

Project #: R0204

Title: NPAFC Salmon Tagging

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Contract Period and Amount of Funding: July 1, 2002 to October 31, 2003: \$190,800 (extension requested through October 31, 2005)

Report Period: July 1 to December 31, 2003

Report Date: January 6, 2004

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Project Summary: The goal of the NPAFC Salmon Tagging project is to gain a better understanding of the distribution patterns, habitat utilization, and movements of Asian and North American salmon migrating in the Bering Sea and North Pacific Ocean. The research is coordinated by NPAFC as a part of their international cooperative salmon research program, the Bering-Aleutian Salmon International Survey (BASIS). Funding from NPRB is used primarily to purchase tags that are deployed on salmon caught during BASIS research vessel cruises in the Bering Sea and Gulf of Alaska. Several types of tags, ranging from simple numbered plastic discs to complex electronic tags that record sea temperature, depth, and daily position estimates are used. The BASIS working group of NPAFC coordinates, implements, and reports the results of our salmon tagging research. The proposed work complements ecosystem research and monitoring activities of the North Pacific Marine Science Organization (PICES) and Global Ocean Ecosystem Dynamics (GLOBEC), as well as the electronic tagging research activities of the Pacific Ocean Salmon Tracking (POST) program of the Census of Marine Life.

Progress Summary:

In 2003 there were 10 reported recoveries in Asia and North America from salmon tagged and released with electronic data storage (DST) tags (Tables 1 and 2). Five salmon tagged with iButton tags, which record sea temperature, were recovered (4% recovery rate, to date), one in Alaska and four in or off of eastern Kamchatka. Five salmon with tags that record sea temperature and depth were recovered (14% recovery rate, to date), one in Alaska, one in Sakhalin, one off southern Kamchatka, and two in Hokkaido. These recoveries provide important new time-series data that show the temperature-depth habitats of maturing Russian, Japanese, and western Alaska salmon from release in common feeding grounds in the central Bering Sea in July to recovery in coastal fisheries, natal streams, or hatcheries, including:

- The first DSTs from Asian pink salmon (Figs. 1 and 2);
- The second and third DSTs from Bristol Bay/North Peninsula sockeye salmon (Figs. 3 and 4);
- The first DST from a Russian hatchery salmon;
- The second DST from a Russian sockeye salmon; and
- The first DST from a Russian chum salmon (Fig. 6),

In addition, data from Asian chum salmon DSTs will allow BASIS scientists to compare and infer possible differences in migration routes of Japanese and Russian fish (Figs. 5 and 6).

Additional information on NPAFC's tag recovery and reward program can be found on our web page (<http://www.npafc.org/>, see "Fish Tag Recovery Program").

Table 1. Recoveries of iButton tags released in 2003. All fish were tagged in the Bering Sea, near 180° longitude.

Tag Number	Species	Tagging Latitude	Release Date	Recovery Date	Recovery Area
W-31	Sockeye	58°30N	7/2/03	7/21/03	Naknek, Bristol Bay, Alaska
W-32	Chum	56°30N	7/6/03	7/21/03	Russian EEZ, E Kamchatka
W-64	Pink	54°30N	6/28/03	7/23/03	Olyutorsky Bay, NE Kamchatka
W-65	Pink	54°30N	6/28/03	8/9/03	Karaginsky Bay, NE Kamchatka
W-75	Pink	57°30N	7/1/03	7/26/03	Karaginsky Bay, NE Kamchatka

Table 2. Recoveries of temperature-depth tags released in 2003. All fish were tagged in the Bering Sea, between 177°E and 180° longitude.

Tag Number	Species	Tagging Latitude	Release Date	Recovery Date	Recovery Area
1685	Sockeye	54°30N	6/28/03	7/31/03	North Alaska Peninsula, Alaska
1396	Chum	57°30N	7/10/03	9/12/03	Kalininsky Hatchery, Sakhalin
1603	Chum	56°30N	7/9/03	10/11/03	Nemuro Coast, Hokkaido
1688	Sockeye	55°30N	6/29/03	8/7/03	S tip of Kamchatka
1709	Chum	56°30N	7/7/03	9/23/03	Okhotsk Coast, Hokkaido

Project Administration and Management:

The NPAFC Salmon Tagging project was approved in on June 20, 2002. A Memorandum of Understanding between NPRB and NPAFC was signed on January 29, 2003. Funds for the purchase of tags were transferred to NPAFC in mid-April 2003, but the transfer was too late for the manufacturer to provide tags before the start of the BASIS field season in May 2003. Due to delays in funding significant opportunities to tag and release salmon during BASIS research cruises in 2002 and 2003 were lost. An extension of the project through October 30, 2005 has been requested by NPAFC.

Tags purchased with NPRB funds in 2003:

Tag type	Maker	Model	No.	Date
Temperature-Depth	Lotek	LTD_1100-500	20	6/16/03
iButton	AlphaMach	iBLite	117	5/29/03
iButton	AlphaMach	iBKrill	91	7/8/03
disk tag	Floy Tag		1,000	7/18/03

Action planned for 2004 and 2005:

In 2004-2005 tags will be used by BASIS research vessels that capture salmon suitable for tagging. The planned re-scheduled delivery of tags is as follows:

Data tag deliveries planned for 2004-2005:

	2004	2005	Total
Geolocation	20	20	40
Temperature-Depth	100	80	180
Total DST	120	100	220

Due to lower-than-anticipated costs of tags, there are sufficient funds remaining to purchase additional iButton tags in 2004, to supplement the 80 iButtons and 18 temperature depth tags left from the 2003 season.

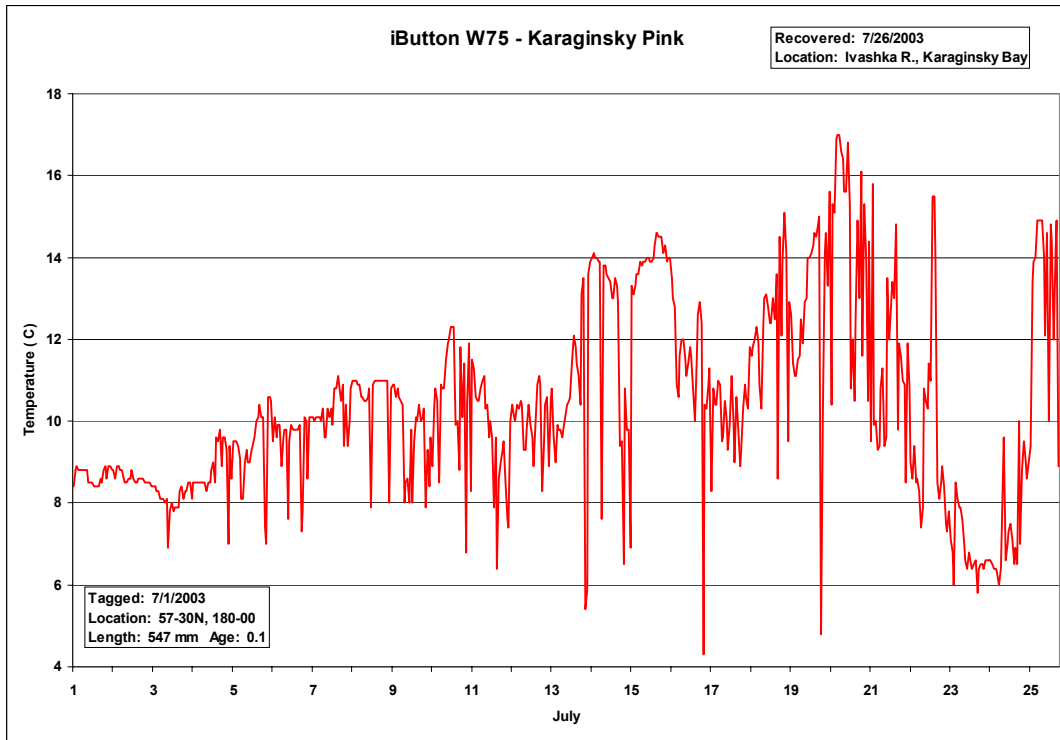


Fig. 1. Sea temperature (°C) data from iButton tag W-75. Pink salmon released in the Bering Sea (180°-longitude, 57°30N) on 7/1/03 and recovered in northeastern Kamchatka, Russia (Karaginsky Bay) 7/26/03.

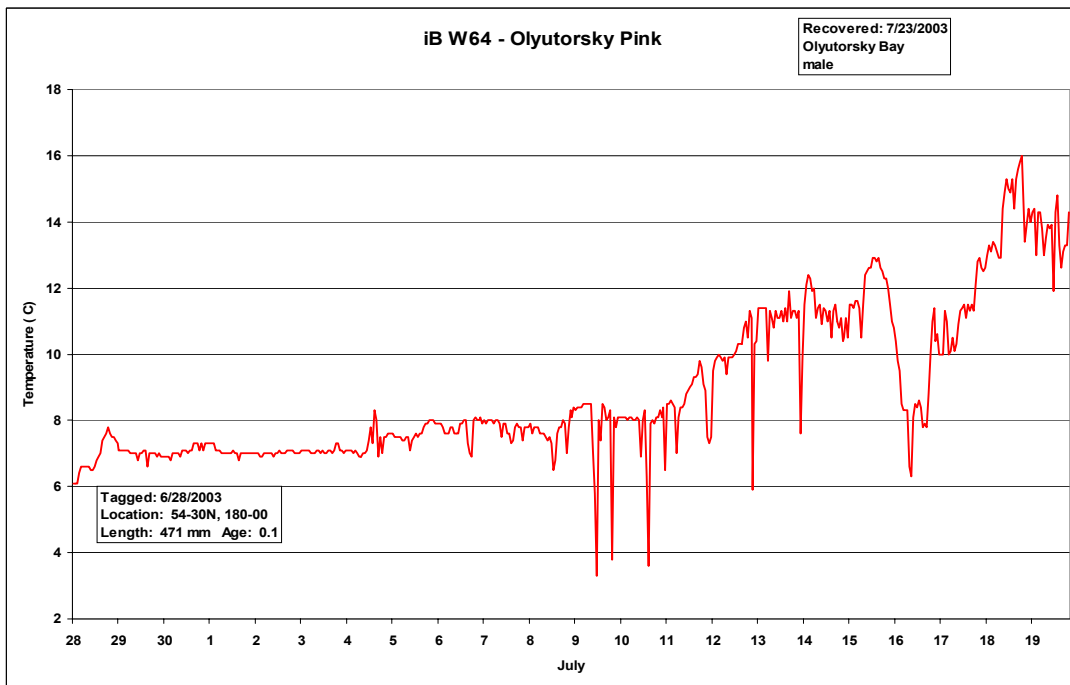


Fig. 2. Sea temperature (°C) data from iButton tag W-64. Pink salmon released in the Bering Sea (180°-longitude, 54°30N) on 6/28/03 and recovered in NE Kamchatka, Russia (Olyutorsky Bay) on 7/23/03.

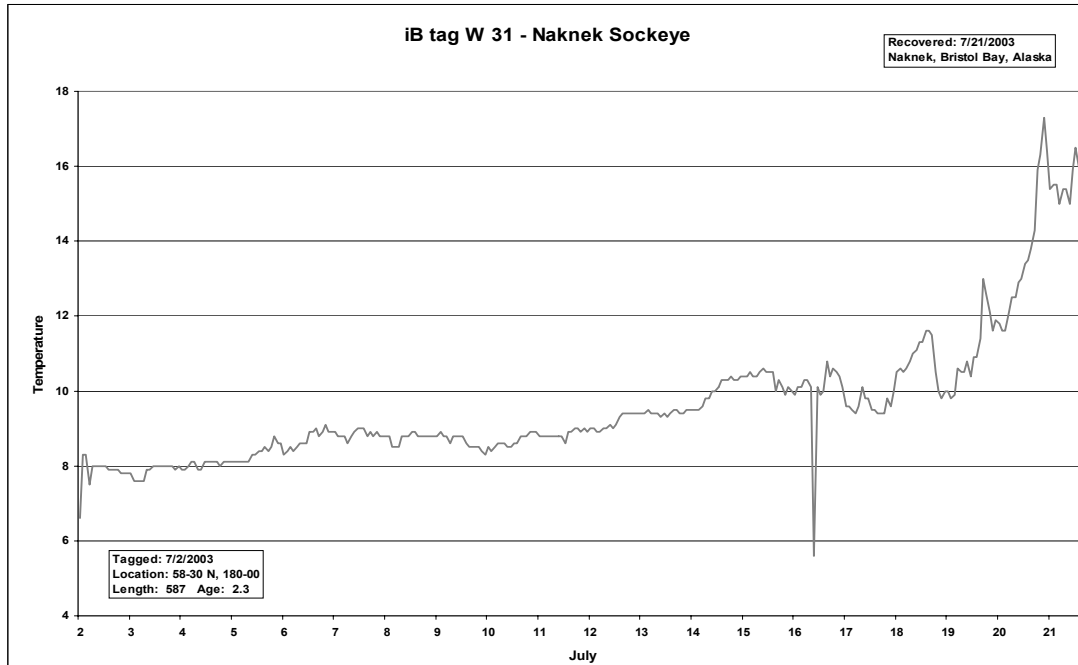


Fig. 3. Sea temperature ($^{\circ}\text{C}$) data from iButton tag W-31. Sockeye salmon released in the Bering Sea (180° -longitude, $58^{\circ}30\text{N}$) on 7/02/03 and recovered in Bristol Bay, Alaska (Naknek Fishing District) on 7/21/03.

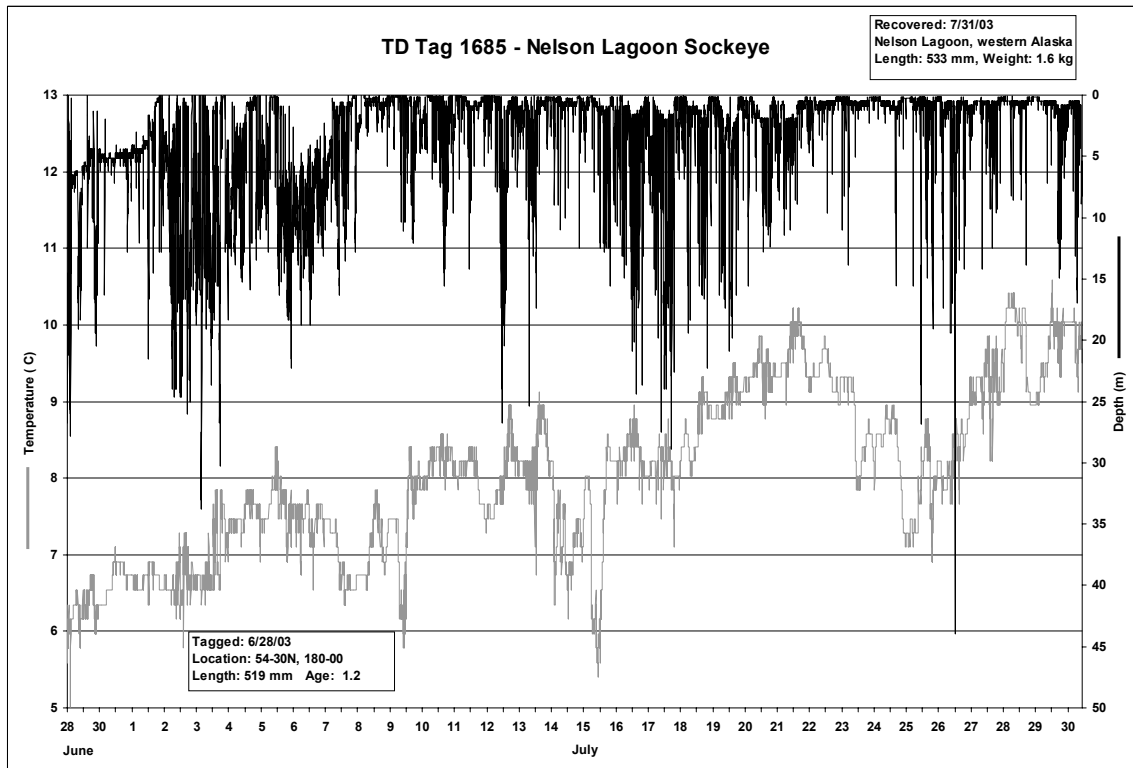


Fig. 4. Sea temperature ($^{\circ}\text{C}$ on left axis, grey line) and depth (m on right axis, black line) data from TD 1685. Sockeye salmon released in the Bering Sea (180° -longitude, $54^{\circ}30\text{N}$) on 6/28/03 and recovered in Nelson Lagoon, North Alaska Peninsula, on 7/31/03.

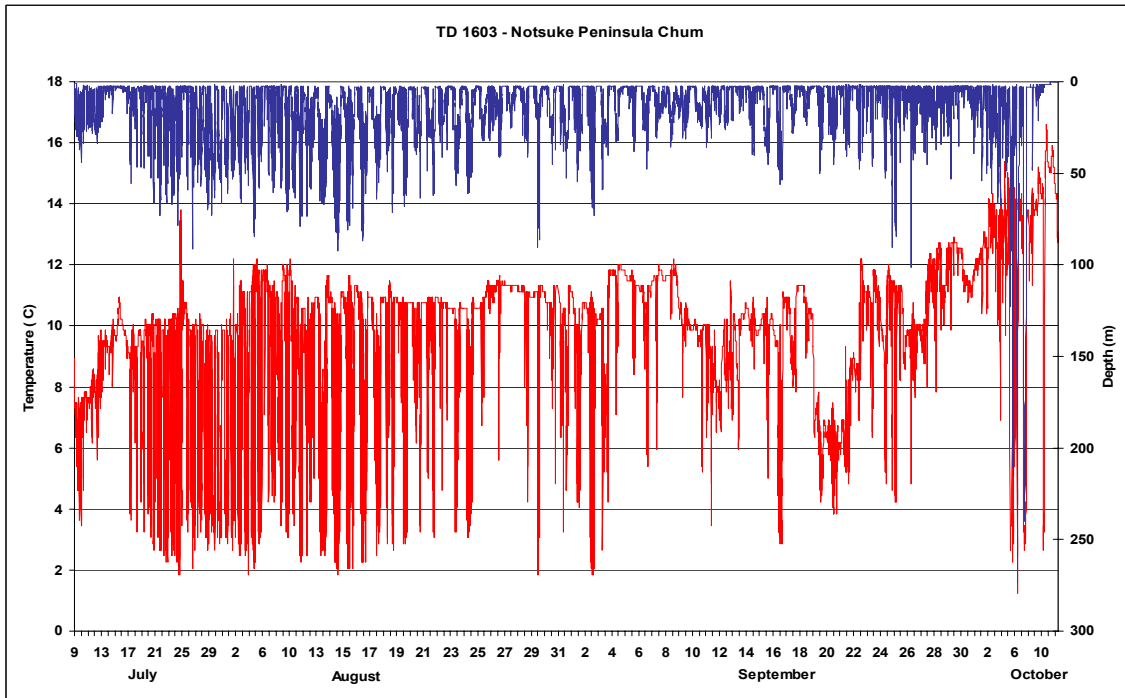


Fig. 5. Sea temperature ($^{\circ}\text{C}$ on left axis, red line) and depth (m on right axis, blue line) data from TD 1603. Chum salmon released in the Bering Sea ($177^{\circ}00'\text{E}$, $56^{\circ}30'\text{N}$) on 7/9/03 and recovered in on the Nemuro Coast, Hokkaido, Japan on 10/11/03.

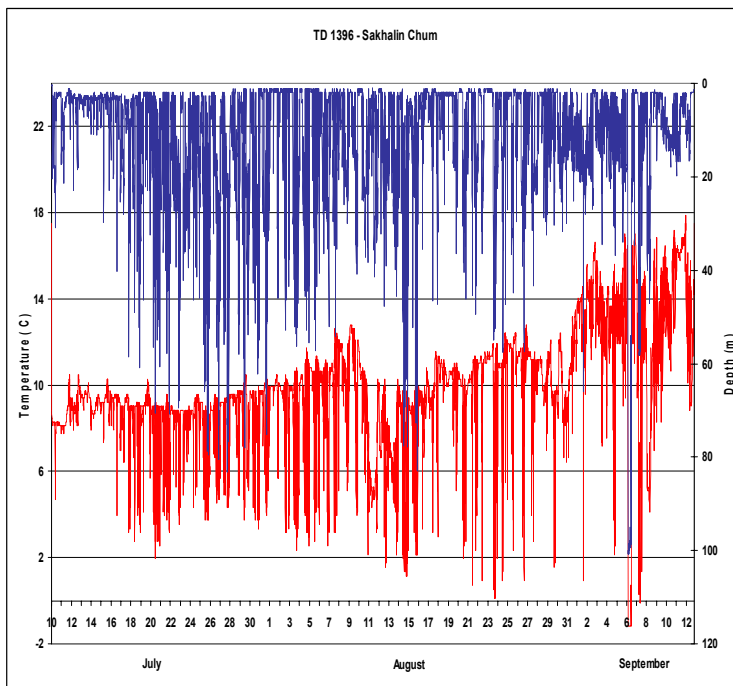


Fig. 6. Sea temperature ($^{\circ}\text{C}$ on left axis, red line) and depth (m on right axis, blue line) from TD 1396. Chum salmon released in the Bering Sea ($177^{\circ}00'\text{E}$, $57^{\circ}30'\text{N}$) on 7/10/03 and recovered at the Kalininsky Hatchery, Sakhalin Island, Russia on 9/12/03.