

**RELEASES AND RECOVERIES OF U.S. SALMONID DATA STORAGE
TAGS, AND RECOVERIES OF HIGH SEAS TAGS IN NORTH
AMERICA, 2001**

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RELEASES AND RECOVERIES OF U.S. SALMONID DATA STORAGE TAGS, AND RECOVERIES OF HIGH SEAS TAGS IN NORTH AMERICA, 2001

ABSTRACT

Information is reported on all high-seas salmon tags recovered in North America from 1 October 2000 through 30 September 2001, and all releases and recoveries of U.S. data storage tags (DSTs). Eighty-eight DSTs, which record temperature and depth data, were placed on Pacific salmonids in the North Pacific Ocean and Bering Sea during three research cruises aboard one U.S. and two Japanese vessels in 2001. Twenty-one sockeye salmon, three chinook salmon, and one steelhead trout were tagged with DSTs in June and July in the central North Pacific and Bering Sea. Forty-five salmonids (8 sockeye, 8 chum, 9 pink, 16 coho, 2 chinook, and 2 steelhead) were tagged with DSTs in the central Gulf of Alaska in July. Eighteen salmon (6 sockeye, 7 chum, 2 pink, and 3 coho) were tagged with DSTs in offshore coastal waters of the northern Gulf of Alaska in August.

One tag from 2000 and three tags from 2001 tagging operations have been returned to date in North America; all are DSTs and all recoveries were in Alaska. One sockeye salmon from 2000 tagging operations in the Bering Sea was recovered in 2000 in Alakanuk Slough in the Yukon River delta of western Alaska. This is the first recovery of a Yukon River sockeye salmon tagged in the Bering Sea (and only the second recovery of a Yukon sockeye) and provides the only information on distribution of Yukon sockeye in the Bering Sea. A pink salmon was tagged and recovered off Kodiak Island, Alaska. One coho salmon, tagged in the Gulf of Alaska, was recovered in coastal waters of northern southeast Alaska. Another coho, tagged off Kodiak Island, was caught in Chignik Lagoon on the Alaska Peninsula. Graphs of ambient temperature and pressure data from the DSTs are presented.

INTRODUCTION

Information is reported on all high-seas salmon (*Oncorhynchus* spp.) tags recovered in North America from 1 October 2000 through 30 September 2001, and all releases and recoveries of U.S. data storage tags (DSTs). The Fisheries Research Institute (FRI), School of Aquatic and Fishery Sciences, 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. high-seas salmon tags and DSTs by all nations.

Releases and recoveries of all U.S. DSTs are reported, in order to have a complete record in one document. Releases of U.S. DSTs from Japanese vessels are also reported in Fukuwaka et al. (2001). Graphs of ambient temperature and pressure data from the DSTs are presented.

MATERIALS AND METHODS

Fish were captured by research trawl on a U.S. vessel, by research longline on one Japanese vessel and by research longline and hook-and-line on another Japanese vessel. U.S. high-seas tags are 20 mm diameter plastic red-and-white Petersen disk tags. The DSTs are small circuit boards potted in a clear urethane manufactured by Conservation Devices, Inc. and Lotek Marine Technologies. Model RL-31 of these tags weighs approximately 9.5 g, and is 40 x 23 x 8 mm in

dimension. Models RL-42 and LTD-1100 are 27 x 16 x 8 mm and weigh 5 g. All tags record temperature and depth data. Tags were attached to fish just anterior to the dorsal fin using one 76 mm nickel pin for disk tags, or two pins for DSTs with labeled U.S. and Japanese or blank disk tags placed on the pins on the other side of the fish.

FRI'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

Eighty-eight DSTs, which record temperature and depth data, were placed on Pacific salmonids in the North Pacific Ocean and Bering Sea during three research cruises aboard two Japanese vessels and one U.S. vessel in 2001 (Table 1). Twenty-one sockeye salmon, three chinook salmon, and one steelhead trout were tagged with DSTs in June and July in the central North Pacific and Bering Sea. Forty-five salmonids (8 sockeye, 8 chum, 9 pink, 16 coho, 2 chinook, and 2 steelhead) were tagged with DSTs in the central Gulf of Alaska in July. Eighteen salmon (6 sockeye, 7 chum, 2 pink, and 3 coho) were tagged with DSTs in offshore coastal waters of the northern Gulf of Alaska in August.

From 1 October 2000 through 30 September 2001, four high-seas salmon tags from recoveries in North America have been returned (Table 2). One is from 2000 and three are from 2001 tagging operations, and all recoveries are from Alaska. All are DSTs. One sockeye salmon from 2000 tagging operations was recovered in 2000 in Alakanuk Slough in the Yukon River delta of western Alaska (Fig. 1). The depth data from this tag have been adjusted and both temperature and depth data may not be reliable because of bad calibration data. This recovery is of interest as the first sockeye salmon tagged in the Bering Sea and recovered in the Yukon River, providing the only information on distribution of Yukon sockeye in the Bering Sea. The only other Yukon River sockeye recovery was of a fish tagged in the Gulf of Alaska in 1966. A pink salmon was tagged and recovered off Kodiak Island, Alaska (Fig. 2). One coho salmon, tagged in the Gulf of Alaska in July, was recovered in coastal waters of northern southeast Alaska (Fig. 3). Another coho, tagged off Kodiak Island in August, was caught in Chignik Lagoon on the Alaska Peninsula (Fig. 4).

Release data from 2000 tagging operations and other recoveries in 2000 were reported in Walker et al. (2000).

Information on a study of chinook salmon in inshore waters of southeast Alaska using DSTs is reported in Murphy and Heard (2001). Recoveries of coded-wire tag recoveries by high seas research vessels and groundfish fisheries are reported in Myers et al. (2001).

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REFERENCES

- Fukuwaka, M., S. Urawa, I. Ono, N. Davis, and R.V. Walker. 2001. Recoveries of high-seas tags in Japan in 2000, and tag releases and recoveries of fin-clipped salmon from Japanese research vessels in the North Pacific Ocean in 2001. (NPAFC Document 545.) Hokkaido National Fisheries Research Institute, Fisheries Research Agency, Kushiro. 12 p.
- Murphy, J.M., and W.R. Heard. 2001. Chinook salmon data storage tag studies in Southeast Alaska, 2001. (NPAFC Doc. 555.) Auke Bay Laboratory, Alaska Fisheries Science Center, National Marine Fisheries Service, NOAA, Juneau, AK.
- Myers, K.W., K.Y. Aydin, R.V. Walker, S. Fowler, and M.L. Dahlberg. 1996. Known ocean ranges of stocks of Pacific salmon and steelhead as shown by tagging experiments, 1956-95. (NPAFC Doc. 192.) FRI-UW-9614. Fisheries Research Institute, University of Washington, Seattle, WA. 4 p. + figs. and appends.
- Myers, K.W., A.G. Celewycz, and E.V. Farley, Jr. 2001. High seas salmonid coded-wire tag recovery data, 2001. (NPAFC Doc. 557.) SAFS-UW-0113. School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA.
- Walker, R.V., N.D. Davis, K.W. Myers, and M. Fukuwaka. 2000. Releases and recoveries of U.S. salmonid data storage tags, and recoveries of high seas tags in North America. (NPAFC Doc. 475.) AFS-UW-2006. School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA. 14 p.

Table 1. U.S. archival data storage tags placed on salmonids in the North Pacific Ocean and Bering Sea in 2001. All tags record temperature and depth data. LL = longline; HL = hook and line. FRI = Fisheries Research Institute; FAJ = Fisheries Agency of Japan.

Vessel and Data Tag #	Tag Model	Species	Release Date	Location		Gear	Fork Length	Age	Other tags	
				Latitude	Longitude				FRI	FAJ
<i>R/V Wakatake maru</i>										
1095	RL-31	Steelhead	06/18/2001	44°00'N	180°00'	LL	642	1.1	LL4043	LL3043
1098	RL-31	Sockeye	06/20/2001	46°00'N	180°00'	LL	482	2.2	LL4075	LL3075
1158	RL-42	Sockeye	06/23/2001	47°30'N	180°00'	LL	480	1.2	red blank	LL3094
1159	RL-42	Sockeye	06/24/2001	48°30'N	180°00'	LL	536	X.3	red blank	LL3100
1100	RL-31	Sockeye	06/24/2001	48°30'N	180°00'	LL	552	2.3	LL4122	LL3122
1102	RL-31	Sockeye	06/24/2001	48°30'N	180°00'	LL	538	2.3	LL4123	LL3123
1106	RL-31	Sockeye	06/24/2001	48°30'N	180°00'	LL	520	2.2	LL4124	LL3124
1108	RL-31	Sockeye	06/24/2001	48°30'N	180°00'	LL	526	2.3	LL4125	LL3125
1160	RL-42	Sockeye	06/24/2001	48°30'N	180°00'	LL	530	1.3	red blank	LL3126
1161	RL-42	Sockeye	06/24/2001	48°30'N	180°00'	LL	498	2.2	red blank	LL3127
1109	RL-31	Sockeye	06/25/2001	49°30'N	180°00'	LL	521	2.2	LL4138	LL3138
1110	RL-31	Sockeye	06/25/2001	49°30'N	180°00'	LL	571	2.3	LL4139	LL3139
1112	RL-31	Sockeye	06/26/2001	50°30'N	180°00'	LL	663	1.3	LL4140	LL3140
1113	RL-31	Sockeye	06/26/2001	50°30'N	180°00'	LL	554	1.3	LL4146	LL3146
1115	RL-31	Sockeye	06/30/2001	54°30'N	180°00'	LL	530	1.3	LL4216	LL3216
1117	RL-31	Sockeye	07/03/2001	57°30'N	180°00'	LL	600	1.3	LL4322	LL3322
1119	RL-31	Sockeye	07/03/2001	57°30'N	180°00'	LL	660	2.3	LL4323	LL3323
1121	RL-31	Sockeye	07/03/2001	57°30'N	180°00'	LL	604	1.3	LL4327	LL3327
1162	RL-42	Sockeye	07/05/2001	57°30'N	179°00'W	LL	598	2.3	red blank	LL3366
1163	RL-42	Sockeye	07/05/2001	57°30'N	179°00'W	LL	586	1.3	red blank	LL3402
1164	RL-42	Chinook	07/05/2001	57°30'N	179°00'W	LL	610	X.2	red blank	LL3403
1165	RL-42	Sockeye	07/06/2001	57°30'N	178°00'W	LL	594	1.3	red blank	LL3496
1167	RL-42	Chinook	07/06/2001	57°30'N	178°00'W	LL	504	X.X	red blank	LL3497
1168	RL-42	Chinook	07/06/2001	57°30'N	178°00'W	LL	524	1.2	red blank	LL3498
1169	RL-42	Sockeye	07/09/2001	56°30'N	179°00'W	LL	550	2.3	red blank	LL3594
<i>T/S Oshoro maru</i>										
1293	RL-42	Coho	06/29/2001	56°00'N	145° 00'W	HL	582	1.1	LL1639	red blank
1297	RL-42	Pink	06/29/2001	56°00'N	145° 00'W	HL	469	0.1	LL1640	red blank
1301	RL-42	Coho	06/29/2001	56°00'N	145° 00'W	HL	570	1.1	LL1641	red blank
1304	RL-42	Sockeye	06/29/2001	56°00'N	145° 00'W	HL	655	1.3	LL1643	red blank
1311	RL-42	Coho	06/30/2001	56°07'N	145° 00'W	LL	585	2.1	LL1651	BB6441
1310	RL-42	Coho	06/30/2001	56°07'N	145° 00'W	LL	620	X.X	LL1652	BB6442
1314	RL-42	Coho	06/30/2001	56°07'N	145° 00'W	LL	600	2.1	LL1653	BB6443
1316	RL-42	Sockeye	06/30/2001	56°07'N	145° 00'W	LL	590	1.2	LL1654	BB6444
1290	RL-42	Chinook	06/30/2001	56°07'N	145° 00'W	LL	625	1.2	LL1655	BB6445
1319	RL-42	Coho	06/30/2001	56°07'N	145° 00'W	LL	580	2.1	LL1656	BB6446
1292	RL-42	Chum	06/30/2001	56°07'N	145° 00'W	LL	490	X.X	LL1657	BB6447
1320	RL-42	Pink	06/30/2001	56°07'N	145° 00'W	LL	475	X.X	LL1660	BB6450
1295	RL-42	Chum	06/30/2001	56°07'N	145° 00'W	LL	520	0.2	LL1658	BB6448
1296	RL-42	Chum	06/30/2001	56°07'N	145° 00'W	LL	530	X.X	LL1659	BB6449

continued

Table 1. continued.

Vessel and Data Tag #	Tag		Release Date	Location		Gear	Fork Length	Age	Other tags	
	Model	Species		Latitude	Longitude				FRI	FAJ
<i>R/V Oshoro maru (continued)</i>										
1321	RL-42	Coho	06/30/2001	56°07'N	145° 00'W	LL	625	X.X	LL1661	BB6451
1322	RL-42	Pink	06/30/2001	56°07'N	145° 00'W	LL	460	0.1	LL1662	BB6452
1307	RL-42	Coho	06/30/2001	56°07'N	145° 00'W	LL	662	X.1	LL1663	BB6453
1323	RL-42	Steelhead	07/01/2001	55°00'N	145° 03'W	LL	455	X.1	LL1668	BB6458
1315	RL-42	Chum	07/01/2001	55°00'N	145° 03'W	LL	505	0.3	LL1669	BB6459
1324	RL-42	Coho	07/02/2001	53°59'N	145° 02'W	LL	626	1.1	LL1670	BB6460
1327	RL-42	Coho	07/02/2001	53°59'N	145° 02'W	LL	640	2.1	LL1671	BB6461
1312	RL-42	Coho	07/02/2001	53°59'N	145° 02'W	LL	650	2.1	LL1672	BB6462
1328	RL-42	Pink	07/02/2001	53°59'N	145° 02'W	LL	460	0.1	LL1673	BB6463
1331	RL-42	Pink	07/02/2001	53°59'N	145° 02'W	LL	496	0.1	LL1674	BB6464
1337	RL-42	Coho	07/02/2001	53°59'N	145° 02'W	LL	622	1.1	LL1675	BB6465
1335	RL-42	Coho	07/02/2001	53°29'N	145° 00'W	HL	512	2.1	LL1711	KK1601
1340	RL-42	Chinook	07/02/2001	53°29'N	145° 00'W	HL	645	1.2	LL1713	KK1603
1342	RL-42	Sockeye	07/03/2001	52°56'N	145° 01'W	LL	552	X.X	LL1677	BB6467
1343	RL-42	Sockeye	07/03/2001	52°56'N	145° 01'W	LL	693	X.X	LL1678	BB6468
1325	RL-42	Coho	07/03/2001	52°56'N	145° 01'W	LL	583	2.1	LL1680	BB6470
1345	RL-42	Sockeye	07/03/2001	52°56'N	145° 01'W	LL	590	1.2	LL1681	BB6471
1334	RL-42	Pink	07/03/2001	52°56'N	145° 01'W	LL	500	0.1	LL1682	BB6472
1318	RL-42	Sockeye	07/03/2001	52°56'N	145° 01'W	LL	468	1.2	LL1684	BB6474
1344	RL-42	Pink	07/03/2001	52°56'N	145° 01'W	LL	468	0.1	LL1685	BB6475
1313	RL-42	Sockeye	07/03/2001	51°57'N	144° 56'W	HL	574	X.X	LL1715	KK1605
1317	RL-42	Coho	07/03/2001	51°57'N	144° 56'W	HL	640	2.1	LL1716	KK1606
1329	RL-42	Steelhead	07/04/2001	51°58'N	144° 54'W	LL	645	X.1	LL1687	BB6477
1332	RL-42	Chum	07/04/2001	51°58'N	144° 54'W	LL	525	0.2	LL1688	BB6478
1347	RL-42	Sockeye	07/04/2001	51°58'N	144° 54'W	LL	638	1.2	LL1689	BB6479
1308	RL-42	Coho	07/04/2001	51°58'N	144° 54'W	LL	687	1.1	LL1690	BB6480
1349	RL-42	Pink	07/04/2001	51°58'N	144° 54'W	LL	510	0.1	LL1693	BB6483
955	RL-42	Chum	07/07/2001	49°58'N	144° 55'W	LL	485	0.2	LL1694	BB6484
926	RL-42	Chum	07/07/2001	49°58'N	144° 55'W	LL	368	0.1	LL1695	BB6485
958	RL-42	Chum	07/07/2001	49°58'N	144° 55'W	LL	453	0.2	LL1696	BB6486
1336	RL-42	Pink	07/07/2001	49°58'N	144° 55'W	LL	467	0.1	LL1697	BB6487
<i>F/V Great Pacific</i>										
949	RL-42	Chum	08/01/2001	56°42'N	151° 17'W	trawl	560	0.2	-	-
907	RL-42	Pink	08/01/2001	56°55'N	151° 29'W	trawl	503	0.1	-	-
941	RL-42	Pink	08/01/2001	56°55'N	151° 29'W	trawl	495	0.1	-	-
947	RL-42	Sockeye	08/01/2001	56°55'N	151° 29'W	trawl	655	1.2	-	-
948	RL-42	Chum	08/01/2001	56°55'N	151° 29'W	trawl	460	0.2	-	-
1333	RL-42	Coho	08/02/2001	57°24'N	152° 07'W	trawl	553	1.1	-	-
1348	RL-42	Coho	08/05/2001	56°15'N	153°31'W	trawl	605	1.1	-	-
1353	RL-42	Coho	08/05/2001	56°15'N	153°31'W	trawl	660	1.1	-	-
1355	RL-42	Sockeye	08/05/2001	56°15'N	153°31'W	trawl	400	2.1	-	-
1356	RL-42	Sockeye	08/05/2001	56°08'N	153°22'W	trawl	620	2.2	-	-
1350	RL-42	Sockeye	08/05/2001	55°55'N	153°09'W	trawl	622	2.2	-	-

continued

Table 1. continued.

Vessel and Data Tag #	Tag Model	Species	Release Date	Location		Gear	Fork Length	Age	Other tags	
				Latitude	Longitude				FRI	FAJ
<i>F/V Great Pacific (continued)</i>										
1351	RL-42	Chum	08/05/2001	55°55'N	153°09'W	trawl	420	0.1	-	-
1361	RL-42	Chum	08/05/2001	55°55'N	153°09'W	trawl	560	0.2	-	-
1362	RL-42	Chum	08/05/2001	55°42'N	152°55'W	trawl	404	0.1	-	-
705	LTD-1100	Chum	08/05/2001	55°42'N	152°55'W	trawl	410	0.1	-	-
607	LTD-1100	Chum	08/05/2001	55°42'N	152°55'W	trawl	407	0.1	-	-
612	LTD-1100	Sockeye	08/06/2001	55°42'N	152°55'W	trawl	350	1.1	-	-
711	LTD-1100	Sockeye	08/06/2001	55°42'N	152°55'W	trawl	325	1.1	-	-

Table 2. Preliminary release and recovery information for U.S. tags and cooperative Japan-U.S. tags returned from 1 October 2000 to 30 September 2001. A blank indicates the information is not available. LL=longline, PS=purse seine. 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: RL-31 and RL-42 are model numbers; both record temperature and depth.

U.S.		Release						Recovery											
Tag	Tag No.	Date	Lat. (°N)	Long.	2°X5° Area	Gear (mm)	FL	Age	Date	Lat. (°N)	Long.	Area Code	Gear	Sex	FL (mm)	BW (g)	Gonad (g)	Age	Location
A. Sockeye Salmon																			
LL-3493, RL-31 data tag no. 1078	EE4286	28-Jun-00	53°30'	180°00'	W8052	LL	610	2.3	08-Sep-00	62°44'	164°52'W	42-1	-	-	-	-	-	-	Atakanuk Slough, Yukon R. delta, western Alaska, USA
B. Pink Salmon																			
RL-42 data tag no. 941		01-Aug-01	56°55'	151°30'	W5556	trawl	495	0.1	05-Aug-01	57°43'	152°12'W	56-2	PS	-	-	-	-	-	Cape Chiniak, east coast of Kodiak Is., central Alaska, USA
C. Coho salmon																			
LL-1675, RL-42 data tag no. 1337	BB6465	02-Jul-01	53°59'	145°02'W	W5052	LL	622	1.1	10-Aug-01	58°03'	136°36'W	62-0	troll	-	655	-	-	-	1.1 Hocktaheen, Yakobi Is., Cross Sound, southeast Alaska, USA
RL-42 data tag no. 1348		05-Aug-01	55°58'	144°56'W	W4554	trawl	605	1.1	29-Aug-01	56°21'	158°16'W	54-1	PS	-	-	-	-	-	1.1 Chignik Lagoon, Pacific coast of Alaska Peninsula, central Alaska, USA

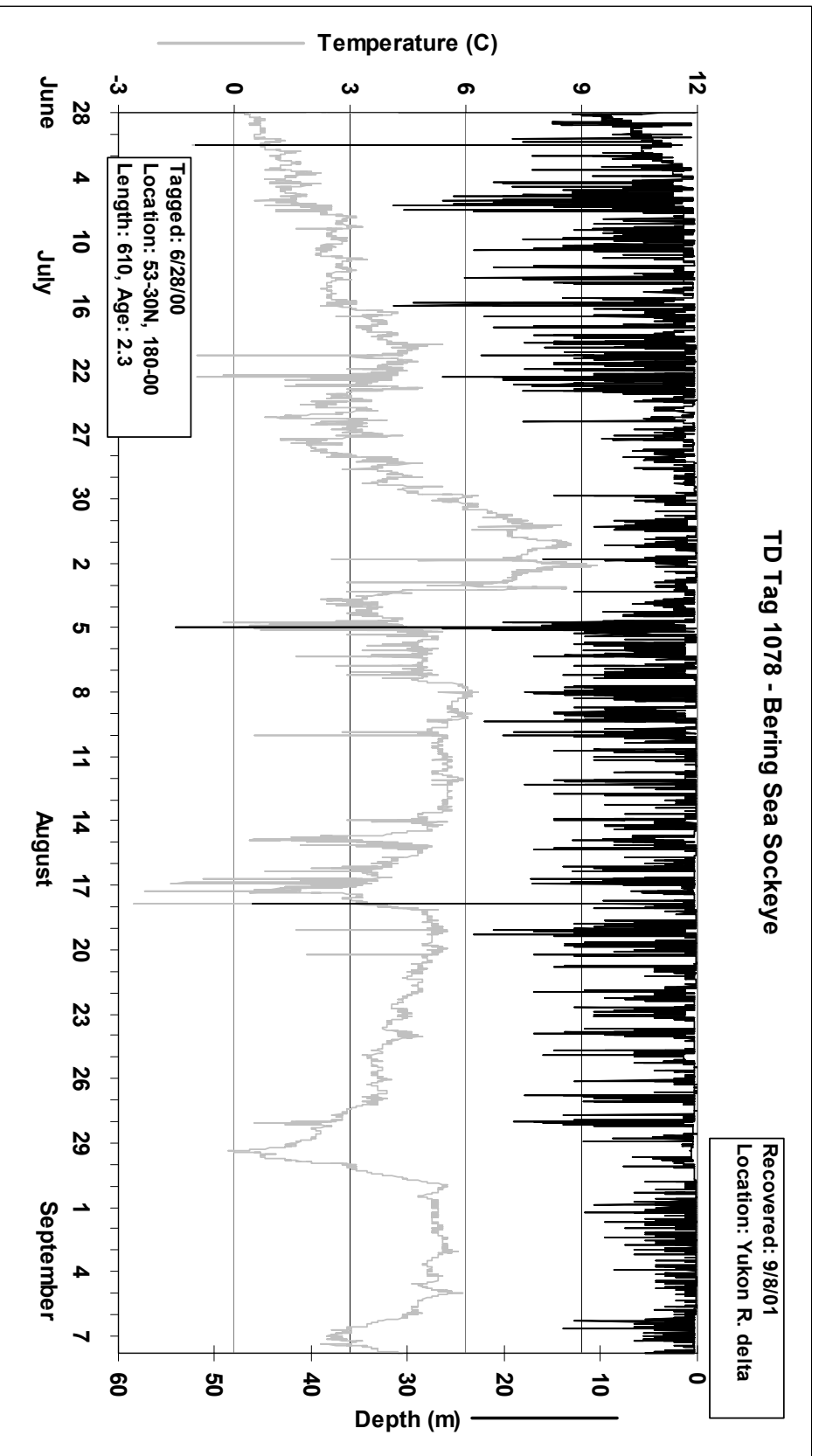


Figure 1. Temperature and depth data recorded on a data storage tag placed on a 610 mm sockeye salmon in the Bering Sea on 28 June 2000 and recovered in Alakanuk Slough, Yukon River delta, western Alaska, on 8 September 2000. Because of bad calibration data, temperature and depth data may not be reliable.

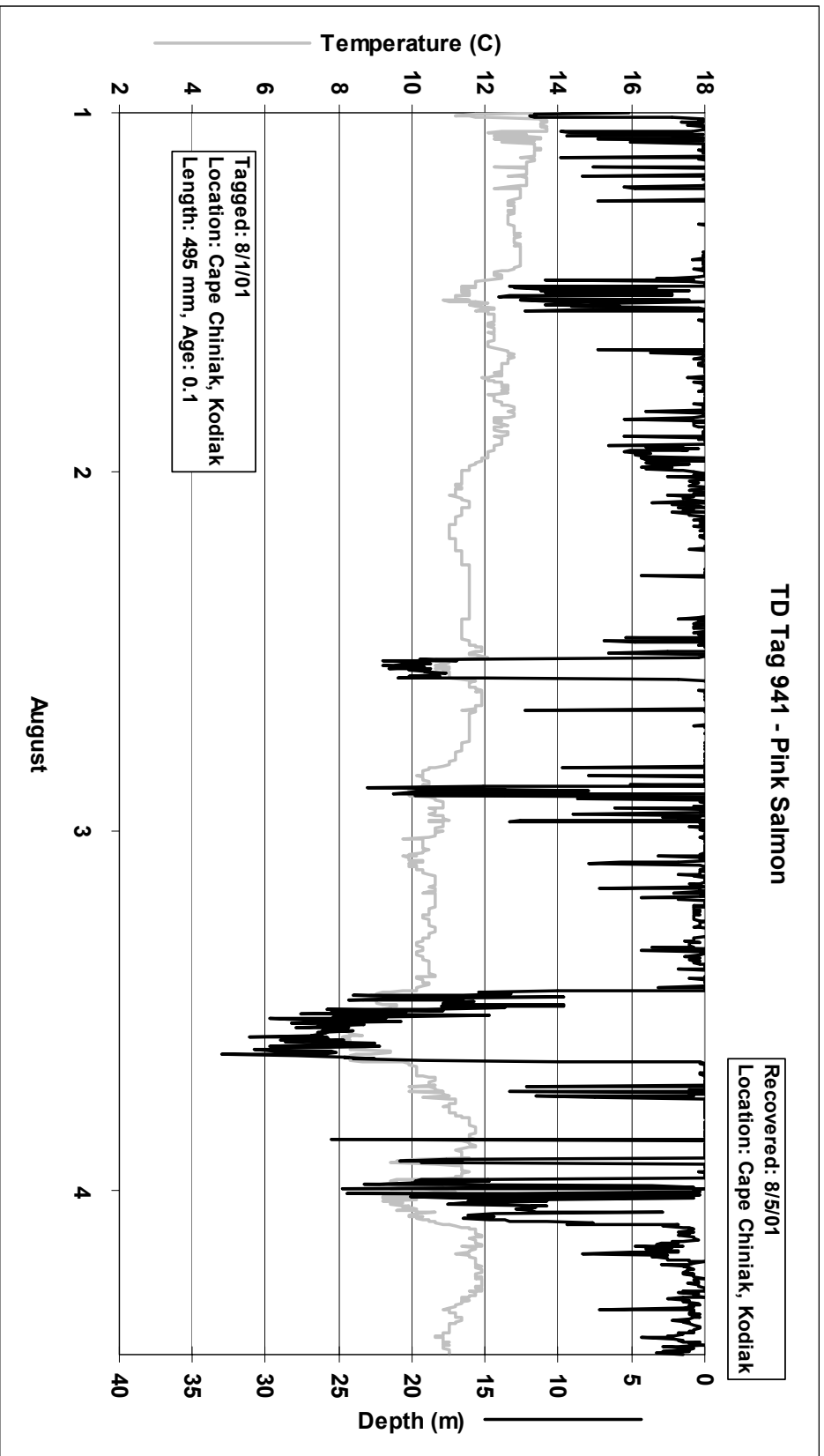


Figure 2. Temperature and depth data recorded on a data storage tag placed on a 495 mm pink salmon off Kodiak Island on 1 August 2001 and recovered off Kodiak Island, south central Alaska, on 5 August 2001.

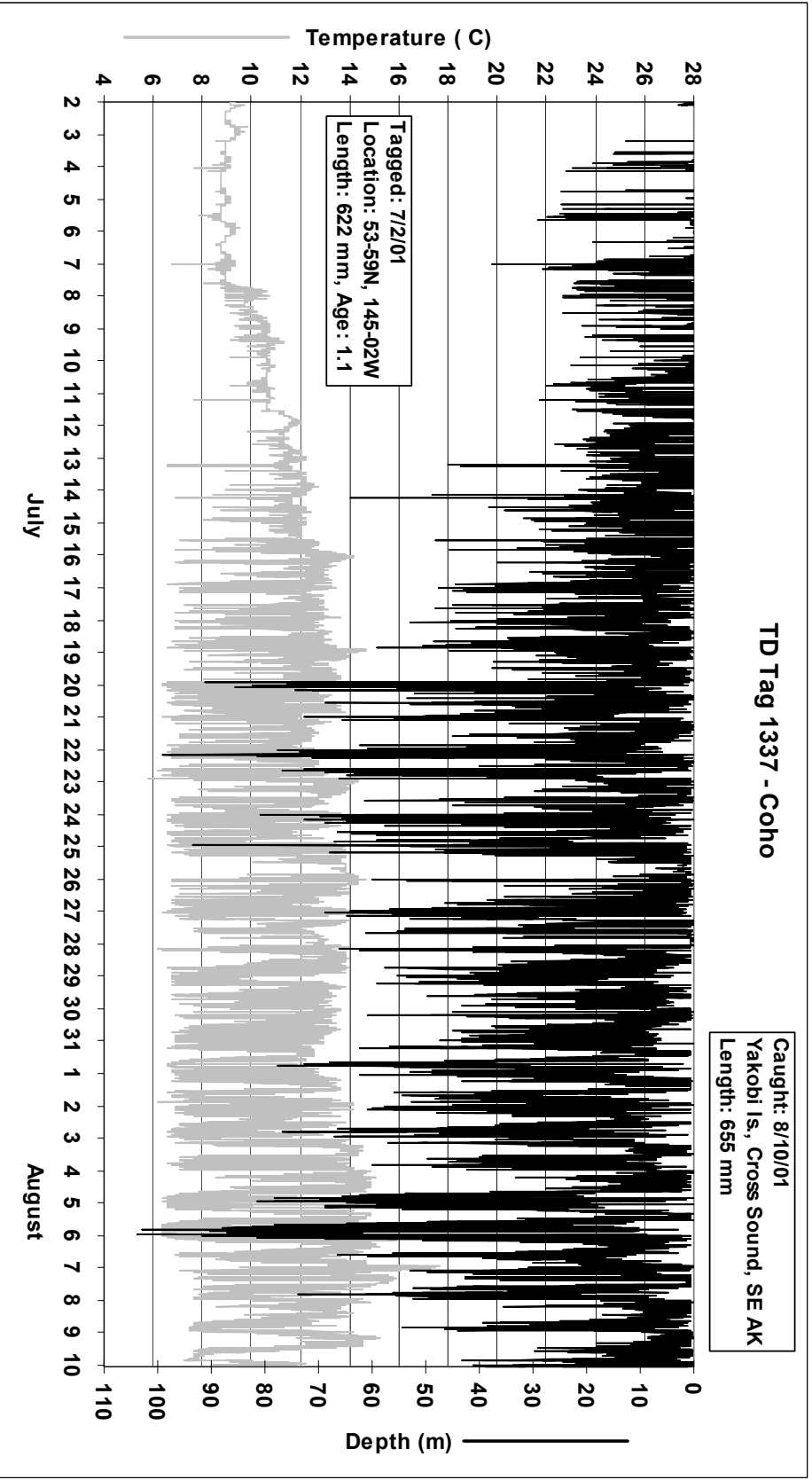


Figure 3. Temperature and depth data recorded on a data storage tag placed on a 622 mm coho salmon in the Gulf of Alaska on 2 July 2001 and recovered off Yakobi Island, southeastern Alaska, on 10 August 2001.

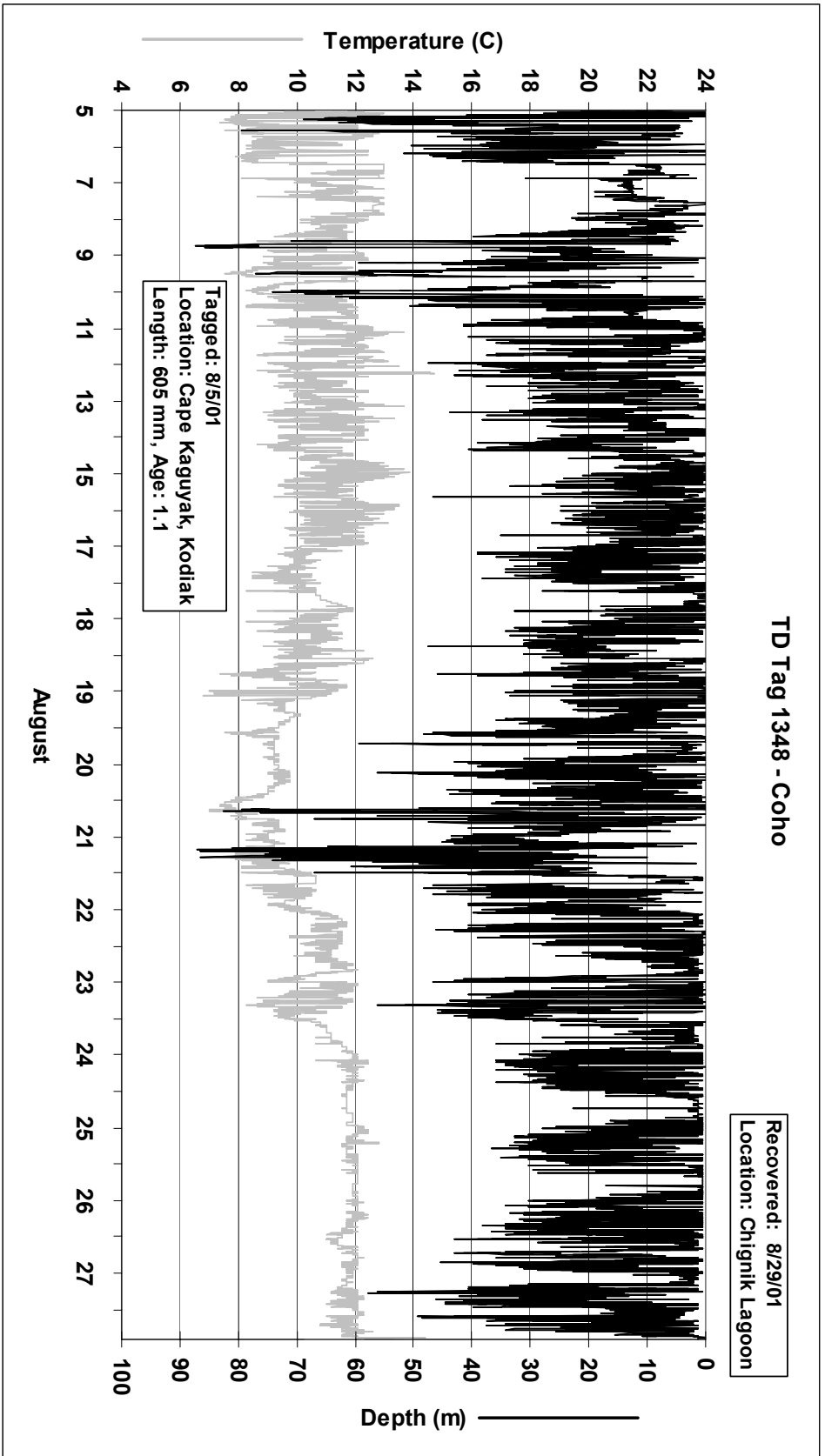


Figure 4. Temperature and depth data recorded on a data storage tag placed on a 585 mm coho salmon off Kodiak Island on 5 August 2001 and recovered in Chignik Lagoon, south central Alaska, on 29 August 2001.