NPAFC
Doc. 904
Rev. _____

Releases and Recoveries of U.S. and NPRB Salmonid Data Storage Tags, and Recoveries of High Seas Tags in North America and Russia, 2005

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submitted to the
NORTH PACIFIC ANADROMOUS FISH COMMISSION
by
THE UNITED STATES OF AMERICA

October 2005

THIS PAPER MAY BE CITED IN THE FOLLOWING MANNER:
Walker, R.V., N.D. Davis, K.W. Myers, J.H. Helle, M. Fukuwaka, S. Urawa, V.I. Karpenko, A.B. Dekshtein, and S. Zolotukhin. 2005. Releases and recoveries of U.S. and NPRB salmonid data storage tags, and recoveries of high seas tags in North America and Russia, 2005. (NPAFC Doc. 904.) 20 p. SAFS-UW-0504. School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA.

RELEASES AND RECOVERIES OF U.S. AND NPRB SALMONID DATA STORAGE TAGS, AND RECOVERIES OF HIGH SEAS TAGS IN NORTH AMERICA AND RUSSIA, 2005

ABSTRACT

Information is reported on all high-seas salmon tags recovered in North America from 1 October 2004 through 30 September 2005, and all releases and recoveries of U.S. and NPRB-funded data storage tags (DSTs). One hundred thirty-eight DSTs, which record temperature, depth, and geoposition based on light data, salinity, temperature, and depth, temperature and depth, or temperature-only data, were placed on Pacific salmon in the central North Pacific Ocean and Bering Sea during a research cruise aboard a Japanese vessel in June and July 2005. During the cruise 63 sockeye, 24 chum, 33 pink, 13 coho, and 5 chinook salmon were tagged with DSTs.

Twenty-two recoveries of fish tagged with DSTs are reported, two from North America, 18 from Japan, and two from Russia. Notable distribution data includes a slight eastward range extension for maturing northern Okhotsk Sea coast chum salmon in the Bering Sea. Notable data tag recoveries include the first recovery for Russian salmon from the northern Okhotsk Sea coast (a chum salmon) and the first recovery for a Russian coho salmon (however, this tag failed). Data from northern Okhotsk and Hokkaido chum salmon showed typical maximum vertical movements to 60-100 m with deeper (250-400 m) vertical excursions in fish entering coastal waters with higher surface temperatures near Hokkaido. Graphs of ambient temperature and pressure data from the DSTs are presented.

The most notable feature of DST recoveries from 2004 tagging was the high incidence of tag failure. Overall, seven of the 20 tags received failed completely, and two had faulty depth data. In addition, two data tags were not recovered from fish where disk tags were found.

We also include information on 13 previously unreported disk tag recoveries from previous years (12 from Russia and 1 Bering Sea recovery). These include three chum, eight pink, and two coho salmon, tagged in 1991 and 2000-2003 and recovered in those years. Recovery of a tag from an Okhotsk chum salmon provided a western range extension for immature fish of that region in the Bering Sea. The remaining Russian fish were recovered in eastern and western Kamchatka, Sakhalin Island, and unknown areas of the Russian Far East.

INTRODUCTION

Information is reported on all high-seas salmon (*Oncorhynchus* spp.) tags recovered in North America from 1 October 2004 through 30 September 2005, and all releases and recoveries of U.S. data storage tags (DSTs) and DSTs funded by the North Pacific Research Board (NPRB). The School of Aquatic and Fishery Sciences (SAFS), University of Washington, serves as a processing center for all North American recoveries of Canadian, Japanese, Russian, and U.S. high-seas salmon tags, and recoveries of U.S. and NPRB high-seas salmon tags and DSTs by all nations.

Releases and recoveries of all U.S. and NPRB DSTs are reported, in order to have a complete record in one document. (Releases of U.S. DSTs from Japanese vessels and recoveries in Asia are also reported in Fukuwaka et al. 2005.) Graphs of ambient temperature and pressure data from recovered DSTs are presented where data are available.

MATERIALS AND METHODS

Fish were captured for tagging by research longline on a Japanese vessel in 2005. U.S. high-seas tags are 20 mm diameter plastic red-and-white Petersen disk tags. Four types of DSTs were used. One type is a small circuit board potted in a clear urethane, manufactured by Lotek Marine Technologies. Model LTD_1100-500 is 27 x 16 x 8 mm and weighs 5 g. These tags record temperature and depth data. Another Lotek tag, model LTD_2400, records temperature, depth, and estimated geoposition based on light data analyzed by the tag. iButton-type tags are Thermochron iButton data storage devices (DS-1921Z-F5) manufactured by Dallas Semiconductor, Inc., and repackaged in urethane for fish tagging by AlphaMach, Inc.; they record temperature data only. Model iBKrill tags are hexagonal, 25 x 13 x 8 mm and weigh 3.2 g. Model DST CTD tags are housed in a 27 x 16 x 8 mm ceramic shell and weigh 8 g. These tags, manufactured by Star-Oddi, record salinity, temperature, and depth data. LTD_1100 and iButton tags were attached to fish just anterior to the dorsal fin using two 76 or 64 mm nickel pins, with labeled U.S. and Japanese disk tags placed on the pins on the other side of the fish. DST CTD and LTD_2400 tags were attached in the same location and method, but were affixed with stainless steel or surgical wire, with a small oval plastic plate on the opposite side of the fish.

SAFS's high-seas tag processing center activities include: (1) advertising for tag recoveries, (2) returning tags and original recovery information to the appropriate release agencies, (3) mailing information on tag recoveries and a tag reward to fishermen and processors, (4) maintaining a file of original correspondence, data, and tags of all recoveries of U.S., U.S.-Russia, and Japan-U.S. tags (1956-present), (5) maintaining and updating an all-agency tag release and computer database, and (6) reporting all recoveries of U.S., U.S.-Russia, and Japan-U.S. high-seas tags to the North Pacific Anadromous Fish Commission (NPAFC). In addition, FRI scientists periodically prepare reports and maps based on historical recoveries of high-seas tags that describe the known ocean ranges of major regional stocks of Asian and North American salmonids (for example, Myers et al. 1996). The complete all-agency (Canada, Japan, Russia, and United States) high-seas tag release and recovery computer database (1954-present) is available from FRI upon request from the parties of NPAFC so that all member nations can have access to a common database.

RESULTS AND DISCUSSION

One hundred thirty-eight DSTs, were placed on Pacific salmon in the central North Pacific Ocean and Bering Sea during a research cruise aboard a Japanese vessel in June and July 2005 (Table 1). Ten DST CTDs (recording salinity, temperature, and depth data), 20 LTD_2400 (temperature, depth, and geoposition based on light), 101 LTD_1100-500 (temperature and depth), and seven iBKrill (temperature-only) tags were used. Sixty-three sockeye, 24 chum, 33 pink, 13 coho, and 5 chinook salmon were tagged with DSTs.

From 1 October 2004 through 30 September 2005, two high-seas salmon tags from recoveries in North America have been reported (Table 2): one chinook and one sockeye salmon, both tagged with DSTs. The DST was not recovered with the sockeye salmon, and the DST on the chinook salmon failed. Both fish were tagged in the previous year (2004) as immature fish, so the tag loss and failure are very unfortunate as lost opportunities to receive overwintering data. The chinook salmon was recovered at Kaltag in the Yukon River, and the sockeye salmon near Ilnik on the north coast of the Alaska Peninsula.

Twenty salmon tagged with DSTs were recovered in waters of Japan (18 chum) and Russia (1 chum and 1 coho) from tagging operations in 2004 in the Bering Sea and North Pacific (Table 2). Notable data tag recoveries from Asia include the first recovery for salmon from the northern Okhotsk Sea coast (a chum salmon) and the first recovery for a Russian coho salmon (however, this tag failed). The northern Okhotsk chum salmon recovery is only the second from that region of a fish

tagged in the Bering Sea, and is a slight eastward range extension in the Bering Sea (55°30'N, 179°58'W; previous record 55°30'N, 179°56'E). Data from the northern Okhotsk chum salmon showed typical maximum vertical movements to 60-80 m (Fig. 1). The fish passed through an area of colder surface water (6°C), similar to temperatures seen in data from tags on Hokkaido and Sakhalin chum salmon as they migrate through the Kuril islands. Data from four chum salmon returning to Hokkaido showed typical maximum vertical movements to 60-100 m with deeper (250-400 m) vertical excursions as they encountered higher surface temperatures near Hokkaido (Figs. 2-3). Temperature data patterns from six other Hokkaido chum salmon carrying temperature-only tags are similar to data from Hokkaido chum salmon with temperature and depth tags (Figs. 4-6). Of the remaining eight DSTs on Hokkaido chum salmon, five failed completely, two had faulty depth data, and one was not recovered when the disk tags on the fish were found.

The most notable feature of DST recoveries from 2004 tagging was the high incidence of tag failure. Overall, seven of the 20 tags received failed completely, and two had faulty depth data. Tags of all three types (from three different manufacturers) failed. In addition, two data tags were not recovered from fish where disk tags were found.

We also include information on 13 previously unreported disk tag recoveries from previous years (12 from Russia and 1 high seas recovery; Table 3). These include three chum, eight pink, and two coho salmon, tagged in 1991 and 2000-2003. One pink salmon was recovered by the vessel that tagged it the morning after it was released in the Bering Sea. The remaining fish were recovered in eastern and western Kamchatka (8), the western coast of the Okhotsk Sea (1), Sakhalin Island (2), and unknown areas of the Russian Far East (1). The Sakhalin recoveries are the fifth and sixth recoveries of maturing Sakhalin chum tagged in the Bering Sea; four of these six recoveries have been from tagging since 2001. The Okhotsk chum recovery is the seventh of an immature northern Okhotsk Sea chum salmon tagged in the Bering Sea (previous recoveries from tagging in 1957-65 and 1982), and is a western range extension in the Bering Sea (56°30'N, 178°00'W; previous record at 57°56'N, 180°00').

Release data for DSTs from 2004 tagging operations and other recoveries in that year were reported by Walker et al. (2004). Release data for disk tags from 1991 and 2000-2003 tagging operations were reported by Ogura (1991) and Fukuwaka et al. (2000, 2001, 2002, 2003).

Recoveries of coded-wire tags by high seas research vessels and groundfish fisheries are reported in Myers et al. (2005).

ACKNOWLEDGMENTS

Japanese, Russian, and U.S. fishermen, processors, biologists, and fisheries agencies who participated in the 2004-2005 high-seas tagging program are gratefully acknowledged for returning tags and providing recovery information. Special acknowledgments are given to Captain Y. Murata and the officers, crew, and students aboard the *Wakatake maru*, and Captain J. Doi and the officers, crew, and students aboard the *Kaiyo maru*, who cooperated in high-seas salmonid tagging experiments in 2004-2005. Funding for SAFS's high-seas tagging operations and tag processing center is from the Ocean Carrying Capacity program of the Auke Bay Laboratory of the Alaska Fisheries Science Center, NMFS (NOAA contract 50ABNF-1-00002).

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Table 1. U.S. and NPRB archival data storage tags placed on salmonids in the North Pacific Ocean and Bering Sea aboard the *Wakatake maru* in 2005. Geo tags record geographical position, temperature and depth data (Lotek LTD_2400); LTD tags record temperature and depth data (LTD_100-500); CTD tags record salinity, temperature, and depth (StarOddi DST CTD); and iBK tags record temperature only (AlphaMach iBKrill). JFRA = Fisheries Research Agency of Japan.

Data	Tag		Release	Location		Fork		Other tags	
Tag #	Model	Species	Date	Latitude	Longitude	Length	Age	US	JFRA
8114	LTD	coho	06/16/05	42°00´N	180°00´	538	1.1	LL8105	MM3005
8115	LTD	coho	06/16/05	42°00´N	180°00´	570	X.1	LL8106	MM3006
8116	LTD	coho	06/16/05	42°00´N	180°00´	482	1.1	LL8107	MM3007
9414	LTD	coho	06/16/05	42°00´N	180°00´	546	2.1	LL8108	MM3008
9415	LTD	coho	06/16/05	42°00´N	180°00´	556	2.1	LL8109	MM3009
9417	LTD	coho	06/17/05	43°00´N	180°00´	522	1.1	LL8149	MM3049
9418	LTD	coho	06/17/05	43°00´N	180°00´	536	2.1	LL8150	MM3050
9420	LTD	coho	06/17/05	43°00´N	180°00´	502	X.1	LL8154	MM3054
9421	LTD	coho	06/18/05	44°00´N	180°00´	492	2.1	LL8158	MM3058
K112	iBK	pink	06/21/05	47°00´N	180°00´	520	0.1	LL8166	MM3066
9422	LTD	coho	06/22/05	47°30´N	180°00´	585	2.1	LL8175	MM3075
9423	LTD	chum	06/23/05	48°30´N	180°00´	544	0.3	LL8177	MM3077
9424	LTD	chum	06/23/05	48°30´N	180°00´	608	0.5	LL8178	MM3078
9425	LTD	chum	06/23/05	48°30´N	180°00´	593	0.3	LL8179	MM3079
9426	LTD	chum	06/23/05	48°30´N	180°00´	540	0.3	LL8180	MM3080
9427	LTD	coho	06/23/05	48°30´N	180°00´	568	2.1	LL8204	MM3104
9428	LTD	sockeye	06/23/05	48°30´N	180°00´	450	1.2	LL8205	MM3105
1898	CTD	chinook	06/24/05	49°30´N	180°00´	645	X.2	LL8211	MM3111
9429	LTD	sockeye	06/24/05	49°30´N	180°00´	605	2.2	LL8212	MM3112
9430	LTD	sockeye	06/24/05	49°30´N	180°00´	625	1.4	LL8213	MM3113
9431	LTD	sockeye	06/24/05	49°30´N	180°00´	525	1.2	LL8219	MM3119
K113	iBK	coho	06/24/05	49°30´N	180°00´	553	2.1	LL8227	MM3127
9432	LTD	chum	06/24/05	49°30´N	180°00´	570	0.3	LL8228	MM3128
K114	iBK	pink	06/25/05	50°30´N	180°00´	476	0.1	LL8229	MM3129
9433	LTD	chum	06/25/05	50°30´N	180°00´	574	0.3	LL8230	MM3130
1900	CTD	sockeye	06/25/05	50°30´N	180°00´	654	1.3	LL8238	MM3138
1902	CTD	sockeye	06/25/05	50°30´N	180°00´	576	2.3	LL8239	MM3139
A13245	Geo	sockeye	06/25/05	50°30´N	180°00´	610	2.3	LL8240	MM3140
K117	iBK	coho	06/25/05	50°30´N	180°00´	540	2.1	LL8241	MM3141
9434	LTD	sockeye	06/25/05	50°30´N	180°00´	600	1.3	LL8242	MM3142
9435	LTD	sockeye	06/25/05	50°30´N	180°00´	610	1.3	LL8243	MM3143
A13250	Geo	sockeye	06/25/05	50°30´N	180°00´	545	2.2	LL8246	MM3146
9436	LTD	sockeye	06/26/05	51°30´N	180°00´	512	2.2	LL8249	MM3149
9437	LTD	chum	06/26/05	51°30´N	180°00´	636	X.5	LL8250	MM3150
K116	iBK	pink	06/27/05	52°30´N	180°00´	430	0.1	LL8251	MM3151
9438	LTD	pink	06/28/05	53°30´N	180°00´	454	0.1	LL8255	MM3155
9439	LTD	pink	06/28/05	53°30´N	180°00´	466	0.1	LL8256	MM3156

continued

Table 1. continued.

Vessel and	Tag		Release	Location		Fork Length		Other tags	
Data Tag #	Model	Species	Date	Latitude	Longitude		Age	FRI	JFRA
A13243	Geo	sockeye	06/28/05	53°30´N	180°00´	456	2.2	LL8257	MM3157
9440	LTD	pink	06/28/05	53°30´N	180°00´	485	0.1	LL8268	MM3168
9441	LTD	pink	06/28/05	53°30´N	180°00´	441	0.1	LL8269	MM3169
9442	LTD	chum	06/28/05	53°30´N	180°00´	578	0.3	LL8270	MM3170
2002	CTD	chum	06/28/05	53°30´N	180°00´	619	0.4	LL8271	MM3171
9443	LTD	chum	06/28/05	53°30´N	180°00´	610	0.3	LL8272	MM3172
9444	LTD	chum	06/28/05	53°30´N	180°00´	560	0.3	LL8273	MM3173
9445	LTD	pink	06/29/05	54°30´N	180°00´	504	0.1	LL8286	MM3186
9446	LTD	pink	06/29/05	54°30´N	180°00´	440	0.1	LL8287	MM3187
9447	LTD	pink	06/29/05	54°30´N	180°00´	462	0.1	LL8307	MM3207
A13257	Geo	chum	06/29/05	54°30´N	180°00´	589	0.4	LL8308	MM3208
A13244	Geo	sockeye	06/30/05	55°30´N	180°00´	486	2.2	LL8309	MM3209
9448	LTD	chum	06/30/05	55°30´N	180°00´	565	0.3	LL8314	MM3214
A13249	Geo	sockeye	06/30/05	55°30´N	180°00´	541	2.2	LL8315	MM3215
9449	LTD	pink	06/30/05	55°30´N	180°00´	493	0.1	LL8316	MM3216
9450	LTD	pink	06/30/05	55°30´N	180°00´	463	0.1	LL8317	MM3217
9451	LTD	sockeye	06/30/05	55°30´N	180°00´	516	1.2	LL8318	MM3218
9452	LTD	pink	06/30/05	55°30´N	180°00´	500	0.1	LL8319	MM3219
9453	LTD	pink	06/30/05	55°30´N	180°00´	543	0.1	LL8320	MM3220
9454	LTD	pink	06/30/05	55°30´N	180°00´	503	0.1	LL8321	MM3221
1903	CTD	sockeye	06/30/05	55°30´N	180°00´	570	1.3	LL8322	MM3222
1916	CTD	sockeye	06/30/05	55°30´N	180°00´	517	1.3	LL8323	MM3223
9455	LTD	pink	06/30/05	55°30´N	180°00´	504	0.1	LL8324	MM3224
9456	LTD	pink	07/01/05	56°30´N	180°00´	410	0.1	LL8334	MM3234
9458	LTD	pink	07/01/05	56°30´N	180°00´	489	0.1	LL8335	MM3235
9459	LTD	chum	07/01/05	56°30´N	180°00´	690	0.4	LL8337	MM3237
A13251	Geo	sockeye	07/01/05	56°30´N	180°00´	660	2.3	LL8343	MM3243
A13252	Geo	sockeye	07/01/05	56°30´N	180°00´	617	2.3	LL8344	MM3244
9460	LTD	chum	07/01/05	56°30´N	180°00´	588	0.3	LL8350	MM3250
A13253	Geo	sockeye	07/01/05	56°30´N	180°00´	579	2.2	LL8351	MM3251
9461	LTD	chum	07/01/05	56°30´N	180°00´	578	0.3	LL8354	MM3254
A13259	Geo	chum	07/01/05	56°30´N	180°00´	598	0.3	LL8355	MM3255
2006	CTD	chum	07/01/05	56°30´N	180°00´	555	0.4	LL8360	MM3260
9462	LTD	pink	07/02/05	57°30´N	180°00´	453	0.1	LL8362	MM3262
9463	LTD	pink	07/02/05	57°30´N	180°00´	426	0.1	LL8363	MM3263
A13254	Geo	sockeye	07/02/05	57°30´N	180°00´	578	1.3	LL8366	MM3266
A13255	Geo	sockeye	07/02/05	57°30´N	180°00´	650	X.X	LL8367	MM3267
9464	LTD	sockeye	07/02/05	57°30´N	180°00´	642	X.3	LL8369	MM3269
9465	LTD	pink	07/07/05	58°30´N	180°00´	545	0.1	LL8370	MM3270
9466	LTD	sockeye	07/07/05	58°30´N	180°00´	536	1.3	LL8371	MM3271
9467	LTD	sockeye	07/07/05	58°30´N	180°00´	522	2.2	LL8372	MM3272
9468	LTD	sockeye	07/07/05	58°30´N	180°00´	510	2.2	LL8373	MM3273

continued

Table 1. continued.

Vessel and Data Tag #	Tag Model	Species	Release Date	Location Latitude	Location Longitude	Fork Length	Age	Other tags US	Other tags JFRA
9470	LTD	sockeye	07/07/05	58°30´N	180°00´	496	1.2	LL8374	MM3274
9471	LTD	pink	07/07/05	58°30´N	180°00´	505	0.1	LL8375	MM3275
9472	LTD	pink	07/07/05	58°30´N	180°00´	491	0.1	LL8376	MM3276
9475	LTD	pink	07/07/05	58°30´N	180°00´	464	0.1	LL8377	MM3277
9476	LTD	pink	07/07/05	58°30´N	180°00´	492	0.1	LL8378	MM3278
K103	iBK	chinook	07/07/05	58°30´N	180°00´	590	1.2	LL8379	MM3279
9477	LTD	sockeye	07/07/05	58°30´N	180°00´	510	2.2	LL8380	MM3280
9479	LTD	sockeye	07/07/05	58°30´N	180°00´	486	2.2	LL8401	MM3301
9480	LTD	sockeye	07/07/05	58°30´N	180°00´	495	2.2	LL8402	MM3302
9481	LTD	sockeye	07/07/05	58°30´N	180°00´	490	1.2	LL8403	MM3303
K111	iBK	chinook	07/08/05	57°30´N	179°00´ W	571	1.2	LL8404	MM3304
9482	LTD	sockeye	07/08/05	57°30´N	179°00´ W	500	1.2	LL8405	MM3305
9483	LTD	chinook	07/08/05	57°30´N	179°00´ W	535	X.2	LL8406	MM3306
9484	LTD	sockeye	07/09/05	57°30´N	178°00´ W	486	1.2	LL8408	MM3308
9485	LTD	pink	07/09/05	57°30´N	178°00´ W	458	0.1	LL8409	MM3309
9486	LTD	pink	07/09/05	57°30´N	178°00´ W	459	0.1	LL8410	MM3310
9487	LTD	pink	07/09/05	57°30´N	178°00´ W	465	0.1	LL8411	MM3311
9488	LTD	sockeye	07/09/05	57°30´N	178°00´ W	439	2.2	LL8412	MM3312
9489	LTD	sockeye	07/09/05	57°30´N	178°00´ W	483	2.2	LL8413	MM3313
9490	LTD	sockeye	07/09/05	57°30´N	178°00´ W	456	2.2	LL8414	MM3314
9491	LTD	sockeye	07/09/05	57°30´N	178°00´ W	530	2.2	LL8415	MM3315
9492	LTD	sockeye	07/09/05	57°30´N	178°00´ W	495	1.2	LL8416	MM3316
9493	LTD	pink	07/09/05	57°30´N	178°00´ W	496	0.1	LL8417	MM3317
9511	LTD	pink	07/09/05	57°30´N	178°00´ W	482	0.1	LL8418	MM3318
9512	LTD	pink	07/09/05	57°30´N	178°00´ W	467	0.1	LL8419	MM3319
9513	LTD	sockeye	07/09/05	57°30´N	178°00´ W	475	2.2	LL8420	MM3320
9514	LTD	sockeye	07/09/05	57°30´N	178°00´ W	488	1.2	LL8421	MM3321
9515	LTD	sockeye	07/09/05	57°30´N	178°00´ W	492	1.2	LL8422	MM3322
9738	LTD	sockeye	07/09/05	57°30´N	178°00´ W	512	2.2	LL8423	MM3323
9739	LTD	sockeye	07/09/05	57°30´N	178°00´ W	509	1.2	LL8424	MM3324
10004	LTD	chinook	07/09/05	57°30´N	178°00´ W	650	1.3	LL8425	MM3325
10005	LTD	sockeye	07/09/05	57°30´N	178°00´ W	534	X.2	LL8443	MM3343
10006	LTD	sockeye	07/09/05	57°30´N	178°00´ W	590	2.3	LL8444	MM3344
10009	LTD	sockeye	07/10/05	56°30´N	178°00´ W	490	1.2	LL8445	MM3345
10010	LTD	sockeye	07/10/05	56°30´N	178°00´ W	492	2.2	LL8446	MM3346
10011	LTD	sockeye	07/10/05	56°30´N	178°00´ W	575	2.3	LL8447	MM3347
10012	LTD	sockeye	07/10/05	56°30´N	178°00´ W	528	2.2	LL8448	MM3348
10013	LTD	sockeye	07/10/05	56°30´N	178°00´ W	460	1.2	LL8449	MM3349
10014	LTD	sockeye	07/10/05	56°30´N	178°00´ W	554	2.2	LL8450	MM3350
10015	LTD	sockeye	07/10/05	56°30´N	178°00´ W	475	1.2	LL8451	MM3351
10016	LTD	sockeye	07/10/05	56°30´N	178°00´ W	490	1.2	LL8452	MM3352
9475	LTD	pink	07/07/05	58°30´N	180°00´	464	0.1	LL8377	MM3277

continued

Table 1. continued.

Vessel and	Tag		Release	Location		Fork		Other tags	
Data Tag #	Model	Species	Date	Latitude	Longitude	Length	Age	US	JFRA
10022	LTD	sockeye	07/10/05	56°30´N	178°00´ W	540	1.3	LL8453	MM3353
10017	LTD	pink	07/10/05	56°30´N	178°00´ W	488	0.1	LL8459	MM3359
10018	LTD	sockeye	07/10/05	56°30´N	178°00´ W	496	1.2	LL8460	MM3360
10019	LTD	sockeye	07/10/05	56°30´N	178°00´ W	480	2.2	LL8461	MM3361
A13260	Geo	chum	07/10/05	56°30´N	178°00´ W	538	X.X	LL8462	MM3362
A13261	Geo	chum	07/10/05	56°30´N	178°00´ W	543	0.3	LL8463	MM3363
A13263	Geo	chum	07/10/05	56°30´N	178°00´ W	550	0.3	LL8465	MM3365
2009	CTD	chum	07/11/05	56°30´N	179°00´ W	563	0.3	LL8466	MM3366
10024	LTD	pink	07/11/05	56°30´N	179°00´ W	535	0.1	LL8468	MM3368
10025	LTD	sockeye	07/11/05	56°30´N	179°00´ W	461	2.2	LL8471	MM3371
A13265	Geo	chum	07/11/05	56°30´N	179°00´ W	523	0.3	LL8472	MM3372
2015	CTD	sockeye	07/12/05	56°30´N	179°00´ E	554	X.3	LL8473	MM3373
10026	LTD	sockeye	07/12/05	56°30´N	179°00´ E	535	1.2	LL8474	MM3374
A13267	Geo	sockeye	07/13/05	56°30´N	178°00´ E	478	2.2	LL8475	MM3375
A13268	Geo	sockeye	07/13/05	56°30´N	178°00´ E	542	1.3	LL8478	MM3378
2021	CTD	chum	07/13/05	56°30´N	178°00´ E	543	0.3	LL8483	MM3383
A13270	Geo	sockeye	07/13/05	56°30´N	178°00´ E	596	X.X	LL8484	MM3384
A13271	Geo	sockeye	07/13/05	56°30´N	178°00´ E	603	2.3	LL8485	MM3385

Table 2. Preliminary release and recovery information for U.S. tags and cooperative Japan-U.S. tags returned from 1 October 2004 to 30 September 2005. A blank indicates the information is not available. HL=hook and line, LL=longline, GN= gillnet, SGN=set gillnet. Age designation is the European method, first number is the number of freshwater annuli, second number is the number of ocean annuli. FL=fork length, and BW=body weight. Data storage tags: LTD=Lotek LTD_1100-500 (records temperature and depth); iB=AlphaMach iBKrill (records temperature only); CTD=StarOddi DST CTD (records salinity, temperature, and depth). * = data tag not recovered

U.S.	Japan	Release							Recovery										
Tag.	Tag		Lat.		2°X5°		FL			Lat.		Area			FL	BW	Gonad		
Nos.	No.	Date	(°N)	Long.	Area	Gear	(mm)	Age	Date	(°N)	Long.	Code	Gear	Sex	(mm)	(g)	(g)	Age	Location
A. Sockeye Salmon																			
NN0137, iBK W128*	MM2137	28-Jun-04	52°30	180°00	W8052	LL	465	0.2	29-Jun-05	56°52	158°57W	50-2	GN	M	-	-	-	-	Ilnik, N. Alaska Peninsula, Alaska, USA
B. Chum Salmon																			
LL7612, iBK K050	BB1846	29-Jun-04	57°01	175°03W	W8056	HL	585	0.3	11-Oct-04	44°17	145°21E	02-0	SGN	F	-	2000	-	-	Rausu, Nemuro coast, Hokkaido, Japan
LL7660, iBK K052	BB1894	30-Jun-04	54°58	175°05W	W8054	HL	555	0.3	6-Oct-04	44°17	145°21E	02-0	SGN	-	-	-	-	-	Rausu, Nemuro coast, Hokkaido, Japan
NN0198, LTD 5963*	MM2198	30-Jun-04	54°30	180°00	W8054	LL	588	0.3	18-Sep-04	44°37	142°56E	02-2	SGN	-	-	-	-	-	Ohmu, Okhotsk coast, Hokkaido, Japan
NN00209, LTD 5980	MM2209	30-Jun-04	54°30	180°00	W8054	LL	521	0.3	11-Oct-04	45°07 - 45°13	142°19E - 142°26E	02-2	SGN	F	575	2201	-	-	Hamatonbetsu, Okhotsk coast, Hokkaido, Japan
NN0237, LTD 5991	MM2237	2-Jul-04	56°30	180°00	W8056	LL	635	0.4	16-Sep-04	42°10	143°20E	02-1	SGN	M	630	3500	-	-	Hiroo, Pacific coast, Hokkaido, Japan
NN0245, LTD 7430	MM2245	2-Jul-04	56°30	180°00	W8056	LL	605	0.3	29-Sep-04	42°47	143°47E	02-1	-	M	700	3000	-	-	Urahoro, Pacific coast, Hokkaido, Japan
LL7811, LTD 8105	BB2486	5-Jul-04	55°30	179°58W	W8054	HL	580	0.4	28-Sep-04	43°59	144°18E	02-2	SGN	M	619	2450	-	-	Abashiri, Okhotsk coast, Hokkaido, Japan

Table 2. continued

U.S.	Japan	Release							Recovery										
Tag.	Tag		Lat.		2°X5°		FL			Lat.		Area			FL	BW	Gonad		
Nos.	No.	Date	(°N)	Long.	Area	Gear	(mm)	Age	Date	(°N)	Long.	Code	Gear	Sex	(mm)	(g)	(g)	Age	Location
B. Chum Salmon - continued																			
NN0358, iBK W149	MM2358	5-Jul-04	57°30	179°00W	W8056	LL	637	0.4	2-Oct-04	43°13	145°37E	02-0	SGN	M	700	3500	-	-	Nemuro, Nemuro coast, Hokkaido, Japan
LL7836, LTD 8106	N4810	5-Jul-04	55°30	179°58W	W8054	HL	540	0.3	5-Sep-04	59°24	143°16E	07-2	-	F	560	1950	-	-	Kukhtui R., N. Okhotsk coast, Russia
NN0421, CTD 1379	MM2421	7-Jul-04	56°30	178°00W	E7556	LL	591	0.4	21-Sep-04	43°08	145°09E	02-1	-	F	680	3100	-	-	Horoto River, Pacific coast, Hokkaido, Japan
NN0541, LTD 7467	MM2541	8-Jul-04	56°30	179°00W	W8056	LL	583	0.3	22-Oct-04	43°49	145°08E - 145°09E	02-1	SGN	M	650	2800	-	-	Shibetsu, Nemuro coast, Hokkaido, Japan
NN0562, LTD 7469	MM2562	9-Jul-04	56°30	179°00E	E7556	LL	641	0.4	27-Sep-04	42°25 - 42°33	143°24E - 143°31E	02-1	-	M	-	-	-	-	Taiki, Pacific coast, Hokkaido, Japan
NN0581, LTD 7473	MM2581	9-Jul-04	56°30	179°00E	E7556	LL	640	0.4	1-Oct-04	42°05	143°19E	02-1	SGN	F	670	2400	-	-	Erimo, Pacific coast, Hokkaido, Japan
NN0670, LTD 7480	MM2670	10-Jul-04	56°30	178°00E	E7556	LL	615	0.3	24-Sep-04	42°57	144°23E	02-1	SGN	-	-	-	-	-	Kushiro, Pacific coast, Hokkaido, Japan
NN0687, iBK W153	MM2687	11-Jul-04	56°30	177°00E	E7556	LL	719	0.5	21-Sep-04	43°03	144°24E	02-1	-	F	745	4430	-	-	Kushiro River, Pacific coast, Hokkaido, Japan
NN0688, iBK W154	MM2688	11-Jul-04	56°30	177°00E	E7556	LL	564	0.3	29-Sep-04	44°14	145°21E - 145°22E	02-0	SGN	M	698	3590	-	-	Rausu, Nemuro coast, Hokkaido, Japan
NN0696, iBK W179	MM2696	12-Jul-04	57°30	177°00E	E7556	LL	608	0.4	21-Sep-04	43°23	145°17E	02-0	SGN	F	615	2650	-	-	Bekkai, Nemuro coast, Hokkaido, Japan

Table 2. continued

U.S.	Japan	Release							Recovery										
Tag.	Tag		Lat.		2°X5°		FL			Lat.		Area			FL	BW	Gonad		
Nos.	No.	Date	(°N)	Long.	Area	Gear	(mm)	Age	Date	(°N)	Long.	Code	Gear	Sex	(mm)	(g)	(g)	Age	Location
B. Chum Salmon - continued																			
NN0702, iBK W185	MM2702	13-Jul-04	57°30	176°00E	E7556	LL	588	0.3	22-Oct-04	43°50 - 43°51	145°06E - 145°07E	02-0	SGN	M	650	2200	-	-	Shibetsu, Nemuro coast, Hokkaido, Japan
NN0705, iBK W188	MM2705	13-Jul-04	57°30	176°00E	E7556	LL	741	0.4	2-Sep-04	42°57	144°07E	02-1	SGN	F	780	5200	-	-	Shiranuka, Pacific coast, Hokkaido, Japan
C. Coho Salmon																			
LL7690, LTD 8101	BB1924	2-Jul-04	51°26	175°02W	W8050	HL	650	1.1	20-Aug-04	56°10	162°30E	11-1	GN	M	570	-	-	-	Kamchatka R., E Kamchatka, Russia
D. Chinook Salmon																			
NN0686, LTD 7484	MM2686	11-Jul-04	56°30	177°00E	E7556	LL	710	X.3	30-Jun-05	64°19	158°43W	42-1	GN	F	-	-	-	-	Kaltag, Yukon R., western Alaska, USA

Table 3. Preliminary release and recovery information for previously unreported Japanese and cooperative Japan-U.S. tags recovered in Russia or the Bering Sea and returned from 1991 to 30 September 2005. A blank indicates the information is not available. LL=longline, GN= gillnet, SGN=set gillnet, TN=trapnet. Age designation is the European method, first number is the number of freshwater annuli, second number is the number of ocean annuli. FL=fork length and BW=body weight.

U.S.	Japan	Release							Recovery										
Tag.	Tag		Lat.		2°X5°		FL			Lat.		Area			FL	BW	Gonad		
Nos.	No.	Date	(°N)	Long.	Area	Gear	(mm)	Age	Date	(°N)	Long.	Code	Gear	Sex	(mm)	(g)	(g)	Age	Location
A. Chum Salmon																			
LL5853	Y9853	8-Jul-02	56°30	179°00W	W8056	LL	572	0.4	2-Oct-02	46°25	143°20E	06-2	-	F	630	2820	-	-	Monetka Hatchery, Ostrovka R., Aniva Bay, SE Sakhalin, Russia
-	Y1897	11-Jul-02	56°30	177°00E	E7556	LL	600	0.4	30-Aug-02	46°40	141°52E	06-1	-	M	670	3105	-	-	Sokolnikovskiy Hatchery, Zavetinka R., SW Sakhalin, Russia
LL4503	LL3503	7-Jul-01	56°30	178°00W	W8056	LL	523	0.3	9-Jul-03	56°20	138°00E	07-1	SGN	M	-	-	-	-	Ayan City, W. Okhotsk coast, Russia
B. Pink Salmon																			
LL4353	LL3353	5-Jul-01	54°30	180°00	W8054	LL	471	0.1	2001	-	-	10-4	-	-	-	-	-	-	E. Kamchatka, Russia
LL4537	LL3537	7-Jul-01	56°30	178°00W	W8056	LL	512	0.1	17-Aug-01	60°00	165°40E	12-3	-	-	-	-	-	-	Podsobnaya R., Korf Bay, E. Kamchatka, Russia
LL6085	Z5485	23-Jun-03	49°30	180°00	W8048	LL	432	0.1	June-July 2003	56°59	165°-170°E	22	GN	-	-	-	-	-	western Bering Sea, off E. Kamchatka
LL6191	Z5591	26-Jun-03	52°30	180°00	W8052	LL	487	0.1	19-Jul-03	59°30	163°11E	12-1	-	M	503	1480	-	-	Tymlat R., Karaginski Bay, E. Kamchatka, Russia

Table 3. continued

U.S.	Japan	Release							Recovery										
Tag.	Tag		Lat.		2°X5°		FL			Lat.		Area			FL	BW	Gonad		
Nos.	No.	Date	(°N)	Long.	Area	Gear	(mm)	Age	Date	(°N)	Long.	Code	Gear	Sex	(mm)	(g)	(g)	Age	Location
B. Pink Salmon - continued																			
LL6382	Z7282	29-Jun-03	55°30	180°00	W8054	LL	498	0.1	9-Aug-03	58°35	162°19E	12-1	-	F	480	1340	259	-	Karaginski Bay near Ivashka R., E. Kamchatka, Russia
LL6570	Z7470	3-Jul-03	57°30	179°00W	W8056	LL	468	0.1	2003	58°47	162°37E	12-1	TN	M	500	1260	-	-	Dranka R., Karaginski Bay, E. Kamchatka, Russia
LL6716	Z7616	8-Jul-03	56°30	178°00E	E7556	LL	474	0.1	2003	58°47	162°37E	12-1	TN	F	440	1270	-	-	Dranka R., Karaginski Bay, E. Kamchatka, Russia
LL6773	Z7673	10-Jul-03	57°30	177°00E	E7556	LL	480	0.1	11-Jul-03	57°30	177°00E	24	GN	-	-	-	-	-	Bering Sea, recovered by tagging vessel
C. Coho Salmon																			
-	HH6057	22-Jun-91	44°30	175°27E	E7544	LL	436	2.1	1991	-	-	15-2	-	-	-	-	-	-	Far East, Russia
LL3345	EE4138	19-Jun-00	46°00	180°00	W8046	LL	512	2.1	12-Oct-00	-	-	09-4	-	-	-	-	-	-	Kotelnikova R., W. coast Kamchatka, Russia

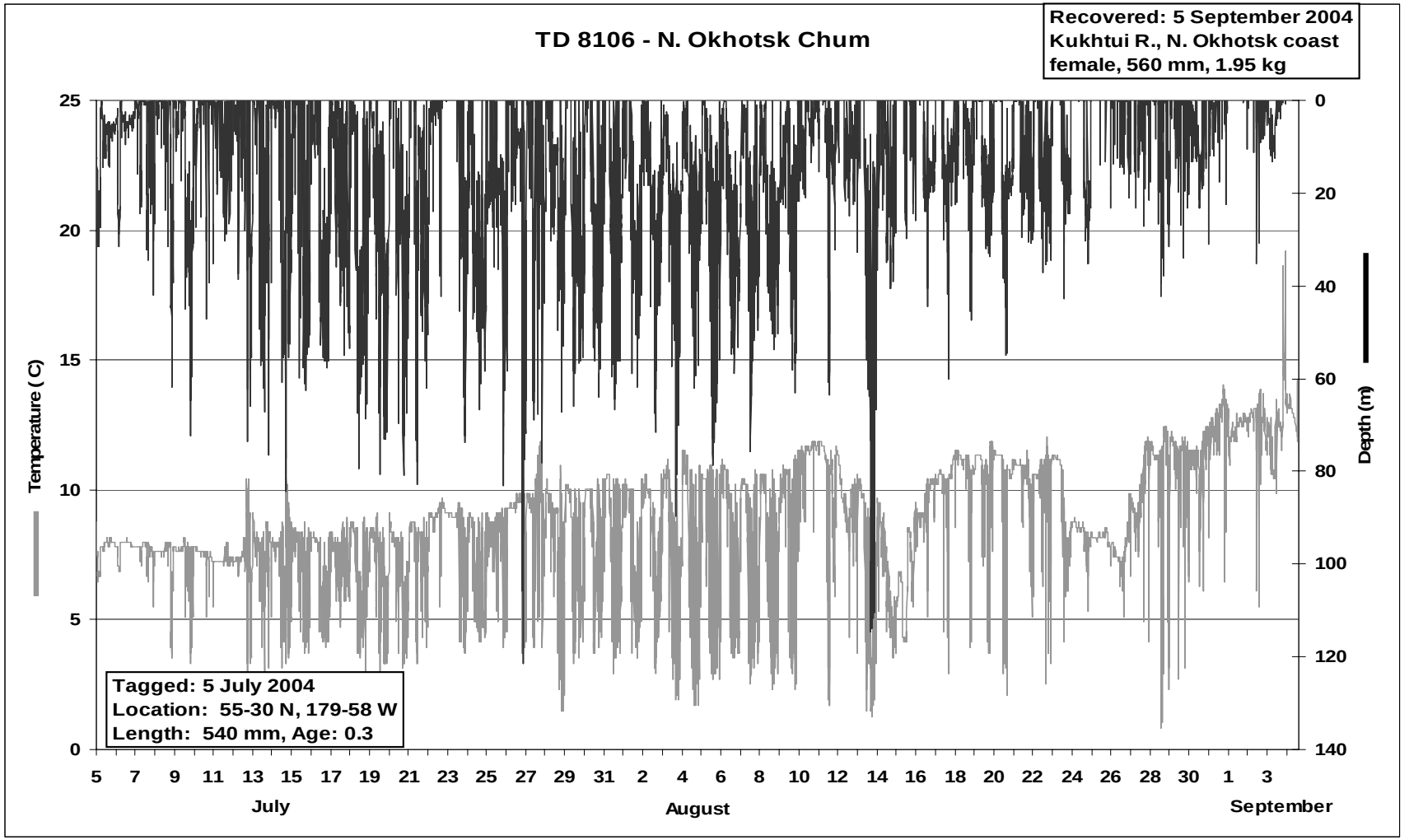

Figure 1. Temperature and depth data recorded on a data storage tag placed on a 540 mm chum salmon in the Bering Sea on 5 July 2004 and recovered in the Kukhtui River, north Okhotsk Sea coast, on 5 September 2004.

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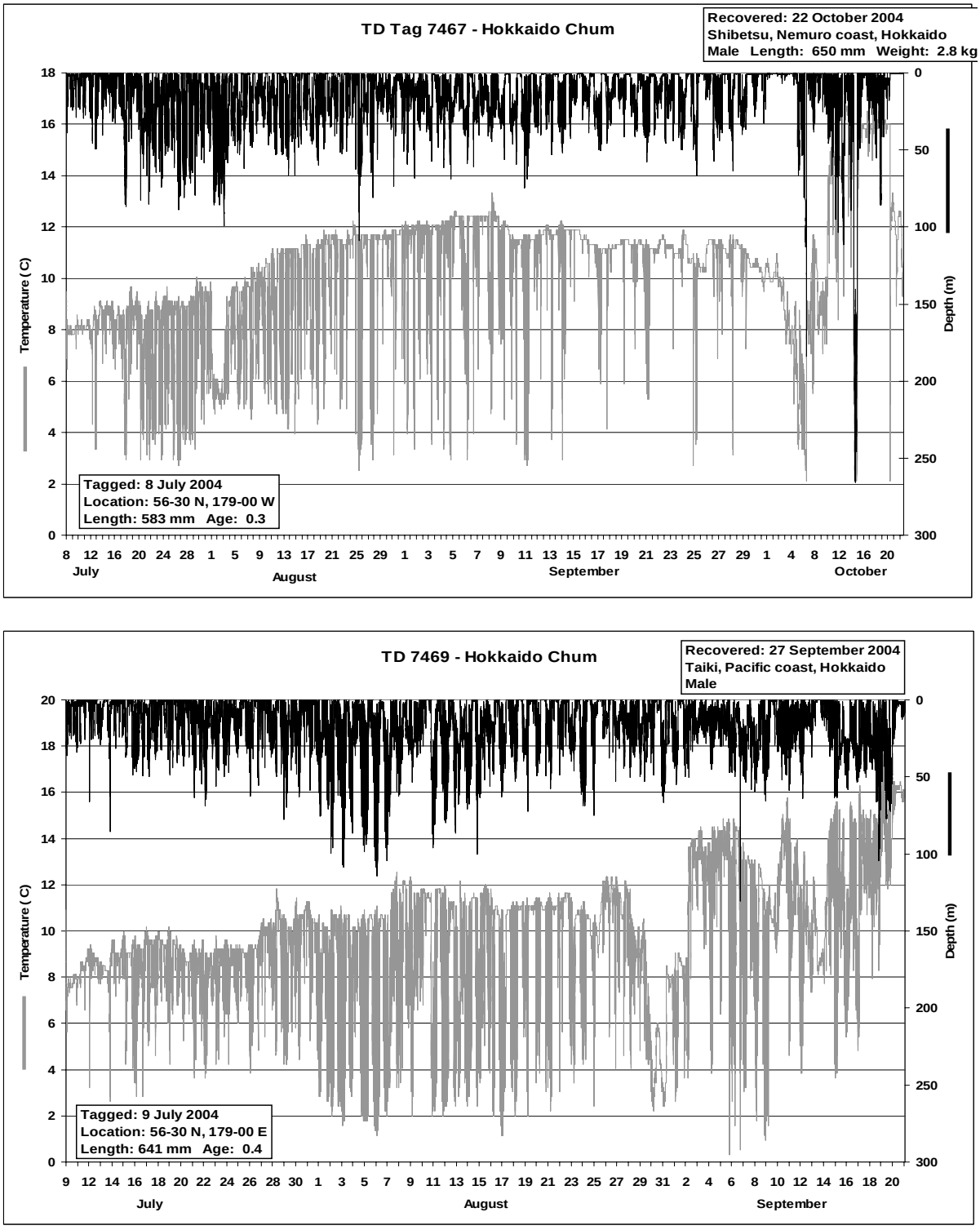


Figure 3. Temperature and depth data recorded on data storage tags placed on two chum salmon in the Bering Sea on 8 July 2004 (top) and 9 July 2004 (bottom) and recovered in Hokkaido, Japan, on the Nemuro coast on 22 October 2004 (top) and the Pacific coast on 27 September 2004 (bottom).

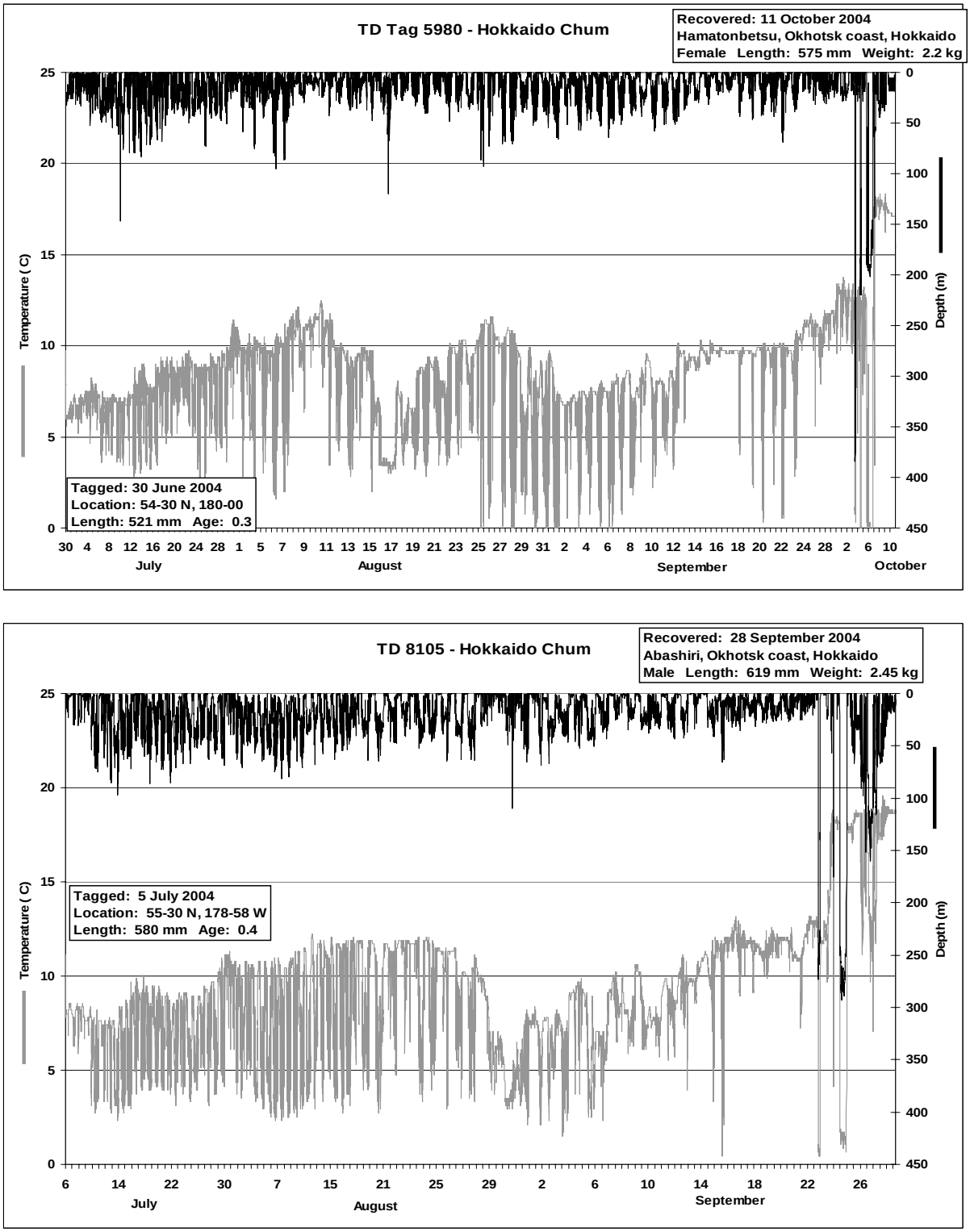


Figure 4. Temperature and depth data recorded on data storage tags placed on two chum salmon in the Bering Sea on 30 June 2004 (top) and 5 July 2004 (bottom) and recovered in Hokkaido, Japan, on the Okhotsk coast on 11 October 2004 (top) and 28 September 2004 (bottom).

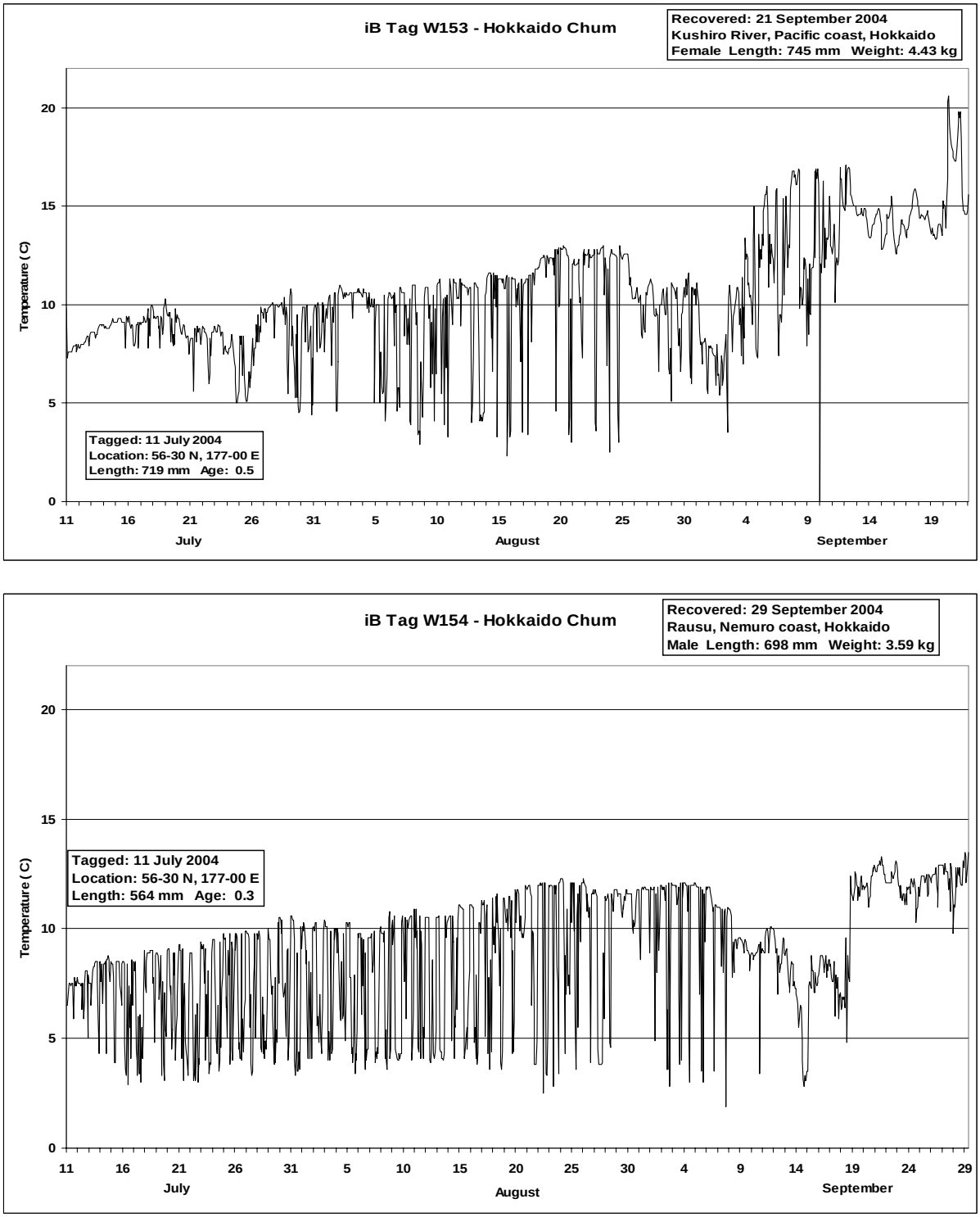


Figure 5. Temperature data recorded on data storage tags placed on two chum salmon in the Bering Sea on 11 July 2004 and recovered in Hokkaido, Japan, on the Pacific coast on 21 September 2004 (top) and on the Nemuro coast on 29 September 2004 (bottom).

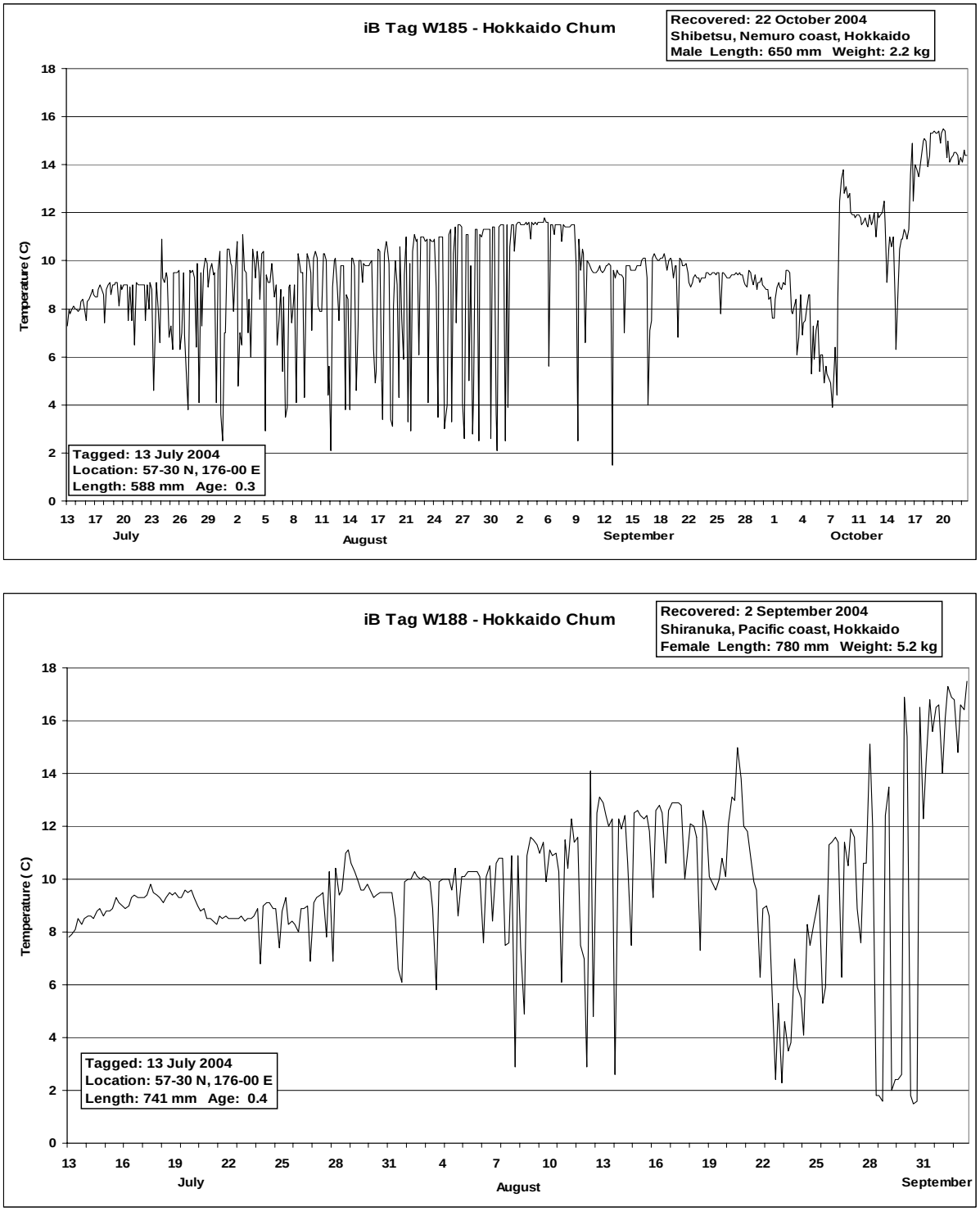
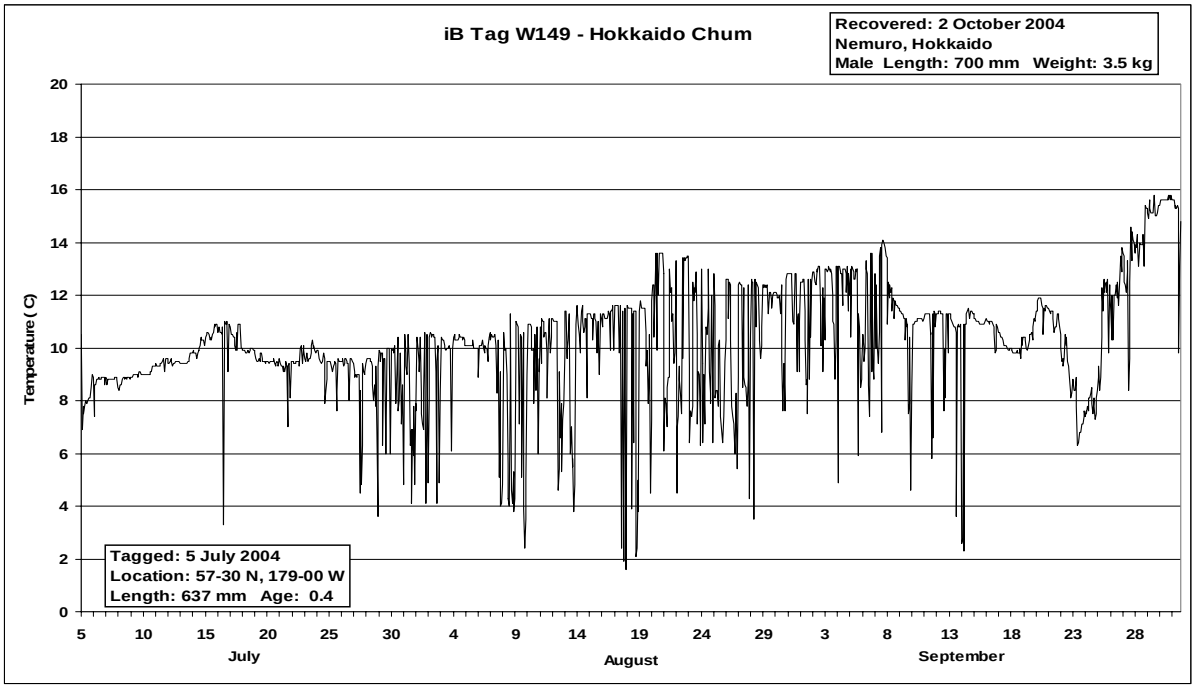


Figure 5. Temperature data recorded on data storage tags placed on two chum salmon in the Bering Sea on 13 July 2004 and recovered in Hokkaido, Japan, on the Nemuro coast on 22 October 2004 (top) and on the Pacific coast on 2 September 2004 (bottom).



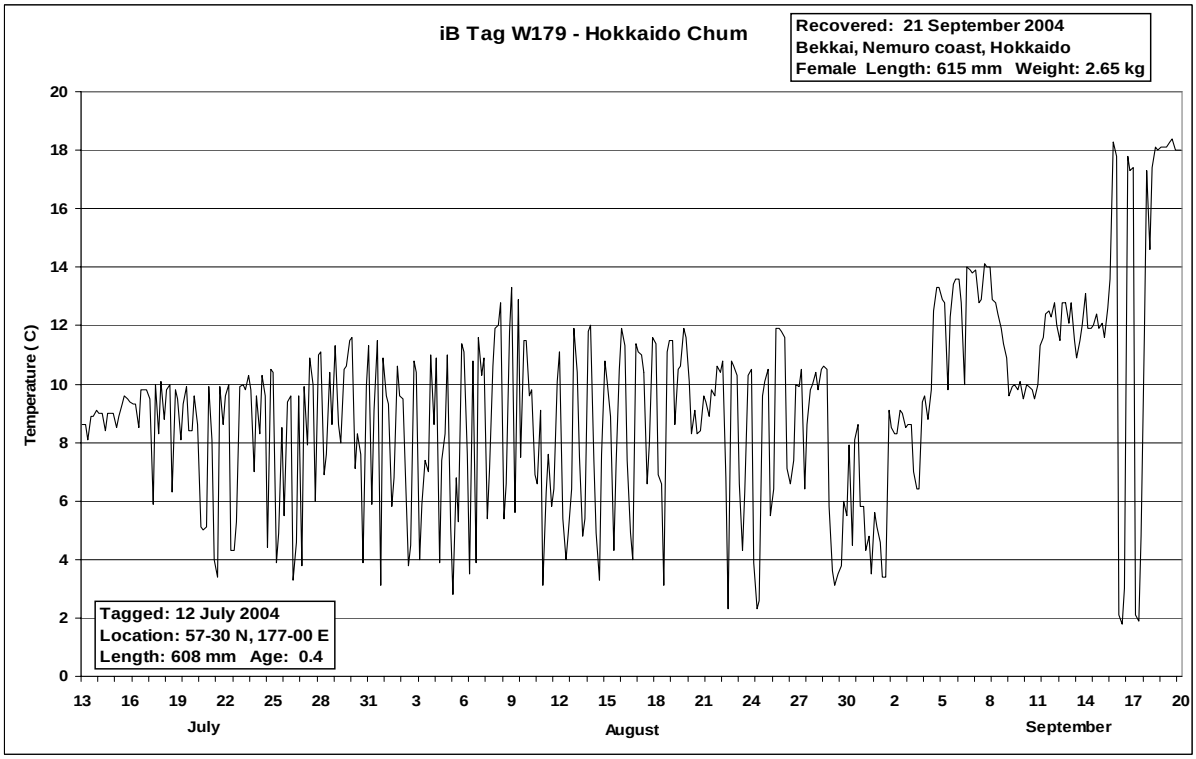


Figure 5. Temperature data recorded on data storage tags placed on two chum salmon in the Bering Sea on 6 July 2004 (top) and 12 July 2004 (bottom) and recovered in Hokkaido, Japan, on the Nemuro coast on 2 October 2004 (top) and on 21 September 2004 (bottom).