

Alaska Hatchery Research Program: Overview of results and products to date



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Alaska Board of Fisheries Hatchery Committee
October 14, 2023

More detail in previous presentations to the Board of Fisheries:

- October 2018 [under Department Reports] <https://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo&date=10-15-2018&meeting=anchorage>
- March 2019 <https://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo&date=03-08-2019&meeting=anchorage>
- March 2020 <https://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo&date=03-07-2020&meeting=anchorage>
- March 2022 <https://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.meetinginfo&date=03-23-2022&meeting=anchorage>

Precautionary Approach

Alaska Constitution: Article 8



Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses.

ADF&G Mission



To protect, maintain, and improve the fish, game, and aquatic plant resources of the state, and manage their use and development in the best interest of the economy and the well-being of the people of the state, consistent with the sustained yield principle.

Precautionary Approach

Purpose of Alaska's PNP Salmon Fishery Enhancement Program

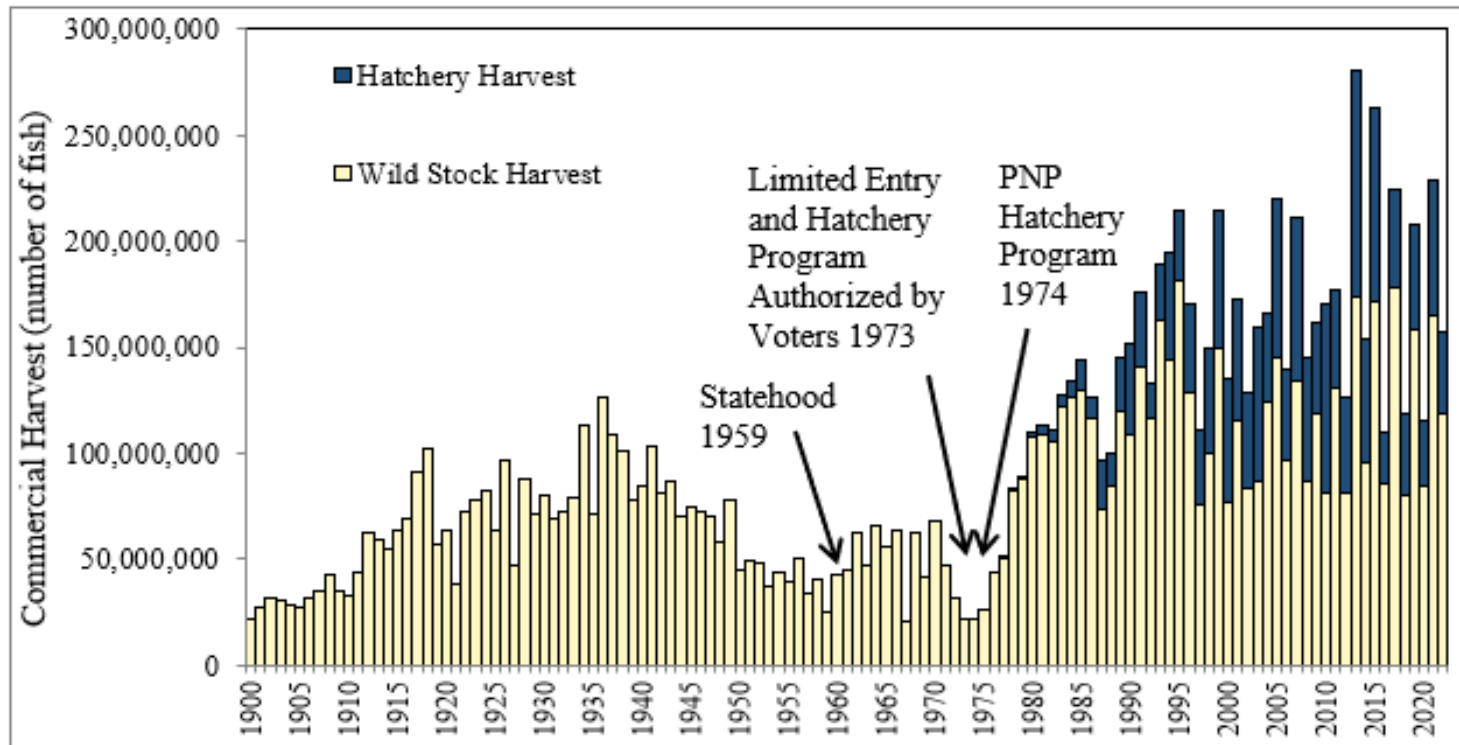
- Recovery and support of Alaska's salmon fisheries and fishing economy
- Provide an economic engine to support and grow coastal communities

Presentation to Board of Fish October 2018 -

https://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/ws/rcs/rc039_ADF&G_Hatchery_Reports_Alaskas_Precautionary_Approach.pdf

Precautionary Approach

- Hatcheries began making substantial contributions to harvest in 1980's
- Hatchery production largest part of pink and chum salmon harvest in PWS and chum salmon harvest in SEAK
- Policies and statutes to protect wild fish developed early



Alaska commercial harvest of wild and hatchery salmon, 1900-2022

Wilson (2023)

Alaska's Precautionary Approach

Policy and Implementation

McGee, S.G. Salmon Hatcheries in Alaska—Plans, Permits, and Policies Designed to Provide Protection for Wild Stocks. In American Fisheries Society Symposium 2004 (Vol. 44, pp. 317-331).

[Available on meeting website](#)

Heard, W.R. Overview of salmon stock enhancement in southeast Alaska and compatibility with maintenance of hatchery and wild stocks. Environ Biol Fish 94, 273–283 (2012).

[Available on meeting website](#)

American Fisheries Society Symposium 44:317–331, 2004
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Salmon Hatcheries in Alaska—Plans, Permits, and Policies Designed to Provide Protection for Wild Stocks

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Environ Biol Fish (2012) 94:273–283
DOI 10.1007/s10641-011-9855-6

Overview of salmon stock enhancement in southeast Alaska and compatibility with maintenance of hatchery and wild stocks

William R. Heard

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Abstract Modern salmon hatcheries in Southeast Alaska were established in the 1970s when wild runs of hatchery-origin fish to this harvest respectively averaged 2%, 9%, 19%, 20%, and 78% for pink,

Alaska's Precautionary Approach

Policy and Implementation

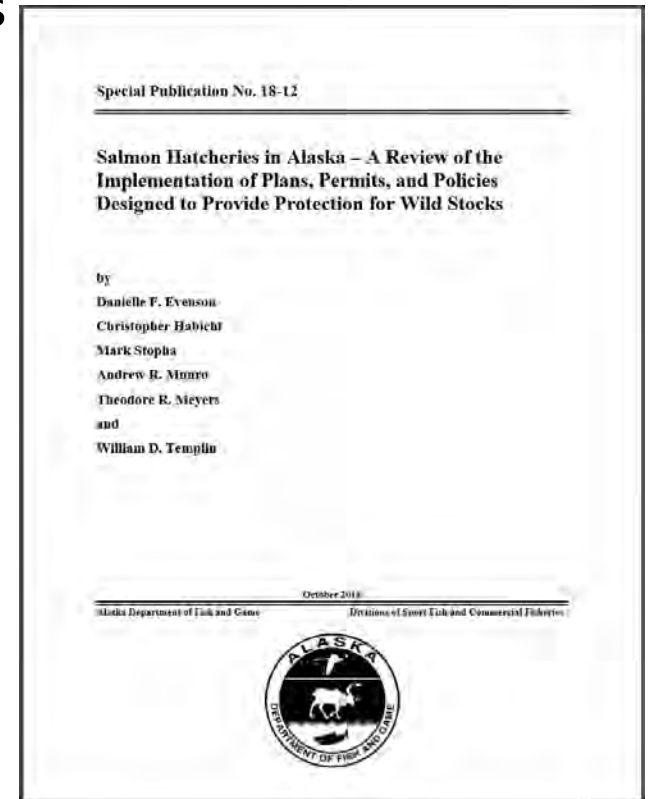
1. Overview of the structure of Alaska's approach – Policies, Plans, Permits
2. Elements used for implementation of policies
 - Management
 - Fish health
 - Genetics
3. Case studies
 - Southeast Alaska king salmon
 - Prince William Sound pink salmon
4. Recommendations

Evenson et al. 2018 –

<http://www.adfg.alaska.gov/FedAidPDFs/SP18-12.pdf>

Presentation to Board of Fish October 2018 -

https://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2018-2019/ws/rcs/rc039_ADF&G_Hatchery_Reports_Alaskas_Precautionary_Approach.pdf

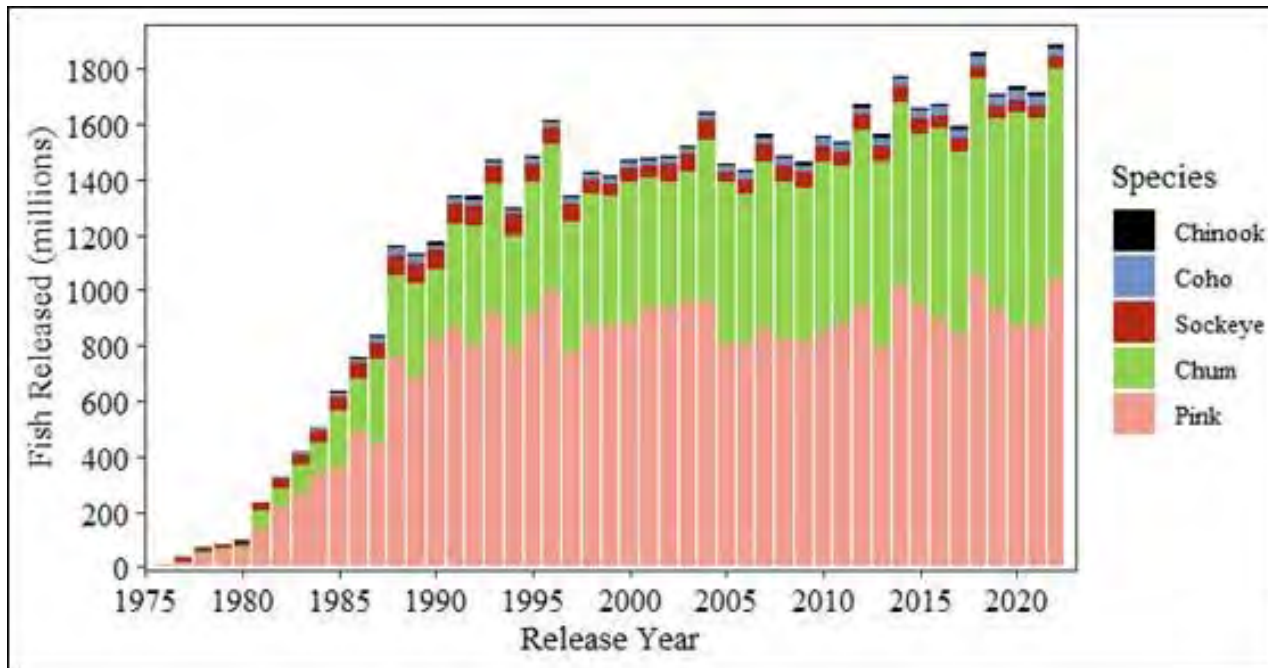


Alaska's Precautionary Approach

Large-scale salmon releases raise concerns for effect on wild stocks

Do hatchery fish detrimentally affect productivity and sustainability of wild stocks?

Alaska policy mandates sustainable productivity of wild stocks



Alaska hatchery releases, 1975-2022

Alaska's Precautionary Approach

Alaska Hatchery Research Project

Plan:

PNPs proposed that ADF&G organize science panel to design/implement a research project to inform resource management decisions

Funding partnership:

State, Operators & Industry

Purpose:

Examine potential effect of hatchery straying on fitness of wild stocks

- Pink and chum salmon PWS
- Chum salmon SEAK



More information available at

https://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/research/background_rfp_hatchery_fish_interaction.pdf

Structure of AHRP

Science Panel

Current Members

Dr. Milo Adkison – UAF; ADF&G
Dr. David Bernard – ADF&G Retired
Dr. John Burke – ADF&G Retired; SSRAA
Chris Habicht – ADF&G Retired
Dr. Jeff Hard – NOAA Fisheries Retired
Ron Josephson – ADF&G Retired
Dr. William Smoker – UAF Emeritus; PWSAC
William Templin – ADF&G
Alex Wertheimer – NOAA Fisheries Retired; DIPAC
Dr. Peter Westley – UAF

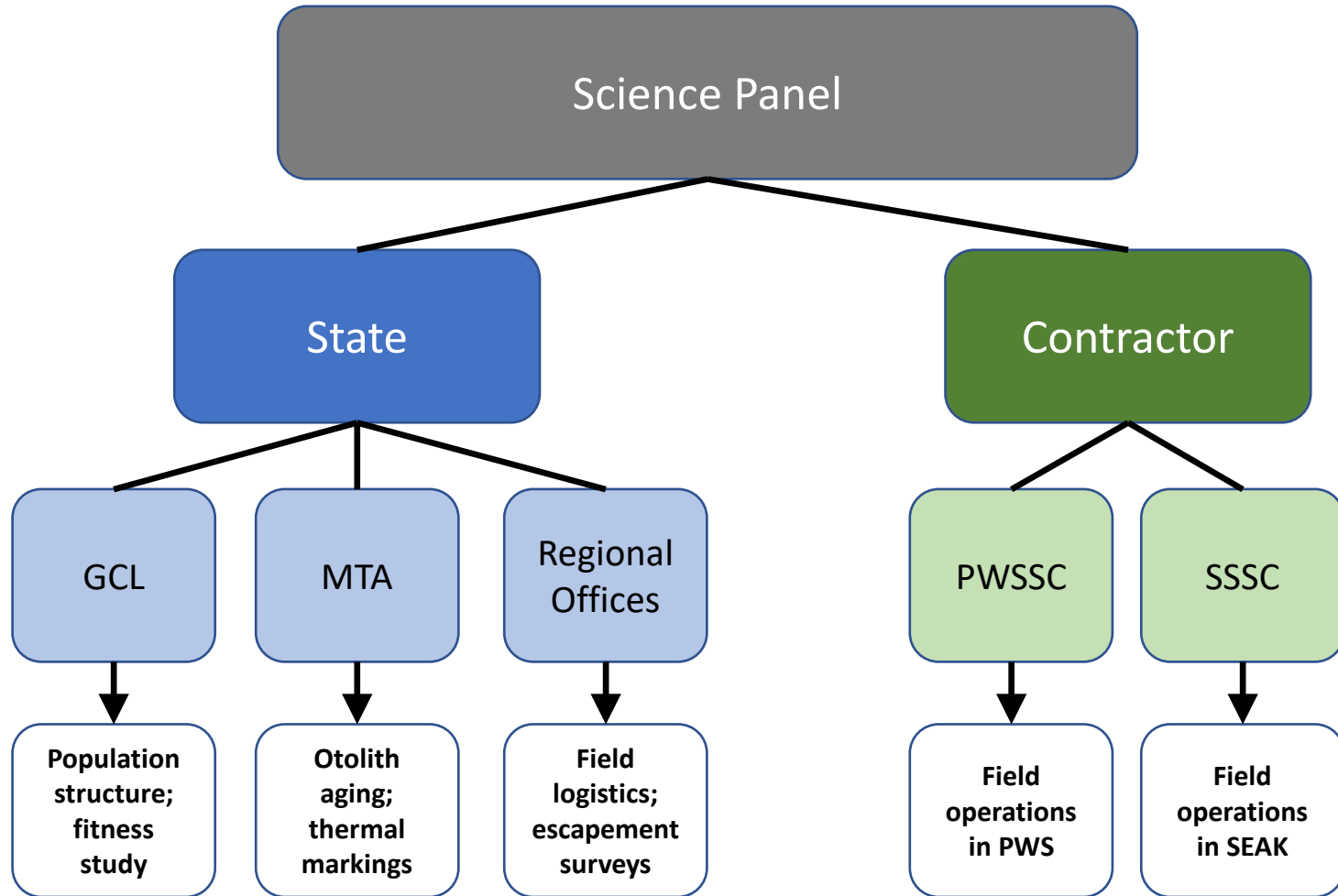
Former Members

Dr. John H. Clark – ADF&G Retired
Jeff Regnart – ADF&G Retired
Steve Reifenstuhl – NSRAA Retired
Thomas Sheridan – ADF&G;
Silver Bay Seafoods
Eric Volk – ADF&G Retired

More detailed information available at

http://www.adfg.alaska.gov/static/fishing/PDFs/hatcheries/research/2018.12.19_hwi_sp_roster.pdf

Structure of AHRP



More detailed information available at

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AHRP Research Questions

- 1) What is the genetic stock structure of pink and chum in PWS and SEAK?
- 2) What is the extent and annual variability of straying?
- 3) What is the impact on fitness (*productivity*) of natural pink and chum stocks?



More information available at

https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.current_research

AHRP Research Questions

1) *What is the genetic stock structure of pink and chum in PWS and SEAK?*

Why is this important?

- Provides a measure of genetic diversity
 - Within area
 - Across the species range
- Insight into temporal changes associated with hatchery production
- Capacity to track future changes



AHRP Research Questions

2) What is the extent and annual variability of straying? Part 1 – Patterns and Proportions of Strays

Why is this important?

- Interaction while spawning is necessary for there to be genetic risk
- Patterns in magnitude and occurrence of straying in space and time inform evaluation of risk



AHRP Research Questions

2) What is the extent and annual variability of straying? Part 2 – Run reconstruction 2013-2015

Why is this important?

Ocean sampling of salmon entering PWS allows reconstruction of the run of wild and hatchery fish

- Total size of hatchery and wild runs
- Independent estimates of wild escapement
- Number of hatchery strays
- Harvest rates of hatchery and wild runs
- Hatchery donor stray rate

AHRP Research Questions

3) What is the impact on fitness (productivity) of wild pink and chum stocks?

Why is this important?

Wild stocks of salmon have priority

- Policy for the Management of Sustainable Salmon Fisheries [5 AAC 39.222]:
“...wild salmon stocks and fisheries on those stocks should be protected from **adverse** impacts from artificial propagation and enhancement efforts”
- Genetic Policy: “First priority will be given to the protection of wild stocks from possible **harmful** interactions with introduced stocks”

Harmful & adverse genetic interactions include:

- Loss of diversity among populations
- Introduction of poorly adapted traits

AHRP Communications

Public and professional contexts

Evolutionary Applications

Evolutionary approaches to environmental, biomedical and socio-economic issues

Open Access

ORIGINAL ARTICLE | Open Access | CC BY

Reduced relative fitness in hatchery-origin Pink Salmon in two streams in Prince William Sound, Alaska

Kyle R. Shedd, Emily A. Lescak, Christopher Habicht, E. Eric Knudsen, Tyler H. Dann, Heather A. Hoyt, Daniel J. Prince, William D. Templin

Marine and Coastal Fisheries

Dynamics, Management, and Ecosystem Science

Featured Paper | Open Access | CC BY

Hatchery-Origin Stray Rates and Total Run Characteristics for Pink Salmon and Chum Salmon Returning to Prince William Sound, Alaska, in 2013–2015

E. Eric Knudsen, Peter S. Rand, Kristen B. Gorman, David R. Bernard, William D. Templin

North American Journal of Fisheries Management

Article | Open Access | CC BY-NC-ND

Proportions of Hatchery Fish in Escapements of Summer-Run Chum Salmon in Southeast Alaska, 2013–2015

Ronald Josephson, Alex Wertheimer, David Gaudet, E. Eric Knudsen, Benjamin Adams, David R. Bernard, Steven C. Heinl, Andrew W. Piston, William D. Templin

The screenshot shows the Alaska Department of Fish and Game website. The main navigation bar includes Home, Fishing, Hunting, Subsistence, Viewing, Education, Species, Habitat, and Regulations. Below this is a secondary navigation bar with Licenses & Permits, Commercial, Sport, Subsistence, Personal Use, Aquatic Farming, Hatcheries, and Research. The current page is titled 'Hatcheries Research Overview' and features a sidebar with links to Hatcheries Home, Planning, Regulations and Policies, Permitting, and Facilities. The main content area has tabs for Overview, Current Research Project, Findings, and Meetings. A text snippet reads: 'In 1971, the State of Alaska initiated its modern salmon fishery enhancement program in response to severely depressed commercial salmon fisheries. Protection of wild stocks has been foremost since the inception of the program and statutes, regulations, and policies are in place to provide for this'.

Overview:

<https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.main>

Reports & Publications:

https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.findings_updates

Science Panel & Informational Meetings/Workshops:

<https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.meetings>

Questions?

