

## North Pacific Research Board: Format for Semiannual Progress Reports

**Please Note:** Semiannual Progress Reports are due beginning with the first July 15 and January 15 after the contract start date, for the first and last six months of the calendar year, respectively, and then every semester thereafter until the contract is completed. If the first report comes due before substantial progress has been made, please just note that in your initial report. If progress reports are delinquent, current and subsequent invoices will not be paid.

Please email electronic copy to: [carolyn.rosner@nprb.org](mailto:carolyn.rosner@nprb.org)  
with the following Subject line: *NPRB Project XXX Progress Report*

If you have any questions about the content of reports or schedule of reporting, please contact: Francis Wiese (907) 644-6713 or email [francis.wiese@nprb.org](mailto:francis.wiese@nprb.org).

Project #: 728

**Title:** *Herring Synthesis: Documenting and Modeling Herring Spawning Areas within Socio-Ecological Systems over Time in the Southeastern Gulf of Alaska*

**Principal Investigator(s) and Recipient Organization(s):** Thomas F. Thornton, Portland State University; [tthornto@pdx.edu](mailto:tthornto@pdx.edu).

**Contract Period and Amount of Funding:** July 1, 2007-June 31, 2009

**Report Period:** January 1 to July 15, 2008

**Report Date:** 7/15/08

**Lead Author of Report:** Thomas F. Thornton

**Project Summary:** Pacific herring (*Clupea pallasii*) is a foundation and bellwether species for North Pacific marine ecosystems. Productive spawning areas (and times) in Southeast Alaska are limited and historical population dynamics and ecology of herring are not well understood. Yet many communities with local and traditional knowledge (LTK) of herring fisheries claim that historical stocks were larger and spawning areas more numerous, but that they have dwindled due to factors such as over-harvesting, predation, disease, development, and climate change. While shifts in stocks and spawning have been documented since 1980, no synthesis of the deeper archaeological, historical, and ethno-ecological records on herring spawning areas has been carried out. We are synthesizing this information for the Southeast AK region, where herring and herring roe traditionally have been harvested in quantity. Using existing archaeological, ethnological, historical and biological records and community focus groups in each historical herring stock region, we are building historical and spatial database (using GIS) to: 1) identify the extent of historic and prehistoric herring spawning and massing areas; 2) link changes in herring spawn extent and intensity to environmental and human factors in the socio-ecological system; and 3) identify sensitive areas for protection and potential restoration of herring spawning.

### Progress Summary:

As of July 15, 2008, we have made the following progress on key project tasks:

1. *Completion of preliminary a literature review, annotated bibliography, and historical timelines.*

The literature compilation and review has been supervised by PI Tom Thornton (Portland State University) with assistance from PSU graduate student Jamie Hebert and the Sitka Tribe of Alaska. We built a RefWorks database to house references and annotations, which now contains nearly 400 entries, many with annotations.

Sitka Tribe of Alaska (STA) has completed a preliminary compilation of its in-house herring records (testimonies, interviews, resolutions, correspondence photos etc.) consisting of several hundred additional entries to be added to the master RefWorks bibliography by September 2008, along with an historical guide summarizing the Tribe's documentary records and formal actions on herring over the past decade. Additionally, STA continues to build a digital image archive of herring-related photos from Southeast villages to be used on the project's website. The RefWorks database can be viewed at:

<http://www.refworks.com/refshare/?site=037971147244400000/RWWS4A660669/RefShare%20Herring>

2. *Preliminary synthesis of herring massing, spawning, and harvest data from Alaska Dept. of Fish & Game, interviews, and industry records (esp. herring reduction plants) into a GIS database.* Tom Thornton, assisted by Jamie Hebert, has conducted Local and Traditional Knowledge (LTK) interviews and focus groups on historical herring ecology with more than 60 consultants in the communities of Angoon, Craig/Klawock, Hoonah, Juneau/Douglas, Kake, Ketchikan/Saxman, Petersburg, and Sitka. Additional interviews are planned in Angoon, Ketchikan, Sitka, Metlakatla, Petersburg, and Wrangell by the end of 2008. So far data collected reveal the strong cultural and ecological significance of herring and evidence of localized declines in herring stocks and spawning areas, which our sources attribute to a variety of factors, including over-fishing, non-human predation, development, and environmental change. In addition, we have mapped hundreds of miles of historical herring spawning habitat, much of which has not been previously documented in the scientific record. Approximately 40 percent of the interviews conducted have been transcribed and are now being edited and coded. When this process is completed in September 2008, we will begin drafting a report synthesizing this information in conjunction with the archeological and historical fisheries data that is being compiled separately.

3. *Compilation of archeological site data and archaeofish records in Southeast AK.* Co-PIs Madonna Moss (U. Oregon) and Virginia Butler (PSU) and graduate student Tait Elder (PSU) have compiled records of herring and other animal remains from ~35 archaeological project reports in Southeast Alaska. Preliminary review of the data indicates that 17 different archaeological sites have herring remains. The earliest herring remains are about 8000 radiocarbon years old and from the Chuck Lake Site (CRG-237) on Heceta Island. Most of the records date to the last 4000 years. All of the project faunal records will be compiled by July 2008. Spatial coordinates for each archaeological site location will be included in GIS being developed by Thornton and other project members. Spatial and temporal patterns in herring and other fish abundance will be identified and compared with contemporary and historic records. The investigators will complete a draft report of their project results by December 2008.

4. *Historical catch records.* Historical herring catch records for Southeast Alaska from 1978 to 1966 (closure of the last herring reduction plant) have been collected from a number of overlapping sources and compiled into a "best blend" reflecting the most reliable data source for each year. This catch time series plus information on the number of plants and quotas provide a synoptic view of herring exploitation and some inferences about abundance over the period. Explicit scientific information about herring abundance from the late 19th and early 20th century is rare, but the few references from the early period of exploitation have been compiled and are being further analyzed. Late 19th century travel writers and early scientists also provided some revealing textual accounts of herring abundance which are in marked contrast to contemporary experience. Special attention has been focused on the Killisnoo herring plant. As the first and only herring plant in Southeast Alaska for nearly 40 years (1880-1918), the limited data from this plant provide a unique insight into the period before the heavy exploitation of herring which occurred when the number of plants dramatically expanded in the 1920's and fishing technology improved. In addition, the Killisnoo plant maintained a unique relationship with the Angoon-area Tlingit community over this period, providing an additional link to local and traditional knowledge derived from project interviews. Historical research on the Killisnoo plant has included biographical research on the plant's founders, early managers, and vessels in order to better interpret the limited data left by plant managers and late 19th and early 20th century Bureau of Commercial Fisheries biologists. In cooperation with project GIS specialists, historical catch information and plant locations have been turned into GIS overlays for synthesis with other elements of the project.

5. *Project webpage,* (<http://herringsynthesis.research.pdx.edu/research/index.html>). For outreach, a webpage has been constructed to describe the project and facilitate dissemination of information to the public. Jamie Hebert has updated this webpage to include a project summary, updates, community contacts, and numerous links to relevant herring information, photos, and other material compiled by project personnel, or available elsewhere on the web.