Alaska Department of Fish & Game Mark, Tag, and Age Laboratory Support - Year 5

by

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Mark, Tag, and Age Laboratory
Alaska Department of Fish and Game Division of Commercial Fisheries

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Alaska Department of Fish and Game
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EXECUTIVE SUMMARY

Support from the Northern Fund was used to help the Alaska Department of Fish and Game's Mark, Tag, and Age (MTA) Laboratory meet its primary obligations to provide fisheries managers with the data needed to effectively manage southeast Alaska sockeye salmon fisheries. In addition, these funds allowed the MTA Lab to assess the efficacy of enhancement programs and meet US/Canada Pacific Salmon Treaty obligations. To accomplish this, sockeye salmon otoliths were recovered from Transboundary River (TBR) fisheries in southeast Alaska and examined for thermal mark patterns to identify a fish's hatchery of origin, brood year, and age. Each week, the first 100 sockeye salmon otolith TBR samples were examined for thermal marks within 24 hours of recovery. These data posted to the internet as they were generated, so fishery biologists could manage TBR fisheries. A total of 14,079 pairs of sockeye salmon otoliths were sampled from commercial fisheries in southeast Alaska in the 2018 fishing season; 13,217 (94%) were collected from fisheries associated with the US/Canada Enhancement Program.

Key words: Pacific salmon, thermal mark, hatchery, otolith.

INTRODUCTION

The ability to thermal-mark otoliths in hatchery salmon and subsequently identify those marks recovered from individuals caught in a fishery is critical to monitoring and evaluating enhancement projects and fisheries conducted as part of the Pacific Salmon Treaty [Annex IV, Chapter 1, Transboundary Rivers (TBR)] in southeast Alaska. Each mark pattern not only allows biologists to distinguish between wild and hatchery fish, but it also provides information regarding hatchery of origin, brood year, and age. Hatcheries in Alaska and Canada produce, mark, and release approximately 2.5 billion salmon per year. The Mark, Tag, and Age (MTA) Laboratory in Juneau, Alaska is responsible for coordinating these marking activities, validating the marks produced, and identifying marks on otoliths recovered from salmon caught in select fisheries within southeast Alaska. Mark recovery data are used to manage fisheries in southeast Alaska in real-time, with an emphasis on fisheries targeting TBR stocks. The recovery and identification of marked otoliths allow managers in Alaska and Canada to assess the efficiency of enhancement programs, estimate hatchery contribution to a fishery, and determine the proportion of Canadian and Alaskan salmon caught in TBR fisheries.

The objective of this project was to ensure that the MTA Lab continued to provide the data needed to fulfill its obligation to deliver thermal mark recovery data to the Alaska Department of Fish and Game (ADF&G) and Canadian Department of Fisheries and Oceans Canada (CDFO) fishery managers. These data were needed to effectively manage sockeye resources in the transboundary Taku and Stikine Rivers in southeast Alaska. These data allowed participants to meet state and Treaty obligations regarding sockeye salmon fisheries management.

METHODS

Sockeye salmon otoliths were shipped to the MTA Lab from commercial and test fisheries throughout southeast Alaska. Otoliths were removed from fish in the field by Canadian port samplers prior to shipment, whereas most other samples arrived at the lab as heads and were sampled by MTA Lab staff. Each otolith was cleaned and mounted to a petrographic slide with thermoplastic cement. Each slide was labeled with a bar code to track its progress through the mark recovery process. Each otolith was polished with 1500 grit grinding paper until the primordia were visible and the otolith thin enough to allow light to illuminate the growth rings and thermal mark. Because thermal marks are unique among hatcheries and years, thermal mark patterns were used to identify an individual's brood year and hatchery of origin.

RESULTS

The first 100 sockeye salmon otolith samples collected from all TBR fisheries were examined for thermal marks within 24 hours of recovery. Associated mark recovery data (sample location, mark pattern, hatchery of origin, brood year, etc.) were entered into an online relational Oracle database. These data were available on the ADF&G Mark, Tag, and Age Lab website immediately after entry and were therefore available for use in real-time fishery management. The remaining otolith samples were examined in-season for marks as time permitted. The thermal mark recovery report may be found at: *http://mtalab.adfg.alaska.gov/OTO/reports/MarkSummary.aspx*.

Of the 14,079 pairs of sockeye salmon otoliths sampled from commercial and test fisheries during the 2018 fishing season, 13,217 (94%) were collected from fisheries associated with the US/Canada Enhancement Program. Approximately 3,605 (29%) of these TBR salmon were thermal marked and thus of hatchery origin. Approximately, 63% of otolith samples were read twice by independent readers to assess reader agreement and maintain data quality. Reader agreement exceeded 98%.

DISCUSSION AND CONCLUSIONS

All proposed objectives and timelines were met. Sample sizes and otolith mark recoveries from TBR-related fisheries met proposed expectations during the grant period. Otolith samples arrived at the MTA Lab as early as mid-June and continued through August. The lab consistently reviewed the first 100 otoliths collected per week from each sampling location for marks within 24 hours of receipt, and they posted all results to the MTA Lab website. Specimens and data flow through the lab were monitored continuously by personnel to ensure efficient and timely data production. Because each otolith sample is bar coded, the thermal mark laboratory supervisor was able to monitor production in real-time using Oracle-based queries. All otoliths from the 2018 fishing season were mounted, polished, examined for thermal marks, second read, and the conflicts reviewed and assessed by October 2018.

Support from the Northern Fund helped the MTA Lab provide fisheries managers with the data needed to efficiently manage southeast Alaskan salmon fisheries, thus the MTA Lab was able to meet US/Canada Pacific Salmon Treaty obligations. Because thermal mark recovery results were posted to the web the instant data were generated, the benefits to its users, primarily fishery biologists at ADF&G, CDFO and the Pacific Salmon Commission (PSC), were immediate because the data could be used to manage southeast Alaskan fisheries in real-time. All past and present mark recovery data were stored in a relational Oracle database that was accessible online to users through customizable web-based reports. In addition to providing summary information, raw data can be downloaded directly to Excel spreadsheets. Three backup copies of the database were made weekly and stored in off-site locations for security purposes.

An official summary of the financial expenditures was sent to the PSC NF separately by ADF&G Commercial Fisheries Division Administrative staff. We did not deviate significantly from the projected budget described in the original proposal. Most funds provided salaries and benefits for laboratory staff directly involved with dissection, processing, and reading of otoliths as well as entry of associated data into the online Oracle database. This amounted to approximately ten months of technician time and one month of time for a Fishery Biologist II. The remaining funds were used to purchase the consumables and lab supplies needed to recover thermal marks from otoliths. These included petrographic glass slides, slide labels, and trays.