

Recoveries of High-Seas Tags in Japan in 2005, and Tag Releases and Recoveries of Fin-Clipped Salmon from Japanese Research Vessel Surveys in the North Pacific Ocean in 2006

by

Masa-aki Fukuwaka¹, Shigehiko Urawa², Shoji Yoshimitsu², Nancy D. Davis³, and Robert V. Walker³

¹**Hokkaido National Fisheries Research Institute, Fisheries Research Agency
116 Katsurakoi, Kushiro 085-0802, Japan**

²**National Salmon Resources Center, Fisheries Research Agency
2-2 Nakanoshima, Toyohira-ku, Sapporo 062-0922, Japan**

³**School of Aquatic and Fishery Sciences, University of Washington
Box 355020, Seattle, WA 98195-5020, USA**

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Recoveries of High-Seas Tags in Japan in 2005, and Tag Releases and Recoveries of Fin-Clipped Salmon from Japanese Research Vessel Surveys in the North Pacific Ocean in 2006

M. Fukuwaka¹, S. Urawa², S. Yoshimitsu², N.D. Davis³, and R.V. Walker³

¹ Hokkaido National Fisheries Research Institute, Fisheries Research Agency

² National Salmon Resources Center, Fisheries Research Agency

³ School of Aquatic and Fishery Sciences, University of Washington

ABSTRACT

During 2005, six tagged chum salmon were recovered along the Japanese coast from releases of tagged fish in the Bering Sea and central North Pacific. Recoveries included one chum salmon with the LTD tag. The tag recovery rate for chum salmon released and recovered in 2005 (2.7%) was similar to the recovery rate since 1995 (1.6-3.6%), except for 1998 (8.8%), 2001 (6.9%) and 2004 (4.9%). From January to July 2006, two Japanese research vessels, *Kaiyo maru* and *Wakatake maru*, conducted 62 trawl, 11 hook-and-line, and 17 longline (510 hachi) operations to attach archival and disk tags on salmonids. Eight salmonids (1 sockeye and 7 pink salmon) in the western North Pacific, 336 salmonids (32 sockeye, 166 chum, 7 pink, 124 coho, 3 chinook salmon, and 4 steelhead trout) in the central North Pacific, 492 salmonids (75 sockeye, 385 chum, 14 pink, 1 coho, 11 chinook salmon, and 6 Dolly Varden) in the Bering Sea, and 69 salmonids (27 sockeye, 23 chum, 18 pink, and 1 coho salmon) in the eastern North Pacific, were tagged and released. Of these fish, 24 salmonids with LTD or CTD tags were released in the eastern North Pacific and Bering Sea. During research surveys in summer of 2006, Japanese salmon research vessels recovered 28 steelhead trout lacking the adipose fin.

INTRODUCTION

Japanese and U.S. cooperative high-seas tagging experiments were conducted in 2006. In this report, we summarize tags recovered from salmon that returned to Japanese coastal areas in 2005. In addition, releases of high seas tags and collection of fin-clipped salmonids during Japanese salmon research vessel operations in the North Pacific Ocean in 2006 are summarized.

MATERIALS AND METHODS

Recovery of high seas tags in 2005

In June and July 2005, four salmonids (3 chum and 1 pink) in the western North Pacific, 146 salmonids (11 sockeye, 68 chum, 5 pink, 58 coho salmon, 1 chinook, and 3 steelhead trout) in the central North Pacific, and 237 salmonids (71 sockeye, 79 chum, 83 pink, and 4 chinook salmon) in the Bering Sea were tagged and released by two Japanese research vessels, *Oshoro maru* and *Wakatake maru* (Tables 3 and 4). Of these fish, 138 salmonids with temperature tags (IB tag), temperature-depth tags (LTD tag), conductivity-temperature-depth tags (CTD tag), or geolocating tags were released in the central North Pacific and Bering Sea.

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 archival tags. Four types of externally-attached archival tags were used by UW (Walker et al. 2005). Two tags are manufactured by Lotek Marine Technologies; one (model LTD_1100-500) records temperature and depth data. The other (model LTD_2400) records light, temperature, and depth and provides geolocation estimates based on light data. Another tag is a ThermoChron iButton data storage device manufactured by Dallas Semiconductor, Inc., and repackaged for fish tagging by AlphaMach, Inc. (model iBKrill). These tags record temperature data only. A fourth type of archival tag manufactured by Star-Oddi, Reykjavik, Iceland (model DST CTD), records seawater temperature, salinity, and depth. All archival tags were attached externally in the dorsal musculature of the fish anterior to the dorsal fin.

The National Salmon Resources Center collected archival tags, disk tags, and data on recovery locations from salmon hatcheries, private fishermen, fishing cooperative unions, and prefectural governments along the coast of northern Japan from chum salmon that returned to Japan coastal areas in fall of 2005.

We compared tag recovery rates (number of recovered fish / number of released fish) from 1995 to 2005 using the data from tagging experiments conducted by the *Wakatake maru* and *Kaiyo maru* in the central North Pacific and Bering Sea (Ito 1995, Myers et al. 1995-1998, Ito and Ishida 1996, 1998, Walker et al. 1998, Ueno and Ishida 1999, Fukuwaka et al. 1999-2003, Nagasawa et al. 2004, Fukuwaka et al. 2005).

Releases of high seas tags in 2006

From January to July 2006, two Japanese research vessels, *Kaiyo maru* and *Wakatake maru*, conducted 62 trawl, 11 hook-and-line, and 17 longline (510 hachi) operations to attach archival and disk tags on salmonids. The disk tags used in 2006 were the same types used in 2005. Two types of archival tag were used in 2006, namely the temperature and depth recording

LTD 1100-500, and the salinity, temperature and depth recording DST CTD (Walker et al. 2003, 2004). Archival tags were placed externally in the dorsal musculature of the fish anterior to the dorsal fin.

Collection of snouts from adipose fin-clipped salmonids in 2006

Four salmon research vessels, the *Kaiyo maru*, *Wakatake maru*, *Oshoro maru*, and *Kaiun maru* caught 4,329 salmonids in the western and central North Pacific, the Bering Sea, and the Gulf of Alaska from January through August, 2006. Salmon and steelhead trout lacking the adipose fin were recovered during biological measurements. Snout samples were collected from these fish for potential recovery of coded-wire tags (CWT).

RESULTS

Recovery of high seas tags in 2005

Six tagged chum salmon were recovered from the coast of Japan during fall 2005 (Table 1). Five recoveries were from salmon tagged only with disk tags. Recoveries included one chum salmon with the LTD archival tag. The tag recovery rate for chum salmon released and recovered in 2005 (2.7%) was similar to the recovery rate since 1995 (1.6-3.6%), except for 1998 (8.8%), 2001 (6.9%), and 2004 (4.9%; Table 2).

Releases of high seas tags in 2006

From January to July in 2006, eight salmonids (1 sockeye and 7 pink salmon) in the western North Pacific, 336 salmonids (32 sockeye, 166 chum, 7 pink, 124 coho, 3 chinook salmon, and 4 steelhead trout) in the central North Pacific, 492 salmonids (75 sockeye, 385 chum, 14 pink, 1 coho, 11 chinook salmon, and 6 Dolly Varden) in the Bering Sea, and 69 salmonids (27 sockeye, 23 chum, 18 pink, and 1 coho salmon) in the eastern North Pacific, were tagged and released by two Japanese research vessels, *Kaiyo maru* and *Wakatake maru* (Tables 3 and 4). Of these fish, 24 salmonids with LTD or CTD tags were released in the eastern North Pacific and Bering Sea.

Collection of snouts from adipose fin-clipped salmonids in 2006

Twenty-eight fin-clipped steelhead trout were recaptured by Japanese salmon research vessels (Table 5). Snouts were collected from 27 fish and one fish was released with double disk tag. These snouts were retained and later sent to the Auke Bay Laboratory (U.S. National Marine Fisheries Service) for collection and reading of the coded-wire tags.

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Table 1. Recoveries of high-seas tagged salmon returning to Japan in 2005. 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 #	Archival tag #	Release						Recovery							
			Date	Lat	Long	Sp	FL	Age	Date	Lat	Long	Gear	Sex	FL	BW	Location
MM2493	NN0493		7/8/04	56°30'N	179°00'W	chum	502	0.2	9/22/05	44°06'N	145°00'E	setnet	-	600	2400	Shari, Okhotsk Sea coast, Hokkaido
MM3206	LL8306		6/29/05	54°30'N	180°00'	chum	621	0.3	9/29/05	43°59'N	144°17'E	setnet	M	689	3500	Abashiri, Okhotsk Sea coast, Hokkaido
MM3077	LL8177	LTD9423	6/23/05	48°30'N	180°00'	chum	544	0.3	11/5/05	42°34'N	141°24'E	setnet	-	-	-	Shiraoi, Pacific coast, Hokkaido
MM3212	LL8312		6/30/05	55°30'N	180°00'	chum	520	0.3	12/8/05	39°30'N	142°01'E	setnet	M	550	1550	Yamada, Pacific coast, Iwate, Honshu
MM2382	NN0382		7/6/04	57°30'N	178°00'W	chum	540	0.3	9/20/05	43°17'N	145°40'E	setnet	-	-	-	Habomai, Pacific coast, Hokkaido
MM3203	LL8303		6/29/05	54°30'N	180°00'	chum	514	0.2	10/13/05	43°28'N	145°15'E	setnet	-	-	-	Notsuke, Nemuro Strait, Hokkaido

Table 2. Number of tagged chum salmon released in the Bering Sea and the central North Pacific by the research vessels *Wakatake maru* and *Kaiyo maru*, and recovered along the Japanese coast and in Russia in 1995-2005. In 1995, fish were not tagged and released in the central North Pacific. Numbers in parentheses indicate number or recovery rate of archival-tagged fish.

Year	Region	Number of releases	Number of recoveries	Recovery rate (%)
1995	Bering Sea	128	4	3.1
1996	Bering Sea	619	9	1.4
	Central North Pacific	36	2	5.6
	Total	655	11	1.6
1997	Bering Sea	399	13	3.3
	Central North Pacific	5	0	0
	Total	404	13	3.2
1998	Bering Sea	734 (48)	71 (8)	9.7 (16.7)
	Central North Pacific	75	0	0
	Total	809 (48)	71 (8)	8.8 (16.7)
1999	Bering Sea	226 (31)	6 (3)	2.7 (9.7)
	Central North Pacific	15	0	0
	Total	241 (31)	6 (3)	2.5 (9.7)
2000	Bering Sea	575 (48)	15 (2)	2.6 (4.2)
	Central North Pacific	52 (2)	0	0
	Total	627 (50)	15 (2)	2.4 (4.0)
2001	Bering Sea	406 (7)	31 (1)	7.6 (14.3)
	Central North Pacific	72	2	2.8
	Total	478 (7)	33 (1)	6.9 (14.3)
2002	Bering Sea	956 (45)	26 (3)	2.7 (6.7)
	Central North Pacific	18 (3)	0	0
	Total	974 (48)	26 (3)	2.7 (6.3)
2003	Bering Sea	135 (40)	6 (2)	4.4 (5.0)
	Central North Pacific	31 (0)	0	0
	Total	166(40)	6 (2)	3.6 (5.0)
2004	Bering Sea	782 (337)	42 (19)	5.4 (5.6)
	Central North Pacific	71 (28)	0	0
	Total	853 (365)	42 (19)	4.9 (5.2)
2005	Bering Sea	79 (18)	3 (0)	3.8 (0)
	Central North Pacific	68 (6)	1 (1)	1.5 (16.7)
	Total	147 (24)	4 (1)	2.7 (4.2)

Table 3. Number of salmon caught by trawl, hook-and-line, and longline operations to attach archival and disk tags, and number of fish tagged and released by the research vessels, *Kaiyo maru* and *Wakatake maru* in 2006. T: trawl, HL: hook-and-line, LL, longline (30 hachi/operation), BS: Bering Sea, WNP: Western North Pacific, CNP: Central North Pacific, ENP: Eastern North Pacific.

Region/ Vessel	Date	Latitude	Longitude	Gear	Number of fish caught						Number of fish released						
					Sock	Chum	Pink Coho	Chin	SteelDolly	Sock	Chum	Pink Coho	Chin	SteelDolly			
WNP	1/28	41°01N	154°56E	T	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Kaiyo maru</i>	1/28	42°02N	154°50E	T	0	1	697	0	0	0	0	0	0	5	0	0	0
	1/29	43°05N	154°59E	T	0	4	37	0	0	0	0	0	0	0	0	0	0
	1/29	44°06N	154°53E	T	0	1	11	0	0	0	0	0	0	0	0	0	0
	1/31	41°07N	165°00E	T	0	0	7	0	0	0	0	0	0	0	0	0	0
	1/31	42°03N	164°55E	T	0	1	38	0	0	0	0	0	0	0	0	0	0
	2/01	42°54N	164°58E	T	5	5	242	0	1	0	0	1	0	2	0	0	0
	2/01	44°02N	164°49E	T	11	0	6	0	0	0	0	0	0	0	0	0	0
	2/25	44°51N	165°06E	T	0	1	0	0	2	0	0	0	0	0	0	0	0
	2/26	45°59N	165°03E	T	6	0	0	0	0	0	0	0	0	0	0	0	0
	2/26	46°57N	165°01E	T	5	1	0	0	0	0	0	0	0	0	0	0	0
	2/27	48°00N	165°03E	T	3	2	0	0	0	0	0	0	0	0	0	0	0
	2/28	44°21N	165°06E	T	8	23	11	0	1	0	0	0	0	0	0	0	0
	2/28	43°21N	165°04E	T	86	135	50	0	0	0	0	0	0	0	0	0	0
	3/01	42°30N	164°56E	T	23	62	206	0	1	0	0	0	0	0	0	0	0
	3/01	41°36N	164°51E	T	3	0	0	0	0	0	0	0	0	0	0	0	0
	6/16	49°00N	165°00E	T	9	22	4	0	0	0	0	0	0	0	0	0	0
6/16	48°00N	165°00E	T	3	9	0	1	0	0	0	0	0	0	0	0	0	
6/17	47°00N	165°00E	T	16	18	18	0	0	0	0	0	0	0	0	0	0	
6/17	46°00N	165°00E	T	3	15	5	0	0	0	0	0	0	0	0	0	0	
Total					181	300	1332	1	5	0	0	1	0	7	0	0	0
CNP	2/04	40°59N	174°47E	T	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Kaiyo maru</i>	2/06	42°03N	174°53E	T	0	0	0	0	0	0	0	0	0	0	0	0	0
	6/3	52°00N	170°00W	T	11	27	3	0	0	0	0	0	0	0	0	0	0
	6/4	51°00N	170°00W	T	11	26	4	0	0	0	0	0	0	0	0	0	0
	6/4	50°00N	170°00W	T	20	68	17	0	0	0	0	6	0	0	0	0	0
	6/5	50°00N	175°00W	T	5	68	13	0	0	0	1	0	0	0	0	0	0
	6/6	51°00N	175°00W	T	16	31	7	0	0	0	0	0	0	0	0	0	0
	6/6	52°30N	175°00W	T	1	8	0	0	3	0	0	0	0	0	0	0	0
	6/6	52°30N	175°00W	HL	1	0	0	0	0	0	1	0	0	0	0	0	0
	6/11	50°30N	180°00	T	5	18	3	1	0	0	0	0	0	0	0	0	0
	6/12	49°30N	180°00	T	47	29	18	0	0	0	0	0	0	0	0	0	0
	6/13	50°00N	175°00E	T	3	52	7	0	0	0	0	0	0	0	0	0	0
6/13	51°00N	175°00E	T	10	2	1	0	0	0	0	0	0	0	0	0	0	
6/14	52°00N	175°00E	T	2	24	5	0	1	0	0	0	0	0	0	0	0	
<i>Wakatake maru</i>	6/14	40°59N	179°58W	LL	0	4	0	0	0	0	0	1	0	0	0	0	0
	6/15	42°00N	179°58E	LL	0	4	0	0	0	0	0	3	0	0	0	0	0
	6/16	42°59N	179°57W	LL	0	40	3	34	0	0	0	32	2	28	0	0	0
	6/17	43°59N	179°58W	LL	0	24	1	7	0	0	0	20	0	4	0	0	0
	6/18	44°58N	180°00	LL	0	10	1	2	0	2	0	9	0	1	0	2	0
	6/19	45°58N	179°59W	LL	1	6	1	19	2	0	0	4	1	17	2	0	0
	6/20	47°01N	179°57W	LL	0	16	0	51	1	0	0	15	0	41	1	0	0
	6/21	47°34N	179°56W	LL	1	3	1	8	0	0	0	3	1	6	0	0	0
	6/22	48°30N	180°00	LL	2	14	2	15	0	0	0	11	1	12	0	0	0
	6/23	49°30N	180°00	LL	14	58	4	17	0	2	0	14	44	2	15	0	2
6/24	50°30N	180°00	LL	14	22	0	0	0	0	0	12	18	0	0	0	0	

Table 3. (continued)

Region/ Vessel	Date	Latitude	Longitude	Gear	Number of fish caught						Number of fish released							
					Sock	Chum	Pink	Coho	Chin	Steel	Dolly	Sock	Chum	Pink	Coho	Chin	Steel	Dolly
CNP	Total				164	554	91	154	7	4	0	32	166	7	124	3	4	0
BS	6/2	55°00N	170°00W	T	27	35	8	0	66	0	0	0	0	0	0	0	0	0
<i>Kaiyo maru</i>	6/2	54°00N	170°00W	T	23	32	25	0	1	0	0	0	0	0	0	0	0	0
	6/2	54°00N	170°00W	HL	3	4	3	0	1	0	0	3	4	3	0	1	0	0
	6/3	53°00N	170°00W	T	24	90	46	0	2	0	0	0	0	0	0	0	0	0
	6/7	53°00N	175°00W	T	6	13	11	0	96	0	0	0	0	0	0	0	0	0
	6/7	54°00N	175°00W	T	13	47	37	0	14	0	0	2	1	0	0	0	0	0
	6/7	54°00N	175°00W	HL	8	4	2	0	1	0	0	8	4	2	0	1	0	0
	6/8	55°00N	175°00W	T	9	43	1	0	7	0	0	3	3	0	0	1	0	0
	6/8	55°00N	175°00W	HL	17	4	1	0	1	0	0	17	4	1	0	1	0	0
	6/9	55°30N	180°00	T	1	5	0	0	2	0	0	0	0	0	0	0	0	0
	6/9	54°30N	180°00	T	2	3	5	0	0	0	0	0	1	0	0	0	0	0
	6/9	54°30N	180°00	HL	1	0	0	0	0	0	0	1	0	0	0	0	0	0
	6/10	53°30N	180°00	T	9	27	20	0	5	0	0	0	0	0	0	0	0	0
	6/10	52°30N	180°00	T	6	26	24	0	0	0	0	0	0	0	0	0	0	0
	6/11	51°30N	180°00	T	4	27	7	0	2	0	0	0	0	0	0	0	0	0
	6/14	53°00N	175°00E	T	2	9	3	0	0	0	0	0	0	0	0	0	0	0
<i>Wakatake maru</i>	6/25	51°30 N	180°00	LL	4	24	2	1	0	0	0	4	19	2	1	0	0	0
	7/09	58°28 N	179°56E	LL	1	79	1	0	3	0	4	1	64	1	0	3	0	4
	7/10	57°30 N	179°59E	LL	14	259	4	0	5	0	2	11	132	2	0	2	0	2
	7/11	56°29 N	179°55W	LL	10	111	0	0	2	0	0	7	71	0	0	2	0	0
	7/12	55°31 N	179°57W	LL	4	28	1	0	1	0	0	3	22	1	0	0	0	0
	7/13	56°32 N	179°04E	LL	15	79	2	0	0	0	0	15	60	2	0	0	0	0
	Total				203	949	203	1	209	0	6	75	385	14	1	11	0	6
ENP	2/15	53°56N	144°46W	T	9	15	3	1	0	0	0	3	0	0	0	0	0	0
<i>Kaiyo maru</i>	2/16	53°01N	145°00W	T	14	34	0	0	0	0	0	2	0	0	0	0	0	0
	2/16	52°09N	144°58W	T	17	66	0	3	1	0	0	2	0	0	0	0	0	0
	2/17	50°52N	144°52W	T	15	133	5	3	2	0	0	3	0	0	0	0	0	0
	2/17	49°52N	144°53W	T	2	138	4	3	0	0	0	2	0	0	0	0	0	0
	2/18	48°53N	144°49W	T	4	34	0	2	0	0	0	0	0	0	0	0	0	0
	2/18	47°54N	144°49W	T	0	115	10	7	0	0	0	4	0	0	0	0	0	0
	5/26	54°00N	160°00W	T	84	44	43	0	0	0	0	0	0	0	0	0	0	0
	5/26	53°00N	160°00W	T	22	28	29	0	0	0	0	0	0	0	0	0	0	0
	5/26	53°00N	160°00W	HL	1	0	0	0	0	0	0	1	0	0	0	0	0	0
	5/27	52°00N	160°00W	T	5	3	18	0	0	0	0	0	0	0	0	0	0	0
	5/27	51°00N	160°00W	T	10	39	36	0	0	0	0	0	0	0	0	0	0	0
	5/27	51°00N	160°00W	HL	1	1	3	0	0	0	0	1	1	3	0	0	0	0
	5/28	50°00N	160°00W	T	13	33	34	0	0	0	0	0	0	0	0	0	0	0
	5/28	50°00N	160°00W	HL	2	1	13	0	0	0	0	2	1	13	0	0	0	0
	5/29	50°00N	165°00W	T	31	72	57	0	0	0	0	0	0	0	0	0	0	0
	5/29	51°00N	165°00W	T	6	114	21	1	0	0	0	0	9	1	1	0	0	0
	5/29	51°00N	165°00W	HL	0	4	1	0	0	0	0	0	4	1	0	0	0	0
	5/30	52°00N	165°00W	T	35	56	14	0	0	0	0	0	0	0	0	0	0	0
	5/30	53°00N	165°00W	T	7	83	1	0	0	0	0	2	3	0	0	0	0	0
	5/30	53°00N	165°00W	HL	3	1	0	0	0	0	0	3	1	0	0	0	0	0
	5/31	53°00N	165°00W	T	33	98	2	0	0	0	0	2	3	0	0	0	0	0
	5/31	53°00N	165°00W	HL	0	1	0	0	0	0	0	0	1	0	0	0	0	0
	Total				314	1113	294	20	3	0	0	27	23	18	1	0	0	0
Total					862	2916	1920	176	224	4	6	135	574	46	126	14	4	6

Table 4. Tag numbers of disk tags and archival tags released in 2006. BS: Bering Sea, WNP: western North Pacific, CNP: central North Pacific, ENP: eastern North Pacific.

Region	Date	Location		Disk tag			Archival tag		
				FAJ tag	FRI tag	No. fish	Tag No.	No. fish	
WNP	1/28	42°00N	155°00E	Z7901-7905	NN0721-0725	5		0	
	2/01	43°00N	165°00E	Z7906, 7907, 7915	NN0726, 0727, 0735	3		0	
	Total			Z7901-7907, 7915	NN0721, 0727, 0735	8		0	
CNP	6/04	50°00N	170°00W	Z7865-7870	NN0809-0814	6		0	
	6/05	50°00N	175°00W	Z7871	NN0815	1		0	
	6/06	52°30N	175°00W	Z7872	NN0816	1		0	
	6/14	41°00N	180°00	MM4001	LL6901	1		0	
	6/15	42°00N	180°00	MM4002-4004	LL6902-6904	3		0	
	6/16	43°00N	180°00	MM4005-4066	LL6905-6966	62		0	
	6/17	44°00N	180°00	MM4067-4090	LL6967-6990	24		0	
	6/18	45°00N	180°00	MM4091-4102	LL6991-7002	12		0	
	6/19	46°00N	180°00	MM4103-4127	LL7003-7027	25		0	
	6/20	47°00N	180°00	MM4128-4184	LL7028-7084	57		0	
	6/21	47°30N	180°00	MM4185-4195	LL7085-7095	11		0	
	6/22	48°30N	180°00	MM4196-4221	LL7096-7121	26		0	
	6/23	49°30N	180°00	MM4222-4298	LL7122-7198	77		0	
	6/24	50°30N	180°00	MM4299-4328	LL7199-7228	30		0	
Total			Z7865-7872 MM4001-4328	NN0809-0816 LL6901-7228	336		0		
BS	6/02	54°00N	170°18W	Z7854-7864	NN0798-0808	11	LTD7467, 8105, 9427, 9476, 10651	5	
	6/07	54°00N	175°01W	Z7873-7890	NN0817-0834	18	LTD10635, 10636, 10640, 10642, 10643, 10644, 10645, 10648	9	
	6/08	54°50N	175°08W	Z7891-7900	NN0835-0863	30	LTD10634, 10638, 10639, 10641, 10650, CTD1899	6	
	6/09	54°31N	180°00	Not used	NN0864-0865	2		0	
	6/25	51°30N	180°00	MM4329-4354	LL7229-7254	26		0	
	7/09	58°30N	180°00	MM4355-4427	LL7255-7327	73		0	
	7/10	57°30N	180°00	MM4428-4576	LL7328-7476	149		0	
	7/11	56°30N	180°00	MM4577-4656	LL7477-7499, LL8500-8556	80		0	
	7/12	55°30N	180°00	MM4657-4682	LL8557-8582	26		0	
	7/13	56°30N	179°00E	MM4683-4759	LL8583-8659	77		0	
	Total			Z7854-7900, MM4329-4759	NN0798-0865, LL7229-7449, LL8500-8659	492		20	
	ENP	2/15	54°00N	145°00W	Z7908-7910	NN0728-0730	3		0
		2/16	53°00N	145°00W	Z7911, 7912	NN0731, 0732	2		0
2/16		52°00N	145°00W	Z7913, 7914	NN0733, 0734	2		0	
2/17		50°00N	154°00W	Z7916-7918	NN0736-0738	3		0	
2/17		51°00N	145°00W	Z7919, 7920	NN0739, 0740	2		0	
2/18		48°00N	145°00W	Z7921-7924	NN0741-0743	4		0	
5/26		52°55N	160°13W	Z7801	NN0745	1		0	
5/27		51°00N	160°01W	Z7802-7806	NN0746-0750	5		0	
5/28		49°55N	160°13W	Z7807-7822	NN0751-0766	16	LTD5980, 5996	2	
5/29		50°51N	165°01W	Z7823-7838	NN0767-0782	16	LTD7469, 8106	2	
5/30		52°55N	164°52W	Z7839-7847	NN0783-0791	9		0	
5/31		53°37N	164°48W	Z7848-7853	NN0792-0797	6		0	
Total			Z7801-7853, Z7908-7914, Z7916-7924	NN0728-0734, NN0736-0743, NN0746-0797	69		4		
Total				905			24		

Table 5. Location and biological data for fin-clipped salmonids caught by Japanese salmon research vessels in 2006. LL, longline, - not available.

Research vessel	Date	Location		Mesh (mm)	Species	Fork length (mm)	Body weight (g)	Sex	Gonad weight (g)	Clipped fin
<i>Wakatake</i>	6/17/06	43°00N	180°00	115	steelhead	560	1780	M	2	Adipose
<i>maru</i>	6/18/06	44°00N	180°00	115	steelhead	574	1780	F	3	Adipose
	6/18/06	44°00N	180°00	157	steelhead	800	5500	M	3	Adipose
	6/18/06	45°00N	180°00	LL	steelhead	522	-	-	-	Adipose*
	6/20/06	46°00N	180°00	121	steelhead	690	3470	M	13	Adipose
	6/20/06	46°00N	180°00	115	steelhead	592	1940	F	3	Adipose
	6/20/06	46°00N	180°00	115	steelhead	547	1760	M	1	Adipose
	6/20/06	46°00N	180°00	115	steelhead	689	2910	F	19	Adipose
	6/21/06	47°00N	180°00	93	steelhead	642	2390	F	9	Adipose
	6/21/06	47°00N	180°00	106	steelhead	569	1840	M	1	Adipose
	6/21/06	47°00N	180°00	106	steelhead	560	1730	F	5	Adipose
	6/21/06	47°00N	180°00	106	steelhead	683	2970	F	25	Adipose
	6/21/06	47°00N	180°00	121	steelhead	694	2850	M	3	Adipose
	6/21/06	47°00N	180°00	115	steelhead	562	1920	M	1	Adipose
	6/21/06	47°00N	180°00	115	steelhead	642	2650	M	2	Adipose
	6/21/06	47°00N	180°00	115	steelhead	636	2760	F	27	Adipose
	6/21/06	47°00N	180°00	115	steelhead	535	1570	F	3	Adipose
	6/21/06	47°00N	180°00	115	steelhead	690	3330	F	22	Adipose
	6/21/06	47°00N	180°00	115	steelhead	723	3600	M	18	Adipose
	6/21/06	47°00N	180°00	115	steelhead	685	3050	F	5	Adipose
	6/22/06	47°30N	180°00	138	steelhead	668	2990	F	34	Adipose
	6/22/06	47°30N	180°00	115	steelhead	702	3260	F	30	Adipose
	6/22/06	47°30N	180°00	115	steelhead	660	2800	F	24	Adipose
	6/22/06	47°30N	180°00	115	steelhead	656	2750	F	30	Adipose
<i>Oshoro</i>	7/03/06	50°00N	165°00W	115	steelhead	530	1515	M	3	Adipose
<i>maru</i>	7/03/06	50°00N	165°00W	115	steelhead	741	4744	F	48	Adipose
	7/03/06	50°00N	165°00W	82	steelhead	567	1833	M	1	Adipose
	7/03/06	50°00N	165°00W	82	steelhead	500	1245	M	1	Adipose

* released with disk tag # MM4099 and LL6999.