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Recoveries of High-Seas Tags in 2007-2008 and Tag Releases in 2008 from High-seas Research Vessel Surveys in the North Pacific Ocean

by

**Working Group on Salmon Tagging
Committee on Scientific Research and Statistics**

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ABSTRACT

In 2007 and 2008, high seas tags were recovered from seven chum in Japan, seven sockeye in the US, and nine pink, one coho, and five chum salmon in Russia. In addition, one high-seas tagged chum salmon was recovered in the central Bering Sea the following day after it was tagged. No data storage tags were recovered during this time period. From June to July 2008, a Japanese research vessel, *Wakatake maru*, conducted 28 longline (840 hachi) operations to attach disk tags and data storage tags to salmonids. In September 2008, the NOAA Ship *Oscar Dyson* also conducted research trawling operations to attach data storage tags and disk tags to salmonids. A total of 224 salmonids (2 sockeye, 132 chum, 11 pink, 70 coho, and 1 Chinook salmon and 8 steelhead trout) in the central North Pacific and 1,373 salmonids (68 sockeye, 1,248 chum, 33 pink, and 22 Chinook salmon and 2 Dolly Varden) in the Bering Sea were tagged and released. These releases included one Chinook salmon released in the central North Pacific and 22 chinook salmon released in the Bering Sea tagged with data storage tags.

INTRODUCTION

The Working Group on Salmon Tagging (WGST) was established by the CSRS at the 15th Annual Meeting in 2007 to manage the INPFC-NPAFC tagging database and to coordinate high seas tagging activities of the Parties. In this report, we summarize releases of tagged high seas salmon in 2008 and recoveries of high seas tags by the Parties in 2007 and 2008. This report includes tag recoveries reported in Fukuwaka et al. (2007a) and updated information from tags recovered since that report was compiled.

MATERIALS AND METHODS

Releases of high seas tags in 2007

From June to July in 2007, 340 salmonids (10 sockeye, 225 chum, 36 pink, 58 coho, and 2 Chinook salmon and 9 steelhead trout) in the central North Pacific and 1,181 salmonids (57 sockeye, 489 chum, 625 pink, and 10 Chinook salmon) in the Bering Sea were caught during 29 longline operations by the *Wakatake maru* for the purposes of tagging salmonids (Fukuwaka et al. 2007b). Of these fish, 211 salmonids (9 sockeye, 143 chum, 19 pink, 30 coho, and 2 Chinook salmon and 8 steelhead trout) in the central North Pacific and 849 salmonids (51 sockeye, 339 chum, 449 pink, and 10 Chinook salmon) in the Bering Sea were tagged and released. These releases included four steelhead trout released in the central North Pacific and two Chinook salmon released in the Bering Sea with data storage tags.

Fish were tagged with two disk tags: one issued by the Fisheries Agency of Japan (FAJ) and a second disk tag issued by the School of Aquatic and Fishery Sciences, University of Washington (UW). Both disk tags were placed on one plastic cinch strap and applied to the fish anterior to the dorsal fin. A few of the disk-tagged fish were selected for tagging with data storage tags. The type of data storage tag used in 2007 recorded water temperature and the fish's swimming depth (Lotek model LTD 1100-500 Walker et al. 2003, 2004). Data storage tags were placed externally in the dorsal musculature of the fish anterior to the dorsal fin with two metal pins, which were held in place with a twist on the opposite side of the fish from the data storage tag. Two disk tags were used as back-up plates against the fish's skin to protect it from wear from the twisted pin.

Releases of high seas tags in 2008

From June to July 2008, a Japanese research vessel, *Wakatake maru*, conducted 28 longline (840 hachi) operations for live capture of salmonids for tagging (Fukuwaka et al. 2008). Three types of disk tags were used in 2008: the FAJ disk tag and the UW disk tag were the same type used previously, plus a third disk tag type was the new NPAFC tag. The NPAFC tag is the same color and size as the UW tag, but displays the NPAFC logo. One type of data storage tag was used in 2008. This model (Lotek model LAT 1400; <http://www.lotek.com/lat.htm>) records water temperature and the fish's swimming depth, and contains more memory and programming capability than the temperature and depth recording tags used previously. Data storage tags were placed externally in the dorsal musculature of the fish anterior to the dorsal fin using metal pins and disk tags in a similar manner as described for tagging in 2007.

On September 27, 2008 the NOAA Ship *Oscar Dyson* conducted two rope trawl operations with an experimental live-box attached to the trawl cod end to permit high seas

tagging on immature salmon. The live-box design was developed as part of the NPAFC salmon tagging project to enable salmon tagging as part of surface trawl research surveys (Murphy et al. 2007; Walker et al. 2006). Salmon were tagged with NPAFC Petersen disk tags and data storage tags DST (LTD 1100 series data storage tags). DSTs were secured to the dorsal musculature of salmon anterior to the dorsal fin with an oval backing plate and two nickel pins. NPAFC disk tags were secured to salmon on the inside of the oval backing plate when DSTs were used. Salmon with higher scale loss levels were not tagged with DSTs, and only a disk tag was used. When tagging salmon with only a disk tag, disk tags were inserted into the dorsal musculature of the fish with a cinch strap posterior to the dorsal fish. Fish with extensive scale loss (>50%) were not tagged. Immature salmon that did not enter the live-box during trawling experienced extensive scale loss, similar to rates observed in trawl caught salmon.

Recovery of high seas tags

Scientists at the Pacific Biological Station in Canada, the National Salmon Resources Center in Japan, the Youngdong Inland Fisheries Research Institute in Korea, the Pacific Fisheries Research Centre (TINRO-Centre) in Russia, the Auke Bay Laboratory and the University of Washington in the United States, and the NPAFC Secretariat collected recovery information. To increase awareness of the tag recovery program for the general public, posters displaying information on types of tags, attachment location, guidelines for collecting important recovery data, and how to report a tag recovery were distributed by representatives of the Parties in their own countries to agencies conducting salmonid-related activities. In addition, versions of this poster in multiple languages were placed on the NPAFC website (http://www.npafc.org/new/science_fishtag2.html).

RESULTS

Recovery of high seas tags in 2007-2008

In 2007 and 2008, high seas tags were recovered from seven chum in Japan, seven sockeye in the US, and nine pink, one coho, and five chum salmon in Russia (Table 1). In addition, one high-seas tagged chum salmon was recovered in the central Bering Sea the following day after it was tagged. No data storage tags were recovered during this time period.

Releases of high seas tags in 2008

From June to July in 2008, 274 salmonids (2 sockeye, 158 chum, 14 pink, 90 coho, and 1 Chinook salmon and 9 steelhead trout) in the central North Pacific and 1,696 salmonids (60

sockeye, 1,566 chum, 48 pink, and 20 Chinook salmon and 2 Dolly Varden) in the Bering Sea were caught by surface longline during the salmon research cruise of the *Wakatake maru* (Table 2; Fukuwaka et al. 2008). Of these fish, 224 salmonids (2 sockeye, 132 chum, 11 pink, 70 coho, and 1 Chinook salmon and 8 steelhead trout) in the central North Pacific and 1,292 salmonids (50 sockeye, 1,189 chum, 33 pink, and 18 Chinook salmon and 2 Dolly Varden) in the Bering Sea were tagged and released (Tables 2 and 3). These releases included one Chinook salmon released in the central North Pacific and 18 Chinook salmon released in the Bering Sea with data storage tags.

During September 27, 2008, two live-box trawl sets were completed in the Bering Sea aboard the NOAA Ship *Oscar Dyson* at the same location (55.5N 168.5W). A total of 107 immature salmon were caught and 81 were tagged (59 chum, 18 sockeye, and 4 Chinook salmon). A total of 63 salmon were released with both data storage tags (DSTs) and disk tags (47 chum, 12 sockeye, and 4 Chinook salmon), one chum salmon was released with just a DST, and 17 salmon (11 chum, and 6 sockeye salmon) released with a disk tag (Tables 2 and 3).

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Table 1. Recoveries of high-seas tagged salmon in 2007 and 2008. Age designation is the European method, where the first number is the number of freshwater annuli and the second number is the number of ocean annuli. FL: fork length (mm), BW: body weight (g), -: no data.

Japan tag #	U.S. tag #	NPAFC tag #	Release						Recovery							
			Date	Lat	Long	Sp	FL	Age	Date	Lat	Long	Gear	Sex	FL	BW	Location
MM4265	LL7165	-	6/23/06	49°30'N	180°00'	chum	572	0.3	5/-/07	-	-	driftnet	-	-	-	Petropavlovsk-Komandorskii sub-zone, Russia
MM4322	LL7222	-	6/24/06	50°30'N	180°00'	chum	514	0.3	7/14/07	57°10'N	156°40'E	setnet	F	-	2500	Khairyuzoba R. mouth, E. Kamchatka, Russia
MM4500	LL7400	-	7/10/06	57°30'N	180°00'	chum	550	0.4	-	46°03'N	152°44'E	-	F	632	3150	Russia
MM4694	LL8594	-	7/13/06	56°30'N	179°00'E	sockeye	474	x.2	7/1/07	58°48'N	158°34'W	driftnet	M	-	3600	Nushagak Bay, Bristol Bay, Alaska
MM4699	LL8599	-	7/13/06	56°30'N	179°00'E	sockeye	451	1.2	7/17/07	58°43'N	157°0'W	driftnet	-	-	-	Naknek, Bristol Bay, Alaska
MM4712	LL8612	-	7/13/06	56°30'N	179°00'E	sockeye	454	1.2	6/30/07	58°43'N	158°34'W	driftnet	-	-	-	Nushagak Bay, Bristol Bay, Alaska
-	LL4921	-	7/30/06	57°09'N	166°56'W	chum	595	-	7/24/07	51°42'N	160°19'E	driftnet	-	-	-	Petropavlovsk-Komandorskii sub-zone, Russia
LL5026	LL8088	-	6/15/07	42°56'N	179°58'E	coho	523	3.1	9/7/07	51°57'N	156°29'E	seine	-	-	-	mouth of Opara River, Russia
LL5236	NN0961	-	6/24/07	51°30'N	180°00'	chum	504	0.3	10/16/07	44°17'N	145°17'E	trapnet	F	540	2100	Shari, Okhotsk Sea coast, Hokkaido
LL5255	NN0980	-	6/25/07	52°30'N	180°00'	chum	645	0.4	9/23/07	42°24'N	143°22'E	trapnet	-	-	-	Hiroo, Pacific coast, Hokkaido
LL5259	NN0984	-	6/25/07	52°30'N	180°00'	chum	605	0.3	9/13/07	45°20'N	142°10'E	trapnet	-	640	2800	Sarufutsu, Okhotsk Sea coast, Hokkaido
LL5267	NN0992	-	6/25/07	52°30'N	180°00'	pink	468	0.1	7/22/07	60°40'N	169°50'E	setnet	M	-	-	Pahachi River, Russia
LL5280	LL8705	-	6/25/07	52°30'N	180°00'	chum	570	0.4	7/24/07	51°36'N	160°05'E	driftnet	F	-	-	Petropavlovsk-Komandorskii sub-zone, Russia
LL5312	LL8737	-	6/26/07	53°30'N	180°00'	sockeye	632	1.3	7/23/07	58°56'N	160°19'W	driftnet	-	-	3180	Anchor Point, Togiak Bay, Alaska
LL5370	LL8795	-	6/28/07	55°28'N	179°56'W	chum	604	0.4	9/29/07	44°05'N	144°15'E	trapnet	M	630	2300	Abashiri, Okhotsk Sea coast, Hokkaido
LL5376	LL8801	-	6/29/07	56°29'N	179°58'W	pink	517	0.1	-	59°22'N	163°21'E	-	-	-	-	Russia
LL5408	LL8833	-	6/29/07	56°29'N	179°58'W	sockeye	600	1.3	8/14/07	56°10'N	160°26'W	setnet	-	648	3720	Bear River, Bristol Bay, Alaska
LL5419	LL8844	-	6/29/07	56°29'N	179°58'W	pink	489	0.1	7/14/07	60°40'N	169°50'E	setnet	M	600	2730	Pahachi River, Russia
LL5446	LL8871	-	6/30/07	57°30'N	179°56'W	chum	526	0.3	10/10/07	43°57'N	144°22'E	trapnet	F	570	2000	Abashiri, Okhotsk Sea coast, Hokkaido
LL5510	LL8935	-	7/01/07	58°29'N	180°00'	pink	449	0.1	7/25/07	57°36'N	162°32'E	seine	M	460	1200	Cape Nachinkisky, Russia
LL5526	LL8951	-	7/01/07	58°29'N	180°00'	pink	544	0.1	7/25/07	57°56'N	162°32'E	seine	M	500	1800	Cape Nachinkisky, Russia
LL5694	GG0119	-	7/03/07	57°35'N	177°59'W	pink	463	0.1	7/27/07	60°30'N	167°40'E	seine	M	-	1500	Grigornavirinvyam River, Russia
LL5732	GG0157	-	7/03/07	57°35'N	177°59'W	pink	458	0.1	-	-	-	-	M	475	1375	Karaginskii sub-zone, Russia
LL5832	LL1778	-	7/05/07	56°33'N	178°59'W	pink	458	0.1	7/25/07	57°56'N	162°32'E	seine	M	475	1300	Cape Nachinkisky, Russia
LL5926	LL1886	-	7/08/07	56°28'N	177°04'E	pink	507	0.1	7/25/07	57°36'N	162°32'E	seine	M	530	2000	Cape Nachinkisky, Russia
LL5977	LL1940	-	7/09/07	57°32'N	177°02'E	chum	600	0.3	9/17/07	43°55'N	144°40'E	trapnet	-	-	-	Shari, Okhotsk Sea coast, Hokkaido
LL5982	LL1945	-	7/09/07	57°32'N	177°02'E	chum	576	0.3	9/24/07	42°10'N	142°46'E	trapnet	M	615	2500	Urakawa, Pacific coast, Hokkaido
LL6493	MM3493	NA0493	6/29/08	56°32'N	179°55'W	sockeye	581	1.3	7/27/08	58°43'N	157°00'W	driftnet	-	-	-	Naknek District, Bristol Bay, Alaska
LL6636	MM3636	NA0636	6/30/08	57°34'N	179°58'W	sockeye	608	1.3	7/24/08	58°39'N	157°22'W	driftnet	M	-	-	Naknek-Kvichak District, Bristol Bay, Alaska
-	-	NA1240	7/08/08	56°32'N	177°06'W	chum	460	0.2	7/9/08	56°30'N	177°00'W	driftnet	M	457	1010	Central Bering Sea, High Seas

Table 2. Number of salmon caught by longline and rope trawl operations to attach data storage and disk tags, and number of fish tagged and released by the research vessels in 2008. LL: longline (30 hachi/operation), RT: rope trawl (1 hour duration), BS: Bering Sea, CNP: Central North Pacific.

Region/ Vessel	Date	Latitude	Longitude	Gear	Number of fish caught						Number of fish released							
					Sock	Chum	Pink	Coho	Chin	SteelDoll	Sock	Chum	Pink	Coho	Chin	SteelDoll		
CNP	6/13	41°03N	179°59W	LL	0	3	0	1	0	2	0	0	2	0	1	0	2	0
<i>Wakatake</i>	6/14	42°04N	179°57W	LL	0	2	0	4	0	1	0	0	1	0	2	0	1	0
<i>maru</i>	6/15	43°03N	179°56W	LL	0	5	0	9	0	0	0	0	4	0	8	0	0	0
	6/16	44°03N	179°56W	LL	0	17	1	40	0	1	0	0	11	1	29	0	1	0
	6/17	45°02N	179°55W	LL	0	3	1	10	0	3	0	0	3	1	9	0	2	0
	6/18	46°01N	180°00	LL	0	1	0	8	0	0	0	0	1	0	6	0	0	0
	6/19	47°05N	179°54W	LL	0	47	4	9	0	2	0	0	42	3	7	0	2	0
	6/20	47°30N	179°59W	LL	0	8	0	6	1	0	0	0	7	0	5	1	0	0
	6/21	48°30N	180°00	LL	0	17	3	2	0	0	0	0	16	3	2	0	0	0
	6/22	49°30N	180°00	LL	2	39	5	1	0	0	0	2	34	3	1	0	0	0
	6/23	50°30N	180°00	LL	0	16	0	0	0	0	0	0	11	0	0	0	0	0
	Total				2	158	14	90	1	9	0	2	132	11	70	1	8	0
BS	6/24	51°30N	180°00	LL	0	23	0	0	0	0	0	0	20	0	0	0	0	0
<i>Wakatake</i>	6/25	52°30N	180°00	LL	8	137	2	0	0	0	0	7	104	0	0	0	0	0
<i>maru</i>	6/26	53°30N	180°00	LL	0	103	1	0	0	0	0	0	76	1	0	0	0	0
	6/27	54°30N	180°00	LL	0	20	0	0	0	0	0	0	15	0	0	0	0	0
	6/28	55°33N	179°55W	LL	1	44	7	0	0	0	0	1	36	6	0	0	0	0
	6/29	56°32N	179°55W	LL	1	98	1	0	0	0	0	1	86	0	0	0	0	0
	6/30	57°34N	179°58W	LL	5	62	4	0	11	0	0	5	41	4	0	9	0	0
	7/01	58°30N	179°55E	LL	0	31	6	0	1	0	2	0	24	5	0	1	0	2
	7/02	57°27N	179°12W	LL	2	72	11	0	2	0	0	2	59	6	0	2	0	0
	7/03	57°28N	178°05W	LL	3	171	2	0	6	0	0	1	129	1	0	6	0	0
	7/04	56°26N	178°09W	LL	3	39	5	0	0	0	0	2	33	3	0	0	0	0
	7/05	56°26N	179°04W	LL	5	75	4	0	0	0	0	4	59	3	0	0	0	0
	7/06	56°29N	178°57E	LL	8	187	0	0	0	0	0	6	136	0	0	0	0	0
	7/07	56°27N	178°02E	LL	3	133	1	0	0	0	0	3	105	1	0	0	0	0
	7/08	56°32N	177°06E	LL	3	116	1	0	0	0	0	2	88	1	0	0	0	0
	7/09	57°29N	176°57E	LL	8	49	3	0	0	0	0	7	36	2	0	0	0	0
	7/10	57°29N	176°07E	LL	10	206	0	0	0	0	0	9	142	0	0	0	0	0
	Total				60	1566	48	0	20	0	2	50	1189	33	0	18	0	2
<i>Oscar Dyson</i>	9/27	55°30N	168°30W	RT	24	79	0	0	4	0	0	18	59	0	0	4	0	0
BS total					84	1645	48	0	24	0	0	68	1248	0	0	22	0	0
Total					86	1803	62	90	25	9	2	52	1380	44	70	23	8	2

Table 3. Numbers of disk tags and data storage tags attached to Pacific salmon and steelhead trout and released in 2008. BS: Bering Sea, CNP: central North Pacific.

Region/ vessel	Date	Location		Disk tag			N. fish	Data storage tag	
				FAJ	FRI	NPAFC		Tag No.	N. fish
CNP	6/13	41°03N	179°59W	LL6001-6005	MM3001-3005	NA0001-0005	5		
<i>Wakatake maru</i>	6/14	42°04N	179°57W	LL6006-6009	MM3006-3009	NA0006-0009	4		
	6/15	43°03N	179°56W	LL6010-6021	MM3010-3021	NA0010-0021	12		
	6/16	44°03N	179°56W	LL6022-6063	MM3022-3063	NA0022-0063	42		
	6/17	45°02N	179°55W	LL6064-6078	MM3064-3078	NA0064-0078	15		
	6/18	46°01N	180°00	LL6079-6085	MM3079-3085*	NA0079-0085	7		
	6/19	47°05N	179°54W	LL6086-6139	MM3086-3139	NA0086-0139	54		
	6/20	47°30N	179°59W	LL6140-6152	MM3141-3152*	NA0140-0152	13	LAT0592	1
	6/21	48°30N	180°00	LL6153-6173	MM3153-3173	NA0153-0173	21		
	6/22	49°30N	180°00	LL6174-6213	MM3174-3213	NA0174-0213	40		
	6/23	50°30N	180°00	LL6214-6224	MM3214-3224	NA0214-0224	11		
Total							224		1
BS	6/24	51°30N	180°00	LL6225-6244	MM3225-3244	NA0225-0244	20		
<i>Wakatake maru</i>	6/25	52°30N	180°00	LL6245-6355	MM3245-3355	NA0245-0355*	111		
	6/26	53°30N	180°00	LL6356-6432	MM3356-3432	NA0356-0432	77		
	6/27	54°30N	180°00	LL6433-6447	MM3433-3447	NA0433-0447	15		
	6/28	55°33N	179°55W	LL6448-6490	MM3448-3490	NA0448-0490	43		
	6/29	56°32N	179°55W	LL6491-6577	MM3491-3577	NA0491-0576	87		
	6/30	57°34N	179°58W	LL6578-6636	MM3578-3636*†	NA0579-0636	59	LAT	9
								0593-0595, 0597-0599, 0601-0603	
	7/01	58°30N	179°55E	LL6637-6668	MM3638-3668*†	NA0637-0668	32	LAT0604	1
	7/02	57°27N	179°12W	LL6669-6737	MM3670-3737†	NA0669-0737	69	LAT0605- 0606	2
	7/03	57°28N	178°05W	LL6738-6874	MM3740-3874†	NA0738-0874	137	LAT0607- 0608, 0610-0613	6
7/04	56°26N	178°09W	LL6875-6912	MM3875-3912	NA0875-0912	38			
7/05	56°26N	179°04W	LL6913-6978	MM3913-3978	NA0913-0978	66			
7/06	56°29N	178°57E	LL6979-7000	MM3979-3999	NA0979-1120	142			
7/07	56°27N	178°02E			NA1121-1230	109			
7/08	56°32N	177°06E			NA1231-1322	91			
7/09	57°29N	176°57E			NA1323-1367	45			
7/10	57°29N	176°07E			MM3000, 3140, 3601-3604, 3606-3608, 3637, 3669, 3721, 3738-3739, 3781-3783, 3830	151			
<i>Oscar Dyson</i>	9/27	55°30N	168°30W			NA2002-2059	80	LTD	64
						NA2061-1063		13271-13277	
						NA2065-2083		13280	
								13282	
								13284-13287	
								13292	
								13294	
								13296-13299	
								13303-13306	
								13308-13329	
							13331		
							13333-13340		
							13358-13462		
							13445-13447		
							13450		
Total							1372		82
Total							1596		83

* MM3080, 3605, 3641, NA0288, and 1233 not used. † MM3601-3604, 3606-3608, 3637, 3669, 3721, 3781-3783, and 3830, used later.