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Proposed Thermal Marks for Brood Year 2010 Salmon in Alaska

By

Dion S. Oxman
Ron Josephson

Mark, Tag, and Age Laboratory
Alaska Department of Fish and Game
P.O. Box 115526, Juneau, Alaska 99811-5526

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Abstract

In Alaska, mass-marking of salmon using otolith thermal marking is an effective research and management tool applicable to a variety of situations. For brood year 2010, approximately 56 million sockeye, 700 million pink salmon, 590 million chum, 9 million coho, and 6 million Chinook salmon will be marked at 19 different hatcheries using 62 thermal marks.

Introduction

In Alaska, thermal marking is used to provide information about the contribution of hatchery fish, primarily pink, chum and sockeye salmon, to commercial and cost-recovery fisheries during the summer fishing season. Because most fisheries are managed on the basis of wild stocks, fishery managers subtract the estimated hatchery catch from total catch and use that information to structure the fisheries. Hatchery operators are most interested in their own production and use thermal marking to estimate how their fish contribute to traditional fisheries and to terminal harvests. In addition, thermal marks are being used to determine the origin of juvenile and immature salmon collected during surveys in the Gulf of Alaska by the National Marine Fisheries Service and as part of the Bering Sea and Aleutian Island Salmon Investigative Study (BASIS) program.

Plan for 2010 brood year stocks

The proposed thermal marks for brood year 2010 salmon are listed in Table 1. We plan to mark approximately 56 million sockeye, 700 million pink salmon, 590 million chum, 9 million coho, and 6 million Chinook salmon at 19 different hatcheries using 62 thermal marks.

The proposed otolith plan includes scheduled changes. Some marks are on an every other year cycle, while others rotate on a three-year cycle. Thermal mark patterns are presented in both the RBr notation (Munk and Geiger 1998), as well as well as in the Uniform Hatch Code notation (Johnson et al. 2006).

References

Johnson, W.F., R.P. Josephson, T.R. Frawley, and D.S. Oxman 2006. Revised web-based North Pacific salmon otolith mark directory. (NPAFC Doc. 971). 39p. Alaska Dept. Fish and Game, Juneau Alaska

Munk, K.M. and Geiger, H.J. 1998. Thermal marking of otoliths: the “RBr” coding structure of thermal marks. (NPAFC Doc. 367). 19 p. Alaska Dept. of Fish and Game, Juneau Alaska.

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Table 1. Summary of thermal mark codes to be applied to Alaska hatchery salmon in brood year 2010.

SPECIES: SOCKEYE

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK10-01	SM	2010	2011	Sockeye	Alaska	Southcentral	PWSA	Gulkana	Gulkana
AK10-02	TM	2010	2011	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Bear Lake
AK10-03	TM	2010	2012	Sockeye	Alaska	Southcentral	PWSA	Main Bay	Main Bay
AK10-04	TM	2010	2011	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Hidden Lake
AK10-05	TM	2010	2011	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	English Bay Lakes
AK10-06	TM	2010	2011	Sockeye	Alaska	Southeast	DIPC	Snettisham	Tatsamenie Lake
AK10-07	TM	2010	2011	Sockeye	Alaska	Southeast	DIPC	Snettisham	Tahltan Lake
AK10-08	TM	2010	2012	Sockeye	Alaska	Southeast	DIPC	Snettisham	Snettisham
AK10-09	TM	2010	2012	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Bear Lake
AK10-10	TM	2010	2011	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Hidden Lake
AK10-11	TM	2010	2012	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	English Bay Lakes
AK10-12	TM	2010	2012	Sockeye	Alaska	Southeast	DIPC	Snettisham	Snettisham
AK10-13	TM	2010	2011	Sockeye	Alaska	Southeast	DIPC	Snettisham	Tahltan Lake
AK10-14	TM	2010	2011	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Hidden Lake
AK10-15	TM	2010	2011	Sockeye	Alaska	Southeast	DIPC	Snettisham	Tatsamenie Lake
AK10-16	TM	2010	2011	Sockeye	Alaska	Southeast	DIPC	Snettisham	Snettisham
AK10-17	TM	2010	2012	Sockeye	Alaska	Southeast	DIPC	Snettisham	Snettisham

ID#	MARK NAME	STAGE	ESIMATED RELEASE	HATCH CODE	RBr CODE	Pre-Hatch Graphic	Post-Hatch Graphic	MARKING SYSTEM	TEMP SHIFT DIRECTION
AK10-01	GULKANA10	Fry	22,000,000	HS1	2:1.S1		|	Immersion	
AK10-02	TRAILLAKES10A	Fry	2,400,000	4H	1:1.4	||||		Boiler	Up
AK10-03	MAINBAY10	Smolt	10,000,000	3H	1:1.3	|||			
AK10-04	PENINSULA10SOCKEYE	Fry	3,500,000	1,3H	1:1.1,2.3	| |||		Boiler	Up
AK10-05	ENGLISH BAY10	Pre-smolt	150,000	5H	1:1.5	|||||		Boiler	Up
AK10-06	TATSAMENIE10	Fry	800,000	2,1,2H	1:1.2,2.1,3.2	|| | ||		Chiller	Down
AK10-07	TUYA10	Fry	1,200,000	3n,3H	1:1.3n,2.3	||| |||		Chiller	Down
AK10-08	SPEELARM10A	Smolt	8,000,000	3,3nH	1:1.3,2.3n	||| |||		Chiller	Down
AK10-09	TRAILLAKES10B	Smolt	2,000,000	2,4H	1:1.2,2.4	|| ||||		Boiler	Up
AK10-10	HIDDENLAKE10	Fry	530,000	2,2,2H	1:1.2,2.2,3.2	|| || ||		Boiler	Up
AK10-11	ENGLISH BAY10SMOLT	Smolt	300,000	1,5H	1:1.1,2.5	| |||||		Boiler	Up
AK10-12	SPEELARM10B	Smolt	1,000,000	4n,3H	1:1.4n,2.3	|||| |||		Chiller	Down
AK10-13	TAHLTAN10	Fry	2,000,000	4,3H	1:1.4,2.3	|||| |||		Chiller	Down
AK10-14	TUTKA10	Fry	530,000	2,5H	1:1.2,2.5	|| |||||		Boiler	Up
AK10-15	TATSAMENIE10ER	Fingerling	200,000	2,2,3H	1:1.2,2.2,3.3	|| || |||		Chiller	Down
AK10-16	SWEETHEART10	Fry	500,000	5,3nH	1:1.5,2.3n	||||| |||		Chiller	Down
AK10-17	SPEELARM10C	Smolt	1,000,000	4,4nH	1:1.4,2.4n	|||| ||||		Chiller	Down

Table 1 (continued). Summary of thermal mark codes to be applied to Alaska hatchery salmon in brood year 2010.
SPECIES: PINK

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK10-18	TM	2010	2011	Pink	Alaska	Southcentral	PWSA	A F Koernig	Armin F. Koernig
AK10-19	TM	2010	2011	Pink	Alaska	Southeast	KAKE	Gunnuk Creek	Gunnuk Cr
AK10-20	TM	2010	2011	Pink	Alaska	Southeast	SJ	Sheldon Jackson	Sheldon Jackson
AK10-21	TM	2010	2011	Pink	Alaska	Southeast	AKI	Port Armstrong	Port Armstrong
AK10-22	TM	2010	2011	Pink	Alaska	Southcentral	VFDA	Solomon Gulch	Solomon Gulch
AK10-23	TM	2010	2011	Pink	Alaska	Southcentral	PWSA	Cannery Creek	Cannery Creek
AK10-24	TM	2010	2011	Pink	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg

ID#	MARK NAME	STAGE	ESIMATED RELEASE	HATCH CODE	RBr CODE	Pre-Hatch Graphic	Post-Hatch Graphic	MARKING SYSTEM	TEMP SHIFT DIRECTION
AK10-18	AFK10	Fed Fry	150,000,000	4H3	1:1.4+2.3	||||	|||		
AK10-19	KAKE10PINK	Fed Fry	5,000,000	1,2,1H	1:1.1,2.2,3.1	| || |		Chiller	Down
AK10-20	SJ10PINK	Fed Fry	100,000	4,1H	1:1.4,2.1	|||| |		Chiller	Down
AK10-21	PORTARMSTRONG10	Fed Fry	85,000,000	3H	1:1.3	|||		Load Bank	Up
AK10-22	SGH10	Fed Fry	200,000,000	6H	1:1.6	||||||			
AK10-23	CCH10	Fed Fry	140,000,000	3,3H	1:1.3,2.3	||| |||			
AK10-24	WHN10PINK	Fed Fry	120,000,000	8H3	1:1.8+2.3	||||||||	|||		

Table 1 (continued). Summary of thermal mark codes to be applied to Alaska hatchery salmon in brood year 2010.
SPECIES: CHUM

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK10-25	TM	2010	2011	Chum	Alaska	Southeast	SJ	Sheldon Jackson	Sheldon Jackson
AK10-26	TM	2010	2011	Chum	Alaska	Southeast	KAKE	Hidden Falls	Gunnuk Cr
AK10-27	TM	2010	2011	Chum	Alaska	Southeast	AKI	Port Armstrong	Port Armstrong
AK10-28	TM	2010	2011	Chum	Alaska	Southeast	NSRA	Medvejie	Medvejie
AK10-29	TM	2010	2011	Chum	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg
AK10-30	TM	2010	2011	Chum	Alaska	Southeast	NSRA	Medvejie	Hidden Falls
AK10-31	TM	2010	2011	Chum	Alaska	Southeast	NSRA	Hidden Falls	Hidden Falls
AK10-32	TM	2010	2011	Chum	Alaska	Southeast	NSRA	Medvejie	Medvejie
AK10-33	TM	2010	2011	Chum	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg
AK10-34	TM	2010	2011	Chum	Alaska	Southeast	DIPC	Macaulay	Macaulay
AK10-35	TM	2010	2011	Chum	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg
AK10-36	TM	2010	2011	Chum	Alaska	Southeast	NSRA	Hidden Falls	Hidden Falls
AK10-37	TM	2010	2011	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay
AK10-38	TM	2010	2011	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay
AK10-39	TM	2010	2011	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay
AK10-40	TM	2010	2011	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay
AK10-41	TM	2010	2011	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay
AK10-42	TM	2010	2011	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay
AK10-43	TM	2010	2011	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay
AK10-44	TM	2010	2011	Chum	Alaska	Western	NSED	Nome Incubation	Solomon River
AK10-45	TM	2010	2011	Chum	Alaska	Western	NSED	Nome Incubation	Snake River

ID#	MARK NAME	STAGE	ESIMATED RELEASE	HATCH CODE	RBr CODE	Pre-Hatch Graphic	Post-Hatch Graphic	MARKING SYSTEM	TEMP SHIFT DIRECTION
AK10-25	SJ10CHUM	Fed Fry	100,000	1,3H	1:1.1,2.3	| |||		Heater	Up
AK10-26	KAKE10	Fed Fry	25,000,000	3,2nH	1:1.3,2.2n	||| ||		Chiller	Down
AK10-27	PORTARMSTRONG10CHUM	Fed Fry	30,000,000	1,2,2H	1:1.1,2.2,3.2	| || ||		Load Bank	Up
AK10-28	DEEPINLETMV10	Fed Fry	49,000,000	1,3,2H	1:1.1,2.3,3.2	| ||| ||			
AK10-29	WHN10	Fed Fry	75,000,000	3,4nH	1:1.3,2.4n	||| ||||			
AK10-30	DEEPINLETHF10	Fed Fry	22,000,000	5,2nH	1:1.5,2.2n	||||| ||		Lake Intakes	Up
AK10-31	HIDDENFALLS10	Fed Fry	53,000,000	4n,3H	1:1.4n,2.3	|||| |||		Lake Intakes	Up
AK10-32	BEARCOVE10	Fed Fry	9,000,000	3n,4H	1:1.3n,2.4	||| ||||		Heater	Up(5-9)
AK10-33	WHN-AFK10	Fed Fry	15,000,000	1,2,3H	1:1.1,2.2,3.3	| || |||			
AK10-34	DIPAC10	Fed Fry	100,000,000	1,6H	1:1.1,2.6	| |||||		Boiler	Up
AK10-35	PORTCHALMERS10	Fed Fry	40,000,000	1,3,3H	1:1.1,2.3,3.3	| ||| |||			
AK10-36	TAKATZ10	Fed Fry	45,000,000	1,2,1,3H	1:1.1,2.2,3.1,4.3	| || | |||		Lake Intakes	Up
AK10-37	ANITABAY10	Fed Fry	22,000,000	5,1,2H	1:1.5,2.1,3.2	||||| | ||		Boiler	Up
AK10-38	KENDRICK10	Fed Fry	18,000,000	4n,2n,2H	1:1.4n,2.2n,3.2	|||| || ||		Boiler	Up
AK10-39	NEETSBAY10SUM	Fed Fry	49,000,000	4,4H2,3	1:1.4,2.4+3.2,4.3	|||| ||||	|| |||	Boiler	Up
AK10-40	NEETSBAY10FALL	Fed Fry	20,000,000	4,2,2H2,3	1:1.4,2.2,3.2+4.2,5.3	|||| || ||	|| |||	Boiler	Up
AK10-41	NAKATINLET10SUM	Fed Fry	8,000,000	4,1,3H	1:1.4,2.1,3.3	|||| | |||		Boiler	Up
AK10-42	KENDRICKLL10	Fed Fry	2,000,000	3,5H	1:1.3,2.5	||| |||||		Boiler	Up
AK10-43	NAKATINLET10FALL	Fed Fry	8,000,000	3,4,1H2,3	1:1.3,2.4,3.1+4.2,5.3	||| |||| |	|| |||	Boiler	Up
AK10-44	NORTON10CHUMA	Egg	140,000	3,2nH	1:1.3,2.2n	||| ||		Moist Air	
AK10-45	NORTON10CHUMB	Egg	250,000	4,1H	1:1.4,2.1	|||| |		Moist Air	

Table 1 (continued). Summary of thermal mark codes to be applied to Alaska hatchery salmon in brood year 2010.

SPECIES: COHO

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK10-46	TM	2010	2012	Coho	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg
AK10-47	TM	2010	2011	Coho	Alaska	Southcentral	CIAA	Trail Lakes	Bear Lake
AK10-48	TM	2010	2012	Coho	Alaska	Southcentral	ADFG	Fort Richardson	Ship Creek
AK10-49	TM	2010	2012	Coho	Alaska	Southeast	DIPC	Macaulay	Macaulay
AK10-50	TM	2010	2012	Coho	Alaska	Southcentral	VFDA	Solomon Gulch	Solomon Gulch
AK10-51	TM	2010	2012	Coho	Alaska	Southcentral	ADFG	Fort Richardson	Bear Lake
AK10-52	TM	2010	2012	Coho	Alaska	Southeast	NSRA	Medvejie	Salmon Lake
AK10-53	TM	2010	2012	Coho	Alaska	Sotheast	PWHA	Klawock	Klawock Lake
AK10-54	TM	2010	2011	Coho	Alaska	Western	NSED	Nome Incubation	Snake River

ID#	MARK NAME	STAGE	ESIMATED RELEASE	HATCH CODE	RBr CODE	Pre-Hatch Graphic	Post-Hatch Graphic	MARKING SYSTEM	TEMP SHIFT DIRECTION
AK10-46	WHN10COHO	Smolt	1,000,000	3H	1:1.3	|||			
AK10-47	TRAILLAKES10SMCOHO	Fry	555,000	2,2H	1:1.2,2.2	|| ||		Boiler	Up
AK10-48	COOKINLET10COHO	Smolt	800,000	5H	1:1.5	|||||		Boiler	Up
AK10-49	DIPAC10COHO	Smolt	300,000	3,2H	1:1.3,2.2	||| ||		Boiler	Up
AK10-50	SGH10COHO	Smolt	1,500,000	6H	1:1.6	|||||			
AK10-51	RESURRECTION10COHO	Smolt	240,000	2,4H	1:1.2,2.4	|| |||		Boiler	Up
AK10-52	DEEPINLET10COHO	Fed Fry	300,000	4H	1:1.4	|||			
AK10-53	KLAWOCK10COHO	Smolt	4000000	4,2H	1:1.4,2.2	||| ||			
AK10-54	NORTON10COHO	Egg	200,000	2,3H	1:1.2,2.3	|| |||		Moist Air	

SPECIES: CHINOOK

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK10-55	TM	2010	2011	Chinook	Alaska	Southcentral	CVTC	Chickaloon Village CIF	Moose River
AK10-56	TM	2010	2012	Chinook	Alaska	Southeast	NSRA	Hidden Falls	Hidden Falls
AK10-57	TM	2010	2012	Chinook	Alaska	Southeast	NSRA	Medvejie	Medvejie
AK10-58	TM	2010	2012	Chinook	Alaska	Southeast	SSRA	Whitman Lake	Whitman Lake
AK10-59	TM	2010	2011	Chinook	Alaska	Southeast	NSRA	Medvejie	Medvejie
AK10-60	TM	2010	2012	Chinook	Alaska	Southeast	NSRA	Medvejie	Medvejie
AK10-61	TM	2010	2012	Chinook	Alaska	Southeast	NSRA	Hidden Falls	Tahini
AK10-62	TM	2010	2011	Chinook	Alaska	Southeast	NSRA	Medvejie	Medvejie

ID#	MARK NAME	STAGE	ESIMATED RELEASE	HATCH CODE	RBr CODE	Pre-Hatch Graphic	Post-Hatch Graphic	MARKING SYSTEM	TEMP SHIFT DIRECTION
AK10-55	CHICKALOON10	Egg	100,000	3,2H	1:1.3,2.2	||| ||		Moist Air	
AK10-56	HIDDENFALLS10CHIN	Smolt	1,500,000	4,2H	1:1.4,2.2	||| ||		Lake Intakes	Up
AK10-57	GREENLAKE10CHIN	Smolt	850,000	3,3nH	1:1.3,2.3n	||| ‖			
AK10-58	WHITMAN10CHIN	Smolt	725,000	1,5H	1:1.1,2.5	| ||||		Boiler	Up
AK10-59	MEDVEJIE10CHINZ	Smolt	1,000,000	5,2H	1:1.5,2.2	|||| ||			
AK10-60	MEDVEJIE10CHIN	Smolt	1,000,000	4,3H	1:1.4,2.3	||| |||			
AK10-61	LUTAK10CHIN	Smolt	150,000	3,2,2H	1:1.3,2.2,3.2	||| || ||		Lake Intakes	Up
AK10-62	DEEPINLET10CHINZ	Smolt	1,000,000	2,3,2H	1:1.2,2.3,3.2	|| ||| ||			