.
- 1960 - the freshwater areas within Valdez Bay were closed to salmon fishing.
- 1961 - saltwater bag limit of 8 coho with possession limit of 3 bag limits.
- 1965 - Cordova Road system (Steamship dock to Million Dollar Bridge) freshwater limits were set at 6 salmon daily with a possession limit of 2 bag limits.
- 1965 - Eyak Lake, Power Creek, and Hatchery Creek closed to salmon fishing beyond markers at the east end of Power Creek Arm.
- 1967 - a saltwater bag limit of 8 coho, 8 chum, and 15 pink salmon was set, possession limit was 3 daily bag limits.
- 1968 - Fishing from the bridge across Eyak River at Mile 3 of the Copper River Highway is prohibited.
- 1969 – upper limit of Cordova area salmon restriction moved from Million Dollar Bridge upstream to the Copper River below Woods Canyon.
- 1970 - 8 sockeye were included in this limit with possession limits reduced to 2 daily bag limits.
- 1970 - The following closures were established: Eccles Creek (Hartney Bay Road) closed to the taking of salmon, Hartney Creek above Hartney Bay Road closed to the taking of salmon.
- 1973 - fresh and saltwater limits were reduced to 6 salmon daily, 12 in possession. Eyak River 200 yards above the weir and 200 yards below the bridge closed to fishing.
- 1975 - Clear Creek closed to the taking of salmon. Eyak Lake and all tributaries closed to the taking of salmon.
- 1979 - Closure on Eyak River 200 yards above the weir and 200 yards below the bridge, limited to June 15 through October 1.
- 1980 – Dates of closure on Eyak River changed to June 1 through October 1.

- 1984 - Eshamy Lagoon, inside department markers placed on the lagoon shore approximately ½ mile on either side of the ADF&G cabin, is closed to snagging until the department announces the escapement goal will be met.
- 1984 - The Robe River downstream of the Richardson Highway was established as a fly-fishing only water from May 15 through June 14, with a bag limit of 6 per day and 12 in possession only 1 of which could be a sockeye salmon.
- 1987 - further restriction on Robe River, May 15 to June 22, only 1 salmon of each species daily and in possession.
- 1989 - further fine tuning of Robe River fly fishing area. Dates extended to year round, area refined to the highway downstream to 100 yards below the confluence with the Lowe River, bag limit is 3, only 1 may be sockeye and only 1 may be a coho.
- 1989 – Valdez Arm closed, area boundary changed to Allison Point to and including Mineral Creek.
- 1989 - Eshamy Lagoon, Lake, and stream bag limit reduced to only 3 sockeye per day and 6 in possession.
- 1989 - Lake Bay (Ester Island) all salt waters inside department markers located approximately 100 feet seaward of Esther Hatchery brood stock holding facility are closed to all fishing.
- 1989 - Cordova in all freshwater drainages crossed by the Copper River Highway from and including Eyak River to the Million Dollar Bridge, and including Clear Creek (Mile 42), excluding the Martin River; the bag and possession limits were reduced to 3 salmon other than king salmon. Clear Creek remains closed to king salmon fishing. In addition, Eyak River 200 yards above the weir and 200 yards below the bridge was opened to fishing year-round and as a fly fishing only water from June 1 through September 30.
- 1989 - a limit of 2 king salmon (4 in possession) 16 inches or more, and 6 per day 12 in possession less than 16 inches, was added.
- 1991 - Eyak fly fishing only area gear restrictions: only single-hook, artificial flies with gap between point and shank 3/8 inch or less and no additional weight attached to the line may be used.
- 1991 - Solomon Gulch Creek, downstream of a department marker located approximately 300 feet downstream of the Valdez Fisheries Development Association weir, opened to salmon fishing.
- 1994 - Cordova – in the marine waters of Orca Inlet between Odiak Inlet and the Orca Cannery on Orca Road, snagging is prohibited from June 1 through September 30, and in Fleming Spit Creek snagging is allowed from October 1 through May 31.
- 1994 - salmon bag limits of 3 per day and in possession in Clear Creek and all freshwater drainages crossing the Copper River Highway were changed to include king salmon under 16 inches.

Halibut

- There was no limit on halibut until 1981 when 2/day and in possession was allowed and a spawning season closure was put into effect from November 1 through the end of February (regulations established by the IPHC).
- 1985 – spawning period closure changed to exclude January only.
- 1988 - the halibut possession limit was raised to 4.

Rockfish

- Prior to 1989 there was no limit on the sport harvest of rockfish.
- In 1989, the bag limits were set at 20 per day and in possession, with only 5 being "red rockfish."
- 1991 - the bag limits were changed to 5 per day, 10 in possession May 1 through September 15, and 10 per day and 10 in possession September 15 through April 30, with no species restrictions. In addition, a rockfish, which is removed from the water, shall be retained and becomes part of the bag limit of the person originally hooking it.
- 1997 - the total bag limit was unchanged, but the provision was added that only 1 rockfish per day and 2 in possession May 1 through September 15, and only 2 per day and 2 in possession September 15 through April 30 could be "non-pelagic."

Lingcod

- No bag or possession limits prior to 1991.
- 1991 - bag limits were set at 2 per day and 4 in possession.
- 1993 - a minimum length of 35 inches with head attached or 28 inches with head removed, was included, the season was closed from January 1 through June 30, and lingcod can only be landed by hand or landing net (no gaffs).

Sharks

- Prior to 1997, no season or bag limits.
- 1997 - daily bag and possession limit set at 1, with an annual limit of 2. Harvest must be recorded on license or harvest card.

Appendix C2.-Changes in Prince William Sound shellfish sport fishing regulations since 1957.

Note: Underlined text indicates regulations currently in effect.

Areawide

- Prior to 1990 shellfish regulations fell under personal use or subsistence.
- A valid sport fishing license is required to take shellfish.
- Legal gear: Shrimp – pots and ring nets.

  Crab – pots, ring-nets, diving gear, dip nets, and hooked or hookless hand lines.

  Clams – rakes, shovels manually operated clam guns.
- 1981 - Marking of pots: First initial, last name and address on a keg or buoy attached to unattended subsistence fishing gear.
- 1988 - A side wall of all shellfish pots must contain an opening with a perimeter equal to or exceeding one-half of the tunnel eye opening perimeter. The opening must be laced, sewn or secured together by untreated cotton twine, or other natural fiber no larger than 120 thread. Dungeness crab and shrimp pots may have the pot lid tie-down straps secured to the bottom at one end by untreated cotton twine no larger than 120 thread, as a substitute for the above requirement.
- 1988 - No person may mutilate or otherwise disfigure any crab in any manner which would prevent determination of the minimum size restriction until the crab has been processed or prepared for consumption.
- 1988 - No more than 5 pots of any type per person and 10 pots of any type per vessel may be used
- 1990 – PU regulations adopted as sport regulations.
- 1990 – Criteria for escape mechanism modified. Opening must equal or exceed 18 inches, except in shrimp pot where it must exceed 6 inches. Must be laced with 100% cotton twine no larger than 30 thread, knotted only at the ends, and cannot be tied or looped around the web bars. The opening must be within 6 inches of the bottom and parallel to it. Dungeness pots can substitute the above with the lid tie-down at one end with a single loop of 30 strand cotton twine such that when the twine degrades the lid is no longer secure.
- 1992 – thread count on cotton twine changed to 60.
- 1994 – thread count on cotton twine changed to 30 thread for sewn opening and 60 thread for Dungeness pot lid closure.

Razor Clams

- No specific regulations prior to statehood.
- 1961 - season 1/1-6/30 and 8/15-12/31, no bag limit. No razor clams may be taken with the aid of any device other than manually operated shovel, fork or clam gun. Sport fishing license is required.
- 1988 – PU regulations. No closed season, no bag limit, no size limit except: in waters east of 149 west longitude and south of a line from the southernmost top of Point Bentinck to the southernmost tip of Point Whitshed, only razor clams 4 ½ inches or longer in length of shell may be taken or possessed. In that same area a personal use permit from the department is required.
- 1990 – PU regulations adopted as sport fish regulations.

Shrimp

- 1957 – current - No bag limits, no size limits, and no closed season.
- 1996 – all shrimp pots must have at least two adjacent vertical or near-vertical sides, excluding tunnels, completely composed of uncovered net webbing or rigid mesh. A pot with no definable side (including round pots) must have net webbing or rigid mesh panels covering at least 50% of its vertical or near-vertical surface area. On all pots, the net webbing or rigid mesh must be large enough to allow unaided passage of a maximum 12-inch long, 7/8 inch-diameter round wooden peg without deforming the opening, except for the selvage.

Tanner Crab

- Prior to 1981 there were no closed seasons and no bag limits.
- 1988 – PU regulations. Bag and possession limit 20, only male crabs may be retained, minimum size limit 5.3 inches, no closed season.
- 1990 – PU regulations adopted as sport fish regulations.
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King Crab

- 1988 – PU regulations. Bag and possession limit 6, only male crabs may be retained, no closed season, size limits 5.9 inches for blue king crab and 7 inches for red and brown king crabs.
- 1990 – PU regulations adopted as sport fish regulations.

Dungeness Crab

- 1981 – Subsistence regulations, 20 Dungeness crab per day, crab must be male only, 6 ½ inches or over in size.
- 1988 – PU regulations. Bag and possession limits 20, only male crab, 6 ½ inches or over may be retained.
- 1990 – PU regulations adopted as sport fish regulations.
- 1998 – All waters of Orca Inlet (see regulation for definition) closed to sport fishing for Dungeness crab.

Appendix C3.-Emergency orders issued for the Prince William Sound Management Area sport fisheries, 1989-1999.

Emergency Order Number	Action
2-RS-6-14-89	Opened that portion of Eshamy Lagoon, inside Department markers placed on the lagoon shore approximately one-half mile east of the ADF&G cabin, to snagging. This action was taken in anticipation that the escapement objective of 40,000 sockeye salmon would be attained. (8/10/89, Craig Whitmore)
2-RS-6-09-90	Closed the Coghill Lake drainage to sport fishing for sockeye salmon on July 5, 1990. This action was taken because the sockeye salmon escapement to the Coghill Lake drainage was behind the projection required to attain the escapement objective of 55,000 sockeye salmon. (7/3/90, Kevin Delaney)
2-RS-6-20-90	Closed Eshamy Lagoon and all fresh waters draining into the lagoon to sport fishing for sockeye salmon on August 4, 1990. This action was taken because the escapement of sockeye salmon to the Eshamy system was behind the projection required to attain the escapement goal objective of 40,000 sockeye salmon. (8/2/90, Craig Whitmore)
2-KC/TC-6-32-90	Closed the described waters of Hinchinbrook Island and Orca Bay to the sport harvest of king crab and Tanner crab. Crab assessment indicated continued depressed stock levels for red king crab, and low abundance levels of Tanner crab. (9/24/90, Craig Whitmore)
2-RS-6-20-91	Closes Coghill Lake and River to sockeye salmon sport fishing due to low escapement. Effective 12:01 a.m., Saturday, June 29. (6/28/91, Kelly Hepler)
2-RS-6-26-91	Close Eshamy Lagoon and all fresh waters draining into Eshamy Lagoon for sockeye salmon sport fishing due to low (20%) escapement. Adjacent commercial fisheries were also closed. (7/25/91 Kelly Hepler)

2-PS-6-46-91 Pink salmon bag and possession limits increased to 18 daily and 36 in possession, in the marine waters of Lake and Quillian bays due to excess numbers of brood stock with high quality meat. (8/22/91, Kevin Delaney)

2-RS-6-48-91 Reopens Eshamy Lagoon and all fresh waters draining into Eshamy Lagoon to sport fishing for sockeye salmon due to higher numbers of sockeye by weir count. (8/30/91, Kevin Delaney)

2-KC-6-51-91 Closes sport fishing for king crab in waters of Hinchinbrook Entrance, Orca Bay in Prince William Sound in order to rebuild red king crab stock. (9/20/91, Kelly Hepler)

2-CT-6-02-92 Eshamy Creek drainage (including Eshamy Lake), and Green Island Creek drainage will be closed to sport fishing. This includes catch-and-release fishing, effective at 12:01 a.m. Wed., April 15, 1992 through 11:59 p.m. June 30, 1992. Studies following the *Exxon Valdez* oil spill documented that mortality rates increased and growth rates decreased for cutthroat trout in oiled areas of the sound. (4/9/92, Kevin Delaney)

2-LC-6-03-92 Closes all waters of Cook Inlet–Resurrection Bay salt water and PWS to the retention of lingcod. Available data indicate that recruitment of young lingcod into the population is declining and some lingcod populations in the marine waters of the Central Gulf of Alaska are depressed. (2/10/93, Doug Vincent-Lang)

2-RS-6-17-92 Closes the Coghill Lake drainage to sport fishing for sockeye salmon. The returns of sockeye salmon into Coghill Lake is behind projections and the minimum escapement goal of 55,000 sockeye salmon is not expected to be met. (7/1/92, Kelly Hepler)

2-SS-6-34-92 Closes the Alaganik Slough drainage, including those waters crossed by the Copper River Highway from 17 Mile to 23 Mile, and including McKinley Lake, to fishing for coho salmon due to the low probability of large numbers left to enter the slough. (9/18/92, Kevin Delaney)

2-TC-6-01-93 Closes the described waters of Hinchinbrook Entrance and Orca Bay to the sport harvest of Tanner crab. 1992 crab assessment surveys indicate continued depressed stock levels for Tanner crab. (1/8/93, Kelly Hepler)

2-LC-6-02-93 Closes all waters of Cook Inlet–Resurrection Bay salt water and PWS to the retention of lingcod. Available data indicate that some lingcod populations in the marine waters of the Central Gulf of Alaska are depressed. (2/10/93, Doug Vincent-Lang)

2-CT-6-03-93 Closes Eshamy Creek drainage and Green Island Creek drainage to sport fishing for cutthroat trout, May 3 through June 15, 1993. Studies following the *Exxon Valdez* oil spill documented that mortality rates increased and growth rates decreased for cutthroat trout in oiled areas of the sound. (4/30/93, Kelly Hepler)

2-RS-6-35-93 Opens Eshamy Lagoon, outside a cable stretched across the mouth of Eshamy Creek near the ADF&G cabin, to snagging. Escapement counts at the weir on Eshamy Creek indicate that the escapement goal of 45,000 sockeye is expected to be met. (9/2/93, Kelly Hepler)

2-RS-6-17-94 Closes the Coghill Lake drainage to sport fishing for sockeye salmon. The return of sockeye to Coghill Lake was far behind the projected and it appeared unlikely that the escapement goal of 25,000 would be met. (6/22/94, Andrew Hoffmann)

2-RS-6-37-94 Closes all waters within the Eshamy Lagoon including all freshwater tributaries draining into Eshamy Lagoon and all water within 100 yards outside the narrows at the entrance of Eshamy Lagoon to sport fishing for sockeye salmon. Weir counts are well below the projected and the escapement goal of 35,000 sockeye is not expected to be met. (8/11/94, Doug McBride)

2-TC-6-02-95 Closes the described waters of Orca Inlet and Hinchinbrook Entrance in PWS to the sport harvest of Tanner crab. 1994 surveys indicated that Tanner crab stocks remain depressed with legal males and recruitment declining. (4/6/95, Andrew Hoffmann)

2-DC-6-03-95 Closes the described waters of Orca Inlet in PWS to the sport harvest of Dungeness crab. 1994 surveys showed continuing low levels of abundance for Dungeness crabs in Orca Inlet. (4/6/95, Andrew Hoffmann)

2-KC-6-04-95 Closes the described waters of Orca Inlet and Hinchinbrook Entrance in PWS to the sport harvest of king crab. The 1994 crab assessment trawls showed continued depressed stocks of king crab. (4/6/95, Andrew Hoffmann)

2-RS-6-18-95 Closes Coghill Lake drainage and lagoon to sport fishing for sockeye salmon. The return of sockeye to Coghill Lake was far behind the projected and it appeared unlikely that the escapement goal of 25,000 would be met. (6/20/95, Andrew Hoffmann)

2-RS-6-37-95 Re-opens Coghill Lake drainage and lagoon to sport fishing for sockeye salmon effective Tuesday August 1, 1995. Escapement objective of 30,000 sockeye was reached justifying the opening. (7/31/95, Andrew Hoffmann)

2-TC-6-05-96 Closed described waters of Orca Inlet and Hinchinbrook Entrance in PWS to sport harvest of Tanner crab. 1995 surveys indicated that Tanner crab stocks remain depressed with legal males and recruitment declining. (2/21/96, Andrew Hoffmann)

2-DC-6-06-96 Closed described waters of Orca Inlet in PWS to sport harvest of Dungeness crab. Annual surveys showed continued low levels of abundance for Dungeness crabs in Orca Inlet. (2/21/96, Andrew Hoffmann).

2-KC-6-07-96 Closed described waters of Hinchinbrook Entrance and Orca Inlet in PWS to sport harvest of king crab. Annual surveys showed continued low levels of abundance for Dungeness crabs in Orca Inlet. (2/21/96, Andrew Hoffmann).

2-RS-6-38-96 Closed Eshamy Bay, Eshamy Lagoon, Eshamy Creek and Eshamy Lake to sport fishing for sockeye salmon. The closure is prompted by a low escapement of only 2,002 sockeye and is accompanied by the closure of the commercial fishery in the Crafton Island district. (8/14/96, Andrew Hoffmann)

2-TC-6-06-97 Closed described waters of Orca Inlet and Hinchinbrook Entrance in PWS to sport harvest of Tanner crabs. 1995 surveys indicated that Tanner crab stocks remain depressed with legal males and recruitment declining. (2/12/97, Andrew Hoffmann)

2-DC-6-07-97 Closed described waters of Orca Inlet in PWS to sport harvest of Dungeness crabs. Annual surveys showed continued low levels of abundance for Dungeness crabs in Orca Inlet. (2/12/97, Andrew Hoffmann).

2-KC-6-08-97 Closed described waters of Hinchinbrook Entrance and Orca Inlet in PWS to sport harvest of king crab. Annual surveys showed continued low levels of abundance for Dungeness crab in Orca Inlet. (2/12/97, Andrew Hoffmann).

2-SS-6-37-97 Reduces the daily bag and possession limit for coho salmon in all fresh and marine waters of PWS to one per day and in possession. Only unbaited artificial lures may be used in flowing waters of PWS. The hatchery returns in Valdez Arm, Orca Inlet and Passage Canal are excluded from these restrictions. (8/29/97, Andrew Hoffmann)

2-KC-6-01-98 Closes the described waters of Hinchinbrook Entrance and Orca Bay in PWS to the sport harvest of king crab. King crab stocks in eastern PWS remain depressed. (1/22/98, Andrew Hoffmann)

2-TC-6-02-98 Closes the described waters of Orca Bay and Hinchinbrook Entrance in PWS to the sport harvest of Tanner crab. Department's Tanner crab surveys indicate that PWS stocks of tanner crab remain depressed. (1/22/98, Andrew Hoffmann)

2-SS-6-30-98 Reduced bag and possession limits for coho salmon in all fresh and marine waters of PWS to 1 per day and 1 in possession. Closes all flowing waters north of the Copper River Highway to sport fishing for coho salmon. Restricts all flowing waters of PWS to unbaited artificial lures only. Hatchery enhanced runs not included. (9/9/98, Andrew Hoffmann)

2-SS-6-33-98	Relaxes bag limit restrictions for salmon south of the Copper River Highway to 3 per day and in possession, also closes Clear Creek to all fishing. (9/18/98, Andrew Hoffmann)
2-KC-6-01-99	Closes waters of Orca Bay, Hinchinbrook Entrance, and eastern PWS for sport harvest of king crab effective Jan. 1, 1999. (Andrew Hoffmann)
2-TC-6-02-99	Closes fishing for Tanner crab in Orca, Hinchinbrook Entrance. Effective Jan. 1, 1999 (Andrew Hoffmann)
2-RS-6-13-99	Increase bag limit in Coghill River drainage from 6 to 12 per day effective 12:01 a.m. July 8 through December 31, 1999. (Andrew Hoffmann)