

**Recoveries of High-Seas Tags in Japan in 2001, and Tag  
Releases and Recoveries of Fin-Clipped Salmon from  
Japanese Research Vessel Surveys in the North Pacific Ocean  
in the summer of 2002**

by

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# **Recoveries of High-Seas Tags in Japan in 2001, and Tag Releases and Recoveries of Fin-Clipped Salmon from Japanese Research Vessel Surveys in the North Pacific Ocean in the summer of 2002**

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## **ABSTRACT**

In the fall of 2001, twenty-nine tagged chum salmon were recovered along the Japanese coast and five tagged salmon were recovered in Russia from releases of tagged fish in the Bering Sea and the central North Pacific. Recoveries included one fish with an internal archival tag, one fish with an external archival tag, and thirty-two fish only with disk tags. The tag recovery rate for chum salmon in 2001 (6.5%) was higher than rates from 1995 to 2000 (1.4-3.3%) except for 1998 (8.8%). In the summer of 2002, two Japanese salmon research vessels conducted 31 longline and 2 hook-and-line operations in the North Pacific Ocean and the Bering Sea. A total of 39 salmonids (2 sockeye, 18 chum, 2 pink, 15 coho salmon, and 2 steelhead trout) in the central North Pacific, 1,003 salmon (26 sockeye, 956 chum, and 21 chinook salmon) in the Bering Sea, and 2 salmon (1 chum and 1 pink) in the eastern North Pacific were tagged with two disk tags (Fisheries Agency of Japan and Fisheries Research Institute) and released. Of these fish, 25 salmonids with temperature tags (IB), 25 salmonids with temperature-depth tags (LTD), and six chum salmon double-tagged with both IB and LTD tags were released in the central and eastern North Pacific and Bering Sea. In addition, 30 chum salmon were released in the Bering Sea with data storage tags that record fish swimming speed (PDT). During research surveys in the summer of 2002, Japanese salmon research vessels recovered 35 salmonids lacking the adipose fin.

## INTRODUCTION

Japanese and U.S. cooperative high-seas tagging experiments were conducted in 2001 and 2002. In this report, we summarize tags recovered from salmon that returned to Japanese coastal areas and to Russia in the fall of 2001, and releases of high seas tags and recoveries of fin-clipped salmonids collected by Japanese salmon research vessel surveys in the North Pacific Ocean during the summer of 2002.

## MATERIALS AND METHODS

### Recovery of high seas tags in 2001

In June and July 2001, 156 salmonids (21 sockeye, 72 chum, 21 pink, 39 coho salmon, and 3 steelhead trout) in the central North Pacific, 541 salmonids (11 sockeye, 406 chum, 120 pink, and 4 chinook salmon) in the Bering Sea, and 60 salmonids (10 sockeye, 8 chum, 13 pink, 25 coho, 2 chinook salmon, and 2 steelhead trout) in the eastern North Pacific were tagged and released by two Japanese salmon research vessels, the *Wakatake maru* and *Oshoro maru* (Fukuwaka et al. 2001). Of these fish, 70 salmonids with externally-attached temperature-depth (LTD tag) tags were released in the central, eastern North Pacific and the Bering Sea, and 7 chum salmon with internally-inserted archival tags (AT tag) were released in the 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 Fisheries Research Institute, University of Washington (FRI). 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. Two types of archival tags were used in 2001 (Fukuwaka et al. 2001, Walker et al. 2001). One type of archival tag, referred to as a LTD tag in this report records seawater temperature and depth. Two sizes of this tag were used. Fourteen large LTD tags (30 X 23 X 8 mm) manufactured by Conservation Devices, Belmont, MA, were used. These tags are no longer manufactured, however, and a new, smaller version (28 X 16 X 8 mm) is currently available and 11 of these smaller tags were also used to tag salmon. The small LTD tags are model LTD 1100 and they are manufactured by Lotek Marine Technologies, Newfoundland, Canada. A second type of archival tag, referred to as an AT tag, in this report, records the fish's internal temperature, seawater temperature, light levels (for location), and depth. Lotek Marine Technologies also manufactures the AT tag. This tag was used by the Hokkaido

National Fisheries Research Institute (HNFRI) and was inserted into the peritoneal cavity of fish.

The National Salmon Resources Center collected archival tags, disk tags, and data on recovery locations from salmon hatcheries, private fishermen, fishing cooperative unions, or prefectural governments along the coast of northern Japan from chum salmon that returned to Japan coastal areas in the fall of 2001.

We compared tag recovery rates (number of recovered fish / number of released fish) from 1995 to 2001 using data from tagging experiments conducted by the *Wakatake 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. 1999-2001).

### **Releases of high seas tags in 2002**

In June and July of 2002, two Japanese research vessels, the *Wakatake maru* and *Oshoro maru*, conducted 31 longline (830 hachi) and 2 hook-and-line operations to attach archival and disk tags on salmonids. The disk tags used in 2002 were the same types used in 2001. Three types of externally-attached archival tags were used (Tanaka et al. 2002, Walker et al. 2002). One tag, used by FRI, is manufactured by Lotek Marine Technologies (model LTD\_1100-300) and records temperature and depth data. Another tag used by FRI is a Thermonchron iButton data storage device, manufactured by Dallas Semiconductor, Inc., and repackaged for fish tagging by AlphaMach, Inc. (model iB4). These tags record temperature data only. Both FRI tags were attached externally in the dorsal musculature of the fish anterior to the dorsal fin. A third type of archival tag manufactured by the Little Leonard Ltd., Tokyo, Japan (model W190L-PDT), records the seawater temperature, swimming speed, and depth (Tanaka et al. 2001).

### **Collection of snouts from adipose fin-clipped salmonids in 2002**

Four salmon research vessels, the *Wakatake maru*, *Oshoro maru*, *Kaiun maru* and *Kaiyo maru*, caught 13,570 salmonids in the central North Pacific, the Bering Sea, and the Gulf of Alaska from June through August, 2002. Salmon lacking the adipose fin were recovered during biological measurements. Snout samples were collected from these fish for later examination for coded-wire tags (CWT).

## RESULTS

### **Recovery of high seas tags in 2001**

In the fall of 2001, twenty-nine tagged chum salmon were recovered from areas along the coast of Japan, and five tagged salmon were recovered along the coast of Russia (Table 1). Recoveries included one fish recovered with an internal AT tag, one fish with an external LTD tag, and thirty-two fish with only disk tags. The tag recovery rate for chum salmon in 2001 (6.5%) was higher than rates from 1995 to 2000 (1.6-3.3%) except for 1998 (8.8%, Table 2).

### **Releases of high seas tags in 2002**

In June and July 2002, 39 salmonids (2 sockeye, 18 chum, 2 pink, 15 coho salmon, and 2 steelhead trout) in the central North Pacific, 1,003 salmon (26 sockeye, 956 chum, and 21 chinook salmon) in the Bering Sea, and 2 salmon (1 chum and 1 pink salmon) in the eastern North Pacific were tagged and released by two Japanese research vessels, the *Wakatake maru*, and *Oshoro maru* (Table 3). Of these fish, 25 salmonids with IB temperature tags, 25 salmonids with LTD temperature-depth tags, and six chum salmon double-tagged with both IB and LTD tags were released in the central and eastern North Pacific and Bering Sea. In addition, 30 chum salmon were released in the Bering Sea with PDT swimming-speed recording tags (Table 4).

### **Collection of snouts from adipose fin-clipped salmonids in 2002**

Thirty-five fin-clipped steelhead trout were recovered by Japanese salmon research vessels (Table 5). Snout samples were collected from fin-clipped steelhead trout and provided to the U.S. for inspection for CWTs.

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Table 1. Releases in 2001 and recoveries of high-seas tagged salmon returning to Japan and Russia in the fall of 2001. A hyphen indicates the information is not available. 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, BW: body weight, River: any gears used in rivers but not identified.

Japan tag #	U.S. tag #	Archival tag #	Release						Recovery							
			Date	Lat	Long	Species	FL	Age	Date	Lat	Long	Gear	Sex	FL	BW	Location
LL3096	LL4096	-	Jun 23	47°30N	180°00	chum	550	0.3	Oct 1	43°33N	145°21E	Setnet	-	-	-	Nemuro St. Hokkaido
LL3109	LL4109	-	Jun 24	48°30N	180°00	sockeye	524	2.2	-	51°23N	156°30E	River	-	-	-	Ozernaya R. W. Kamchatka
LL3117	LL4117	-	Jun 24	48°30N	180°00	pink	445	0.1	-	58°00N	164°00E	River	-	-	-	Drauka R. Karaginskiy
LL3135	LL4135	-	Jun 25	49°30N	180°00	chum	643	0.2	Sep 14	43°42N	145°06E	Setnet	M	605	2400	Nemuro St. Hokkaido
LL3140	LL4140	LTD1112	Jun 26	50°30N	180°00	sockeye	663	1.3	Aug 16	56°10N	162°30E	River	-	-	-	Kamchatka R. E. Kamchatka
LL3177	LL4177	-	Jun 29	53°30N	180°00	chum	505	0.3	late Sep	51°50N	143°10E	River	M	650	3160	Tym R. Sakhalin
LL3191	LL4191	-	Jun 29	53°30N	180°00	chum	556	0.3	Sep 5	42°12N	143°19E	Setnet	M	500	3000	Pacific C. Hokkaido
LL3225	LL4225	AT1601	Jun 30	54°30N	180°00	chum	630	0.4	Sep 30	44°00N	144°55E	Setnet	M	670	3500	Okhotsk Sea C. Hokkaido
LL3252	LL4252	-	Jul 1	55°30N	180°00	chum	567	0.3	Sep 5	44°04N	145°14E	Setnet	M	605	2350	Nemuro St. Hokkaido
LL3276	LL4276	-	Jul 1	55°30N	180°00	chum	572	0.3	Oct 22	40°31N	141°35E	Setnet	F	-	-	Pacific C. Aomori
LL3291	LL4291	-	Jul 1	55°30N	180°00	chum	601	0.4	Sep 28	44°57N	142°34E	Setnet	M	-	-	Okhotsk Sea C. Hokkaido
LL3294	LL4294	-	Jul 1	55°30N	180°00	chum	606	0.3	Sep 19	44°23N	143°17E	Setnet	-	656	3443	Okhotsk Sea C. Hokkaido
LL3303	LL4303	-	Jul 2	56°30N	180°00	chum	676	0.4	Sep 8	42°24N	143°23E	Setnet	M	700	4000	Pacific C. Hokkaido
LL3307	LL4307	-	Jul 2	56°30N	180°00	chum	606	0.3	Sep 28	42°13N	143°19E	Setnet	M	600	3400	Pacific C. Hokkaido
LL3325	LL4325	-	Jul 3	57°30N	180°00	chum	630	0.4	Sep 21	44°56N	144°30E	Setnet	M	680	3500	Okhotsk Sea C. Hokkaido
LL3329	LL4329	-	Jul 4	58°30N	180°00	chum	636	0.4	Sep 1	42°12N	143°19E	Setnet	M	600	4000	Pacific C. Hokkaido
LL3379	LL4379	-	Jul 5	57°30N	179°00W	chum	612	0.3	Oct 8	43°48N	145°04E	Setnet	M	-	-	Nemuro St. Hokkaido
LL3380	LL4380	-	Jul 5	57°30N	179°00W	chum	592	0.3	Sep 21	39°10N	141°54E	Setnet	M	650	2600	Pacific C. Iwate
LL3391	LL4391	-	Jul 5	57°30N	179°00W	chum	544	0.3	Sep 22	44°50N	142°39E	Setnet	M	570	1700	Okhotsk Sea C. Hokkaido
LL3393	LL4393	-	Jul 5	57°30N	179°00W	chum	560	0.3	Oct 1	44°20N	143°10E	Setnet	M	610	2600	Okhotsk Sea C. Hokkaido
LL3400	LL4400	-	Jul 5	57°30N	179°00W	chum	636	0.4	-	-	-	-	-	-	-	Russia
LL3405	LL4405	-	Jul 5	57°30N	179°00W	chum	554	0.3	Sep 21	44°20N	143°10E	Setnet	M	635	2600	Okhotsk Sea C. Hokkaido
LL3489	LL4489	-	Jul 6	57°30N	178°00W	chum	590	0.3	Sep 20	43°38N	145°10E	Setnet	M	660	3000	Nemuro St. Hokkaido
LL3550	LL4550	-	Jul 7	56°30N	178°00W	chum	567	0.3	Sep 25	43°37N	145°11E	Setnet	-	-	-	Nemuro St. Hokkaido
LL3552	LL4552	-	Jul 7	56°30N	178°00W	chum	545	0.2	Oct 4	44°08N	145°05E	Setnet	-	-	-	Okhotsk Sea C. Hokkaido
LL3587	LL4587	-	Jul 9	56°30N	179°00E	chum	576	0.3	Oct 8	42°36N	141°30E	Setnet	F	620	3000	Pacific C. Hokkaido
LL3591	LL4591	-	Jul 9	56°30N	179°00E	chum	584	0.4	Sep 24	44°12N	143°41E	Setnet	-	550	2700	Okhotsk Sea C. Hokkaido
LL3596	LL4596	-	Jul 9	56°30N	179°00E	chum	606	0.3	Oct 1	44°20N	145°19E	Setnet	M	640	3200	Okhotsk Sea C. Hokkaido
LL3603	LL4603	-	Jul 9	56°30N	179°00E	chum	586	0.3	Sep 25	43°37N	145°11E	Setnet	-	-	-	Nemuro St. Hokkaido
LL3607	LL4607	-	Jul 10	56°30N	178°00E	chum	628	0.3	Oct 16	43°59N	144°18E	Setnet	F	600	4000	Okhotsk Sea C. Hokkaido
LL3609	LL4609	-	Jul 10	56°30N	178°00E	chum	600	0.3	Oct 27	42°49N	141°39E	River	F	650	2900	Chitose R. Hokkaido
LL3619	LL4619	-	Jul 11	56°30N	177°00E	chum	650	0.4	Oct 1	42°11N	140°25E	Setnet	M	670	3400	Pacific C. Hokkaido
LL3651	LL4651	-	Jul 11	56°30N	177°00E	chum	553	0.3	Sep 25	43°33N	145°21E	Setnet	-	590	2100	Nemuro St. Hokkaido
LL3662	LL4662	-	Jul 12	57°30N	177°00E	chum	550	0.3	Sep 27	43°37N	145°12E	Setnet	F	595	2350	Nemuro St. Hokkaido



Table 2. Number of tagged chum salmon released in the Bering Sea and the central North Pacific by the research vessel *Wakatake maru*, and recovered along the Japanese coast and in Russia in 1995-2001. 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)	29 (1)	7.1 (14.3)
	Central North Pacific	72	2	2.8
	Total	478 (7)	31 (1)	6.5 (14.3)

Table 3. Number of salmon caught by longline and hook-and-line operations, and number of fish tagged and released by the research vessel *Wakatake maru* and *Oshoro maru* in the summer of 2002. H&L: hook-and-line operation.

Region	Vessel	Date	Location	Hachi	Number of fish caught						Number of fish released					
					Sock	Chum	Pi	Coho	Chin	Steel	Sock	Chum	Pink	Coho	Chin	Steel
Central		Jun 15	40°59N 180°00	30	0	0	0	0	0	0	0	0	0	0	0	0
North		Jun 16	41°57N 179°56W	30	0	0	0	0	0	0	0	0	0	0	0	0
Pacific		Jun 17	42°59N 179°59W	30	0	7	0	0	0	0	0	0	0	0	0	0
		Jun 18	43°58N 179°54W	30	0	2	1	0	0	0	0	0	1	0	0	0
<i>Wakatake maru</i>		Jun 19	44°57N 179°59W	30	0	7	0	15	0	2	0	1	0	11	0	2
		Jun 20	45°58N 179°55W	30	0	14	1	4	0	0	0	1	0	3	0	0
		Jun 22	46°58N 179°56W	30	0	3	1	0	0	0	0	0	1	0	0	0
		Jun 23	47°29N 180°00	30	0	10	0	0	0	0	0	1	0	0	0	0
		Jun 24	48°30N 179°59W	30	0	14	0	0	0	0	0	5	0	0	0	0
		Jun 25	49°30N 180°00	30	3	9	1	1	0	0	2	3	0	1	0	0
		Jun 26	50°30N 180°00	30	2	15	0	0	0	0	0	7	0	0	0	0
		Total			330	5	81	4	20	0	2	2	18	2	15	0
Bering Sea		Jun 27	51°29N 180°00	30	5	7	0	0	0	0	3	0	0	0	0	0
		Jun 28	52°30N 180°00	30	2	17	0	0	0	0	1	7	0	0	0	0
		Jun 29	53°30N 180°00	30	0	16	0	0	0	0	0	8	0	0	0	0
<i>Wakatake maru</i>		Jun 30	54°30N 179°59W	30	3	249	0	0	0	0	2	130	0	0	0	0
		Jul 1	55°30N 179°56W	30	0	269	1	0	0	0	0	164	0	0	0	0
		Jul 2	56°30N 179°54W	30	0	37	0	0	0	0	0	18	0	0	0	0
		Jul 3	57°29N 179°58W	30	0	48	0	0	0	0	0	24	0	0	0	0
		Jul 4	58°30N 179°55W	30	0	63	0	0	0	0	0	34	0	0	0	0
		Jul 5	57°30N 178°55W	30	3	163	0	0	1	0	3	73	0	0	1	0
		Jul 6	57°32N 177°48W	30	8	245	0	0	10	0	8	124	0	0	8	0
		Jul 7	56°30N 177°58W	30	0	100	0	0	5	0	0	67	0	0	5	0
		Jul 8	56°32N 178°53W	30	2	166	0	0	9	0	1	94	0	0	7	0
		Jul 9	56°30N 179°06E	30	3	247	0	0	0	0	3	123	0	0	0	0
		Jul 10	56°32N 178°02E	30	7	154	0	0	0	0	4	75	0	0	0	0
	Jul 11	56°32N 177°04E	30	1	105	0	0	0	0	1	15	0	0	0	0	
	Total			450	34	1886	1	0	25	0	26	956	0	0	21	0
Eastern North Pacific		Jul 18	50°00N 145°00W	10	0	0	0	0	0	0	0	0	0	0	0	0
		Jul 20	51°01N 144°56W	10	0	0	0	0	0	0	0	0	0	0	0	0
		Jul 22	53°05N 144°55W	10	0	1	0	0	0	0	0	0	0	0	0	0
<i>Oshoro maru</i>		Jul 22	54°00N 145°00W	H&L	0	1	0	0	0	0	0	1	0	0	0	0
		Jul 23	54°00N 145°01W	10	0	0	0	0	0	0	0	0	0	0	0	0
		Jul 23	55°00N 145°00W	H&L	0	0	1	0	0	0	0	0	1	0	0	0
		Jul 24	55°03N 144°53W	10	0	0	0	0	0	0	0	0	0	0	0	0
	Total			50	0	2	1	0	0	0	1	1	0	0	0	
<b>Total</b>				<b>830</b>	<b>39</b>	<b>1969</b>	<b>6</b>	<b>20</b>	<b>25</b>	<b>2</b>	<b>28</b>	<b>975</b>	<b>3</b>	<b>15</b>	<b>21</b>	<b>2</b>

Table 4. Tag numbers of disk tags and archival tags released by the research vessels *Wakatake maru* and *Oshoro maru* in summer of 2002.

Region	Vessel	Date	Location	Disk tag			Archival tag	
				FAJ tag	FRI tag	No. fish	Tag No.	No. fish
Central Pacific	Jun 18	43°58N 179°54W	Y9051	LL5051	1		0	
North Pacific	Jun 19	44°57N 179°59W	Y9052-9065	LL5052-5065	14	IB1, 2	2	
	Jun 20	45°58N 179°55W	Y9066-9069	LL5066-5069	4		0	
	Jun 22	46°58N 179°56W	Y9070	LL5070	1		0	
	Jun 23	47°29N 180°00	Y9071	LL5071	1		0	
	Jun 24	48°30N 179°59W	Y9072-9076	LL5072-5076	5	IB3, 4	2	
	Jun 25	49°30N 180°00	Y9077-9082	LL5077-5082	6	LTD1318, 1320	2	
	Jun 26	50°30N 180°00	Y9083-9089	LL5083-5089	7	IB5	1	
	Total		Y9051-9089	LL5051-5089	39		7	
Bering Sea	Jun 27	51°29N 180°00	Y9090-9092	LL5090-5092	3	IB6, LTD1322	2	
	Jun 28	52°30N 180°00	Y9093-9100	LL5093-5100	8	IB16-18; LTD1327	4	
	Jun 29	53°30N 180°00	Y9101-9108	LL5101-5108	8	PDT1	1	
	Jun 30	54°30N 179°59W	Y9109-9240	LL5109-5240	132	LTD1331, 1332; PDT2, 3	4	
	Jul 1	55°30N 179°56W	Y9241-9404	LL5241-5404	164	PDT4, 5	2	
	Jul 2	56°30N 179°54W	Y9405-9423 <sup>1</sup>	LL5405-5423 <sup>1</sup>	18	IB19; PDT6-9	5	
	Jul 3	57°29N 179°58W	Y9424-9447	LL5424-5447	24	IB20; LTD1334; PDT10-12	4	
	Jul 4	58°30N 179°55W	Y9448-9481	LL5448-5481	34	PDT13, 14	2	
	Jul 5	57°30N 178°55W	Y9482-9563 <sup>2</sup>	LL5482-5563 <sup>2</sup>	77	IB7-11, 26; LTD1364, 1365, LTD1373; PDT15-17	11	
	Jul 6	57°32N 177°48W	Y9564-9703	LL5564-5703	140	IB12-15, 21-25; PDT18-20	12	
	Jul 7	56°30N 177°58W	Y9704-9775	LL5704-5775	72	LTD1392, 1432-1434, 1454; PDT21	6	
	Jul 8	56°32N 178°53W	Y9776-9877	LL5776-5877	102	IB27, 28; LTD1398, 1401, 1403, LTD1417, 1437, 1444, 1465, LTD1475, 1477, 1478; PDT22-25	14	
	Jul 9	56°30N 179°06E	Y9878-9999	LL5878-5999	126	IB 29, 30; LTD1562, 1565, 1583; PDT26-28	6	
		56°32N 178°02E	Y1801-1805	LL5001-5005				
	Jul 10	56°32N 177°04E	Y1806-1884	LL5006-5049 <sup>3</sup>	79	LTD1585, 1586; PDT29, 30	4	
	Jul 11	51°29N 180°00	Y1885-1900		16		0	
	Total		Y9090-9999	LL5090-5999	1003		77	
			Y1801-1901	LL5001-5049				
Eastern North Pacific	Jul 22	54°00N 145°00W	AA1571	LL4871	1	IB G13	1	
	Jul 23	55°00N 145°00W	AA1572	LL4872	1	LTD 1587	1	
	Total		AA1571-1572	LL4871-4872	2		2	
Total					1044		86	

<sup>1</sup> Y9416, LL5416 not used.

<sup>2</sup> Y9484, Y9485, Y9490, Y9493, Y9500, LL5484, LL8485, LL5490, LL5493, LL5500 not used.

<sup>3</sup> ran out of FRI tags. Thus, 21 fish were released without FRI tags.

Table 5. Location and biological data for recovered fin-clipped salmonids caught by Japanese salmon research vessels in the summer of 2002. Ad: adipose fin, LV: left ventral fin, Do: dorsal fin.

Research vessel	Date	Location		Mesh (mm)	Species	Fork length (mm)	Body weight (g)	Sex	Gonad weight (g)	Clipped fin
<i>Wakatake maru</i>	Jun 18	43°00N	180°00	115	steelhead	576	1760	Male	5	Ad
	Jun 19	44°00N	180°00	106	steelhead	540	1620	Female	5	Ad, LV, Do
	Jun 19	44°00N	180°00	115	steelhead	555	1630	Female	4	Ad
	Jun 19	44°00N	180°00	115	steelhead	582	1840	Male	2	Ad
	Jun 19	44°00N	180°00	115	steelhead	609	2050	Female	4	Ad
	Jun 23	47°00N	180°00	115	steelhead	558	1780	Male	5	Ad
	Jun 23	47°00N	180°00	115	steelhead	766	4800	Male	25	Ad
	Jun 23	47°00N	180°00	115	steelhead	764	4600	Female	50	Ad
	Jun 23	47°00N	180°00	138	steelhead	579	1920	Female	8	Ad
	Jun 23	47°00N	180°00	157	steelhead	693	3650	Female	43	Ad
	Jun 23	47°00N	180°00	157	steelhead	847	5950	Male	6	Ad
	Jun 23	47°00N	180°00	106	steelhead	551	1800	Male	13	Ad
<i>Oshoro maru</i>	Jul 18	50°00N	144°59W	121	steelhead	560	2400	Female	9	Ad
	Jul 20	51°00N	145°00W	72	steelhead	332	350	Male	1	Ad
	Jul 22	53°01N	145°00W	115	steelhead	710	3500	Female	36	Ad
	Jul 22	53°01N	145°00W	115	steelhead	322	370	Male	2	Ad
	Jul 22	53°01N	145°00W	121	steelhead	710	3050	Male	12	Ad
	Jul 22	53°01N	145°00W	63	steelhead	314	310	Male	1	Ad
	Jul 23	54°00N	145°01W	121	steelhead	584	2280	Male	4	Ad
	Jul 23	54°00N	145°01W	55	steelhead	324	355	Female	3	Ad
	Jul 23	54°00N	145°01W	63	steelhead	322	330	Male	1	Ad
	Jul 23	54°00N	145°01W	63	steelhead	332	375	Female	2	Ad
	Jul 23	54°00N	145°01W	63	steelhead	316	270	Male	1	Ad
	Jul 23	54°00N	145°01W	63	steelhead	312	290	Male	1	Ad
	Jul 23	54°00N	145°01W	72	steelhead	480	1120	Female	8	Ad
	Jul 24	55°00N	144°59W	72	steelhead	322	360	Female	1	Ad
	Jul 24	55°00N	144°59W	72	steelhead	353	435	Male	1	Ad
	Jul 24	55°00N	144°59W	72	steelhead	349	500	Male	1	Ad
	Jul 24	55°00N	144°59W	72	steelhead	372	520	Male	2	Ad
	Jul 24	55°00N	144°59W	82	steelhead	458	1880	Female	130	Ad
	Jul 24	55°00N	144°59W	93	steelhead	567	2240	Male	61	Ad
	Jul 24	56°00N	145°00W	63	steelhead	334	340	Male	1	Ad
Jul 24	56°00N	145°00W	72	steelhead	330	440	Female	4	Ad	
Jul 24	56°00N	145°00W	93	steelhead	444	920	Male	2	Ad	
Jul 24	56°00N	145°00W	121	steelhead	362	440	Male	5	Ad	