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## **Proposed Thermal Marks for Brood Year 2002 Salmon in Alaska**

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## **Proposed Thermal Marks for Brood Year 2002 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 2002, we plan to mark approximately 31 million sockeye, 5 million chinook, 424 million chum, 5 million coho, and 456 million pink salmon. Salmon will be marked at 14 different hatcheries using approximately 40 unique thermal mark patterns. The proposed otolith plan is similar to the 2001 brood year program, except a new program will be taking place to mark chum salmon at Neets Bay Hatchery in Southeast Alaska.

### **Introduction**

In Alaska, the primary use of thermal marking is 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. Several on-going programs use this mark-recovery information as an aid to the in-season management of mixed stock fisheries, and hatcheries use the information to evaluate the success of various rearing and release strategies. In addition, thermal marks are being used to determine the origin of juvenile and immature salmon collected during biotic surveys in the Gulf of Alaska by the National Marine Fisheries Service.

### **Plan for 2002 brood year stocks**

The proposed thermal marks for brood year 2002 salmon are listed in Table 1. We plan to mark approximately 31 million sockeye, 5 million chinook, 424 million chum, 5 million coho, and 456 million pink salmon. Sixty five release groups of salmon will be marked at 14 different hatcheries using 40 thermal mark patterns. The proposed otolith plan is similar to the 2001 brood year program, except that it includes a new program to mark chum salmon at Neets Bay Hatchery in Southeast Alaska in 2002. Thermal mark patterns are presented in both the RBr notation (Munk and Geiger 1998), with the modification by Hagen (1999) to include narrow ring bands, as well as in the Hatch Code notation. The Hatch Code notation is similar to the RBr code in that thermal rings are considered to be grouped into bands of rings that are evenly spaced and the hatching event is designated by 'H' indicating which rings are formed pre or post hatch. Table 1 also includes a graphic representation of the mark

## References

- Hagen, P. 1999. A modeling approach to address the underlying structure and constraints of thermal mark codes and code notation. (NPAFC Doc. 395). 12 p. 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 2002.

SPECIES: CHINOOK

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	DATE LAST RELEASED	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK02-01	TM	2002	2004		CHINOOK	Alaska	Southeast	NSRAA	Medvejie	Medvejie
AK02-02	TM	2002	2004		CHINOOK	Alaska	Southeast	NSRAA	Hidden Falls CIF	Hidden Falls
AK02-03	TM	2002	2004		CHINOOK	Alaska	Southeast	DIPAC	Gastineau Hatchery	Gastineau
AK02-04	TM	2002	2004		CHINOOK	Alaska	Southeast	NSRAA	Medvejie	Medvejie
AK02-05	TM	2002	2003		CHINOOK	Alaska	Southcentral	ADFG	Fort Rich	Ressurrection Bay
AK02-06	TM	2002	2003		CHINOOK	Alaska	Southcentral	ADFG	Fort Rich	Crooked Cr
AK02-07	TM	2002	2003		CHINOOK	Alaska	Southcentral	ADFG	Fort Rich	Cook Inlet

ID#	MARK NAME	STAGE	WEIGHT	LENGTH	ESIMATED RELEASE	RBr CODE	HATCH CODE	Pre-Hatch Graphic	Post-Hatch Graphic	COMMENTS
AK02-01	MEDVEJIE02CHIN				1,500,000	1:1.4.2.3	4,3H			
AK02-02	KASNYKYU02CHIN				1,200,000	1:1.4.2.2	4,2H			
AK02-03	GASTINEUA02CHIN				600,000	1:1.4	4H			
AK02-04	GREENLK02CHIN				600,000	1:1.3.2.3	3,3H			
AK02-05	RESSURECTION02CHIN				200,000	1:1.2.2.5	2,5H			
AK02-06	PWS02CHIN				315,000	1:1.2.2.4	2,4H			
AK02-07	COOKINLET02CHIN				300,000	1:1.2.2.3	2,3H			

SPECIES: COHO

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	DATE LAST RELEASED	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK02-27	TM	2002	2004		COHO	Alaska	Southeast	Port Armstrong	Port Armstrong	Port Armstrong
AK02-28	TM	2002	2003		COHO	Alaska	Southcentral	ADFG	Fort Rich	Ship & Jim Cr
AK02-29	TM	2002	2004		COHO	Alaska	Southeast	NSRAA	Medvejie	Medvejie
AK02-30	TM	2002	2004		COHO	Alaska	Southeast	DIPAC	Gastineau Hatchery	Gastineau
AK02-31	TM	2002	2003		COHO	Alaska	Southcentral	ADFG	Fort Rich	Bear Lk
AK02-32	TM	2002	2003		COHO	Alaska	Southcentral	CIAA	Trail Lakes	Bear Lk
AK02-33	TM	2002	2003		COHO	Alaska	Southcentral	CIAA	Trail Lakes	Bear Lk
AK02-34	TM	2002	2004		COHO	Alaska	Southcentral	PWSAC	Ily H.Noerenberg Hatc	Wally Noerenberg

ID#	MARK NAME	STAGE	WEIGHT	LENGTH	ESIMATED RELEASE	RBr CODE	HATCH CODE	Pre-Hatch Graphic	Post-Hatch Graphic	COMMENTS
AK02-27	PORTARMSTRONG02COHO				200,000	1:1.5	5H			
AK02-28	COOKINLET02COHO				640,000	1:1.5	5H			
AK02-29	DEERLK02COHO				2,500,000	1:1.4.2.2	4,2H			
AK02-30	GASTINEAU02COHO				800,000	1:1.4	4H			
AK02-31	RESSURECTION02COHO				240,000	1:1.4	4H			
AK02-32	BEARLK(WEIR)02COHO				150,000	1:1.3.2.3+3.2	3,3H2			
AK02-33	BEARLK02COHO				450,000	1:1.3.2.3	3,3H			
AK02-34	WHN02COHO				300,000	1:1.3	3H			

Table 1 (continued). Summary of thermal mark codes to be applied to Alaska hatchery salmon in brood year 2002.

SPECIES: CHUM

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	DATE LAST RELEASED	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK02-08	TM	2002	2003		CHUM	Alaska	Southeast	DIPAC	Gastineau Hatchery	Gastineau
AK02-09	TM	2002	2003		CHUM	Alaska	Southeast	DIPAC	Gastineau Hatchery	Gastineau
AK02-10	TM	2002	2003		CHUM	Alaska	Southeast	DIPAC	Gastineau Hatchery	Gastineau
AK02-11	TM	2002	2003		CHUM	Alaska	Southeast	DIPAC	Gastineau Hatchery	Gastineau
AK02-12	TM	2002	2003		CHUM	Alaska	Southeast	DIPAC	Gastineau Hatchery	Gastineau
AK02-13	TM	2002	2003		CHUM	Alaska	Southeast	DIPAC	Gastineau Hatchery	Gastineau
AK02-14	TM	2002	2003		CHUM	Alaska	Southeast	NSRAA	Medvejie	Medvejie
AK02-15	TM	2002	2003		CHUM	Alaska	Southeast	SSRAA	Neets	NA
AK02-16	TM	2002	2003		CHUM	Alaska	Southeast	SSRAA	Neets	NA
AK02-17	TM	2002	2003		CHUM	Alaska	Southeast	NSRAA	Hidden Falls CIF	Hidden Falls
AK02-18	TM	2002	2003		CHUM	Alaska	Southeast	SSRAA	Neets	NA
AK02-19	TM	2002	2003		CHUM	Alaska	Southeast	NSRAA	Hidden Falls CIF	Hidden Falls
AK02-20	TM	2002	2003		CHUM	Alaska	Southeast	SSRAA	Neets	NA
AK02-21	TM	2002	2003		CHUM	Alaska	Southeast	NSRAA	Hidden Falls CIF	Hidden Falls
AK02-22	TM	2002	2003		CHUM	Alaska	Southcentral	PWSAC	WHN Hatchery	Wally Noerenberg
AK02-23	TM	2002	2003		CHUM	Alaska	Southeast	SSRAA	Neets	Summer
AK02-24	TM	2002	2003		CHUM	Alaska	Southeast	NSRAA	Hidden Falls CIF	Hidden Falls
AK02-25	TM	2002	2003		CHUM	Alaska	Southeast	SSRAA	Neets	NA
AK02-26	TM	2002	2003		CHUM	Alaska	Southcentral	PWSAC	WHN Hatchery	Wally Noerenberg

ID#	MARK NAME	STAGE	WEIGHT	LENGTH	ESIMATED RELEASE	RBr CODE	HATCH CODE	Pre-Hatch Graphic	Post-Hatch Graphic	COMMENTS
AK02-08	AMALGA02L/LCHUM				8,000,000	1:1.6+2.6	6H6			
AK02-09	BOATHARBOR02CHUM				15,000,000	1:1.6+2.5	6H5			
AK02-10	LIMESTONE02CHUM				15,000,000	1:1.6+2.4	6H4			
AK02-11	GASTINEAU02L/LCHUM				7,000,000	1:1.6+2.3,3.3	6H3,3			
AK02-12	GASTINEAU02CHUM				20,000,000	1:1.6+2.3	6H3			
AK02-13	AMALGA02CHUM				40,000,000	1:1.6	6H			
AK02-14	DEEPINLET02CHUM				20,000,000	1:1.5	5H			
AK02-15	NAKATINLET02FALLCHUM				8,000,000	1:1.4+2.5	4H5			
AK02-16	NEETSBAY02FALLCHUM				20,000,000	1:1.4+2.4	4H4			
AK02-17	KAKE02CHUM				questionable	1:1.4+2.3	4H3			
AK02-18	ANITABAY02CHUM				15,000,000	1:1.4,2,3n	4,3nH			
AK02-19	DEEPINLET02CHUM				14,000,000	1:1.4	4H			
AK02-20	NEETSBAY02SUMCHUM				36,000,000	1:1.3+2.4	3H4			
AK02-21	TAKATZ02CHUM				42,000,000	1:1.3+2.2	3H2			
AK02-22	WHN02CHUM				75,000,000	1:1.3,2.4	3,4H			
AK02-23	NAKATINLET02SUMCHUM				16,000,000	1:1.3,2,3n	3,3nH			
AK02-24	KASNYKU02CHUM				38,000,000	1:1.3,2,3	3,3H			
AK02-25	KENDRICK02CHUM				10,000,000	1:1.3,2,2n	3,2nH			
AK02-26	PORTCHALMERS02CHUM				25,000,000	1:1.3	3H			

Table 1 (continued). Summary of thermal mark codes to be applied to Alaska hatchery salmon in brood year 2002.

SPECIES: SOCKEYE

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	DATE LAST RELEASED	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK02-46	TM	2002	2003		SOCKEYE	Alaska	Southeast	DIPAC	Snettisham CIF	Tahltan Lk
AK02-47	TM	2002	2003		SOCKEYE	Alaska	Southcentral	CIAA	Trail Lakes	Bear Lk
AK02-48	TM	2002	2003		SOCKEYE	Alaska	Southeast	DIPAC	Snettisham CIF	Snettisham
AK02-49	TM	2002	2004		SOCKEYE	Alaska	Southcentral	CIAA	Trail Lakes	Bear Lk
AK02-50	TM	2002	2003		SOCKEYE	Alaska	Southeast	DIPAC	Snettisham CIF	Tatsamenie Lk
AK02-51	TM	2002	2003		SOCKEYE	Alaska	Southcentral	CIAA	Trail Lakes	Bear Lk
AK02-52	TM	2002	2003		SOCKEYE	Alaska	Southeast	DIPAC	Snettisham CIF	Tatsamenie Lk
AK02-53	TM	2002	2003		SOCKEYE	Alaska	Southcentral	CIAA	Trail Lakes	Big Lk
AK02-54	TM	2002	2004		SOCKEYE	Alaska	Southeast	DIPAC	Snettisham CIF	Snettisham
AK02-55	TM	2002	2004		SOCKEYE	Alaska	Southeast	DIPAC	Snettisham CIF	Snettisham
AK02-56	TM	2002	2003		SOCKEYE	Alaska	Southcentral	CIAA	Trail Lakes	Hidden Lake
AK02-57	TM	2002	2003		SOCKEYE	Alaska	Southeast	DIPAC	Snettisham CIF	Tahltan Lake
AK02-58	TM	2002	2003		SOCKEYE	Alaska	Southeast	SSRAA	Burnett Inlet	McDonald Lk
AK02-59	TM	2002	2004		SOCKEYE	Alaska	Southeast	DIPAC	Snettisham CIF	Snettisham
AK02-60	TM	2002	2004		SOCKEYE	Alaska	Southeast	DIPAC	Snettisham CIF	Snettisham
AK02-61	TM	2002	2003		SOCKEYE	Alaska	Southcentral	PWSAC	Main Bay Hatchery	Main Bay
AK02-62	TM	2002	2003		SOCKEYE	Alaska	Southcentral	CIAA	Trail Lakes	Tutsumena Lk
AK02-63	TM	2002	2003		SOCKEYE	Alaska	Southeast	POWHA	Klawock	Klawock Lk
AK02-64	TM	2002	2003		SOCKEYE	Alaska	Southeast	SSRAA	Burnett Inlet	Hugh Smith Lk
AK02-65	TM	2002	2003		SOCKEYE	Alaska	Southeast	SSRAA	Burnett Inlet	Hugh Smith Lk

ID#	MARK NAME	STAGE	WEIGHT	LENGTH	ESIMATED RELEASE	RBr CODE	HATCH CODE	Pre-Hatch Graphic	Post-Hatch Graphic	COMMENTS
AK02-46	TAHLTAN02SOCK				2,500,000	1:1.6,2.2n	6,2nH	II		
AK02-47	BEARLK02FRYSOCK				1,000,000	1:1.6	6H			
AK02-48	SWEETHEART02SOCK				500,000	1:1.5,2.4n	5,4nH	III		
AK02-49	BEARLK02SMOLTSOCK				250,000	1:1.5,2.4	5,4H			
AK02-50	TATSAMENIE02FEDSOCK	Early Fed			500,000	1:1.5,2.3,3.2n	5,3,2nH	II		
AK02-51	BEARLK02PRESMOLSOCK				700,000	1:1.5,2.3	5,3H			
AK02-52	TATSAMENIE02UNFEDSOCK	Early unfed			500,000	1:1.5,2.2n	5,2nH	II		
AK02-53	BIGLK02SOCK				1,500,000	1:1.5	5H			
AK02-54	SPEELARM02ESSOCK	ES			1,500,000	1:1.4,2.4	4,4H			
AK02-55	SPEELARM02LSSOCK	LS			1,500,000	1:1.4,2.3n	4,3nH	III		
AK02-56	HIDDENLK02SOCK				1,100,000	1:1.4,2.2	4,2H	II		
AK02-57	TUYALK02SOCK				1,000,000	1:1.4	4H			
AK02-58	NECKCR02SOCK				500,000	1:1.3,2.5	3,5H			
AK02-59	SPEELARM02L/LSOCK	LL			1,500,000	1:1.3,2.4n	3,4nH			
AK02-60	SPEELARM02E/LSOCK	EL			1,500,000	1:1.3,2.3	3,3H			
AK02-61	MAINBAY02SOCK				8,000,000	1:1.3,2.2	3,2H			
AK02-62	TUTSUMENA02SOCK				6,000,000	1:1.3	3H			
AK02-63	KLAWOCK02SOCK				500,000	1:1.2,2.3	2,3H			
AK02-64	HUGHSMITH01E/SSOCK	E/S			225,000	1:1.2,2.2,3.3	2,2,3H			
AK02-65	HUGHSMITH01L/LSOCK	L/L			225,000	1:1.2,2.2,3.2	2,2,2H			

Table 1 (continued). Summary of thermal mark codes to be applied to Alaska hatchery salmon in brood year 2002.

SPECIES: PINK

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	DATE LAST RELEASED	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK02-35	TM	2002	2003		PINK	Alaska	Southcentral	PWSAC	Wally H.Noerenberg Hatchery	Wally H.Noerenberg
AK02-36	TM	2002	2003		PINK	Alaska	Southcentral	PWSAC	Wally H.Noerenberg Hatchery	Wally H.Noerenberg
AK02-37	TM	2002	2003		PINK	Alaska	Southcentral	PWSAC	Wally H.Noerenberg Hatchery	Wally H.Noerenberg
AK02-38	TM	2002	2003		PINK	Alaska	Southeast	DIPAC	Gastineau Hatchery	Gastineau
AK02-39	TM	2002	2003		PINK	Alaska	Southcentral	PWSAC	Armin F. Koerniq Hatchery	Armin F. Koerniq
AK02-40	TM	2002	2003		PINK	Alaska	Southcentral	PWSAC	Armin F. Koerniq Hatchery	Armin F. Koerniq
AK02-41	TM	2002	2003		PINK	Alaska	Southcentral	PWSAC	Armin F. Koerniq Hatchery	Armin F. Koerniq
AK02-42	TM	2002	2003		PINK	Alaska	Southeast	Port Armstrong	Port Armstrong	Port Armstrong
AK02-43	TM	2002	2003		PINK	Alaska	Southeast	Port Armstrong	Port Armstrong	Port Armstrong
AK02-44	TM	2002	2003		PINK	Alaska	Southcentral	PWSAC	Cannery Creek Hatchery	Cannery Cr
AK02-45	TM	2002	2003		PINK	Alaska	Southeast	Port Armstrong	Port Armstrong	Port Armstrong

ID#	MARK NAME	STAGE	WEIGHT	LENGTH	ESIMATED RELEASE	RBr CODE	HATCH CODE	Pre-Hatch Graphic	Post-Hatch Graphic	COMMENTS
AK02-35	WHN02+5PINK				40,000,000	1:1.8+2.5	8H5			
AK02-36	WHN02+3PINK				40,000,000	1:1.8+2.3	8H3			
AK02-37	WHN02PINK				40,000,000	1:1.8	8H			
AK02-38	GASTINEAU02PINK				1,500,000	1:1.5	5H			
AK02-39	AFK02+5PINK				50,000,000	1:1.4+2.5	4H5			
AK02-40	AFK02+3PINK				50,000,000	1:1.4+2.3	4H3			
AK02-41	AFK02PINK				50,000,000	1:1.4	4H			
AK02-42	PORTARMSTRONG02LPINK				15,000,000	1:1.3+2.4	3H4			
AK02-43	PORTARMSTRONG02MPINK				15,000,000	1:1.3+2.3	3H3			
AK02-44	CANNERYCREEK02PINK				140,000,000	1:1.3,2.3	3,3H			
AK02-45	PORTARMSTRONG02EPINK				15,000,000	1:1.3	3H			