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## **Releases of Otolith Marked Salmon from Alaska in 2017**

by

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**Keywords:** otolith, thermal mark, salmon, Alaska, releases

### **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 2017. It includes five species of salmon from brood years 2015 through 2016. 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 2017, hatcheries in Alaska released the following numbers of otolith marked salmon: 7 million Chinook, 618 million chum, 6 million coho, 774 million pink, and 50 million sockeye. A list of otolith marks applied to hatchery-reared salmon released in 2017 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 2015 and 2016. 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 2017.

NPAFC ID	BROOD YEAR	SPECIES	STATE	REGION	FACILITY	RELEASE SITE	DATE RELEASED	MARK TYPE	MARK ID	HATCH CODE	STAGE	NUMBER RELEASED
AK15-95	2015	CHINOOK	AK	1	CRYSTAL & WHITMAN	KETCHIKAN CR, PORT ST NICHOLAS, CARROLL IN, HERRING CV, NEETS BAY	5/29/2017	Thermal	WHITMAN15CHIN	1,5H	SMOLT	1,801,672
AK15-94	2015	CHINOOK	AK	1	HIDDEN FALLS	KASNYKU BAY	5/17/2017	Thermal	HIDDENFALLS15CHIN	4,2H	SMOLT	556,005
AK15-96	2015	CHINOOK	AK	1	MEDVEJIE	BEAR COVE, CRAWFISH INLET, HALIBUT PT	5/19/2017	Thermal	MEDVEJIE15CHIN	2,3nH	SMOLT	1,998,042
AK15-100	2015	CHINOOK	AK	2	WALLY NOERENBERG	CHENEGA BAY	6/8/2017	Thermal	PWS15CHIN	2,4H	SMOLT	32,100
AK15-87	2015	COHO	AK	1	MEDVEJIE	BEAR COVE	5/9/2017	Thermal	MEDVEJIE15COHO	7H	SMOLT	187,435
AK15-88	2015	COHO	AK	1	MEDVEJIE, SAWMILL CR	BEAR COVE, DEEP INLET	5/17/2017	Thermal	DEEPINLET15COHO	4H	SMOLT	921,671
AK15-91	2015	COHO	AK	4	PILLAR CREEK	ISLAND LK, MISSION LK, MONASHKA CR, PILLAR CR	6/12/2017	Thermal	PILLAR15COHO	2,2H	SMOLT	222,950
AK15-92	2015	COHO	AK	1	SHELDON JACKSON	CRESCENT BAY	5/19/2017	Thermal	SJ15COHO	3,2H	SMOLT	29,449
AK15-85	2015	COHO	AK	2	SOLOMON GULCH	BOULDER BAY, SOLOMON GULCH	6/9/2017	Thermal	SGH15COHO	6H	SMOLT	1,785,397
AK15-83	2015	COHO	AK	2	TRAIL LAKES	BEAR CR	6/6/2017	Thermal	BEARLAKE15COHO	5,3H	SMOLT	54,000
AK15-81	2015	COHO	AK	2	WALLY NOERENBERG	LAKE BAY, CHENEGA BAY, FLEMING SPIT, WHITTIER HBR	6/8/2017	Thermal	WNH15COHO	3H	SMOLT	1,390,000
AK15-90	2015	COHO	AK	1	WHITMAN LAKE	NAKAT INLET	4/6/2017	Thermal	NAKAT15COHO	2,5H	SMOLT	606,713
AK15-84	2015	COHO	AK	2	WJ HERNANDEZ	BIRD CR, CAMPBELL CR, EKLUTNA TAILRACE, HOMER SPIT, SHIP CR	5/28/2017	Thermal	COOKINLET15COHO	1,5H	SMOLT	704,492
AK15-86	2015	COHO	AK	2	WJ HERNANDEZ	SEWARD LAGOON	5/19/2017	Thermal	RESURRECTION15COHO	2,4H	SMOLT	264,935
AK15-28	2015	SOCKEYE	AK	4	KITOI BAY	LITTLE KITOI BAY, OUZINKIE HARBOR	6/8/2017	Dry	KITOI15	6,3H	SMOLT	635,198
AK15-03	2015	SOCKEYE	AK	2	MAIN BAY	MAIN BAY	5/25/2017	Thermal	MBH15A	2,2H3	SMOLT	1,956,000
AK15-04	2015	SOCKEYE	AK	2	MAIN BAY	MAIN BAY	5/23/2017	Thermal	MBH15B	2,2H2,2	SMOLT	2,170,000
AK15-05	2015	SOCKEYE	AK	2	MAIN BAY	MAIN BAY	5/25/2017	Thermal	MBH15C	2,2H5	SMOLT	1,938,000
AK15-06	2015	SOCKEYE	AK	2	MAIN BAY	MAIN BAY	5/23/2017	Thermal	MBH15D	2,2H3,3	SMOLT	2,170,000
AK15-07	2015	SOCKEYE	AK	2	MAIN BAY	MAIN BAY	5/23/2017	Thermal	MBH15E	2,2H4,2	SMOLT	2,270,000
AK15-27	2015	SOCKEYE	AK	4	PILLAR CREEK	TELROD COVE	5/29/2017	Dry	KODIAK15A	5,2H	SMOLT	355,569
AK15-13	2015	SOCKEYE	AK	1	SNETTISHAM	SPEEL ARM	6/10/2017	Thermal	SPEELARM15A	3,2nH	SMOLT	2,381,500
AK15-19	2015	SOCKEYE	AK	1	SNETTISHAM	SPEEL ARM	6/1/2017	Thermal	SPEELARM15B	7H	SMOLT	643,700
AK15-24	2015	SOCKEYE	AK	1	SNETTISHAM	SPEEL ARM	6/2/2017	Thermal	SPEELARM15C	4,3nH	SMOLT	1,254,200
AK15-25	2015	SOCKEYE	AK	1	SNETTISHAM	SPEEL ARM	6/3/2017	Thermal	SPEELARM15D	5n,3H	SMOLT	3,758,300
AK15-10	2015	SOCKEYE	AK	2	TRAIL LAKES	PORT GRAHAM	5/25/2017	Thermal	BRADLEYPONDS15	2,4H	SMOLT	86,000
AK15-14	2015	SOCKEYE	AK	2	TRAIL LAKES	BEAR CR, RESURRECTION BAY	5/22/2017	Thermal	TRAILLAKES15B	3,3,2H	SMOLT	1,816,000
AK15-21	2015	SOCKEYE	AK	2	TRAIL LAKES	TUTKA BAY	5/25/2017	Thermal	TUTKA15	3,5H	SMOLT	356,000

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Table 1 (continued). Releases of otolith marked salmon from Alaska in 2017.

NPAFC ID	BROOD YEAR	SPECIES	STATE	REGION	FACILITY	RELEASE SITE	DATE RELEASED	MARK TYPE	MARK ID	HATCH CODE	STAGE	NUMBER RELEASED
AK16-98	2016	CHINOOK	AK	1	MEDVEJIE	BEAR COVE, CRAWFISH INLET	6/14/2017	Thermal	MEDVEJIE16CHIN	5,2H	SMOLT	512,562
AK16-99	2016	CHINOOK	AK	2	WJ HERNANDEZ	SELDOVIA HBR, NINILCHIK R, HOMER SPIT, HALIBUT LAG,EKLUTNA TAILRACE, CROOKED CR, DECEPTION CR	6/19/2017	Thermal	COOKINLET16CHIN	2,3H	SMOLT	1,178,268
AK16-102	2016	CHINOOK	AK	2	WJ HERNANDEZ	FLEMING SPIT, WHITTIER HBR	6/15/2017	Thermal	PWS16CHIN	2,4H	SMOLT	202,988
AK16-103	2016	CHINOOK	AK	2	WJ HERNANDEZ	SEWARD LAGOON	6/9/2017	Thermal	RESURRECTION16CHIN	2,5H	SMOLT	328,337
AK16-101	2016	CHINOOK	AK	2	WJ HERNANDEZ	SHIP CR	6/6/2017	Thermal	SHIPCREEK16CHINL	2,3H5	SMOLT	143,555
AK16-100	2016	CHINOOK	AK	2	WJ HERNANDEZ	SHIP CR	6/6/2017	Thermal	SHIPCREEK16CHINS	2,3H3	SMOLT	197,382
AK16-55	2016	CHUM	AK	2	A F KOERNIG	SAWMILL BAY	5/31/2017	Thermal	WNH16B	1,4H	FED FRY	29,100,000
AK16-66	2016	CHUM	AK	1	BURNETT INLET	ANITA BAY	4/28/2017	Thermal	ANITABAY16	5,1,2H	FED FRY	15,761,000
AK16-73	2016	CHUM	AK	1	BURNETT INLET	ANITA BAY	5/9/2017	Thermal	ANITABAYL16	3,5H	FED FRY	5,895,000
AK16-70	2016	CHUM	AK	1	BURNETT INLET	BURNETT INLET	5/8/2017	Thermal	BURNETTINLET16	3,3,5H	FED FRY	18,713,028
AK16-75	2016	CHUM	AK	1	BURNETT INLET	BURNETT INLET	4/25/2017	Thermal	BURNETTINLET16FALL	4,2,4H	FED FRY	4,771,676
AK16-106	2016	CHUM	AK	1	HIDDEN FALLS	KASNYKU BAY, THOMAS BAY	5/14/2017	Thermal	HIDDENFALLS16	8n,2H	FED FRY	34,858,244
AK16-61	2016	CHUM	AK	1	HIDDEN FALLS	KASNYKU BAY, THOMAS BAY	6/1/2017	Thermal	HIDDENFALLS16LL	6,3H	FED FRY	8,795,340
AK16-52	2016	CHUM	AK	1	HIDDEN FALLS	KASNYKU BAY, THOMAS BAY	5/31/2017	Thermal	HIDDENFALLS16LLB	4n,3,2nH	FED FRY	9,645,136
AK16-62	2016	CHUM	AK	1	HIDDEN FALLS	SE COVE	5/21/2017	Thermal	SECOVE16	3,7H	FED FRY	29,183,809
AK16-63	2016	CHUM	AK	1	HIDDEN FALLS	SE COVE	6/4/2017	Thermal	SECOVE16LL	3,4,3H	FED FRY	17,565,716
AK16-78	2016	CHUM	AK	4	KITOI BAY	KITOI BAY	5/19/2017	Thermal	KITOI16CHUM	3,1,3H	FRY	8,940,312
AK16-79	2016	CHUM	AK	4	KITOI BAY	KITOI BAY	5/12/2017	Thermal	KITOI16CHUMA	3n,2n,3H	FED FRY	5,252,607
AK16-56	2016	CHUM	AK	1	MACAULAY	AMALGA HRB, BOAT HRB, GASTINEAU CH, LIMESTONE IN, THANE NET PENS	6/9/2017	Thermal	DIPAC16	6H	FED FRY	98,199,400
AK16-53	2016	CHUM	AK	1	MEDVEJIE	BEAR COVE	4/16/2017	Thermal	BEARCOVE16	3,3,2H	FED FRY	9,973,607
AK16-54	2016	CHUM	AK	1	MEDVEJIE	BEAR COVE	4/21/2017	Thermal	BEARCOVE16LL	6,2H	FED FRY	2,303,934
AK16-50	2016	CHUM	AK	1	MEDVEJIE	DEEP INLET	4/24/2017	Thermal	DEEPINLETHF16	5,2nH	FED FRY	19,615,191
AK16-47	2016	CHUM	AK	1	MEDVEJIE	BEAR COVE, DEEP INLET	5/24/2017	Thermal	DEEPINLETMV16	1,3,2H	FED FRY	16,586,394
AK16-48	2016	CHUM	AK	1	MEDVEJIE	DEEP INLET	4/26/2017	Thermal	DEEPINLETMV16LL	5,2,3H	FED FRY	3,563,819
AK16-74	2016	CHUM	AK	1	NEETS BAY	NAKAT INLET	5/2/2017	Thermal	NAKATINLET16FALL	3,4,1H2,3	FED FRY	8,149,143
AK16-71	2016	CHUM	AK	1	NEETS BAY	NEETS BAY	5/8/2017	Thermal	NEETS BAY16FALL	4,2,2H2,3	FED FRY	16,128,000
AK16-69	2016	CHUM	AK	1	NEETS BAY	NEETS BAY	5/8/2017	Thermal	NEETS BAY16SUM	4,4H2,3	FED FRY	61,740,000
AK16-45	2016	CHUM	AK	1	PORT ARMSTRONG	PORT ARMSTRONG	5/5/2017	Thermal	PORTARMSTRONG16CHUM	1,2,2H	FED FRY	24,802,314
AK16-64	2016	CHUM	AK	1	SAWMILL CREEK	CRAWFISH INLET	5/14/2017	Thermal	CRAWFISH16	5H	FED FRY	9,711,464
AK16-65	2016	CHUM	AK	1	SAWMILL CREEK	CRAWFISH INLET	5/25/2017	Thermal	CRAWFISH16LL	6,4H	FED FRY	13,330,768
AK16-44	2016	CHUM	AK	1	SHELDON JACKSON	CRESCENT BAY	5/1/2017	Thermal	SJ16CHUM	1,3H	FED FRY	2,293,105

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Table 1 (continued). Releases of otolith marked salmon from Alaska in 2017.

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AK16-80	2016	CHUM	AK	1	TAMGAS CREEK	TAMGAS CR	4/5/2017	Thermal	TAMGAS16	4H3	FED FRY	3,250,000
AK16-49	2016	CHUM	AK	2	WALLY NOERENBERG	LAKE BAY	5/31/2017	Thermal	WNH16A	4,3nH	FED FRY	67,100,000
AK16-59	2016	CHUM	AK	2	WALLY NOERENBERG	PORT CHALMERS	5/21/2017	Thermal	WNH16C	1,3n,2H	FED FRY	34,900,000
AK16-67	2016	CHUM	AK	1	WHITMAN LAKE	KENDRICK BAY	5/12/2017	Thermal	KENDRICK16	4n,2n,2H	FED FRY	29,470,550
AK16-72	2016	CHUM	AK	1	WHITMAN LAKE	NAKAT INLET	4/21/2017	Thermal	NAKATINLET16SUM	4,1,3H	FED FRY	8,007,154
AK16-81	2016	COHO	AK	1	MACAULAY	DAVIDSON CR	7/20/2017	Thermal	DAVIDSON16	2,6H	FED FRY	46,800
AK16-84	2016	COHO	AK	2	TRAIL LAKES	BEAR LK	6/6/2017	Thermal	BEARLAKE16COHO	2,2H	FINGERLING	125,000
AK16-30	2016	PINK	AK	2	A F KOERNIG	SAWMILL BAY	5/23/2017	Thermal	AFK16B	4H	FED FRY	137,500,000
AK16-39	2016	PINK	AK	2	CANNERY CREEK	CANNERY CR	5/28/2017	Thermal	CCH16	3,3H	FED FRY	149,000,000
AK16-33	2016	PINK	AK	1	PORT ARMSTRONG	PORT ARMSTRONG	5/6/2017	Thermal	PORTARMSTRONG16	3H	FED FRY	26,056,773
AK16-34	2016	PINK	AK	1	PORT ARMSTRONG	PORT ARMSTRONG	5/14/2017	Thermal	PORTARMSTRONG16A	3H4	FED FRY	8,323,003
AK16-35	2016	PINK	AK	1	PORT ARMSTRONG	PORT HERBERT	4/28/2017	Thermal	PORTARMSTRONG16B	3H3	FED FRY	5,587,220
AK16-36	2016	PINK	AK	1	PORT ARMSTRONG	PORT ARMSTRONG	4/28/2017	Thermal	PORTARMSTRONG16C	3H5	FED FRY	8,345,116
AK16-37	2016	PINK	AK	1	PORT ARMSTRONG	PORT HERBERT	4/28/2017	Thermal	PORTARMSTRONG16D	3H6	FED FRY	4,508,462
AK16-43	2016	PINK	AK	2	PORT GRAHAM	PORT GRAHAM	6/7/2017	Thermal	PORTGRAHAM16	5H3	FED FRY	6,059,757
AK16-32	2016	PINK	AK	1	SHELDON JACKSON	CRESCENT BAY	5/1/2017	Thermal	SJ16PINK	4,1H	FED FRY	2,264,509
AK16-38	2016	PINK	AK	2	SOLOMON GULCH	SOLOMON GULCH	5/19/2017	Thermal	SGH16	6H	FED FRY	241,542,706
AK16-41	2016	PINK	AK	2	TUTKA BAY	TUTKA BAY	6/7/2017	Thermal	TUTKA16PINK	5,3H	FED FRY	17,263,920
AK16-42	2016	PINK	AK	2	TUTKA BAY	TUTKA BAY	6/7/2017	Thermal	TUTKA16PINKA	4,4H	FED FRY	36,981,491
AK16-31	2016	PINK	AK	2	WALLY NOERENBERG	LAKE BAY	5/29/2017	Thermal	WNH16PINKB	8H	FED FRY	130,900,000
AK16-01	2016	SOCKEYE	AK	2	GULKANA	CROSSWIND, PAXSON LK	5/27/2017	Strontium	GULKANA16	HS1	FED FRY	15,690,000
AK16-26	2016	SOCKEYE	AK	4	PILLAR CREEK	JENNIFER LK, RUTH LK, SPIRIDON LK	6/17/2017	Dry	KODIAK16	2,4,2H	FED FRY	2,275,225
AK16-23	2016	SOCKEYE	AK	1	SNETTISHAM	SWEETHEART LK	5/28/2017	Thermal	SWEETHEART16	5,3nH	FRY	508,700
AK16-20	2016	SOCKEYE	BC	1	SNETTISHAM	R-TAHLTAN LK	5/28/2017	Thermal	TAHLTAN16	4,3H	FRY	2,211,500
AK16-11	2016	SOCKEYE	BC	1	SNETTISHAM	R-TATSAMENIE LK	5/29/2017	Thermal	TATSAMENIE16	2,1,2H	FRY	1,018,700
AK16-22	2016	SOCKEYE	BC	1	SNETTISHAM	R-TATSAMENIE LK	6/20/2017	Thermal	TATSAMENIE16ER	2,2,3H	FED FRY	183,000
AK16-13	2016	SOCKEYE	BC	1	SNETTISHAM	R-TRAPPER LK	5/29/2017	Thermal	TRAPPER16	4,4n,3H	FRY	211,800
AK16-12	2016	SOCKEYE	BC	1	SNETTISHAM	R-TAHLTAN LK	5/28/2017	Thermal	TUYA16	3n,3H	FRY	925,000
AK16-09	2016	SOCKEYE	AK	2	TRAIL LAKES	HAZEL LK	6/21/2017	Thermal	HAZEL16	4,1,3H	FED FRY	834,000
AK16-08	2016	SOCKEYE	AK	2	TRAIL LAKES	KIRSCHNER LK, LEISURE LK	6/21/2017	Thermal	PENINSULA16SOCKEYE	1,3H	FED FRY	1,647,000
AK16-02	2016	SOCKEYE	AK	2	TRAIL LAKES	BEAR LK	6/2/2017	Thermal	TRAILLAKES16A	4H	FED FRY	2,468,000