

Proposed Thermal Marks for Brood Year 2011 Salmon in Alaska

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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 2011, approximately 60 million sockeye, 800 million pink salmon, 586 million chum, 9 million coho, and 7 million Chinook salmon will be marked at 22 different hatcheries using 77 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 2011 brood year stocks

The proposed thermal marks for brood year 2011 salmon are listed in Table 1. We plan to mark approximately 60 million sockeye, 800 million pink salmon, 586 million chum, 9 million coho, and 7 million Chinook salmon at 22 different hatcheries using 77 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 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.

Table 1. Summary of thermal mark codes to be applied to Alaska hatchery salmon in brood year 2011.

SPECIES: SOCKEYE

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK11-01	SM	2011	2012	Sockeye	Alaska	Southcentral	PWSA	Gulkana	Gulkana
AK11-02	TM	2011	2012	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Bear Lake
AK11-03	TM	2011	2013	Sockeye	Alaska	Southcentral	PWSA	Main Bay	Main Bay
AK11-04	TM	2011	2013	Sockeye	Alaska	Southcentral	PWSA	Main Bay	Main Bay
AK11-05	TM	2011	2013	Sockeye	Alaska	Southcentral	PWSA	Main Bay	Main Bay
AK11-06	TM	2011	2013	Sockeye	Alaska	Southcentral	PWSA	Main Bay	Main Bay
AK11-07	TM	2011	2013	Sockeye	Alaska	Southcentral	PWSA	Main Bay	Main Bay
AK11-08	TM	2011	2012	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Hidden Lake
AK11-09	TM	2011	2012	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	English Bay Lakes
AK11-10	TM	2011	2012	Sockeye	Alaska	Southeast	DIPC	Snettisham	Tatsamenie Lake
AK11-11	TM	2011	2012	Sockeye	Alaska	Southeast	DIPC	Snettisham	Tahltan Lake
AK11-12	TM	2011	2013	Sockeye	Alaska	Southeast	DIPC	Snettisham	Snettisham
AK11-13	TM	2011	2013	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Bear Lake
AK11-14	TM	2011	2012	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Hidden Lake
AK11-15	TM	2011	2013	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	English Bay Lakes
AK11-16	TM	2011	2013	Sockeye	Alaska	Southeast	DIPC	Snettisham	Snettisham
AK11-17	TM	2011	2012	Sockeye	Alaska	Southeast	DIPC	Snettisham	Tahltan Lake
AK11-18	TM	2011	2012	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Hidden Lake
AK11-19	TM	2011	2012	Sockeye	Alaska	Southeast	DIPC	Snettisham	Tatsamenie Lake
AK11-20	TM	2011	2012	Sockeye	Alaska	Southeast	DIPC	Snettisham	Snettisham
AK11-21	TM	2011	2013	Sockeye	Alaska	Southeast	DIPC	Snettisham	Snettisham
AK11-22	TM	2011	2013	Sockeye	Alaska	Southeast	DIPC	Snettisham	Snettisham
AK11-23	TM	2011	2013	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
AK11-01	GULKANA11	Fry	22,000,000	HS1	2:1.S1			Immersion	
AK11-02	TRAILLAKES11A	Fry	2,400,000	2,4H	1:1.2,2.4			Boiler	Up
AK11-03	MAINBAY11A	Smolt	2,380,000	5H3	1:1.5+2.3				
AK11-04	MAINBAY11B	Smolt	2,380,000	5H2,2	1:1.5+2.2,3,2				
AK11-05	MAINBAY11C	Smolt	2,380,000	5H5	1:1.5+2.5				
AK11-06	MAINBAY11D	Smolt	2,380,000	5H3,3	1:1.5+2.3,3,3				
AK11-07	MAINBAY11E	Smolt	2,380,000	5H	1:1.5				
AK11-08	PENINSULA11SOCKEYE	Fry	3,500,000	2,2H	1:1.2,2.2			Boiler	Up
AK11-09	ENGLISH BAY11	Pre-smolt	150,000	4H	1:1.4			Boiler	Up
AK11-10	TATSAMENIE11	Fry	800,000	3n,5H	1:1.3n,2.5			Chiller	Down
AK11-11	TUYA11	Fry	1,200,000	6H	1:1.6			Chiller	Down
AK11-12	SPEELARM11A	Smolt	8,000,000	5H	1:1.5			Chiller	Down
AK11-13	TRAILLAKES11B	Smolt	2,000,000	3,2,3H	1:1.3,2.2,3,3			Boiler	Up
AK11-14	HIDDENLAKE11	Fry	530,000	2,1,2H	1:1.2,2.1,3,2			Boiler	Up
AK11-15	ENGLISH BAY11SMOLT	Smolt	300,000	2,4,2H	1:1.2,2.4,3,2			Boiler	Up
AK11-16	SPEELARM11B	Smolt	1,000,000	3n,4H	1:1.3n,2.4			Chiller	Down
AK11-17	TAHLTAN11	Fry	2,000,000	3,2n,2H	1:1.3,2.2n,3,2			Chiller	Down
AK11-18	TUTKA11	Smolt	530,000	4,2H	1:1.4,2.2			Boiler	Up
AK11-19	TATSAMENIE11ER	Fingerling	200,000	6,2H	1:1.6,2.2			Chiller	Down
AK11-20	SWEETHEART11	Fry	500,000	5,2H	1:1.5,2.2			Chiller	Down
AK11-21	SPEELARM11C	Smolt	1,000,000	4n,4H	1:1.4n,2.4			Chiller	Down
AK11-22	SPEELARM11D	Smolt	1,000,000	5,4nH	1:1.5,2.4n				
AK11-23	SPEELARM11E	Smolt	1,000,000	4,6H	1:1.4,2.6				

Table 1 (continued). Summary of thermal mark codes to be applied to Alaska hatchery salmon in brood year 2011.

SPECIES: PINK

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK11-24	TM	2011	2012	Pink	Alaska	Southcentral	PWSA	A F Koernig	Armin F. Koernig
AK11-25	TM	2011	2012	Pink	Alaska	Southcentral	PWSA	A F Koernig	Armin F. Koernig
AK11-26	TM	2011	2012	Pink	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg
AK11-27	TM	2011	2012	Pink	Alaska	Southeast	KAKE	Gunnuk Creek	Gunnuk Cr
AK11-28	TM	2011	2012	Pink	Alaska	Southeast	SJ	Sheldon Jackson	Indian River
AK11-29	TM	2011	2012	Pink	Alaska	Southeast	AKI	Port Armstrong	Port Armstrong
AK11-30	TM	2011	2012	Pink	Alaska	Southcentral	VFDA	Solomon Gulch	Solomon Gulch
AK11-31	TM	2011	2012	Pink	Alaska	Southcentral	PWSA	Cannery Creek	Cannery Creek
AK11-32	TM	2011	2012	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
AK11-24	AFK11A	Fed Fry	90,000,000	4H3	1:1.4+2.3				
AK11-25	AFK11B	Fed Fry	90,000,000	4H	1:1.4				
AK11-26	WNH11PINKB	Fed Fry	70,000,000	8H	1:1.8				
AK11-27	KAKE11PINK	Fed Fry	5,000,000	1,2,1H	1:1.1,2.2,3.1			Chiller	Down
AK11-28	SJ11PINK	Fed Fry	100,000	4,1H	1:1.4,2.1			Chiller	Down
AK11-29	PORTARMSTRONG11	Fed Fry	85,000,000	2,2H	1:1.2,2.2				Up
AK11-30	SGH11	Fed Fry	200,000,000	6H	1:1.6				
AK11-31	CCH11	Fed Fry	140,000,000	3,3H	1:1.3,2.3				
AK11-32	WNH11PINKA	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 2011.

SPECIES: CHUM

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	SPECIES	STATE/ PROV/INCE	REGION	RELEASE	AGENCY	FACILITY	STOCK
AK11-33	TM	2011	2012	Chum	Alaska	Southeast	SJ	Sheldon Jackson	Indian River	
AK11-34	TM	2011	2012	Chum	Alaska	Southeast	KAKE	Gunnuk Creek	Gunnuk Cr	
AK11-35	TM	2011	2012	Chum	Alaska	Southeast	AKI	Port Armstrong	Port Armstrong	
AK11-36	TM	2011	2012	Chum	Alaska	Southeast	NSRA	Medvejie	Medvejie	
AK11-37	TM	2011	2012	Chum	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg	
AK11-38	TM	2011	2012	Chum	Alaska	Southeast	NSRA	Medvejie	Hidden Falls	
AK11-39	TM	2011	2012	Chum	Alaska	Southeast	NSRA	Hidden Falls	Hidden Falls	
AK11-40	TM	2011	2012	Chum	Alaska	Southeast	NSRA	Hidden Falls	Hidden Falls	
AK11-41	TM	2011	2012	Chum	Alaska	Southeast	NSRA	Medvejie	Medvejie	
AK11-42	TM	2011	2012	Chum	Alaska	Southeast	NSRA	Medvejie	Medvejie	
AK11-43	TM	2011	2012	Chum	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg	
AK11-44	TM	2011	2012	Chum	Alaska	Southeast	DIPC	Macaulay	Macaulay	
AK11-45	TM	2011	2012	Chum	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg	
AK11-46	TM	2011	2012	Chum	Alaska	Southeast	NSRA	Hidden Falls	Hidden Falls	
AK11-47	TM	2011	2012	Chum	Alaska	Southeast	NSRA	Hidden Falls	Hidden Falls	
AK11-48	TM	2011	2012	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay	
AK11-49	TM	2011	2012	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay	
AK11-50	TM	2011	2012	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay	
AK11-51	TM	2011	2012	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay	
AK11-52	TM	2011	2012	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay	
AK11-53	TM	2011	2012	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay	
AK11-54	TM	2011	2012	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay	
AK11-55	TM	2011	2012	Chum	Alaska	Western	NSED	Nome Incubation	Solomon River	
AK11-56	TM	2011	2012	Chum	Alaska	Western	NSED	Nome Incubation	Snake River	
AK11-57	TM	2011	2012	Chum	Alaska	Southeast	NSRA	17 Mi Stream Incubation	Chilkat	
AK11-58	TM	2011	2012	Chum	Alaska	Southeast	MIC	Tamgas Creek	Carroll River	

ID#	MARK NAME	STAGE	ESIMATED RELEASE	HATCH CODE	RBr CODE	Pre-Hatch Graphic	Post-Hatch Graphic	MARKING SYSTEM	TEMP SHIFT DIRECTION
AK11-33	SJ11CHUM	Fed Fry	100,000	6,1H	1:1.6.2.1			Heater	Up
AK11-34	KAKE11	Fed Fry	25,000,000	4n,2H	1:1.4n,2.2			Chiller	Down
AK11-35	PORTARMSTRONG11CHUM	Fed Fry	30,000,000	3H3	1:1.3+2.3			Ambient and Load Bank	Up
AK11-36	DEEPINLETMV11	Fed Fry	28,000,000	3,3,3H	1:1.3,2.3,3.3				
AK11-37	WNH11	Fed Fry	75,000,000	5n,2H	1:1.5n,2.2				
AK11-38	DEEPINLETHF11	Fed Fry	22,000,000	4n,3,2nH	1:1.4n,2.3,3.2n			Lake Intakes	Up
AK11-39	HIDDENFALLS11	Fed Fry	33,000,000	3,2n,2nH	1:1.3,2.2n,3.2n			Lake Intakes	Up
AK11-40	HIDDENFALLS11LL	Fed Fry	9,000,000	3,2n,4nH	1:1.3,2.2n,3.4n			Lake Intakes	
AK11-41	BEARCOVE11	Fed Fry	14,000,000	4,2,2H	1:1.4,2.2,3.2			Heater	Up(5-9)
AK11-42	BEARCOVE11LL	Fed Fry	6,000,000	5n,4H	1:1.5n,2.4				
AK11-43	WNH-AFK11	Fed Fry	15,000,000	1,2,2H	1:1.1,2.2,3.2				
AK11-44	DIPAC11	Fed Fry	100,000,000	4H	1:1.4			Boiler	Up
AK11-45	PORTCHALMERS11	Fed Fry	40,000,000	3,2n,1H	1:1.3,2.2n,3.1				
AK11-46	TAKATZ11	Fed Fry	33,000,000	3,3,1H	1:1.3,2.3,3.1			Lake Intakes	Up
AK11-47	TAKATZ11LL	Fed Fry	18,000,000	3,5nH	1:1.3,2.5n			Lake Intakes	Up
AK11-48	ANITABAY11	Fed Fry	22,000,000	3,2,4H	1:1.3,2.2,3.4			Boiler	Up
AK11-49	KENDRICK11	Fed Fry	18,000,000	6,2H	1:1.6,2.2			Boiler	Up
AK11-50	NEETSBBAY11SUM	Fed Fry	49,000,000	4,4H4	1:1.4,2.4+3.4			Boiler	Up
AK11-51	NEETSBBAY11FALL	Fed Fry	20,000,000	4,2,2H4	1:1.4,2.2,3.2+4.4			Boiler	Up
AK11-52	NAKATINLET11SUM	Fed Fry	8,000,000	3,2,3H	1:1.3,2.2,3.3			Boiler	Up
AK11-53	KENDRICKLL11	Fed Fry	2,000,000	4,1,2,1H	1:1.4,2.1,3,2,4.1			Boiler	Up
AK11-54	NAKATINLET11FALL	Fed Fry	8,000,000	3,4,1H4	1:1.3,2,4,3,1+4.4			Boiler	Up
AK11-55	NORTON11CHUMA	Egg	140,000	1,4H	1:1.1,2.4			Moist Air	
AK11-56	NORTON11CHUMB	Egg	250,000	3H	1:1.3			Moist Air	
AK11-57	CHILKAT11	Fed Fry	1,212,003	3,4nH	1:1.3,2.4n				
AK11-58	TAMGAS11	Fed Fry	10,000,000	3H4	1:1.3+2.4				

Table 1 (continued). Summary of thermal mark codes to be applied to Alaska hatchery salmon in brood year 2011.

SPECIES: COHO

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK11-59	TM	2011	2013	Coho	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg
AK11-60	TM	2011	2012	Coho	Alaska	Southcentral	CIAA	Trail Lakes	Bear Lake
AK11-61	TM	2011	2013	Coho	Alaska	Southcentral	ADFG	WJHSFH	Ship Creek
AK11-62	TM	2011	2013	Coho	Alaska	Southeast	DIPC	Macaulay	Macaulay
AK11-63	TM	2011	2013	Coho	Alaska	Southcentral	VFDA	Solomon Gulch	Solomon Gulch
AK11-64	TM	2011	2013	Coho	Alaska	Southcentral	ADFG	WJHSFH	Bear Lake
AK11-65	TM	2011	2013	Coho	Alaska	Southeast	NSRA	Medvejie	Salmon Lake
AK11-66	TM	2011	2013	Coho	Alaska	Sotheast	PWHA	Klawock	Klawock Lake
AK11-67	TM	2011	2012	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
AK11-59	WNH11COHO	Smolt	1,000,000	3H	1:1.3				
AK11-60	TRAILLAKES11SMCOHO	Fry	555,000	4,3H	1:1.4,2.3			Boiler	Up
AK11-61	COOKINLET11COHO	Smolt	800,000	1,5H	1:1.1,2.5			Boiler	Up
AK11-62	DIPAC11COHO	Smolt	300,000	3,2H	1:1.3,2.2			Boiler	Up
AK11-63	SGH11COHO	Smolt	1,500,000	6H	1:1.6				
AK11-64	RESURRECTION11COHO	Smolt	240,000	2,4H	1:1.2,2.4			Boiler	Up
AK11-65	DEEPINLET11COHO	Smolt	225,000	4H	1:1.4				
AK11-66	KLAWOCK11COHO	Smolt	4000000	4,2H	1:1.4,2.2				
AK11-67	NORTON11COHO	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
AK11-68	TM	2011	2012	Chinook	Alaska	Southcentral	CVTC	Chickaloon Village CIF	Moose River
AK11-69	TM	2011	2013	Chinook	Alaska	Southeast	NSRA	Hidden Falls	Hidden Falls
AK11-70	TM	2011	2013	Chinook	Alaska	Southeast	NSRA	Medvejie	Medvejie
AK11-71	TM	2011	2013	Chinook	Alaska	Southeast	SSRA	Whitman Lake	Whitman Lake
AK11-72	TM	2011	2012	Chinook	Alaska	Southeast	NSRA	Medvejie	Medvejie
AK11-73	TM	2011	2013	Chinook	Alaska	Southcentral	ADFG	WJHSFH	Cook Inlet
AK11-74	TM	2011	2013	Chinook	Alaska	Southcentral	ADFG	WJHSFH	Deception Cr
AK11-75	TM	2011	2013	Chinook	Alaska	Southcentral	ADFG	WJHSFH	Crooked Creek
AK11-76	TM	2011	2013	Chinook	Alaska	Southeast	DIPC	Macaulay	Macaulay
AK11-77	TM	2011	2013	Chinook	Alaska	Southeast	DIPC	Macaulay	Macaulay

ID#	MARK NAME	STAGE	ESIMATED RELEASE	HATCH CODE	RBr CODE	Pre-Hatch Graphic	Post-Hatch Graphic	MARKING SYSTEM	TEMP SHIFT DIRECTION
AK11-68	CHICKALOON11	Egg	100,000	3,2H	1:1.3,2.2			Moist Air	
AK11-69	HIDDENFALLS11CHIN	Smolt	650,000	4,2H	1:1.4,2.2			Lake Intakes	Up
AK11-70	GREENLAKE11CHIN	Smolt	2,500,000	2,4nH	1:1.2,2.4n				
AK11-71	WHITMAN11CHIN	Smolt	725,000	1,5H	1:1.1,2.5			Boiler	Up
AK11-72	MEDVEJIE11CHINZ	Smolt	550,000	4,1H	1:1.4,2.1				
AK11-73	COOKINLET11CHIN	Smolt	1,145,000	2,3H	1:1.2,2.3			Boiler	Up
AK11-74	PWS11CHIN	Smolt	315,000	2,4H	1:1.2,2.4			Boiler	Up
AK11-75	RESURRECTION11CHIN	Smolt	210,000	2,5H	1:1.2,2.5			Boiler	Up
AK11-76	DIPAC11CHINA	Smolt	250,000	3H3	1:1.3+2.3				
AK11-77	DIPAC11CHINB	Smolt	250,000	4H4	1:1.4+2.4				