

**Project Title: Developing maturity schedules to improve stock assessments for data-poor commercially important flatfishes in the Gulf of Alaska.**

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**Industry Partners:** Alaska Groundfish Data Bank, Inc., Kodiak, Alaska (contact: Julie Bonney)

**Overview:** This proposed project is considered a "High Priority" by the North Pacific Fishery Management Council (NPFMC) – acquiring basic life history information for data-poor stocks. The goal of this project is to update estimates of length and age at maturity for commercially important flatfish species in the Gulf of Alaska (GOA). Samples were collected at processing plants in Kodiak through a partnership with the industry group, Alaska Groundfish Data Bank (AGDB), who played a major role by collecting field samples necessary for successful completion of this project. Otolith (age structures) and ovary samples were collected from several commercially important flatfish species for the purposes of updating maturity estimates. Preparatory laboratory work, histological analysis, ageing of specimens, data analysis, and manuscript preparation remain for this project. These new data will directly enhance stock assessment and fisheries management. Updated maturity estimates are also important to the industry to maintain Marine Stewardship Council (MSC) certification of some commercially important flatfish species.

**Research Description:** Maturity ogives (the proportion of a population mature by age or length) are an important metric of fish populations, and play a critical role in the formulation of fishing reference points and harvest specifications. Published maturity estimates for commercial species in Alaska have often come from a single year of observations. Temporal changes in maturity estimates have implications to fisheries management; therefore, updating maturity estimates is critical. Limited or lack of recent data results in less than ideal values in their respective stock assessment models, especially since annual and/or decadal variation in length or age at maturity estimates have been observed in some fish stocks. Current information on maturity for these GOA species is often based on data collected between 10-15 years ago. Furthermore, the biology of fish populations (maturity and other vital rates) is time variant, but is also sensitive to other factors such as changes in the ecosystem and climate, and fisheries exploitation. In an effort to provide current maturity data from data-poor stocks and substantially improve age-structured stock assessment models, four commercially important flatfishes within the GOA management area are being targeted: arrowtooth flounder *Atheresthes stomias*, southern rock sole *Pleuronectes bilineata*, northern rock sole *Pleuronectes polyxystra*, and flathead sole *Hippoglossoides elassodon*.

In 2012 and 2013, opportunistic sampling for the four flatfish species was conducted at Kodiak processing plants by AGDB personnel. Otoliths and ovaries were collected from each female specimen within a specified size range. A total of 709 samples were collected. Each ovary was placed inside a separate cloth specimen bag with a separate label and submerged in 5-gallon buckets half-filled with 10% formalin to be processed later by AFSC personnel. Otoliths were stored dry in vials and placed in styrofoam boxes and shipped to AFSC with the ovary samples for subsequent ageing.

The main cost of this project is to process the collected samples and provide expertise by using histological methods to determine maturity. From the samples collected, general reproductive characteristics, such as seasonality, will also be described. We will examine each otolith sample and assign ages. For this work, funds are requested for Todd TenBrink, who has been with the AFSC since 2003, focusing on life history-related projects on data-poor stocks, which included describing the reproductive biology and maturity of commercially important species. No permanent federal employees are currently available to perform this important stock assessment work. Mr. TenBrink will conduct the laboratory processing and histological analysis of all 709 ovary samples as well as assist in ageing. We

will contract time to an age reader in AFSC's Age and Growth group to assist in age reading of the samples. A contract for a histological laboratory is also necessary for slide preparation prior to analysis.

**Budget:**

Personnel

(Todd TenBrink-salary and benefits, 9 months)

Salary - \$60,372

Benefits - \$16,904

\$77,276

(contractor time in AFSC's Age and Growth lab, 1 month)

\$6,128

Histological laboratory contract

\$5,320

General supplies

\$300

**Total funds requested**

**\$89,024**