

ANNUAL REPORT #2

To:

DISTRICT ENGINEER
DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, ALASKA

REFERENCE NO. N-880038, KAMISHAK BAY 1

From:

PAINT RIVER/
McNEIL RIVER STATE GAME SANCTUARY AND REFUGE/
KATMAI NATIONAL PARK AND PRESERVE
ANNUAL REVIEW GROUP

Submitted: May 12, 1994

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1. INTRODUCTION

A. Background

On August 31, 1988 the Department of the Army issued permit No. 2-880038, Kamishak Bay 1, to Cook Inlet Aquaculture Association covering the work necessary to construct the Paint River fish ladder.

A reevaluation of the permit decision was conducted during 1991; and on January 10, 1992, the District Engineer announced his decision to allow the permit to stand but to modify it.

After consultation between the representatives of the District Engineer and the Cook Inlet Aquaculture Association, agreement was reached on the permit modification. On September 1, 1992 the permit was modified to include the following special conditions:

- "a. The permittee will meet with representatives of the Alaska Department of Fish and Game (ADF&G), Alaska Department of Natural Resources, U.S. Fish and Wildlife Service, and the National Park Service annually in February, beginning in 1993. The permittee will notify the Alaska District Engineer (DE) a minimum of 24 hours in advance of the date, time, and location of each meeting. Additional meetings will be held as required by the DE.
 - (1) The purpose of the meeting(s) will be to review available reports and pertinent scientific information, including the Commissioner of ADF&G's annual report to the legislature on the status of resources in the McNeil River State Game Sanctuary and Refuge; and any similar data on resources in Katmai National Park and Preserve.
 - (2) The primary agenda for each meeting will be to consider variations, if any, in bear concentrations or behavior at either McNeil or Katmai which could reasonably be attributed to the introduction of salmon into the Paint River via the fish ladder authorized by this permit, and to recommend any appropriate remedial measures.
 - (3) A written report, including a minority report if there is disagreement among the parties, will be submitted to the DE (within 30 days from the date of any meeting) for review to determine if future modification, suspension, or revocation of the permit is warranted. Copies of the report will also be provided to each agency listed above.

Preparation of the minority report will be the responsibility of any dissenting party or parties. If the permittee is in the minority, the majority report may be prepared by one of the agencies as determined by majority vote of the agency representatives present. If agreement can not be reached in this manner, the majority report will be prepared by the permittee.

- b. The permittee understands and accepts that further conditioning of this permit may be initiated by the DE upon completion of the ADF&G Management Plan for the McNeil River State Game Sanctuary and Refuge. Any such action would be conducted according to the procedures found at 33 CFR Part 325.7."

B. Meeting and Participants

On January 4, 1994 a letter was sent to the named representatives announcing the meeting date as February 25, 1994. The Department of the Army; U.S. Army Engineer District, Alaska; Regulatory Branch (ACOE) was notified of the meeting at the same time in keeping with a condition in the permit modification.

On February 1, 1994 the participants were sent a reminder consisting of a preliminary agenda and copies of the "Kamishak Special Use Area and Site Specific Plan", the "McNeil River Chum Salmon Fishery Management Plan", the "Paint River Salmon Enhancement Project Operational Plan", the "McNeil River State Game Sanctuary and Refuge Draft Operational Management Plan" and an ADF&G memorandum entitled "1993 McNeil River Field Season".

ADF&G Commissioner Carl Rosier's "Status of Brown Bears and Other Natural Resources in the McNeil River State Game Sanctuary and Refuge - Annual Report to the Alaska State Legislature" for 1993, which is supposed to be submitted to the legislature by January 30, had not been completed or submitted by either the date of the reminder (February 1) or the date of the meeting (February 25). It is under ADF&G review and will be available from the Commissioner's office on May 16, 1994.

The meeting was convened at approximately 10:00 a.m. on February 25, 1994 at the Cook Inlet Aquaculture Association Building in Soldotna. The designated representatives present were:

Ms. Mary Walter	- ADNR
Mr. Gary Vequist	- NPS
Mr. Gary Wheeler	- USFWS
Mr. Gary Fandrei	- CIAA

Others present at the meeting were:

Mr. Kevin Morgan	- ACOE
Mr. Steve Meyers	- ACOE
Mr. Doug Palmer	- USFWS
Mr. Thomas Walker	- CIAA

The meeting was adjourned at approximately noon.

C. Report Organization

The report follows the general pattern of examining the relevant history and the prior year's experiences in each of the identified "special" areas, i.e. McNeil River State Game Sanctuary (the Sanctuary), McNeil River State Game Refuge (the Refuge), Katmai National Park (the Park) and Katmai National Preserve (the Preserve).

It then reviews the relevant history and the prior year's experiences for areawide activities, e.g. Kamishak Bay commercial fisheries, Kamishak Bay salmon production and Alaska Peninsula bear population dynamics.

Next, it reviews the history and the prior year's experiences in the Paint River salmon enhancement project and seeks to identify any correlations between the Paint River project and changes (positive or negative) taking place in the area.

Finally, should such correlations be established and deemed to warrant remedial measures, remedies will be recommended.

It is important to the reading of this report one understand the charge of each of the agencies represented in the Review Group is far broader than the narrow role each representative plays in the context of the Review Group. The Review Group is less concerned with absolute values for any of the resources or resource characteristics being examined than it is in the degree to which there has been change in those values. It is for this reason considerable attention has been given to what is available for an historical record.

D. Executive Summary

This report presents historic information pertinent to the issues the Review Group will consider and addresses

specifically the year beginning March 1, 1993 and ending February 28, 1994.

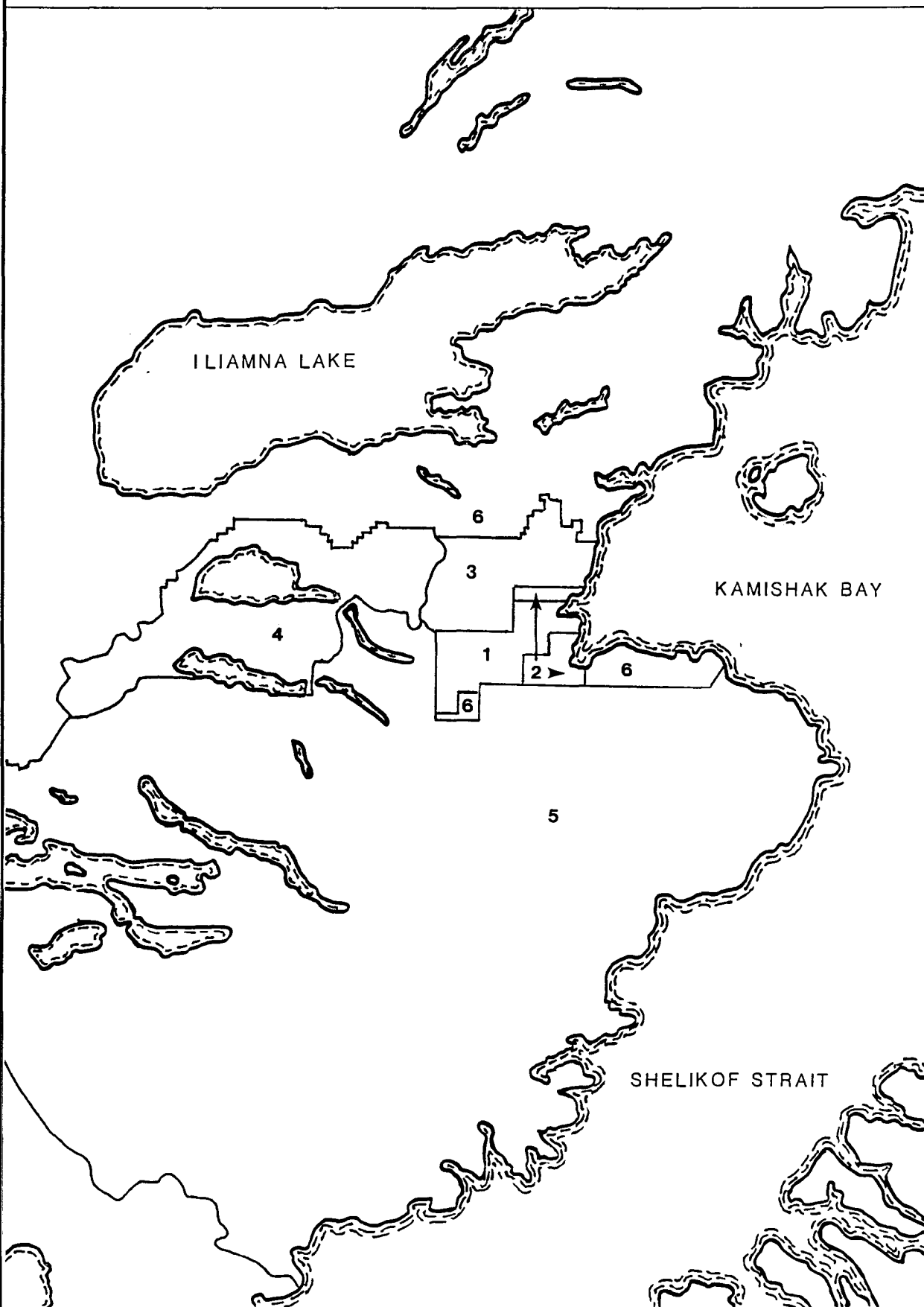
The fish ladder did not operate in 1993; and, therefore, no impacts from its operation were cited.

The Review Group makes no recommendations to the District Engineer for additional permit modification, permit suspension permit revocation or other remedial measures for the coming year.

The Review Group concentrated on reviewing and discussing available related information, particularly the "Kamishak Special Use Area and Site Specific Plan", the "McNeil River Chum Salmon Fishery Management Plan", the "Paint River Salmon Enhancement Project Operational Plan", the "McNeil River State Game Sanctuary and Refuge Draft Operational Management Plan" and an ADF&G memorandum entitled "1993 McNeil River Field Season".

Figure 1

SANCTUARY/REFUGE/PARK/PRESERVE BOUNDARIES



- 1 = Original McNeil River State Game Sanctuary
- 2 = Areas added to the McNeil River State Game Sanctuary by 1991 legislation (effective 1/1/93)
- 3 = McNeil River State Game Refuge created by 1991 legislation (effective 1/1/93)
- 4 = Katmai National Preserve
- 5 = Katmai National Park
- 6 = State-owned land

2. McNEIL RIVER STATE GAME SANCTUARY

A. Regulatory and Program Histories

Exactly how far back the McNeil River was recognized as an area where brown bears concentrated during the July run of chum salmon into that river is unclear. For purposes of this report and the following chronology it is sufficient to start in 1955.

1955: The McNeil River drainage was closed to brown bear hunting on July 1, 1955 by the Alaska Game Commission of the U.S. Fish and Wildlife Service.

1960: The Alaska Board of Fish and Game continued the closure in the McNeil River drainage from 1960 to 1967.

1963: In 1963 a bear research program was initiated, and it involved marking 60 bears at McNeil Falls. The program would continue until 1973.

1967: In 1967 the Alaska Legislature created the McNeil River State Game Sanctuary (Section 1, chapter 108, SLA 1967): "to provide for the permanent protection of brown bear and other wildlife populations and their vital habitat in the area of McNeil River so that these resources may be preserved for scientific, esthetic and educational purposes."

1968: In 1968 the Board of Game expanded the area closed to bear hunting to include all drainages into McNeil Cove (e.g., Mikfik Creek) to make the closed area conform to the new sanctuary boundary.

In 1968 Governor Hickel was advised that the Secretary of the Interior's Advisory Board on National Parks, Historic Sites, Buildings and Monuments had recommended the Brown Bear Refuge along the McNeil River (McNeil River State Game Sanctuary) for inclusion in the National Registry of Natural Landmarks and the Secretary had approved that recommendation. The State of Alaska applied for and received that registration.

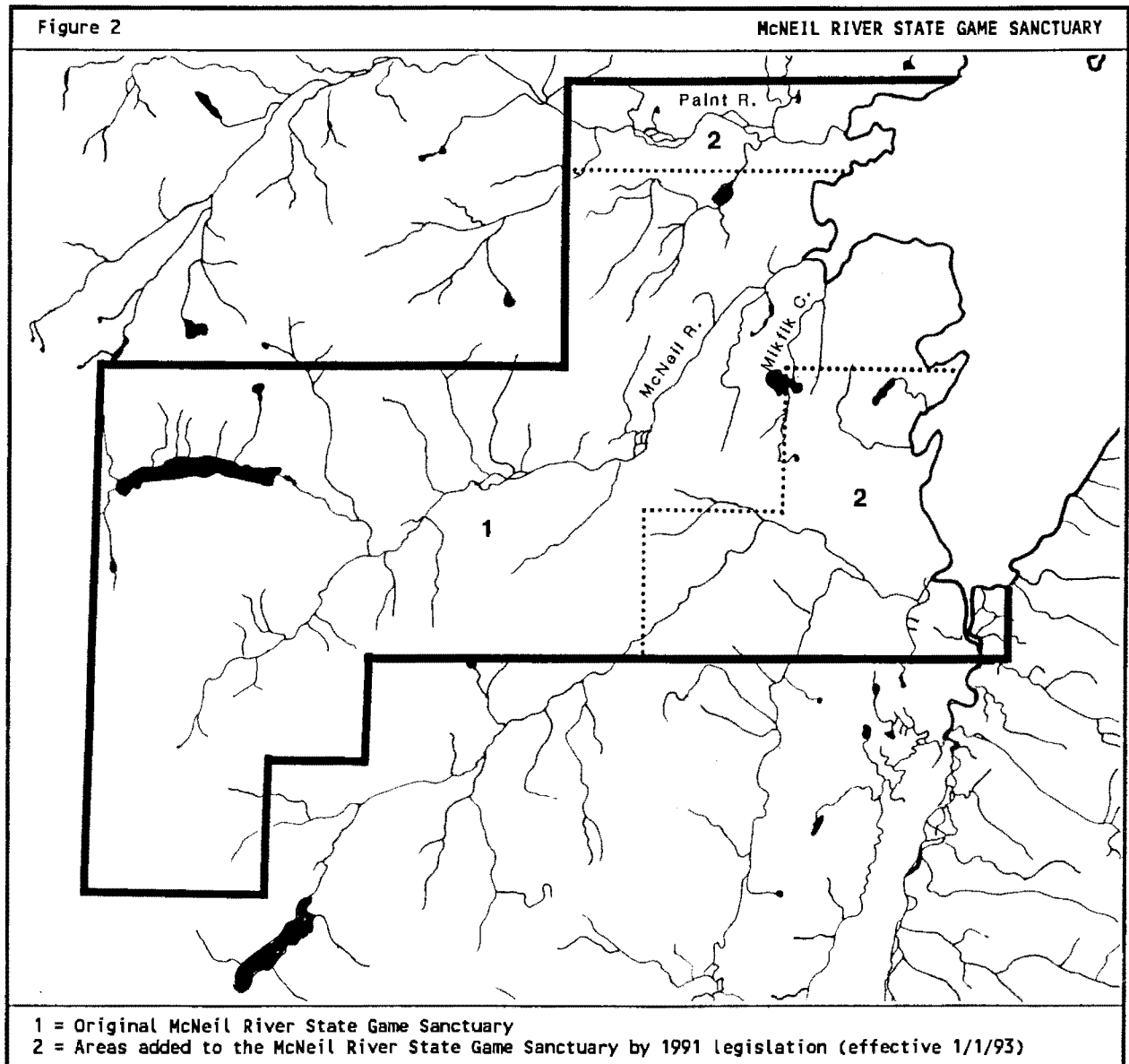
1973: In 1973 the Board of Game adopted regulations which required all visitors to the sanctuary to obtain a permit and limited the number of visitors to the falls to 10 per day during the peak visiting period in July and early August. The Board also restricted camping to the present camp site. Access to the east side of McNeil River was prohibited. Sportfishing was limited progressively from seaward of a point 1/4 mile upstream from the lagoon, then seaward of the river's mouth, then allowed on the Spit only. The Board limited the

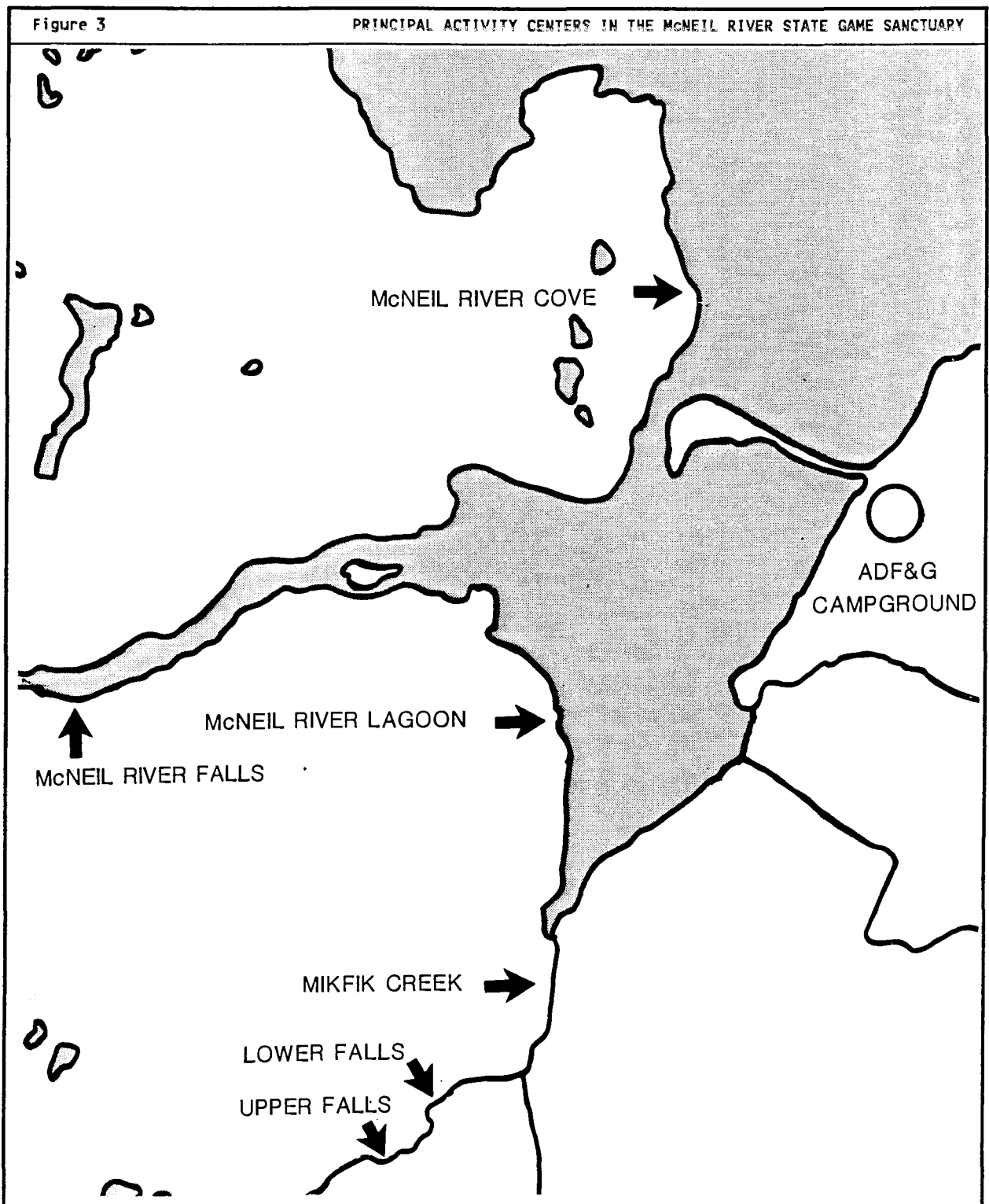
length of time allowed in the sanctuary to seven days.

The collars from the research program begun in 1963 were removed, and research was discontinued.

Mid-1970's: The Division of Wildlife Conservation requested that the Federal Aviation Administration ask pilots to avoid the area during the period when bear numbers peaked to keep bears from abandoning the Falls and avoid having a frightened bear run into a nearby group of visitors.

1976: By 1976 visitors were required to travel to and from the viewing area in a group.





1978: In 1978 Katmai National Monument was expanded northward to include most of the area south and west of the sanctuary. The drawing period for permits to visit McNeil was extended into mid-June and through August.

1979: The Board of Fisheries prohibited sportfishing within 1/2 miles of McNeil Falls to minimize encounters between

anglers and habituated bears.

1980: In 1980 ANILCA changed the monument into a park and preserve. This constricted sport hunting to a narrow strip of land between the sanctuary and the park.

1983: In 1983 the permit drawing required an application fee of \$5.00.

1985: In 1985 the Board of Game closed bear hunting on state land between the Sanctuary and the Park to protect habituated bears travelling to and from McNeil Falls.

1987: In 1987 the application fee was increased to \$10.00, and user fee of \$40.00 was required of all permit winners.

1991: In 1991 a new standby system was begun, and the maximum number of visitors allowed in the campground at one time was limited to 15 to reduce crowding. In the spring of 1991 the legislature passed and the Governor signed Senate committee substitute for committee substitute for House Bill No. 306. This Bill, in part, expanded the McNeil River State Game Sanctuary by adding a parcel to the southeast including the mouth of the Kamishak River and a parcel to the north including a substantial portion of the mainstem of the Paint River. The Bill also contained the following statement of purpose.

"... The McNeil River State Game Sanctuary is established to

- (1) provide permanent protection for brown bear and other fish and wildlife populations and their habitats, so that these resources may be preserved for scientific, aesthetic, and educational purposes;
- (2) manage human use and activities in a way that is compatible with (1) of this subsection and to maintain and enhance the unique bear viewing opportunities in the McNeil River State Game Sanctuary established under AS 16.20.160;
- (3) provide opportunities that are compatible with (1) of this subsection for wildlife viewing, fisheries enhancement, fishing, for temporary safe anchorage, and for other activities."

The same legislation contained a clause which set the effective date (for expansion of the Sanctuary) as the date on which the Commissioner of the Alaska Department of Fish and Game declared the Paint River fish ladder to be in operation.

In the fall of 1991 the Board of Game directed the Alaska Department of Fish and Game to create a citizen's advisory group that would make recommendations on sanctuary and refuge management.

1992: Effective June 1, 1992 (first application in the 1993 season) the 10 person/day limit was extended to cover the period June 7 through August 25 thereby expanding the number of permit days from 560 to 800.

The citizen's advisory group mandated by the Board of Game was appointed by the Commissioner and met during 1992. The recommendations of the group were forwarded to the Commissioner.

1993: The Commissioner of the Alaska Department of Fish and Game declared the Paint River fish ladder to be in operation as of January 1, 1993. Therefore, all references to the Sanctuary in the years prior to January 1, 1993 are references to the original sanctaury. References to the Sanctuary after January 1, 1993 include the expansions to the south and to the north shown in Figure 2.

B. Information About Bears

A number of the bears which appear at the McNeil River falls in July are in the Sanctuary and feeding on Mikfik Creek sockeye salmon in the month of June.

To correctly interpret the information which is available on bears at the McNeil falls and at Mikfik Creek it is important to understand the categorization which is applied to them.

Starting from the largest possible group and working down to the level of the individual, the system works this way.

No one knows the number which represents all of the brown bears in the McNeil River State Game Sanctuary at any given time during the summer season. It is widely assumed to be greater than the number of bears which are identified. For example, in Table 1 for the year 1992 there was a total of 114 identified bears. In addition there were "x" number of unobserved or unidentified bears. The true total number of brown bears in the Sanctuary would have been 114 plus "x".

ADF&G staff at the Sanctuary believe they can - in the absence of any formal tagging or marking - recognize a certain number of individual bears with sufficient consistency to allow for a count. These counts are presented on an annual basis; and in the 1992 example the count was 114.

An initial sub-division of this "identified total" occurs with counts along age and sex lines. Continuing with the 1992 example in Table 1, the 114 bears are seen to be comprised of 32 cubs (young bears accompanying their mothers), 8 sub-adults (bears 5.5 years old or younger and not accompanying the mother) and 74 adults. Among the 82 adult and sub-adult bears, there were 41 males and 41 females (Table 2).

A further sub-division of this "identified total" may be among those which are assigned some "name" and those which are not. In the 1992 example and in Tables 4 and 5 it is seen that all of the adult and sub-adult brown bears in the "identified total" were assigned a "name". That has not been the case in any prior year. The naming can bring the categorization down to the level of the single individual.

Whether or not it was intended, the naming of bears at the McNeil River viewing area gained considerable significance in the public perception of the program. Many of the comments received during the Corps permit reevaluation process, in one fashion or another, referenced bears by name and seemed to make it clear that knowledge of its name caused the viewer to attach some additional measure of importance to the individual animal.

Table 1	AGE COMPOSITION OF IDENTIFIED BROWN BEARS AT McNEIL SANCTUARY															
	1980	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Total identified cubs	12	14	16	12	17	28	6	30	31	42	34	30	32	24		
Total identified sub-adults	10	15	15	14	13	12	14	15	17	9	10	10	8	12		
Total identified adults	38	44	36	44	47	55	56	61	61	75	69	68	74	78		
Total identified bears	60	73	67	70	77	95	96	106	109	126	113	108	114	114		

Table 2	SEX RATIOS OF IDENTIFIED ADULT AND SUB-ADULT BROWN BEARS AT McNEIL SANCTUARY															
	1980	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Total identified females (adult + sub-adult)	20	27	27	31	33	30	32	34	36	37	37	33	41	38		
Total identified males (adult + sub-adult)	23	27	21	26	27	37	38	42	42	47	42	45	41	52		
Identified sub-adults of unknown gender	4	5	3	1	0	0	0	0	0	0	0	0	0	0		
Total identified bears (adult + sub-adult)	47	59	51	58	60	67	70	76	78	84	79	78	82	90		

Table 3	NUMBERS OF IDENTIFIED BROWN BEARS AT MIKFIK CREEK									
	1985	86	87	88	89	90	91	92	93	
Identified adult and sub-adult brown bears (cubs not included)	14	19	28	18	24	18	30	29	43*	
[* = with cubs included]										

It should be noted there is some unmeasured element of uncertainty associated with this annual tabulation of bears in the absence of the tags or similar unequivocal identifiers.

There is more than one individual involved in the "count", and the accuracy of the count depends on each of those individuals correctly recognizing as distinct the same physical characteristics and behaviors.

Therefore, it is important to understand what the history of these named bears has been. It should also be noted that the number of named bears can change in, at least, three ways: (1) the named bear can cease to appear at the viewing area, (2) new bears can be given names or (3) bears incorrectly identified (it may not be possible to define identifying marks on two similar bears) can be given a new name.

The naming of the bears is essentially only of use at the viewing area. In most cases identification of the live bear is not possible outside of the context of the Sanctuary, and identification of the carcass generally not possible at all.

Table 4

NAMED MALE BROWN BEARS AT McNEIL SANCTUARY

(P = present and -- = absent)

NAME	1980	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Patches	P	P	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Siedelman	P	P	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Harpo	P	P	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Chico	P	P	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Tim	P	P	P	P	P	P	P	P	-----	-----	-----	-----	-----	-----	-----	-----
Romeo	P	P	P	P	P	P	P	P	P	-----	-----	-----	-----	-----	-----	-----
Patchbutt	P	P	P	P	P	P	P	P	P	P	P	-----	-----	-----	-----	-----
Groucho	P	P	P	P	P	P	P	P	P	P	P	P	-----	-----	-----	-----
Flashman	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Rusty	P	P	P	P	P	P	P	P	P	P	P	P	P	P	--	--
Dismay	P	P	P	P	P	P	P	P	P	P	P	P	P	P	--	--
RC	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
White Claws	P	--	P	P	P	P	P	-----	-----	-----	-----	-----	-----	-----	-----	-----
Sterling	P	P	P	-----	-----	-----	P	P	P	P	P	P	P	P	P	P
(1) Monkey Face																
(Mindy)		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Whippet		P	P	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Earl			P	P	P	P	P	P	P	P	P	P	P	P	P	P
Scarface			P	P	P	P	P	P	P	P	P	P	-----	-----	-----	-----
Wierd				P	P	P	P	P	P	P	P	P	P	P	P	P
Rex				P	P	P	P	P	P	P	-----	-----	-----	-----	-----	-----
Chaser					P	P	P	--	P	-----	-----	-----	-----	-----	-----	-----
Dallhart					P	P	P	P	P	P	P	P	--	P	-----	-----
Dallas						P	P	P	P	P	P	P	-----	-----	-----	-----
LDMF						P	P	P	P	P	--	P	P	P	-----	-----
Luigi						P	P	P	P	P	P	P	P	P	--	--
Harley						P	P	P	P	P	P	P	P	P	P	P
Dark							P	P	P	-----	-----	-----	-----	-----	-----	-----
Tubenose							P	P	P	P	P	P	P	P	P	P
Geek							P	P	P	P	P	P	P	P	P	P
Waldo							P	P	P	P	P	P	P	P	P	P
Collins								P	P	P	--	P	-----	-----	-----	-----
Bunky								P	P	P	P	P	P	P	P	P
Ramon									P	P	P	P	P	P	P	P
Ted									P	P	P	P	P	P	P	P
Scraper									P	P	P	P	P	P	P	P
Cecil									P	P	P	P	P	P	P	P
Didgit									P	P	-----	-----	-----	-----	-----	-----
PH									P	P	P	P	P	P	P	P
Custer									P	P	P	P	P	P	P	P
Fritts										P	P	P	P	P	P	P
Goggles										P	P	P	P	P	P	P
McDougall										P	P	P	P	P	P	P
Luther										P	P	P	P	P	P	P
Dave													P	P	P	P
Woofie													P	P	P	P
Creek Bear													P	P	P	P
Motley													P	P	P	P
Crude													P	P	P	P
Daryl													P	P	P	P
Big Gimp													P	--	-----	-----
Sisson													P	P	P	P
Mr. B													P	--	-----	-----
Hechtel													P	P	P	P
Jones (Fido)													P	--	-----	-----
#1													P	--	-----	-----
Rover													P	P	P	P
Spot													P	P	P	P
Mr. Bad													P	--	-----	-----
Elton													P	--	-----	-----
Otto														P	P	P
Barnes														P	P	P
Ivan														P	P	P
Zapus														P	P	P
T.J.														P	P	P
L.B.J.														P	P	P
Shideler														P	P	P
Young Rusty														P	P	P
Monkey Face														P	P	P
Young White Claws														P	P	P
Joe														P	P	P
Tyson														P	P	P
Tear														P	P	P
Boris														P	P	P
False Sterling														P	P	P
Shed Ted														P	P	P
J.D.														P	P	P
Jolsen														P	P	P
Fuzzy														P	P	P
(2) Named Male Bears	12	15	12	15	14	20	25	31	31	34	29	30	41	52		

- (1) = The two bears, Monkey Face and Mindy, were only recognized as being the same bear in retrospect.
- (2) = For the years 1980 through 1991 the lists above are partial lists. They include only named bears which were seen two or more years excluding adolescents. They do not include bears which are given different names each year or bears which are recognized as an individual only one year. The only complete lists of individually named bears are those for 1992 and 1993.(ADF&G)

Table 5

NAMED FEMALE BROWN BEARS AT McNEIL SANCTUARY

(P = present and -- = absent)

NAME	1980	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Big Mamma																
Jeanie	P	P														
Slack Jaw	P	P														
Waif	P	P														
Red Collar	P	P	P	P	P	P										
Reggie	P	P	P	P	P	P	P									
Goldie	P	P	P	P	P	P	P	P	P							
Lady Bird	P	P	P	P	P	P	P	P	P	P	P					
Spooky	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Lanky	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	--
White	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Ms. Mouse	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	--
Nanou			P	P	--	P										
Holderman			P	P	P											
Patchette			P	P	P	P	P	P								
Tiny			P	P	P	P	P	P	P	P						
Teeny			P	P	P	P	P	P	P	P	P					
Rolli			P	P	P	P	P	P	P	P	P	P	P	P	P	P
Melody			P	P	P	P	P	P	P	P	P	P	P	P	P	--
Duggie				P	P	P	P	P	--	P	P	P	P	P	P	P
McBride					P	P	P	P	P							
Teddy					P	P	P	P	P	P	P	P	P	P	P	P
Fossey						P	P	P	P	P	P	P	P	P	P	P
Zarimbuck							P	P	P	P	P	P	P	P	P	--
Anita							P	P	P	P	P	P	P	--	--	--
Norma Jean							P	P	P	P	P	P	--	--	P	
Helen								P	P	P	P	P	P	P	--	--
Billington									P	P	P	P				
Ida									P	P	P	P	P	--	--	--
Alice									P	P	P	P	P	P	--	--
Manny										P	P	P	P	P	P	P
White Claws										P	P	--	P	--	--	--
Winslow										P	P	P	P	P	P	P
Snobear										P	P	P	P	P	P	P
Regina											P	P	P	P	P	P
Marilee											P	P	P	--	--	--
Jennifer											P	P	P	P	P	P
Kutzie														P	P	P
Melba														P	P	P
Carmella														P	P	P
Willie														P	P	P
Weener														P	P	P
Raven														P	--	--
June														P	P	P
Karen														P	--	--
McB														P	P	P
Molly														P	P	P
Jean														P	P	P
Vivian														P	P	P
Holdermann														P	P	P
Barni														P	P	P
Monroe														P	P	P
Greybear														P	--	--
Judy														P	--	--
Shedback														P	P	P
Hazel														P	P	P
Schultz														P	P	P
Unk F														P	--	--
Unk F														P	--	--
Amanda															P	P
Kimberlye															P	P
Kowen															P	P
Shed Butt															P	P
Hardesty															P	P
Little Gimp															P	P
Jake															P	P
Unk F															P	P
Unk F															P	P

(1) Named Female Bears 11 11 15 16 17 17 19 19 20 23 25 20 41 38

(1) = For the years 1980 through 1991 the lists above are partial lists. They include only named bears which were seen two or more years excluding adolescents. They do not include bears which are given different names each year or bears which are recognized as an individual only one year. The only complete lists of individually named bears are those for 1992 and 1993.(ADF&G)

C. Annual Bear Viewing Program

The principal bear-viewing area in the Sanctuary is at the falls in the McNeil River where a pad overlooking the falls has been constructed for the viewers. The development of the Mikfik Creek area as a seasonally earlier and secondary viewing area is a relatively recent occurrence. Because the feeding pattern of the bears at Mikfik Creek is somewhat more dispersed than at McNeil, the viewing experience is somewhat less centralized. In addition, the June viewing at Mikfik Creek has not been limited by the lottery permit system which covers the July and August viewing at McNeil and is detailed in Table 7.

One of the measures used by ADF&G to assess each year's program at the Sanctuary is bear-use days. This is the summation of the number of identified bears which visit the falls each day for the entire visitor season, i.e. 10 different bears each day for 60 days would equal 600 bear-use days. The method requires the correct identification and counting of the individual bears on a daily basis and an estimate for days when sanctuary staff do not visit the falls. The results of this method of assessment are shown in Table 6.

Table 6		ESTIMATED ANNUAL BEAR-USE DAYS AT McNEIL RIVER AND MIKFIK CREEK	
	McNeil River	Mikfik Creek	
1980	Preliminary	No Counts	
1981	Preliminary	No Counts	
1982	Preliminary	No Counts	
1983	Preliminary	No Counts	
1984	1,208	No Counts	
1985	1,518	159	
1986	1,661	190	
1987	1,720	230	
1988	1,545	231	
1989	1,880	230	
1990	1,627	518	
1991	1,388	591	
1992	1,507	499	
1993	1,215	256	
No Counts = This type of information was not gathered for Mikfik Creek until 1985.			

Table 7

ANNUAL McNEIL SANCTUARY VISITOR/PERMIT INFORMATION

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
(1) Number of permit applicants	532	397	485	625	992	832	806	1,757	1,094	1,306	1,481	1,818	1,672	2,150
Permit season opens	7/1	7/1	7/1	7/1	7/1	7/1	7/1	7/1	7/1	7/1	7/1	7/1	7/1	6/7
Permit season closes	8/25	8/25	8/25	8/25	8/25	8/25	8/25	8/25	8/25	8/25	8/25	8/25	8/25	8/25
Number of permit season days	56	56	56	56	56	56	56	56	56	56	56	56	56	80
(2) Number of available permits	(140) 131	(140) 131	(140) 131	(140) 131	(140) 131	(140) 131	(140) 131	(140) 131	(140) 131	(140) 131	(140) 131	(140) 131	(140) 131	(200) 185
Number of permits awarded	NC	NC	NC	NC	NC	NC	NC	NC	118	125	130	128	125	185
(3) Number of permit-days available	(560) 524	(560) 524	(560) 524	(560) 524	(560) 524	(560) 524	(560) 524	(560) 524	(560) 524	(560) 524	(560) 524	(560) 524	(560) 524	(800) 740
Number of permit-days used	356	434	420	454	377	449	430	473	498	488	524	526	478	709
(4) Number of standby-days available	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Number of standby-days used	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

NC = Not Compiled. The raw information probably exists, but it has not been compiled.

(1) = A permit entitles one person to visit the brown bear viewing pad at McNeil River falls for four consecutive days.

(2) = The 56 day permit season divided by the 4 consecutive days each permit holder is entitled to take one of the ten daily spots on the brown bear viewing pad at the McNeil River falls means there are 14 permit periods in the permit season. For each of those 14 periods 10 permits (a total of 140 permits) are issued. Of the 140 permits 131 permits are available to the general public through the lottery system. The remaining 9 permits are held by ADF&G to accommodate special scientific/educational requests.

In 1993 the permit period was expanded to 20 permit periods for a total of 200 to be issued. Of the 200 permits 185 are available to the general public through the lottery system. The remaining 15 permits are held by ADF&G to accommodate special scientific/educational requests.

(3) = By virtue of the system described in footnote (2) there are a total of 560 permit days available, 524 for the general public and 36 for special scientific/educational use.

In 1993 because of the permit period expansion noted in footnote (2) there were a total of 800 permit days, 740 for the general public and 60 for special scientific/educational use.

(4) = Some permit holders will not arrive, and some who do will choose not use every one of their designated 4 days at the viewing pad. Both situations create the opportunity for someone on standby to visit the viewing pad for a day.

D. 1993 (03/01/93 - 02/28/94) Update

The summer of 1993 saw the first implementation of a revision in the permit system in which the 10 person/day limit was extended to cover the period June 7 through August 25 thereby expanding the number of permit days from 560 to 800.

It should be noted that during this period ADF&G staff apparently conducted a review of the data upon which bear-use days had been calculated since at least 1985. The result was a downward adjustment in the annual estimates of bear-use days at McNeil Falls which averaged -446 bear-use days/year (-22%) for each of the years 1985 through 1992. The new figures are presented in Table 6.

In September 1993 ADF&G promulgated the McNeil River State Game Sanctuary and Refuge Draft Operational Management Plan. "This management plan provides detailed guidelines in accordance with the statutes of the McNeil River State Game Sanctuary and Refuge ..., the Commissioner's Title 16 permitting and other authorities, the authorities of the Boards of Fisheries and Game, and sanctuary access regulations ..., and hunting and fishing regulations."

"... Because of the diverse authorities of the Boards and Commissioner, this management plan will be implemented in several ways.

- 1) Guidelines that require Board of Game approval (primarily sanctuary access, all hunting regulations, and use of off-road vehicles for hunting) will be submitted as proposals by the Commissioner, after coordinated review by the appropriate resource management divisions.
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- 4) Guidelines that are within the authority of the Commissioner (e.g., wildlife research and management activities, fish stocking permits, some salmon escapement goals) will be implemented according to the management plan (and pertinent appendices) after the management plan

is reviewed by the Boards and adopted by the Commissioner."

This draft plan was submitted to the Board of Game at its fall 1993 meeting.

The Alaska Department of Fish and Game's Habitat and Restoration Division is developing strategic management plans for all sanctuaries, refuges, and critical habitat areas. It intends to begin the strategic planning process for the McNeil River sanctuary and refuge when salmon have become established in the Paint River and initial changes in bear distribution and abundance are documented, perhaps six to ten years at a minimum.

For well over a year the Cook Inlet Aquaculture Association has been attempting to determine what degree of statistical significance ADF&G Division of Wildlife Conservation places on the bear-use day numbers which it annually reports and which it uses as a measure of the viewing program's seasonal success. In response to the most recent such inquiry (December 1993) the Division stated, "Regarding comparison of bear use day totals and their statistical analysis, the Division made a presentation at the fall 1993 Board of Game meeting describing methodology developed by staff to enumerate bears at the falls such that the data could be statistically compared on an annual basis. The primary benefits of this method are that it is standardized, all staff can conduct the counts, and it is statistically valid. The statistical method to be used is called the combined Shewhart-Cusum Quality Control scheme.

"Sanctuary staff will collect both data sets during the season. The bear use day method will continue to be used until 1997, when we will have a new data set large enough to be statistically valid."

CIAA has interpreted this response to mean the existing bear use day record does not have any statistical validity in the measurement of year-to-year variability and has asked for confirmation of that interpretation. That confirmation has not been received at this writing.

During the past year there was also a new development concerning the naming of bears. In a December 8, 1993 memorandum from the Director of the Division of Wildlife Conservation to the Regional Supervisor of Region II (copied to the Board of Game, the Commissioner and the Director of the Commercial Fisheries Management and Development Division) the Director said, "If there was a single point of substantial agreement among a majority of the board members, it was that naming of individual bears by department staff is at the very

root of the hunting controversy and should not be continued in the future. Allowing staff to name bears and promote public recognition of and attachment to individual animals within this dynamic wild population has precipitated and continues to fuel the controversy. I do not believe any member of this department should ever again be placed in the position of having to explain to the Board of Game why this professional resource management agency allowed this to occur, placing management staff and members of the board in a position of having to discuss the wisdom and feasibility of trying to protect individual animals rather than to manage populations and use opportunities.

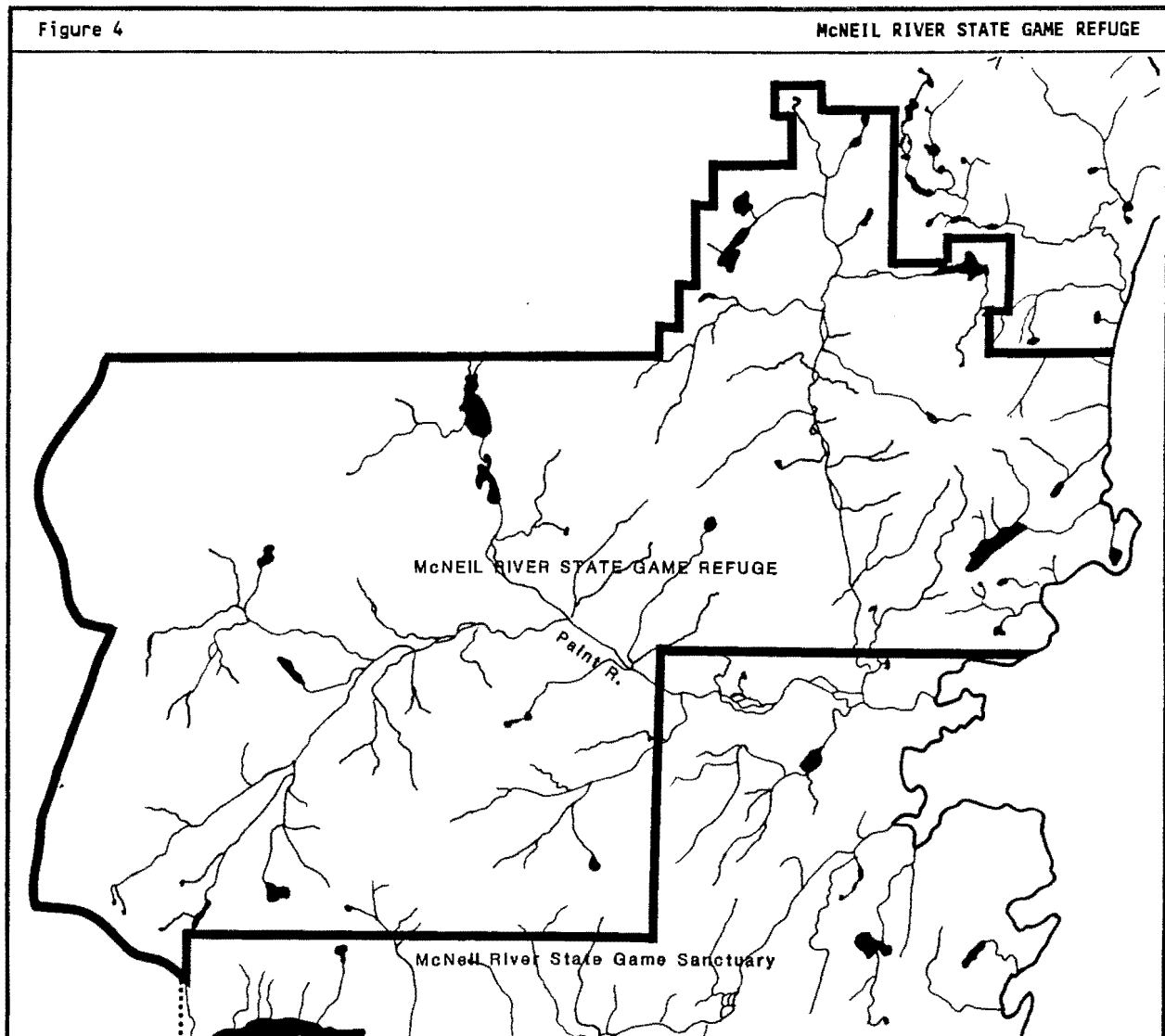
"... For these reasons, department staff responsible for interpretation, orientation and conduct of visitor activities in the McNeil Sanctuary will refrain from fostering anthropomorphism among the public by naming individual bears from this point forward.

"... If approved research requires identification of individuals, study bears will be identified by numbers/letters similar to other studies conducted by the department. Even if animals must be assigned descriptive names by department staff to facilitate approved research, such names will not be used when dealing with public visitors to the sanctuary or other members of the public."

3. McNEIL RIVER STATE GAME REFUGE

A. History

In the spring of 1991 the legislature passed and the Governor signed Senate committee substitute for committee substitute for House Bill No. 306. This Bill, in part, defined for the first time the boundaries of an area adjacent to the northern boundary of the McNeil River State Game Sanctuary which would



be called the McNeil River State Game Refuge. The Bill also contained the following statement of purpose.

"... The McNeil River State Game Refuge is established to

- (1) provide permanent protection for brown bear and other fish and wildlife populations and their habitats, so that these resources may be preserved for scientific, aesthetic, and educational purposes;
- (2) manage human use and activities in a way that is compatible with (1) of this subsection and to maintain and enhance the unique bear viewing opportunities in the McNeil River State Game Sanctuary established under AS 16.20.160;
- (3) provide opportunities that are compatible with (1) of this subsection for wildlife viewing, fisheries enhancement, fishing, hunting, and trapping, for temporary safe anchorage, and for other activities."

The same legislation contained a clause which set the effective date (for establishment of the Refuge) as the date on which the Commissioner of the Alaska Department of Fish and Game declared the Paint River fish ladder to be in operation. The Commissioner declared the Paint River fish ladder to be in operation as of January 1, 1993.

This area has not previously had a widely accepted identity. As a practical matter Uniform Coding Unit 09A-0301 (see Figure 6 and Table 8) is coincidental with a major portion of the new Refuge. It is also worthy of note that the Refuge encompasses the balance of the Paint River watershed not already included in the Sanctuary expansion as well as Chenik Lake and its drainage.

The Commissioner of the Alaska Department of Fish and Game requested that the Commissioner of the Alaska Department of Natural Resources close the Refuge to mineral entry. At this writing that closure has not been instituted.

B. 1993 (03/01/93 - 02/28/94) Update

In September 1993 ADF&G promulgated the McNeil River State Game Sanctuary and Refuge Draft Operational Management Plan. "This management plan provides detailed guidelines in accordance with the statutes of the McNeil River State Game Sanctuary and Refuge ..., the Commissioner's Title 16 permitting and other authorities, the authorities of the Boards of Fisheries and Game, and sanctuary access regulations ..., and hunting and fishing regulations."

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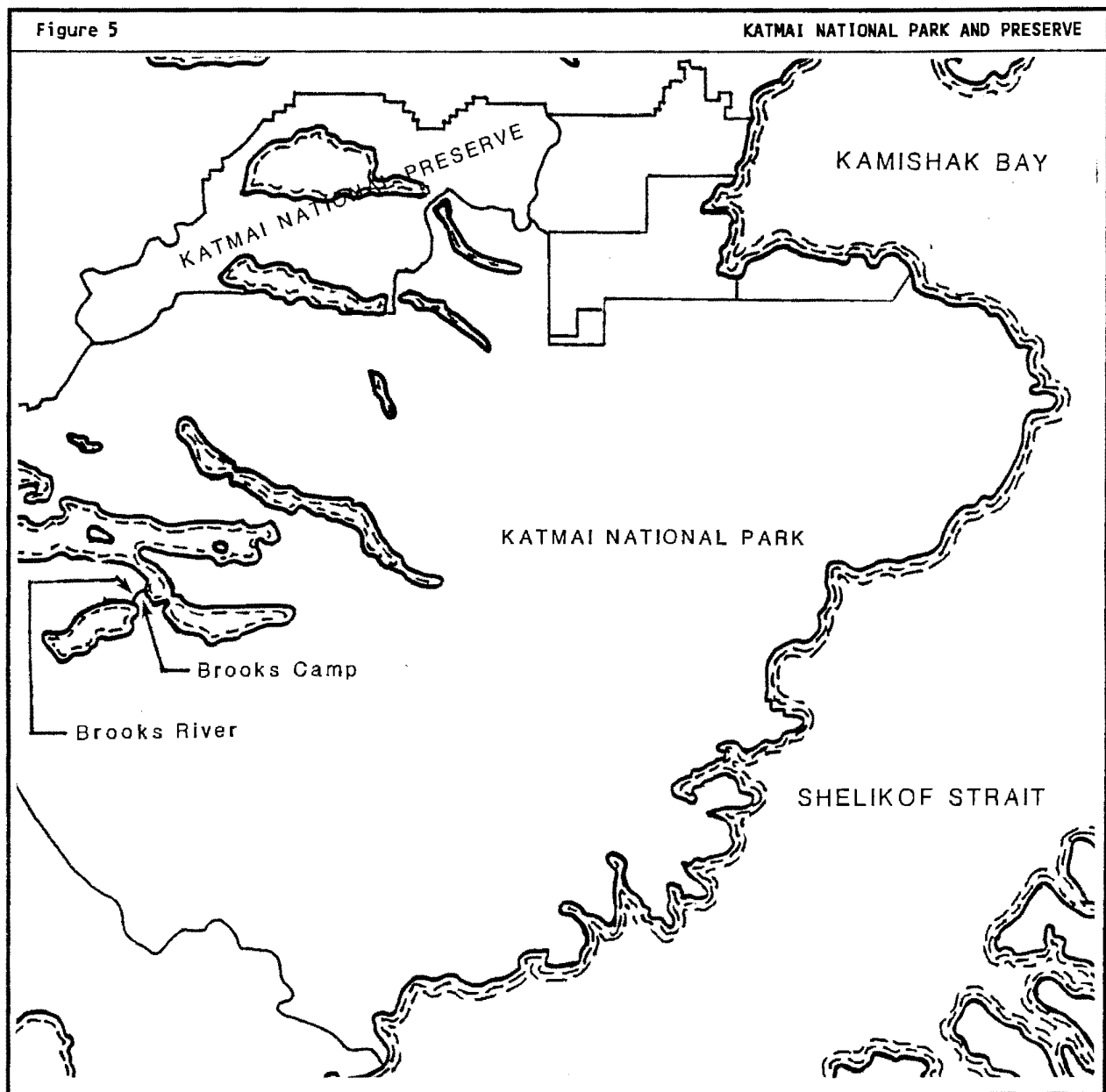
This draft plan was submitted to the Board of Game at its fall 1993 meeting.

The Alaska Department of Fish and Game's Habitat and Restoration Division is developing strategic management plans for all sanctuaries, refuges, and critical habitat areas. It intends to begin the strategic planning process for the McNeil River sanctuary and refuge when salmon have become established in the Paint River and initial changes in bear distribution and abundance are documented, perhaps six to ten years at a minimum.

4. KATMAI NATIONAL PARK AND PRESERVE

A. Background

[The preliminary results from two studies which are mentioned in the next section will provide new and updated background information. They will be supplied by the National Park Service in approximately one month and will be submitted as a supplement to this report. This supplemental submission will not change the recommendations in this report.]



B. 1993 (03/01/93 - 02/28/94) Update

The group received no document similar to the "Summary - Bear Management Incidents - Brooks Camp - Katmai National Park - 1992" which was reviewed last year; however, in a presentation at the February 25, 1994 meeting the National Park Service presented information on an ongoing study and on a survey which the National Park Service are conducting cooperatively with the Alaska Department of Fish and Game and the National Biological Survey. As mentioned in the prior section preliminary status reports on these two efforts will be available in approximately one month.

A coastal brown bear study involving the use of radio collars on brown bears - adult females and cubs - began following the oil spill. Fifty adult female bears have been collared in the coastal area around Hallo Bay and followed for several years. It is expected they will be monitored for at least two more years. Some of these bears have not moved much. When there has been movement, it has generally been to the south rather than toward McNeil River. The most notable movement was a single bear which moved approximately 100 miles to the south to the vicinity of Becharof Lake. None of these collared bears have been identified at McNeil River. As an adjunct to the research project 15 brown bear cubs were collared in 1993 to check the effectiveness of a new collar type and to examine the timing and pattern of cub dispersal. Some collars were lost very quickly, and some cubs remained with the sow; so only limited data was acquired this year.

Movement of brown bears between McNeil River and the Katmai National Preserve to the west may be more likely. Aerial surveys were flown in the Preserve in late May of 1993. One survey counted 39 bears and the other 46. Previous surveys at Black Lake suggest in the terrain of the Preserve 25% to 35% of the bears present would be seen. Application of this percentage would suggest a total population in the Preserve (1,000 square kilometers) would be between 120 and 168 brown bears. Brown bear hunting (under a guide/outfitter allocation system) is still allowed in the Preserve, and harvests in the last couple of years have been higher than usual.

Because it is the upper reaches of streams which are in the Preserve, salmon arrive later (mid-August) in the Preserve. In the coastal portion of the Park there are at least 12 streams which have salmon runs utilized by bears, and these runs combined provide all five species of anadromous salmon.

It was also noted coastal bear watching in the Park by visitors housed on boats in the Shelikof Strait is increasingly popular.

5. AREAWIDE ISSUES CONSIDERED

A. Introduction

There are a number of things which can occur in any given year outside the boundaries of the Sanctuary, Refuge, Park and Preserve which may be reflected inside those specially designated units. Since the object of this report is to identify changes inside these units and to the extent possible attribute a cause to each of those changes, it is both prudent and necessary that these areawide activities be examined.

B. Areawide Bear Mortalities

Little is known about the range of travel and the activities of bears which frequent the McNeil Sanctuary during the portion of the year when they are not at McNeil (approximately September through May). In one instance two bears tagged at Hallo Bay were later seen at McNeil River (see Figure 6).

ADF&G assumes none of these bears are year-around residents of the Sanctuary. Bears which fail to reappear at McNeil are assumed to be dead rather than to have dispersed after two consecutive years of absence.

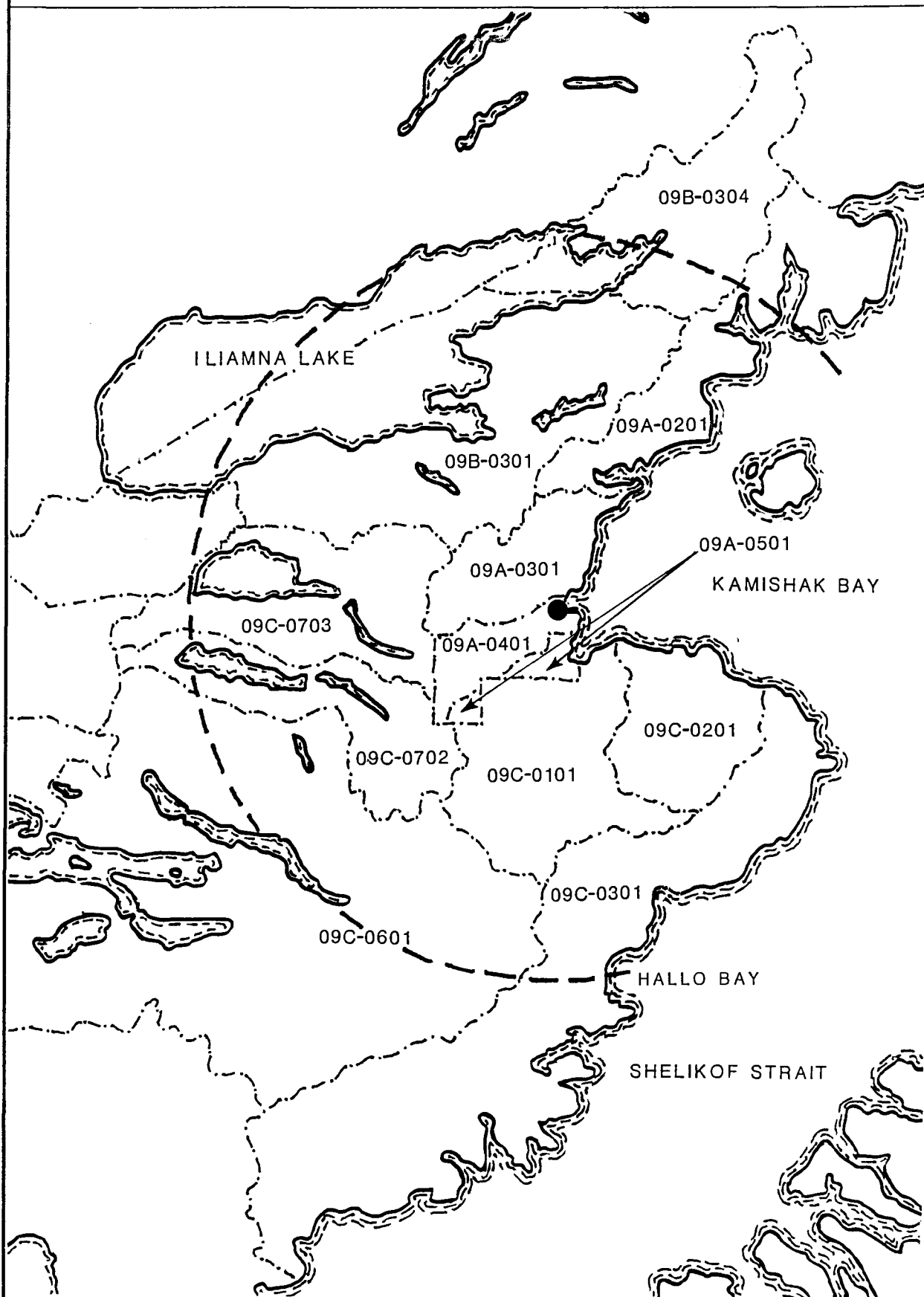
The bears which are identified at McNeil are generally not identifiable even by the McNeil staff - and certainly by the public - either alive or dead outside of the McNeil context.

Limited tagging data from the 1970's shows McNeil identified bears being killed at several locations well removed from the Sanctuary.

Because an issue has been made of the potential of the Paint River project to draw bears away from McNeil and to increase their vulnerability to being killed, it is worthwhile to look at what the history of area bear deaths and the McNeil program has been. Bear deaths are reported by Uniform Coding Units (UCU's) as shown in Figure 6 and Table 8.

Figure 6

ADF&G DIVISION OF WILDLIFE CONSERVATION UNIFORM CODING UNITS (UCU's)



These UCU's are referenced in Table 9 and all or some portion of each is within the demonstrated traveling distance of bears identified at the McNeil Sanctuary (Hallo Bay to McNeil River).

Table 8

DEATHS OF BROWN BEARS IN THE VICINITY OF McNEIL SANCTUARY

Unified Coding Unit	1972*	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
09A-0201	10	14	5	16	9	0	13	0	11	0	12	0	35	0	35	0	42	0	35	0	35	0	
09A-0301	--	3	1	0	3	0	2	0	6	0	9	0	4	0	2	0	7	3	10	0	5	0	
09A-0401	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	
09A-0501	0	2	3	4	5	0	1	0	3	0	6	0	5	0	7	0	0	0	0	0	0	0	
09B-0301	4	4	0	1	4	0	2	0	2	0	7	0	1	0	10	0	9	0	12	0	7	0	
09B-0304	8	2	4	2	1	0	2	0	11	0	3	0	7	0	6	0	4	0	9	0	10	0	
09C-0101	--	--	--	--	--	--	--	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
09C-0201	0	3	0	1	7	0	1	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	
09C-0301	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2	1	0	0	0	0	0	0	
09C-0601	0	0	0	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
09C-0702	9	1	3	2	4	0	8	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	
09C-0703	1	1	2	0	0	0	1	0	0	0	0	0	2	0	6	0	11	0	10	0	17	0	
Total	32	30	18	28	34	0	33	0	34	0	41	0	58	0	68	1	74	3	77	0	74	0	

* = Hunting seasons occur in two parts (a fall season and a spring season) which bridge calendar years. On this chart the year designation is that of the spring hunt since that summer is the period when the results of both the fall and spring hunts would be observed in the programs under consideration. Therefore, on this chart the following holds true:

1972 = the fall of 1971 and the spring of 1972

Table 9

AREA BROWN BEAR DEATHS AND NUMBER OF IDENTIFIED BROWN BEARS AT McNEIL SANCTUARY

(columns should be read vertically)

In ----->	1980	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
the total number of identified adult and sub-adult bears at McNeil was ----->	48	59	51	58	60	67	70	76	78	84	79	78	82					
Between the ----->	1980	81	82	83	84	85	86	87	88	89	90	91	92					
season and the ----->	1981	82	83	84	85	86	87	88	89	90	91	92	93					
bears killed in the area numbered ----->	0	41	0	58	0	68	1	74	3	77	0	74	0					
In ----->	1981	82	83	84	85	86	87	88	89	90	91	92	93					
the total number of identified adult and sub-adult bears at McNeil was ----->	59	51	58	60	67	70	76	78	84	79	78	82	90					
Between ----->	1980	81	82	83	84	85	86	87	88	89	90	91	92					
and ----->	1981	82	83	84	85	86	87	88	89	90	91	92	93					
the change in the number of identified adult and sub-adult bears at McNeil was>	+11	-8	+7	+2	+7	+3	+6	+2	+6	-5	-1	+4	+8					

C. Other Kamishak Bay Salmon Enhancement Projects

In addition to the Paint River project there are four other salmon enhancement projects in the Kamishak Bay drainage, and all of them involve sockeye salmon. Those projects are at Chenik Lake, Kirschner Lake, Bruin Lake and Ursus Lake.

Table 10 SUMMARY OF KAMISHAK BAY (other than Paint River) SALMON STOCKING HISTORY BY YEAR					
(expressed in millions of fry)					
	Chenik Lake Sockeye	Kirschner Lake Sockeye	Bruin Lake Sockeye	Ursus Lake Sockeye	Total Sockeye
1986	0.839	-.----	-.----	-.----	0.839
1987	1.000	0.867	-.----	-.----	1.867
1988	2.600	0.521	-.----	-.----	3.121
1989	3.500	0.250	-.----	-.----	3.750
1990	3.250	0.250	0.500	-.----	4.000
1991	2.200	0.250	0.250	-.----	2.700
1992	2.750	0.250	0.250	0.250	3.500
1993	1.400	0.250	0.250	0.250	2.150

(1) Chenik Lake

Chenik Lake was historically an excellent sockeye salmon producer prior to the 1940's when annual runs approached 150,000 fish. Since that time, however, sockeye salmon runs declined dramatically, forcing complete closure of the Chenik area fishery beginning in 1952. By the mid-70's the annual return to this system was less than 500 fish.

In 1978 ADF&G initiated a program to re-establish the sockeye salmon returns and subsequently increase commercial fishing opportunities in the Kamishak Bay area. Sockeye salmon fry from Crooked Creek Hatchery have been annually stocked in Chenik Lake since that time, and a fish pass was developed at the intertidal mouth of Chenik Creek, alleviating a partial migrational barrier. Since 1987, lake enrichment has occurred through the application of liquid fertilizer, but not on an annual basis.

Increased escapements in the early 1980's enhanced subsequent production, and the Chenik area was re-opened to commercial fishing. Recent returns have produced nearly 50% of the total Lower Cook Inlet commercial sockeye salmon harvest, approaching the historical record high runs of the 1930's.

(2) Kirschner Lake

Kirschner Lake has been stocked with sockeye salmon annually since 1987. However, since the only connection to saltwater is over a substantial waterfall which is impassable for salmon there is no real relevance for the discussion of bear/salmon interaction. The entire return to Kirschner Lake is harvested in saltwater. There is no freshwater escapement to serve as food or an attractant to bears.

(3) Bruin Lake

Bruin Lake has been stocked with sockeye salmon fry since 1990. Bruin Lake is on the north side of Bruin Bay and drains into the Bay. There have not yet been adult returns to this project; the first are anticipated in 1993. Returns, when they do occur, will be harvested primarily in sub-districts 249-70 and 249-75 (see figure 7).

(4) Ursus Lake

Ursus Lake is located on the south side of Ursus Cove and drains into the Cove, and it was stocked for the first time in 1992. There have, therefore, been no adult returns to this project; however, when they do occur, the harvest would be expected to occur primarily in sub-district 249-80 (see Figure 7).

D. Other Kamishak Bay Salmon Production

There are numerous stream systems which feed into Kamishak Bay, and the salmon returns to these streams form the basis of both the commercial fisheries and the salmon feeding opportunities for brown bears in Kamishak Bay.

In examining the history of salmon runs in these systems it is very important to recognize the only one of these systems on which a weir is installed to actually count the returning fish is Chenik Creek. That weir began operation in 1989; was not operated in 1990 when ground surveys were used; and resumed operation in 1991.

Table 11

SALMON ESCAPEMENT ESTIMATES IN KAMISHAK BAY

	(numbers presented in thousands of adults)(1)													
	1980	81	82	83	84	85	86	87	88	89	90	91	92	93
SOCKEYE (2)														
Mikfik L.	6.5	5.3	35.0	7.0	6.0	20.0	7.8	9.0	10.1	11.5	8.8	9.7	7.8	6.4
Chenik L.	3.5	2.5	8.0	11.0	13.0	3.5	7.0	10.0	9.0	12.0	17.0	10.2	9.3	4.0
Amakdedori C.	2.6	1.9	3.2	1.2	1.4	0.9	1.9	1.1	0.4	1.2	1.8	1.9	1.9	2.0
Kamishak R.	0.1	0.8	10.0	5.0	2.5	0.8	5.0	-.-	0.5	0.5	0.2	0.7	4.9	4.1
Douglas R.	0.4	0.2	4.2	0.5	0.0	0.0	0.2	0.1	0.0	0.6	0.6	-.-	0.2	-.-
Douglas Beach	0.5	0.3	1.6	0.4	0.1	0.0	0.2	-.-	0.1	0.2	-.-	0.1	0.0	-.-
PINK (2)														
Big											(3)	(3)	(3)	(3)
Kamishak R.	2.0	-.-	5.0	-.-	-.-	-.-	5.0	-.-	1.0	-.-	-.-	-.-	(4)	-.-
Little														
Kamishak R.	0.6	-.-	2.2	-.-	0.1	1.6	2.0	-.-	0.5	-.-	-.-	0.9	(4)	-.-
Amakdedori C.	3.8	1.5	6.3	0.2	-.-	1.0	6.0	0.4	1.0	2.0	0.1	0.7	3.2	1.7
Bruin Bay R.	400.0	95.0	75.0	4.0	110.0	3.5	1200.0	24.0	29.0	350.0	19.0	74.9	3.2	86.4
Sunday C.	5.2	14.2	12.0	4.7	12.0	11.4	109.0	29.7	18.0	103.0	2.8	20.9	2.9	57.8
Browns Peak C.	2.3	17.7	3.5	1.7	6.8	7.0	28.0	40.2	17.0	120.0	1.0	16.7	5.0	41.6
CHUM (2)														
Big														
Kamishak R.	10.0	11.0	25.0	25.0	19.0	6.0	24.0	12.0	15.0	30.0	2.5	8.7	4.5	9.1
Little														
Kamishak R.	13.0	6.0	18.0	25.0	12.0	4.5	17.0	18.0	13.0	12.0	7.9	8.4	7.1	6.3
McNeil R.	8.0	30.0	25.0	48.0	21.0	9.5	22.0	26.0	49.0	34.0	8.0	10.0	19.2	15.6
Bruin Bay	15.0	10.0	10.0	5.5	8.0	2.0	2.0	10.0	7.0	8.0	4.0	6.0	8.5	6.0
Ursus Cove	8.0	10.0	9.0	7.7	7.0	3.0	11.0	9.9	9.4	6.3	3.8	1.3	1.7	7.7
Cottonwood C.	4.2	9.0	7.0	8.3	6.5	3.0	11.0	17.0	16.0	8.0	4.3	7.7	6.1	12.0
Iniskin Bay	9.3	9.0	12.8	12.0	9.8	5.0	5.9	9.1	9.5	5.9	8.4	8.3	3.4	8.0

(1) = All of these numbers, except for Chenik since 1989, are estimations achieved by aerial surveys, a means which incorporates a large number of variables. These estimations are a matter of annual public record. However, extreme care should be taken when it comes to using these numbers for anything other than the immediate management needs of the fishery manager, who is usually the one making the observation and estimation.

Some of the more significant variables which need to be factored into the use of these numbers are; (1) the historic record represents estimated counts by several individuals, (2) the numbers do not represent total run strength, (3) the counts can be significantly affected by both the weather and water conditions on the day the count is made as well as by physical characteristics of the system itself, and (4) what the number represents varies dramatically depending upon which phase of the annual run build-up, peak and decline is observed.

The estimate which is reported probably does not represent either a maximum or a minimum. For any use of these numbers beyond the immediate needs of the fishery manager, the safest assumption is only that the number represents the presence of fish on the day (or days) of observation.

(2) = The estimated sockeye salmon escapements, pink salmon escapements for the years 1980 - 1989 and the chum salmon escapements are either peak aerial survey counts or adjusted aerial survey counts based on survey conditions and time of surveys.

(3) = The pink salmon escapement estimates for 1990, 1991, 1992 and 1993 are unexpanded live counts.

(4) = In sufficient survey data for escapement estimates.

E. Kamishak Bay Commercial Salmon Fisheries Management

The statutory obligation and primary mission of ADF&G's Division of Commercial Fisheries is the protection of wild stocks. All stocks identified in Table 12 fall into this category including the sockeye salmon run into Mikfik Creek and the chum salmon run into the McNeil River.

The primary concern is achieving this protection in the mixed-stock fishery which occurs in the Kamishak Bay district. One of the management tools which has been employed is the division of the Kamishak Bay District into eleven sub-districts (see Figure 7).

- 249-40 - Douglas River Subdistrict
- 249-45 - Kamishak River Subdistrict
- 249-50 - McNeil Cove Subdistrict
- 249-52 - Paint River Subdistrict
- 249-55 - Chenik Subdistrict
- 249-70 - Bruin Bay Subdistrict
- 249-75 - Bruin Bay Subdistrict (Kirschner sub-section)
- 249-78 - Rocky Cove Subdistrict
- 249-80 - Ursus Cove Subdistrict
- 249-83 - Cottonwood Bay Subdistrict
- 249-85 - Iniskin Bay Subdistrict

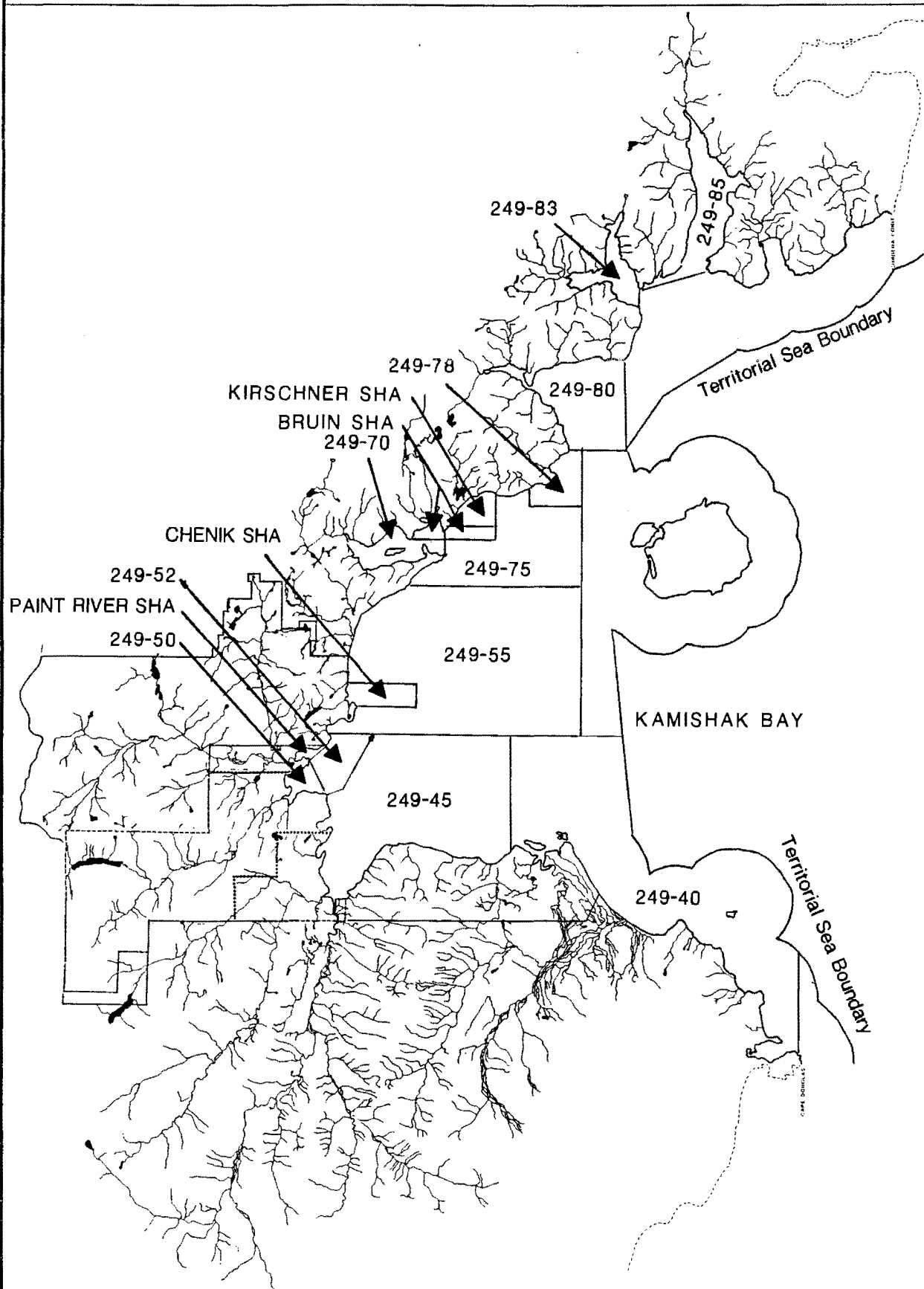
These sub-districts can be opened or closed individually or in combination to provide, on one hand, the most effective targetting of the commercial fleet to attain maximum harvest of surplus fish and, on the other hand, the wild stock protection necessary to assure adequate spawning escapements into the various stream systems. Tables 14 through 24 show the pattern of openings in these various subdistricts over the last thirteen years and demonstrate considerable year-to-year flexibility. It should be noted almost without exception the annual number of periods in which fishing can take place exceeds the number of periods in which fishing actually does take place due to such factors as weather and fish movement patterns.

When it is deemed prudent, additional sub-districts can be created to refine the management; and this was done as recently as 1989 when the Paint River, Douglas, Kamishak and Bruin Bay (Kirschner sub-section) were established.

Within four of the sub-districts mentioned above (249-52 - Paint River Subdistrict, 249-55 - Chenik Subdistrict, 249-70 - Kirschner sub-section of the Bruin Bay Subdistrict and 249-75 - Bruin Bay Subdistrict) there has been a further sub-division to delineate four special harvest areas. These special

Figure 7

KAMISHAK BAY COMMERCIAL FISHING SUBDISTRICTS AND SPECIAL HARVEST AREAS (SHA's)



249-40 Douglas River Subdistrict
 249-45 Kamishak River Subdistrict
 249-50 McNeil River Subdistrict
 249-52 Paint River Subdistrict
 249-55 Chenik Subdistrict
 249-70 Bruin Bay Subdistrict (Bruin Bay Section)

249-75 Bruin Bay Subdistrict (Kirschner Lake Section)
 249-78 Rocky Cove Subdistrict
 249-80 Ursus Cove Subdistrict
 249-83 Cottonwood Subdistrict
 249-85 Iniskin Bay Subdistrict

harvest areas are associated with salmon enhancement projects, and they provide the Cook Inlet Aquaculture Association with locations in which fish may be harvested at the mouth of the stream of origin for purposes of generating the revenue necessary to continue operation of the project.

Table 12		KAMISHAK BAY DISTRICT SALMON HARVESTS BY SUBDISTRICT													
		(numbers presented in thousands of adults)													
		1980	81	82	83	84	85	86	87	88	89	90	91	92	93
<u>SOCKEYE</u>															
249-40 and															
249-45		0.0	4.9	0.0	2.8	0.0	0.7	7.6	2.3	5.0	0.0	0.1	7.0	9.9	1.3
249-50		3.9	0.0	17.8	5.8	10.7	67.0	27.5	21.4	14.6	7.0	9.1	12.9	4.0	0.9
249-52		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
249-55		0.0	0.0	0.3	2.7	13.9	10.6	111.3	98.5	164.2	38.9	70.3	60.4	14.4	24.6
249-70 and															
249-75		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	14.5	55.9	40.5	39.7
Total Kamishak District		3.9	4.9	18.1	11.3	24.6	78.3	146.4	122.2	183.8	46.1	94.0	136.6	68.8	66.5
<u>PINK</u>															
249-70		100.6	51.9	13.3	0.3	125.2	0.0	349.7	1.2	5.0	202.8	0.4	45.1	1.9	0.1
249-78 and															
249-80		0.0	14.1	20.2	0.0	8.5	0.0	71.1	69.4	49.9	53.8	0.0	0.0	0.3	0.0
249-83 and															
249-85		0.1	0.0	0.4	0.3	0.4	0.0	0.2	53.8	1.3	0.0	0.0	0.0	0.0	0.0
Total Kamishak District		100.7	66.0	33.9	0.6	126.1	0.0	421.0	124.4	56.2	256.6	0.4	45.1	2.2	0.1
<u>CHUM</u>															
249-40		10.0	46.7	37.1	27.2	9.2	8.0	11.6	23.7	24.8	0.0	0.1	3.0	12.5	
249-45		2.8	8.6	9.2	23.9	16.2	0.1	0.1	24.6	26.7	0.0	T	0.7	1.5	0.0
249-50		6.3	11.6	32.6	67.9	12.0	0.0	13.7	32.9	104.0	0.1	0.1	0.1	2.0	0.4
249-70		11.0	1.7	1.3	2.6	5.9	0.0	5.4	0.1	2.8	4.4	0.1	2.6	0.8	
249-78 and															
249-80		0.3	1.5	13.5	0.0	3.7	0.0	22.1	17.2	20.7	3.4	0.0	0.0	2.7	0.0
249-83 and															
249-85		5.4	3.5	21.6	21.4	23.0	0.0	8.8	9.7	39.2	0.0	0.0	1.0	0.2	0.0
Total Kamishak District		35.8	73.6	115.3	143.0	70.0	8.1	61.7	108.2	218.2	7.9	0.3	7.4	19.7	0.4
249-40 - Douglas River Subdistrict															
249-45 - Kamishak River Subdistrict															
249-50 - McNeil Cove Subdistrict															
249-52 - Paint River Subdistrict															
249-55 - Chenik Subdistrict															
249-70 - Bruin Bay Subdistrict															
249-75 - Bruin Bay Subdistrict (Kirschner sub-section)															
249-78 - Rocky Cove Subdistrict															
249-80 - Ursus Cove Subdistrict															
249-83 - Cottonwood Bay Subdistrict															
249-85 - Iniskin Bay Subdistrict															

Table 13

ANNUAL COMMERCIAL SALMON HARVEST PERIODS IN DOUGLAS RIVER SUBDISTRICT 249-40

(H = a day in which there was an open fishing period)

DATE	June 00000000011111111122222222233 123456789012345678901234567890	July 00000000011111111122222222233 1234567890123456789012345678901	August 00000000011111111122222222233 1234567890123456789012345678901
(1) 1980	-----HH-HH--HH-HH--HH-HH--H	H-HH--HH-HH--HH-HH--HH-HH--HH-H	H--HH-----HHHHH-HHHHHHHH-----
(1) 1981	-----HHHHHHHH--HH-HH--HH	-HH--HH-HH--HH-HH--HH-HH--HH-HH	--HH-HH--HH-HH--HH-HH--HH-HH--H
(1) 1982	-----HH--HH-HH--HH	HH--HH-HH--HH-HH--HH-HH--HH	-HH-----HH--HH-HH--HHHHH--HH
(1) 1983	-----HHHHHHHHHHHH-HH--HH-H	H--HH-HH--HH-HH--HH-HH--HH	HH-HH--HH-HH--HH-HH--HH-HH--HH
(1) 1984	----HHHHHHHHHHHHHHHHHHHHHHHHHH	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHH	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
(1) 1985	-----H--HHHHHHHHHHHH--HH-HH--	HH-HH--HH-HH--HH-HH--HH-HH--HH	HH-----H--HHHHHHHHHHHHHHHHHH
(1) 1986	-HH-HH--HH-HHHHHHHHHH	-----HHHHHHHHHHHHHHHHHHHHHH	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
(1) 1987	HH-HHHHHHHHHHHHHHHHHHHHHHHHH	HHHHHHHHHHHHHHHHHHHHHHHHHHHH	-----H--HH-HHHHHHHHHHHHHHHHH
(1) 1988	HHH--HH-H-----HHHHHHHHH-H	H--H-HH--HH-HH--HH-HH--HH	-----HH-HH--HH-HH-HHHHHHHHHH
1989	HH--HH-HH-----	-----	-----
1990	H--HH-HH--HH-HH--HH-HH--HH-HH	-HH-HH--HH-----	-----HHHHH--HHHHH--HHHHH
1991	--HH-HH--HH-HH--HH-HH--HH-HH--	HH-HH-----	-----HHHHH--HHHHH--HHHHH
1992	HH-HH--HH-HH--HH-HH--HH-HH--HH	-HH--HH-HH--HH-HH--HH-HH--HH-HH	--HH-HH--HH-HH--HH-HH--HH-HH--H
1993	H-HH--HH-HH--HH-HH--HH-HH--HH	HH--HH-HH--HH-HH--HH-HH--HH-HH	-HH-HH--HH-HH--HH-HH--HH-HH--HH

(1) = Until 1989 what is now the Douglas Subdistrict existed as part of a larger combined Kamishak-Douglas Subdistrict. The open periods for this combined subdistrict are shown in this Table.

Table 14

ANNUAL COMMERCIAL SALMON HARVEST PERIODS IN KAMISHAK RIVER SUBDISTRICT 249-45

(H = a day in which there was an open fishing period)

DATE	June 00000000011111111122222222233 123456789012345678901234567890	July 00000000011111111122222222233 1234567890123456789012345678901	August 00000000011111111122222222233 1234567890123456789012345678901
(1) 1980			
thru			
1988			
1989	HH--HH-HH-----	-----	-----
1990	H--HH-HH--HH-HH--HH-HH--HH-HH	-HH-HH--HH-----	-----
1991	--HH-HH--HH-HH--HH-HH--HH-HH--	HH-HH-----	-----HHHHH--HHHHH--HHHHH
1992	HH-HH--HH-HH--HH-HH--HH-HH--HH	-HH--HH-HH--HH-HH--HH-HH--HH-HH	--HH-HH--HH-HH--HH-HH--HH-HH--H
1993	H-HH--HH-HH--HH-HH--HH-HH--HH	HH--HH-HH--HH-HH--HH-HH--HH-HH	-HH-HH--HH-HH--HH-HH--HH-HH--HH

(1) = Until 1989 what is now the Kamishak Subdistrict existed as part of a larger combined Kamishak-Douglas Subdistrict. The open periods for this combined subdistrict are shown in Table 14.

Table 15

ANNUAL COMMERCIAL SALMON HARVEST PERIODS IN McNEIL RIVER SUBDISTRICT 249-50

(H = a day in which there was an open fishing period)

DATE	June 00000000011111111122222222233 123456789012345678901234567890	July 00000000011111111122222222233 1234567890123456789012345678901	August 00000000011111111122222222233 1234567890123456789012345678901
(1) 1980	-----HH-HH--HH-HH--HH-HH--H	H-HH-HH--HH-HH--H-----	-----HHHHHHH-----
(1) 1981	-----HHHHHHHH--HH-H-----	-----H-HH-HHHHHHHHHHHHH	HHHHHHHHHHHHHHHHHHHHHHHHHHHH
(1) 1982	-----HHHHHHHHHHHHHH	HH--HH-HH--HH-HH-----HH-HH	-HH-HH--HH-HH--HH-HH--HH-HH--HH
(1) 1983	-----HHHHHHHHHHHHHH-HH--HH-H	H--HH-----H-HH--HHHHHHHHHHHH	HH-HH--HH-HH--HH-HH--HH-HH--HH
(1) 1984	----HHHHHHHHHHHHHHHHHHHHHHHHHH	HHHHHHHHHHHH-----	-----
(1) 1985	-----H--HHHHHHHHHHHH--HH-HH--	HH-HH--HH-HH--HH-HH--HH-----	HHHHHHHHHHHHHHHHHHHHHHHHHHHH
(1) 1986	-HH-HH--HH-HHHHHHHHHH-----HHH--	H-----HHHHHHHHHHHH	HHHHHHHHHHHHHHHHHHHHHHHHHHHH
(1) 1987	HH-HHHHHHHHHHHHHHHHHHHHHHHHH	HHHHHHHHHHHH-----H-HH--HH-HH	-----H--HH-HHHHHHHHHHHHHHHHH
(1) 1988	HHH--HH-H-----HHHHHH--HH-H	H-----H-HH--HH-HH--	HH-HH--HH-HH--HH-HH--HHHHHHHHHH
1989	HH--HH-----	-----	-----
1990	H--HH-H-----	-----	-----
1991	--HH-HH--HH-----HH-HH--HH-HH--	HH-HH-----	-----
1992	HH-HH--HH-HH--HH-HH--HH-HH--HH	-----	-----
1993	H-HH--HH-HH--HH-HH--HH-HH--HH	HH--HH-HH--HH-HH-----	-----

(1) = Until 1989 the McNeil River Subdistrict was larger than it is now and contained what is now the Paint River Subdistrict. The open periods for this larger subdistrict are shown in this table.

Table 19 ANNUAL COMMERCIAL SALMON HARVEST PERIODS IN BRUIN BAY SUBDISTRICT (KIRSCHNER sub-section) 249-75

(H = a day in which there was an open fishing period)

	June	July	August
DATE	00000000011111111122222222233 123456789012345678901234567890	00000000011111111122222222233 1234567890123456789012345678901	00000000011111111122222222233 1234567890123456789012345678901
(1) 1980			
thru			
1988			
1989	HH--HH-HH-----	-----HH--HHHHHHHH	HHHHHHHHHHHHHH--
1990	H--HH-HH--HH-HH--HH-HH--HHHHH--	-HHHHH--HHHHH--HHHHH--HHHHH--HH	HHH--HHHHH--HHHHH--HHHHH--HHHHH
1991	--HH-HH--HH-HH--HH-HH--HHHHH--	HHHHH--HHHHH--HHHHH--HHHHH--HHH	HH--HHHHHHHHHHHHHHHHHHHHHHHHHHH
1992	HH-HH--HH-HH--HH-HH--HH-HH--HH	-HH--HH-HH--HH-HH--HHHHH--HHHHH--	--HHHHH--HHHHH--HHHHH--HHHHH--H
1993	H-HH--HH-HH--HH-HH--HH-HH--HH--	HH--HH-HH--HH-HH--HH-HH--HH-HH--	-HH-HH--HH-HH--HH-HH--HH-HH--HH

(1) = Until 1989 the Bruin Bay Subdistrict was larger than it is now and contained what is now the Bruin Bay Subdistrict (Kirschner sub-section). The open periods for this larger sub-district are shown in Table 18.

Table 20 ANNUAL COMMERCIAL SALMON HARVEST PERIODS IN ROCKY COVE SUBDISTRICT 249-78

(H = a day in which there was an open fishing period)

	June	July	August
DATE	0000000001111111112222222223 123456789012345678901234567890	0000000001111111112222222223 1234567890123456789012345678901	0000000001111111112222222223 1234567890123456789012345678901
1980	-----	-----	-----HHHHHHHH-----
1981	-----	-----	-----HHHHHH--HH--HH--HH--HH--H
1982	-----	-----	-----H-----HH--HH--HH--HH--HH--HH
1983	-----	-----	-----
1984	-----	-----H-----	-----HHHH--HH--HH--HH--HH--HH--HH
1985	-----HHHHHHHHHH--HH--HH--	HH--HH--HH--HH--HH--HH--HH--HH--	HH--HH--HH--HH--HH--HH--HH--HH--
1986	-----HHHH--HH--HH--HH--HH--	-----HHHH--HH--HH--HH--HH--H	H--HH--HH--HH--HH--HH--HH--HH--
1987	HH--HHHHHHHHHHHHHHHHHHHHHHHHHH	HHHHHHHHHHHHHHHHHH--HH--HH--	-----H--HH--HHHHHHHHHHHHHHHHHHHH
1988	--HH--HH--HH--HH--HH--HH--HH--H	H-----HH-----HH-----	HH--HH--HH--HH--HH--HH--HHHHHHHHHH
1989	HH--HH--HH--	-----HHHHHHHH	HHHHHHHHHHHHHHHH
1990	--HH--HH--HH--HH--HHHH--HHHH--	--HHHH--HHHH--HHHH--HHHH--HH--	HHH--HHHH--HHHH--HHHH--HHHHHH--
1991	--HH--HH--HH--HH--HH--HH--HH--HH--	HH--HH--HH--HH--HH--HH--HH--HH--	HH--HH--HHHHHHHHHHHHHHHHHHHHHHHHHH
1992	HH--HH--HH--HH--HH--HH--HH--HH--	--HH--HH--HH--HH--HH--HH--HH--HH--	--HH--HH--HH--HH--HH--HH--HH--HH--H
1993	H--HH--HH--HH--HH--HH--HH--HH--	HH--HH--HH--HH--HH--HH--HH--HH--	--HH--HH--HH--HH--HH--HH--HH--HH--

Table 21 ANNUAL COMMERCIAL SALMON HARVEST PERIODS IN URSUS COVE SUBDISTRICT 249-80

(H = a day in which there was an open fishing period)

	June	July	August
DATE	00000000011111111122222222233 123456789012345678901234567890	00000000011111111122222222233 1234567890123456789012345678901	00000000011111111122222222233 1234567890123456789012345678901
1980	-----	-----	-----HHHHHHHH-----
1981	-----	-----H	-----HHHH-----HH-HH--HH-HH--H
1982	-----	-----	-----H-----HH--HH-HH--HH-HH--HH
1983	-----	-----	-----HH--H--HH-HH--HH-
1984	-----	-----	-----HHHH-HH--HH-HH--HH-HH--HH-HH
1985	-----HHHHHHHHHHHH--HH-HH--	HH-HH--HH-HH--HH-HH--HH-HH--HH-	HH--HH-HH--HH-HH--HH-HH--HH-HH--
1986	-----	-----HHHHHHHHHHHHHHHHHHHH	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
1987	-----	-----H-HH	-----H--HH--HHHHHHHHHHHHHHHHHHHH
1988	-HH--HH-HH--HH-HH--HH-HH--HH-H	H-----HH--HH-HH--	HH-HH-----HH--HH-HHHHHHHHHHHHH
1989	HH--HH-HH--	-----HHH-HHHHHHHH	HHHHHHHHHHHHHH-----
1990	H--HH-HH--HH-HH--HH-HH--HH-HH--	-HH-HH--HH-HH--HH-	-----
1991	--HH-HH--HH-HH--HH-HH--HH-HH--	HH-HH--HH-HH--HH-HH--HH-HH--HH-	HH--HH-HHHHHHHHHHHHHHHHHHHHHHHHH
1992	HH-HH--HH-HH--HH-HH--HH-HH--HH	HH--HH-HH--HH-HH--HH-HH--HH-HH--	--HH-HH--HH-HH--HH-HH--HH-HH--H
1993	H-HH--HH-HH--HH-HH--HH-HH--HH-	HH--HH-HH--HH-HH--HH-HH--HH-HH--	--HH-HH--HH-HH--HH-HH--HH-HH--H

Table 22		ANNUAL COMMERCIAL SALMON HARVEST PERIODS IN COTTONWOOD BAY SUBDISTRICT 249-83			
(H = a day in which there was an open fishing period)					
DATE	June 0000000001111111112222222223 123456789012345678901234567890	July 00000000011111111122222222233 1234567890123456789012345678901	August 00000000011111111122222222233 1234567890123456789012345678901		
1980	-----	-----	-----	HHHHHHHH	-----
1981	-----	-----	-----	HH	-----
1982	-----	-----	-----	H	-----HH-----
1983	-----	-----	-----	HH	-----HH-----
1984	-----	-----	-----	HH	-----HH-----
1985	-----HHHHHHHHHH--HH-HH--	HH-HH--HH-HH--HH-HH--HH-HH--HH-	HH-HH--HH-HH--HH-HH--HH-HH--HH-	HH-HH--HH-HH--HH-HH--HH-HH--HH-	HH-HH--HH-HH--HH-HH--HH-HH--HH-
1986	-----	-----	-----	H	-----HHHHHHHHHH
1987	-----	-----	-----	HHH	-----HHHHHHHH
1988	-HH--HH-HH--HH-HH--HH-HH--HH-H	H-----	HH-HH--HH-HH--HH-HH--HH-HH--HH-	HH-HH--HH-HH--HH-HH--HH-HH--HH-	HH-HH--HH-HH--HH-HH--HH-HH--HH-
1989	HH--HH-HH--	-----	-----	-----	-----
1990	H--HH-HH--HH-HH--HH-HH--HH-HH--	-HH-HH--HH-HH--HH-----	-----	-----	-----
1991	--HH-HH--HH-HH--HH-HH--HH-HH--	HH-HH--HH-HH--HH-HH--HH-HH--HH-	HH--HH-HH--HH-HH--HH-HH--HH-HH--	HH--HH-HH--HH-HH--HH-HH--HH-HH--	HH--HH-HH--HH-HH--HH-HH--HH-HH--
1992	HH-HH--HH-HH--HH-HH--HH-HH--HH	-HH--HH-HH--HH-HH--HH-HH--HH-HH	--HH-HH--HH-HH--HH-HH--HH-HH--H		
1993	H-HH--HH-HH--HH-HH--HH-HH--HH-	HH--HH-HH--HH-HH--HH-HH--HH-HH-	-HH-HH-----		

Table 23		ANNUAL COMMERCIAL SALMON HARVEST PERIODS IN INISKIN BAY SUBDISTRICT 249-85		
(H = a day in which there was an open fishing period)				
DATE	June 0000000001111111112222222223 123456789012345678901234567890	July 00000000011111111122222222233 1234567890123456789012345678901	August 000000000111111111222222222233 1234567890123456789012345678901	
1980	-----	-----	H--HH-HH--HH-HH--HHHHHHHH-----	
1981	-----	-----	--H-HH--HH-HH--HH-HH--HH-HH--H	
1982	-----	-----	---HH--HH-HH--HH-HH--HH-HH--HH	
1983	-----	-----	HH-HH-----HH-HH--HH-HH--HH--	
1984	-----	-----HH-HH--HH	---HHHH-HH--HH-HH--HH-HH--HH-HH	
1985	-----HHHHHHHHHH--HH-HH--	HH-HH--HH-HH--HH-HH--HH-HH--HH-	HH--HH-HH--HH-HH--HH-HH--HH-HH--	
1986	-----	-----	-----H--HH-HH--HHHHHHHH	
1987	-----	-----	-----HHHHHHHHHHHHHHHHHHHH	
1988	-HH--HH-HH--HH-HH--HH-HH--HH-H	H-----HH--	HH-HH--HH-HH--HH-HH--HHHHHHHHHH	
1989	HH--HH-HH--	-----	-----	
1990	H--HH-HH--HH-HH--HH-HH--HH-HH--	-HH-HH--HH-HH--HH-----	-----	
1991	--HH-HH--HH-HH--HH-HH--HH-HH--	HH-HH--HH-HH--HH-HH--HH-HH--HH-	HH--HH-HH--HH-HH--HH-HH--HH-HH--	
1992	HH-HH--HH-HH--HH-HH--HH-HH--HH	-HH--HH-HH--HH-HH--HH-HH--HH-HH	--HH-HH--HH-HH--HH-HH--HH-HH--H	
1993	H-HH--HH-HH--HH-HH--HH-HH--HH-	HH--HH-HH--HH-HH--HH-HH--HH-HH-	-HH-HH-----	

6. PAINT RIVER SALMON ENHANCEMENT PROJECT

A. History

Discussions about developing salmon runs to Paint River by either building a ladder or blasting the falls have been going on since the federal salmon management days prior to statehood. It was specifically identified in a statewide plan in 1975. ADF&G and CIAA began cooperative engineering and biological feasibility studies in 1978.

Test stockings of pink salmon were carried out in 1980 through 1982. The project was again described in the Cook Inlet Regional Salmon Enhancement Plan 1981-2000, which was published in 1982.

Stocking of sockeye salmon in some of the lakes of the system has been carried out since 1986.

Engineering and design work began in 1987. Funding was secured in 1990, and construction was initiated and completed in 1991.

Table 24		PAINT RIVER SALMON STOCKING HISTORY				
(expressed in millions of fry)						
	Sockeye	Chum	Pink	Coho	King	
1980	-.----	-.----	0.554	-.----	-.----	
1981	-.----	-.----	0.410	-.----	-.----	
1982	-.----	-.----	0.405	-.----	-.----	
1983	-.----	-.----	-.----	-.----	-.----	
1984	-.----	-.----	-.----	-.----	-.----	
1985	-.----	-.----	-.----	-.----	-.----	
1986	0.820	-.----	-.----	-.----	-.----	
1987	-.----	-.----	-.----	-.----	-.----	
1988	2.173	-.----	-.----	-.----	-.----	
1989	2.000	-.----	-.----	-.----	-.----	
1990	2.000	-.----	-.----	-.----	-.----	
1991	0.750	-.----	-.----	-.----	-.----	
1992	0.750	-.----	-.----	-.----	-.----	
1993	0.750	-.----	-.----	-.----	-.----	

The general pattern of annual operation for the Paint River fish ladder will call for it to be shut down (dewatered) during the winter months. This will be achieved by the insertion of stop logs near the upper end of the channel where water enters the structure.

In the spring the stop logs will be removed to allow water to move through the structure so that adult fish may move upstream.

All of the commercial fisheries in Kamishak Bay employ power purse seines.

Table 25	PAINT RIVER SALMON RETURN HISTORY				
(expressed in thousands of adults)					
	Sockeye	Chum	Pink	Coho	King
1980	-.----	-.----	-.----	-.----	-.----
1981	-.----	-.----	0.600	-.----	-.----
1982	-.----	-.----	4.700	-.----	-.----
1983	-.----	-.----	(1)	-.----	-.----
1984	-.----	-.----	-.----	-.----	-.----
1985	-.----	-.----	-.----	-.----	-.----
1986	-.----	-.----	-.----	-.----	-.----
1987	-.----	-.----	-.----	-.----	-.----
1988	-.----	-.----	-.----	-.----	-.----
1989	(1)	-.----	-.----	-.----	-.----
1990	0.070	-.----	-.----	-.----	-.----
1991	0.700	-.----	-.----	-.----	-.----
1992	0.300	-.----	-.----	-.----	-.----
1993	0.800	-.----	-.----	-.----	-.----

(1) = No fish were observed, but a small return was possible.

B. 1993 (03/01/93 - 02/28/94) Update

The Paint River fish ladder was not opened for the passage of fish during the 1993 season; therefore, no adult salmon entered the Paint river system.

Sockeye salmon were stocked in the Paint River system in 1993 as indicated in Table 24.

7. ISSUES, FINDINGS AND RECOMMENDATIONS

The Review Group discussed the desirability of criteria which they might use to screen each year's information and determine whether or not an additional permit modification should be recommended. After considerable review of the available information, it appears it is not reasonable to set specific numeric criteria.

For those elements which are reported in a numeric fashion, the information is collected in such a way it is very difficult to place any meaningful confidence limits on the numbers; and, therefore, to determine if one is, in fact, observing a statistically valid change from one year to the next.

The non-numeric, behavioral observations are sufficiently subjective as to require any new incident to be assessed as a specific individual case.

The most productive approach for the Review Group to take is to be sure each of the major issues which was raised during the permit re-evaluation process is revisited annually in the context of past experience. The Review Group will then subjectively determine whether or not the experience of a given year is sufficiently outside the historical experience to merit further consideration. If it is, the Review Group must attempt to account for the change and determine if action by the Review Group is warranted.

In each case the Review Group cites the records of the past experience to which it has access so the reader is free to evaluate the assessment made by the Review Group.

The issues considered for the 1993 season are set out below.

Issue A: Was the estimated number of identified brown bears using the area in 1993 within the range which the pre-Paint River project historical record suggests could be expected at

McNeil River Falls?

Findings: The estimated number of identified brown bears using the McNeil River falls area during 1993 as stated by ADF&G is shown in the context of similar information for the years 1980 through 1992

in Table 1 on page 11.

Recommendation: The Review Group has no recommendations for permit modification based on the estimated number of identified brown bears at the McNeil River falls in 1993.

Mikfik Creek?

Findings: The estimated number of identified brown bears using the Mikfik Creek area during 1993 as stated by ADF&G is shown in the context of similar information for the years 1985 through 1992 in Table 3 on page 12.

Recommendation: The Review Group has no recommendations for permit modification based on the estimated number of identified brown bears at the Mikfik Creek area in 1993.

Brooks River?

Findings: The group received no document similar to the "Summary - Bear Management Incidents - Brooks Camp - Katmai National Park - 1992"; however, in a presentation at the February 25, 1994 meeting the National Park Service made no mention of any significant increase or decrease in the number of brown bears using the Brooks River area during 1993.

Recommendation: The Review Group has no recommendations for permit modification based on the estimated number of brown bears at the Brooks River area in 1993.

Issue B: Was the estimated sex ratio of the brown bears using the area in 1993 within the proportions which the pre-Paint River project historical record suggests could be expected at

McNeil River Falls?

Findings: The estimated sex ratio of identified brown bears using the McNeil River falls area during 1993 as stated by ADF&G is shown in the context of similar information for the years 1980 through 1992 in Table 2 on page 11.

Recommendation: The Review Group has no recommendations for permit modification based on the estimated sex ratio of the identified brown bears at the McNeil River falls in 1993.

Mikfik Creek?

Findings: ADF&G did not publish the estimated sex ratio of identified brown bears using the Mikfik Creek area during 1993.

Recommendation: The Review Group has no recommendations for permit modification based on the estimated sex ratio of the identified brown bears at the Mikfik Creek area in 1993.

Brooks River?

Findings: The group received no document similar to the "Summary - Bear Management Incidents - Brooks Camp - Katmai National Park - 1992"; however, in a presentation at the February 25, 1994 meeting the National Park Service made no mention of any significant shift in the estimated sex ratio of brown bears using the Brooks River area during 1993.

Recommendation: The Review Group has no recommendations for permit modification based on the estimated sex ratio of the identified brown bears at the Brooks River area in 1993.

Issue C: Was the estimated age composition of the identified brown bears using the area in 1993 within the proportions which the pre-Point River project historical record suggests could be expected at

McNeil River Falls?

Findings: The estimated age composition of identified brown bears using the McNeil River falls area during 1993 as stated by ADF&G is shown in the context of similar information data for the years 1980 through 1992 in Table 1 on page 11.

Recommendation: The Review Group has no recommendations for permit modification based on the estimated age composition of the identified brown bears at the McNeil River falls in 1993.

Mikfik Creek?

Findings: The estimated age composition of identified brown bears using the Mikfik Creek area during 1993 as stated by ADF&G is partially shown in the context of similar information for the years 1980 through 1992 in Table 3 on page 11. This table shows a single figure for adults and sub-adults and does not reflect the number of cubs for all years except 1993, when cubs were included.

Recommendation: The Review Group has no recommendations for permit modification based on the estimated age composition of the identified brown bears at the Mikfik Creek area in 1993.

Brooks River?

Findings: The group received no document similar to the "Summary - Bear Management Incidents - Brooks Camp - Katmai National Park - 1992"; however, in a presentation at the February 25, 1994 meeting the National Park Service made no mention of any significant shift in the estimated age composition of brown bears using the Brooks River area during 1993.

Recommendation: The Review Group has no recommendations for permit modification based on the estimated age composition of the identified brown bears at the Brooks River area in 1993.

Issue D: Was the estimated number of brown bear-use days in the area in 1993 within the range which the pre-Paint River project historical record suggests could be expected at

McNeil River Falls?

Findings: The estimated number of brown bear-use days at the McNeil River falls area in 1993 as stated by ADF&G is shown in the context of similar information for the years 1989 through 1992 in Table 6 on page 15.

It should be noted that between the 1992 report and this one there was a major revision of the bear-use day numbers for the years 1984 through 1992. The

numbers were adjusted downward by between 25 percent and 35 percent.

Recommendation: The Review Group has no recommendations for permit modification based on the estimated number of brown bear-use days at the McNeil River falls in 1993.

Mikfik Creek?

Findings: The estimated number of brown bear-use days at the Mikfik Creek area in 1993 as stated by ADF&G is shown in the context of similar data for the years 1989 through 1992 in Table 6 on page 15.

Recommendation: The Review Group has no recommendations for permit modification based on the estimated number of brown bear-use days at the Mikfik Creek area in 1993.

Brooks River?

Findings: At the Brooks River area the NPS does not regularly collect data which would be comparable to the estimated number of brown bear-use days reported by ADF&G for McNeil River and Mikfik Creek.

Recommendation: The Review Group has no recommendations for permit modification based on an estimated number of brown bear-use days at the Brooks River area in 1993.

Issue E: Were there any unusual behaviors evidenced by the brown bears in the area during 1993 at

McNeil River Falls?

Findings: ADF&G reported no unusual behaviors evidenced by the brown bears at the McNeil River falls in 1993. They did note the death of one cub but could not ascribe a cause.

Recommendation: The Review Group has no recommendations for permit modification based on brown bear behavior at the McNeil River falls in 1993.

Mikfik Creek?

Findings: ADF&G reported no unusual behaviors evidenced by the bears at the Mikfik Creek area in 1993.

Recommendation: The Review Group has no recommendations for permit modification based on brown bear behavior at the Mikfik Creek area in 1993.

Brooks River?

Findings: The group received no document similar to the "Summary - Bear Management Incidents - Brooks Camp - Katmai National Park - 1992"; however, in a presentation at the February 25, 1994 meeting the National Park Service made no mention of any significant shifts in various types of behavior or the number of incidents per category of behavior at the Brooks River area during 1993.

Recommendation: The Review Group has no recommendations for permit modification based on brown bear behavior at the Brooks River area in 1993.

Issue F: Were there program or operational changes in 1993 which ought to be noted for future reference at

McNeil River Falls?

Findings: The Review Group is aware of the following 1993 program and/or operational changes which would influence future interpretation of the historical record.

There was the implementation of a revision in the permit system in which the 10 person/day limit was extended to cover the period June 7 through August 25 thereby expanding the number of permit days from 560 to 800.

ADF&G staff conducted a review of the data upon which bear-use days had been calculated since at least 1985. The result of the review was a downward adjustment in the annual estimates of bear-use days at McNeil Falls which averaged -446

bear-use days/year (-22%) for each of the years 1985 through 1992.

ADF&G promulgated the McNeil River State Game Sanctuary and Refuge Draft Operational Management Plan. "This management plan provides detailed guidelines in accordance with the statutes of the McNeil River State Game Sanctuary and Refuge ..., the Commissioner's Title 16 permitting and other authorities, the authorities of the Boards of Fisheries and Game, and sanctuary access regulations ..., and hunting and fishing regulations." This draft plan was submitted to the Board of Game at its fall 1993 meeting.

The Division of Wildlife Conservation (DWC) made a presentation at the fall 1993 Board of Game meeting describing a new methodology developed by staff to enumerate bears at the falls such that the data could be statistically compared on an annual basis. The primary benefits of this method are that it is standardized, all staff can conduct the counts, and it is statistically valid. The statistical method to be used is called the combined Shewhart-Cusum Quality Control scheme. Sanctuary staff will collect both data sets during the season. The bear use day method will continue to be used until 1997, when DWC will have a new data set large enough to be statistically valid. CIAA has interpreted this to mean the existing bear use day record does not have any statistical validity in the measurement of year-to-year variability, but this has not been confirmed at this writing.

There was a new development concerning the naming of bears. The Director of the Division of Wildlife Conservation said, "... naming of individual bears by department staff is at the very root of the hunting controversy and should not be continued in the future. Allowing staff to name bears and promote public recognition of and attachment to individual animals within this dynamic wild population has precipitated and continues to fuel the controversy. I do not believe any member of this department should ever again be placed in the position of having to explain to the Board of Game why this professional resource management agency allowed this to occur, placing management staff and members of the board in a position of having to discuss the wisdom and feasibility of trying to protect individual animals rather than to manage populations and use opportunities. ... For these

reasons, department staff responsible for interpretation, orientation and conduct of visitor activities in the McNeil Sanctuary will refrain from fostering anthropomorphism among the public by naming individual bears from this point forward. ... If approved research requires identification of individuals, study bears will be identified by numbers/letters similar to other studies conducted by the department. Even if animals must be assigned descriptive names by department staff to facilitate approved research, such names will not be used when dealing with public visitors to the sanctuary or other members of the public."

Mikfik Creek?

Findings: The Review Group finds that the changes listed above for McNeil River are generally applicable to Mikfik Creek and is not aware of any other 1993 program or operational changes relating specifically to Mikfik Creek which would influence future interpretation of the historical record.

Brooks River?

Findings: The group received no document similar to the "Summary - Bear Management Incidents - Brooks Camp - Katmai National Park - 1992"; however, in a presentation at the February 25, 1994 meeting the National Park Service made no mention of any significant shifts in either program or operational procedures during 1993.

Issue G: Was the estimated number of brown bears killed in the Kamishak Bay area in 1993 within the range which the pre-Paint River project historical record suggests could be expected?

Findings: The estimated number of brown bears killed in the Kamishak Bay area in 1993 as stated by ADF&G is shown in the context of similar information for the years 1972 through 1992 in Table 9 on page 27.

Recommendation: The Review Group has no recommendations for permit modification based on the number of brown bears killed in the Kamishak Bay area in 1993.