

**Fishery Management Report No. 05-45**

---

---

**Pillar Creek Hatchery Annual Management Plan,  
2005**

by

**Steven G. Honnold**

and

**Gary Byrne**

July 2005

---

---

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries





***FISHERY MANAGEMENT REPORT NO. 05-45***

**PILLAR CREEK HATCHERY ANNUAL MANAGEMENT PLAN, 2005**

by

Steven G. Honnold,  
and  
Gary Byrne

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

July 2005

The Kodiak Regional Aquaculture Association (KRAA) funds the general operation of the Pillar Creek Hatchery and the facility's stocking and evaluation programs. The Alaska Department of Fish and Game, Division of Sport Fish, the Kodiak Sport Fish Association, and the Kodiak Association of Charterboat Operators provided partial funding for the Chinook salmon project. The Division of Commercial Fisheries provides material and financial support for the management of returning adult runs enhanced or rehabilitated by hatchery stocking projects.

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

*Steven G. Honnold,  
Alaska Department of Fish and Game, Division of Commercial Fisheries,  
211 Mission Road, Kodiak, AK 99615, USA  
and  
Gary Byrne  
Kodiak Regional Aquaculture Association,  
P.O. Box 3407, Kodiak, AK 99615, USA*

*This document should be cited as:*

*Honnold, S. G. and G. Byrne. 2005. Pillar Creek hatchery annual management plan, 2005. Alaska Department of Fish and Game, Fishery Management Report No. 05-45, Anchorage.*

The Alaska Department of Fish and Game administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

If you believe you have been discriminated against in any program, activity, or facility, or if you desire further information please write to ADF&G, P.O. Box 25526, Juneau, AK 99802-5526; U.S. Fish and Wildlife Service, 4040 N. Fairfax Drive, Suite 300 Webb, Arlington, VA 22203 or O.E.O., U.S. Department of the Interior, Washington DC 20240.

For information on alternative formats for this and other department publications, please contact the department ADA Coordinator at (voice) 907-465-6077, (TDD) 907-465-3646, or (FAX) 907-465-6078.

# TABLE OF CONTENTS

	<b>Page</b>
LIST OF TABLES.....	ii
LIST OF FIGURES.....	ii
LIST OF APPENDICES.....	iii
PREFACE: EXECUTIVE SUMMARY, 2005, AND SUMMARY OF ACTIVE FISH TRANSPORT PERMITS.....	v
ABSTRACT.....	1
INTRODUCTION.....	2
2005 SOCKEYE SALMON RELEASES.....	4
Early-Run Sockeye Salmon: Malina Lake Donor Stock.....	4
Late-Run Sockeye Salmon: Saltery Lake Donor Stock.....	4
2005 COHO SALMON RELEASES: BUSKIN LAKE DONOR STOCK.....	4
2005 CHINOOK SALMON RELEASES: KARLUK RIVER DONOR STOCK.....	5
BROODSTOCK NUMBERS, ESCAPEMENT GOALS, AND EGG-TAKE GUIDELINES.....	5
2005 SOCKEYE SALMON EGG TAKES (2006 STOCKING).....	6
Early-Run Sockeye Salmon: Malina Lake Donor Stock.....	6
Late-Run Sockeye Salmon: Saltery Lake Donor Stock.....	7
2005 COHO SALMON EGG TAKES (2006 STOCKING).....	7
2005 CHINOOK SALMON EGG TAKES (2007 STOCKING).....	7
SOCKEYE SALMON HARVEST AND MANAGEMENT.....	8
Harvest of Returns to Hidden Lake.....	8
Harvest of Returns to Crescent Lake.....	9
Harvest of Returns to Little and Big Waterfall Lakes.....	9
Harvest of Returns to Spiridon Lake.....	10
Harvest of Returns to Ruth Lake.....	11
Harvest Reporting.....	11
ADDITIONAL MEASURES FOR WILDSTOCK PROTECTION.....	11
Genetics Policy.....	11
Policies and Guidelines for Health and Disease Control.....	12
SPECIAL STUDIES/RESEARCH.....	12
ACKNOWLEDGMENTS.....	12
REFERENCE CITED.....	13
TABLES AND FIGURES.....	15
APPENDIX A. PILLAR CREEK HATCHERY SALMON EGG TAKES, 1991-2005.....	39
APPENDIX B. WORKSHEETS FOR BROODSTOCK NUMBERS AND REPLACEMENT OPTIONS FOR ADULT REMOVALS.....	47
APPENDIX C. GUIDELINES FOR REPLACEMENT STOCKING OF SOCKEYE SALMON.....	57

## LIST OF TABLES

<b>Table</b>	<b>Page</b>
1. Pillar Creek Hatchery early-run sockeye salmon egg takes (Malina Lake broodstock) in 2004, resultant juvenile releases planned in 2005, projected adult production, and fish transport permit information. ....	16
2. Salmon survival and age assumptions used to estimate returns for Pillar Creek Hatchery stocking projects. ....	17
3. Pillar Creek Hatchery late-run sockeye salmon egg takes (Saltery Lake broodstock) in 2004, resultant juvenile releases planned for Spiridon and Ruth Lakes in 2005, projected adult production, and fish transport permit information. ....	18
4. Pillar Creek Hatchery coho salmon egg takes (Buskin Lake broodstock) in 2003, resultant juvenile (planned) releases at Road System Lakes in 2005, projected adult production, and fish transport permit information. ....	19
5. Pillar Creek Hatchery coho salmon egg takes (Buskin Lake broodstock) in 2004, resultant juvenile releases planned for Road System Lakes in 2005 and 2006, projected adult production, and fish transport permit information. ....	20
6. Karluk River chinook salmon egg takes (2000-2005), Monashka Creek releases (2002-2007), projected returns (2003-2012), and fish transport permit (FTP) information.....	21
7. Donor stock, broodstock numbers, escapement goal range, egg-take guidelines, and egg-take replacement criteria for 2005 egg takes.....	22
8. Proposed Pillar Creek Hatchery early-run sockeye salmon egg takes (Malina Lake broodstock) in 2005, juvenile releases in 2006, projected adult production, and fish transport permit information.....	23
9. Proposed Pillar Creek Hatchery late-run sockeye salmon egg takes (Saltery Lake broodstock) in 2005, juvenile releases for Spiridon, Jennifer, and Ruth Lakes in 2006, projected adult production, and fish transport permit information. ....	24
10. Pillar Creek Hatchery coho salmon egg takes (Buskin Lake broodstock) in 2005, resultant juvenile releases planned for Road System Lakes in 2006 (Monashka Creek in 2007), projected adult production, and fish transport permit information.....	25
11. Estimated 2005 sockeye salmon runs as a result of Pillar Creek Hatchery stocking projects. ....	26

## LIST OF FIGURES

<b>Figure</b>	<b>Page</b>
1. Locations of sockeye salmon enhancement and rehabilitation projects on Kodiak and Afognak islands, 2005.....	27
2. Locations of Kodiak Island road system lakes stocked with coho and Chinook (Monashka Creek) salmon. ....	28
3. Malina Lake sockeye salmon average escapement timing (1993-2002; weir was not operated in 2003) compared to the 2004 escapement timing. ....	29
4. Saltery Lake sockeye salmon average escapement timing, 1994-2003 (weir was not operated in 2004). ....	30
5. Buskin River coho salmon average escapement timing (1994-2003) compared to the 2004 escapement timing. ....	31
6. Karluk River Chinook salmon average escapement timing (1994-2003) compared to the 2004 escapement timing.....	32
7. Location of the Foul Bay special harvest area, ADF&G field camp and fish weir at Hidden Creek. ....	33
8. Map of the Kodiak Management Area depicting commercial fishing districts and selected sections.....	34
9. Afognak Lake (Litnik) sockeye salmon average escapement timing (1994-2003) compared to the 2004 escapement timing.....	35
10. Settler Cove (Crescent Lake) special harvest area boundaries in Kizhuyak Bay. ....	36
11. Waterfall Bay (Little and Big Waterfall Lakes) special harvest area and rehabilitation systems and the Pauls Bay Section in Perenosa Bay. ....	37
12. Spiridon Bay (Telrod Cove) special harvest area boundaries, and ADF&G camp location in Telrod Cove. ....	38

## LIST OF APPENDICES

<b>Appendix</b>	<b>Page</b>
A1. Pillar Creek Hatchery sockeye salmon egg takes at Malina Lake, 1991-2005.....	40
A2. Sockeye salmon egg takes at Saltery Lake, 1994-2005.....	41
A3. Pillar Creek Hatchery coho salmon egg takes, 1991-2005.....	42
A4. Pillar Creek Hatchery chinook salmon egg takes at Karluk River, 2000-2005.....	43
A5. Pillar Creek Hatchery sockeye salmon egg takes at Afognak Lake, 1991-2005.....	44
B1. Worksheet for determining sockeye salmon broodstock numbers allowed, based on escapement levels at Malina Lake, 2005.....	48
B2. Worksheet for determining sockeye salmon broodstock numbers allowed, based on escapement levels at Afognak Lake, 2005.....	50
B3. Worksheet for determining sockeye salmon broodstock numbers allowed, based on escapement levels at Saltery Lake, 2005.....	52
B4. Worksheet for calculating sockeye salmon "replacement" options for adult removals from Malina Lake, 2005.....	54
B5. Worksheet for calculating sockeye salmon "replacement" options for adult removals from Afognak Lake, 2005.....	55
B6. Worksheet for calculating sockeye salmon "replacement" options for adult removals from Saltery Lake, 2005.....	56
C1. Guidelines for "replacement" stocking (backstocking) of sockeye salmon as applicable to adult removals from Malina, Afognak and Saltery Lakes in 2005.....	58



**PREFACE:  
EXECUTIVE SUMMARY, 2005, AND SUMMARY OF ACTIVE  
FISH TRANSPORT PERMITS**



PILLAR CREEK HATCHERY ANNUAL MANAGEMENT PLAN  
EXECUTIVE SUMMARY, 2005.

New Projects for 2005: No new egg take or stocking locations are planned for 2005.

Cost Recovery Harvests for 2005: NONE

Stocking Location	Broodstock	2005 Projected Enhanced Return	2005 Stocking (brood year 2004)	2005 Stocking (brood year 2003)	2005 Egg-take Goals	2006 Stocking (brood year 2005)	2006 Stocking (brood year 2004)
<b>Sockeye:</b>							
Hidden Lake	Afognak Lake early run	13,557					
Big & Little Waterfall Lakes	Afognak Lake early run	22,511					
Crescent Lake	Afognak Lake early run	2,055					
<b>Total</b>	<b>Afognak Lake early run</b>	38,123	0	0	0	0	0
Hidden Lake	Malina Lake early run		188,250		691,892	400,000	
Little Waterfall Lake	Malina Lake early run		78,650		345,946	200,000	
Big Waterfall Lake	Malina Lake early run		49,100		216,216	125,000	
Crescent Lake	Malina Lake early run		54,000		345,946	200,000	
<b>Total</b>	<b>Malina Lake early run</b>	0	370,000	0	1,600,000	925,000	0
Spiridon Lake	Saltery Lake late run	103,662	1,380,000		4,000,000	3,000,000	
Ruth Lake	Saltery Lake late run	900	35,000		200,000	150,000	
Jennifer Lake	Saltery Lake late run				466,667	350,000	
<b>Total</b>	<b>Saltery Lake late run</b>	104,562	1,415,000	0	4,666,667	3,500,000	0
<b>Total Sockeye</b>		142,685	1,785,000	0	4,666,667	3,500,000	0

-continued-

Executive Summary, 2005. (page 2 of 2)

Stocking Location	Broodstock	2005 Projected Enhanced Return	2005 Stocking (brood year 2004)	2005 Stocking (brood year 2003)	2005 Egg-take Goals	2006 Stocking (brood year 2005)	2006 Stocking (brood year 2004)
<b>Coho:</b>							
Mayflower Lake	Buskin Lake	700	3,000		8,125	6,500	
Island Lake	Buskin Lake	3,600	20,100	10,034	28,125	22,500	12,500
Dark Lake	Buskin Lake	500	7,500		9,375	7,500	
Mission Lake	Buskin Lake	4,100	12,500	10,097	15,625	12,500	12,500
Potato Patch Lake	Buskin Lake	1,700	9,500		11,875	9,500	
Southern Lake	Buskin Lake	landlocked	0	3,200	4,375	3,500	
Margaret Lake	Buskin Lake	landlocked	0	3,505	4,375	3,500	
Monashka Creek	Buskin Lake	1,100	0	10,000	12,500		10,000
<b>Total Coho</b>	<b>Buskin Lake</b>	11,700	52,600	36,836 <sup>a</sup>	94,375	65,500	35,000 <sup>b</sup>
<b>Chinook:</b>							
Monashka Creek	Karluk River	449	0	72,150	300,000 <sup>c</sup>	0	37,000

<sup>a</sup> Includes a total of 36,836 BY03 spring presmolt and smolt releases into Island, Mission, Southern (landlocked), and Margaret (landlocked) Lakes, and Monashka Creek the spring of 2005. The remaining 52,600 juvenile coho to be released in 2005 are BY04 fingerling and/or fall presmolt.

<sup>b</sup> Includes a total of 35,000 BY04 spring presmolt and smolt releases into Island and Mission Lakes, and Monashka Creek the spring of 2006. The remaining 65,500 juvenile coho to be released in 2006 releases are to be BY05 fingerling and/or fall presmolt.

<sup>c</sup> The 2005 egg take should result in a release of 130,000 smolts in 2007.

**Pillar Creek Hatchery summary of active (in use)  
Fish Transport Permits (FTP):**

Project Name FTP Number	Issue Date	Expiration Date	Purpose
<b>Egg takes, early-run sockeye</b>			
Afognak Lake egg take 99A-0051	7/15/1999	12/31/2008	Allows egg take of 4,100,000 green eggs at Afognak Lake; incubation and rearing at PCH, and release of the resultant fry into Hidden, Waterfall, and Crescent Lakes.
Malina Lake egg take 04A-0042	4/1/2004	12/31/2009	Allows egg take of 4,100,000 green eggs at Malina Lake, to be incubated and reared at PCH; progeny to be released into Hidden, Crescent, Big Waterfall and Little Waterfall Lakes.
Little Waterfall Creek 04A-0054	7/15/2004	12/31/2009	Allows egg take of 4,100,000 green eggs at the Little Waterfall Lake, outlet creek, to be incubated and reared at PCH; progeny to be released into Hidden, Crescent, Big Waterfall and Little Waterfall Lakes. This is an alternate early-run brood source.
Laura Lake egg take 99A-0060	7/15/1999	12/31/2008	Allows egg take of 1,500,000 green eggs at Laura Lake, incubation and rearing at PCH, and release of progeny into Laura Lake.
<b>Egg takes, late-run sockeye</b>			
Saltery Lake egg take 97A-0071	8/31/1997	12/31/2008	Allows egg take of 9,800,000 green eggs at Saltery Lake, incubation and rearing at PCH, and release of progeny into Spiridon and Ruth Lakes.
Little Kitoi Lake egg take 04A-0041	4/1/2004	12/31/2009	Allows egg take of 9,800,000 green eggs at Little Kitoi Lake, incubation and rearing at PCH, and release of progeny into Spiridon and Ruth Lakes.
<b>Stocking, early-run sockeye</b>			
Afognak Lake 04A-0055	8/1/2004	12/31/2009	Allows the release of up to 300,000 <b>Afognak Lake stock</b> fry, or 150,000 fingerling, or 75,000 presmolt, incubated and reared at PCH, into Afognak Lake.
Hidden Lake 99A-0053	7/15/1999	12/31/2008	Allows the release of up to 500,000 <b>Afognak Lake stock</b> fry, incubated and reared at PCH into Hidden Lake.
Hidden Lake 99A-0054	7/15/1999	12/31/2008	Allows the release of up to 500,000 <b>Afognak Lake stock</b> presmolt, incubated and reared at PCH into Hidden Lake
Hidden Lake 04A-0035	4/1/2004	12/31/2009	Allows the release of up to 600,000 each <b>Malina Lake stock</b> fry and fingerling, and 500,000 presmolt, incubated and reared at PCH, into Hidden Lake.
Little Waterfall Lake 97A-0076	10/1/1997	12/31/2008	Allows the release of up to 200,000 <b>Afognak Lake stock</b> presmolt, incubated and reared at PCH into Little Waterfall Lake.

-continued-

**Pillar Creek Hatchery summary of active (in use)  
Fish Transport Permits (FTPs): (page 2 of 4)**

Project Name FTP Number	Issue Date	Expiration Date	Purpose
Little Waterfall Lake 04A-0038	4/1/2004	12/31/2009	Allows the release of up to 400,000 each <b>Malina Lake stock</b> fry and fingerling, and 350,000 presmolt, incubated and reared at PCH, into Little Waterfall Lake.
Big Waterfall Lake 99A-0055	7/15/1999	12/31/2008	Allows the release of up to 250,000 <b>Afognak Lake stock</b> fingerling, incubated and reared at PCH, into Big Waterfall Lake
Big Waterfall Lake 04A-0032	4/1/2004	12/31/2009	Allows the release of up to 250,000 <b>Afognak Lake stock</b> presmolt, incubated and reared at PCH, into Big Waterfall Lake
Big Waterfall Lake 04A-0031	4/1/2004	12/31/2009	Allows the release of up to 250,000 each <b>Malina Lake stock</b> fry, fingerling and presmolt, incubated and reared at PCH, into Big Waterfall Lake.
Crescent Lake 99A-0052	7/15/1999	12/31/2008	Allows the release of up to 500,000 <b>Afognak Lake stock</b> fingerling, incubated and reared at PCH into Crescent Lake.
Crescent Lake 04A-0034	4/1/2004	12/31/2009	Allows the release of up to 275,000 <b>Afognak Lake stock</b> fingerling, incubated and reared at PCH, into Crescent Lake.
Crescent Lake 04A-0033	4/1/2004	12/31/2009	Allows the release of up to 500,000 each <b>Malina Lake stock</b> fry and fingerling, and 275,000 presmolt, incubated and reared at PCH, into Crescent Lake.
Malina Lake 99A-0056	7/15/1999	12/31/2008	Allows the release of up to 500,000 <b>Malina Lake stock</b> fingerling, incubated and reared at PCH, into Malina Lake.
Malina Lake 97A-0078	7/15/1999	12/31/2008	Allows the release of up to 300,000 <b>Malina Lake stock</b> presmolt, incubated and reared at PCH, into Malina Lake.
Laura Lake 99A-0062	7/15/1999	12/31/2008	Allows the release of up to 200,000 <b>Laura Lake stock</b> fingerling, incubated and reared at PCH, into Laura Lake.
Laura Lake 99A-0061	7/15/1999	12/31/2008	Allows the release of up to 200,000 <b>Laura Lake stock</b> presmolt, incubated and reared at PCH, into Laura Lake.
<b>Stocking, late-run sockeye</b>			
Saltery Lake 04A-0056	8/1/2004	12/31/2009	Allows the release of up to 800,000 <b>Saltery Lake stock</b> fry, or 400,000 fingerling, or 200,000 presmolt, incubated and reared at PCH, into Saltery Lake.
Spiridon Lake 99A-0059	07/15/99	12/31/08	Allows the release of up to 7,000,000 <b>Saltery Lake stock</b> fingerling, incubated and reared at PCH into Spiridon Lake.
Spiridon Lake 04A-0040	4/4/2004	12/31/2009	Allows the release of up to 7,000,000 <b>Saltery Lake stock</b> fry, and 1,000,000 presmolt, incubated and reared at PCH, into Spiridon Lake.

-continued-

**Pillar Creek Hatchery summary of active (in use)  
Fish Transport Permits (FTPs): (page 3 of 4)**

Project Name FTP Number	Issue Date	Expiration Date	Purpose
Little Kitoi Lake 04A-0037	5/1/2004	12/31/2009	Allows the release of up to 100,000 <b>Saltery Lake stock</b> fingerling, and 150,000 presmolt, incubated and reared at PCH, into Ruth Lake.
Ruth Lake 99A-0058	07/15/99	12/31/08	Allows the release of up to 300,000 <b>Saltery Lake stock</b> fingerling, incubated and reared at PCH, into Ruth Lake.
Ruth Lake 04A-0039	5/1/2004	12/31/2009	Allows the release of up to 300,000 each <b>Saltery Lake stock</b> fry and presmolt, incubated and reared at PCH, into Ruth Lake.
Jennifer Lake 04A-0036	3/1/2004	12/31/2009	Allows the release of 400,000 and 250,000 <b>Saltery Lake stock</b> fry and presmolt, incubated and reared at PCH, into Jennifer Lake.
<b>Egg takes, coho</b> Buskin Lake egg take 04A-0004	1/1/2004	12/31/2013	Allows egg take of 200,000 green eggs at Buskin Lake; incubation and rearing at PCH, and release of the resultant progeny into anadromous and landlocked systems in Chiniak Bay.
<b>Stocking, coho</b> Road System Lakes 04A-0006	1/1/2004	12/31/2013	Allows the release of Buskin Lake stock juveniles, incubated and reared at PCH, into Kodiak road system lakes, as follows: 22,500 into Island Lake ( <b>plus 32,500 smolt - amendment in process</b> ) 7,500 into Dark Lake 12,500 into Mission Lake ( <b>plus 32,500 smolt - amendment in process</b> ) 9,500 into Potato Patch Lake 6,500 into Mayflower Lake
Southern Lake 04A-0005	1/1/2004	12/31/2013	Allows the release of up to 3,500 Buskin Lake stock juveniles, incubated and reared at PCH, into Southern Lake.
Margaret Lake 04A-0013	1/1/2004	12/31/2013	Allows the release of up to 3,500 Buskin Lake stock juveniles, incubated and reared at PCH, into Margaret Lake.
Abercrombie Lake 05A-0003	1/12/05	12/31/2013	Allows the release of up to 3,500 Buskin Lake stock juveniles, incubated and reared at PCH, into Abercrombie Lake.
Big (Lily) Lake 05A-0004	1/12/05	12/31/2013	Allows the release of up to 10,000 Buskin Lake stock juveniles, incubated and reared at PCH, into Big (Lily) Lake.
Monashka Creek 04A-0007	1/1/2004	12/31/2008	Allows the release of up to 10,000 Buskin Lake stock smolt, incubated and reared at PCH, into Monashka Creek.
<b>Egg takes, chinook</b> Karluk River egg take 00A-0010	02/06/00	06/30/06	Allows egg take of 300,000 green eggs at Karluk River; incubation and rearing at PCH, and release of the resultant presmolt into Monashka Creek. <b>(12/31/08 expiration date - amendment in process)</b>

-continued-

**Pillar Creek Hatchery summary of active (in use)  
Fish Transport Permits (FTPs): (page 4 of 4)**

Project Name FTP Number	Issue Date	Expiration Date	Purpose
Dog Salmon egg take 04A-0009	1/1/2004	12/31/2006	Allows egg take of 300,000 green eggs at Dog Salmon; incubation and rearing at PCH, and release of the resultant presmolt into Monashka Creek. <b>(12/31/08 expiration date - amendment in process)</b>
Monashka egg take 05A-0050	4/1/2005	9/1/2014	Allows egg take of 300,000 green eggs at Monashka Creek; incubation and rearing at PCH, and release of the resultant presmolt into Monashka Creek. Egg take may occur at Karluk River during transition from Karluk to Monashka broodstock.
<b>Stocking, chinook</b> Monashka Creek			see above
Island Lake 04A-0011	1/1/2004	12/31/2006	Allows the release of up to 150,000 juvenile chinook, incubated and reared at PCH, into Island Lake.
Abercrombie Lake 04A-0012	1/1/2004	12/31/2006	Allows the release of up to 10,000 juvenile chinook, incubated and reared at PCH, into Abercrombie Lake.

## ABSTRACT

Pillar Creek Hatchery (PCH) was constructed in 1990 as a cooperative project between the Alaska Department of Fish and Game (ADF&G) and the Kodiak Regional Aquaculture Association (KRAA). The hatchery is located on the road system north of the city of Kodiak and has a capacity to incubate 20 million salmon eggs and rear up to 16 million juvenile fish. Currently, the hatchery incubates and rears single stocks of Chinook *Oncorhynchus tshawytscha* and coho *O. kisutch* salmon and two stocks of sockeye salmon *O. nerka*.

A total of 370,000 early-run juvenile sockeye salmon (Malina Lake broodstock) will be released in 2005. Of these, 188,250 will be released into Hidden Lake, 78,650 into Little Waterfall Lake, 49,100 into Big Waterfall Lake, and 54,000 into Crescent Lake. Prior releases of the Afognak Lake early-run stock are expected to produce 38,123 adult sockeye salmon returning in June 2005. About 1,600,000 eggs will be collected from Malina Lake sockeye salmon broodstock in 2005 for incubation at PCH. After emergence and rearing at the hatchery, a total of 925,000 juveniles will be released in 2006. These releases will include 400,000 into Hidden Lake, 200,000 into Little Waterfall Lake, 125,000 into Big Waterfall Lake, and 200,000 into Crescent Lake. If the Malina Lake sockeye salmon escapement is less than or equal to 500 fish, an egg take will not occur in 2005. If the escapement is between 501 and 2,799 sockeye, additional eggs will be collected to provide 36,250 presmolt for “backstocking” into Malina Lake in 2006. This release will replace lost production as a result of the removal of adults for broodstock.

Approximately 1,415,000 late-run juvenile sockeye salmon (Saltery Lake broodstock) will be released in 2005. The majority of these fish will be released into Spiridon Lake (1,380,000) with a smaller release into Ruth Lake (35,000). Prior releases (Saltery Lake broodstock) are expected to produce 103,662 adult sockeye salmon returning to Spiridon Lake and 900 returning to Ruth Lake in late June through early August 2005. About 4,666,667 Saltery Lake sockeye salmon eggs will be collected in 2005 for stocking Spiridon (3,000,000), Ruth (150,000), and Jennifer (350,000) Lakes in 2006. If the Saltery Lake sockeye salmon escapement is less than or equal to 7,500 fish, an egg take will not occur in 2005. If the escapement is between 7,501 and 19,115 sockeye salmon, additional eggs will be collected to provide 111,550 presmolt for “backstocking” into Saltery Lake in 2006. This release will replace lost production as a result of the removal of adults for broodstock.

A total of about 89,436 juvenile coho salmon (Buskin Lake broodstock) will be released in 2005. These releases include 36,836 coho presmolt and smolt (brood year 2003) which will be released into four road system lakes and Monashka Creek. An additional 52,600 fingerlings and/or fall presmolt (brood year 2004) will be released into five road system lakes in 2005. Some coho juveniles (brood year 2004) may be reared longer and then released as smolt at Island Lake, Mission Lake, landlocked lakes, and/or Monashka Creek in 2006, depending upon Chinook salmon smolt production. If this occurs, fewer fingerlings and /or presmolt will be released in 2005. Prior releases of this coho salmon stock are expected to produce a return of 11,700 adult coho salmon in late August and September 2005. The Buskin River coho salmon egg take in 2005 will target about 94,375 eggs for the release of about 65,500 juveniles in 2006. Another 10,000 juveniles may be reared an additional year to produce smolt for release into Monashka Creek in 2007. The latter release will be dependent upon the 2005 Chinook salmon egg take and resultant juvenile rearing numbers. If the Buskin Lake coho salmon escapement is less than or equal to 1,600 fish, an egg take will not occur in 2005.

About 72,150 smolt from the brood year 2003 Karluk River Chinook salmon will be released into Monashka Creek in 2005 (37,000 smolt from the 2004 egg take will be released in 2006). About 449 adult Chinook salmon are expected to return to Monashka Creek in 2005. Approximately 300,000 Chinook salmon eggs will be collected from Karluk River and Monashka Creek (a portion from each stock) in 2005 and should result in approximately 130,000 smolt released into Monashka Creek in 2007. If the Karluk Lake Chinook salmon escapement is less than or equal to 1,800 fish, an egg take will not occur there in 2005.

There are no cost recovery projects planned for this facility in 2005; however, an “unplanned cost recovery operational plan” (UCROP) has been prepared by KRAA and will be implemented to prevent straying if, for any reason, sockeye salmon cannot be harvested by common property commercial fisheries at the special harvest areas.

Key words: Pillar Creek Hatchery, Kodiak Regional Aquaculture Association, sockeye salmon, coho salmon, Chinook salmon, egg take, broodstock, stocking, fry, fingerling, presmolt, smolt, harvest, return

## INTRODUCTION

Pillar Creek Hatchery (PCH) is located on the Kodiak road system about seven miles north of the City of Kodiak (Figures 1 and 2). The hatchery was constructed in 1990 as a cooperative project between the Alaska Department of Fish and Game (ADF&G) and the Kodiak Regional Aquaculture Association (KRAA; McCullough and Clevenger 2002; Honnold and Clevenger 2003; Honnold and Byrne 2004). PCH has the capacity to incubate 20 million salmon eggs and rear up to 16 million juveniles of a variety of life stages (fry, fingerlings, presmolt, and smolt). The facility is operated primarily by funds provided by KRAA and to a lesser extent through a cooperative agreement with the ADF&G Division of Sport Fish. PCH was designed to produce juvenile sockeye salmon *Oncorhynchus nerka* for: 1) stocking barren-lake systems to enhance adult production, and 2) stocking anadromous lakes to supplement wild sockeye salmon stocks in attempts to rehabilitate diminished runs (KRAA 1998). These stocking projects were developed to improve sockeye salmon harvest opportunities in the Kodiak Management Area (KMA) for commercial seine and gillnet, subsistence, and recreational fishers.

Spiridon Lake was selected as the primary barren-lake sockeye salmon stocking project for PCH and has been stocked annually since 1991 (Figure 1). Malina and Laura Lakes were the initial anadromous lake stocking projects conducted by PCH (Figure 1). The latter stocking projects were initiated in 1992 and 1993, respectively, and were discontinued in the late 1990s after successful re-building of both sockeye runs.

Late-run Upper Station sockeye salmon were initially used to stock Spiridon Lake and Little Kitoi Lake near the Kitoi Bay Hatchery (KBH; Figure 1). Little Kitoi Lake releases were intended to develop a brood source for the Spiridon Lake project (Honnold and Aro *in press*). Investigations by ADF&G and the FWS indicated that the Saltery Lake stock would be preferred for Spiridon Lake stocking (Honnold 1997; Honnold et al. 1999). The earlier run timing of Saltery Lake sockeye salmon (about three weeks earlier than the late-run Upper Station sockeye stock) was expected to improve returns to Little Kitoi Lake and make broodstock collection easier. Additionally, the earlier run timing was expected to reduce the incidental harvest of Spiridon River pink *O. gorbuscha* and chum *O. keta* salmon stocks during the terminal fishery targeting sockeye salmon returns to Spiridon Lake.

Saltery Lake stock will continue to be the brood source for the Spiridon Lake project in 2005. Little Kitoi Lake has been stocked with Saltery Lake sockeye salmon stock from KBH annually since 1999 and this stocking will continue in 2005 (Honnold and Aro *in press*). Depending on the magnitude of the adult sockeye run, an egg take may occur at Little Kitoi Lake in 2005 for the first time since the brood source was changed. If the 2005 run is not sufficient to meet a substantial portion of the egg-take goals, broodstock from Saltery Lake will again be collected and used for stocking Spiridon, Jennifer, and Ruth Lakes and continuing broodstock development at Little Kitoi Lake.

PCH also provides early-run juvenile sockeye salmon for stocking several barren lakes in the Kodiak area. Hidden, Little Waterfall, Big Waterfall, and Crescent Lakes will be stocked with Malina Lake sockeye salmon juveniles in 2005 (Figure 1). Poor sockeye salmon escapements into the Afognak Lake system have prevented the use of this stock for stocking at the aforementioned early-run systems. The Afognak Lake stock may be used as an alternate broodstock for early-run egg takes in 2005 if sockeye salmon escapement to Malina Lake is less than anticipated.

Lake fertilization (1991-2001) and sockeye salmon stocking (1992-1999) projects were conducted at the Malina Lake system during 1991 to 2001 to restore adult production to levels adequate to consistently achieve escapement goals (Schrof and Honnold 2003; Figure 1). Juveniles (Malina Lake broodstock) were released (“backstocked”) into this early-run system, which increased ensuing adult returns. Sockeye salmon escapement goals were achieved from 1999 through 2002 (Wadle 2004). Stocking was planned for the 2000-2002 seasons, but escapement levels were sufficient to forego egg takes. Planning for rehabilitation egg takes was discontinued after 2002 and the stock is now considered to be rehabilitated (McCullough and Clevenger 2002).

A similar restoration project was conducted at Laura Lake, which was also fertilized (1993-2001) and supplemented with sockeye fry (1994-1996 and 1999) of Laura Lake origin (Figure 1). In 1996, 1997, and 1999 through 2002 sockeye salmon eggs were not collected at Laura Lake due to adequate adult escapement. As a result of reaching escapement goals for four consecutive years, both lake fertilization and egg takes were discontinued after 2002 and the stock was considered rehabilitated (McCullough and Clevenger 2002).

Another intent of the hatchery was to produce coho salmon *O. kisutch* juveniles for stocking of lakes along the Kodiak Island road system to enhance recreational fishing opportunities (KRAA 1998). Buskin Lake coho salmon were reared to the fingerling life stage at PCH annually from 1995 to 2004 for road system stocking (Figure 2). In addition, Buskin Lake coho salmon eggs were used for several classroom incubation programs in Kodiak area schools. Due to reduced numbers of Chinook salmon *O. tshawytscha* fry rearing at PCH, additional rearing space for coho salmon was available in 2003. This allowed for the rearing and release of coho salmon smolt in five lakes and Monashka Creek in 2004. This same scenario occurred in 2004 and presmolt will be released into four lakes and smolt will be released into Monashka Creek in 2005. Coho salmon fingerling and smolt stocking is also planned for 2006. The release of coho smolt will continue to be dependent upon the number of Chinook salmon reared at PCH.

A Chinook salmon enhancement project was initiated at PCH in 2000 after the sockeye and coho salmon programs were established (McCullough et al. 2000). A permit alteration request (PAR) was approved for the PCH Basic Management Plan in January 2000 (McCullough et al. 2000). The PAR provides for the development of a Chinook salmon enhancement project for the Kodiak road system to increase recreational fishing opportunities. Chinook salmon eggs were collected for the first time from the Karluk River in 2000. These eggs were incubated and reared at PCH and about 60,400 smolt were released into Monashka Creek in the spring of 2002 (Figure 2). This project was continued with egg takes occurring at Karluk River during 2001 to 2004 and the release of smolt in 2003 and 2004. Currently PCH is rearing 72,150 juvenile Chinook salmon from brood year 2003, which will be released into Monashka Creek in 2005. An additional 37,000 Chinook salmon fry from the 2004 egg take are being reared for release as smolt in 2006. We propose continuing the Chinook salmon project in 2005 with an egg-take goal (300,000) designed to produce about 130,000 smolt (current rearing capacity at PCH) for release in 2007. A portion of the eggs will be collected from adult Chinook salmon returning to Monashka Creek in 2005; an egg take at Karluk River will also occur in 2005.

PCH will continue to adhere to all measures for protecting natural salmon stocks including genetics guidelines, policies and guidelines for health and disease control, and the prevention of straying. The latter may require the implementation of “unplanned cost recovery” fisheries in the event enhanced returns of adults cannot be efficiently harvested.

## **2005 SOCKEYE SALMON RELEASES**

Below we describe stock-specific sockeye salmon releases planned for 2005. All sockeye fry and fingerlings will be transported to specific lakes by float-equipped aircraft and releases will occur after landing on the lake. Presmolt will be transported from Kodiak by a wheel-equipped aircraft and air-dropped into each lake specified.

### **EARLY-RUN SOCKEYE SALMON: MALINA LAKE DONOR STOCK**

A total of approximately 370,000 early-run Malina Lake stock will be released into four lakes (Hidden, Little Waterfall, Big Waterfall, and Crescent) in 2005 (Table 1; Figure 1; Appendix A1). About 190,000 fingerlings will be released in June with the remaining 180,000 juveniles reared until October and released as presmolt. Fingerling releases will range from about 6,600 (Big Waterfall Lake) to 113,250 (Hidden Lake) while presmolt releases will range from 42,500 (Big Waterfall Lake) to 75,000 (Hidden Lake).

Adult returns from these releases are estimated to total about 29,379 fish (Tables 1 and 2). Approximately 2,936 “jacks” (age 1.1 fish) will return in 2007, with the remaining returns expected in 2008 (9,206 fish), 2009 (15,199 fish), and 2010 (2,038). About half (14,386) of the total adult production is expected from the Hidden Lake releases. The run timing of these returns should be similar to Malina Lake sockeye salmon (brood source) escapement, with runs beginning in late May, peaking about mid June, and substantially declining by early July (Figure 3).

### **LATE-RUN SOCKEYE SALMON: SALTERY LAKE DONOR STOCK**

Spiridon Lake will be stocked with about 1,380,000 juvenile SALTERY Lake sockeye salmon in 2005 (Table 3; Figure 1; Appendix A2). Of these, 820,000 will be released as fry in June and 560,000 as presmolt in October. Another 35,000 SALTERY Lake fry will be released into Ruth Lake in June 2005 (Table 3; Figure 1; Appendix B).

We expect about 106,863 adult salmon to return as a result of the 2005 releases into Spiridon Lake (Tables 2 and 3). A small number of jacks (1,305) will return in 2007 and some older age fish (1,993) will return in 2010; however, the majority of returns should occur in 2008 (49,884) and 2009 (53,682). Ruth Lake releases in 2005 are expected to produce 1,573 adults returning primarily in 2008 (501) and 2009 (980; Tables 2 and 3). The run timing of returns from the stocking of Spiridon and Ruth Lakes should be similar to the escapement timing of SALTERY Lake sockeye salmon, with the run beginning in mid June, peaking in early to mid July, and ending in mid to late August (Figure 4).

## **2005 COHO SALMON RELEASES: BUSKIN LAKE DONOR STOCK**

PCH released 26,836 juvenile coho salmon (Brood Year 2003) in March and April 2005 including 10,034 presmolt into Island Lake, 10,097 presmolt into Mission Lake, 3,200 presmolt into Southern Lake, and 3,505 presmolt into Margaret Lake (Table 4; Figure 2; Appendix A3). Another 10,000 smolt will be released into Monashka Creek in June. We also plan to release an additional 52,600 coho salmon fingerlings (Brood Year 2004) in August and September 2005 (Table 5; Figure 2; Appendix A3). These releases will be distributed among Mayflower, Island, Mission, Dark, and Potato Patch Lakes.

The coho salmon juveniles stocked in March and April 2005 were transported from PCH by a truck-mounted transport tank to each stocking location with the exception at Southern Lake, where presmolt were transported by aircraft. The remaining 2005 releases will be transported similarly, depending upon location.

A small number of Buskin Lake coho salmon eggs (up to 500 per school) were provided for 2004/2005 educational programs in the Kodiak Island Borough school system. Eggs from the 2004 egg take were incubated in classroom incubators and resultant fry will be released by students into one of the several previously mentioned lakes.

Presmolt and smolt releases in 2005 are expected to produce about 3,263 adult returns in 2006 (Tables 2 and 4). About 3,419 adults should return in 2008 from the 2005 fingerling releases. Estimates of adult returns will vary if fingerling releases are reduced in 2005 in lieu of smolt releases in 2006. The run timing should be similar to the escapement timing of Buskin Lake coho, with fish beginning to return in mid to late August, peaking in mid to late September, and declining by late September or early October (Figure 5).

## **2005 CHINOOK SALMON RELEASES: KARLUK RIVER DONOR STOCK**

In May 2005 about 72,150 Chinook salmon smolt will be transported in a truck-mounted transport tank from PCH to the stocking location at Monashka Creek (Table 6; Figure 2; Appendix A4). The smolt will be held in a raceway adjacent to Monashka Creek and/or a pool in Monashka Creek for about a week to allow the fish to imprint before their release.

Approximately 1,804 adult Chinook salmon are expected to return from 2005 releases with the majority (1,046) returning in 2009 (Table 6). The run timing should be similar to escapement timing of Karluk River Chinook salmon, with fish returning in late May, peaking in mid June, and declining by early July (Figure 6).

## **BROODSTOCK NUMBERS, ESCAPEMENT GOALS, AND EGG-TAKE GUIDELINES**

In 2005 we propose collecting the following broodstock for egg takes: 1,800 Malina Lake early-run sockeye salmon (1,400 sockeye salmon if Afognak Lake is used as an alternate early-run broodstock), 4,116 Saltery Lake late-run sockeye salmon, 47 Buskin Lake coho salmon, and 120 Karluk River/Monashka Creek Chinook salmon (Table 7). Escapement goal ranges for these systems are (Nelson et al *in press*): 1,000-10,000 sockeye salmon at Malina Lake (20,000-50,000 sockeye salmon at Afognak Lake), 15,000-30,000 sockeye salmon at Saltery Lake, 3,200-7,200 coho salmon at Buskin River, and 3,600-7,300 Chinook salmon at Karluk River (Monashka Creek does not have a coho salmon escapement goal).

We propose the egg-take guidelines in 2005 as follows:

1. Egg takes will be prohibited when escapements are less than or equal to 50% of the lower bound of the escapement goal range for a given system (Table 7).
2. Broodstock removals will not reduce escapements below 50% of the lower bound of the escapement goal range for a given system (Table 7); broodstock removals will be reduced accordingly if necessary (Appendices B1-B3).

3. Broodstock removals for sockeye salmon egg takes may be contingent upon specific “replacement requirements” to compensate for the adults that were removed from the spawning population.
4. Replacement requirement is defined as the number of juvenile sockeye salmon of the specific stock needed for “backstocking” into each system (Appendices B4-B6).
5. Replacement will be required when escapements are over 50% of the lower bound of the escapement goal range to just under (one fish) the lower bound of the escapement goal range, including broodstock removals, for a given system. For example, the lower bound of the escapement goal range for Malina Lake is 1,000 sockeye salmon and we propose using 1,800 for broodstock. Thus,  $50\% * 1,000 + 1 = 501$  and  $1,000 - 1 + 1,800 = 2,799$ , so replacement backstocking will be required if the escapement is from 501 to 2,799 sockeye salmon in 2005. If the escapement is less than or equal to 500 fish, the egg take will be prohibited.
6. Backstocking options will be based upon productivity parameters for each sockeye salmon system and are intended to replace potential lost production from adult removals (i.e., the number of juveniles backstocked will produce the approximate number of adults that the spawners would have produced had they not been removed).
7. Guidelines for backstocking, as recommended by ADF&G geneticists, will be adhered to (Appendix C).
8. Specific backstocking options based on proposed broodstock removal in 2005 include 145,000 0.4-g fry or 72,500 3.0-g fingerlings or 36,250 10-g presmolt into Malina Lake (Appendix B4) or 113,000 0.4-g fry or 56,500 3.0-g fingerlings or 28,250 10-g presmolt into Afognak Lake (Appendix B5) and 446,000 0.4-g fry or 223,000 3.0-g fingerlings or 111,500 10-g presmolt into SALTERY Lake (Appendix B6).
9. Backstocking of sockeye salmon presmolt is recommended to lessen lake grazing pressure and to provide for easy identification of returning adults (through unique scale patterns).
10. Replacement will be optional for coho or Chinook broodstock removals due to the small numbers of adults needed for egg takes and the anticipation of escapement requirement being met at the Buskin River (coho) and Karluk River (Chinook) systems (L. Schwarz, Alaska Department of Fish and Game, Kodiak, personal communication). If these runs are weak in 2005, replacement for broodstock removal may occur and, if needed, backstocking options will be developed.

### **2005 SOCKEYE SALMON EGG TAKES (2006 STOCKING)**

Egg-take goals for 2005 and stocking levels for 2006, as described below for each broodstock, are based on the evaluation of the rearing capacity of each lake. This evaluation was based on zooplankton data collected in 2004 and may be adjusted in season as a result of limnological analysis of zooplankton data collected at each lake in 2005. Rearing limitations at PCH (i.e., how many juveniles of each life stage can be successfully cultured) may also result in modifications to stocking levels in 2006.

#### **EARLY-RUN SOCKEYE SALMON: MALINA LAKE DONOR STOCK**

The 2005 early-run egg-take goal is 1,600,000 Malina Lake sockeye salmon eggs (1,800 adults), which should provide for stocking about 925,000 juveniles in 2006 (Table 8; Appendix A1).

These fish will be released into Hidden (200,000 fry and 200,000 presmolt), Little Waterfall (200,000 presmolt), Big Waterfall (125,000 presmolt), and Crescent (200,000 presmolt) Lakes.

The escapement levels at Malina Lake in 2005 will determine the number of broodstock available for an egg take (Table 7; Appendix B1). Afognak Lake sockeye salmon may be used as an alternative broodstock for the aforementioned stocking projects if escapement levels preclude or do not allow the egg-take goal to be met at Malina Lake (Table 7; Appendix A5). The egg-take guidelines previously described will be adhered to regardless of the egg-take location. (Table 7; Appendices B2 and B5).

### **LATE-RUN SOCKEYE SALMON: SALTERY LAKE DONOR STOCK**

The 2005 late-run egg-take goal is 4,666,667 Saltery Lake sockeye salmon eggs (3,444 adults) (Table 9; Appendix A2). The 2006 stocking goal is 3,500,000 juveniles, of which 3,000,000 (2,500,000 fry and 500,000 presmolt) will be released into Spiridon Lake, 350,000 (200,000 fry and 150,000 presmolt) into Jennifer Lakes, and 150,000 (50,000 fry and 100,000 presmolt) into Ruth Lake.

As described above for early-run sockeye salmon (Malina Lake donor stock), the egg take at Saltery Lake will be based upon the level of escapement available for broodstock collection (Table 7; Appendix B3). There are no other “wild” late-run stocks available for alternate egg takes if escapement levels preclude or do not allow the egg-take goal to be met at Saltery Lake. Little Kitoi Lake sockeye salmon returns, as a result of broodstock development at Kitoi Bay Hatchery, may be available for broodstock collection; however, we do not anticipate that egg-take goals can be reached at the level of escapement expected at Little Kitoi Lake in 2005 (Honnold and Aro *in press*).

### **2005 COHO SALMON EGG TAKES (2006 STOCKING)**

About 94,375 Buskin Lake coho salmon eggs (47 adults) will be collected in 2005, which will provide approximately 65,500 fingerlings for stocking into seven road system lakes in 2006 (Table 10; Appendix A3). If Chinook salmon egg-take goals are not met in 2005 then additional rearing space will be available at PCH. If this occurs, additional coho salmon eggs will be taken in the fall of 2005 and reared to smolt size for release into Island, Mission, Margaret, and Abercrombie Lakes and Monashka Creek in June 2007. Up to 10,000 smolt may be stocked into Monashka Creek in 2007.

We do not expect that Buskin River coho salmon escapement levels will preclude or reduce broodstock collection in 2005, due to the small number (47) of broodstock needed to attain egg take goals (Table 7; Appendix A3) and the anticipated magnitude of the 2005 coho salmon escapement (L. Schwarz, Alaska Department of Fish and Game, Kodiak, personal communication). However, alternate broodstocks for coho stocking projects have not been identified and adherence to egg-take guidelines may result in reducing egg-take goals or not collecting eggs in 2005. Replacement requirements have not been identified for the Buskin River coho salmon stock, but may be developed in 2005.

### **2005 CHINOOK SALMON EGG TAKES (2007 STOCKING)**

The 2005 Chinook salmon egg-take goal is 300,000 Karluk River/Monashka Creek eggs (120 adults), which is expected to provide for stocking of 130,000 smolt into Monashka Creek in 2007

(Table 6; Appendix A4). A portion of the eggs will be collected from the available Chinook run (includes only 1 to 3-ocean age fish) to Monashka Creek, with the remainder collected from the Karluk River Chinook run (includes 1 to 5-ocean age fish).

The Chinook salmon run to the Karluk River is expected to meet escapement requirements in 2005 (L. Schwarz, Alaska Department of Fish and Game, Kodiak, personal communication) and should allow broodstock goals (120) to be reached (Table 6; Appendix A4). The Dog Salmon River Chinook salmon stock is permitted (FTP 04A-009) as an alternate broodstock for the Monashka Creek enhancement project. If Chinook salmon run to the Karluk River is weak, this stock may be used for the 2005 egg take. Replacement requirements have not been identified for Chinook salmon; egg-take guidelines could restrict or preclude an egg take in 2005 (Table 7). Replacement requirements have not been identified for the Karluk River Chinook salmon stock, but may be developed in 2005.

## **SOCKEYE SALMON HARVEST AND MANAGEMENT**

A total of 142,685 sockeye salmon produced from PCH stocking projects are expected to return in 2005 (Table 11). The majority of these fish (103,662) will be a result of Spiridon Lake stocking. Hidden, Little Waterfall, Big Waterfall, Crescent, Spiridon, and Ruth Lakes are barriered systems without native salmon runs. Salmon may be present in the lake outlet stream from marine waters to the salmon barrier. All sockeye salmon returning to these systems will be available for harvest. Prior to 2005, designated Terminal Harvest Areas (THA) were used to manage the harvest of enhanced sockeye salmon production from PCH (Honnold and Byrne 2004). Special Harvest Areas (SHA) were established by regulation in 2005 to replace the THAs (5 AAC 40.085).

### **HARVEST OF RETURNS TO HIDDEN LAKE**

The Foul Bay (Hidden Lake; Figure 7) harvest strategy is designed to allow for the harvest of sockeye salmon produced from the Hidden Lake enhancement project and to provide for the protection of wild salmon stocks returning to, or passing through, the Northwest Afognak Section of the Afognak District (Figure 8). The run timing of Hidden Lake returns should be similar to the timing of Afognak Lake sockeye salmon (brood source) escapement, with runs beginning in late May, peaking in early June, and declining substantially by early July (Figure 9).

Hidden Lake sockeye salmon runs will be harvested in the Foul Bay SHA, which includes the area of Foul Bay east of 152°47.20' W long. (Figure 7; 5 AAC 40.085(3)). By regulation the only legal gear type for the SHA is seine gear. Because a harvestable surplus of enhanced sockeye salmon is expected in the SHA, continuous fishing periods through the duration of the sockeye run will be allowed by the ADF&G beginning 1 June (Brennan et al. 2005). The fishery directed at the Hidden Lake sockeye salmon run is not expected to impact pink salmon escapement; the fishery occurs prior to the arrival of most of the pink salmon. There is no escapement requirement for sockeye salmon in Hidden Creek as the lake is inaccessible due to a large barrier falls. The sockeye salmon harvest is expected to occur primarily in the Foul Bay SHA; however, some Hidden Lake sockeye salmon may be harvested in the Northwest Afognak Section (Figure 8).

The ADF&G recognizes that some incidental harvest of wild stocks could occur in the Foul Bay SHA while the fishery is managed to harvest the Hidden Lake sockeye salmon run. The ADF&G may adjust the size of the SHA to minimize the harvest of wild stocks and to target the Hidden

Lake sockeye salmon. To date, age and scale pattern analysis of the harvests have indicated a minimal wild stock bycatch (Schrof et al. 2000; Schrof and Honnold 2003). A reduction in the size of the SHA is not expected in 2005 (K. Brennan, Alaska Department of Fish and Game, Kodiak, personal communication).

A weir was installed annually on Hidden Lake Creek during 1995 to 2003 to ensure that the majority of Hidden Lake sockeye salmon were harvested in the common property fishery (Figure 7). Large numbers of sockeye salmon were not observed in front of the weir either before or during the commercial fishery. Based on these observations, the ADF&G did not operate the weir in 2004. Fishery evaluation efforts in 2004 were based from the department vessel *K-Hi-C* anchored in Foul Bay in early June. ADF&G personnel will evaluate the Foul Bay SHA fishery in a similar manner in 2005.

### **HARVEST OF RETURNS TO CRESCENT LAKE**

The purpose of the Crescent Lake stocking project is to provide additional sockeye salmon for harvest in the Settler Cove (Crescent Lake) area without compromising wild stock escapements, primarily Barabara Lake sockeye salmon (Figure 10). The run timing of Crescent Lake returns should be similar to the escapement timing of Afognak Lake sockeye salmon (brood source), with runs beginning in late May, peaking in early June, and declining substantially by early July (Figure 9).

The harvest of Crescent Lake sockeye salmon is expected to occur during fishing periods targeting early-run sockeye, pink, and chum salmon in the Central Section of the Northwest Kodiak District (Figure 8). During 2005 the fishery will open in the Central Section of the Northwest Kodiak District on 1 June for a 57-hour period (Brennan et al. 2005). Additional fishing time is dependent on the run strength of early-run Karluk Lake sockeye salmon (5 AAC 18.362). The Settler Cove SHA, which includes all waters of Settler Cove west of 152°50.80' W long. (Figure 10; 5 AAC 40.085(5)), could open in 2005 if large numbers of sockeye salmon are not harvested during normal commercial fishery openings and are observed in the Settler Cove area. All fish in the SHA will be available for harvest; residents of Port Lions utilize all inriver escapement for subsistence purposes.

### **HARVEST OF RETURNS TO LITTLE AND BIG WATERFALL LAKES**

The Waterfall Bay harvest strategy allows for the harvest of enhanced sockeye salmon returning to Waterfall Bay and provides safeguards for wild salmon escapements (Figure 11). The run timing of returns to Waterfall Bay should be similar to the escapement timing of Afognak Lake sockeye salmon (brood source), with runs beginning in late May, peaking in early June, and declining substantially by early July (Figure 9).

The sockeye salmon harvest is expected to occur in the Waterfall Bay SHA within the Perenosa Bay Section (Figure 11). The Waterfall Bay SHA includes waters seaward of the stream terminus of Little (251-822) Big (251-821) Waterfall Creeks to a straight line extending northwesterly from 58°24.15' N lat., 152°28.23' W long. to 58°25.60' N lat., 152°28.23' W long. (5 AAC 40.085(4)). By regulation, the only legal gear type for the Waterfall Bay SHA is seine gear. Since escapement and broodstock are not required, all returning enhanced sockeye salmon will be available for harvest. Because a harvestable surplus of enhanced sockeye salmon is expected in 2005, continuous fishing through the duration of the sockeye run will be allowed beginning 1 June (Brennan et al. 2005).

The ADF&G recognizes that an incidental harvest of wild salmon could occur in the Waterfall Bay SHA while the fishery is managed to harvest the enhanced Little and Big Waterfall Lakes sockeye salmon. The ADF&G may adjust the size of the SHA open to commercial fishing to avoid harvesting wild stocks (Pauls Bay and Portage Lake sockeye salmon; Figure 11). To date, scale pattern and age analysis of harvest samples have indicated minimal wild stock harvest (Schrof et al. 2000; Baer and Honnold 2002). A reduction in the size of the Waterfall SHA is not expected in 2005 (K. Brennan, Alaska Department of Fish and Game, Kodiak, personal communication).

Unlike the sockeye salmon returning to Foul Bay, fish returning to Waterfall Bay tend to migrate into the confluence of Little Waterfall Creek. Thus, a fish barrier will be installed in 2005 near the terminus of Little Waterfall Creek to ensure that all returning sockeye salmon will be harvested. This barrier has been installed prior to the start of the terminal fishery each year since 1995 (Honnold and Clevenger 2003; Honnold and Byrne 2004). Although there have been concerns that the barrier may cause straying (Honnold et al. 1998), studies have conclusively demonstrated that the barrier net at the Waterfall Bay THA does not cause adverse straying affects to nearby systems with natural salmon runs (Wadle and Honnold 2000; Baer and Honnold 2002). The ADF&G will continue to allow the use of the barrier net as long as effort to harvest fish remains aggressive as in most prior years. If a fishery does not occur, the net may be removed to allow returning sockeye salmon access to Little Waterfall Creek. A fish barrier will not be used in the terminus of Big Waterfall Creek; all returning adults that are not harvested will have unimpeded access to freshwater downstream of the barrier falls.

## **HARVEST OF RETURNS TO SPIRIDON LAKE**

The Spiridon Lake sockeye salmon management plan, 5 AAC 18.366, is designed to allow for the harvest of enhanced sockeye salmon returning to Spiridon Lake (Brennan et al. 2005; Figure 12) and to provide adequate protection for escapements of wild salmon stocks returning to streams in the area (Spiridon River sockeye, pink, chum, and coho salmon; stream number 254-401). The intent of this stocking project is to provide enhanced sockeye salmon in traditional commercial fishing areas in the Northwest Kodiak District (Figure 8). Sockeye salmon returns in 2005 are expected to begin in late June and continue into mid-August (Figure 4).

Harvests of Spiridon Lake sockeye salmon are expected to occur during openings targeting Karluk Lake sockeye and westside pink and chum salmon stocks (Brennan et al. 2005). A SHA, however, is required to provide for an orderly harvest of enhanced sockeye salmon that have migrated past the traditional commercial fishing areas of the Northwest Kodiak District. The Spiridon Bay SHA includes all waters of Telrod Cove north of a line extending from Stream Point at 57° 39.00' N lat., 153° 38.50' W long., to a point at 57° 38.80' N lat., 153° 37.70' W long. (5 AAC 40.085(2); Figure 12). A continuous fishing period will be announced by the ADF&G when enhanced sockeye salmon are documented within the SHA (Brennan et al. 2005). By regulation, the only legal gear type for the Spiridon Bay SHA is seine gear. A series of barrier falls prevents salmon from entering Spiridon Lake, but sockeye salmon returning to Telrod Cove have access to Telrod Creek (Figure 12). Closed water markers ensure that intertidal habitat is not disturbed during fishing operations.

The ADF&G recognizes that some incidental harvest of wild stocks could occur in this area while the fishery is managed to harvest the enhanced Spiridon Lake sockeye salmon. The restricted size of the SHA coupled with the run timing (Saltery Lake sockeye salmon broodstock)

of returns to Spiridon Lake, however, are expected to reduce the incidental harvest of wild salmon stocks, specifically those returning to Spiridon River (pink and chum salmon) and Telrod Creek (pink salmon).

The SHA will be monitored by ADF&G personnel beginning in mid June and continuing until early August or when the SHA is closed to fishing.

### **HARVEST OF RETURNS TO RUTH LAKE**

The Ruth Lake enhanced sockeye salmon run will be harvested incidentally in 2005 during pink, chum, and coho salmon fisheries in the Kitoi, Izhut, and Duck Bay Sections of the Afognak District (Figures 1 and 8; Brennan et al. 2005; Honnold and Aro *in press*). The run timing is expected to be similar to that described for Spiridon Lake runs, since Saltery Lake sockeye salmon were used as broodstock (Figure 4).

### **HARVEST REPORTING**

Spiridon Lake SHA, Foul Bay SHA, Waterfall Bay SHA, and Kitoi Bay Area (Ruth Lake) salmon harvest information will be monitored through daily verbal processor reports and the ADF&G fish ticket database. On-site estimates of harvest and the collection of age and sex composition data from returning sockeye salmon will be collected by field personnel at each of these locations.

Harvest information from the Crescent Lake sockeye salmon run will be monitored through the ADF&G fish ticket database and subsistence permit reports. The harvest contribution from this project will be determined by assigning all sockeye salmon harvested in the Settler Cove SHA as originating from Crescent Lake. The run timing and location of the fishery (SHA) provides for an isolated harvest of returning adults. The subsistence harvest will be assigned through the ADF&G subsistence use reporting system.

## **ADDITIONAL MEASURES FOR WILDSTOCK PROTECTION**

### **GENETICS POLICY**

The ADF&G Genetics policy is designed to assure that stocking projects do not negatively impact the genetic integrity of wild stocks (McGee 1995). The policy addresses three primary areas: 1) stock transport, 2) protection of wild stocks, and 3) maintenance of genetic variance. This policy, as described in the 1998 Pillar Creek Hatchery AMP (Honnold et al. 1998), will be followed in 2005 for all projects.

To protect wild stocks and maintain genetic variance unharvested adults produced from hatchery stocking projects must be prevented from straying into stream and lake systems supporting wild stocks. A management strategy targeting unharvested enhanced production is required by ADFG to insure compliance with state regulations for private nonprofit (PNP) salmon hatcheries (5AAC 40.005(f)). This strategy must address ADF&G PNP permitting requirements for salmon straying concerns and include detailed actions required when harvest of enhanced production is delayed or abandoned.

These actions were detailed in an unplanned cost recovery operational plan (UCROP) as part of the PCH annual management plan, 2003 and included cost recovery fisheries in the THAs (currently SHAs; Honnold and Clevenger 2003). If commercial fishing does not occur for some reason in 2005, salmon returning to the SHAs will be harvested using the guidelines described in the UCROP.

## **POLICIES AND GUIDELINES FOR HEALTH AND DISEASE CONTROL**

The State of Alaska Pathology Review Committee has developed a long range goal to prevent dissemination of infectious finfish (and shellfish) disease within or outside the borders of Alaska (McGee 1995). This goal is intended to protect stocks without constraining aquaculture or stock renewal programs. The policy and guidelines do not advocate transplanting wild finfish stocks between geographic zones to minimize the risk of transporting disease from one zone to another. This policy includes hatchery stocks in order to be consistent with the Genetics policy. Some exceptions may be made on a case by case basis. The policy and guidelines for health and disease control, as described in the 1998 Pillar Creek Hatchery AMP (Honnold et al. 1998), will be followed in 2005 for all projects.

## **SPECIAL STUDIES/RESEARCH**

The 1994 to 1997 Spiridon Lake sockeye salmon runs were reconstructed using scale pattern analysis to delineate Spiridon Lake fish in the Northwest Kodiak District or in the Southwest Afognak Section commercial harvests (Nelson and Barrett 1994; Nelson and Swanton 1996; Nelson and Swanton 1997; Nelson 1999). The runs from 1998 to 2004, however, have not been formally reconstructed due to the run timing differences between the original late-run Upper Station broodstock (stocked from 1991 to 1994 and 1996 to 1997) and the Saltery Lake broodstock (stocked in 1995 and from 1998 to 2004). Stock separation techniques used when only the late-run Upper Station stock fish returned (1994 to 1997) were not appropriate for application to the mixed stock runs (1998 to 2002) or for future runs when only the Saltery Lake fish return (P. Nelson, Alaska Department of Fish and Game, Kodiak, personal communication). This is primarily due to the increased number of both local and non-local stocks present in the Northwest Kodiak District during the earlier Saltery Lake broodstock run timing (P. Nelson, Alaska Department of Fish and Game, Kodiak, personal communication).

The average proportion of the Spiridon-bound sockeye salmon harvested in the Spiridon Lake THA from 1994 to 1997 (41%) was applied to the 1998 through 2004 THA harvest to reconstruct the recent Spiridon Lake sockeye salmon contribution to the harvest in the SW Afognak Section and Northwest Kodiak District (Schrof and Honnold 2003; Honnold and Byrne 2004). This method of run reconstruction will be used for the 2005 and future Spiridon Lake sockeye salmon runs until a new method of stock separation is developed and implemented to identify the Saltery Lake stock returns (P. Nelson, Alaska Department of Fish and Game, Kodiak, personal communication).

Smolt abundance will be estimated and samples collected for age and condition during their emigration from Spiridon Lake as a check on stocking density and to assist with run forecasts (ADF&G 2005). Spiridon Lake will also be monitored by townetting and hydroacoustics to evaluate juvenile sockeye salmon population trends.

Smolt will also be sampled for condition and age at all other systems stocked with juvenile sockeye salmon. Stocked lakes will also be sampled to evaluate zooplankton trends and water quality parameters.

## **ACKNOWLEDGMENTS**

We acknowledge the KRAA Director, Larry Malloy and all KRAA permanent and seasonal personnel that staff Pillar Creek Hatchery. We also acknowledge the ADF&G salmon managers,

project biologists, and field staff that contribute to Pillar Creek Hatchery programs including Kevin Brennan, Len Schwarz, Donn Tracy, Jeff Wadle, Steve Schrof, Rob Baer, Greg Watchers, and Steve Thomsen. We also thank Lucinda Neel for her publication expertise, Jim McCullough, Kevin Brennan, and Len Schwarz who provided editorial comments, and Patti Nelson, the Division of Commercial Fisheries Finfish Regional editor.

## REFERENCE CITED

- ADF&G (Alaska Department of Fish and Game). *In press*. Salmon research operational plans for the Kodiak area, 2005. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report, Kodiak.
- Baer, R.T. and S.G. Honnold. 2002. A straying assessment of an introduced sockeye salmon stock on northern Afognak Island as determined by two methods of stock identification. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K02-56, Kodiak.
- Brennan, K., J. Wadle, and D. Gretsche. 2005. Kodiak Management Area harvest strategy for the 2005 season commercial salmon fishery. Alaska Department of Fish and Game, Division of Commercial Fisheries, Fishery Management Report 05-329, Anchorage.
- Honnold, S.G. 1997. The results of sockeye salmon (*Oncorhynchus nerka*) stocking into Spiridon Lake on the Kodiak National Wildlife Refuge: juvenile and adult production, commercial harvest, and ecosystem effects, 1987-1996. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report 4K97-47, Kodiak.
- Honnold, S.G. and D. Aro. *In press*. Kitoi Bay Hatchery annual management plan, 2005. Alaska Department of Fish and Game, Division of Commercial Fisheries, Fishery Management Report, Anchorage.
- Honnold, S.G. and D. Aro. 2004. Kitoi Bay Hatchery annual management plan, 2004. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K04-29, Kodiak.
- Honnold, S.G. and G. Byrne. 2004. Pillar Creek Hatchery annual management plan, 2004. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K04-40, Kodiak.
- Honnold S.G., C. Clevenger, and J.N. McCullough. 1998. Pillar Creek Hatchery annual management plan, 1998. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report 4K98-24, Kodiak.
- Honnold, S.G., C. Clevenger, J.N. McCullough and S.T. Schrof. 1999. Pillar Creek Hatchery annual management plan, 1999. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K99-45, Kodiak.
- Kodiak Regional Aquaculture Association (KRAA). 1998. Pillar Creek Hatchery basic management plan. Alaska Department of Fish and Game, Private Nonprofit Salmon Hatchery Permit No. 41, Juneau.
- McGee, S.G. 1995. The hatchery program and protection of wild salmon in Alaska: policies and regulations. Alaska Department of Fish and Game, Division of Commercial Fisheries, Draft Report (compilation), Juneau.
- McCullough, J.N., C. Clevenger, S.G. Honnold, and S.T. Schrof. 2000. Pillar Creek Hatchery annual management plan, 2000. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K00-39, Kodiak.
- McCullough, J.N. and C. Clevenger. 2002. Pillar Creek Hatchery annual management plan, 2002. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K02-38, Kodiak.
- Nelson, P.A. 1999. An estimate of Spiridon Lake sockeye salmon commercially harvested within the Southwest Afognak Section and the Northwest Kodiak Districts, 1997. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K99-25, Kodiak.

## REFERENCES CITED (Continued)

- Nelson, P.A. and B.M. Barrett. 1994. An estimate of the number of Spiridon Lake sockeye salmon commercially harvested within the Northwest Kodiak and Southwest Kodiak Districts, 1994. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report 4K94-43, Kodiak.
- Nelson, P.A. and C.O. Swanton. 1996. An estimate of the number of Spiridon Lake sockeye salmon commercially harvested within the Northwest Kodiak and Southwest Kodiak Districts, 1995. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report 4K96-32, Kodiak.
- Nelson, P.A. and C.O. Swanton. 1997. An estimate of the number of Spiridon Lake sockeye salmon commercially harvested within the Northwest Kodiak and Southwest Kodiak Districts, 1996. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report 4K97-44, Kodiak.
- Nelson, P.A., M.J. Witteveen, S.G. Honnold, I.Vining, and J.J. Hasbrouk. *In press*. Review of salmon escapement goals in the Kodiak Management Area. Alaska Department of Fish and Game, Division of Commercial Fisheries, Fishery Management Report, Anchorage.
- Schrof S.T. and S.G. Honnold. 2003. A summary of salmon enhancement, rehabilitation, evaluation, and monitoring efforts conducted in the Kodiak Management Area through 2001. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K03-41, Kodiak.
- Schrof, S.T., S.G. Honnold, C. Hicks, and J. Wadle. 2000. A summary of salmon enhancement, rehabilitation, evaluation, and monitoring efforts conducted in the Kodiak Management Area through 1998. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K00-57, Kodiak.
- Wadle, J. A. 2004. Kodiak Management Area commercial salmon annual management report, 2002. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K04-1, Kodiak.
- Wadle, J. and S.G. Honnold. 2000. An assessment of the straying of two enhanced sockeye salmon stocks on northern Afognak Island, as influenced by artificial barriers preventing access to freshwater. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K00-53, Kodiak.

## **TABLES AND FIGURES**

**Table 1.**-Pillar Creek Hatchery early-run sockeye salmon egg takes (Malina Lake broodstock) in 2004, resultant juvenile releases planned in 2005, projected adult production, and fish transport permit information.

<b>Parameter</b>	Early-run Sockeye	Early-run Sockeye	Early-run Sockeye	Early-run Sockeye	Early-run Sockeye	Early-run Sockeye	Early-run Sockeye	Totals
<b><u>Egg take</u></b>								
<b>eggs</b>	484,486	320,852	69,090	267,377	28,235	181,816	231,013	1,582,869
<b>adults</b>	750	497	107	414	44	281	358	2,450
<b><u>Releases</u></b>								
<b>location</b>	Hidden Lake	Hidden Lake	Little Waterfall Lake	Little Waterfall Lake	Big Waterfall Lake	Big Waterfall Lake	Crescent Lake	
<b>number</b>	113,250	75,000	16,150	62,500	6,600	42,500	54,000	370,000
<b>size (g)</b>	1.6	12.8	1.2	15.3	1.3	11.2	1.3	
<b>lifestage</b>	Fingerlings	Presmolt	Fingerlings	Presmolt	Fingerlings	Presmolt	Fingerlings	
<b>date</b>	28-Jun-05	05-Oct-05	22-Jun-05	05-Oct-05	22-Jun-05	05-Oct-05	22-Jun-05	
<b><u>Projected Returns</u></b> <sup>a</sup>								
<b>2007</b>	537	848	77	706	31	480	256	2,936
<b>2008</b>	1,936	2,483	276	2,069	113	1,407	923	9,206
<b>2009</b>	3,438	3,930	490	3,275	200	2,227	1,639	15,199
<b>2010</b>	1,215	0	173	0	71	0	579	2,038
<b>total</b>	7,126	7,260	1,016	6,050	415	4,114	3,398	29,379
<b><u>Fish Transport Permit (FTP)</u></b> <sup>b</sup>								
<b>number</b>	04A-0035	04A-0035	04A-0038	04A-0038	04A-0031	04A-0031	04A-0033	
<b>expires</b>	31-Dec-09	31-Dec-09	31-Dec-09	31-Dec-09	31-Dec-09	31-Dec-09	31-Dec-09	
<b>max. no.</b>	600,000	500,000	400,000	350,000	250,000	250,000	500,000	
<b>lifestage</b>	Fingerlings	Presmolt	Fingerlings	Presmolt	Fingerlings	Presmolt	Fingerlings	

<sup>a</sup> Projected returns are calculated from Table 2 survival and age assumptions.

<sup>b</sup> FTP 04A-0042 - for 4.1 million green eggs, expiring 31 Dec-09, authorizes egg take for these projects.

**Table 2.-**Salmon survival and age assumptions used to estimate returns for Pillar Creek Hatchery stocking projects.

Species	Broodstock <sup>a</sup>	Stocking		Survival <sup>b</sup> Stocking-to- adult return	Age-at-return Proportions <sup>b</sup>							
		Life Stage <sup>c</sup>	Size (g)		1.1	1.2	2.1	1.3	2.2	1.4	2.3	1.5
Sockeye	AL/ML	F	0.4	4.5%	0.07	0.22	0.04	0.36	0.11		0.17	
Sockeye	AL/ML	FG	1.0-3.0	6.5%	0.07	0.22	0.04	0.36	0.11		0.17	
Sockeye	AL/ML	PS	8.0-15.0	10.0%	0.11	0.33		0.52				
Sockeye	SL	F	0.4-0.6	4.5%	0.01	0.31	0.01	0.39	0.24		0.05	
Sockeye	SL	FG	3.0-6.0	6.5%	0.01	0.31	0.01	0.39	0.24		0.05	
Sockeye	SL	PS	8.0-13.0	12.5%	0.02	0.55		0.44				
Coho	BL	FG	3.0-5.0	6.5%			1.00					
Coho	BL	PS	8.0	10.0%	1.00							
Coho	BL	S	15.0	12.5%	1.00							
Chinook	KR	S	30.0	2.5%	0.02	0.13		0.22		0.58		0.05

<sup>a</sup> AL=Afognk Lake early run, ML=Malina Lake early run, SL=Saltery Lake late run, BL=Buskin Lake, and KR=Karluk River.

<sup>b</sup> based on actual survival and age-at-return data from Pillar Creek Hatchery and/or other ADF&G research projects.

<sup>c</sup> F=fry, FG=fingerling, PS=presmolt, and S=smolt.

**Table 3.**-Pillar Creek Hatchery late-run sockeye salmon egg takes (Saltery Lake broodstock) in 2004, resultant juvenile releases planned for Spiridon and Ruth Lakes in 2005, projected adult production, and fish transport permit information.

<b>Parameter</b>	Late-run Sockeye	Late-run Sockeye	Totals	Late-run Sockeye
<b><u>Egg take</u></b>				
eggs	2,236,518	1,527,378	3,763,896	109,780
adults	1,827	1,248	3,075	90
<b><u>Releases</u></b>				
location	Spiridon Lake	Spiridon Lake	Spiridon Lake	Ruth Lake
number	820,000	560,000	1,380,000	35,000
size (g)	0.6	12.0		0.6
lifestage	Fry	Presmolt		Fry
date	28-Jun-05	05-Oct-05		23-Jun-05
<b><u>Projected Returns</u></b> <sup>a</sup>				
2007	185	1,120	1,305	8
2008	11,734	38,150	49,884	501
2009	22,952	30,730	53,682	980
2010	1,993	0	1,993	85
total	36,863	70,000	106,863	1,573
<b><u>Fish Transport Permit (FTP)</u></b> <sup>b</sup>				
number	04A-0040	04A-0040		04A-0039
expires	31-Dec-09	31-Dec-09		31-Dec-09
max. no.	7,000,000	1,000,000		300,000
lifestage	Fry	Presmolt		Fry

<sup>a</sup> Projected returns are calculated from Table 2 survival and age assumptions.

<sup>b</sup> FTP 97A-0071 - for 9.8 million green eggs, expiring 31 Dec-08, authorizes egg take for these projects.

**Table 4.-**Pillar Creek Hatchery coho salmon egg takes (Buskin Lake broodstock) in 2003, resultant juvenile (planned) releases at Road System Lakes in 2005, projected adult production, and fish transport permit information.

<b>Parameter</b>	Coho	Coho	Coho	Coho	Coho	Totals
<b><u>Egg take</u></b>						
<b>eggs</b>	11,763	11,837	3,751	4,109	11,723	43,183
<b>adults</b>	6	6	2	2	6	21
<b><u>Releases</u></b>						
<b>location</b>	Island Lk.	Mission Lk.	Southern Lk.	Margaret Lk.	Monashka Ck.	
<b>number</b>	10,034	10,097	3,200	3,505	10,000	36,836
<b>size (g)</b>	9.5	9.5	12.0	9.5	15.0	
<b>lifestage</b>	Presmolt	Presmolt	Presmolt	Presmolt	Smolt	
<b>date</b>	15-Mar-05	15-Mar-05	20-Apr-05	15-Mar-05	03-Jun-05	
<b><u>Projected Returns</u></b> <sup>a</sup>						
<b>2006</b>	1,003	1,010	0	0	1,250	3,263
<b>total</b>	1,003	1,010	landlocked	landlocked	1,250	3,263
<b><u>Fish Transport Permit (FTP)</u></b> <sup>b</sup>						
<b>number</b>	04A-0006	04A-0006	04A-0005	04A-0013	04A-0007	
<b>expires</b>	31-Dec-13	31-Dec-13	31-Dec-13	31-Dec-13	31-Dec-08	
<b>max. no.</b>	22,500	12,500	3,500	3,500	10,000	
<b>lifestage</b>	any	any	any	any	smolt	

<sup>a</sup> Projected returns are calculated from Table 2 survival and age assumptions. Assume that presmolt outmigrate in 2005.

<sup>b</sup> FTP 93A-0105 - for 150,000 green eggs, expiring 31 Dec-03, authorized egg take for these projects.

**Table 5.**-Pillar Creek Hatchery coho salmon egg takes (Buskin Lake broodstock) in 2004, resultant juvenile releases planned for Road System Lakes in 2005 and 2006, projected adult production, and fish transport permit information.

<b>Parameter</b>	Coho	Coho	Coho	Coho	Coho	Coho	Coho	Coho	Coho	Totals
<b><u>Egg take</u></b>										
<b>eggs</b>	3,108	0	20,826	12,952	7,771	9,843	0	0	0	54,500
<b>adults</b>	2	0	12	8	5	6	0	0	0	32
<b><u>Releases</u></b>										
<b>location</b>	Mayflower Lk.	Southern Lk.	Island Lk.	Mission Lk.	Dark Lk.	P.Patch Lk.	Margaret Lk.	Abercrombie Lk.	Monashka Cr. <sup>a</sup>	
<b>number</b>	3,000	0	20,100	12,500	7,500	9,500	0	0		52,600
<b>size (g)</b>	4.5		4.5	4.5	4.5	8.0			15.0	
<b>lifestage</b>	Fingerling	Fingerling	Fingerling	Fingerling	Fingerling	Fingerling	Fingerling	Fingerling	Smolt	
<b>date</b>	05-Aug-05		05-Aug-05	05-Aug-05	05-Aug-05	04-Sep-05			03-Jun-06	
<b><u>Projected Returns</u></b> <sup>b</sup>										
<b>2007</b>	0	0	0	0	0	0	0	0	0	0
<b>2008</b>	195	0	1,307	813	488	618	0	0	0	3,419
<b>total</b>	195	landlocked	1,307	813	488	618	landlocked	landlocked	0	3,419
<b><u>Fish Transport Permit (FTP)</u></b> <sup>c</sup>										
<b>number</b>	04A-0006	04A-0005	04A-0006	04A-0006	04A-0006	04A-0006	04A-0013	05A-xxxx	04A-0007	
<b>expires</b>	31-Dec-13	31-Dec-13	31-Dec-13	31-Dec-13	31-Dec-13	31-Dec-13	31-Dec-13	31-Dec-13	31-Dec-08	
<b>max. no.</b>	6,500	3,500	22,500	12,500	7,500	9,500	3,500	3,500	10,000	
<b>lifestage</b>	any	any	any	any	any	any	any	any	smolt	

<sup>a</sup> Coho smolt may be reared and then released at Island Lk., Mission Lk., landlocked lakes, and/or Monashka Creek depending upon chinook salmon smolt production. Possible 2006 releases are not included in total releases for all locations.

<sup>b</sup> Projected returns are calculated from Table 2 survival and age assumptions. If smolt are released in 2006, they would return in 2007 (age 1.1 fish).

<sup>c</sup> FTP 04A-0004 - for 200,000 green eggs, expiring 31 Dec-13, authorized egg take for these projects.

**Table 6.-**Karluk River chinook salmon egg takes (2000-2005), Monashka Creek releases (2002-2007), projected returns (2003-2012), and fish transport permit (FTP) information.

Year	Egg Take <sup>a, b</sup>		Releases			Adult Returns <sup>b</sup>										Total Return	
	Eggs	Adults	Number	Size (g)	Date	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012		
2000	124,818	48	60,400	30.0	May-02	30	196	332	876	76							1,510
2001	86,120	34	34,000	21.0	May-03		17	111	187	493	43						850
2002	147,000	59	12,300	30.0	May-04			6	40	68	178	15					308
2003	172,300	70	72,150	20.0	May-05				36	234	397	1,046	90				1,804
2004	181,600	76	37,000	20.0	May-06					19	120	204	537	46			925
2005	300,000	120	130,000	20.0	May-07						65	423	715	1,885	163		3,250
Total Run:						30	213	449	1,139	889	803	1,688	1,342	1,931	163		
FTP	Summary					Maximal number				Expiration							
00A-0010	Allows chinook eggtake at Karluk River					60 pairs / 300,000 eggs				6/30/06							
05A-0050	Allows chinook eggtake at Monashka Creek					300,000 eggs				9/1/14							

<sup>a</sup> In 2000, 2001, and 2003 equal numbers of females and males were used; in 2002, 25 females and 34 males were used.

<sup>b</sup> 2005 will be the first year that adult progeny of this chinook project will return to Monashka Creek. An egg take will be attempted at Monashka Creek utilizing a portion of the return as brood. Eggs will also be taken from Karluk River brood. The combined total of the egg takes will not exceed 300,000 eggs.

<sup>c</sup> Projected returns are calculated from Table 2 survival and age assumptions.

**Table 7.-**Donor stock, broodstock numbers, escapement goal range, egg-take guidelines, and egg-take replacement criteria for 2005 egg takes.

Species	Donor Stock	Broodstock Numbers	Escapement Goal Range	Egg-take Guidelines - Escapement		Egg-take Replacement Criteria	
				<b>Egg take Prohibited</b> Escapement is $\leq$ :	<b>Full Egg take Allowed</b> Escapement is $>$ : <sup>a</sup>	Replacement Required Escapement is: <sup>b</sup>	Replacement Requirement <sup>c</sup>
Sockeye	Malina Lake	1,800	1,000-10,000	500	2,300	501-2,799	36,250 presmolt
Sockeye	Afognak Lake	1,400	20,000-50,000	10,000	11,400	10,001 - 21,399	28,250 presmolt
Sockeye	Saltery Lake <sup>d</sup>	4,116	15,000-30,000	7,500	11,616	7,501 - 19,115	111,500 presmolt
Coho	Buskin Lake	47	3,200-7,200	1,600	1,647	none	none
Chinook	Karluk River/Monashka Creek	120	3,600-7,300	1,800	1,920	none	none

<sup>a</sup> Full egg take refers to removal of proposed broodstock numbers. If escapements are less than this guideline, then broodstock removals will be reduced (Appendix E-G) to maintain escapements at or above 50% of the lower bound of the escapement goal range.

<sup>b</sup> 50% of lower bound of escapement goal range plus one (lower number) to the lower bound of escapement goal range minus one plus broodstock numbers (upper number). For example, for Afognak Lake - lower number is  $50\% * 20,000 + 1 = 10,001$ ; upper number is  $20,000 - 1 + 1400 = 21,399$ .

<sup>c</sup> Refers to the number of juvenile fish necessary to replace lost production from the removal of adults used for broodstock (from Appendices H-J).

<sup>d</sup> Broodstock numbers include approximately 700 adults for Kitoi Bay Hatchery projects (Honnold and Aro in press).

**Table 8.-**Proposed Pillar Creek Hatchery early-run sockeye salmon egg takes (Malina Lake broodstock) in 2005, juvenile releases in 2006, projected adult production, and fish transport permit information.

<b>Parameter</b>	Early-run Sockeye	Early-run Sockeye	Early-run Sockeye	Early-run Sockeye	Early-run Sockeye	Totals
<b><u>Egg take</u></b> <sup>a</sup>						
eggs	345,946	345,946	345,946	216,216	345,946	1,600,000
adults	389	389	389	243	389	1,800
<b><u>Releases</u></b>			Little Waterfall Lake	Big Waterfall Lake	Crescent Lake	
location	Hidden Lake	Hidden Lake				
number	200,000	200,000	200,000	125,000	200,000	925,000
size (g)	0.4	10.0	10.0	10.0	10.0	
lifestage	Fry	Presmolt	Presmolt	Presmolt	Presmolt	
date	15-May-06	15-Oct-06	15-Oct-06	15-Oct-06	15-Oct-06	
<b><u>Projected Returns</u></b> <sup>b</sup>						
2008	657	2,260	2,260	1,413	2,260	8,193
2009	2,367	6,620	6,620	4,138	6,620	23,998
2010	4,203	10,480	10,480	6,550	10,480	37,990
2011	1,485	0	0	0	0	0
total	8,712	19,360	19,360	12,100	19,360	70,180
<b><u>Fish Transport Permit (FTP) (Malina Lake stock)</u></b> <sup>c</sup>						
number	04A-0035	04A-0035	04A-0038	04A-0031	04A-0033	
expires	31-Dec-09	31-Dec-09	31-Dec-09	31-Dec-09	31-Dec-09	
max. no.	600,000	500,000	350,000	250,000	275,000	
lifestage	Fry	Presmolt	Presmolt	Presmolt	Presmolt	
<b><u>Fish Transport Permit (FTP) (Afognak Lake stock)</u></b> <sup>c</sup>						
number	99A-0053	99A-0054	97A-0076	04A-0032	04A-0034	
expires	31-Dec-08	31-Dec-08	31-Dec-08	31-Dec-09	31-Dec-09	
max. no.	500,000	500,000	200,000	250,000	275,000	
lifestage	Fry	Presmolt	Presmolt	Presmolt	Presmolt	

<sup>a</sup> Afognak Lake sockeye salmon has traditionally been the primary broodstock for early-run stocking projects, but adult returns have been depressed since 2001. Malina Lake sockeye were utilized as an alternative broodstock in 2004, and are the preferred broodstock for the 2005 early-run sockeye egg take. Afognak Lake sockeye may be utilized as a 2005 brood source if egg take goals cannot be achieved using Malina Lake sockeye salmon.

<sup>b</sup> Projected returns are calculated from Table 2 survival and age assumptions.

<sup>c</sup> FTP 99A-0051 - for 4.1 million green eggs, expiring 31 Dec-08, authorizes Afognak Lake egg take for these projects. Malina Lake egg take is provided for under FTP 04A-0042, for 4.1 million eggs, expiring 31 Dec-09.

**Table 9.-**Proposed Pillar Creek Hatchery late-run sockeye salmon egg takes (Saltery Lake broodstock) in 2005, juvenile releases for Spiridon, Jennifer, and Ruth Lakes in 2006, projected adult production, and fish transport permit information.

<b>Parameter</b>	Late-run Sockeye	Late-run Sockeye	<b>Totals</b>	Late-run Sockeye	Late-run Sockeye	<b>Totals</b>	Late-run Sockeye	Late-run Sockeye	<b>Totals</b>	<b>Late-run Totals</b>
<b>Egg take</b>										
eggs	3,333,333	666,667	<b>4,000,000</b>	266,667	200,000	<b>466,667</b>	66,667	133,333	<b>200,000</b>	<b>4,666,667</b>
adults <sup>a</sup>	2,460	492	<b>2,952</b>	197	148	<b>344</b>	49	98	<b>148</b>	<b>3,444</b>
<b>Releases</b>										
location	Spiridon Lake	Spiridon Lake	<b>Spiridon Lake</b>	Jennifer Lakes	Jennifer Lakes	<b>Jennifer Lakes</b>	Ruth Lake	Ruth Lake	<b>Ruth Lake</b>	
number	2,500,000	500,000	<b>3,000,000</b>	200,000	150,000	<b>350,000</b>	50,000	100,000	<b>150,000</b>	<b>3,500,000</b>
size (g)	0.4	10.0		0.4	10.0		0.4	10.0		
lifestage	Fry	Presmolt		Fry	Presmolt		Fry	Presmolt		
date	01-Jun-06	15-Oct-06		01-Jun-06	15-Oct-06		01-Jun-06	15-Oct-06		
<b>Projected Returns</b> <sup>b</sup>										
2008	563	1,000	<b>1,563</b>	45	300	<b>345</b>	11	200	<b>211</b>	<b>2,119</b>
2009	35,775	34,063	<b>69,838</b>	2,862	10,219	<b>13,081</b>	716	6,813	<b>7,528</b>	<b>90,446</b>
2010	69,975	27,438	<b>97,413</b>	5,598	8,231	<b>13,829</b>	1,400	5,488	<b>6,887</b>	<b>118,129</b>
2011	6,075	0	<b>6,075</b>	486	0	<b>486</b>	122	0	<b>122</b>	<b>6,683</b>
total	112,388	62,500	<b>174,888</b>	8,991	18,750	<b>27,741</b>	2,248	12,500	<b>14,748</b>	<b>217,376</b>
<b>Fish Transport Permit (FTP)</b> <sup>c</sup>										
number	04A-0040	04A-0040		04A-0036	04A-0036		04A-0039	04A-0039		
expires	31-Dec-09	31-Dec-09		31-Dec-09	31-Dec-09		31-Dec-09	31-Dec-09		
max. no.	7,000,000	1,000,000		400,000	250,000		300,000	300,000		
lifestage	Fry	Presmolt		Fry	Presmolt		Fry	Presmolt		

<sup>a</sup> Totals adults do not include approximately additional 700 fish that will be utilized for Kitoi Bay Hatchery projects (Honnold and Aro *in press*)

<sup>b</sup> Projected returns are calculated from Table 2 survival and age assumptions.

<sup>c</sup> FTP 99A-0071 - for 9.8 million green eggs, expiring 31 Dec-08, authorizes egg take for these projects.

**Table 10.**-Pillar Creek Hatchery coho salmon egg takes (Buskin Lake broodstock) in 2005, resultant juvenile releases planned for Road System Lakes in 2006 (Monashka Creek in 2007), projected adult production, and fish transport permit information.

<b>Parameter</b>	Coho	Coho	Coho	Coho	Coho	Coho	Coho	Coho	Totals
<b><u>Egg take</u></b>									
<b>eggs</b>	8,125	28,125	9,375	15,625	11,875	4,375	4,375	12,500 <sup>a</sup>	94,375
<b>adults</b>	4	14	5	8	6	2	2	6 <sup>a</sup>	47
<b><u>Releases</u></b>									
<b>location</b>	Mayflower Lk.	Island Lk.	Dark Lk.	Mission Lk.	P.Patch Lk.	Southern Lk.	Margaret Lk.	Monashka Cr. <sup>a</sup>	
<b>number</b>	6,500	22,500	7,500	12,500	9,500	3,500	3,500	10,000	75,500
<b>size (g)</b>	3.0	3.0	3.0	3.0	3.0	3.0	3.0	15.0	
<b>lifestage</b>	Fingerling	Fingerling	Fingerling	Fingerling	Fingerling	Fingerling	Fingerling	Smolt	
<b>date</b>	15-Jul-06	15-Jul-06	15-Jul-06	15-Jul-06	15-Jul-06	15-Jul-06	15-Jul-06	15-May-07	
<b><u>Projected Returns</u></b> <sup>b</sup>									
<b>2008</b>	0	0	0	0	0	0	0	1,250	1,250
<b>2009</b>	423	1,463	488	813	618	0	0	0	3,803
<b>total</b>	423	1,463	488	813	618	landlocked	landlocked	1,250	5,053
<b><u>Fish Transport Permit (FTP)</u></b> <sup>c</sup>									
<b>number</b>	04A-0006	04A-0006	04A-0006	04A-0006	04A-0006	04A-0005	04A-0013	04A-0007	
<b>expires</b>	31-Dec-13	31-Dec-13	31-Dec-13	31-Dec-13	31-Dec-13	31-Dec-13	31-Dec-13	31-Dec-08	
<b>max. no.</b>	6,500	22,500	7,500	12,500	9,500	3,500	3,500	10,000	
<b>lifestage</b>	any	any	any	any	any	any	any	smolt	

<sup>a</sup> Coho smolt may be reared at PCH and then released into Island, Mission, and/or landlocked lakes, depending upon chinook salmon smolt production. The possible 2007 releases are not included in column above of total releases for all locations.

<sup>b</sup> Projected returns are calculated from Table 2 survival and age assumptions.

<sup>c</sup> FTP 04A-0004 - for 200,000 green eggs, expiring 31 Dec-13, authorized egg take for these projects.

**Table 11.-**Estimated 2005 sockeye salmon runs as a result of Pillar Creek Hatchery stocking projects.

Lake Stocked	Broodstock <sup>a</sup>	Harvest Location	Estimated Enhanced Run			
			Point	Range		
Hidden	Afognak Lake (ER)	Foul Bay SHA	13,557	5,300	to	29,410
Big & Little Waterfall	Afognak Lake (ER)	Waterfall Bay SHA	22,511	14,001	to	40,355
Crescent	Afognak Lake (ER)	Settler Cove SHA <sup>b</sup>	2,055	453	to	8,768
Spiridon	Saltery Lake (LR)	Spiridon Bay SHA <sup>c</sup>	103,662	61,330	to	144,600
Ruth	Saltery Lake (LR)	Kittoi, Duck, Izhut Bays	900	400	to	1,400
Total Early Run:			38,123	19,754	to	78,533
Total Late Run:			104,562	61,730	to	146,000
Total Both Runs:			142,685	81,484	to	224,533

<sup>a</sup> ER = early run; LR = late run

<sup>b</sup> Some fish may be harvested in the Central Section of the Northwest Kodiak District.

<sup>c</sup> Fish will also be harvested in traditional commercial fishing areas in the Northwest Kodiak District.

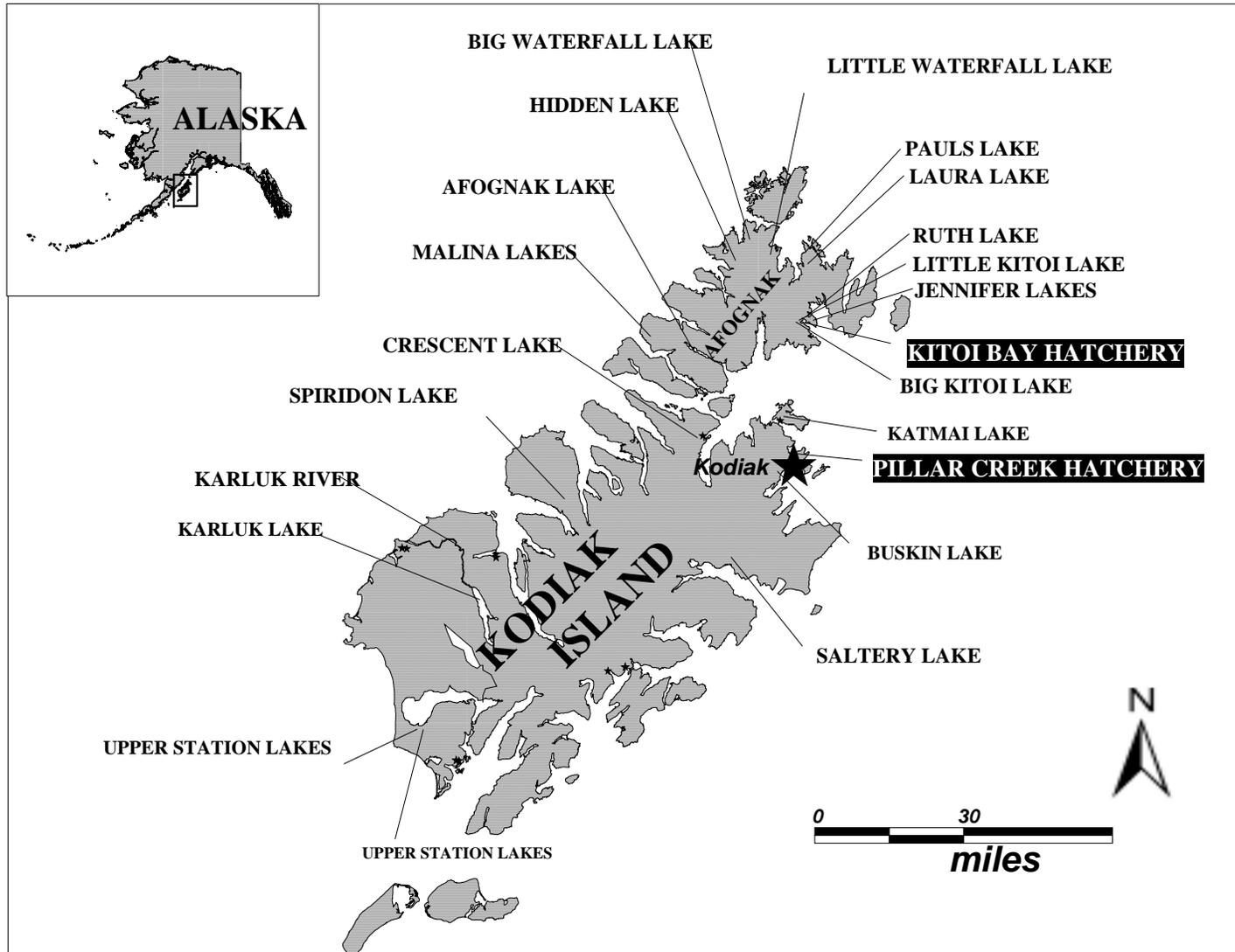
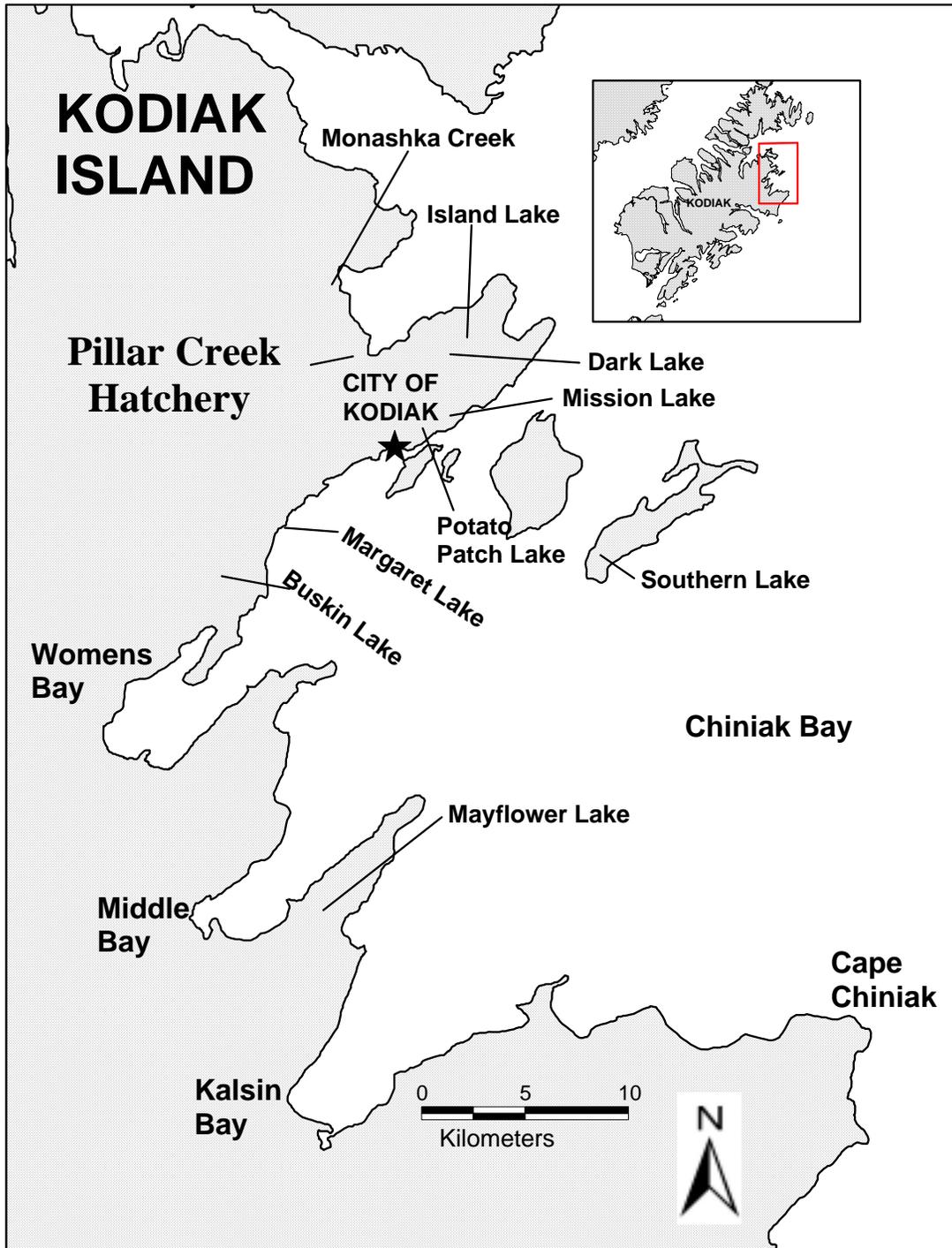
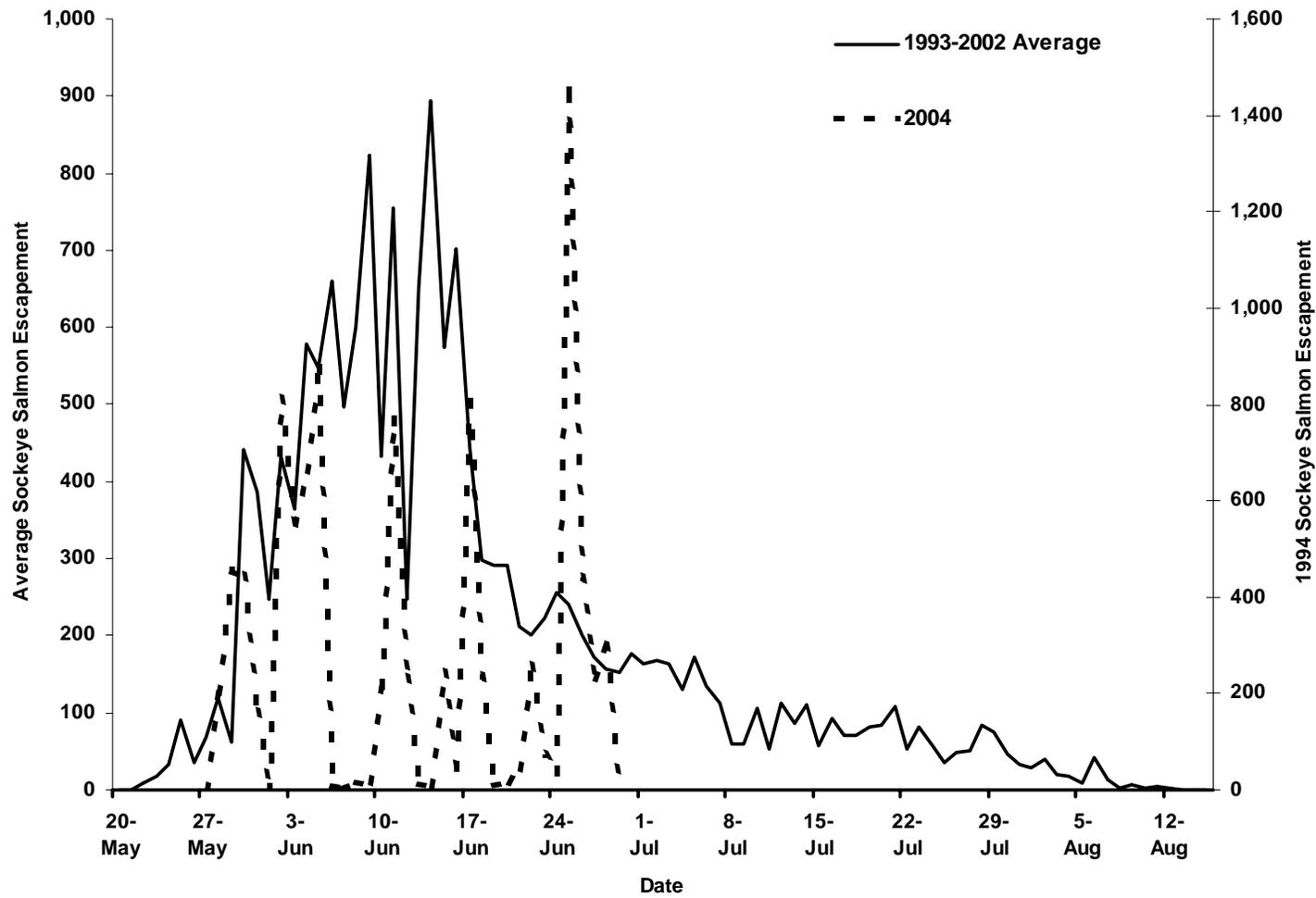


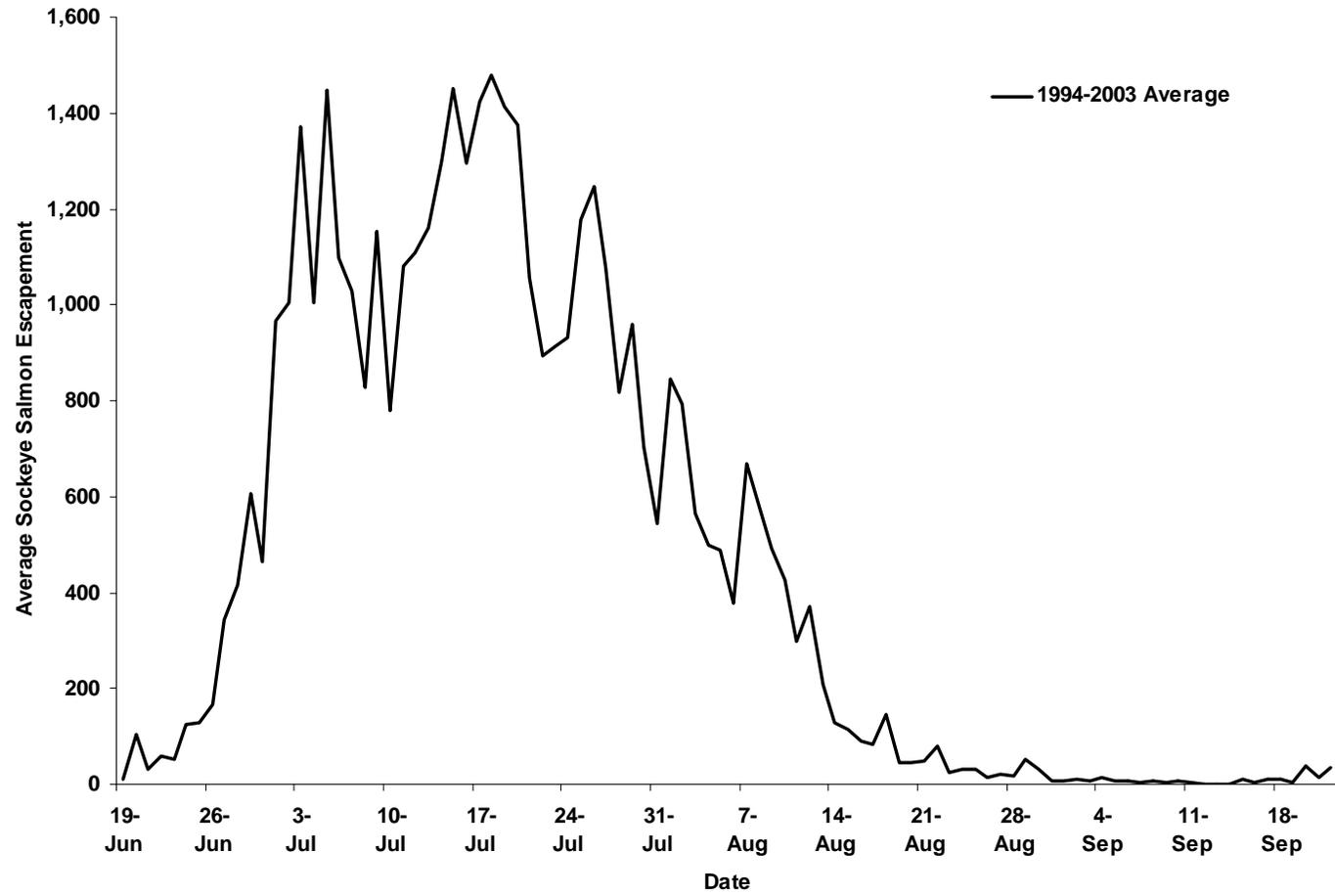
Figure 1.-Locations of sockeye salmon enhancement and rehabilitation projects on Kodiak and Afognak Islands, 2005.



**Figure 2.-**Locations of Kodiak Island road system lakes stocked with coho and Chinook (Monashka Creek) salmon.



**Figure 3.-**Malina Lake sockeye salmon average escapement timing (1993-2002; weir was not operated in 2003) compared to the 2004 escapement timing.



**Figure 4.**-Saltery Lake sockeye salmon average escapement timing, 1994-2003 (weir was not operated in 2004).

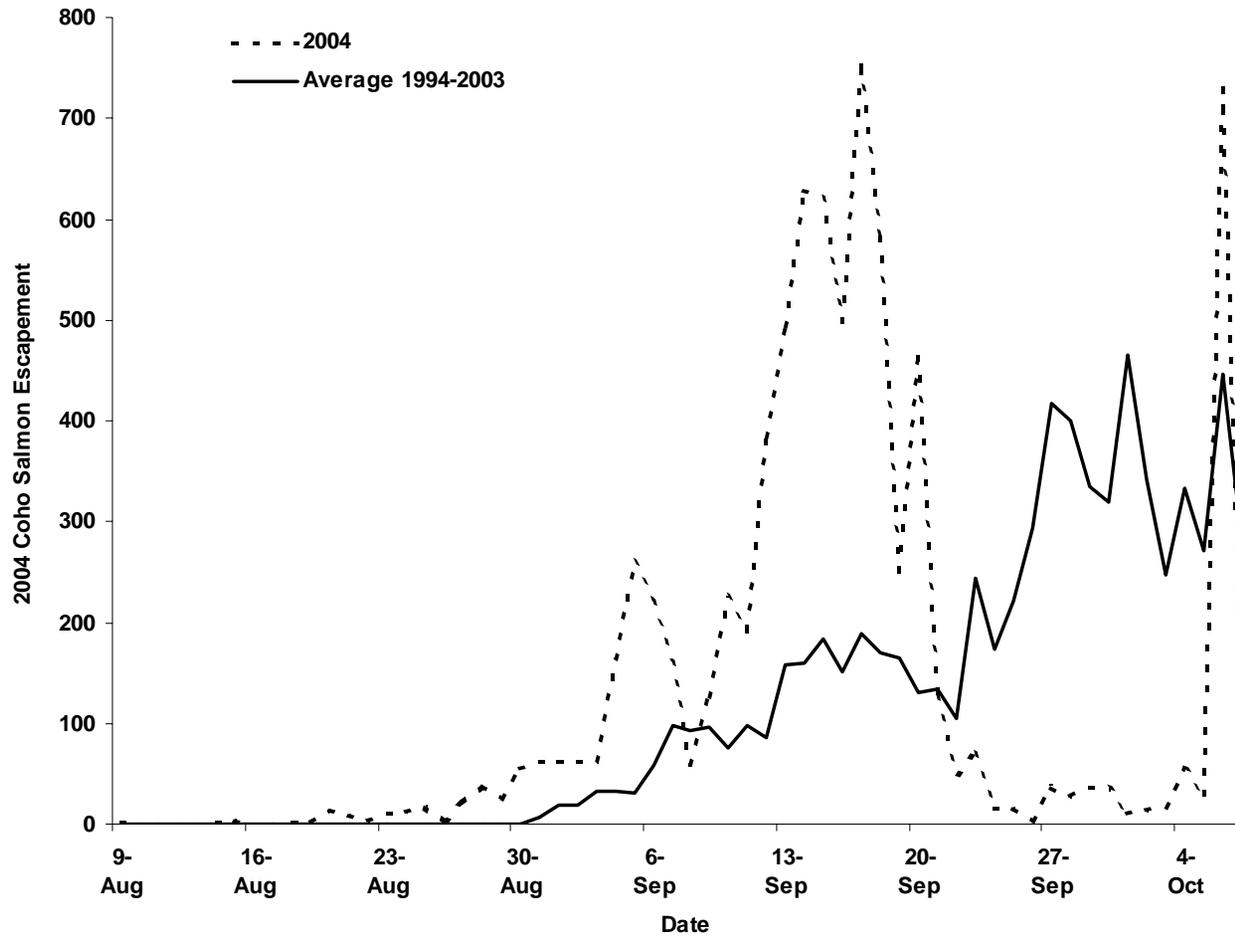
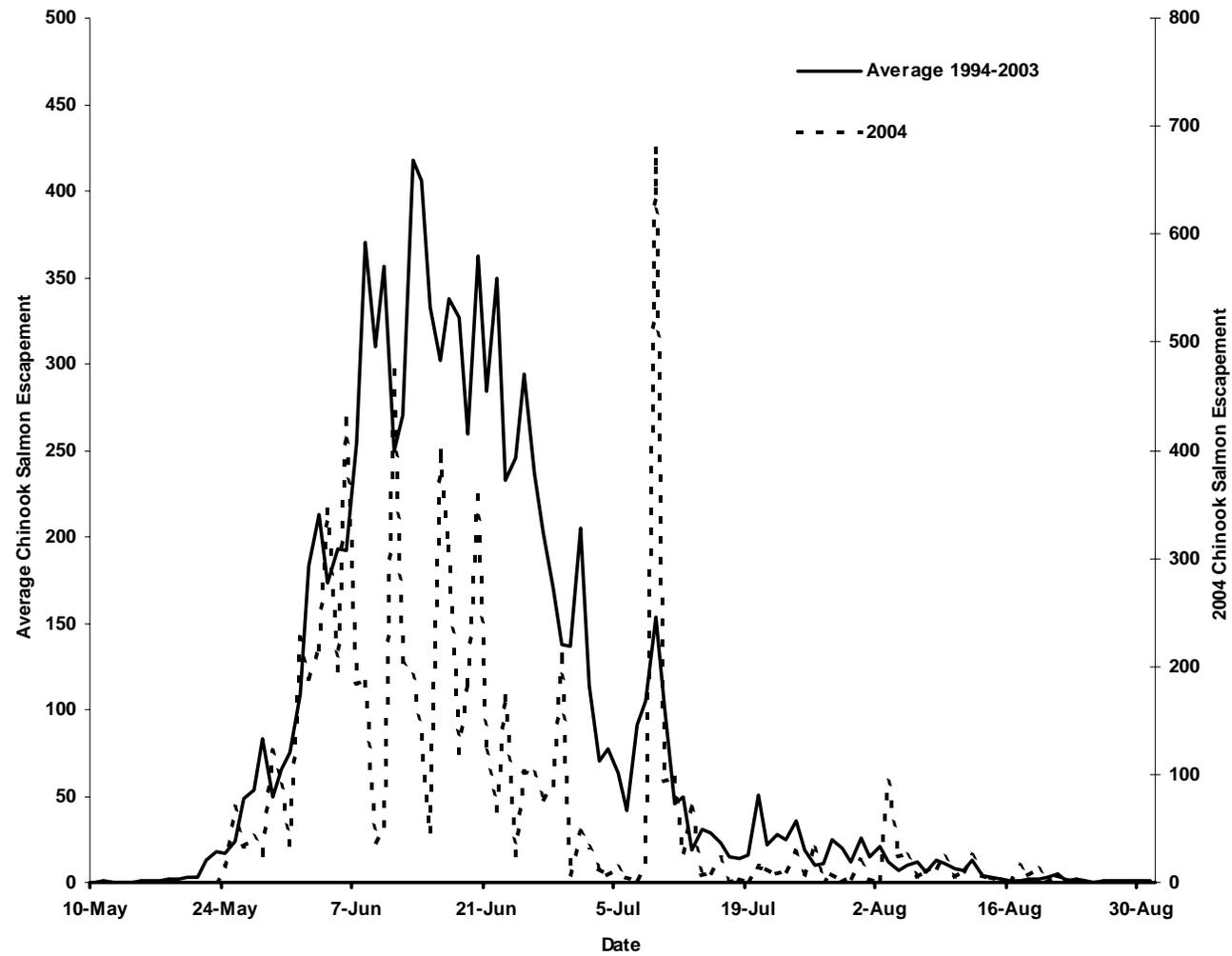
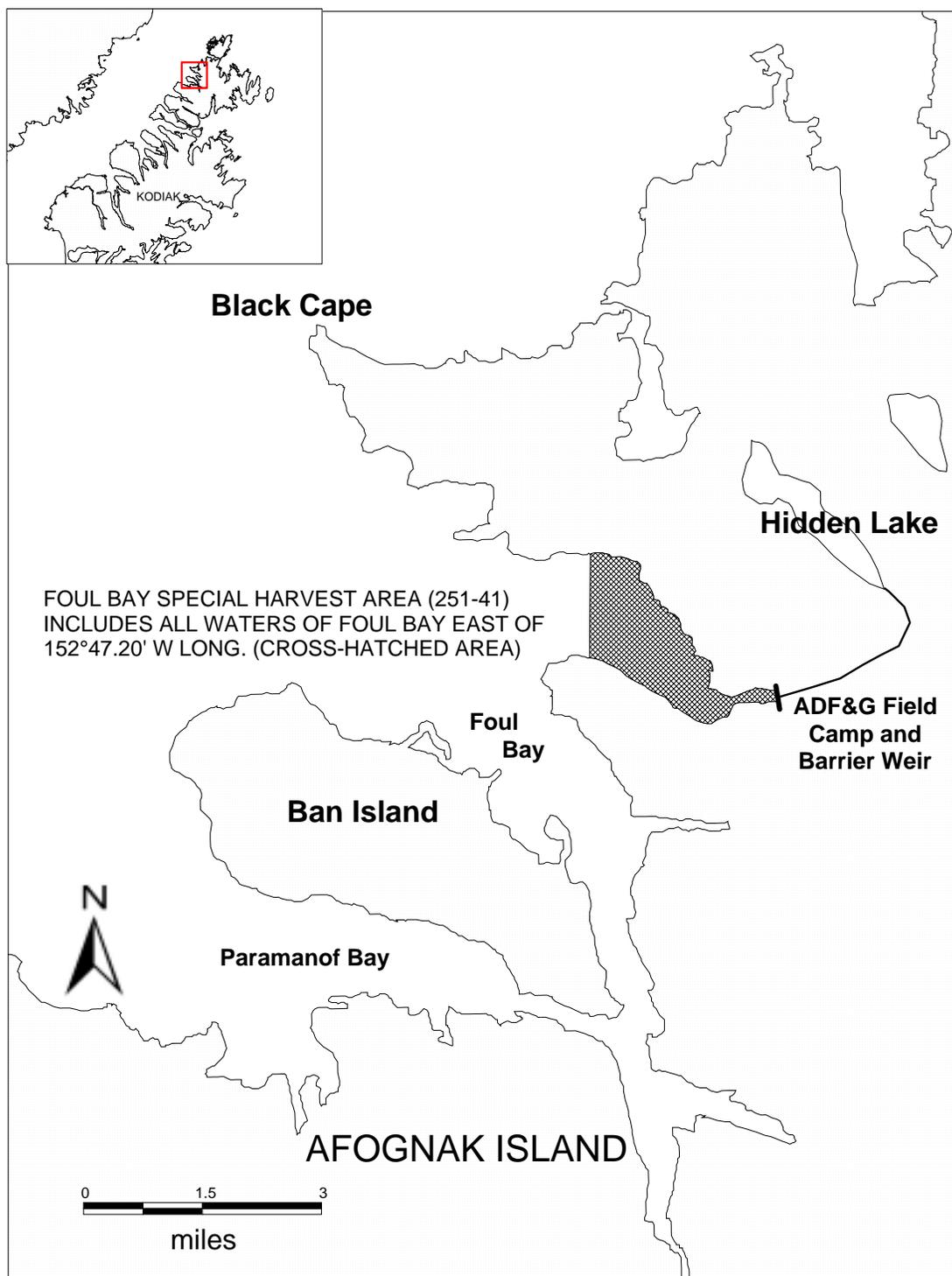


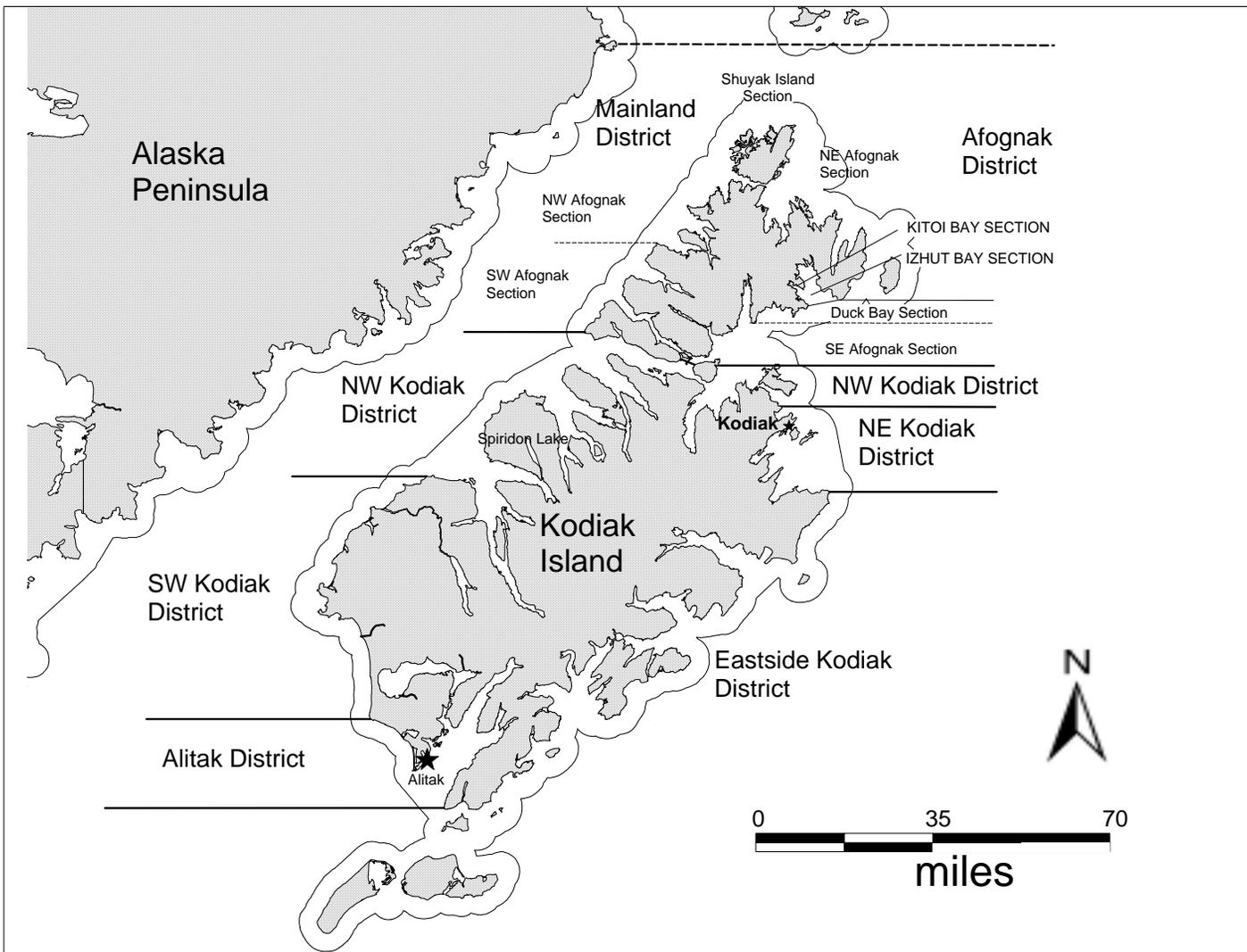
Figure 5.-Buskin River coho salmon average escapement timing (1994-2003) compared to the 2004 escapement timing.



**Figure 6.-**Karluk River Chinook salmon average escapement timing (1994-2003) compared to the 2004 escapement timing.



**Figure 7.**-Location of the Foul Bay special harvest area, and former locations of ADF&G field camp and fish weir at Hidden Creek.



**Figure 8.-**Map of the Kodiak Management Area depicting commercial fishing districts and selected sections.

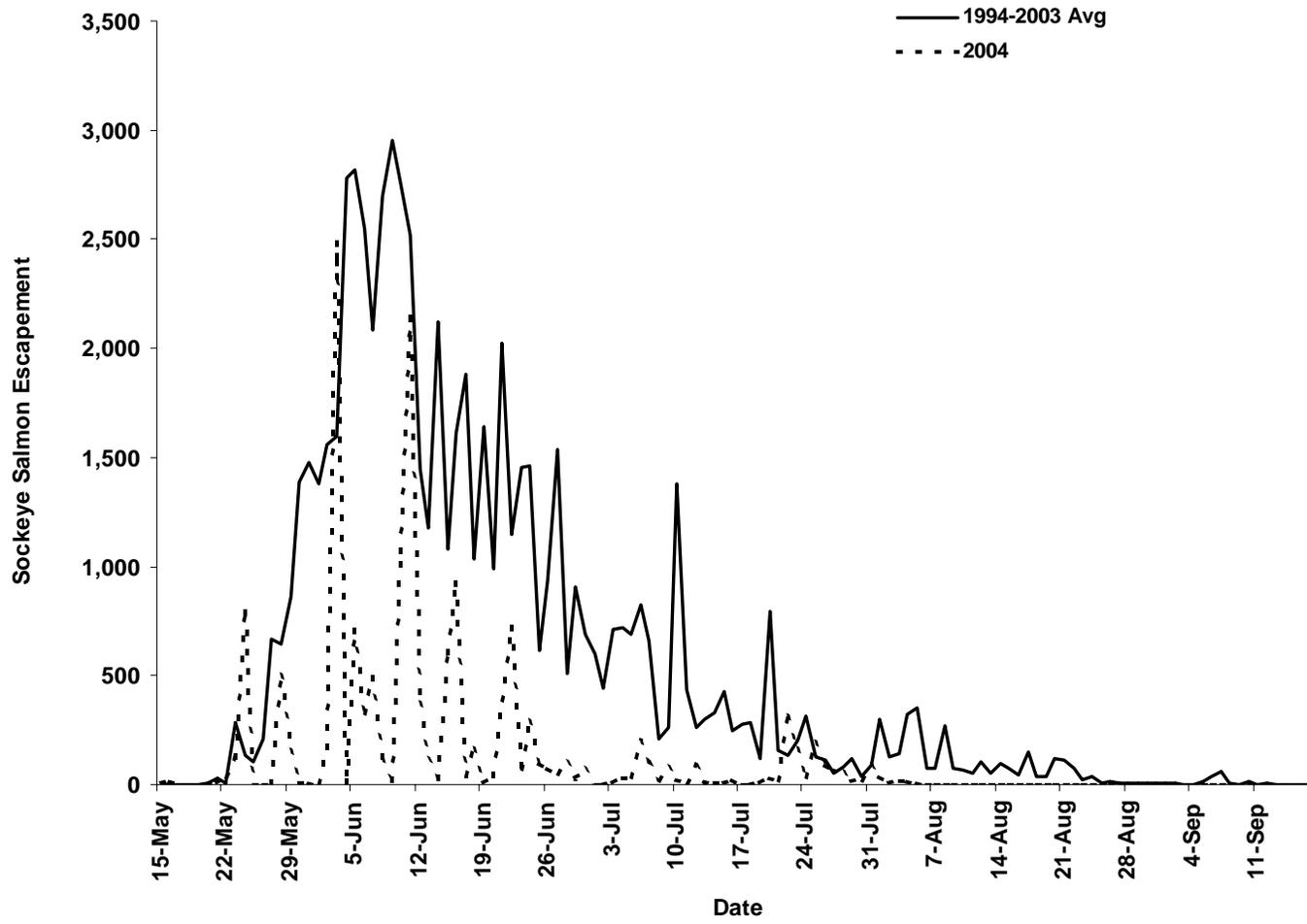
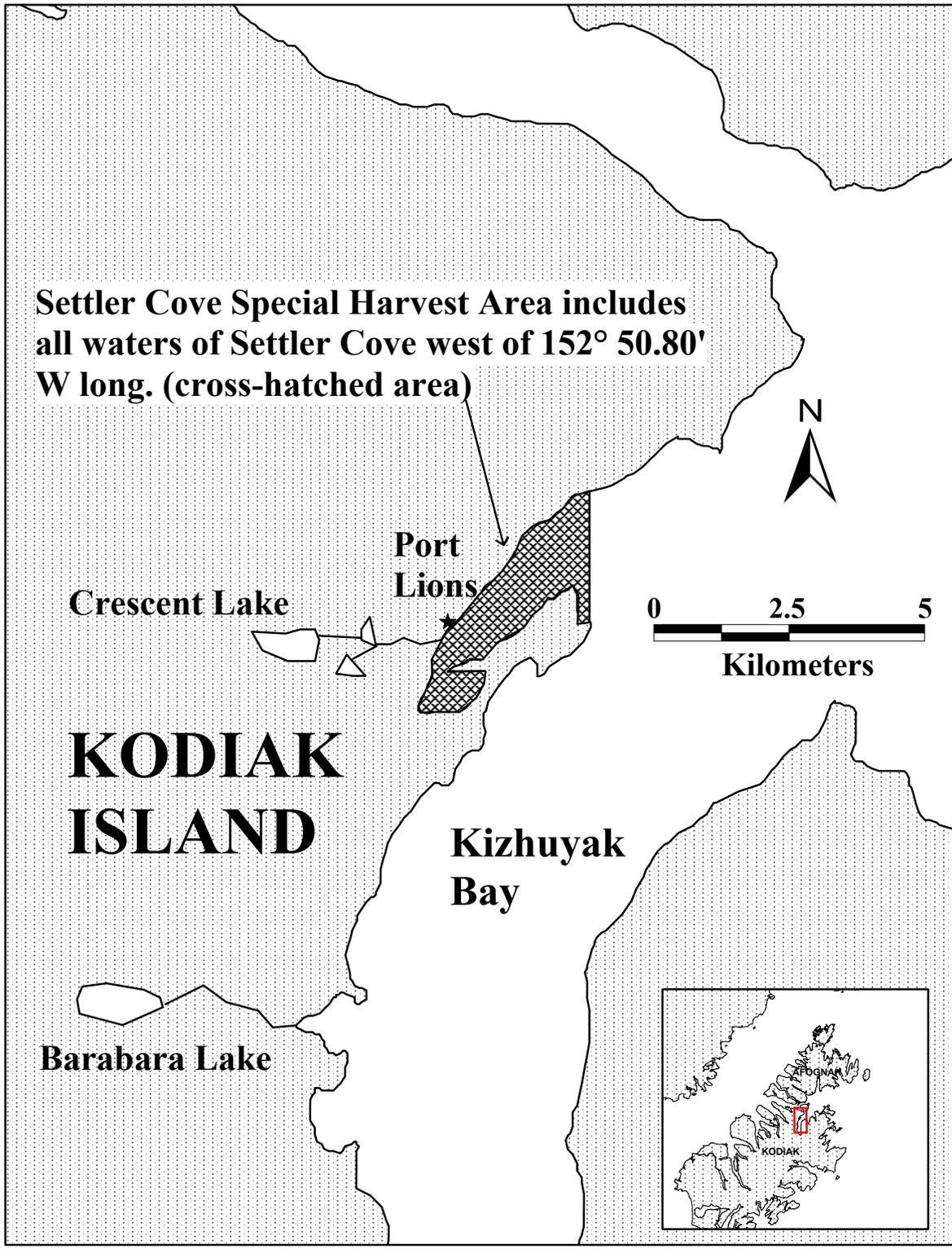
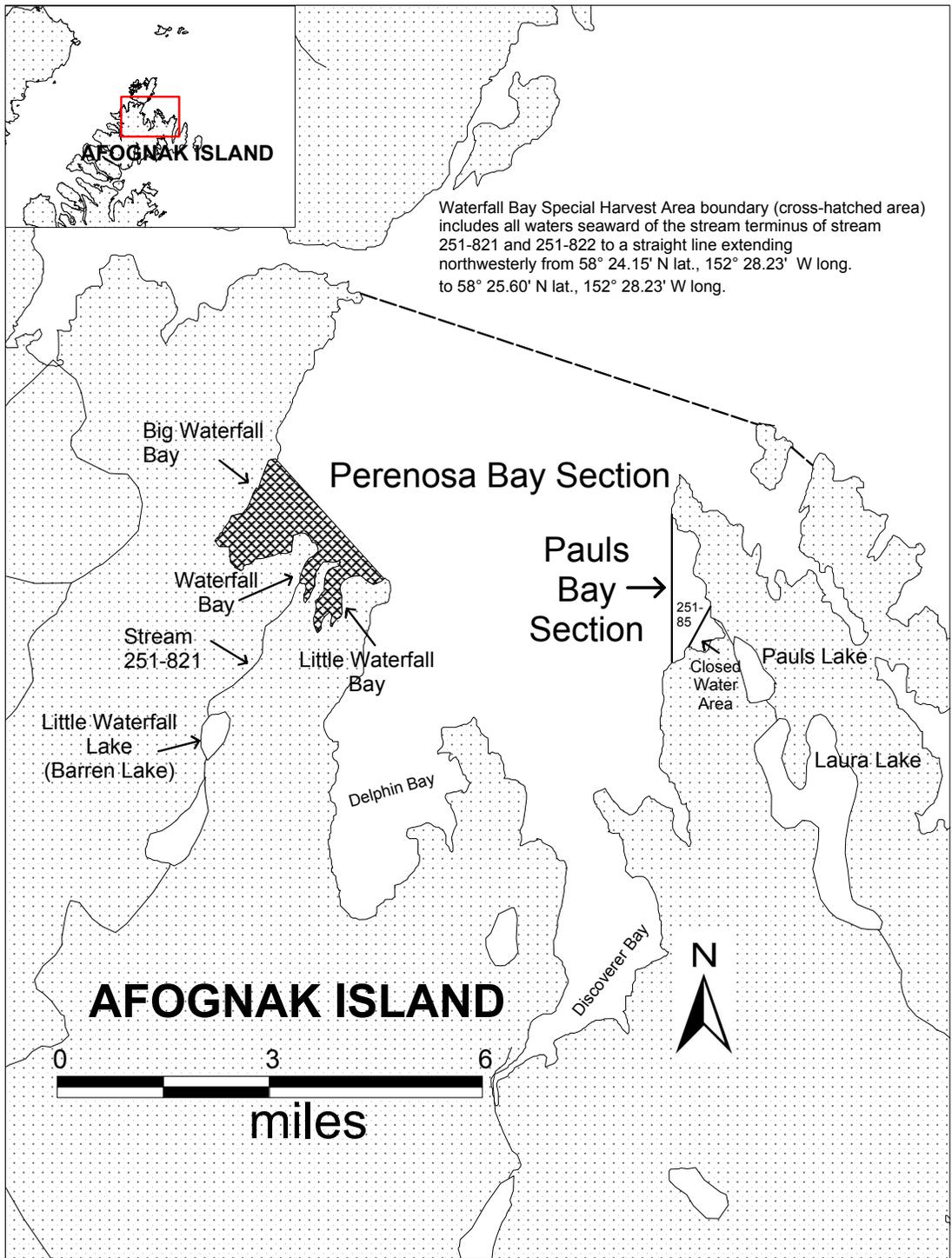


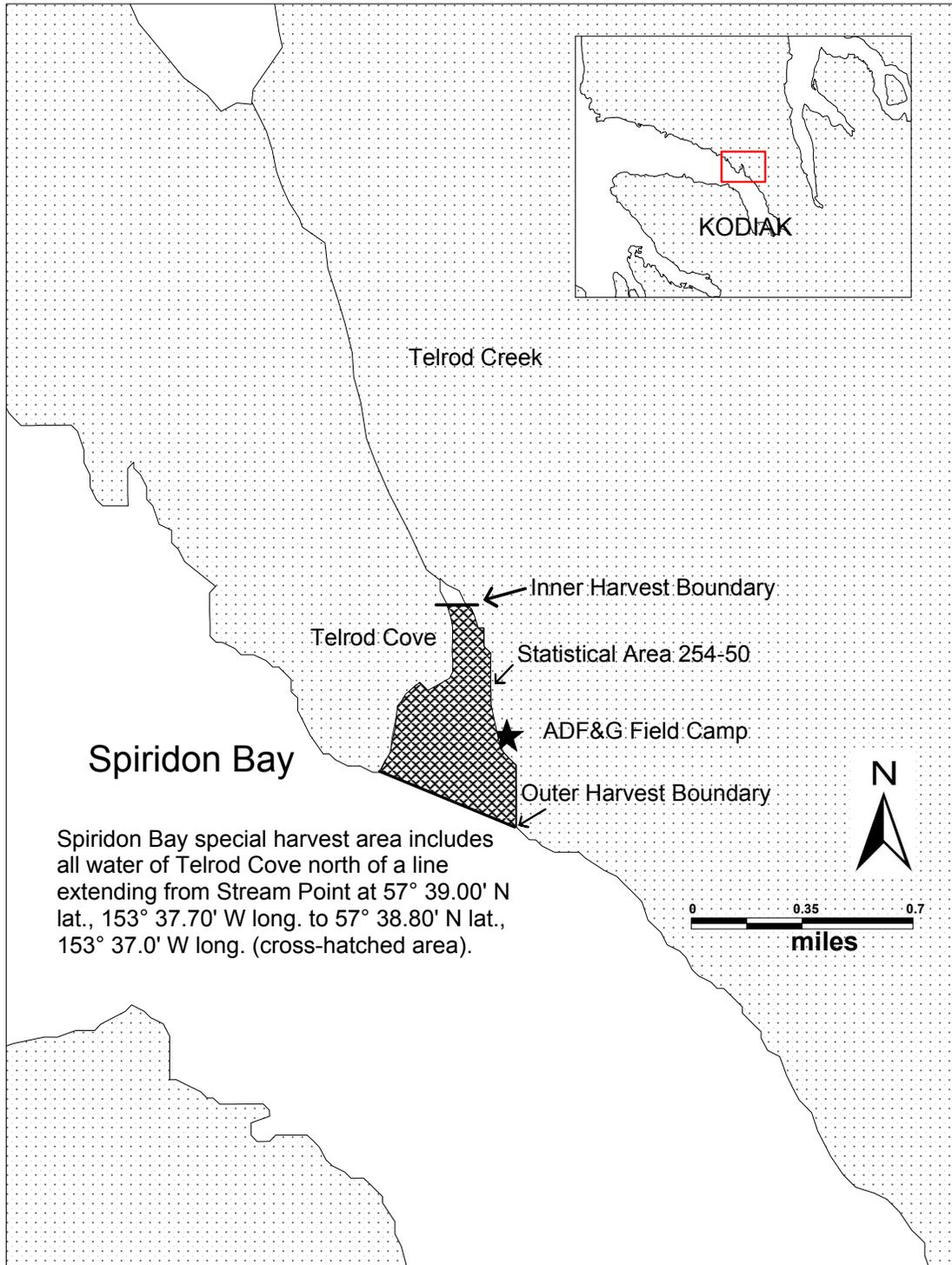
Figure 9.-Afognak Lake (Litnik) sockeye salmon average escapement timing (1994-2003) compared to the 2004 escapement timing.



**Figure 10.**-Settler Cove (Crescent Lake) special harvest area boundaries in Kizhuyak Bay.



**Figure 11.**-Waterfall Bay (Little and Big Waterfall Lakes) special harvest area and rehabilitation systems and the Pauls Bay Section in Perenosa Bay.



**Figure 12.**-Spiridon Bay (Telrod Cove) special harvest area boundaries, and ADF&G camp location in Telrod Cove.

**APPENDIX A. PILLAR CREEK HATCHERY SALMON EGG  
TAKES, 1991-2005**

**Appendix A1.-Pillar Creek Hatchery sockeye salmon egg takes at Malina Lake, 1991-2005.**

Brood Year	Adult Salmon	Eggs (millions)	Number Stocked	Year Stocked	Stocking Location
1991	120	0.141	85,000	1992	Malina Lake
1992	1,005	1.410	318,000	1993	Malina Lake
1993	644	0.930	547,000	1994	Malina Lake
1994	350	0.475	53,500	1995	Malina Lake
1995	400	0.590	426,300	1996	Malina Lake
1996	454	0.791	390,400	1997	Malina Lake
1997	470	0.800	350,500	1998	Malina Lake
1998 <sup>a</sup>	550	0.710	406,000	1999	Malina Lake
2004 <sup>b</sup>	2,450	1.582	188,300	2005	Hidden Lake
			78,700	2005	Little Waterfall Lake
			49,100	2005	Big Waterfall Lake
			54,000	2005	Crescent Lake
2005 <sup>c</sup>	1,800	1.600	400,000	2006	Hidden Lake
			200,000	2006	Little Waterfall Lake
			125,000	2006	Big Waterfall Lake
			200,000	2006	Crescent Lake

<sup>a</sup> Escapement goal was achieved from 1999 to 2002 and no additional rehabilitation egg takes are planned.

<sup>b</sup> Malina Lake sockeye were utilized as an alternative broodstock for early-run sockeye enhancement projects in 2004. Afognak Lake had been the primary broodstock, but adult returns have been depressed since 2001.

<sup>c</sup> Malina Lake is the preferred brood source for the 2005 early-run sockeye egg take. Afognak Lake sockeye may be utilized as a 2005 brood source if egg-take goals cannot be achieved using Malina Lake sockeye salmon; egg-take goal to be determined after inseason limnology evaluation and escapement results.

**Appendix A2.-Sockeye salmon egg takes at Saltery Lake, 1994-2005.**

Brood Year	Adult Salmon	Eggs (millions)	Hatchery <sup>a</sup>	Number Stocked	Year Stocked	Stocking Location
1994	4,238	7.60	PCH	4,599,000	1995	Spiridon Lake
1995	122	0.20	PCH	150,000	1996	Ruth Lake
1996	103	0.20	PCH	147,000	1997	Ruth Lake
1997	2,700	4.00	PCH	3,340,000	1998	Spiridon Lake
			PCH	100,000	1998	Ruth Lake
			KBH	106,700	1999	Little Kitoi Lake
1998	2,560	4.30	PCH	3,564,000	1999	Spiridon Lake
			PCH	66,500	1999	Ruth Lake
			KBH	98,700	1999	Little Kitoi Lake
			KBH	74,500	2000	Little Kitoi Lake
			KBH	23,800	2000	Little Kitoi Bay
1999	4,318	6.80	PCH	4,397,100	2000	Spiridon Lake
			PCH	78,700	2000	Ruth Lake
			KBH	154,000	2000	Little Kitoi Lake
2000	2,582	4.80	PCH	1,700,600	2001	Spiridon Lake
			PCH	0	2001	Ruth Lake
			KBH	282,100	2001	Little Kitoi Lake
2001	845	1.57	PCH	1,182,000	2002	Spiridon Lake
			PCH	0	2002	Ruth Lake
			KBH	212,400	2002	Little Kitoi Lake
2002	2,000	3.30	PCH	1,417,500	2003	Spiridon Lake
			PCH	0	2003	Ruth Lake
			KBH	102,800	2003	Little Kitoi Lake
			KBH	193,600	2004	Little Kitoi Lake
2003	4,175	5.96	PCH	2,800,000	2004	Spiridon Lake
			PCH	111,400	2004	Ruth Lake
			PCH	0	2004	Jennifer Lake
			PCH	97,400	2004	Little Kitoi Lake
			KBH	20,700	2004	Little Kitoi Lake
			KBH	280,000	2005	Little Kitoi Lake
2004	4,079	4.99	PCH	1,380,000	2005	Spiridon Lake
			PCH	35,000	2005	Ruth Lake
			PCH	0	2005	Jennifer Lake
			PCH	0	2005	Little Kitoi Lake
			KBH	100,000	2005	Little Kitoi Lake
			KBH	400,000	2006	Little Kitoi Lake
2005 <sup>b</sup>	4,000	5.00	PCH	3,000,000	2006	Spiridon Lake
			PCH	150,000	2006	Ruth Lake
			PCH	350,000	2006	Jennifer Lake
			PCH	0	2006	Little Kitoi Lake
			KBH	100,000	2006	Little Kitoi Lake
			KBH	400,000	2007	Little Kitoi Lake

<sup>a</sup> Pillar Creek Hatchery (PCH), Kitoi Bay Hatchery (KBH).

<sup>b</sup> Egg-take goal to be determined after inseason limnology evaluation and escapment results.

**Appendix A3.-Pillar Creek Hatchery coho salmon egg takes, 1991-2005.**

Brood Year	Adult Salmon	Green Eggs	Number Stocked	Year Stocked	Stocking Location
<u>Monashka Creek stock:</u>					
1991	25	60,100	52,000	1992	Monashka Creek
1992	6	10,500	9,000	1993	Monashka Creek
<u>Buskin River stock:</u>					
1993 <sup>a</sup>	78	156,000	136,200	1994	Kodiak Road System Lakes <sup>b</sup>
1994	56	98,000	76,140	1995	"
1995	85	120,000	28,000	1996	"
1996	65	177,000	148,200	1997	"
1997	65	153,000	134,500	1998	"
1998	102	158,000	128,000	1999	"
1999	40	91,000	63,800	2000	"
2000	60	112,000	73,400	2001	"
2001	60	146,000	110,000	2002	"
2002	29	57,100	48,300	2003	"
	25	51,000	43,100	2004	Kodiak road system lakes, Monashka Creek <sup>c</sup>
2003	49	98,500	83,900	2004	"
	21	43,200	36,800	2005	Kodiak road system lakes, Monashka Creek
2004	32	54,500	52,600	2005	"
	22	36,300	35,000	2006	Kodiak road system lakes, Monashka Creek
2005	42	81,900	65,500	2006	"
	5	11,000	10,000	2007	Kodiak road system lakes, Monashka Creek

<sup>a</sup> Prior to 1993, Kitoi Bay Hatchery supplied juvenile coho salmon for stocking the road system lakes.

<sup>b</sup> Road system lakes include: Mayflower, Island, Dark, Mission, Potato Patch, Pony, and Southern Lake on Long Island; Margaret (Boy Scout) Lake replaced Pony Lake after 2003; FTPs are pending (as of April 2005) for Abercrombie (Gertrude) and Big (Lily) Lakes.

<sup>c</sup> Smolt releases occur only as rearing space allows. Lower than anticipated chinook production can make available rearing space for spring coho smolt production. The determination to take eggs for coho smolt is made just prior to the coho egg take, when chinook egg survival for the brood year has been assessed.

**Appendix A4.-Pillar Creek Hatchery chinook salmon egg takes at Karluk River, 2000-2005.**

Brood Year	Adult Salmon	Number of Eggs	Number Stocked	Year Stocked	Stocking Location
2000	48	124,818	60,400	2002	Monashka Creek
2001	34	86,120	34,000	2003	Monashka Creek
2002	59	147,000	12,300	2004	Monashka Creek
2003	70	172,300	72,150	2005	Monashka Creek
2004	76	181,600	37,000	2006	Monashka Creek
2005 <sup>a</sup>	120	300,000	130,000	2007	Monashka Creek

<sup>a</sup> 2005 will be the first year that adult progeny of this chinook project will return to Monashka Creek. An egg take will be attempted at Monashka Creek utilizing a portion of the return as brood. Eggs will also will also be taken from Karluk River brood. The combined total of the egg takes will not exceed 300,000 eggs.

**Appendix A5.-Pillar Creek Hatchery sockeye salmon egg takes at Afognak Lake, 1991-2005.**

Brood Year	Adult Salmon	Eggs (millions)	Number Stocked	Year Stocked	Stocking Location
1991	2,076	2.6	260,000	1992	Hidden Lake
			399,000	1992	Crescent Lake
			493,000	1992	Little Waterfall Lake
			96,000	1992	Big Waterfall Lake
			464,000	1992	Afognak Lake
			182,000	1992	Little Kitoi Bay
1992	1,890	2.7	554,600	1993	Hidden Lake
			202,000	1993	Crescent Lake
			205,000	1993	Little Waterfall Lake
1993	2,169	3.4	250,000	1994	Hidden Lake
			314,000	1994	Crescent Lake
			150,000	1994	Little Waterfall Lake
			183,000	1994	Little Kitoi Lake
			311,000	1994	Afognak Lake
			293,000	1994	Little Kitoi Bay
			3,500	1995	Little Kitoi Lake
			97,800	1995	Little Waterfall Lake
1994	1,190	1.6	98,650	1995	Hidden Lake
			90,200	1995	Crescent Lake
			100,000	1995	Little Waterfall Lake
			112,900	1995	Little Kitoi Lake
1995	1,440	2.2	390,800	1996	Hidden Lake
			427,000	1996	Crescent Lake
			82,300	1996	Little Waterfall Lake
			146,000	1996	Sorg Lake
			50,600	1996	Little Kitoi Lake
			528,000	1996	Afognak Lake
1996	1,700	2.2	455,200	1997	Hidden Lake
			432,000	1997	Crescent Lake
			246,800	1997	Little Waterfall Lake
			125,800	1997	Little Kitoi Lake
			328,300	1997	Afognak Lake
1997	1,600	2.4	340,400	1998	Hidden Lake
			571,000	1998	Crescent Lake
			237,300	1998	Little Waterfall Lake
			422,700	1998	Afognak Lake
1998	1,060	1.6	310,000	1999	Hidden Lake
			273,000	1999	Little Waterfall Lake
			42,000	1999	Big Waterfall Lake
			371,700	1999	Crescent Lake

-continued-

**Appendix A5.**-(page 2 of 2)

Brood Year	Adult Salmon	Eggs (millions)	Number Stocked	Year Stocked	Stocking Location
1999	1,350	1.8	504,400	2000	Hidden Lake
			358,800	2000	Little Waterfall Lake
			124,400	2000	Big Waterfall Lake
			206,000	2000	Crescent Lake
2000	1,420	2.1	315,500	2001	Hidden Lake
			310,000	2001	Little Waterfall Lake
			224,300	2001	Big Waterfall Lake
			331,500	2001	Crescent Lake
2001	290	0.4	51,600	2002	Hidden Lake
			46,100	2002	Little Waterfall Lake
			44,300	2002	Big Waterfall Lake
			33,600	2002	Crescent Lake
2002	180	0.3	31,000	2003	Hidden Lake
			72,500	2003	Little Waterfall Lake
			0	2003	Big Waterfall Lake
			36,500	2003	Crescent Lake
2003	268	0.4	70,700	2004	Hidden Lake
			32,100	2004	Little Waterfall Lake
			0	2004	Big Waterfall Lake
			22,600	2004	Crescent Lake
2004 <sup>a</sup>	0	0.0	0	--	--
2005 <sup>b</sup>	1,400	1.6	400,000	2006	Hidden Lake
			200,000	2006	Little Waterfall Lake
			125,000	2006	Big Waterfall Lake
			200,000	2006	Crescent Lake

<sup>a</sup> No eggtake occurred at Afognak Lake in 2004. Malina Lake was utilized as an alternative broodstock for early-run sockeye stocking projects because adult returns to Afognak Lake had been depressed since 2001.

<sup>b</sup> Malina Lake is the preferred brood source for the 2005 early-run sockeye egg take. Afognak Lake sockeye may be utilized as a 2005 brood source if egg-take goals cannot be achieved using Malina Lake sockeye salmon; egg-take goal to be determined after inseason limnology evaluation and escapement results.



**APPENDIX B. WORKSHEETS FOR BROODSTOCK  
NUMBERS AND REPLACEMENT OPTIONS FOR  
ADULT REMOVALS**

**Appendix B1.-**Worksheet for determining sockeye salmon broodstock numbers allowed, based on escapement levels at Malina Lake, 2005.

50% Lower Bound	2005	<b>Broodstock</b>	50% Lower Bound	2005	<b>Broodstock</b>	50% Lower	2005	<b>Broodstock</b>
EGR	Escapement	<b>Allowed</b>	EGR	Escapement	<b>Allowed</b>	Bound EGR	Escapement	<b>Allowed</b>
500	2,300	<b>1,800</b>	500	1,980	<b>1,480</b>	500	1,660	<b>1,160</b>
500	2,290	<b>1,790</b>	500	1,970	<b>1,470</b>	500	1,650	<b>1,150</b>
500	2,280	<b>1,780</b>	500	1,960	<b>1,460</b>	500	1,640	<b>1,140</b>
500	2,270	<b>1,770</b>	500	1,950	<b>1,450</b>	500	1,630	<b>1,130</b>
500	2,260	<b>1,760</b>	500	1,940	<b>1,440</b>	500	1,620	<b>1,120</b>
500	2,250	<b>1,750</b>	500	1,930	<b>1,430</b>	500	1,610	<b>1,110</b>
500	2,240	<b>1,740</b>	500	1,920	<b>1,420</b>	500	1,600	<b>1,100</b>
500	2,230	<b>1,730</b>	500	1,910	<b>1,410</b>	500	1,590	<b>1,090</b>
500	2,220	<b>1,720</b>	500	1,900	<b>1,400</b>	500	1,580	<b>1,080</b>
500	2,210	<b>1,710</b>	500	1,890	<b>1,390</b>	500	1,570	<b>1,070</b>
500	2,200	<b>1,700</b>	500	1,880	<b>1,380</b>	500	1,560	<b>1,060</b>
500	2,190	<b>1,690</b>	500	1,870	<b>1,370</b>	500	1,550	<b>1,050</b>
500	2,180	<b>1,680</b>	500	1,860	<b>1,360</b>	500	1,540	<b>1,040</b>
500	2,170	<b>1,670</b>	500	1,850	<b>1,350</b>	500	1,530	<b>1,030</b>
500	2,160	<b>1,660</b>	500	1,840	<b>1,340</b>	500	1,520	<b>1,020</b>
500	2,150	<b>1,650</b>	500	1,830	<b>1,330</b>	500	1,510	<b>1,010</b>
500	2,140	<b>1,640</b>	500	1,820	<b>1,320</b>	500	1,500	<b>1,000</b>
500	2,130	<b>1,630</b>	500	1,810	<b>1,310</b>	500	1,490	<b>990</b>
500	2,120	<b>1,620</b>	500	1,800	<b>1,300</b>	500	1,480	<b>980</b>
500	2,110	<b>1,610</b>	500	1,790	<b>1,290</b>	500	1,470	<b>970</b>
500	2,100	<b>1,600</b>	500	1,780	<b>1,280</b>	500	1,460	<b>960</b>
500	2,090	<b>1,590</b>	500	1,770	<b>1,270</b>	500	1,450	<b>950</b>
500	2,080	<b>1,580</b>	500	1,760	<b>1,260</b>	500	1,440	<b>940</b>
500	2,070	<b>1,570</b>	500	1,750	<b>1,250</b>	500	1,430	<b>930</b>
500	2,060	<b>1,560</b>	500	1,740	<b>1,240</b>	500	1,420	<b>920</b>
500	2,050	<b>1,550</b>	500	1,730	<b>1,230</b>	500	1,410	<b>910</b>
500	2,040	<b>1,540</b>	500	1,720	<b>1,220</b>	500	1,400	<b>900</b>
500	2,030	<b>1,530</b>	500	1,710	<b>1,210</b>	500	1,390	<b>890</b>
500	2,020	<b>1,520</b>	500	1,700	<b>1,200</b>	500	1,380	<b>880</b>
500	2,010	<b>1,510</b>	500	1,690	<b>1,190</b>	500	1,370	<b>870</b>
500	2,000	<b>1,500</b>	500	1,680	<b>1,180</b>	500	1,360	<b>860</b>
500	1,990	<b>1,490</b>	500	1,670	<b>1,170</b>	500	1,350	<b>850</b>

-continued-

Appendix B1.-page 2 of 2

50% Lower Bound	2005	Broodstock	50% Lower Bound	2005	Broodstock	50% Lower	2005	Broodstock
EGR	Escapement	Allowed	EGR	Escapement	Allowed	Bound EGR	Escapement	Allowed
500	1,340	840	500	1,050	550	500	760	260
500	1,330	830	500	1,040	540	500	750	250
500	1,320	820	500	1,030	530	500	740	240
500	1,310	810	500	1,020	520	500	730	230
500	1,300	800	500	1,010	510	500	720	220
500	1,290	790	500	1,000	500	500	710	210
500	1,280	780	500	990	490	500	700	200
500	1,270	770	500	980	480	500	690	190
500	1,260	760	500	970	470	500	680	180
500	1,250	750	500	960	460	500	670	170
500	1,240	740	500	950	450	500	660	160
500	1,230	730	500	940	440	500	650	150
500	1,220	720	500	930	430	500	640	140
500	1,210	710	500	920	420	500	630	130
500	1,200	700	500	910	410	500	620	120
500	1,190	690	500	900	400	500	610	110
500	1,180	680	500	890	390	500	600	100
500	1,170	670	500	880	380	500	590	90
500	1,160	660	500	870	370	500	580	80
500	1,150	650	500	860	360	500	570	70
500	1,140	640	500	850	350	500	560	60
500	1,130	630	500	840	340	500	550	50
500	1,120	620	500	830	330	500	540	40
500	1,110	610	500	820	320	500	530	30
500	1,100	600	500	810	310	500	520	20
500	1,090	590	500	800	300	500	510	10
500	1,080	580	500	790	290	500	500	0
500	1,070	570	500	780	280	500		
500	1,060	560	500	770	270	500		

**Appendix B2.-**Worksheet for determining sockeye salmon broodstock numbers allowed, based on escapement levels at Afognak Lake, 2005.

50% Lower Bound EGR	2005 Escapement	<b>Broodstock Allowed</b>	50% Lower Bound EGR	2005 Escapement	<b>Broodstock Allowed</b>	50% Lower Bound EGR	2005 Escapement	<b>Broodstock Allowed</b>
10,000	11,400	<b>1,400</b>	10,000	11,080	<b>1,080</b>	10,000	10,760	<b>760</b>
10,000	11,390	<b>1,390</b>	10,000	11,070	<b>1,070</b>	10,000	10,750	<b>750</b>
10,000	11,380	<b>1,380</b>	10,000	11,060	<b>1,060</b>	10,000	10,740	<b>740</b>
10,000	11,370	<b>1,370</b>	10,000	11,050	<b>1,050</b>	10,000	10,730	<b>730</b>
10,000	11,360	<b>1,360</b>	10,000	11,040	<b>1,040</b>	10,000	10,720	<b>720</b>
10,000	11,350	<b>1,350</b>	10,000	11,030	<b>1,030</b>	10,000	10,710	<b>710</b>
10,000	11,340	<b>1,340</b>	10,000	11,020	<b>1,020</b>	10,000	10,700	<b>700</b>
10,000	11,330	<b>1,330</b>	10,000	11,010	<b>1,010</b>	10,000	10,690	<b>690</b>
10,000	11,320	<b>1,320</b>	10,000	11,000	<b>1,000</b>	10,000	10,680	<b>680</b>
10,000	11,310	<b>1,310</b>	10,000	10,990	<b>990</b>	10,000	10,670	<b>670</b>
10,000	11,300	<b>1,300</b>	10,000	10,980	<b>980</b>	10,000	10,660	<b>660</b>
10,000	11,290	<b>1,290</b>	10,000	10,970	<b>970</b>	10,000	10,650	<b>650</b>
10,000	11,280	<b>1,280</b>	10,000	10,960	<b>960</b>	10,000	10,640	<b>640</b>
10,000	11,270	<b>1,270</b>	10,000	10,950	<b>950</b>	10,000	10,630	<b>630</b>
10,000	11,260	<b>1,260</b>	10,000	10,940	<b>940</b>	10,000	10,620	<b>620</b>
10,000	11,250	<b>1,250</b>	10,000	10,930	<b>930</b>	10,000	10,610	<b>610</b>
10,000	11,240	<b>1,240</b>	10,000	10,920	<b>920</b>	10,000	10,600	<b>600</b>
10,000	11,230	<b>1,230</b>	10,000	10,910	<b>910</b>	10,000	10,590	<b>590</b>
10,000	11,220	<b>1,220</b>	10,000	10,900	<b>900</b>	10,000	10,580	<b>580</b>
10,000	11,210	<b>1,210</b>	10,000	10,890	<b>890</b>	10,000	10,570	<b>570</b>
10,000	11,200	<b>1,200</b>	10,000	10,880	<b>880</b>	10,000	10,560	<b>560</b>
10,000	11,190	<b>1,190</b>	10,000	10,870	<b>870</b>	10,000	10,550	<b>550</b>
10,000	11,180	<b>1,180</b>	10,000	10,860	<b>860</b>	10,000	10,540	<b>540</b>
10,000	11,170	<b>1,170</b>	10,000	10,850	<b>850</b>	10,000	10,530	<b>530</b>
10,000	11,160	<b>1,160</b>	10,000	10,840	<b>840</b>	10,000	10,520	<b>520</b>
10,000	11,150	<b>1,150</b>	10,000	10,830	<b>830</b>	10,000	10,510	<b>510</b>
10,000	11,140	<b>1,140</b>	10,000	10,820	<b>820</b>	10,000	10,500	<b>500</b>
10,000	11,130	<b>1,130</b>	10,000	10,810	<b>810</b>	10,000	10,490	<b>490</b>
10,000	11,120	<b>1,120</b>	10,000	10,800	<b>800</b>	10,000	10,480	<b>480</b>
10,000	11,110	<b>1,110</b>	10,000	10,790	<b>790</b>	10,000	10,470	<b>470</b>
10,000	11,100	<b>1,100</b>	10,000	10,780	<b>780</b>	10,000	10,460	<b>460</b>
10,000	11,090	<b>1,090</b>	10,000	10,770	<b>770</b>	10,000	10,450	<b>450</b>

-continued-

**Appendix B2.-page 2 of 2**

50% Lower Bound	2005	<b>Broodstock</b>	50% Lower Bound	2005	<b>Broodstock</b>	50% Lower	2005	<b>Broodstock</b>
EGR	Escapement	<b>Allowed</b>	EGR	Escapement	<b>Allowed</b>	Bound EGR	Escapement	<b>Allowed</b>
10,000	10,440	<b>440</b>	10,000	10,150	<b>150</b>			
10,000	10,430	<b>430</b>	10,000	10,140	<b>140</b>			
10,000	10,420	<b>420</b>	10,000	10,130	<b>130</b>			
10,000	10,410	<b>410</b>	10,000	10,120	<b>120</b>			
10,000	10,400	<b>400</b>	10,000	10,110	<b>110</b>			
10,000	10,390	<b>390</b>	10,000	10,100	<b>100</b>			
10,000	10,380	<b>380</b>	10,000	10,090	<b>90</b>			
10,000	10,370	<b>370</b>	10,000	10,080	<b>80</b>			
10,000	10,360	<b>360</b>	10,000	10,070	<b>70</b>			
10,000	10,350	<b>350</b>	10,000	10,060	<b>60</b>			
10,000	10,340	<b>340</b>	10,000	10,050	<b>50</b>			
10,000	10,330	<b>330</b>	10,000	10,040	<b>40</b>			
10,000	10,320	<b>320</b>	10,000	10,030	<b>30</b>			
10,000	10,310	<b>310</b>	10,000	10,020	<b>20</b>			
10,000	10,300	<b>300</b>	10,000	10,010	<b>10</b>			
10,000	10,290	<b>290</b>	10,000	10,000	<b>0</b>			
10,000	10,280	<b>280</b>						
10,000	10,270	<b>270</b>						
10,000	10,260	<b>260</b>						
10,000	10,250	<b>250</b>						
10,000	10,240	<b>240</b>						
10,000	10,230	<b>230</b>						
10,000	10,220	<b>220</b>						
10,000	10,210	<b>210</b>						
10,000	10,200	<b>200</b>						
10,000	10,190	<b>190</b>						
10,000	10,180	<b>180</b>						
10,000	10,170	<b>170</b>						
10,000	10,160	<b>160</b>						

**Appendix B3.-**Worksheet for determining sockeye salmon broodstock numbers allowed, based on escapement levels at Saltery Lake, 2005.

50% Lower Bound	2005	<b>Broodstock</b>	50% Lower Bound	2005	<b>Broodstock</b>	50% Lower	2005	<b>Broodstock</b>
EGR	Escapement	<b>Allowed</b>	EGR	Escapement	<b>Allowed</b>	Bound EGR	Escapement	<b>Allowed</b>
7,500	11,616	<b>4,116</b>	7,500	10,816	<b>3,316</b>	7,500	10,016	<b>2,516</b>
7,500	11,591	<b>4,091</b>	7,500	10,791	<b>3,291</b>	7,500	9,991	<b>2,491</b>
7,500	11,566	<b>4,066</b>	7,500	10,766	<b>3,266</b>	7,500	9,966	<b>2,466</b>
7,500	11,541	<b>4,041</b>	7,500	10,741	<b>3,241</b>	7,500	9,941	<b>2,441</b>
7,500	11,516	<b>4,016</b>	7,500	10,716	<b>3,216</b>	7,500	9,916	<b>2,416</b>
7,500	11,491	<b>3,991</b>	7,500	10,691	<b>3,191</b>	7,500	9,891	<b>2,391</b>
7,500	11,466	<b>3,966</b>	7,500	10,666	<b>3,166</b>	7,500	9,866	<b>2,366</b>
7,500	11,441	<b>3,941</b>	7,500	10,641	<b>3,141</b>	7,500	9,841	<b>2,341</b>
7,500	11,416	<b>3,916</b>	7,500	10,616	<b>3,116</b>	7,500	9,816	<b>2,316</b>
7,500	11,391	<b>3,891</b>	7,500	10,591	<b>3,091</b>	7,500	9,791	<b>2,291</b>
7,500	11,366	<b>3,866</b>	7,500	10,566	<b>3,066</b>	7,500	9,766	<b>2,266</b>
7,500	11,341	<b>3,841</b>	7,500	10,541	<b>3,041</b>	7,500	9,741	<b>2,241</b>
7,500	11,316	<b>3,816</b>	7,500	10,516	<b>3,016</b>	7,500	9,716	<b>2,216</b>
7,500	11,291	<b>3,791</b>	7,500	10,491	<b>2,991</b>	7,500	9,691	<b>2,191</b>
7,500	11,266	<b>3,766</b>	7,500	10,466	<b>2,966</b>	7,500	9,666	<b>2,166</b>
7,500	11,241	<b>3,741</b>	7,500	10,441	<b>2,941</b>	7,500	9,641	<b>2,141</b>
7,500	11,216	<b>3,716</b>	7,500	10,416	<b>2,916</b>	7,500	9,616	<b>2,116</b>
7,500	11,191	<b>3,691</b>	7,500	10,391	<b>2,891</b>	7,500	9,591	<b>2,091</b>
7,500	11,166	<b>3,666</b>	7,500	10,366	<b>2,866</b>	7,500	9,566	<b>2,066</b>
7,500	11,141	<b>3,641</b>	7,500	10,341	<b>2,841</b>	7,500	9,541	<b>2,041</b>
7,500	11,116	<b>3,616</b>	7,500	10,316	<b>2,816</b>	7,500	9,516	<b>2,016</b>
7,500	11,091	<b>3,591</b>	7,500	10,291	<b>2,791</b>	7,500	9,491	<b>1,991</b>
7,500	11,066	<b>3,566</b>	7,500	10,266	<b>2,766</b>	7,500	9,466	<b>1,966</b>
7,500	11,041	<b>3,541</b>	7,500	10,241	<b>2,741</b>	7,500	9,441	<b>1,941</b>
7,500	11,016	<b>3,516</b>	7,500	10,216	<b>2,716</b>	7,500	9,416	<b>1,916</b>
7,500	10,991	<b>3,491</b>	7,500	10,191	<b>2,691</b>	7,500	9,391	<b>1,891</b>
7,500	10,966	<b>3,466</b>	7,500	10,166	<b>2,666</b>	7,500	9,366	<b>1,866</b>
7,500	10,941	<b>3,441</b>	7,500	10,141	<b>2,641</b>	7,500	9,341	<b>1,841</b>
7,500	10,916	<b>3,416</b>	7,500	10,116	<b>2,616</b>	7,500	9,316	<b>1,816</b>
7,500	10,891	<b>3,391</b>	7,500	10,091	<b>2,591</b>	7,500	9,291	<b>1,791</b>
7,500	10,866	<b>3,366</b>	7,500	10,066	<b>2,566</b>	7,500	9,266	<b>1,766</b>
7,500	10,841	<b>3,341</b>	7,500	10,041	<b>2,541</b>	7,500	9,241	<b>1,741</b>

-continued-

Appendix B3.-page 2 of 2

50% Lower Bound		2005	Broodstock	50% Lower Bound		2005	Broodstock	50% Lower		2005	Broodstock
EGR	Escapement		Allowed	EGR	Escapement		Allowed	Bound EGR	Escapement		Allowed
7,500	9,216		<b>1,716</b>	7,500	8,491		<b>991</b>	7,500	7,766		<b>266</b>
7,500	9,191		<b>1,691</b>	7,500	8,466		<b>966</b>	7,500	7,741		<b>241</b>
7,500	9,166		<b>1,666</b>	7,500	8,441		<b>941</b>	7,500	7,716		<b>216</b>
7,500	9,141		<b>1,641</b>	7,500	8,416		<b>916</b>	7,500	7,691		<b>191</b>
7,500	9,116		<b>1,616</b>	7,500	8,391		<b>891</b>	7,500	7,666		<b>166</b>
7,500	9,091		<b>1,591</b>	7,500	8,366		<b>866</b>	7,500	7,641		<b>141</b>
7,500	9,066		<b>1,566</b>	7,500	8,341		<b>841</b>	7,500	7,616		<b>116</b>
7,500	9,041		<b>1,541</b>	7,500	8,316		<b>816</b>	7,500	7,591		<b>91</b>
7,500	9,016		<b>1,516</b>	7,500	8,291		<b>791</b>	7,500	7,566		<b>66</b>
7,500	8,991		<b>1,491</b>	7,500	8,266		<b>766</b>	7,500	7,541		<b>41</b>
7,500	8,966		<b>1,466</b>	7,500	8,241		<b>741</b>	7,500	7,516		<b>16</b>
7,500	8,941		<b>1,441</b>	7,500	8,216		<b>716</b>				
7,500	8,916		<b>1,416</b>	7,500	8,191		<b>691</b>				
7,500	8,891		<b>1,391</b>	7,500	8,166		<b>666</b>				
7,500	8,866		<b>1,366</b>	7,500	8,141		<b>641</b>				
7,500	8,841		<b>1,341</b>	7,500	8,116		<b>616</b>				
7,500	8,816		<b>1,316</b>	7,500	8,091		<b>591</b>				
7,500	8,791		<b>1,291</b>	7,500	8,066		<b>566</b>				
7,500	8,766		<b>1,266</b>	7,500	8,041		<b>541</b>				
7,500	8,741		<b>1,241</b>	7,500	8,016		<b>516</b>				
7,500	8,716		<b>1,216</b>	7,500	7,991		<b>491</b>				
7,500	8,691		<b>1,191</b>	7,500	7,966		<b>466</b>				
7,500	8,666		<b>1,166</b>	7,500	7,941		<b>441</b>				
7,500	8,641		<b>1,141</b>	7,500	7,916		<b>416</b>				
7,500	8,616		<b>1,116</b>	7,500	7,891		<b>391</b>				
7,500	8,591		<b>1,091</b>	7,500	7,866		<b>366</b>				
7,500	8,566		<b>1,066</b>	7,500	7,841		<b>341</b>				
7,500	8,541		<b>1,041</b>	7,500	7,816		<b>316</b>				
7,500	8,516		<b>1,016</b>	7,500	7,791		<b>291</b>				

**Appendix B4.-Worksheet for calculating sockeye salmon "replacement" options for adult removals from Malina Lake, 2005.**

Lost Production Estimates						Backstocking Options (1 only)			Returns from Backstocking by Option		
Adults Removed (all age)	Potential Females	Potential Eggs	Potential Emergent Fry	Potential Smolt (4 g, 80 mm)	Potential Adult Return	Spring Fry (0.4 g)	Summer FINGERLING (3.0 g)	RECOMMENDED <sup>a</sup> Fall Presmolt (8-10 g)	Spring Fry (0.4 g)	Summer FINGERLING (3.0 g)	RECOMMENDED <sup>a</sup> Fall Presmolt (8-10 g)
300	134	333,750	23,363	4,906	491	25,000	12,500	6,250	500	500	500
350	156	389,375	27,256	5,724	572	29,000	14,500	7,250	580	580	580
400	178	445,000	31,150	6,542	654	33,000	16,500	8,250	660	660	660
450	200	500,625	35,044	7,359	736	37,000	18,500	9,250	740	740	740
500	223	556,250	38,938	8,177	818	41,000	20,500	10,250	820	820	820
550	245	611,875	42,831	8,995	899	45,000	22,500	11,250	900	900	900
600	267	667,500	46,725	9,812	981	49,000	24,500	12,250	980	980	980
650	289	723,125	50,619	10,630	1,063	53,000	26,500	13,250	1,060	1,060	1,060
700	312	778,750	54,513	11,448	1,145	57,000	28,500	14,250	1,140	1,140	1,140
750	334	834,375	58,406	12,265	1,227	61,000	30,500	15,250	1,220	1,220	1,220
800	356	890,000	62,300	13,083	1,308	65,000	32,500	16,250	1,300	1,300	1,300
850	378	945,625	66,194	13,901	1,390	69,000	34,500	17,250	1,380	1,380	1,380
900	401	1,001,250	70,088	14,718	1,472	73,000	36,500	18,250	1,460	1,460	1,460
950	423	1,056,875	73,981	15,536	1,554	77,000	38,500	19,250	1,540	1,540	1,540
1,000	445	1,112,500	77,875	16,354	1,635	81,000	40,500	20,250	1,620	1,620	1,620
1,050	467	1,168,125	81,769	17,171	1,717	85,000	42,500	21,250	1,700	1,700	1,700
1,100	490	1,223,750	85,663	17,989	1,799	89,000	44,500	22,250	1,780	1,780	1,780
1,150	512	1,279,375	89,556	18,807	1,881	93,000	46,500	23,250	1,860	1,860	1,860
1,200	534	1,335,000	93,450	19,625	1,962	97,000	48,500	24,250	1,940	1,940	1,940
1,250	556	1,390,625	97,344	20,442	2,044	101,000	50,500	25,250	2,020	2,020	2,020
1,300	579	1,446,250	101,238	21,260	2,126	105,000	52,500	26,250	2,100	2,100	2,100
1,350	601	1,501,875	105,131	22,078	2,208	109,000	54,500	27,250	2,180	2,180	2,180
1,400	623	1,557,500	109,025	22,895	2,290	113,000	56,500	28,250	2,260	2,260	2,260
1,450	645	1,613,125	112,919	23,713	2,371	117,000	58,500	29,250	2,340	2,340	2,340
1,500	668	1,668,750	116,813	24,531	2,453	121,000	60,500	30,250	2,420	2,420	2,420
1,550	690	1,724,375	120,706	25,348	2,535	125,000	62,500	31,250	2,500	2,500	2,500
1,600	712	1,780,000	124,600	26,166	2,617	129,000	64,500	32,250	2,580	2,580	2,580
1,650	734	1,835,625	128,494	26,984	2,698	133,000	66,500	33,250	2,660	2,660	2,660
1,700	757	1,891,250	132,388	27,801	2,780	137,000	68,500	34,250	2,740	2,740	2,740
1,750	779	1,946,875	136,281	28,619	2,862	141,000	70,500	35,250	2,820	2,820	2,820
<b>1,800</b>	801	2,002,500	140,175	29,437	2,944	145,000	72,500	<b>36,250</b>	2,900	2,900	2,900
Assumptions: 1. "jack" % = 11% 2. Fecundity = 2500 3. Egg-to-emergence = 7% 4. Fry-to-smolt = 21% 5. Smolt-to-adult = 10%						Highlighted indicates proposed adult removals in 2005 and replacement stocking recommended for 2006.			Assumptions: 1. Fry-to-adult - 2% 2. Fingerling-to-adult - 4% 3. Presmolt-to-adult - 8% Note: survivals are less than for Table 2 to account for interactions w/resident fish and smaller presmolt stocking size.		

<sup>a</sup> Presmolt stocking is recommended because late fall stocking should reduce competition for food with resident fish (majority should emigrate the following spring) and growth characteristics from scale patterns can be used to identify these fish when they return as adults

**Appendix B5.-Worksheet for calculating sockeye salmon "replacement" options for adult removals from Afognak Lake, 2005.**

55

Lost Production Estimates						Backstocking Options (1 only)			Returns from Backstocking by Option		
Adults Removed (all age)	Potential Females	Potential Eggs	Potential Emergent Fry	Potential Smolt (4 g, 80 mm)	Potential Adult Return	Spring Fry (0.4 g)	Summer FINGERLING (3.0 g)	RECOMMENDED <sup>a</sup> Fall Presmolt (8-10 g)	Spring Fry (0.4 g)	Summer FINGERLING (3.0 g)	RECOMMENDED <sup>a</sup> Fall Presmolt (8-10 g)
300	134	333,750	23,363	4,906	491	25,000	12,500	6,250	500	500	500
350	156	389,375	27,256	5,724	572	29,000	14,500	7,250	580	580	580
400	178	445,000	31,150	6,542	654	33,000	16,500	8,250	660	660	660
450	200	500,625	35,044	7,359	736	37,000	18,500	9,250	740	740	740
500	223	556,250	38,938	8,177	818	41,000	20,500	10,250	820	820	820
550	245	611,875	42,831	8,995	899	45,000	22,500	11,250	900	900	900
600	267	667,500	46,725	9,812	981	49,000	24,500	12,250	980	980	980
650	289	723,125	50,619	10,630	1,063	53,000	26,500	13,250	1,060	1,060	1,060
700	312	778,750	54,513	11,448	1,145	57,000	28,500	14,250	1,140	1,140	1,140
750	334	834,375	58,406	12,265	1,227	61,000	30,500	15,250	1,220	1,220	1,220
800	356	890,000	62,300	13,083	1,308	65,000	32,500	16,250	1,300	1,300	1,300
850	378	945,625	66,194	13,901	1,390	69,000	34,500	17,250	1,380	1,380	1,380
900	401	1,001,250	70,088	14,718	1,472	73,000	36,500	18,250	1,460	1,460	1,460
950	423	1,056,875	73,981	15,536	1,554	77,000	38,500	19,250	1,540	1,540	1,540
1,000	445	1,112,500	77,875	16,354	1,635	81,000	40,500	20,250	1,620	1,620	1,620
1,050	467	1,168,125	81,769	17,171	1,717	85,000	42,500	21,250	1,700	1,700	1,700
1,100	490	1,223,750	85,663	17,989	1,799	89,000	44,500	22,250	1,780	1,780	1,780
1,150	512	1,279,375	89,556	18,807	1,881	93,000	46,500	23,250	1,860	1,860	1,860
1,200	534	1,335,000	93,450	19,625	1,962	97,000	48,500	24,250	1,940	1,940	1,940
1,250	556	1,390,625	97,344	20,442	2,044	101,000	50,500	25,250	2,020	2,020	2,020
1,300	579	1,446,250	101,238	21,260	2,126	105,000	52,500	26,250	2,100	2,100	2,100
1,350	601	1,501,875	105,131	22,078	2,208	109,000	54,500	27,250	2,180	2,180	2,180
<b>1,400</b>	623	1,557,500	109,025	22,895	2,290	113,000	56,500	<b>28,250</b>	2,260	2,260	2,260
1,450	645	1,613,125	112,919	23,713	2,371	117,000	58,500	29,250	2,340	2,340	2,340
1,500	668	1,668,750	116,813	24,531	2,453	121,000	60,500	30,250	2,420	2,420	2,420
1,550	690	1,724,375	120,706	25,348	2,535	125,000	62,500	31,250	2,500	2,500	2,500
1,600	712	1,780,000	124,600	26,166	2,617	129,000	64,500	32,250	2,580	2,580	2,580
1,650	734	1,835,625	128,494	26,984	2,698	133,000	66,500	33,250	2,660	2,660	2,660
1,700	757	1,891,250	132,388	27,801	2,780	137,000	68,500	34,250	2,740	2,740	2,740
1,750	779	1,946,875	136,281	28,619	2,862	141,000	70,500	35,250	2,820	2,820	2,820
1,800	801	2,002,500	140,175	29,437	2,944	145,000	72,500	36,250	2,900	2,900	2,900
Assumptions: 1. "jack" % = 11% 2. Fecundity = 2500 3. Egg-to-emergence = 7% 4. Fry-to-smolt = 21% 5. Smolt-to- adult = 10%						Highlighted indicates proposed adult removals in 2005 and replacement stocking recommended for 2006.			Assumptions: 1. Fry-to-adult - 2% 2. Fingerling-to-adult - 4% 3. Presmolt-to-adult - 8% Note: survivals are less than for Table 2 to account for interactions w/resident fish and smaller presmolt stocking size.		

<sup>a</sup> Presmolt stocking is recommended because late fall stocking should reduce competition for food with resident fish (majority should emigrate the following spring) and growth characteristics from scale patterns can be used to identify these fish when they return as adults

**Appendix B6.-Worksheet for calculating sockeye salmon "replacement" options for adult removals from Saltery Lake, 2005.**

56

Lost Production Estimates						Backstocking Options (1 only)			Returns from Backstocking by Option		
Adults Removed (all age)	Potential Females	Potential Eggs	Potential Emergent Fry	Potential Smolt (4 g, 80 mm)	Potential Adult Return	Spring Fry (0.4 g)	Summer Fingerling (3.0 g)	RECOMMENDED <sup>a</sup> Fall Presmolt (8-10 g)	Spring Fry (0.4 g)	Summer Fingerling (3.0 g)	RECOMMENDED <sup>a</sup> Fall Presmolt (8-10 g)
1500	738	2,214,000	154,980	32,546	3,255	160,000	80,000	40,000	3,200	3,200	3,200
1600	787	2,361,600	165,312	34,716	3,472	171,000	85,500	42,750	3,420	3,420	3,420
1700	836	2,509,200	175,644	36,885	3,689	182,000	91,000	45,500	3,640	3,640	3,640
1800	886	2,656,800	185,976	39,055	3,905	193,000	96,500	48,250	3,860	3,860	3,860
1900	935	2,804,400	196,308	41,225	4,122	204,000	102,000	51,000	4,080	4,080	4,080
2000	984	2,952,000	206,640	43,394	4,339	215,000	107,500	53,750	4,300	4,300	4,300
2100	1,033	3,099,600	216,972	45,564	4,556	226,000	113,000	56,500	4,520	4,520	4,520
2200	1,082	3,247,200	227,304	47,734	4,773	237,000	118,500	59,250	4,740	4,740	4,740
2300	1,132	3,394,800	237,636	49,904	4,990	248,000	124,000	62,000	4,960	4,960	4,960
2400	1,181	3,542,400	247,968	52,073	5,207	259,000	129,500	64,750	5,180	5,180	5,180
2500	1,230	3,690,000	258,300	54,243	5,424	270,000	135,000	67,500	5,400	5,400	5,400
2600	1,279	3,837,600	268,632	56,413	5,641	281,000	140,500	70,250	5,620	5,620	5,620
2700	1,328	3,985,200	278,964	58,582	5,858	292,000	146,000	73,000	5,840	5,840	5,840
2800	1,378	4,132,800	289,296	60,752	6,075	303,000	151,500	75,750	6,060	6,060	6,060
2900	1,427	4,280,400	299,628	62,922	6,292	314,000	157,000	78,500	6,280	6,280	6,280
3000	1,476	4,428,000	309,960	65,092	6,509	325,000	162,500	81,250	6,500	6,500	6,500
3100	1,525	4,575,600	320,292	67,261	6,726	336,000	168,000	84,000	6,720	6,720	6,720
3200	1,574	4,723,200	330,624	69,431	6,943	347,000	173,500	86,750	6,940	6,940	6,940
3300	1,624	4,870,800	340,956	71,601	7,160	358,000	179,000	89,500	7,160	7,160	7,160
3400	1,673	5,018,400	351,288	73,770	7,377	369,000	184,500	92,250	7,380	7,380	7,380
3500	1,722	5,166,000	361,620	75,940	7,594	380,000	190,000	95,000	7,600	7,600	7,600
3600	1,771	5,313,600	371,952	78,110	7,811	391,000	195,500	97,750	7,820	7,820	7,820
3700	1,820	5,461,200	382,284	80,280	8,028	402,000	201,000	100,500	8,040	8,040	8,040
3800	1,870	5,608,800	392,616	82,449	8,245	413,000	206,500	103,250	8,260	8,260	8,260
3900	1,919	5,756,400	402,948	84,619	8,462	424,000	212,000	106,000	8,480	8,480	8,480
4000	1,968	5,904,000	413,280	86,789	8,679	435,000	217,500	108,750	8,700	8,700	8,700
<b>4100</b>	2,017	6,051,600	423,612	88,959	8,896	446,000	223,000	<b>111,500</b>	8,920	8,920	8,920
4200	2,066	6,199,200	433,944	91,128	9,113	457,000	228,500	114,250	9,140	9,140	9,140
4300	2,116	6,346,800	444,276	93,298	9,330	468,000	234,000	117,000	9,360	9,360	9,360
4400	2,165	6,494,400	454,608	95,468	9,547	479,000	239,500	119,750	9,580	9,580	9,580
4500	2,214	6,642,000	464,940	97,637	9,764	490,000	245,000	122,500	9,800	9,800	9,800

<p>Assumptions:</p> <ol style="list-style-type: none"> <li>"jack" % = 1.6%</li> <li>Fecundity = 3000</li> <li>Egg-to-emergence = 7%</li> <li>Fry-to-smolt = 21%</li> <li>Smolt-to- adult = 10%</li> </ol> <p style="text-align: right;">= ~2.1 Return per spawner</p>	<p><b>Highlighted indicates proposed adult removals in 2005 and replacement stocking recommended for 2006.</b></p>	<p>Assumptions:</p> <ol style="list-style-type: none"> <li>Fry-to-adult - 2%</li> <li>Fingerling-to-adult - 4%</li> <li>Presmolt-to-adult - 8%</li> </ol> <p>Note: survivals are less than for Table 2 to account for interactions w/resident fish and smaller presmolt stocking size.</p>
---	--	--

<sup>a</sup> Presmolt stocking is recommended because late fall stocking should reduce competition for food with resident fish (majority should emigrate the following spring) and growth characteristics from scale patterns can be used to identify these fish when they return as adults.

**APPENDIX C. GUIDELINES FOR REPLACEMENT STOCKING OF  
SOCKEYE SALMON**

**Appendix C1.-Guidelines for "replacement" stocking (backstocking) of sockeye salmon as applicable to adult removals from Malina, Afognak and Saltery Lakes in 2005.**

---

(The following text is from Dan Moore, Fishery Biologist, Division of Commercial Fisheries, SW Genetics, Anchorage)

There are currently about 12 "backstocking" projects (including Malina or Afognak and Saltery) statewide. Eight are in the south central/Kodiak area and 8 of the 12 are sockeye projects. Only two (Malina or Afognak and Saltery) will be conducted as a replacement for broodstock removed for other enhancement projects.

Backstocking is a high risk practice with regards to viability of the wild stock. Deleterious effects can include changed run timing, change in adult size, reduced spawning success and other reductions in fitness.

(The literature is rich with examples of supplementation/backstocking projects that have not had the results hoped for by the managers. To be fair, these are mostly from the lower 48 but then we have not examined our projects to the extent they have outside. We do not want to repeat these mistakes.)

Specific guidelines:

1) Collect eggs from throughout the duration of the run in proportion to their occurrence in the natural population. Also spawn adults randomly with respect to age and size.

(Randomizing selection of spawning pairs during the egg take will maximize genetic variability. Selecting individuals for anthropogenic reasons may decrease the genetic viability of the population. Propagating eggs from only one portion of the return could select for that particular segment of the population and result in shifts in the timing of subsequent returns of adults, their age and size composition.)

2) When taking eggs from a system with multiple spawning locations do not combine the different populations (e.g. inlet and outlet spawners).

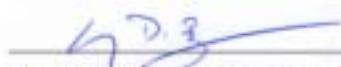
(The separate populations may exhibit different return timings, different rheotactic responses and may be adapted to specific temperature regimes and other environmental parameters in their spawning environments. )

3) When returning progeny to an egg take site containing wild fish, the progeny should not exceed a 1:1 wild/cultured ratio. This applies to all life stages. Return the progeny to the egg take site.

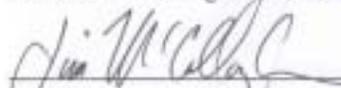
(The 1:1 ratio may not apply in certain rehabilitation projects, determined on a case by case basis. No examples of this scenario come to mind.)

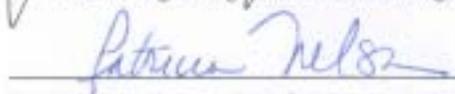
---

**SIGN-OFF**

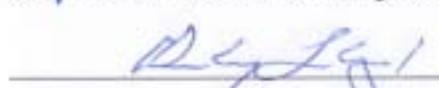
  
\_\_\_\_\_  
Gary Byrne: Pillar Creek Hatchery Manager, KRAA  
Date 7/15/05

  
\_\_\_\_\_  
Steve Honnold: Regional Resource Development Biologist, CFD  
Date 7/8/05

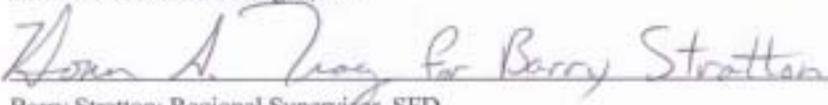
  
\_\_\_\_\_  
Jim McCullough: Regional Finfish Management Supervisor, CFD  
Date 7/14/05

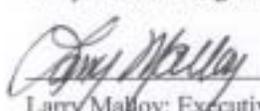
  
\_\_\_\_\_  
Patti Nelson: Regional Finfish Research Supervisor, CFD  
Date 7/8/05

  
\_\_\_\_\_  
Kevin Brennan: Area Finfish Management Biologist, CFD  
Date 7-15-05

  
\_\_\_\_\_  
Denby Lloyd: Regional Supervisor, CFD  
Date 7/15/05

  
\_\_\_\_\_  
Len Schwarz: Area Biologist, SFD  
Date 7/8/05

  
\_\_\_\_\_  
Barry Stratton: Regional Supervisor, SFD  
Date 7/8/05

  
\_\_\_\_\_  
Larry Malloy: Executive Director, KRAA  
Date 07.15.05

*The 2005 Hatchery Management Plan for PCH is hereby approved:*

  
\_\_\_\_\_  
McKie Campbell: Commissioner, ADF&G  
Date 7/15/05