Fishery Management Report No. 04-10

Area Management Report for the Recreational Fisheries in Resurrection Bay, 2002

by

Matt G. Miller

and

Daniel E. Bosch

November 2004

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

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AREA MANAGEMENT REPORT FOR THE RECREATIONAL FISHERIES IN RESURRECTION BAY, 2002

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Matt G. Miller
and

Daniel E. Bosch
Division of Sport Fish, Anchorage

Alaska Department of Fish and Game
Division of Sport Fish, Research and Technical Services
333 Raspberry Road, Anchorage, Alaska, 99518-1599

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Matt G. Miller and Daniel Bosch
Alaska Department of Fish and Game, Division of Sport Fish,
333 Raspberry Road, Anchorage, AK 99518-1599, USA

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MANAGEMENT AREA

The North Gulf Coast sport fish management area consists of all fresh and salt waters between Gore Point and Cape Puget. This management area is further divided into Resurrection Bay proper (all waters north of a line between Cape Resurrection and Aialik Cape) and all waters outside Resurrection Bay from Gore Point to Cape Puget (Figure 1). The city of Seward is the only community in the management area. Tourism, including a growing sport fish charter industry, is vital to the economy of Seward. Access to area sport fisheries is by road, rail, air, and boat. Except for a few road-accessible streams, lakes, and Seward beaches, most sport fisheries in the Resurrection Bay Management Area are relatively remote and require a boat or plane to access. Principal land managers include private individuals, the City of Seward, U.S. National Park Service, U.S. Forest Service, Native corporations, and the State of Alaska.

Prior to 2003, groundfish (halibut, rockfish, lingcod, and shark) research and management was directed by a Fishery Biologist III, Scott Meyer, stationed in Homer. At that time groundfish were managed on a regional scale covering the Gulf of Alaska west of Cape Suckling to the Aleutian Islands. Although groundfish issues will continue to be examined on a regional scale, these fisheries are now being managed by local Area Management Biologists. Groundfish issues will also now be covered in this report. A more complete history of the groundfish resource can be found in the Management Report for Southcentral Alaska Recreational Halibut and Groundfish Fisheries, 2001 (Meyer and Stock 2002).

In September 1995, the Central Gulf Management Area was split into two separate areas: Prince William Sound and Resurrection Bay. North Gulf Coast (Resurrection Bay) sport fisheries management and research functions are now directed by Area Management Biologist, Matt Miller, and Assistant Area Management Biologist Dan Bosch, stationed in Anchorage. This report addresses saltwater catch and harvest data from the North Gulf Coast management area through 2002.

Codified regulations for Resurrection Bay area saltwater sport fisheries are found in the Cook Inlet-Resurrection Bay Saltwater Area section under Chapter 58, Title 5 of the Alaska Administrative Code (AAC). Codified regulations for Resurrection Bay area freshwater sport fisheries are found in the Kenai Peninsula Area section under Chapter 56 of the AAC. For the purposes of effort, catch, and harvest reporting, the Statewide Harvest Survey (SWHS) is used (Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, in prep.). Resurrection Bay area fisheries are summarized under Area P in the SWHS reports. The SWHS does not estimate effort on a species-specific basis, but rather includes effort for all species at a given location.

FISHERIES RESOURCES

Most area sport fisheries occur in salt water and target five species of Pacific salmon (coho or silver *Oncorhynchus kisutch*, chinook or king *O. tshawytscha*, pink or humpy *O. gorbuscha*, chum or dog *O. keta*, and sockeye or red *O. nerka*), and Dolly Varden *Salvelinus malma*. The Resurrection Bay area is home to one of the largest marine coho salmon fisheries in the Pacific Northwest. This popular fishery is highlighted during the August Seward Silver Salmon Derby sponsored by the Seward Chamber of Commerce. Coho salmon are a mix of hatchery and naturally produced fish, chinook and sockeye salmon are a result of hatchery production, pink

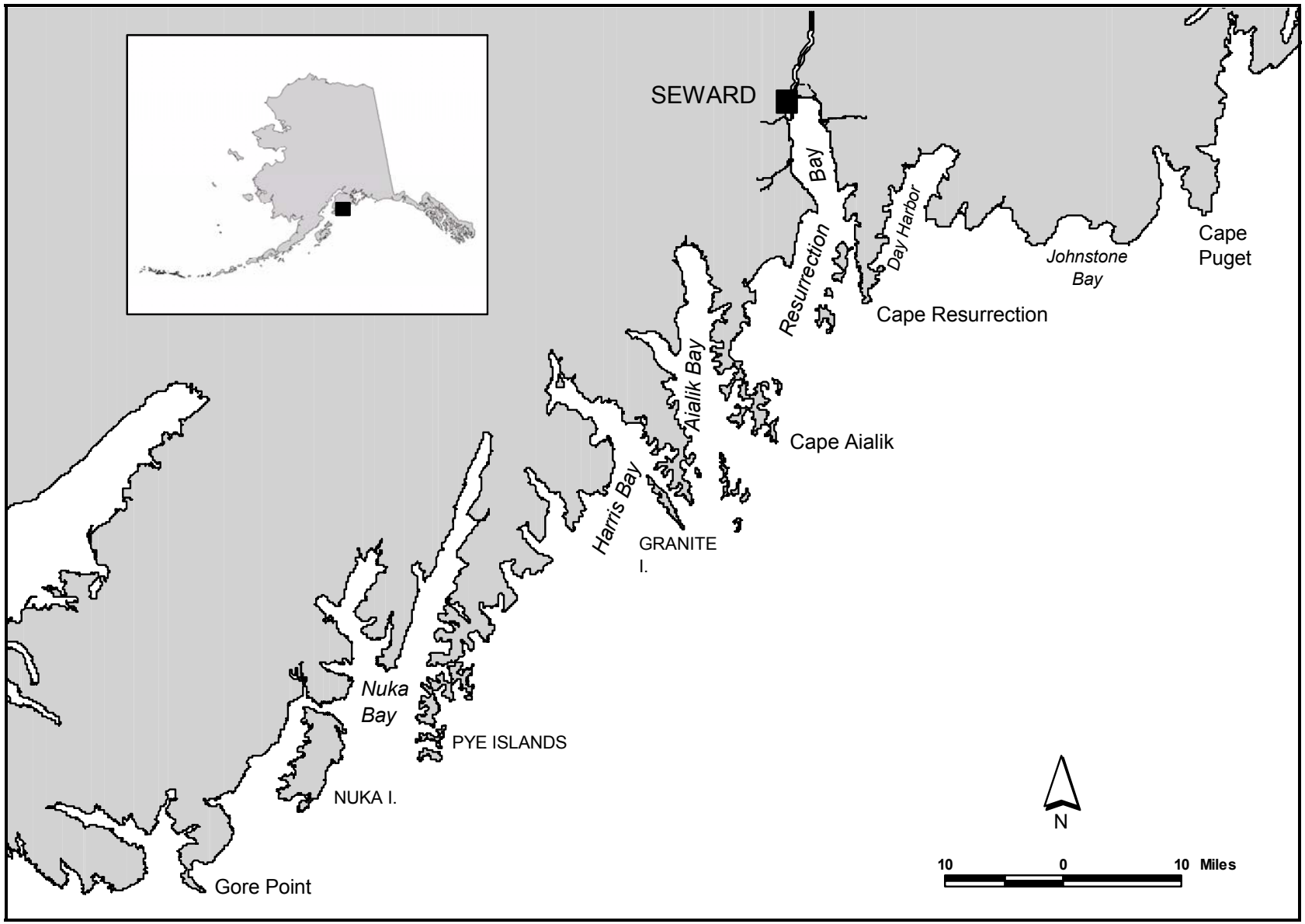

Figure 1.-Resurrection Bay Sport Fish management area.

and chum salmon and Dolly Varden are wild fish. Resurrection Bay is a popular jumping off point for sport fishing boats targeting groundfish species such as halibut *Hippoglossus stenolepis*, rockfish *Sebastes* and *Sebastolobus*, and lingcod *Ophiodon elongatus*. There is also a salmon shark *Lamna ditropis* fishery. All freshwater drainages in Resurrection Bay are closed to salmon fishing but open to Dolly Varden, rainbow trout *O. mykiss*, and Arctic grayling *Thymallus arcticus* sport fishing.

ALASKA BOARD OF FISHERIES ACTIVITIES

The Alaska Board of Fisheries (BOF) is responsible for promulgating regulations in state waters. Public input concerning regulation changes and allocation issues is provided through various means including direct testimony to the BOF and participation in local fish and game advisory committees. These advisory committees have been established throughout Alaska to assist the Boards of Fisheries and Game in assessing fisheries and wildlife issues and proposed regulation changes. Proposals must be submitted between the time the board issues a call for proposals, usually in December or January, and a set deadline, usually in early April. Most advisory committees meet at least once each year, usually in the fall prior to BOF meetings. Staff from the Division of Sport Fish and other divisions of the Alaska Department of Fish and Game (ADF&G) often attend committee meetings. Advisory committee meetings allow for direct public interaction with department staff involved with local resource issues. The Seward Advisory Committee represents Seward and Moose Pass.

Under its current schedule, the BOF reviews regulations for each area on a 3-year cycle. Proposals for the Resurrection Bay-Cook Inlet Regulatory Area will next be considered in 2004/2005.

ACTIONS TAKEN AT THE 2001 BOARD OF FISHERIES MEETING

There were seven proposals before the BOF for consideration at the November 2001 meeting that had the potential to affect Resurrection Bay fisheries.

Two proposals targeted coho salmon harvest by anglers in Resurrection Bay toward hatchery stocks. Proposal 32, submitted by Alaska Sportfishing Association, recommended restricting the bag and possession limit of coho salmon to three fish prior to August 1, and six fish August 1 and later. The BOF took "no action" on Proposal 32, based on their action on Proposal 33. Proposal 33, submitted by the Seward Advisory Committee, created a Terminal Harvest Area within Resurrection Bay. In the marine waters north of a line between Cape Resurrection and Cape Aialik, bag and possession limits for salmon other than king salmon in the Terminal Harvest Area would be six per day and in possession. Limits for salmon other than kings outside the Terminal Harvest area would be six per day and in possession, but only three per day and in possession may be coho salmon. The BOF favored Proposal 33 because it provides regulatory consistency between Cook Inlet and Prince William Sound, decreases the harvest rate on mixed stocks, and provides protection to local North Gulf Coast coho salmon stocks. Proposal 33 was passed without change.

Proposal 17 proposed a bag limit of two chinook salmon for the Cook Inlet winter fishery between November 1 and March 31. This proposal was submitted in the 1998/1999 BOF cycle, but was deferred to the North Gulf of Alaska King Salmon Task Force. However, that task force was eliminated in the fall of 2000 due to lack of funding, so the proposal was considered during the 2001/2002 BOF cycle. The proposal was amended by the BOF to include all marine waters of Cook Inlet, including the North Gulf Coast (Cape Puget to Gore Point) and Resurrection Bay.

The proposal was further amended to include chinook salmon harvested in the winter in the annual limit of five fish that had previously applied only to the Cook Inlet summer fishery. Proposal 17 was carried as amended by the BOF, and for the first time set an annual limit of five chinook salmon in North Gulf Coast and Resurrection Bay waters, and requires all anglers to record the harvest of all chinook salmon 20 inches in length or greater. The daily bag limit for chinook salmon in this area remains at two.

Proposal 27 was submitted by ADF&G to standardize boundaries for sport, personal use, subsistence, and commercial fishing in the Outer Gulf Coast. This proposal would have moved the sport fishing regulatory boundary between the North Gulf Coast Area and Prince William Sound Area from Cape Puget to Cape Fairfield. Bag limits for rockfish and lingcod are more liberal in the Prince William Sound Area than they are in the North Gulf Coast Area. Moving the regulatory boundary east to Cape Fairfield would have included the Cape Puget to Cape Fairfield area, which receives extensive effort from the Seward-based charter boat fleet, in the more liberal Prince William Sound regulations. Liberalizations to rockfish regulations would have only occurred during the winter months when very few boats are fishing. There would have been no real impact to rockfish stocks with this boundary change. However, liberalization of the lingcod regulations would have real impacts to lingcod stocks as the Prince William Sound regulations allow for two lingcod per day compared to the current one per day. With this in mind, ADF&G withdrew the proposal. The BOF took no action on Proposal 27. ADF&G will not resubmit this proposal and North Gulf Coast/Prince William Sound Sport Fish regulatory boundaries will remain as they are.

Cook Inlet Aquaculture Association (CIAA, a private nonprofit corporation) submitted Proposal 31 to amend the Bear Lake Hatchery Plan (Appendix A1). The amendment would have required the Resurrection Bay commercial purse seine fishery to be managed for a sockeye harvest of 66,000 fish, and would have established a Special Harvest Area in the northeast corner of Resurrection Bay. CIAA further proposed to discontinue the Grouse Lake late-run sockeye stocking and instead enhance the Bear Lake system with early-run fall pre-smolt and spring smolt releases for cost recovery. This proposal failed. It met fairly stiff broad-based opposition, mainly against the proposed harvest strategy. The last portion of this proposal, enhancing Bear Lake with a different life stage of sockeye salmon, has been put forth by CIAA as a change to the Trail Lakes Hatchery Plan for 2002, and was still under consideration by ADF&G as of fall 2002.

Two proposals would have affected the Resurrection Bay shark fisheries. The first was in response to the regulation that states a fish becomes a part of the bag and possession limit of the person originally hooking the fish. Proposal 40 would have allowed guides to hook sharks for their clients. However, the BOF expressed concern in setting a precedent of regulation allowing someone else to hook fish, and turned down this proposal. The second proposal, Proposal 41, would have allowed for directed commercial hook-and-line shark fisheries, with sale of sharks as bycatch allowable in other commercial fisheries as well as liberalized bag limits in recreational fisheries. The BOF deferred this proposal to their March 2002 statewide meeting, where it was not accepted.

ACTION TAKEN AT THE OCTOBER 2002 SPECIAL BOARD OF FISH MEETING

During October 20 and 21, 2002 the Board of Fish held a special meeting to re-access king salmon issues brought up during the 2001 regular board meeting, and created the North Gulf

Coast King Salmon Sport Fish Management Plan (5AAC 58.065). At this special meeting ideas were discussed to focus fishing effort on hatchery stocks while protecting wild stocks and still allow for the historic levels of effort and harvest of king salmon in Resurrection Bay. The BOF rescinded actions taken in their 2001 meeting by removing the North Gulf Coast and Resurrection Bay from the annual king salmon limit. Resurrection Bay was turned into a terminal harvest area for king salmon. The boundaries of the terminal harvest area are the same already used in regulation for lingcod and coho salmon. The terminal harvest area is only in effect from May 1 through August 31 each year with a bag and possession limit of 2 king salmon any size. During the rest of the year the bag and possession limit is 1 king salmon. The rest of the North Gulf Coast area has a bag and possession limit of 1 king salmon year round.

RECREATIONAL ANGLER EFFORT

Recreational angler effort in Resurrection Bay was 91,477 angler-days in 2001 and 97,351 angler-days in 2002 (Table 1), well above the 1991-2000 average of 84,645 angler-days. Effort during these two years was the highest recorded except for 1995, an estimate known to be inaccurate. Angler effort trends in Resurrection Bay indicate an overall increase in effort (Figure 2), from 72,181 angler-days in 1990 to approaching 100,000 angler-days in 2002. The 2002 level of sport fishing effort represents 4% of the statewide and 6% of the Southcentral sport angling effort (Table 1).

Beginning in 1986, the SWHS began estimating angler activity in Resurrection Bay by charter boat, private boat, and shore anglers (Table 2, Figure 3). In 2001 and 2002, fishing from charter boats represented 32% and 34% of total effort, private boats accounted for 48% each year, and shore fishing made up 19% and 18% respectively.

STOCKING PROGRAM INVENTORY

Stocking of hatchery-raised coho, chinook, and sockeye salmon has increased and diversified opportunities for Resurrection Bay saltwater anglers. These stocking activities consist of two types of programs: those directed specifically toward enhancing the sport fisheries, and those that are intended to increase the harvest potential of the commercial fisheries but incidentally enhance the availability of fish for the sport angler. All of the salmon releases contribute to the common property fisheries and are thus available to any fishery regardless of the target group.

Programs directed toward enhancing sport fisheries include the stocking of coho and chinook salmon smolt by state-operated hatcheries (Fort Richardson and Elmendorf) and the release of coho salmon raised by CIAA. CIAA releases sockeye salmon into Resurrection Bay fresh waters primarily for commercial activities. In 2002, 2.4 million sockeye salmon fry were released at Bear Lake to support commercial fishing activities. To benefit sport anglers, 404,700 coho salmon fry were released into Bear Lake. In addition, over 365,055 coho smolt and over 220,307 chinook salmon smolt were stocked in Seward-area waters in 2002 (Table 3). A complete stocking history of Resurrection Bay can be found in Appendix B1. First Lake, located in Two Lakes Park Seward, is also stocked with 1,000 catchable-sized rainbow trout. This stocking targets local Seward children as a user group.

Table 1.-Number of angler-days expended in Resurrection Bay compared to Southcentral and Statewide, 1977-2002.

	Statewide	Southcentral	Resurrection Bay		
Year	Effort	Effort	Effort	% of Statewide	% of S.Central
1977			41,797		
1978			53,355		
1979			43,576		
1980			49,623		
1981			56,410		
1982			49,167		
1983	1,732,528	1,212,916	42,150	2%	3%
1984	1,866,837	1,341,658	46,678	3%	3%
1985	1,943,069	1,406,419	55,759	3%	4%
1986	2,071,412	1,518,712	55,372	3%	4%
1987	2,152,886	1,556,050	44,299	2%	3%
1988	2,311,291	1,679,939	53,029	2%	3%
1989	2,264,079	1,583,547	50,546	2%	3%
1990	2,453,284	1,745,110	72,181	3%	4%
1991	2,456,328	1,782,055	73,683	3%	4%
1992	2,540,374	1,889,730	83,568	3%	4%
1993	2,559,408	1,867,233	90,274	4%	5%
1994	2,719,911	1,966,985	86,861	3%	4%
1995	2,787,670	1,985,539	100,194 [a]	4%	5%
1996	2,006,528	1,434,943	81,699	4%	6%
1997	2,079,514	1,400,983	90,031	4%	6%
1998	1,856,976	1,258,482	71,564	4%	6%
1999	2,499,152	1,659,966	84,742	3%	5%
2000	2,627,805	1,844,824	83,830	3%	5%
2001	2,261,941	1,560,562	91,477	4%	6%
2002	2,259,091	1,569,513	97,351	4%	6%

Sources: Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, in prep.

Notes: Starting in 2001 location codes for Resurrection Bay are based on destination rather than location, so harvest, catch, and effort is estimated by "port of return" and a small portion of these estimates may have come from outside the North Gulf Coast Area.

[a] This estimate may be anomalous because of methods used for the 1995 Statewide Harvest Survey.

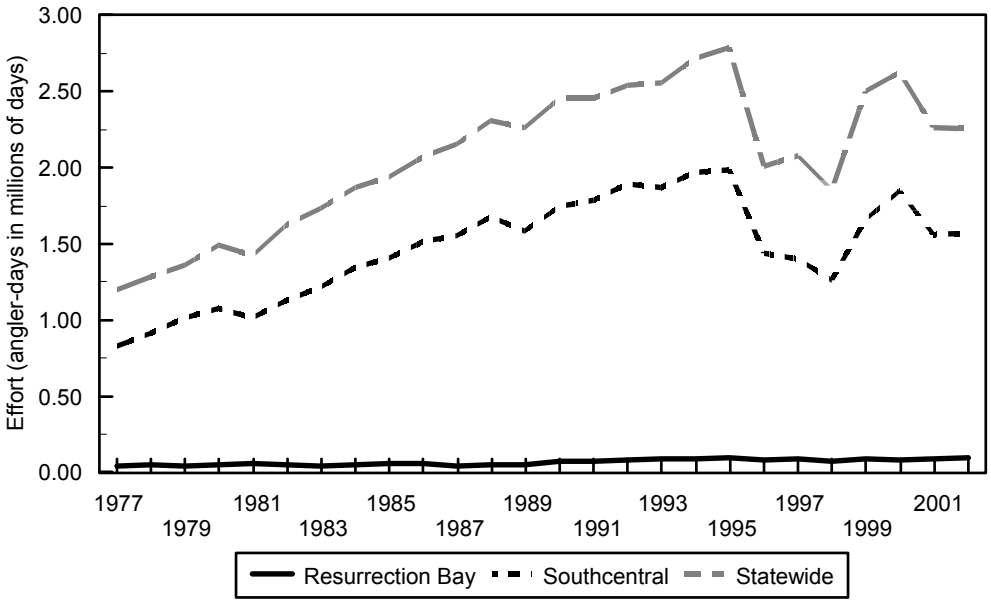

Figure 2.-Sport fishing effort (angler-days) expended in Resurrection Bay compared to Southcentral and Statewide, 1977-2002.

Table 2.-Components of Resurrection Bay saltwater sport fishing effort, 1977-2002.

	Saltwater	Charter Boat		Private Boat		Shore	
Year	Effort	Effort	Percent	Effort	Percent	Effort	Percent
1977	41,797						
1978	53,355						
1979	43,576						
1980	49,623						
1981	56,410						
1982	49,167						
1983	40,144						
1984	44,669						
1985	47,472						
1986	51,375	13,180	26%	24,923	49%	13,272	26%
1987	42,143	12,423	29%	18,364	44%	11,356	27%
1988	50,251	10,587	21%	23,520	47%	16,144	32%
1989	47,386	10,628	22%	21,207	45%	15,551	33%
1990	69,485	17,810	26%	36,556	53%	15,119	22%
1991	71,332	20,872	29%	32,291	45%	18,169	25%
1992	80,814	21,342	26%	41,206	51%	18,266	23%
1993	85,559	22,251	26%	41,442	48%	21,866	26%
1994	85,742	26,664	31%	38,807	45%	20,271	24%
1995	99,689	32,057	32%	42,132	42%	25,500	26%
1996	81,499	23,214	28%	36,156	44%	22,129	27%
1997	89,686	24,052	27%	41,446	46%	24,188	27%
1998	71,034	22,409	32%	32,129	45%	16,496	23%
1999	84,637	22,962	27%	45,143	53%	16,532	20%
2000	83,551	27,184	33%	41,560	50%	14,807	18%
2001	91,477	29,573	32%	44,195	48%	17,709	19%
2002	97,351	33,138	34%	47,074	48%	17,139	18%
1986-2002 Average	75,471	21,785	28%	35,774	47%	17,913	24%
1993-2002 Average	87,023	26,350	30%	41,008	47%	19,664	23%

Sources: Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, in prep.

Notes: Starting in 2001 location codes for Resurrection Bay are based on destination rather than location, so harvest, catch, and effort is estimated by "port of return" and a small portion of these estimates may have come from outside the North Gulf Coast Area.

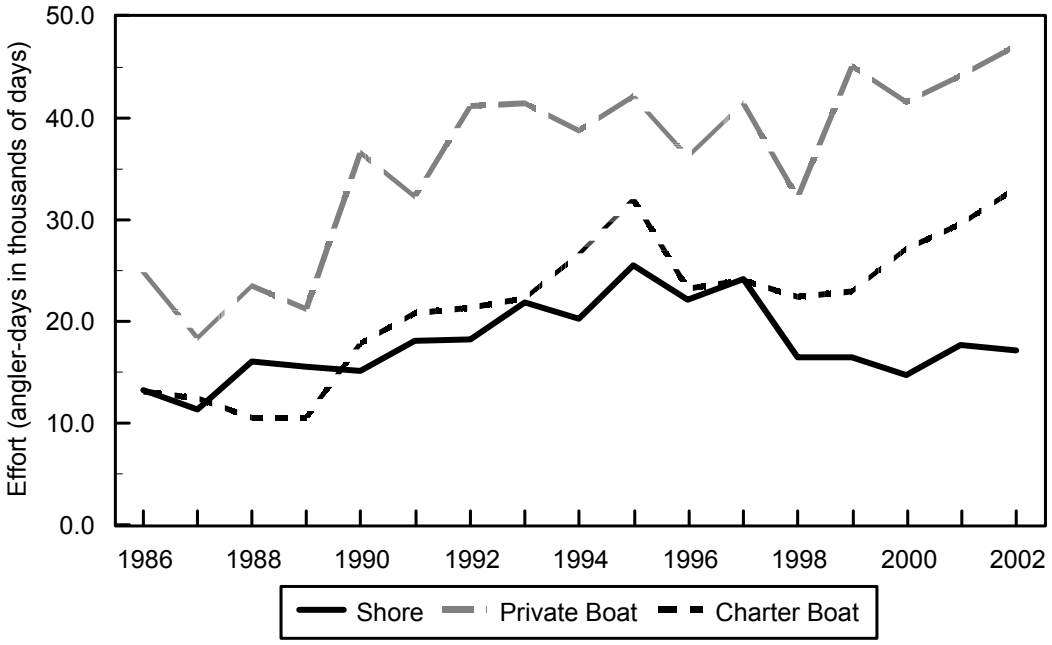

Figure 3.-Sport fishing effort (angler-days) expended by shore, private, and charter anglers in Resurrection Bay, 1986-2002.

Table 3.-Hatchery releases in Resurrection Bay from 1997-2002.

Stocking location[a]	1997	1998	1999	2000	2001	2002
Coho fry						
Bear Lake	448,700	409,000	306,000	316,000	310,000	404,700
Bear Creek						
Coho fingerling						
Bear Creek						
Bear Lake						
Box Canyon Creek						
First Lake						
Sink Hole						
Seward Lagoon						
Coho smolt						
Bear Creek	153,000	177,000	51,000	102,000	120,500	123,800
Bear Lake						
Box Canyon Creek						
Grouse Lake						
Lowell Creek	61,687	65,687	62,580	54,184	125,618	119,512
Seward Lagoon	144,112	74,365	109,142	145,693	124,703	121,743
Seward Sealife						
Chinook smolt						
Box Canyon Creek						
Lowell Creek	117,208	101,992	85,502	109,461	114,748	93,296
Seward Lagoon	203,932	205,133	88,066	212,873	113,147	100,314
Spring Creek						
Thumb Cove						
Chum fingerling						
Jap Creek						
Spring Creek						
Sockeye fry						
Bear Lake	788,000	360,000	1,380,000	1,800,000		2,407,700
Sockeye fingerling						
Bear Lake						
Sockeye smolt & Pre-smolt						
Bear Lake		506,703				802,600
Grouse Lake	2,428,000	1,573,458				
Rainbow trout catchables						
First Lake				1,000	1,000	1,007
Rainbow trout fingerling						
Lost Lake					25,000	

Sources: Marianne McNair, ADF&G, CFMD, Juneau; Jeff Hetrick and Robert Blankenship, CIAA, Trail Lakes Hatchery; ADF&G, Division of Sport Fish stocking records.

[a] Blank entries are included because they were stocked historically. See Appendix B1 for complete history.

NORTH GULF COAST MANAGEMENT PLANS

The Board of Fisheries has now established three management plans for North Gulf Coast and Resurrection Bay salmon fisheries. These plans provide for the sustained yield of area fisheries, as well as establishing allocations and management guidelines for department managers. Management plans and policies established for Resurrection Bay include:

1. Bear Lake Management Plan 5 AAC 21.375. This management plan establishes guidelines for the enhancement of coho and sockeye salmon in Bear Lake near Seward. In essence, the plan provides for the enhancement of sockeye salmon in Bear Lake intended for commercial use in Resurrection Bay, provided the enhancement does not negatively impact coho salmon smolt production from Bear Lake.
2. Resurrection Bay Salmon Management Plan 5 AAC 21.376. This management plan provides allocation and management guidelines for Resurrection Bay salmon fisheries. The plan stipulates that coho and chinook salmon fisheries of Resurrection Bay be managed exclusively for recreational uses, and provides for a commercial fishery for other salmon species only if the prosecution of these fisheries does not interfere with the recreational fishery in Resurrection Bay.
3. North Gulf Coast king salmon sport fishery management plan 5 AAC 58.065: This management plan directs king salmon fishery effort to hatchery stocks and stabilizes the sport harvest of king salmon in the North Gulf Coast.

These plans, along with the statewide plan for sharks, are presented in Appendices A1-A4.

SECTION II: FISHERIES OVERVIEW

Major Resurrection Bay sport fisheries occur in salt water. These include a popular coho salmon fishery, as well as chinook, pink, sockeye, and chum salmon, and Dolly Varden fisheries. Groundfish fisheries targeting halibut, rockfish, and lingcod are also popular. In 2002, 97,351 angler-days were expended in Resurrection Bay marine sport fisheries (Table 4). Coho salmon (98,559) and groundfish (78,049) supported the bulk of the harvest.

The following discussion of each fishery includes a brief historical overview, discussions about recent fishery performance, management objectives, recent BOF actions, current issues, and current or recommended management and research activities.

RESURRECTION BAY COHO SALMON FISHERY

Resurrection Bay supports one of the largest marine coho salmon sport fisheries in the Pacific Northwest. Although most (56%) coho salmon harvested from 1992-2001 were by anglers in private boats (Table 5, Figure 4), a shore-based fishery on beaches in and near Seward accounts for about 16% of the total coho salmon harvest in those years. Guided anglers utilizing a growing charter boat fleet harvest the remaining 28%. Since the inception of the SWHS in 1977, the marine harvest of coho salmon has ranged from 9,727 in 1984 to a peak of 98,559 in 2002 (Table 5, Figure 5). The 9-day Seward Silver Salmon Derby, which has been held each August since 1956, highlights this fishery. The Board of Fisheries recognized the importance of the Resurrection Bay coho salmon sport fishery, and in 1966 developed the Resurrection Bay Salmon Management Plan (5 AAC 21.376), which gave the sport fishery exclusive use of the bay's coho salmon. In 1976, the BOF modified the plan to stipulate that the commercial fishery for pink and chum salmon be managed so that it does not interfere with the recreational coho and

Table 4.-Sport fishing effort (angler-days) and harvest by species in Resurrection Bay, 1977-2002.

Year	Saltwater Effort	All Effort	Salmon					Dolly Varden	Groundfish [a]	Other [b]
			Chinook	Coho	Pink	Sockeye	Chum			
1977	41,797		515	14,528	1,595	6	63	1,720	14,457	26,034
1978	53,355		501	16,731	6,610	0	39	1,248	20,080	47,173
1979	43,576		156	14,315	2,100	0	100	973	24,690	15,562
1980	49,623		198	19,665	12,614	0	276	878	30,884	32,496
1981	56,410		162	14,721	7,776	0	194	5,335	22,853	20,736
1982	49,167		345	18,518	9,328	0	458	1,562	25,687	21,830
1983	40,144	42,150	199	11,277	4,909	0	923	5,811	20,215	15,421
1984	44,669	46,678	24	9,727	11,510	1,305	2,569	1,771	26,087	12,773
1985	47,472	55,759	187	11,227	5,262	1,335	634	191	22,554	4,382
1986	51,375	55,372	207	14,418	11,008	337	1,958	1,071	47,222	11,637
1987	42,143	44,299	633	24,220	3,368	815	1,974	815	18,853	1,694
1988	50,251	53,029	2,056	17,626	2,001	418	3,947	728	46,327	2,754
1989	47,386	50,546	976	19,184	4,856	624	1,696	993	41,186	17,806
1990	69,485	72,181	1,004	29,761	6,193	418	427	228	27,910	9,480
1991	71,332	73,683	1,547	30,964	4,714	983	757	524	38,352	2,299
1992	80,814	83,568	2,925	27,904	4,277	1,135	1,321	376	53,453	6,728
1993	85,559	90,274	5,121	47,572	4,172	1,865	680	774	50,537	1,644
1994	85,742	86,861	2,078	38,465	5,573	1,415	688	283	56,910	1,744
1995	99,689	100,194	3,886	40,098	4,799	1,294	396	675	43,743	2,356
1996	78,262	81,699	6,247	75,808	4,910	767	1,676	705	48,303	1,646
1997	89,686	90,031	6,436	87,213	1,571	1,786	745	494	50,967	4,042
1998	71,034	71,564	3,267	69,146	2,837	1,269	209	861	47,803	9,975
1999	84,637	84,742	2,640	75,620	4,560	1,031	663	221	53,122	2,060
2000	83,551	83,830	2,655	70,771	3,883	1,485	1,179	514	64,829	3,269
2001	91,477	91,934	2,281	96,470	3,840	1,263	650	388	64,393	1,330
2002	97,351	98,464	3,380	98,559	4,280	3,112	430	915	78,049	2,816
1982-1991 average	51,342	54,855	718	18,692	6,315	624	1,534	1,369	31,439	10,008
1992-2001 average	85,045	86,470	3,754	62,907	4,042	1,331	821	529	53,406	3,479

Sources: Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, in prep.

[a] Includes halibut, rockfish, and lingcod (1991-2002).

[b] Other may include smelt, herring, sablefish, cod, greenling, sculpin, shark, and lingcod (1987-1990).

Table 5.-Resurrection Bay saltwater sport catch (1990-2002) and harvest (1977-2002) of coho salmon.

	Boat									
	Charter		Private		Total		Shore		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977										14,528
1978										16,731
1979										14,315
1980										19,665
1981										14,721
1982										18,518
1983										11,277
1984										9,727
1985										11,227
1986		2,125		8,364		10,489		3,929		14,418
1987		2,209		16,652		18,861		5,359		24,220
1988		1,473		9,932		11,405		6,221		17,626
1989		2,889		13,444		16,333		2,851		19,184
1990	10,039	7,487	21,392	16,631	31,431	24,118	8,403	5,643	39,834	29,761
1991	8,265	7,335	20,484	18,452	28,749	25,787	5,827	5,177	34,576	30,964
1992	5,830	5,263	19,199	15,976	25,029	21,239	7,823	6,665	32,852	27,904
1993	13,957	12,907	31,728	27,018	45,685	39,925	8,512	7,647	54,197	47,572
1994	6,872	6,377	23,510	21,248	30,382	27,625	11,337	10,840	41,719	38,465
1995	9,150	8,172	25,737	21,713	34,887	29,885	12,717	10,213	47,604	40,098
1996	24,093	18,696	51,346	41,898	75,439	60,594	19,217	15,214	94,656	75,808
1997	30,300	24,010	75,463	50,188	105,763	74,198	16,771	13,015	122,534	87,213
1998	19,501	16,288	63,145	42,552	82,646	58,840	11,537	10,306	94,183	69,146
1999	29,891	24,053	54,169	44,500	84,060	68,553	8,628	7,067	92,688	75,620
2000	25,706	22,708	47,222	42,079	72,928	64,787	7,186	5,984	80,114	70,771
2001	41,739	36,873	53,011	45,990	94,750	82,863	15,969	13,607	110,719	96,470
2002	38,944	34,018	62,642	54,811	101,586	88,829	10,486	9,730	112,072	98,559

Sources: Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, in prep.

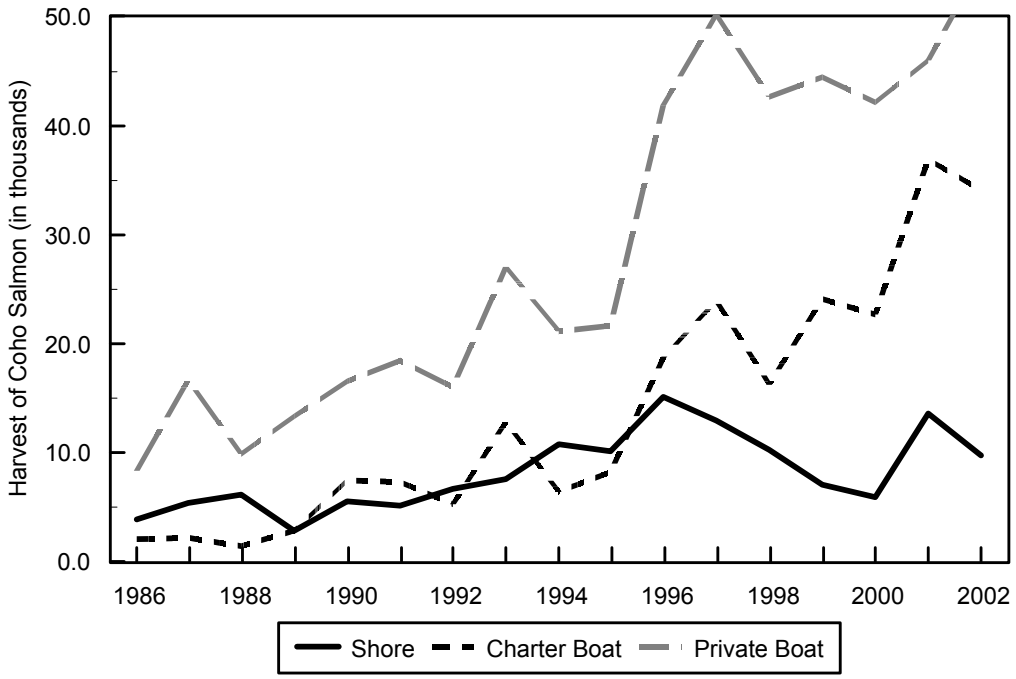

Figure 4.-Resurrection Bay saltwater coho salmon harvest by fishery, 1986-2002.

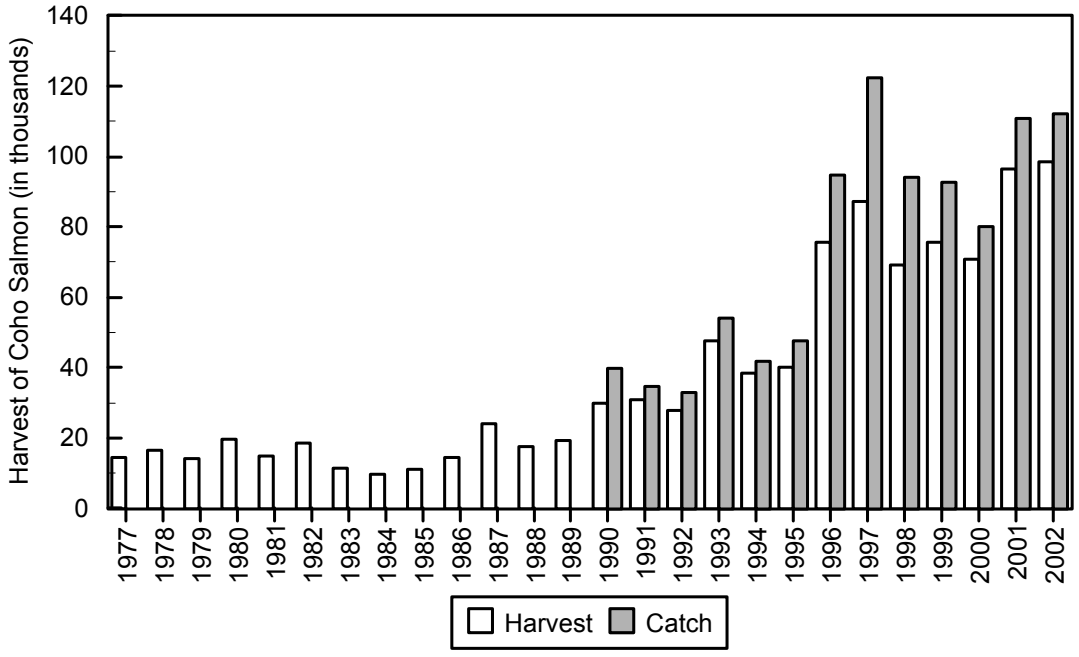

Figure 5.-Total Resurrection Bay saltwater coho salmon harvest, 1977-2002.

chinook salmon fishery. During their November 2001 meeting the BOF created the Resurrection Bay Terminal Harvest Area for Silver Salmon. This area includes all the marine waters in Resurrection Bay north of a line extending from Cape Resurrection to Cape Aialik. Bag and possession limits of six silver salmon inside the terminal harvest remain in effect. In North Gulf Coast marine waters (Cape Puget to Gore Point) outside this terminal harvest area, new bag and possession limits of three silver salmon went into effect in 2002.

An ongoing enhancement program was initiated in 1964 in Bear Lake, which flows into Resurrection Bay, to supplement wild-stock production of coho salmon. The enhancement program included stocking hatchery-reared coho fingerlings and eradicating major competitors such as threespine stickleback *Gasterosteus aculeatus*. Initial results of the program resulted in increased smolt production (Vincent-Lang 1987). However, the lake gradually became re-infested with stickleback and the lake was again rehabilitated in 1971. Subsequently, survival of stocked fingerlings to smolt in some years has exceeded 50%. This, coupled with correspondingly high adult survival rates, has increased harvests in the recreational fishery. The Board of Fisheries recognized the importance of this enhancement program's contribution to the sport fishery and in 1971 adopted the Bear Lake Management Plan (5 AAC 21.375). This plan directed that Bear Lake be managed primarily for the production of coho salmon and in accordance with this objective, placed restrictions on the number of adult sockeye salmon that could be passed into Bear Lake.

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

Another component of the coho salmon enhancement in Resurrection Bay began in 1969 with annual releases of hatchery-reared smolt at a variety of local sites. Although survival rates have varied between sites and years, smolt-to-adult survival has been as high as 15%. The contribution of these fish to the sport fishery has also been significant, up to 51% (Vincent-Lang 1987; Vincent-Lang et al. 1988; Carlon and Vincent-Lang 1989, 1990). Hatchery release sites and number of fish stocked can be found in Table 3 and Appendix B1.

The Department's current stocking goal is 240,000 coho smolt at two Resurrection Bay locations: Lowell Creek (120,000) and Seward Lagoon (120,000). CIAA has a permit to release another 250,000 coho smolt into Bear Creek. The Seward Chamber of Commerce typically buys 120,000 coho smolt each year from CIAA, and these fish are the only coho CIAA uses to fill this release permit. Recently the Chamber of Commerce enacted a tax on charter boat fishing to fund more coho smolt. In 2003 the Chamber bought another 253,400 smolt, which CIAA released into Bear Creek. In 2004 CIAA anticipates releasing another 250,000 into Bear Creek. As part

of their contractual agreement to operate the Trail Lakes Hatchery, CIAA also releases about 400,000 coho fry annually into Bear Lake.

The current bag and possession limits for salmon other than chinook salmon in Resurrection Bay salt water are six fish per day and in possession. Snagging is legal in salt water. All freshwater drainages of Resurrection Bay have been closed to salmon sport fishing since before statehood in 1959.

Recent Fishery Performance

Estimates for Resurrection Bay angler effort in saltwater in 2002 were 97,351 angler days and a harvest of 98,559 coho salmon (Table 4), representing an increase over the previous 10-year average (Figure 5) of 85,045 angler days and 62,907 coho salmon harvested. Angler harvest by type in 2002 varied from the 1992-2001 averages mentioned earlier. Anglers fishing from private boats still accounted for most of the coho salmon harvest and maintained their ten-year average harvest of 54,811 (56% of the total harvest). Shore-based anglers, fishing along Seward beaches from the boat harbor to Lowell Point, and fishing across the bay at the mouth of Spring Creek only accounted for 9,730 coho, or just 10% of the harvest well below their percentage of their usual harvest (16%). Charter boat clients harvested the remaining 34,018 fish or 35% of the harvest (Table 5, Figure 4). Charter boat clientele continue to harvest an increasing percentage of the North Gulf Coast coho salmon, while their most current ten-year average harvest is 28%, during 2002 they accounted for 35% of the harvest.

The average yearly coho harvest in Resurrection Bay increased from 15,858 fish for 1977-1989, to an average of 82,113 coho for 1998-2002. Stocking levels alone do not appear to account for this increased level of harvest. Both charter and private anglers continue to venture farther out of Resurrection Bay and target coho salmon earlier in the season. Anecdotal evidence suggested that coho salmon caught in the Resurrection Bay fisheries were from adjacent coho salmon stocks, most likely Prince William Sound. A study addressing this issue was initiated in 2001. Starting in 2002, 100% of all coho salmon released into Resurrection Bay will have thermal marked otoliths (these fish will return in 2003). All hatcheries involved in coho release programs in Prince William Sound and in Cook Inlet thermally mark the otoliths of all coho salmon released. With all hatchery-released coho salmon marked, the department implemented a study to estimate the hatchery contribution of the coho salmon harvest from the Port of Seward. This study was designed to estimate the contribution of each hatchery by time and area of harvest. The origin of the wild contribution of the harvest will not be determined because wild stocks were not marked, but the total wild contribution will be estimated.

There are now two different bag and possession limits for coho in the marine waters of the North Gulf Coast (Gore Point to Cape Puget). In the marine water of Resurrection Bay, north of a line from Cape Resurrection to Aialik Cape the limit is six. In all other marine waters in the North Gulf Coast management area the limit is three per day and three in possession. Coho limits in Cook Inlet to the west, and Prince William Sound to the east are also both regulated at three per day and three in possession. In designated Terminal Harvest Areas, in Prince William Sound and Lower Cook Inlet, where returning hatchery fish are targeted, coho bag limits are six per day. The BOF considered two proposals during the winter of 2001/2002 to help limit the harvest of coho salmon in the Resurrection Bay fisheries that are bound for other areas.

Since 1998, 5 AAC 75.076 has required that all saltwater charter boat operators report their number of clients, their catch, and their harvest by species. The saltwater charter logbooks (from

1998 to 2000) report fishing for, or harvesting coho salmon from, 35 statistical areas out of Seward (Figure 6). Of these 35 areas, 90% or more of the coho salmon harvested from charter boats comes from only five statistical areas: 496002, 495938, and 495932 which all include portions of Resurrection Bay; 485933 (Whidbey Bay); and 485935 (Johnstone Bay) to the east of Resurrection Bay. During 1998–2000 only 6,160 (38%) to 7,336 (29%) of the total coho harvested by charter boat were harvested before the beginning of August, while 10,236–17,608 (62% to 71%) were harvested after the beginning of August. In almost all of these five statistical areas a majority of the coho are harvested after the beginning of August. The one exception is area 495932, which includes Pony Cove and Cape Aialik. Generally by the time the Seward Silver Salmon Derby begins in early August, 50% or more of the coho harvest has occurred. To the east of Resurrection Bay, Whidbey Bay (485933), and Johnstone Bay (485935) are targeted more heavily after the beginning of August.

Management Objective

For coho salmon smolt releases, the management objectives are to: (1) produce, through supplemental hatchery production, an annual return of 18,000 coho salmon; and (2) generate 25,000 angler-days of fishing opportunity directed at stocked coho salmon for both boat and shore-based anglers.

While no formal escapement goals have been established for coho salmon returns in Resurrection Bay, CIAA allows a minimum of 300 coho salmon into Bear Lake. A weir on Bear Creek is used to collect coho salmon eggs for ADF&G and CIAA stocking activities.

No other specific fishery objectives have been formally established for Resurrection Bay coho salmon fisheries to date other than management objectives outlined in the Bear Lake and Resurrection Bay Management Plans.

Recent Board of Fisheries Actions

In 1998/1999, the BOF passed a proposal submitted by the Alaska Sealife Center (ASLC). This proposal asked for a small saltwater closed area centered around their newly constructed fish pass to protect returning experimental pink salmon in 2000 through 2002. Although the department has the authority to invoke 5 AAC 75.050 [Waters Closed to Sport Fishing. (a) the waters within 300 feet of a fish weir or fish ladder are closed to sport fishing, unless a lesser distance is indicated by department markers], ASLC was encourage by Sport Fish Division to submit this proposal for BOF deliberation. The area in question is popular with shore and boat anglers, especially during the Seward Silver Salmon Derby. The department recognized the need for a seasonal closure around the fish pass to ensure adequate returns of research fish, but did not agree that a year-round closure was necessary. The BOF passed an amended version of the original proposal, closing the saltwater area within a 300-ft radius of the ASLC fish pass (or as marked by the department) to sport fishing from August 1 through October 31. This regulation expired after the 2002 season.

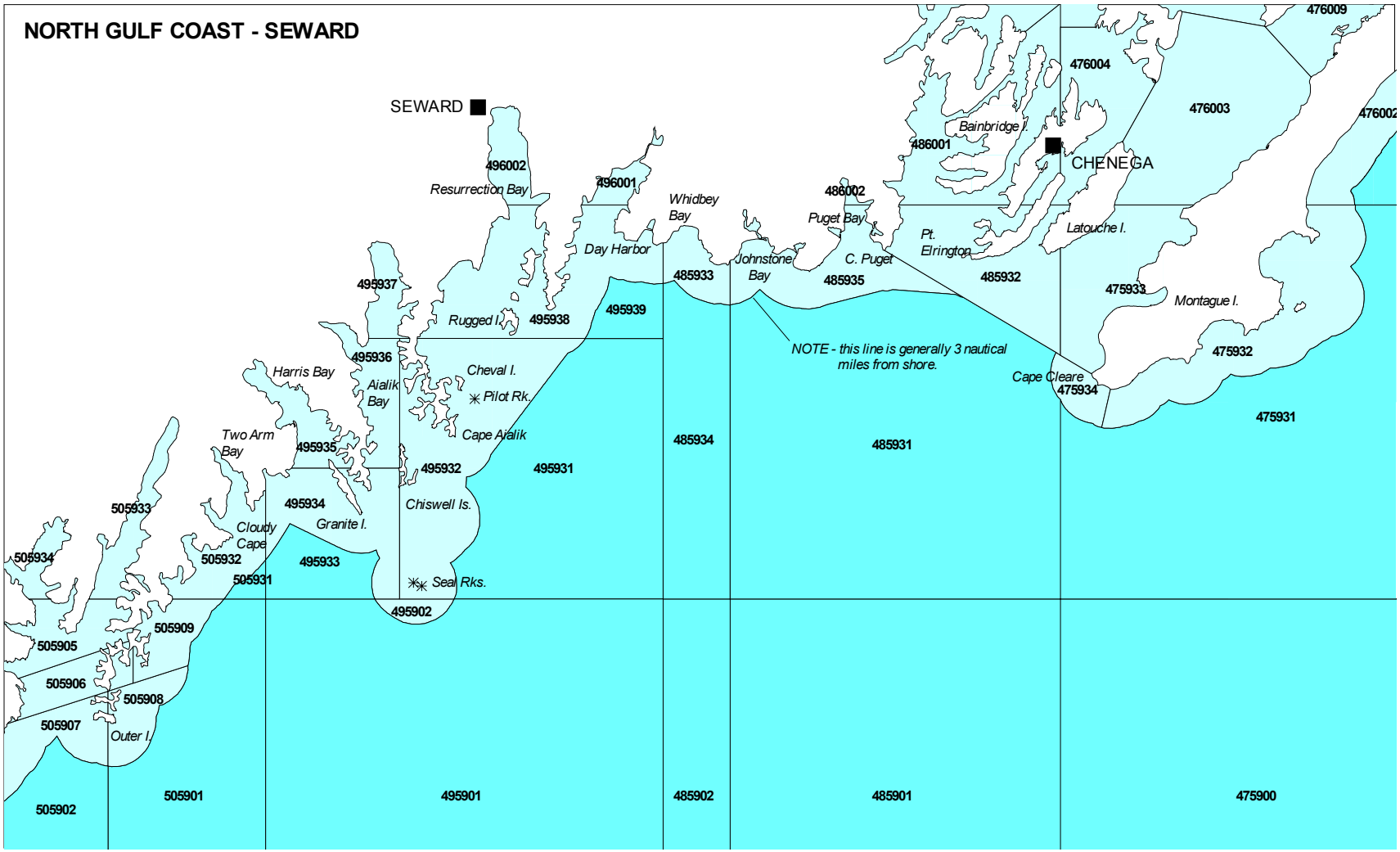

Figure 6.-Seward-area and North Gulf Coast statistical reporting areas for charter boat logbook data.

In November 2001 the BOF enacted regulations that make all marine waters in Resurrection Bay, north of a line between Cape Aialik and Cape Resurrection, a Terminal Harvest Area for coho salmon. The bag and possession limit for coho salmon in this Terminal Harvest Area is six per day and six in possession. In all other North Gulf Coast Marine waters, from Cape Puget to Gore Point, the bag and possession limit for coho is now three per day and three in possession, and is consistent with coho salmon bag and possession limits in Cook Inlet and Prince William Sound. This is designed to focus effort on enhanced stocks of coho in Resurrection Bay and to reduce fishing effort on wild coho stocks in the North Gulf coast.

Current Issues

The impact on Resurrection Bay sport fisheries by developing a commercial sockeye salmon fishery targeting stocks returning to Bear Lake appears to be minimal. This fishery occurs in late-May through June, well before coho salmon are present in Resurrection Bay. The commercial fishery is further restricted to weekdays to avoid any conflict with weekend anglers and the area near Seward is closed to commercial fishing. The Division of Commercial Fisheries staff based in Homer is responsible for management of this fishery and works closely with Division of Sport Fish staff to minimize conflicts. The increasing sport harvest of coho salmon reported from Seward is another issue being addressed as previously described.

Ongoing Research and Management Activities

Due to the increasing harvest of coho salmon landed at the port of Seward a research project to estimate hatchery and natural contribution to the sport fishery was initiated during 2002. This project collected the sagital otoliths of sport harvested coho landed at the Port of Seward. Sampling was stratified by area (three areas) and time (six periods). The goal was to collect a sample size of 96 otoliths from each area for each period. Resurrection Bay was divided into two study areas: the marine waters from Caines Head north, and the rest of Resurrection Bay waters south to Cape Resurrection and Aialik Cape. The third area in the study was all marine waters in the North Gulf Coast management area outside Resurrection Bay. However, we do not expect a complete sample from each area for each period due to local migration patterns of coho salmon, and the resulting characteristics of the sport fishery targeting them. At the end of the season these otoliths are sent to the Cordova ADF&G office were they are prepared and examined under a dissecting microscope to first identify the fish as either hatchery or wild, and if hatchery, determine hatchery of origin. During the 2003 fishery all coho salmon released by hatcheries and returning into Prince William Sound, Resurrection Bay, and Cook Inlet waters will have unique thermal otolith bands, enabling ADF&G to determine the hatchery of origin of any of these fish if collected. A total of 3.3 million thermal marked coho salmon smolt were released into these waters by hatcheries in 2002. This study will continue through the 2004 fishing season.

A total of 1,058 otoliths were collected at the Seward Harbor, or from the beach fishery at Seward Lagoon and Lowell Creek. Twenty-seven of these otoliths could not be read. At the head of Resurrection Bay, in the area closest to Seward, 339 readable otoliths were collected across six sampling periods from 5 July through 12 September. In Resurrection Bay from Caines Head South a total of 320 readable otoliths were collected over four periods from 5 July through 24 August. In North Gulf Coast waters, 372 readable otoliths were collected across four periods from 5 July through 24 August. Samples were not collected in proportion to the harvest. Thirty-three percent of all the otoliths collected were of hatchery origin. Fifty-three of those collected at the head of Resurrection Bay were from hatcheries releases while 23% of those otoliths

collected in the remainder of Resurrection Bay and from the North Gulf Coast were of hatchery origin. In all three areas most coho salmon of hatchery origin were collected after 1 August. This project will continue through 2005 and results published in the Fishery Data Series.

Recommended Research and Management Activities

We recommend continued study to determine hatchery contribution of coho salmon harvested in Seward; by time and area, using thermal-marked otoliths on all hatchery released coho salmon.

RESURRECTION BAY CHINOOK SALMON FISHERY

Historically Resurrection Bay fresh water streams never supported wild returns of chinook salmon. The sport fishery for chinook salmon in and near Resurrection Bay is supported primarily by hatchery-produced fish, with a limited harvest during the winter. Chinook salmon smolts were stocked in Box Canyon Creek, a tributary of Resurrection River, from 1976-1979 and 1983, in an attempt to create a new sport fishery (Appendix B1). These attempts failed to produce significant adult returns. Beginning in 1984, chinook salmon smolt have been released in marine waters adjacent to Lowell Creek. In 1985, Seward Lagoon was also stocked with early-run chinook smolt. These releases of "early-run" (May-June) fish have averaged approximately 225,000 smolt annually since 1988 (Table 3, Appendix B1). Starting in 1991, chinook salmon smolt with late run timing (August) were stocked in Seward Lagoon. This program, to release late-run chinook, intended to diversify and extend fishing opportunities in Resurrection Bay, was cut in 1998 due to the unavailability of brood stock. Consequently, a reduction in chinook salmon sport harvest of about 1/3 was expected.

The marine waters of Resurrection Bay are open to the taking of chinook salmon throughout the year. The bag and possession limits for chinook salmon in Resurrection Bay salt water are two fish per day and in possession with no size restrictions. Snagging is legal in salt water. All freshwater drainages of Resurrection Bay have been closed to salmon sport fishing since before statehood.

From 1992-2001, the average harvest of chinook salmon from marine waters of Resurrection Bay was about 3,754 fish (Table 4). Harvests ranged from 1,547 in 1991 to a peak of 6,469 in 1997. Most chinook (60%) during this period were harvested by shore-based anglers (Table 6, Figure 7).

Recent Fishery Performance

The sport harvest of chinook salmon in Resurrection Bay during 2002 was 3,380 (Figure 8), within the range of sport harvests for 1992-2001 (Table 4). In 2002, shore anglers, concentrated near release sites at Lowell Creek and the Seward Lagoon outfall, accounted for 34% of the total harvest (Table 6, Figure 7) with snagging being the preferred method. Anglers trolling in private boats accounted for 37% of the total harvest, while anglers employing charter boats saw an increase in 2002 and accounted for 29% of the total chinook harvest. A small but growing number of boat anglers are targeting these hatchery-produced fish in May. From 1992 to 2001 the average proportion of the chinook harvest that came from private, charter and shore anglers was 28%, 14%, and 58% respectively. During the 2002 the percent of the chinook harvest from charter boats rose from 14% (1992-2001 average) to 29%, the private boat harvest rose from 28% to 37%, but the percent of the shore harvest dropped from 58% to 34%. A small number of anglers with private boats and a few charter operators have also started targeting chinook salmon in the winter. This fishery is highly weather dependant and reported harvest is low so far.

Table 6.-Resurrection Bay saltwater sport catch (1990-2002) and harvest (1977-2002) of chinook salmon.

	Boat									
	Charter		Private		Total		Shore		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977										515
1978										501
1979										156
1980										198
1981										162
1982										345
1983										199
1984										24
1985										187
1986		13		97		110		97		207
1987		217		127		344		289		633
1988		236		655		891		1,165		2,056
1989		147		371		518		458		976
1990	84	62	890	532	974	594	1,290	410	2,264	1,004
1991	437	358	452	420	889	778	888	769	1,777	1,547
1992	388	329	1,584	1,219	1,972	1,548	1,669	1,377	3,641	2,925
1993	976	674	1,655	1,292	2,631	1,966	3,834	3,155	6,465	5,121
1994	632	348	691	434	1,323	782	2,092	1,296	3,415	2,078
1995	913	608	1,225	899	2,138	1,507	3,139	2,379	5,277	3,886
1996	1,330	807	1,354	1,172	2,684	1,979	4,972	4,268	7,656	6,247
1997	1,175	573	3,220	2,156	4,395	2,729	4,924	3,740	9,319	6,469
1998	729	263	1,421	880	2,150	1,143	2,447	2,124	4,597	3,267
1999	594	303	1,185	779	1,779	1,082	2,432	1,558	4,211	2,640
2000	854	717	1,478	717	2,332	1,434	1,565	1,221	3,897	2,655
2001	907	572	1,278	870	2,185	1,442	1,093	839	3,278	2,281
2002	1,509	982	1,853	1,247	3,362	2,229	1,503	1,151	4,865	3,380

Sources: Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, in prep.

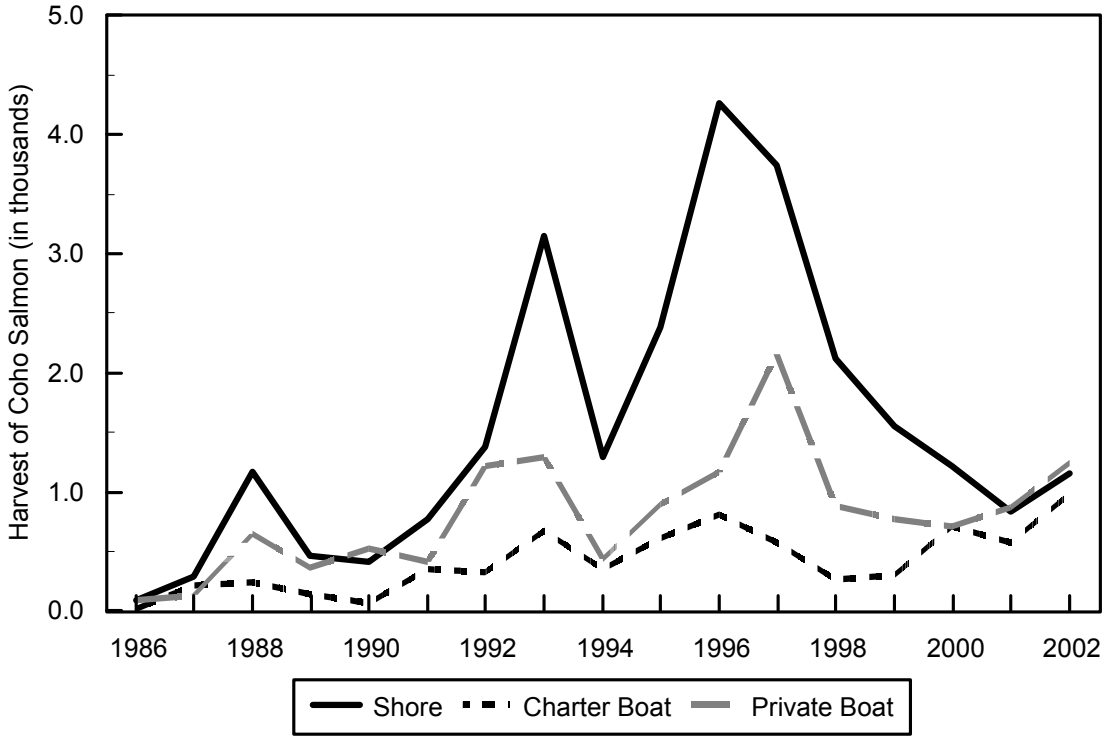

Figure 7.-Resurrection Bay saltwater chinook salmon harvest by fishery, 1986-2002.

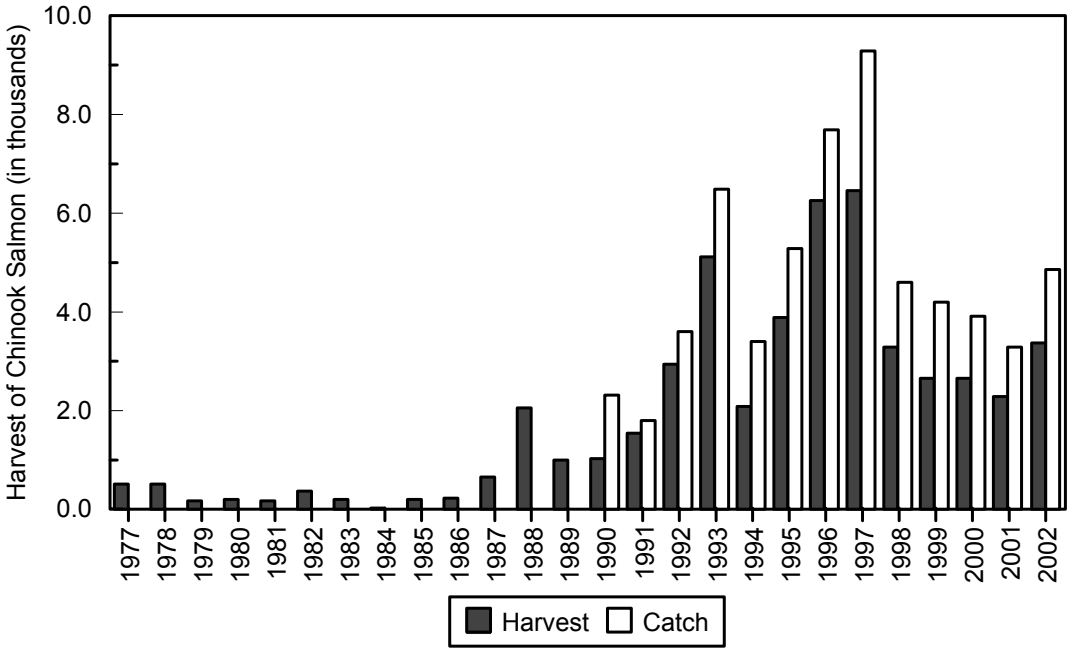

Figure 8.-Total Resurrection Bay saltwater chinook salmon harvest, 1977-2002.

Management Objective
The Resurrection Bay Salmon Management Plan allocates chinook salmon to the sport fishery. For hatchery-produced chinook salmon, the management objectives are to: (1) produce, through hatchery production, an annual return of 4,000 - 6,000 early-run chinook salmon; and (2) generate 10,000 angler-days of chinook salmon fishing opportunity annually for both boat and shore-based anglers.

Recent Board of Fisheries Actions
There were no BOF actions specific to this fishery in 1998/1999. In November 2001 the BOF enacted regulations to include North Gulf Coast marine waters, including Resurrection Bay, in the annual limit of five chinook salmon 20 inches in length or greater that had previously applied only to Cook Inlet waters. This regulation will go into effect in the 2002 fishing season. During an October 2002 Board of Fish special meeting the BOF created the "North Gulf Coast King Salmon Sport Fish Management Plan (5AAC 58.065). This plan has been discussed in previous sections.

Current Issues
There has been some public discussion in Seward in regard to the "snag" fishery that has developed targeting these hatchery fish. A small but growing portion of the public would like to see regulations similar to those in effect for the Homer Spit Lagoon enacted for Seward area beaches, i.e. only allow snagging by emergency order after fish "go off the bite." To date, no BOF proposal has been generated. Another issue discussed is the high mortality associated with the release of smolt at Lowell Creek. It appears that high predation by seabirds is taking a toll and alternate release methods have been discussed. The Sealife Center will helping with this problem in the future.

Ongoing Research and Management Activities
There are no ongoing research projects. Management activities consist of attending public meetings, working with the local Fish and Game Advisory Committee, and observing the fishery in mid-June and again during the Seward Silver Salmon Derby.

Recommended Research and Management Activities
No new research or management activities are recommended.

RESURRECTION BAY PINK SALMON FISHERY
Wild stocks that spawn in most Resurrection Bay streams support the pink salmon fishery. Pink salmon return to Resurrection Bay from late-July through mid-September with the peak of the return occurring in mid-late August. Pink salmon returns are largest during even years.

The sport fishing season is open all year and the bag and possession limit is six salmon per day other than chinook, and six in possession. Snagging is legal in salt water. All freshwater drainages of Resurrection Bay have been closed to salmon sport fishing since before statehood.

The 1992-2001 average pink salmon harvest in Resurrection Bay was 4,042 fish (Table 4). Between 1992 and 2001 most of the harvest was from shore anglers (41%) and private boat anglers (40%) (Table 7, Figure 9).

Recent Fishery Performance
The sport harvest of pink salmon from Resurrection Bay in 2002 was an estimated 4,280 and falls close to 10-year estimated harvest (Table 7, Figure 10). Private boat anglers harvested the

largest proportion of the total harvest (49%) in 2002 followed by shoreline anglers (36%) and charter boat anglers 15% (Table 7, Figure 9). Most pink salmon observed caught by sport anglers are released. The pink salmon fishery is not as important to Resurrection Bay as either the coho or chinook salmon fisheries. Boat anglers typically do not target pinks, but catch these incidentally while fishing for other salmon.

Table 7.-Resurrection Bay saltwater sport catch (1990-2002) and harvest (1977-2002) of pink salmon.

	Boat									
	Charter		Private		Total		Shore		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977										1,595
1978										6,610
1979										2,100
1980										12,614
1981										7,776
1982										9,328
1983										4,909
1984										11,510
1985										5,262
1986		2,538		1,911		4,449		6,559		11,008
1987		1,503		471		1,974		1,394		3,368
1988		346		1,255		1,601		400		2,001
1989		557		990		1,547		3,309		4,856
1990	2,346	1,027	7,224	3,086	9,570	4,113	5,326	2,080	14,896	6,193
1991	1,873	1,157	3,833	1,569	5,706	2,726	2,996	1,988	8,702	4,714
1992	1,328	897	4,067	1,548	5,395	2,445	4,616	1,832	10,011	4,277
1993	1,284	866	5,946	1,822	7,230	2,688	3,978	1,484	11,208	4,172
1994	1,435	657	4,320	1,500	5,755	2,157	5,782	3,416	11,537	5,573
1995	1,549	883	6,119	2,186	7,668	3,069	5,081	1,730	12,749	4,799
1996	1798	645	4,152	1,351	5,950	1,996	6,572	2,914	12,522	4,910
1997	911	298	3,376	676	4,287	974	2,647	597	6,934	1,571
1998	1131	406	5,928	1,409	7,059	1,815	2,575	1,022	9,634	2,837
1999	3,961	1,285	9,471	2,386	13,432	3,671	2,314	889	15,746	4,560
2000	2,355	791	8,189	1,681	10,544	2,472	6,848	1,411	17,392	3,883
2001	1,412	865	6,692	1,564	8,104	2,429	3,937	1,411	12,041	3,840
2002	2,736	650	8,186	2,098	10,922	2,748	5,630	1,532	16,552	4,280

Sources: Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, in prep.

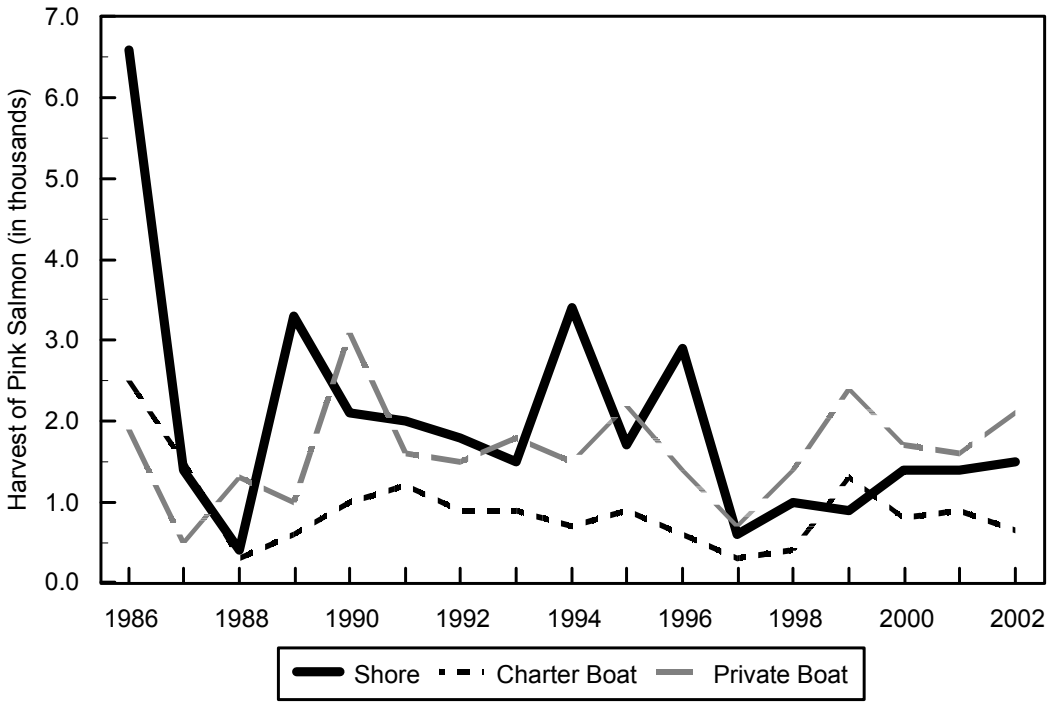

Figure 9.-Resurrection Bay saltwater pink salmon harvest by fishery, 1986-2002.

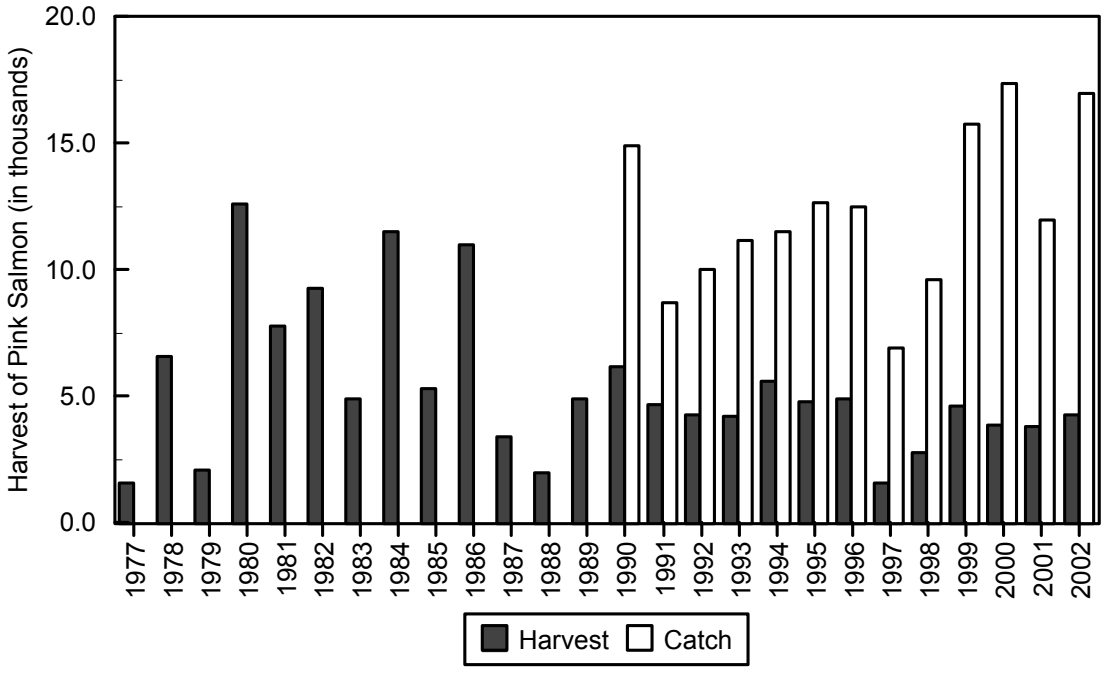

Figure 10.-Total Resurrection Bay saltwater pink salmon harvest, 1977-2002.

Management Objective
No specific fishery objectives have been formally established for Resurrection Bay pink salmon sport fisheries. However, the Resurrection Bay Salmon Management Plan allocates surplus pink salmon to the commercial fleet.

Recent Board of Fisheries Actions
At the 1998/1999 BOF meeting a proposal was submitted by the Alaska SeaLife Center (ASLC). This proposal asked for a small saltwater closed area centered around their newly constructed fish pass to protect returning experimental pink salmon in 2000 through 2002. While the department has the authority to invoke 5 AAC 75.050. Waters Closed to Sport Fishing. (a) the waters within 300 feet of a fish weir or fish ladder are closed to sport fishing, unless a lesser distance is indicated by department markers, the ASLC was urged to submit this proposal for BOF deliberation. The area in question is popular with shore and boat anglers, especially during the Seward Silver Salmon Derby. The department recognized the need for a seasonal closure around the fish pass to ensure adequate returns of research fish, but did not agree that a year-round closure is necessary. BOF passed an amended version of the original proposal, closing the saltwater area within a 300-ft radius of the ASLC fish pass (or as marked by the department) to sport fishing from August 1 through October 31. This regulation blocked some access to the popular coho salmon boat fishery at Lowell Creek, and was not popular with local anglers. This regulation expired by natural causes after the 2002 season.

Current Issues
There are no major issues surrounding the Resurrection Bay pink salmon sport fishery.

ASLC initiated a genetic research project releasing fish from the facility in 1999 and 2000. The newly constructed fish pass allowing fish to return to the facility failed to pass fish. Research permits were issued to allow ASLC staff to recover stray experimental fish in freshwater streams in the Resurrection Bay area.

Ongoing Research and Management Activities
The Division of Sport Fish does not conduct any research on pink salmon stocks in Resurrection Bay. Management activities consist of attending public meetings, and working with the local Fish and Game Advisory Committee. The Division of Commercial Fisheries conducts aerial escapement surveys of pink salmon in the lower Cook Inlet area including Resurrection Bay.

Recommended Research and Management Activities
No new research or management activities are recommended.

RESURRECTION BAY SOCKEYE SALMON FISHERY
Sockeye salmon return to Resurrection Bay streams, primarily Bear Lake and its tributaries, from late-May through July. Spawning occurs in mid-July through September.

Resurrection Bay has historically been managed primarily for the recreational coho salmon fishery. The sport harvest of sockeye salmon has been incidental. In 1966, the BOF developed the Resurrection Bay Salmon Management Plan (5 AAC 21.376), which allocated the bay's coho salmon to the sport fishery. In 1976 the BOF modified the plan to stipulate that commercial fisheries for pink and chum salmon be managed so that they did not interfere with the recreational coho and chinook salmon sport fishery. After a successful coho salmon enhancement program was established in Bear Lake, the BOF adopted the Bear Lake Management Plan (5 AAC 21.375) in 1971. This plan stated that Bear Lake be managed primarily for the

production of coho salmon and, in accordance with this objective, placed restrictions on the number of sockeye salmon entering Bear Lake.

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

In the spring of 1990, 20,000 sockeye salmon fry and 2.4 million early-run sockeye salmon smolt were released into Bear Lake. These smolt contributed to the first sockeye salmon returns in 1992, and are targeted by a commercial seine fishery conducted from late-May through June in Resurrection Bay. The first significant return from the 1990 fry release occurred in 1994 when fish returned as 2-ocean adults. In 1994, about 540,000 “late-run” sockeye salmon smolt were released into Grouse Lake. Returning adults to Grouse Lake are not available to commercial fishers in Resurrection Bay. CIAA attempted to harvested the returning adults in Grouse Creek for cost recovery. CIAA has stopped stocking sockeye into Grouse Lake due to the poor commercial value of fish harvested here. They are attempting to change the Trail Lakes Hatchery Management Plan to stock Bear Lake with more sockeye pre-smolt in an attempt to increase their cost recovery profits in Resurrection Bay.

The saltwater sport fishing season is open all year and the bag and possession limit is six salmon other than chinook per day and in possession. Snagging is legal in salt water. All freshwater drainages of Resurrection Bay have been closed to salmon sport fishing since before statehood.

From 1992-2001, the average harvest of sockeye salmon from Resurrection Bay was 1,331 fish (Table 4). In most years estimates are available, shore anglers account for the largest proportion of harvest (Table 8, Figure 11).

Recent Fishery Performance

The sport harvest of sockeye salmon from Resurrection Bay in 2002 was 3,112 or about 2½ times the 10-year average (Tables 4 and 8, Figure 12). In 2002 shore anglers took (25%) of the harvested fish. The big increase in harvest came from private boat anglers who harvested a record 2,087 sockeye (67%). Past observations of the chinook salmon fishery indicate most sockeye salmon caught by sport anglers were incidental. However, some boat anglers, adapting techniques developed in British Columbia, have started to target sockeye and this catch may be the result of that experimentation. Sockeye salmon, unlike pink salmon, were usually not released if caught incidental to targeted species.

Management Objective

The department has established a biological escapement goal of 1,000 sockeye salmon for Bear Lake. CIAA’s annual management plan, approved by the department, specifies that a minimum of 5,000 and maximum of 8,000 sockeye salmon are passed into Bear Lake. No other specific fishery objectives have been formally established for Resurrection Bay sockeye salmon fisheries

to date other than management objectives outlined in the Bear Lake and Resurrection Bay Management Plans.

Recent Board of Fisheries Actions

CIAA submitted a proposal for the 1998/1999 BOF meeting requesting the closure of a small area of salt water centered around the mouth of Spring Creek to all sport fishing from July 1 through August 7. CIAA had submitted to ADF&G project plans to stock sockeye salmon smolt into Spring Creek and use returning adults for cost recovery. CIAA also proposed to release approximately 250,000 coho salmon smolt into Spring Creek primarily for sport anglers, although fish that escape the sport fishery would be harvested for cost recovery. The ADF&G Commissioner denied the project permits citing pathological concerns; therefore, CIAA withdrew their proposal. A revision to the Bear Lake management plan (Proposal 31), submitted by CIAA during the last BOF cycle did not pass. This has been previously discussed in the report.

Table 8.-Resurrection Bay saltwater sport catch (1990-2002) and harvest (1977-2002) of sockeye salmon.

	Boat									
	Charter		Private		Total		Shore		Total[a]	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977										6
1978										0
1979										0
1980										0
1981										0
1982										0
1983										0
1984										1,305
1985										1,335
1986		31		92		123		214		337
1987		91		217		308		507		815
1988		18		236		254		164		418
1989		128		99		227		397		624
1990	273	68	408	272	681	340	185	78	866	418
1991	320	256	216	208	536	464	692	519	1,228	983
1992	99	58	666	551	765	609	699	526	1,464	1,135
1993	318	206	1,375	1,147	1,693	1,353	666	512	2,359	1,865
1994	408	408	574	306	982	714	748	701	1,730	1,415
1995	209	198	407	284	616	482	833	812	1,449	1,294
1996	409	161	507	325	916	486	491	281	1,407	767
1997	458	76	636	493	1,094	569	1,447	1,217	2,541	1,786
1998	516	431	591	439	1,107	870	716	399	1,823	1,269
1999	151	108	719	697	870	805	280	259	1,150	1,064
2000	460	331	1,609	477	2,069	808	712	677	2,781	1,485
2001	1,046	705	534	293	1,580	998	374	265	1,954	1,263
2002	317	252	2,629	2,087	2,946	2,339	900	773	3,846	3,112

Sources: Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, in prep.

[a] Harvest was not estimated by boat, charter, private, or shore prior to 1986; catch was not estimated prior to 1990.

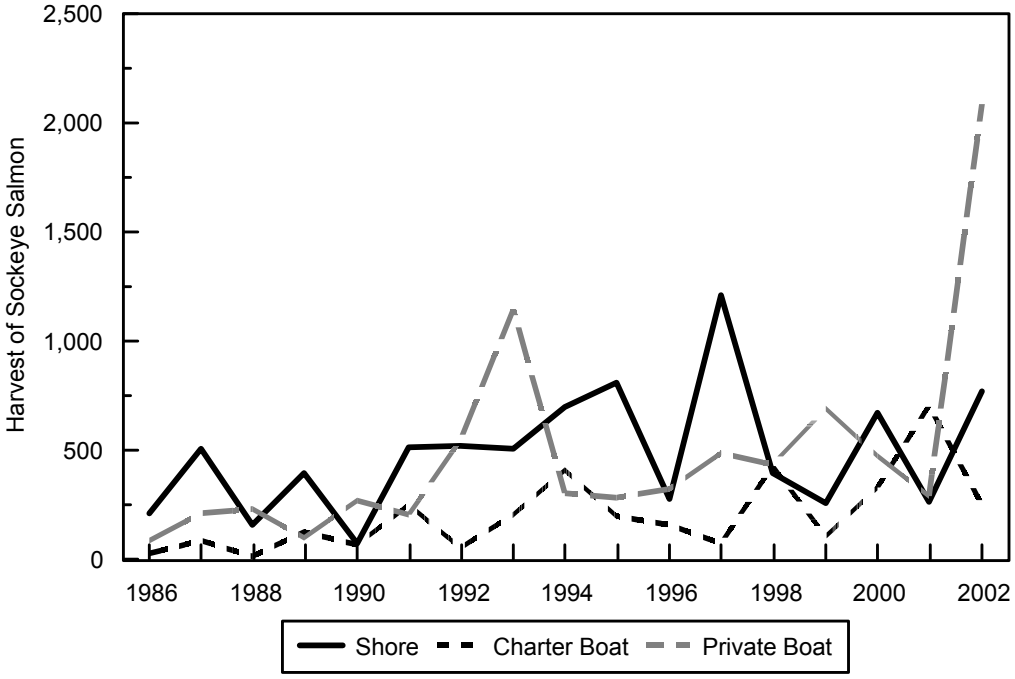

Figure 11.-Resurrection Bay saltwater sockeye salmon harvest by fishery, 1986-2002.

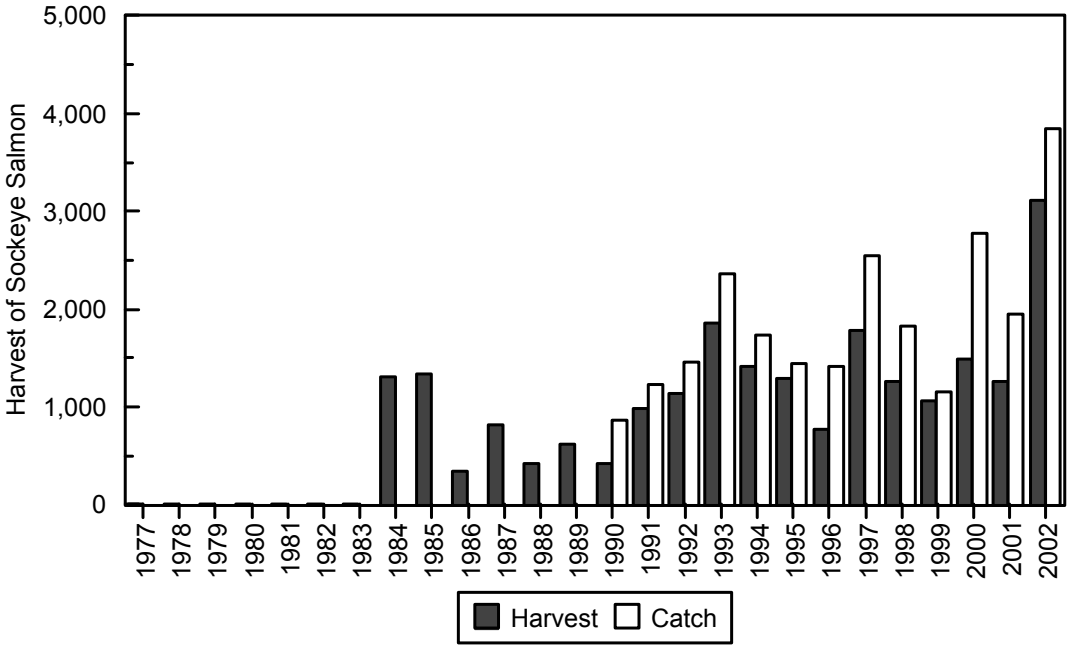

Figure 12.-Total Resurrection Bay saltwater sockeye salmon harvest, 1977-2002.

Current Issues

The impact on Resurrection Bay sport fisheries by developing a commercial sockeye salmon fishery targeting stocks returning to Bear Lake appears to be minimal. This commercial fishery occurs in late-May through June, well before coho salmon are present in Resurrection Bay. The commercial fishery is further restricted to weekdays to avoid any conflict with weekend anglers and restricted away from Seward beaches to avoid conflicts with chinook salmon anglers. The Division of Commercial Fisheries staff responsible for management of this fishery have worked closely with Division of Sport Fish staff to minimize conflicts.

CIAA had a proposal before the BOF at the 2001/2002 meeting to amend the Bear Lake Hatchery Plan (Appendix A1). The amendment required the Resurrection Bay commercial purse seine fishery to be managed for a sockeye harvest of 66,000 fish; and would have established a Special Harvest Area in the northeast corner of Resurrection Bay. CIAA further proposed to discontinue the Grouse Lake late-run sockeye stocking and enhance the Bear Lake system with early-run fall pre-smolt and spring smolt releases for cost recovery. This proposal failed at the BOF meeting, but CIAA is still attempting to gain permission to enhance the Bear Lake system with early-run fall pre-smolt and spring smolt releases for cost recovery.

There has been some public discussion about having a dip net fishery for sockeye salmon and/or a freshwater sport fishery targeting these hatchery sockeye salmon. To date, no BOF proposal has been submitted.

Some sport anglers fishing from boats have been trying to develop methods for catching sockeye by trolling. They have used a variety of terminal tackle from bare red hooks to plastic squid with some success. This very small, but growing fishery does not interfere with small commercial fishery.

Ongoing Research and Management Activities

There are no ongoing research projects. Management activities consist of attending public meetings, Cook Inlet Regional Planning Team meetings, and working with the local Fish and Game Advisory Committee.

Recommended Research and Management Activities

There are no recommended management or research projects at this time.

RESURRECTION BAY CHUM SALMON FISHERY

Wild stocks that spawn in most Resurrection Bay streams support the chum salmon fishery. Chum salmon return to Resurrection Bay from mid-July through late August with the peak of the return occurring in early August. Chum salmon fingerlings were stocked into two Resurrection Bay streams, Jap and Spring creeks, in 1985 (Appendix B1).

The sport fishing season is open all year and the bag and possession limit is six salmon other than chinook per day and six in possession. Snagging is legal in salt water. All freshwater drainages of Resurrection Bay have been closed to salmon sport fishing since before statehood.

The 1992-2001 average chum salmon harvest in Resurrection Bay was 821 fish. That is nearly half the average chum harvest of 1,463 from 1980-1989 (Table 4). Shore anglers (Table 9, Figure 13) harvested 56% of the chum salmon from 1992-2001.

Recent Fishery Performance

The sport harvest of chum salmon from Resurrection Bay in 2002 was an estimated 430 (Table 9, Figure 14). Shore anglers and private boat anglers harvested most of the chum salmon (42% and 41% respectively (Table 9, Figure 13). Most chum salmon harvested by boat anglers are taken incidental to other species, while shore anglers target chum salmon at the mouths of Spring and Tonsina creeks.

Management Objective

No specific fishery objectives have been formally established for Resurrection Bay chum salmon sport fisheries. However, the Resurrection Bay Salmon Management Plan allocates surplus chum salmon to the commercial fleet.

Table 9.-Resurrection Bay saltwater sport catch (1990-2002) and harvest (1977-2002) of chum salmon.

	Boat									
	Charter		Private		Total		Shore		Total[a]	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977										63
1978										39
1979										100
1980										276
1981										194
1982										458
1983										923
1984										2,569
1985										634
1986		275		199		474		1,484		1,958
1987		163		362		525		1,449		1,974
1988		819		1,091		1,910		2,037		3,947
1989		222		207		429		1,267		1,696
1990	296	148	268	56	564	204	480	223	1,044	427
1991	415	294	106	106	521	400	471	357	992	757
1992	501	243	2,338	463	2,839	706	1,374	615	4,213	1,321
1993	267	79	294	117	561	196	1,913	484	2,474	680
1994	87	58	251	131	338	189	926	499	1,264	688
1995	287	92	257	120	544	212	1,294	184	1,838	396
1996	517	363	961	176	1,478	539	3,123	1,137	4,601	1,676
1997	263	248	866	241	1,129	489	1,886	256	3,015	745
1998	128	49	99	8	227	57	575	152	802	209
1999	242	79	430	61	672	140	2,621	523	3,293	663
2000	844	179	1,103	541	1,947	720	2,488	459	4,435	1,179
2001	159	29	2,144	360	2,303	389	1,014	261	3,317	650
2002	560	71	638	181	1,198	252	868	178	2,066	430

Sources: Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, in prep.

[a] Harvest was not estimated by boat, charter, private, or shore prior to 1986; catch was not estimated prior to 1990.

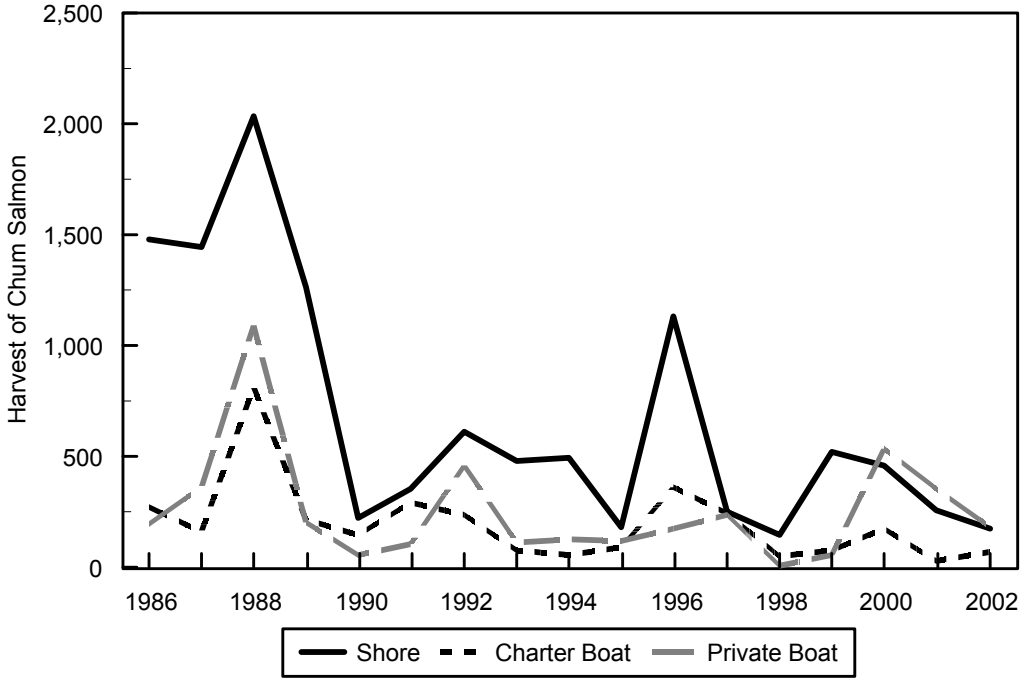

Figure 13.-Resurrection Bay saltwater chum salmon harvest by fishery, 1986-2002.

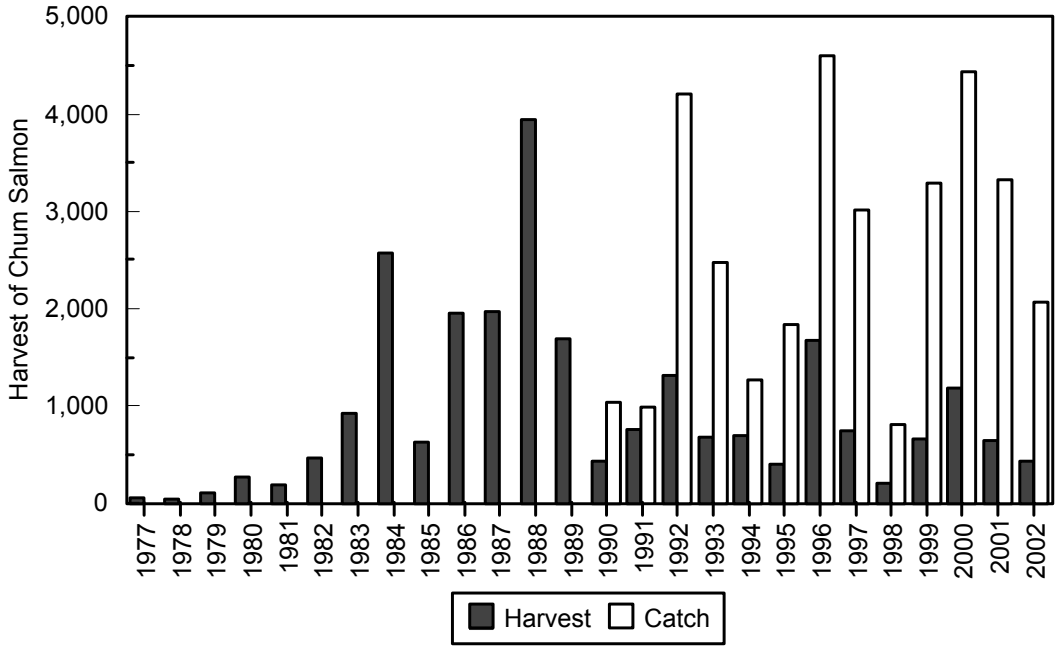

Figure 14.-Total Resurrection Bay saltwater chum salmon harvest, 1977-2002.

Recent Board of Fisheries Actions
There were no BOF actions specific to this fishery in 2001/2002.

Current Issues
There are no major issues surrounding the Resurrection Bay chum salmon sport fishery.

Ongoing Research and Management Activities
The Division of Sport Fish does not conduct any research on chum salmon stocks in Resurrection Bay. Management activities consist of attending public meetings, and working with the local Fish and Game Advisory Committee. The Division of Commercial Fisheries conducts aerial and/or foot escapement surveys of chum salmon in the lower Cook Inlet area including Resurrection Bay.

Recommended Research and Management Activities
No new research or management activities are recommended.

RESURRECTION BAY DOLLY VARDEN FISHERY
Dolly Varden are available to Resurrection Bay saltwater anglers in May as fish migrate out of over-wintering and spawning areas to sea and again in late August through September as fish return to freshwater over-wintering areas.

All Resurrection Bay waters (fresh and salt) are open year-round to fishing for Dolly Varden, except Seward Lagoon, which is closed to all sport fishing. Daily bag and possession limits are five in salt water, two in flowing fresh waters, and five in lakes and ponds. There are no size restrictions for Dolly Varden in Resurrection Bay. Snagging is legal in salt water but illegal in fresh water.

The average saltwater harvest from 1992-2001 was 529 fish (Table 4). This harvest is mostly split between shore-based (37%) and private boat anglers (41%), with anglers fishing from charter boats accounting for only 20% of the harvest in marine waters (Table 10, Figure 15).

Recent Fishery Performance
The Dolly Varden harvest in 2002 was estimated to be 915 fish (Table 10, Figure 16), most of which (57%) were taken from shore. Private boat anglers harvested 43%, while there was no report of harvest from charter boats. Few anglers are observed targeting Dolly Varden in marine waters during the time period that they are present. Anglers fishing in May now target hatchery chinook salmon and anglers fishing in August through September are targeting coho salmon.

Management Objective
No specific fishery objectives have been formally established for Resurrection Bay marine Dolly Varden fisheries.

Recent Board of Fisheries Actions
During the 1995/1996 meeting cycle, the BOF passed a Kenai Peninsula freshwater proposal, which reduced Dolly Varden bag, and possession limits in fresh water streams from five to two. No proposals specific to Resurrection Bay Dolly Varden were submitted for BOF deliberation during the 2001/2002 meeting.

Current Issues

It is not known whether the decline in Resurrection Bay saltwater Dolly Varden harvests is a result of declining stock size or a function of anglers targeting more desirable and abundant salmon species.

Ongoing Research and Management Activities

The Division of Sport Fish does not conduct any research on Dolly Varden stocks in Resurrection Bay. Management activities consist of attending public meetings and working with the local Fish and Game Advisory Committee.

Recommended Research and Management Activities

No new research or management activities are recommended.

Table 10.-Resurrection Bay saltwater sport catch (1990-2002) and harvest (1977-2002) of Dolly Varden.

	Boat									
	Charter		Private		Total		Shore		Total[a]	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
1977										1,720
1978										1,248
1979										973
1980										878
1981										5,335
1982										1,562
1983										5,811
1984										1,771
1985										191
1986		260		245		505		566		1,071
1987		109		344		453		362		815
1988		36		437		473		255		728
1989		75		618		693		300		993
1990	115	94	246	21	361	115	226	113	587	228
1991	97	97	311	220	408	317	336	207	744	524
1992	24	24	262	164	286	188	344	188	630	376
1993	370	321	770	328	1,140	649	238	125	1,378	774
1994	66	47	271	27	337	74	718	209	1,055	283
1995	43	33	237	204	280	237	699	438	979	675
1996	752	254	182	146	934	400	744	305	1,678	705
1997	396	141	645	170	1,041	311	337	183	1,378	494
1998	149	72	1,931	670	2,080	742	296	119	2,376	861
1999	125	34	242	154	367	188	55	33	422	221
2000	138	34	105	34	243	68	498	174	741	242
2001	0	0	452	108	452	108	410	108	862	216
2002	69	0	531	391	600	391	783	524	1,383	915

Sources: Mills 1979-1980, 1981a-b, 1982-1994; Howe et al. 1995, 1996, 2001 a-d; Walker et al. 2003; Jennings et al. 2004, in prep.

[a] Harvest was not estimated by boat, charter, private, or shore prior to 1986; catch was not estimated prior to 1990.

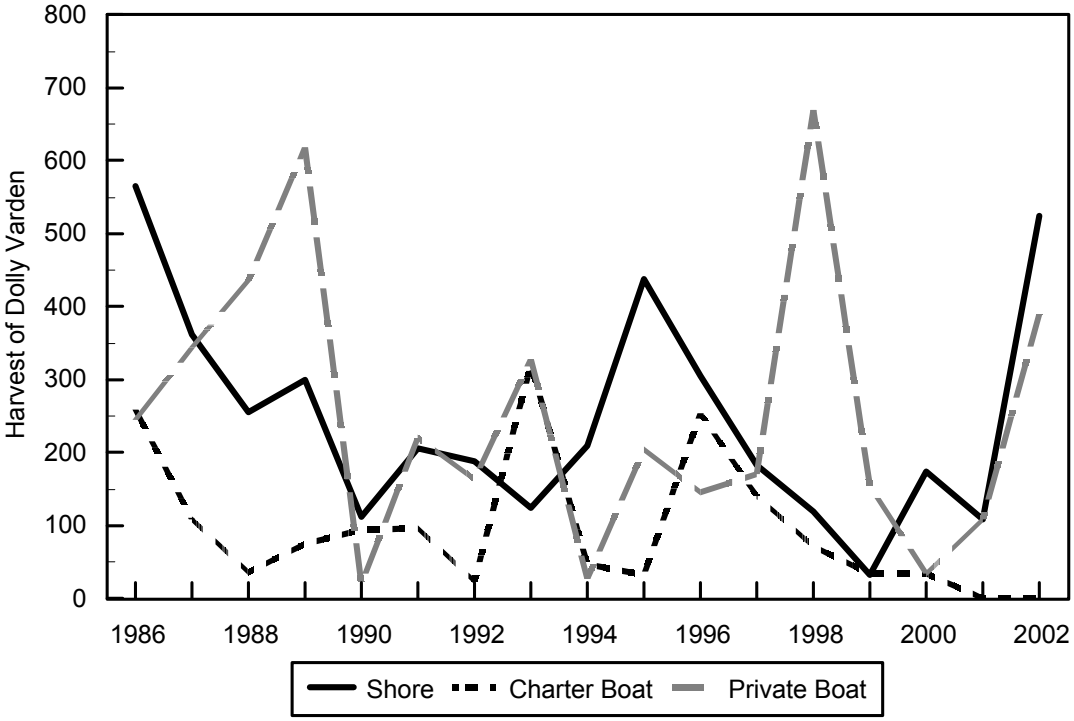

Figure 15.-Resurrection Bay saltwater Dolly Varden harvest by fishery, 1986-2002.

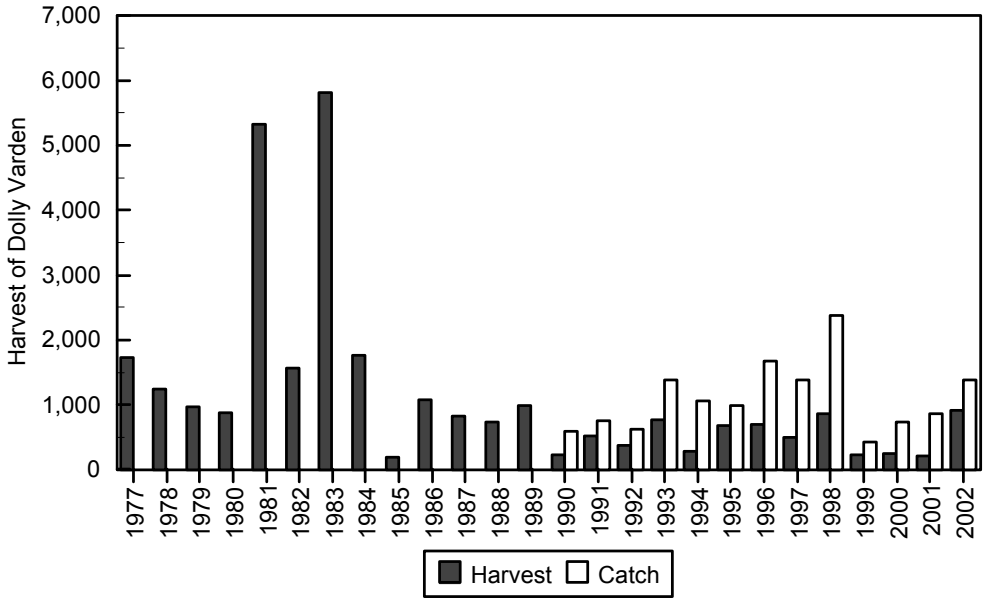

Figure 16.-Total Resurrection Bay saltwater Dolly Varden harvest, 1977-2002.

RESURRECTION BAY PACIFIC HALIBUT FISHERY

Pacific halibut are one of the most sought after fish by anglers out of Seward. Halibut average 30-40 pounds in weight and can range well over 200 pounds. They are a highly prized big-game fish favored for their fighting ability as well as the excellent flesh. These fish are taken almost exclusively from boats, and a large charter fleet operates from the Port of Seward. Charter boats are typically larger and faster than most private boats. This allows charter boats to venture further into North Gulf Coast waters, and in rougher weather than the average private boat would tempt. Many charter boats operating out of Seward chase these fish well into the Prince William Sound waters in Port Bainbridge and around Montague Island. Good catches of halibut are available to anglers in starting in May as these fish migrate from deeper over-wintering and spawning areas through September when they return to deeper waters.

Halibut have been managed under a treaty between the U.S. and Canada since 1923. This treaty resulted in the formation of the International Pacific Halibut Commission (IPHC). The IPHC, charged with the conservation of halibut, sets harvest goals for halibut for each of ten regulatory areas from Oregon to Alaska. The Port of Seward, and the entire North Gulf Coast fishing area fall into Area 3A. Once harvest goals have been set it is the responsibility of the North Pacific Fishery Management Council (NPFMC) to allocate the harvest between commercial, sport and subsistence users. The council (NPFMC) can also set bag limits. The Alaska Department of Fish and Game's role in this management equation is to collect sport fishery data and provides this to the IPHC and NPFMC to help them in making management and allocation decisions. The current bag limit is 2 per and 4 in possession and there is no size restriction. Halibut fishing is open February 1 – December 31. A more complete history of the North Gulf coast halibut fishery can be found in Meyer and Stock (2002).

The average harvest of halibut from 1992-2001 was 25,520 fish (Table 11). This harvest is split between charter boat anglers (62%) take a majority and private boat angler accounting most of the rest (Figure 17). Shore anglers account for a very small portion of the harvest.

Recent Fishery Performance

The halibut harvest in 2002 was estimated to be 36,081 fish (Table 11), most of which (62%) were taken from charter boats (Figure 18). Private boat anglers harvested 38% of the halibut, while there was no report of harvest from shore anglers. During 2002 halibut fishing was excellent as anglers harvested nearly 11,000 fish more than the previous 10-year average. Charter operators continue to go farther a field in pursuit of these large flat fish. Port Bainbridge, Montague Strait, and the Gulf waters south of Montague Island are all favorite destinations for the charter fleet. Some of the larger private boat fish these waters, but for the most part they stay much closer to the protection of Resurrection Bay and Seward.

Management Objective

The State of Alaska does not have direct management authority over halibut in Alaska waters. The IPHC manages the halibut fishery under the management goal of optimum yield. While the term "optimum yield" is not defined in the Halibut Convention, it is commonly interpreted to imply consideration of food production, recreational opportunity, protection of the ecosystem, and other social and economic benefits. The ADF&G objective with respect to halibut management is to provide the agencies (IPHC, NPFMC, and BOF) with the best possible information regarding the recreational halibut fishery, so that management and allocation

decisions can be made that optimize the social and economic benefits of the fishery. A more complete discussion on management objectives can be found in Meyer and Stock (2002).

Recent Board of Fisheries Actions

Neither the IPHC nor the Alaska halibut sports fishing regulations have changed since 1988. The daily bag limit remains at 2 fish daily, the possession limit is 4 fish and there is no minimum size. Bag and possession limits are found in Title 5 area regulations. Halibut special regulations apply statewide and are found in 5 AAC 75.070. State statutes regarding licensing for sport fishing (AS 16.05.340-430) also apply to the sport halibut fishery. Rules governing charter logbooks are found in statewide sport fishing regulation, 5 AAC 75.076. Charter boat operators have been required to keep vessel logbooks since 1998. Logbook regulation requires recording locations of fishing, effort, catch, and harvest by all clients.

Table 11.-Estimates of recreational halibut harvest (number of fish) in the North Gulf Coast subarea, 1977-2002.

	Charter[a]		Private[a]		Total	
Year	Catch[b]	Harvest	Catch[b]	Harvest	Catch[b]	Harvest
1984						3,294
1985						5,943
1986		4,423		6,041		10,464
1987		2,830		4,484		7,314
1988		4,359		7,388		11,747
1989		2,632		4,681		7,313
1990	7,625	4,180	8,902	5,396	16,527	9,576
1991	10,530	7,794	7,048	6,266	17,578	14,060
1992	14,664	9,544	13,891	9,061	28,555	18,605
1993	18,359	11,722	24,809	13,826	43,168	25,548
1994	24,308	15,501	14,013	9,549	38,321	25,050
1995	27,985	16,331	12,843	7,348	40,828	23,679
1996	26,075	15,421	13,960	8,802	40,035	24,223
1997	31,572	17,633	10,203	10,203	48,701	27,836
1998	26,573	16,486	13,403	8,261	39,976	24,747
1999	20,670	15,092	18,381	10,789	39,051	25,881
2000	26,768	18,655	14,418	10,463	41,186	29,118
2001	32,775	20,795	14,303	9,716	47,078	30,511
2002	33,773	22,267	18,356	13,814	52,129	36,081
Average 1992-2001	24,975	15,718	15,022	9,802	40,690	25,520

[a] Estimates of charter and private harvest are not available prior to 1986.

[b] Catch not estimated prior to 1990.

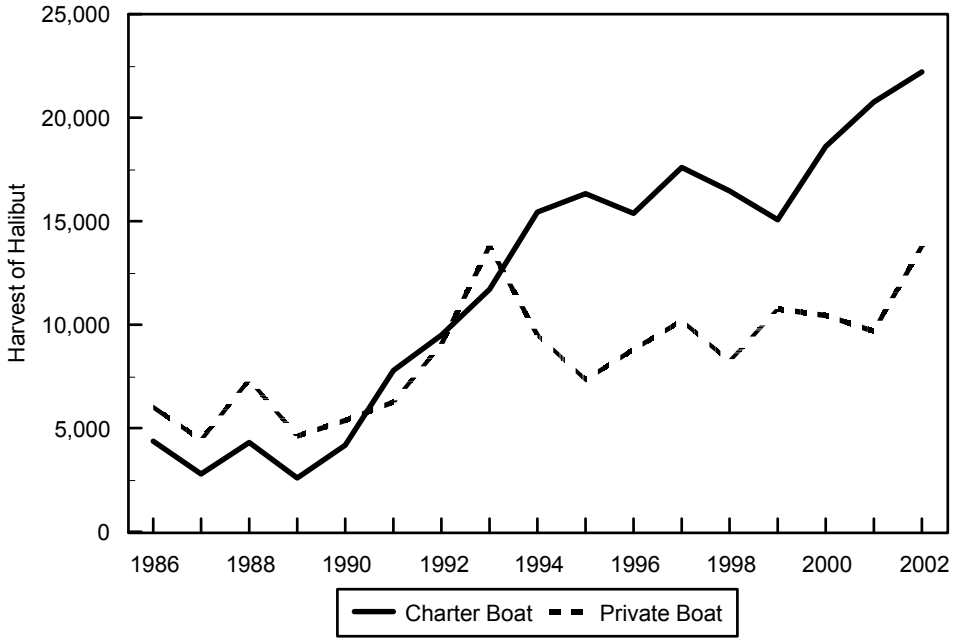

Figure 17.-Resurrection Bay halibut harvest by fishery, 1986-2002.

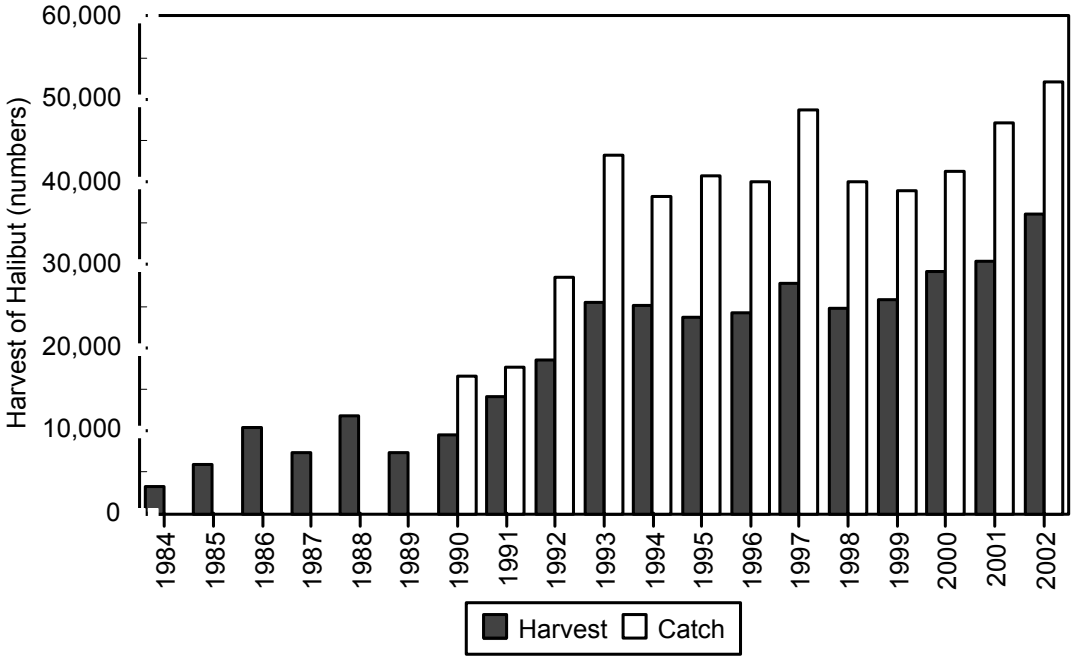

Figure 18.-Total Resurrection Bay halibut harvest, 1984-2002.

Current Issues

The allocation of halibut harvest between the commercial fleet and other user groups remains a contentious issue. The NPFMC has this responsibility since the Magnuson Fishery Management Conservation Act of 1975. Historically the NPFMC has not allocated between user groups, but this strategy is going through a change, brought on by the implementation of IFQs for the commercial halibut harvest in 1995. Prior to 1995 the commercial harvest was controlled through one or two very short fishing periods a year. Setting the commercial quota after the harvest by other users was deducted from the CEY amounted to a *de facto* allocation to sport and personal use users. This has lead to a push for a formal allocation for charter boat operators using some sort of IFQ arrangement. ADF&G and BOF was against this for a variety of reasons (Meyer and Stock 2002). Despite the state's objection the NPFMC approved a motion in April 2003 to incorporate the Area 3A charter fleets into existing halibut IFQ program. As of March 2004 this program has still not been implemented.

Ongoing Research and Management Activities

The Division of Sport Fish will continue to collect fishery related data (ageing structures, sex, and length data), estimate harvest and catch to help the IPHC and NPFMC make informed management and allocation decisions. An ADF&G Division of Sport Fish Port sampler works at the Port of Seward each summer to collect this data. This position is supervised from Homer.

Recommended Research and Management Activities

No new research or management activities are recommended.

NORTH GULF COAST ROCKFISH FISHERY

Rockfish are categorized into three assemblages based on habitat use. For sport fish management purposes these are condensed into two, pelagic and demersal (or non pelagic) assemblages. While both assemblages are typically found near some sort of bottom structure, the pelagic group can be found schooling near the surface to right on the bottom among the rocks. Species that belong to the demersal group are always on the bottom. The pelagic assemblage is the most commonly caught species and in North Gulf Coast waters, and is represented by black rockfish (*S. melanops*), dusky rockfish (*S. ciliatus*), and the least common of these three species the yellowtail rockfish (*S. flavidus*). The most commonly caught from the non-pelagic group is the yelloweye rockfish (*S. ruberrimus*). Other commonly caught non-pelagic species are the copper rockfish (*S. caurinus*), quillback rockfish (*S. maliger*), China rockfish (*S. nebulosus*), and the tiger rockfish (*S. nigrocinctus*).

Rockfish are a long-lived group of fish. Black rockfish harvested in North Gulf Coast waters typically range in age from 8 to 20 years old and have been known to reach the age of 50. Demersal, or non-pelagic species live even longer. Yelloweye rockfish, the most commonly caught from this group have been documented to live well over 100 years. This entire group of fish is very slow growing and mature at a fairly old age, in some cases not until 15 or 20 year old. They also have a very low natural mortality rate (M), O'Connell et al. (1999) estimated the rate instantaneous natural mortality for yelloweye rockfish at 0.02, or an annual rate of about 2% per year. For black rockfish M has been estimated to range from 0.10 to 0.26 (Wallace and Tagart 1994), or 10% to 23% each year.

Rockfish do not have vented swim bladder (physoclistic). Physoclistic fish can only vent gases from their swim bladder via gas exchange across tissue, while more primitive fish like trout and salmon can vent gas directly through the pneumatic duct. This slow venting mechanism

dramatically increases the mortality of rockfish caught at depths greater than 20m. Rockfish caught below this depth suffer embolism and other decompression trauma when reeled to the surface by anglers. Life history traits, along with fishery characteristics (high bycatch mortality) make this group of fish a challenge to manage in a sustainable manner.

All North Gulf Coast and Resurrection Bay waters are open year-round to fishing for rockfish. Most rockfish are taken incidentally while fishing for other species, and a majority of the rockfish caught are pelagic (black rockfish). Daily bag and possession limits are five per day and ten in possession; only one per day and two in possession can be non-pelagic species. There are no size restrictions for rockfish in North Gulf Coast waters. Rockfish can be found in North Gulf Coast year-round, but winter fishing is severely limited by foul winter weather.

Pelagic and non-pelagic species are not accounted for in the SWHS, so the reported rockfish catch and harvest is a conglomerate of species. Estimates of harvest are thought to be bias high due to misidentification (Meyer and Stock 2002). Black rockfish make up a majority of the harvest, typically 70%-80%. The average harvest from 1992-2001 was 24,433 fish (Table 12, Figure 17). This harvest is split closely between charter (47%) and private boat anglers (53%), with anglers fishing from shore account for little harvest (Table 12, Figure 17).

Recent Fishery Performance

The rockfish harvest in 2002 was estimated to be 39,959 fish (Table 12, Figure 17), which again was evenly distributed between charter (48%) and private (52%) boat fishermen. Recent harvests have been increasing steadily and are approaching historic high levels, levels that initiated regulatory action to slow the harvest. On top of this harvest, the total catch of rockfish was 61,557 was fish. While the mortality of released rockfish has not been rigorously estimated, and involves many factors, like depth of capture, it is believed that a majority dies after being released. Total removals from North Gulf Coast waters are significantly higher than the harvest only suggests. The Division of Sport Fish continues to monitor the harvest of rockfish closely through on site creel surveys at the Port of Seward and through the SWHS.

Management Objective

Due to the lack of a comprehensive stock assessment for rockfish, no specific fishery objectives have been formally established of recreational fisheries in Southcentral Alaska. The department has a constitutional mandate to manage on the sustained yield principle. Within the sustained yield principle, the Division of Sport Fish goals seek to optimize social and economic benefits, and where possible, expand opportunity to participate in diverse fisheries on these stocks.

Recent Board of Fisheries Actions

The department and the BOF have attempted to take a conservative approach to rockfish management. Sport bag limits have been reduced in the last ten years in recognition of the failure of other Pacific rockfish fisheries. In 1989 the bag and possession limit was dropped from 10/10 to 5/10. During 1995 it was restricted even further to include non-pelagic rockfish and the bag an possession limit was limited to 5/10 no more than 1 fish daily and 2 in possession could be non-pelagic.

Table 12.-Estimates of recreational rockfish harvest (number of fish) in the North Gulf Coast subarea, 1977-2002.

	Charter[a]		Private[a]		Total	
Year	Catch[b]	Harvest	Catch[b]	Harvest	Catch[b]	Harvest
1984						23,287
1985						17,105
1986		12,365		26,473		38,838
1987		6,595		6,285		12,880
1988		16,662		19,106		35,768
1989		8,490		16,467		24,957
1990	14,675	9,349	18,095	9,894	32,770	19,243
1991	13,892	10,615	13,892	9,253	27,784	19,868
1992	17,690	14,131	22,429	14,598	40,119	28,729
1993	14,025	10,860	27,420	14,143	41,445	25,003
1994	21,176	14,577	21,904	13,679	43,080	28,256
1995	13,929	10,357	11,639	7,003	25,568	17,360
1996	14,051	9,643	18,967	11,818	33,018	21,461
1997	12,771	9,033	22,865	11,352	35,636	20,385
1998	16,121	9,423	24,459	11,452	40,580	20,875
1999	15,885	9,498	25,448	14,510	41,333	24,008
2000	23,911	14,494	30,689	15,860	54,600	30,354
2001	23,401	15,967	33,103	16,494	56,504	32,461
2002	26,342	19,206	35,215	20,753	61,557	39,959
Average 1992-2001	16,987	11,691	22,983	12,742	39,970	24,433

[a] Estimates of charter and private harvest are not available prior to 1986.

[b] Catch not estimated prior to 1990.

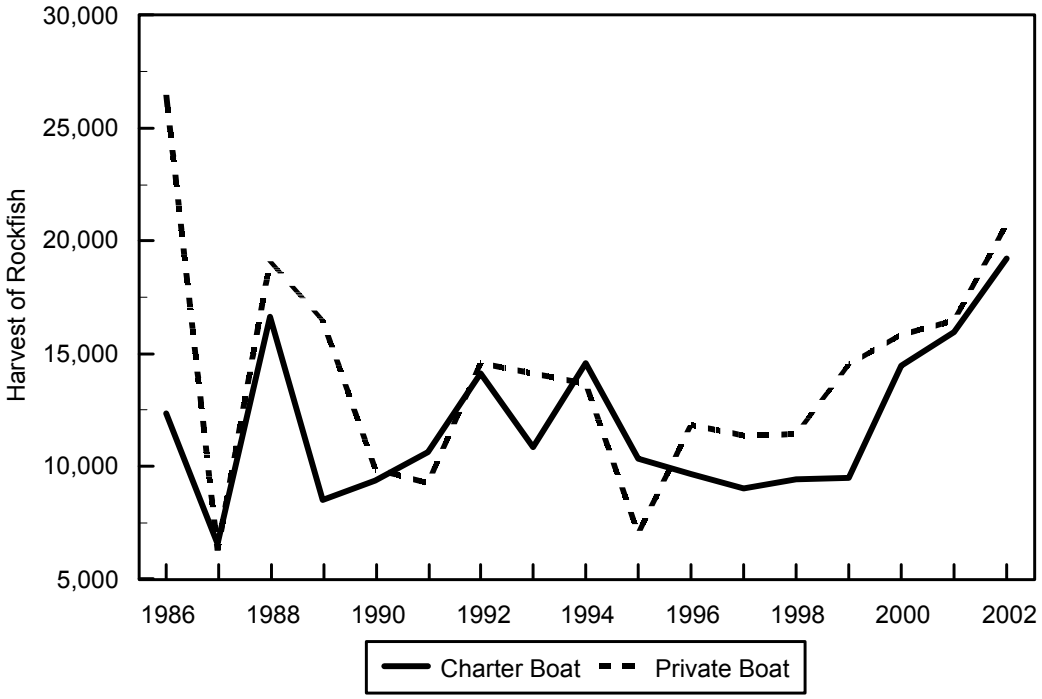

Figure 19.-Resurrection Bay rockfish harvest by fishery, 1986-2002.

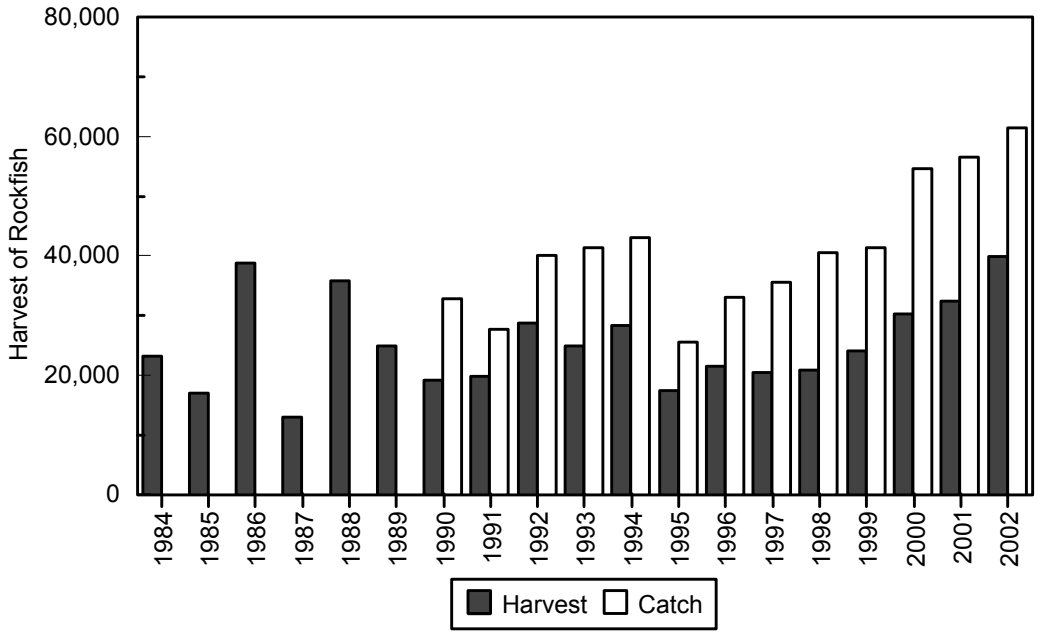

Figure 20.-Total Resurrection Bay rockfish harvest, 1984-2002.

Current Issues

The status of rockfish stocks in the North Gulf Coast management area is unknown. Much information is still needed to adequately manage these assemblage of species: a longer time series of fishery data, more accurate harvest information, accurate estimates of bycatch mortality, and more accurate estimates of effort. We also need fishery independent information like habitat quantity, species distribution (both spatial and by depth), and stock structure. Current catches are starting to approach historic high catch rates that previously brought more restrictive regulations by the BOF. The current time series of harvest information suggests that if the past levels of harvest exceeded surplus production, they have not done so by a large degree. Many rockfish species recruit to the fishery before reaching sexual maturity, so current fisheries fish on standing stock rather than surplus production. Over fishing is the greatest management concern for rockfish. However, stocks have sustained variable, but stable harvests for at least 20 years. Current harvest trends will be monitored closely.

Ongoing Research and Management Activities

The Division of Sport Fish currently collects fishery related information from the sport fishery at Ports throughout Southcentral Alaska. A port sampler at Seward collects important baseline biological rockfish data needed to develop a times series for this long live assemblage. This port sampler also collects important information on the characteristics of the rockfish fishery. This ongoing creel survey is the only information we have, and is integral to the management of these fish. Other management activities consist of attending public meetings and working with the local Fish and Game Advisory Committee.

Recommended Research and Management Activities

There is currently a lack of fishery independent information about rockfish. The Division of Commercial Fish is collecting fishing independent data. It is hoped that this information can be collected over a long period of time and a meaningful time series can be developed. A program needs to be developed the estimates stock status independent to the fishery. Rockfish management has failed throughout much of western United States, and in British Columbia. Many rockfish stocks in California, Oregon, Washington, and British Columbia are severely depleted. More fishery independent information needs to be collected to provide for the educated management of this group.

NORTH GULF COAST LINGCOD FISHERY

Lingcod are commonly found along the outer gulf coast. This fish is voracious and feeds on many types of fish, crustaceans, octopus, and their own kind. If it moves, and they can fit it in their mouth, they will try to eat it. They are easy to find and easy to catch. Lingcod prefer a rocky reef habitat and typically does not stay far from the home reef (Barss and Demory 1989; Jagielo 1990). However some fish do appear to move great distances as tagged lingcod have been caught 50 kilometers from their release site (Mathews and LaRiviere 1987; Jagielo 1990). Lingcod caught in the North Gulf typically range in age from 7 to 16 years old (Vincent-Lang 1991; Meyer 1992, 1993). They are commonly caught exceeding 1 meter in length and weighting more than 50 pounds. Growth is relatively rapid with both sexes reaching 50-60 cm by the time they are age 4 (Meyer 1992). Unlike rockfish they have no swim bladder and can be released with a high expectation of survival. During 1993 many new lingcod fishing regulation went into effect: Resurrection Bay was closed to lingcod fishing, a legal size for lingcod was established at 35 inches with the head on, 28 inches with the head removed (where the head ends and the body begins was never established), it became illegal to land lingcod with a gaff, and a

fishing season was established from July 1 through December 31, and the bag and possession limit was established at 1/1. Once an angler has kept a lingcod in waters outside Resurrection Bay they may not fish inside Resurrection Bay that day. These regulations remain in effect.

The average lingcod harvest from 1992-2001 was 3,737 fish (Table 13), which were evenly split at 50% for both private an charter boat fishermen (Figure 21). Few shore anglers have the opportunity to take legal-sized lingcod. A great majority of the harvest occurs during July, August and September. Foul weather keeps almost all sport anglers out of the North Gulf Coast area during the late fall and winter months.

Recent Fishery Performance

The 2002 lingcod harvest was estimated to be 4,163 fish (Table 13, Figure 22) with a majority (54%) taken by charter boat anglers. The size restriction for lingcod was put into place to allow these fish to spawn at least twice before they recruited into the fishery. This inevitably leads to the release of under sized lingcod. The mortality rate for lingcod caught on hook and line gear is low and has been estimated at only 4.3% (Albin and Karpov 1998), and it is illegal to land lingcod with a gaff. During 2002 there were an estimated 9,718 lingcod were caught, so anglers released about 43% of the catch. Meyer and Stock (2002) report that lingcod are rarely a targeted species, and most lingcod are harvested by anglers targeting halibut, or after a variety of groundfish.

Management Objectives

No specific fishery objectives have been established due to the lack of a comprehensive stock assessment for lingcod in Southcentral Alaska. The department manages lingcod in state waters as well as the EEZ on the constitutionally mandated sustained yield principle. Within this principle, the Division of Sport Fish goals seek to optimize social and economic benefits, and where possible, expand opportunity to participate in diverse fisheries on these stocks.

Recent Board of Fisheries Actions

Lacking a comprehensive stock assessment, ADF&G and the BOF have adopted a precautionary approach for management of the lingcod fishery. This approach includes closures to rebuild overfished areas, conservative bag limits, and size limits and closed seasons to maximize spawning and recruitment. Resurrection Bay was closed to sport and commercial fishing by emergency order in 1992 and by BOF regulation in 1998. Bag and possession limits in the North Gulf Coast management area were set at 1/1 in 1993 and the use of gaff to land lingcod was prohibited. Fishing for lingcod was prohibited from January 1 – June 30, and a minimum size limit of 35 inches with the head on and 28 inches with the head removed was also established, this to allow lingcod to spawn twice before recruiting into the fishery.

Current Issues

This upcoming winter (2004-2005) is another BOF meeting cycle for the North Gulf Coast management area. There are two main issues this year concerning lingcod; the first is opening Resurrection Bay to sport fishing for lingcod, and the second is the 28-inch legal definition of a headless lingcod.

Some local Resurrection Bay Anglers want to open the bay to the harvest of lingcod, and may submit a proposal to the BOF. The last time a fishery independent survey was conducted on lingcod in Resurrection Bay was in 1998 (Bethe and Meyer 2002). In this study only 12 legal-sized were sampled at 101 sites during 78 hours (CPUE = 0.15) of sampling inside the bay compared to 170 legal-sized lingcod in 109 hours (CPUE = 1.56) of sampling at the Chiswell

Islands. There is anecdotal evidence that lingcod populations are on the rebound in the Bay, but there is no fishery independent collaboration. Lingcod populations in Washington, Oregon, and California are considered overfished, and these fisheries are currently in a 10-year rebuilding program (NMFS 2001). Given that these aggressive fish are easy to find and easy catch, over-fishing the current unknown population of lingcod in Resurrection Bay is likely.

During the 1993 BOF meeting when the 35-inch minimum size limit was established for lingcod, a minimum headless measurement was requested, but no data was present and the 28-inch length put forward was a best guess. Further more, where the head ended and body began was not defined. In the years since this was enacted few headless lingcod have been seen in the Port of Seward. The few that have been seen were obviously cut to a 28-inch length to hide the fact that they were probably under the 35-inch minimum size in total length. Recent measurement studies have now concluded that a 35-inch lingcod (TL) is probably 30-inches in length with its head removed. The department will put forth a proposal to eliminate the minimum headless measure. This will eliminate a loophole to harvest undersized fish and will allow for the collection of measurement data from all harvested lingcod.

On Going Research and Management Activities

The Division of Sport Fish currently collects fishery related information from the sport fishery at Ports throughout Southcentral Alaska. A port sampler at Seward collects important baseline biological lingcod data needed to develop a times series for this species. This port sampler also collects important information on the characteristics of the lingcod fishery. This ongoing creel survey is the only information we have, and is integral to the management of these fish. Other management activities consist of attending public meetings and working with the local Fish and Game Advisory Committee.

Recommended Research and Management Activities

The current stock status of lingcod in North Gulf coast waters is unknown. The department has no fishery independent assessment tool to assess these stocks. A good baseline of data was established in with the original survey conducted in 1998. This survey should be duplicated to get help determine lingcod stock status both inside Resurrection Bay, and outside Resurrection Bay. A current study would help determine if our manage tools put in place in 1993 (closed areas, minimum size restrictions, lowered bag limits) have been effective in maintaining a sustainable harvest of lingcod.

Table 13.-Estimates of recreational lingcod harvest (number of fish) in the North Gulf Coast subarea, 1987-2002.

	Charter[a]		Private[a]		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest
1990	6,467	3,241	6,687	3,656	13,154	6,897
1991	3,780	3,088	3,595	3,104	7,375	6,192
1992	5,124	3,621	6,298	4,460	11,422	8,081
1993	2,078	875	5,083	2,204	7,161	3,079
1994	4,928	1,891	4,943	1,821	9,871	3,712
1995	3,314	1,643	2,139	976	5,453	2,619
1996	2,292	1,296	3,395	1,334	5,687	2,630
1997	2,716	1,631	4,261	1,115	6,977	2,746
1998	2,517	1,179	3,599	1,009	6,116	2,188
1999	3,280	1,597	4,802	1,752	8,082	3,349
2000	5,445	2,559	7,017	2,711	12,462	5,270
2001	4,428	2,339	4,263	1,354	8,691	3,693
2002	4,238	2,248	5,480	1,915	9,718	4,163
Average 1992-2001	3,612	1,863 #	4,580	1,874	8,192	3,737

[a] Estimates of charter and private harvest are not available prior to 1986.

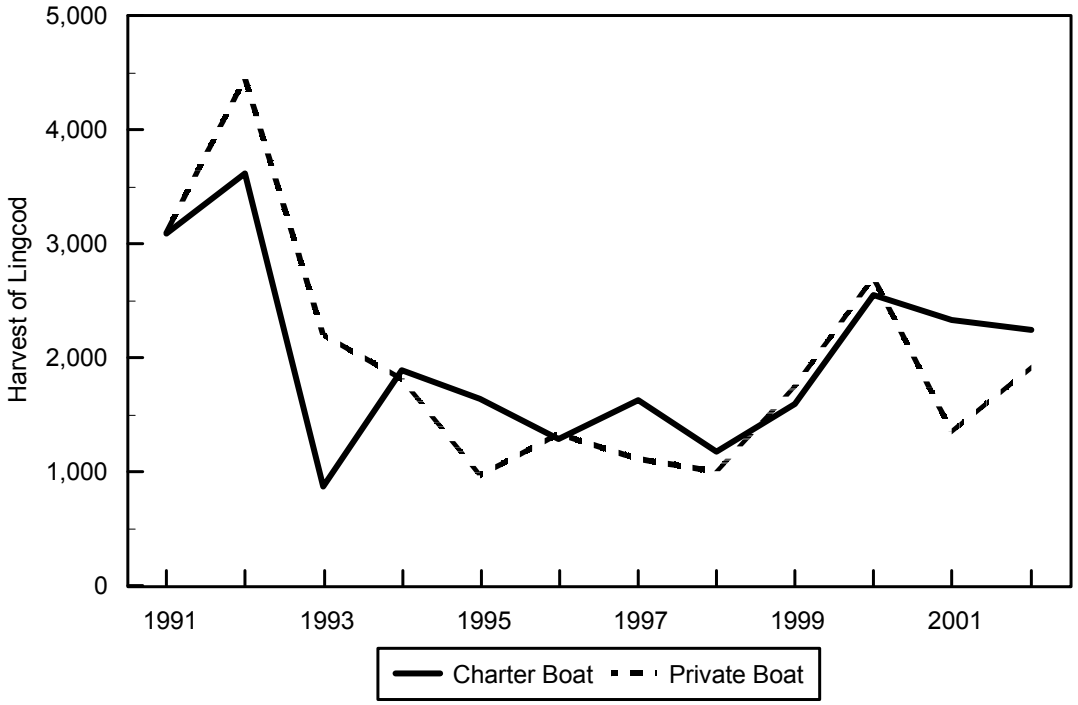

Figure 21.-Resurrection Bay lingcod harvest by fishery, 1991-2002.

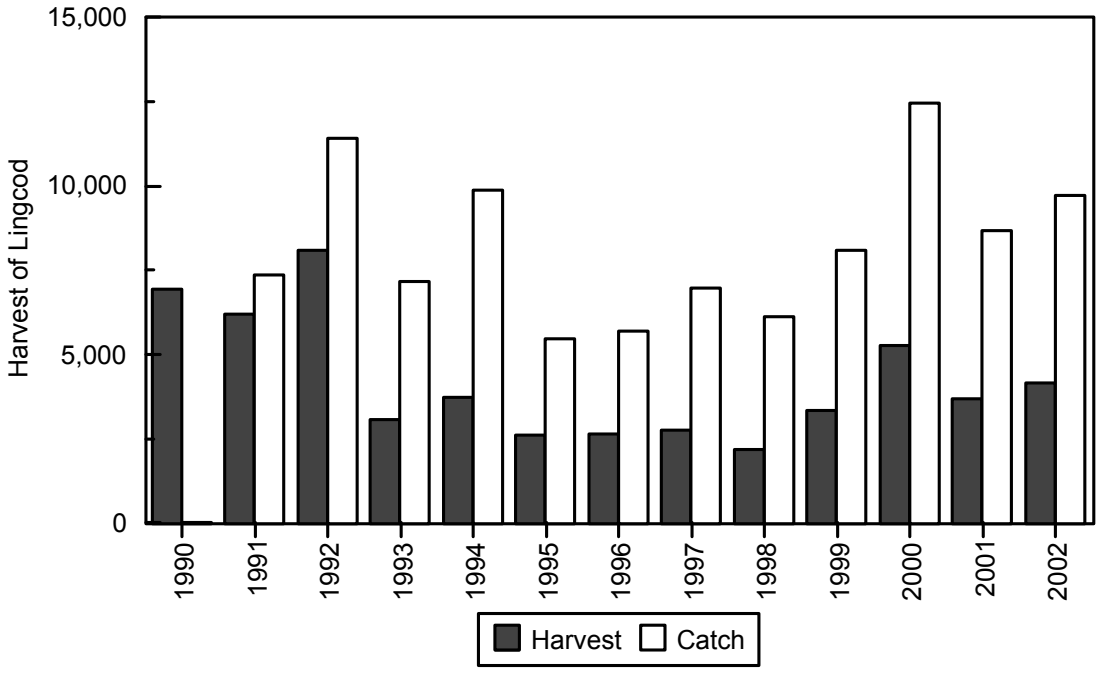

Figure 22.-Total Resurrection Bay lingcod harvest, 1990-2002.

NORTH GULF COAST SHARK FISHERY

Three species of sharks are occasionally caught in the North Gulf Coast: the salmon shark, spiny dogfish, and Pacific sleeper shark. Individual shark species are not distinguished in the SWHS and are only reported "sharks." Pacific sleeper sharks have inedible flesh that may be poisonous and a rarely kept. Salmon sharks and spiny dogfish are both slow growing, late to mature species. Both are ovoviviparous, or give birth to live young called pups. Average litter size for salmon sharks is five pups while spiny dogfish give birth to an average 7 pups. The maximum age for salmon sharks is reported to be about 25 (Tanaka 1980), while dogfish live to be more than 80 (Meyer and Stock 2002). Little is known about the stock status of either species in the North Gulf coast. Both species are pelagic and have been know to move great distances.

The recreational shark fishery takes place primarily in state waters. There is annual limit of 2 sharks and shark harvest must be recorded on sport fishing licenses, or on a harvest record card. The SWHS provide estimates of catch and harvest of sharks, the charter logbook program (outlined in 5AAC 75.076) required recording of salmon sharks kept and released in 1998, 2000, and 2001, and the port sampling program in Seward collects information on the number of salmon sharks, spiny dogfish and sleeper sharks kept and released. All this information has been integrated to describe the shark fishery in Meyer and Stock (2002).

The most commonly caught shark is the spiny dogfish making up about 95% of the shark catch (Meyer and Stock 2002). Anglers fishing for halibut and other groundfish typically catch these sharks. According to Meyer and Stock (2002) only 1.6% of the spiny dogfish caught were retained during the period 1998-2000. Salmon sharks make up a much smaller portion of the catch, but are a targeted species. At least one charter operator in Seward specializes in salmon shark fishing trips. Salmon sharks are a fairly large fish; in the Gulf of Alaska the average size

of 72 measured since 1987 was 223 cm (7.3 ft). These fish require special knowledge to successfully catch and land. Salmon sharks have typical abrasive skin and have a tendency to roll when caught wrapping themselves tightly in fishing line before breaking off.

The harvest of salmon sharks according to charter vessel logbooks in 1998 was 66 fish while 63 were released. In 2000 this number jumped to a harvest of 84, and 315 salmon sharks released. The SWHS does not separate the harvest of shark species.

Recent Fishery Performance

In 2002 the SWHS estimates the aggregate shark harvest landed at the Port of Seward was estimated to be 177 fish, while 2,170 were caught (Table 14). The proportion of the harvest taken by charter boat anglers and private anglers was variable from 1996-2002 (Figure 23). Anglers released most of the sharks they caught (Figure 24).

Table 14.-Estimates of recreational shark harvest (number of fish) in the North Gulf Coast subarea, 1996-2002.

	Charter		Private		Total	
Year	Catch	Harvest	Catch	Harvest	Catch	Harvest
1996	13	6	16	16	29	22
1997	1,821	104	592	77	2,413	181
1998	1,091	89	1,748	107	2,839	196
1999	336	37	1,217	197	1,553	234
2000	1,715	101	2,112	98	3,827	199
2001	4,787	52	1,791	15	6,578	67
2002	1,166	133	1,004	44	2,170	177
Average 1996-2001	1,627	65	1,246	85 #	2,873	150

Management Objective

Due to a lack of a comprehensive stock assessment for sharks, no specific fishery objectives have been established for recreational shark fisheries. The statewide Sport Shark Fishery Management Plan (5AAC 75.012) states that the department shall manage sport shark fisheries for sustained yield. Within this principle, the Division of Sport Fish goals seek to optimize social and economic benefits, and where possible, expand opportunity to participate in diverse fisheries on these stocks where possible.

Recent Board of Fisheries Actions

Prior to 1998, shark fishing in state waters was unregulated. Due to concerns over the potential for rapid development of fisheries targeting sharks and the history of overexploitation and the collapse of stocks elsewhere ADF&G submitted agenda changes to the BOF in the spring of 1998 to address these concerns. The BOF took the following actions affecting shark fisheries statewide.

1. Extended state sport fish authority to the exclusive economic zone (EEZ).
2. Amended the ADF&G proposal for a pelagic shark management plan and established a sport salmon shark fishery management plan for all species.

3. Amended an ADF&G proposal for a permit only commercial fishery to close the directed commercial shark fishery (bycatch still allowed).

The Sport Shark Fishery Management Plan sets bag limits of 1 fish daily and 1 in possession, as well as an annual limit of 2 sharks of any species. At the November 2001 BOF meeting the board rejected a proposal to allow the hooking of sharks by a second party in sport fisheries.

Current Issues

There are currently no reliable estimates of stock status for any species of shark in the North Gulf Coast management area. The tendency for sharks to congregate in near shore waters during the summer makes them particularly vulnerable to the sport angler. This combined with more media coverage of shark fishing has increased the popularity of this big game fish recently. It has also been speculated that an IFQ implemented on halibut charter boat my direct more effort toward sharks. The vulnerability of sharks to overexploitation is well documented (Walker 1998).

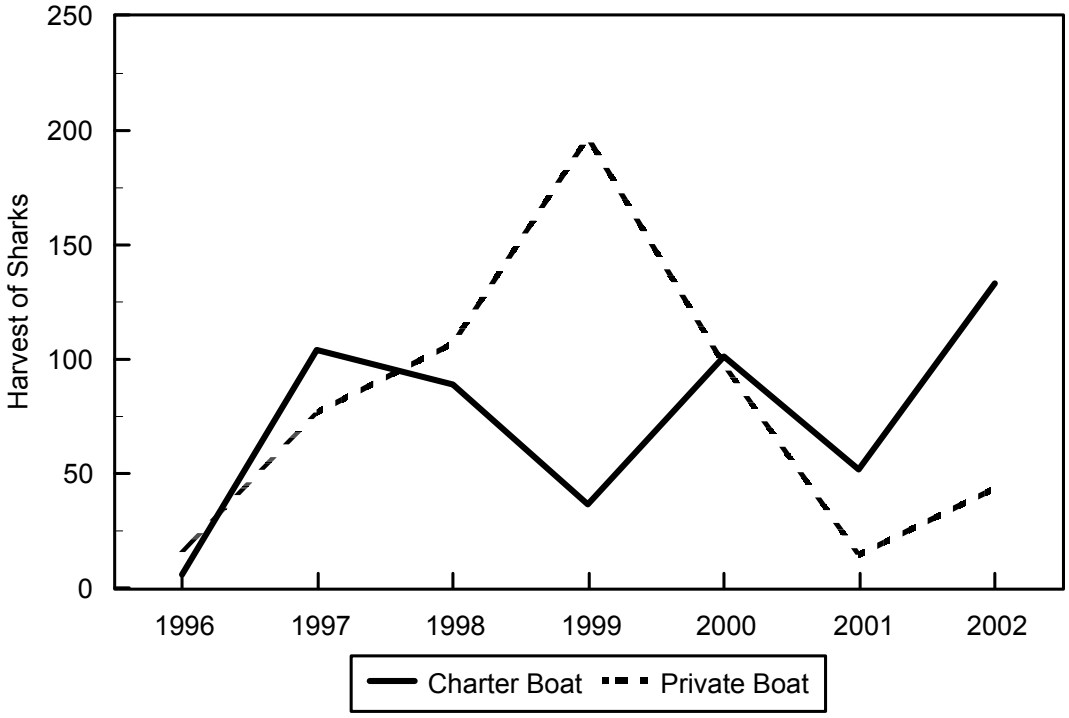

Figure 23.-Resurrection Bay shark harvest by fishery, 1996-2002.

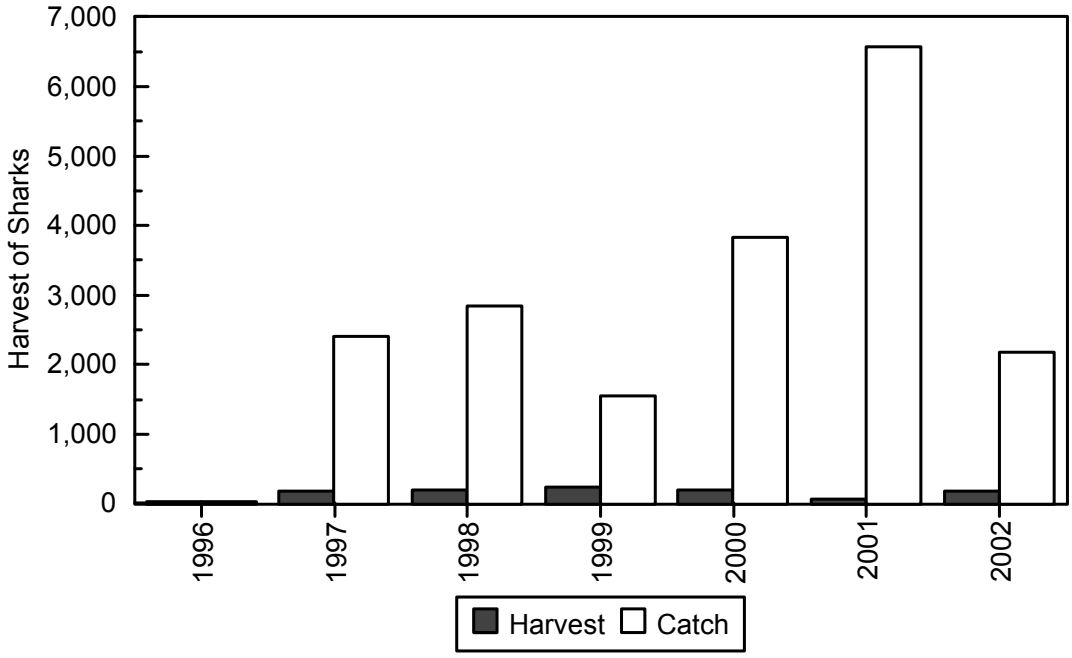

Figure 24.-Total Resurrection Bay shark harvest, 1996-2002.

On Going Research and Management Activities

To effectively mange these species, ADF&G is cooperating with other shark researchers gain more information about age, growth, diet, migration and the thermal biology of sharks. A port sampler at Seward collects important baseline biological shark data needed to develop a times series for these long live fish. This port sampler also collects important information on the characteristics of the shark fishery. This ongoing creel survey is the only information we have, and is integral to the management of these fish. Other management activities consist of attending public meetings and working with the local Fish and Game Advisory Committee.

Recommended Research and Management Activities

ADF&G should continue to collect shark information through their groundfish port-sampling program in Seward, and through the SWHS. An assessment of catch and release mortality should also be conducted, especially considering the increased interest in this fishery and the number of sharks currently released. This research should be continued in the future and will lead to a better understanding of sharks stocks.

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APPENDIX A. RESURRECTION BAY MANAGEMENT PLANS

Appendix A1.-Bear Lake management plan.

5 AAC 21.375. BEAR LAKE MANAGEMENT PLAN

(a) Any restrictions, in board policies dated before the effective date of this section, on the maximum number of indigenous Bear Lake sockeye salmon spawners are rescinded. The department shall establish an escapement goal for Bear Lake sockeye salmon stocks and shall manage all contributing fisheries to meet this goal.

(b) Enhancement activities related to either indigenous Bear Lake sockeye salmon stocks or transplanted sockeye salmon stocks must consider the impact on continuing enhancement of Bear Lake coho salmon. It is the intent of the Board of Fisheries that

(1) any enhancement of sockeye salmon must not cause a net loss of coho salmon smolt production from Bear Lake;

(2) any enhancement of sockeye salmon in Bear Lake must maintain the early run timing of the indigenous stocks;

(3) the prime objective of any Bear Lake sockeye salmon enhancement must be to provide the opportunity for a commercially viable sockeye salmon fishery prosecuted with minimal conflict with the recreational fishery.

History - Eff. 6/10/89, Register 110 Authority - AS 16.05.060, AS 16.05.251

Appendix A2.-Resurrection Bay salmon management plan.

5 AAC 21.376. RESURRECTION BAY SALMON MANAGEMENT PLAN

(a) Since the beginning of significant commercial harvests of pink and chum salmon in Resurrection Bay, there have been some conflicts between recreational and commercial fishermen. The issues are the protection of coho and chinook salmon for the recreational fishery, and the management of surplus pink and chum salmon stocks in a manner that provides for a commercial fishery while minimizing the incidental catch of coho and chinook salmon.

(b) The department shall, by emergency order,

(1) manage Resurrection Bay coho and chinook salmon stocks exclusively for recreational use;

(2) manage the indigenous pink and chum salmon stocks primarily for commercial use, insofar as that harvest does not interfere in time or area with the recreational fishery;

(3) manage the commercial fishery in Resurrection Bay in a manner that does not interfere with the recreational fishery.

History - Eff. 6/10/89, Register 110 Authority - AS 16.05.060, AS 16.05.251

Appendix A3.-North Gulf Coast king salmon sport fishery management plan.

5 AAC 58.065. NORTH GULF COAST KING SALMON SPORT FISHERY MANAGEMENT PLAN

(a) The purpose of the management plan under this section is to meet the Board of Fisheries' goal of directing the king salmon sport fishing effort on hatchery stocks in Resurrection Bay and stabilizing the sport harvest of king salmon in the North Gulf Coast.

(b) In the king salmon sport fishery,

(1) from January 1 through December 31, outside of the Resurrection Bay Terminal Harvest Area, the bag and possession limit for king salmon is one fish, with no size limit;

(2) within the Resurrection Bay Terminal Harvest Area,

(A) from May 1- August 31, the bag and possession limit is two fish; with no size limit;

(B) from September 1-April 30, the bag and possession limit for king salmon is one fish, with no size limit;

(3) in the North Gulf Coast, the annual limit and harvest record specified in 5 AAC 58.022 and 5 AAC 58.024 do not apply

(c) For the purpose of this section, the

(1) North Gulf Coast consists of the salt waters between Gore Point at 59o 12.00' N. lat., 150o 57.85' W. long. And Cape Puget at 59o 56.57' N. lat., 148o 26.68' W. long;

(2) Resurrection Bay Terminal Harvest Area consists of the salt waters north of a line between Cape Resurrection and Aialik Cape. (Eff. 12/29/2002, Register 164)

History: Eff. 12/29/2002, Register 164; Authority: AS 16.05.251

Appendix A4.-Sport shark fishery management plan.

5 AAC 75.012. SPORT SHARK FISHERY MANAGEMENT PLAN

(a) The department shall manage sport shark fisheries for sustained yield.

(b) Recognizing the lack of stock status information, the potential for rapid growth in the sport shark fishery, and the potential for over-exploitation, the following provisions apply to the sport shark fishery:

(1) the bag and possession limits for sharks in salt water is one fish;

(2) the annual limit for sharks in salt water is two fish;

(3) a non-transferable harvest record is required and must be in the possession of each angler sport fishing for sharks in salt water; the harvest record

(A) for a licensed angler is located on the back of the angler's sport fishing license;

(B) for an angler not required to have a sport fishing license may be obtained, without charge, from department offices and sport fishing license vendors throughout the state; and

(4) immediately upon landing a shark from salt water, an angler shall enter the date, location (water body), and species of the catch, in ink, on the harvest record.

(c) The provisions of (b) of this section also apply in the adjoining waters of the exclusive economic zone.

(d) For the purpose of this section, "shark" means a species of the orders Lamniformes, Squaliformes, or Carcharhiniformes.

History: Eff. 4/23/98, Register 146; Authority: AS 16.05.251

APPENDIX B. STOCKING RECORDS

Appendix B1.-Hatchery releases in Resurrection Bay, 1966-2002.

Stocking location	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Coho Fry													
Bear Lake													
Bear Creek													
Coho fingerling													
Bear Creek													
Bear Lake	360,100	246,400					450,800	453,300	450,800	449,900	224,600	10,800	225,820
Box Canyon Creek													
First Lake										1,000			
Sink Hole												11,500	
Seward Lagoon													
Coho smolt													
Bear Creek				47,900	6,400	50,983	155,500				35,600	35,102	28,574
Bear Lake													
Box Canyon Creek					3,200								
Grouse Lake											35,200	35,003	53,455
Lowell Creek													
Seward Lagoon			42,400	27,100	38,600	10,900	66,500	30,200	100,000	100,700	100,600	100,456	148,999
Chinook smolt													
Box Canyon Creek											25,100	50,036	150,488
Lowell Creek													
Seward Lagoon													
Spring Creek													
Thumb Cove													
Chum fingerling													
Jap Creek													
Spring Creek													
Sockeye fry													
Bear Lake													
Sockeye fingerling													
Bear Lake													
Sockeye smolt													
Bear Lake													
Grouse Lake													

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Appendix B1.-Page 2 of 3.

Stocking location	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Coho fry													
Bear Lake												333,211	
Bear Creek													
Coho fingerling													
Bear Creek													390,060
Bear Lake	225,460	150,011	246,545	227,800	198,801	220,000	300,446	445,693	223,300	347,155			
Box Canyon Creek									257,461				
First Lake													
Sink Hole													
Seward Lagoon								122,908					
Coho smolt													
Bear Creek	40,503												
Bear Lake												583,700	
Box Canyon Creek								53,607					
Grouse Lake	44,010	50,286	54,593	13,238		53,100	56,134						
Lowell Creek									57,232	63,806	66,606	63,733	89,892
Seward Lagoon	98,566	100,757	109,958	53,970	82,506	67,772	50,256	88,704	65,514	118,741	272,346	145,619	119,057
Chinook smolt													
Box Canyon Creek	257,540				54,521								
Lowell Creek						39,206	132,708	100,900	95,963	95,673	122,800	216,140	93,200
Seward Lagoon							53,587			109,020	109,464	112,831	373,165
Spring Creek											75,063		
Thumb Cove						71,427							
Chum fingerling													
Jap Creek							282,620						
Spring Creek							173,187						
Sockeye fry													
Bear Lake												20,000	1,530,000
Sockeye fingerling													
Bear Lake													
Sockeye smolt													
Bear Lake												2,399,000	74,900
Grouse Lake													

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Stocking location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Coho fry											
Bear Lake		450,000	320,000	509,000	350,000	448,700	409,000	306,000	316,000	310,000	404,700
Bear Creek		170,000									
Coho fingerling											
Bear Creek											
Bear Lake											
Box Canyon Creek											
First Lake											
Sink Hole											
Seward Lagoon											
Coho smolt											
Bear Creek						153,000	177,000	51,000	102,000	120,500	123,800
Bear Lake	51,733			7,400	75,000						
Box Canyon Creek											
Grouse Lake											
Lowell Creek	59,492	64,361	38,000	50,698	69,000	61,687	65,687	62,580	54,184	125,618	119,512
Seward Lagoon	154,219	159,091	201,577	133,700	182,000	144,112	74,365	109,142	145,693	124,703	121,743
Chinook smolt											
Box Canyon Creek											
Lowell Creek	108,390	104,870	104,477	95,256	115,000	117,208	101,992	85,502	109,461	114,748	93,296
Seward Lagoon	261,803	184,742	165,596	220,146	300,000	203,932	205,133	88,066	212,873	113,147	100,314
Spring Creek											
Thumb Cove											
Chum fingerling											
Jap Creek											
Spring Creek											
Sockeye fry											
Bear Lake	1,795,529	44,400	170,000	330,000	780,638	788,000	360,000	1,380,000	1,800,000		2,407,700
Sockeye fingerling											
Bear Lake		1,765,861									
Sockeye smolt											
Bear Lake	565,489						506,703				
Grouse Lake			570,000	993,000	217,605	2,428,000	1,573,458				
Sockeye pre-smolt											
Bear Lake											802,600
Rainbow trout catchables											
First Lake									1,000	1,000	1,007
Rainbow trout fingerling											
Lost Lake										25,000	

Sources: Marianne McNair, ADF&G, CFMD, Juneau; Jeff Hetrick and Robert Blankenship, CIAA, Trail Lakes Hatchery; ADF&G, Division of Sport Fish stocking records.