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## **Releases of Otolith Marked Salmon from Alaska in 2018**

by

Dion S. Oxman

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

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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 for a variety of situations. This document reports the otolith mark patterns applied to hatchery-raised salmon stocks released in Alaska during 2018. It includes five species of salmon from brood years 2016 and 2017. Release numbers, mark patterns, and release locations are summarized.

### **Summary of Alaska Thermal Marking Programs**

In Alaska, thermal marking of otoliths is primarily 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. In addition, several on-going programs use this information to aid in the in-season management of mixed stock fisheries. Hatcheries use mark recovery data to evaluate the success of various release strategies. In research applications, thermal marks have been used to answer questions regarding lake survival and straying rates of returning adults. The presence of otolith thermal marks is also being used to determine the origin of juvenile and immature salmon collected during biotic surveys in the Gulf of Alaska and the Bering Sea. In many instances, thermal marks are being applied by hatcheries in the absence of a directed sampling program. This applies primarily to coho and Chinook salmon, but it includes some sockeye releases as well. The reasons for this vary, but it primarily occurs in situations where the marks cost little to apply, and there is anticipation that a thermal mark recovery program will be implemented by the time the fish return.

Thermal mark patterns are assigned annually by the Alaska Department of Fish and Game with consideration based on the constraints of the hatchery, the need to identify specific stocks, and the existence of a program to recover and identify the thermal patterns. It has become increasingly difficult to create and apply unique patterns as the hatchery marking programs have expanded. Consequently, alternative marking strategies, such as the use of strontium chloride and calcein, are currently being explored.

In 2018, hatcheries in Alaska released the following numbers of otolith marked salmon: 4 million Chinook, 690 million chum, 7 million coho, 878 million pink, and 47 million sockeye. A list of otolith marks applied to hatchery-reared salmon released in 2018 is

provided in Table 1. Thermal mark patterns are presented in the Uniform Hatch Code notation (Johnson et al. 2006).

The information presented in this report is based on release year, which is defined as when the fish is removed from artificial culture and released into the natural environment. The data includes fish from brood years 2016 and 2017. In some instances, fish from the same thermal mark group will be released over several years, so this list may not be comprehensive for each NPAFC number (e.g. a single NPAFC number may appear during multiple release years). Further information regarding thermal mark patterns and numbers of released fish in Alaska is available from the Alaska Department of Fish and Game, Mark, Tag and Age Laboratory database (<http://taglab.org>) and from the NPAFC Working Group on Salmon Marking's Website (<http://npafc.taglab.org>).

## **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

**Table 1.** Releases of otolith marked salmon from Alaska in 2018.

NPAFC ID	BROOD YEAR	SPECIES	STATE	REGION	FACILITY	RELEASE SITE	DATE RELEASED	MARK TYPE	MARK ID	HATCH CODE	STAGE	NUMBER RELEASED
AK16-96	2016	CHINOOK	AK	1	HIDDEN FALLS	GUNNUK CR, KASNYKU BAY	5/15/2018	Thermal	HIDDENFALLS16CHIN	4,2H	SMOLT	602,669
AK16-97	2016	CHINOOK	AK	1	WHITMAN LAKE	CARROLL INLET, HERRING COVE, KETCHIKAN CR	5/23/2018	Thermal	WHITMAN16CHIN	H4	SMOLT	1,295,813
AK16-98	2016	CHINOOK	AK	1	MEDVEJIE	BEAR COVE, CRAWFISH INLET+HALIBUT PT, HALIBUT PT	5/21/2018	Thermal	MEDVEJIE16CHIN	5,2H	SMOLT	1,599,410
AK16-102	2016	CHINOOK	AK	2	WALLY NOERENBERG	CHENEGA BAY	5/31/2018	Thermal	PWS16CHIN	2,4H	SMOLT	49,400
AK17-106	2017	CHINOOK	AK	1	MEDVEJIE	BEAR COVE, CRAWFISH INLET	5/25/2018	Thermal	MEDVEJIE17CHIN	4,1H	SMOLT	541,609
AK17-107	2017	CHINOOK	AK	2	WILLIAM JACK HERNANDEZ	ALASKA SEALIFE CENTER H	6/12/2018	Thermal	COOKINLET17CHIN	2,3H	SMOLT	100
AK17-44	2017	CHUM	AK	1	SHELDON JACKSON	CRESCENT BAY	5/3/2018	Thermal	SJ17CHUM	6,1H	FED FRY	2,743,086
AK17-45	2017	CHUM	AK	1	PORT ARMSTRONG	PORT ARMSTRON	5/4/2018	Thermal	PORTARMSTRONG17CHUM	3H3	FED FRY	34,876,032
AK17-46	2017	CHUM	AK	1	MEDVEJIE	DEEP INLET	5/23/2018	Thermal	DEEPINLETMV17	3,3,3H4	FED FRY	12,103,581
AK17-47	2017	CHUM	AK	1	SAWMILL CREEK, SHELDON JACKSON	DEEP INLET	5/23/2018	Thermal	DEEPINLETMV17B	3,3,3H	FED FRY	9,446,110
AK17-47	2017	CHUM	AK	1	SAWMILL CREEK, SHELDON JACKSON	DEEP INLET	5/9/2018	Thermal	DEEPINLETMV17B	3,3,3H	SMOLT	7,780,000
AK17-48	2017	CHUM	AK	1	MEDVEJIE	DEEP INLET	5/10/2018	Thermal	DEEPINLETMV17LL	6,3,2H	FED FRY	7,234,609
AK17-49	2017	CHUM	AK	2	WALLY NOERENBERG	LAKE BAY	6/4/2018	Thermal	WNH17A	1,3,1H	FED FRY	73,060,000
AK17-50	2017	CHUM	AK	1	MEDVEJIE	DEEP INLET	5/22/2018	Thermal	DEEPINLETHF17	4n,3,2nH	FED FRY	19,702,189
AK17-51	2017	CHUM	AK	1	HIDDEN FALLS	KASNYKU BAY	5/20/2018	Thermal	HIDDENFALLS17	3,2n,2nH	FED FRY	14,633,344
AK17-52	2017	CHUM	AK	1	HIDDEN FALLS	KASNYKU BAY	6/3/2018	Thermal	HIDDENFALLS17LLB	3,2n,4nH	FED FRY	5,686,637
AK17-53	2017	CHUM	AK	1	MEDVEJIE	BEAR COVE	5/20/2018	Thermal	BEARCOVE17	4,2,2H	FED FRY	13,463,071
AK17-54	2017	CHUM	AK	1	MEDVEJIE	BEAR COVE	5/3/2018	Thermal	BEARCOVE17LL	5n,4H	FED FRY	3,555,053
AK17-55	2017	CHUM	AK	2	A F KOERNIG	SAWMILL BAY	6/1/2018	Thermal	WNH17B	1,2,1,2H	FED FRY	19,000,000
AK17-56	2017	CHUM	AK	1	MACAULAY	JUNEAU, THANE	6/10/2018	Thermal	DIPAC17	4H	FED FRY	107,838,000
AK17-59	2017	CHUM	AK	2	WALLY NOERENBERG	PORT CHALMERS	5/18/2018	Thermal	WNH17C	1,2n,3H	FED FRY	40,420,000
AK17-61	2017	CHUM	AK	1	HIDDEN FALLS	KASNYKU BAY	5/22/2018	Thermal	HIDDENFALLS17B	3,2n,2nH3	FED FRY	15,549,940
AK17-62	2017	CHUM	AK	1	HIDDEN FALLS	KASNYKU BAY	6/2/2018	Thermal	HIDDENFALLS17LL	3,5nH	FED FRY	7,855,870
AK17-63	2017	CHUM	AK	1	HIDDEN FALLS	SE COVE	5/26/2018	Thermal	SECOVE17	7,3H	FED FRY	27,367,140
AK17-64	2017	CHUM	AK	1	HIDDEN FALLS	SE COVE	6/10/2018	Thermal	SECOVE17LL	4,3,3H	FED FRY	15,741,942
AK17-65	2017	CHUM	AK	1	HIDDEN FALLS	THOMAS BAY	5/24/2018	Thermal	THOMASBAY17	5,5H	FED FRY	12,952,470
AK17-66	2017	CHUM	AK	1	HIDDEN FALLS	THOMAS BAY	6/9/2018	Thermal	THOMASBAY17LL	5,5H3	FED FRY	9,303,427
AK17-67	2017	CHUM	AK	1	HIDDEN FALLS	L GUNNUK CR	6/2/2018	Thermal	GUNNUKCREEK17	6,5nH	FED FRY	8,866,586
AK17-68	2017	CHUM	AK	1	MEDVEJIE	BEAR COVE	4/29/2018	Thermal	BEARCOVEHF17	4,3H4	FED FRY	7,467,358
AK17-69	2017	CHUM	AK	1	MEDVEJIE	BEAR COVE	5/19/2018	Thermal	BEARCOVEHF17LL	4,3H	FED FRY	5,201,705
AK17-70	2017	CHUM	AK	1	SAWMILL CREEK	CRAWFISH INLET	5/12/2018	Thermal	CRAWFISH17	3,6H	FED FRY	14,037,446
AK17-71	2017	CHUM	AK	1	SAWMILL CREEK	CRAWFISH INLET	5/18/2018	Thermal	CRAWFISH17LL	4,7H	FED FRY	13,282,071

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NPAFC ID	BROOD YEAR	SPECIES	STATE	REGION	FACILITY	RELEASE SITE	DATE RELEASED	MARK TYPE	MARK ID	HATCH CODE	STAGE	NUMBER RELEASED
AK17-72	2017	CHUM	AK	1	BURNETT INLET	ANITA BAY	5/6/2018	Thermal	ANITABAY17	3,2,4H	FINGERLING	18,360,000
AK17-73	2017	CHUM	AK	1	WHITMAN LAKE	KENDRICK BAY	4/30/2018	Thermal	KENDRICK17	6,2H	FINGERLING	25,110,000
AK17-74	2017	CHUM	AK	1	WHITMAN LAKE	KENDRICK BAY	5/10/2018	Thermal	KENDRICK17LL	3n,4,4nH	FINGERLING	4,610,000
AK17-75	2017	CHUM	AK	1	NEETS BAY	NEETS BAY	5/11/2018	Thermal	NEETSBAV17SUM	4,4H4	FINGERLING	62,130,000
AK17-76	2017	CHUM	AK	1	BURNETT INLET	BURNETT INLET	5/9/2018	Thermal	BURNETTINLET17	7,4H	FINGERLING	24,710,000
AK17-77	2017	CHUM	AK	1	NEETS BAY	NEETS BAY	5/11/2018	Thermal	NEETSBAV17FALL	4,2,2H4	FINGERLING	4,500,000
AK17-78	2017	CHUM	AK	1	WHITMAN LAKE	NAKAT INLET	4/30/2018	Thermal	NAKATINLET17SUM	3,2,3H	FINGERLING	8,738,000
AK17-79	2017	CHUM	AK	1	BURNETT INLET	ANITA BAY	5/17/2018	Thermal	ANITABAYLL17	4,1,2,1H	FINGERLING	6,050,000
AK17-81	2017	CHUM	AK	1	BURNETT INLET	BURNETT INLET	5/10/2018	Thermal	BURNETTINLET17FALL	4,5H	FINGERLING	3,310,000
AK17-85	2017	CHUM	AK	4	KITOI BAY	KITOI BAY	5/25/2018	Thermal	KITOI17CHUM	3n,2H	FED FRY	13,222,995
AK17-86	2017	CHUM	AK	4	KITOI BAY	KITOI BAY	5/17/2018	Thermal	KITOI17CHUMA	3,4,2H	FED FRY	9,712,547
AK16-82	2016	COHO	AK	2	WALLY NOERENBERG	CHENEGA BAY, LAKE BAY, WHITTIER HBR	6/6/2018	Thermal	WNH16COHO	3H	SMOLT	2,241,000
AK16-84	2016	COHO	AK	2	TRAIL LAKES	RESURRECTION BAY	6/5/2018	Thermal	BEARLAKE16COHO	2,2H	SMOLT	28,000
AK16-86	2016	COHO	AK	2	SOLOMON GULCH	SOLOMON GULCH	6/20/2018	Thermal	SGH16COHO	6H	SMOLT	1,929,471
AK16-87	2016	COHO	AK	2	TRAIL LAKES	BEAR CR	6/5/2018	Thermal	RESURRECTION16COHO	2,4H	SMOLT	70,000
AK16-88	2016	COHO	AK	1	SAWMILL CREEK	BEAR COVE	5/7/2018	Thermal	MEDVEJIE16COHO	8H	SMOLT	205,346
AK16-89	2016	COHO	AK	1	SAWMILL CREEK	DEEP INLET	5/22/2018	Thermal	DEEPINLET16COHO	4H	SMOLT	1,096,961
AK16-90	2016	COHO	AK	1	KLAWOCK RIVER	PORT ASUMCION	5/22/2018	Thermal	KLAWOCK16COHO	4,2H	SMOLT	387,412
AK16-92	2016	COHO	AK	1	WHITMAN LAKE	NAKAT INLET	5/21/2018	Thermal	NAKAT16COHO	2,5H	SMOLT	591,228
AK16-93	2016	COHO	AK	4	PILLAR CREEK	MONASHKA CR, PILLAR CR	4/19/2018	Thermal	PILLAR16COHO	3,2H	SMOLT	89,427
AK16-94	2016	COHO	AK	1	SHELDON JACKSON	CRESCENT BAY	5/25/2018	Thermal	SJ16COHO	5,2H	SMOLT	157,554
AK17-88	2017	COHO	AK	1	MACAULAY	DAVIDSON CR	6/26/2018	Thermal	DAVIDSON17	5,3H	FED FRY	73,800
AK17-91	2017	COHO	AK	2	TRAIL LAKES	BEAR LK	6/27/2018	Thermal	BEARLAKE17COHO	4,4H	FED FRY	438,000
AK17-28	2017	PINK	AK	2	A F KOERNIG	SAWMILL BAY	5/18/2018	Thermal	AFK17B	4H	FED FRY	173,000,000
AK17-29	2017	PINK	AK	2	WALLY NOERENBERG	LAKE BAY	5/23/2018	Thermal	WNH17PINKB	8H	FED FRY	130,100,000
AK17-30	2017	PINK	AK	1	SHELDON JACKSON	CRESCENT BAY	4/30/2018	Thermal	SJ17PINK	4,1H	FED FRY	2,526,914
AK17-32	2017	PINK	AK	1	PORT ARMSTRONG	PORT ARMSTRONG	5/8/2018	Thermal	PORTARMSTRONG17A	3H4	FED FRY	11,808,145
AK17-33	2017	PINK	AK	1	PORT ARMSTRONG	PORT ARMSTRONG	4/30/2018	Thermal	PORTARMSTRONG17B	3H3	FED FRY	12,003,506
AK17-34	2017	PINK	AK	1	PORT ARMSTRONG	PORT HERBERT	5/8/2018	Thermal	PORTARMSTRONG17C	3H5	FED FRY	12,062,158
AK17-35	2017	PINK	AK	1	PORT ARMSTRONG	PORT ARMSTRON	5/8/2018	Thermal	PORTARMSTRONG17D	3H6	FED FRY	11,945,822
AK17-36	2017	PINK	AK	1	PORT ARMSTRONG	PORT ARMSTRON	5/7/2018	Thermal	PORTARMSTRONG17E	3H7	FED FRY	30,084,822
AK17-37	2017	PINK	AK	2	SOLOMON GULCH	SOLOMON GULCH	5/22/2018	Thermal	SGH17	6H	FED FRY	242,018,707

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**Table 1** (continued). Releases of otolith marked salmon from Alaska in 2018.

NPAFC ID	BROOD YEAR	SPECIES	STATE	REGION	FACILITY	RELEASE SITE	DATE RELEASED	MARK TYPE	MARK ID	HATCH CODE	STAGE	NUMBER RELEASED
AK17-38	2017	PINK	AK	2	CANNERY CREEK	CANNERY CR	5/27/2018	Thermal	CCH17	3,3H	FED FRY	163,000,000
AK17-40	2017	PINK	AK	2	TUTKA BAY	TUTKA BAY	6/1/2018	Thermal	TUTKA17PINK	5,3H	FED FRY	21,881,986
AK17-41	2017	PINK	AK	2	TUTKA BAY	TUTKA BAY	6/1/2018	Thermal	TUTKA17PINKA	4,4H	FED FRY	28,158,014
AK17-42	2017	PINK	AK	2	PORT GRAHAM	PORT GRAHAM	6/18/2018	Thermal	PORTGRAHAM17	5H3	FED FRY	20,850,000
AK17-43	2017	PINK	AK	2	PORT GRAHAM	PAINT RIVER	5/15/2018	Thermal	PORTGRAHAM17A	5H5	EMERGENT FRY	305,000
AK17-115	2017	PINK	AK	4	KITOI BAY	KITOI BAY	5/25/2018	Saltwater	KITOI17PINK	3,2H	FED FRY	18,364,905
AK16-03	2016	SOCKEYE	AK	2	MAIN BAY	MAIN BAY	6/1/2018	Thermal	MBH16A	3H3	SMOLT	2,058,000
AK16-04	2016	SOCKEYE	AK	2	MAIN BAY	MAIN BAY	5/30/2018	Thermal	MBH16B	3H2,2	SMOLT	2,040,000
AK16-05	2016	SOCKEYE	AK	2	MAIN BAY	MAIN BAY	5/30/2018	Thermal	MBH16C	3H5	SMOLT	2,110,000
AK16-06	2016	SOCKEYE	AK	2	MAIN BAY	MAIN BAY	5/30/2018	Thermal	MBH16D	3H3,3	SMOLT	2,030,000
AK16-07	2016	SOCKEYE	AK	2	MAIN BAY	MAIN BAY	6/1/2018	Thermal	MBH16E	3H	SMOLT	2,002,000
AK16-14	2016	SOCKEYE	AK	1	SNETTISHAM	SPEEL ARM	6/1/2018	Thermal	SPEELARM16A	3,3nH	SMOLT	3,842,800
AK16-15	2016	SOCKEYE	AK	2	TRAIL LAKES	RESURRECTION BAY	6/1/2018	Thermal	TRAILLAKES16B	2,4H	SMOLT	1,488,000
AK16-18	2016	SOCKEYE	AK	2	TRAIL LAKES	SHELL LK	5/31/2018	Thermal	SHELLLAKE16	3,2,4H	SMOLT	46,000
AK16-19	2016	SOCKEYE	AK	1	SNETTISHAM	SPEEL ARM	6/8/2018	Thermal	SPEELARM16B	3,6H	SMOLT	2,560,000
AK16-21	2016	SOCKEYE	AK	2	TRAIL LAKES	TUTKA BAY	6/4/2018	Thermal	TUTKA16	2,5H	SMOLT	518,000
AK16-24	2016	SOCKEYE	AK	1	SNETTISHAM	SPEEL ARM	5/30/2018	Thermal	SPEELARM16C	4,4nH	SMOLT	1,282,100
AK16-25	2016	SOCKEYE	AK	1	SNETTISHAM	SPEEL ARM	5/30/2018	Thermal	SPEELARM16D	4,6nH	SMOLT	1,279,800
AK16-27	2016	SOCKEYE	AK	4	PILLAR CREEK	TELROD COVE	5/26/2018	Dry	KODIAK16A	4,3,2H	SMOLT	230,544
AK16-28	2016	SOCKEYE	AK	4	KITOI BAY	LITTLE KITOI LK, OUZINKIE BOAT HARBOR	5/31/2018	Dry	KITOI16	3,2H	SMOLT	454,994
AK17-01	2017	SOCKEYE	AK	2	GULKANA	CROSSWIND LK, PAXSON LK	6/1/2018	Strontium	GULKANA17	HS1	FED FRY	10,214,863
AK17-02	2017	SOCKEYE	AK	2	TRAIL LAKES	BEAR LK	6/13/2018	Thermal	TRAILLAKES17A	3,3H	FED FRY	2,555,000
AK17-08	2017	SOCKEYE	AK	2	TRAIL LAKES	KIRSCHNER LK, LEISURE LK	6/20/2018	Thermal	PENINSULA17SOCKEYE	2,2H	FED FRY	2,192,000
AK17-09	2017	SOCKEYE	AK	2	TRAIL LAKES	HAZEL LK	6/21/2018	Thermal	HAZEL17	3,3H3	FED FRY	813,000
AK17-10	2017	SOCKEYE	BC	1	SNETTISHAM	R-TATSAMENIE LK	5/31/2018	Thermal	TATSAMENIE17	3n,5H	EMERGENT FRY	1,263,500
AK17-11	2017	SOCKEYE	BC	1	SNETTISHAM	R-TRAPPER LK	5/29/2018	Thermal	TRAPPER17	4,2,3H	EMERGENT FRY	187,700
AK17-15	2017	SOCKEYE	AK	2	TRAIL LAKES	HIDDEN LK	43221	Thermal	HIDDENLAKE17	2,1,2H	EMERGENT FRY	1271000
AK17-18	2017	SOCKEYE	BC	1	SNETTISHAM	R-TAHLTAN LK	43256	Thermal	TAHLTAN17	5nH	EMERGENT FRY	2634200
AK17-20	2017	SOCKEYE	BC	1	SNETTISHAM	R-TATSAMENIE LK	43250	Thermal	TATSAMENIE17ER	6,2H	FED FRY	214300
AK17-21	2017	SOCKEYE	AK	1	SNETTISHAM	SWEETHEART LK	43256	Thermal	SWEETHEART17	5,2H	EMERGENT FRY	487900
AK17-24	2017	SOCKEYE	AK	4	PILLAR CREEK	JENNIFER LK, RUTH LK, SPIRIDON LK	43283	Dry	KODIAK17	3,3,3H	FED FRY	3479493
AK17-26	2017	SOCKEYE	AK	4	KITOI BAY	LITTLE KITOI LK	43370	Dry	KITOI17	5,4H	PRESMOLT	76613