Fishery Management Report No. 01-8

Area Management Report for the Recreational Fisheries of the Prince William Sound Management Area, 2000

by

Matt Miller

and

Barry Stratton

May 2001

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

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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 current major fishery and social issues 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. In 1995, the Central Gulf Coast Management Area was divided into two separate areas.

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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 Cape Suckling (143° 53' W longitude), and east of Cape Pug 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 PWSMA includes the communities of Valdez, Cordova, Whittier and the villages of Chenega and Tatitlek. Until recently, Valdez was the only community in Prince William Sound (PWS) accessible by road. With the opening of the Anton Anderson Memorial Tunnel in 2000, Whittier became accessible via the Alaska Highway System in addition to the railroad services already in operation. The Alaska Marine Highway ferries travelers to Valdez, Whittier, Cordova, and Tatitlek; while Chenega is reachable only by plane or boat. With the exception of some road-accessible streams, virtually all sport fisheries in the PWSMA are remote and relatively difficult to access. Principal land managers in the PWSMA include the U.S. Forest Service; various native corporations; the cities of Valdez, Cordova and Whittier; the Bureau of Land Management; and the State of Alaska.

In the spring of 1999, the PWSMA was added to the Anchorage/Resurrection Bay Management Area. Activities in PWSMA are directed by Fisheries Biologist III Area Management Biologist, Barry Stratton, stationed in Anchorage, and Fisheries Biologist II, Matt Miller, stationed in Cordova (May-September) and Anchorage (October-April). Groundfish research and management (including halibut, rockfishes, lingcod, and sharks) is directed by Fisheries Biologist Scott Meyer, stationed in Homer. Groundfish issues are managed on a larger geographic 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 development of fishing regulations for PWSMA recreational fisheries occurs within the established Alaska Board of Fisheries (BOF) process. 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 assess 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

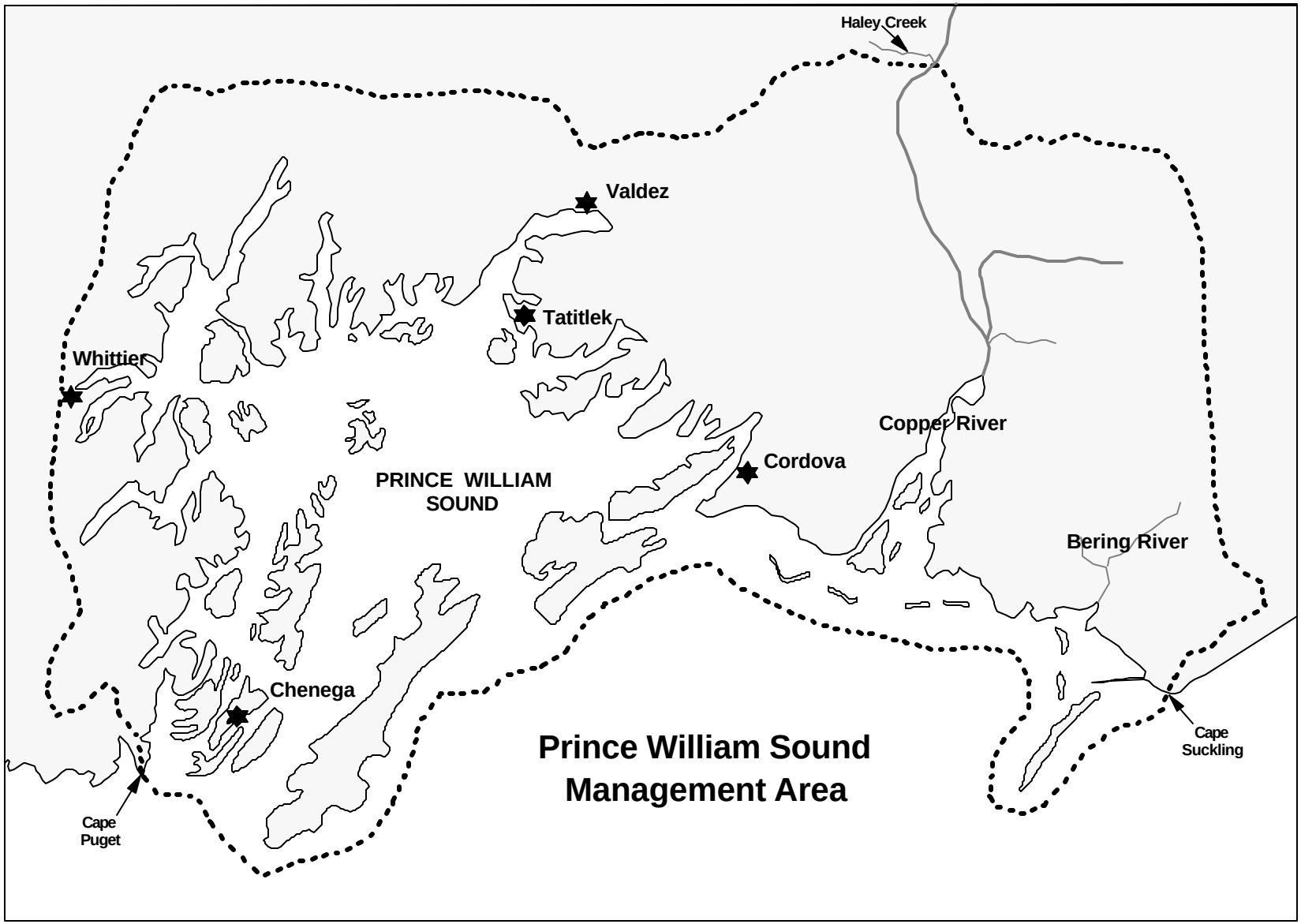

Figure 1.-Map of Prince William Sound Management Area.

1999 Board meetings held in Valdez. The next meeting will be in the fall or spring cycle of 2002-2003. Proposals must be submitted to the Division of Boards 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.

FISHERIES RESOURCE INVENTORY

Sport anglers fishing PWSMA waters target five species of Pacific salmon (coho *Oncorhynchus kisutch*, chinook *O. tshawytscha,* sockeye *O. nerka,* chum *O. keta*, and pink *O. gorbuscha*). 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 a few lakes. An anadromous chinook salmon stocking program has also been developed by state hatcheries to increase opportunities for recreational anglers near Valdez, Cordova and Whittier. In addition, two private non-profit hatchery corporations (Figure 2) release coho salmon to provide sport fishing opportunities. These same corporations also release pink, sockeye and chum salmon. Commercial fishers primarily harvest these enhanced runs of common-property fish. Sport and personal use shellfish fisheries are currently reduced to shrimp *Pandalidae*, and razor *Siliqua patula* and other hard-shelled clams. The Dungeness *Cancer magister,* Tanner *Chinoecetes bairdi,* and king crab *Paralithodes* fisheries are currently closed throughout PWSMA.

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, and cutthroat trout fisheries and stocked lakes provide Level I fisheries near 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]

From 1990 through 1999, recreational anglers fishing PWSMA waters (Table 1 and Figure 3) have expended an average of 111,041 angler-days a year. Recreational angler effort has generally been increasing steadily since 1983. Angler effort in 1996-1998 dropped below the peak estimate of effort in 1995 of 138,194 angler-days.

[1] 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 and 1996, *In prep* a, b, c and d) 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.

The slight decline in angler effort in PWSMA is also seen on a larger scale in the Southcentral region and statewide estimates. The contribution of angler effort in the PWSMA to the total regional and statewide effort is increasing. From 1990-1999, estimated effort for the PWSMA represents approximately 5% and 7% of the total statewide and Southcentral region sport angling effort, respectively (Table 1 and Figure 3). Some discrepancy in the effort data is due to a correction of errors in the estimation process. In 1999, the Division of Sport Fish, Research and Technical Services Unit, discovered nonresponse bias correction factors had not been applied to previous years' data. The factors have been applied and estimates were revised back to, and including, 1996 data. The raw data from 1995 and before were unrecoverable.

The most popular fisheries in PWSMA in terms of recreational angling effort have been in the Valdez area (Table 2 and Figure 4), historically the only road-accessible port in the management area. This demonstrates the influence that road access has on angler participation. Anglers fishing in the Valdez Arm area accounted for nearly 48% of the recreational angling effort expended in PWSMA in 1999. Saltwater boat anglers expended the majority of the angling effort near this port. While information from the Statewide Harvest Survey does not delineate exact locations where anglers were fishing in the marine waters, much of this effort is accounted for by anglers targeting hatchery-enhanced runs of coho and pink salmon returning to Port Valdez. Anglers have been traveling further from ports in recent years. Charter operators from Valdez regularly travel to Hinchinbrook Entrance, the waters of the outside shore of Montague Island, and beyond.

Cordova and Whittier are the next most popular fishing ports in PWSMA. In 1999, anglers fishing from these ports accounted for 16% and 14% respectively of the recreational angling effort expended in PWSMA (Table 2). Recreational anglers accessing PWSMA from Cordova and Whittier participate in fisheries throughout PWSMA. Other popular fisheries in PWSMA include Eshamy, Main Bay, the marine waters near Ester Island, and Coghill River.

COMMERCIAL AND SUBSISTENCE SALMON HARVESTS

Salmon returning to PWSMA are harvested extensively by various commercial fisheries. For nearly all species, commercial harvests are significantly larger than corresponding recreational harvests. In 1999 commercial fishermen reported harvests of 63,500 chinook, 2,000,000 sockeye, 245,000 coho, 45,000,000 pink, and 3,000,000 chum salmon (Sharp et al. 2000). Commercial harvests of halibut, lingcod and rockfish from PWSMA fisheries are also larger than corresponding recreational harvests.

Fish stocks of PWSMA are also harvested in various subsistence fisheries. Harvests in these fisheries are generally small.

STOCKING PROGRAM INVENTORY

Stocking of hatchery-raised fish has increased and diversified the opportunities available to recreational anglers. Five species of salmon, rainbow trout, and Arctic grayling have been stocked in various locations in PWSMA. 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,

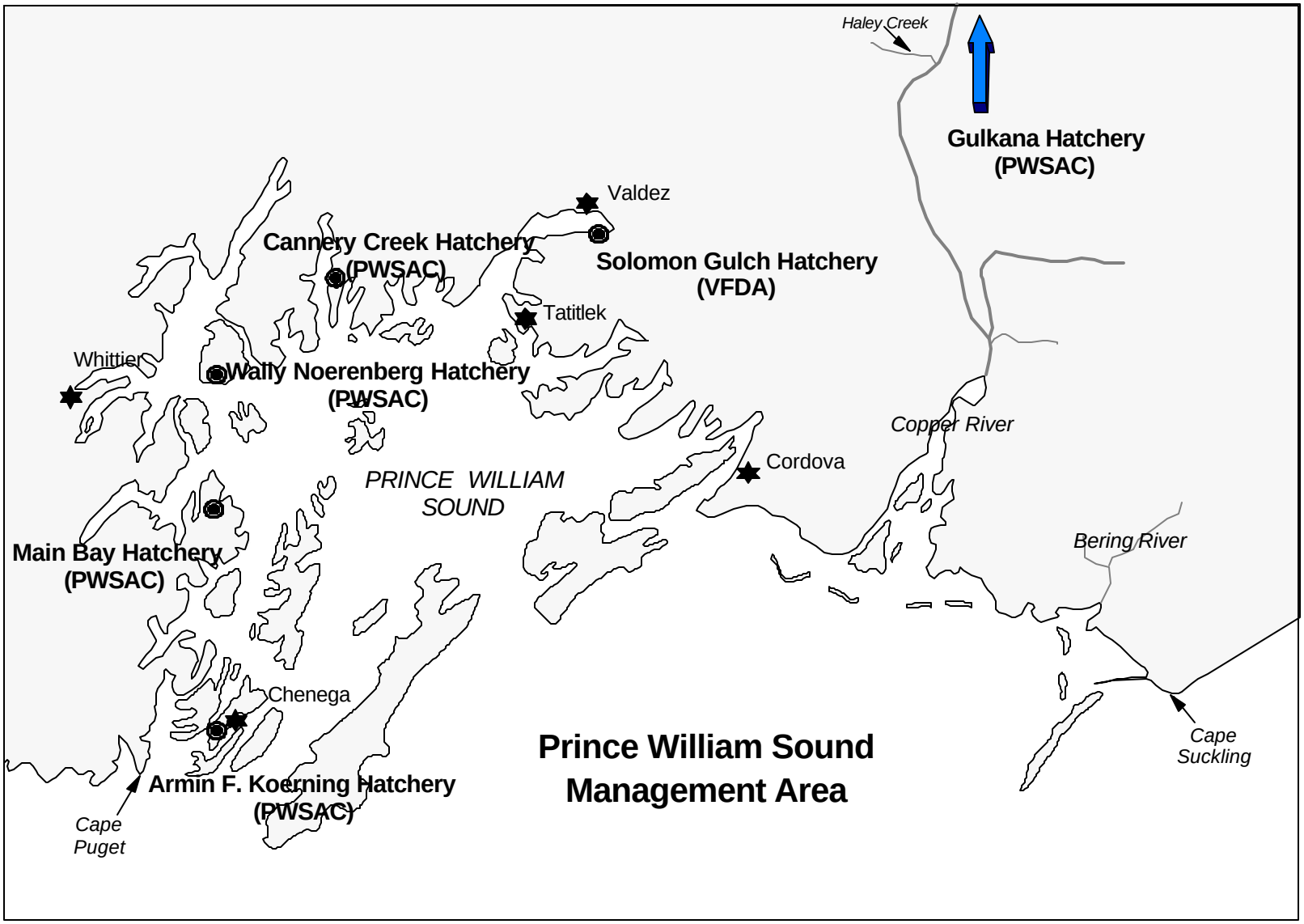

Figure 2.-Map of PWSMA hatcheries.

Table 1.-Number of angler-days of effort expended sport fishing in Prince William Sound Management Area (PWSMA) from 1983-1999

Year	Effort			Percent of Statewide	Percent of Southcentral
	Statewide	Southcentral	PWS	From PWS	From PWS
1983	1,732,528	1,212,916	47,614	3%	4%
1984	1,866,837	1,341,658	57,548	3%	4%
1985	1,943,069	1,406,419	72,662	4%	5%
1986	2,071,412	1,518,712	64,251	3%	4%
1987	2,152,886	1,556,050	81,221	4%	5%
1988	2,311,291	1,679,939	84,971	4%	5%
1989	2,264,079	1,583,547	95,295	4%	6%
1990	2,453,284	1,745,110	105,739	4%	6%
1991	2,456,328	1,782,055	113,062	5%	6%
1992	2,540,374	1,889,930	113,418	4%	6%
1993	2,559,408	1,867,233	104,577	4%	6%
1994	2,719,911	1,966,985	121,944	4%	6%
1995	2,787,670	1,985,539	138,194	5%	7%
1996	2,006,528	1,434,943	97,448	5%	7%
1997	2,079,514	1,400,983	101,079	5%	7%
1998	1,856,976	1,258,782	92,503	5%	7%
1999	2,499,152	1,659,966	122,447	5%	7%
90-99 Avg.	2,395,915	1,699,153	111,041	5%	7%

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

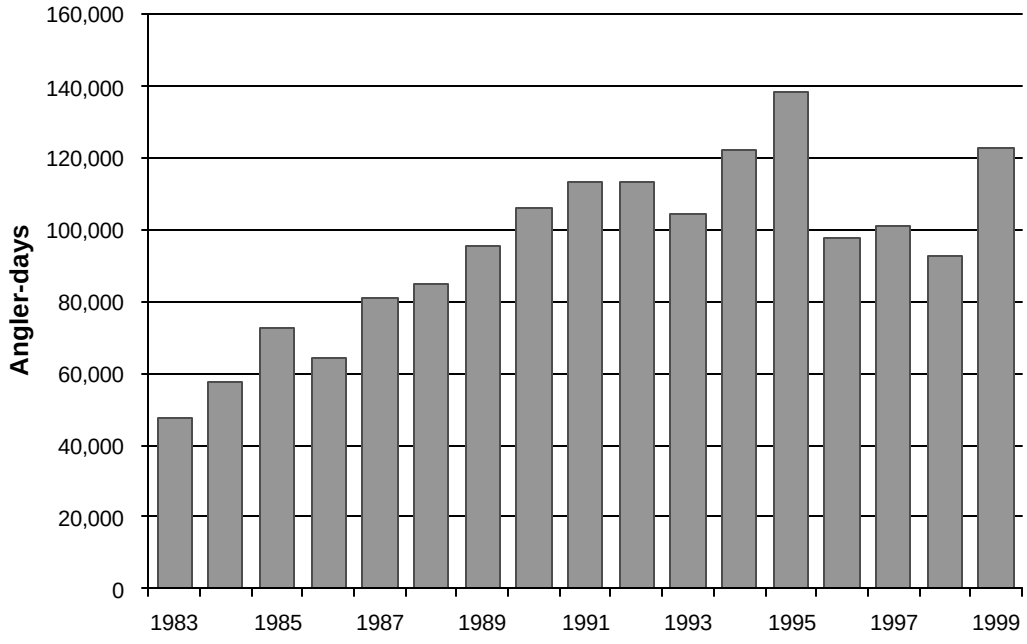

Figure 3.-Relative magnitude of angler effort expended sport fishing in PWSMA, 1983-1999.

Table 2.-Number of angler-days of effort by geographical regions in PWSMA, 1983-1999.

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	2,951	16,456	557	1,905	2,094	13,124	2,676	50,896	6,789	97,448
1997	5,468	13,842	676	2,809	1,789	13,511	3,969	47,516	11,499	101,079
1998	4,307	15,039	455	1,135	864	13,752	4,433	46,571	5,947	92,503
1999	5,810	19,907	682	1,515	2,189	17,265	4,151	59,080	11,848	122,447
MEAN	2,712	12,858	524	1,751	1,637	12,895	3,670	50,911	8,179	94,937

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

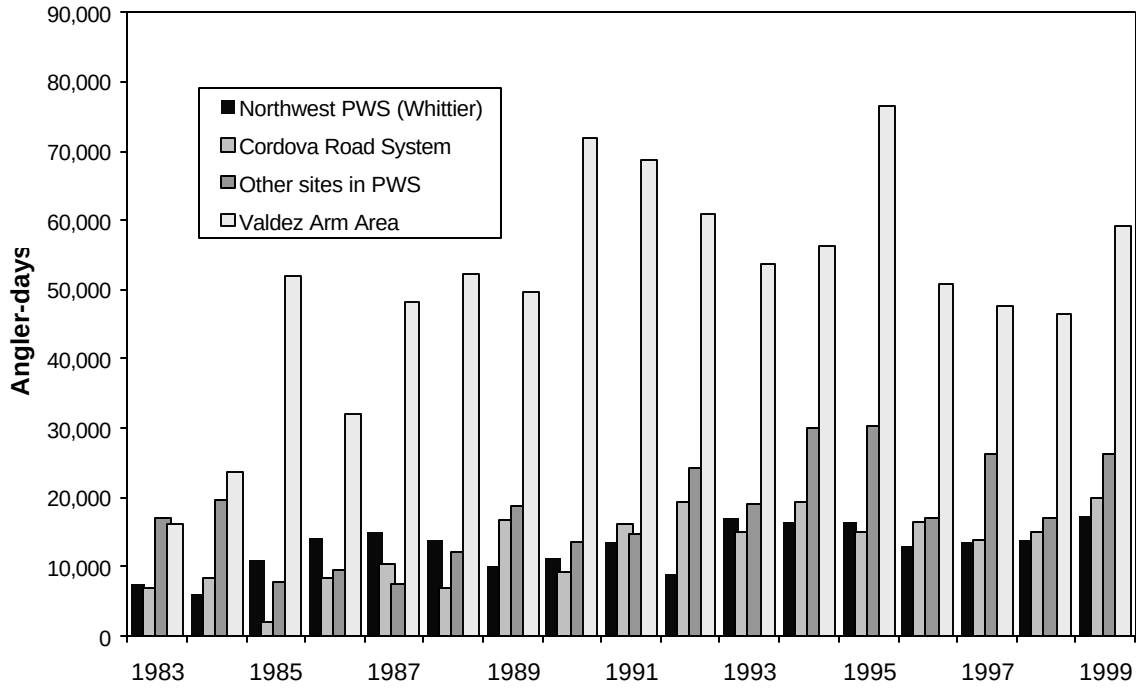

Figure 4.-Major components of angler effort by geographical regions in PWSMA, 1983-1999.

are exclusively harvested by sport anglers. A summary of the stocking efforts in PWSMA is listed in Appendix A.

Those programs directed toward enhancing sport fisheries currently include the stocking of rainbow trout, Arctic 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). The chinook salmon stocking program at PWSAC has been phased out recently with the last releases at Whittier in 1997 and at Cordova in 1998. This program has been continued by the state hatcheries with releases at Valdez, Cordova and Whittier in 1999 and 2000.

Other hatchery-reared salmon releases include pink, chum, and sockeye salmon at various locations throughout PWSMA. Pink salmon are released from three PWSAC hatcheries and one VFDA hatchery. Sockeye salmon are reared in two PWSAC hatcheries and released from several remote sites in PWSMA. Chum salmon are reared in two hatcheries and released from those two hatcheries and one remote location 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 composed of representatives from the regional private nonprofit hatchery corporation (PWSAC), 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.

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 access projects in PWSMA, as of January 2001, are listed below.

Active access projects:

Whittier Boat Launch. The road to Whittier was completed and vehicles, with boats in tow, began moving through the tunnel in June 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. The first year the road was open the study projected that the total number of visitors traveling to Whittier for all purposes

was expected to reach as high as 900,000, or 10 times the number who now visit Whittier. 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 was initiated. The proposed facility would include an entrance road, parking for at least 200 vehicles with trailers, four launch ramp lanes with room for an additional four lanes, boarding floats adjacent to the ramp lanes and the various amenities needed to make a complete facility. By the end of 2000, the preliminary design and environmental assessment of the project were complete. The department is currently pursuing a permit from the Corps of Engineers for proposed dredging. It will be necessary to take soil core samples to assure that the dredging area does not contain petroleum-contaminated material remaining from an oil spill that occurred in the area during the 1964 earthquake. This work should be completed by fall 2001. The department has set aside $1.5 million to build these upland facilities. However, the location at the head of the bay will subject them to severe winds and swells from the east; therefore the design must also include a breakwater. Department funds will build the upland facilities but the City of Whittier must find an additional $2.7 to $5.5 million to build the breakwater. At this time the city is pursuing funding. The upland portion of the project will not be built until funding for the breakwater is secured.

Whittier Fish Cleaning/Bulletin Board Modules. Cleaning tables and a carcass disposal system are needed at Whittier Harbor. In 1998 four cleaning tables were modified for interim use in the Whittier Harbor. These 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 highway to Whittier is expected to increase the waterfront user group by a factor of nine times over the next several years. 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.

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 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.

MAJOR BIOLOGICAL AND SOCIAL ISSUES FOR PWSMA

Following is a summary of the major biological and social issues surrounding 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 completed construction on road access into Whittier by modification of the current railroad tunnel system. In response, the City of Whittier had begun planning for the expansion of the harbor to more than double its capacity. Currently there are approximately 623 people on the waiting list for a slip in the Whittier harbor. The wait time varies from 3½ years for a slip up to 28 ft in length, to 35 years for a 37 ft-45 ft slip (Charlene Arneson, Whittier Harbor Master, personal communication). From the tunnel's opening June 7, 2000 through September, approximately 76,675 vehicles used it to visit Whittier (Gordon Burton, State of Alaska, Department of Transportation, Anchorage, personal communication). Growth in the number of recreational anglers accessing PWSMA fisheries through Whittier is expected to increase steadily in the next several years. This growth has the potential of drastic-ally changing the character of the fisheries in western PWSMA. 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 PWSMA and streams accessible from the Cordova Road system were low in 1997 and 1998. These low returns prompted emergency orders (EOs) (Appendix B3) in both 1997 and 1998 restricting bag limits, eliminating bait in the fresh waters, and in some cases, closing streams adjoining the road system. Regulations were implemented by the BOF in 1999 reducing coho salmon daily bag and possession limits to 3 in marine waters of PWSMA (matching freshwater bag limits) and closing Clear Creek upriver of the Carbon Mountain Bridge to salmon fishing (Appendix B1). Although good returns to most of the systems along the road were recorded in 1999 and 2000, the popularity of these coho fisheries is increasing and the department will continue to monitor returns and angler participation.

Carbon Mountain Road

A 25-mile road from approximately Mile 40 of the Copper River Highway to native corporation holdings 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. Limited construction occurred in 1999 and none in 2000. It is speculated that construction will continue in earnest when depressed timber prices rise.

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 ages 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

Prince William Sound is at the most northern and western extreme of the natural range for cutthroat trout. As a result, cutthroat populations in PWSMA are small and scattered in their distribution. Populations of fish on the outer extremes of their range 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, adding further risk to these small stocks. The department is unsure 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 PWSMA stocks. At the 1999 meeting, the BOF passed into regulation a proposal that created a special management area for trout. This proposal created a catch-and-release fishery with single-hook, unbaited artificial lures for fresh waters in the PWSMA east of the Copper River. This proposal was largely in response to concerns for managing trout in those waters that will be accessible from the proposed Carbon Mountain road easement.

Coghill and Eshamy Lakes Sockeye Salmon Escapement

Historically, Coghill and Eshamy lakes have produced the highest returns of sockeye salmon of any site in PWSMA. These two systems accounted for slightly over 41% of the total PWSMA sport harvest for sockeye in 1983, but decreased drastically to less than 6% by 1990. The escapement goal for Coghill Lake was not met for several years. In 1991, both of these systems were closed to harvest of sockeye salmon by emergency order. 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 an exceptionally strong return in 1999. Sockeye returns to Eshamy Lake have met escapement goals, but fall within the lower part of the range.

SECTION II: MAJOR FISHERIES OVERVIEW

Fishing activities in PWSMA 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 PWSMA, they are divided into eight geographically distinct areas (Figure 5). 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 PWSMA 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 (Figure 6) support the most popular fisheries in PWSMA. In 1983, the Valdez area fisheries accounted for 34% of the total effort expended in PWSMA and by 1999 had increased to 48% of the total effort (Table 2). Because of limited freshwater opportunities, nearly all of the angling effort out of Valdez is spent in the marine fisheries. 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 SWHS.

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.

PORT OF CORDOVA FISHERIES

The waters of the Cordova area (Figure 7) support the most popular freshwater fisheries in PWSMA in terms of angling effort. In 1999 these waters accounted for 16% of the total angling effort expended in the PWSMA (Table 2). Most of the effort in Cordova is expended in fresh-water fisheries. Angler effort increased dramatically in 1989, and has remained strong, although somewhat variable throughout the 1990's. This trend can be largely attributed to the growing popularity of the Fleming Spit coho salmon 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.

PORT OF WHITTIER FISHERIES

In terms of angling effort expended since 1983, the waters of the Whittier area (Figure 8) have historically supported the second most popular fisheries in PWSMA. However, in the last 10 years or so, Whittier has shared this distinction with fisheries in the Cordova area. In 1999 these waters only accounted for 14% of the recreational effort expended in PWSMA (Table 2). Nearly all of the angling effort is expended in marine waters since there are limited opportunities to fish in fresh water. Sport fisheries mainly target salmon and bottomfish such as halibut. In 1999, 17,265 angler-days were

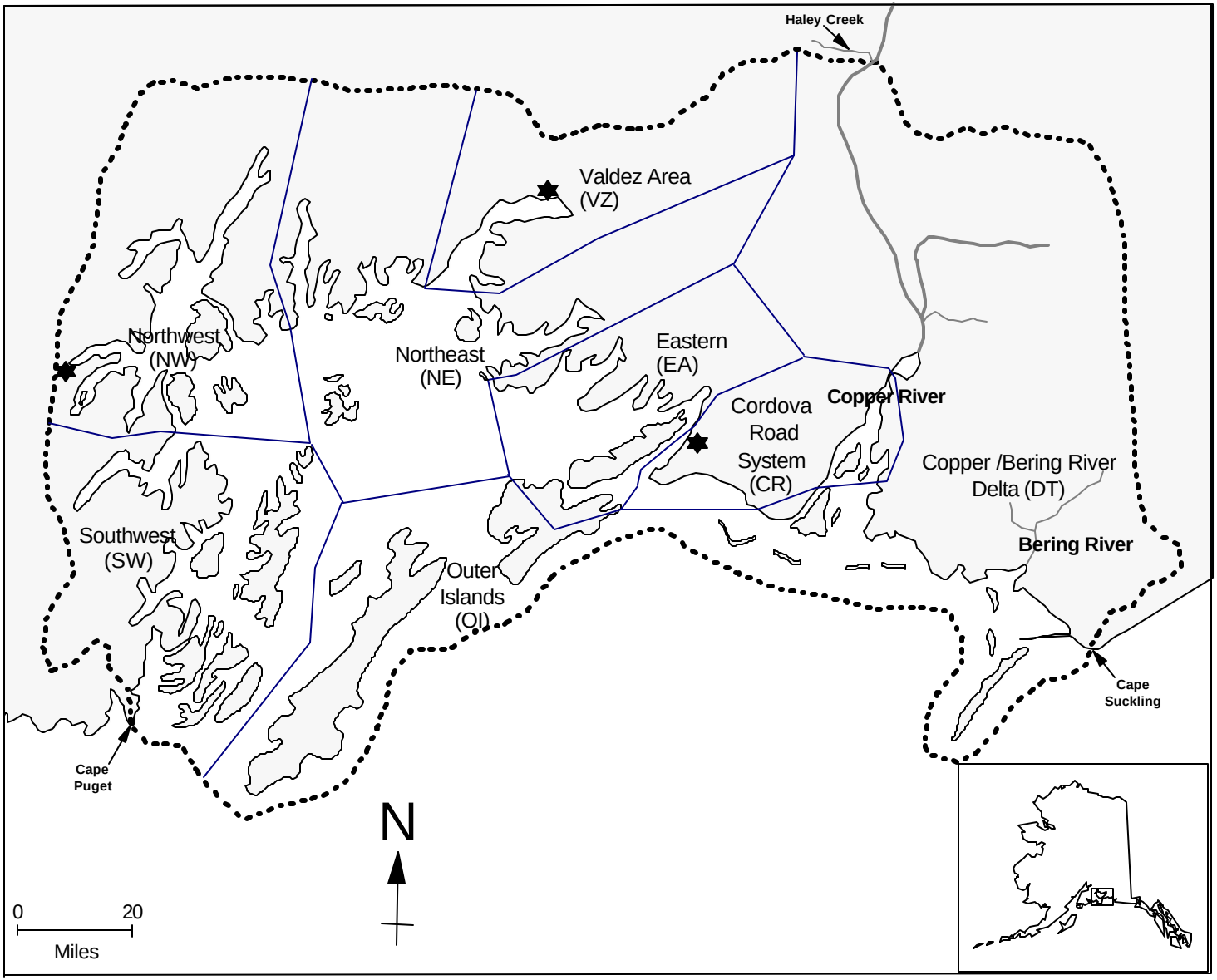

Figure 5.-Map of the geographical regions in PWSMA.

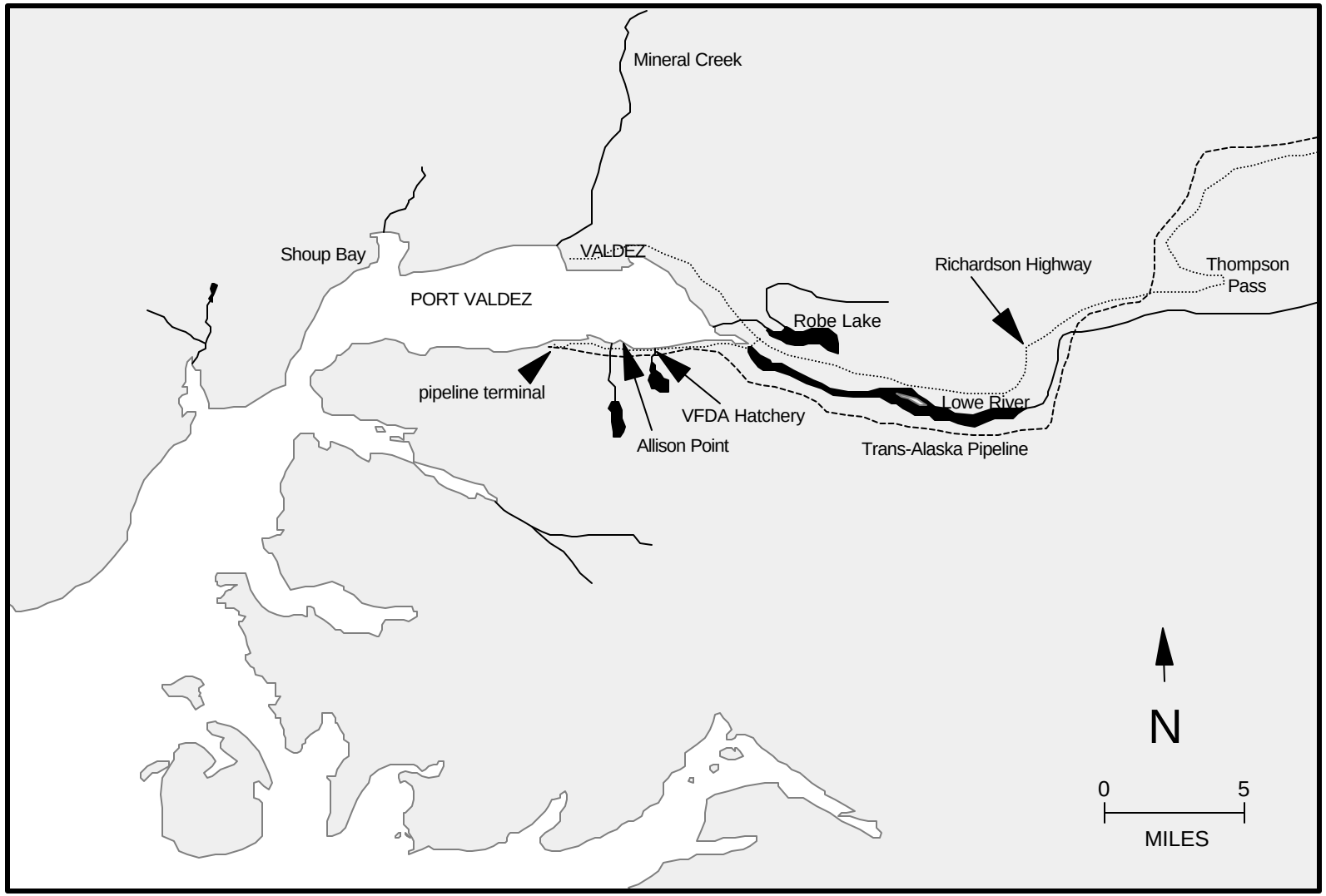

Figure 6.-Map of the Valdez area.

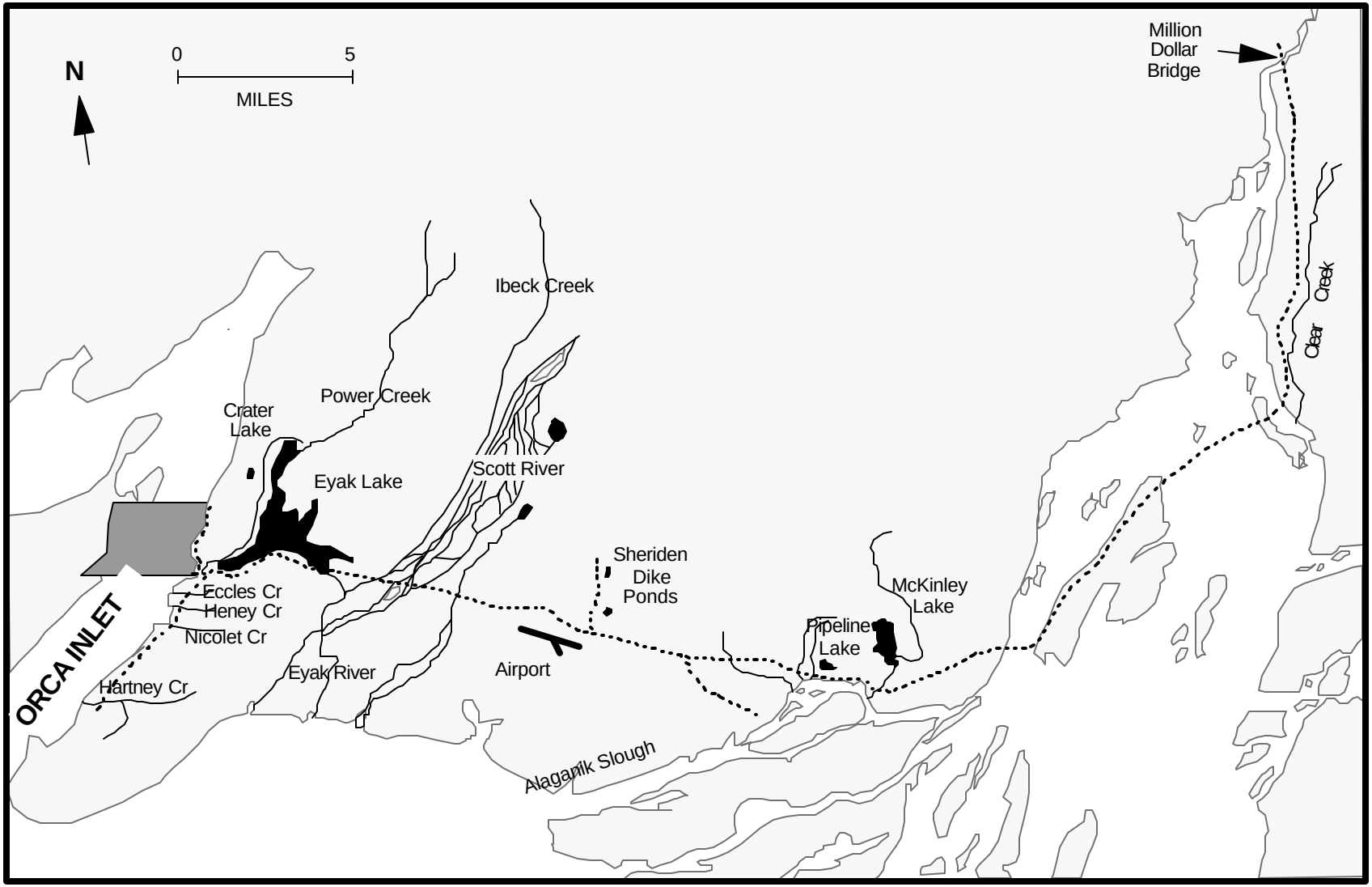

Figure 7.-Map of the Cordova area.

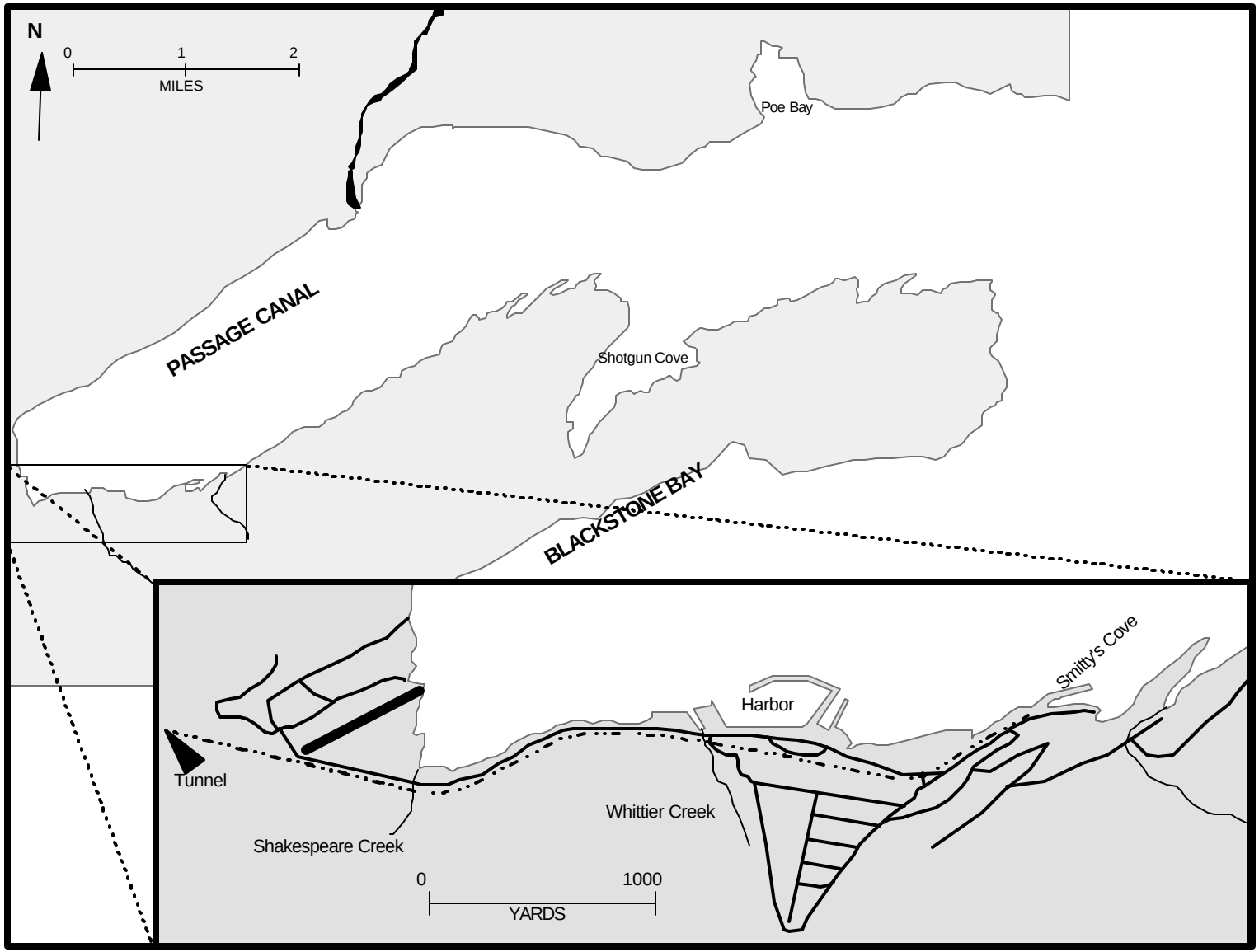

Figure 8.-Map of the Whittier area.

expended in the Whittier area (northwest PWSMA). This represents a significant increase over the mean of 12,895 angler days a year since 1983.

COHO SALMON FISHERY

Recreational coho salmon fisheries in PWSMA are supported by both wild and hatchery fish, although the majority of the harvest is hatchery fish. Coho salmon smolt are released in the waters of Valdez, Cordova, Chenega and Whittier. Returns from these stocking efforts have established major sport fisheries at these 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. New regulations passed at the November 1999 BOF meeting changed the bag and possession limits for coho in marine waters to 3 fish per day and 3 fish in possession to match the existing 3 fish per day and 3 in possession freshwater regulations. The limits remain at 6 per day and 12 in possession in the Terminal Harvest Areas identified around hatchery release sites in Valdez, Cordova, Whittier and Chenega. New regulations also reduced the limit to 1 per day and 1 in possession in Shelter Bay. There are some PWS waters that are closed to coho salmon fishing. These waters include Eccles Creek, Eyak Lake, Clear Creek upriver of the Carbon Mountain Bridge, and Hartney Creek (all near Cordova); all freshwater drainages of Valdez Arm except for a portion of Robe River and Solomon Gulch Creek; and all waters within 300 ft of a weir or fish ladder.

Since 1990, the average annual coho harvest in PWSMA has doubled (Table 3 and Figure 9). This growth in coho harvest can partially be attributed to the success of the hatchery programs developed to increase angler opportunity. The Valdez Arm recreational fishery grew in popularity as documented by a jump in the coho catch from 22,071 in 1994 to 50,907 in 1995. Coho catch estimates have remained above 50,000 for Valdez Arm ever since (Table 3). Another factor is the increased public exposure of PWSMA due to the 1989 *Exxon Valdez* Oil Spill. Many people discovered the relatively untapped resources in PWSMA while working on the clean-up efforts or through media coverage focused on PWSMA. Since catch data were first made available in 1990, the percent of the catch that was harvested has varied from 56% in 1997 to 77% in 1994, for a 10-year average of 67%.

In 1999, 68% of PWSMA coho salmon harvest was from Valdez Arm (Table 3). 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. Recreational coho salmon fishing in Port Valdez largely takes place in salt water from boats and the shoreline near Allison Point since, by regulation, most of the freshwater drainages of Port Valdez are closed to salmon fishing.

Coho fisheries along the Cordova road system are also popular fisheries in PWSMA. Since 1990 anglers fishing this area accounted for an average of 15% of the PWS recreational coho harvest (Table 3, Figure 9). The recreational harvest of coho salmon is composed of both wild and hatchery fish. The wild stock component of the harvest is taken from the tributaries accessible from the Copper River Highway between Eyak River and the Million Dollar Bridge (Figure 7). Eyak River is the most popular fishing location for coho salmon along the Cordova road system, and accounted for 56% of the

Table 3.-Coho salmon catch (1990-1999) and harvest (1983-1999) by geographical regions in PWSMA.

	Cordova Road System		Copper River Delta		Northwest PWS		Valdez Arm Area		Other Sites in PWS		PWS Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983		2,139		52		294		4,710		3,210		10,405
1984		2,506		150		561		5,138		2,008		10,363
1985		564		76		1,725		8,020		1,248		11,633
1986		3,440		244		2,981		6,911		2,522		16,098
1987		2,351		651		2,262		8,884		2,532		16,680
1988		5,311		291		1,600		10,241		1,819		19,262
1989		4,248		207		1,238		18,143		1,795		25,631
1990	6,762	3,900	14	14	3,606	2,200	29,828	18,630	3,715	1,895	43,925	26,639
1991	7,634	4,943	164	68	3,310	2,799	12,761	10,393	2,160	1,580	26,029	19,783
1992	7,256	5,150	1,028	113	777	640	22,705	17,580	3,625	1,776	35,391	25,259
1993	8,313	5,056	138	78	1,846	1,558	14,799	12,841	3,626	2,260	28,722	21,793
1994	8,782	5,933	346	266	2,979	2,317	22,071	18,633	5,484	3,424	39,662	30,573
1995	7,286	4,279	814	39	1,918	943	50,907	37,265	8,572	4,590	69,497	47,116
1996	16,287	8,182	4,244	439	4,616	3,282	66,594	42,822	11,896	5,209	103,637	59,934
1997	9,032	4,575	12,801	302	3,051	1,745	51,429	36,311	12,156	6,212	88,469	49,145
1998	8,567	5,026	139	119	3,994	3,235	55,222	37,088	5,032	2,505	72,954	47,973
1999	14,264	8,763	3,538	577	2,991	2,385	50,045	36,125	10,580	5,239	81,418	53,089
90-'99 Avg.	9,418	5,581	2,323	202	2,909	2,110	37,636	26,769	6,685	3,469	58,970	38,130

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

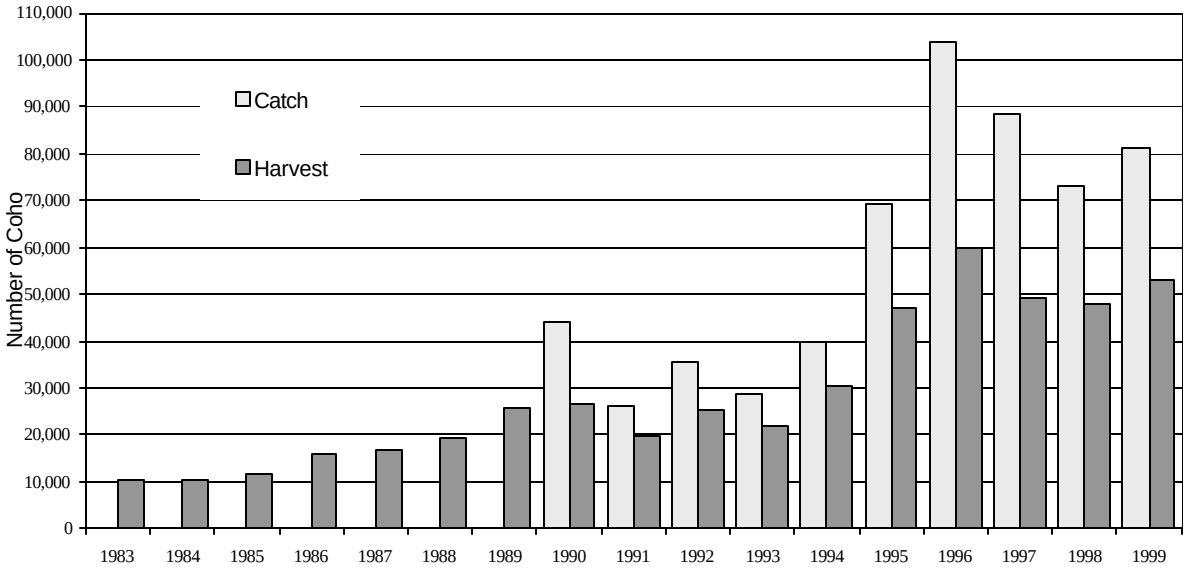

Figure 9.-Coho salmon catch (1990-1999) and harvest (1983-1999) in PWSMA.

Cordova area harvest in 1999 (Table 4 and Figure 10). The next largest coho salmon fishery targets hatchery coho salmon returning to Fleming Spit in Orca Inlet, located near downtown Cordova. Since 1987, when hatchery fish began returning to Fleming Spit, anglers have harvested about 1,600 coho a year.

The Whittier area sport fishery (Northwest PWSMA) for coho salmon depends entirely on returning hatchery fish. The coho salmon smolt release program has produced annual catches that have ranged from 777 to 4,616 adult coho. The harvest has ranged from 294 in 1983 to a maximum estimated harvest of 3,282 in 1996 (Table 3). Since the adult returns have been highly variable, the sport harvest has also fluctuated. 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.

The remainder of the PWSMA harvest of coho salmon comes from sites other than the three major ports (Table 3). These fisheries occur primarily on wild stocks of coho salmon throughout the non-road-accessible areas of PWSMA.

Recent Fishery Performance

The estimated sport harvest of coho salmon from all PWSMA waters during 1999 was 53,089. This is well above the previous 1989-1998 average harvest of 35,385 a year. Valdez Arm once again supported the largest harvest of coho salmon in PWSMA, followed by fisheries in the Cordova road system (Table 3 and Figure 9). Since catch data were made available in 1990, the yearly harvest rates (percent of the catch that was harvested) have ranged from 77% in 1994 to 56% in 1997, for a 10-year average of 67%. The harvest rate in 1999 fell close to that average at 65%. As the PWSMA coho fisheries become more popular and more anglers access PWSMA through Whittier, we can expect to see increased effort and harvest.

Although SWHS data are not yet available for 2000, it appears to have been a strong coho year throughout PWSMA. Extremely good coho returns were reported in many of the southcentral Alaska coho fisheries, such as Cook Inlet and Resurrection Bay. Large numbers of big coho were reported by recreational anglers in PWSMA and were most noticeable in the Valdez fishery where the majority of the harvest takes place. Officials for the Valdez Silver Salmon Derby weighed numerous coho over 18 lb, and the winner came in at over 21 lb. The small, scattered stocks of wild coho are more difficult to summarize, but they also appeared to have benefited from good ocean survival. ADF&G maintained the weir on the Coghill River this fall in order to count coho returns. As of September 29, 2000, an estimated 760 coho had passed the weir. Recreational anglers reported good to excellent catches in August and September in several systems along the Copper River Highway.

Management Objective

For hatchery-produced coho salmon (reared at Wally Noerenberg Hatchery) 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

Table 4.-Coho salmon catch (1990-1999) and harvest (1983-1999) in the Cordova area of PWSMA.

	Alaganik		Clear Creek		Eyak Drainage[a]		Orca Inlet		Other Sites		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
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	1,350	316	105	70	1,884	1,462	2,988	1,883	435	169	6,762	3,900
1991	490	306	415	211	2,486	1,355	4,018	2,989	225	82	7,634	4,943
1992	1,207	729	57	16	4,178	2,996	1,741	1,377	73	32	7,256	5,150
1993	2,255	1,127	736	332	3,854	2,431	931	721	537	445	8,313	5,056
1994	1,128	433	894	568	3,998	3,083	2,025	1,592	737	257	8,782	5,933
1995	224	177	674	375	2,893	1,831	2,830	1,364	665	532	7,286	4,279
1996	4,167	1,480	3,971	1,585	5,265	3,107	2,733	1,982	151	28	16,287	8,182
1997	1,939	789	1,089	391	2,316	1,549	3,355	1,816	333	30	9,032	4,575
1998	659	340	1,523	869	4,880	2,732	1,492	1,072	13	13	8,567	5,026
1999	3,592	1,240	1,264	800	6,806	4,914	2,558	1,809	44	0	14,264	8,763
90-99 Avg.	1,701	694	1,073	522	3,856	2,546	2,467	1,661	321	159	9,418	5,581

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

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

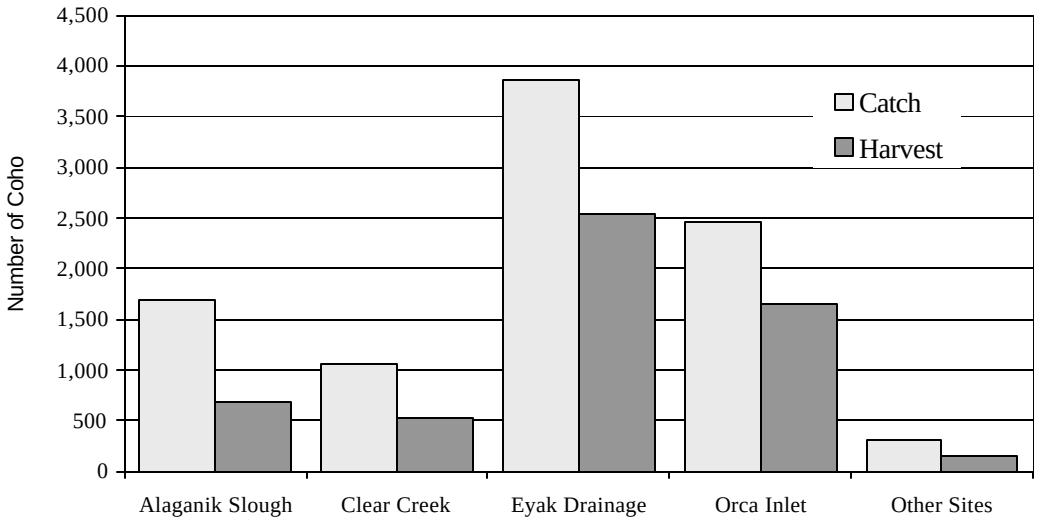

Figure 10.-Coho salmon catch (1990-1999) and harvest (1983-1999) in the Cordova area of PWSMA.

opportunity annually; and (3) promote diverse sport fishing opportunity by providing coho salmon to both boat and shorebased anglers.

For 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 50,000 coho with a range of 32,000-67,000. The range for coho in the Bering drainage is 13,000-33,000.

No specific fishery objectives for the remaining coho salmon fisheries in PWSMA have been established to date. However, the directive for the management of recreational fisheries is to assure the sustained yield of the various wild coho salmon stocks 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 1999 when the Board reduced the bag and possession limits for coho to 3 per day and 3 in possession in all marine waters of PWSMA. In the following Terminal Harvest Areas (where angler effort targets hatchery fish) the bag and possession limits for coho salmon remained at 6 and 12, respectively:

Cordova	-	all marine waters north of a line from Odiak Slough to Stump Point, and south of a line from Orca Cannery to Knot Point.
Whittier	-	all marine waters west of a line from Blackstone Point to Pigot Point (Passage Canal).
Valdez	-	all marine waters north of a line from Potato Point to Entrance Point.
Chenega	-	all marine waters inside the entrance of Sawmill and Crab bays (Evans Island).

New coho regulations that affect specific fisheries include: a reduction of the daily bag and possession limit of coho salmon in Shelter Bay to 1; and a year-round closure of salmon fishing upstream of the Carbon Mountain Bridge on Clear Creek (Mile 42 on the Copper River Highway).

Current Issues

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 communities of Valdez, Cordova and Whittier. The Valdez Chamber of Commerce conducts a silver 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 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

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. In addition to an awareness of increasing effort on these streams are concerns of mortality due to catch-and-release anglers using bait. Sites of particular interest are Eyak River, Elsner Creek and Clear Creek. Although escapement goals continue to be met in these systems, there is some community unease about the increasing effort by recreational anglers.

The department does not feel there are any major conservation issues with the Copper River Delta coho stocks. Although effort and harvest continue to increase, staff believes the necessary tools to manage

these fisheries, including both sport and commercial, on a sustained yield basis exist. Bi-weekly escapement surveys and commercial fishery openings provide data necessary to manage these fisheries. If any of the streams are not meeting minimum escapement guidelines, the department can, and has, responded with appropriate emergency orders.

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.

An increase in "floating lodges" and charter activity has increased pressure on small coho stocks returning to the shorter coastal streams on Hawkins Island and along the shores of Orca Bay and Orca Inlet.

Ongoing Research and Management Activities

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

Effort, catch and harvest estimates of anglers fishing for coho salmon are provided by the Statewide Harvest Survey.

A weir and creel survey has been proposed as a project to be funded with Federal Subsistence funds at Billy's Hole and Shrode Lake. This study would give managers better data on sockeye and coho returns to these systems and demographics data of the user groups. Although the project was recommended for funding after review by the USF&WS Office of Subsistence Management, it was denied funding. It will automatically be reconsidered for 2002.

Recommended Research and Management Activities

A system for monitoring and evaluating the increase in road system fisheries should be implemented. A proposal for a roadside creel survey was submitted for federal funding in 2000, but was rejected. It will be resubmitted in 2001. Increased monitoring of the Orca Bay and Orca Inlet coho salmon fisheries should also be implemented.

CHINOOK SALMON FISHERY

There is very little wild production of chinook salmon in PWSMA, and the sport fishery is supported almost entirely by hatchery-produced fish. Healthy returns of wild chinook return to the Copper River every spring, but very little recreational harvest occurs in the lower Copper River (PWSMA). 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 PWSMA are open to the taking of chinook salmon year-round. In winter 2001, the BOF passed a regulation to standardize the definition of "jacks" for chinook salmon in freshwater statewide. The new definition states that in all freshwaters open to king salmon fishing the bag and possession limit for king salmon less than 20 inches in length is 10 fish. This bag and possession limit is

in addition to any bag and possession limits for king salmon 20 inches or greater in length. King salmon less than 20 inches in length shall not count against any annual or seasonal king salmon harvest limit. King salmon less than 20 inches in length shall not count against any Guideline Harvest Limits or harvest caps established by the Board of Fisheries, except in the Nushagak River drainage. This new definition does not affect chinook salmon in saltwater fisheries. The bag and possession limits in PWSMA marine waters remain at 2 per day and 4 in possession for chinook 16 inches or more, and 6 per day and 12 in possession for chinook less than 16 inches. Closed waters include Eccles Creek, the Eyak Lake drainage, Clear Creek upstream of the Carbon Mountain Bridge, and Hartney Creek, all near Cordova; all freshwater drainages of Valdez Arm except for a portion of Robe River and Solomon Gulch Creek; and all waters within 300 ft of a weir or fish ladder.

The mean harvest of chinook salmon from PWSMA since 1990 is 1,417 (Table 5). The average catch for that 10-year period is 2,119. Since catch rates became available in 1990 the yearly average harvest has ranged from 56% of the catch in 1990 to 83% in 1996, for a 10-year average of 67% (Table 5 and Figure 11). Since 1990, 37% of this harvest has come from Valdez Arm (Table 5). The next largest harvest occurs in Cordova, which accounted for 32% of the historical mean harvest in the last 10 years. The fishery on the Robe River accounts for the majority of the chinook harvest in Valdez Arm. Since 1988 various hatchery programs have supplemented chinook fisheries in the Valdez area. The release of chinook smolt at Anderson Bay (1985) was canceled after only 2 years. In 1991, chinook salmon smolt were 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. Chinook smolt were released from Glacier Creek Pit in Valdez in 1999 and 2000.

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 healthy chinook fishery in Orca Inlet. The average chinook harvest from 1983-1991 was 15 fish a year, and jumped to a 552 fish average harvest for 1992-1999 (Table 5). The stocking program was suspended in 1996 and 1998, but was continued in 1999 and 2000.

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. Since 1983 the estimated harvest has ranged from 0 to 548 chinook salmon (Table 5). 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 PWSMA waters has varied a great deal since 1983. Due largely to hatchery enhanced runs returning to the major ports, low harvest estimates in the 1980s began to grow rapidly after 1990. The mean harvest of chinook salmon for PWSMA from 1990-1999 was 1,417 (Table 5). The average catch for that 10-year period was 2,119. Since catch rates became available in 1990 the yearly average harvest has ranged from 56% of the catch in 1990 to 83% in 1996, for a 10-year average of 67% (Table 5 and Figure 11). Data from the 2000 SWHS are not available at this time, but 2000 appeared to have been an average to good year for recreational anglers targeting chinook salmon.

Table 5.-Chinook salmon catch (1990-1999) and harvest (1983-1999) by geographical regions in PWSMA.

	Cordova Area		Northwest PWS (Whittier)		Valdez Arm Area		Other sites in PWS		PWS Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983		21		0		241		314		576
1984		0		212		125		74		411
1985		0		22		326		0		348
1986		11		22		168		301		502
1987		0		321		360		184		865
1988		9		160		227		47		443
1989		0		199		526		368		1,093
1990	79	34	192	85	367	220	108	79	746	418
1991	191	59	59	59	400	353	6	6	656	477
1992	416	321	609	367	437	317	191	111	1,653	1,116
1993	369	302	585	353	660	405	661	284	2,275	1,344
1994	1,046	764	296	220	483	394	376	346	2,201	1,724
1995	479	303	262	161	378	333	263	180	1,382	977
1996	822	779	470	224	1,055	971	85	53	2,432	2,027
1997	1,133	692	1,047	548	1,787	1,193	453	270	4,420	2,703
1998	606	470	860	444	998	571	212	137	2,676	1,622
1999	1,085	787	454	299	848	421	366	256	2,753	1,763
90-99 Avg.	623	451	483	276	741	518	272	172	2,119	1,417

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

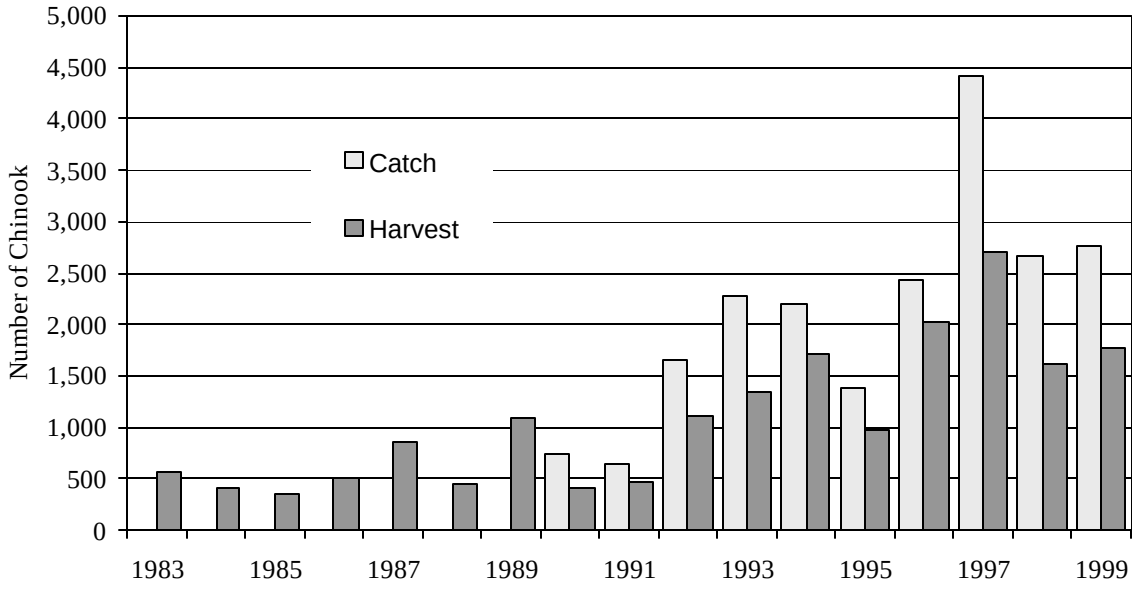

Figure 11.-Chinook salmon catch (1990-1999) and harvest (1983-1999) in PWSMA.

Management Objective

Since 1999 the state hatchery at Fort Richardson has been responsible for stocking chinook salmon in PWSMA (Appendix A3). Previous to that, chinook smolt were reared in the state hatchery at Elmendorf, and PNP hatcheries (Wally Noerenberg and Solomon Gulch). The following specific management goals are stated in the Statewide Stocking Plan for Recreational Fisheries (ADF&G 2000b). 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 PWSMA 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

At the January 2001 meeting in Anchorage, the Board passed a statewide regulation that defined "jack" king salmon in fresh waters as follows:

In all fresh waters open to king salmon fishing the bag and possession limit for king salmon less than 20 inches is 10 fish. This bag and possession limit is in addition to any bag and possession limits for king salmon 20 inches or greater in length. King salmon less than 20 inches in length shall not count against any annual or seasonal king salmon harvest limit. King salmon less than 20 inches in length shall not count against any Guideline Harvest Limits or harvest caps established by the Board of Fisheries, except in the Nushagak River drainage.

Current Issues

The first chinook salmon from the state hatchery system were stocked in 1999. Continuation of this program will be based on the success of this and the next few years of stocking effort. Fishable returns from the stocking program are not expected until 2002; thus it will take 5 to 7 years to determine the success of the program. A priority for 2001 is to work with local organizations to find better chinook smolt release sites in Valdez and Whittier.

Ongoing Research and Management Activities

There are currently no chinook research projects in PWSMA. However, Region III Sport Fish projects in the upper Copper River have studies that include the entire drainage. The Division of Sport Fish placed coded wire tags in wild Copper River stock chinook smolt, and is working with the Commercial Fisheries Division on recovering tags that may show up in the commercial harvest.

Proposals being considered for Federal Subsistence funding include radio tagging adult chinook in the lower Copper River to collect data regarding run timing and distribution, and presence or absence of chinook in tributaries of the Copper River below Haley Creek and above Miles Lake.

Recommended Research and Management Activities

There is currently no research recommended for this fishery.

SOCKEYE SALMON FISHERY

Sockeye salmon return to PWSMA 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 and coho are 6 and 12 fish, respectively. In all freshwater drainages crossed by the Copper River Highway, including Clear Creek (except upstream of the Carbon Mountain Bridge, which is closed to all salmon fishing), 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 PWSMA have occurred at Eshamy, Cordova, Valdez, and Coghill. From 1990 through 1999, the average harvest of sockeye salmon from PWSMA was 6,116 (Table 6 and Figure 12). Since 1990, the average harvest of sockeye salmon from non-road-accessible areas has been 2,972 fish. Since catch data became available in 1990, the estimated yearly catch has ranged from 5,795 sockeye in 1991 to the peak of 16,891 in 1999. This represents an increase in the PWSMA sockeye fisheries of 163% over 10 years. 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; Coghill sockeye also showed a very strong return in 1999.

The jump in the sockeye fisheries in 1992 was largely the result of a 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 operated instead in the vicinity of Golden Lagoon, away from Coghill, and recreational 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 in 1993 due to continued concerns over Coghill stock interception.

Recent Fishery Performance

The sport harvest of sockeye salmon from PWSMA during 1999 (10,666) was 102% above the 1990-1997 mean harvest (Table 6 and Figure 12). The harvest of sockeye from non-road-accessible areas (Eshamy, Coghill and "Other") represented 52% of the total PWSMA harvest in 1999 (Table 7 and Figure 13). In 1999, catch and harvest numbers at Coghill were well over the previous 9-year average (1990-1998), while Eshamy numbers were a little below. Catch and harvest in streams defined as "Other" grew substantially in 1998 and 1999.

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. Good numbers of sockeye continued to return to Coghill and escapement goals have been met since 1995. 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.

Table 6.-Sockeye salmon catch (1990-1999) and harvest (1983-1999) by geographical regions in PWSMA.

	Cordova Road system		Northwest PWS		Valdez Area		Other Sites in PWS		PWS Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983		1,082		932		343		2,767		5,124
1984		112		660		811		2,494		4,077
1985		130		759		1,085		934		2,908
1986		321		2,890		413		1,254		4,878
1987		507		1,884		1,756		742		4,889
1988		600		728		1,582		1,873		4,783
1989		661		1,172		881		1,225		3,939
1990	708	466	1,213	533	2,823	1,630	1,672	933	6,416	3,562
1991	2,050	806	871	444	1,746	1,471	1,128	1,033	5,795	3,754
1992	3,641	1,578	2,752	1,947	2,506	2,153	3,757	2,680	12,656	8,358
1993	2,204	1,321	1,505	1,152	1,706	1,235	2,210	1,561	7,625	5,269
1994	6,101	3,066	1,707	601	4,159	2,368	1,334	913	13,301	6,948
1995	2,472	590	1,365	739	1,791	1,358	2,169	1,024	7,797	3,711
1996	5,076	2,235	2,295	1,246	2,600	1,367	2,087	648	12,058	5,496
1997	2,265	972	3,039	1,374	1,669	1,077	3,681	1,663	10,654	5,086
1998	5,600	2,015	4,311	2,328	1,595	566	4,972	3,403	16,478	8,312
1999	5,541	2,855	4,366	2,942	3,510	2,220	3,474	2,649	16,891	10,666
90-99 Avg.	3,566	1,590	2,342	1,331	2,411	1,545	2,648	1,651	10,967	6,116

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

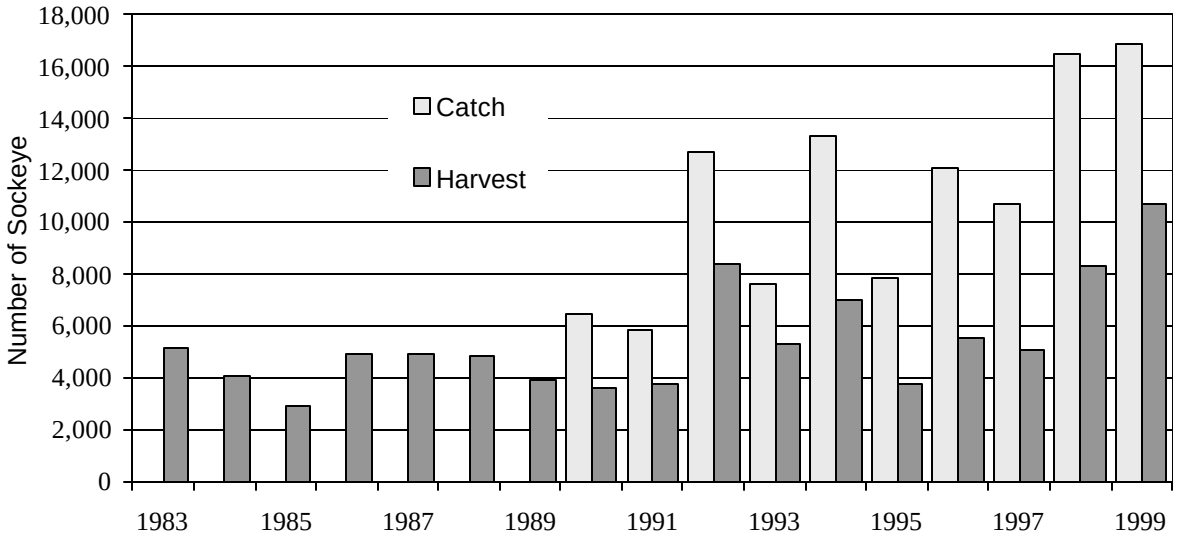

Figure 12.-Sockeye salmon catch (1990-1999) and harvest (1983-1999) PWSMA.

Table 7.-Sockeye salmon catch (1990-1999) and harvest (1983-1999) for selected sites in PWSMA.

	Coghill Drainage		Eshamy Drainage		Valdez Area		Cordova Road System		Other Sites in PWS		PWS Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983		781		1,315		343		1,082		1,603		5,124
1984		249		1,048		811		112		1,832		4,052
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		1,648		3,886
1990	165	49	340	175	2,823	1,630	708	466	2,380	1,242	6,416	3,562
1991	9	0	247	152	1,746	1,471	2,050	806	1,743	1,325	5,795	3,754
1992	66	0	1,019	649	2,506	2,153	3,641	1,578	5,424	3,978	12,656	8,358
1993	114	79	793	581	1,706	1,235	2,204	1,321	2,808	2,053	7,625	5,269
1994	19	19	189	148	4,159	2,368	6,101	3,066	2,833	1,338	13,301	6,939
1995	606	62	735	350	1,791	1,358	2,472	590	2,193	1,306	7,797	3,666
1996	1,411	631	834	206	2,600	1,367	5,076	2,235	2,137	1,015	12,058	5,454
1997	1,731	788	510	310	1,669	1,077	2,265	972	4,479	1,939	10,654	5,086
1998	1,518	349	561	276	1,595	566	5,600	2,015	7,204	5,106	16,478	8,312
1999	1,739	752	443	248	3,510	2,220	5,541	2,855	5,658	4,591	16,891	10,666
90-99 Avg.	738	273	567	310	2,411	1,545	3,566	1,590	3,686	2,389	10,967	6,107

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

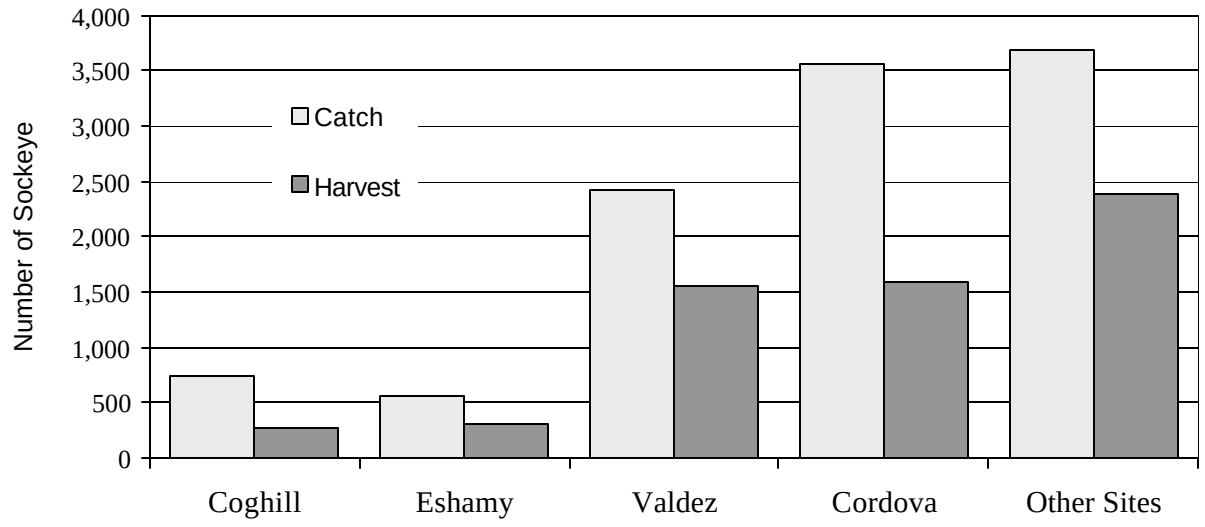

Figure 13.-Sockeye salmon catch (1990-1999) and harvest (1983-1999) for selected sites in PWSMA.

Due to low early returns, emergency orders were issued to close sport fishing in Eshamy in 1992, 1994 and 1995. Escapement in Eshamy Creek was not met in 1995, 1996, 1999 or 2000. No weir was in place in 1997 or 1998, and the weir was put in late in 1999. Releases of sockeye smolt reared from eggs collected outside of the Eshamy system affected returns from 1993 through 1997. The enhanced runs returning to Eshamy Lake shifted the run timing from mid August to late September. In addition, many of the returning hatchery sockeye stayed in the lagoon rather than spawning in Eshamy Lake and so didn't contribute to the spawning escapement.

SWHS data for 2000 are not available yet, but sockeye runs seemed to have been average to good. Main Bay Hatchery had a fair return this summer. Concerns for brood stock prompted the issuance of emergency orders prohibiting sport fishing within 100 ft of the holding pen to coincide with commercial fisheries closures in that same area. Closures only affected an area in front of the brood pen at the head of Main Bay designated as the Alternating Gear Zone (AGZ). PWSAC was concerned that there would not be enough sockeye available for brood stock and that the loss of fish due to damage from snag wounds could be significant. The EO resulted in a substantial drop in the number of damaged fish PWSAC had to cull from the available brood stock.

Eshamy and Coghill, both considered recovery fisheries, had good returns in 2000. Eshamy had a strong start with the early run of sockeye, but finished with a total of 22,653 sockeye past the weir as opposed to the projected 37,930. Coghill was close to the projected 31,647 salmon with 28,416 sockeye estimated past the weir. Returns to the streams along the Copper River Highway were good and early Eyak River sockeye provided anglers with fishing opportunities in late May.

Management Objective

For sockeye salmon returning to Eshamy and Coghill lakes, the management objective is to meet the biological escapement goals with a range of 30,000-40,000 for Eshamy, and 20,000-30,000 for Coghill (Fried 1994), while providing at least 2,000 angler-days of effort annually at each location.

No other specific fishery objectives have been formally established for PWSMA 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 PWSMA 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 1999 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

The Division of Commercial Fisheries conducts an extensive research and management program.

A weir and creel survey was proposed as a project to be funded with Federal Subsistence funds at Billy's Hole and Shrode Lake. This study would give managers better data concerning sockeye and coho returns to these systems and demographics data of the user groups. Although the project was recommended for funding after review by the USF&WS Office of Subsistence Management, it was denied funding. It will automatically be reconsidered for 2002.

Recommended Research and Management Activities

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

PINK SALMON FISHERY

There are over 200 streams in PWSMA that support wild returns of pink salmon. In addition, there are four PNP hatcheries that produce pink salmon. Pink salmon return to PWSMA 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 and coho 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, Clear Creek upstream of the Carbon Mountain Bridge, 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 PWSMA has been the largest in the state since 1985 (Howe et al. 1995). From 1990 through 1999, the average annual sport harvest of pink salmon in PWSMA was 39,538 fish (Table 8, Figure 14). Over 90% of this harvest was from the marine fishery in Valdez Arm (Table 8, Figure 14), and shorebased anglers accounted for 63% of that harvest (Table 9, Figure 15). 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 1 million to nearly 14 million in 1994. The returning pink salmon are harvested by recreational and commercial fishers and utilized for cost recovery at the Solomon Gulch Hatchery. Other significant fisheries for pink salmon in PWSMA occur in non-road-accessible areas and in Passage Canal outside of Whittier.

Recent Fishery Performance

The number of pink salmon that returned to PWSMA in 1999 was much larger than the 32 million fish forecast (Sharp et al. 2000). The sport harvest of pink salmon from PWSMA waters in 1999 (33,993) was an average harvest for the last 5 years. However, the sport catch of 132,858 pink salmon was the highest recorded since catch data were first reported from the SWHS in 1990 (Table 8). In 1999 the commercial pink salmon fisheries hit a record high harvest of 45 million fish. The 2000 SWHS data are not available at this time but 2000 seems to have been another good year for anglers targeting pink salmon. Reports of good pink salmon catches came from anglers fishing out of Valdez, Whittier, and Cordova.

Management Objective

The stocking of pink salmon in PWSMA 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

Table 8.-Pink salmon catch (1990-1999) and harvest (1983-1999) for selected sites in PWSMA.

	Cordova Road System		Northwest PWS (Whittier)		Valdez Arm Area		Other Sites in PWS		PWS Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983		0		2,413		8,696		3,587		14,696
1984		149		1,422		9,825		3,092		14,488
1985		55		1,975		28,450		2,190		32,670
1986		412		1,620		22,170		1,070		25,272
1987		641		2,699		27,071		971		31,382
1988		364		2,729		26,776		1,601		31,470
1989		627		1,681		32,922		2,764		37,994
1990	476	162	3,414	1,033	98,847	46,730	4,273	1,221	107,010	49,146
1991	6,291	747	4,473	1,647	74,583	48,618	5,949	1,278	91,296	52,290
1992	970	37	2,482	1,025	48,987	28,596	5,697	2,353	58,136	32,011
1993	1,707	433	3,627	775	58,540	32,479	9,208	2,048	73,082	35,735
1994	1,396	487	4,535	1,335	74,235	46,494	9,783	3,222	89,949	51,538
1995	4,837	444	4,164	921	94,887	41,963	17,237	3,616	121,125	46,944
1996	2,484	413	4,848	1,070	82,259	27,996	15,130	1,573	104,721	31,052
1997	2,133	837	8,475	979	67,269	22,132	12,601	2,489	90,478	26,437
1998	8,267	1,916	6,419	1,101	71,558	31,933	10,214	1,281	96,458	36,231
1999	4,342	624	10,464	1,047	97,133	29,407	20,919	2,915	132,858	33,993
90-99 Avg.	3,290	610	5,290	1,093	76,830	35,635	11,101	2,200	96,511	39,538

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

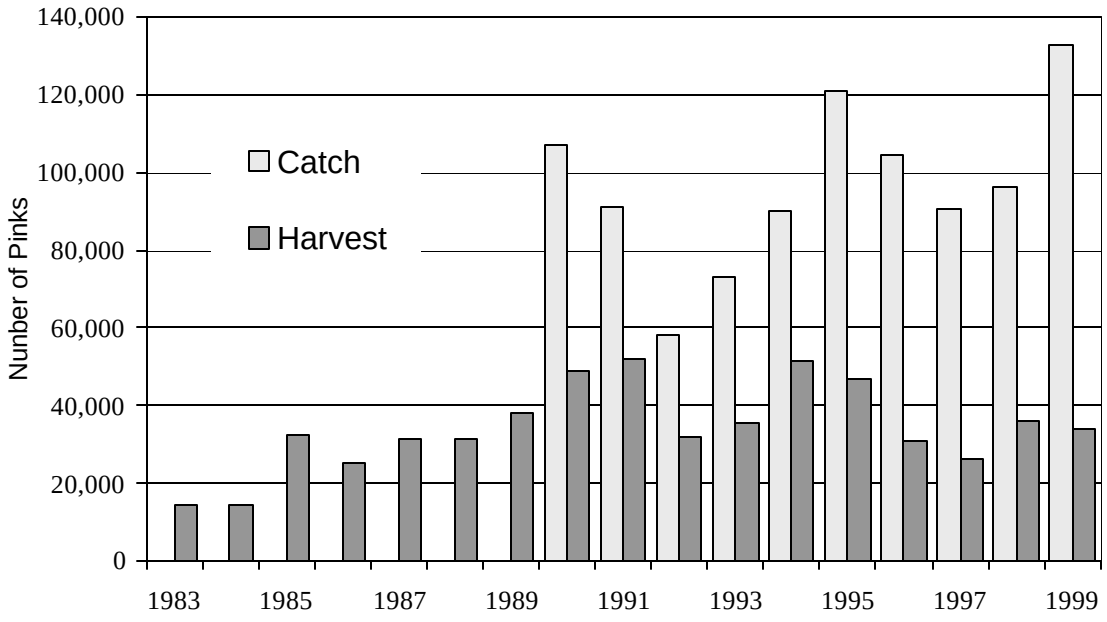

Figure 14.-Pink salmon catch (1990-1999) and harvest (1983-1999) in PWSMA.

Table 9.-Pink salmon catch (1990-1999) and harvest (1983-1999) in the Valdez Arm area of PWS.

	Boat		Shore		Stream		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
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	32,345	18,077	66,502	28,653	0	0	98,847	46,730
1991	24,993	16,128	49,482	32,481	108	9	74,583	48,618
1992	25,372	14,518	23,514	14,069	101	9	48,987	28,596
1993	23,633	13,417	34,849	19,062	58	0	58,540	32,479
1994	24,632	15,822	49,275	30,604	328	68	74,235	46,494
1995	32,699	15,332	61,976	26,631	212	0	94,887	41,963
1996	28,079	8,011	53,434	19,954	746	31	82,259	27,996
1997	15,685	6,346	51,553	15,775	31	11	67,269	22,132
1998	28,562	11,674	42,086	20,259	910	0	71,558	31,933
1999	39,672	11,502	57,293	17,905	168	0	97,133	29,407
90-99 Avg.	27,567	13,083	48,996	22,539	266	13	76,830	35,635

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

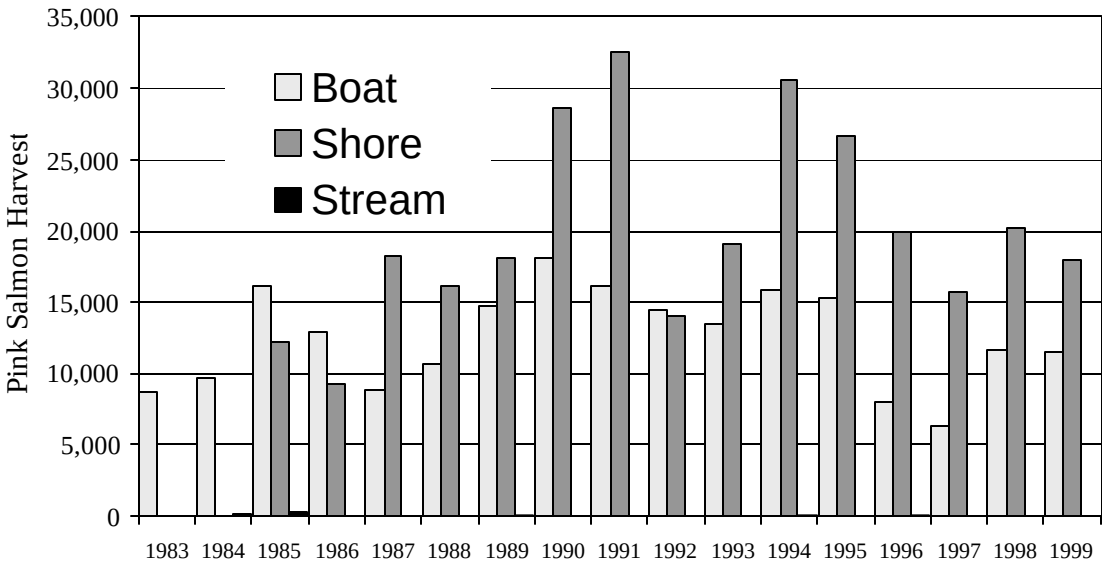

Figure 15.-Pink salmon catch (1990-1999) and harvest (1983-1999) in the Valdez Arm area of PWS.

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 PWSMA 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 1999 meeting.

Current Issues

The large commercial harvest (an annual average of 25 million pink salmon harvested from 1990-1998) drives the management of the PWSMA pink salmon sport fishery (Sharp et al. 2000). 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 Division of Sport Fish and Commercial Fisheries Division 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 commercial and sport fishing groups; but these strategies have been effective since 1993 in maintaining an orderly fishery.

Ongoing Research and Management Activities

The Division of Sport Fish does not currently conduct any research on pink salmon stocks in PWSMA; however, the Division of Commercial Fisheries conducts extensive research programs in PWSMA. 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.

CHUM SALMON FISHERY

Chum salmon have not historically been targeted by recreational anglers in the PWSMA, but some have been taken incidentally to other salmon species. In recent years chum salmon returning to Wally Noerenberg hatchery on Esther Island have been targeted. An average of 1,724 chum salmon were harvested annually by sport anglers from PWSMA waters from 1990 through 1999 (Table 10 and Figure 16). Since 1990, an average of 54% of the chum harvest in PWSMA occurred in the Valdez Arm area (Table 10). Although the chum harvest has remained relatively stable since 1990, from a low

of 964 in 1992 to a peak harvest of 2,593 in 1997; the annual catch rates have varied widely from 3,118 chum in 1991 to 15,376 in 1996. This trend is probably related to the natural cycle of the chum returns and general availability of the fish. The 1999 estimates of 7,212 caught and 1,330 chum harvested fall within the ranges for 1990-1998.

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. This typically occurs from mid-June through September. Spawning begins in April and lasts into June.

The daily bag and possession limits for PWSMA 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.

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.

A Board of Fisheries action in 1994 established a spawning season closure in all marine and fresh waters of the PWSMA from April 15 through June 14.

The annual harvest of cutthroat trout since 1990 has ranged from 122 to 1,015 fish, with a 10-year average of 614 (Table 11 and Figure 17). The catch during that same period varied from 632 to 4,641 fish. The annual harvest rate (percent of caught fish that are harvested) has remained fairly steady at an average of 25%, and reflects the catch-and-release nature of the cutthroat fisheries in PWSMA. There are three major harvest areas for cutthroat trout in PWSMA: Eshamy drainage, Eyak drainage, and other Cordova road-accessible streams. These areas accounted for 7%, 11%, and 39%, respectively, of the 1990-1999 average annual harvest.

Recent Fishery Performance

The sport harvest of cutthroat trout in PWSMA for 1999 of 449 was 29% below the 1990-1998 mean harvest for the area of 633 (Table 11). The catch and harvest of cutthroat trout throughout PWS have varied greatly in the last 10 years. There appears to be a growth in the catch until 1993, followed by a decline, building to another peak in 1997 (Figure 17). However, fluctuations in the fisheries and low response rates to the SWHS make it difficult to identify trends in these cutthroat trout fisheries.

Management Objective

No specific fishery objectives have been formally established for PWSMA cutthroat trout fisheries to date. An underlying assumption of past and current fisheries management, however, has been to assure the sustained yield of the various cutthroat trout stocks that occur within PWSMA and aid in the recovery of stocks impacted by the *Exxon Valdez* oil spill.

Table 10.-Chum salmon catch (1990-1999) and harvest (1983-1999) by geographical regions in PWSMA.

	Cordova and Eastern PWS		Northwest PWS		Valdez Area		Other Sites in PWS		PWS Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983		84		31		976		262		1,353
1984		0		49		1,397		461		1,907
1985		0		228		1,400		0		1,628
1986		46		749		1,865		198		2,858
1987		0		359		1,525		10		1,894
1988		290		1,818		4,201		928		7,237
1989		64		257		2,736		578		3,635
1990	102	45	510	236	4,136	1,258	940	406	5,688	1,945
1991	989	507	474	229	1,401	838	254	48	3,118	1,622
1992	851	46	220	91	2,621	804	153	23	3,845	964
1993	736	216	1,732	686	2,686	873	651	243	5,805	2,018
1994	646	141	1,273	202	1,747	767	1,468	217	5,134	1,327
1995	1,652	185	1,967	234	3,708	653	579	40	7,906	1,112
1996	4,395	165	1,952	576	7,983	1,043	1,046	296	15,376	2,080
1997	3,252	668	1,351	290	4,522	1,388	2034	247	11,159	2,593
1998	2,141	122	2,166	543	6,230	1,424	567	159	11,104	2,248
1999	1,376	492	1,591	255	3,244	338	1,001	245	7,212	1,330
90-99 Avg.	1,614	259	1,324	334	3,828	939	869	192	7,635	1,724

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

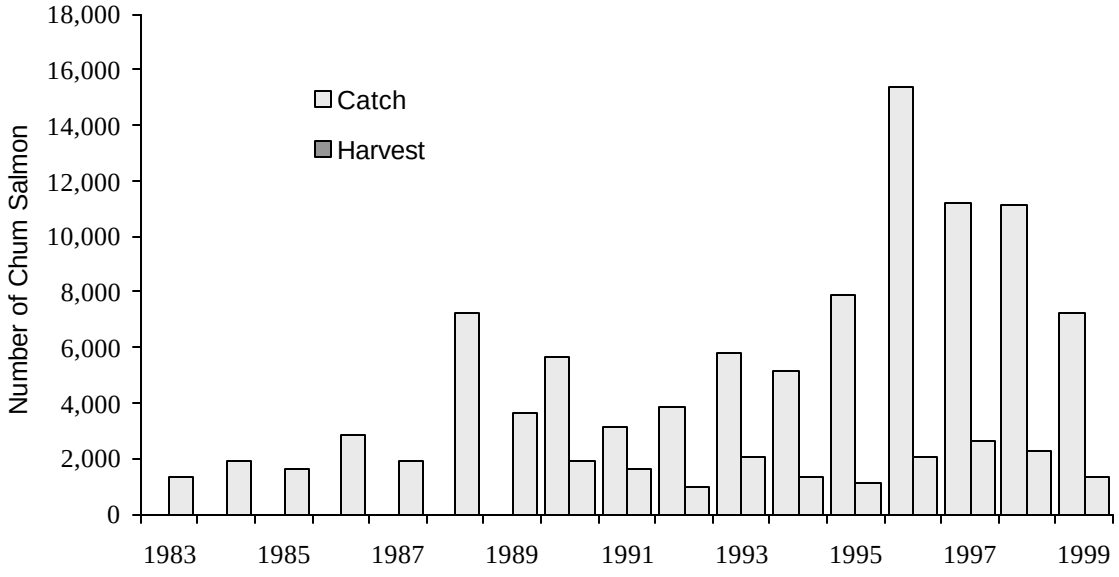

Figure 16.-Chum salmon catch (1990-1999) and harvest (1983-1999) in PWSMA.

Table 11.-Cutthroat trout catch (1990-1999) and harvest (1983-1999) for selected sites in PWSMA.

	Eyak Drainage		Other Cordova Sites		Eshamy Drainage		Other PWS Areas		PWS Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
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		145		219		146		619
1989		300		553		39		619		1,511
1990	245	164	490	147	131	33	605	179	1,471	523
1991	155	68	87	48	290	213	648	87	1,180	416
1992	477	73	852	559	412	0	1,310	383	3,051	1,015
1993	308	75	1,437	335	392	11	2,504	519	4,641	940
1994	297	154	1,323	289	63	0	328	169	2,011	612
1995	36	27	157	61	307	34	132	0	632	122
1996	79	12	953	413	884	49	855	233	2,771	707
1997	83	16	1,205	236	894	81	1,933	309	4,115	642
1998	50	33	571	108	308	17	2,350	559	3,279	717
1999	172	65	287	179	0	0	773	205	1,232	449
90-99 Avg	190	69	736	238	368	44	1,144	264	2,438	614

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

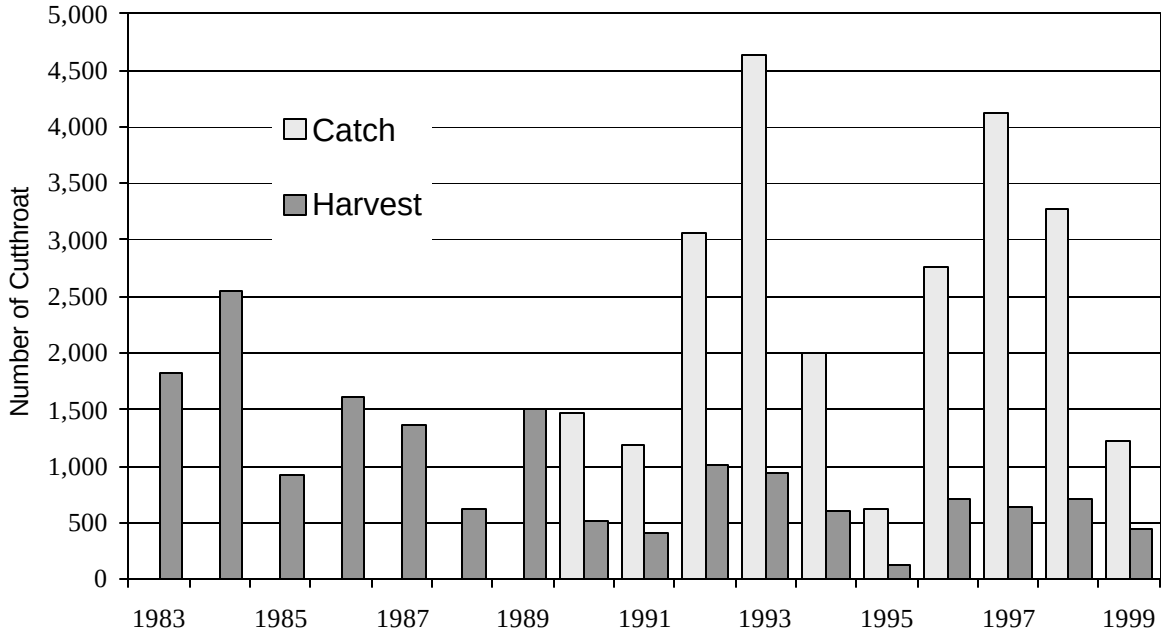

Figure 17.-Cutthroat trout catch (1990-1999) and harvest (1983-1999) in PWSMA.

Recent Board of Fisheries Actions

In November 1999 the Board created the Copper River Special Management Area for Trout. This area designated all fresh waters south of Miles Glacier, east of the Copper River (excluding the Clear Creek drainage) and west of Cape Suckling as catch and release, only unbaited, single-hook, artificial lures year-round waters.

Current Issues

PWSMA is the most northern and western extreme of the natural range for cutthroat trout. These are small, scattered populations. 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. 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 PWSMA stocks and maintain the sustainability of the present small harvest.

Information collected by the Natural Resource Damage Assessment program following the *Exxon Valdez* oil spill documented injury to cutthroat trout in western PWSMA (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 non-oiled areas of eastern PWSMA. 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

In anticipation of the Carbon Mountain road being built through the Special Trout Management Area, the Copper River Trout Project was started in 2000 and has been funded through 2001. The goal of this study is to collect baseline length, sex and age distribution data on the trout populations of the Martin River drainage and other systems whose trout populations would be accessible by the new road.

Project objectives were not met in 2000 due largely to budget restrictions and logistical challenges. What was gained this season was a more detailed map of trout presence/absence in the Delta, a test of our sampling methods, and a greater appreciation of the size and challenges of the area to be sampled. In order to meet the stated objectives it will take a dedicated crew (two techs) and a reliable means of getting to the sampling areas several times a week. The USFS Cordova Ranger District was very helpful in 2000 in providing airboat access to the Delta for three of the sampling trips, and showing where they had observed cutthroat in the past. While it is important to continue to work with USFS on this project, a more rigorous sampling schedule needs to be instituted in order to meet the project's objectives. Additional funding has been approved to hire two technicians to collect data in the Special Management Area for Trout, but an airboat is necessary to access the study area on a regular sampling schedule in 2001.

Recommended Research and Management Activities

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 PWSMA cutthroat trout restoration management plan. The merit of these projects was recognized; however neither project was funded. Both projects were submitted again in the spring of 2000, and were once again denied funding. The value of these studies in understanding our managing cutthroat trout in PWSMA still exists.

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 marine waters of PWS. The average annual sport harvest of halibut from PWSMA waters from 1990 through 1999 was 21,210 halibut (Table 12 and Figure 18). During this period, catch and harvest rates have increased dramatically. In 1983 the estimated halibut harvest in PWS was 3,493 halibut. The harvest has grown to 27,600 halibut in 1999 (Table 12 and Figure 18). This steady increase in halibut harvest indicates an average growth of 17% a year for PWS.

The sport catch and harvest of halibut from the PWSMA during 1999 was the second highest on record (Table 12 and Figure 18). As in the past, the majority of the PWS halibut harvest (41%) in 1999 was from anglers fishing out of Valdez (Table 12). From 1990 through 1999, anglers returning to Valdez have harvested an average of 8,418 halibut every year. Seward-based chartered anglers also account for a significant harvest, although most of this harvest is reported in Seward.

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 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.

Table 12.-Halibut catch (1990-1999) and harvest (1983-1999) by geographical regions in PWSMA.

	Outer Islands		Cordova Area		Valdez Arm Area		Other Sites in PWS		PWS Total	
YEAR	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983		0		0		1,846		1,647		3,493
1984		0		237		1,322		2,869		4,428
1985		0		33		3,310		1,184		4,527
1986		91		596		3,669		3,975		8,331
1987		78		253		2,185		1,863		4,379
1988		649		963		4,599		3,634		9,845
1989		540		809		4,231		3,117		8,697
1990	2,239	1,075	769	486	10,837	6,045	5,052	3,245	18,897	10,851
1991	1,940	1,227	2,581	1,463	8,120	6,122	5,128	3,921	17,769	12,733
1992	2,840	1,553	3,450	2,305	12,973	8,379	8,248	5,618	27,511	17,855
1993	6,128	2,727	3,807	2,165	14,664	8,457	11,537	6,367	36,136	19,716
1994	5,800	3,239	4,213	2,488	10,910	7,457	14,898	10,303	35,821	23,487
1995	7,227	3,410	6,126	2,627	12,968	9,087	16,925	9,647	43,246	24,771
1996	5,239	2,599	7,165	3,176	14,227	8,029	13,818	8,526	40,449	22,330
1997	10,924	5,572	4,955	2,636	17,168	9,918	18,172	10,330	51,219	28,456
1998	5,008	2,805	5,785	3,310	15,961	9,337	14,943	8,849	41,697	24,301
1999	6,098	3,290	6,864	3,339	20,792	11,348	14,335	9,623	48,089	27,600
90-99 Avg.	5,344	2,750	4,572	2,400	13,862	8,418	12,306	7,643	36,083	21,210

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

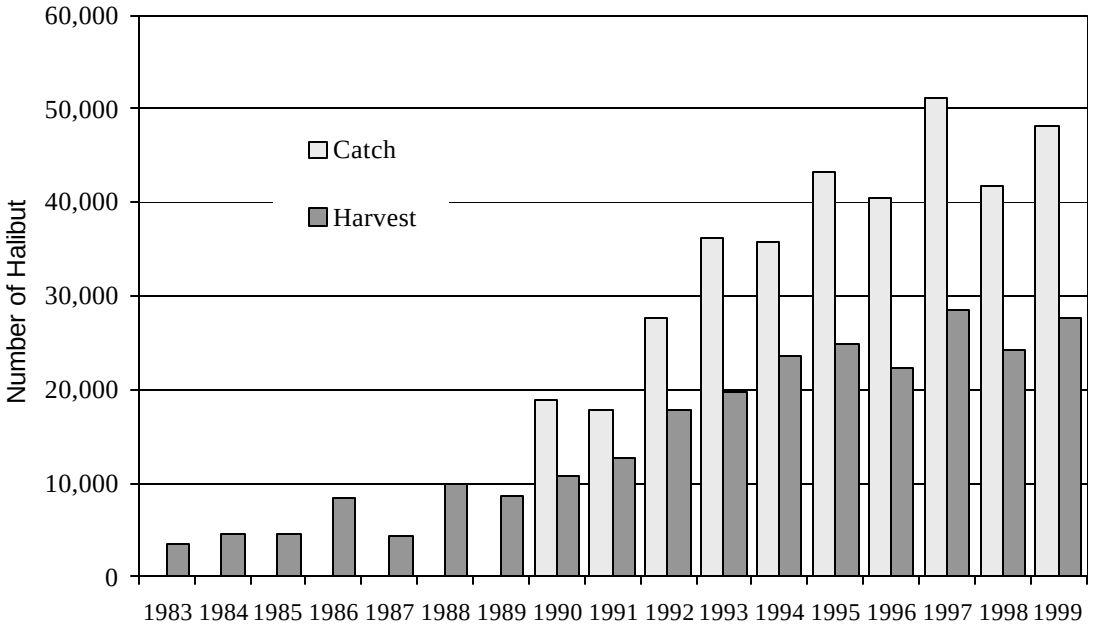

Figure 18.-Halibut catch (1990-1999) and harvest (1983-1999) in PWSMA.

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 foreseeable future.

ROCKFISH FISHERY

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 and pelagic 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 PWSMA are 5 per day and 10 in possession (only 2 per day and

2 in possession may be non-pelagic) from May 1 through September 15, and 10 per day and 10 in possession (only 2 per day and 2 in possession may be non-pelagic) from September 16 through April 30. Also, the first two non-pelagic rockfish that are removed from the water must be retained as part of the bag limit of the person originally hooking them.

The average annual sport harvest of rockfish from PWSMA waters from 1990 through 1999 was 13,785 fish (Table 13, Figure 19). Waters fished in PWSMA 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 1999 (12,996) was just below the 10-year average (Table 13 and Figure 19). 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 1999, the Board mandated that year-round, only 2 rockfish per day and 2 in possession may be non-pelagic. In addition, the first two non-pelagic 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.

A proposal passed by the BOF out of cycle in the January 2001 meeting established definitions of "pelagic rockfishes" and "non-pelagic rockfishes" in statewide sport fishing regulations as follows:

> 5 AAC 75.995. Definitions.
>
> "Pelagic rockfishes" includes dusky *Sebastes ciliatus*, widow *S. entomelas*, yellowtail *S. flavidus*, black *S. melanops*, and blue *S. mystinus* rockfish.
>
> "Non-pelagic rockfishes" includes all other rockfish species in the genus *Sebastes*.

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 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 recommends continuation of the current research program.

Table 13.-Rockfish catch (1990-1999) and harvest (1983-1999) by geographical regions in PWSMA.

	Cordova Area		Northwest PWS		Valdez Area		Other Sites in PWS		PWS Total	
YEAR	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983		0		1,112		3,703		1,699		6,514
1984		37		836		4,402		2,718		7,993
1985		380		1,974		6,304		195		8,853
1986		145		1,810		6,366		1,441		9,762
1987		0		1,971		3,175		1,417		6,563
1988		169		2,371		6,983		3,188		12,711
1989		270		2,374		7,072		3,203		12,919
1990	213	136	2,758	1,398	10,390	4,350	5,059	2,273	18,420	8,157
1991	1,866	477	3,356	2,497	5,223	3,979	2,752	1,780	13,197	8,733
1992	1,129	879	3,439	1,483	10,099	7,625	7,454	5,491	22,121	15,478
1993	643	335	3,707	2,158	7,852	4,894	6,752	4,887	18,954	12,274
1994	2,050	1,215	4,546	3,158	9,184	5,725	9,526	5,284	25,306	15,382
1995	1,241	644	4,527	2,379	9,383	6,359	9,113	5,319	24,264	14,701
1996	2,107	1,713	5,732	2,598	6,194	3,600	6,916	4,464	20,949	12,375
1997	2,202	1,048	4,326	2,909	6,423	4,385	11,923	7,061	24,874	15,403
1998	1,758	950	3,638	2,318	8,898	4,293	8,753	5,890	23,047	13,451
1999	2,241	1,467	4,867	3,370	7,146	4,110	6,539	4,049	20,793	12,996
90-99 Avg.	1,910	1,164	4,618	2,715	7,609	4,549	8,649	5,357	22,785	13,785

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

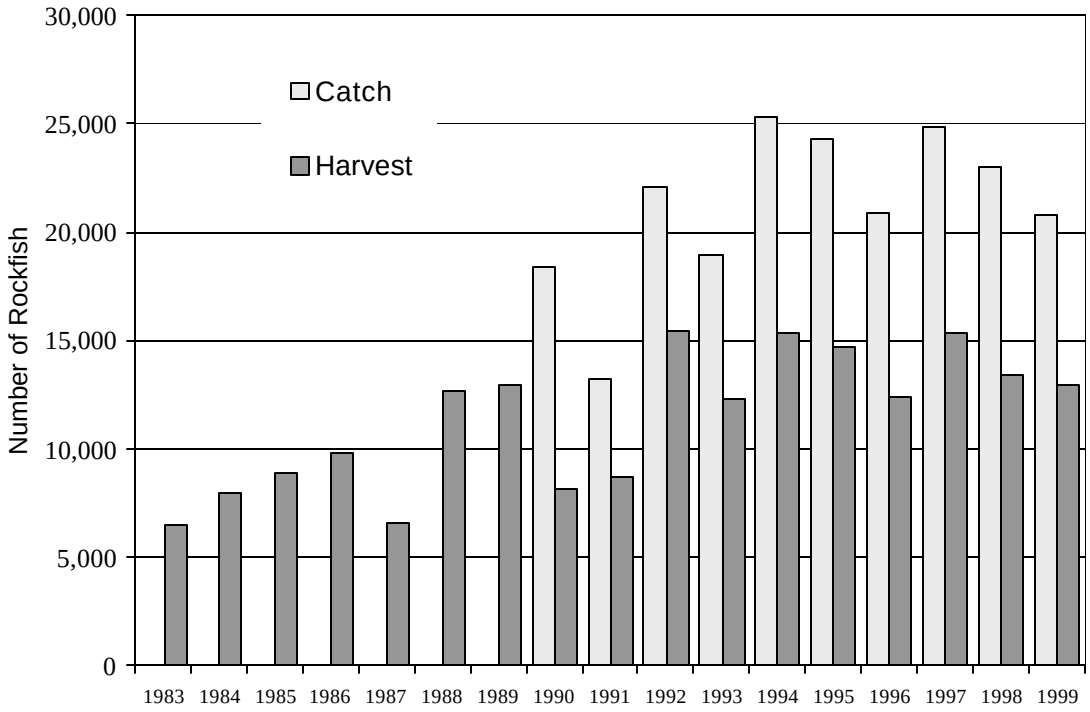

Figure 19.-Rockfish catch (1990-1999) and harvest (1983-1999) in PWSMA.

LINGCOD FISHERY

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 two main entrances of PWS. Catch and harvest estimates for lingcod were not available from the Statewide Harvest Survey data until 1991. Since then the average annual harvest for the PWSMA recreational lingcod fishery has been 2,259 fish. The 1999 estimate of 7,039 lingcod caught was 15% above the 1991-1999 mean, however the harvest estimate of 1,913 was 15% below the historical average (Table 14 and Figure 20).

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.

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. The information collected will be useful in formulating management objectives that provide for sustained yield. Managers recommend continuation of this sampling program.

Table 14.-Lingcod catch and harvest by geographical regions in PWSMA, 1991-1999.

	Outer Islands		Northwest PWS		Valdez Arm Area		Other sites in PWS		PWS Total	
Year[a]	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1991	259	142	345	274	2,006	1,122	998	441	3,608	1,979
1992	1,148	337	522	252	3,903	1,476	3,024	510	8,597	2,575
1993	606	343	505	150	4,016	1,117	1,740	398	6,867	2,008
1994	799	383	500	303	1,286	287	1,910	685	4,495	1,658
1995	826	304	660	243	1,997	1,028	1,771	741	5,254	2,316
1996	840	311	1,514	423	2,151	691	1,224	610	5,729	2,035
1997	1,864	993	958	564	2,269	904	2,813	1,127	7,904	3,588
1998	948	332	602	307	2,427	825	1,731	796	5,708	2,260
1999	676	228	1,375	333	2,453	1,002	2,535	350	7,039	1,913
91-99 Avg.	885	375	776	317	2,501	939	1,972	629	6,133	2,259

From: Mills 1992-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

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

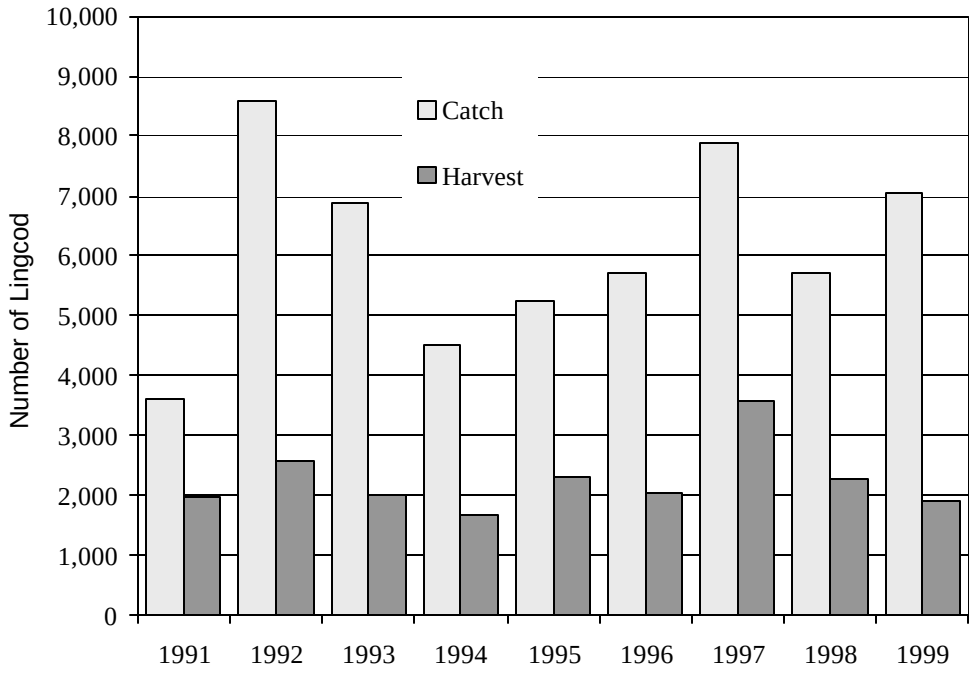

Figure 20.-Lingcod catch and harvest in PWSMA, 1991-1999.

SHARK FISHERY

The shark fisheries in PWSMA 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, and Whittier target salmon sharks in the waters of the PWSMA. Charter operators from Seward also target salmon sharks in the marine waters of PWSMA. In addition, a small number of unguided anglers target sharks, primarily around Cordova. Most sharks caught in the recreational fishery are released. The 1999 estimated catch of 216 sharks and 72 harvested is well above the 1995-1998 annual average of 111 caught and 14 harvested (Howe et al. 1996, *In prep* a, b, c, and d). These catch and harvest data only account for sharks caught by anglers returning to ports in PWSMA, not Seward.

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 PWSMA, 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 1999 and 2000, research on PWSMA salmon shark populations was conducted by ADF&G, the National Marine Fisheries Service (NMFS) and Virginia Institute of Marine Sciences (VIMS). It is hoped that these projects 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.

DOLLY VARDEN FISHERY

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 PWSMA are open year-round to Dolly Varden fishing. The daily bag and possession limits for PWSMA are 10 Dolly Varden with no size limit.

The most recent BOF action in this fishery occurred at the 1991 Board meeting where the PWSMA 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.

Within PWSMA, significant fisheries for Dolly Varden include Valdez Arm area and the Cordova roadside streams (Table 15, Figure 21). 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 1990-1999 harvest in the Valdez area has averaged 1,077 Dolly Varden with an average catch of 2,688. This indicates a harvest rate (percent of fish caught that are harvested) of 40%. Along the Cordova road system the Eyak River drainage has supported the largest Dolly Varden fishery. There are also very popular fisheries at Power Creek, and Clear Creek. The 1990-1999 average harvest for waters of the Cordova area is 650 with a mean catch of 3,421. This calculates to a harvest rate of only 19% reflecting the catch and release nature of this fishery.

Recent Fishery Performance

After a large increase in Dolly Varden catch and harvest in 1996, both indicators have been on the decline. Estimates for 1999 show that catch and harvest estimates in all areas of the PWSMA (with the exception of the catch in the Cordova area) were below the 1990-1999 average.

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

No proposals were presented for this fishery at the 1994, 1997 or 1999 BOF meetings.

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 averaged 1,077 fish for the last 10 years (Table 15 and Figure 21). However, since catch data were not available from the SWHS before 1990, it is impossible to correlate decreased harvests to lower catch rates. Rather than reflecting declining populations, lower harvests could indicate changes in angler attitudes towards Dolly Varden. Some species, such as rainbow trout, are often considered by recreational anglers as too valuable a resource to harvest, and declining Dolly Varden harvests could be a result of a growing appreciation by anglers for this char species. 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

Table 15.-Dolly Varden catch (1990-1999) and harvest (1983-1999) by geographical regions in PWSMA.

	Cordova Area		Northwest PWS		Valdez Area		Other Sites in PWS		PWS Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983		2,632		293		976		796	0	4,697
1984		1,245		299		9,566		597	0	11,707
1985		714		69		4,803		918	0	6,504
1986		902		688		5,077		552	0	7,219
1987		1,268		1,593		1,049		688	0	4,598
1988		1,309		73		983		254	0	2,619
1989		1,888		388		1,141		919	0	4,336
1990	4,891	670	1,015	262	3,452	1,341	2,060	425	11,418	2,698
1991	3,072	997	216	40	1,576	1,441	1,105	876	5,969	3,354
1992	3,752	1,138	228	89	5,923	1,622	1,302	533	11,205	3,382
1993	3,044	586	856	213	4,077	1,801	1,462	556	9,439	3,156
1994	4,216	611	943	108	1,190	404	1,337	260	7,686	1,383
1995	1,474	330	0	0	1,363	506	1,201	412	4,038	1,248
1996	3,663	789	97	60	4,512	1,941	4,303	1,058	12,575	3,848
1997	3,356	481	859	138	1,410	663	6,054	885	11,679	2,167
1998	3,163	605	667	321	1,236	517	2,617	289	7,683	1,732
1999	3,579	297	45	11	2,136	534	1,285	311	7,045	1,153
90-99 Avg.	3,421	650	493	124	2,688	1,077	2,273	561	8,874	2,412

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

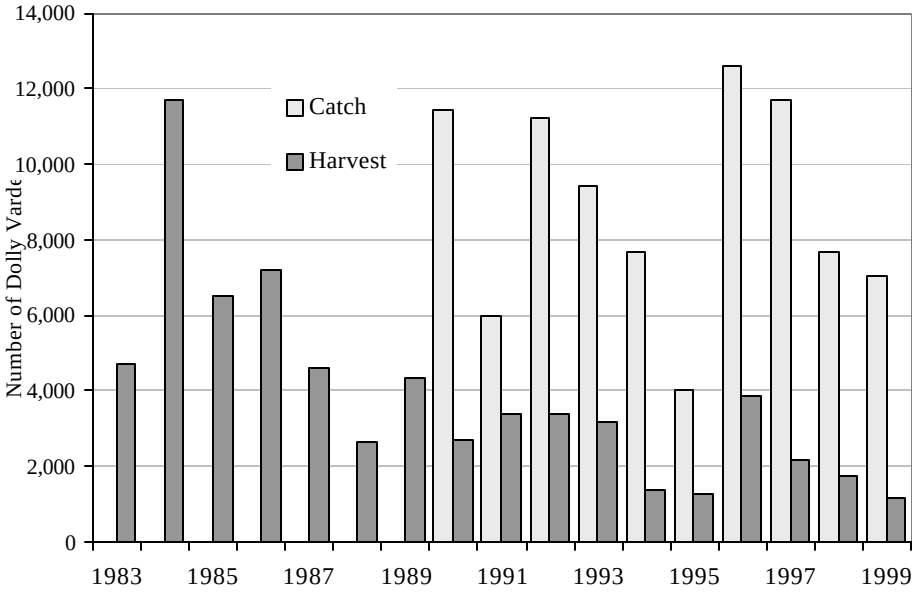

Figure 21.-Dolly Varden catch (1990-1999) and harvest (1983-1999) in PWSMA.

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 1998.

Another area possibly affecting PWSMA Dolly Varden stocks is the hydroelectric project on Power Creek near Cordova. 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.

CLAMS AND SHELLFISH

Limited fisheries occur for shellfish in the PWSMA. Crab fisheries have been closed during most of the 1990s. 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 1999 the king, Dungeness and Tanner crab fisheries were closed by the BOF throughout PWSMA (Appendix B2). Limited harvests of shrimp occur in western PWSMA. At the 1999 meeting the Board reduced the number of pots allowed to no more than 5 pots per person with a maximum of 5 per vessel; and in order to help reduce harvest of egg-bearing females, defined the season from April 15-September 15. In addition, a permit will be required to harvest shrimp starting in 2001.

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 1990 through 1999, the average annual harvest of clams was 11,244 (Table 16). The majority of the PWSMA harvest is taken in the eastern sound, primarily along the Cordova road system and in the Copper River Delta.

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 harvest shellfish stocks when surplus was available.

Recent Board of Fisheries Actions

1997 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 The BOF closed PWS to all fishing for Tanner and king crabs.

2000 The Board closed Dungeness crab fishing throughout the Sound, and reduced the sport, personal use and subsistence shellfish pot limits from 5 per person/10 per vessel to 5 per

person/5 per vessel. Shrimp may only be taken between April 15-September 15. In addition, starting in 2001, a permit will be required to harvest shrimp.

Current Issues

Starting in 2001, a permit will be required by sport, personal use, and subsistence users to fish for shrimp in the waters of PWSMA. As with any new regulation, some degree of opposition is expected from the public.

Ongoing Research and Management Activities

Educating the public regarding the new shrimp regulations and permit requirements, and working with Fish and Wildlife Protection Officers to enforce the new regulations will be the focus of PWS managers this season.

ADF&G, Division of Commercial Fisheries conducts annual shrimp pot surveys.

Recommended Research and Management Activities

Educating the public regarding the new shrimp regulations and permit requirement are issues that will require attention from PWS managers in upcoming years.

Table 16.-Razor clam harvest by geographical regions in PWSMA, 1983-1999.

Year	Outer Islands	Cordova Road	Copper R. Delta	Valdez Arm Area	Other Sites in PWS	PWS Total
1983	0	0	0	0	16,640	16,640
1984	0	0	0	0	36,003	36,003
1985	0	1,680	0	0	0	1,680
1986	61	489	4,740	306	1,453	7,661
1987	0	9,234	0	154	0	9,388
1988	0	0	0	27	5,428	5,455
1989	0	0	3,988	64	191	4,243
1990	0	0	9,816	0	654	10,470
1991	0	1,538	3,846	0	0	5,384
1992	108	4,694	44,026	2,228	1,450	52,939
1993	0	4,040	6,982	0	2,236	15,494
1994	0	608	1,236	4,126	1,174	7,144
1995	0	0	254	250	3,706	5,462
1996	135	1,384	1,092	0	992	3,603
1997	0	144	0	0	0	144
1998	360	0	0	120	0	420
1999	42	476	570	0	0	11,383
90-99 Avg.	64	1,288	6,782	672	1,021	11,244

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

OTHER FISHERIES

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

Arctic Grayling and Rainbow Trout

There are no indigenous stocks of Arctic grayling in the PWSMA, and only a few systems with rainbow trout in the Copper River Delta, but these fish have been stocked in landlocked lakes near Valdez and Cordova in PWSMA 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. Thompson Lake is the only site in the PWSMA currently being stocked with grayling. The average annual harvest of Arctic grayling from 1990 through 1999 is 202 fish and has ranged from a low of 15 fish in 1998 to a high of 497 in 1991 (Table 17).

The average annual harvest of rainbow trout (largely from stocked lakes) from 1990 through 1999 is estimated at 474 fish (Table 18). Historically, 18 sites in the PWSMA were stocked with rainbow trout. Since 1990, the number of sites has been reduced to four. The majority of the angler effort was from Ruth, Blueberry, and Worthington lakes located near Valdez. Initially, Ruth Lake had been the only lake stocked with catchable sized rainbows; however, Blueberry and Thompson lakes began receiving catchable-size fish in 1995. Worthington Lake was dropped from the stocking program in 1999 because it is an open system. Crater Lake was last stocked with rainbow trout fingerlings in 1994 (Appendix A1) and was officially dropped from the stocking program in 2000.

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 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 PWSMA waters. This action brought the PWS regulatory area in conformity with the surrounding regulatory areas.

1999 In November 1999 the Board created the Copper River Special Management Area for Trout. This area designated all fresh waters south of Miles Glacier, east of the Copper River (excluding the Clear Creek drainage), and west of Cape Suckling as catch and release, only unbaited, single-hook, artificial lures year-round waters.

Table 17.-Arctic grayling catch (1990-1999) and harvest (1983-1999) by geographical regions in PWSMA.

	Cordova Road System		Eastern PWS		Valdez Arm Area		Other sites in PWS		PWS Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983		0		0		0		0		0
1984		0				0		0		0
1985		0		0		0		52		52
1986		0		0		352		0		352
1987		0		0		54		0		54
1988		0		0		182		0		182
1989		116		194		58		0		368
1990	0	0	0	0	834	114	360	180	1,194	294
1991	0	0	0	0	900	331	817	166	1,717	497
1992	16	16	150	15	225	0	166	46	557	77
1993	59	0	0	0	428	249	127	34	614	283
1994	323	28	0	0	188	0	326	188	837	216
1995	0	0	0	0	314	95	672	44	986	139
1996	36	0	0	0	359	0	669	131	1,064	131
1997	0	0	0	0	91	0	593	119	684	119
1998	0	0	0	0	146	0	388	15	534	15
1999	0	0	0	0	212	180	151	66	363	246
90-99 Avg.	43	4	15	2	370	97	427	99	855	202

From: Mills 1984-1994, Howe et al. 1995 and 1996, *In prep* a, b, c, and d.

Current Issues

New sites need to be identified in Cordova that would be suitable for supporting new hatchery enhanced rainbow trout and grayling fisheries. A reduction of hatchery releases in recent years has resulted in lost opportunity and less diversity for recreational anglers.

Ongoing Research and Management Activities

In anticipation of the Carbon Mountain road being built through the Special Trout Management Area, the Copper River Trout Project was started in 2000 and has been funded through 2001. The goal of this study is to collect baseline length, sex and age distribution data on the trout populations of the Martin River drainage and other systems whose trout populations would be accessible by the new road.

Project objectives were not met in 2000 due largely to budget restrictions and logistical challenges. What was gained this season was a more detailed map of trout presence/absence in the Delta, a test of our sampling methods, and a greater appreciation of the size and challenges of the area to be sampled. In order to meet the stated objectives it will take a dedicated crew (two techs) and a reliable means of getting to the sampling areas several times a week. The USFS Cordova Ranger District was incredibly helpful in 2000 in providing airboat access to the Delta for sampling trips several times throughout the summer, and showing where they had observed cutthroat and rainbow trout in the past. While it is important to continue to work with USFS on this project, a more rigorous sampling schedule needs to

Table 18.-Rainbow trout catch (1990-1999) and harvest (1983-1999) by geographical regions in PWSMA.

	Cordova Road System		Southwest PWS		Valdez Arm Area		Other Sites in PWS		PWS Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1983		31		944		0		210		1,185
1984		24		0		499		0		523
1985		0		0		87		190		277
1986		15		0		15		77		107
1987		0		0		72		54		126
1988		18		0		91		0		109
1989		271		0		174		232		677
1990	245	82	0	0	508	262	228	48	981	392
1991	58	29	0	0	88	88	802	423	948	540
1992	269	95	0	0	396	71	397	120	1,062	286
1993	168	79	0	0	82	37	342	20	592	136
1994	120	56	56	0	103	84	119	17	398	157
1995	11	11	0	0	378	135	1,557	631	1,946	777
1996	147	0	0	0	840	256	727	80	1,714	336
1997	0	0	0	0	1,163	331	2,281	94	3,444	425
1998	226	0	0	0	568	282	447	55	1,241	337
1999	98	0	0	0	3,164	676	1,185	679	4,447	1,355
90-99 Avg.	134	35	6	0	729	222	809	217	1,677	474

From: Mills 1984-1994, Howe et al. 1995 and 1996, In prep a, b, c, and d.

be instituted in order to meet the project's objectives. Additional funding has been approved to hire two technicians to collect data in the Special Management Area for Trout, but an airboat is necessary to access the study area on a regular sampling schedule in 2001.

Recommended Research and Management Activities

Continued research on trout stocks in the Special Management Area for Trout to include: collecting length, sex and age distribution data for trout stocks; identifying spawning sites and other critical habitat; and collecting data on the degree of mixing between rainbow and cutthroat stocks.

Eulachon (Smelt)

Small numbers of eulachon, also known as "hooligan," return to PWSMA glacial streams to spawn from late winter to spring and are harvested. In PWSMA there are over 1,000 documented salmon spawning systems and less than six eulachon spawning systems. Suitable eulachon spawning habitat has mainly been documented in the Copper River Delta and includes the Copper and Martin rivers, and Alaganik and Ibeck sloughs. However, as these are commercial and subsistence eulachon fisheries and not sport or personal use, they will not be detailed here (Moffitt and Miller *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
2000			500				0									1,750		

Source: ADF&G 2000a.

Note: Unless noted separately, all rainbow released 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
	2000													1,117

Source: ADF&G 2000a.

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	35,627				35,600	0
1999				0		0	49,723 [b]	49,853			0	49,853 [b]
2000				0		0	45,000 [b]	115,582			0	119,389 [b]

Source: ADF&G 2000a.

[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			99,943	830,243			81,685			0	19,810	1,843,718
2000		47,395			93,000	187,775			47,500			0	20,000	1,605,599

Source: ADF&G 2000a.

[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 includes 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
2000	142,537,692		132,236,317			116,069,339				195,763,690

Source: ADF&G 2000a.

[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	0					75,000,000	24,300,000	
2000	0					79,306,351	24,045,577	

Source: ADF&G 2000a.

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
2000						8,181,502			116,473

Source: ADF&G 2000a.

[a] Reared at Main Bay Hatchery.

[b] Reared at W. Noerenberg Hatchery.

[c] Reared at Trail Lake Hatchery.

APPENDIX B. SUMMARY OF REGULATION CHANGES IN PWS

Appendix B1.-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.
- 1999 – Established the *Copper River Delta Special Management Area for Trout*:
  Only unbaited, single-hook, artificial lures are allowed year-round in all fresh waters south of Miles Lake Glacier and east of the Copper River (excluding the Clear Creek drainage), and all waters draining into the Gulf of Alaska west of Cape Suckling. In addition no retention of rainbow/steelhead trout or cutthroat trout is allowed year-round.

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.
- 1999 – Established the *Copper River Delta Special Management Area for Trout*:
  Only unbaited, single-hook, artificial lures are allowed year-round in all fresh waters south of Miles Lake Glacier and east of the Copper River (excluding the Clear Creek drainage), and all waters draining into the Gulf of Alaska west of Cape Suckling. In addition no retention of rainbow/steelhead trout or cutthroat trout is allowed year-round.

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 salmon 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 was 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 (Esther 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.
- 1999 - Daily limits for coho salmon are 3 per day and 3 in possession, except in designated Terminal Harvest Areas where the saltwater limit remains at 6 per day and 12 in possession.
- 1999 - Daily bag and possession limits for coho salmon at Shelter Bay are 1 per day and 1 in possession.
- 1999 - Clear Creek is closed to salmon fishing year-round upstream of the Carbon Mountain Bridge.

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."
- 1999 - the total bag limit was unchanged, but the provision was revised so that year-round 2 rockfish per day and 2 in possession could be "non-pelagic." In addition, the first two non-pelagic rockfish removed from the water must be retained and become part of the bag limit of the person originally hooking the fish.

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 B2.-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.
- 1999 - Established a season from April 15-September 15.
- 1999 - Reduced the number of pots allowed to 5 per person with a maximum of 5 per vessel.
- 1999 - Starting in 2001, a permit will be required to harvest shrimp.

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.
- 1999 - closed all waters of the PWSMA to the taking of Tanner crab.

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.
- 1999 - closed all waters of the PWSMA to the taking of king crab.

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.
- 1999 - All waters of the PWSMA are closed to the taking of Dungeness crab.

Appendix B3.-Emergency orders issued for the Prince William Sound Management Area sport fisheries, 1989-2000.

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	Closes 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)

Emergency Order Number	Action
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 return 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)

Emergency Order Number	Action
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)

Emergency Order Number	Action
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 1 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)

Emergency Order Number	Action
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 Bay, 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)
2-DC-6-01-00	PWS Closes Dungeness crab sport fishery in Prince William Sound through July 31, when regulations close PWS Dungeness crab sport fishing until further notice. (Barry Stratton)
2-SHR-6-02-00	PWS Limits shrimp pots in Prince William Sound to no more than 5 pots per person, with a maximum of 5 pots per vessel. (Barry Stratton)
2-RS-6-06-00	PWS Closes head of Main Bay (AGZ) to sport fishing June 14 through July 25, 2000. (Barry Stratton)
2-RS-6-15-00	PWS Small section of Main Bay in Prince William Sound will continue to be closed to sport fishing. (Barry Stratton)