CHUM STOCK ID ASSESSMENT (CANADIAN AREA 3 COMMERCIAL FISHERY OTOLITHS): ADF&G COMPONENT

by

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EXECUTIVE SUMMARY

The Alaska Department of Fish and Game Thermal Mark Laboratory, Juneau examined chum salmon (*Oncorhynchus keta*) otoliths for the presence of thermal marks as part of a multi-year stock identification assessment of Canadian chum salmon. Chum salmon otoliths recovered from 2018 fisheries were analyzed during fall/winter 2018-2019 to determine the presence of a thermal mark. From 2018 fishery sampling, we received 916 samples of which 891 were readable. Of these, 589 (66.1%) were thermal marked, 85.6% of the marked fish were released in Nakat Inlet, Alaska. The Southern Southeast Regional Aquaculture Association's Whitman Lake Hatchery utilizes Nakat Inlet as a remote release site.

Key words: chum salmon, *Oncorhynchus keta*, thermal mark, hatchery, otolith

INTRODUCTION

Thermal marking of salmonid otoliths is an effective tool for identifying hatchery salmon (Munk and Smoker 1991; Volk et al. 1990), because thermal mark identification is quick and fairly accurate (Hagen et al. 1995). Salmonid otoliths are thermal marked by exposing them to repeated temperature cycles that create patterns of optically-dense bands (Volk et al. 1990). Thermal mark identification is used by the Alaska Department of Fish and Game (ADF&G) for in-season management of Alaska's salmon stocks (TTC 1990) and for evaluation of hatchery success rates. Recent studies have used thermal marks to document the presence and distribution of stray hatchery chum salmon (*Oncorhynchus keta*) in index streams throughout Southeast Alaska (Piston and Heinl 2011).

The objective of this study was to detect and identify chum salmon thermal marks for the Chum Stock Identification Assessment project in Canadian Area 3 commercial seine and gillnet fisheries.

METHODS

Chum salmon otoliths were collected from the Canadian Area 3 commercial fishery in 2018, as part of a continuing study. All sample data were entered in specialized applications, and summary results were immediately available online. Individual specimen results were queried from the Southeast Alaska Mark Recovery Oracle database, and results were saved in Microsoft Excel.

The chum salmon otoliths were prepared for thermal mark examination in the ADF&G Thermal Mark Lab. The otoliths were cleaned with a chlorine solution (5%), rinsed with a de-chlorine solution (0.7% thiosulfate), and then mounted on 1- by 2-inch glass slides with thermoplastic cement. Otoliths were examined for thermal mark presence by grinding the otolith on a grinder using 800 grit grinding paper until the primordia were visible under 200x magnification on a compound microscope. Fine polishing was performed by hand using 9 μm grinding paper. Readers identified specimens as marked, unmarked, or unreadable. If a specimen was marked, readers described the mark with special codes known as hatch codes. For quality control, each specimen was independently read a second time, and any conflicts between the two reads were resolved.

RESULTS AND DISCUSSION

From the 2018 fishery, ADF&G Mark, Tag, and Age Lab readers examined 916 samples of which 891 were readable (Table 1). Of these, 589 (66.1%) were thermal-marked, and 587 (99.7%) were marked by the Southern Southeast Regional Aquaculture Association (SSRAA) and released in southern southeast Alaska. Two otoliths were found with a mark from northern southeast Alaska (DIPAC14). Of the SSRAA marks, most (504, 85.6%) recoveries were released in Nakat Inlet. Most (346, 58.7%) Nakat Inlet recoveries were from the brood year 2014 summer release. Nakat Inlet is a remote release site used by Whitman Lake Hatchery, part of SSRAA.

The 2017 chum salmon results by specimen were delivered to the Department of Fisheries and Oceans Canada Stock Assessment Biologist on 4 March 2019.

We met all required timelines and objectives. We were unable to judge the benefits of this project. We provided the data to the Prince Rupert Department of Fisheries and Oceans office, and they utilized it in their fishery management.

A summary of the financial expenditures will be sent separately by ADF&G Headquarters. There was little deviation from the projected budget.

Table 1. Thermal marks (n = 589) recovered from 916 otoliths collected during the 2018 fishing season in British Columbia's Area 3. SSRAA = Southern Southeast Regional Aquaculture Association; DIPAC = Douglas Island Pink and Chum, Inc.

Agency	Mark Name	n	Total Release Site	Overall %
SSRAA	ANITABAY14	12	16	2.7%
	ANITABAY15	3		
	ANITABAYLL15	1		
SSRAA	BURNETTINLET15	2	2	0.3%
DIPAC	DIPAC14	2	2	0.3%
SSRAA	KENDRICK13	3	58	9.8%
	KENDRICK15	55		
SSRAA	NAKATINLET13Sum	25	504	85.6%
	NAKATINLET14Sum	346		
	NAKATINLET15Fall	2		
	NAKATINLET15Sum	131		
SSRAA	NEETSBAY14Sum	4	7	1.2%
	NEETSBAY15Sum	3		

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