ALASKA CHARTER ASSOCIATION

P.O. Box 478 Homer, Alaska 99603

info@alaskacharter.org

www.alaskacharter.org

Wednesday, September 26, 2018

AK Board of Fish
Boards Support Section,
P.O. Box 115526, Juneau, AK 99811-5526

RE: ACR #1 and ACR #2; SUPPORT

Dear Members of the Board of Fish,

The Alaska Charter Association represents recreational charter fishing operators, associated businesses and guided anglers in Alaska with the mission to "protect the rights and conserve the resources of Alaska's recreational anglers." Our member businesses operate more than 200 permitted vessels in the Recreational Charter Halibut fishery in Alaska, and our industry contributes millions of dollars to the economy of Alaska every year.

Our Board of Directors discussed the proposals on your agenda regarding pink salmon hatchery production. According to the biologists we talked to, the historical data shows a high degree of correlation between high abundance of pink salmon and low king salmon production. The ACA Board strongly agrees with ACR proposals #1 and #2 and is concerned that any expansion of pink salmon hatchery production should not go forward until we understand the negative impacts to other species of salmon. The proposals before you lay out common-sense arguments and we share these concerns.

Respectfully,

Jim Martin
Executive Director

From: Erin Mckittrick
To: DFG, BOF Comments (DFG sponsored)
Subject: comments on hatcheries
Date: Wednesday, October 3, 2018 9:22:29 PM

I am concerned about the ecological impacts of hatcheries, and I support the proposal to reduce hatchery production by 25%

Hatchery salmon stray significantly into wild salmon creeks. Sampling has shown that many creeks are actually dominated by escaped hatchery fish, and this can be true even very far from the originating hatchery (such as PWS hatchery salmon ending up in Barabara Creek in Kachemak Bay).

Hatchery salmon in large numbers impact the balance of the ocean ecosystem. Pink salmon, in particular, have been shown to outcompete and depress other species in the ocean, from red salmon to sea birds.

--
Erin McKittrick
Ground Truth Trekking (www.groundtruthtrekking.org)
Author of *Mud Flats and Fish Camps*, *A Long Trek Home*, *Small Feet, Big Land*, *My Coyote Nose and Ptarmigan Toes*, and a freelancer for the Alaska Dispatch News
907-290-6994
PO Box 164, Seldovia AK 99663

Submitted By
Jacob Hoppen
Submitted On
10/1/2018 4:05:04 PM
Affiliation
Commercial Fisherman

Re: Support for Hatchery Committee 5 AAC 39.222 Sustainable Salmon Fishery Policy

Dear Board of Fisheries,

I support your work on hatcheries. Favoring hatchery economic potential over wild salmon run health is putting the cart before the horse. This is what has happened, and now various Alaska salmon fisheries are stuck in the pickle of having become economically dependent on hatched fish, and would seek to protect them at all costs. New hatchery runs continue to be made, both in the public and private sector. Take the new 2018 “Crawfish Inlet” hatchery in Southeast that almost turned into an environmental disaster this fall. When 10 million fish arrived at the Sitka hatchery doorstep and they were scrapping carcasses off the beach, it is time to seriously think about the ecological impacts that large scale ocean ranging is having on our delicate eco-system.

Legitimate science regarding hatchery and wild salmon interactions must be performed by a party with no affiliations to the State of Alaska. It is a conflict of interest for ADFG to be involved, as they can’t upset the golden goose.

I support ACR 1 and ACR 2 for the following reasons:

1. To ensure the wild fish priority and statues regulation and policy mandates are being upheld.
2. That risk to wild fish from hatchery interaction is kept to a minimum.
3. This hatchery committee needs an external scientific review to gain the best available scientific information and ensure the environmental impact of these hatchery activities does not damage the public trust wild fish resources of the state.
4. The grave uncertainty of effects to the food web from the sheer magnitude of introduced fish into the marine ecosystems requires the BOF to assess these effects and interactions as per the Sustainable Salmon Fisheries Policy For The State Of Alaska 5 AAC 39.222.
5. The joint protocol on hatchery enhancement of 2002 needs to become an institutional regulatory document that also allows public noticed Call for Proposals on hatchery issues, identical to the way regulatory proposals are submitted now in an open transparent public forum.

Thank you,

Jacob Hoppen

Submitted By
Jeffrey T Lee
Submitted On
10/3/2018 1:31:58 PM
Affiliation

Support for BOF hatchery Committee!

Absolutely support ACR 1 and 2. These are essential to help hold the epidemic and begin focusing on the BOF committee to investigate hatchery issues.

Hatchery issues must be investigated by the BOF

Since 2012, when CIAA ramped up the pink salmon production plant in the fox river critical habitat and state park in kachemak bay, there has been an incredibly long and costly conflict with ever increasing proportions and expense as CIAA refuses to budge from their business plan of turning whatever part of the park they want into a terminal fishery comprised of invasive artifically produced fish at the expense of the rest of the eco-system and other park users. But it is not just CIAA. The CIAA and Parks conflict has shown me the problem is much bigger.

I am relieved beyond words to have this board and place to write to with these concerns where I feel they might be heeded and not just used against me and the wild fish.

The frenzy to make pinks appears to have no ability to slow itself down in Alaska. Hatchery high production industrial pink processing cannot stop itself and appears to be running out of control.

This UFA letter is a prime example of how the lack of words is so easily manipulated to hide real meaning. These points made in this "completed" letter shows truths behind the half completed UFA statements, I respectfully request the BOF hatchery committee to investigate these points. The BOF committee needs to protect itself from the bias of people who are or have been in positions of gain from hatchery production on the hatchery review board. The task of keeping our wild fish a priority needs to be upheld before it gets any worse. Hatchery Bias is rampant in Fish and Game and needs to be admitted and mitigated.

Here is a UFA letter, (with completed sentences-)

- Alaska's salmon hatchery program has operated for 45 years and supplements wild salmon harvests **while replacing and out-competing wild salmon** throughout the state
- Alaska's salmon hatchery program is an example of **very fluctuating boom and bust** economic development that directly **asks for millions of dollars in disaster funds when the hatcheries fail.** benefits **limited numbers of** subsistence fishermen, personal use fishermen, sport fishermen, charter fishermen, commercial fishermen, **but most of all the international** seafood processors, **who in 11 years made 1.8 billion as compared to the 18 million (1%) for the** state and local governments, **in the same time period**which receive raw fish tax dollars.
- Alaska's salmon hatchery program employs strong scientific methodology **that they create themselves without any back up data or meaningful design protocols** and is built **without** precautionary principles and
- sustainable fisheries policies that **degrade** wild salmon populations **and contaminate the integrity of their genetics.**
- Alaska Department of Fish and Game **does not have enough money or manpower to**regulate **or monitor** hatchery operations, production, and permitting through a **non**transparent public process and **closed**-stakeholder development of annual management plans
- Returns of hatchery and wild salmon stocks follow similar survival trends over time **because ocean conditions dictate survival** and the largest returns of both hatchery and wild salmon stocks have largely occurred since hatchery returns began in about 1980
- There are no stocks of concern where most hatchery production occurs, **because SEG's are dominated by hatchery fish without adequate baselines or monitoring giving the illusion** indicating that adequate escapements to wild stock systems **are masked and** are **not** being met in these areas over time
- Alaska hatcheries contributed an annual average of nearly 67 million **predator** fish to Alaska's commercial fisheries in the past decade **that eat 5,000,000 pounds of seafood removed from wild pastures each day or 300,000,000 pounds in the last couple of months of their lives**
- Alaska hatcheries accounted for 22% of the total common property commercial catch in Alaska **less that 4% of the x-vessel value in Alaska yet cost the ADFG an enormous % of there budget of time and money that should be devoted to wild fish priority**
- Alaska's salmon **sportfish** hatchery program is .007% of the industrial corporate fish releases into wild ocean pastures and has

proven to be significant and vital to Alaska's seafood and sportfish industries and the state of Alaska by creating employment and economic opportunities throughout the state and in particular in rural coastal communities

- Alaska's salmon hatchery program **pretends to be** non-profit and self-funded through cost recovery and enhancement taxes **as well as free ADFG assessments,and free management taken from the public trust, 10s of millions of dollars in disaster funding, and 10s of millions in state of Alaska capital budgets that would be better spent on the citizens of the state of Alaska** on the resource and is a model partnership between **a closed very corrupt** private and public entities
- The State of Alaska has significantly invested in Alaska's salmon hatchery program **getting out in the early 1990's when it was realized it was not sustainable for state general funds** and associated research **is hidden that shows hatcheries** to provide for unstable salmon harvests and to bolster the economies of coastal communities while **not adequately or accurately** maintaining a wild stock escapement priority
- Alaska salmon fisheries, including the hatchery program, continue to be certified as sustainable by two separate programs, Responsible Fisheries Management (RFM) **that does not have accurate data or assessment or monitoring to be honest** and Marine Stewardship Council (MSC) **that replaced all assessors that demanded hatchery condition standards be upheld**

Thank you for forming an oversight board and please continue

Sincerely,

Jeffrey Lee

Submitted By
Josiah Johnson
Submitted On
10/3/2018 12:14:56 AM
Affiliation
None

Alaska's salmon hatcheries have many factors to consider to be operated in a responsible manner. Large volumes of hatchery raised salmon can have tremendous effects on the environment. Some them know and understood and others that are unforseen.

If the Board of Fish continues to allow the operation of these hatcheries, we need to explore as much of the science surrounding the issue as possible. Introducing large volumes of non-native fish into the ecosystem is of concern to me as a fisherman. Hatchery raised salmon must compete with wild salmon for a limited amount of food that is availible. How do we know from year to year what the ocean can handle in terms of availible food and habitat? Interupting the natural cycle must have some effects. To err on the side of sustainability, hatcheries should only be operated on a limited scale, so as to reduce the chance of effects on our fisheries that cannot be reversed. No more than 10-15 percent of an areas wild stocks should be added as hatchey raised salmon.

Aside from the environmental aspect is economic factor. Producing large volumes of hatchery raised salmon must have some effect on the market price for other fisherman around the state. The focus should be on obtaining the highest price for a quality product at a lower volume, rather than a higher volume at a lower price. Fisherman in some areas only have wild stocks to fish on. There is more expense involved for the fisherman out on the capes with a bigger boat, more expierenced crew, burning more fuel, than fisherman in the bay in front of the net pens. The fish then have to be sold on the same market that is flooded with hatchery raised fish at a reduced price. This system creates an unfair advantage. I do believe that hatcheries can play a roll in leveling out the boom and bust cycles that are inherinent in paticular areas.

For these reasons I support the reduction in volume of the Prince William Sound hatcheries. To protect the abundant natural resource that we have in Alaska's wild salmon for the benifit of future generations and to be cautious of altering the natural cycle of the wild salmon returning to spawn.

Submitted By
Kenai Area Fisherman's Coalition
Submitted On
10/2/2018 8:05:01 AM
Affiliation

Phone
907-395-7558
Email
dwimar@gci.net
Address
PO Box 375
Kenai, Alaska 99611

Kenai Area Fisherman's Coalition would like to submit the following comments regarding ACR1 and ACR2. We Support both of these ACR's and share many of the same concerns regarding density dependent diet composition and competition between hatchery produced Pink salmon and Alaska's Chinook salmon.

In the 2013 Arctic-Yukon-Kuskokwim Chinook Salmon Research Action Plan, an expert panel of fisheries scientists identified various concerns with hatchery produced Pink, Chum and Sockeye with regard to their food competition with Western Alaska Chinook salmon in the Bering Sea. They estimated that the current biomass of Pink, Chum and Sockeye hatchery produced fish is at historically high levels which are 3 - 4 times the production of the 1970s. In part, they estimate that currently 38% of the biomass in the North Pacific Ocean is made up from hatchery production.

They also cited a 2009 study of reviewed evidence that competition at sea can lead to reduced Chinook salmon growth and survival, that can also potentially lower the reproductive potential of survivors. They also reviewed evidence from high seas field research on interspecific diet overlap and interannual density-dependent shifts in diet composition of Chinook salmon in the Bering Sea. Scale growth studies indicated that Norton Sound Chinook Salmon growth and survival was influenced by competition with Pink salmon in alternating years when Russian produced Pink salmon were in abundance. Additionally, scale samples from Yukon and Kuskokwim Chinook showed alternating year growth patterns in their second year at sea consistent with the time period when Asian produced Pink salmon and immature AYK Chinook salmon overlapped in the Aleutian Basin.

Because of this research evidence and other ocean factors we have yet to identify, combined with the expansion of warming waters we are experiencing, we believe it is prudent to hold off on any increase in hatchery production until more research can be accomplished.

Kenai Area Fisherman's Coalition

KRSA comments on Agenda Change Requests to be considered by the Alaska Board of Fisheries at the 2018 Work Session, October 15-16, Anchorage, Alaska.

5 AAC 39.999. Policy for changing board agenda

(a) The Board of Fisheries (board) will, in its discretion, change its schedule for consideration of a proposed regulatory change in response to an agenda change request, submitted on a form provided by the board, in accordance with the following guidelines:

(1) the board will accept an agenda change request only

(A) for a fishery conservation purpose or reason;

(B) to correct an error in a regulation; or

(C) to correct an effect on a fishery that was unforeseen when a regulation was adopted;

(2) the board will not accept an agenda change request that is predominantly allocative in nature in the absence of new information that is found by the board to be compelling;

Kenai River Sportfishing Association (KRSA) recommends that the Alaska Board of Fisheries (BOF) accept the following four Agenda Change Requests (ACRs) as they address important issues and meet criteria for accepting ACRs.

ACR 1 seeks to prohibit Valdez Fisheries Development Association from incubating, rearing, and releasing pink salmon resulting from additional egg take capacity permitted in 2018 and cap egg take capacity at the level permitted in 2017 (5 AAC 24.366). This ACR was submitted by Kenai River Sportfishing Association (KRSA). See ACR 1 for justification.

ACR 2 seeks to cap statewide private non-profit salmon hatchery egg take capacity at 75% of the level permitted in 2000 (5 AAC 40.XXX). This ACR was submitted by Virgil Umphenour. ACR 2 addresses an important fishery conservation purpose or reason and as such should be accepted.

ACR 9 Align regulations within the Southeast Alaska King Salmon Management Plan with provisions of the Pacific Salmon Treaty annex (5 AAC 47.055). This ACR was submitted by the Alaska Department of Fish and Game. ACR seeks to address what will be an error in regulation for the 2019 season if not corrected.

ACR 11 seeks to align regulations for sport fishing services and sport fishing guide services in fresh and salt water and update guide registration and reporting regulations (5 AAC 75.075, 5 AAC 75.076, 5 AAC 75.085, 5 AAC 75.995). This ACR was submitted by the Alaska Department of Fish and Game. ACR 11 seeks to correct what will be an error in regulation and as such should be accepted.

Kenai River Sportfishing Association (KRSA) strongly recommends that the Alaska Board of Fisheries (BOF) fail, in each case, the following four Agenda Change Requests (ACRs) as they fail to meet any criteria for accepting ACRs and/or would be much more appropriately discussed within the regular Board cycle.

ACR 5 seeks to prohibit fishing in the waters of the Homer Spit Marine Terminal barge basin (5 AAC 58.022). This ACR was submitted by Homer Spit Properties LLC. Although this ACR appears to address an effect on a fishery that was unforeseen when a regulation was adopted KRSA is in opposition. KRSA's is opposed to acceptance of this ACR for two reasons. First there are numerous land owners in the State who would welcome situations where the State is responsible for policing trespass on private land by individuals participating in the taking of fish and wildlife. Second this type of issue is best discussed within the regularly scheduled Board cycle.

ACR 6 seeks to provide the department emergency order authority to utilize time, area, methods and means or possession limits to restrict Kenai and Kasilof river personal use fisheries and require daily reporting of harvest in these fisheries (5

AAC 77.540, 5 AAC 21.360). This ACR meets none of the criteria and in addition is predominantly allocative in nature. The issue addressed by this ACR is more appropriately address within the regularly scheduled Board cycle.

ACR 7 seeks to open and close the commercial set gillnet fishery within 600 feet of the North Kalifornsky Beach area independent of fishing time restrictions described in various management plans (5 AAC 21.310). This ACR was submitted by Gary Hollier. This ACR meets none of the criteria and in addition is predominantly allocative in nature. The issue addressed by this ACR is more appropriately addressed within the regularly scheduled Board cycle.

ACR 8 Prohibit operation of dipnet gear from a boat to harvest salmon for subsistence purposes in the Glennallen Subdistrict (5 AAC 01.620). This ACR was submitted by Ahtna Tene Nene'. This ACR fails to meet any of the criteria, addresses issues that were discussed at length at the previous (December 2017) meeting of the BOF on PWS and Copper River and in addition if the solution suggested by the author was to be adopted it is predominantly allocative in nature. The issue addressed by this ACR is more appropriately addressed within the regularly scheduled Board cycle.

Submitted By
Monique Couture
Submitted On
10/1/2018 4:00:51 PM
Affiliation
Commercial Fisherman

Phone
805-689-0923
Email
couturesb@gmail.com
Address
2058 Elise Way
Santa Barbara, California 93109

October 1st, 2018

Re: Support for Hatchery Committee 5 AAC 39.222 Sustainable Salmon Fishery Policy

Dear Board of Fisheries,

I applaud the Board of Fisheries to continue proceeding with an open and transparent public process sorely needed to address the hatchery issues in the State of Alaska.

Sufficient science is needed examining hatched fish impacts on wild salmon runs and what a sustainable co-existing wild and hatched salmon fishery would look like. Perhaps the Board of Fisheries could recommend the State of Alaska to pursue criteria for what constitutes a “sustainable” hatchery. It is a great opportunity for Alaska to lead the way in doing hatcheries in an environmentally conscious way, and to set an example in the North Pacific.

Alaska can choose to meet this hatchery issue head on, avoiding blowback that will ultimately undermine Alaska’s Wild salmon marketing efforts. This is important because it is unethical for Alaska to continue selling "hatchery" fish as "wild" in the marketplace. Conscious consumers will not stand for this when they catch wind of it.

I support ACR 1 and ACR 2 for the following reasons:

1. To ensure the wild fish priority and statues regulation and policy mandates are being upheld.
2. That risk to wild fish from hatchery interaction is kept to a minimum.
3. This hatchery committee needs an external scientific review to gain the best available scientific information and ensure the environmental impact of these hatchery activities does not damage the public trust wild fish resources of the state.
4. The grave uncertainty of effects to the food web from the sheer magnitude of introduced fish into the marine ecosystems requires the BOF to assess these effects and interactions as per the Sustainable Salmon Fisheries Policy For The State Of Alaska 5 AAC 39.222.
5. The joint protocol on hatchery enhancement of 2002 needs to become an institutional regulatory document that also allows public noticed 'Call for Proposals' on hatchery issues, identical to the way regulatory proposals are submitted now in an open transparent public forum.

Thank-you for fulfilling your responsibility at your critical level of oversight to hatchery activities as per your regulatory authority.

Sincerely,

Monique Couture

Nancy Hillstrand
Pioneer Alaskan Fisheries Inc.
Box 674
Homer, Alaska 99603

10/2/18

SUPPORT for BOF hatchery committee to:

Dear BOF Members,

Thank -you for creating a hatchery committee to begin peeling back the layers of complexity. We need to begin understanding that "sustainability" is more than a marketing term.

Hatchery proponents would be better served to become part of the solution and come to the table instead of reverting to denial or knee jerk reaction throwing darts as a strategy for diversion.

Yes, hatcheries are under the microscope.

The Policy for the Management of Sustainable fisheries 5 AAC 39.222 requires periodic review, assessment, monitoring and the best available scientific information. These and the precautionary principle are regulatory responsibilities of the BOF.

If the goal is sustainability for wild salmon, our state priority, please consider:

- **institutionalize in regulation, a public forum** to bring a statewide perspective to issues associated with hatcheries affecting wild fisheries production.
- **public notice proposals** allowing wild fisheries, fisherman, and citizens affected by hatchery interactions to have a public forum identical to the way regulatory proposals are submitted by region in the call for proposals.
- **coordinate and balance** department and BOF, with special understanding of regional planning teams, and Comprehensive Salmon Plans (CSP);
    - to institute a wild fisheries ecosystem approach to planning and management
    - provisions for wild fish priority is lost at this regional planning team level.
    - Remove impediments to wild fish production in CSP's,
    - Allow transparent accessible hatchery planning be brought to this public forum before actions are taken,
- **create an external scientific review panel** to remove impediments to incorporate comprehensive best available defensible science:
    - request accessibility from independent scientists; state and federal agencies; professional societies; tribal entities; wild fisheries associations or knowledgeable individuals to verify and ground-truth answers to questions as a precaution from uncertainty or narrow ideology.
- **consider comprehensive** biological considerations; hatchery/ wild interactions of all species, food web and carrying capacity, hatchery location issues, straying, genetics, all life stage histories in fresh estuarine, marine, nearshore and off shore migrations, assess and verify wild salmon spawning escapements, and anticipate climatic shifts or weather patterns affecting wild fisheries production.

PLEASE SUPPORT ACR 1 and forward to March meeting

Over one third of the hatchery strays in Cook Inlet were from the VFDA. Hatchery strays are not wild salmon. Straying of inter-regional hatchery fish is trespass and invasive. This is not acceptable and must cease. Production should be restricted in all hatcheries that ignore compliance of straying. ADFG does not have the funds not time to continually wrangle with this straying issue as documented in the 2010 Internal Review. The many ignored recommendations made by the ADFG need revised. Last years straying attests to the continuing stance of the hatchery industry being above the law.
This is a very unhealthy situation for the state of Alaska.

PLEASE SUPPORT ACR 2 and forward to March meeting

Most hatcheries are already at full capacity so this ACR will cause little change. Capping hatcheries will allow time to gather critical information about the complexities of the massive introductions discharged into wild marine and estuarine pastures.

Until the Hatchery industry begins consideration and serious acknowledgement of wild fisheries belonging to the public trust of 700,000 citizens of the State of Alaska, the ecosystem function to support diverse wild fisheries and the repercussions caused to those fishermen who utilize these wild fisheries, there needs to be a cap.

Marketing, processor capacity, prices, tender displacement away from wild fisheries, over escapement from less diverse genetic straying causing suffocation in wild streams has very real effects on wild fisheries and the marine ecosystem.

Knowing there is a cap will give hatchery industry corporations the opportunity to reassess and reevaluate business plans and marketing strategies just like all businesses. An unbridled industry of this magnitude using obsolete science without updated scientific inquiry, scanty monitoring or documented assessment does not serve sustainable wild salmon populations.

(3)(J) Proposals for salmon fisheries development or expansion and artificial propagation and enhancement should include assessments required for sustainable management of existing salmon fisheries and wild salmon stocks

(3)(K) Plans and proposals for development or expansion of salmon fisheries and enhancement should document resource assessments, potential impacts, and other information needed to assure sustainable management of wild salmon stocks;

The conceptual foundation of the 45-year-old salmon ranching culture at the magnitudes of discharge they have grown into, have not been subjected to adequate critical review and evaluation. They are based in outdated or inadequate science buried deep within the institutions using shifted baselines.

The Salmon Ranching industry need capped due to gross uncertainty. Guesswork is not legal. The Best available information on biological, environmental, economic, social, and resource use factors and the heavy weight of science urging caution and showing risk needs to be synthesized and incorporated. We can not feed the world while breaking our wild fisheries.

THE KEY PRINCIPLES OF ALASKA POLICIES…IS TO PROTECT OUR WILD NATURALLY SPAWNING SALMON INTO PERPETUITY

Please consider the starvation indicators between 2013-2018 food in the GOA:

2013 -Record run of introduced hatchery pinks, then again in 2015 a wall of introduced predators.

2014 epidemic unprecedented proportions of hatchery straying up to 93% in LCI significant stocks of limited genetic diversity with no science to protect wild populations? ADFG thought it must be a fluke.

2015 another record run of 450,000,000 pounds predators - hatchery pinks eating **10 million pounds (10,000,000) of food each day**. 300 million pounds (300,000,000) each month. Is this sustainable

2015 While this barricade of record hatchery returns are eating at their peak thousands of emaciated Thick-billed Murres, Common Murres, Fork-tailed Petrels, Short-tailed Shearwaters, Black-legged Kittiwakes, and Northern Fulmars washed up on the Alaskan coasts. Their cause of death? Starvation.

2015 Indicators showing stress in the marine ecosystems become prevalent; Another factor. The Blob increasing salmon metabolism and narrowing feeding corridors.

2015 Whales are found up on beaches Cause of death? Starvation

2015 Wild Sockeye salmon up to a pound less. Loss to wild fisheries fisherman $40,000,000. Is this a statewide perspective? Is this inherent rights for all fisherman?

2016 Cod Crash

2016 the year after the 2015 record hatchery return to PWS? A disaster declaration for the hatchery ranchers? spurring millions of dollars in disaster relief diverted from true disaster victims who have lost their homes boats and complete livelihood from hurricanes...?

2016 2017, 2018 Chinook depletions smaller size

2018 Tiny Sockeye, year classes missing in GOA

2018 sockeye not materializing in GOA affecting thousands of fishermen.

There is more than economic considerations involved in hatchery production. It is time to reassess hatcheries on multiple levels. Magnitudes of extra mouths to feed in wild fish pastures are having impacts on wild fisheries and the fisherman who fish on them.

The BOF Hatchery Committee is purposely delegated with the critical responsibility designed by the constitution, statute, regulation and policies of the State of Alaska to use the best available scientific information, not hatchery generated science, as the critical additional oversight and assessment to ensure the PNP Hatchery ***"program shall be operated without adversely affecting natural stocks of fish…"***

The intent of this hatchery act was for ***"the rehabilitation of the states depleted and depressed salmon fishery."***

Pink salmon are neither depleted nor depressed.

Alaska Hatchery Research Program

Technical Document:[1]
#

Title: Potential Issues and Solutions for Estimating Unbiased Area-Wide Hatchery Salmon Straying Proportions

Version: 1.0

Authors: R. Brenner, A. Munro, and S. Moffitt

Date: October 3, 2018

Abstract

The second priority question of the Alaska Hatchery Research Program aims to elucidate the extent and annual variability in straying of hatchery pink salmon in Prince William Sound (PWS) and chum salmon in PWS and Southeast Alaska (SEAK). The purpose of this technical document is to discuss factors that influence estimates of hatchery straying proportions, given the study design, and explore methods that might account for these drivers and reduce bias in estimates. This technical document follows a review of methods and draft estimates of hatchery pink salmon straying to PWS and SEAK streams for the ongoing hatchery salmon evaluation (2013–2015) and comparisons with previous hatchery salmon straying studies in these areas (1995–2011). Based on results from previous studies, the proportion of hatchery salmon strays in streams is influenced by a variety of factors, including: distance to a hatchery release location, the number of salmon within the sampled stream (spawning escapement), and run timing of hatchery and wild components. Other factors, including the location of release sites in relation to migratory pathways, harvest, environmental conditions, and broodstock characteristics may also influence hatchery straying. We present several considerations and possible solutions for estimating the mean hatchery fraction of the spawning population across all streams given the design of the current study.

Background of AHRP

Extensive ocean-ranching salmon aquaculture is practiced in Alaska by private non-profit corporations (PNP) to enhance common property fisheries. Most of the approximately 1.7B juvenile salmon that PNP hatcheries release annually are pink salmon in Prince William Sound (PWS) and chum salmon in Southeast Alaska (SEAK; Vercessi 2014). The large scale of these hatchery programs has raised concerns among some that hatchery fish may have a detrimental impact on the productivity and sustainability of natural stocks. Others maintain that the potential for positive effects exists. To address these concerns ADF&G convened a Science Panel for the Alaska Hatchery Research Program (AHRP) whose members have broad experience in salmon enhancement, management, and natural and hatchery fish interactions. The AHRP was tasked with answering three priority questions:

[1] This document serves as a record of communication between the Alaska Department of Fish and Game Commercial Fisheries Division and other members of the Science Panel of the Alaska Hatchery Research Program. As such, these documents serve diverse ad hoc information purposes and may contain basic, uninterpreted data. The contents of this document have not been subjected to review and should not be cited or distributed without the permission of the authors or the Commercial Fisheries Division

I. *What is the genetic stock structure of pink and chum salmon in each region (PWS and SEAK)*?;
II. *What is the extent and annual variability in straying of hatchery pink salmon in PWS and chum salmon in PWS and SEAK*?; and
III. *What is the impact on fitness (productivity) of natural pink and chum salmon stocks due to straying of hatchery pink and chum salmon*?

Goal

The goal of this technical document is to describe some of the factors that contribute to hatchery salmon straying and recommend possible strategies to account for these factors when estimating the extent and annual variability of hatchery salmon straying for this program.

Introduction

This technical document focuses on the second priority question of the AHRP: *What is the extent and annual variability in straying of hatchery pink salmon in PWS and chum salmon in PWS and SEAK*? We make the assumption that **extent** and **annual variability**, collectively, refer to: proportions of hatchery salmon strays within streams; the temporal variability of hatchery straying across- and within years; and the spatial variability of straying. Previous studies in PWS and SEAK suggest that the proportion of hatchery pink and chum salmon in streams is influenced by a variety of factors including: distance to hatchery release location, the number of salmon within the sampled stream (i.e. spawning escapement), and run timing of hatchery and wild components. Other factors, including the location of release sites in relation to migratory pathways, harvest pressure, within-year environmental conditions, and broodstock characteristics may also influence hatchery straying; however, the singular effects of these factors are difficult to measure and are not addressed in this document. Given this, sampling and analysis protocols capable of accounting for spatial, temporal, and other gradients of hatchery salmon straying are necessary for producing an unbiased estimate of the mean fraction of hatchery fish across all streams for management units (e.g., for district or area). In this document, we describe some of the trends and types of variability observed in hatchery salmon straying in PWS and SEAK and recommend possible strategies to account for these patterns when estimating the extent and annual variability of hatchery salmon straying for the AHRP. Our suggestions should also be broadly applicable to other areas for which hatchery salmon straying is assessed.

Trends and Types of Variability of Hatchery Salmon Straying

Relation between percent hatchery strays and escapement

Streams sampled for the current AHRP studies conducted in PWS and SEAK were selected from aerial index streams (AIS) flown by ADF&G biologists to assess populations of pink and chum salmon, "…with probabilities proportional to their size, based on the 25-year average of spawning abundance indices…" (Knudsen et al. 2015). Thus, the sampling design was done in a manner that favored the inclusion of streams with larger spawning escapements. Furthermore, aerial index streams themselves were not selected randomly, and may not have spawning populations or locations that are representative of the ~1,000 streams listed in the Anadromous Waters Catalog (AWC) for PWS pink and chum salmon (Fried et al. 1998), or the approximately 1,200 streams listed for SEAK chum salmon (Geiger and McPherson 2004). Rather, AIS for PWS were chosen for the management objective of surveying a large portion of the overall spawning population (escapement) and have substantially larger escapements of pink and chum salmon compared to non-index streams (Fried et al. 1998). For SEAK, aerial survey streams for chum salmon were chosen based on several criteria, including the long-term consistency of survey data, but streams selected as AIS in SEAK are also thought to be the more productive chum salmon systems in this region (Geiger and McPherson 2004). Therefore, streams selected for the present AHRP study are skewed towards those with large spawning escapements, because only AIS were considered for the initial selection, and then the larger of these were favored for being chosen for sampling. This selection process presents a challenge for producing an unbiased estimate of straying proportions across all streams because escapement size is a significant covariate in determining straying proportions (Figures 1 and 2): streams with larger escapements tend to have a lower percentage of hatchery strays due to the dilution of hatchery strays by natural spawners. Accordingly, these data suggest that it would not be appropriate to apply straying proportions for streams with large escapements to those containing substantially smaller escapements, or vice versa.

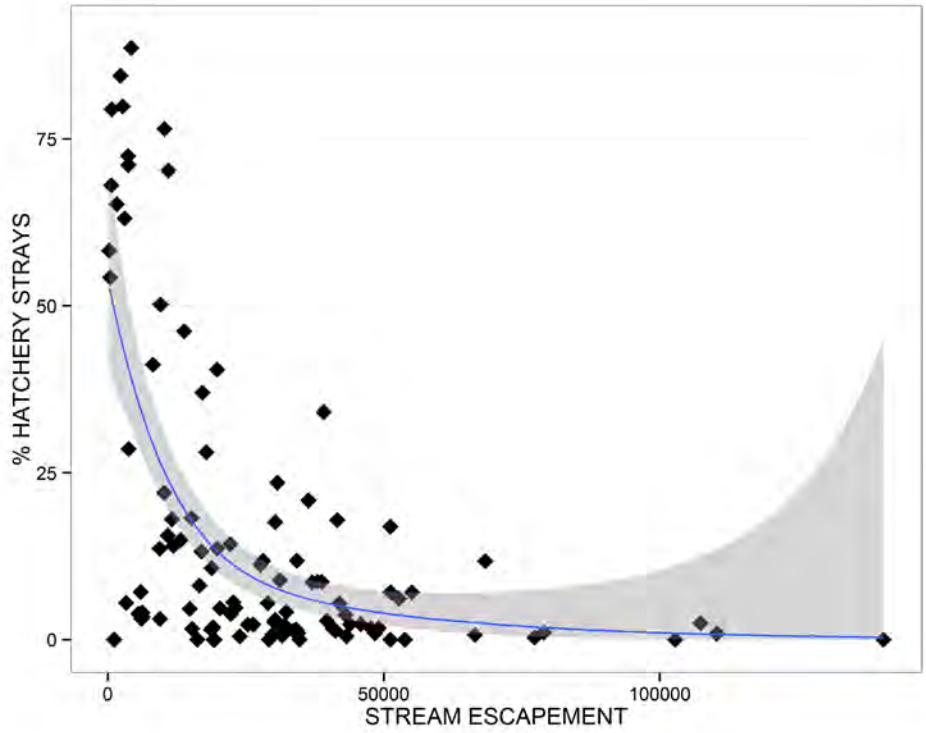


Figure 1. Percentage of stray hatchery pink salmon in PWS streams (2008–2010) versus estimated total annual escapement to that stream (data from Brenner et al. 2012). The blue line is a general additive model (GAM) fit and the shaded area is 95% confidence intervals. The model assumes a quasi-Poisson distribution.

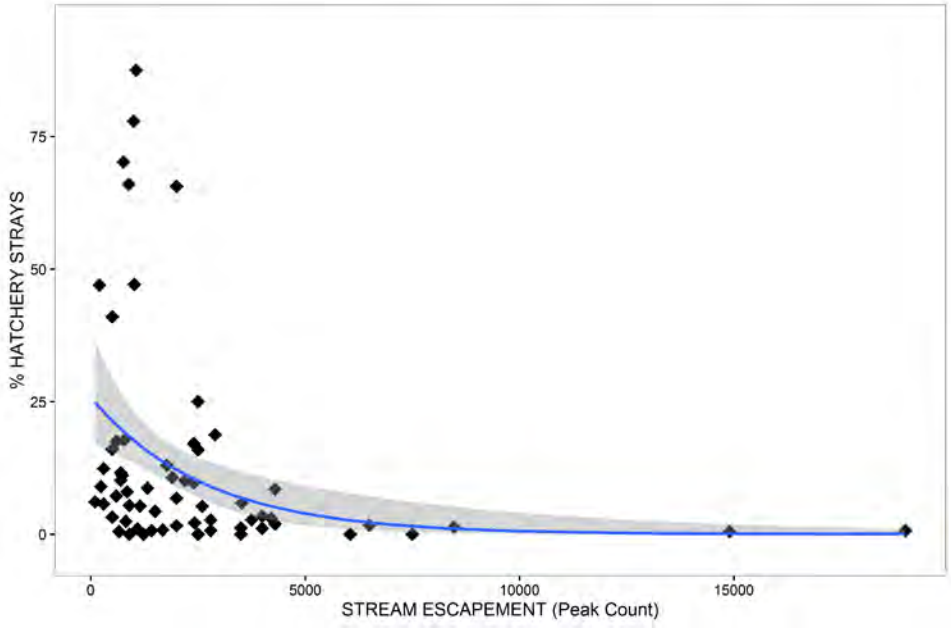


Figure 2. Percentage of stray hatchery chum salmon in SEAK streams (2008–2010) versus estimated peak counts for that stream (data from Piston and Heinl 2012). The blue line is a general additive model (GAM) fit and the shaded area is 95% confidence intervals. The model assumes a quasi-Poisson distribution.

To illustrate differences in escapements between streams surveyed for the current study and the overall AIS, in Figure 3 we show boxplots of pink salmon escapements for PWS streams. As would be expected from a study that selected streams in proportion to escapement size, median pink salmon escapement is always larger for the streams selected for the AHRP study compared to overall AIS, such that: hatchery-wild study streams > AIS > overall streams.

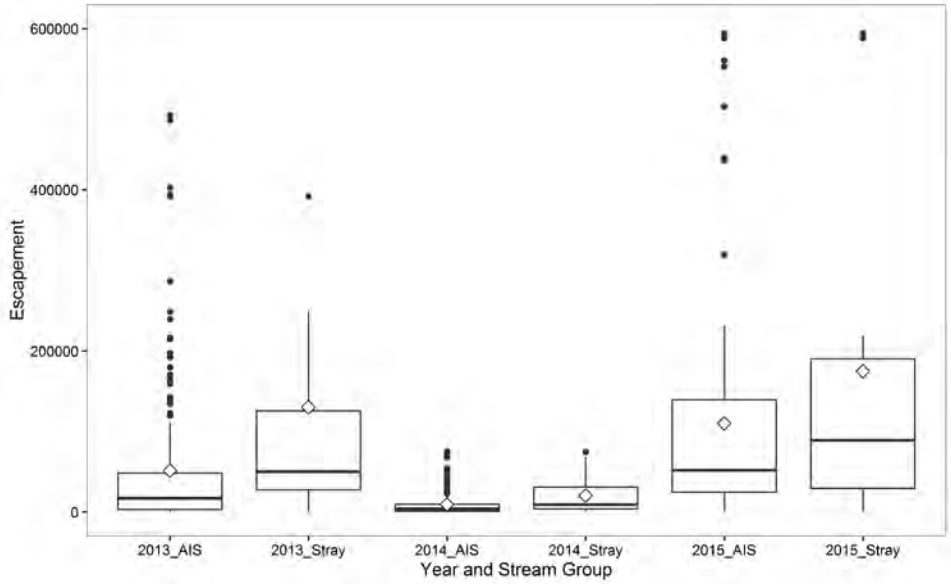
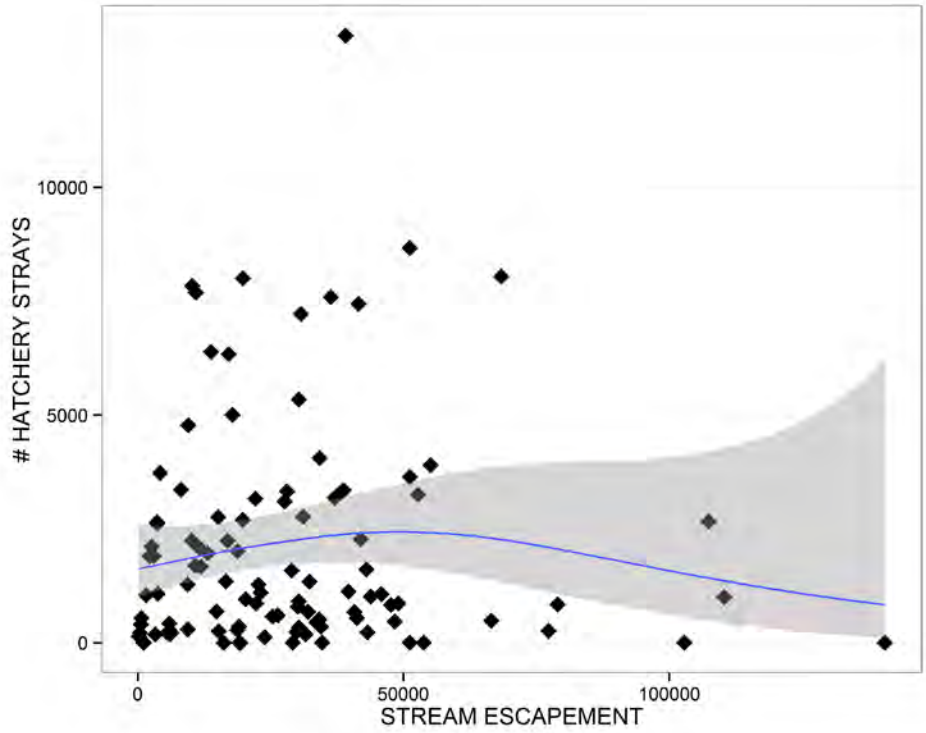


Figure 3. Box plots of estimated stream escapements for aerial index streams (AIS) and those selected for the AHRP straying project (Stray) for PWS. Median escapements for each group are indicated by black horizontal lines and correspond to: 16,924 (2013 AIS) vs. 50,059 (2013 Stray), 3,862 (2014 AIS) vs. 9,099 (2014 Stray), and 51,792 (2015 AIS) vs. 89,133 (2015 Stray). Mean escapement is indicated by diamonds. Escapement estimates have been adjusted for stream life and observer efficiency.

In addition, the mean *number* of hatchery pink salmon in wild-stock streams appears to be relatively fixed (but with a high variance) across streams with low and average escapements (Figure 4), and then declines slightly in streams with the highest escapements. This may provide an avenue for estimating total numbers of stray hatchery fish in streams across a region. Figures 1, 2 and 4 also illustrate why the possible ecological and genetic consequences of straying could be more pronounced in systems with relatively smaller escapements, as these systems tend to have higher proportions of hatchery fish. Hatchery escapements into streams (Figure 5) do not appear to be normally distributed. Rather, as would be expected for count data, the number of hatchery salmon likely follows a Poisson or negative binomial distribution and is right skewed. This is an important consideration if using this relationship for estimating the overall numbers and variance of hatchery fish across a district or region.



120

121 Figure 4. Estimated hatchery pink salmon escapement in streams versus estimated total annual
122 escapement (2008-2010) from area-under-the-curve estimates (data from Brenner et al. 2012). The
123 blue line is a GAM fit and the shaded area 95% confidence intervals. In this case we assumed that
124 the number of hatchery strays in streams followed a quasi-Poisson distribution.

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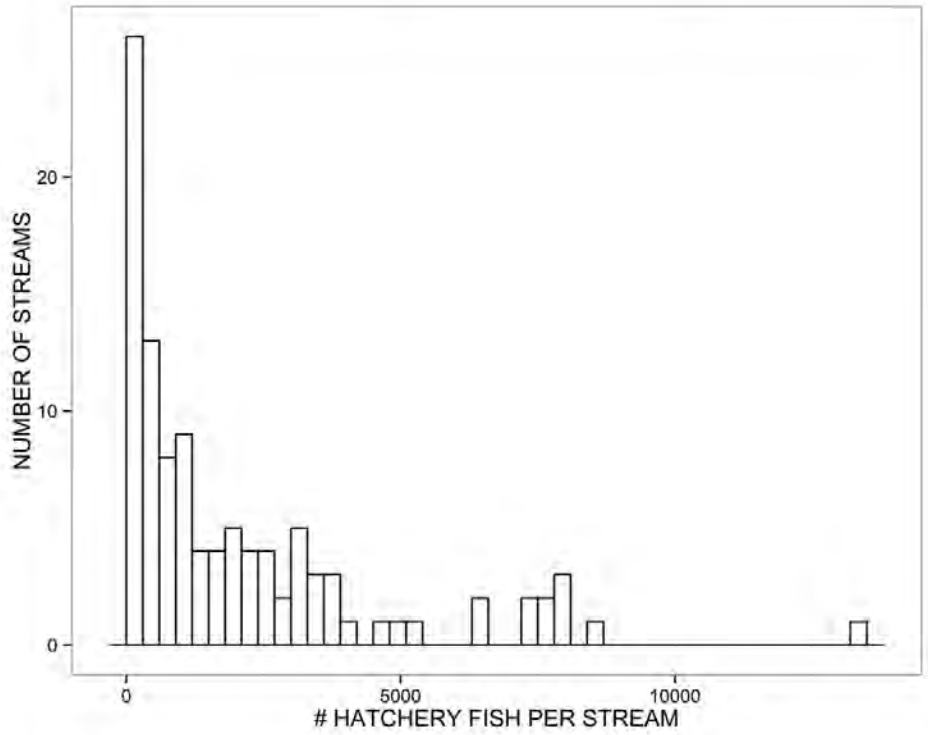

Figure 5. Estimated number of hatchery pink salmon per stream in PWS, for 37 streams sampled 2008–2010 (Data from Brenner et al. 2012).

Spatial Trends in Straying

There is a long history of aerial surveys in PWS and SEAK (Fried et al. 1998, Geiger and McPherson 2004), and, over the years, streams have been added or removed for various reasons from the suite of streams used to estimate the escapement index. Some of the streams removed from the AIS in PWS have been those in areas surrounding hatcheries. For example, Cannery Creek was formerly an aerial index stream (flown 1963–1982) that contained as many as 35,000 pink salmon during individual surveys (AUC estimates would be considerably greater than this), but was removed following the advent of the Cannery Creek Hatchery. All AIS were also removed from within the Port of Valdez and Valdez Arm north of Sawmill Bay, mostly because of airspace restrictions near the pipeline terminal and Valdez airport; flown 1963–1997. In addition, there are no aerial index streams within the immediate area (~13 km radius) surrounding the Wally Noerenberg Hatchery (WNH) on Esther Island. Streams adjacent to WNH were listed within the

1968 AWC (J. Johnson *pers. comm.),* and remained listed as recently as 1977 (Pirtle 1977), but were removed sometime after this; possibly due to the establishment of that hatchery in 1985. As places lacking AIS, these areas were not represented within the sample-space considered for the current AHRP study, even though some of them had substantial escapements prior to the advent of the hatchery program (e.g., Pirtle et al. 1972). The paucity of sampled streams close to some hatcheries may be somewhat problematic for achieving the stated goals of this study because straying proportions are, to a large extent, a function of distance from release facilities (Figures 6 and 7; Brenner et al. 2012, Joyce and Evans 2000, Knudsen et al. 2015, Piston and Heinl 2012).

Estimation of the hatchery fraction of the overall spawning population should, ideally, account for the strong spatial trend of straying (Figures 6 and 7). The goal of estimating the extent and annual variability of straying could be partially achieved by using non-linear models to estimate straying proportions or numbers as a function of distances from release locations (e.g., Figure 6). Data to parameterize such models could be obtained from previous studies of hatchery salmon straying (Brenner et al. 2012, Joyce and Evans 2000, Piston and Heinl 2012). After choosing the most parsimonious model for a given broodline (even years and odd years for pink salmon) and hatchery, these models could then be fit to the data for the existing study. In this way, mean values of stream straying proportions could be pulled from the estimated proportions of strays across all AIS. This method would not address the issue of using larger AIS for the study design, but—in the absence of additional sampling—corrections for non-AIS in PWS could come from methods within Fried et al. (1998), which estimated overall escapement into non-AIS. Such an exercise may also help to resolve discrepancies in estimated wild salmon escapements using extrapolations from aerial surveys and those provided within the AHRP draft reports.

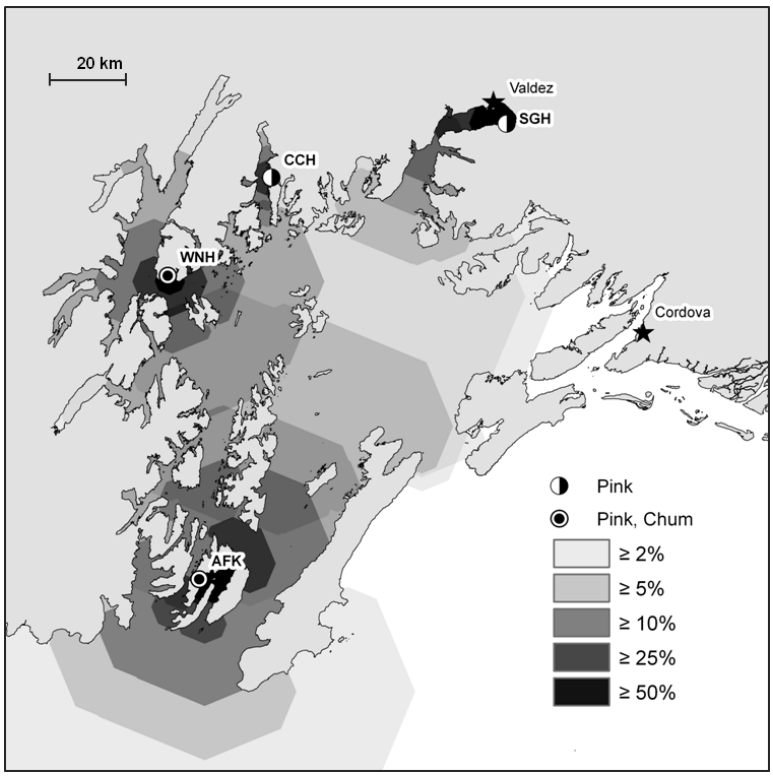

Figure 6. Spatial trends in hatchery pink salmon straying in PWS in 2009. The density of strays was generated in GIS from four separate models used to estimate the proportion of hatchery fish in streams as a function of distance from each release facility (from Brenner et al. 2012).

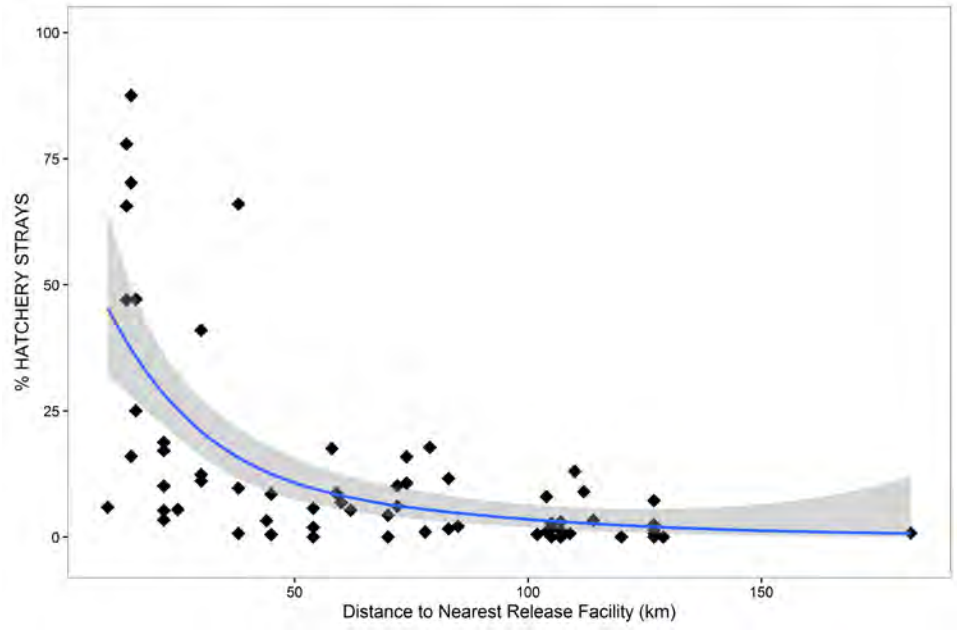

Figure 7. Percentage of stray hatchery chum salmon in SEAK streams (2008–2010) versus distance to the nearest chum salmon release facility (data from Piston and Heinl 2012). The blue line is a GAM fit and the shaded area 95% confidence intervals. In this case we assumed that the number of hatchery strays in streams followed a quasi-Poisson distribution.

Temporal Trends in Hatchery Salmon Straying

The change in hatchery straying proportions across the spawning season has been documented by previous studies for PWS for pink and chum salmon (Figure 8, Brenner et al. 2012, Joyce and Evans 2000). In SEAK, temporal changes in hatchery chum salmon strays also exist; however, the run timing of multiple hatchery and wild components is more complicated (Andy Piston, *pers. comm.)* than PWS, where all hatchery chum salmon return during a similar time period. The current experimental design and analysis does acknowledge temporal trends in straying with stratified sampling, but draft AHRP reports could be clarified with a more detailed explanation for how temporal weighting was conducted. For example, it would be useful if assumptions about stream life, observer efficiency, carcass residency, and correlations between ground and aerial counts were provided and accounted for in analyses (e.g., Fried et al. 1998).

We do have questions about the validity of the method used to weight hatchery proportions in streams over time. Notably, the current protocol calls for weighting based upon the sum of live and dead salmon at the time that samples were collected (Equation 5 of Knudsen et al. 2015). However, Table 2 of the 2014 Annual Progress Report (Knudsen et al. 2015) states that straying proportions were only weighted based upon carcass counts, not live counts. In contrast, the original Request for Proposals of the AHRP stated that weighting would be based on aerial survey estimates. Regardless of whether ground or aerial estimates are used to assess stream escapement, we believe that the weighting method should be based upon an integrated estimate of escapement over time. Such an integrated estimate—area-under-under-the-curve—is already being used to evaluate escapement goals for pink and chum salmon in PWS (e.g., Moffitt et al. 2014). For SEAK, peak counts of escapement are also based on aerial survey estimates (Geiger and McPherson 2004). Point estimates of escapement can be integrated across time and combined with assumptions about stream life (e.g., Fried et al. 1998), and carcass residence in streams, to produce a weighting of hatchery straying proportions that accounts for annual trends in escapement (Brenner et al. 2012). In contrast, it has been our experience that salmon carcasses can quickly wash out of streams, making them an ephemeral and unreliable indicator of overall escapement into a system, and therefore a poor choice for weighting of hatchery proportions across a season. The 2014 AHRP report also acknowledges that high water events flush carcasses out of streams (Knudsen et al. 2015). We note that ADF&G already uses integrated weighting approach to estimate salmon stock components in escapement samples and harvests in fisheries across Alaska. For example, scales, otoliths, and genetic tissues collected during the course of a run for which strata estimates sum to total escapement or harvest, etc. Thus, for a variety of reasons, we suggest that the AHRP use weighting methods that can be linked to integrated measures of abundance; thereby making estimates of hatchery proportions consistent with existing ADF&G assessment methods and previous studies that have evaluated straying (Brenner et al. 2012).

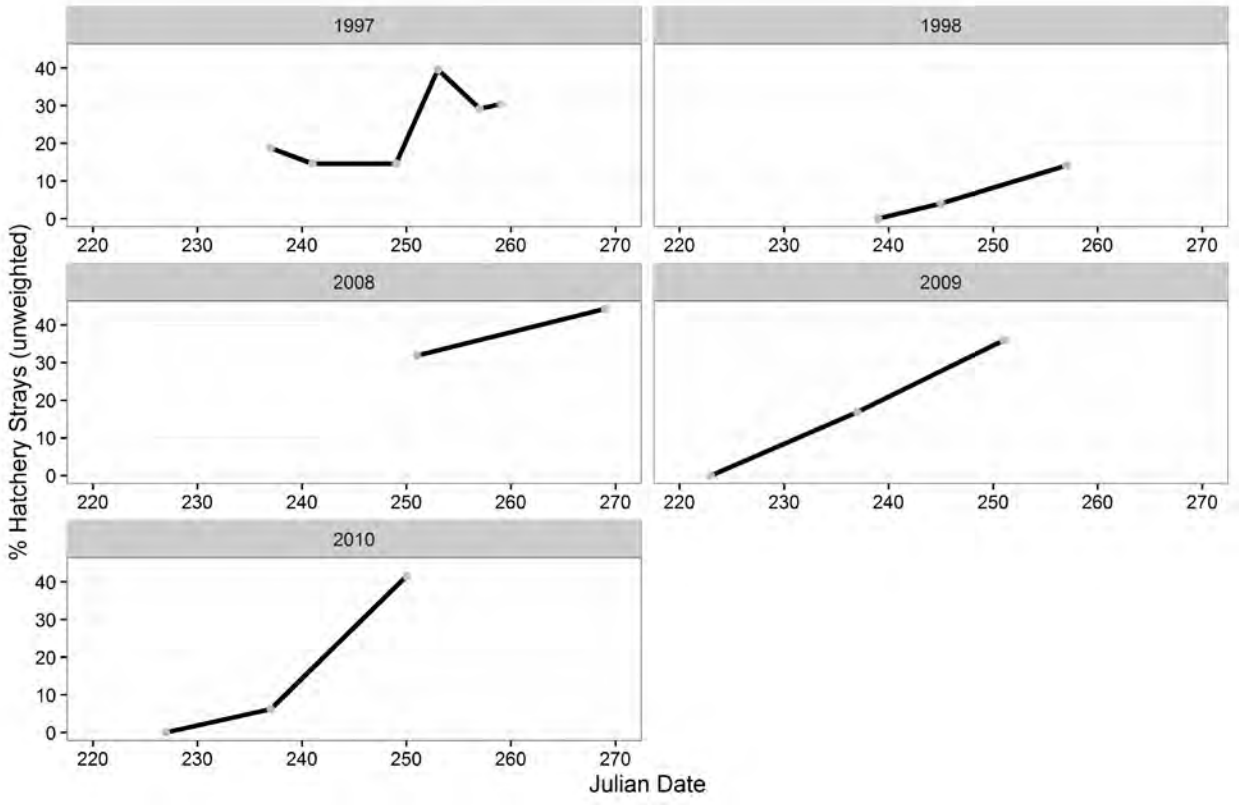

Figure 8. Example of temporal trends in hatchery salmon straying proportions based on proportions of hatchery pink salmon carcasses sampled from Snug Harbor Creek in PWS from 1997 to 2010 (Brenner et al. 2012).

Discussion and Summary

Data from previous hatchery salmon straying studies conducted in PWS and SEAK suggest that the proportion of hatchery strays in streams is a function of distance to release facility, time, and the size of wild escapements. It is recommended that known drivers be taken into account in analyses to meet the objective of producing an unbiased estimate of the hatchery fraction of the spawning population across all streams. Other factors, including the location of release sites in relation to migratory pathways, harvest pressure, within-year environmental conditions, and broodstock characteristics may also influence hatchery straying. The singular effects of these additional factors may be more difficult to discern; however, they should be considered for analyses.

The AHRP annual reports note differences in escapement estimates between the current study and those produced by ADF&G's aerial survey program (Knudsen et al. 2015). We suggest that these discrepancies could—at least in part—be attributed to some of the points we have addressed within this technical document. For example, excluding spawning areas, not accounting for spatial patterns in straying, not sampling across the full range of possible stream escapements, and not weighting straying proportions according to overall escapement could bias estimates of hatchery and wild escapement. Not accounting for major covariates can be indicated by overdispersion (the variance being larger than the mean), and can be exacerbated by zero-inflation (more zeros in the data than would be expected). Overdispersion can be a product of count data in general and not accounting for major covariates within models in particular (Zuur et al. 2009). Figures 1, 2, 4 and 7 show a very wide range of hatchery straying proportions and number of hatchery fish across stream escapements and, without accounting for distance to release facility or other drivers, these data appear to exhibit overdispersion: the mean hatchery straying proportions is a small fraction of the variance for years we have examined. In addition, the histogram of hatchery stays (Figure 5) suggests an inflation of the number of streams with zero hatchery fish. Zero-inflation is also quite common (normal) in count data and could come about as a result of the reduced probability to detect hatchery strays within streams having larger escapements (Figures 1 and 2) or, as previously discussed, a sampling design that biases against streams that have hatchery strays. Zuur et al. (2009) presents an excellent discussion of how to account for overdispersion and zero-inflation in a variety of ecological models that use count data.

Herein, we have proposed some possible solutions for analyzing data collected during the course of the AHRP project in order to meet the objective of quantifying the extent and annual variability of pink and chum salmon straying in PWS and SEAK. Most notably, we suggest the inclusion of data from previous studies and modeling approaches to account for known spatial trends in straying and the influence of stream escapement size on straying proportions. The benefits of using previous studies to extrapolate straying proportions across areas are that it would take advantage of a rich source of available data to fill in gaps within the current study design, which did not stratify across gradients that are important determinants of straying—distance from release facility and escapement size. Using this approach may necessitate pooling data across years, which would nullify annual variance estimates of straying proportions. If straying proportions exhibit a strong

covariance across streams, replicates from individual streams taken across years could still be used to estimate spatial trends in straying.

Another possible approach is to limit the interpretation of the result to the subset of larger AIS surveyed during this study; at the exclusion of extrapolating to other streams, or areas not surveyed. This approach has the benefit of not having to address the issues of spatial gradients in straying proportions or stream escapements. However, without extrapolating stream proportions to larger areas, key objectives of this study would not be achieved and the data collected from the ocean sampling portion of this study may be of limited use.

Acknowledgments

We thank Andy Piston, Chris Habicht, Dr. Dion Oxman, Ben Williams, and Kyle Shedd for many helpful comments and suggestions.

Questions for the AHRP

1) Are the issues highlighted in this technical document deserving of a solution? If so:
2) What solution(s) do you think are most appropriate to account for spatial gradients in stream straying proportions for the purpose of estimating mean straying proportions across a larger area?
3) What solution(s) do you think are most appropriate to address the influence of escapement size on stream straying proportions for the purpose of estimating straying proportions across a diversity of stream escapements?
4) What solution(s) do you think are most appropriate to address concerns that weighting of straying proportions using carcass counts is not indicative of cumulative stream escapement?
5) How would the issues raised in this technical document influence escapement estimates of wild and hatchery fish into streams published in initial AHRP reports?

AHRP Review and Comments

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Submitted By
ken federico
Submitted On
9/22/2018 1:44:20 PM
Affiliation
South Central Alaska Dipnetters Association

Phone
907-715-8363
Email
kenfederico@mtaonline.net
Address
PO Box 873641
Wasilla, Alaska 99687

I am writing this on behalf of the South Central Alaska Dipnetters Association. We are concerned about the possible release of another 20,000,000 pink salmon smolt on top of the already 680,000,000 pink salmon smolt being released.

There is no historical scientific basis to judge as to whether this is a sound decision to make without more information. No one knows the ramafications of these extra mouths to feed on their own or other salmon species, never mind other wildlife. Mother Nature has a way of keeping a balance over time but this force feed of an extra biomass seems to really push the limits, in our collective opinion.

Commercial fishers in UCI always use the notion of over escapement to push for longer fishing times and emergency openers. The arguement is that too much biomass overwhelms the habitat and cannot support too many extra smolts. Maybe that arguement should be applied to this situation. We are not prepared to gamble on the other species of salmon so a few commercial fishers can make a few extra car or truck payments. It just does not seem like a smart and prudent decision for the community biomass either. In closing, we wish that the BOF takes the prudent and conservative approach when discussing this issue. It would be wise to error on the side of caution rather then succumb to outside pressures.

Thank You, Ken Federico, Chair, SCADA

Submitted By
ken Federico
Submitted On
9/28/2018 10:35:27 AM
Affiliation
South Central Alaska Dipnetters association

Phone
907-715-8363
Email
kenfederico@mtaonline.net
Address
PO Box 873641
wasilla, Alaska 99687

I am writing on behalf of the South Central Alaska Dipnetters association. We are concerned about ACR #6, which concerns the Kenai/Kasilof area for dipnetting. It is our collective belief that something of this magnitude should be addressed in-cycle rather than how it is currently being presented. This ACR will affect 30,000 to 35,000 households that apply for a dipnetting permit every year. This is not an emergency and two more years of the status quo will not greatly affect other users. By other users I am referring to commercial interests since the author has a vested interest. We believe this ACR is just an "end Run" around the system in place so those permit holders above cannot have a chance to discuss and present their case. We further believe that this disinfranchises all dipnet permit holders and other interested parties by submitting this out of cycle. Dipnetters lost to habitat concerns about 5 miles of Kenai river access at the last BOF meeting. That alone will make it harder for people to attempt to put fish in their freezers. In closing, these rivers mentioned affect most of the states population for dipnetting since it is on the road system and only two hours from Anchorage. People from all over the state come to dipnet the Kenai/Kasilof too. I did a breakdown a couple of years ago on the geographic locations of Permit holders for South Central dipnetting. I was suprised that people from Nome, Bethel and other outlying villages also come to dipnet in UCI. So your decisions will concern all Alaskans. Thank you for your time and effort. There is no grander service than Public service.

Ken Federico, on behalf of SCADA

CITY OF VALDEZ, ALASKA

RESOLUTION NO. 18-33

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF VALDEZ, ALASKA, SUPPORTING THE ALASKA SALMON HATCHERY PROGRAM

WHEREAS, the City of Valdez benefits greatly from the State of Alaska Hatchery Program; and

WHEREAS, Alaska's salmon hatchery program has operated for 45 years and supplements wild salmon harvests throughout the state; and

WHEREAS, Alaska's salmon hatchery program is an example of sustainable economic development that directly benefits subsistence fishermen, personal use fishermen, sport fishermen, charter fishermen, commercial fishermen, seafood processors, as well as state and local governments such as Valdez, which receive raw fish tax dollars; and

WHEREAS, Alaska hatcheries accounted for 57% of the total common property commercial catch and 60% of the total ex-vessel value in the Prince William Sound region in 2017; and

WHEREAS, the Prince William Sound Aquaculture Corporation (PWSAC) headquartered in Cordova contributes significantly to the economy of Prince William Sound by providing 1,405 jobs, $68 million in labor income, and $192 million in total economic output in 2017; and

WHEREAS, the Valdez Fisheries Development Association, Inc. (VFDA) headquartered in Valdez contributes significantly to the economy of Prince William Sound by providing 824 jobs, $21.5 million in labor income, and $80.1 million in total economic output between 2008 to 2012; and

WHEREAS, Alaska's salmon hatchery program has proven to be significant and vital to Alaska's seafood and sportfish industries and the state of Alaska by creating employment and economic opportunities throughout the state and in particular in coastal communities such as Valdez ; and

WHEREAS, Alaska's salmon hatchery program is non-profit and self-funded through cost recovery and enhancement taxes on the resource and is a model partnership between private and public entities; and

WHEREAS, the State of Alaska has significantly invested in Alaska's salmon hatchery programs and associated research to provide for stable salmon harvests and to bolster the economies of coastal communities like Valdez, while maintaining a wild stock escapement priority; and

WHEREAS, Alaska salmon fisheries, including those of hatchery origin, continue to be certified as sustainable by two separate programs, Responsible Fisheries Management (RFM) and Marine Stewardship Council (MSC);

WHEREAS, salmon hatchery programs are permitted using a public process, employ strong scientific methodology and are built upon sound and sustainable fisheries policies intended to protect wild salmon populations.

NOW, THEREFORE, BE IT RESOLVED, BY THE CITY COUNCIL OF THE CITY OF VALDEZ, ALASKA, that

Section 1. The City of Valdez affirms its support for Alaska's Salmon Hatchery Programs including PWSAC and VFDA.

Section 2. The City of Valdez supports unbiased and scientific methods to assess the interaction of Alaska's salmon hatchery programs with natural stocks, such as the Alaska Hatchery/Wild Salmon Interaction Study which began in 2011 and is scheduled to conclude in 2023.

Section 3 The City of Valdez calls on the Alaska Board of Fisheries to work with the hatchery community, the Alaska Dept. of Fish and Game and industry leaders to further its understanding of the importance of the Alaska salmon hatchery program to all Alaskans.

Section 4 The City of Valdez supports the Alaska Dept. of Fish & Game's approval of VFDA's permitted increase of 20 million pink salmon eggs taken in 2018 at the Solomon Gulch Hatchery.

PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF VALDEZ, ALASKA, this 2nd day of October, 2018.

CITY OF VALDEZ, ALASKA

Jeremy O'Neil, Mayor

SEAL OF THE CITY OF VALDEZ, ALASKA INC. 1901

ATTEST:

Sheri L. Pierce, MMC, City Clerk

Submitted By
Jeff Cabana
Submitted On
9/30/2018 5:19:13 PM
Affiliation
Commercial fisherman 37 yrs PWS

Phone
907-205-7933
Email
bamacabana@gmail.com
Address
P.O. Box 26
Homer, Alaska 99603

To the Board of Fish,

I am writing to you in regards to ACR1 PWS. I am questioning why this proposal might be addressed at the Oct 3rd meeting in Anchorage. We just had a regular Board of Fish cycle meeting regarding PWS this past spring,held in Valdez. KRSA was in attendance That would have been the time to address this issue , where there were more local area people in attendance. Reportedly, KRSA is claiming they had no other way to submit their proposal.

Due to the fact that everything about the VALDEZ Production takes place in PWS, there is NO OTHER place this should be heard other than at the regular PWS meetings.

KRSA is no new comer to The Board of Fish process. They know what the proper process is. This is not an emergency or crises situation where irreparable damage could be done and it cannot wait until a regular cycle meeting.

Please consider this matter to reflect fairness for the commercial fisherman of PWS.

Thank you. Jeff Cabana

Submitted By
Nathan tueller
Submitted On
10/3/2018 5:14:13 PM
Affiliation

acr 1. not an emergency. Should not be heard out of sequence. valdez hatchery produces pink salmon caught in valdez. This proposal should be heard in 2020 when pws in in cycle, otherwise what is the point of having regional meetings in the regons affected. the sportsfishermen of the keani are looking to anchorage as more favorable environment to pass this acr. that is the only reason it has been brought up now. Hear this, review it, and make a decision on it in the pws meeting of 2020.

Submitted By
Nathan tueller
Submitted On
10/3/2018 5:22:22 PM
Affiliation

I'm commenting on acr 1, which i am against. Acceptable hatchery eggtake levels are set by ADF&G. They are the trained, educated, marine biologists who have sucessfully protectected the salmon of Prince Williams Sound and Alaska since before I was born. This is an attempt to politically control somthing that the science based managers have been handeling sucessfully for decades. Please do not allow this.

Submitted By
Nathan tueller
Submitted On
10/3/2018 5:27:36 PM
Affiliation

I am against acr 1. The eggs have allready been taken. There is no conclusive evidence that valdez hatchery pinks adversly affect other salmon runs. There is conclusive proof that lots of alaskans, like over 2000, rely on the hatcheries of pws for their incomes.

Lets get the results of adf&gs hatchery straying study before we jump to any conclusions.

Submitted By
Nathan tueller
Submitted On
10/3/2018 5:44:54 PM
Affiliation

my comments address acr 1. In my opinion, there is no good reason to allow this reduction in eggtake. Salmon straying is the natural process that allow salmon to retain genetic diversity and replentish streams that are occasionaly wiped out by one act of nature or another. Do these straying pinks threaten or outcompete the keani fish or for that matter any other run of salmon? no. We have banner hatchery returns side by side with banner natural returns to pws. reds and kings have different food sources than pinks. The keani river fisherman need to look to fixing their own cituation before lashing out at us hundreds of miles away.

Submitted By
Russell Fitzwater
Submitted On
10/2/2018 12:11:16 PM
Affiliation

Phone
4802923404
Email
russellfitzwater@gmail.com
Address
1290 Alyeska Hwy
Girdwood, Alaska 99587

I want to point out that not only is there a serious lack of proof (data) to support the notion that pink salmon released from any hatchery have a direct effect on the Chinook Salmon population, we especially do not have the data to conclude that the number of Valdez Pinks directly corresponds to the number of Chinook returning to the Kenai River. Our fisheries should be managed based on scientific data collected to conclude a cause and effect before making any decisions such as this one. Yes, it's worth pointing out ACR 1 claims they have to use the ACR which is code for out of cycle because there is no other way for them to submit a proposal to reduce the pink eggs at Valdez. This is pure BS. The should have to submit their proposal during a PWS cycle just like everyone else has to do for PWS issues. If the BOF Grant's them a ACR this means they can submit proposals every year. The very reason there is a 3 year cycle for every area in Alaska is this gives the stakeholders a chance to plan to attend a BOF meeting in an area close to where the fishery occurs. Thus PWS is held in Valdez or Cordova, kodiak is held in Kodiak, BB is held in Dillingham... Anchorage is not close to PWS and is not where this proposal should be heard.

Submitted By
Tim Cabana
Submitted On
9/27/2018 1:48:14 PM
Affiliation
Fisherman

Acr 1 is out of cycle. We just finnished our areas issues in March 2018 and these people were there. They had there chance to do this then and for whatever reason thought an out of cycle surprise proposal would have a better chance. This is wrong and sets a very bad president. Not a good idea, this will open it up to any other proposals to be brought up anytime. There is a reason we are on a 3 year cycle. Either keep to it or change the rules.

From: tim cabana
To: DFG, BOF Comments (DFG sponsored)
Subject: Acr1
Date: Thursday, September 27, 2018 1:28:19 PM

It is wrong and sets a bad precedent to take up a PWS prososal out of cycle just a few months after we went through our areas proposals. The Kenai river sportfisherman where at the meetings in March and should have brought it up then. This will set a bad precedent that could allow any proposals anytime. It is hard enough to keep track of whats going on in our fisheries without having to check ever month on whatever someone wa ts to throw at us out of cycle. Please do not let this ho on.

This is a Valdez PWS issue and should wait till the next cycle to be addressed. That you

Tim Cabana, PWS SALMON FISHERMAN

Sent from Yahoo Mail on Android

Submitted By
wendy tueller
Submitted On
10/3/2018 5:33:12 PM
Affiliation

Proposals are concidered for each region once every 3 years, that is my argument against acr 1. This is a PWS proposal out of sequence. It can wait till 2020. The rest of us do.

Submitted By
wendy tueller
Submitted On
10/3/2018 5:38:32 PM
Affiliation

Phone
907 783 1178
Email
bellaphylomena@hotmail.com
Address
box 913
Girdwood, Alaska 9

If the keani river sportsfishermen want to make changes in pws, rather than on the keani river, than they should do so in 2020, when pws issues are heard. It is a deliberate political manuver to have this heard in anchorage rather than in one of the communitys that would be directly, negativly impacted by acr 1. I urge you to say no for now, and hear it at the pws meeting in 2020. Say no to this proposal.

Submitted By
Bruce Marifern
Submitted On
10/3/2018 4:49:24 PM
Affiliation
SE Seine

Phone
907-518-1113
Email
fishfern@gci.net
Address
Po box 917. Petersburg Alaska
Petersburg , Alaska 99833

Good Afternoon

I would like to express my concern on ACR 10 ,,, Considering we just visited these issues , I would be of the humble opinion to let fish and game manage these stocks. They have a conservative approach to a sustainable fishery.

On ACR 2 I would oppose the cap

Sincerely Bruce Marifern

Submitted By
Leif Dobszinsky
Submitted On
10/3/2018 9:02:56 AM
Affiliation

I am in opposition to ACR 2. Hacthery produced salmon in SEAK are a vital economic leveler to the ups and downs of natural spawning salmon stocks. Commercial and Sport fisherman rely on the hatchery returns to augment commercial fisheries and recreations opportunities in down years such as the summers of 2016 and 2018.

PVOA BOF Comments
PO Box 232 Petersburg, AK 99833
Petersburg Vessel Owner's Association
(907) 772-9323
email: pvoa@gci.net

October 1, 2018

Alaska Department of Fish and Game
Board of Fisheries
PO Box 115526
Juneau, AK 99811
Via email: dfg.bof.comments@alaska.gov

RE: Comments on October 15-16 Work Session ACRs

Dear Chairman Jensen and Board of Fisheries Members,

PVOA's mission statement is to:
"Promote the economic viability of the commercial fishing fleet in Petersburg, promote the conservation and rational management of North Pacific resources, and advocate the need for protection of fisheries habitat."

We appreciate the opportunity to provide these comments on Agenda Change Requests regarding Southeast fisheries.

ACR2 *Cap statewide private non-profit salmon hatchery egg take capacity at 75% of the level permitted in 2000.*

ACR2 would greatly harm the seafood industry, the sport fishing industry, and coastal communities dependent on these sectors in Southeast Alaska. Private Non-Profit (PNP) hatchery operators Armstrong-Keta Inc (AKI), Douglas Island Pink and Chum (DIPAC), Northern Southeast Regional Aquaculture Association (NSRAA), and Southern Southeast Regional Aquaculture Association (SSRAA) greatly contribute to the overall harvest of salmon.

PVOA asks the Board of Fisheries not adopt this ACR. Below are some economic impacts of hatcheries statewide and in Southeast for 2017 to show the importance of their contributions:

-Statewide, hatcheries contributed nearly 47 million fish to the commercial fishery and accounted for 21% of the commercial harvest of 222 million salmon with an ex-vessel value of $162 million. This comprised 24% of the statewide harvest exvessel value.

-In Southeast, about 8 million hatchery fish were harvested at an ex-vessel value of $53 million. This comprised 39% of the Southeast total exvessel value.

-The statewide first wholesale value of hatchery fish was $331 million.

-About 194,000 hatchery-produced fish were harvested by subsistence, personal use, and sport fishers; including salmon, rainbow trout, arctic char, and grayling.

Petersburg Vessel Owner's Association
(907) 772-9323
email: pvoa@gci.net

Two of the state's five largest wild runs occurred in 2013 and 2015. Likewise, the two largest hatchery harvests occurred in 2013 and 2015.[1]

The Alaska Hatchery program was created by the State in 1971 during historic low harvests to supplement fisheries, not to replace wild fisheries. Today, this is still the primary objective of the program. Alaska has set high standards for hatcheries, that have been proven to be very successful, requiring them to be located away from natural salmon stocks, use local broodstock sources, and mark hatchery fish to decipher from wild stocks.

Great care is taken in operations of and choosing sites for hatcheries through the public Regional Planning Team process and oversight from the Alaska Department of Fish and Game, Department of Natural Resources, and Department of Environmental Conservation.

ACR10 *Close Sitka Sound commercial sac roe herring fishery until regional herring stock status improves, additional research on herring is conducted, and the amount necessary for subsistence is met in at least three consecutive years (5 AAC 27.110 and 5 AAC 27.160)*

PVOA members ask the Board of Fisheries not adopt ACR10. While the Sitka Sound herring biomass has shown a slight decline in recent years, it is still robust and above the 25,000 ton threshold of spawning biomass for a fishery in recent history. Furthermore, this threshold has increased from 6,000 in 1977 to 7,500 in 1983, to 20,000 in 1997, and 25,000 in 2009 as the biomass increased.

We believe the Sitka herring biomass is stable, and protected from overfishing by the spawning biomass threshold and harvest rate starting at 12%.

ADF&G uses an Age Structured Analysis, which relies on a time series of herring stock assessments, to estimate the biomass in Sitka. This same method is used to forecast spawning biomass of herring in Southcentral Alaska, the Eastern Bering Sea, and British Columbia. This method estimates recruitment, age, growth, maturation, natural mortality, weight-at-age, and spawning escapement to forecast abundance.[2]

This ACR lacks objectives for the requested 'stock status improvements' in which to re-open the fishery if this were to become a proposal and passed by the Board of Fisheries. If a fishery is to be closed until stock conditions improve, there need to be clear objectives to compare the current condition of the biomass against the trigger to re-open the fishery. The ACR also does not include information on what kind of additional research they are seeking. As described above, ADF&G already has extensive and regionally proven herring research.

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[1] Stopha, M. 2018. Alaska salmon fisheries enhancement annual report 2017. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 5J18-02, Juneau.

[2] Hebert, K. 2017. 2018 Report to the Alaska Board of Fisheries: Southeast Alaska–Yakutat herring fisheries. Alaska Department of Fish and Game, Fishery Management Report No. 17-58, Anchorage.

PVOA BOF Comments
PO Box 232 Petersburg, AK 99833
Petersburg Vessel Owner
(907) 772-9323
email: pvoa@gci.net

The Board of Fisheries extensively reviewed the management of the Sitka Sac Roe fishery in January while addressing proposals in the Southeast cycle. In light of the very recent work and consideration regarding this fishery, this ACR is untimely.

Thank you for your time and dedication in considering public comments for the upcoming Work Session. We ask ACR2 and ACR10 are not moved forward as proposals.

Petersburg Vessel Owner's Association (PVOA) is composed of over 100 members participating in a wide variety of species and gear type fisheries in state and federally managed waters. An additional thirty businesses supportive to our industry are members. PVOA members fish throughout Alaska from Southeast to the Bering Sea. Targeted species include salmon, herring, halibut, sablefish, crab, shrimp, sea cucumbers, and geoducks.

Respectfully,

Megan O'Neil

Megan O'Neil
Executive Director

Submitted By
Max Worhatch
Submitted On
9/30/2018 5:08:14 PM
Affiliation
United Southeast Alaska Gillnetters

Phone
253-237-3099
Email
usag.alaska@gmail.com
Address
PO Box 2196
Petersburg, Alaska 99833

~~September 30, 2018

John Jensen, Chair
Alaska Board of Fisheries, Boards Support Section
PO Box 115526
Juneau, AK 99811-5526

Submitted via online form.

Dear Chairman Jensen and Board of Fisheries members:

United Southeast Alaska Gillnetters is opposed to ACR2.
The economic impacts that would occur should this draconian proposal be adopted would have a devastating effect on the economy of southeast Alaska. The fleet we represent, comprised of 474 small family owned businesses, of which over 80% are residents, rely heavily on enhanced fish. The communities of Haines, Juneau, Sitka, Petersburg, Wrangell, Craig, Coffman Cove, and Ketchikan all have vibrant, active fleets. These communities rely heavily on the gillnet fishery as a force in their local economies. Most of these communities also have seine and troll fleets that also rely on enhanced fish.
With the advent of farmed fish in the early nineties, Alaska salmon went from being a luxury item to a commodity. While the market has grown, so has the competition. Prices today are near the levels of the early to mid-eighties. Without the increased volume enhanced fish affords us, we would not exist as the economic engine we are today.
The coastal communities of southeast that have processing plants have invested millions in infrastructure to support both processing and fishing fleets in an effort to capture a piece of the economy generated by the fishing industry. Processors have likewise invested in communities and local fishermen. Raw fish taxes generated by salmon go to the state and communities where fish are landed.
If the board were to adopt this proposal, southeast Alaska would be sent into a serious recession, perhaps a depression, and would probably have to reinvent itself. With all the investment and infrastructure geared toward the fishing industry, that could take decades.
While the proposer may be correct in that the hatchery protocol has been ignored, the proposal itself appears punitive toward industry, as if it were their fault two different political appointees have ignored this over the years. It also appears to us that the protocol is redundant, given that the Regional Planning Team process covers these very issues, and is a very public process.
If the board were to adopt this proposal, our organization's message to our representatives on the regional boards would be to cut all king salmon production first. Our ability to harvest these fish has been marginalized with the recent lack of king salmon in the southeast region, and represents the least value for our fleet as well as the worst cost/benefit ratio in our region. It is also the most expensive fish we raise, and with this draconian cut, we would have a reduction in chum salmon returns. Chum salmon returns pay for many of these king salmon programs.
To adopt this proposal, and the socio-economic impacts associated with it, would require a real emergency. There's no stock of concern, no stock being negatively impacted that's been identified. We see no emergency. We see no science. What we do see is a punitive proposal with no real basis.

Sincerely,

Max Worhatch
Executive Director

UNITED SOUTHEAST ALASKA GILLNETTERS' MISSION IS TO SERVE, PROTECT AND ENHANCE THE COMMERCIAL GILLNET SALMON FLEET OF SOUTHEAST ALASKA

Submitted By
Kyle Rosendale
Submitted On
10/3/2018 10:55:14 AM
Affiliation

Board of Fisheries

ADF&G Boards Support

P.O. Box 115526

Juneau, Alaska 99811-5526

Re: October Board of Fisheries Work Session

03 October 2018

Chairman Jensen and members of the Board of Fisheries,

Thank you for the opportunity to comment on issues that will be discussed during the October 15-16 Board of Fisheries Work Session. I would like to note my support for two Agenda Change Requests (ACRs): ACR 2 and ACR 10.

ACR 2: Cap statewide private non-profit salmon hatchery egg take capacity at 75% of the level permitted in 2000.

The impacts of hatchery salmon on the ecosystem are not well-known, with one review of hatchery-wild salmon interactions in Alaska concluding "virtually nothing is known about the effects of hatchery fish on wild populations in Alaska" and called for additional study of hatchery-wild interactions in Alaska (Grant, 2012). In a review of work on hatchery and wild salmon interactions, Rand et al (2012) noted "there remains substantial uncertainty regarding the interpretation of spatial, temporal, and dietary overlap between hatchery and wild fish during their early life history in the marine environment" and Naish et al (2008) found studies of hatchery-wild "interactions at all ecological scales during the entire salmon life history have been rare". Further studies (Cross, 2005; Pearson et al, 2012; Ruggerone et al, 2012; Springer and van Vliet, 2014) have implicated hatchery salmon as negatively impacting wild salmon, herring, and birds.

Amaroso et al (2017) note that it is difficult to evaluate hatchery programs due to "a lack of suitable controls that would allow for isolation of any enhancement effect" and found evidence that hatchery production can "replace" wild production. The authors concluded "the benefits of enhancement may be considerably overestimated" if reduced productivity of wild salmon populations due to hatchery salmon is not fully considered. Hatcheries in Alaska released about 1.6 billion fry in 2017 (Stopha, 2018); given the uncertainty surrounding the large-scale impacts of hatchery operations to the ecosystem, releases of this magnitude seem unwise. I believe that reducing hatchery production state-wide while continuing to study ecosystem impacts of hatchery salmon would be in line with the Precautionary Principle and would be my preferred course of action. Therefore, I support ACR 2.

I should note that Alaska is not the only state producing large numbers of hatchery salmon. Ruggerone and Irvine (2018) found that 40% of the total salmon biomass in the North Pacific Ocean is hatchery-origin. With that in mind, I would also encourage the Board of Fisheries, if possible, to direct ADF&G to coordinate research efforts on marine impacts of hatchery salmon with other major North Pacific hatchery producers, such as Canada, Japan, and Russia, and develop policy and management strategies based on the results.

ACR 10: Close Sitka Sound commercial sac roe herring fishery until regional herring stock status improves, additional research on herring is conducted, and the amount necessary for subsistence is met in at least three consecutive years.

Herring are a culturally and ecologically important species and herring populations throughout the Southeast Alaska have been severely depleted or even extirpated (Thornton et al, 2010). The needs of subsistence herring egg harvesters in Sitka have been met in only three of the past 10 years (Sill and Cunningham, 2017). Herring are also a forage fish and an invaluable resource for other culturally, ecologically, and economically important species, such as humpback whales, king salmon, halibut, lingcod, and coho salmon (Environment Canada, 1998). Traditional ecological knowledge suggests that the spatiotemporal distribution of herring spawn in Sitka Sound has drastically changed and subsistence harvesters are no longer able to meet their needs. The Board of Fisheries must act to provide opportunity for subsistence users and prevent an irreplaceable loss to Alaskan Native culture and to Southeast Alaskan ecosystems. Therefore, I support ACR 10.

Thank you for the opportunity to comment on Agenda Change Requests to be heard at the October Work Session. And thank you for streaming the proceedings – I look forward to listening from Sitka.

Thank you,

Kyle Rosendale

References

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AFDF
Alaska Fisheries Development Foundation, Inc.

A Resolution in Support of the Alaska Salmon Hatchery Program

WHEREAS, the people of Alaska benefit greatly from the State of Alaska Salmon Hatchery Program; and

WHEREAS, Alaska's salmon hatchery program has operated for 45 years and supplements wild salmon harvests throughout the state; and

WHEREAS, Alaska's salmon hatchery program is an example of sustainable economic development that directly benefits subsistence fishermen, personal use fishermen, sport fishermen, charter fishermen, commercial fishermen, seafood processors, as well as state and local governments, which receive raw fish tax dollars; and

WHEREAS, Alaska's salmon hatchery program employs strong scientific methodology and is built upon precautionary principles and sustainable fisheries policies to protect wild salmon populations; and

WHEREAS, Alaska Department of Fish and Game regulates hatchery operations, production, and permitting through a transparent public process and multi-stakeholder development of annual management plans; and

WHEREAS, returns of hatchery and wild salmon stocks follow similar survival trends over time and the largest returns of both hatchery and wild salmon stocks have largely occurred since hatchery returns began in about 1980; and

WHEREAS, there are no stocks of concern where most hatchery production occurs, indicating that adequate escapements to wild stock systems are being met in these areas over time; and

WHEREAS, Alaska hatcheries contributed an annual average of nearly 67 million fish to Alaska's commercial fisheries in the past decade; and

WHEREAS, Alaska hatcheries accounted for 22% of the total common property commercial catch and 43% of the total ex-vessel value in the Southeast region in 2016; and

WHEREAS, a recent McDowell Group report identifies the average annual economic contribution for years 2012-2017 to be 4,700 jobs, $218 million in labor income, including all

direct, indirect and induced economic impacts, and $600 million in total economic output is associated with Alaska salmon hatchery production; and

WHEREAS, Alaska's salmon hatchery program has proven to be significant and vital to Alaska's seafood and sportfish industries and the state of Alaska by creating employment and economic opportunities throughout the state and in particular in rural coastal communities; and

WHEREAS, Alaska's salmon hatchery program is non-profit and self-funded through cost recovery and enhancement taxes on the resource and is a model partnership between private and public entities; and

WHEREAS, the State of Alaska has significantly invested in Alaska's salmon hatchery program and associated research to provide for stable salmon harvests and to bolster the economies of coastal communities while maintaining a wild stock escapement priority; and

WHEREAS, Alaska salmon fisheries, including the hatchery program, continue to be certified as sustainable by two separate programs, Responsible Fisheries Management (RFM) and Marine Stewardship Council (MSC);

THEREFORE BE IT RESOLVED that the Alaska Fisheries Development Foundation affirms its support for Alaska's salmon hatchery programs; and

FURTHER BE IT RESOLVED that the Alaska Fisheries Development Foundation supports unbiased and scientific methods to assess the interaction of Alaska's salmon hatchery programs with natural salmon stocks, such as the Alaska Hatchery-Wild Salmon Interaction Study which began in 2011 and is scheduled to conclude in 2023; and

FURTHER BE IT RESOLVED that the Alaska Fisheries Development Foundation calls on the Alaska Board of Fisheries to work with the hatchery community, the Alaska Department of Fish and Game and industry leaders to further its understanding of the importance of the Alaska salmon hatchery program to all Alaskans.

Approved by the AFDF Board of Directors via email vote and signed this 9th day of September, 2018.

Witness:

Julie Decker, Executive Director

Julie Decker, Executive Director
Alaska Fisheries Development Foundation
www.afdf.org

Glenn Reed, President
Pacific Seafood Processors Association
www.pspafish.net

Alaska Board of Fisheries
Mr. John Jensen, Chair
Via email: dfg.bof.comments@alaska.gov

October 3, 2018

RE: Alaska Salmon Hatchery Reports & Forum - MSC and RFM Certifications of Alaska Salmon

Dear Chairman Jensen and Board members,

The Alaska Fisheries Development Foundation (AFDF) and the Pacific Seafood Processors Association (PSPA) offer the attached materials with respect to the Tuesday, October 16 afternoon session of the Alaska Board of Fisheries Work Session on Alaska salmon enhancement issues. AFDF is the Client for the Responsible Fisheries Management (RFM) certification and PSPA is the Client for the Marine Stewardship Council (MSC) certification of Alaska's salmon fishery, which will be transferred to AFDF in the Winter of 2018.

Sustainability certification has become a necessity for accessing markets and selling seafood internationally. The Alaska salmon fishery has been certified as sustainably managed by MSC and RFM since 2000 and 2011, respectively. These programs use third-party scientific experts to serve on Assessment Teams and review Alaska's management practices against the programs' standards. The certification period is five years with annual audits by the Assessment Team to assure no drastic changes have occurred which would negatively affect certification.

In 2013, the 2nd re-certification under the MSC program identified questions about Alaska's pink and chum salmon enhancement programs, consequently placing conditions on continued certification relevant to large-scale chum enhancement in Southeast (SE), and Kodiak pink and chum salmon. PWS salmon was not certified by MSC due to an identified need for additional data, although the RFM certification remained in place. Since then, RFM became the first certification program in the world to be recognized by the Global Sustainable Seafood Initiative (GSSI) as meeting the rigorous FAO guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries. Subsequently, the MSC program received the same GSSI recognition.

Since 2013, PSPA and AFDF have worked with the hatchery associations in SE, PWS and Kodiak to satisfy the MSC conditions for certification. Several SE conditions specific to chum have been resolved. An Action Plan has been developed which satisfies Kodiak pink and chum salmon conditions.

In 2017, PWS was brought back into the Alaska salmon certification by MSC for two reasons. First, the research plan from the Alaska Hatchery-Wild Interaction Study showed intent to provide extensive scientific data on the questions and preliminary results of the research looked positive. Second, PSPA

conducted extensive education and outreach efforts. PSPA facilitated two separate 3-day workshops in Cordova with Assessment Team members, concerned NGO participants, ADF&G staff, and hatchery staff in order to more thoroughly discuss salmon management in Alaska. As a result, channels of communication were opened which allowed for a deeper understanding of the complex issues and Alaska's precautionary approach. ***Consequently, since 2017, the Alaska salmon fishery (every region, gear group and species) is certified as sustainable by two separate third-party programs. This is critically important to selling Alaska seafood into global and domestic markets.***

The attached documents consist of a Powerpoint presentation prepared by Mr. Dave Gaudet who works as a Technical Facilitator for AFDF and PSPA on these certifications. This document gives a description of the third-party certification process, compares the RFM and MSC processes, and compares some of the outcomes. Also attached are the current full assessment reports for each of the certifications. Please note, there are two reports for MSC as the report for Prince William Sound was done separately.

We offer these documents to demonstrate that certification of a fishery is the result of a thorough assessment by experts in the field with many levels of assurance of professional conduct. We do not defend the means of assessment. Mr. Gaudet will also be available to discuss our involvement in the process and the outcomes.

Please feel free to contact us if you have any questions.

Sincerely,

Julie Decker, Executive Director, AFDF

Glenn Reed, President, PSPA

Attachments:

1) **Gaudet Presentation on MSC and RFM Certifications of Alaska Salmon**

2) **RFM Salmon Assessment Report, March, 2017**
Excerpt included only; full report is 289 pages; see link below for full doc:
https://www.alaskaseafood.org/wp-content/uploads/2017/03/ALASKA-RFM-SALMON-REASSESSMENT-Final-Report-March-2017.pdf

3) **MSC Salmon Assessment Report, Nov, 2013**
Excerpt included only; full report is 583 pages; see link below for full doc:
https://cert.msc.org/FileLoader/FileLinkDownload.asmx/GetFile?encryptedKey=UTVgITCKxlpIN0sKejV08aW2NRoD2Qr/GEpOHQADkMEpwAKqRasuTa4eWpffo6if

4) **MSC Salmon (PWS Only Scope Extension) Assessment Report, May, 2017**
Excerpt included only; full report is 106 pages; see link below for full doc:
https://cert.msc.org/FileLoader/FileLinkDownload.asmx/GetFile?encryptedKey=Sni28hTCmUq9x1A6unmnPLUk5Y0kkqLUo+9B6QLE7x6WjtAYJS87Mwgv0msFbkcV

Slide 1

I contract with the Alaska Fisheries Development Foundation and the Pacific Seafood Processors Association, in this case known as the Clients, as a technical facilitator for the purpose of obtaining fishery certifications for the Alaska Commercial Salmon fishery from the Alaska Seafood Marketing Institute's Responsible Fisheries Management and Marine Stewardship Council's programs. In short, I work with the Certifying bodies to ensure that they receive materials needed to conduct a thorough and complete assessment. That includes providing data and documents, identifying sources, reviewing results and acting as an interface with ADF&G. I have been involved with the process off and on, since 2000 when I was an ADF&G employee. I also perform the same task for Pacific cod. I will walk you through the processes and the outcomes. My role as a technical facilitator does mean that I am an expert on the processes but I will do my best to explain them and answer questions.

Slide 2

All of the material contained in this presentation can be found on line. Please note that for the rest of the presentation I will refer the two processes as RFM and MSC. The latest full assessments are also available as RCs.

Slide 3

Certifications are “relatively” new to the seafood industry. They are somewhat the result the environmental movement but they do have practical value by providing an independent assessment and certification of sustainable fisheries management – or not – to the public. In addition, many foodservice companies and retailers require it.

Slide 4

A few notes about what certification is not and is. The RFM and MSC processes are not intended to direct research, provide advice or management. It is simply a third party verification of performance.

Slide 5

I will only be discussing the RFM and MSC certification processes. There are others, such as Monterey Bay Aquarium, Best Aquaculture Practices and Aquaculture Stewardship Council but the Alaska Seafood industry actively works with the RFM and MSC programs. As all of the programs have the same goal – are the fish populations that support these fisheries sustainable. There is currently a movement to look into other fishing practices such as labor, but the RFM and MSC programs currently concern only the sustainability of the fish populations.

Since both programs have the same goal, they have some similarities. Both of them are primarily based on best practices and guidelines developed by the FAO. They also incorporate principles from ISEAL and GSSI. GSSI is a global, multi-stakeholder initiative to streamline seafood purchasing decisions while promoting sustainability

They both use a 3rd party certification process. The RFM and MSC provide standards and guidance against which an independent Certifying body assesses the fishery in question. The Certifying Bodies consist of experts in both the relevant fishery and the assessment process to ensure a fair outcome.

The RFM and MSC organizations and the Certifying Bodies are subject to review by the ISO.

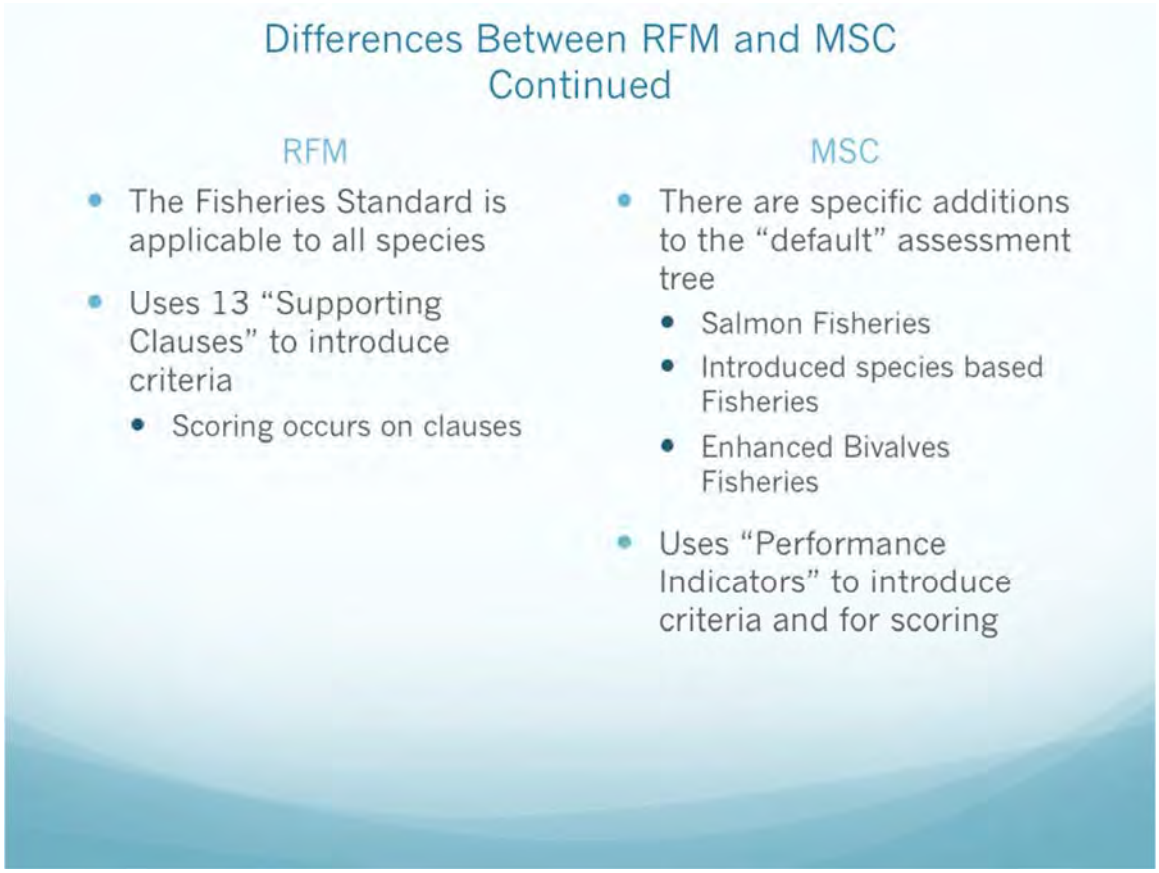
Finally, both the RFM and MSC standards are updated on a regular schedule.

Slide 6

Although both programs seek the same outcome – is a fishery sustainable – they organize their review processes differently. RFM develops a fisheries standard with a team comprised of academics and industry. MSC does the same but has much more participation from NGOs. The RFM program uses four key components while the MSC used three principles. A quick comparison between the key components and the principles reveals that they are very similar.

In summary, these documents define the management components needed to verify sustainable management.

Slide 7

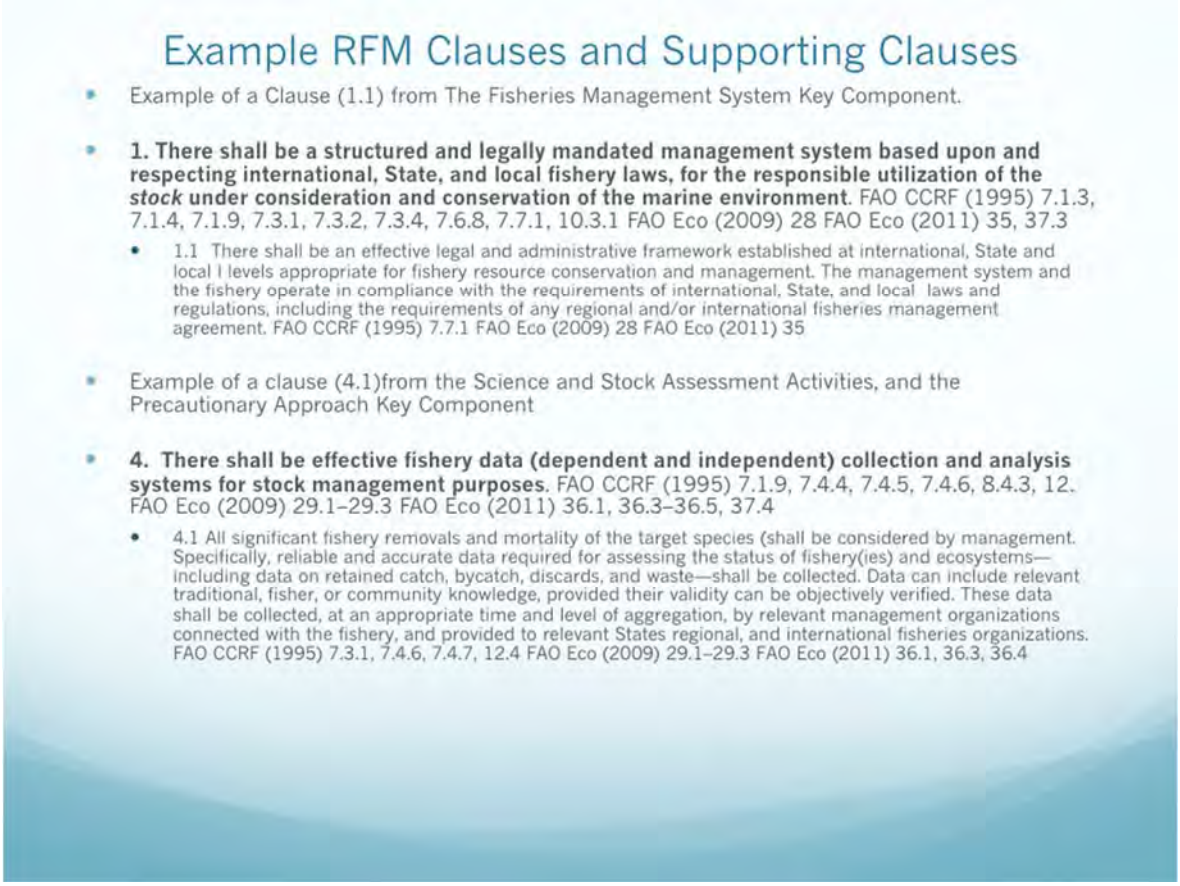


A further difference is that RFM has only one Fisheries Standard that is applicable to all fisheries. The MSC has a "default' assessment tree with three specific assessment trees, one of which is for salmon.

RFM scores on clauses while MSC scores on Performance Indicators.

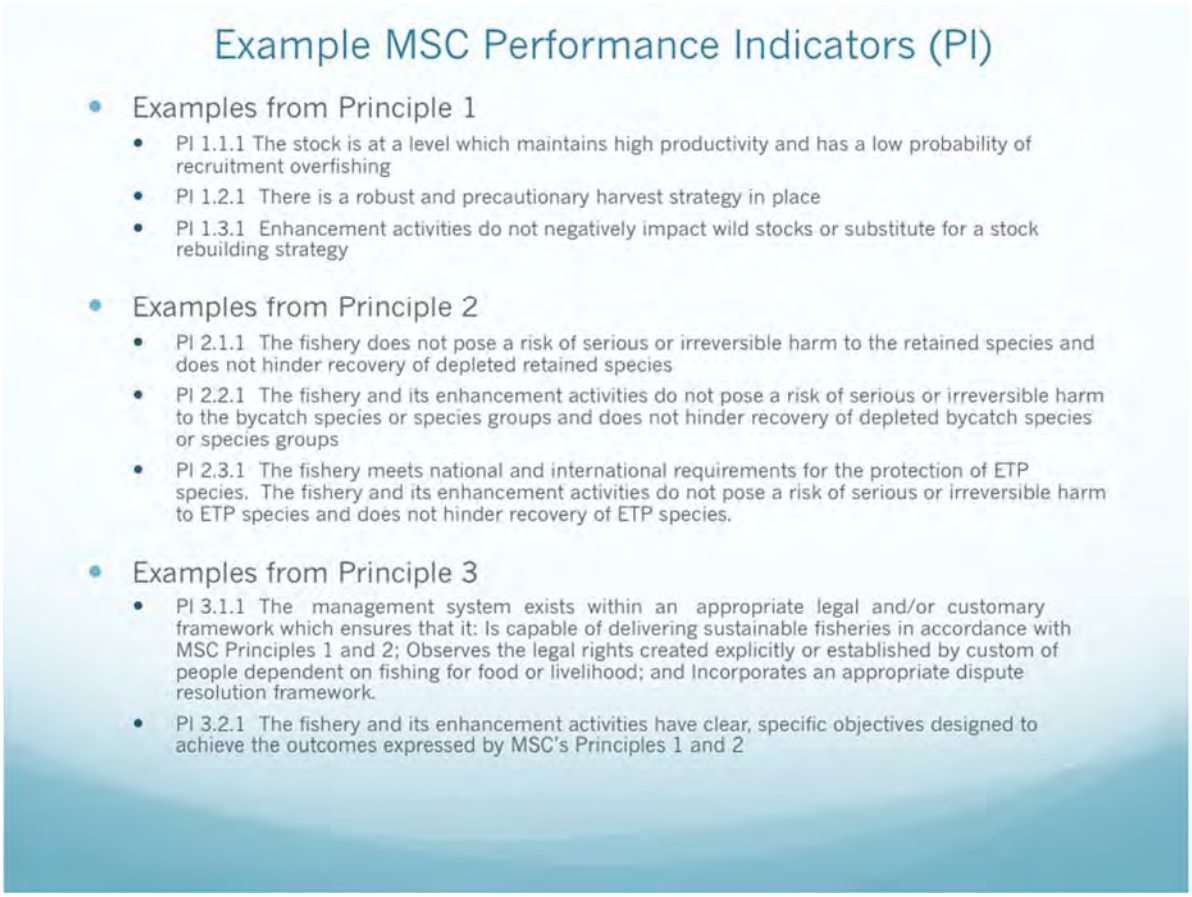
For Alaska, an important feature of the RFM program is that it preserves the Alaska origin.

Slide 8



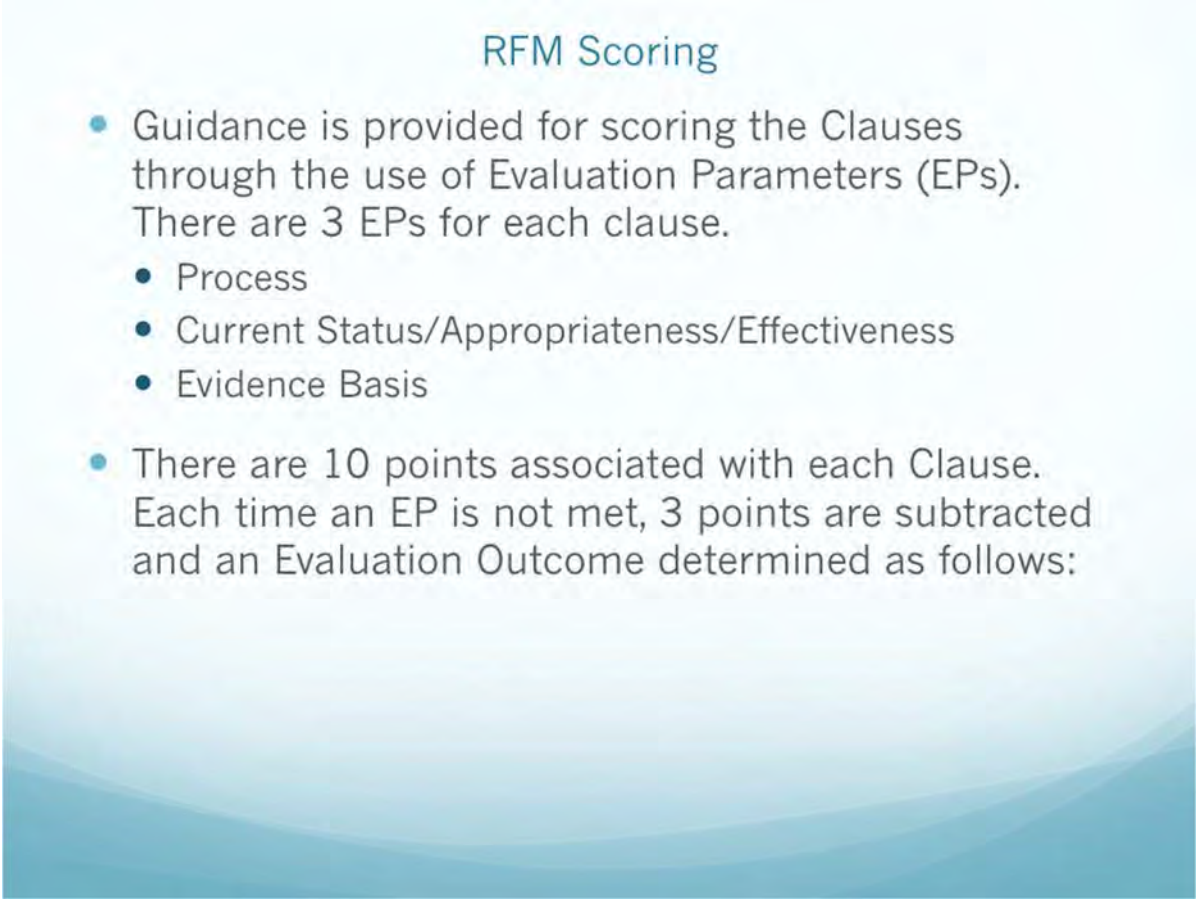
These are 2 examples of Clauses for two Key Components. The references following the statements (FAO CCRF (1995) are documents where the best practices and guidance are found. Guidance for scoring 1.1 and 4.1 are found in the RFM V2.0 Guidance document found on the website.

Slide 9



These are examples of Performance Indicators from the 2013 Alaska salmon fishery assessment. The assessment used an older version than 2.0 but is very similar. Note that there are general categories within each principle, i.e., 1.1, 1.2, 1.3. I chose to list the 1st from each category.

Slide 10



As I mentioned, guidance for scoring in provided. For each clause, there are 3 Evaluation Parameters The EPs are: Process, Current Status/Appropriateness/Effectiveness and Evidence Basis. An explanation of the EPs is in the guidance document.

Slide 11

During an assessment, each clause is evaluated to determine its "Conformance Level". There are four levels, Full Conformance, Minor Non-Conformance, Major Non-Conformance and Critical Non-Conformance. Evaluation of the EP is used to determine the level.

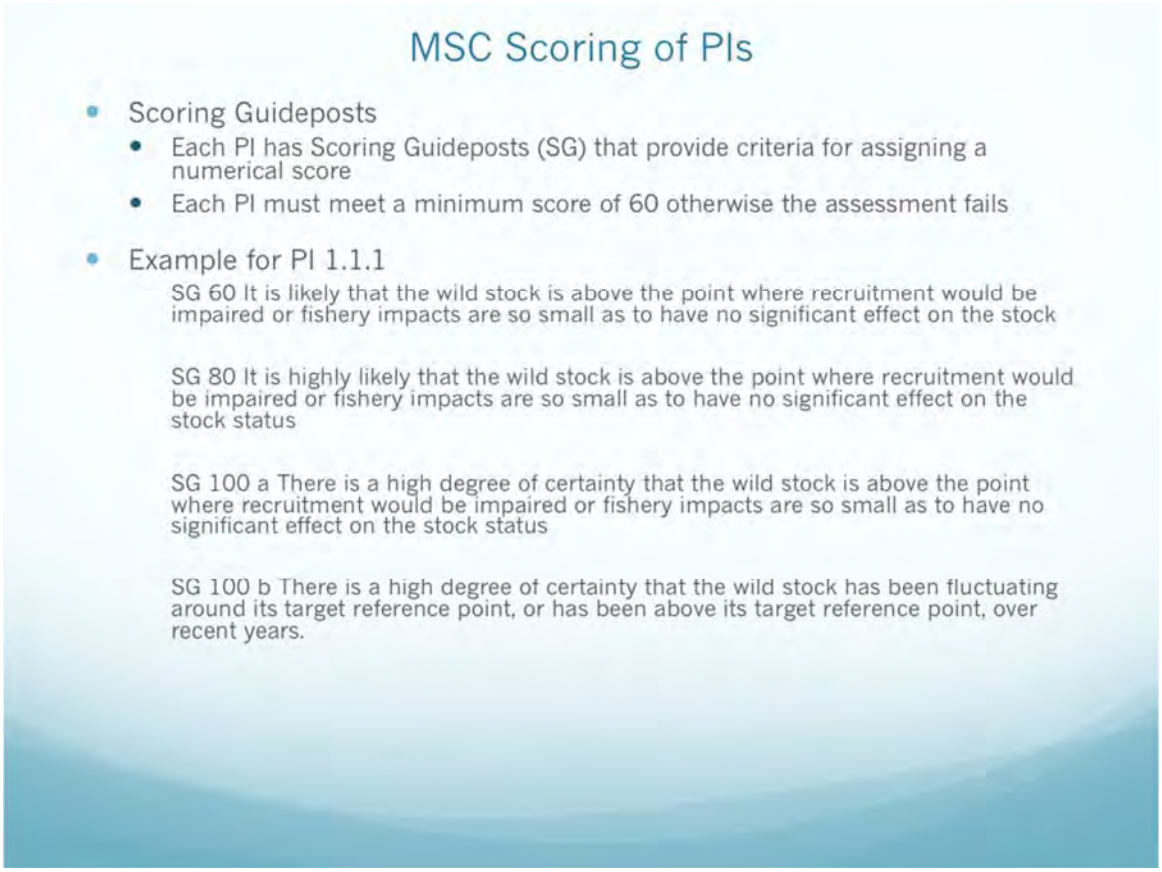
Slide 12

Fishery Failure Thresholds

Key Component	# of clauses	Maximum # of non-conformances allowed per category		
		Critical	Major	Minor
Fishery Management System	30	No Critical Non-conformance is allowed within the overall assessment, or in any Key Component; 1 Critical Non-conformance = Fail	1 Major Non-conformance per Key Component, If no Minor Non-conformance is assigned.	3 Minor Non-conformances allowed per Key Component, if no Major Non-conformance is assigned.
Science and Stock Assessment Activities, and the Precautionary Approach	30			
Management Measures, Implementation, Monitoring and Control	30			
Serious Impacts of the Fishery on the Ecosystem	35			
Total	125	No Critical Non-conformance allowed.	Up to 4 Major Non-conformances (provided that there is no more than 1 Major Non-conformance per Key Component and no Minor Non-compliances)	Up to 12 Minor Non-compliances (provided that there are no Major Non-compliances in the same Key Component and no more than 3 Minor Non-conformances in any one Key Component)

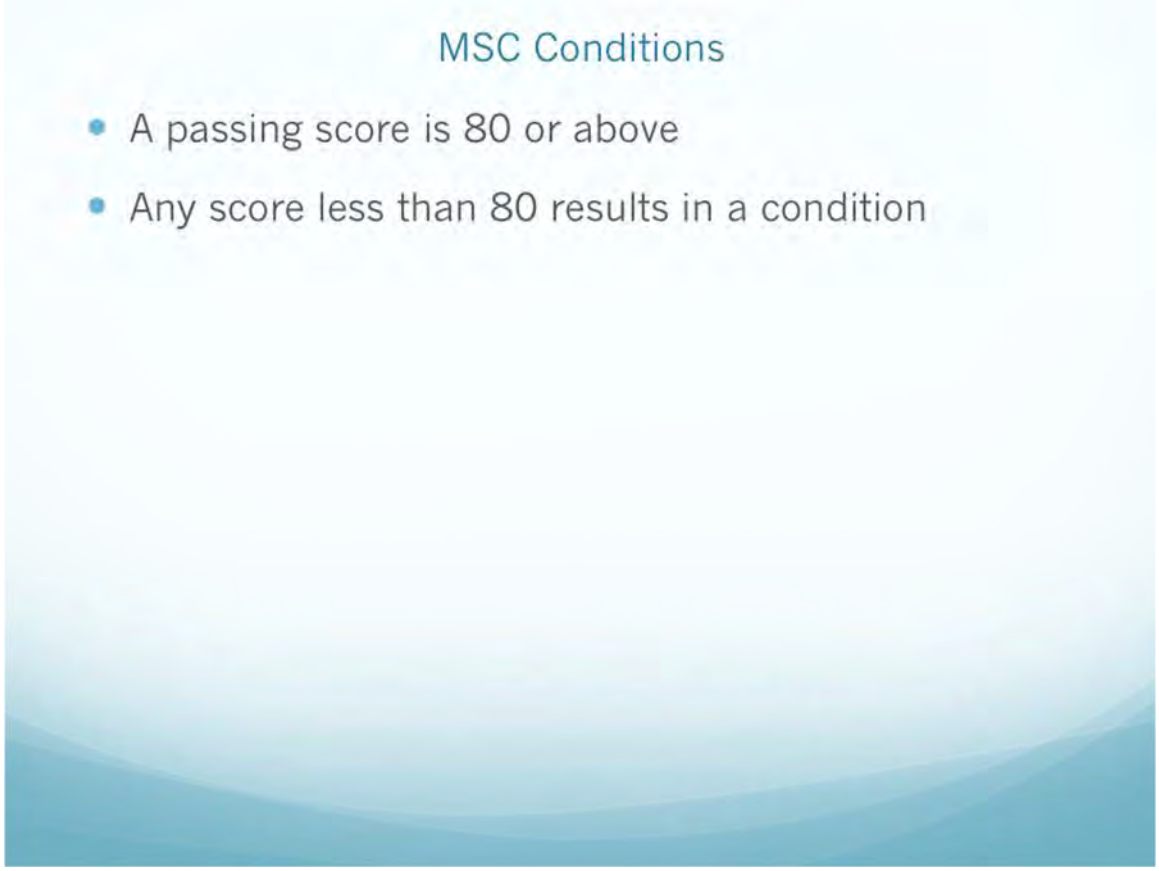
At some point a fishery may fail the assessment. This table identifies the levels for failure. Note that no Critical Non-conformances are permitted. The Certifying body will identify the Major and Minor Non-Conformances and the Client will develop an Action Plan to remedy them.

Slide 13



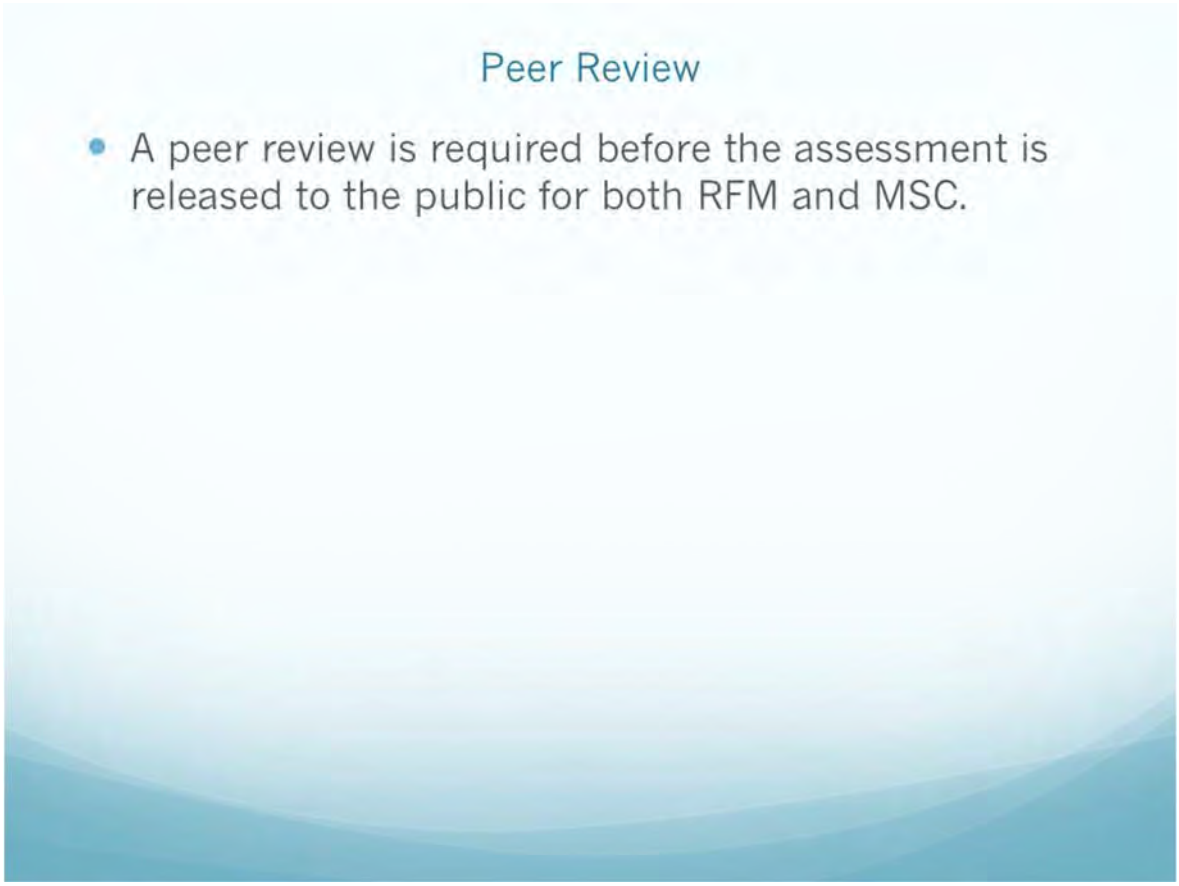
If a score is less than 60, the assessment fails.
Each of the Performance Indicators is numerically evaluated through the use of Scoring Guideposts (SG). The Certifying Body's Assessment Team evaluates evidence to arrive at a score for the PI. The SGs outline what is expected of a higher score. Note that the SG 60 "it is likely" compared to what the SG100 states "there is a high degree of certainty".

Slide 14



If a PI receives a score below 60, the assessment is stopped. If it receives a score between 60 and 80, it receives a Condition.

Slide 15



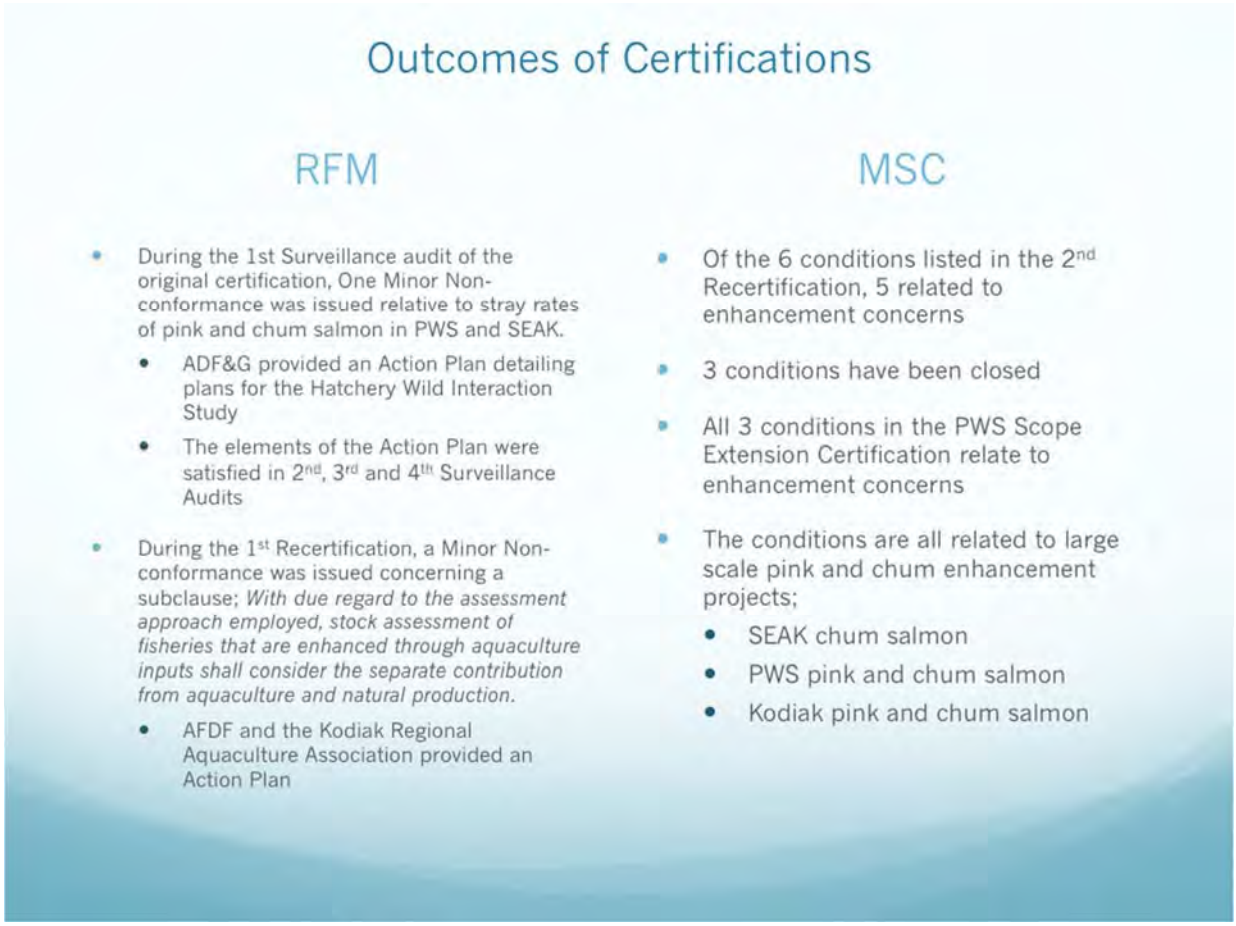
Finally, a peer review is required prior to the assessment being released to the public.

Slide 16

This is of assessment activity for the Alaska salmon fishery for both RFM and MSC. RFM was begun in part to provide a choice for certification processes.

The 1st MSC Assessment was in 2000, shortly after MSC was founded in 1996 by the World Wide Fund for Nature (WWF) and Unilever. In the beginning, ADF&G was the Client. That lasted through the first recertification in 2007 after which there were other Clients. During the 2nd recertification, PWS was not included in the final primarily due to a lack of data for the evaluation of enhancement. The present Client, PSPA, requested a "Scope Extension" and provided data collected by the Hatchery Wild Interaction Study. The 3rd recertification is in progress and will be completed in 2018.

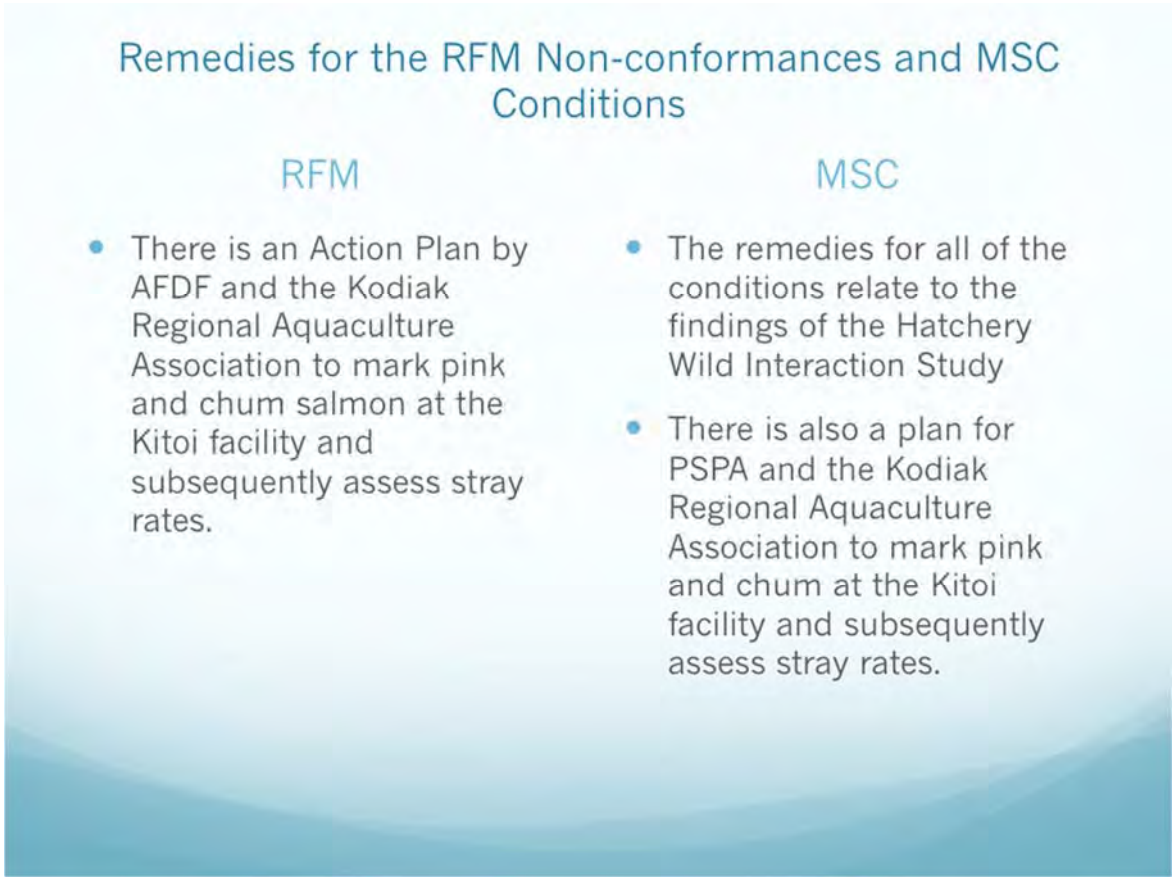
Slide 17



The RFM assessments have issued 2 Minor Non-Conformances, one during the 1st Surveillance Audit of the original certification and the 2nd during the 1st Recertification. Both concerned enhancement activities. The 1st Minor Non-Conformance was remedied with the initiation of the Hatchery Wild Interaction study. The 2nd Minor Non-Conformance is currently in effect with an Action Plan.

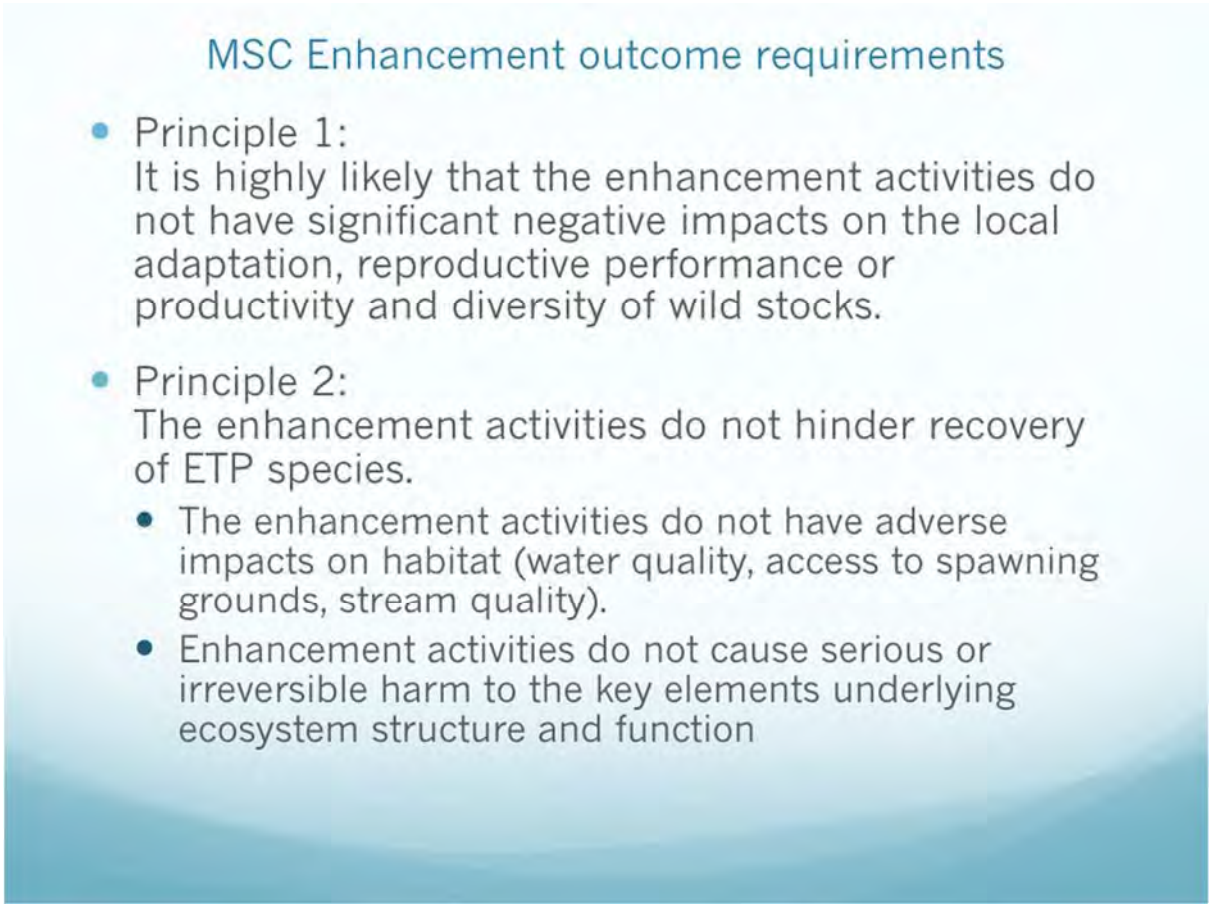
There were 6 conditions associated with the 2nd Recertification. Of those, 3 have been closed. The Scope Extension for PWS resulted in another 3 conditions. All of the remaining conditions relate to large scale pink and chum enhancement in SEAK, PWS and Kodiak.

Slide 18



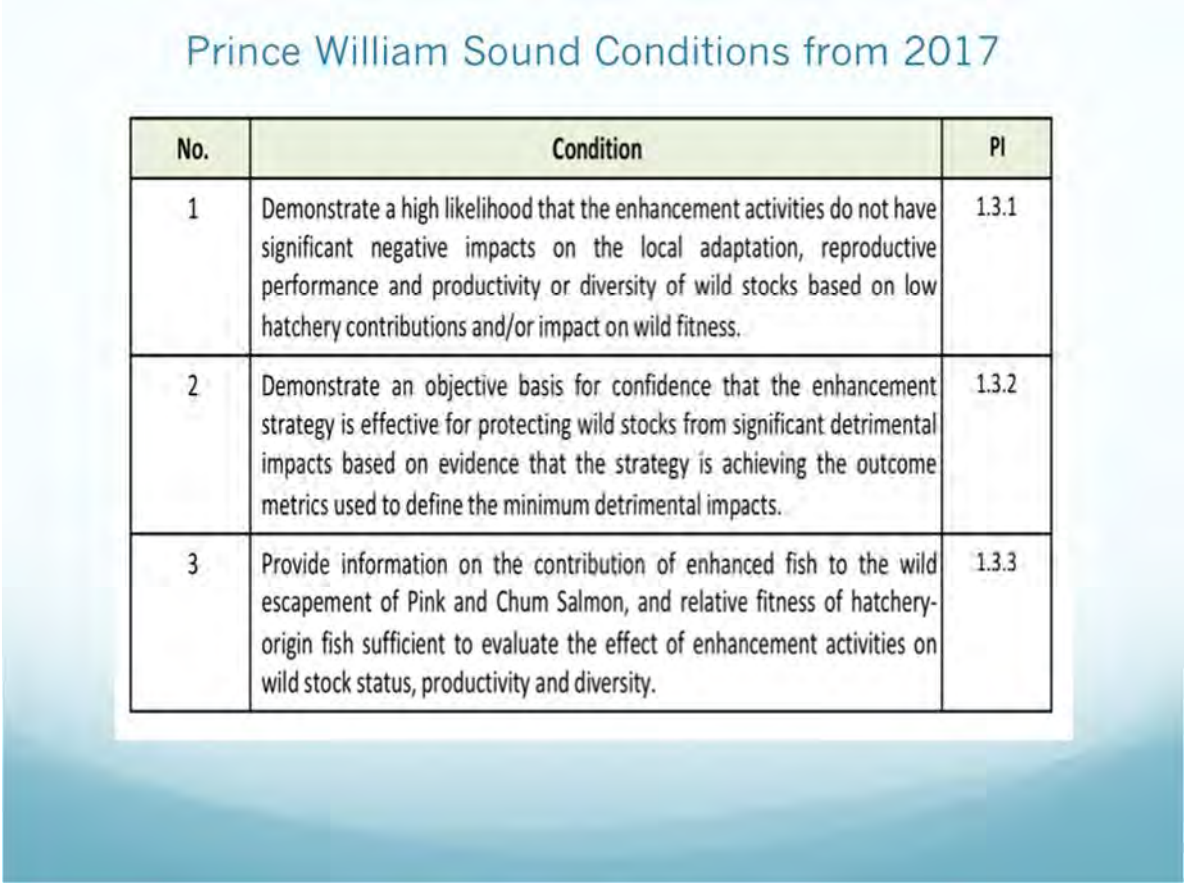
All of the Non-Conformances and conditions issued by the RFM and MSC Assessment Teams relate to large scale pink and chum enhancement. In short, the Assessment Teams are awaiting results from the Hatchery Wild Interaction study. As was said in the introduction, the purpose of Certification is not for the Assessment Teams/Process to provide advice. If a Non-Conformance or Condition is in place, it is up to the Client and whatever party (ADF&G, enhancement facility operator) may be involved to find a solution with respect to the problem. In the case of the Kitoi facility, assessing stray rates and determining the enhanced proportion of the harvest can best, and likely only, be accomplished through the use of marking.

Slide 19



At a presentation in 2015, MSC summarized the outcome requirements for salmon enhancement. In Alaska, Principle 1 is the concern of the Assessment as there are no ETP species (Endangered, Threatened or Protected).

Slide 20



These are the conditions listed in the PWS Scope Extension. The bottom line is that the determination is not linked only to straying but rather to an evaluation of all possible significant detrimental impacts. It is interesting to note that MSC chose to specifically identify the fisheries for which information isto be provided that there are no significant detrimental impacts while the RFM process is awaiting the outcome of the study without specifically identifying the fisheries.

Slide 21

Third party certifications are needed for the Alaska seafood industry to source its products worldwide. But more importantly, the certification process results in an independent expert review and assessment of fishery management.
FAO led the way in developing best practices and guidelines for sustainable fisheries and is the best basis from which to develop assessment programs. The certification process is more that just having an Assessment team review the fishery. It must involve the scientific, industry, NGO, academic and management communities in a transparent process with the public.

Finally, the results of the Hatchery Wild Interaction Study are expected to provide the necessary information for the analysis of any negative impacts of enhanced fish on wild stocks.

ALASKA RESPONSIBLE FISHERIES MANAGEMENT CERTIFICATION

Full Assessment and Certification Report

For The

US Alaska Salmon Commercial Fisheries

Facilitated By the

Alaska Fisheries Development Foundation

Assessors: Ivan Mateo, Lead Assessor
Brian Allee, Assessor
Marc Johnson, Assessor
Scott Marshall, Assessor

Report Code: **AK/SAL/002/2016**
Date: **9th March 2017**

Global Trust Certification Ltd.
3rd Floor, Block 3,
Quayside Business Park,
Mill Street,
Dundalk,
Co. Louth,
Ireland.
T: +353 42 932 0912
F: +353 42 938 6864
www.GTCert.com

Foreword

The Alaska Responsible Fisheries Management (RFM) Standard Version 1.3 is composed of Conformance Criteria and is based on the 1995 FAO Code of Conduct for Responsible Fisheries and the FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Marine Capture Fisheries adopted in 2005 and amended/extended in 2009. The Standard also includes full reference to the 2011 FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Inland Fisheries which in turn are now supported by a suite of guidelines and support documents published by the UN FAO. Further information on the Alaska RFM program may be found here.

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Acronyms

ABC	Allowable Biological Catch
AC	Advisory Committee
ACC	Alaska Administrative Code
ADFG	Alaska Department of Fish and Game
AFA	American Fisheries Act
AFDF	Alaska Fisheries Development Foundation
AFSC	Alaska Fisheries Science Center
AS	Alaska Statue
ASMI	Alaska Seafood Marketing Institute
AWT	Alaska Wildlife Troopers
AYK	Artic Yukon Kuskokwim
BC	British Columbia
BEG	Biological Escapement Goal
BOF	Board of Fisheries
BSAI	Bering Sea and Aleutian Islands
CCRF	Code of Conduct for Responsible Fisheries
CIAA	Cooke Inlet Aquaculture Association
CMA	Chignik Management Area
CDQ	Community Development Quota
CFEC	Commercial Fisheries Entry Commission
COAR	Commercial Operators Annual Report
CPUE	Catch per Unit Effort
CWCS	Comprehensive Wildlife Conservation Strategy
CWT	Coded Wire Tags
DEC	Department of Environmental Conservation
DIPAC	Douglas Island Pink and Chum Inc.
EIS	Environmental Impact Statement
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FAO	Food and Agriculture Organization of the United Nations
FDA	Food Drugs Administration
FMP	Fishery Management Plan
FSB	Federal Subsistence Board
GOA	Gulf of Alaska
GHL	Guideline Harvest Level
HAPC	Habitat Area of Particular Concern
HCD	Habitat Conservation Division
IFQ	Individual Fishing Quota
IJC	International Joint Commission
IMS	Institute of Marine Sciences
IRFA	Initial Regulatory Flexibility Analysis
IRIU	Improved Retention/Improved Utilization
IUCN	International Union of Conservation of Nature
KMA	Kodiak Management Area
KRAA	Kodiak Regional Aquaculture Association
KSMSC	Kodiak Seafood and Marine Science Centre
LCI	Lower Cooke Inlet
LLP	License Limitation Program
LOF	List of Fisheries
ISO	International Organization for Standardization
MMPA	Marine Mammal Protection Act

MOU	Memorandum of Understanding
MSFCMA	Magnuson-Stevens Fisheries Management and Conservation Act
MT	Metric tons
MSY	Maximum Sustainable Yield
Ne	Effective Population
NEPA	National Environmental Policy Act
NGO	Non-governmental Organization
nm	Nautical miles
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
NPRB	North Pacific Research Board
NRSEAA	Northern Southeast Aquaculture Association
OEG	Optimal Escapement Goal
OFL	Overfishing Level
OLE	Office for Law Enforcement
OY	Optimum Yield
PAR	Permit Alteration Request
PNP	Private Non Profit
PSMFC	Pacific States Marine Fisheries Commission
PSC	Pacific Salmon Commission
PSC	Prohibited Species Catch
PWS	Prince William Sound
PWSAC	Prince William Sound Aquaculture Center
PWSS	Prince William Sound Science Center
RAC	Regional Advisory Council
RACE	Resource Assessment and Conservation Engineering
REFM	Resource Ecology and Fisheries Management
RFM	Responsible Fisheries Management
SAFE	Stock Assessment and Fishery Evaluation (Report)
SEAK	Southeast Alaska
SEG	Sustainable Escapement Goal
SET	Sustained Escapement Threshold
SSC	Scientific and Statistical Committee
SSL	Steller Sea Lion
SSSC	Sitka Sound Science Center
TAC	Total Allowable Catch
UCI	Upper Cook Inlet
USCG	U.S. Coast Guard
USDA	US Department of Agriculture
USFWS	US Fish and Wildlife
VFDA	Valdes Fisheries Development Association
YRP	Yukon River Panel

i. Summary and Recommendations

This is the Reassessment Report (ref AK/Sal/002./2016) for the US Alaska Salmon Commercial Fisheries following original certification in March 11th 2011.

The United States Alaska commercial salmon [all Pacific salmon species: Chinook *Oncorhynchus tschawytscha*, sockeye *O. nerka*, coho *O. kisutch*, pink *Oncorhynchus gorbuscha*, and chum *O. keta*] fisheries, employ troll, purse seine, drift gillnet, beach seine, set gillnet and fish wheel (Upper Yukon River only) gear in the four administrative Regions of Alaska that are principally managed by the Alaska Department of Fish and Game (ADFG). While certification covers the entire Alaska Exclusive Economic Zone (EEZ), most of the harvest is taken in the internal waters (0-3 nautical miles, and other enclosed waters) of the state of Alaska.

The reassessment was conducted according to the Global Trust procedures for Alaska RFM V1.3.

The assessment was conducted by a team of Global Trust appointed Assessors comprising of three externally contracted fishery experts and Global Trust internal staff (Appendix 1).

The Assessment Team recommends that the salmon fisheries reviewed be awarded continuing certification by the Alaska Responsible Fisheries Management Certification Program (Section 6 Assessment Outcome Summary).

ii. Schedule of Key Reassessment Activities

Assessment Activities	Date(s)
Appointment of Reassessment Team	March 14th 2016
On-site Witnessed Reassessment and Consultation Meetings	April 11th – 18th 2016
Draft Reassessment Report	July 25th 2016
Client Corrective Action Plan and Acceptance	December 9th 2016
External Peer Review	January 2nd – 9th 2017
Stakeholder Consultation	January 21st – February 21st 2017
Final Reassessment Report	February 22nd 2017
Certification Review/Decision	February 27th 2017

iii. Reassessment Team Details

Dr. Ivan Mateo, Lead Assessor
SAI Global/Global Trust Certification Ltd.
Saunderstown, Rhode Island, USA
Tel/skype: ralfe501
Email: Ivan.mateo@saiglobal.com

Scott Marshall, Assessor:
Independent fishery expert,
Eagle ID, USA
Email: slmarshallfisheries@gmail.com

Dr. Brian Allee, Assessor
Independent fishery expert,
Gilroy, California, USA.
Email: allee.keta@gmail.com

Dr. Marc Johnson, Assessor:
Independent fishery expert,
Corvallis, Oregon, USA
Email: marc.aaron.johnson@gmail.com

Jean Ragg, Program Administrator
SAI Global/Global Trust Certification Ltd.
Quayside Business Centre,
Dundalk, Co. Louth, Ireland.
Email: Jean.ragg@saiglobal.com

1. Introduction

The US Alaska Commercial Salmon Fisheries, employing troll, purse seine, beach seine, drift gillnet, set gillnet (and fish wheel in Upper Yukon River only) gear, in the four administrative Regions of Alaska, was assessed against the requirements of the Alaska Responsible Fisheries Management (AFM) Certification Program.

The request for reassessment was made by the Alaska Fisheries Development Foundation (AFDF) on behalf of the Alaska commercial salmon fisheries and participants, and was conducted by Global Trust Certification Ltd.

This reassessment report documents the procedure for the continuing certification of commercially exploited Alaska salmon under the Alaska RFM Certification Program. This is a voluntary program for Alaska fisheries developed by the Alaska Seafood Marketing Institute (ASMI) to provide an independent, third-party verification that Alaska fisheries are responsibly managed according to the FAO Code of Conduct for Responsible Fisheries.

The reassessment was conducted in accordance to Global Trust accredited procedures for V1.3 of the Standard. The Standard is accredited in accordance with ISO/IEC 17065: Requirements for bodies certifying products, processes and services. It is also benchmarked against GSSI.

The reassessment is based on the criteria specified in the Food and Agriculture Organization of the United Nations (FAO) Code of Conduct for Responsible Fisheries (1995) and the minimum criteria set out for marine fisheries in the FAO Guidelines for the Eco-Labelling of Fish and Fishery Products from Marine Capture Fisheries (2005/2009), hereafter generally referred to as the FAO Criteria.

The reassessment is based on 6 major components of responsible management that are derived from the FAO Code of Conduct for Responsible Fisheries and Guidelines for the Eco-labelling of products from marine capture fisheries.

A The Fisheries Management System
B Science and Stock Assessment Activities
C The Precautionary Approach
D Management Measures
E Implementation, Monitoring and Control
F Serious Impacts of the Fishery on the Ecosystem

These six major components are supported by 13 fundamental clauses, which in turn are sustained by 124 sub-clauses. Collectively, these form the Alaska RFM Standard against which a fishery applying for certification is assessed. The reassessment was comprised of planning, onsite audits, certification reporting, peer review, and a Certification Committee review. Five site visits were made to the fishery during the reassessment. At various stages in the reassessment process, information pertaining to the step in the process was posted on the ASMI website[1]. A summary of the consultation meetings is presented in section 5 in this report. Assessors are external contracted fishery consultants and Global Trust internal staff (Appendix 1). Peer Reviewers are external contracted fisheries consultants (Appendix 2).
This report documents each step in the reassessment process and recommendations made to the Certification Committee of Global Trust, who will make the certification decision according to the requirements of ISO/IEC Guide 65 accredited certification.

[1] http://www.alaskaseafood.org/rfm-certification/certified-fisheries-companies/certified-fisheries

1.1 Recommendations of the Assessment Team

Following approval of the client's action plan to address the minor non-conformance found on sub clause 13.4 during this reassessment, the Assessment Team recommends continuing certification under the AK RFM Certification Program for, US Alaska Commercial Salmon Fisheries, under federal National Marine Fisheries Service (NMFS) and North Pacific Fishery Management Council (NPFMC) and state of Alaska Department of Fish and Game (ADFG) and Board of Fisheries (BOF) management, fished by the directed fisheries with troll, purse seine, beach seine, drift gillnet, set gillnet, and, in the upper Yukon River, fish wheel gear, in the four administrative Regions of Alaska and within Alaska's 200 nm EEZ.

INTERTEK MOODY MARINE

November 2013

Ref: 82540

Alaska Salmon Fishery

PUBLIC CERTIFICATION REPORT

Dr. Rob Blyth-Skyrme
Dr. Greg Ruggerone
Dr. Dana Schmidt
Professor Jim Seeb
Paul Knapman

Purse Seine Vessel Owners' Association
Fishermen's Terminal
1900 W Nickerson,
Suite 320
Seattle
WA 98119
USA

Intertek Moody Marine
1801 Hollis Street
Suite 1220
Halifax
Nova Scotia
B3J 3N4
Canada

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Glossary of Acronyms

ADF&G	Alaska Department of Fish and Game
AK	State of Alaska
AMMOP	Alaska Marine Mammal Observer Program
ANS	Amounts necessary for subsistence
AYK	Arctic-Yukon-Kuskokwim (Region)
BEG	Biological escapement goal
BOF	Board of Fisheries
CIAA	Cook Inlet Aquaculture Association
CITES	Convention on International Trade in Endangered Species
CMA	Chignik Management Area
CPF	Common property fishery
CWT	Coded-wire tag
ESA	Endangered Species Act
GSI	Genetic stock identification
IMEG	Interim management escapement goal
IMM	Intertek Moody Marine
IPI	Inseparable / Practically Inseparable
ISBF	Introduced species based fisheries
KMA	Kuskokwim Management Area
LCI	Lower Cook Inlet
LRP	Limit reference point
MBA	Migratory Bird Act
MMPA	Marine Mammal Protection Act
MSC	Marine Stewardship Council
MSY	Maximum sustainable yield
NGO	Non-governmental organisation
NMFS	National Marine Fisheries Service
NSEDC	Norton Sound Economic Development Corporation
NSI	Northern Southeast Inside
PBR	Potential Biological Removal
PI	Performance Indicator
PSC	Pacific Salmon Commission
PST	Pacific Salmon Treaty
PSVOA	Purse Seine Vessel Owners' Association
PWS	Prince William Sound
PWSAC	Prince William Sound Aquaculture Corporation
SEAK	Southeast Alaska
SEG	Sustainable escapement goal
SG	Scoring Guidepost
SI	Scoring Issue
SOC	Stock of concern
SRA	Spawner-recruit analysis
TAC	Total allowable catch
TRP	Target reference point
UCI	Upper Cook Inlet
UoC	Unit of Certification
USFWS	United States Fish and Wildlife Service
WASSIP	Western Alaska Salmon Stock Identification Program
WWF	World Wildlife Fund
YMA	Yukon Management Area

1 Executive Summary

The Alaska salmon fishery has been certified twice previously, first in 2000 and then again in 2007. The client for this third assessment is the Purse Seine Vessel Owners' Association (PSVOA). This Public Certification Report now presents the final results of this assessment of the Alaska salmon fishery against the Marine Stewardship Council (MSC) Principles and Criteria for Sustainable Fishing. Peer review, public consultation and final determination stages of review have been undertaken, and the 13 Units of Certification (UoCs) that progressed through the assessment process are now certified. The Prince William Sound UoC has not progressed and remains in assessment.

The Alaska salmon fishery targets five Pacific salmon species (Chinook – *Oncorhynchus tshawytscha*, sockeye – *Oncorhynchus nerka*, pink – *Oncorhynchus gorbuscha*, chum – *Oncorhynchus keta* and coho – *Oncorhynchus kisutch*). All five species are anadromous, spawning and hatching in freshwater but living and feeding in the ocean, before heading back to freshwater to repeat the spawning and hatching cycle. Pink salmon is the smallest but most numerous species, and Chinook salmon is the largest but least numerous species. All five species that occur in Alaska have strong commercial markets and varying levels of subsistence, personal use, and sport fishing importance.

Six separate gear types are utilized in the Alaska salmon fishery; these are purse seine, drift gillnet, set gillnet, troll, beach seine (Yukon River, Kodiak, Alaska Peninsula), and fishwheel (Yukon River), and these are used variously within 14 separate Units of Certification (UoC).

Table ES1: Units of Certification within the Alaska salmon fishery (target species are shaded grey).

			Target Species				
Unit	Regulatory Area	Gear types	Sockeye	Chinook	Coho	Pink	Chum
1	Southeast	Purse seine, drift gillnet, troll	■	■	■	■	■
2	Yakutat	Set gillnet, troll	■	■	■	■	
3	Prince William Sound	Purse seine, drift gillnet, set gillnet	■			■	■
4	Copper/Bering Districts	Drift gillnet	■	■	■		
5	Lower Cook Inlet	Purse seine, set gillnet	■			■	■
6	Upper Cook Inlet	Drift gillnet, set gillnet	■	■	■	■	■
7	Bristol Bay	Drift gillnet, set gillnet	■	■		■	■
8	Yukon River	Beach seine, drift gillnet, set gillnet, fish wheel		■	■		■
9	Kuskokwim	Drift gillnet, set gillnet	■	■	■		■
10	Kotzebue	Set gillnet					■
11	Norton Sound	Set gillnet	■	■	■	■	■
12	Kodiak	Purse seine, beach seine, set gillnet	■	■	■	■	■
13	Chignik	Purse seine	■	■	■	■	■
14	Peninsula/Aleutian Islands ("Area M")	Purse seine, beach seine, drift gillnet, set gillnet	■		■	■	■

The 14 UoCs are listed in the table above, and are based on Management Areas contained within the four Alaska Management Regions – Southeast Region (Southeast and Yakutat UoCs), Central Region (Prince William Sound, Copper/Bering Districts, Lower Cook Inlet, Upper Cook Inlet and Bristol Bay UoCs), Arctic-Yukon-Kuskokwim Region (Yukon River, Kuskokwim, Kotzebue and Norton Sound UoCs) and Westward Region (Kodiak, Chignik, and Peninsula/Aleutian Islands [Area M] UoCs). There is no commercial harvest of salmon in the Northern Management Area of the Arctic-Yukon-Kuskokwim Region (i.e., north of Kotzebue), and this Management Area is therefore not included as a UoC.

This reassessment of the Alaska salmon fishery was undertaken by Dr. Greg Ruggerone, Dr. Dana Schmidt and Professor Jim Seeb, who covered Principle 1 (target stock), Principle 2 (environment) and Principle 3 (management) components of the MSC Standard across the different UoCs. Site visits to Seattle, Washington (18-19 October 2012) and then to Anchorage, Alaska (22-23 October 2012) were undertaken in order to meet with scientists, fishery managers and stakeholders, as well as with representatives of the PSVOA. During the days that the team was convened, opportunities to meet with the team were provided for all stakeholders who expressed such a desire.

An important aspect of the Alaska salmon fishery is that a significant proportion of the harvest in some UoCs is made up of hatchery-reared fish. The 'hatch and catch' rearing system is intended to supplement, not supplant, the wild stock production, and takes advantage of the natural homing instinct of Pacific salmon that typically bring them back to their natal rivers to spawn after the marine feeding phase. Although the first Alaska hatcheries were established in the 1890s, a major expansion in salmon aquaculture research and production began in the 1970s, and hatchery returns in some areas now comprise a significant proportion of the total harvests.

Key strengths of the Alaska salmon fishery include the long period of time over which catch and escapement data have been collected, the strong management focus on achieving sustainable escapements of wild salmon, Alaska's relatively pristine habitats, and the knowledge and experience of the staff of the Alaska Department of Fish and Game (ADF&G).

The assessment results show that 13 of the 14 UoCs meet the MSC standard with generally high overall scores. As such, these 13 UoCs are certified according to the MSC standard as being sustainable. At the present time, the assessment team considers that additional information is needed in order to conduct the assessment of the Prince William Sound (PWS) UoC, and so the PWS UoC remains in assessment. Summary scores for each of the UoCs are provided in Table 2, below.

Table ES2: Summary table showing final Principle level scores

Unit of Certification		Principle	Score	Pass?
1	Southeast Alaska	P1 - Target Species	80.7	Yes
		P2 - Ecosystem	81.0	
		P3 - Management System	91.5	
2	Yakutat	P1 - Target Species	97.1	Yes
		P2 - Ecosystem	83.7	
		P3 - Management System	96.5	
3	Prince William Sound	P1 - Target Species	-	Still in assessment
		P2 - Ecosystem	-	
		P3 - Management System	-	
4	Copper/Bering Districts	P1 - Target Species	82.4	Yes
		P2 - Ecosystem	85.7	
		P3 - Management System	91.5	

5	Lower Cook Inlet	P1 - Target Species	91.0	Yes
		P2 - Ecosystem	86.0	
		P3 - Management System	89.5	
6	Upper Cook Inlet	P1 - Target Species	94.3	Yes
		P2 - Ecosystem	85.7	
		P3 - Management System	91.5	
7	Bristol Bay	P1 - Target Species	98.9	Yes
		P2 - Ecosystem	87.3	
		P3 - Management System	96.5	
8	Yukon River	P1 - Target Species	91.7	Yes
		P2 - Ecosystem	87.3	
		P3 - Management System	96.5	
9	Kuskokwim	P1 - Target Species	91.2	Yes
		P2 - Ecosystem	87.3	
		P3 - Management System	96.5	
10	Kotzebue	P1 - Target Species	88.3	Yes
		P2 - Ecosystem	87.7	
		P3 - Management System	96.5	
11	Norton Sound	P1 - Target Species	84.2	Yes
		P2 - Ecosystem	87.3	
		P3 - Management System	96.5	
12	Kodiak	P1 - Target Species	82.5	Yes
		P2 - Ecosystem	85.3	
		P3 - Management System	91.5	
13	Chignik	P1 - Target Species	87.1	Yes
		P2 - Ecosystem	87.7	
		P3 - Management System	96.5	
14	Peninsula/Aleutian Islands	P1 - Target Species	97.4	Yes
		P2 - Ecosystem	87.3	
		P3 - Management System	96.5	

Six conditions of certification were placed on the fishery across the 13 UoCs that are now certified. In recognition of their interlinked nature and in order to minimise repetition, the text of a number of conditions was drafted to address deficiencies identified across two or more PIs.

It should be noted that the timeline for Condition 1 extends the period of time available for meeting this condition to beyond the period of the certification, due to 'exceptional circumstances' (CR 27.11.8, MSC 2013a). In this case, the exceptional circumstances relate to the life cycle of chum salmon, and therefore to the time taken for data to be collected and made available for the study, as detailed in the Condition.

The Conditions are summarised as follows:

Condition 1: (UoC = 1, SEAK; Performance Indicator = 1.3.1)

By the end of 2023, the SG 80 scoring requirements must be met in full. This will be achieved when it has been demonstrated that:

a) (PI 1.3.1, SG80a) It is highly likely that the chum salmon enhancement activities in SEAK do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild chum stocks.

Condition 2: (UoC = 1, SEAK; Performance Indicator = 1.3.2)

By the end of the fourth year of certification, the SG 80b scoring requirements must be met for chum salmon. This will be achieved when it has been demonstrated that:

a) (PI 1.3.2, SG80b) There is some objective basis for confidence that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement).

Condition 3: (UoC = 1, SEAK; Performance Indicator = 1.3.3 and 2.5.2)

By the end of the fourth year of certification, the SG 80 scoring requirements for PI 1.3.3, and the SG80e scoring requirements for PI 2.5.2 must be met in full. This will be achieved when it has been demonstrated that:

a) (PI 1.3.3, SG80a) Sufficient relevant information is available on the contribution of enhanced Chinook, coho, pink and chum salmon to the harvest and wild escapement of the stocks.
b) (PI 1.3.3, SG80b) The assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.
c) (PI 2.5.2, SG80e) There is a tested and evaluated artificial production strategy, if necessary, with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome.

Condition 4: (UoC = 5, Copper/Bering Districts; Performance Indicator = 1.3.1, 1.3.2 and 1.3.3)

By the end of the fourth year of certification, the SG 80 scoring requirements must be met in full. This will be achieved when it has been demonstrated that:

a) (PI 1.3.1, SG80a) It is highly likely that the Gulkana hatchery enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of Copper/Bering District stocks of sockeye salmon,
b) (PI 1.3.2, SG80b) There is some objective basis for confidence that the strategy is effective, based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts (e.g., related to verifying and achieving acceptable proportions of hatchery-origin fish in the natural spawning escapement),
c) (PI 1.3.3, SG80a) Sufficient relevant information is available on the contribution of enhanced sockeye to the harvest and wild escapement of the wild sockeye stock, and
d) (PI 1.3.3, SG80b) The assessment includes estimates of the impacts of enhancement activities on wild sockeye stock status, productivity and diversity.

Condition 5: (UoC = 12, Kodiak; Performance Indicators = 1.3.1, 1.3.3 and 2.5.2)

By the end of the 5th year of certification, the SG 80 scoring requirements for PI 1.3.1 and PI 1.3.3, and the SI 80e requirements for PI 2.5.2, must be met in full. With respect to the current hatchery programs at Pillar Creek and Kitoi Bay for Chinook, coho, pink and chum salmon, this will be achieved when it has been demonstrated that:

a) (PI 1.3.1, SG80a) it is highly likely that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks.
b) (PI 1.3.3, SG80a) sufficient relevant information is available on the contribution of enhanced Chinook, coho, pink and chum salmon to the harvest and wild escapement of the stocks.

c) (PI 1.3.3, SG80b) the assessment includes estimates of the impacts of enhancement activities on wild stock status, productivity and diversity.

d) (PI 2.5.2, SG80e) there is a tested and evaluated artificial production strategy, if necessary, with sufficient monitoring in place and evidence is available to reasonably ensure with high likelihood that strategy is effective in achieving the SG 80 outcome.

Condition 6: (UoC = 13, Chignik; Performance Indicator = 1.1.2)

By the end of the fourth year of certification, the SG 80 scoring requirements must be met in full. This will be achieved when it has been demonstrated that:

a) (PI 1.1.2, SG80a) Reference points are appropriate for the wild stock and can be estimated,

b) (PI 1.1.2, SG80b) The limit reference point (e.g., lower end of the Sustainable Escapement Goal or equivalent) is set above the level at which there is an appreciable risk of impairing reproductive capacity,

c) (PI 1.1.2, SG80c) The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome and,

d) (PI 1.1.2, SG80e) Where the wild stock is a management unit comprised of more than one subcomponent, it is highly likely that the target and limit reference points are consistent with maintaining the inherent diversity and reproductive capacity of each stock subcomponent.

Authorship and Peer Reviewers

1.1 Assessment team

Nominations for the assessment team for this second reassessment were consulted on for 11 days from the 5th of July, 2012. Following the consultation, the assessment team was confirmed as the three salmon management and science experts listed below:

Dr. Greg Ruggerone

Greg has investigated population dynamics, ecology, and management of Pacific salmon in Alaska and the Pacific Northwest since 1979. He was the Project Leader of the Alaska Salmon Program, University of Washington, from the mid-1980s to early 1990s where he was responsible for conducting and guiding research at the Chignik and Bristol Bay field stations, preparing salmon forecasts, and evaluating salmon management issues. Most of his research involves factors that affect survival of salmon in freshwater and marine habitats, including climate shifts, habitat degradation, predator-prey interactions, and hatchery/wild salmon interactions. He is currently a member of the Columbia River Independent Scientific Advisory Board and the Independent Scientific Review Panel. He recently served as the fish ecologist on the Secretary of Interior review of dam removal on the Klamath River. During the past six years, he has evaluated salmon fisheries for sustainability using guidelines developed by the Marine Stewardship Council.

Dr. Dana Schmidt

Dana is a limnologist and quantitative fisheries biologist with 39 years of experience of which 18 were in Alaska and 14 in British Columbia. He is responsible for statistical design and analysis of many of Golder Associates Ltd. western North America fisheries and limnology studies and has directed numerous projects involving environmental assessment and investigations of population dynamics of species that are impacted by development. He spent 16 years with the ADF&G conducting fisheries research are Alaska lakes, streams, and marine habitat with much effort directed at numerous sockeye salmon lakes across Alaska. He directed stock assessment programs on all Pacific Salmon species in the westward region of Alaska during his tenure as regional research supervisor on Kodiak Island and principal limnologist for ADF&G's statewide limnology laboratory. He has been a senior reviewer of BC lake fertilization programs targeting kokanee and is currently reviewing limnological and fisheries data related to stock status on 16 Kodiak Island lakes and Chilkoot and Chilkat Lakes in Southeast Alaska. He has been recognized as the lead author of the "Most Significant Paper" in the North American Journal of Fisheries Management for his research on ecology of Karluk Lake sockeye salmon on Kodiak Island, Alaska and has authored over 50 publications and research reports on environmental impacts on aquatic systems and fisheries management. He has served as an assessment team member for the sockeye salmon component of the MSC BC salmon certification program since 2002 and the pink and chum salmon assessment programs since 2008, and is currently on the surveillance audit team for BC sockeye and pink salmon.

Professor Jim Seeb

Jim is a Research Professor at the School of Aquatic and Fishery Sciences at University of Washington. He is a principal in the Gordon and Betty Moore sponsored International Program for Study of Salmon Ecological Genetics. In his current research he uses DNA polymorphisms in Pacific salmon for study of the interaction of life history, ecology and genetics. He formerly was a senior scientist with the ADF&G where he was steward of the State's Genetics Policy and worked to interpret that and other policies to minimize the risks of hatchery/wild stock interactions.

1.2 Intertek Moody Marine assessors

In addition to the three experts who undertook the assessment, the lead assessor for the assessment was Dr. Rob Blyth-Skyrme, with technical support being provided to the assessment team by Dr. Andy Hough; their details are below:

Dr. Rob Blyth-Skyrme

Rob has worked in aquaculture and then in marine fisheries science, management and policy since 1996. Rob started his career in mariculture, before switching to a focus on wild fisheries. Following his PhD, he moved to Eastern Sea Fisheries Joint Committee, the largest inshore fisheries management organization in England, where he was the Environment Officer and then the Deputy Chief Officer. He then became a senior advisor to the UK Government on marine fisheries and environmental issues, leading a team dealing with fisheries policy, science and nationally significant fisheries and environmental casework. Rob has extensive experience of running and providing lead input to workshops and management fora at a national level, and has published a number of papers in peer-reviewed international journals. Rob now runs Ichthys Marine Ecological Consulting, a marine fisheries and environmental consultancy with offices in the UK and Hawaii, and has undertaken all facets of MSC work as a lead assessor and expert team member, including leading the assessment team that conducted the third audit in 2010 of the recertified Alaska salmon fishery, and supporting the team that conducted the fourth audit in 2011. Rob has been trained in the use of the MSC's risk-based framework.

Paul Knapman

Paul is a Lead Assessor/Auditor and is the General Manager for Intertek Moody Marine (IMM). He has extensive experience of the fishing industry in North America and Europe. He was previously Head of an inshore fisheries management organisation, a senior government advisor on fisheries and environmental issues, a fisheries officer and a fisheries consultant working in Europe and Canada.

1.3 Peer Reviews

Two suitably qualified experts were asked to conduct a peer review prior to the report proceeding to public consultation as a Public Comment Draft Report. Following a 10-day stakeholder consultation period, the following individuals were confirmed as peer reviewers:

Professor Milo Adkinson

Milo is a Professor in the Fisheries Division for the School of Fisheries and Ocean Sciences at the University of Alaska, Fairbanks. Current research interests and activities include: Pacific salmon management, especially forecasting methodologies, implications of climate fluctuations, early marine growth and survival, the economic viability of rural fishing communities; the application of decision analysis and bayesian statistics to resource management; selection methodologies for ecological, epidemiological and fisheries data series and conservation and dynamics of small populations.

Dr. Katherine W. Myers

Katherine is a fishery scientist with 35 years of experience in fishery biology, ecology, and management. For most of her career, Katherine conducted international cooperative high seas research on Pacific salmon and steelhead, including stock identification, catch, bycatch, and run-size estimation, tagging experiments, and investigations of distribution, abundance, migration, food habits, feeding ecology, bioenergetics, age and growth, competitive stock interactions, survival, and habitat and climate-change effects on fish production. She retired from the University of Washington, in December 2010, after 30 years of service as a Research Scientist. Currently, Katherine is a

Washington State advisor to the North Pacific Anadromous Fish Commission, a member of the Northwest Power and Conservation Council Fish and Wildlife Program's Independent Scientific Advisory Board, a member of the Scientific and Technical Committee of the Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative, and the Northwest Washington District Director of the American Institute of Fishery Research Biologists. Katherine has degrees in fishery sciences from the University of Washington (B.S.), Oregon State University (M.S.), and Hokkaido University (Ph.D.), and has authored or co-authored over 150 peer-reviewed scientific publications and technical reports.

MSC Public Certification Report

for

Alaska Salmon- Prince William Sound Scope Extension Assessment

MRAG Americas, Inc.

Amanda Stern-Pirlot, Ray Beamesderfer & Scott Marshall

May 12, 2017

CLIENT DETAILS:

Pacific Seafood Processors Association

MSC reference standards:
MSC Certification Requirements (CR) Version 1.3 (standard)
MSC Fishery Certification Requirements (FCR) Version 2.0 (process)

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1 Executive Summary

This Final Report and Determination sets out the results of the Marine Stewardship Council (MSC) assessment of the Prince William Sound (PWS) Salmon fisheries against the MSC Principles and Criteria for Sustainable Fishing. This evaluation has been undertaken by way of a "scope extension" to the currently certified Alaska Salmon fishery, comprising the remainder of the state's Salmon fisheries. As such, only those components not held in common with the rest of the Alaska Salmon fishery have been evaluated, and the commensurate background sections revised. See IMM 2013 for the complete report on the components of the fishery that were not re-evaluated during the scope extension process. This report is incorporated herein by reference.

Intertek Moody Marine (IMM) was contracted in 2012 by the Purse Seine Vessel Owners Association (PSVOA) to undertake an MSC assessment of the Alaska Salmon fishery, which was subsequently certified in November, 2013. There were 14 Units of Certification (UoC) covered by that assessment, comprising all Salmon fisheries in the state of Alaska including those in PWS. However, the PWS unit did not complete the assessment at that time, and is therefore presently being assessed again via a scope extension to the valid AK Salmon certificate.

Table 1. Units of Certification covered by the currently valid Alaska Salmon MSC certificate (from IMM, 2013).

			Target Species				
Unit	Regulatory Area	Gear types	Sockeye	Chinook	Coho	Pink	Chum
1	Southeast	Purse seine, drift gillnet, troll	■	■	■	■	■
2	Yakutat	Set gillnet, troll	■	■	■	■	
4	Copper/Bering Districts	Drift gillnet	■	■	■		
5	Lower Cook Inlet	Purse seine, set gillnet	■			■	■
6	Upper Cook Inlet	Drift gillnet, set gillnet	■	■	■	■	■
7	Bristol Bay	Drift gillnet, set gillnet	■	■		■	■
8	Yukon River	Beach seine, drift gillnet, set gillnet, fish wheel		■	■		■
9	Kuskokwim	Drift gillnet, set gillnet	■	■	■		■
10	Kotzebue	Set gillnet					■
11	Norton Sound	Set gillnet	■	■	■	■	■
12	Kodiak	Purse seine, beach seine, set gillnet	■	■	■	■	■
13	Chignik	Purse seine	■	■	■	■	■
14	Peninsula/Aleutian Islands	Purse seine, beach seine, drift gillnet, set gillnet	■		■	■	■

The assessment was undertaken in accordance with the MSC Certification Requirements (v. 1.2, January 10th, 2012) and using the MSC Guidance to MSC Certification Requirements (v. 1.0, August 15, 2011), which set out the assessment and certification process. In 2015, PSVOA transferred clientship for the Alaska Salmon fishery to the Pacific Seafood Processors Association (PSPA), and PSPA requested that Intertek Fisheries Certification (formerly IMM) transfer the Alaska Salmon MSC certificate to MRAG Americas, in order that MRAG Americas could undertake the remaining surveillance audits. It was decided in 2016 that PSPA would also contract MRAG Americas to conduct

an assessment of the PWS Salmon fisheries by way of a scope extension to the certification for the rest of the state of Alaska.

The scope extension process adds one additional Unit of Certification to the fishery, as follows:

			Target Species				
Unit	Regulatory Area	Gear types	Sockeye	Chinook	Coho	Pink	Chum
3	Prince William Sound	Purse seine, drift gillnet, set gillnet		Covered via IPI	Covered via IPI		

The following steps have been undertaken as part of the scope extension process:

- A Gap Analysis per FCR 7.22.4 to confirm which assessment components are the same and different to the certified Alaska Salmon fishery (https://fisheries.msc.org/en/fisheries/alaska-Salmon/@@assessment-documentsets?documentset_name=Gap+Analysis&phase_name=Expedited+audit+announcement&start_date=2016-10-06&title=Scope+Extension).
- Announcement of the assessment, including scope extension assessment team, use of the modified assessment tree for enhanced Salmon fisheries, and notification of the site visit.
- Undertaking of the site visit
- Production of the client draft scope extension report that describes the background to the fisheries, the fishery management operations and the evaluation procedure and results. The client and subsequent draft and final reports include only the information required for the scope extension evaluation according to FCR PE 3.1.2. The original IMM Alaska Salmon Public Certification Report (IMM 2013) contains the remaining evaluation of those components held in common between the two fisheries.
- The stakeholder consultation on proposed peer reviewer
- Peer Review Confirmation
- Production of the Peer Review Report
- Response to Peer Review comments, and report revisions where necessary
- Production of the Public Comment Draft Report and public comment period
- Response to Stakeholder comments
- Production of the Final Report and Determination
- Completion of the objections period and Production of the Public Certification Report
- Issuance of the certificate

The assessment of PWS Salmon (Principle 1 and Principle 2 assessment only) was undertaken by Ray Beamesderfer, Scott Marshall and Amanda Stern-Pirlot. Amanda Stern-Pirlot was the Assessment Team Leader. According to the gap analysis, differences between the PWS Salmon fishery and certified Alaska Salmon fishery were found only in Principles 1 and 2, as the target stocks and geographic area (hence potential for P2 impacts, are different). The governance and management jurisdiction are all the same for all of the fisheries.

A site visit was conducted in Juneau AK on November 16th, 2016. In addition, in August of 2016, a large informational meeting was attended by some members of this assessment team in Cordova during which much of the new research and management pertaining to the PWS Salmon fishery was presented and discussed. Although the Cordova meeting was not an official part of this PWS scope extension assessment, it was important for gathering relevant information. During the site visits, the assessment team met with scientists, fishery managers and stakeholders as well as clients and harvester representatives. There were no meetings requested from additional stakeholders

particularly pertaining to the PWS Salmon scope extension and no written submissions were received prior to the site visit.

The following strengths and weakness were identified with respect to

Principle 1:

Strengths:

- The fishery is intensively managed and successful in providing natural spawning escapement consistent with sustaining high yields.
- Assessments of hatchery numbers and hatchery contributions to natural spawning populations provide a basis for assessing the potential risk of hatchery enhancement to wild populations.

Weaknesses:

- Additional information is needed on the effects on wild population productivity and fitness of hatchery-origin Pink and Chum Salmon spawning in natural production areas.

Principle 2:

Strengths:

- Commercial salmon fishing gear is highly selective for target salmon species with a very low incidence of incidental harvest or interaction of other species.

Weaknesses:

- Questions remain in some quarters regarding the potential ecosystem effects of large scale hatchery production of salmon throughout the Pacific.

Based on the information available to date, the PWS Salmon fishery scope extension achieved overall scores of 82.4 for Principle 1 and 86.0 for Principle 2. P3 scores are the same as for the currently certified Alaska Salmon fishery, Southeast AK unit (IMM 2013). As such, the PWS Salmon fishery was recommended for certification against the MSC Standard, as no indicator scored less than 60, and all overall principle scores were above 80.

Following the final review stages and objections period, MRAG Americas has decided to certify the PWS salmon fishery as sustainable according to the Marine Stewardship Council Fisheries Standard.

Three conditions of certification were placed on the PWS Salmon fishery (Table 2). The conditions and milestones for the fishery are detailed in Appendix 1.2 of this report.

Table 2. Conditions identified by the assessment for the Prince William Sound commercial salmon fishery.

No.	Condition	PI
1	Demonstrate a high likelihood that the enhancement activities do not have significant negative impacts on the local adaptation, reproductive performance and productivity or diversity of wild stocks based on low hatchery contributions and/or impact on wild fitness.	1.3.1
2	Demonstrate an objective basis for confidence that the enhancement strategy is effective for protecting wild stocks from significant detrimental impacts based on evidence that the strategy is achieving the outcome metrics used to define the minimum detrimental impacts.	1.3.2
3	Provide information on the contribution of enhanced fish to the wild escapement of Pink and Chum Salmon, and relative fitness of hatchery-	1.3.3

	origin fish sufficient to evaluate the effect of enhancement activities on wild stock status, productivity and diversity.	

All comments and information presented by the peer reviewer and stakeholders were considered and the report revised as necessary prior to the publication of the Final Report and Determination in April, 2017.

2 Authorship and Peer Reviewers

2.1 Assessment Team

The assessment team consists of Ms. Amanda Stern-Pirlot (team leader), Mr. Ray Beamesderfer and Mr. Scott Marshall, and. Qualifications of the team are:

Ms. Amanda Stern-Pirlot. Ms. Stern-Pirlot is an M.Sc graduate of the University of Bremen, Center for Marine Tropical Ecology (ZMT) in marine ecology and fisheries biology. Ms. Stern-Pirlot joined MRAG Americas in mid-June, 2014 as MSC Certification Manager and senior fisheries consultant, a role involving oversight of and participation in MSC assessment activities, and has since served as a member and leader on several assessment teams. She has worked together with other scientists, conservationists, fisheries managers and producer groups on international fisheries sustainability issues for the past 10 years. With the Institute for Marine Research (IFM-GEOMAR) in Kiel, Germany, she led a work package on simple indicators for sustainable within the EU-funded international cooperation project INCOFISH, followed by five years within the Standards Department at the Marine Stewardship Council (MSC) in London, developing standards, policies and assessment methods informed by best practices in fisheries management around the globe. She has also worked with the Alaska pollock industry as a resources analyst, within the North Pacific Fisheries Management Council process, focusing on bycatch and ecosystem-based management issues, and managing the day-to-day operations of the offshore pollock cooperative. She has co-authored a dozen publications on fisheries sustainability in the developing world and the functioning of certification schemes as an instrument for transforming fisheries to a sustainable basis.

Ray Beamesderfer. Mr. Beamesderfer holds a bachelor's degree in Wildlife and Fisheries Biology from the University of California, Davis, and a Master's in Fishery Resources from the University of Idaho. Ray has special expertise in using quantitative analysis, statistics, and computer modelling to solve difficult fisheries-related questions, and in synthesizing and translating scientific analyses. He has completed a wide variety of projects in fishery management, biological assessment, and conservation/recovery planning. He is the author of numerous reports, biological assessments, management plans, and scientific articles on fish population dynamics, fish conservation, fishery and hatchery management, sampling, and species interactions. Ray has served on fishery assessment teams for Salmon fisheries in Alaska and Russia.

Scott Marshall. Mr Marshall earned a B.S. in Fisheries from Oregon State University, and a M.S. in Fisheries Science from the University of Washington. He has held multiple positions in fisheries, including Project Leader at the Fisheries Research Institute (UW); Research Project Leader, Principal Fishery Scientist and SE Region Supervisor for the Division of Commercial Fisheries for the Alaska Department of Fish and Game; staff biologist for Idaho Department of Fish and Game; and Fisheries Administrator in charge of the Lower Snake River Compensation Plan for the US Fish and Wildlife Service. He has served on Scientific and Statistical Committee of the North Pacific Fisheries Management Council and as Co-Chairman of the Transboundary Rivers Panel of the Pacific Salmon commission.

2.2 Peer Reviewer

As this is a scope extension assessment, only one peer reviewer was required, with expertise in Salmon assessments:

Dr. Dmitry Lajus is an Associate Professor at the Department of Ichthyology and Hydrobiology at St. Petersburg State University since 2003. In 2006, Dr. Lajus received a Fulbright Fellowship at the University of New Hampshire. Previously, from 1987 to 2003, Dr. Lajus was a Researcher and Senior Researcher at the Zoological Institute, Russian Academy of Sciences. He specializes in population biology of marine fish and invertebrates, population phenogenetics, stress assessment, history of fisheries, historical ecology, and population dynamics. His salmon experience includes conservation

implications of salmon genetics, salmon population dynamics, history of salmon fisheries, and salmon ecology. Dr. Lajus has an extensive list of peer-reviewed publications, chapters in books, conference proceedings, participation in international conferences, and involvement in international research and educational projects. Dr. Lajus received a M.S. degree from the St. Petersburg State University and a Ph.D. from the Zoological Institute, Russian Academy of Sciences.

3 Description of the Fishery

3.1 Unit(s) of Certification and scope of certification sought

The MRAG Americas assessment team determined that the fishery is within scope as required by the MSC.

The Unit of Assessment includes Pink, Chum, Sockeye, Chinook and Coho Salmon harvested by commercial purse seine and gill net fisheries in PWS, Alaska. These fisheries harvest Salmon that originate almost entirely in the same region and these fisheries are managed by the Alaska Department of Fish and Game (ADF&G).

The 2013 Alaska Salmon assessment identified Chinook and Coho Salmon as non-target IPI species for PWS (IMM 2013). The total combined catch of non-target Chinook and Coho Salmon in the PWS UoC is approximately 1%, and these species therefore qualify for an exemption from IPI requirements under CR 27.4.10.2 (MSC 2013a).

This Unit of Assessment was used as it is compliant with client wishes for assessment coverage and in full conformity with MSC criteria for setting the Unit of Assessment.

3.1.1 Scope of Assessment in Relation to Enhanced Fisheries

The Alaska Salmon fishery is partially enhanced (i.e., some of the fishery is entirely based on wild runs, while the rest of the fishery is based on a 'hatch and catch' enhancement system). The fishery meets the scope criteria for enhanced fisheries, as described by the MSC (MSC 2013a, Table C1). The following is confirmed:

Linkages to and maintenance of a wild stock

A1: That the fishery relies upon the capture of fish from the wild environment,

A2: The five Salmon species are native to the Alaska region,

A3: There are natural reproductive components of the stock from which the fishery's catch originates that maintain themselves without having to be restocked every year, and

A4: Stocking as part of the 'hatch and catch' system does not form a major part of a current rebuilding plan for depleted stocks.

Feeding and husbandry

B1: The 'hatch and catch' production system operates without substantial augmentation of food supply, and feeding is used only to grow the Salmon to a small size prior to release, and

B2: Is not relevant to the Alaska Salmon fishery as it applies to 'catch and grow' systems.

Habitat and ecosystem impacts

C1: Any modifications to the habitat of the stock do not cause serious or irreversible harm to the natural ecosystem's structure and function (noting that Salmon fry farms permitted to be in-scope).

3.1.2 Scope of Assessment in Relation to Introduced Species Based Fisheries

This is not a fishery based on introduced species.

Alaska Board of Fisheries

October 16th, 2018
Alaska Salmon Hatchery Forum Discussion - Anchorage, Alaska

Alaska Salmon Hatchery Contribution Estimates to Sport, Personal Use and Subsistence Harvests (1977-2017)

Respectfully Submitted by Alaska PNP Aquaculture Associations:
Valdez Fisheries Development Association (VFDA), Mike Wells
Prince William Sound Aquaculture Corporation (PWSAC), Casey Campbell
Cook Inlet Aquaculture Association (CIAA), Gary Fandrei
Kodiak Regional Aquaculture Association (KRAA), Tina Fairbanks
Douglas Island Pink and Chum (DIPAC), Eric Prestegard
Northern Southeast Regional Aquaculture Association (NSRAA), Steve Reifenstuhl
Southern Southeast Regional Aquaculture Association (SSRAA), David Landis
Armstrong Keta Inc. (AKI), Bart Watson

Representing over 5,000 Alaska Fishermen

Dear Chairman Jensen and Board of Fish Members:

This document provides current estimates of hatchery salmon contributions to the sport, personal use and subsistence harvests of Alaska over a 40 year period. Harvest estimates for all salmon species were collected from ADF&G Sport Fish Management Area reports and those provided by hatchery operators to ADF&G in Annual Reports of PNP operations.

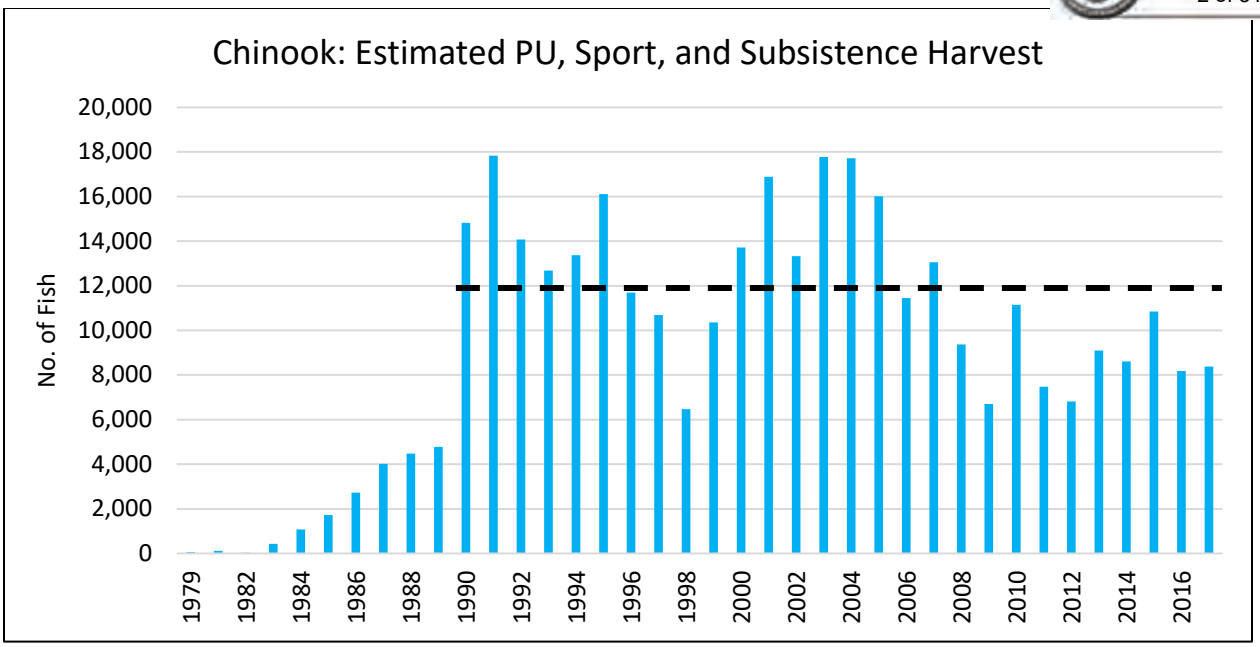

Figure 1. Estimated sport, personal use, and subsistence harvest of Chinook salmon for all PNP hatchery agencies from 1979 - 2017. Data is determined from hatchery Annual Reports and Sportfish Area Management Reports. The average contribution of Chinook from 1990 – 2017 is 11,951 fish, shown as the dashed line.

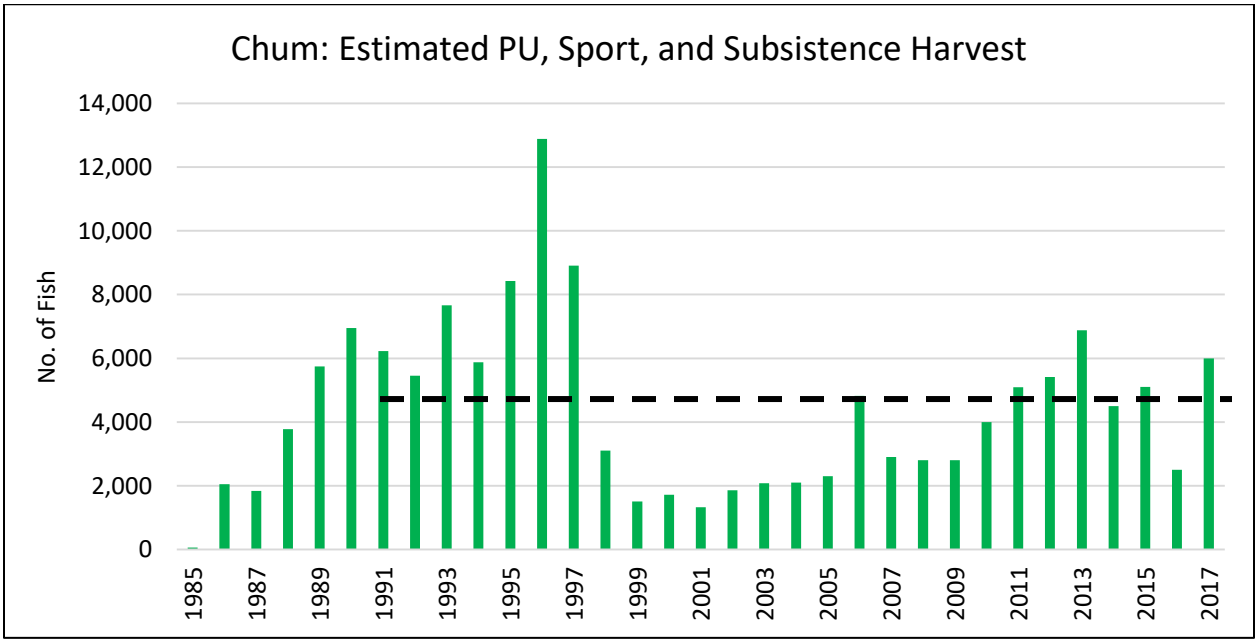

Figure 2. Estimated sport, personal use, and subsistence harvest of Chum salmon for all PNP hatchery agencies from 1985 - 2017. Data is determined from hatchery Annual Reports and Sportfish Area Management Reports. The average contribution of Chum from 1990 – 2017 is 4,685 fish, shown as the dashed line.

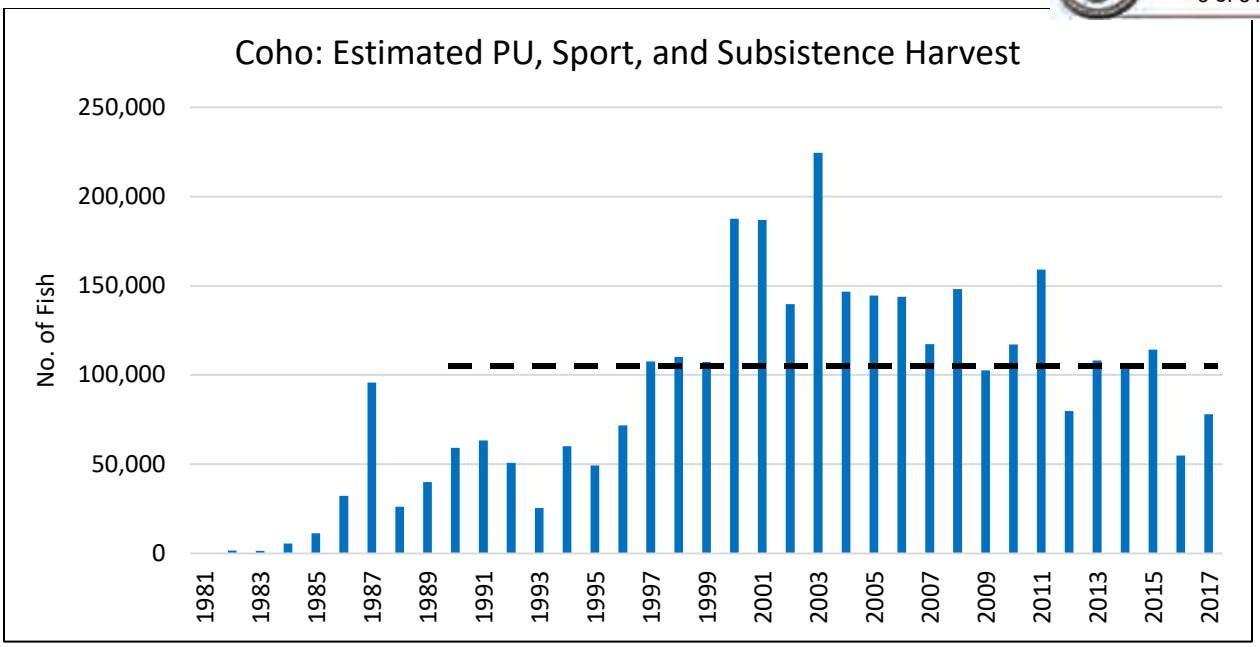

Figure 3. Estimated sport, personal use, and subsistence harvest of Coho salmon for all PNP hatchery agencies from 1980 - 2017. Data is determined from hatchery Annual Reports and Sportfish Area Management Reports. The average contribution of Coho from 1990 – 2017 is 109,398 fish, shown as the dashed line.

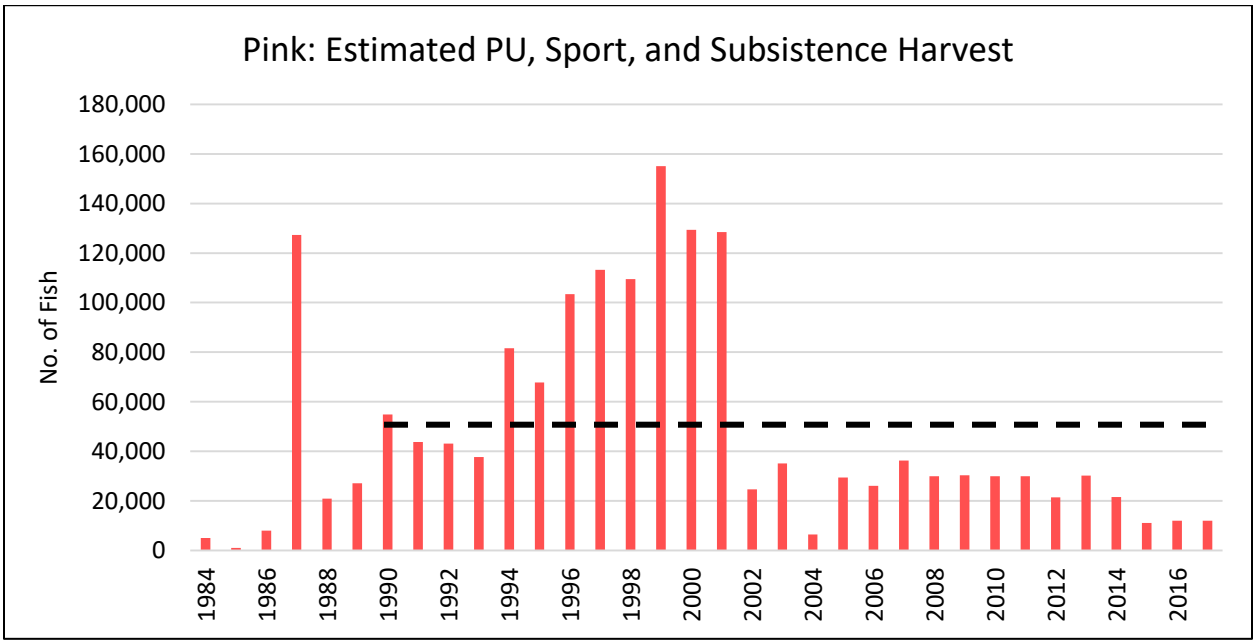

Figure 4. Estimated sport, personal use, and subsistence harvest of Pink salmon for all PNP hatchery agencies from 1979 - 2017. Data is determined from hatchery Annual Reports and Sportfish Area Management Reports. The average contribution of Pink from 1990 – 2017 is 51,952 fish, shown as the dashed line.

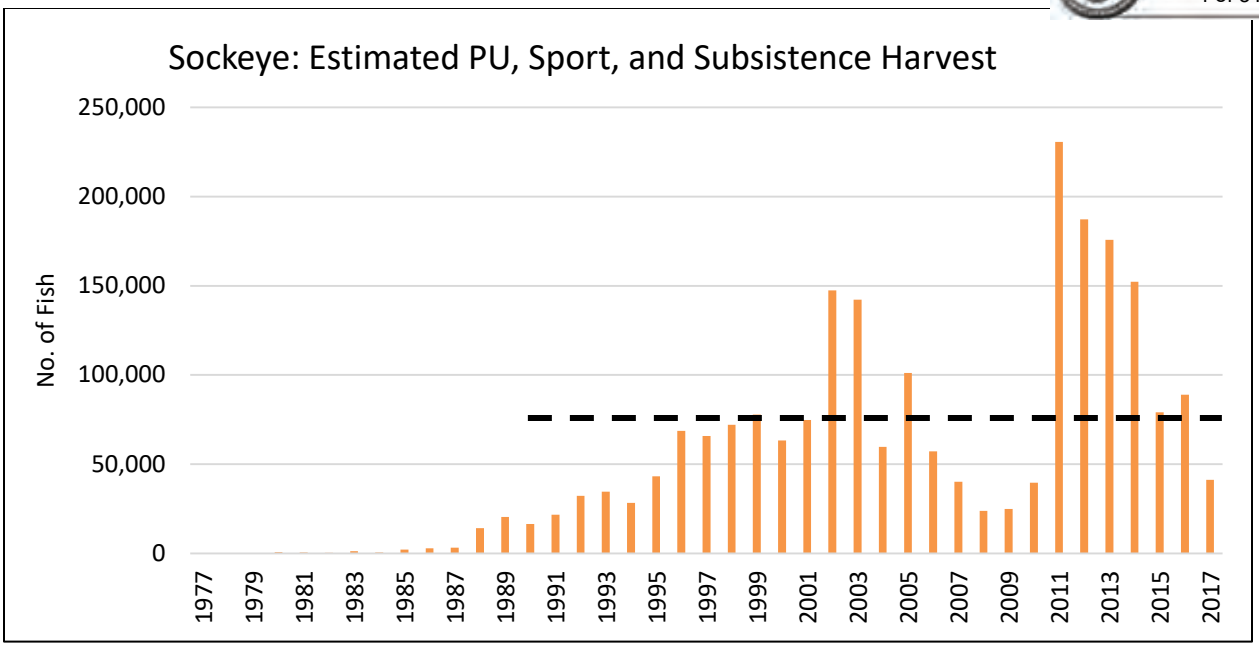

Figure 5. Estimated sport, personal use, and subsistence harvest of Sockeye salmon for all PNP hatchery agencies from 1977 - 2017. Data is determined from hatchery Annual Reports and Sportfish Area Management Reports. The average contribution of Sockeye from 1990 – 2017 is 78,225 fish, shown as the dashed line.

All Agencies Estimated Contributions (Sport, Personal Use, Subsistence)

Year	Chinook	Chum	Coho	Pink	Sockeye	Total (by year, all species)
1977	-	-	-	-	13	13
1978	-	-	-	-	79	79
1979	55	-	-	-	412	467
1980	-	-	-	-	629	629
1981	115	-	3	-	488	606
1982	32	-	1,600	-	329	1,961
1983	425	-	1,350	-	1,228	3,003
1984	1,075	-	5,573	5,000	472	12,120
1985	1,724	55	11,313	1,000	2,223	16,315
1986	2,720	2,050	32,333	8,030	2,829	47,962
1987	4,011	1,838	95,828	127,247	3,265	232,189
1988	4,471	3,778	26,220	20,850	14,136	69,455
1989	4,781	5,745	40,022	27,115	20,401	98,064
1990	14,821	6,954	59,134	54,917	16,510	152,336
1991	17,837	6,229	63,294	43,808	21,687	152,855
1992	14,079	5,452	50,830	43,088	32,219	145,668
1993	12,678	7,660	25,434	37,695	34,625	118,092
1994	13,371	5,873	60,122	81,598	28,302	189,266
1995	16,116	8,423	49,323	67,767	43,197	184,826
1996	11,688	12,880	71,750	103,413	68,760	268,491
1997	10,684	8,908	107,670	113,205	65,850	306,317
1998	6,466	3,100	110,099	109,546	72,100	301,311
1999	10,356	1,505	107,173	155,058	77,815	351,907
2000	13,709	1,718	187,535	129,387	63,334	395,683
2001	16,890	1,326	186,805	128,453	74,795	408,269
2002	13,334	1,856	139,649	24,639	147,429	326,907
2003	17,776	2,083	224,548	35,138	142,188	421,733
2004	17,721	2,100	146,631	6,500	59,731	232,683
2005	16,009	2,300	144,573	29,450	101,133	293,465
2006	11,446	4,822	143,817	26,123	57,120	243,328
2007	13,062	2,900	117,321	36,309	40,195	209,787
2008	9,362	2,800	148,117	30,000	23,758	214,037
2009	6,695	2,805	102,590	30,371	24,949	167,410
2010	11,140	4,000	117,066	30,000	39,564	201,770
2011	7,469	5,090	159,027	30,000	230,543	432,129
2012	6,815	5,412	79,707	21,414	187,187	300,535
2013	9,090	6,883	108,061	30,218	175,789	330,041
2014	8,609	4,500	105,889	21,602	152,301	292,901
2015	10,846	5,100	114,232	11,076	79,088	220,342
2016	8,175	2,500	54,788	11,938	88,903	166,304
2017	8,373	6,000	77,968	11,938	41,237	145,516
Total (by species, all years)	**354,026**	**144,645**	**3,277,395**	**1,643,893**	**2,236,813**	**Overall Total 7,656,772**
Average (by species): 1990 – 2017	**11,951**	**4,685**	**109,398**	**51,952**	**78,225**	

Alaska Board of Fisheries

October 3, 2018
Worksession Meeting Anchorage, Alaska

Scientific Analysis & Review of Journal Articles in Response to ACR 1 & ACR 2

Respectfully Submitted by Alaska PNP Aquaculture Associations:
Valdez Fisheries Development Association (VFDA), Mike Wells
Prince William Sound Aquaculture Corporation (PWSAC), Casey Campbell
Cook Inlet Aquaculture Association (CIAA), Gary Fandrei
Kodiak Regional Aquaculture Association (KRAA), Tina Fairbanks
Douglas Island Pink and Chum (DIPAC), Eric Prestegard
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Southern Southeast Regional Aquaculture Association (SSRAA), David Landis
Armstrong Keta Inc. (AKI), Bart Watson

Representing over 5,000 Alaska Fishermen

Dear Chairman Jensen and Board of Fish Members:

We recognize this is a dense response, and that your time is limited. The fact is this document only scrapes the surface of the complex issues of ocean carrying capacity and straying. These topics cannot and should not be reduced to sound bites, considering that the foundational research, like most science, has been ongoing for decades, and is anything but simple. For example, the Alaska Hatchery Research Project (AHRP) took a year to plan and will require eleven years to execute the fieldwork.

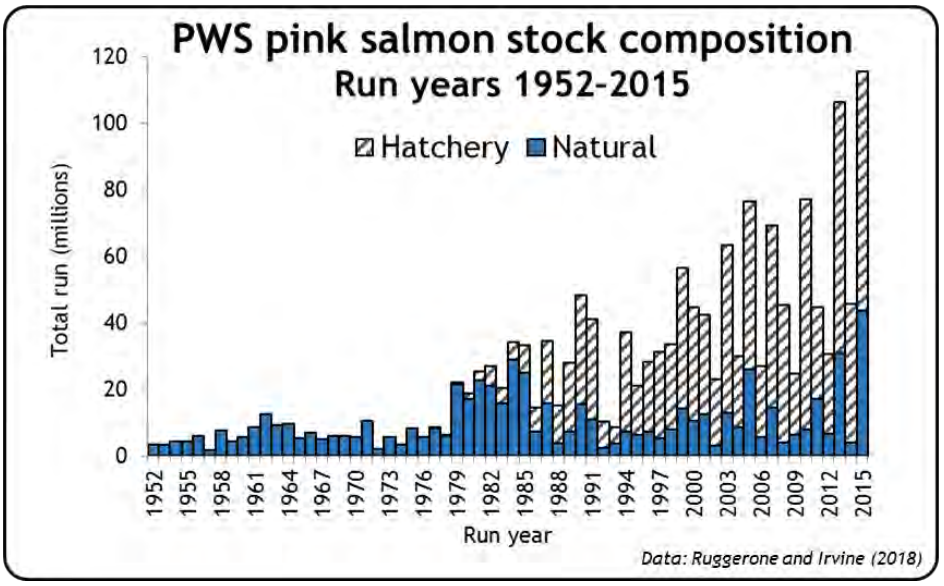
I. Ruggerone and Irvine (2018). Numbers and Biomass of Natural- and Hatchery-Origin Pink Salmon, Chum Salmon, and Sockeye Salmon in the North Pacific Ocean, 1925–2015.

This is an excellent compendium of the best available data on numbers and biomass of pink, chum, and sockeye salmon in the North Pacific Ocean. The authors have done a commendable job of compiling diverse data sources of harvest, harvest rates, and escapement. They have used reasonable approaches to estimating total salmon escapements by species by region, and to estimate hatchery and wild origins. They find that the abundance and biomass of pink, sockeye, and chum salmon has been higher in the past 2.5 decades (1990–2015) than at any time in the 90-year time series. The lead author is well known for his "concern" about the impacts of pink salmon (wild and hatchery) and hatchery salmon on the growth and survival of wild stocks of salmon. There is some obvious bias in the discussion of the implications of the results. An example of the anti-hatchery bias is seen in the Discussion on page 162, where Hilborn and Eggers (2001) and Amorosa et al (2017) are cited to minimize the contributions of enhancement to Prince William Sound fisheries, while ignoring the results of Wertheimer et al. (2004a, 2004b). The major recommendations of the paper, however, are quite reasonable: 1) mass-marking of hatchery salmon; and 2) estimate and document abundance of natural and hatchery salmon in the catch and escapement. Alaska has been a leader in both of these areas in order to properly manage the salmon enhancement programs in the state.

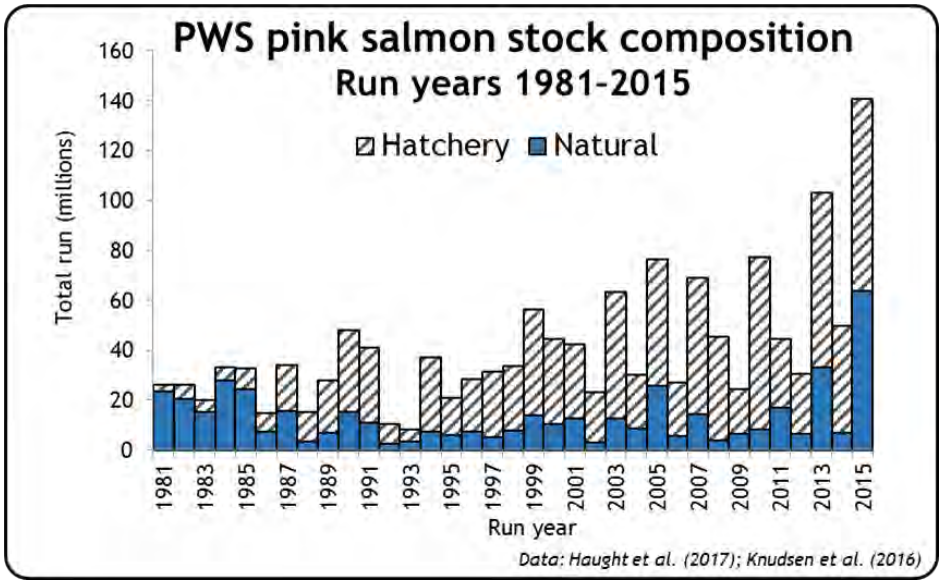
Most Alaska PNP programs have been marking their production for two decades, and ADF&G has been assessing wild/hatchery escapements for the past decade.

Here are major take-aways from the paper.

1. The high-sustained abundance of these species is good news. These abundances are consistent with the renaissance of Alaska salmon, recovering from catches of 22 million fish Statewide in 1974 to an average of 177 million from 1990–2015 (Stopha 2018). The recovery of Alaska salmon can be attributed to the change in ecosystem dynamics associated with the 1977/1978 "regime shift," which resulted in greatly increased zooplankton productivity in the North Pacific and significant changes in species composition of fish and crustaceans (Brodeur and Ware 1992). Also contributing to the high biomass of salmon have been the large-scale enhancement of chum salmon in Asia, especially Japan, and of pink and chum salmon in North America, especially Alaska. Ruggerone and Irvine's (2018) summaries of wild and hatchery pink salmon abundance in Prince William Sound (PWS) from 1952–2015 do well to show a trend in increasing pink salmon production in the region, as depicted in the following graph:



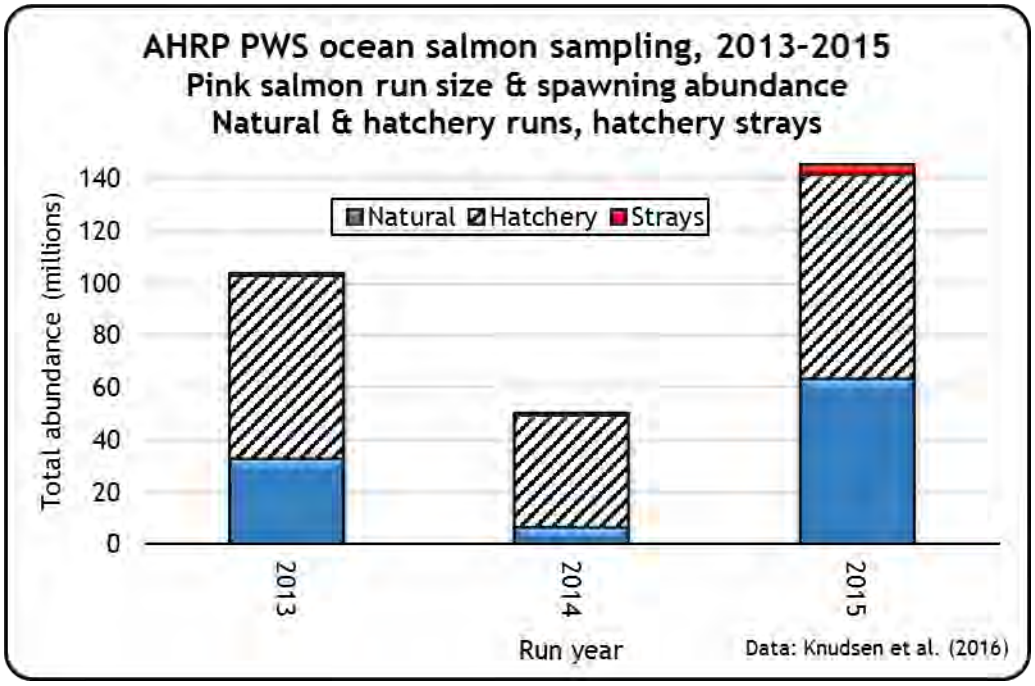
However, there are notable differences between Ruggerone and Irvine's (2018) and Knudsen et al.'s (2016) estimates for PWS pink salmon run size and stock composition for the years 2013–2015. Ruggerone and Irvine (2018) estimate a total run estimate of approximately 115 million pink salmon returning to PWS in 2015, whereas data collected through ADF&G's collaboration with the groundbreaking Alaska Hatchery Research Project (AHRP) indicate a total run estimate of over 140 million pink salmon (Knudsen et al. 2016):



The AHRP may be found further described at
http://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.current_research

For the years 2013–2015, the AHRP combined ocean and stream sampling to estimate run size and spawning abundance for both wild and hatchery fish in PWS, including estimates

of the hatchery fraction of spawning populations (Knudsen et al. 2016). Knudsen et al. (2016) report a total 2015 run size of PWS pink salmon to be over 140 million fish, which was record setting and approximately 37% larger than the previous record in 2013. Germane to current reviews of PWS pink salmon hatchery production is the estimation of hatchery fractions as measured by the number of hatchery fish assumed to have spawned in PWS natural streams, which Knudsen et al. (2016) report as being 4.4% in 2013, 14.8% in 2014, and 9.5% in 2015. Or, put another way, for these same years between 1% and 5% of the total pink salmon hatchery returns were estimated to have spawned naturally. Numerically, these estimates equate to a potential for approximately 702,000 fish in 2013, 742,000 in 2014, and just over 4 million fish in 2015, as shown graphically below in relation to total run estimates (data from Knudsen et al. 2016):



As summarized in the AHRP 2018 Project Synopsis (http://www.adfg.alaska.gov/static-f/fishing/PDFs/hatcheries/research/alaska_hatchery_research_project_synopsis_june_2018.pdf), preparations are underway to publish run reconstruction and straying results.

2. In Alaska, the management system developed by ADF&G has certainly played a major role (Clark et al. 2006) in sustaining wild and hatchery production. This management includes the capacity to mass mark hatchery fish and sample for these marks in commercial fisheries to avoid the over-exploitation of wild stocks. Finally, the cessation and ultimate ban of high-seas drift netting can also be considered a contributing factor.

3. The high salmon abundance has been relatively consistent over the 1990–2015 period, with higher variability in pink salmon numbers than the other species (Figure 3 of Ruggerone and Irvine). Thus, recent changes in abundance, survival, and size of coho and Chinook salmon have NOT been in response to any recent changes in aggregate salmon numbers or

biomass.

4. This paper makes clear that in the context of salmon carrying capacity, hatchery pink salmon are a relatively minor player. Only 15% of the abundance of pink salmon is attributed to hatchery production.

5. The 20 million scheduled increase in egg takes at VFDA would have virtually no effect on numbers or biomass in relation to current numbers of pink salmon or biomass of salmon in the North Pacific. Assuming 90% egg-to-fry survival and 3% marine survival, this increment would produce approximately 500,000 adults. This is 0.1% of the pink salmon in the North Pacific. In terms of biomass of salmon in the North Pacific, this is < 0.02%!

6. In the Discussion, it is clear that the Russian view of the impacts of density-dependent competition among salmon is very different from the North American academic view cited extensively by the authors, and presented in the several of the papers submitted to the BOF by the petitioners asking to rescind the 2014 VFDA PAR. The perspective championed by Ruggerone and Irvine (2018) is that density-dependent competition is having profound impacts on growth and survival of North American salmon stocks. Three papers cited by Ruggerone and Irvine (2018) and the petitioners (Batten et al. (in press), Springer et al. 2018, Shaul and Geiger 2016) propose that pink salmon are keystone predators, controlling the population dynamics and abundance of epipelagic zooplankton and nekton. In contrast, Shuntov (2017) is cited in Ruggerone and Irvine (2018) as stating that **Pacific salmon consume only 1-5% of prey consumed** by all epipelagic nekton in the Western Bering Sea, and up to 15% near eastern Kamchatka (where returning mature salmon are concentrated), and thus have only a low to moderate impact on the food epipelagic food web. Similarly, Radchenko et al. (2018) reviews studies showing that "as a rule, no significant correlations occur among pink salmon growth rate, stock abundance, or zooplankton standing crop." (Note that the Russians have the most extensive and intensive monitoring of salmon in offshore and coastal waters of any nation in the salmonsphere.) This view of low to moderate impact on epipelagic food webs is consistent with mass-balance modeling of North Pacific ecosystems by Pauley et al. (1996). **Pacific salmon** were estimated to make up **less than 7% of the biomass of the epipelagic fish biomass** in the Alaska gyre. If squid are including as competitive nekton for zooplankton production, Pacific salmon made up less than 3% of the biomass.

II. Springer et al. (2018). Transhemispheric ecosystem disservices of pink salmon in a Pacific Ocean macrosystem.

This is a very poor scientific paper. Frankly, it is surprising it was published. The authors have greatly overreached their data. They accept results that have low statistical significance when the data analyzed agrees with their hypothesis, and dismiss them at the same level of significance if they disagree with their hypothesis. They ignore or dismiss data and results that contradict their conclusions.

The authors attempt to demonstrate that indices of shearwater abundance are being driven by changes in abundance of pink salmon in the North Pacific Ocean. They present data from four indices of abundance of shearwaters on nesting colonies, and analyze data from three of the colonies (the fourth has only five years of data). One of the data series, Montagu Island, extends back to 1967; the others are more recent, and coincident with the high abundance of pink salmon that has persisted in the North Pacific Ocean since 1990 (Ruggerone and Irvine 2018). Because of higher abundance of pink salmon in the North Pacific from the odd-year line, they attempt to use differences in the mean and median of the indices for odd- and even-years to show that pink salmon abundance is affecting shearwater abundance. They also look at trends in abundance, regressing the indices on pink salmon abundance across all years. They construct a multiple regression model with rainfall and measures of regional pink salmon abundance as prediction variables for the dependent variable, the shearwater abundance indexes.

Here is a litany of problems with Springer et al.'s (2018) data presentation, analysis, and interpretation.

1. In their trend analysis, there is a negative trend for two colonies and no trend for the third, Wedge Island. The Wedge Island colony is the only one of the three evaluated that actually measured abundance; the others actually measure nesting success. The lowest abundance in the Wedge Island data series occurred in an even year. The major change in the longer-term data set for Montagu Island is coincident with the 1977/1978 regime shift. This regime shift resulted in big increases in zooplankton productivity in North Pacific (Brodeur and Ware). Large changes in relative species composition occurred. Salmon abundance increased dramatically; shrimp, king crab declined precipitously in the Gulf of Alaska; gadids and flatfish increased. Could pink salmon be the mechanistic explanation for the downturn in shearwater dynamics, when there is higher productivity in general? Perhaps, if pinks (and other salmon) caused local depletion of the amount of shearwater prey near the surface. (Another possible scenario is that salmon drive prey to the surface where they would be more susceptible to shearwater predation). Given the large changes in productivity and species composition, there are probably multiple factors causing the shearwaters to decline at a time of increased productivity of their general prey groups.

2. The authors take the approach that odd/even year differences in abundance of pink salmon are reflected in odd/even year medians and mean averages at the nesting colony. They point out a tendency for shearwater averages to be higher in even years. However, at all three nesting colonies, none of the differences are statistically significant, regardless of how they truncate the data series (Tables 1,2,3). For the long-term data series at Montagu Island, the p-value for the comparison is 0.3 (p greater than 0.05 = not significant).

3. The authors discuss shearwater-pink correlations ostensibly to show the connection between pink salmon abundance and shearwater abundance indexes. They actually do not give the correlations, but rather the direction and significance of pink salmon abundances as covariates in a multiple regression model including rainfall. The amount of variation explained by rainfall alone is not presented. Rainfall must be a big driver in this relationship; note the nest failures on Montagu attributed to rainfall in 1971 and 1999. Shearwaters migrate through North Pacific waters through the ocean range of Asian and North American pink salmon (Figure 1). The salmon covariates are broken into four regional components, three Asian and one North American ("Alaska").

4. For the rainfall/salmon model, there was no relationship with salmon abundance at two of the three colonies evaluated: Wedge (with the actual measures of abundance) and Forneaux. At Montagu, the pink salmon covariates were negatively related to pink salmon abundance for Japan/Okhotsk and Alaska, positively related for East Kamchatka, and either negative or positive for Western Kamchatka, depending on how the data series was truncated (Table 4). Significance level for each region also varied depending on how the data series were truncated. In summary, two colonies had no relationship to salmon abundance; and one colony had no consistent relationship with salmon abundance.

5. The authors then use an arbitrary model selection process to drop Japan/Okhotsk and West Kamchatka from the model for Montagu. Certainly, among the long list of authors someone has heard of using criteria such as the AIC (Akaike Information Criterion) to select the best model. At any rate, this action results in Table 5, showing significant negative effects of Alaska salmon. The relationships for Eastern Kamchatka salmon remain positive. The authors make a big deal that the regions "importance" declined markedly, but note that this positive relationship remains significant for the 1990–2016 interval, and "marginally" significant (p = .1) for the most recent interval.

6. For the rainfall/salmon model, there is no relationship with salmon abundance for two of the three colonies. The Montagu colony model showed a positive relationship with Eastern Kamchatka pink salmon, which contribute the most to the overall abundance of pink salmon, and a negative relationship with Alaskan pink salmon. When looking at the map of Shearwater distributions, their migration overlaps to a greater degree with Asian pink

salmon. By the time the birds are swinging down to the eastern part of their range, pink salmon from Southeast Alaska and Prince William Sound are probably eastward in more coastal waters. Thus, the pink salmon with which the shearwaters are most likely to co-occur are Asian pink salmon, which have no discernable effect or even a positive effect in the authors' models.

7. The authors acknowledge these contradictions, but that does not stop them from affirming their hypotheses. They note that the positive relationship of the Montagu shearwaters with East Kamchatka salmon "was not expected." They then go through the statistical gymnastics to dismiss the significance of these positive relationships, **even though non-significant** but consistent differences in odd/even year averages were evidence of a pink salmon effect. As for the results of NO relationships for the other two colonies, "…we believe that this does not materially controvert our hypothesis, based on the totality of the evidence that competition by pink salmon leads to negative effects on overwintering and nesting shearwaters." There you have it: no point in letting contradictory results spoil the hypothesis of a true believer.

III. Batten et al. (In press). Pink salmon induce a trophic cascade in plankton population in the southern Bering Sea and around the Aleutian Islands.

This paper attempts to show top-down control of plankton populations around the Aleutian Islands and in the southern Bering Sea. This paper is in the genre of "tail wags dog." The authors purportedly show that zooplankton standing crop is affected by the number of pink salmon present. They do this by comparing odd/even year data from a surface layer tow of a continuous plankton recorder, attributing the difference to higher odd-year abundance of pink salmon. They correlate the findings to specific regional abundances of Asian pink salmon, and explain anomalies in their data series with particular changes in relative abundance by region. They characterize these results as a "trophic cascade", with pink salmon controlling zooplankton trophic dynamics.

This paper has some serious flaws, both conceptually and in its analysis of the data:

1. Conceptually, it is highly unlikely that pink salmon control the zooplankton population dynamics in these oceanic regions. Localized depletion of zooplankton can certainly occur due to foraging by zooplanktivorous nekton. However, broad-scale description of trophic structure in the North Pacific Ocean **show that salmon in general have a low to moderate position** in the grand scheme of things. Mass-balance modeling of North Pacific ecosystems by Pauley et al. (1996) estimated that Pacific salmon make up less than 7% of the biomass of the epipelagic fish biomass in the Alaska gyre. If squid are included as competitive nekton for zooplankton production, Pacific salmon make up less than 3% of the nekton biomass. This is all salmon, not just pink salmon, and the majority of the biomass of salmon in the Gulf of Alaska and Bering Sea is chum salmon. In the mass-balance model, zooplankton biomass was over 40 times that of ALL planktivorous nekton consumption.

   Another conceptual problem to the odd/even evidence of plankton depletion is **prey-switching by salmon species**. Pink, chum, and sockeye salmon have substantial overlap in their diets, and the latter two species have been shown to switch to other, "lower-quality" prey when pink salmon are abundant (e.g., Davis 2003). These changes in feeding habit are often used to support the concept of density-dependent interactions with pink salmon and their congeners, e.g., Ruggerone and Connors (2015). Why would we not expect these species to switch back to the preferred prey when pinks are not abundant? Given higher biomass of chum salmon and sockeye salmon in the North Pacific, why would they not consume the "pink prey" when pink abundance is lower in even years?

2. The conclusions of the authors go well beyond the scope of the sampling, in space and time. The plankton recorder is at 7.5 M (~23') depth. **Zooplankton biomass occupies much more of the water column, and is typically more abundant below 20 M (60' depth)**, with diel migrations from depth to near-surface waters (e.g., Orsi et al. 2004). Even

if local surface depletion of zooplankton was occurring by foraging salmon, that in no way shows general depletion of zooplankton standing crop.

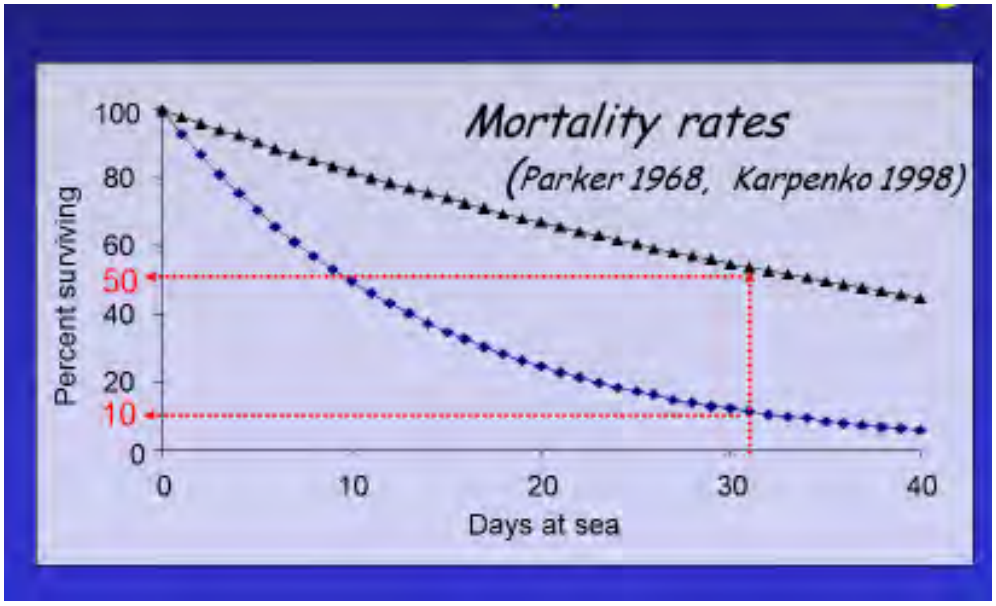
3. In some odd years, sampling extended into August. By this time, most pink salmon would have left the sampling area to migrate into coastal waters; many are entering their natal streams! Thus, depletion of surface zooplankton must have been due to other zooplanktivorous nekton.

4. The glaring problem of the analysis of the plankton indexes to pink salmon abundance is the selection of specific indexes of abundance of pink salmon based on putative distributions by region. The authors have a map showing their sampling areas delineated into Eastern, Central, and Western regions (Figure 1). They cite Tagaki et al. (1981) and Myers et al. (1996) to assign the eastern and central region for correlation with Eastern Kamchatka pink salmon as the primary population in these areas, and the western region to other regions of Alaska. However, except for the central region, these assignments are not consistent with maps from Tagaki et al (1981). of the distribution of pink salmon by region (reproduced in Heard 1991). Their eastern sampling area is at the edge of the range for East Kamchatka pink salmon, but is well within the range of North American pink salmon originating from the Gulf of Alaska and western Alaska. In a more recent overview of pink salmon ocean distribution, Radchenko et al. (2018) also show ocean distributions that place Batten et al.'s (In press) eastern sampling stations at the edge of the Eastern Kamchatka pink salmon range, and well within North American pink salmon distribution.

   This mis-assignment of "principle" regional stocks has large implications for the authors' conclusions. For example, in the Western sampling region, even though large numbers of East Kamchatka pink salmon are present, surface zooplankton has no trend in relation to the abundance of these fish. In the Eastern sampling region, it negates their explanation of high zooplankton counts in 2013. This year had the highest large copepods counts observed in their data series. The authors emphasize that Eastern Kamchatka pink salmon abundance was lower than average in that year. However, North American pink salmon abundance was at a record high in 2013. Thus, the high zooplankton counts in the region are actually associated with high pink salmon abundance. Indeed, the high productivity of zooplankton in 2013 may have been a driver in the record abundance of North American pink salmon.

5. In contrast to the authors' observations of the relationship between surface zooplankton and pink salmon abundance, Radchenko et al. (2018) reviews extensive Russian studies showing that "as a rule, no significant correlations occur among pink salmon growth rate, stock abundance, or zooplankton standing crop." These studies included comprehensive sampling of zooplankton, concurrent salmon abundance, and analysis of growth and diet of the salmon. Supporting evidence for lack of significant correlation is that the first 30 to

45 days of a salmon fry/smolt sustain 50% to 90% mortality (Parker 1968 & Karpenko 1998), with predators likely being the main driver rather than zooplankton abundance.



IV. Shaul and Geiger (2016). Effects of climate and competition for offshore prey on growth, survival, and reproductive potential of coho salmon in Southeast Alaska.

This paper finds that size of Southeast Alaska coho salmon, and survival of Berners Bay coho salmon, are driven by climatic conditions and density dependent-interactions with pink salmon. The paper is both data and analytically intensive, and is a very thoughtful approach to understanding the processes affecting size and other population characteristics of Southeast Alaska coho salmon. The authors develop models to support their hypothesis that pink salmon are a top-down controlling factor in the abundance of North Pacific squid (*Berryteuthis anonychus*) populations that are the primary prey for coho salmon in offshore waters. Pink and coho salmon have similar duration of time at sea. In offshore regions, squid are the primary prey of coho salmon at all sizes, whereas pink salmon do not consume substantial quantities of squid until they reach a size greater than 1000 g. The authors' model indicate that size of coho salmon is not affected by direct (within year) competition of pink salmon for squid, but rather by impairing the reproductive potential of squid in subsequent years.

1. The authors present strong evidence for size declines in Southeast Alaska coho salmon, with differing trends for odd- and even-year returns indicating a density-dependent relationship with pink salmon abundance. Declines in size with increased pink salmon abundance have also been observed for Prince William Sound pink salmon (Wertheimer et al. 2004b) and for pink salmon in BC (Jeffrey et al. 2017). Jeffrey et al. (2017) also found that body size of chum salmon in BC species has declined with ocean biomass of North American salmon, but also found that body size Chinook, coho, and sockeye salmon in BC fisheries have increased with higher ocean biomass of North American salmon.

2. While the size decline data are compelling, we are not convinced of the proposed mechanism for how pink salmon affect coho size. It seems another "tail wags dog" concept. The biomass of pink salmon is only a small fraction of the nekton in the Alaska gyre, with squid estimated to have a 30-fold higher biomass (Pauley et al. 1996). In contrast to the conclusions of Shaul and Geiger (2016), **Aydin (2000) concluded** that the trophic position and high productivity of **squid give it a controlling position in the ecosystem** in relation to salmon predation and growth. Aydin (2000) found that squid abundance, while highly variable, had increased greatly (as did salmon) after the 1977/1978 regime shift. That squid abundance increased commensurate with salmon abundance indicates the species were responding similarly to the increased productivity in the North Pacific (Brodeur and Ware 1992). If squid were controlled by pink salmon predation, there should have been a decline in squid production as pink salmon increased.

   In addition, the consumption of squid on the high seas by pink salmon is limited by their size and temporal distribution. Substantial quantities of squid are not consumed by pink salmon until they reach 1000 g in weight (Aydin 2000, Davis 2003). Pink salmon typically

attain this size by mid- or late-June (Radchenko et al. 2018). At this time, the fish are starting to migrate from offshore (squid) areas towards coastal water as they move towards their natal streams to spawn. This limited feeding opportunity is more consistent with the Aydin (2000) hypothesis of squid population size and biomass affecting salmon growth than with the Shaul and Geiger concept of pink salmon controlling the reproductive potential of the squid. Aydin (2000) also estimated that coho salmon consume more squid overall than pink or sockeye salmon. Coho salmon have a much broader temporal window for foraging on squid, as ocean age 1 coho salmon are larger than ocean age 1 pink salmon, and eat large quantities of squid even at sizes less than 500 g (Davis 2003). Coho salmon have much greater growth rates than pink salmon as they attain a size of 7 pounds in the same two years that pink salmon mature at 3.5 pounds.

The Shaul/Geiger lag response model requires that the squid have an obligate two-year life-history cycle as proposed by Jorgensen (2011). This is contradicted by other literature, which characterizes *B. anonychus* as an annual species with high productivity (Katugin et al. 2005, Drobney et al. 2008). Aydin (2000) cites studies showing that *B. anonychus* is highly productive, and spawns twice a year.

3. If direct or indirect competition for squid is not driving the size decline, **what are the alternative hypotheses?** Aydin (2000) thought that the winter ocean period was when salmon growth was most susceptible to density-dependent interactions; however, it is not clear how density-dependent interactions between pink salmon and coho salmon would affect coho salmon growth at this time. However, Aydin (2000) also found distinct differences in the distribution of squid in odd- and even-years in the 1990s, which he attributed to variations in in oceanographic conditions. If such biennial differences are persistent, the interaction of squid distribution with SEAK coho distribution could produce the odd/even differences in size.

4. Given the differential association of SEAK coho size and BC coho size to North Pacific salmon abundances observed by Shaul and Geiger (2016) and Jeffrey et al. (2017), the effect of competitive interactions between coho and other salmon must vary with the ocean domains used by the different stocks. It is interesting that Shaul and Geiger found an increase in size for Southeast Alaska pink and sockeye salmon in recent years, while coho sizes were declining. They attribute that to the "flexibility" in their diets, which may indeed make them less susceptible to variations in squid abundance than coho salmon. Ruggerone and Irvine (2018) report recent general declines in average size of pink and sockeye salmon, again indicating **heterogeneous responses across regions** to ocean conditions.

5. The authors also attribute declines in marine survival of Berner's River coho salmon to the lagged-impact of pink salmon on squid. Yet, year-class strength of coho salmon and pink

salmon in Southeast Alaska are strongly and positively correlated. We looked at the time series of coho and pink salmon harvest from 1960 to 2017; the association is 0.82, significant at $p < 0.001$. Since the 1977/1978 regime shift, the relationship has not been quite as strong, but is still 0.70, also significant at $p < 0.001$. This suggests that pink salmon and coho salmon are responding similarly to ocean conditions. Briscoe (2004) and LaCroix et al. (2009) suggested predator buffering as a mechanism that could explain this association: strong year-classes of juvenile pink salmon could improve survival of coho salmon smolts by deflecting predation pressure from less abundant coho salmon juveniles. However, Mallick et al. (2009), in examining survival trends for 14 stocks of hatchery and wild coho salmon in Southeast, did not find consistent effects of hatchery or wild juvenile salmon on the survival data. Shaul and Geiger also looked for such an effect on Berner's River coho survival, but did not find any indication that survival was influenced by estimated numbers of juvenile salmon in northern Southeast Alaska waters. Nevertheless, in terms of numbers of fish harvested, pink and coho salmon in Southeast Alaska generally are positively associated, indicating no or little density-dependent effect of pink salmon on coho salmon survival.

6. The authors have tied reduction in coho salmon size to the general increase in pink salmon biomass in the North Pacific. The correlation in year-class numbers of Southeast Alaska coho and pink salmon, and the differing response of pink salmon size in Southeast Alaska than in Prince William Sound suggest that density-dependent interactions, both negative and positive are regionally driven. This may be due to shared ocean distributions. Because production of hatchery pink salmon in Southeast Alaska is quite small (< 5%), these interactions are driven primarily by wild stocks of pink salmon.

V. Aydin (2000). Trophic feedback and carrying capacity of Pacific salmon on the high seas of the Gulf of Alaska.

This dissertation is an impressive body of work. The author used field samples of salmon food habits in conjunction with bioenergetics models, foraging models, climate data, and salmon size data to examine the relative effects of environmental variation and potential density-dependence on "carrying capacity" in the northeastern Pacific Ocean. The author's main conclusions are that (1) the winter prior to maturation is a critical time for salmon competitive interactions; (2) small differences in salmon body size after the winter period can limit foraging capability and thus growth and size at maturity; and (3) micronektonic squid are an important driver in adult salmon growth, and may function as a keystone species. The author expresses concern that "pumping up production with hatcheries" may have deleterious impacts on the salmon ecosystem, possibly resulting in "trophic cascades" that could limit growth and potentially impact survival.

1. Squid is a very important salmon prey item across wide areas of the Pacific, especially for coho salmon. Its abundance and distribution is highly variable, depending on oceanographic conditions. Squid abundance generally increased in the 1980s and 1990s, when salmon abundance also generally increased.

2. In the 1990s, the distribution of squid was different between odd and even years. These differences were attributed to differing oceanographic conditions.

3. Salmon diet varies across large ocean domains; there are large areas with low populations of squid where zooplankton or fish larvae are primary prey.

4. Density-dependence is most likely during winter. The strongest controller of growth during this time is zooplankton. Density-dependence is likely strongest for pink salmon and age .2 sockeye salmon.

5. The differential feeding habits of chum salmon on gelatinous organisms make them less susceptible to density-dependent effects.

6. Local depletion of prey resources can occur as salmon school density increases, even if prey is not depleted over large ocean areas. This is an important point in understanding regional differences in changes in size at return.

7. Despite the concern expressed by the author some 15 years ago about density-dependent interactions resulting in negative feedback loops**, abundance and biomass of salmon in the North Pacific Ocean remains at historically high levels**, albeit with high variability and differing responses depending on species and region.

VI. Davis (2003). Feeding ecology of Pacific salmon in the central north Pacific and central Bering Sea.

This paper provides extensive food habit information for Pacific salmon in the central North Pacific and Bering Sea during June and July. The author also determines caloric densities of prey, and uses these data and a bioenergetics model to estimate salmon growth and prey consumption during June and July. The author considers the effect of pink salmon abundance on diet composition. This is an important contribution to the understanding of summer food habits of Pacific salmon on the high seas. Major results from the analyses include:

1. Diet items varied greatly among the three regions (two in the North Pacific and one in the Bering Sea) sampled.

2. Shifts in prey composition were observed in chum, sockeye, and pink salmon when pink salmon were abundant. All three species consumed more low-caloric content prey at higher pink salmon abundances, and had lower stomach fullness. Chinook salmon in the central Bering Sea had lower stomach fullness in years pink salmon were more abundant. Coho salmon did not show either diet shifts or changes in stomach fullness in relation to pink salmon abundance.

3. The author concludes that the shifts in prey composition in the presence of abundant pink salmon are indicative of feeding competition among pink, sockeye, and chum salmon, and that this composition could result in density-dependent reduction of the growth of these species in the Central Bering Sea.

4. Bioenergetic models indicate that salmon are feeding close to their physiological maximum. When prey is abundant, there is an upper thermal limit to growth due to large metabolic requirements. At lower temperatures, growth is limited by a decreased capacity for prey consumption.

5. **The major take-away:** feeding competition causes diet shifts in pink, chum, and sockeye salmon. Reliance on lower quality food, along with localized prey depletion at high salmon abundances, may result in lower growth, with some decrease in size at maturity for pink, sockeye, and chum salmon, and shifts to older ages at maturity for sockeye and chum salmon. However, these **impacts have not prevented the sustained high biomass** of these species in the North Pacific Ocean over the last 30 years. In addition, **Russian studies of growth and feeding habits of pink salmon have not found an association of lower growth rates with pink salmon abundance (Radchenko 2018).**

VII. Lewis et al. (2015). Changes in size and age of Chinook salmon returning to Alaska.

This is a very good analysis of temporal trends in size at age and age at maturity for 10 stocks of Alaska Chinook salmon that occur from southern Southeast Alaska to Yukon River. The authors use regression analyses to quantify decadal trends, and suggest possible causes for the changes observed.

1. On average, these stocks of Chinook salmon have become smaller over the past 30 years because of a decline in the predominant age at maturity and because of a decrease in age-specific length.

2. Average size has declined for all 10 stocks of Chinook salmon evaluated. The observed smaller size is a result of trends in size-at-age and age at maturity.

3. Size-at-age has declined in all stocks for older (1.3 and 1.4) ages. However, **no overall trend in size at age 1.2 was found**. Six stocks had no significant trend, two stocks (Kenai and Copper) had significantly negative trends, and two stocks (Nushagak and Unuk) had significantly positive trends in size at age 1.2 (Table 2).

4. The age-at-maturity has declined for all 10 stocks. The proportion of age 1.4 fish has decreased, and the proportion of age 1.2 fish has increased.

5. The authors conclude that the concordant trends among these ten Chinook stocks across a broad geographic range indicate a common suite of large-scale mechanisms may be responsible for the changes.

6. Three possible mechanisms are identified: 1) **size-selective fishing removing larger**, older fish; 2) marine environmental conditions affecting growth and maturation rates; and 3) competition with the high abundance of salmon in the North Pacific affecting growth and thus size at age and age at maturity.

7. While size-selective fishing can affect the size and age structure of Chinook salmon (Bromaghin et al. 2011), the concordant trends are occurring in stocks with widely different fishery exploitation rates and exposure to size selective fishing (such as trolling with a minimum size limit), which makes it unlikely that fishing is the primary driver of these changes.

8. Differing environmental conditions could certainly play a major role in growth of Chinook salmon. **However, size at age 1.2 has not declined**; indicating that growth during at least the first two years at sea has not been impacted. Given broad prey overlap of 1.2 and older

Chinook salmon, it is unclear why older fish would experience reduced growth in response to the same environmental conditions.

9. The high abundance of other species of salmon has been persistent over the past 25–30 years, and thus is not an obvious cause for the trend in sizes. There is no apparent odd/even cycle in the size data (Figure 3), as was found by Shaul and Geiger (2016) for Southeast Alaska coho salmon, so pink salmon is not singled out! In addition, the size-class with the greatest diet overlap with congener species is age 1.2, which does not show a downward trend in size.

10. We can **identify another possible mechanism causing the changes in size and age:** increasing predation by a rapidly expanding marine mammal population that has a strong preference for Chinook salmon in its feeding habits. Resident killer whales preferentially feed on large Chinook salmon (Olesiuk et al. 1990; Hansen et al. 2010). Resident killer whales in northern BC and Gulf of Alaska waters have increased at annual rates of 2.9% and 3.5%, respectively (Hilborn et al. 2012; Matkin et al. 2014). At these rates, numbers of killer whales in these areas have increased 2–3 times over the 30-year time series evaluated by Lewis et al. (2015). Differential removal of large fish could cause the reduction in both the proportion of older fish and the size at age of older fish.

VIII. Jeffrey et al. (2017). Changes in body size of Canadian Pacific salmon over six decades.

This paper is an excellent update of Ricker's (1981) analyses of trends in body size of Pacific salmon. The data are extended to cover 1951–2012. Average body size for each species was calculated from commercial catch statistics over this timeframe. General additive models (GAM) were used to test the importance of potential factors affecting change in body size. Four climatic indices were used to examine for broad-scale environmental impacts, and estimates of biomass of potentially competing species (pink, chum, and sockeye salmon) were used to examine for density-dependent interactions.

1. The mean weight of all species changed over time.

2. Chinook salmon size declined markedly from 1951 to the early 1970s but then increased to close to its maximum annual weight in the 1990s. Since 2000, Chinook weight has again declined slightly.

3. Coho salmon size also declined from the 1950s, and did not reach its minimum until around 1985. Since then it has increased and is now at the highest level in the data series.

4. Chum and pink salmon declined initially in size, and then have remained relatively stable since the 1990s at a size that is 20–30% less than in the 1950s and 1960s. There was little change over the time series in the average size of sockeye salmon.

5. Annual size data for Chinook, chum, and sockeye salmon can be confounded by differing proportion of ages at return; the assumption is made that these effects are smoothed out over the long time series.

6. The GAM models identified at least two of the climate variables as important in explaining annual variations. There was no indication of abrupt climate effect, but rather more of a response to continuous changes in the climate indices.

7. The biomass of North American pink salmon entering the Gulf of Alaska was the most important biomass variable in explaining size variation in BC pink salmon. The direction of the effect was negative, suggesting some degree of intra-specific competition.

8. The combined biomass of North American pink, sockeye, and chum salmon was the most important biomass variable explaining size variation in chum salmon. The direction of the effect was negative, suggesting some degree of competition among these congeners.

9. The biomass of North American chum salmon was the most important biomass variable explaining size variation in sockeye salmon. Adding Asian chum salmon to this (or combined measures of biomass) did not improve the fit. **The direction of the effect was positive, indicating that when chums are abundant, growth conditions for sockeye are positive.**

10. The combined biomass of North American pink, sockeye, and chum salmon was the most important biomass variable explaining size variation in Chinook and coho salmon. The effect was again positive for these species. **The authors note there is less diet overlap of these species with pinks, chums, and sockeye.** They speculate that the positive relationship may be driven by environmental conditions, which when favorable allow for greater total biomass of salmon species and higher growth (thus larger size) in Chinook and coho salmon.

11. Relaxation of fishing pressure may have contributed to some increase in body size. For Chinook and coho salmon, **fishing pressure has shifted from commercial to recreational fishing.** The authors conclude that the effect of fishing is unclear, but place it as less important than the ecological (salmon biomass) and climatic effects. Their results are consistent with the "unclear" conclusion. They have no analytical approach to determine if and to what degree fishing influenced annual variation in size.

12. The most striking take-aways from this paper are the positive relationships of body size to ocean salmon biomass for sockeye, Chinook, and coho salmon. These relationships are consistent with the Russian view that environmental conditions are driving variability in biomass, and that **growth and survival is driven more by density-independent changes in productivity than density-dependent interactions among salmon species**. The authors do present evidence of density-dependent effects on growth for pink and chum salmon, with pinks most affected by intraspecific density and chums by total salmon biomass. Perhaps this latter is the effect of chum salmon switching to gelatinous prey to avoid more intense competitive interactions with pinks and sockeye.

13. The results for coho salmon are a striking contrast to Shaul and Geiger's (2016) finding of size decline in commercial weights of coho salmon in Southeast Alaska. Restating what was said in the critique of Shaul & Geiger: these opposite results indicate that stock-specific differences in ocean distribution may be very important in determining growth potential and the degree and direction of species interactions.

IX. Jones et al. (2018). Population viability improves following termination of coho hatchery releases.

This is an interesting case history study of the response of a natural-spawning coho salmon population to the termination of an in-stream hatchery. It has **little relevance to the concern the petitioners expressed vis-à-vis ocean carrying capacity**. It does have some relevance to the on-going debate on impacts of domestication selection of hatchery fish on the fitness of wild stocks.

The hatchery on the Salmon River in Oregon was operated from 1978–2005, representing 27 brood years (generations) of directed hatchery influence. The brood stock was derived from the local Salmon River coho population. Once hatchery returns began, the hatchery, located some 8 km up-river, would collect approximately 270 adults for brood stock, and allow the other hatchery fish to spawn naturally. During the hatchery period for which data are presented (1992–2005 broods, 1995–2008 returns), the hatchery would release approximately 200,000 smolts annually. The majority of naturally spawning fish during this period were first-generation hatchery fish; productivity of naturally-spawning fish was low. After termination of the hatchery, productivity has increased and the natural spawning fish have produced runs of approximately the same size as when the hatchery was operating (from 1995–2008; 1978–1994 numbers are not shown). The authors suggest that density-dependent interactions between hatchery smolts and naturally-produced fish reduced survival of the naturally-produced juveniles. There also could have been density-dependent loss of productivity through competition for limited spawning habitat, and potentially lower fitness of the hatchery fish spawning naturally. Marine survival was higher for smolts after the hatchery period, which would also contribute to increased productivity.

Coho salmon are typically reared in hatcheries until yearling smolts. This long period of hatchery rearing makes them more susceptible to domestication selection that could affect their reproductive success when spawning naturally (Theriault et al. 2011). In addition, the authors note that there had been a substantial shift to earlier-spawn timing from the original brood stock. Spawn timing is quite heritable and hatchery programs can easily select for earlier timing by filling up on eggs from the early returns.

In spite of the concerns for domestication selection and reduced reproductive success of hatchery fish, this population recovered quickly from the density-dependent impacts of in-river hatchery releases after 27 generations of direct hatchery/wild interactions. Productivity is similar to neighboring wild-stock systems, and the population appears to be self-sustaining. These results support the policy of deriving hatchery populations from local stocks; it also demonstrates the need to evaluate the efficacy of hatchery programs to ensure they are meeting their management goals. Supplementation of coho salmon populations with in-river fry and smolt releases can result in replacement of wild production due to density-dependent interactions in their freshwater spawning and rearing habitats (Nickelson 2003). When this occurs to the degree observed in the Salmon River, termination of hatchery releases is the reasonable and cost-effective course of action. This

is a very different from lake stocking of sockeye fry in lake systems, which have been identified as spawner-limited, e.g. Babine Lake, Tahltan Lake, and the Gulkana program.

This case history study demonstrates that appropriate brood-stock selection, and maintenance of spawning and rearing habitat, can ensure that wild stocks retain their viability and productive capacity even when exposed to long-term and direct interactions with hatchery fish. It is important to note that Alaska's hatchery program is dissimilar to the one described here. Most pink, chum, Chinook, and coho salmon are released to the ocean and not in freshwater rivers, and programs are located away from major wild stock systems.

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Submitted By
Arthur Bloom
Submitted On
10/2/2018 10:07:49 AM
Affiliation

I believe we should be more cautious about hatchery production. I do not believe we understand in any meaningful way the impact of releasing millions of hatchery reared salmon fry/smolt on wild salmon stocks.

Submitted By
Ben Van Alen
Submitted On
10/1/2018 12:34:04 PM
Affiliation

It is time for our experiment with the ocean ranching of hatchery salmon to end. There is no ecological, nor economic, niche for hatchery salmon. Hatchery fish increase competition, decrease growth, increase predation, decrease survivals, increase straying, decrease fitness, increase harvest pressure, and decrease management precision on wild fish. Hatchery releases put wild and hatchery fish in direct competition for declining resources. We observe declining or depressed runs of eulachon, herring, and wild and hatchery salmon wherever we have industrial scale hatchery releases. How can a hatchery fish help a wild one?

To have healthy salmon runs we must maintain the environment, maintain the wild spawners, and close hatcheries – to protect the environment and protect the spawners. The abundance of salmon (and all biota) is always ultimately limited by the environment's carrying capacity - not by the numbers of babies. The carrying capacity can be filled with wild fish, or hatchery fish, but it is the nutrient cycling of wild fish that maintains the carrying capacity. Wild fish are dying for more. It is best to manage for naturally distributed spawners within a range that returns are not obviously limited by too few, or too many, spawners. Our industrial-scale "ocean ranching" hatchery releases push carrying capacity thresholds and contribute to highly variable survivals and returns of both wild and hatchery salmon. Poor survivals of wild salmon results in low returns and low escapements and years of fishery restrictions to rebuilt escapements and returns. It takes fish to make fish. The sustaining and rebuilding of wild runs is impossible in the face of continued hatchery releases. Where are there industrial-scale hatchery releases and not declining runs of eulachon, herring, and salmon?

Production of salmon (and all plants and animals) is always ultimately limited by the environment's carrying capacity – not by the numbers of babies. You can't just release more fish and get more fish just like you can't just plant more corn to get more corn. The productivity of the ocean is limited just like the productivity of a field is limited. The natural fertilizing by millions of salmon in thousands of natal lakes, streams, and rivers is needed to maintain the environment's productivity just like the farmer must fertilize to maintain the productivity of his/her field. In fact, the farmer also knows the importance of tilling the soil before planting and the importance of seed quality. The farmer knows if she/he wants more corn then they need a bigger field. Our industrial-scale ocean-ranching hatchery program disregards natural ecological processes and all that we have learned about agriculture and farming since 700 BC. The Mighty Pacific is Nature where carrying capacity and natural selection rules. There is only one Mighty Pacific. We can't do better that what happens naturally. We must use Nature as our guide and minimize differences from what happens naturally. There is nothing natural or sustainable about hatchery propagation regardless of the millions of dollars we spend to build and operate hatcheries and the millions of dollars and hours we spend to manage for and around hatchery fish. Ironically, about the same proportion of wild runs are allowed to spawn as the proportion of hatchery runs that are harvested for brood stock and cost recovery? Again, the production of salmon is limited by the carrying capacity and the carrying capacity is limited by our habitat protections, the number we harvest, and the number we release from hatcheries. To sustain healthy stocks and fisheries we must maintain natural habitat conditions as much as possible (Vote yes on Proposition 1), actively manage salmon harvests to maintain naturally distributed and abundant spawners, and close hatcheries. Its the numbers that die, not the poor egg-to-fry. Human nature is not mother nature. We can't do better than what happens naturally. Realize that what happens naturally is the positive result of millions, billions, and gazillions of experiments in the competition and cooperation of the biota in the biosphere (fish in the sea).

Hatchery salmon swim with wild fish, they eat what wild fish eat, they eat wild fish, they stray and spawn and reduce the fitness of wild fish, they reduce survivals of wild fish, and, they do not make more fish - they make fewer. Wild and hatchery fish fill the carrying capacity but only wild fish help to sustain it. It is the natural nutrient cycling of millions of wild salmon spawning and dying in thousands of natal streams that helps maintain the productive capacity of our watersheds, estuaries, bays, straits, and ocean. It is the millions of wild salmon that return to spawn where and when their parents did that maintains the genetic and biodiversity fitness needed to have healthy stocks and fisheries. We've allowed billions of hatchery fish to elbow their way into the ecosystem potluck without bringing a dish. We've allowed millions of hatchery fish to stray, spawn, and unnaturally hybridize with, and reduce survivals of, wild fish. The "nutrient mining" inherent with ocean ranching is lowering the productivity for all biota. The 1.6+ billion "nutrient miners" now released from Alaskan hatcheries each year are in direct competition for space and food with wild fish.

How can a hatchery fish help a wild fish? Every place we look we find hatchery releases up and wild (and now hatchery) fish down. Cutting hatchery fish by 100% is needed to sustain healthy eulachon, herring, and salmon stocks and essential now that we have declining and depressed runs of wild eulachon, herring, and salmon in Southeast Alaska, Prince William Sound, Cook Inlet, and Kodiak. It is not thanks to hatcheries that we still have fisheries - it is because of hatcheries that we are loosing our fisheries. From fishers to hatchery harvesters. Hatcheries have become one of the biggest "user group" in the State. Simply put, low salmon runs are a consequence of over-fishing and over-releasing. We have nearly 100% control over the former and should close hatcheries to control the latter.

The Board of Fisheries should take actions immediately to: 1) discontinue hatchery releases of Chinook, Coho, and Sockeye Salmon; and 2) allow only volutional releases of less than 20 million unfed Pink and Chum Salmon fry from hatchery sites until a complete review of factors limiting the production of wild and hatchery fish is completed.

In summary, it is impossible to maintain healthy salmon stocks and fisheries in the face of industrial-scale hatchery releases. There is only one ocean and the production of salmon from the ocean is ultimately limited by its carrying capacity. Wild fish can fill this carrying capacity and only wild fish help to sustain it. It is the natural spawning and dying of millions of salmon in thousands of natal streams that helps maintain the productive capacity of our watersheds, estuaries, bays, straits, and ocean. Hatchery fish are elbowing their way into the ecosystem potluck without bringing a dish. The "nutrient mining" inherent with ocean ranching is lowering the productivity for all biota. The

1.6+ billion ”nutrient miners” now released from Alaskan hatcheries each year are in direct competition for space and food with wild fish. We observe declining and depressed runs of eulachon, herring, Chinook, Sockeye, Coho, Pink, and Chum Salmon wherever we have industrial scale hatchery programs. Why do we continue to think that the ocean is limitless and that we will have more salmon if we just release more salmon? Why allow hatcheries to employ whatever rearing and release strategies they can “afford” to provide their releases with a survival advantage over wild fish? Why allow hatchery strays? Why spend millions of dollars to supplant wild fish with hatchery fish? Instead of joining Japan and Russia as world leaders in ocean ranching nutrient mining we must stand tall and go wild for healthy runs and healthy fisheries. We all know the key to abundant salmon is to maintain the habitat and maintain the spawners. Minimizing hatchery releases is critical to maintaining the habitat and maintaining the spawners – and completely under our control. How can a hatchery fish help a wild one?

It is time to accept and embrace Alaska’s wild stock priority. Alaska Salmon: Wild, Natural, Sustainable…or Hatchery? Stand Tall, Go Wild.

From: Robert Henrichs
To: DFG, BOF Comments (DFG sponsored)
Cc: Jack Hopkins; Mark King; Patty Schwalenberg; Kerin Kramer; Reyna Newirth
Subject: hatcheries
Date: Wednesday, October 3, 2018 11:19:06 PM

Hatcheries are a huge part of the economy of the State.
They have created thousands of jobs on fishing boats, tenders, hatcheries, processing plants and freight companies.
It is a multi million dollar industry.
We can take the lessons that we have learned from the hatcheries, and apply them to restoring the king salmon runs all over Alaska.
We can cry about it or we can shape our own destiny/
Bob “Moose” Henrichs
Founding Director of Prince William Sound Aquaculture Corp.

From: Caleb Nichols
To: DFG, BOF Comments (DFG sponsored)
Subject: BOF Special Session regarding Hatchery Production
Date: Wednesday, October 3, 2018 3:13:02 PM

To the members of the Board of Fish,

My name is Caleb Nichols and I believe it is important that I inform you who your decisions regarding a strong and sustainable hatchery program in Alaska support. This year as you are aware, the Copper River sockey salmon run was dismal. In the ten years that I have fished area E as a captain, it was the first time that I have offloaded my sockeye catch in a five gallon bucket. When the Copper River became closed due to the low sonar counts, I had the painful but necessary conversation with my wife about if we should sell our house or our boat. "The runs just late" and "the blob" was to blame were the thoughts circulating in my head, causing anxiety. My boat was still in harbor. When it became apparent that many sockeye salmon runs with the exception of the Nushigak and Main Bay (Prince William Sound PWSAC Hatchery) came in above expected. If it were not for Prince William Sound Hatchery Produced Sockeye salmon at Main Bay that I was able to harvest, you'd be seeing my boat for sale on ak list or Craigslist and my home for sale on Zillow. Thanks to Hatchery production, they are not. Please consider this in your decision and thanks for your time.

Caleb J Nichols RN
F/V Liam Joshua

Sent from my iPhone

Submitted By
Catherine Bursch
Submitted On
10/3/2018 5:19:37 AM
Affiliation
commercial fisherman

Phone
907-235-5111
Email
tcbursch@gmail.com
Address
2233 Mount Augustine Drive
Homer, Alaska 99603

I am an Alaskan resident and I have been fishing commercialy in Alaska for 35 years. I have gillnetted, seined and longlined in many different fisheries around the state.

I am concerned with the salmon hatchery system and oversight. Hatcheries are powerful tools and all Alaskans need to be able to weigh in on the effect hatcheries have on our coastlines and our shared oceans. As we begin to understand that our oceans have carrying capacities, almost all our fisheries management decisions become allocative.

As resources become more scarce, they become more coveted with increased competition for use.

As we see this scenerio unfolding with our state fisheries, I would ask the Board of Fisheries to examine and possibly rec-create a more equitable system for the people of Alaska to evaluate and weigh in on the pros and cons of salmon hatcheries.

I would caution the Board in increasing hatchery production until there is better citizen involvement and process created surrounding hatchery decisions.

Submitted By
Charlie Black
Submitted On
10/1/2018 9:51:54 AM
Affiliation

Phone
907 299 0750
Email
fvladygrace@gmail.com
Address
PO box 666
Homer, Alaska 99603

I am a commercial fisherman in Prince William Sound and depend on the area's commercial salmon fishery for my family's livelihood. 1,500 active salmon permit holders and their crew would not be able to make a living in PWS without hatchery production. Studies have shown that VFDA salmon account for 30% of PWS seiners' annual average gross earnings, while PWS seiners and gillnetters derive 64% of their gross earnings from harvesting PWSAC salmon. On many years in PWS, there would not be much fish at all if it weren't for the hatcheries.

Hatchery programs are economic drivers for Alaskan communities. Studies have shown that 74% of VFDA's commercial salmon harvest value goes to Alaskan residents, with 37% going to residents of Cordova and Valdez, 23% to the Kenai Peninsula, 9% to residents of Anchorage, and 4% combined to residents from Kodiak, Mat-Su, Sitka, and Wrangell-Petersburg. It should be noted that these hatchery fish are not just benefiting commercial fisherman. According to the McDowell Group, almost 700,000 PWSAC sockeye salmon were harvested in subsistence and personal use fisheries between 1999 and 2011, with 73% of these fish going to residents of Anchorage, Fairbanks North Star Borough, and the Matanuska-Susitna Borough. Further, VFDA hatchery production accounts for 75% of all coho and 90% of all pink salmon caught by sport fish anglers in the Valdez area, and the total sport fish economic output for VFDA is estimated at $6.6 million annually.

Finally, I wish to voice a concern about process. Convening an emergency meeting on this issue during the middle of our commercial salmon fishing is unreasonable and poor process, especially when the same petition has already been denied due to not meeting emergency criteria. The board has scheduled a discussion on hatchery production at the October 2018 work session. By holding this meeting in Anchorage on July 17, you have denied me and my fellow PWS fishermen an opportunity for meaningful participation.

PLEASE DENY THIS EMERGENCY PETITION REQUEST

Signed,

CITY AND BOROUGH OF SITKA

RESOLUTION NO. 2018-19

A RESOLUTION OF THE CITY AND BOROUGH OF SITKA SUPPORTING THE ALASKA SALMON HATCHERY PROGRAM

WHEREAS, the City and Borough of Sitka benefits greatly from the State of Alaska Salmon Hatchery Program; and

WHEREAS, Alaska's salmon hatchery program has operated for 45 years and supplements wild salmon harvests throughout the state; and

WHEREAS, Alaska's salmon hatchery program is an example of sustainable economic development that directly benefits subsistence fishermen, personal use fishermen, sport fishermen, charter fishermen, commercial fishermen, seafood processors, as well as state and local governments, which receive raw fish tax dollars; and

WHEREAS, Alaska's salmon hatchery program employs strong scientific methodology and is built upon precautionary principles and sustainable fisheries policies to protect wild salmon populations; and

WHEREAS, Alaska Department of Fish and Game regulates hatchery operations, production, and permitting through a transparent public process and multi-stakeholder development of annual management plans; and

WHEREAS, returns of hatchery and wild salmon stocks follow similar survival trends over time and the largest returns of both hatchery and wild salmon stocks have largely occurred since hatchery returns began in about 1980; and

WHEREAS, there are no stocks of concern where most hatchery production occurs, indicating that adequate escapements to wild stock systems are being met in these areas over time; and

WHEREAS, Alaska hatcheries contributed an annual average of nearly 67 million fish to Alaska's commercial fisheries in the past decade; and

WHEREAS, Alaska hatcheries accounted for 22% of the total common property commercial catch and 43% of the total ex-vessel value in the Southeast region in 2016; and

WHEREAS, a McDowell Group report identifies the economic contribution in 2017 of the Southern Southeast Regional Aquaculture Association (SSRAA) to be 680 jobs, $32 million in labor income, and $70 million in total economic output; and

WHEREAS, NSRAA's most recent 2009 McDowell Group report notes a first wholesale value of $63.3 million in 2008, with a total economic output of $100 million for that same year; and

WHEREAS, Alaska's salmon hatchery program has proven to be significant and vital to Alaska's seafood and sportfish industries and the state of Alaska by creating employment and economic opportunities throughout the state and in particular in rural coastal communities; and

WHEREAS, Alaska's salmon hatchery program is non-profit and self-funded through cost recovery and enhancement taxes on the resource and is a model partnership between private and public entities; and

WHEREAS, the State of Alaska has significantly invested in Alaska's salmon hatchery program **through the State Revolving Loan Fund** and associated research to provide for stable salmon harvests and to bolster the economies of coastal communities while maintaining a wild stock escapement priority; and

WHEREAS, Alaska salmon fisheries, including the hatchery program, continue to be certified as sustainable by two separate programs, Responsible Fisheries Management (RFM) and Marine Stewardship Council (MSC).

NOW, THEREFORE, BE IT RESOLVED by the Assembly of the City and Borough of Sitka that the City and Borough of Sitka affirms its support for Alaska's salmon hatchery programs; and

BE IT FURTHER RESOLVED that the City and Borough of Sitka supports unbiased and scientific methods to assess the interaction of Alaska's salmon hatchery programs with natural salmon stocks, such as the Alaska Hatchery-Wild Salmon Interaction Study which began in 2011 and is scheduled to conclude in 2023; and

AND, BE IT FURTHER RESOLVED that the City and Borough of Sitka calls on the Alaska Board of Fisheries to work with the hatchery community, the Alaska Department of Fish and Game and industry leaders to further its understanding of the importance of the Alaska salmon hatchery program to all Alaskans.

PASSED, APPROVED, AND ADOPTED by the Assembly of the City and Borough of Sitka, Alaska on this 25th day of September, 2018.

Matthew Hunter, Mayor

ATTEST:

Sara Peterson, MMC
Municipal Clerk
1st and final reading 9/25/18

Sponsors: Eisenbeisz and Knox

CITY AND BOROUGH OF WRANGELL

RESOLUTION NO. 09-18-1427

A RESOLUTION OF THE ASSEMBLY OF THE ASSEMBLY OF THE CITY AND BOROUGH OF WRANGELL, ALASKA, SUPPORTING THE ALASKA SALMON HATCHERY PROGRAM

WHEREAS, the City and Borough of Wrangell, and the fishermen, processors and businesses in Wrangell all benefit greatly from the State of Alaska Salmon Hatchery Program; and

WHEREAS, Alaska's salmon hatchery program has operated for 45 years and supplements wild salmon harvests throughout the state; and

WHEREAS, Alaska's salmon hatchery program is an example of sustainable economic development that directly benefits subsistence fishermen, personal use fishermen, sport fishermen, charter fishermen, commercial fishermen, seafood processors, as well as state and local governments, which receive raw fish tax dollars; and

WHEREAS, Alaska's salmon hatchery program employs strong scientific methodology and is built upon precautionary principles and sustainable fisheries policies to protect wild salmon populations; and

WHEREAS, Alaska Department of Fish and Game regulates hatchery operations, production, and permitting through a transparent public process and multi-stakeholder development of annual management plans; and

WHEREAS, returns of hatchery and wild salmon stocks follow similar survival trends over time and the largest returns of both hatchery and wild salmon stocks have largely occurred since hatchery returns began in about 1980; and

WHEREAS, there are no stocks of concern where most hatchery production occurs, indicating that adequate escapements to wild stock systems are being met in these areas over time; and

WHEREAS, Alaska hatcheries contributed an annual average of nearly 67 million fish to Alaska's commercial fisheries in the past decade; and

WHEREAS, Alaska hatcheries accounted for 22% of the total common property commercial catch and 43% of the total ex-vessel value in the Southeast region in 2016; and

WHEREAS, a McDowell Group report identifies the economic contribution in 2017 of the Southern Southeast Regional Aquaculture Association (SSRAA) to be 680 jobs, $32 million in labor income, and $70 million in total economic output; and

WHEREAS, Alaska's salmon hatchery program has proven to be significant and vital to Alaska's seafood and sportfish industries and the state of Alaska by creating employment and economic opportunities throughout the state and in particular in rural coastal communities; and

WHEREAS, Alaska's salmon hatchery program is non-profit and self-funded through cost recovery and enhancement taxes on the resource and is a model partnership between private and public entities; and

WHEREAS, the State of Alaska has significantly invested in Alaska's salmon hatchery program and associated research to provide for stable salmon harvests and to bolster the economies of coastal communities while maintaining a wild stock escapement priority; and

WHEREAS, Alaska salmon fisheries, including the hatchery program, continue to be certified as sustainable by two separate programs, Responsible Fisheries Management (RFM) and Marine Stewardship Council (MSC);

NOW, THEREFORE BE IT RESOLVED that the City and Borough of Wrangell affirms its support for Alaska's salmon hatchery programs; and

FURTHER BE IT RESOLVED that the City and Borough of Wrangell supports unbiased and scientific methods to assess the interaction of Alaska's salmon hatchery programs with natural salmon stocks, such as the Alaska Hatchery-Wild Salmon Interaction Study which began in 2011 and is scheduled to conclude in 2023; and

FURTHER BE IT RESOLVED that the City and Borough of Wrangell calls on the Alaska Board of Fisheries to work with the hatchery community, the Alaska Department of Fish and Game and industry leaders to further its understanding of the importance of the Alaska salmon hatchery program to all Alaskans.

ADOPTED: September 25, 2018

Stephen Prysunka, Vice-Mayor

ATTEST:
Kim Lane, MMC, Borough Clerk

City & Borough of Wrangell Alaska
Incorporated Borough May 30, 2008
Incorporated City June 15th 1903

CITY OF CORDOVA, ALASKA
RESOLUTION 09-18-24

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CORDOVA, ALASKA, SUPPORTING THE ALASKA SALMON HATCHERY PROGRAM

WHEREAS, the City of Cordova benefits greatly from the State of Alaska Salmon Hatchery Program; and

WHEREAS, Alaska's salmon hatchery program has operated for 45 years and supplements wild salmon harvests throughout the state; and

WHEREAS, Alaska's salmon hatchery program is an example of sustainable economic development that directly benefits subsistence fishermen, personal use fishermen, sport fishermen, charter fishermen, commercial fishermen, seafood processors, as well as state and local governments, which receive raw fish tax dollars; and

WHEREAS, Alaska's salmon hatchery program employs strong scientific methodology and is built upon precautionary principles and sustainable fisheries policies to protect wild salmon populations; and

WHEREAS, the Alaska Department of Fish and Game regulates hatchery operations, production, and permitting through a transparent public process and multi-stakeholder development of annual management plans; and

WHEREAS, returns of hatchery and wild salmon stocks follow similar survival trends over time and the largest returns of both hatchery and wild salmon stocks have largely occurred since hatchery returns began in about 1980; and

WHEREAS, there are no stocks of concern where most hatchery production occurs, indicating that adequate escapements to wild stock systems are being met in these areas over time; and

WHEREAS, Alaska hatcheries contributed an annual average of nearly 67 million fish to Alaska's commercial fisheries in the past decade; and

WHEREAS, Alaska hatcheries contributed nearly 47 million fish to the commercial fisheries and $162 million in statewide ex-vessel value in 2017; and

WHEREAS, Alaska hatcheries accounted for 57% of the total common property commercial catch and 60% of the total ex-vessel value in the Prince William Sound region in 2017; and

WHEREAS, a draft McDowell Group report on the Economic Impacts of Alaska's Salmon Hatcheries identifies the economic contribution in 2017 of the Prince William Sound hatcheries to be 2,135 jobs, $101 million in labor income, and $307 million in total economic output; and

WHEREAS, Alaska's salmon hatchery program has proven to be significant and vital to Alaska's seafood and sportfish industries and the state of Alaska by creating employment and economic opportunities throughout the state and particularly in rural coastal communities; and

WHEREAS, Alaska's salmon hatchery program is non-profit and self-funded through cost recovery and enhancement taxes on the resource and is a model partnership between private and public entities; and

WHEREAS, the State of Alaska has significantly invested in Alaska's salmon hatchery program and associated research to provide for stable salmon harvests and to bolster the economies of coastal communities while maintaining a wild stock escapement priority; and

WHEREAS, Alaska salmon fisheries, including the hatchery program, continue to be certified as sustainable by two separate programs, Responsible Fisheries Management (RFM) and Marine Stewardship Council (MSC);

NOW, THEREFORE BE IT RESOLVED that the City Council of the City of Cordova, Alaska affirms its support for Alaska's salmon hatchery programs; and

BE IT FURTHER RESOLVED that the City Council of the City of Cordova, Alaska supports unbiased and scientific methods to assess the interaction of Alaska's salmon hatchery programs with natural salmon stocks, such as the Alaska Hatchery-Wild Salmon Interaction Study which began in 2011 and is scheduled to conclude in 2023; and

BE IT FURTHER RESOLVED that the City Council of the City of Cordova, Alaska calls on the Alaska Board of Fisheries to work with the hatchery community, the Alaska Department of Fish and Game and industry leaders to further its understanding of the importance of the Alaska salmon hatchery program to all Alaskans.

PASSED AND APPROVED THIS 19th DAY OF SEPTEMBER 2018.

CITY OF CORDOVA CORPORATE SEAL JULY 8, 1909 ALASKA

ATTEST:

Clay R. Koplin, Mayor

ATTEST:

Susan Bourgeois, CMC, City Clerk

Susan Bourgeois, CMC, City Clerk

Submitted By
Mayor Tim O'Connor
Submitted On
10/3/2018 7:56:52 AM
Affiliation
City of Craig

Phone
907-826-3275
Email
mayor@craigak.com
Address
PO box 725
Craig, Alaska 99921

Dear Alaska Board of Fisheries members:

The City of Craig supports existing hatchery production of salmon efforts in Alaska.

Alaska's salmon hatchery program has operated for 45 years and supplements wild salmon harvests throughout the state. Residents of Craig benefit measurably from salmon hatchery production in the region. That production is sustainable economically and biologically, and provides benefits to all gear groups, seafood processors, and communities.

Alaska's salmon hatchery program employs strong scientific methodology and is built upon precautionary principles and sustainable fisheries policies to protect wild salmon populations. The Alaska Department of Fish and Game regulates hatchery operations, production, and permitting through a transparent public process and multi-stakeholder development of annual management plans. To that end, the city supports unbiased and scientific methods to assess the interaction of Alaska's salmon hatchery programs with natural salmon stocks, such as the Alaska Hatchery-Wild Salmon Interaction Study which began in 2011 and is scheduled to conclude in 2023

For its part, the City of Craig financially supports hatchery production of salmon locally. The city participates using cash and in-kind contributions through a cooperative agreement with the Southern Southeast Regional Aquaculture Association in the production of king salmon and chum salmon.

I will note here that returns of hatchery and wild salmon stocks follow similar survival trends over time; the largest returns of both hatchery and wild salmon stocks have largely occurred since hatchery returns began in about 1980. There are no stocks of concern where most hatchery production occurs. Adequate escapements to wild stock systems are being met in these areas over time.

Alaska hatcheries contributed an annual average of nearly 67 million fish to Alaska's commercial fisheries in the past decade. Those hatcheries accounted for 22% of the total common property commercial catch and 43% of the total ex-vessel value in the Southeast region in 2016.

I encourage the Board of Fisheries to work with regional aquaculture associations, ADF&G, and fishing industry groups to build recognition of the need to appreciate the benefits of hatchery production and the considerable investment it represents.

Sincerely,

Mayor Tim O'Connor, City of Craig

October 2, 2018

Department of Fish and Game
Fax No. 907-465-6094

Hatchery's are not the problem in my opinion. Mid water trawlers harvest a lot of King Salmon as Bycatch as I understand. Yet only 30% of the trawl fleet has human observers on board. It is my understanding they are getting better at not catching Kings, another problem I see is catch and release, molesting spawning salmon in river, anchors drug through spawning beds and outboard motors.

I don't see any reports of Pink Salmon Bycatch by mid water trawlers, so it seems to me that if Pink Salmon were competing with Kings for food they would be caught by the mid water trawlers. No reports of that. No way to remove drugs that pass through sewage treatment plants into our oceans. Hatchery or wild strays salmon that don't return to river of origin, it is one of the ways salmon populate.

The Unalakleet River got a sockeye run no one complained about that. Years ago I was with Lowel Anagik on the Unalakleet River and I saw several sockeye salmon pairs there, Lowel told me there never used to be any sockeyes there and people were happy to have another food source.

Sustainability: the Kenai/Kasilof drainages are a zoo during the summer months; I only go there in September and October on week days even then certain places get crowded. Known King Salmon spawning areas should be closed to all boat traffic and all fishing once the salmon are paired up and nesting. I also feel the number of people on these waters need to be limited/reduced on years like 2018. I feel it will take several decades for the "big" (>50 lbs) King run's to recover.

Sincerely,

Dan Mclean
Born in the territory of Alaska…
living in Homer

Submitted By
Dianne Dubuc
Submitted On
10/3/2018 2:28:47 PM
Affiliation

Phone
907-491-1328
Email
florette@arctic.net
Address
POB 584
Seward, Alaska 99664

I believe the current managemant plan for hatcheries leaves the public out of the process as only ADF&G and the hatchery managers are at the table.

I am also concerned about the carrying capacity of our oceans.

I would like to show my support for the Hatcherry Committee 5AAC 39.222 Sustainable Salmmon Fishery Policy and thank the board for considering this very important and timely issue.

From: elisay kuzmin
To: DFG, BOF Comments (DFG sponsored)
Subject: Hatchery Fishing
Date: Wednesday, October 3, 2018 5:32:09 PM

As a PWS gillnet fisherman of 20 years I oppose shutting down production of the hatcheries. If it wasn't for hatchery fishing me and my family would be relying on welfare a long time ago.

Sent from my iPhone

Gale K. Vick
Fairbanks, Alaska 99709

COMMENTARY TO THE ALASKA BOARD OF FISHERIES
October 3, 2018
Regarding Alaska salmon hatchery production

My name is Gale Vick. I am a 50 year resident of Alaska, a former drift gillnetter in Prince William Sound, and for 27 years I have owned a business related to community fisheries policy. I have worked on salmon, crab, groundfish, and halibut issues. I have worked on commercial, subsistence and sports charter issues. I am currently working within the Yukon River drainage and I am on a SASAP team, a collaboration of scientists from all over the Pacific Coast, including Canada and Alaska, looking at salmon decline drivers. I was recently a member of a MAFAC subcommittee regarding aquaculture policy *only because I wanted to understand what the rest of the country was doing and what might constitute threats to Alaska.*

I am speaking today on behalf of myself and my very large extended family to address the need to have an institutionalized hatchery review process, on an on-going basis, at the Alaska Board of Fisheries.

My first caution is that all species of salmon in Alaska are in obvious trouble, with the exception of Bristol Bay sockeye. You do not need to be a scientist to fully appreciate this. Most of us who have fished all over the state know, for instance, that Chinook salmon abundance and size is dramatically decreasing. Our science supports this and our trajectories suggest that we have not hit bottom yet.

I had sort of an epiphany working on that MAFAC subcommittee. I realized that the rest of the world looked at our hatchery system as no different than the hatchery systems of Washington, Oregon or California. I started reading tremendous amounts of material about hatcheries in those areas, who had developed hatcheries for similar reasons Alaska has, to augment natural runs. Unfortunately, in most states, including the Canadian coast, hatchery and fish farm productions have been the public's default action when the modern world had so decimated wild salmon passage and habitat. And unfortunately, those states are now concerned with the unintended consequences of hatchery production.

We think of Alaska as the world's last stronghold of wild salmon. We think that our support systems are unique and that we are not going to fall prey to the problems of other places. And we are wrong. Of course we can have the same problems, some of which are human caused and some of which are environmental and may indirectly be or not be human-caused. It is just that we haven't hit the magnitude of those problems yet… but we could. We are well on our way. Our support systems and safeguards are not nearly as strong as people might think.

Even though, for the most part, in Alaska, we have not decimated our wild salmon passage by massive dams and channel diversions, etc., we have taken far too much for granted that our wild stocks will overcome our lapses of knowledge or our hubris. As well regulated as Alaska's fisheries are, we may have inadvertently helped the decline of salmon stocks, particularly Chinook - by gear type, lack of research, lack of enumeration in key spawning streams, lack of meeting our escapement goals, lack of monitoring quality of escapement, some intermittent poor management decisions, and an unknown factor of hatchery impacts.

Despite what occurs out in the ocean, or maybe because of it, our wild salmon need all the protections we can give them in protecting their passage and habitat, in helping them get to spawning grounds in sufficient numbers, monitoring sex ratios and year classes. And they need our protection in mitigating some of the key impacts of hatchery production.

Alaska has had salmon hatcheries since Territorial days. But we did not start operating commercial hatcheries, after statehood, until the 1970's. To my knowledge, we have never done a comprehensive EIS of any of our hatcheries. That would be going on 60 years.

I read and appreciate the hatchery annual enhancement reports. I learn a lot from these. For instance, in the 2016 report, the hatchery percentage of commercial harvest was 22%, with the ex-vessel value of the commercial hatchery harvest at $85million dollars, the lowest since 2005. While it spiked in 2017, I can only imagine the 2018 report will be significantly lower. I often wonder what triggers hatcheries have to increase egg production in low abundance? While that is my ignorance showing, it leads to a greater question.

Because we have virtually operated with a fully integrated system and have not had independent on-going or even intermittent hatchery review, we find ourselves becoming more reliant economically on hatchery-produced salmon without benefit of knowing the real impacts to wild salmon. We can't seem to have a dialogue about this without pitting the needs of salmon against all the other factors of hatchery economic contribution to the state. That is not the contrast we need to draw.

I see a lot of unanswered questions. Chief among them:

(1) Does the Alaska hatchery system have sufficient independent oversight?
(2) Have hatchery salmon compromised wild production?
(3) Have we over-reached the production of hatchery fish in relation to original requirements for limitations?
(4) What do hatchery fish extract from an ecosystem without contributing back to it?
(5) How have hatchery fish affected wild fish genetics where hatchery fish have strayed?
(6) Are we looking at the best science?
    a. Considering that we have extremely limited science on hatchery impacts of wild stock, maybe the better question is – what science do we need?
    b. Has hatchery production contributed to the decline of stocks overall?

I have many questions about the cost/benefits ratio of hatchery production but that is a separate issue. Our first responsibility is to protect our wild salmon as separate from hatchery stock. However, the perceived net benefit to the state from a hatchery system is the driver in much of our policy and politics. Therefore, it would seem that we would want to fully understand the true costs of hatchery production and the true impacts.

(7) What are the *real* costs of hatchery production? Both start-up and operational?
    a. How does that change according to geography?
    b. Who pays those costs and how?
(8) What are the true economic benefits to Alaska from hatchery production?
    a. The benefits *to Alaska fishermen and Alaska processors* vs the costs of production to PNPs
    b. The benefit of sports stocking vs. commercial production

I know there is a current study in Prince William Sound regarding some of these questions, which may or may not get answered. But, regardless of the outcome, my *summary recommendations are:*

(1) Institutionalize a subcommittee of the Alaska Board of Fisheries or a Committee-of-the-Whole that operates within the BOF cycle to review hatchery production in relation to state requirements for wild fish protection on a regular basis
(2) Put together a team of non-hatchery related scientists, tribal fishermen, and others to provide oversight review recommendations to the Board of Fisheries
(3) Create a dialogue that puts the needs of Alaska's wild salmon *before every other consideration, including any economic benefits to fishermen or processors or others*

I have a high regard for most of our fishery management, but understanding the real impacts of hatchery production will help us all to reach agreements and policies that better protect wild stock. And right now, they need all the protections they can get.

And we cannot, should not, look to hatchery production as our default for loss of wild stock because that might be a contributing factor. Just take lessons from the Pacific Northwest.

From:	Casey Campbell
To:	DFG, BOF Comments (DFG sponsored)
Subject:	Board of Fish Comments
Date:	Wednesday, October 3, 2018 1:48:52 PM
Attachments:	Alaska Hatchery Impacts, Executive Summary.pdf

Dear Chairman Jensen and Board of Fisheries Members,
The following hatchery operators would like to submit the attached document as public comment related to ACR #1 and ACR #2.

- Southern Southeast Regional Aquaculture Association
- Armstrong-Keta
- Douglas Island Pink and Chum, Inc.
- Northern Southeast Regional Aquaculture Association
- Prince William Sound Aquaculture Corporation
- Valdez Fisheries Development Association. Inc.
- Cook Inlet Aquaculture Association
- Kodiak Island Aquaculture Association

The attached document is an executive summary of the economic impact of the Alaska hatchery program, a full report will be available to those interested. We feel this information is important to further understanding the Alaska hatchery program and has been referenced in several comments submitted to the board.

We appreciate you considering this important information.

Kind Regards,

Casey Campbell
General Manager/CEO
Prince William Sound Aquaculture Corporation
casey.campbell@pwsac.com

Developing Sustainable Fisheries for Alaska and the World

ECONOMIC IMPACT OF ALASKA'S SALMON HATCHERIES

EXECUTIVE SUMMARY

OCTOBER 2018

PREPARED FOR

- Southern Southeast Regional Aquaculture Association
- Armstrong-Keta
- Douglas Island Pink and Chum, Inc.
- Northern Southeast Regional Aquaculture Association
- Prince William Sound Aquaculture Corporation
- Valdez Fisheries Development Association, Inc.
- Cook Inlet Aquaculture Association
- Kodiak Island Aquaculture Association

PREPARED BY

McDowell GRO

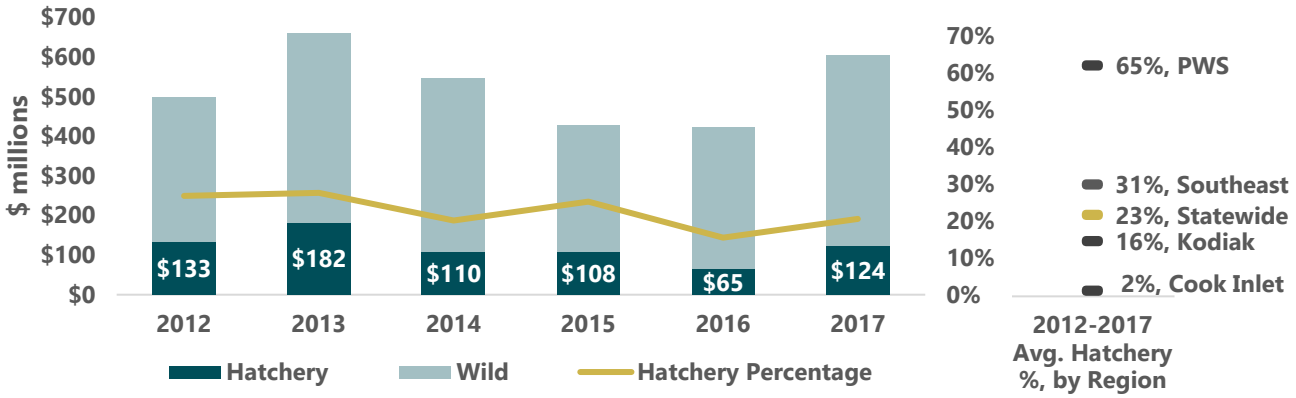
Executive Summary

Alaska's salmon hatcheries contribute nearly a quarter of the value of our state's salmon harvests and generate $600 million in economic output, with impacts throughout the economy. The scope of this report includes Alaska's eight private, nonprofit hatchery associations, including impacts resulting from hatchery-produced salmon as well as hatchery operations. Data sources include ADF&G, hatcheries, CFEC, DOLWD, and IMPLAN. Commercial harvest and processing data presented reflect annual averages across the six-year period 2012-2017. Sport harvest and related data reflects 2012-2016 averages due to a lag in ADF&G data availability.

Common Property Ex-Vessel Volume and Value

- Over the study period, commercial fishermen harvested an annual average of 222 million pounds of hatchery-produced salmon worth $120 million in ex-vessel value.
- Chum and pink salmon are the most important species – responsible for 39 and 38 percent of ex-vessel value, respectively – followed by sockeye (16 percent), coho (4 percent), and Chinook (2 percent).
- More than half of hatchery salmon ex-vessel value went to seiners (57 percent). Gillnetters pulled in 38 percent, while trollers caught 5 percent of hatchery ex-vessel value over the study period.
- Regionally, Prince William Sound (PWS) harvests of hatchery salmon generated $69 million in ex-vessel value annually. Southeast harvests earned fishermen $44 million on average, followed by Kodiak ($7 million) and Cook Inlet ($0.5 million) harvests. It should be noted that Cook Inlet Aquaculture Association (CIAA) is currently building up their pink production and the full impact of these additional investments will not be seen for several more years. In addition, CIAA maintains several flow control structures and a fish ladder – efforts that lead to additional (though unquantifiable) salmon production.
- As a percentage of statewide harvest value, hatchery-derived salmon represents 22 percent of total salmon ex-vessel value over the study period. This percentage ranged from a high of 28 percent in 2013 to a low of 15 percent in 2016. Hatchery contribution was highest in PWS (65 percent) over the study period, followed by Southeast (31 percent), Kodiak (16 percent), and Cook Inlet (2 percent).

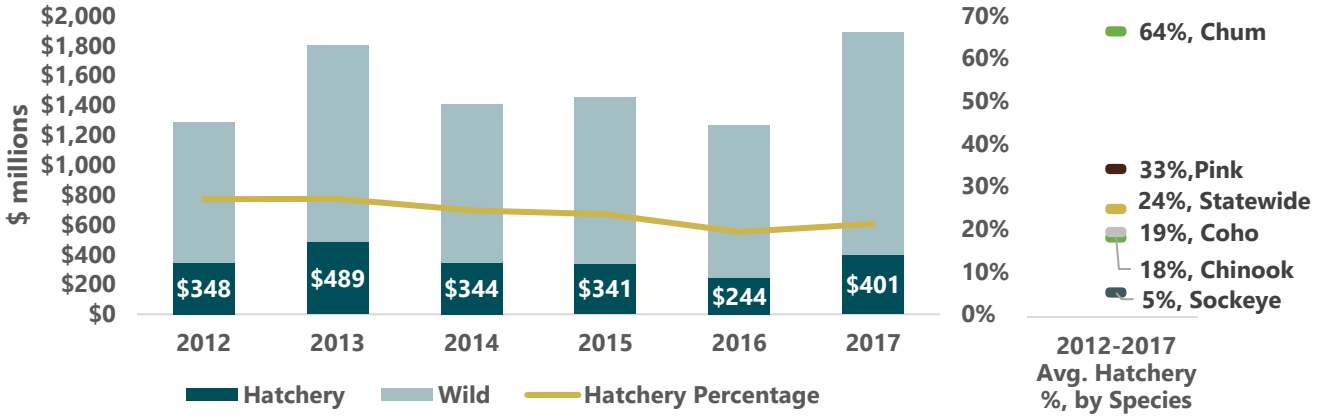
Hatchery Contribution to Ex-Vessel Value of Alaska's Salmon Harvests, 2012-2017



First Wholesale Value

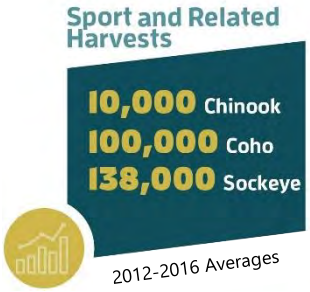
- The first wholesale value – the value of raw fish plus the value added by the first processor – of hatchery-produced salmon averaged $361 million annually across the study period.
- Nearly four-fifths (79 percent) of hatchery-produced first wholesale value is estimated to come from common property fisheries, with the remainder deriving from cost recovery harvests.
- Hatchery-derived first wholesale value represents 24 percent of total statewide salmon first wholesale value over the study period. By species, nearly two-thirds of chum, one-third of pink, and close to two-fifths of coho (19 percent) and Chinook (18 percent) wholesale production value was derived from hatchery salmon over the study period.

Hatchery Contribution to First Wholesale Value of Alaska Salmon Products, 2012-2017



Sport/Personal Use/Subsistence

- Coho, Chinook, and sockeye salmon are the most important hatchery-produced species for sport, personal use, and subsistence harvests. These species are produced in smaller numbers compared to pink and chum but are much more valuable on a per fish basis.
- On average, about 10,000 hatchery-origin Chinook, 5,000 chum, 100,000 coho, 19,000 pink, and 138,000 sockeye salmon were harvested annually in sport and related fisheries over the study period. These numbers are considered conservative due to limited sampling of sport and related harvests for origin (hatchery/non-hatchery), among other factors.



- Sport harvests accounted for over 99 percent of the sport/personal use/subsistence harvest of hatchery-produced coho and Chinook. By contrast, most non-commercial hatchery sockeye were harvested by personal use and subsistence fishermen (80 percent), with only 20 percent caught by sport fishermen.
- As a percentage of statewide sport-caught fish, hatchery-origin salmon accounted for 17 percent of sport coho harvests, 13 percent of sport sockeye harvests, and 8 percent of sport Chinook harvests.

Economic Impacts

- Alaska's salmon hatcheries account for the annual equivalent of 4,700 jobs and $218 million in total labor income, including all direct, indirect, and induced economic impacts. A total of $600 million in annual economic output is connected to Alaska salmon hatchery production.
- The employment impact of 4,700 jobs is an annualized estimate. The number of people who earn some income from the harvest of hatchery-produced salmon is several times the annual average. More than 16,000 fishermen, processing employees, and hatchery workers can attribute some portion of their income to Alaska's salmon hatchery production. Thousands of additional support sector workers earn wages connected to Alaska hatchery production.
- The economic footprint of Alaska's hatcheries includes $95 million in labor income associated with commercial fishing, $82 million in labor income associated with processing, and $25 million connected to hatchery operations.
- Non-resident sport harvest of hatchery salmon accounts for $16 million in annual labor income created directly or indirectly by Alaska's hatcheries. This number is limited to impacts resulting from non-resident sport harvest of hatchery salmon and should be considered conservative. Clearly, resident sport/personal use/subsistence harvests of hatchery salmon have additional economic impacts as well as very significant social and cultural impacts in Alaska.
- Southeast Alaska hatcheries account for 2,000 jobs (annualized), $90 million in labor income, and $237 million in total annual output, including all multiplier effects.
- Prince William Sound hatcheries account for 2,200 jobs, $100 million in labor income, and $315 million in total annual output, including all direct, indirect, and induced effects.

Total Annual Statewide Economic Impact of Alaska Salmon Hatcheries

	Direct Impacts	Indirect & Induced Impacts	Total Economic Impacts
Commercial Fishing			
Employment	1,040	500	1,540
Labor Income	$70.9 million	$23.5 million	$94.4 million
Seafood Processing			
Employment	1,360	820	2,180
Labor Income	$52.2 million	$29.5 million	$81.7 million
Hatchery Operations			
Employment	345	270	615
Labor Income	$15.5 million	$9.3 million	$24.8 million
Non-resident Sport Fishing			
Employment	285	90	375
Labor Income	$10.5 million	$5.7 million	$16.2 million
Total Economic Impact			
Employment	**3,030**	**1,680**	**4,710**
Labor Income	**$149.1 million**	**$68.1 million**	**$217.2 million**
Output	**$386.1 million**	**$216.0 million**	**$602.1 million**

Kachemak Bay Conservation Society
3734 Ben Walters Ln, Homer, AK 99603
907 235.8214
kbayconservation@gmail.com

Submitted Electronically

October 2, 2018

Dfg.bof.comments@alaska.gov

Ref. Support for Hatchery Committee 5AAC5 39.222

Sustainable Fishery Policy

To Alaska Board of Fish

Greetings,

Kachemak Bay Conservation Society (KBCS) is a thirty-five year old nonprofit based in Homer, Alaska. Our mission is to protect the environment of the Kachemak Bay region and greater Alaska by encouraging sustainable use and stewardship of natural resources through advocacy, education, information, and collaboration.

We applaud the board of fisheries proceeding with an open and transparent public process sorely needed to address the hatchery issues in the state of Alaska.

KBCS agrees with the need to gather information on hatcheries and pursue science driven projects to answer pressing questions and agree strongly with creation of a Hatchery Committee. We feel this way for the following reasons:

1. This hatchery committee needs an external scientific review to gain the best available scientific information and ensure the environmental impact of these hatchery activities does not damage the public trust wild fish resources of the state.

2. The grave uncertainty of effects to the food web from the sheer magnitude of introduced fish into the marine ecosystems requires the BOF to assess these effects and interactions as per the Sustainable Salmon Fisheries Policy For The State Of Alaska 5 AAC 39.222

3. To ensure the wild fish priority, statues, regulations and policy mandates are being upheld

4. Risk to wild fish from hatchery interaction is kept to a minimum

5. We understand adding this issue to your very full plate will require additional funding and we will be contacting our legislators to ask for support.

Thank you for fulfilling your oversight responsibility of hatcheries at this critical level, per your regulatory authority.

Kachemak Bay Conservation Society
3734 Ben Walters Ln, Homer, AK 99603
907 235.8214
kbayconservation@gmail.com

In conclusion, KBCS has concerns regarding the effects hatchery fish have on wild fish stocks. In addition, the time has come for collaboration with all sources to better understand the effects of the massive hatchery releases on the North Pacific. . The adverse effects from climate change & warming waters need to be understood along with ocean acidification.

From all KBCS members, young and old, we implore you to move swiftly on hatchery questions and attempt to preserve wild fish stocks for future generations.

Respectfully,

Roberta Highland

President, Kachemak Bay Conservation Society

From: kayley
To: DFG, BOF Comments (DFG sponsored)
Subject: Hatcheries of Prince William Sound
Date: Wednesday, October 3, 2018 5:09:17 PM

My name is Kayley Babic, I am a fourth generation fisherwoman of Prince William Sound & The Copper River flats. Me and my brothers grew up fishing on our father and grandfathers boats learning the ways of the wild Alaskan waters . The majority of our seine fleets livelihoods are directly correlated with the hatcheries located in the Sound. I believe that the world and America is on the precipice of realizing what has gone wrong with our food industries (GMOs, pesticides, preservatives, etc.) and what is acceptable in standards to feed our growing families and the next generation of people. Wild Salmon is an exceptional organic food source that should be shared with all. It is incredibly important to the future of Alaskans, and the future of our rural communities to keep funding these hatcheries.
But also to help them have the best returns possible in order to sustain livelihoods of thousands of families and to spread the health and wealth of Wild Alaskan Salmon. It is vital to our economy, as a state and as the last frontier to not only maintain the standard of having the best wild salmon in the world, but to supply an abundance of these fish as well. Spreading the love of salmon, the love of real food, and the love of Alaska with the rest of the world is what we are all about and hope to continue our ways. Funding these hatcheries is crucial to our future. Thank you -
Kayley Babic
Sent from my iPhone

Sent from my iPhone

From: Between Beaches Alaska
To: DFG, BOF Comments (DFG sponsored)
Subject: Hatchery comment
Date: Wednesday, October 3, 2018 4:55:17 PM

Kristi McLean
Re: Support for hatchery committee 5 AAC 39.222 Sustainable salmon fishery policy

I appreciate the board of fisheries looking into this and taking the time to address this issue and listening to fisherman like myself. We have to keep unnatural ways of reproducing salmon in our state to a minimum and make sure that the hatchery fish aren't contributing negatively.

I was born and raised in Alaska and have been in the fisheries for over 45 years. My family fished together and continue to participate in the fishery. I lived it, breathed it, and can look back at how things have changed and truly believe this is having an affect on our fishery.

The hatchery pink salmon are ruining our set net fishery in Kachemak Bay. Essentially the red salmon fishery has been replaced with a hatchery pink salmon fishery to benefit a small handful of fishermen. This strongly affects us 30 set netters who live locally year round here in Kachemak Bay.

This year there were just too many hatchery pinks to make the effort to continue fishing worth it. Because of our gear type, we hand pick our fish and because of the flooding of these hatchery pinks in our nets we had to quit fishing early the past few years.

Also, I believe these hatchery fish are affecting the food source of our wild fish, and we are noticing a size decrease of our wild stocks. This has forced us to invest in smaller mesh sized nets to catch the smaller reds, which in turn catches more of the pink salmon.

Another concern is the straying issue I witnessed in 2017 here at Kasitsna Bay. We had so many dead rotting pinks on our beach that were tested and shown to be from a PWS hatchery that we had to scrape them down the beach to get the smell away from the house.

Kachemak bay fishery is in a designated critical habitat area and to assure this natural wild stock fishery will stay healthy and will be around for future generations is basically what the decision you are making will decide. Please keep hatchery fish to a minimum.

Thank you for your time,

Kristi Mclean

Submitted By
Mike Mahoney
Submitted On
10/3/2018 2:16:24 PM
Affiliation

Phone
907 429 5405
Email
mjmahoney22@hotmail.com
Address
PO box 2416
Block 1, lot 13 Hartney Bay
Cordova, Alaska 99574

Dear Board of Fish,

The state hatchery program benefits all user groups and is vital to the health of of coastal fishing economies. As a Cordova resident and an area E salmon gill net permit holder for the past 18 years I can honestly say I would not be in business today if there were no hatcheries producing salmon in PWS. There is no evidence that hatchery fish are damaging our wild stocks. Let's continue to manage our resources using the best science available to us . I support more research being done to assess the true impact of hatchery and wild fish interaction, but arbitrarily shutting down hatchery production will have terrible consequences for the commercial fleet and all user groups. Thank you.

Mike Mahoney

NATIVE VILLAGE OF AFOGNAK
RESOLUTION NUMBER 2018-14

IN SUPPORT OF THE ALASKA SALMON HATCHERY PROGRAM

WHEREAS, subsistence fishing is important to the members of the Native Village of Afognak; and

WHEREAS, the State of Alaska has increasingly emphasized the importance of tribal consultation for state agencies; and

WHEREAS, tribes are stakeholders in Alaska's fisheries as changes in policy have direct impacts on tribal members who subsist and otherwise rely on fish for the health of their families and communities; and

WHEREAS, members of the Native Village of Afognak benefit greatly from the State of Alaska Salmon Hatchery Program; and

WHEREAS, Alaska's salmon hatchery program has operated for 45 years and supplements wild salmon harvests throughout the state; and

WHEREAS, Alaska's salmon hatchery program is an example of sustainable economic development that directly benefits subsistence fishermen, personal use fishermen, sport fishermen, charter fishermen, commercial fishermen, seafood processors, as well as state and local governments, which receive raw fish tax dollars; and

WHEREAS, Alaska's salmon hatchery program employs strong scientific methodology and is built upon precautionary principles and sustainable fisheries policies to protect wild salmon populations; and

WHEREAS, Alaska Department of Fish and Game regulates hatchery operations, production, and permitting through a transparent public process and multi-stakeholder development of annual management plans; and

WHEREAS, returns of hatchery and wild salmon stocks follow similar survival trends over time and the largest returns of both hatchery and wild salmon stocks have largely occurred since hatchery returns began in about 1980; and

WHEREAS, there are no stocks of concern where most hatchery production occurs, indicating that adequate escapements to wild stock systems are being met in these areas over time; and

WHEREAS, Alaska hatcheries contributed an annual average of nearly 67 million fish to Alaska's commercial fisheries in the past decade and account for 22% of the total common property commercial catch; and

WHEREAS, the Kodiak Regional Aquaculture Association (KRAA), headquartered in Kodiak, produced 3.2 million pink salmon (53%) of a total return of 6 million to the Kodiak Management Area in 2018; and whereas the preliminary ex-vessel value of the Kodiak hatchery pink salmon in 2018 is estimated to be approximately $4.7 million; and

WHEREAS, the Kodiak Regional Aquaculture Association (KRAA) production resulted in $7 million from hatchery production between 2012 and 2017, and over $3 million on an annual average between 2003 and present; and

WHEREAS, preliminary ex-vessel values indicate chum, sockeye, and coho salmon produced by Kodiak Regional Aquaculture Association will contribute an additional estimated $2 million to the commercial fishery of Kodiak in 2018; and

WHEREAS, the Kodiak Regional Aquaculture Association production results in over 3 million dollars annually in ex-vessel value, contributing significant economic benefits to local user groups, municipalities, and businesses; and

WHEREAS, the economic contributions of Kodiak Regional Aquaculture Association (KRAA) to the Kodiak management region resulted in 43 jobs, $1.8 million in labor income, and almost $1 million in total economic output in 2017; and

WHEREAS, Alaska's salmon hatchery program has proven to be significant and vital to Alaska's seafood and sportfish industries and the state of Alaska by creating employment and economic opportunities throughout the state and in particular in rural coastal communities; and

WHEREAS, Alaska's salmon hatchery program is non-profit and self-funded through cost recovery and enhancement taxes on the resource and is a model partnership between private and public entities; and

WHEREAS, the State of Alaska has significantly invested in Alaska's salmon hatchery program and associated research to provide for stable salmon harvests and to bolster the economies of coastal communities while maintaining a wild stock escapement priority; and

WHEREAS, Alaska salmon fisheries, including the hatchery program, continue to be certified as sustainable by two separate programs, Responsible Fisheries Management (RFM) and Marine Stewardship Council (MSC);

WHEREAS, Kodiak fisheries have been the target of recent Agenda Change Requests at the Alaska Board of Fisheries claiming it is an intercept fishery by others in Bristol Bay, Chignik, and Cook Inlet;

NOW THEREFORE BE IT RESOLVED, that the Native Village of Afognak affirms its support for Alaska's salmon hatchery programs; and

FURTHER BE IT RESOLVED, that the Native Village of Afognak supports unbiased and scientific methods to assess the interaction of Alaska's salmon hatchery programs with natural salmon stocks, such as the Alaska Hatchery-Wild Salmon Interaction Study which began in 2011 and is scheduled to conclude in 2023; and

FURTHER BE IT RESOLVED, that the Native Village of Afognak calls on the Alaska Board of Fisheries to work with the hatchery community, the Alaska Department of Fish and Game and industry leaders to further its understanding of the importance of the Alaska salmon hatchery program to all Alaskans.

NATIVE VILLAGE OF AFOGNAK

By: _____

Meagan Christiansen, Chairman
Native Village of Afognak Tribal Council

ATTESTATION

The foregoing Resolution was adopted by telephone poll of the NVA, on October 2, 2018 in Kodiak Alaska, during which all available members were polled and a quorum was achieved, by a vote of 7 FOR and 0 AGAINST, with 0 Abstentions.

By: Natasha M. Hayden

Natasha Hayden, Secretary
Native Village of Afognak Tribal Council

NATIVE VILLAGE OF PORT LIONS
PORT LIONS TRADITIONAL TRIBAL COUNCIL

RESOLUTION NO.: 2018-15R
A Resolution in Support of the Alaska Salmon Hatchery Program

WHEREAS, the Native Village of Port Lions is a federally recognized Indian Tribe as defined in Section 3(c) of the Alaska Native Claims Settlement Act, as amended; and

WHEREAS, the Port Lions Traditional Tribal Council is the governing body of the Native Village of Port Lions; and

WHEREAS, subsistence fishing is important to the members of the Native Village of Port Lions; and

WHEREAS, the State of Alaska has increasingly emphasized the importance of tribal consultation for state agencies; and

WHEREAS, tribes are stakeholders in Alaska's fisheries as changes in policy have direct impacts on tribal members who subsist and otherwise rely on fish for the health of their families and communities; and

WHEREAS, members of the Native Village of Port Lions benefit greatly from the State of Alaska Salmon Hatchery Program; and

WHEREAS, Alaska's salmon hatchery program has operated for 45 years and supplements wild salmon harvests throughout the state; and

WHEREAS, Alaska's salmon hatchery program is an example of sustainable economic development that directly benefits subsistence fishermen, personal use fishermen, sport fishermen, charter fishermen, commercial fishermen, seafood processors, as well as state and local governments, which receive raw fish tax dollars; and

WHEREAS, Alaska's salmon hatchery program employs strong scientific methodology and is built upon precautionary principles and sustainable fisheries policies to protect wild salmon populations; and

WHEREAS, Alaska Department of Fish and Game regulates hatchery operations, production, and permitting through a transparent public process and multi-stakeholder development of annual management plans; and

WHEREAS, returns of hatchery and wild salmon stocks follow similar survival trends over time and the largest returns of both hatchery and wild salmon stocks have largely occurred since hatchery returns began in about 1980; and

WHEREAS, there are no stocks of concern where most hatchery production occurs, indicating that adequate escapements to wild stock systems are being met in these areas over time; and

WHEREAS, Alaska hatcheries contributed an annual average of nearly 67 million fish to Alaska's commercial fisheries in the past decade and account for 22% of the total common property commercial catch; and

WHEREAS, the Kodiak Regional Aquaculture Association (KRAA), headquartered in Kodiak, produced 3.2 million pink salmon (53%) of a total return of 6 million to the Kodiak Management Area in 2018; and whereas the preliminary ex-vessel value of the Kodiak hatchery pink salmon in 2018 is estimated to be approximately $4.7 million; and

WHEREAS, the Kodiak Regional Aquaculture Association (KRAA) production resulted in $7 million from hatchery production between 2012 and 2017, and over $3 million on an annual average between 2003 and present; and

WHEREAS, preliminary ex-vessel values indicate chum, sockeye, and coho salmon produced by Kodiak Regional Aquaculture Association will contribute an additional estimated $2 million to the commercial fishery of Kodiak in 2018; and

WHEREAS, the Kodiak Regional Aquaculture Association production results in over 3 million dolla[illegible] vessel value, contributing significant economic benefits to local user groups, municipalities, and busin[illegible]; and

WHEREAS, the economic contributions of Kodiak Regional Aquaculture Association (KRAA) to the Kodiak management region resulted in 43 jobs, $1.8 million in labor income, and almost $1 million in total economic output in 2017; and

WHEREAS, Alaska's salmon hatchery program has proven to be significant and vital to Alaska's seafood and sportfish industries and the state of Alaska by creating employment and economic opportunities throughout the state and in particular in rural coastal communities; and

WHEREAS, Alaska's salmon hatchery program is non-profit and self-funded through cost recovery and enhancement taxes on the resource and is a model partnership between private and public entities; and

WHEREAS, the State of Alaska has significantly invested in Alaska's salmon hatchery program and associated research to provide for stable salmon harvests and to bolster the economies of coastal communities while maintaining a wild stock escapement priority; and

WHEREAS, Alaska salmon fisheries, including the hatchery program, continue to be certified as sustainable by two separate programs, Responsible Fisheries Management (RFM) and Marine Stewardship Council (MSC);

WHEREAS, Kodiak fisheries have been the target of recent Agenda Change Requests at the Alaska Board of Fisheries claiming it is an intercept fishery by others in Bristol Bay, Chignik, and Cook Inlet;

THEREFORE BE IT RESOLVED that the Native Village of Port Lions affirms its support for Alaska's salmon hatchery programs; and

FURTHER BE IT RESOLVED that the Native Village of Port Lions supports unbiased and scientific methods to assess the interaction of Alaska's salmon hatchery programs with natural salmon stocks, such as the Alaska Hatchery-Wild Salmon Interaction Study which began in 2011 and is scheduled to conclude in 2023; and

FURTHER BE IT RESOLVED that the Native Village of Port Lions calls on the Alaska Board of Fisheries to work with the hatchery community, the Alaska Department of Fish and Game and industry leaders to further its understanding of the importance of the Alaska salmon hatchery program to all Alaskans.

CERTIFICATION:
We, the undersigned members of the Port Lions Traditional Tribal Council, do hereby certify that the foregoing resolution was duly adopted by the Port Lions Traditional Tribal Council, on the 2 day of October, 2018 with a quorum present and 5 votes for, 0 votes against, and 0 abstaining.

Nancy M Nelson
Nancy Nelson, President

Lester Lukin Jr., Vice-President

Submitted By
Nicholas Crump
Submitted On
10/2/2018 11:29:43 PM
Affiliation
PWS Seiner

Phone
9078316020
Email
nicholaswcrump@gmail.com
Address
PO Box 321
Valdez, Alaska 99686

Distinguished members of the Alaska Board of Fisheries,

My name is Nicholas Crump, I am a Commercial Salmon Seiner in Prince William Sound, and I am writing you in hopes of defending our Hatcheries. As a young boy I watched my father struggle through the oil spill, increased competition from salmon farming, and many other challenges of his time. Through hard work and dedication he persevered and successfully supported our family. Now it appears that defending our enhanced fisheries hatchery system will be one of the many challenges my generation will face.

Although there have been many highs and lows, Commercial Fishing has been good to me. I used the money I saved from working as a crewman to pay my way through college and eventually earn a Master's Degree in Business Administration. Thanks to my experience in PWS seining, my formal business education, and my unique local knowledge I was able to land a job with Valdez Fisheries Development Association as the Cost Recovery Manager. Although I recently resigned from VFDA to operate my own PWS Seine operation, I spent four years in that role and it was a truly remarkable experience. Getting to meet all the key industry players and helping to manage how the runs were harvested was both extremely fascinating and rewarding. I can personally attest to and vouch for the integrity of everyone involved. They all have the best interests and intentions at heart for both the industry and the environment. After all, if we don't protect our environment there won't be an industry. I believe that all parties involved, on both sides of this debate, care deeply about keeping our fisheries healthy and strong in a responsible and sustainable manner. Many commercial fishermen, hatchery workers, cannery workers, ADF&G employees, and other stakeholders are avid sports fishermen and would hate to inadvertently harm other stocks of salmon. I for one really enjoy rafting down the Russian-Kenai Ferry route and catching Rainbow Trout with a bead that resembles a salmon egg. It's world class fishing, a truly Alaskan experience, and I hope it can be preserved.

Although salmon are known for their ability to home back into the freshwater habitat they were born in, there has always been a percentage that stray into non-natal streams. However, I believe the acceptable range of natural stray interaction is still somewhat unknown and currently being studied. Straying can actually be considered a fundamental part of salmon's ability to strengthen genetic diversity, resilience, and colonize new habitats which have never had salmon before. Also, Pink Salmon from PWS hatcheries are all from ancestral PWS streams, which have been straying into and interbreeding with various local stocks well before hatcheries came into existence.

I'm all for protecting the Cook Inlet fisheries from environmental dangers, but I still don't believe PWS hatcheries are a threat to them. If all the PWS stakeholders get penalized for something that may not even be a problem in the first place it would be tragically unfortunate. All the investment made by hatcheries, canneries, fishermen, and other supporting businesses would be in vain because of something happening in an entirely different area that is likely completely unrelated. It's my humble opinion that many of the greatest statemen of all time have been savvy compromisers. This is why I'd recommend that instead of reducing the amount of eggs the hatcheries can incubate, or destroying already fertilized eggs, there be a moratorium placed on future expansions until studies with conclusive evidence can be produced to prove the theories of the KRSA. Meanwhile, there should be more localized studies done on those areas to determine if there are any actions that could be taken directly in Cook Inlet, rather than guessing what might be happening in the vast Gulf of Alaska.

Thank you for taking the time to read and consider my comments. I know you all have a tough decision in front of you and I respect the position of authority you're in. I think measured restraint is the prudent action in this case. Recognizing the presence of a theoretical problem based on circumstantial and anecdotal evidence without overreacting to it. I wish you luck with your decision and hope for the best.

Respectfully,

Nicholas Crump

Submitted By
olga von ziegesar
Submitted On
10/3/2018 7:51:14 PM
Affiliation
director of winged whale research

Phone
9072010160
Email
olgavonziegesar@hotmail.com
Address
po box 15191
fritz creek, Alaska 99603

I have been researching the humpback whales of Prince William Sound since 1980. I have watched the changes as the fishery has evolved from targeting wild stock to hatchery produced fish. I feel it would be best to reduce the number of fish created by the hatcheries. Many ocean species are declining because of the effects of ocean acidification and warming. it is realy important to fully fund research as things are changing so rapidly.

sincerely, Olga von ziegesar and Shelley Gill, Directors of Winged Whale Research

From: Penelope Anne Haas
To: DFG, BOF Comments (DFG sponsored)
Subject: Hatchery Committee 5 AAC 39.222 Sustainable Salmon Fishery Policy
Date: Wednesday, October 3, 2018 12:35:11 PM

Thank you for proceeding with a transparent public process to address the hatchery issues in the state of Alaska.

The state cannot shirk it's responsibility to protect wild stocks. Wild stocks are severely threatened by hatchery fish though competition and straying. There is strong evidence to support these claims in the scientific literature. This is extremely serious and cannot be ignored. Management decisions must be based on good, pier reviewed science if there is to be any future for Alaska salmon.

I hope the Board of Fish will continue to look into the matter and will seek to keep their proceedings unbiased and open to the public.

Thank you,
Penelope Haas
Homer, Alaska

Petersburg Borough, Petersburg, Alaska
RESOLUTION #2018-12

A RESOLUTION IN SUPPORT OF THE ALASKA SALMON HATCHERY PROGRAM AND URGING THE ALASKA BOARD OF FISHERIES TO FURTHER ITS UNDERSTANDING OF THE IMPORTANCE OF THE PROGRAM TO ALL ALASKANS

WHEREAS, the Petersburg Borough and our fishermen, processors and businesses in Petersburg all benefit greatly from the State of Alaska Salmon Hatchery Program; and

WHEREAS, Alaska's salmon hatchery program has operated for 45 years and supplements wild salmon harvests throughout the state; and

WHEREAS, Alaska's salmon hatchery program is an example of sustainable economic development that directly benefits subsistence fishermen, personal use fishermen, sport fishermen, charter fishermen, commercial fishermen, and seafood processors, as well as state and local governments which receive raw fish tax dollars; and

WHEREAS, Alaska's salmon hatchery program employs strong scientific methodology and is built upon precautionary principles and sustainable fisheries policies to protect wild salmon populations; and

WHEREAS, the Alaska Department of Fish and Game regulates hatchery operations, production, and permitting through a transparent public process and multi-stakeholder development of annual management plans; and

WHEREAS, returns of hatchery and wild salmon stocks follow similar survival trends over time and the largest returns of both hatchery and wild salmon stocks have mostly occurred since hatchery returns began in about 1980; and

WHEREAS, there are no stocks of concern where most hatchery production occurs, indicating that adequate escapements to wild stock systems are being met in these areas over time; and

WHEREAS, Alaska hatcheries contributed an annual average of nearly 67 million fish to Alaska's commercial fisheries in the past decade; and

WHEREAS, Alaska hatcheries accounted for 22% of the total common property commercial catch and 43% of the total ex-vessel value in the Southeast region in 2016; and

WHEREAS, Alaska's salmon hatchery program has proven to be significant and vital to Alaska's seafood and sportfish industries and the State of Alaska by creating employment and economic opportunities throughout the State and in particular in rural coastal communities such as Petersburg; and

WHEREAS, Southern Southeast Regional Aquaculture Association (SSRAA), a non-profit corporation whose mission is "to enhance and rehabilitate salmon production in Southern Southeast Alaska to the optimum social and economic benefit of salmon users", operates

salmon hatcheries at Whitman Lake near Ketchikan, Neets Bay in Behm Canal, Burnett Inlet in Clarence Strait, and Crystal Lake near Petersburg; and

WHEREAS, a McDowell Group report identifies the economic contribution in 2017 of SSRAA to be 680 jobs, $32 million in labor income, and $70 million in total economic output; and

WHEREAS, Petersburg's Crystal Lake Hatchery, owned by the State of Alaska and managed by SSRAA, releases 600,000 Crystal Creek King Salmon into Blind Slough, 500,000 Crystal Creek King Salmon at Anita Bay near Wrangell, 100,000+ Crystal Creek King Salmon at City Creek in Petersburg, 500,000 Chickamin River King Salmon at Neets Bay near Ketchikan, and 150,000 Crystal Creek Coho Salmon into Blind Slough annually, benefiting all fishing user groups in Southeast Alaska; and

WHEREAS, Northern Southeast Regional Aquaculture Association (NSRAA), a non-profit corporation whose mission is "to assist in the restoration and rehabilitation of Alaska's salmon stocks, and to supplement the fisheries of Alaska by utilizing artificial propagation to enhance the availability of salmon to all common property users", operates salmon hatcheries at Medvejie and Sawmill Creek near Sitka, Hidden Falls in Chatham Strait, and Gunnuk Creek in Kake; and

WHEREAS, Hidden Falls Hatchery, owned by the State of Alaska and managed by NSRAA, releases 45 million Chum Salmon, 400,000 King Salmon and 2.2 million Coho Salmon in Chatham Strait, 45 million Chum Salmon and 200,000 King Salmon at Southeast Cove in Keku Strait near Kake, 2 million Coho Salmon in lower Chatham at Deer Lake, and 25 million Chum Salmon in Thomas Bay near Petersburg annually, benefiting all fishing user groups in Southeast Alaska; and

WHEREAS, Alaska's salmon hatchery program is non-profit and self-funded through cost recovery and enhancement taxes on the resource and is a model partnership between private and public entities; and

WHEREAS, the State of Alaska has significantly invested in Alaska's salmon hatchery program and associated research to provide for stable salmon harvests and to bolster the economies of coastal communities while maintaining a wild stock escapement priority; and

WHEREAS, the Petersburg Borough Assembly supports unbiased and scientific methods to assess the interaction of Alaska's salmon hatchery programs with natural salmon stocks, such as the Alaska Hatchery-Wild Salmon Interaction Study which began in 2011 and is scheduled to conclude in 2023; and

WHEREAS, Alaska salmon fisheries, including the hatchery program, continue to be certified as sustainable by two separate programs, Responsible Fisheries Management (RFM) and the Marine Stewardship Council (MSC).

THEREFORE BE IT RESOLVED, that the Petersburg Borough Assembly affirms its support for Alaska's salmon hatchery programs; and

BE IT FURTHER RESOLVED, that the Petersburg Borough Assembly urges the Alaska Board of Fisheries to work with the hatchery community, the Alaska Department of Fish and

Game and industry leaders to further its understanding of the importance of the Alaska salmon hatchery program to all Alaskans.

Passed and Approved by the Petersburg Borough Assembly on October 1, 2018.

Mark Jensen, Mayor

ATTEST:

Debra K. Thompson

Debra K. Thompson, Borough Clerk

From: Robert Archibald
To: DFG, BOF Comments (DFG sponsored)
Subject: Support for Hatchery Committee
Date: Wednesday, October 3, 2018 12:01:24 PM

Support for Hatchery Committee 5 AAC 39.222 Sustainable Salmon Fishery Policy

Greetings,

I fully support the creation of the Hatchery Committee investigate the science based issues to modern hatcheries.
We need to have a “Time Out” to further enhancements before we continue to raise the level of hatchery produced fish discharger into the North Pacific.

Respectfully,

Robert Archibald
PO Box 2460
Homer, AK. 99603