

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 approved through September 30, 2006)

Report Period: June 30 to December 31, 2005

Report Date: January 15, 2006

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Project Summary: The goal of the North Pacific Anadromous Fish Commission (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, salinity, 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 2005, 138 electronic data storage tags (DSTs) were released during the research cruise of a Japanese vessel, the *Wakatake maru*, in June and July. Tags were released along 180° in the central North Pacific Ocean and Bering Sea, between 42°N and 58°30'N, and in international waters (the donut hole) in the Bering Sea between 178°E and 178°W longitude and between 56°30'N and 58°30'N latitude. Four types of DSTs were used: geolocating tags (recording temperature, depth, and geolocation based on light levels), CTD tags (recording conductivity (salinity), temperature, and depth), TD tags (temperature and depth) and iButton tags (temperature only). These included new and replacement tags received in 2005 and tags remaining from the 2004 field season.

*Data Tags Released in 2005:*

Geolocating	20
CTD	10
Temperature-Depth	101
iButton	7
Total DST	138

In our last two progress reports, we have reported recoveries of 24 DSTs recovered from tagging activities in 2004. Subsequently we have received two more temperature-depth tags from 2004 tagging (Table 1) and another 2004 TD tag has been reported from Sakhalin, Russia, but not yet returned. Overall recovery rate for DSTs released in 2004 is 8.8% (27 of 306). All three 2004 tags were from 2005 recoveries, and the tags should have carried overwintering data. Unfortunately, the two tags received so

far have failed; all three tags are part of a batch of tags that has had a very high rate of failures. All failed tags have been returned to the manufacturer for evaluation and replacement.

We have also received four tags from tagging in 2005 (Table 1). These tags were recovered in three locations in Russia (Figs. 1-3) and one in Japan (Fig. 4). The tag from Japan ceased collecting data 83 days after release (58 days before recapture). Despite the large number of tags deployed in 2005, recoveries so far have been relatively few. This is partially due to tagging more immature fish, which will return in 2006 or later, but 2005 has been a poor year for tag recoveries in general.

Table 1. Recoveries of data storage tags in 2005, by tag type. Tagging location designated as NP (North Pacific Ocean) or BS (Bering Sea).

Tag Type	Tag		Location	Tagging		Release Date	Recovery Date	Recovery Area
	No.	Species		Lat.	Long.			
TD	7457	chinook	BS	56°30	178°W	7/7/04	5/05	Kamchatka River, Russia
TD	7484	chinook	BS	56°30	177°E	7/11/04	6/30/05	Yukon River, Alaska
TD	8116	coho	BS	42°	180°	6/16/05	9/5/05	W. Kamchatka, Russia
TD	9423	chum	BS	48°30	180°	6/23/05	11/05/05	Pacific coast, Hokkaido
TD	9427	coho	BS	48°30	180°	6/23/05	8/14/05	Kuril Islands, Russia
TD	9476	pink	BS	58°30	180°	7/7/05	/05	Olyutorskiy Bay, Russia

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").

Outreach and Other Activities

R. Walker presented a paper summarizing the results of new information from U.S. and NPRB tagging programs at the Annual Meeting of the American Fisheries Society held in Anchorage September 11-15, 2005. The paper was part of a special symposium on Bering Sea research under the BASIS program of NPAFC, "Science Bridging Five Nations: The Bering-Aleutian Salmon International Survey."

R. Walker also presented a paper on depth distribution of salmon, which relied heavily on data collected from NPRB tagging, at the joint NPAFC-PICES symposium "The Status of Pacific Salmon and their Role in North Pacific Marine Ecosystems", held on Jeju Island, Korea, October 30-November 1, 2005.

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. Because of delays in transfer of funds and lost opportunities to tag and release salmon during BASIS research cruises in 2002 and 2003, an extension of the project through October 30, 2005 was requested by NPAFC and approved by NPRB on December 19, 2003. A further extension of the project through September 30, 2006 was requested by NPAFC and approved by NPRB on April 13, 2005. The new extension allows follow-up on recoveries of tags released in 2005 and preparation of a complete final report.

No tags were purchased in the reporting period. Travel funds were provided for R. Walker to present papers on NPRB tagging at the two meetings detailed above.

Action planned for 2006:

An opportunity arose to put tags on salmon caught during a rare winter cruise in the North Pacific Ocean by the Japanese research vessel *Kaiyo maru*. There are 279 disk tags remaining from the 2004 field season and one unused CTD archival tag. In addition, there are eight TD tags which have been used but can be re-used. A small order for additional TD tags may also be placed, to be paid for with funds remaining in the equipment category. A U.S. scientist will participate and assist with tagging on each of the two legs of the cruise. Travel funds will be used to support one scientist to board the vessel in Japan. Remaining funds will be used to prepare a manuscript for publication as the final report for the project.

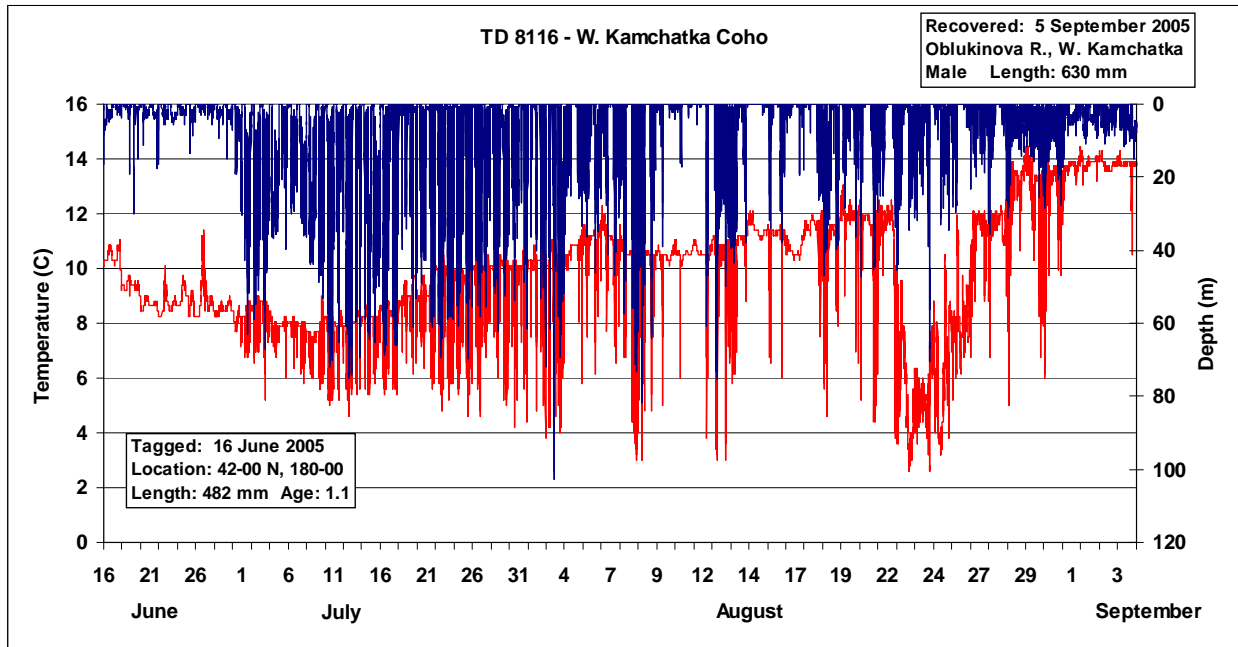


Fig. 1. Sea temperature ( $^{\circ}\text{C}$  on left axis, red line) and depth (m on right axis, blue line) data from TD 8116. Coho salmon released in the North Pacific Ocean ( $180^{\circ}00'$ ,  $42^{\circ}00'\text{N}$ ) on 6/16/05 and recovered in the Oblukinova River, West Kamchatka, Russia on 9/5/05.

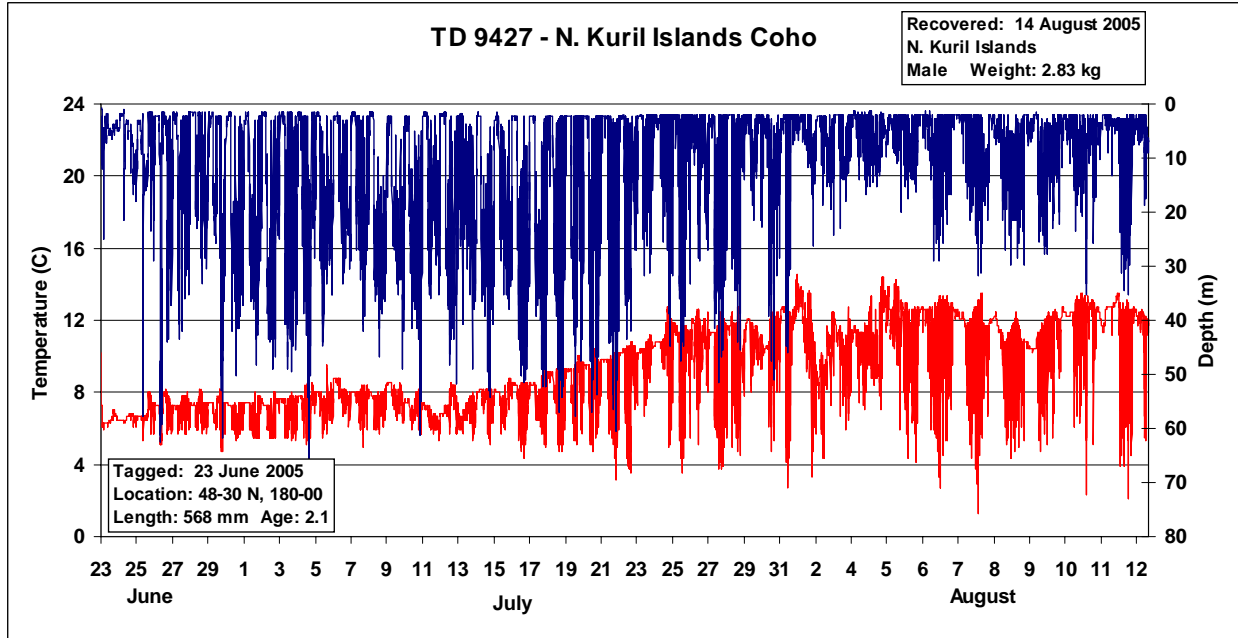


Fig. 2. Sea temperature ( $^{\circ}\text{C}$  on left axis, red line) and depth (m on right axis, blue line) data from TD 9427. Coho salmon released in the North Pacific Ocean ( $180^{\circ}00'$ ,  $48^{\circ}30'\text{N}$ ) on 6/23/05 and recovered in the north Kuril Islands, Russia on 8/14/05.

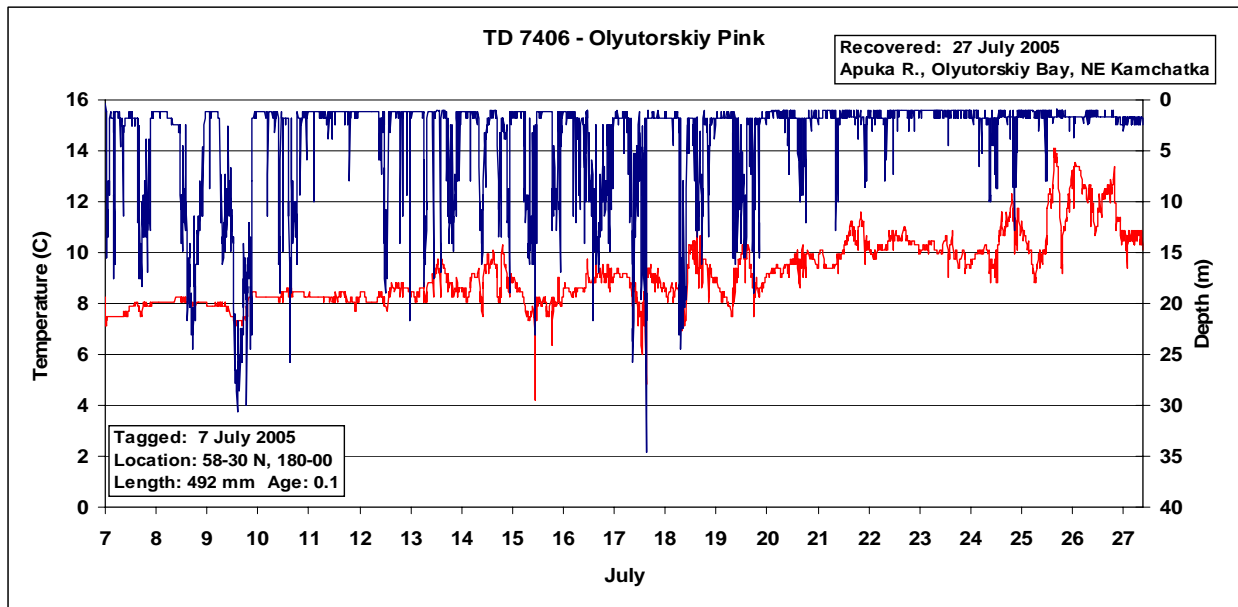


Fig. 3. Sea temperature (°C on left axis, red line) and depth (m on right axis, blue line) data from TD 9427. Coho salmon released in the Bering Sea (180°00', 58°30N) on 7/7/05 and recovered in the Apuka River, Olyutorskiy Bay, northeastern Kamchatka, Russia on 7/27/05.

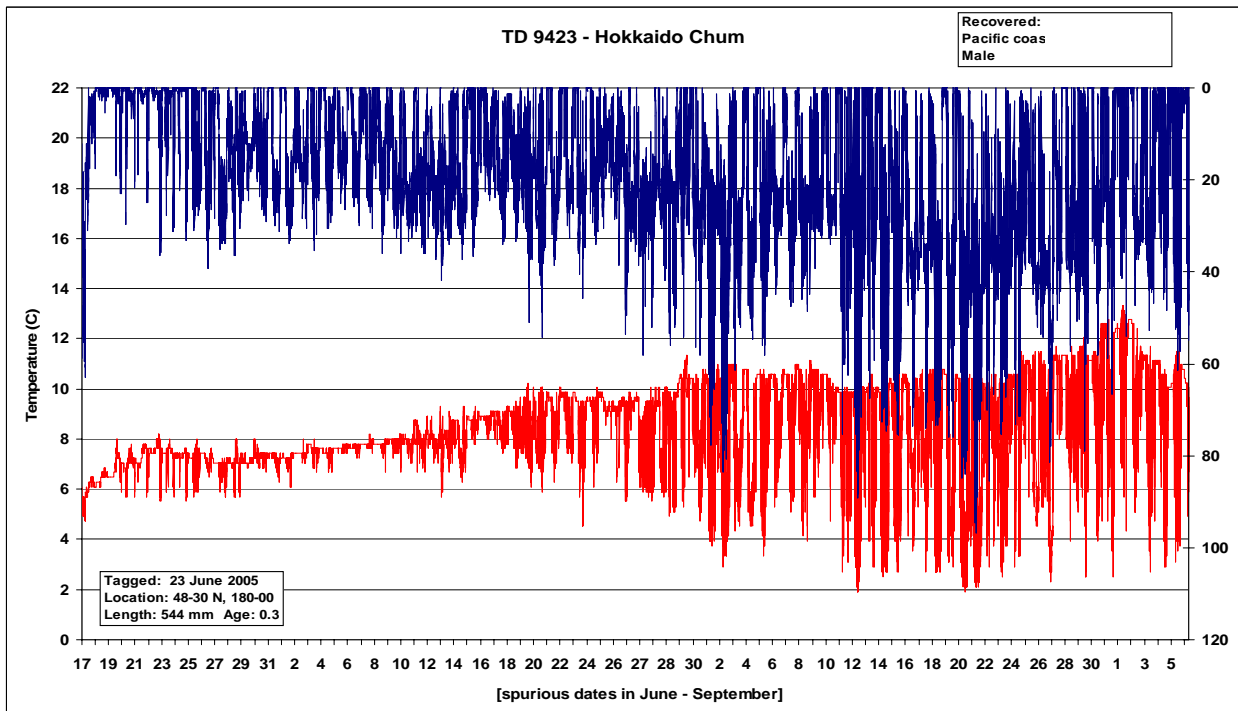


Fig. 3. Sea temperature (°C on left axis, red line) and depth (m on right axis, blue line) data from TD 9423. Chum salmon released in the North Pacific Ocean (180°00', 48°30N) on 6/23/05 and recovered on the Pacific coast of Hokkaido, Japan, on 11/5/05.