North Pacific Research Board
Project Synopsis

PROJECT
204 303

North Pacific Anadromous Fish Commission salmon tagging

FUNDING SUMMARY
Principal Investigators
Jack Helle,
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North Pacific Anadromous Fish Commission

Year funded
2002

Research period
July 2002–September 2006

Budget
$190,167

WHERE DO THE SALMON GO?

Where do salmon go in the open ocean, and what affects their survival? Before leaving the ocean to return to their home streams, a stock of salmon may be distributed across two thousand square miles of ocean habitat. Salmon in the Bering Sea have been taking longer to mature and, once they reach adulthood, are smaller than they have been historically, possibly due to a lack of food during their time in the ocean. We need a better understanding of the stock dynamics, assessment and ecology of Bristol Bay sockeye salmon to aid in fisheries management.

WHY WE DID IT

We wanted to better understand the distribution patterns, habitat use, and movements of Asian and North American salmon migrating in the Bering Sea and North Pacific Ocean. This understanding would help us determine the extent to which competitive feeding dynamics between different stocks and species may be negatively affecting the growth, maturation rates, and survival of salmon in the Bering Sea.

HOW WE DID IT

Over the course of three years, we tagged almost 1,500 salmon (*Oncorhynchus sp.*) in an effort to learn more about the depths, salinities and temperatures preferred by different species of salmon. Tag types included simple numbered plastic discs as well as four types of complex electronic tags that recorded sea temperature, depth, salinity, and daily position estimates. During the summer and fall seasons of 2003-2005, and winter and spring cruises in 2006, 595 archival tags and 862 disk tags were placed on fish. We captured fish using surface longline, hook-and-line, and surface trawl gear. The development of a live box protected fish during capture with trawl sampling.

(Continued)

The Big Picture

We now have more information on the vertical distribution of some salmon species during the time they spend in the ocean. Baseline data and monitoring will be needed to detect changes in these distributions over multi-year periods.

NPRB Research Interest

Managers and policymakers can use these data to guide trawling efforts, such as avoiding salmon bycatch by timing trawls for periods when high numbers of salmon are not close to the surface.

RESEARCH THEME
Fish and Invertebrates

WHAT WE DISCOVERED

To date, 50 data tags have been recovered and returned, for an overall recovery rate of 7.8 percent. The greatest number of recoveries have come from chum (*O. keta*) and sockeye (*O. nerka*). We also had 21 recoveries (19 chum and 2 sockeye) from 530 fish carrying only disk tags, a 4.0 percent recovery rate. The recovery of a data tag in Sand Point, Alaska, was the first record from a maturing sockeye from southcentral Alaska tagged in the Bering Sea and was the first indication that some fish from this area spend part of their final spring and summer in the Bering Sea. This is a northward range extension for this group of stocks. Specifically, we found that chum and chinook (*O. tshawytscha*) salmon prefer deeper (58-130 meters) water than sockeye, pink (*O. gorbuscha*) and coho (*O. kisutch*) salmon (22-46 meters), but temperatures varied widely. This indicates that fish choose depth over temperature and that these depths may remain relatively constant across water masses and ocean areas. It remains to be seen whether warming ocean temperatures might lead to increases in depths preferred by both salmon and their prey.

WHAT'S NEXT?

NPRB Project 303 extended this research for another three years, expanding the focus to include salmon captured in other surveys. Researchers investigated the stock composition and abundance of Asian and Alaskan chum salmon in the Bering Sea, their seasonal migration routes and timing, and factors affecting the oceanic distribution and abundance of each stock.

A SAMPLING OF OUTREACH

Selected Conference Presentations

- Walker, R. Results of new information from U.S. and NPRB tagging programs at an NPAFC Workshop, "BASIS-2004: Salmon and Marine Ecosystems in the Bering Sea and Adjacent Waters," Sapporo, Hokkaido, Japan, October 30-31, 2004; extended abstract published in NPAFC Technical Report 6.
- Walker, R. Results of new information from U.S. and NPRB tagging programs presented at American Fisheries Society, September 2005.
- Walker, R. presented a paper for inclusion in the proceedings of 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.

Community and Fleet meetings

Posters, explanatory letters, and return envelopes were distributed to over 1,500 locations in North America. Japanese and Russian scientists also advertised for return of tags.

Selected Publications

- Walker, R.V., V.V. Sviridov, S. Urawa, and T. Azumaya. "Spatio-temporal variation in vertical distributions of Pacific salmon in the ocean." NPAFC Bulletin 4: Proceedings of the 2005 NPAFC-PICES Joint Symposium on the Status of Pacific Salmon and Their Role in North Pacific Marine Ecosystems. October 30-November 1, 2005, Jeju Island, Republic of Korea.

Websites

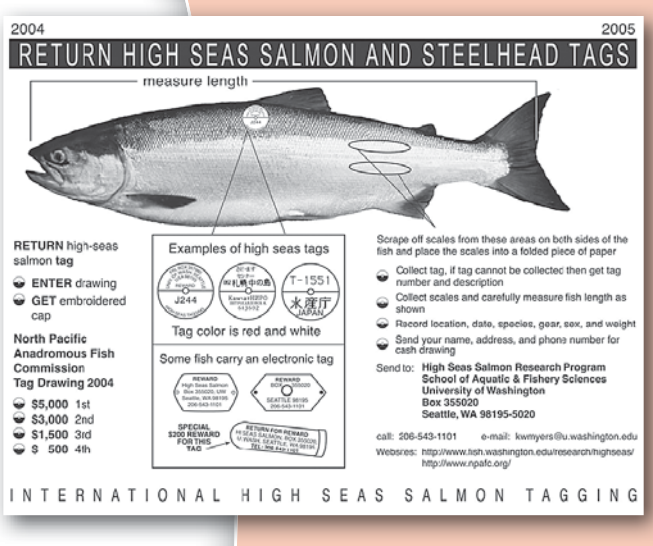
- NPAFC's tag recovery and reward program: www.npafc.org/new/science_fishtag.html
- UW's tag recovery program: www.fish.washington.edu/research/highseas/tagging.html

MORE | http://project.nprb.org

Download reports associated with this project and learn more about fish and invertebrate research funded by NPRB.

MISSION OF THE NPRB

Building a clear understanding of the North Pacific, Bering Sea and Arctic Ocean ecosystems that enables effective management and sustainable use of marine resources



North American tag return poster, 2004-2005.

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