Fishery Management Report No. 05-61

Area Management Report for Recreational Fisheries of the Prince William Sound Management Area, 2005

by

Brian H. Marston

December 2005

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

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

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

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

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
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
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
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	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
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.
minute (angular)	'
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
variance	
population	Var
sample	var

FISHERY MANAGEMENT REPORT NO. 05-61

AREA MANAGEMENT REPORT FOR THE RECREATIONAL FISHERIES OF THE PRINCE WILLIAM SOUND MANAGEMENT AREA, 2005

by

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The Division of Sport Fish Fishery Management Reports series was established in 1989 for the publication of an overview of Division of Sport Fish management activities and goals in a specific geographic area. Since 2004, the Division of Commercial Fisheries has also used the Fishery Management Report series. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: http://www.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm. This publication has undergone regional peer review.

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TABLE OF CONTENTS

Page

TABLE OF CONTENTS (Continued)

Page

TABLE OF CONTENTS (Continued)

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Appendix **Page**

ABSTRACT

This report presents information on sport fishing in the Prince William Sound Management Area through 2004, with historic data presented in tables for comparison dating back to 1983. The report includes an introduction with a general description of the area and its fisheries. Fisheries issues that encompass the area as a whole are also found in the introductory paragraphs. Specific fisheries data in regards to catch, harvest and effort are presented for each major fishery in subsequent sections of the report, as well as management issues that affect those fisheries. Brief summaries of smaller less important fisheries are also included in the later sections.

Keywords: Prince William Sound, Valdez, Whittier, Cordova, coho salmon *Oncorhynchus kisutch*, Chinook *O. tshawytscha*, sockeye *O. nerka*, chum *O. keta*, pink *O. gorbuscha*, halibut *Hippoglossus stenolepis*, rockfish *Sebastes*, lingcod *Ophiodon elongates*, shark , Dolly Varden *Salvelinus malma*, cutthroat *O. clarki*, rainbow trout *O. mykiss*, shrimp *Pandalidae*, shellfish, sport fish, recreational fishery, Prince William Sound Management Area, Board of Fisheries, angler effort, wild trout, hatchery raised fish.

INTRODUCTION

The Prince William Sound Management Area (PWSMA) for sport (recreational) fisheries is located on the Northern Gulf of Alaska in Southcentral Alaska. This area includes all waters of the Gulf of Alaska, its drainages west of the longitude of Cape Suckling (143° 53' W longitude), and east of the longitude of Cape Puget (148° 26' 30" W longitude), including waters of the Copper River drainage downstream of Haley Creek (Figure 1). Principal land managers in the PWSMA include the U.S. Forest Service (USFS), various native corporations, the cities of Valdez, Cordova and Whittier, the Bureau of Land Management (BLM), and the State of Alaska.

Historical sport fishing reports for this area from 1997-2000 can be found in Miller and Stratton (2001). Prior to 1997 the sport fisheries of this area were included in the Central Gulf Coast Management Area (Vincent-Lang 1998; Hepler et al.1993b).

The PWSMA includes the communities of Valdez, Cordova, Whittier, Chenega, and Tatitlek (Figure 1). Sport fishing effort in the PWSMA originates from, or passes through these communities as well as Seward, which is located in the Resurrection Bay Management Area and by air from Anchorage. Until recently, Valdez offered the only road access to Prince William Sound (PWS). With the opening of the Anton Anderson Memorial Tunnel in 2000, Whittier also became accessible via the Alaska Highway system. The Alaska Marine Highway ferries travelers to and from Valdez, Whittier, and Cordova several times per week, while Tatitlek and Chenega are reachable intermittently. With the exception of some road-accessible fisheries in Cordova, Valdez and Whittier, virtually all sport fisheries in the PWSMA are remote and relatively difficult to access.

ALASKA BOARD OF FISHERIES REGULATION

The development of fishing regulations for PWSMA sport fisheries occurs within the Alaska Board of Fisheries (BOF) process. Public input concerning regulation changes and allocation issues is encouraged through various means including direct testimony at Board of Fisheries meetings, and participation in local fish and game advisory committees. The advisory committees were established throughout Alaska to assist the Boards of Fisheries and Game in assessing fish and wildlife regulatory issues. Within the PWSMA there are three Fish and Game Advisory Committees: Valdez, Whittier, and Cordova (Copper River/Prince William Sound). 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.

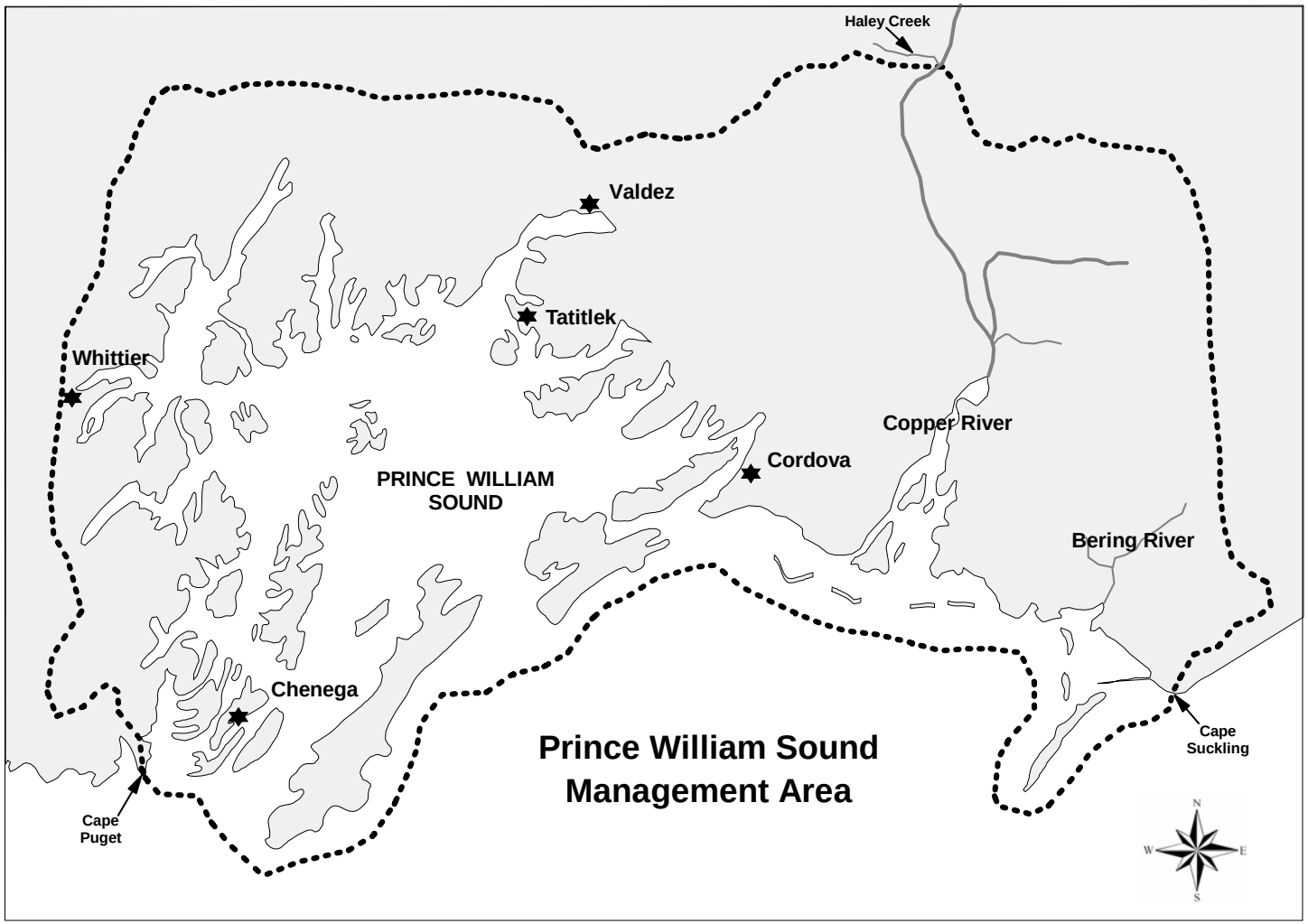


Figure 1.-Prince William Sound Management Area.

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 2002 board meetings held in Cordova. Proposals must be submitted to the Division of Boards approximately 8 months prior to the meeting. The next scheduled meeting for the PWSMA is in December 2005 in Valdez.

PRINCE WILLIAM SOUND REGIONAL PLANNING TEAM

Alaskan law stipulates that the commissioner of ADF&G will establish regions and regional planning teams (RPT) for the purpose of developing comprehensive salmon management plans for various regions of the state. An RPT was established for Prince William Sound comprising representatives from the regional private nonprofit hatchery corporation (Prince William Sound Aquaculture 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 non-regulatory rehabilitation projects, and reviews and comments on proposed hatchery permit suspensions and/or revocations. In 2004 preliminary planning for a new potential release of common property salmon in Nelson Bay near Cordova was initiated.

FISHERIES RESOURCE INVENTORY

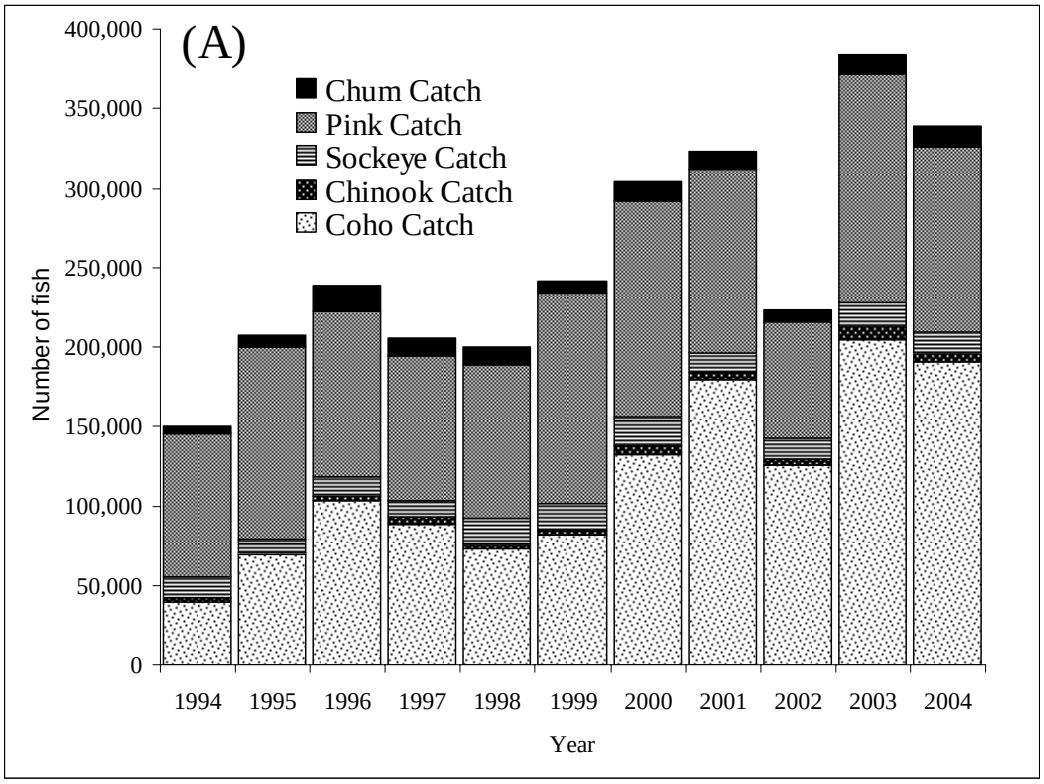
The PWSMA offers several types of fishing opportunities for recreational anglers ranging from high yield, low angler-cost fisheries (anglers can participate with little direct cost) to low yield, high cost fisheries (typically remote with a high cost to participate). Angling opportunities range from road-accessible pink salmon, Dolly Varden, and cutthroat trout streams, stocked lakes, or saltwater fisheries near Whittier, Cordova and Valdez; salmon or groundfish species which can be targeted by anglers from small skiffs near the communities of Cordova, Whittier and Valdez; and fisheries that are only accessible by larger boats or by float plane, such as the sockeye salmon fishery on Eshamy Bay, halibut fishing on the outside of Montague Island, and fly-in coho salmon fishing on the Katalla River south of the Copper River.

Wild Stock Fisheries

Sport anglers fishing PWSMA waters principally target five species of Pacific salmon (coho *Oncorhynchus kisutch*, Chinook *O. tshawytscha*, sockeye *O. nerka*, chum *O. keta*, and pink *O. gorbuscha*) (Figure 2). Also there are targeted saltwater sport fisheries for halibut *Hippoglossus stenolepis*, rockfish *Sebastes*, and lingcod *Ophiodon elongates* (Figure 3). Dolly Varden *Salvelinus malma*, cutthroat *O. clarkii*, and rainbow trout *O. mykiss*, are also targeted to a lesser degree, especially on the Copper River Delta. Sport and personal use shellfish fisheries are limited to shrimp *Pandalidae*, and hard-shell clams *Siliqua*. The Dungeness *Cancer magister*, tanner *Chinoecetes bairdi*, and king crab *Paralithodes camtschatica* fisheries are currently closed throughout the PWSMA, due to low abundance.

Stocked Fisheries

Stocking of hatchery-raised fish has increased and diversified the opportunities available to recreational anglers (Appendix A). These stocking activities consist of two types of programs. The first attempts to increase harvest for commercial fisheries, and incidentally enhances the availability of fish for sport anglers. The second is targeted specifically toward enhancing sport



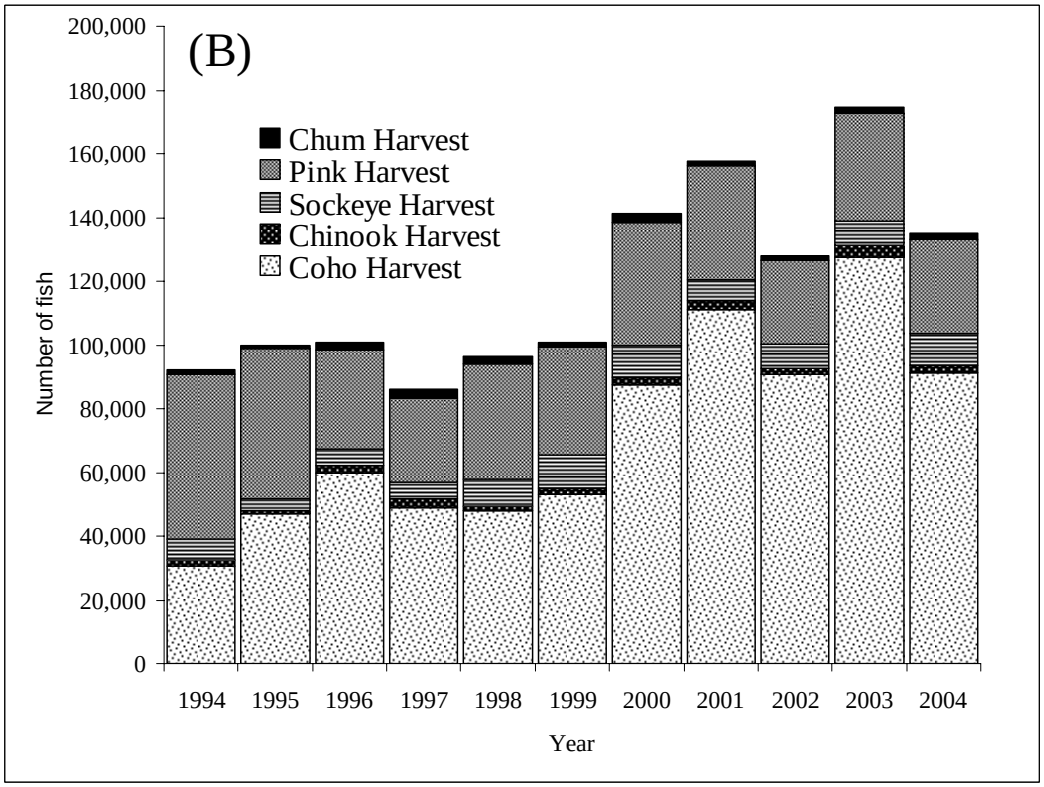


Figure 2.-Catch (A) and harvest (B) of salmon species in PWSMA sport fisheries, 1994-2004.

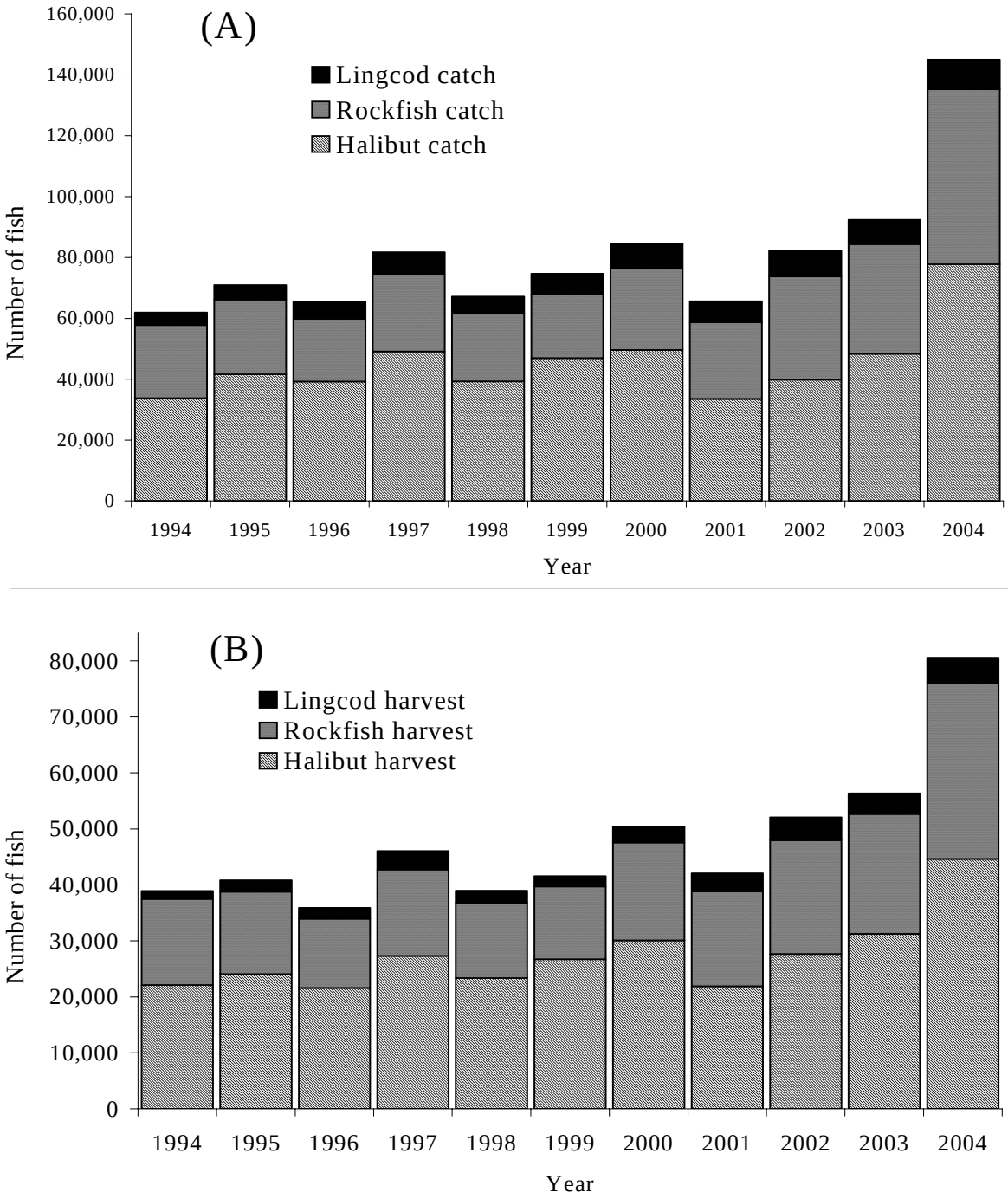


Figure 3.-Catch (A) and harvest (B) of principal groundfish species in PWSMA marine sport fisheries, 1994-2004.

fisheries. However, all hatchery salmon releases contribute to the common property of all fisheries, and are thus available to any fishery regardless of the target group. The releases of resident trout or grayling, while common property, are exclusively harvested by sport anglers.

The state's stocking program provides stocked fisheries for rainbow trout and Arctic grayling *Thymallus arcticus* in lakes near Valdez. A Chinook salmon stocking program is also conducted with state hatcheries to increase opportunities for recreational anglers near Valdez, Cordova and Whittier. Due to reductions in budget and hatchery capacity, the Whittier Chinook stocking will be eliminated in 2006. Additionally, two private non-profit (PNP) hatchery corporations (Appendix B4) release coho salmon to provide sport fishing opportunities in Valdez Arm (by the Valdez Fisheries Development Association [VFDA]), and at Whittier and Fleming Spit in Cordova (Prince William Sound Aquaculture Corporation [PWSAC]). PNPs also release pink, sockeye and chum salmon at various locations throughout PWSMA (Appendix B4) primarily to enhance commercial fisheries but some of these fish are harvested by sport anglers. Pink salmon are released from three PWSAC hatcheries and one VFDA hatchery. Sockeye salmon are reared in two PWSAC hatcheries and released from several sites in PWSMA. Chum salmon are reared in two PWSAC hatcheries, and released from those two hatcheries, as well as two remote locations. The Chinook salmon stocking program, conducted by PWSAC until 1998, has been continued by ADF&G to date with releases at Valdez, Whittier, and Cordova, although Whittier will be dropped in 2006 due to budgetary constraints and reduced hatchery production. Rainbow trout and grayling releases by ADF&G occur yearly at Thompson Lake, Blueberry Lake and Ruth Lake, all near Valdez.

STATEWIDE HARVEST SURVEY

Data on the recreational (sport) harvest of fish in Prince William Sound through 2004 is available from the Statewide Sport Fish Harvest Survey (SWHS) (ADF&G SWHS *Unpublished*; Howe et al. 1995, 1996, 2001 a-d; Jennings et al. 2004, *In prep-a; In prep-b*; Mills 1979-1980, 1981a-b, 1982-1994; Walker et al. 2003). In 2001 the saltwater reporting regions of the SWHS for the PWSMA were changed in order to increase reporting accuracy, and allow for reporting of port of landing and a more general area fished. The reporting regions used prior to 2001 tallied several groups of data by a more complicated collection of areas fished in the PWSMA (Figure 4) (see also Miller and Stratton 2001), and the ports used were not recorded. The new recording method asks anglers to report which port the trip landed at, and simplifies the way saltwater sport fishing is recorded, as one of two areas, western PWS or eastern PWS (Figure 5). Port of landing (Valdez, Cordova, Whittier, or Seward,) is also used to determine port usage proportions. This change was initiated to better describe the fisheries in terms of which ports were being utilized within the PWSMA. Additionally, with the old method, respondents to the SWHS were often unable to accurately describe the specific area that they fished, so a more general description scheme was needed to ensure more accurate results.

These two grouping methods, "area fished" (old method), and "port of landing" (new method) group data similarly but trends calculated prior to 2001 should be compared to the new port of landing data trends with caution, as these two methods may not perfectly coincide. Average catch and harvest statistics for the area fished grouping method are no longer calculated, but historical data groups, and averages from prior to year 2001 are still listed in most tables to present historic trends. Note that this change in grouping method does not affect the overall

Figure 4.- PWSMA reporting regions for the SWHS, 1977-2000.

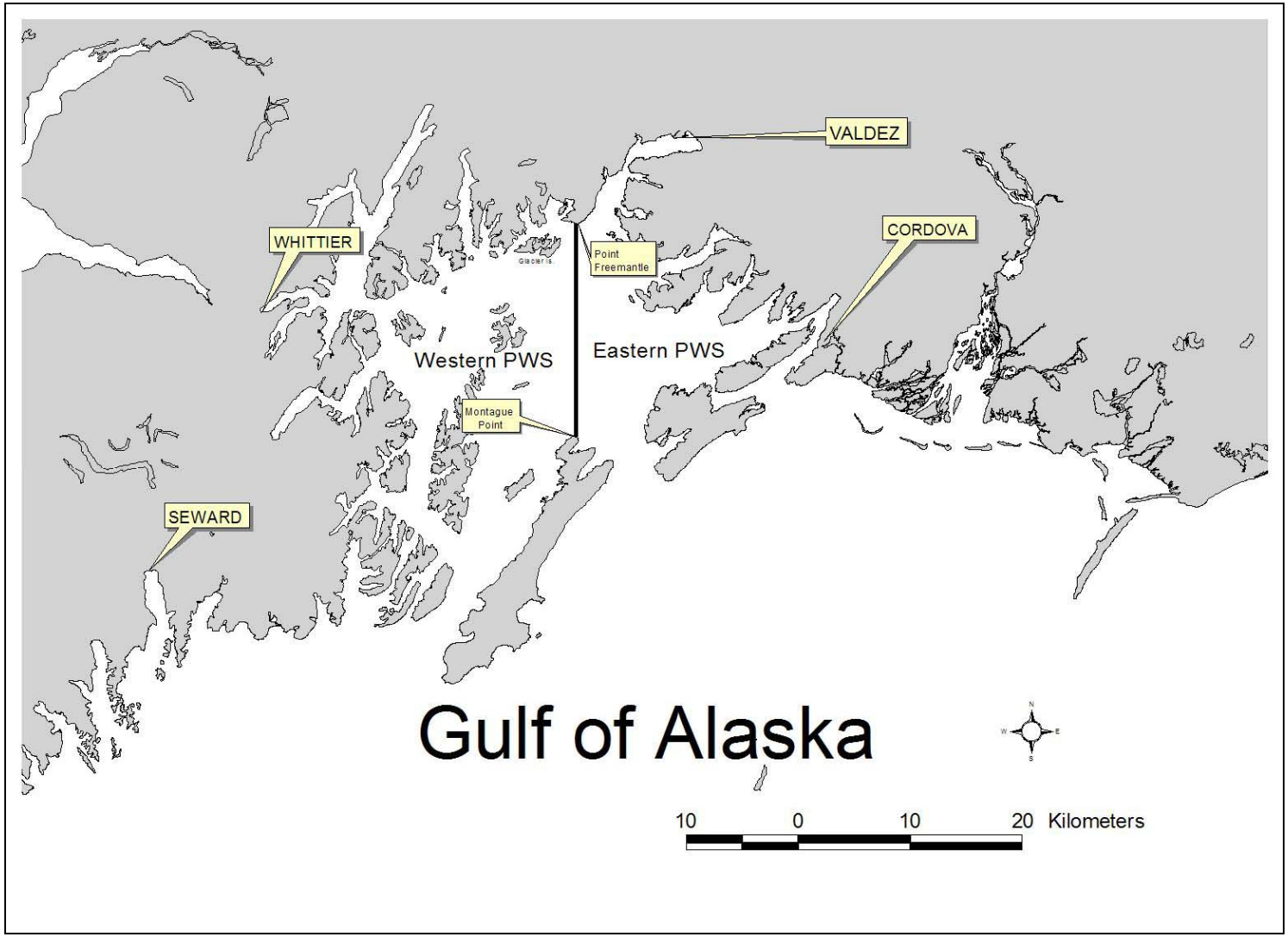


Figure 5.-Reporting regions in the PWSMA for the SWHS, 2001-2004.

PWSMA totals in each table (far right column). In future management reports average catch and harvest statistics will be computed with the "new" port of landing method, after sufficient data (5 years) has been recorded.

Prior to 1996, an additional discrepancy in the SWHS estimates occurred due to a correction of errors in the estimation process. In 1999, the Division of Sport Fish Research and Technical Services Unit discovered non-response bias correction factors had not been applied to previous years' data. The factors were applied and estimates were revised for 1996-1999 data. The raw data from 1995 and before were unrecoverable so estimates for those years were not revised.

RECREATIONAL ANGLER EFFORT

From 1994-2003, recreational anglers fishing PWSMA waters expended an average of 120,967 angler-days per year (Table 1). The 2004 season showed the highest angler effort on record for the PWSMA (Figure 6). From 1983-2000 recreational angler effort increased steadily, remained stable from 2001 to 2002, and then increased significantly in 2003 and 2004. From 1994-2004, the annual percent of angler effort in the PWSMA to the total statewide and regional effort increased, to approximately 7% and 10%, respectively (Table 1).

Valdez is the most popular port in the PWSMA in terms of recreational angling effort (Table 2; Figure 7), although this appears to be changing with Whittier gaining in popularity. Historically Valdez was the only road-accessible port in the management area until the winter of 2000 when Whittier was linked to the road system with a new tunnel. Angler effort expressed as a percent of total effort within the PWSMA has since decreased in Valdez and increased in Whittier demonstrating the influence that road access has on angler participation. Angler effort from Valdez decreased from over 53% of that expended in the PWSMA in and before 2001, to 47% in 2004. Valdez saltwater anglers typically fish in eastern PWS although this was variable from 2002-2004 (Figure 8). Anglers fishing out of Whittier accounted for 30% of the effort in 2004, an increase of 12% since 2001, while anglers out of Cordova accounted for 13%. Saltwater anglers out of Whittier typically fish in western PWS, while Cordova saltwater anglers typically fish in Eastern PWS, which has been decreasing (Figure 8).

Valdez Fisheries

Valdez continued to be the most popular port for fishing in the PWSMA and effort increased to 78,360 angler days in 2004, the highest on record for that port (Table 2). Valdez is the northernmost port in PWSMA (Appendix B1), and saltwater boat anglers out of Valdez reported fishing in the eastern sound 84% of the time in 2004 (Figure 8). Valdez trips represented 47% of the total angler days to PWSMA in 2004 (Figure 7). 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 coho and pink salmon. Valdez is also the most important port for charter boats in PWSMA accounting for at least 50% of the charter fleet moorage.

Cordova Fisheries

Cordova is located on the eastern side of PWS (Appendix B2) adjacent to the Copper River Delta. The waters of the Cordova area supported the most popular freshwater fisheries in the PWSMA accounting for 64% of the total freshwater effort. Sport fisheries target salmon, bottomfish, Dolly Varden, rainbow and cutthroat trout. In terms of numbers of fish harvested, the most popular fisheries were those that targeted coho and sockeye salmon, and halibut. In

Table 1.–Angler-days for sport fishing in the PWSMA, 1983-2004.

Year	Effort			Percent of Statewide From PWS	Percent of Southcentral From PWS
	Statewide	Southcentral	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%
2000	2,627,805	1,844,824	134,288	5%	7%
2001	2,621,941	1,560,562	127,405	5%	8%
2002	2,259,091	1,569,513	125,074	6%	8%
2003	2,219,398	1,535,501	149,290	7%	10%
2004	2,473,961	1,709,671	168,046	7%	10%
Previous 10-year average (1994-2003)	2,367,799	1,621,760	120,967	5%	8%

2004 trips from the port of Cordova accounted for 13% of the total saltwater angling effort expended in the PWSMA (Table 2; Figure 7). Saltwater boat anglers out of Cordova reported fishing in eastern sound salt waters 70% of the time in 2004 (Figure 8). In 2004, an estimated 22,123 angler days were expended in the Cordova area. Angler effort increased dramatically in 1989, and has increased gradually although somewhat variably throughout the 1990s. This trend can be largely attributed to the growing interest in coho salmon fishing along the Cordova road system. The Eyak River and Alaganik Slough are the most popular freshwater streams. Additionally, the popularity of the Fleming Spit salmon enhancements and trolling for salmon in Orca Inlet has also increased.

Whittier Fisheries

In terms of angling effort expended since 1983 the waters of the Whittier area (Appendix B3), located on the western side of PWS, have historically supported the second most popular fisheries in the PWSMA. Boat anglers out of Whittier reported fishing in salt waters of the western sound 85% of the time in 2004 (Figure 8). In 2004 these anglers accounted for 30% of the recreational effort expended in the PWSMA (Table 2; Figure 7), a 9% increase over 2003.

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. An estimated 50,945 angler-days were expended from port of Whittier in 2004 (Table 2). This represents a significant increase over the average of 15,460 angler days for the 10-year period prior to 2001. This increase is attributed to the increase in vehicle access due to the construction of the Whittier Tunnel in 2000, and the numerous new recreational developments to the Whittier Harbor.

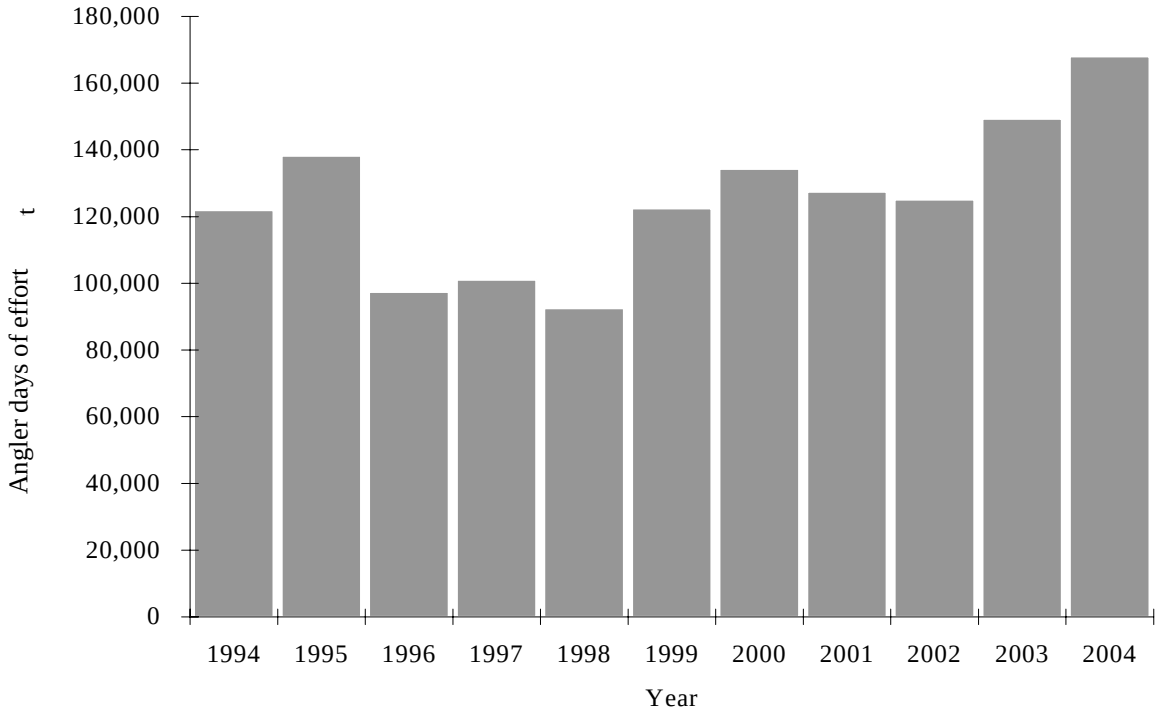


Figure 6.-Angler effort expended in sport fishing in the PWSMA, 1994-2004.

COMMERCIAL AND SUBSISTENCE HARVESTS

Salmon returning to the PWSMA are harvested extensively by various commercial fisheries as are halibut and lingcod. For all salmon species, commercial harvests are larger than corresponding recreational harvests. In 2004 commercial fisheries reported harvests of 39,000 Chinook; 1.9 million sockeye; 620,000 coho; 23.5 million pink; and 2 million chum salmon (Ashe et al. *In prep*). The commercial harvest of halibut, managed by federal regulations, is also larger than sport harvests; 1,492,924 lbs were landed in Cordova in 2004. Lingcod and rockfish commercial harvests from the PWSMA are smaller than corresponding recreational harvests. No directed commercial harvest of rockfish has been allowed since 1999, but a substantial bycatch in other fisheries occurs, which was 52,302 lbs in 2004. Lingcod are harvested commercially by a directed fishery and as bycatch, which totaled 30,290 lbs, or approximately 1,000 fish in 2004.

Table 2.–Summary of angler-days of effort by geographical regions in the PWSMA, 1983-2004.

Year	Cordova Road System	Copper River Delta	Southwest PWS	Northwest PWS (Whittier)	Eastern PWS	Northeast PWS	Valdez Arm Area	Outer Islands	Other sites in PWS	PWS Total
1983	6,946	51	2,192	7,519	151	34	16,052	85	14,584	47,614
1984	8,196	368	2,259	6,123			23,605	450	16,547	57,548
1985	1,884	135	1,601	11,064	329	553	51,862	375	4,859	72,662
1986	8,394	513	1,870	14,176	2,721	306	32,051	1,055	3,165	64,251
1987	10,451	520	1,890	15,028	1,015	856	48,174	1,244	2,043	81,221
1988	6,994	329	3,867	13,868	1,249	1,498	52,108	1,401	3,657	84,971
1989	16,818	270	7,746	10,148	1,365	909	49,500	2,033	6,458	95,247
1990	9,107	203	3,201	11,255	1,918	2,833	71,909	2,259	3,054	105,739
1991	16,070	1,498	3,021	13,646	1,903	2,613	68,794	1,627	3,890	113,062
1992	19,222	1,172	4,524	8,980	2,599	3,715	60,952	4,061	8,193	113,418
1993	14,943	569	4,354	16,917	1,535	1,126	53,658	3,658	7,817	104,577
1994	19,401	529	6,008	16,286	2,669	3,179	56,329	4,194	13,349	121,944
1995	14,918	378	4,626	16,548	3,200	1,628	76,429	5,121	15,346	138,194
1996	16,456	557	2,676	13,124	1,905	2,094	50,896	2,951	6,789	97,448
1997	13,842	676	3,969	13,511	2,809	1,789	47,516	5,468	11,499	101,079
1998	15,039	455	4,433	13,752	1,135	864	46,571	4,307	5,947	92,503
1999	19,907	682	4,151	17,265	1,515	2,189	59,080	5,810	11,848	122,447
2000	16,150	710	3,044	24,567	1,672	1,996	71,484	4,398	10,267	134,288
1991-2000 Avg.	16,595	723	4,081	15,460	2,094	2,119	59,171	4,160	9,495	

Year[a]	Cordova[b]	Whittier[c]	Valdez[d]	Other/unknown	Total
2001	19,918	23,027	67,467	16,993	127,405
2002	15,718	29,301	56,267	23,788	125,074
2003	24,482	31,838	72,761	20,209	149,290
2004	22,123	50,945	78,360	17,008	168,436
			Previous 10-year average (1994-2003)		120,967

[a] To increase reporting accuracy, the SWHS changed from reporting area of harvest to reporting port of landing in 2001. This had no affect on estimates for "PWS Totals."

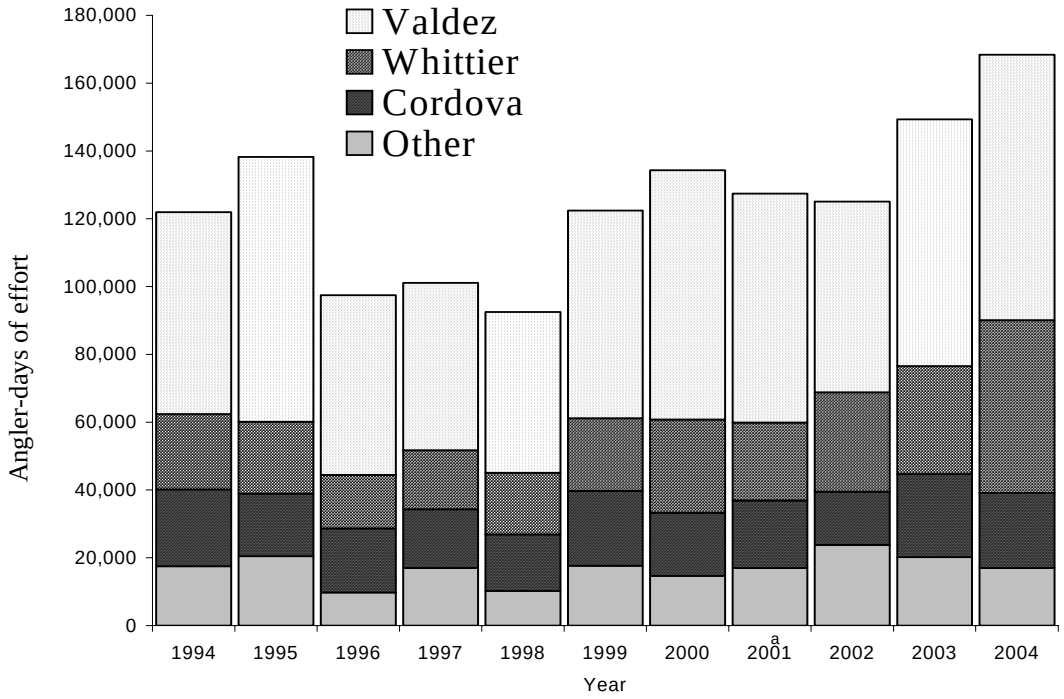
[b] Includes reported landings in Cordova for saltwater trips, and freshwater effort along the Cordova road system.

[c] Includes reported landings in Whittier and Chenega for saltwater trips.

[d] Includes reported landings in Valdez for saltwater trips, and freshwater effort along the Valdez road system.

Fish stocks of the PWSMA are harvested to a limited extent in various state subsistence fisheries. Harvests in these fisheries are generally small, but could be a substantial proportion of small wild salmon stocks, or small localized halibut fisheries in the PWSMA. Specifics of state subsistence harvests, limits, methods, and means can be found in Ashe et al. (*In prep*).

New federal subsistence rules implemented in 2003 altered the potential for subsistence harvests of halibut and rockfish in PWSMA waters (Fall et al. 2003). Federal subsistence regulations and harvests of halibut began in 2003 in PWS, with a limit of 20 fish per day and the use of up to 20 hooks on a set line, and all PWS salt waters are open to federal subsistence harvests of halibut by federally qualified subsistence users. Additionally, a new federal permit system for freshwater subsistence harvest in the PWSMA was begun by the USFS in 2005. With some additional closed areas still to be determined, all streams on the Copper River Delta, excluding the Copper



[a] To increase reporting accuracy, the SWHS changed from reporting area of harvest to reporting port of landing in 2001.

Figure 7.-Major components of angler effort by geographical regions in PWSMA, 1994-2004.

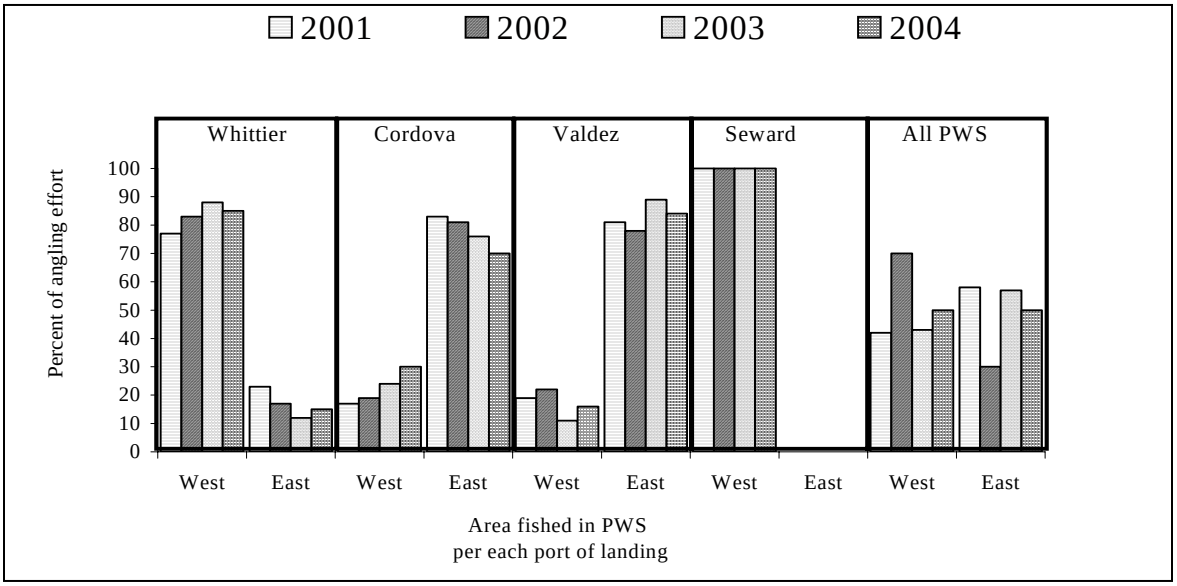


Figure 8.-Percent boat angler effort to each general area of PWSMA salt waters by port of landing, 2001-2004.

River and its tributaries, are open to federally qualified subsistence users for all freshwater fish species. The limit for salmon in fresh waters is 15 yearly, and dip nets or spears are legal gear types. Whitefish limits are 50 fish per permit, and the trout limit is 5 fish per permit. As of September 21, 2005, 43 federal freshwater subsistence permits had been issued in Cordova (T. Joyce, USFS, Cordova Ranger District, personal communication).

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 include boat ramps and lifts, docking and marina facilities, fish cleaning stations, rest rooms and parking areas.

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 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. Prince William Sound Access (getting boats in the water) made this list of short-term critical needs.

In FY 1999 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 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 would build the upland facilities but the City of Whittier must find an additional $2.7 to $5.5 million to build the breakwater. As of fall 2005 the city is still pursuing funding but initiatives to build a private marina may have changed planning.

MAJOR SPORT FISHERY RELATED ISSUES FOR THE PWSMA

New Ferry Service for Prince William Sound Communities

A new high speed ferry began service in fall 2005 within Prince William Sound along with scheduling changes. This linked the communities of Cordova, Whittier, Chenega, Tatitlek and Valdez with more frequent ferry service during summer and cut the travel time to Cordova in half. The more consistent and faster service is expected to increase sport fishing effort throughout PWS in the summer. The recreational use of the Whittier area may also increase because it is the starting point for the new ferry. ADF&G will continue to examine access issues to accommodate this increase in participation, as well as evaluating and developing fishery objectives to maintain and protect fish populations and sport fisheries.

Whittier Developments

Three new developments were planned for the Whittier area, two new parcel sales on the north side of Passage Canal, and new harbor construction near the town of Whittier. A private harbor project was completed in 2005 adding considerable boat moorage. Additionally, in 2004 large cruise ships also began docking in the port of Whittier increasing the recreational use of the area. These developments and the road access project that was completed in 2000 have continued to increase the sport fishing effort of the west side of Prince William Sound and promoted new commercial sport fishing outfitters. Some long time anglers from this port have expressed concerns through advisory committees that harvest rates in fisheries close to Whittier have decreased in recent years. The department will continue examination of groundfish port sampling data and the SWHS to track potential changes in these fisheries.

Federal Subsistence Regulations

Federal subsistence regulations for halibut implemented in the PWSMA in 2003 allow a 20 fish per day limit and the use of up to 20 hooks on a set line. This is a 10-fold increase over the current sport fish daily limit. Additionally, new federal subsistence salmon regulations implemented in 2005 allow dipnetting in all fresh waters other than the Copper River, its tributaries, and some special closed areas yet to be determined. Seasonal subsistence limits are 15 salmon, and 5 cutthroat trout, and all fish may be harvested in 1 day. It is unknown what effect this may have, if any, on stocks of PWSMA halibut and salmon, or their fisheries, but local population depletions or conflicts with sport anglers may occur in subsistence areas. Additionally, enforcement of sport fishing regulations for both salmon and halibut may be complicated by the inclusion of subsistence harvesters during sport fishing seasons. Sport Fish Division will work with state and federal subsistence personnel to limit potential conflicts. The ADF&G Division of Subsistence completed a harvest survey for subsistence halibut in 2003 (Fall et al. 2003).

Nelson Bay Salmon Remote Release and Commercial Fishery

RPT planners have begun implementation of feasibility studies for a new remote release and commercial fishery for chum, coho or sockeye salmon in Nelson Bay, approximately 20 km east of Cordova. In spring 2004 and 2005 this included test fisheries within Nelson Bay, wild salmon population assessments, and site planning of the release and fishery areas. Run timing of the returning chum salmon could overlap the proposed seine fishery with either the sport Chinook salmon or coho salmon fishery in the area of Cordova, both of which are stocked terminal fisheries at Fleming Spit. Similar conflict situations are confronted with commercial pink salmon and coho salmon sport fisheries in Valdez. If significant interception of Chinook salmon occurs the department may need to decide if the current level of stocking is sufficient or warranted. Coho salmon for the terminal fishery are provided by PWSAC and this may also be impacted. The department has funded access ramps and fish cleaning stations for this fishery with the anticipation that the fishery would continue, and additionally the cessation of this fishery will most likely increase effort towards wild coho stocks along the Cordova road system.

Cordova Area Coho Salmon Fisheries

The Sport Fish Division believes the current sport fish harvest is sustainable and the tools exist to manage the fishery into the future. However, coho fishing along the Cordova road system continues to increase markedly as changing river conditions have opened up new fisheries and access to Cordova has improved. Detailed sport fish effort studies per stream on the Delta begun

by the USFS could be augmented by department studies designed to track catch rates, boat usage, and fishing success over time on the Eyak River and Ibeck Creek. This will help ensure conservation of the quality of the current fishery.

COHO SALMON FISHERY

FISHERY DESCRIPTION

Recreational coho salmon fisheries grew significantly in the PWSMA from 1994-2003, and in 2004 coho salmon was the most popular sport fish in PWSMA waters. The PWSMA was at least the second largest coho salmon fishery in Alaska from 1994-2003. The PWSMA coho catch exceeded the Kenai Peninsula to be the largest in terms of coho caught for the years 2001 and 2003.

The majority of PWSMA is open to the taking of coho salmon year-round. In most salt waters limits are 3 fish per day, 3 fish in possession (same as freshwater regulations). However, the limits are 6 per day, 12 in possession in the terminal harvest areas identified around hatchery release sites in Valdez, Cordova, Chenega, and Whittier. Additionally, regulations limit harvest to 1 per day, 1 in possession in Shelter Bay on Hinchinbrook Island. Areas closed to fishing for coho include Eccles Creek, Eyak Lake and its tributaries, Clear Creek upriver of the Carbon Mountain Bridge, Hartney Creek above the Whitshed Road, all near Cordova. Additionally, all freshwater drainages of Valdez Arm except for a portion of Robe River and Solomon Gulch Creek are closed to fishing for coho salmon.

These fisheries are supported by both wild and hatchery fish, although the majority of the catch in Valdez Arm is hatchery fish. Coho salmon smolts are released in the port areas of Whittier, Valdez, and Cordova, as well as the remote waters of Lake Bay. Returns from these releases have established sport fisheries during August through September for Passage Canal, and late July through September for Valdez and Cordova. Wild and stocked coho salmon return to PWSMA streams from mid-August through October. Peak immigration typically occurs during early September and spawning generally occurs in streams beginning in October and continues into November.

Since 1994, the average annual coho catch in PWSMA increased 3 fold into 2004 (Table 3; Figure 9). Although catches varied, the yearly catch increased an average of 38% a year in the 10-year period from 1994-2003. This growth in coho catch can mainly be attributed to the success of the hatchery programs developed to increase angler opportunity near Valdez.

Valdez Arm supports the largest recreational fishery for coho salmon in the PWSMA and this occurs almost entirely in salt waters. Coho catch estimates remained above 50,000 since 1995 for Valdez Arm, ranging from 50,000 to 110,000 for the decade ending in 2004. The percent of the catch that was harvested averaged 72% in Valdez Arm during that period. Recreational coho salmon fishing in Port Valdez occurs almost exclusively in salt waters, since most of the freshwater drainages of Port Valdez are closed to salmon fishing by regulation.

The Whittier fishery is maintained largely by the PWSAC hatchery stock at the Whittier harbor and the Lake Bay common property stock. Lake Bay and Whittier Harbor hatchery stocks typically return to western PWS. Coho catches from the Whittier area ranged from 2,000 to 21,000 from 1994-2003. Coghill Lake and numerous other small freshwater wild stocks also

make up a small portion of this fishery (less than 5%). The Whittier coho salmon fishery had a harvest rate (% of fish kept) averaging 71% from 1994-2003 and has never been below 49%.

Table 3.–Coho salmon catch and harvest by geographical regions in the PWSMA, 1990-2004.

	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
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
2000	9,559	5,586	2,566	514	12,385	8,569	95,097	67,563	12,523	5,235	132,130	87,467
1991-2000 Avg.	9,698	5,749	2,578	252	3,787	2,747	44,163	31,662	7,565	3,803		

	Cordova[b]		Whittier[c]		Valdez[d]		Other/unknown		PWS Total	
Year[a]	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	27,214	14,930	16,218	12,626	104,962	75,109	30,803	8,420	179,197	111,085
2002	18,907	10,370	21,957	15,862	66,556	54,832	18,556	9,696	125,976	90,760
2003	44,618	19,515	20,945	15,554	109,324	83,795	30,133	8,665	205,020	127,529
2004	54,981	19,353	21,488	15,675	90,095	65,696	23,684	7,564	190,248	108,288
					Previous 10-year average (1994-2003)				109,796	70,467

[a] To increase reporting accuracy, the SWHS changed from reporting area of harvest to reporting port of landing in 2001. This had no affect on estimates for "PWS Totals."

[b] Includes reported landings in Cordova for saltwater trips, and freshwater effort along the Cordova road system.

[c] Includes reported landings in Whittier and Chenega for saltwater trips.

[d] Includes reported landings in Valdez for saltwater trips, and freshwater effort along the Valdez road system.

Coho salmon catches in the entire Cordova area have ranged from 7,000 to 38,000 from 1994-2003 (Table 4). Coho fisheries for the Cordova area constitute the largest sport fishery on wild coho salmon stocks in the PWSMA. This freshwater fishery is characterized by a low harvest rate of 55% on average from 1994-2003. Sport fishing opportunities along the Cordova road system are composed of both wild and hatchery fish. On average, 80% of the Cordova area coho salmon catch came from wild coho streams along the Cordova road system from 1994-2003. The Eyak River, the largest river system near Cordova that is fished for coho, contributed an average of 50% of the Cordova catch during that period (Figure 10), ranging as high as 70% in 2001.

The number of respondents in the SWHS was not sufficient to accurately estimate effort and catch from individual small streams on the Copper River Delta and fishing effort on some smaller streams can vary significantly with changing angling conditions. Streams like Ibeck Creek become significant producers for coho salmon when clearwater stream conditions persist.

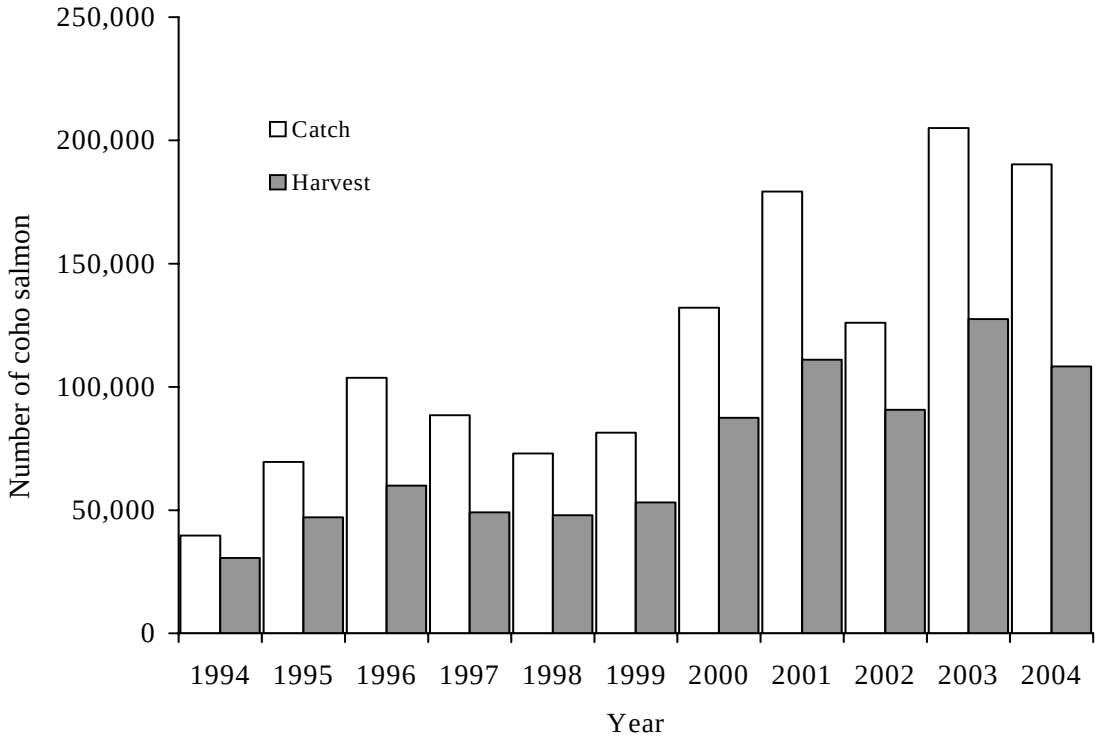


Figure 9.-Total coho salmon catch and harvest for the PWSMA, 1994-2004.

Table 4.–Coho salmon catch and harvest for selected sites along the Cordova road system, 1990-2004.

	Alaganik		Clear Creek		Eyak Drainage		Orca Inlet		Ibeck Creek		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1990	1,350	316	105	70	1,884	1,462	2,988	1,883	0	0	6,327	3,731
1991	490	306	415	211	2,486	1,355	4,018	2,989	0	0	7,409	4,861
1992	1,207	729	57	16	4,178	2,996	1,741	1,377	0	0	7,183	5,118
1993	2,255	1,127	736	332	3,854	2,431	931	721	0	0	7,776	4,611
1994	1,128	433	894	568	3,998	3,083	2,025	1,592	0	0	8,045	5,676
1995	224	177	674	375	2,893	1,831	2,830	1,364	0	0	6,621	3,747
1996	4,167	1,480	3,971	1,585	5,265	3,107	2,733	1,982	0	0	16,136	8,154
1997	1,939	789	1,089	391	2,316	1,549	3,355	1,816	0	0	8,699	4,545
1998	659	340	1,523	869	4,880	2,732	1,492	1,072	0	0	8,554	5,013
1999	3,592	1,240	1,264	800	6,806	4,914	2,558	1,809	0	0	14,220	8,763
2000	2,199	1,024	94	94	5,071	3,037	1,673	1,180	0	0	9,037	5,335
2001	3,188	1,565	0	0	17,477	10,025	3,265	1,334	796	462	24,726	13,386
2002	1,681	663	666	89	9,345	5,547	1,329	908	662	226	13,683	7,433
2003	4,655	1,708	1,290	667	15,604	8,473	4,247	2,304	11,857	3,318	37,653	16,470
2004	13,032	3,843	1,050	299	25,746	10,235	4,581	1,648	377	135	44,786	16,160
Previous 10-year average (1994-2003)	2,343	942	1,147	544	7,366	4,430	2,551	1,536	1,332	401	14,737	7,852

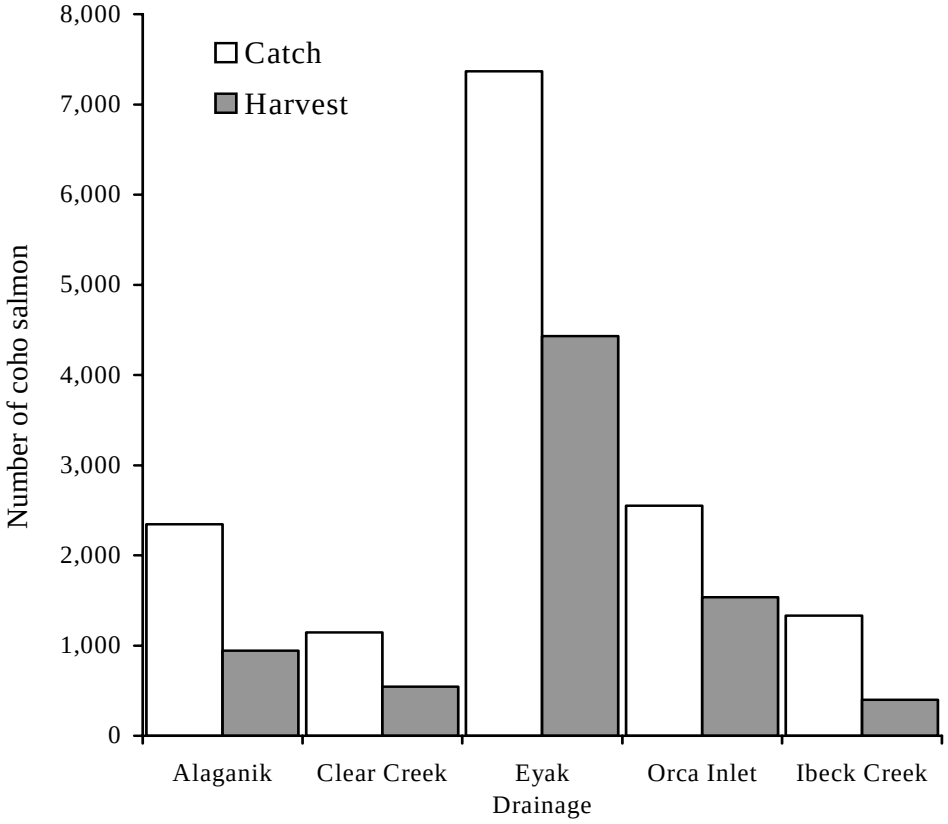


Figure 10.-Mean coho salmon catch and harvest in the Cordova area of PWSMA, 1994-2003.

The saltwater coho fishery in Cordova is principally maintained by the hatchery releases at Fleming Spit. This fishery ranged in catch from 3,000 to 4,200 coho salmon from 1994-2003, averaging 21% of the Cordova-wide catch.

Adult coho salmon began returning to the Fleming Spit fishery in 1987, and from 1994-2003 anglers caught an average of 2,551 coho and harvested an estimated 1,536 coho annually. The harvest rate of Orca Inlet coho was 18% higher than the rest of Cordova averaging 63% from 1994-2003. Anglers often catch and retain coho salmon from the Fleming Spit fishery in order to have fish to take back home, and then practice catch-and-release on wild stocks along the Cordova road system, or at remote fly-in fisheries in the PWSMA. On average, the Orca Inlet coho harvest represented almost 23% of the total harvest from the Cordova area from 1994-2003.

FISHERY PERFORMANCE IN 2004 AND 2005

The areawide coho salmon catch for 2004 was 190,248, and 108,288 were harvested, which was only a slight decrease from the peak fishery of 2003. The 2004 coho salmon recreational catches were the second highest on record for the PWSMA (Table 3 and Figure 9) and were well above

the previous 10-year average overall. The 10-year average harvest rate (percent of fish retained) for coho was 65% for 1994-2003, and was 57% in 2004. All areas of the PWSMA experienced record low rainfall and low water levels until late August 2004, and warm water temperatures that persisted until early September. Some freshwater steams in the Cordova areas had excellent angling due to low flows that held fish in certain accessible areas and slowed migration through popular fishing locations.

All areas within the PWSMA had good or excellent coho salmon fishing in 2004. Valdez saltwater coho catches reached 90,095 in 2004 (Table 3) which decreased 18% from the peak catch of 2003 but was still the fourth highest on record. In 2004, an estimated 65,696 coho salmon were harvested from the Valdez catch. In 2004, 18% of the coho salmon catch from Valdez Arm was from shoreline anglers, mostly from the Allison Point area. The coho salmon catch from the Whittier area was 21,488 or 11% of the total from the entire PWSMA, and the second highest ever recorded. Although the 2004 Whittier catch was essentially unchanged from 2002, it represented a decrease in its proportion of the PWSMA total from 2002, which peaked at 20% that year. Whittier anglers caught 60% of their coho salmon from the west side of the PWS in 2004. The coho catch out of Cordova was 54,981 constituting 28% of the total PWSMA coho salmon catch in 2004, and the highest catch ever recorded. The catch in Eyak River was 60% of the coho salmon caught in Cordova, and 30% came from Alaganik Slough. Ibeck Creek, another popular delta stream, experienced much lower fishing pressure in 2004, with a catch of 377 and harvest of 135 coho salmon, as a result of its waters becoming influenced by turbid glacial silt making them difficult to fish (Table 4). This condition also existed prior to 2001. In 2004 anglers caught 4,581 coho salmon and harvested 1,648 at Fleming Spit.

SWHS data are not available for 2005, but angling for coho salmon was reported as good in most areas. The saltwater fishery was exceptional on the west side of the PWSMA. Anglers reported good catches in late July through mid September. Copper River Delta streams were variable due to high water conditions, but Ibeck Creek was especially productive and far exceeded its average escapement as depicted by commercial fisheries aerial index counts. Delta coho salmon index counts were above average as a whole as well.

MANAGEMENT OBJECTIVES

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 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 escapement goals while providing for at least 4,000 angler-days of effort annually. The sustainable escapement goal for the Copper River Delta is 32,000-67,000. The sustainable escapement goal for coho in the Bering Drainage is 13,000-33,000 (Bue et al. 2002).

No specific fishery objectives for the remaining coho salmon fisheries in the PWSMA have been established to date. However, the directive for the management of recreational fisheries is to protect

fish stocks and their habitats and manage for sustained yield of the various coho salmon stocks and their fisheries.

BOARD OF FISHERIES ACTIONS

At its 2002 meeting the Board of Fisheries adopted a regulation for all streams crossed by the Copper River Highway that requires all coho salmon that are caught to be kept in the water if the fish is to be released. Coho removed from the water are counted in the daily bag limit. Concerns were expressed over a perceived high rate of incidental mortality near Cordova.

CURRENT ISSUES

The coho salmon sport harvest will likely remain relatively inconsequential in achieving escapement goals or determining harvest strategies in comparison to the effects of the commercial harvest. 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. ADF&G has worked with PNP hatchery managers to develop strategies to minimize further conflicts.

ADF&G does not feel there are any major conservation issues with the Copper River Delta coho stocks. Although sport fishing effort and harvest increased through 2004, ADF&G believes the necessary tools exist to manage these fisheries, including both sport and commercial, on a sustained yield basis. Regularly-scheduled aerial escapement surveys, ground surveys, and the commercial fishery provide data necessary to manage these fisheries. If any of the streams are not meeting minimum escapement guidelines, ADF&G can, and has, responded with appropriate emergency orders. In 2003 and 2004, some anglers had concerns that increased effort on the Eyak River and Ibeck Creek may overtax the available facilities for boat launching or parking, and some anglers noted that abundant fast boat traffic hinders fishing. Also, community members along the banks of the Eyak River expressed concerns that increased boat traffic will cause significant bank erosion. ADF&G plans to work with the USFS to help track fishing effort along the Cordova Road system and help mitigate any potential problems if they occur.

An increase in "remote 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. Small stocks throughout PWSMA continue to be of interest to fisheries managers.

RESEARCH AND MANAGEMENT ACTIVITIES

The 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. In 2004 the USFS conducted aerial flights to count anglers on the Copper River delta during coho salmon season and ADF&G staff conducted ground counts of anglers by boat on the Eyak River in order to ground-truth the data for that stream.

A 2-year study to collect data on small salmon stocks at Billy's Hole and user groups utilizing these resources was completed in 2004 (Bullock and Miller *In prep*), providing data on sockeye and coho returns and demographics of user groups. The return was 118 coho salmon in 2002 and 135 coho in 2004, mostly in September. This small coastal stream is typical of many in the area and

recommendations for further research and management plan options can be found in Bullock and Miller (*In prep*).

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Currently, the relatively low number of respondents to the SWHS is insufficient to precisely track angler effort, catch and harvest on individual streams along the Cordova road system. A detailed creel survey of sport fishing effort, catch and harvest on important freshwater streams on the Cordova road system, or in PWS, could help insure that wild stock fisheries will remain productive and current facilities are not overtaxed.

CHINOOK SALMON FISHERY

FISHERY DESCRIPTION

There is very little wild production of Chinook salmon in PWSMA. Healthy stocks of wild Chinook return to the Copper River every spring, but very little recreational harvest occurs in the lower Copper River. There is a small but growing harvest of feeder Chinook (winter kings) by residents in Cordova, Whittier, and Valdez and a few charters target them.

The sport fishery is supported almost entirely by hatchery-produced fish. Beginning in 1988 various hatchery programs supplemented Chinook fisheries in the PWSMA (Miller and Stratton 2001), including the ADF&G hatchery at Elmendorf, and PNP hatcheries (Wally Noerenberg and Solomon Gulch). Beginning in 1999 the ADF&G hatchery at Fort Richardson has been responsible for stocking Chinook salmon in PWSMA (Appendix A3). Chinook smolt were released at three sites near the ports of Valdez, Cordova, and Whittier. The fisheries these releases created were terminal adult return fisheries. At each site, approximately 100,000 smolt were held in net pens for 1 week to imprint to the area before release. This should produce a return of about 3,000 adults per site. Hatchery Chinook salmon return to 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. The bag and possession limits in PWSMA marine waters is 2 per day, 4 in possession for Chinook 16 inches or more, and 6 per day, 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, Hartney Creek above the Whitshed Road, 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 average catch of Chinook salmon in the PWSMA from 1994-2003 was 3,878 (Table 5; Figure 11). The average harvest for that 10-year period was 2,121. From 1994-2003, 42% of this catch came from Valdez Arm. The next largest catch occurred in Cordova, which accounted for 25% of the historical average catch in the 10 years from 1994-2003. Recently, the fishery out of Whittier expanded but the 10-year average was still lowest at 19% of the PWSMA Chinook salmon catch. Chinook salmon anglers harvested 60% of the catch on average from 1994-2003 and harvest peaked in 2003 at 3,672 fish.

Table 5.–Chinook salmon catch and harvest by geographical regions in PWSMA, 1990-2004.

Year	Cordova		Northwest		Valdez		Other sites		PWS Total	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
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
2000	649	448	410	323	4,128	1,229	898	388	6,085	2,388
1991-2000 Avg.	680	493	505	300	1,117	619	351	203		

Year[a]	Cordova[b]		Whittier[c]		Valdez[d]		Other/unknown		PWS Total	
	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	374	312	908	739	2,840	1,155	860	359	4,982	2,565
2002	590	330	1,190	770	846	367	1,118	303	3,744	1,770
2003	844	556	620	432	6,350	2,545	286	139	8,100	3,672
2004	483	224	1,712	645	2,178	1,122	1,485	562	5,858	2,553
Previous 10-year average (1994-2003)									3,878	2,121

[a] To increase reporting accuracy, the SWHS changed from reporting area of harvest to reporting port of landing in 2001. This had no affect on estimates for "PWS Totals."

[b] Includes reported landings in Cordova for saltwater trips, and freshwater effort along the Cordova road system.

[c] Includes reported landings in Whittier and Chenega for saltwater trips.

[d] Includes reported landings in Valdez for saltwater trips, and freshwater effort along the Valdez road system.

FISHERY PERFORMANCE IN 2004 AND 2005

The Chinook salmon catch for 2004 was the third highest on record for the PWSMA and harvest was fourth highest (Table 5). The catch and harvest of Chinook salmon increased slightly from 1994-2003 within a 4-year cycle (Figure 11). Valdez was the most productive port in 2004 with 37% of the catch reported by anglers using that port. In 2004 catches of Chinook salmon in Cordova were below the previous 10-year average, and catches reported in Whittier and areas reported as "unknown" were above average. The 2004 areawide harvest of Chinook salmon was 2,553, slightly above the previous 10-year average of 2,121.

SWHS estimates are not available for 2005 but early reports from anglers inseason indicated average returns in Whittier, and Valdez. Cordova anglers reported an improvement over the 2004 Chinook fishery but still below average. However, similar to 2004 the winter fishery near

Cordova was reported as better than past years and many fish were caught in February 2005 in Orca Inlet. Many of these "winter fishery" fish were white-fleshed Chinook salmon.

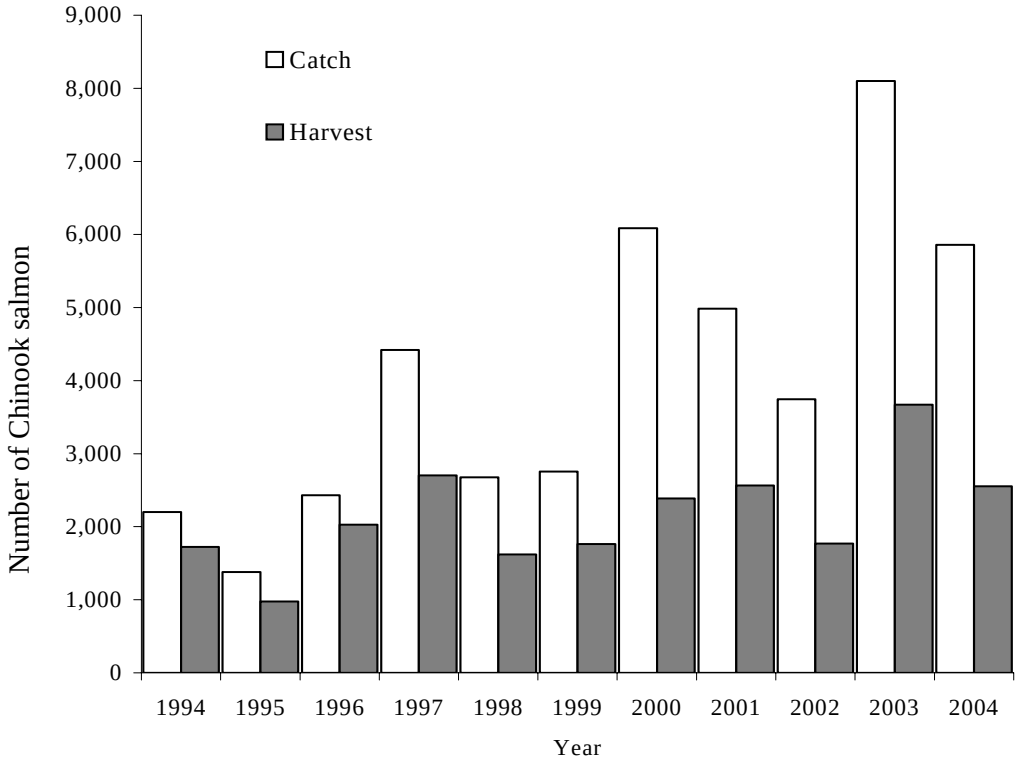


Figure 11.-Total sport catch and harvest of Chinook salmon in PWSMA, 1994-2004.

MANAGEMENT OBJECTIVES

The following specific management goals are stated in the Statewide Stocking Plan for Recreational Fisheries (ADF&G 2004). 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.

BOARD OF FISHERIES ACTIONS

At its 2002 meeting, the BOF passed a regulation to standardize the definition of "jacks" for Chinook salmon in freshwaters 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 are not counted

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. This new definition does not affect Chinook salmon in saltwater fisheries.

CURRENT ISSUES

The first Chinook salmon from the state hatchery system were stocked in 1999. Continuation of this program is based on the success of these hatchery enhanced fisheries. The Cordova Chinook fishery at Fleming Spit was started with PWSAC hatchery smolt in 1990 and has developed into an important Chinook salmon fishery for the PWSMA. The new programs in Valdez and Whittier produced returns of some 2-ocean fish in 2001, but fishable adults (3 to 5-ocean fish) were not expected until at least 2002. It will take several years to determine the success of the program.

Working with local organizations and the cities to find better Chinook smolt release sites in Valdez and Whittier is a top priority. The City of Valdez chose a new site for spring 2005 at the Old Town site east of the harbor. This site was used in 2005 and improved the logistics of the release by removing the need for saltwater net pens to acclimate smolts. In Whittier a new site had been chosen on Whittier Creek and it was used in 2004 and 2005. Unfortunately, the Whittier Chinook release has now been terminated due to reductions in budget and hatchery production at the state hatcheries.

RESEARCH AND MANAGEMENT ACTIVITIES

A Chinook salmon study is slated to begin in spring 2006 that will determine the success of the smolt releases in the PWSMA. Chinook harvests will be sampled in Valdez, Whittier and Cordova to determine the proportion of hatchery fish in the sport harvest. Otoliths will be examined for hatchery marks that identify these fish.

Although not conducted by PWSMA staff, Region III Sport Fish projects in the upper Copper River have studies that affect PWSMA fish. The division is currently radiotagging adult Chinook on the lower Copper River to access migration characteristics, and to aid in a mark-recapture analysis drainage-wide. Additionally a weir project on the Gulkana River is conducted to estimate escapement.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Funding requests have been submitted for FY 2007 to continue the study to determine the hatchery contributions of Chinook salmon to the Chinook sport fishery in PWS. This study will determine the effectiveness of Chinook salmon hatchery releases in PWSMA waters, and if the management goals for Chinook salmon are being met with current Chinook releases.

SOCKEYE SALMON FISHERY

FISHERY DESCRIPTION

Sockeye salmon return to PWSMA streams from June through August, with peak run timing varying by stream. Spawning occurs from mid-July through September. Bag and possession limits governing the saltwater sport fishery for sockeye salmon were 6 and 12 fish, respectively (daily limit is inclusive of chum, pink and coho salmon). 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. In Robe River near Valdez, the bag and possession limits are 1 fish.

Historically the major fisheries for sockeye salmon in PWSMA occur at Eshamy, Cordova, Valdez, and Coghill for freshwaters and Main Bay for salt waters. Main Bay is a PWSAC hatchery facility where an average of 5 million sockeye fry were released from 1995-2004. From 1994 through 2003, the average catch of sockeye salmon from PWSMA was 13,370 (Table 6; Figure 12). Catches ranged from 7,797 sockeye in 1995 to a peak of 17,350 in 2000. Harvest rates of sockeye salmon ranged from 46% to a peak of 76% in 2004, with a 10-year average of 53%. On average during the 10 years from 1994-2003, 11% of the sockeye salmon caught in the PWSMA were from remote non-road-accessible areas away from Cordova or Valdez (Coghill and Eshamy).

During the early 2000s, the sockeye fisheries at Coghill and Eshamy were rebuilding after several years of poor returns in the 1990s. 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 during the early 2000s and were meeting escapement goals, as was Eshamy, which exceeded its escapement goal in 2001 and 2002. Both Eshamy and Coghill exceeded the upper end of the escapement goal range several times during the early 2000s.

FISHERY PERFORMANCE IN 2004 AND 2005

The sport catch of sockeye salmon in PWSMA for 2004 of 13,151 was slightly below the 1994-2003 average catch of 13,370 (Table 6; Figure 12) while the harvest of 9,972 was well above the previous 10-year average. Regionally within the PWSMA the catch and harvest was mixed. The catch of sockeye salmon from areas off the road system (Eshamy + Coghill = 719, Table 7) was only 5% of the total PWSMA catch in 2004. Average sport catch was 944 for the Coghill drainage and 494 for the Eshamy drainage for 1994-2003 (Figure 13). The freshwater systems along the Cordova road system produced a catch and harvest of sockeye salmon less than the previous 10-year average in 2004. In 2004 the sockeye run at Eshamy was low and an emergency order was implemented to close the sport fishery on August 24 and the Eshamy escapement count did not reach the lower end of the escapement range of 20,000 fish. The Coghill sockeye salmon run in 2004 was predicted to exceed the escapement goal and an emergency order was used to raise the sport bag limit to 12 fish in that system, but higher catches did not occur. Additionally, sockeye salmon fishing in areas defined as “Other or Unknown” was near average in 2004.

SWHS estimates for 2005 are unavailable, but anglers reported a good sport fishery for sockeye salmon in 2005. Based on weir counts, both Eshamy and Coghill sockeye salmon escapements were within the escapement goal ranges in 2005. The fishery on the Copper River Delta was reported as above average for sockeye salmon, and escapement counts based on aerial surveys of index streams in the Copper River Delta were above average early in 2005. Sockeye salmon moved into the Eyak River early in 2005 and the fishery appeared to last longer than typical for that system.

Table 6.–Sport catch and harvest of sockeye salmon in PWSMA, 1990-2004.

	Cordova Area		Northwestern PWS		Valdez Area		Other Sites in PWS		PWS Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1990	708	466	1,213	533	2,823	1,630	282	146	6,416	3,562
1991	2,050	806	871	444	1,746	1,471	342	342	5,795	3,754
1992	3,641	1,578	2,752	1,947	2,506	2,153	1,586	1,020	12,656	8,358
1993	2,204	1,321	1,505	1,152	1,706	1,235	741	401	7,625	5,269
1994	6,101	3,066	1,707	601	4,159	2,368	354	283	13,301	6,948
1995	2,472	590	1,365	739	1,791	1,358	992	232	7,797	3,711
1996	5,076	2,235	2,295	1,246	2,600	1,367	319	248	12,058	5,496
1997	2,265	972	3,039	1,374	1,669	1,077	691	513	10,654	5,086
1998	5,600	2,015	4,311	2,328	1,595	566	1,152	959	16,478	8,312
1999	5,541	2,855	4,366	2,942	3,510	2,220	1,698	1,207	16,891	10,666
2000	3,816	2,189	4,085	2,447	7,101	3,550	471	325	17,350	9,830
1991-2000 Avg.	3,877	1,763	2,630	1,522	2,838	1,737	835	553		
	Cordova[b]		Whittier[c]		Valdez[d]		Other/unknown		PWS Total	
Year[a]	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	769	298	4,543	3,140	3,278	2,228	3,078	925	11,668	6,591
2002	1,399	798	5,146	3,708	2,765	1,413	3,481	1,695	12,791	7,614
2003	2,005	631	8,262	5,025	1,783	884	2,658	1,276	14,708	7,816
2004	1,498	952	6,323	5,573	2,889	2,189	2,441	1,258	13,151	9,972
					Previous 10-year average (1994-2003)				13,370	7,207

[a] To increase reporting accuracy, the SWHS changed from reporting area of harvest to reporting port of landing in 2001. This had no affect on estimates for "PWS Totals."

[b] Includes reported landings in Cordova for saltwater trips, and freshwater effort along the Cordova road system.

[c] Includes reported landings in Whittier and Chenega for saltwater trips.

[d] Includes reported landings in Valdez for saltwater trips, and freshwater effort along the Valdez road system.

MANAGEMENT OBJECTIVES

For sockeye salmon returning to Eshamy and Coghill lakes, the management objective is to meet the biological escapement goals with a range of 20,000-40,000 for Eshamy, and 20,000-40,000 for Coghill (Bue et al. 2002), while providing at least 2,000 angler-days of effort annually at each location.

BOARD OF FISHERIES ACTIONS

No specific actions were taken by the Board with respect to this fishery during the 2002 meeting.

CURRENT ISSUES

Although Eshamy Lake and Coghill stocks appear to be recovering, escapement in these systems is highly influenced by commercial fishery management strategies. Managers should continue to monitor escapement inseason and take appropriate management action to assure escapement is met. As angler effort increases in Whittier due to the new road access, small stocks of sockeye salmon, especially those in the western half of the PWSMA should be monitored to assess escapement.

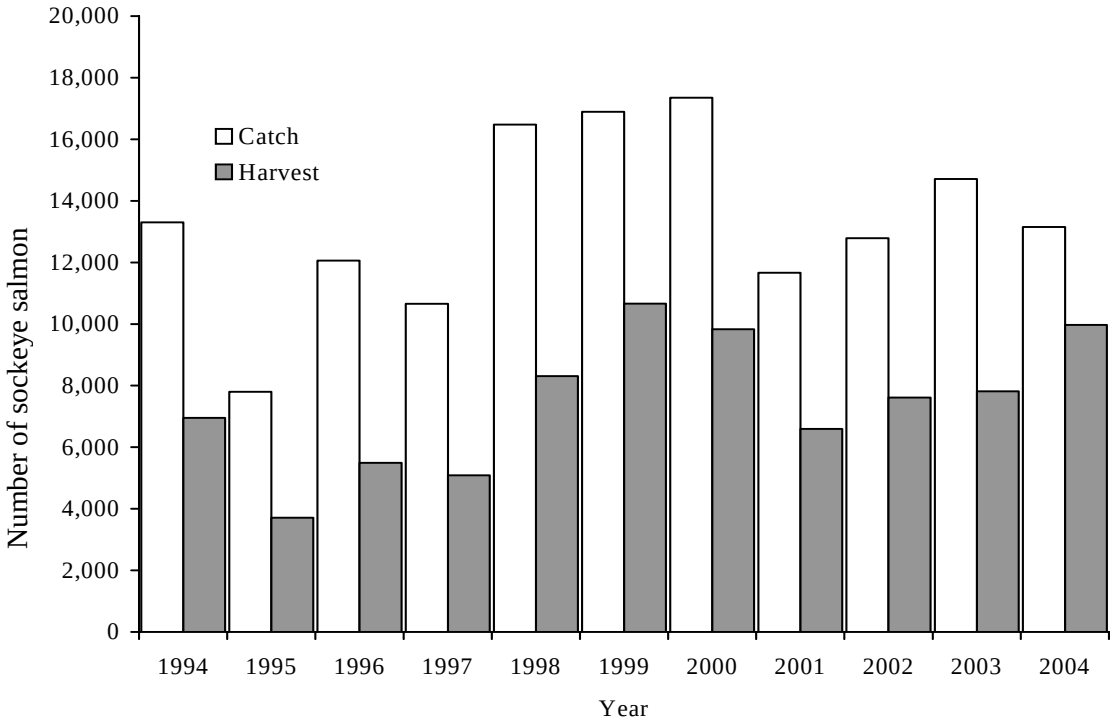


Figure 12.-Total sport catch and harvest of sockeye salmon in PWSMA, 1994-2004.

Table 7.–Sport catch and harvest of sockeye salmon at selected sites in PWSMA, 1990-2004.

	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
1990	165	49	340	175	2,823	1,630	708	466	3,088	1,708	6,416	3,562
1991	9	0	247	152	1,746	1,471	2,050	806	3,793	2,131	5,795	3,754
1992	66	0	1,019	649	2,506	2,153	3,641	1,578	9,065	5,556	12,656	8,358
1993	114	79	793	581	1,706	1,235	2,204	1,321	5,012	3,374	7,625	5,269
1994	19	19	189	148	4,159	2,368	6,101	3,066	8,934	4,413	13,301	6,948
1995	606	62	735	350	1,791	1,358	2,472	590	4,665	1,941	7,797	3,711
1996	1,411	631	834	206	2,600	1,367	5,076	2,235	7,213	3,292	12,058	5,496
1997	1,731	788	510	310	1,669	1,077	2,265	972	6,744	2,911	10,654	5,086
1998	1,518	349	561	276	1,595	566	5,600	2,015	12,804	7,121	16,478	8,312
1999	1,739	752	443	248	3,510	2,220	5,541	2,855	11,199	7,446	16,891	10,666
2000	131	106	505	219	7,101	3,550	3,816	2,189	9,613	5,955	17,350	9,830
2001	97	77	87	87	3,278	2,228	769	298	8,206	4,199	11,668	6,591
2002	392	297	469	390	2,765	1,413	1,399	798	9,165	5,514	12,791	7,614
2003	1,761	625	135	104	1,783	884	2,005	631	9,024	5,572	14,708	7,816
2004	54	0	665	296	2,889	2,189	1,498	952	8,045	6,535	13,151	9,972
Previous 10 year average (1994-	941	371	447	234	3,025	1,703	3,504	1,565	8,757	4,836	13,370	7,207

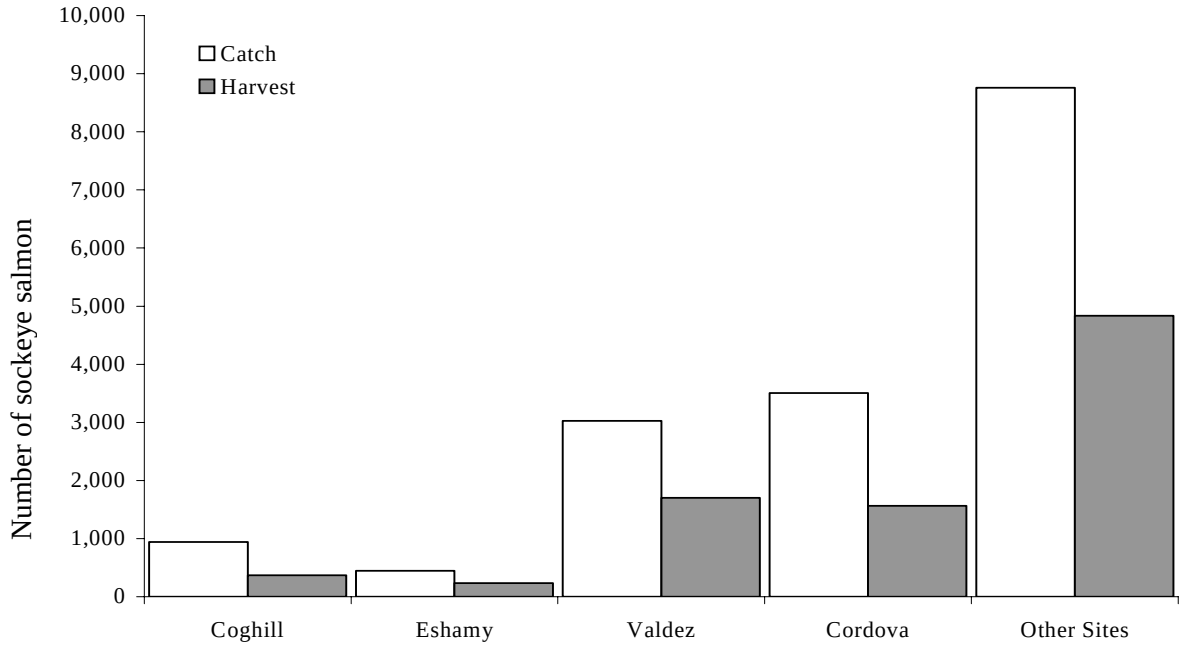


Figure 13.-Mean sport catch and harvest of sockeye salmon at selected sites in PWSMA, 1994-2003.

RESEARCH AND MANAGEMENT ACTIVITIES

The Division of Commercial Fisheries conducts an extensive research and management program for PWS sockeye. Weirs are used to count sockeye salmon escapement into the Eshamy and Coghill drainages. Aerial surveys are also flown to determine sockeye salmon escapement on the Copper River Delta and the upper Copper River. Additionally, inseason samples of commercial catches are taken to determine the proportion of hatchery stocks in the catch.

In 2003 and 2004 the Sport Fish Division conducted a weir and creel survey funded through the Federal Office of Subsistence Management to assess sockeye and coho returns to Billy's Hole, and demographics of the user groups. Results of the study showed a small sockeye salmon return of 1,164 in 2003, and 985 in 2004, mostly in July (Bullock and Miller *In prep*).

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Several streams in PWS have small runs of sockeye salmon. Recent studies at Billy's hole in northern PWS showed a run of approximately 1,000 fish and that this stock is utilized by both sport and subsistence fishers (Bullock and Miller *In prep*). The extent of commercial harvest of small sockeye stocks in the mixed-stock commercial fishery in PWS is not known due to the inability to distinguish individual stocks. Scale pattern analysis may provide a way to differentiate these stocks within the commercial catch. Research should explore the possibility of distinguishing among wild stocks so that management staff could determine the extent that fisheries may be impacting these small runs.

PINK SALMON FISHERY

FISHERY DESCRIPTION

Pink salmon return to the PWSMA from mid-June through late August, with the peak of the return occurring in late July. 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, releasing an average of 590,000,000 fry yearly from 1995-2004. The stocking of pink salmon in the PWSMA is accomplished entirely by PNP hatcheries. The sport fishery in Valdez Arm targets early-run pink salmon returning to the VFDA Solomon Gulch Hatchery.

The sport fishing season is open all year and the bag and possession limits for pink salmon are 6 fish per day, 12 in possession (daily limit is inclusive of chum, sockeye and coho salmon) except in the freshwater drainages crossing the Copper River Highway and the Robe River near Valdez, where the limits are 3 fish per day, 3 in possession. Closed waters near Cordova include Eccles Creek, Eyak Lake drainages, Clear Creek upstream of the Carbon Mountain Bridge, and Hartney Creek above Whitshed Road. Additionally, all freshwater drainages of Valdez Arm except for Robe River and Solomon Gulch Creek are closed to taking salmon.

The pink salmon sport fishery catch in the PWSMA has been the largest in the state since 1985. The 1994–2003 average annual sport catch of pink salmon in PWSMA was 110,503 fish (Table 8; Figure 14). From 1994-2003 on average 76% of this catch was from the fishery in Valdez Arm and shorebased anglers accounted for 66% of that catch (Table 9; Figure 15). The pink salmon sport fishery in the PWSMA as a whole was characterized by a very low harvest rate compared to other salmon species at 33% averaged over 10 years (1994-2003), and tended to remain between 30,000 and 37,000 fish regardless of large increases in catch. The pink salmon returns to PWS are highly cyclic and totaled 26 million in 2004, a decrease from the record return in 2003 of 56 million (Ashe et al. *In prep*).

FISHERY PERFORMANCE IN 2004 AND 2005

The sport catch of pink salmon from PWSMA waters in 2004 of 116,141 was above the average catch for the previous 10 years, but the harvest of 29,531 pink salmon was below average (Table 8). The 2004 pink salmon catch fell from the previous record high in 2003. In 2004 Valdez was the area's largest pink salmon fishery with a catch of 78,326. Interestingly, the catch out of Whittier in 2004 was double that of 2003, most likely due to increased sport fishing after the completion of several access projects. Whittier was the second largest pink salmon fishery in the PWSMA, although as recently as 2001, catches were similar to Cordova.

SWHS estimates for 2005 are not yet available, but 2005 was a record year for pink salmon returns in PWSMA. Commercial harvests reached record highs and wild pink escapements were above average throughout the PWSMA. An emergency order was used to increase the sport fishing bag limit to 12 fish per day in Valdez Arm in late June 2005.

MANAGEMENT OBJECTIVES

The large commercial harvest averaging 32 million pink salmon for 1994-2003 drives management of the PWSMA pink salmon sport fishery. The escapement goal range for pink salmon is 1.25–2.75 million fish for the entire Prince William Sound area. Regularly scheduled aerial flights assess escapements inseason, and the commercial fishery is opened in accordance with management plans.

Table 8.–Pink salmon catch and harvest by geographical regions in PWSMA, 1990-2004.

Year	Cordova Area		Northwest PWS		Valdez Area		Other Sites in PWS		PWS Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
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
2000	7,715	1,295	8,378	1,909	110,386	31,885	9,615	3,425	136,094	38,514
1991-2000 Avg.	4,014	723	5,787	1,181	77,984	34,150	11,635	2,420		
	Cordova[b]		Whittier[c]		Valdez[d]		Other/unknown		PWS Total	
Year[a]	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	7,676	1,896	7,632	2,539	83,264	28,521	17,309	2,903	115,881	35,859
2002	2,934	457	7,386	1,193	52,507	20,713	10,927	4,061	73,754	26,424
2003	6,713	1,777	11,432	3,237	104,879	27,281	20,690	1,282	143,714	33,577
2004	8,053	1,189	21,237	2,188	78,326	25,221	8,525	933	116,141	29,531
					Previous 10-year average (1994-2003)				110,503	36,057

[a] To increase reporting accuracy, the SWHS changed from reporting area of harvest to reporting port of landing in 2001. This had no affect on estimates for "PWS Totals."

[b] Includes reported landings in Cordova for saltwater trips, and freshwater effort along the Cordova road system.

[c] Includes reported landings in Whittier and Chenega for saltwater trips.

[d] Includes reported landings in Valdez for saltwater trips, and freshwater effort along the Valdez road system.

For hatchery-produced pink salmon returning to Valdez Arm, the management objectives are: (1) produce through supplemental hatchery production a sport harvest of 50,000 pink salmon ;

(2) provide 25,000 angler-days of pink salmon fishing opportunity annually; and (3) promote diverse sport fishing opportunity by providing pink salmon to both boat and shorebased anglers.

BOARD OF FISHERIES ACTIONS

No specific actions were taken by the Board with respect to this fishery during the 2002 meeting.

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 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. ADF&G has worked with PNP hatchery managers to develop strategies to minimize further conflicts,

including 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. These strategies have been effective since 1993 in maintaining an orderly fishery.

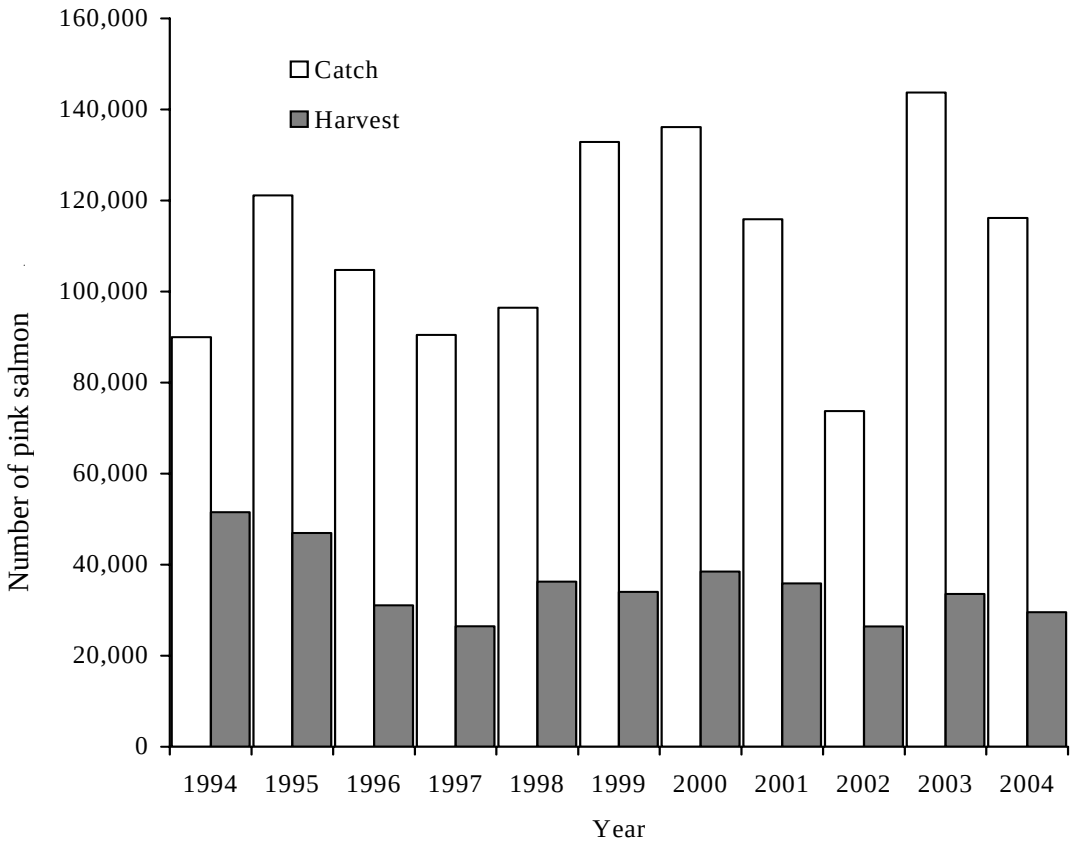


Figure 14.-Total pink salmon catch and harvest in PWSMA, 1994-2004.

RESEARCH AND MANAGEMENT ACTIVITIES

The Division of Sport Fish does not currently conduct any research targeted on pink salmon stocks in the PWSMA, however some incidental data on pink salmon escapement is obtained from a sockeye salmon weir at Billy's Hole, a small lake-stream system in northern PWS (Bullock and Miller *In prep*). The Division of Commercial Fisheries also conducts extensive research programs to monitor and predict wild fish escapement in the PWSMA. Area managers for these two divisions should continue to work together to reduce potential conflicts between commercial and sport fisheries.

Table 9.–Pink salmon catch and harvest by method in Valdez Arm area of PWSMA, 1991-2004.

	Boat		Shore		Stream		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
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
2000	36,998	10,813	72,815	21,072	573	0	110,386	31,885
2001	35,256	2,200	57,002	21,026	224	69	92,482	23,295
2002	11,879	3,983	40,628	16,730	220	25	52,727	20,738
2003	33,333	9,543	58,348	15,977	267	36	91,948	25,556
2004	21,804	5,994	48,948	17,070	648	111	71,400	23,175
Previous 10-year average (1994-2003)	28,680	9,523	54,441	20,593	368	24	83,488	30,140

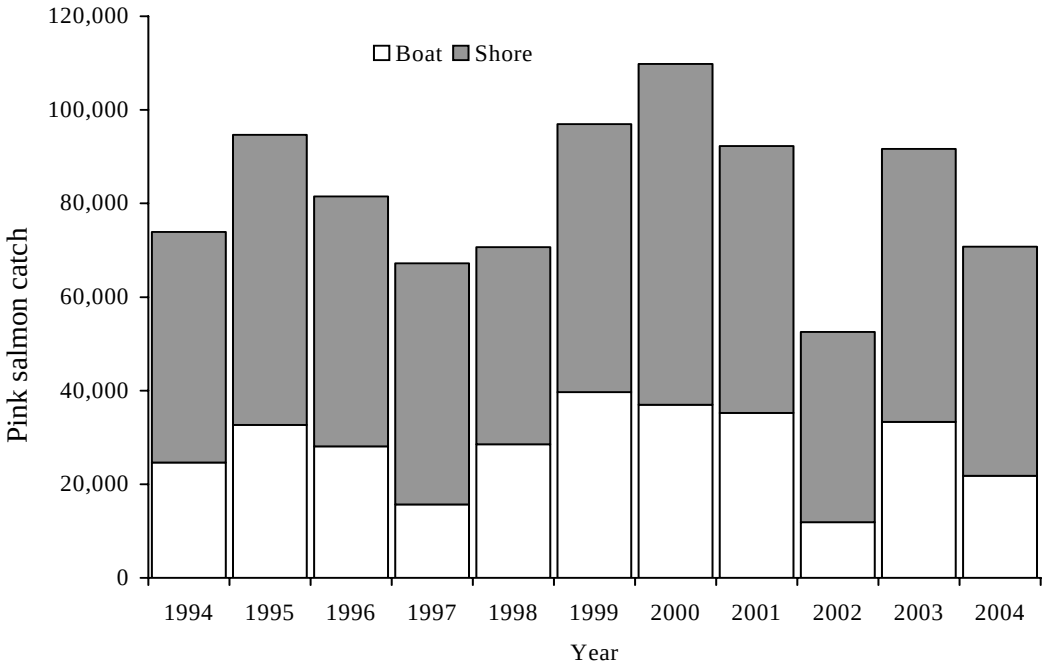


Figure 15.-Pink salmon catch by method in the Valdez Arm area of PWSMA 1994-2004.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Some evidence indicates that hatchery-strayed pink and chum salmon can escape into PWS streams that contain wild salmon runs (Rick Merizon, ADF&G, Division of Commercial Fisheries, Cordova, personal communication). The magnitude or repercussions of this situation on wild salmon stocks are unclear. Sport Fish Division staff members from Cordova have assisted the commercial fisheries staff in preliminary assessments of stray fish in Columbia Bay and Nelson Bay. It is recommended that further research should determine the magnitude of hatchery straying, and assess the potential for straying to harm wild fish stocks. Any potential threats to wild salmon stocks in the PWSMA from current and future hatchery salmon releases should be minimized.

CHUM SALMON FISHERY

The chum salmon fishery is a relatively small part of the PWSMA salmon fishery and largely limited to the western PWSMA. Limits for chum salmon are 6 per day, 12 in possession (daily limit is inclusive of pink, sockeye and coho salmon). On average the annual sport catch was 10,916 chum salmon from PWSMA from 1994-2003 (Table 10; Figure 16). Chum salmon had the lowest average harvest rate of any salmon species at 19% from 1994-2003, and ranged as low as 13% in peak catch years. On average 100,000,000 chum fry are released in PWS by PWSAC. In the early 2000s, more chum salmon returning to Wally Noerenberg Hatchery (WNH) on Esther Island were caught and a small recreational fishery targeting chums appeared to be developing. From 1993-2004 the proportion of the catch coming from the Valdez area declined while that from the Whittier area (port closest to WNH) increased (Table 10).

The chum salmon catch out of Whittier in 2004 was a third more than 2003, and 2003 was twice that of 2002. The sport catch of chum salmon over the 10 years from 1994-2003 was highly variable in the PWSMA ranging from 15,376 to 5,134. The 2004 estimates of 13,227 caught and 1,972 chum salmon harvested in the PWSMA as a whole, was well above the 10-year average for catch but not harvest. The 2004 catch was the second highest on record.

WILD TROUT FISHERIES

FISHERY DESCRIPTION

Wild cutthroat, and to a limited extent rainbow trout, are available to anglers throughout the year in the PWSMA. The peak fishing opportunities typically occur as the fish migrate to spawning areas from April to June; and as they head to overwintering areas, from mid-June through September. Spawning begins in April and lasts into June. Wild rainbow trout are limited in distribution to a few streams on the Copper and Bering River deltas, while cutthroat trout are found in many streams in PWS and in most streams on the deltas. Hybrids of wild cutthroat and rainbow trout have also been observed on several systems (G. Reeves, USFS Pacific Northwest regional research laboratory, Corvallis, Oregon, personal, communication; Marston et al. *In prep*). Wild spawning fish are differentiated by regulation from stocked rainbow trout.

Regulations for wild cutthroat and rainbow trout and their hybrids are inclusive. The daily bag and possession limits for PWSMA are 2 trout with only 1 over 20 inches, except in 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. Prior to

Table 10.–Sport catch and harvest of chum salmon in PWSMA, 1990-2004.

	Cordova Area		Northwestern PWS		Valdez Area		Other Sites in PWS		PWS Total	
Year	Catch	Harves	Catch	Harves	Catch	Harvest	Catch	Harvest	Catch	Harvest
1990	102	45	510	236	4,136	1,258	940	406	5,688	1,945
1991	490	143	474	229	1,401	838	753	412	3,118	1,622
1992	813	38	220	91	2,621	804	191	31	3,845	964
1993	565	170	1,732	686	2,686	873	822	289	5,805	2,018
1994	419	134	1,273	202	1,747	767	1,695	224	5,134	1,327
1995	1,081	73	1,967	234	3,708	653	1,150	152	7,906	1,112
1996	1,878	110	1,952	576	7,983	1,043	3,563	351	15,376	2,080
1997	988	87	1,351	290	4,522	1,388	4,298	828	11,159	2,593
1998	2,017	15	2,166	543	6,230	1,424	691	266	11,104	2,248
1999	912	367	1,591	255	3,244	338	1,465	370	7,212	1,330
2000	1,138	510	4,174	1,169	3,926	437	3,359	642	12,597	2,758
1991-2000	1,030	165	1,690	428	3,807	857	1,799	357		
	Cordova[b]		Whittier[c]		Valdez[d]		Other/unknown		PWS Total	
Year[a]	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	2,504	287	2,325	322	2,762	773	3,446	177	11,037	1,559
2002	973	40	2,571	662	2,026	405	1,854	280	7,424	1,387
2003	1,829	302	5,253	722	2,872	475	2,160	550	12,114	2,049
2004	823	423	8,396	1,367	2,895	135	1,113	47	13,227	1,972
					Previous 10-year average (1994-2003)				10,916	1,909

[a] To increase reporting accuracy, the SWHS changed from reporting area of harvest to reporting port of landing in 2001. This had no affect on estimates for "PWS Totals."

[b] Includes reported landings in Cordova for saltwater trips, and freshwater effort along the Cordova road system.

[c] Includes reported landings in Whittier and Chenega for saltwater trips.

[d] Includes reported landings in Valdez for saltwater trips, and freshwater effort along the Valdez road system.

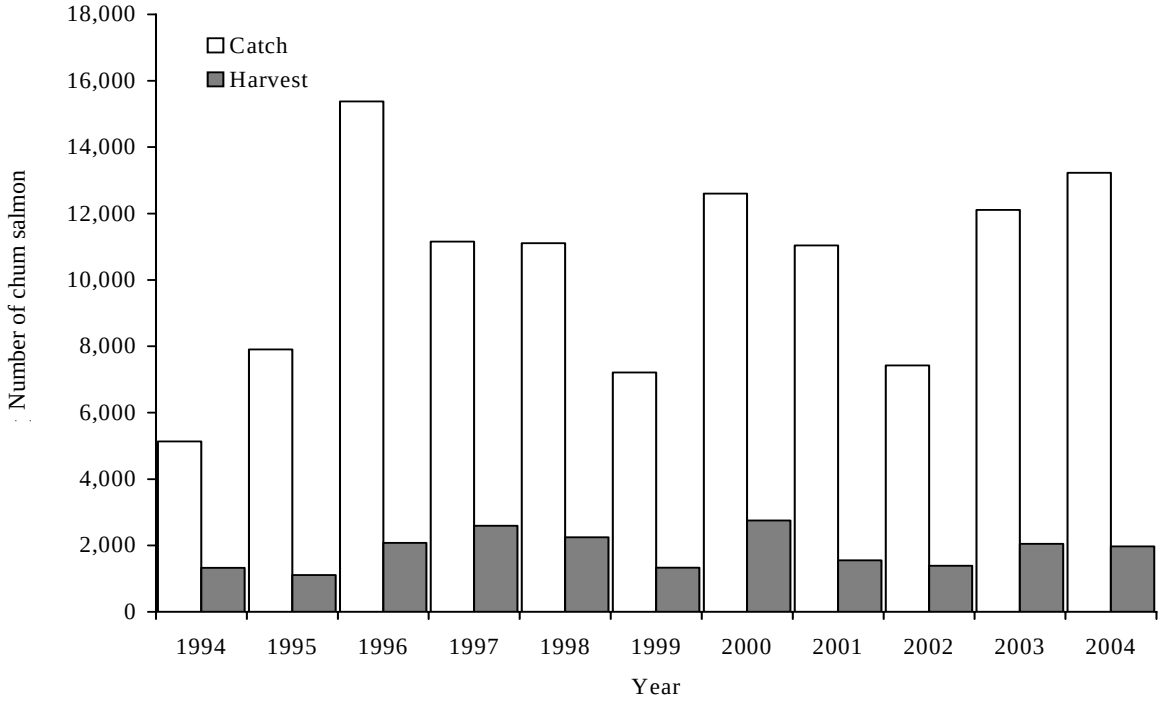


Figure 16.-Total sport catch and harvest of chum salmon in PWSMA, 1994-2004.

1994, all streams in the PWSMA were open year-long to fishing for trout. In 1994, the Board of Fisheries established a spawning season closure from April 15 through June 14.

Catch estimates were focused on cutthroat trout because wild rainbow trout are only occasionally caught in the PWSMA. The annual catch of cutthroat trout from 1994-2003 ranged from 632 to 4,194 fish, with a 10-year average of 2,458 (1994-2003) (Table 11; Figure 17). The annual harvest rate varied from 1994-2003 but averaged only 22%, reflecting the popularity of catch-and-release trout fishing and management directives that mandate catch-and-release near Cordova. The Eyak and Eshamy drainages and other Cordova road-accessible streams are the three major fishing areas for cutthroat trout in the PWSMA. For the 1994-2003 average, the Eyak, Eshamy, and Cordova roadside stream areas accounted for 7%, 18%, and 20% of the 10-year average annual catch respectively.

FISHERY PERFORMANCE IN 2004 AND 2005

The sport catch of cutthroat trout in PWSMA for 2004 of 1,454 fish was well below the 1994-2003 average catch of 2,458 (Table 11) and was less than half that of 2003. The catch of cutthroat trout in streams near Cordova in 2004 was below average, as was the catch at Eshamy. Harvest rates for each area ranged from 0% at Eshamy to 28% in "Other/Unknown" areas of PWS, with an average of 18% overall in 2004. Fluctuations in the fisheries and low response rates to the SWHS make it difficult to identify specifics of these cutthroat trout fisheries.

SWHS estimates for 2005 are unavailable, but angler reports indicated that 2005 was a good year for wild trout fisheries in the PWSMA. Fishers on the Copper River Delta reported good catches and PWS anglers reported good catches at Eshamy.

MANAGEMENT OBJECTIVES

No specific fishery objectives have been established for PWSMA cutthroat trout fisheries to date.

BOARD OF FISHERIES ACTIONS

In 2002 the bag and possession limits for cutthroat trout were grouped with those of rainbow trout. The bag/possession limit for all trout in combination is 5 fish with only one over 10 in. along the Cordova road system. For all other waters the bag/possession limit for all trout is 2 with only 1 over 20 in.

CURRENT ISSUES

The PWSMA is the most northern and western extreme of the natural range for cutthroat trout and the populations are small in size and distribution. Populations of fish on the outer extremes of their distribution tend to be more susceptible to environmental changes and exhibit highly variable survival rates. Cutthroat trout are also subject to incidental catch in the commercial fisheries, increasing the risk to these small stocks. 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.

Table 11.–Cutthroat trout catch and harvest (1990-2004) 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
1990	245	164	474	131	131	33	621	195	1,471	523
1991	155	68	77	48	290	213	658	87	1,180	416
1992	477	73	705	412	412	0	1,457	530	3,051	1,015
1993	308	75	240	66	392	11	3,701	788	4,641	940
1994	297	154	1,046	253	63	0	605	205	2,011	612
1995	36	27	75	18	307	34	214	43	632	122
1996	79	12	225	61	884	49	1,583	585	2,771	707
1997	83	16	523	123	894	81	2,615	422	4,115	642
1998	50	33	571	108	308	17	2,350	559	3,279	717
1999	172	65	199	111	0	0	861	273	1,232	449
2000	52	0	202	43	1,003	27	1,538	285	2,795	355
2001	305	52	95	0	12	0	1,106	324	1,518	376
2002	418	13	992	54	84	0	536	113	2,030	180
2003	256	19	973	206	839	0	2,126	810	4,194	1,035
2004	122	10	371	80	312	0	649	177	1,454	267
Previous 10-year average (1994-	175	39	490	98	439	21	1,353	362	2,458	520

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. 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. Additional funding was acquired to collect data in the Special Management Area for Trout, and allow access to sites in the study area on a regular sampling schedule in 2002-2003. This project is published in the report Marston et al. (*In prep*). Studies designed to identify critical spawning habitat of northern tributary streams were initiated in 2004 and completed in 2005.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

The department has submitted proposals for funding through the *Exxon Valdez* Oil Spill (EVOS) restorati 4,500 gram on several occasions in the recent past. These projects were working towards the development of a PWSMA cutthroat trout restoration management plan in response to impacts of the Exxon oil spill in 1989 (Hepler et al. 1993a). The merit of these projects was recognized, however neither project was funded. The value of these studies to document recovery, as well as the basic understanding of cutthroat trout stocks in PWSMA still exists.

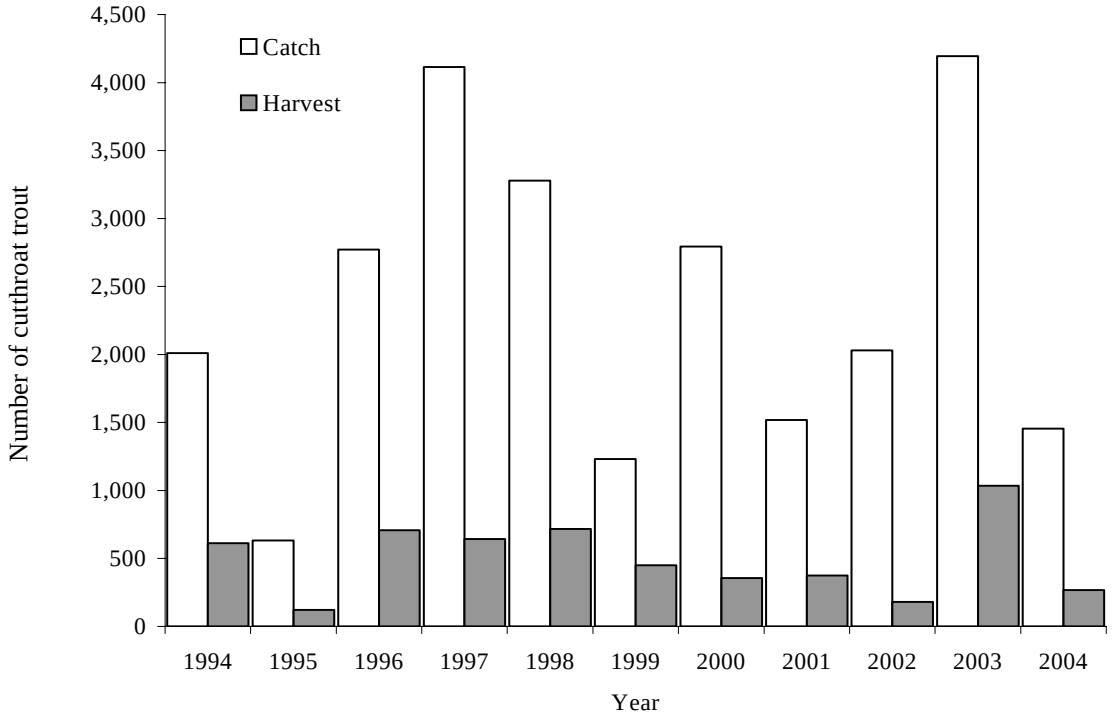


Figure 17.-Total sport catch and harvest of cutthroat trout in PWSMA, 1994-2004.

HALIBUT FISHERY

FISHERY DESCRIPTION

Halibut are one of the most popular targets of anglers fishing marine waters of the PWSMA and are caught throughout most marine waters of PWS. The majority of halibut are harvested from May through early September.

The limits for halibut are 2 fish per day, 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 in Meyer and Stock (2002).

The average annual sport catch of halibut from PWSMA waters from 1994-2003 was 42,127 halibut ranging from 33,496 to 49,641 (Table 12; Figure 18). During this period, catch and harvests remained stable until 2004 when they rose sharply. In 1990 the halibut catch in PWSMA was 18,139 and it has grown fourfold since that time. Sharp increases occurred mainly before 1993 and in 2004.

FISHERY PERFORMANCE IN 2004 AND 2005

The sport catch of halibut from the PWSMA during 2004 of 77,774 was the highest on record, and the harvest rate was 57% (Table 12; Figure 18). The weather conditions in 2004 were exceptionally mild allowing for more boat access to open waters than usual. All ports showed catches and harvests well above previous years. As in the past, the largest portion of the PWS halibut catch (36% in 2004) was from anglers fishing out of Valdez (Table 12), but this decreased sharply from 2001 (49%). The proportional halibut catch from Whittier increased to 29% of PWSMA in 2004.

Table 12.–Sport catch and harvest of halibut in PWSMA, 1990-2004.

	Cordova Area		Northwestern		Valdez Arm Area		Other Sites PWS		PWS Total	
YEAR	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1990	769	486	1,457	1,038	10,837	6,045	4,294	2,712	18,139	10,318
1991	2,581	1,463	1,890	1,484	8,120	6,122	4,632	3,613	17,273	12,425
1992	3,450	2,305	1,460	1,151	12,973	8,379	7,347	4,868	26,610	17,105
1993	3,807	2,165	3,121	1,705	14,664	8,457	10,508	5,676	35,107	19,025
1994	4,213	2,488	2,991	2,438	10,910	7,457	12,875	8,913	33,798	22,097
1995	6,126	2,627	4,474	2,639	12,968	9,087	15,264	8,943	41,585	24,067
1996	7,165	3,176	5,074	3,505	14,227	8,029	12,596	7,780	39,227	21,584
1997	4,955	2,636	7,239	4,355	17,168	9,918	16,079	9,196	49,126	27,322
1998	5,785	3,310	4,898	3,786	15,961	9,337	12,547	7,891	39,301	23,343
1999	6,864	3,339	5,754	4,048	20,792	11,348	13,154	8,734	46,908	26,711
2000	7,188	3,290	6,919	5,479	20,549	12,198	15,208	10,119	49,641	30,089
1991-2000	5,213	2,680	4,382	3,059	14,833	9,033	12,021	7,573		

	Cordova[b]		Whittier[c]		Valdez[d]		Other/unknown		PWS Total	
Year[a]	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	3,893	2,291	9,623	6,570	16,617	11,129	3,363	1,922	33,496	21,912
2002	2,645	1,796	11,444	9,624	13,885	8,333	11,835	7,898	39,809	27,651
2003	4,029	2,281	12,390	8,883	18,433	11,384	13,526	8,717	48,378	31,265
2004	7,092	4,183	22,428	13,107	28,415	17,631	19,839	9,716	77,774	44,637
					Previous 10-year average (1994-2003)				42,127	25,604

[a] To increase reporting accuracy, the SWHS changed from reporting area of harvest to reporting port of landing in 2001. This had no affect on estimates for "PWS Totals."

[b] Includes reported landings in Cordova for saltwater trips, and freshwater effort along the Cordova road system.

[c] Includes reported landings in Whittier and Chenega for saltwater trips.

[d] Includes reported landings in Valdez for saltwater trips, and freshwater effort along the Valdez road system.

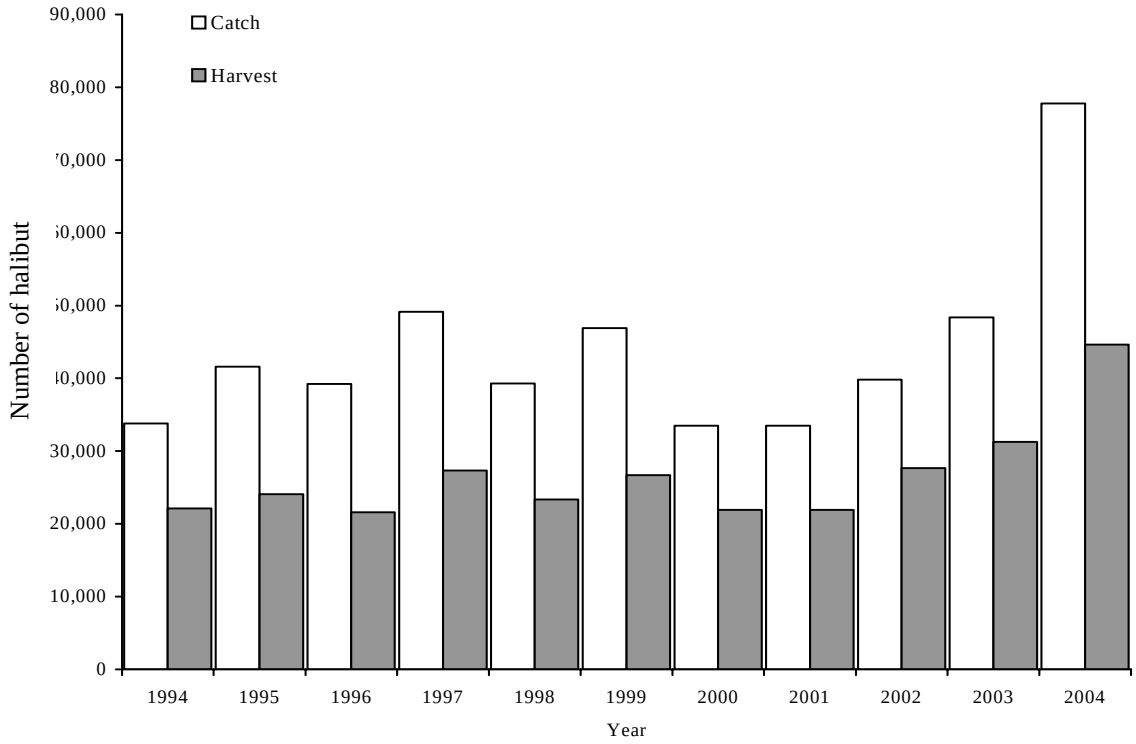


Figure 18.-Sport catch and harvest of halibut in PWSMA, 1994-2004.

SWHS estimates for 2005 are unavailable, but the 2005 catch of halibut was reported as good. Whittier anglers reported good fishing starting in May through early September. The halibut catch out of Cordova and Valdez started earlier in April, and was also reported as good through early September. Like 2004, summertime weather patterns in 2005 were again favorable for anglers to reach more distant areas to fish even in smaller boats.

FISHERY MANAGEMENT

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 harvest 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.

Under treaty, North Pacific halibut stocks are to be managed for optimum sustained yield. Currently, the North Pacific halibut stock is fully utilized. A constant exploitation rate 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 20% exploitation rate. Each CEY thus represents the total allowable removals (includes harvest, waste, and legal-size bycatch) for each regulatory area. The IPHC then estimates the sport and subsistence harvests, as well as wastage and legal-size bycatch mortality for each regulatory area and these are subtracted from the CEY. 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, reflecting the estimated biomass of exploitable halibut.

In February 2000 the NPFMC approved a motion to implement a guideline harvest level (GHL) for the charter fishery in Regulatory Areas 2C (Southeast Alaska) and 3A (Southcentral Alaska). They also established a matrix of management measures that would be implemented or lifted to adjust the GHL in response to changes in estimated abundance. Immediately following the GHL decision, the NPFMC formed an industry committee to develop a list of elements and options to incorporate charter operators into the existing individual fishery quota (IFQ) program. The Council later revised this list and added an option to set aside quota shares for Gulf coastal communities to develop local charter businesses. The Council approved a motion in April 2001 to incorporate the Area 2C and 3A charter fleets into the IFQ program, but this decision was due to be reevaluated in 2005.

RECENT BOARD OF FISHERIES ACTIONS

No specific actions were taken by the Board with respect to this fishery during the 2002 meeting.

CURRENT ISSUES

Recent changes in federal subsistence regulations now allow individuals from Cordova, Chenega, and Tatitlek to harvest halibut with a set line. Up to 20 hooks may be used and no harvest limit has been set. It is unknown if these new regulations will affect the sport fishery.

The NPFMC is currently reconsidering a proposal to create individual fishery quotas (IFQ) for charter operators in the PWSMA. This subject was due for final consideration in October 2005. Although considerable questions remain in regards to implementation of this proposal, if enacted the quota system would change the way the halibut resource is allocated in the area. Some charter operators have expressed considerable disagreements with this proposal, stating that small operators may be driven out of the fishery and new operators may not be able to get established. However, other charter operators have expressed support for the proposal stating it would add value to their businesses.

RESEARCH AND MANAGEMENT ACTIVITIES

The Sport Fish Division's groundfish harvest monitoring program estimates average weight, harvest biomass, length and sex composition, and the spatial distribution of the recreational halibut effort and harvest from Area 3A annually. The harvest is currently sampled at Seward, Valdez, and Whittier for the PWSMA. 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 and Stock 2002). 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 local area management plans and other proposed regulatory options for the sport fishery. Groundfish staff recommends continuation of this program for the foreseeable future.

ROCKFISH FISHERY

FISHERY DESCRIPTION

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). Although available year-round, most rockfish are harvested in the sport fishery from May through early September. Management, issues and stock status, are discussed in Meyer and Stock (2002).

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, 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, 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. Federal subsistence regulations also allow individuals from Cordova, Chenega, and Tatitlek to harvest rockfish as bycatch to subsistence halibut with a set line. Up to 20 hooks may be used and no harvest limit has been set.

The average annual sport catch of rockfish from the PWSMA waters from 1994-2003 was 25,982 fish and has risen in recent years (Table 13; Figure 19). On average the harvest rate was 62% for rockfish in the PWSMA from 1994-2003, and decreased to 55% in 2004. Waters fished in the PWSMA include all inside waters as well as the entrances to PWS. Most rockfish catches are landed at the port of Whittier and Valdez, with Whittier now exceeding 40% of the catch most years. Rockfish catch and harvests increased steadily from 1999-2004, and broke yearly records for 2002-2004.

FISHERY PERFORMANCE IN 2004 AND 2005

The sport catch of rockfish from PWSMA waters during 2004 (57,429) was well above the previous 10-year average (Table 13; Figure 19). Most of the catch for 2004 was from trips out of Whittier (47%), which increased over Valdez to be the most productive rockfish port. Total harvest areawide in 2004 was 31,327 rockfish, well above the previous 10-year average of 16,048.

Table 13.–Sport catch and harvest of rockfish in PWSMA, 1990-2004.

	Cordova Area		Northwestern PWS		Valdez Area		Other Sites in PWS		PWS Total	
YEAR	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1990	213	136	2,758	1,398	10,390	4,350	3,759	2,273	17,120	8,157
1991	1,866	477	3,356	2,497	5,223	3,979	1,755	1,780	12,200	8,733
1992	1,129	879	3,439	1,483	10,099	7,625	6,418	5,491	21,085	15,478
1993	643	335	3,707	2,158	7,852	4,894	6,356	4,887	18,558	12,274
1994	2,050	1,215	4,546	3,158	9,184	5,725	8,219	5,284	23,999	15,382
1995	1,241	644	4,527	2,379	9,383	6,359	9,415	5,319	24,566	14,701
1996	2,107	1,713	5,732	2,598	6,194	3,600	6,569	4,464	20,602	12,375
1997	2,202	1,048	4,326	2,909	6,423	4,385	12,272	7,061	25,223	15,403
1998	1,758	950	3,638	2,318	8,898	4,293	8,170	5,890	22,464	13,451
1999	2,241	1,467	4,867	3,370	7,146	4,110	6,693	4,049	20,947	12,996
2000	1,756	1,090	9,400	5,820	7,913	5,282	7,846	5,284	26,915	17,476
1991-2000	1,699	982	4,754	2,869	7,832	5,025	7,371	4,951		
	Cordova[b]		Whittier[c]		Valdez[d]		Other/unknown		PWS Total	
Year[a]	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	2,411	1,308	11,246	7,948	9,017	6,056	2,508	1,635	25,182	16,947
2002	1,361	916	15,562	9,560	10,225	5,414	6,816	4,458	33,964	20,348
2003	1,991	1,362	16,411	9,817	9,955	6,331	7,604	3,895	35,961	21,405
2004	4,830	1,867	27,006	14,839	16,507	9,105	9,086	5,516	57,429	31,327
					Previous 10-year average (1994-2003)					

[a] To increase reporting accuracy, the SWHS changed from reporting area of harvest to reporting port of landing in 2001. This had no affect on estimates for "PWS Totals."

[b] Includes reported landings in Cordova for saltwater trips, and freshwater effort along the Cordova road system.

[c] Includes reported landings in Whittier and Chenega for saltwater trips.

[d] Includes reported landings in Valdez for saltwater trips, and freshwater effort along the Valdez road system.

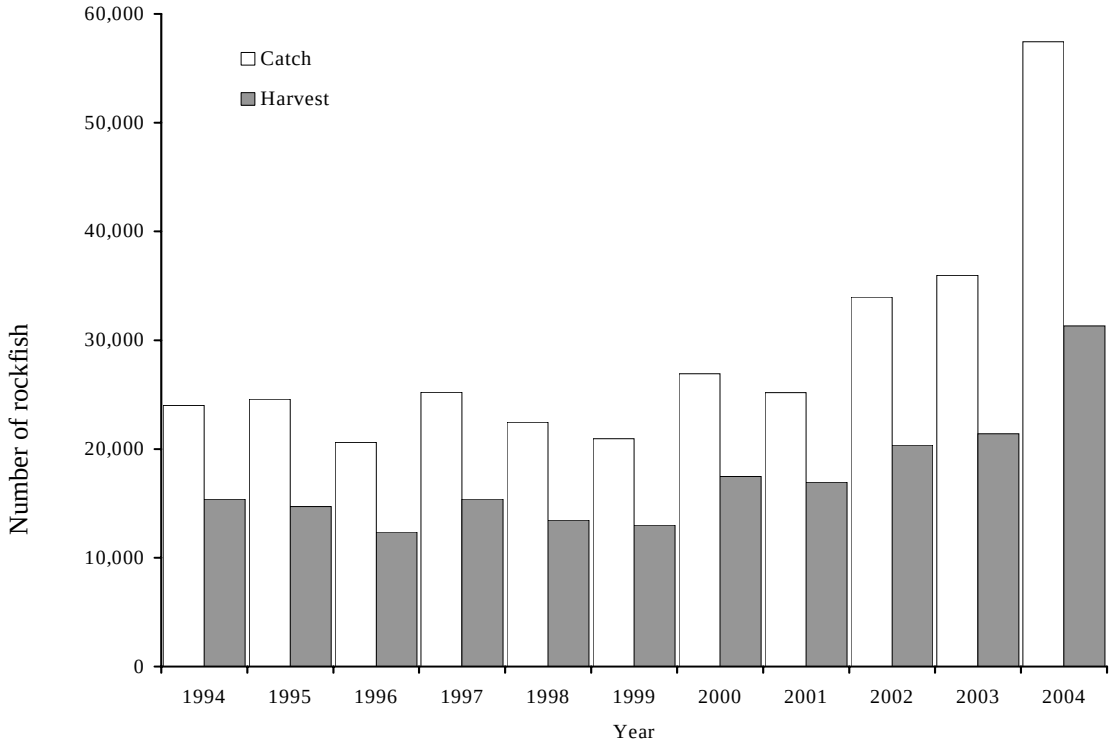


Figure 19.-Sport catch and harvest of rockfish in PWSMA, 1994-2004.

MANAGEMENT OBJECTIVES

Due to a lack of stock assessment data, no specific fishery objectives have been established for recreational rockfish fisheries of the PWSMA. However, the following management approach is followed:

1. Lower bag limits for demersal and slope species – low enough to discourage targeting, high enough to allow retention of bycatch.
2. Education of public regarding life history.
3. Marine Protected Areas (MPAs).

BOARD OF FISHERIES ACTIONS

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

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*.

CURRENT ISSUES

Recent changes in federal subsistence regulations now allow individuals from Cordova, Chenega, and Tatitlek to harvest rockfish as bycatch to subsistence halibut with a set line with up to 20 hooks. It is unknown if these new regulations will affect the sport fishery.

RESEARCH AND MANAGEMENT ACTIVITIES

The Sport Fish Division's groundfish harvest monitoring program provides estimates of species, age, length, and sex composition, as well as the spatial distribution of the recreational rockfish harvest for each port. Ports with recreational rockfish landings include Seward, Whittier, and Valdez. This program is effective at describing harvest, but these data alone cannot be used to evaluate stock status or form management objectives. Groundfish staff recommends continuation of the harvest monitoring program as well as implementation of a fishery-independent survey program to assess relative changes in abundance or density of the primary species in the harvest. Combining harvest with fishery-independent indices of abundance will allow development of an appropriate and sustainable harvest strategy.

LINGCOD FISHERY

FISHERY DESCRIPTION

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 Meyer and Stock (2002). These reports also summarize 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, and all sport-caught lingcod may be landed only by hand or net.

In addition, recent changes in federal subsistence regulations now allow individuals from Cordova, Chenega, and Tatitlek to harvest lingcod as bycatch to subsistence halibut with a set line using up to 20 hooks; no harvest limit has been set.

Lingcod are a relatively minor component of the PWSMA sport harvest, but are increasing in popularity. Lingcod are taken primarily by guided anglers and most of the harvest is from areas near the two main entrances of PWS. The 10-year average annual catch for the PWSMA recreational lingcod fishery was 6,810 fish from 1994-2003, and average harvest was 2,798. Harvests of lingcod have averaged 40% for 1994-2003.

FISHERY PERFORMANCE IN 2004 AND 2005

The 2004 estimate of 9,782 lingcod caught was 44% above the 1994–2003 average, and the harvest estimate of 4,642 was 66% above the historical average (Table 14; Figure 20). In 2002 and 2004 catches out of Whittier surpassed those out of Valdez. Whittier anglers have been increasing their catch of lingcod, and may be overtaking Valdez as the most important lingcod port.

Table 14.–Catch and harvest of lingcod by sport fisheries in PWSMA, 1991-2004.

	Cordova Area		Northwestern PWS		Valdez Area		Other Sites in PWS		PWS Total	
Year[a]	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1991	525	157	345	274	2,006	1,122	847	346	3,457	1,884
1992	1,120	177	522	252	3,903	1,476	2,903	427	8,476	2,492
1993	492	74	505	150	4,016	1,117	1,495	250	6,622	1,860
1994	220	58	500	303	1,286	287	1,523	461	4,108	1,434
1995	308	65	660	243	1,997	1,028	1,299	481	4,782	2,056
1996	392	147	1,514	423	2,151	691	1,111	523	5,616	1,948
1997	448	142	958	564	2,269	904	2,294	849	7,385	3,310
1998	617	326	602	307	2,427	825	1,410	722	5,387	2,186
1999	1,114	196	1,375	333	2,453	1,002	2,310	310	6,814	1,873
2000	594	168	1,701	490	2,572	973	2,188	690	7,945	2,856
1991-2000 Avg.	582	149	868	334	2,508	943	1,738	506		

	Cordova[b]		Whittier[c]		Valdez[d]		Other/unknown		PWS Total	
Year[a]	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	689	282	2,395	1,096	3,487	1,633	340	206	6,911	3,217
2002	683	95	3,871	1,942	2,388	1,313	1,441	720	8,383	4,070
2003	524	228	2,465	1,121	2,466	1,461	2,613	860	8,068	3,670
2004	687	288	3,946	1,250	3,217	2,070	1,932	1,034	9,782	4,642
					Previous 10-year average (1994-2003)				6,810	2,798

[a] To increase reporting accuracy, the SWHS changed from reporting area of harvest to reporting port of landing in 2001. This had no affect on estimates for "PWS Totals." Catch and harvest estimates were not available for lingcod from the SWHS until 1991.

[b] Includes reported landings in Cordova for saltwater trips, and freshwater effort along the Cordova road system.

[c] Includes reported landings in Whittier and Chenega for saltwater trips.

[d] Includes reported landings in Valdez for saltwater trips, and freshwater effort along the Valdez road system.

MANAGEMENT OBJECTIVES

Due to a lack of stock assessment data, no specific fishery objectives have been established for recreational rockfish fisheries of the PWSMA. However, 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 24,000 pound annual guideline harvest level.

BOARD OF FISHERIES ACTIONS

No specific actions were taken by the Board with respect to this fishery during the 2002 meeting.

CURRENT ISSUES

It is unknown if recent changes in federal subsistence regulations allowing individuals from Cordova, Chenega, and Tatitlek to harvest lingcod as bycatch to subsistence halibut will effect the sport fishery.

RESEARCH AND MANAGEMENT ACTIVITIES

The Sport Fish Division's groundfish harvest monitoring program provides estimates of age, length, and sex composition, as well as the spatial distribution of the recreational lingcod harvest for each port. Ports with recreational lingcod landings include Seward, Whittier, and Valdez. This characterization of harvest patterns should continue.

Harvest information alone is insufficient to develop abundance-based management objectives that provide for long-term sustained yield. With implementation of a minimum size limit in 1993, the ability to assess relative changes in recruitment using fishery data was lost. Stock assessment and formulation of a robust harvest strategy will require compilation of existing harvest data and development of a standardized fishery-independent survey to assess relative changes in lingcod abundance.

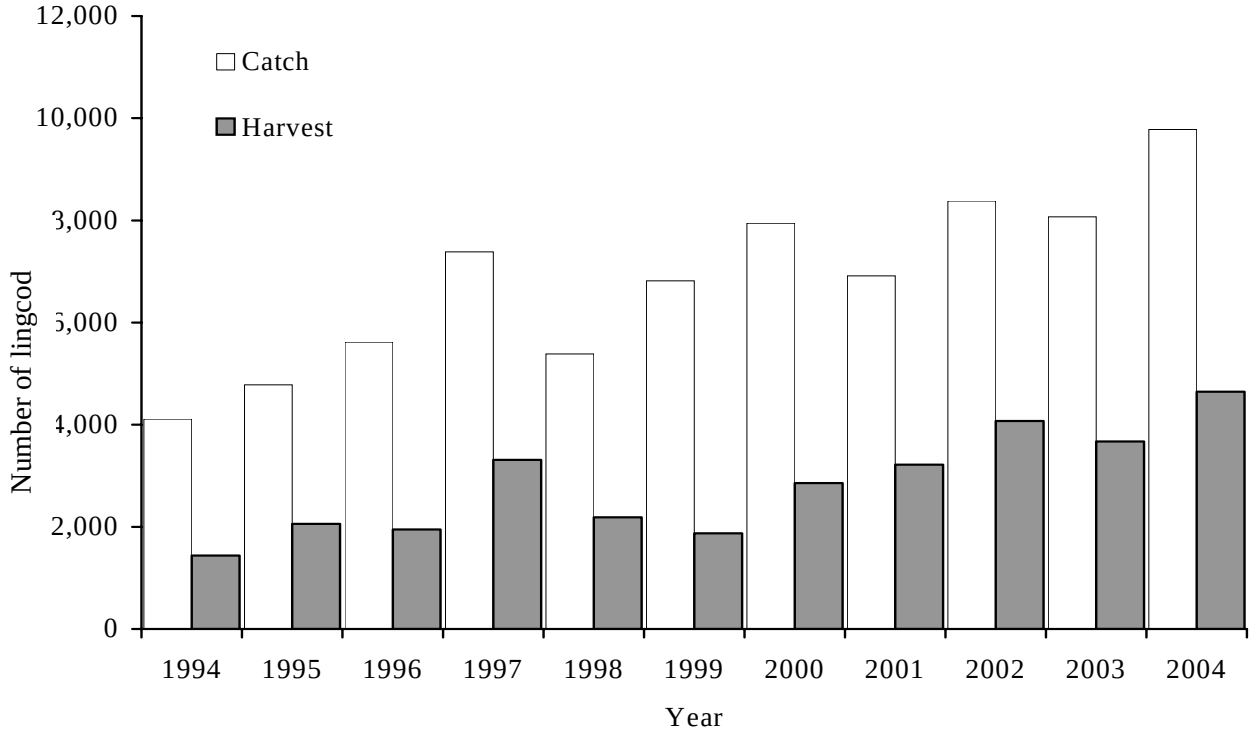


Figure 20.-Catch and harvest of lingcod by sport fisheries in PWSMA, 1994-2004.

SHARK FISHERY

FISHERY DESCRIPTION

The shark fisheries in PWSMA waters 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. A few charter operators from Valdez, Cordova, Seward and Whittier target salmon sharks in the waters of the PWSMA. In addition, a small number of unguided anglers target salmon sharks. The proportion of salmon sharks in the catch, which includes all species, is unknown.

The daily bag and possession limits of 1 shark of any species, with 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.

Catch and harvest data for sharks in the PWSMA were first collected in 1996 (Table 15). Most sharks caught in the recreational fishery are released (Figure 21), as shown by the average harvest rate of 9% from 1996-2003. The 2004 catch of 2,950 sharks and 158 harvested is above the 1996-2003 average catch of 1,895 caught and 126 harvested. Like 2003, the catch from areas designated as "unknown" was exceptionally high in 2004, a large portion of which was landed in the port of Seward. Fluctuations in shark catch and harvest statistics have been large in the past due to the short time series of data and changing nature of a developing fishery. Interpretations of trends in the shark sport fishery in the PWSMA will continue to be tenuous until more data are obtained and the fishery solidifies.

MANAGEMENT OBJECTIVES

Available data on sharks are insufficient to estimate exploitable biomass in the PWSMA, therefore management objectives for this fishery have not been developed yet. Although research being considered might eventually allow estimation of abundance, biomass, or a sustainable level of harvest, none of these tools is currently available to managers. Thus, based on a lack of abundance data, and a life history that is particularly vulnerable to overexploitation, recreational shark fisheries in the PWSMA are managed using a conservative bag limit. Reports from local anglers suggest that abundance of salmon sharks and spiny dogfish may be increasing in the PWSMA, and testimony at the Lower Cook Inlet Board of Fisheries meetings in November 2001 resulted in a draft of a Spiny Dogfish Commercial Fishery Plan. To date no dogfish have been harvested in a directed commercial fishery.

RECENT BOARD OF FISHERIES ACTIONS

No specific actions were taken by the Board with respect to this fishery during the 2002 meeting.

CURRENT ISSUES

Sport fishing for salmon sharks in the PWSMA is of interest to sport fish managers since harvest has increased in recent years, and no data are available to estimate population statistics, or derive specific management guidelines. Incidental harvest of sharks in PWSMA commercial fisheries is also of interest to sport fish managers. A recent test fishery in Nelson Bay for a potential new commercial fishery area showed that salmon sharks were caught in 30% of the seine sets in a

localized area, but in less than 2% of the sets in Nelson Bay as a whole (Rick Merizon, ADF&G, Division of Commercial Fisheries, Cordova, personal communication)

Research and Management Activities

The Sport Fish Division's groundfish harvest monitoring program collects information on age, length, sex, and location of harvested salmon sharks, Pacific sleeper sharks, and spiny dogfish. Although there are no specific objectives with respect to the shark fishery, it is hoped that the harvest of these species can be characterized using several years of data. This characterization of shark harvest should continue.

Table 15.–Catch and harvest of sharks by sport fisheries in PWSMA, 1996-2004.

	PWS Totals	
Year[a]	Catch	Harvest
1996	41	6
1997	1,412	80
1998	1,802	115
1999	520	90
2000	1,842	103
1996-2000 Avg.	1,123	79

	Cordova[b]		Whittier[c]		Valdez[d]		Other/unknown		PWS Total	
Year[a]	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	533	80	891	62	2,082	46	228	8	3,734	196
2002	28	0	126	11	677	80	325	33	1,156	124
2003	140	12	453	49	1,467	187	2,596	42	4,656	290
2004	291	33	308	54	475	63	1,876	8	2,950	158
						1996-2003 Avg.			1,895	126

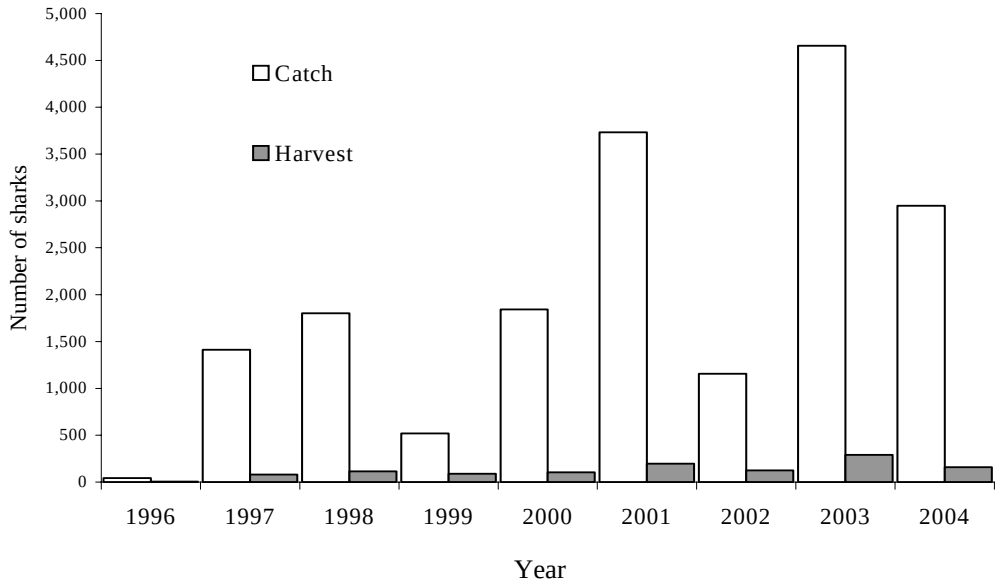
[a] To increase reporting accuracy, the SWHS changed from reporting area of harvest to reporting port of landing in 2001. This had no affect on estimates for "PWS Totals." Catch and harvest estimates for sharks were not available from the SWHS prior to 1996, and estimates by site are only available beginning in 2001.

[b] Includes reported landings in Cordova for saltwater trips, and freshwater effort along the Cordova road system.

[c] Includes reported landings in Whittier and Chenega for saltwater trips.

[d] Includes reported landings in Valdez for saltwater trips, and freshwater effort along the Valdez road system.

ADF&G also initiated a shark tagging program enlisting the aid of shark-charter operators in 1998. Funding for that program was eliminated in 1999 but a low level of tagging has continued. Since 1999, ADF&G has assisted the National Marine Fisheries Service and Virginia Institute of Marine Science in limited research on salmon sharks in the PWSMA. It is hoped that shark research will continue and that the information collected will be useful in formulating management objectives that provide for sustained yield.



Note: Not estimated by SWHS prior to 1996.

Figure 21.-Shark catch and harvest (all species) in the PWSMA, 1996-2004.

DOLLY VARDEN FISHERY

FISHERY DESCRIPTION

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, but much of the catch can be incidental to fishing for other species. 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.

Within the PWSMA significant fisheries for Dolly Varden include the Valdez Arm area and Cordova roadside streams (Table 16). From 1998-2000 Dolly Varden catch and harvest in the PWSMA was well below average indicating a downward trend in the fishery, but this appears to be changing. The 10-year averages for catch and harvest of Dolly Varden calculated through 2003 were 7,855 and 1,736 respectively for the PWSMA. Cordova has been the dominant producer in recent years averaging 40%–60% of the catch. The average harvest rate for Dolly Varden was 22% from 1994 to 2003, representative of a primarily catch and release fishery, and a high incidence of incidental catch for Dolly Varden.

FISHERY PERFORMANCE IN 2004 AND 2005

The catch of Dolly Varden in the PWSMA grew to 8,834 in 2004 (Figure 22), above average, while the harvest remained below average at 713 fish. The harvest rate of Dolly Varden in the

PWSMA for 2004 was only 8%. In 2004 45% of the total catch came from Cordova streams, and 22% came from the Valdez area. The catch in Valdez increased substantially in 2004, quadrupling over 2003. The catch and harvest of Dolly Varden will most likely continue to vary more than other fisheries since anglers often catch these fish incidentally to other fisheries, especially coho, instead of targeting the species directly.

MANAGEMENT OBJECTIVES

No specific fishery objectives have been formally established for PWSMA Dolly Varden fisheries to date.

Table 16.–Sport catch and harvest of Dolly Varden in PWSMA, 1990-2004.

	Cordova Area		Northwest PWS		Valdez Area		Other Sites in PWS		PWS Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
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	1,065	863	5,929	3,341
1992	3,752	1,138	228	89	5,923	1,622	1,228	492	11,131	3,341
1993	3,044	586	856	213	4,077	1,801	1,188	454	9,165	3,054
1994	4,216	611	943	108	1,190	404	1,292	260	7,641	1,383
1995	1,474	330	0	0	1,363	506	749	364	3,586	1,200
1996	3,663	789	97	60	4,512	1,941	4,206	985	12,478	3,775
1997	3,356	481	859	138	1,410	663	5,628	817	11,253	2,099
1998	3,163	605	667	321	1,236	517	2,555	281	7,621	1,724
1999	3,579	297	45	11	2,136	534	1,285	311	7,045	1,153
2000	1,639	250	121	71	1,011	625	2,648	213	5,419	1,159
1991-2000	3,096	608	403	105	2,443	1,005	2,184	504		
	Cordova[b]		Whittier[c]		Valdez[d]		Other/unknown		PWS Total	
Year[a]	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
2001	3,318	465	225	105	810	87	3,796	576	8,149	1,233
2002	2,174	147	154	122	641	251	4,214	1,241	7,183	1,761
2003	4,657	979	148	67	428	307	2,729	171	7,962	1,524
2004	3,983	210	626	110	1,927	323	2,298	70	8,834	713
							Previous 10-year average (1994-2003)		7,855	1,736

[a] To increase reporting accuracy, the SWHS changed from reporting area of harvest to reporting port of landing in 2001. This had no affect on estimates for "PWS Totals."

[b] Includes reported landings in Cordova for saltwater trips, and freshwater effort along the Cordova road system.

[c] Includes reported landings in Whittier and Chenega for saltwater trips.

[d] Includes reported landings in Valdez for saltwater trips, and freshwater effort along the Valdez road system.

BOARD OF FISHERIES ACTIONS

In 2003 a proposal to create a statewide Dolly Varden fishery policy was proposed to the BOF. The Board took no action on the proposal preferring to wait and see how recently enacted statewide salmon and trout policies functioned.

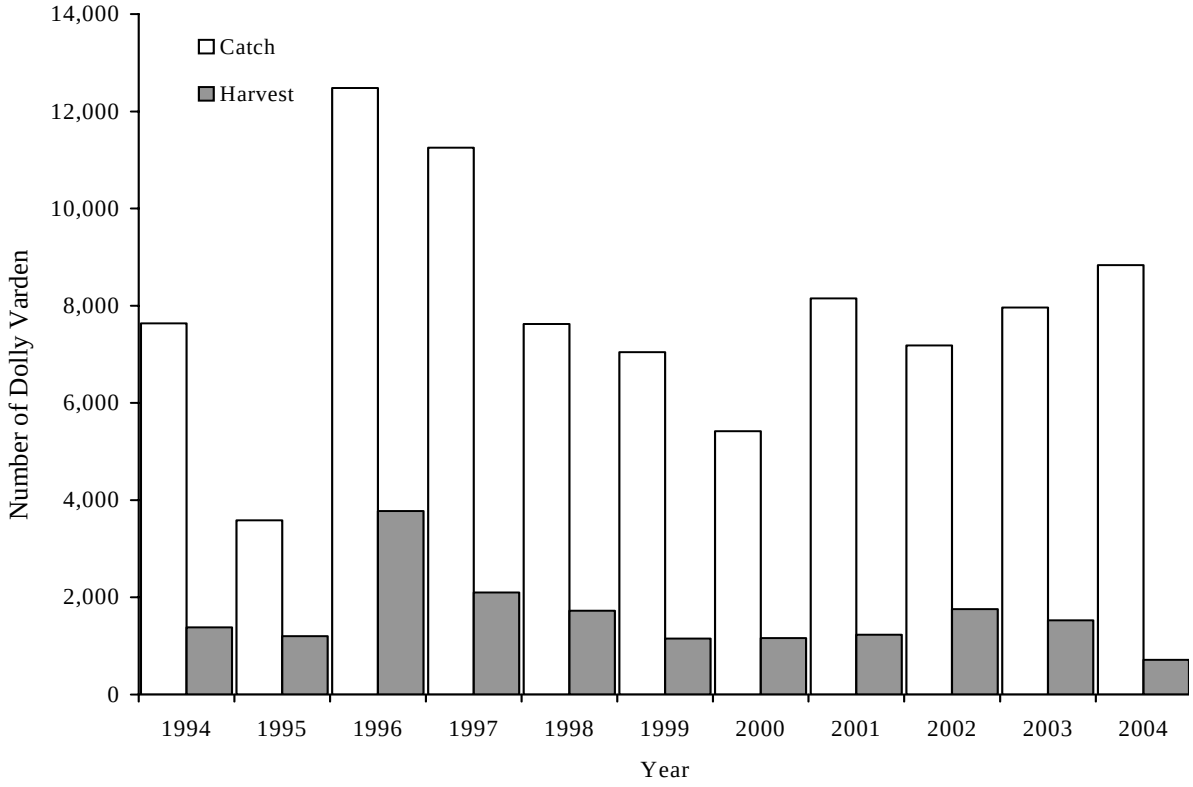


Figure 22.-Sport catch and harvest of Dolly Varden in PWSMA, 1994-2004.

CURRENT ISSUES

Dolly Varden angling in the PWSMA has changed substantially, most notably shown by smaller harvest in the Valdez Arm area as compared to historical data. In the early 1980s, Valdez Arm supported a large Dolly Varden fishery, and harvest (catch data not available) of 9,566, but by 1988 the harvest had declined to 983 fish and has averaged 584 fish from 1994 to 2003 (Table 16; Figure 22). Areas other than Valdez in the PWSMA have had less drastic declines in Dolly Varden angling success, and in the case of some areas such as Cordova, an increase. The fishery in Valdez underwent extensive changes in the past decades due to the introduction of hatchery coho and pink salmon, and coho and pink salmon anglers now dominate in the Valdez area. Smaller harvests of Dolly Varden in the Valdez area in 1994-2003, as well as other areas of the PWSMA most likely resulted from these changes in angler use patterns.

Another issue possibly affecting one PWSMA Dolly Varden stock is the hydroelectric project on Power Creek near Cordova. The Department of Natural Resources (DNR), Division of Habitat and Restoration is monitoring the hydroelectric project and its potential impact. A small resident population of Dolly Varden has been found above the power projects intake tunnel and dam in upper Power Creek. This stunted population is not part of the typical fishery. DNR and ADF&G are working with city of Cordova to mitigate potential impacts on the resident Dolly Varden population and learn more about these small isolated populations.

RESEARCH AND MANAGEMENT ACTIVITIES

No directed research is currently being done by the Sport Fish Division in the PWSMA on Dolly Varden, but two studies have taken data incidentally. A sockeye salmon weir at Billy's Hole counted all Dolly Varden passing through the weir in 2003 and 2004 (Bullock and Miller *In prep*). Additionally, Dolly Varden captured while sampling for trout in the Copper River Special Management Area for Trout (CRSMT) were measured for fork length, area of catch was noted, and a CPUE was calculated for 2002 and 2003 (Marston et al. *In prep*).

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

No research is currently recommended for this species.

OTHER FINFISH 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.

STOCKED ARCTIC GRAYLING AND RAINBOW TROUT

Fishery Description

There are only a few systems with natural Arctic grayling or 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, 10 in possession, only 1 per day, 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 (Appendix A2). The average annual catch of Arctic grayling from 1994-2003 was 1,115 fish and ranged from a low of 363 fish in 1999 to a high of 3,071 in 2000 (Table 17; Figure 23). The 2004 estimated catch of 1,406 grayling was above the previous 10-year average and the third highest on record. On average 14% of grayling caught were harvested.

The estimated average annual catch of rainbow trout (largely from stocked lakes) from 1994-2003 was 2,331 fish (Table 18). Historically, 18 sites in the PWSMA were stocked with rainbow trout (Appendix A1). Since 1990, the number of sites has been reduced to two since the majority of the angler effort was at Ruth and Blueberry lakes located near Valdez. In 2004, catch was 1,068 trout and harvest was 220 (Figure 24), for a harvest rate of 21%. The 2004 catch was well below the previous 10-year average, as was the harvest.

Management Objectives

No specific fishery objectives have been formally established for these fisheries.

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 and east of the Copper River (excluding the Clear Creek drainage) and all the waters draining into the Gulf of Alaska west of

Cape Suckling as catch-and-release, only unbaited, single-hook, artificial lures year-round waters. In 2002 the bag and possession limits for cutthroat trout were grouped with those of rainbow trout. The bag/possession limit for all trout in combination is now 5 fish with only 1 over 10 in. along the Cordova road system. For all other waters except stocked lakes the bag/possession limit for all trout is 2 with only 1 over 20 in. In stocked lakes the bag limit is 5 rainbow trout, and 10 in possession.

Current Issues

Continued stocking of rainbow trout and grayling is dependant on adequate funding at state hatcheries. These hatcheries are currently overtaxed. The stocking program in PWSMA waters adds opportunity for species and areas that do not exist otherwise in the area. Continued funding for this effort is critical for a diverse fishery in the area.

Research and Management Activities

None

Recommended Research and Management Activities

None

Table 17.–Sport catch and harvest of Arctic grayling in PWSMA, 1990-2004.

	Cordova Area		Copper Delta Area		Valdez Arm Area		Other sites in PWS		PWS Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
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	0	0	225	0	316	61	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	302	50	91	0	291	69	684	119
1998	0	0	0	0	146	0	388	15	534	15
1999	0	0	0	0	212	180	151	66	363	246
2000	0	0	0	0	316	41	2,755	48	3,071	89
2001	0	0	0	0	0	0	966	90	966	90
2002	0	0	0	0	1,056	101	149	82	1,215	183
2003	0	0	0	0	1,049	560	378	86	1,427	646
2004	0	0	0	0	1,195	34	378	86	1,406	73
Previous 10-year average (1994-2003)	36	3	30	5	373	98	675	82	1,115	187

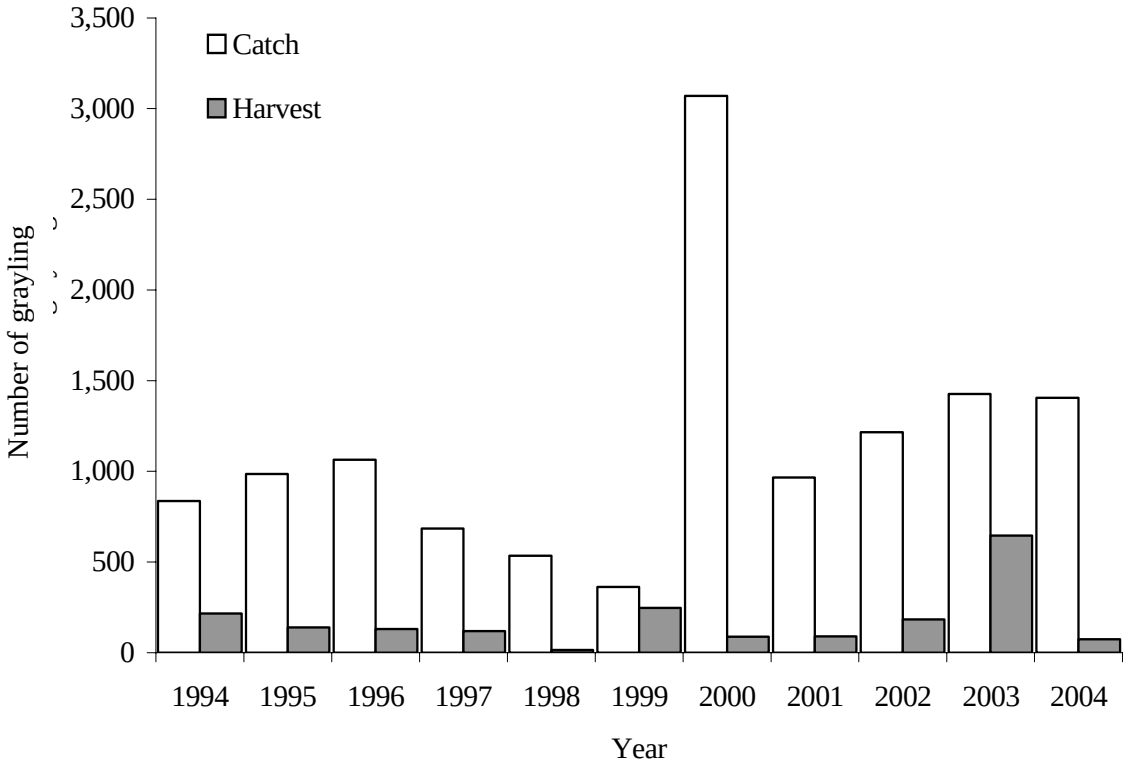


Figure 23.-Sport catch and harvest of Arctic grayling in PWSMA, 1994-2004.

Table 18.–Sport catch and harvest of rainbow trout in PWSMA, 1990-2004.

	Cordova Road Area		Copper Delta Area		Valdez Area		Other Sites in PWS		PWS Total	
	CR		CR				OT			
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1990	245	82	131	16	508	262	97	32	981	392
1991	58	29	292	292	88	88	510	131	948	540
1992	269	95	254	32	396	71	143	88	1,062	286
1993	168	79	107	0	82	37	235	20	592	136
1994	120	56	0	0	103	84	175	17	398	157
1995	11	11	178	24	378	135	1,379	607	1,946	777
1996	147	0	491	27	840	256	236	53	1,714	336
1997	0	0	1,491	0	1,163	331	790	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
2000	278	0	3,588	0	770	366	1,084	140	5,720	506
2001	0	0	283	0	527	156	818	499	1,628	655
2002	87	58	22	0	412	338	435	321	956	717
2003	55	0	44	0	466	150	1,250	151	1815	301
2004	140	0	753	0	117	117	58	103	1068	220
10-year average (1994-2003)	102	13	610	5	839	277	780	262	2,331	557

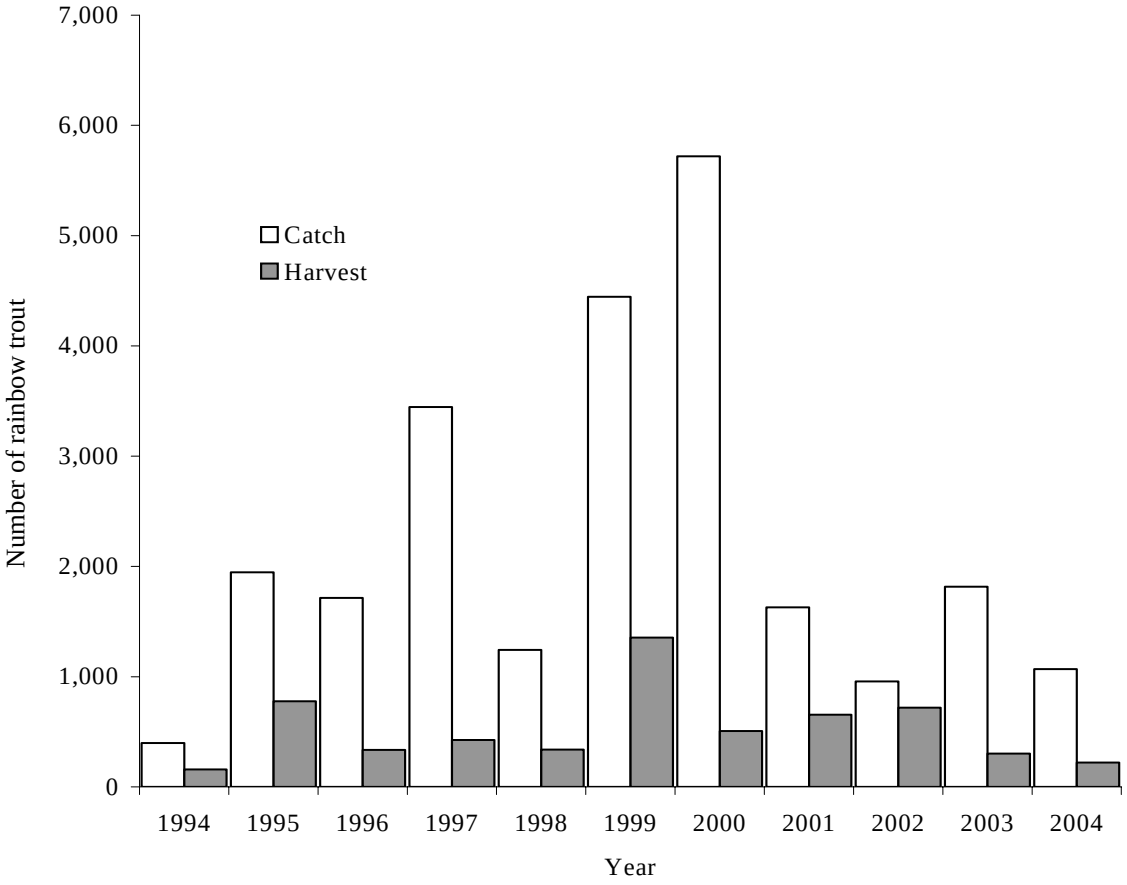


Figure 24.-Sport harvest of rainbow trout in PWSMA, 1994-2004.

EULACHON

Eulachon *Thaleichthys pacificus*, also known as "hooligan," return to PWSMA streams to spawn from late winter to spring. A sport fishery does not exist for this species but hooligan are harvested for bait used in the saltwater sport fishery. In the PWSMA there are over 1,000 documented salmon spawning systems but only six consistent eulachon spawning systems. Eulachon spawning runs have been documented on the Copper and Bering River Deltas, and include the Copper, Martin, and Bering rivers, Alaganik Slough, Scott River, Ibeck Creek, and Eyak River. Sporadic runs can occur in winter (January-February) when temperatures are mild, but most consistent runs are in spring (May-July). Sporadic runs may be as little as a few metric tons, but large runs such as those in the Copper River may reach as many as 1,000 metric tons and are commercially exploited (Moffitt et al. 2002). Commercial hooligan dip-netting occurs occasionally on the Copper River when prices warrant a fishery, and subsistence dipnetting occurs yearly in the Copper River, Alaganik Slough, Ibeck Creek, and Eyak River (Joyce 2002).

SHRIMP FISHERY

FISHERY DESCRIPTION

Shrimp are pursued mainly out of the ports of Valdez and Whittier, but some harvest also occurs in Orca Bay out of Cordova. Shrimp are harvested with no bag limit but with a limit of no more than 5 pots per person, and a maximum of 5 pots per vessel. In order to help reduce harvest of egg-bearing females the defined season is from April 15-September 15. A shrimp harvest record and permit for sport, subsistence and personal use in PWSMA is required to determine the extent of sport, subsistence and personal use harvest. Sport shrimp harvest is also estimated by the SWHS. Data collected from the permits showed users fished pots throughout PWSMA but most effort and harvest occurs in Valdez Arm and Passage Canal.

FISHERY PERFORMANCE IN 2004 AND 2005

Data from PWS shrimp permit returns showed a total of 10,709 gallons of shrimp were harvested in 2004 from 1,649 permit holders, and the SWHS recorded the harvest at 6,784 gallons for that year (Table 19). Most shrimpers recorded harvesting between 0 and 1 gallon of shrimp per pot day of effort in 2004, while less the 5% recorded harvesting 2 or more gallons per pot day, which was a decrease in efficiency over 2003 (Table 20). Both recording methods noted a substantial increase in harvest over 2001-2003. Valdez Arm was the area of most effort for, and harvest of shrimp, and Passage Canal was second (Table 21).

Table 19.–PWSMA shrimp harvest data from permit returns and the SWHS for 2001–2004.

	Year			
Statistic	2001	2002	2003	2004
Permit Data				
Permits Issued	562	717	1,061	1,649
Permits Returned	265	599	968	1,363
Reported As Did Not Fish	90	214	354	461
Total Estimated Effort (pot-days)	7,112	9,324	23,626	30,847
Gallons	1,138	4,008	5,890	10,709
Total Estimated Harvest (lbs)[a]	2,731	9,620	14,136	25,702
SWHS estimate (gallons)		1,430	3,933	6,784

[a] Gallons of shrimp is reported on permits; pounds is calculated from data on returned permits as 1 gal = 2.4 lbs.

Table 20.–Distribution of harvest rate, by year, for the PWSMA shrimp fishery, calculated from returned permits, 2001-2004.

Gallons of Shrimp/Pot	Year			
	2001	2002	2003	2004
0.0	8%	36%	27%	38%
>0 - 1.0	42%	61%	33%	57%
>1.0 - 2.0	18%	2%	18%	4%
> 2.0	32%	1%	22%	1%

Table 21.–Percent of effort for, and harvest of shrimp, by area, reported on returned permits, 2001-2004.

	2001		2002		2003		2004	
Area	% Effort	% Harvest	% Effort	% Harvest	% Effort	% Harvest	% Effort	% Harvest
Valdez	46	43	35	41	34	26	46	38
Port Nellie Juan	8	7	13	17	22	21	7	7
Passage Canal	20	18	11	9	21	16	19	19
Port Wells	10	16	12	12	8	13	8	9
Blue-Derrickson	1	1	4	4	2	5	4	5
Other	15	15	25	17	14	18	16	22

BOARD OF FISHERIES ACTIONS

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 as April 15-September 15. Additionally, starting in 2001 a permit is required by sport, personal use and subsistence users to harvest shrimp.

The permit is intended to give managers a better tool for obtaining estimates of effort and harvest by these user groups. This additional information can be compared to the mail-in responses from the Statewide Harvest Survey to get a more complete picture of the shrimp fisheries.

CURRENT ISSUES

Opposition to the new permit has been minimal, but as with any new program, it will take some time to educate the public regarding this program and achieve a high number of returned permits.

MANAGEMENT OBJECTIVES

No specific fishery objectives have been formally established for this fishery. However, ADF&G, Division of Commercial Fisheries monitors the status of shrimp stocks by annually conducting a pot survey in Prince William Sound. This survey documents average catch weight and abundance per pot by shrimp species, and collects data on sex, size, and egg condition of the spot shrimp. These data provide an index of relative abundance and an indication of the spot shrimp stock condition. Results of the ADF&G spot shrimp survey indicate a pattern of continuing decline in abundance even though the commercial pot fishery for shrimp has been

closed since 1989. Tagging studies conducted in the mid 1980s showed that PWS spot shrimp are long-lived and slow-growing, characteristics that emphasize the need to keep fishing mortality low. Further evidence suggests climate changes or cycles may affect shrimp stocks in PWS (Anderson 2000).

RESEARCH AND MANAGEMENT ACTIVITIES

Data continue to be collected through the shrimp permits to estimate total harvest and effort in the PWSMA, and Sport Fish Division continues to work with the Division of Commercial Fisheries with their annual shrimp pot surveys to monitor stock status.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

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

OTHER SHELLFISH

Limited fisheries occur for other shellfish in the PWSMA. Currently clams are the only other shellfish harvested. Emergency orders were 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. The crab fisheries remained closed through 2005, and it is unknown when they will reopen.

RAZOR CLAMS

Fishery Description and Performance

Razor clams were at one time commercially harvested in the Cordova area, however environmental changes resulting from the 1964 earthquake drastically reduced the razor clam populations. Copper River Delta razor clams can only be harvested in a personal use or sport fishery with a permit issued in Cordova. From 1994-2003 the average annual harvest of clams in the entire PWSMA was 948 according the SWHS. This has been decreasing markedly since data have been recorded (Table 22; Figure 25). In 2004, 44 people acquired the required permits to harvest razor clams on the Copper River Delta, with a reported harvest from the permits of 73.5 lbs by the 14 successful clammers, who clammed for 18 total days. Harvest as estimated from the SWHS was 635 clams (Table 22).

Management Objectives

No specific fishery objectives have been formally established for these fisheries.

Board of Fisheries Actions

In 1997 a proposal was approved to require a permit to harvest razor clams on the Copper River Flats, and the Board closed Dungeness crab fishing in the areas of eastern PWS which had been closed by emergency order for the past 5 years. In 1999, the BOF closed PWS to all fishing for Tanner and king crabs. In 2000, the Board closed Dungeness crab throughout PWS.

Table 22.–Sport harvest of razor clams in the PWSMA, 1990-2004.

Year	Cordova Area	Copper Delta Area	Valdez Arm Area	Other Sites in PWS	PWS Total
1990	0	4,908	0	327	5,235
1991	769	1,923	0	0	2,692
1992	2,347	22,013	1,114	833	26,307
1993	2,020	3,491	0	1,118	6,629
1994	304	618	2,063	587	3,572
1995	0	127	125	1,853	2,105
1996	692	546	0	599	1,837
1997	72	0	0	0	72
1998	0	0	60	360	420
1999	238	285	0	0	523
2000	0	0	0	0	0
2001	0	0	0	702	702
2002	0	0	0	244	244
2003	0	0	0	0	0
2004	0	0	635	0	635
Previous 10-year average (1994-2003)	131	158	225	435	948

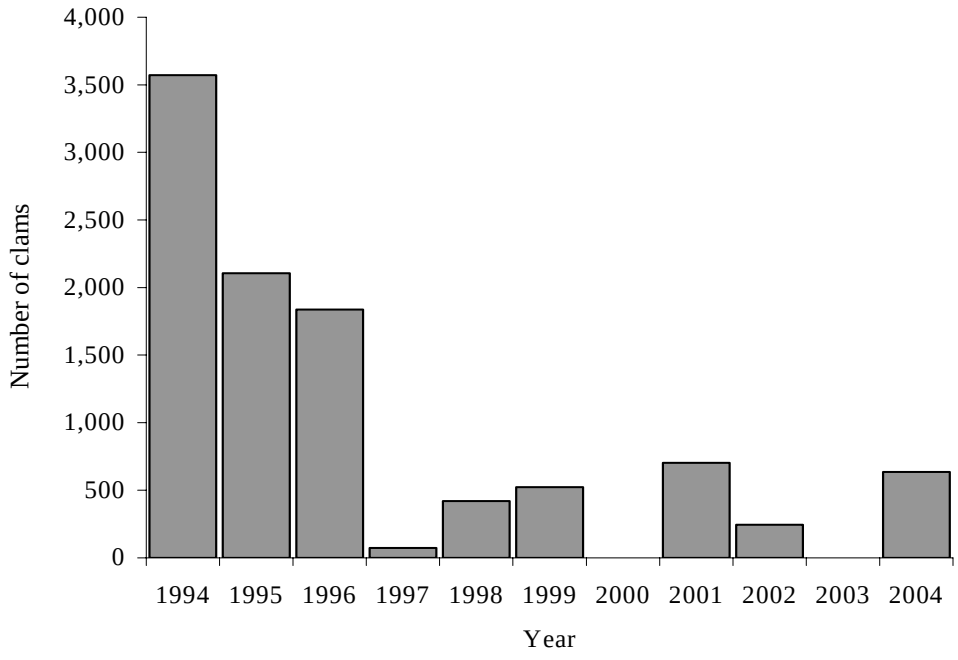


Figure 25.-Sport harvest of razor clams in the PWSMA, 1994-2004.

REFERENCES CITED

ADF&G (Alaska Department of Fish and Game). 2004. Statewide stocking plan for recreational fisheries 2004-2008. Alaska Department of Fish and Game, Division of Sport Fish, Anchorage.

ADF&G SWHS (Alaska Department of Fish and Game, Statewide Harvest Survey). *Unpublished*. 2004 Statewide Harvest Survey estimates, on State of Alaska Network at http://intra.sf.adfg.state.ak.us/databases/swhs_est/html/estimates/index.cfm. September 2005.

Ashe, D. D. Gary, B. Lewis, S. Moffitt and R. Merizon. *In prep*. 2004 Prince William Sound area finfish management report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage.

Anderson, P .J. 2000. Pandalid shrimp as indicators of ecosystem regime shift. Journal Northwest Atl. Sci., Vol 27: 1-10.

Bue, B., J. Hasbrouck, and M. Evenson. 2002. Escapement goal review of Copper and Bering rivers, and Prince William Sound salmon stocks. RIR No. 2A02-35. Alaska Department of Fish and Game, Anchorage.

Bullock, J, and M. Miller. *In prep*. Stock assessment of sockeye and coho salmon from Billy's Hole, Prince William Sound, Alaska, 2004. Alaska Department of Fish and Game, Fishery Data Series report, Anchorage.

Fall, J., M. Kerlin, B. Easley, and R. Walker. 2003. Subsistence harvest of Pacific halibut in Alaska, 2003. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper 288, Anchorage.

Hepler, K., P. Hansen, and D. Bernard. 1993a. Impact of oil spilled from the *Exxon Valdez* on survival and growth of Dolly Varden and cutthroat trout in Prince William Sound, Alaska. Alaska Department of Fish and Game, Division of Habitat and Restoration, Anchorage.

Hepler, K., D. Vincent-Lang, and B. Lafferty. 1993b. 1992 area management report for the recreational fisheries of the Central Gulf Management Area. Alaska Department of Fish and Game, Division of Sport Fish, Anchorage.

Howe, A. L., G. Fidler, A. E. Bingham, and M. J. Mills. 1996. Harvest, catch, and participation in Alaska sport fisheries during 1995. Alaska Department of Fish and Game, Fishery Data Series No. 96-32, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds96-32.pdf

Howe, A. L., G. Fidler, and M. J. Mills. 1995. Harvest, catch, and participation in Alaska sport fisheries during 1994. Alaska Department of Fish and Game, Fishery Data Series No. 95-24, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds95-24.pdf

Howe, A. L., R. J. Walker, C. Olnes, K. Sundet, and A. E. Bingham. 2001a. Revised Edition. Harvest, catch, and participation in Alaska sport fisheries during 1996. Alaska Department of Fish and Game, Fishery Data Series No. 97-29 (revised), Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds97-29(revised).pdf

Howe, A. L., R. J. Walker, C. Olnes, K. Sundet, and A. E. Bingham. 2001b. Revised Edition. Harvest, catch, and participation in Alaska sport fisheries during 1997. Alaska Department of Fish and Game, Fishery Data Series No. 98-25 (revised), Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds98-25(revised).pdf

Howe, A. L., R. J. Walker, C. Olnes, K. Sundet, and A. E. Bingham. 2001c. Revised Edition. Participation, catch, and harvest in Alaska sport fisheries during 1998. Alaska Department of Fish and Game, Fishery Data Series No. 99-41 (revised), Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds99-41(revised).pdf

Howe, A. L., R. J. Walker, C. Olnes, K. Sundet, and A. E. Bingham. 2001d. Participation, catch, and harvest in Alaska sport fisheries during 1999. Alaska Department of Fish and Game, Fishery Data Series No. 01-8, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds01-08.pdf

Jennings, G. B., K. Sundet, A. E. Bingham, and D. Sigurdsson. 2004. Participation, catch, and harvest in Alaska sport fisheries during 2001. Alaska Department of Fish and Game, Fishery Data Series No. 04-11, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds04-11.pdf

Jennings, G. B., K. Sundet, A. E. Bingham, and D. Sigurdsson. *In prep-a*. Participation, catch, and harvest in Alaska sport fisheries during 2002. Alaska Department of Fish and Game, Fishery Data Series, Anchorage.

REFERENCES CITED (Continued)

Jennings, G. B., K. Sundet, A. E. Bingham, and D. Sigurdsson. *In prep-b*. Participation, catch, and harvest in Alaska sport fisheries during 2003. Alaska Department of Fish and Game, Fishery Data Series, Anchorage.

Joyce, T. 2002. Eulachon subsistence use and ecology investigations on the Copper River, 2000-2002. USFWS, Office of Subsistence Management, OMB study number 00-041. Anchorage, Alaska.

Marston, B., M. Miller, and S. Fleischman. *In prep*. Copper River delta trout assessment. Alaska Department of Fish and Game, Anchorage.

McCaughran, D. A., and S. H. Hoag. 1992. The 1979 Protocol to the convention and related legislation. International Pacific Halibut Commission, Technical Report No. 26, Seattle.

Meyer, S. C. 1993. Assessment of the recreational harvest and fishery for lingcod in Southcentral Alaska. Alaska Department of Fish and Game, Fishery Data Series No. 93-33, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds93-33.pdf

Meyer, S. C., and C. E. Stock. 2002. Management report for Southcentral Alaska recreational halibut and groundfish fisheries, 2001. Alaska Department of Fish and Game, Fishery Management Report No. 02-05, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fmr02-05.pdf

Miller, M., and B. Stratton. 2001. Area management report for the recreational fisheries of the Prince William Sound Management Area, 2000. Alaska Department of Fish and Game, Fishery Management Report No.01-8, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fmr01-08.pdf

Mills, M. J. 1979. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Performance Report 1978-1979, Project F-9-11, 20 (SW-I-A), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/f-9-11(20)SW-I-A.pdf

Mills, M. J. 1980. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1979-1980, Project F-9-12, 21 (SW-I-A), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/f-9-12(21)SW-I-A.pdf

Mills, M. J. 1981a. Alaska statewide sport fish harvest studies - 1979 data. Alaska Department of Fish and Game, Federal Aid in Fish Restoration and Anadromous Fish Studies, Annual Performance Report 1980-1981, Project F-9-13, 22 (SW-I-A), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/f-9-13(22a)SW-I-A.pdf

Mills, M. J. 1981b. Alaska statewide sport fish harvest studies - 1980 data. Alaska Department of Fish and Game, Federal Aid in Fish Restoration and Anadromous Fish Studies, Annual Performance Report 1980-1981, Project F-9-13, 22 (SW-I-A), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/f-9-13(22b)SW-I-A.pdf

Mills, M. J. 1982. Alaska statewide sport fish harvest studies - 1981 data. Alaska Department of Fish and Game, Federal Aid in Fish Restoration and Anadromous Fish Studies, Annual Performance Report 1981-1982, Project F-9-14, 23 (SW-I-A), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/f-9-14(23)SW-I-A.pdf

Mills, M. J. 1983. Alaska statewide sport fish harvest studies - 1982 data. Alaska Department of Fish and Game, Federal Aid in Fish Restoration and Anadromous Fish Studies, Annual Performance Report 1982-1983, Project F-9-15, 24 (SW-I-A), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/f-9-15(24)SW-I-A.pdf

Mills, M. J. 1984. Alaska statewide sport fish harvest studies - 1983 data. Alaska Department of Fish and Game, Federal Aid in Fish Restoration and Anadromous Fish Studies, Annual Performance Report 1983-1984, Project F-9-16, 25 (SW-I-A), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/f-9-16(25)SW-I-A.pdf

Mills, M. J. 1985. Alaska statewide sport fish harvest studies - 1984 data. Alaska Department of Fish and Game, Federal Aid in Fish Restoration and Anadromous Fish Studies, Annual Performance Report 1984-1985, Project F-9-17, 26 (SW-I-A), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/f-9-17(26)SW-I-A.pdf

REFERENCES CITED (Continued)

Mills, M. J. 1986. Alaska statewide sport fish harvest studies - 1985 data. Alaska Department of Fish and Game, Federal Aid in Fish Restoration and Anadromous Fish Studies, Annual Performance Report 1985-1986, Project F-10-1, 27 (RT-2), Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/f-10-1(27)RT-2.pdf

Mills, M. J. 1987. Alaska statewide sport fisheries harvest report, 1986. Alaska Department of Fish and Game, Fishery Data Series No. 2, Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds-002.pdf

Mills, M. J. 1988. Alaska statewide sport fisheries harvest report, 1987. Alaska Department of Fish and Game, Fishery Data Series No. 52, Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds-052.pdf

Mills, M. J. 1989. Alaska statewide sport fisheries harvest report, 1988. Alaska Department of Fish and Game, Fishery Data Series No. 122, Juneau. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds-122.pdf

Mills, M. J. 1990. Harvest and participation in Alaska sport fisheries during 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-44, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds90-44.pdf

Mills, M. J. 1991. Harvest, catch, and participation in Alaska sport fisheries during 1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-58, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds91-58.pdf

Mills, M. J. 1992. Harvest, catch, and participation in Alaska sport fisheries during 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-40, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds92-40.pdf

Mills, M. J. 1993. Harvest, catch, and participation in Alaska sport fisheries during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-42, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds93-42.pdf

Mills, M. J. 1994. Harvest, catch, and participation in Alaska sport fisheries during 1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-28, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds94-28.pdf

Moffitt, S., B. Marston, and M. Miller. 2002. Summary of eulachon research in the Copper River Delta. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 2A02-34. 1998-02. Anchorage.

Vincent-Lang, D. 1998. Area management report for North Gulf of Alaska recreational groundfish fisheries, 1997. Alaska Department of Fish and Game, Fishery Management Report No. 98-2, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fmr98-02.pdf

Vincent-Lang, D., and W. Bechtol. 1992. Current status and recommendations for the future management of the lingcod stocks of the central Gulf of Alaska. A report to the Alaska Board of Fisheries, October 1992. Alaska Department of Fish and Game, Anchorage.

Walker, R. J., C. Olnes, K. Sundet, A. L. Howe, and A. E. Bingham. 2003. Participation, catch, and harvest in Alaska sport fisheries during 2000. Alaska Department of Fish and Game, Fishery Data Series No. 03-05, Anchorage. http://www.sf.adfg.state.ak.us/FedAidPDFs/fds03-05.pdf

APPENDIX A. SUMMARY OF STOCKING EFFORTS IN PWSMA

Appendix A1.-Rainbow trout stocking in the PWSMA by year and stocking site (1980-2004).

Year	Blueberry Lake	Cordova Res. #2	Crater Lake	Granite Bay 171	Pipeline Lake #1	Pipeline Lake #4	Ruth Lake	Worthington Lake[a]	Crater Lake	Totals
1980	1,950		0					3,950	0	5,900
1981	0		0					0		0
1982	3,000 [b]		0					0	0	3,000
1983	0		0					10,000	0 [b]	10,000
1984	2,100 [b]		5,000 [b]					0	0	7,100
1985	0		0					9,980	0	9,980
1986	1,500		5,000					0	5,000	11,500
1987	0		0					0		0
1988	2,463		5,762				545	0	5,762	14,532
1989	0		0				1,002	7,946	0	8,948
1990	2,000		5,009	6,677	1,056	5,200	728	0	5,009	25,679
1991	0		0	discon't	discon't	discon't	1,052	8,014	0	9,066
1992	2,000		3,400				1,021	0	0	6,421
1993	0		0				504	8,000	0	8,504
1994	2,000		1,600				518	0	0	4,118
1995	1,038		discon't				1,710	5,002	0	7,750
1996	980						1,028	990	0	2,998
1997	1,000						1,500	1,000	0	3,500
1998	500						1,596	1,000	0	3,096
1999	480						1,481	discon't		1,961
2000	500						1,750			2,250
2001	544						1,000			1,544
2002	438						450			888
2003	556						556			1,112
2004	439						800			1,239
1995-2004 means	648						1,187			2,634

Source: ADF&G 1999a.

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

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

[b] Reared at Elmendorf Hatchery.

Appendix A2.-Arctic grayling stocking in the PWSMA by year and stocking site (1980-2004).

Year	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	Ruth Pond
Fire Lake Hatchery														
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	
2001													1,045	1,000
2002													1,008	
2003													0	
2004													1,000	
1995-2004 mean													1,417	

Source: ADF&G 1999a.

Appendix A3.-Chinook salmon stocking in the PWSMA by year and stocking site (1981-2004).

	Elmendorf Hatchery			Solomon Gulch/ Ft. Richardson/ W. Noerenberg Hatcheries										
Year	Cove Creek	Passage Canal	Wells Passage	6.5 M. Rich. Hy[a]	Anderson Bay[b]	Chenega Lake[c]	Fleming Spit	Glacier Cr. Pit[b]	Valdez Harbor[b]	Granite Bay[b]	Logging Camp Cr.[b]	W. Noerenberg Hatchery[c]	Shakespeare Creek	Totals
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]	591,630
1992				94,748			102,116 [c]					274,754	102,024 [c]	573,642
1993				196,947			113,325 [c]					273,429	85,677 [c]	669,378
1994				discon't		50,318	99,334 [c]					539,195	98,311 [c]	787,158
1995						49,990	89,197 [c]		0			395,850	102,095 [c]	637,132
1996						49,900	0		0			36,515	0	86,415
1997						49,733	46,111 [c]		0			0	0	95,844
1998						43,400	35,627		0			35,600	0	114,627
1999						discon't	49,723 [b]	49,853	0			discon't	49,853 [b]	149,429
2000							45,000 [b]	115,582	0				119,389 [b]	279,971
2001							94,812 [b]	0	94,701				95,823 [b]	285,336
2002							110,000 [b]		110,000				110,000 [b]	330,000
2003							110,000 [b]		108,000				110,000 [b]	328,000
2004							58,000 [b]		99,464				128,611 [b]	286,075
1995-2004 means							63,847		41,217				71,577	259,283

Source: ADF&G 1999a.

[a] Reared at Solomon Gulch Hatchery.

[b] Reared at Ft. Richardson Hatchery.

[c] Reared at W. Noerenberg Hatchery.

Appendix A4.-Coho salmon stocking in the PWSMA by year and stocking site (1980-2004).

	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	Surprise Cove #1[d]	Surprise Cove #2[d]	Whittier Sites[e]	Boulder Bay	Solomon Gulch	Totals
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	443,746
1986	49,990 [d]			99,600 [d]	44,470 [d]	98,778		discon't	20,053	38,698	104,796 [b]		231,538	637,933
1987	discon't			42,516 [d]	58,213 [d]	376,000			21,605	40,158	55,546 [b]		86,300	680,338
1988				discon't	0	871,000			discon't	discon't	107,428 [b]		822,000	1,800,428
1989					75,113 [d]	2,499,000					82,379 [d]		987,000	3,643,492
1990					54,815 [d]	2,390,000					40,912 [d]	20,000	787,153	3,292,880
1991					40,000 [c]	2,083,292					99,990 [c]	30,761	962,872	3,216,915
1992					124,000 [c]	1,564,000					143,800 [c]	19,568	1,206,476	3,057,844
1993					99,848 [c]	1,103,278					99,951 [c]	0	461,388	1,764,465
1994					98,628 [c]	1,281,837					103,471 [c]	13,784	901,303	2,399,023
1995					100,260 [c]	1,861,922					101,775 [c]	20,000	1,305,316	3,389,273
1996					49,845 [c]	176,913					48,648 [c]	20,000	1,855,823	2,151,229
1997					49,583 [c]	104,944					49,124 [c]	21,768	1,293,415	1,518,834
1998					102,955 [c]	205,518					99,242 [c]	16,388	1,732,098	2,156,201
1999		56,500			99,943	830,243					81,685 [c]	19,810	1,843,718	2,931,899
2000		47,395			93,000	187,775					47,500 [c]	20,000	1,605,599	2,001,269
2001		50,341			98,599	47,861					49,861 [c]	16,000	1,503,328	1,765,990
2002		48,935			100,435 [c]	241,545					94,919	20,000	1,821,000	2,326,834
2003		53,594			100,781	666,451					99,942	20,000	1,275,145	2,215,913
2004		50,000			89,893	749,598					99,892		1,442,274	2,431,657
1995-2004 means		51,128			88,529	507,277					77,259		1,567,772	2,288,910

Source: ADF&G 1999a

[a] Reared at Cannery Creek Hatchery.

[b] Reared at Elmendorf Hatchery.

[c] Reared at W. Noerenberg Hatchery.

[d] Reared at Ft. Richardson Hatchery.

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

Appendix A5.-Pink salmon stocking in the PWSMA by year and stocking site (1980-2004).

	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]	Totals
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	125,651,548
1983	87,384,533		22,184,862				25,751,531 [c]		discon't	5,600,000	140,968,926
1984	76,746,000	1,561,750	29,271,000				41,945,403 [c]			8,390,000	157,914,153
1985	103,531,000	discon't	36,497,996	2,003,800			29,286,498 [c]			51,263,063	222,582,357
1986	112,529,000		58,216,842	2,000,000		34,437,214	32,728,663 [c]			54,630,942	294,542,661
1987	116,177,000		42,653,000	discon't		75,933,000	2,660,000 [c]			59,739,000	297,162,000
1988	110,037,000		95,572,691			195,322,000	0	16,960,000		114,030,000	531,921,691
1989	160,000,000		58,969,539			159,890,000	10,200,000 [c]	14,380,000		114,034,000	517,473,539
1990	113,800,000		143,660,000			233,260,000	0	47,026,093		75,177,816	612,923,909
1991	115,750,000		141,510,000			205,728,876	9,235,154 [b]	48,416,027		82,879,067	603,519,124
1992	112,830,588		132,166,231			163,591,000	discon't	discon't		86,902,415	495,490,234
1993	113,337,400		140,030,396			172,087,494				141,865,235	567,320,525
1994	92,078,951		84,616,614			162,386,766				149,473,648	488,555,979
1995	108,583,112		130,339,451			168,864,536				205,371,130	613,158,229
1996	108,636,977		140,441,172			169,508,993				223,088,327	641,675,469
1997	51,562,609		136,838,852			106,440,456				188,862,094	483,704,011
1998	105,974,000		137,572,000			103,675,000				195,162,063	542,383,063
1999	133,200,000		131,200,000			123,900,000				213,906,642	602,206,642
2000	142,537,692		132,236,317			116,069,339				195,763,690	586,607,038
2001	150,287,930		139,226,716			127,651,881				203,897,201	621,063,728
2002	155,982,828		138,626,713			106,229,524				202,573,328	603,412,393
2003	146,407,222		135,584,680			119,553,743				206,397,607	607,943,252
2004	170,460,145		136,288,850			109,640,296				222,457,568	638,846,859
1995-2004 means	127,363,252		135,835,475			125,153,377				205,747,965	594,100,068

Source: ADF&G 1999a

[a] Reared at Cannery Creek Hatchery.

[b] Reared at W. Noerenberg Hatchery.

[c] Reared at Main Bay Hatchery.

[d] Reared at Solomon Gulch Hatchery.

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

Appendix A6.-Chum salmon stocking in the PWSMA by year and stocking site (1980-2004).

	AFK Hatchery		Cannery Creek Hatchery		Main Bay Hatchery		W. Noerenberg Hatchery		Solomon Gulch Hatchery	
Year	Port San Juan	Sawmill Bay	Cannery Creek	Unakwik Inlet	Lake Bay	Main Bay	Lake Bay	Port Chalmers	Solomon Gulch	Totals
1980	395,000		462,849							
1981	745,668		2,448,611							
1982	7,616,000		866,890						400,000	1,266,890
1983	0		0			8,644,179			617,000	9,261,179
1984	7,654,000		1,796,000		7,355,000	7,490,291			900,000	17,541,291
1985	10,944,308		760,000		12,559,082	11,033,065	12,466,732		2,146,017	38,964,896
1986	0		278,900		4,251,497	5,258,175	15,172,261		2,256,291	27,217,124
1987	0		34,800		discon't	76,646,750	36,479,000		3,419,000	116,579,550
1988	0		200,000			discon't	68,388,000		1,614,000	70,202,000
1989	0		discon't	4,487,000			79,845,000		2,900,000	87,232,000
1990	0			discon't			46,980,000		3,100,000	50,080,000
1991	0						76,843,000		1,607,000	78,450,000
1992	0						97,953,492		2,690,414	100,643,906
1993	9,484,200						108,026,724		17,670,620	125,697,344
1994	0						82,029,558	18,078,640	6,088,063	106,196,261
1995	0						72,254,939	24,211,065	1,393,586	97,859,590
1996	0						79,543,524	22,770,999	discon't	102,314,523
1997	8,524,584						77,399,969	17,272,475		94,672,444
1998	10,121,000						77,839,000	22,106,000		99,945,000
1999	0						75,000,000	24,300,000		99,300,000
2000	0						79,306,351	24,045,577		103,351,928
2001	0						57,712,566	18,403,759		76,116,325
2002							75,341,899	25,913,467		101,255,366
2003		15,656,521					59,454,741	23,555,057		98,666,319
2004		32,397,047					73,883,852	43,263,743		149,544,642
1995-2004 means							72,773,684	24,584,214		102,302,614

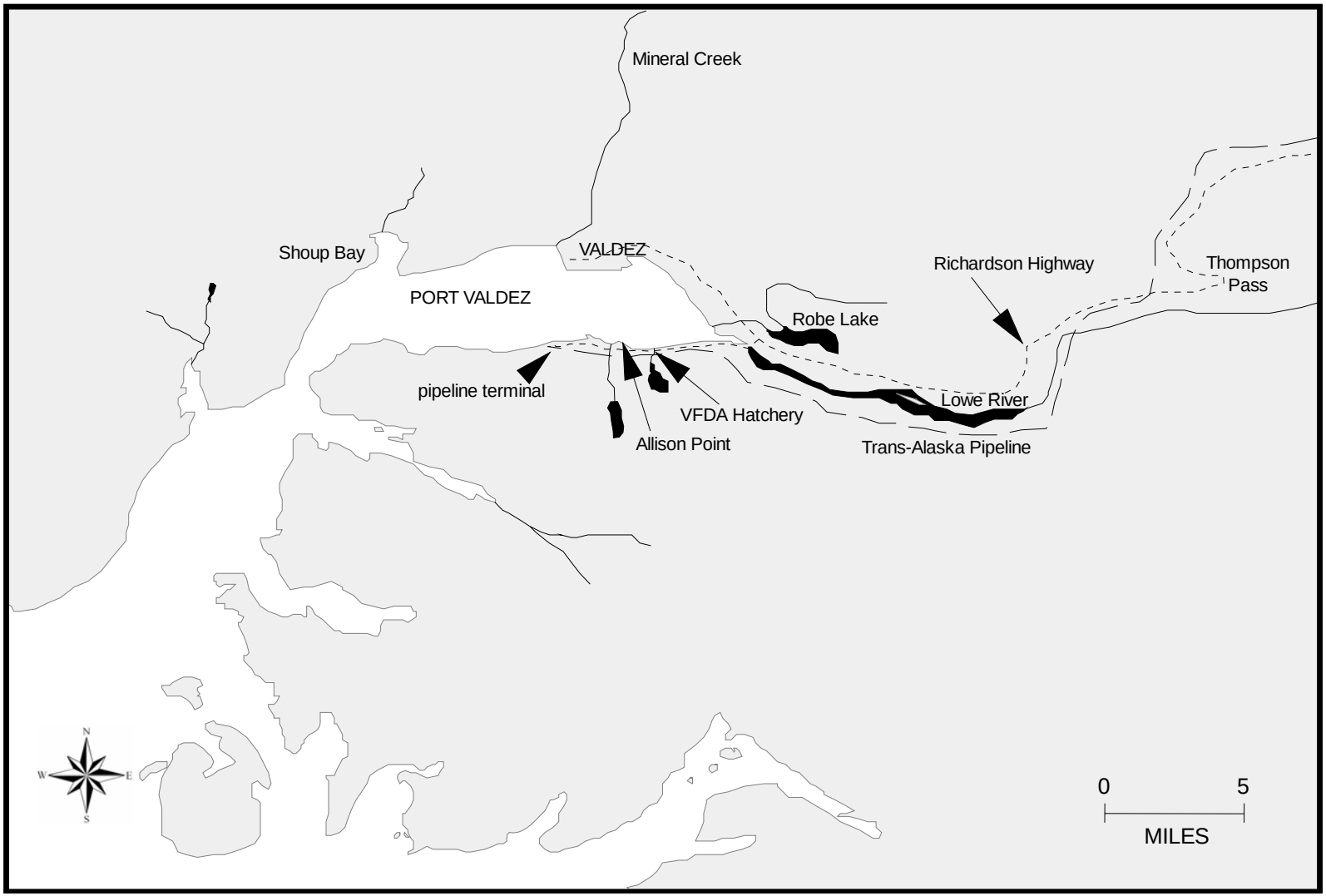
Source: ADF&G 1999a.

Appendix A7.-Sockeye salmon stocking in the PWSMA by year and stocking site (1980-2004).

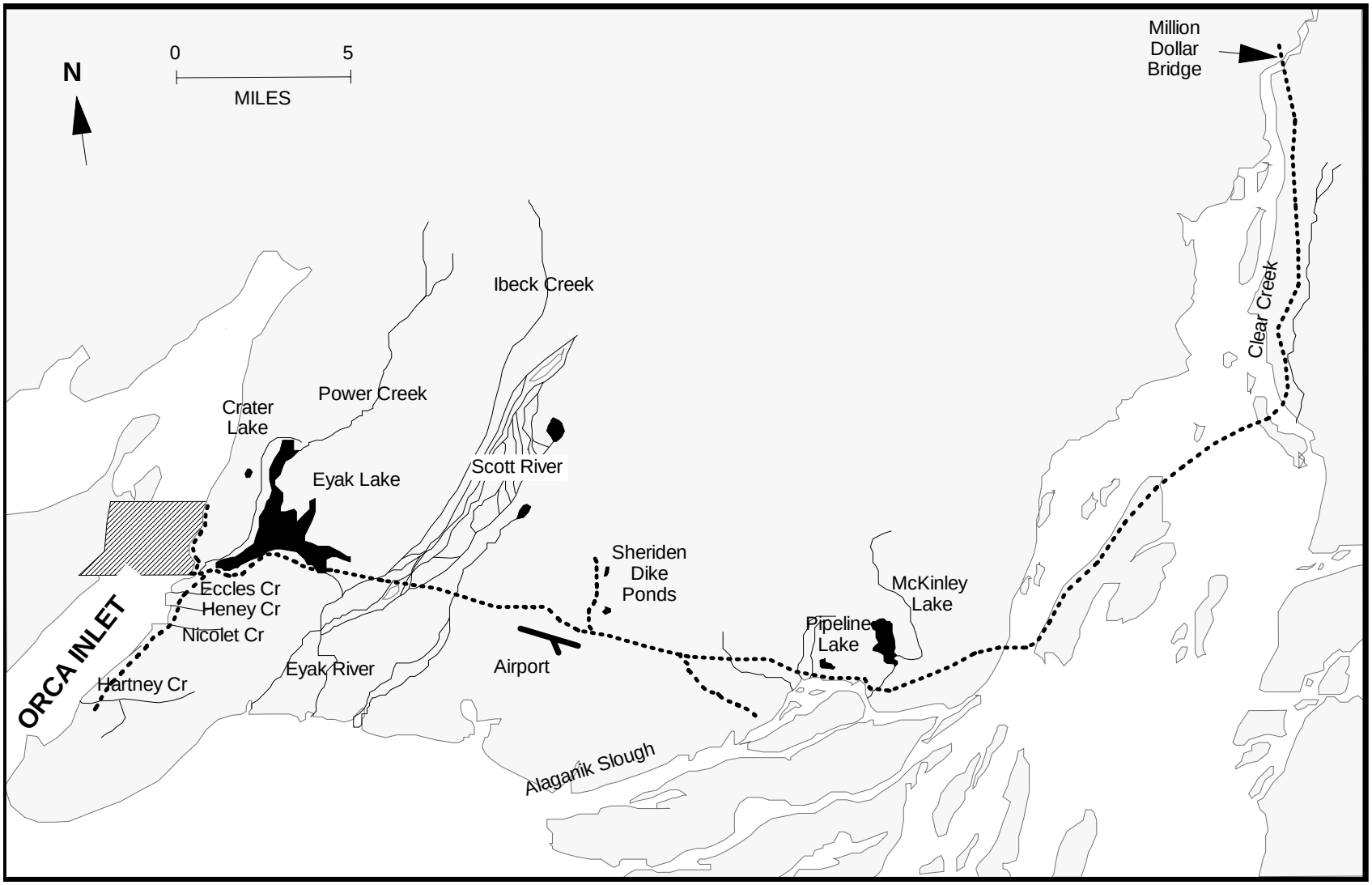
Main Bay/ W. Noerenberg/ Trail Lake Hatcheries										
Year	Coghill Lake[a]	Davis Lake[a]	Eshamy Lake	Esther Pass Lake[a]	Eyak Lake[a]	Main Bay[a]	Marsha Lake[a]	Pass Lake[a]	Solf Lake[a]	Totals
1986			516,000 [c]							
1987			396,000 [b]							
1988		657,287	764,000 [b]	153,031		330,025		594,210		924,235
1989		discon't	2,055,000 [b]	154,644		3,925,357		603,219		4,528,576
1990			0	25,000		2,616,498		100,121		2,716,619
1991	443,000		1,279,475 [a]	discon't	47,609	2,363,337		discon't		2,363,337
1992	720,875		1,043,356 [a]		0	1,914,927	691,405			2,606,332
1993	806,218		966,750 [a]		0	2,597,284	0			2,597,284
1994	1,219,354		691,633 [a]		discon't	2,400,666	0			2,400,666
1995	865,020		discon't			5,348,092	215,944			5,564,036
1996	discon't					3,227,685				3,227,685
1997						1,215,716				1,215,716
1998						2,666,000			109,800	2,775,800
1999						6,970,000			0	6,970,000
2000						8,181,502			116,473	8,297,975
2001						7,379,733			116,144	7,495,877
2002						7,858,190				7,858,190
2003						790,604				790,604
2004						7,607,383	946,336		248,090	8,801,809
1995-2004 means						5,124,491				5,299,769

Source: ADF&G 1999a.

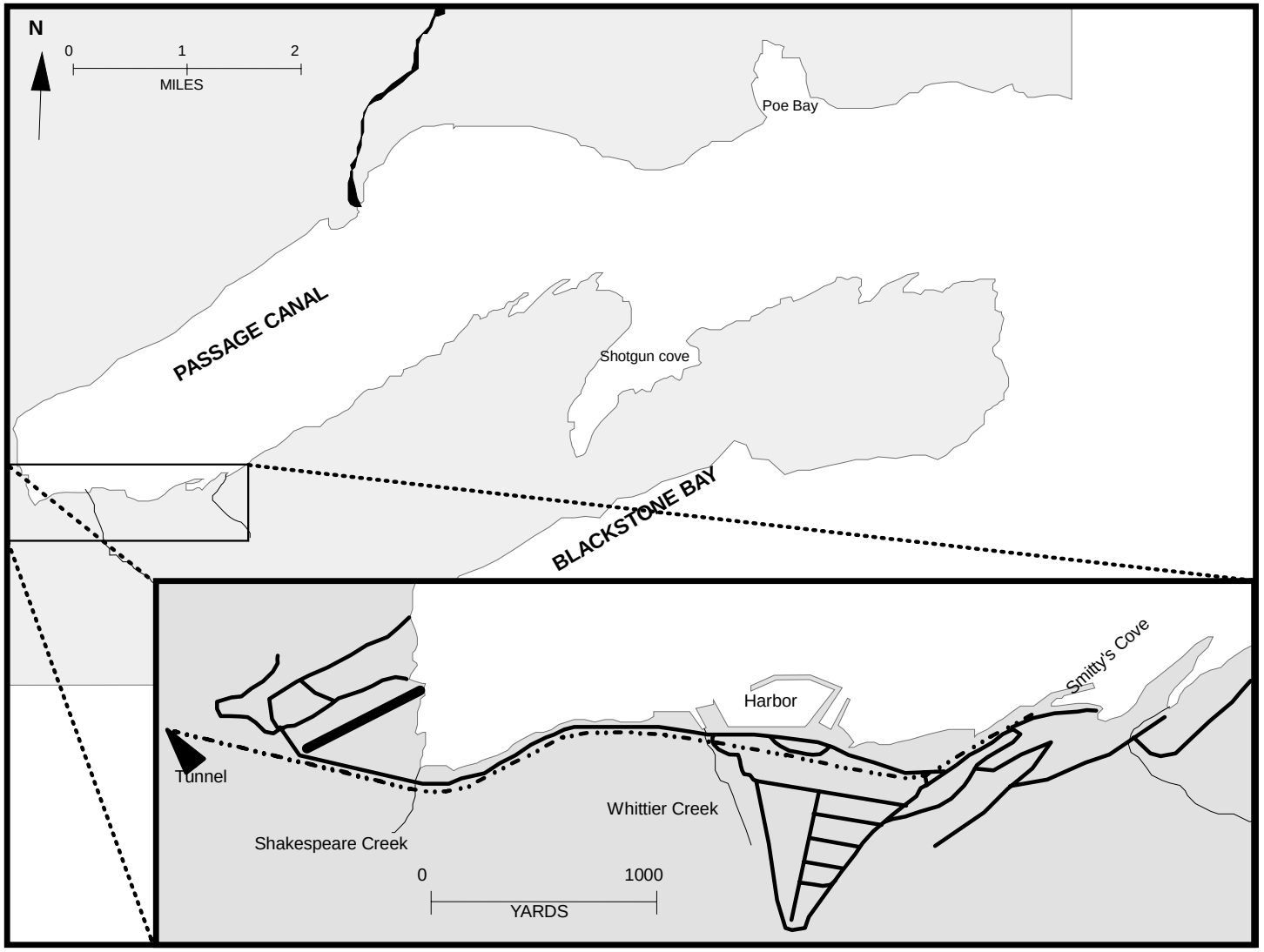
APPENDIX B. MAPS OF THE MAJOR PWSMA COMMUNITIES AND HATCHERIES



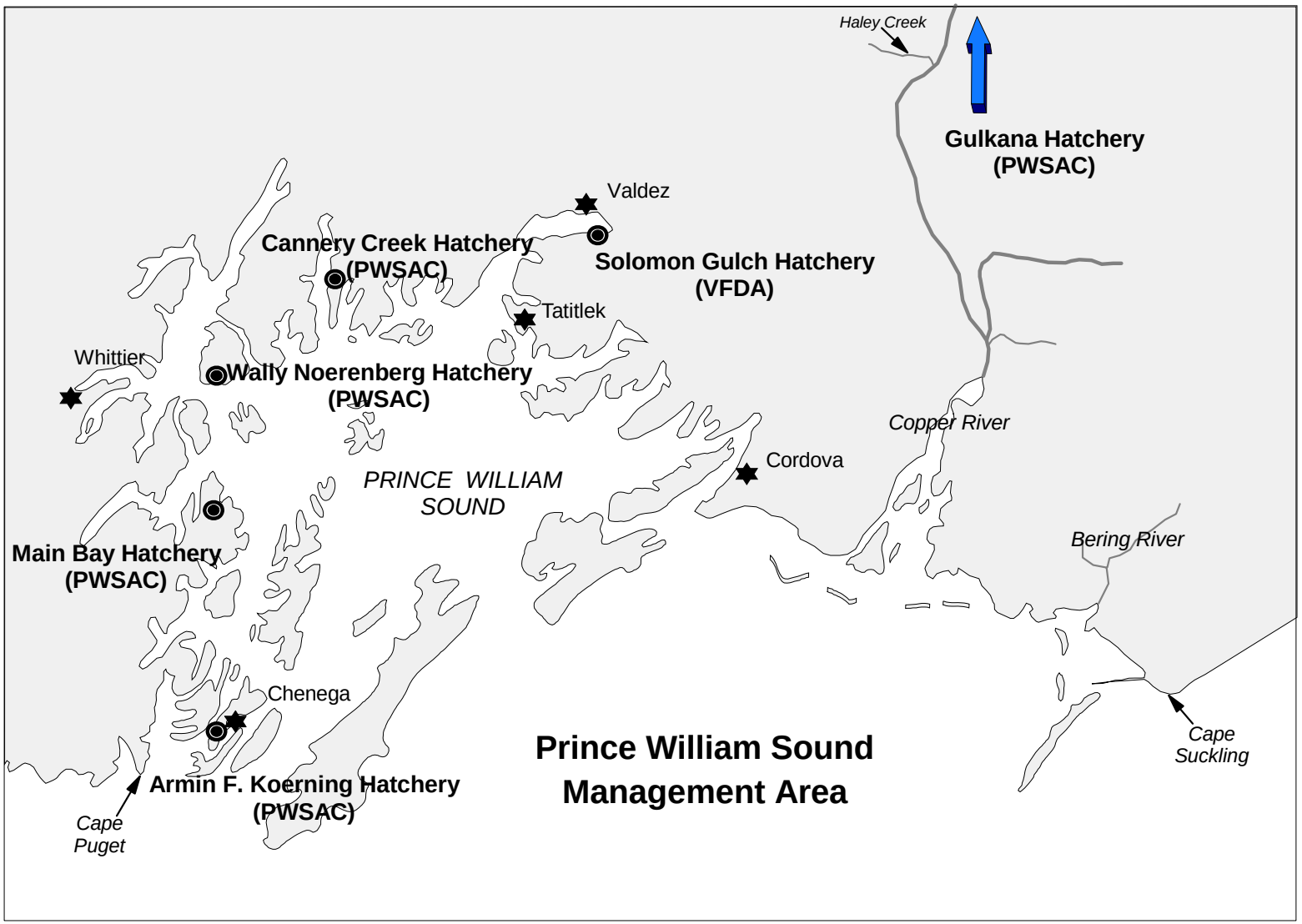
Appendix B1.–The Valdez area.



Appendix B2.–The Cordova area.



Appendix B3.–The Whittier area.



Appendix B4.–PWSMA hatcheries.