On-Time Public Comment List

Alaska Board of Fisheries
Alaska Peninsula/Chignik/Bering Sea-Aleutian Islands Finfish
Anchorage, AK, February 21–26, 2019

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February 5, 2019

Board of Fisheries,

GOT FISH? NO FISH...NO WORK...NO FOOD...NO FUEL TO HEAT HOME...NO BASIC NEEDS

Chignik has been devastated by the interception of sockeye salmon in the waters of Alaska.

As a child I grew up commercial fishing out of Kodiak. I loved the fishing time which consist of Midnight Sunday night to 6:00 pm on Friday night. My father tried to explain it was to conserve fish for future salmon seasons. I didn't understand the concept as a child, I only enjoyed the time off to go beach combing.

Oh, how I understand the concept now! The whole community of Chignik, Chignik Lake, Chignik Lagoon, Ivanof Bay and Perryville feel the devastation when the "WINDOWS HAVE BEEN ELIMINATED" No fish to get to their destination. No conservation plan in place. The sockeye salmon need to be able to not only get up the Chignik Weir but there needs to be enough fish to make this Chignik Fisheries a reliable, economical and sustainable fisheries again.

Up until 1984 the "WINDOWS WERE IN PLACE" the Alaska Board of fisheries restricted fishing time in the Southeastern District until the Chignik Management Area catch exceeded 1,000,000 sockeye before July 10th.

It doesn't take a rocket scientist to figure out the management of both areas. There is enough fish for Area L and Area M to both have economical and sustainable fisheries.

Thank-you,

Alana Anderson

Chignik Bay resident

February 7, 2019

Alaska Department of Fish and Game
Boards Support Section – Alaska Board of Fisheries
P.O. Box 115526
Juneau, AK 99811-5526

Attn: Alaska Board of Fisheries

Reed Morisky, Chairman
John Jensen
Fritz Johnson
Israel Payton
Orville Huntington
Alan Cain
Robert Ruffner

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Proposal 128
Recommendation: Oppose

The Aleut Corporation Comments:

The Aleut Corporation strongly opposes Proposal 128 to increase Chignik Management Area's sockeye salmon harvest and escapement thresholds in the Southeastern District Mainland Salmon Management Plan (SEDM).

The statement the proponent made regarding modifying the SEDM Management plan *"to allow a higher minimum sockeye harvest for Chignik that is more in line with current economic conditions*" is deceptive. There are more permits fished in the SEDM area but the average sockeye harvest of a SEDM permit holder is lower than that of a Chignik fisherman (figure 1 and 2). SEDM Harvest also has a positive correlation to Chignik Management Area Harvest. Meaning as SEDM Harvest increases so does CMA Harvest. Reducing harvest in the SEDM Area does not necessarily mean harvest in the CMA Area would increase, it is likely due to the small proportion of harvest the Chignik bound fish have by the SEDM fisherman over all (Figure 3).

By increasing the Chignik Management Area sockeye salmon harvestable and escapement goals as stated by the proponent, it would essentially shut down a vital fishery in the SEDM Area. When the average harvest of Chignik bound salmon is 6% of the SEDM total harvest, it would unjustly close a fishery when they harvest an insignificant amount of Chignik bound salmon (figure 4). The Aleut communities will lose out on an economic opportunity that affords them the ability to live in our rural communities, support their families, and provide economic opportunities for other individuals.

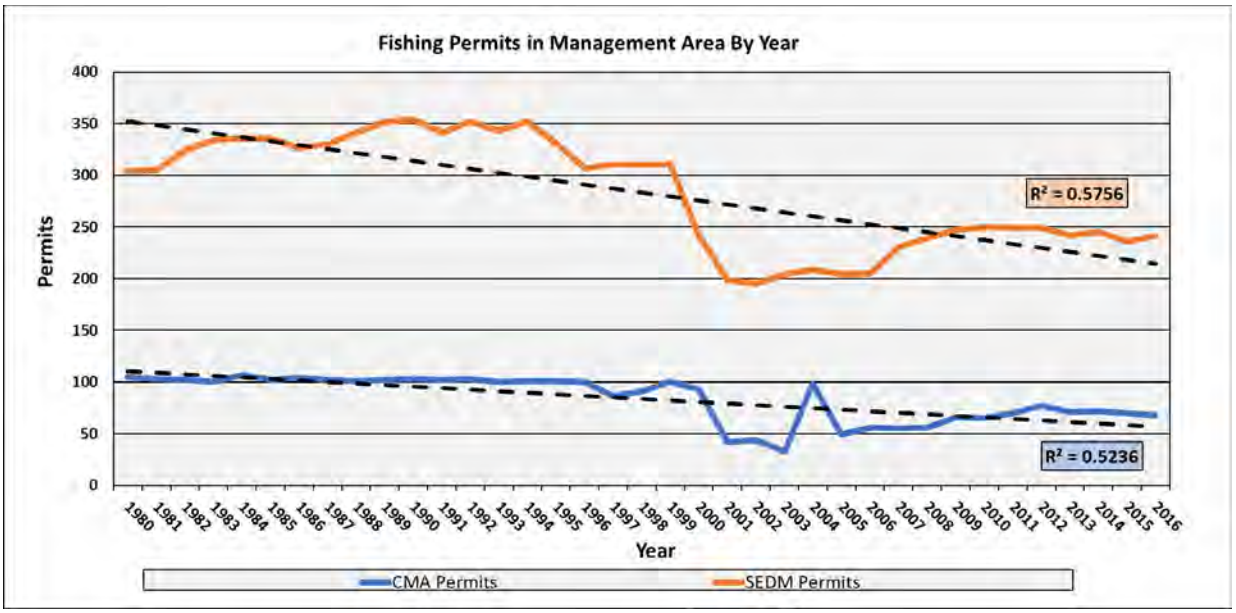

Figure 1. There are more fishing permits in the SEDM Area than the CMA. Since inception, both districts have seen a decrease in permits per year. However, there are more SEDM fisherman who rely on salmon fishing than fisherman in the CMA Area.

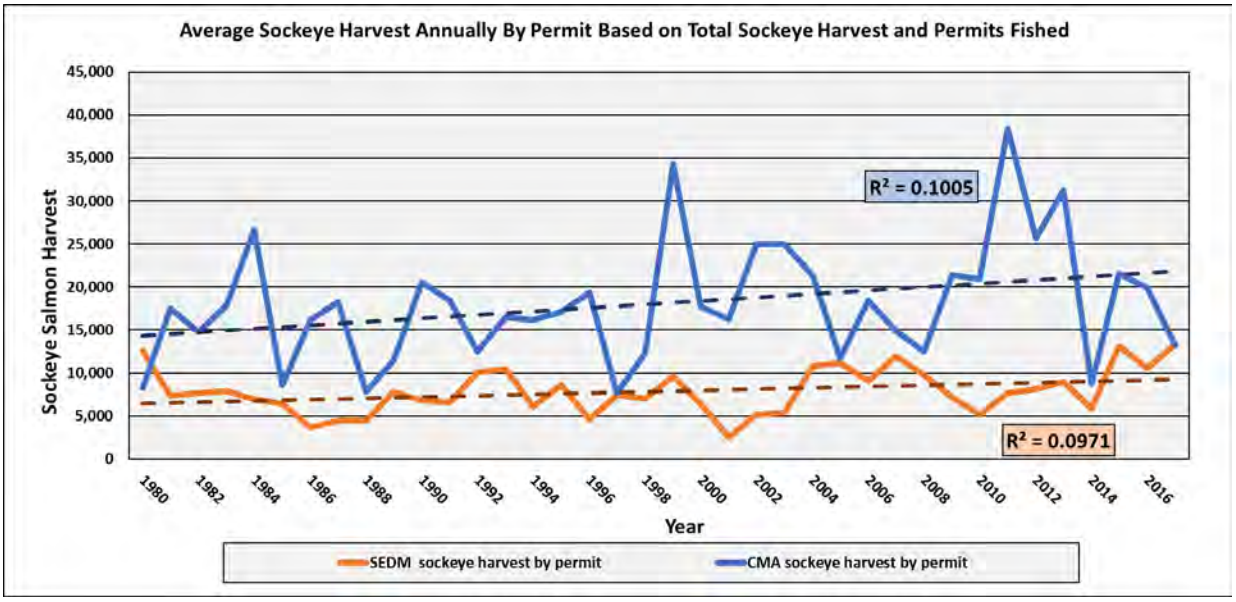

Figure 2. This figure depicts the average sockeye salmon harvest over time between the CMA and SEDM Areas. The average SEDM sockeye salmon harvest per permit is LOWER THAN average CMA sockeye salmon harvest per permit; meaning that the average permit holder for the CMA area harvests more salmon than the average SEDM permit owner. If harvests in the SEDM area are decreased, it will have a larger impact on the permit holders in the SEDM area than the CMA area.

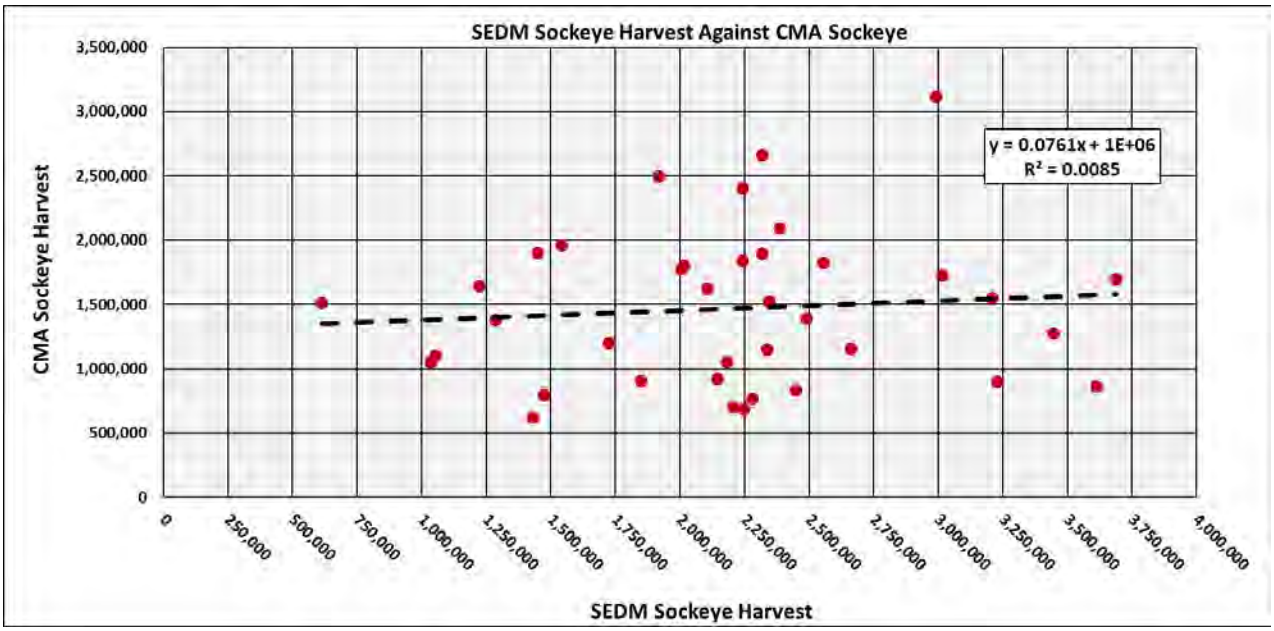

Figure 3. SEDM Harvest also has a positive correlation to Chignik Management Area Harvest. Meaning as SEDM Harvest increases so does CMA Harvest.

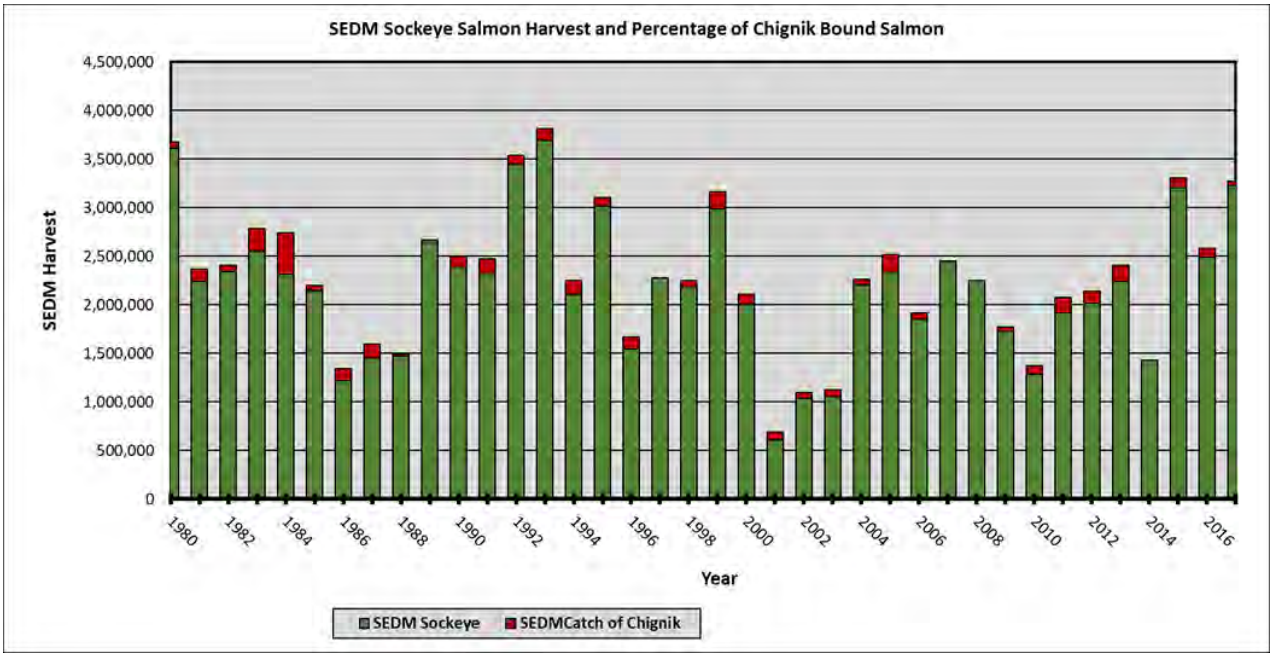

Figure 4. This figure depicts the sockeye salmon harvest over time in SEDM Area. The Chignik bound sockeye salmon harvest is in red and averages 6% over time. The non-Chignik bound sockeye salmon harvest is in green and averages 94% of the SEDM fisherman's harvest.

Proposal 130
Recommendation: Support

The Aleut Corporation Comments:

The Aleut Corporation supports Proposal 130 to decrease the Chignik River-origin sockeye salmon harvest composition from 80 percent to 60 percent of harvest in the Southeast District Mainland Salmon Management Plan.

The Western Alaska Salmon Stock Identification Program indicated that the actual percentage of Chignik bound salmon caught in the SEDM is lower than 80%. The current regulations written to reflect an estimated 80% Chignik River-origin sockeye salmon harvest composition which results in lost fishing time and opportunities in the SEDM of Area M.

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Proposal 131
Recommendation: Support

The Aleut Corporation Comments:

The Aleut Corporation supports Proposal 131 to increase the Southeast District Mainland allocation of Chignik River-origin sockeye salmon from 7.6% to 10%. Currently our fisherman harvest has averaged 6% overtime and the average harvest at Cape Igvak is 11% (Figure 5 and 6). This modification would bring SEDM closer in line with Igvak. We believe that the current regulations inequitably targeted the SEDM area when our fisherman have a 7.6% allocation at 80% while Kodiak has a 15% allocation based on a 90% catch of Chignik bound salmon.

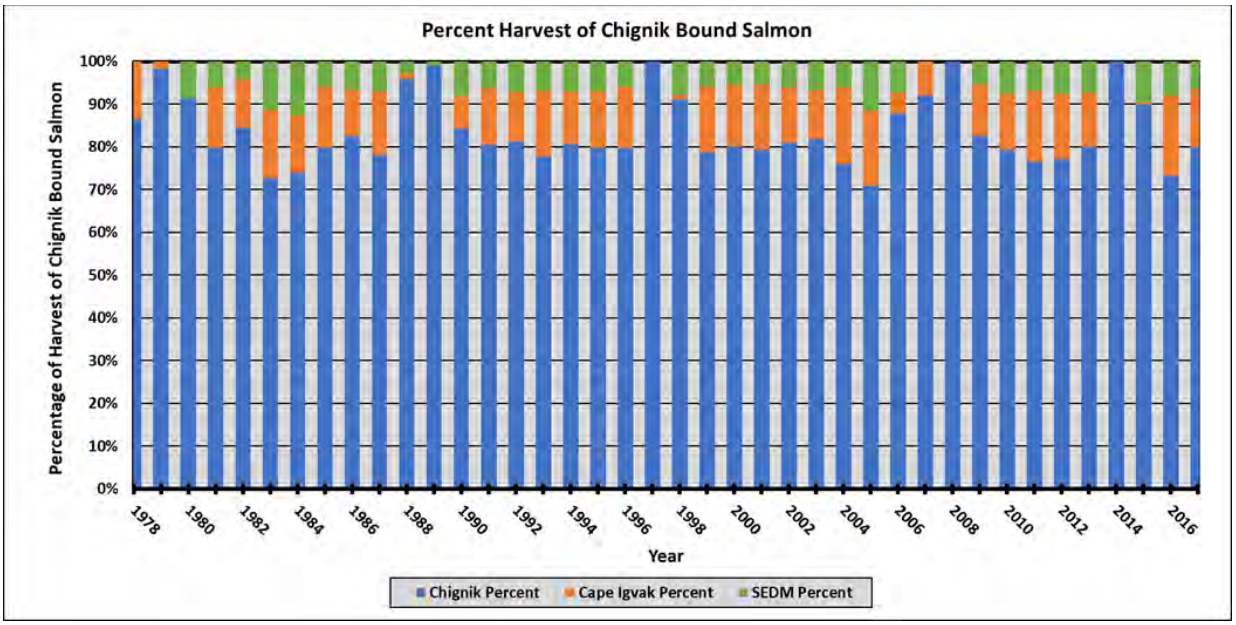

Figure 5. This figure depicts the percent harvest of Chignik bound sockeye salmon from Chignik, Cape Igvak, and SEDM. The average harvest of Chignik bound sockeye salmon for Igvak (11%), Chignik, (84%), and SEDM (6%).

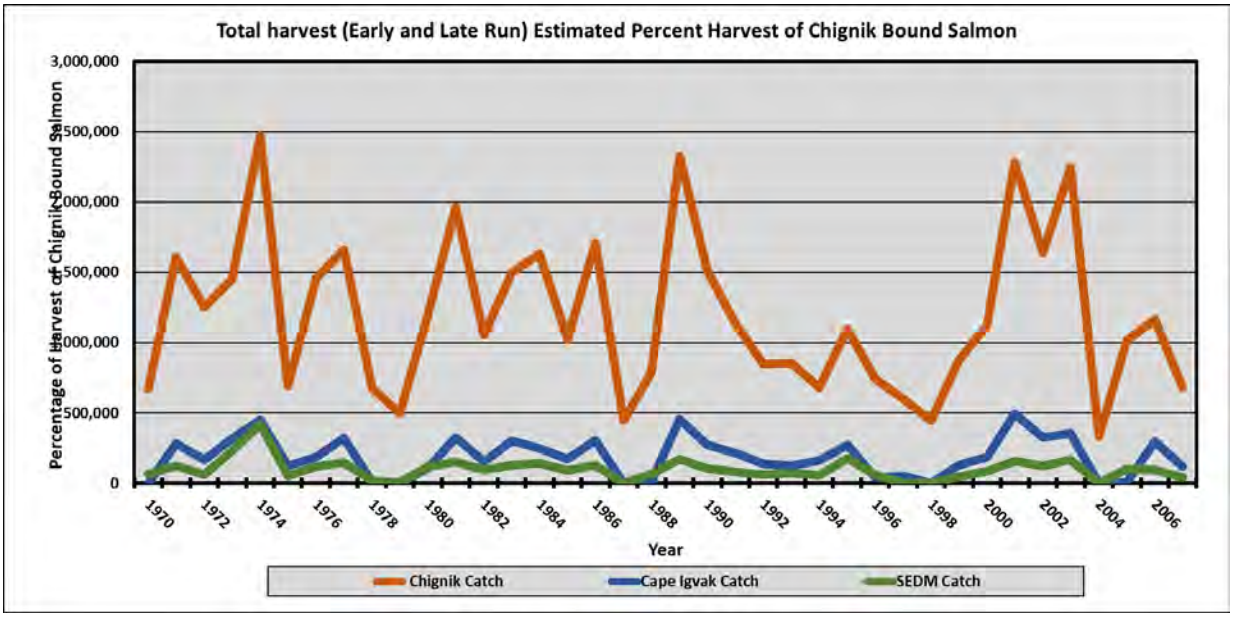

Figure 6. This figure depicts the harvest of Chignik bound sockeye salmon (in fish) from Chignik, Cape Igvak, and SEDM.

Proposal 132
Recommendation: Support

The Aleut Corporation Comments:
The Aleut Corporation supports Proposal 132 which would revise the SEDM Salmon Management Plan to allow commercial salmon fishing with set gillnet gear concurrent to open commercial fishing periods for salmon in the Chignik Management Area. We also support the motion from Sand Point AC to include seiners in this change which would result in a revision for the SEDM Salmon Management Plan to allow commercial salmon fishing with ***set gillnet and seine*** gear concurrent to open commercial fishing periods for salmon in the Chignik Management Area.

The fishermen from our region loose fishing time and opportunities in the Southeast District Mainland (SEDM) fishery for a number of reasons. If fishermen in the CMA have an open commercial fishing period, we believe that the SEDM area should also be open.

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Proposal 133
Recommendation: Support

The Aleut Corporation Comments:
The Aleut Corporation supports Proposal 133 to open the SEDM to commercial fishing for salmon in concurrence with Western and Perryville district open commercial salmon fishing periods from June 1 through July 13. This modification would increase opportunity for SEDM fishermen. Why is Chignik allowed to fish when our fishermen cannot fish if they are closed to limit harvest of Chignik bound sockeye?

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Proposal 134
Recommendation: Oppose

The Aleut Corporation Comments:
The Aleut Corporation opposes Proposal 134 which would repeal the current South Unimak and Shumagin Islands June Salmon Management Plan and readopt the management plan in place prior to 2001.

We strongly oppose this proposal because it is not supported by the data gathered from ADF&G on estimated harvest Chignik bound sockeye salmon in the SEDM fishery (Figure 7 and 8) as the proponent stated in the justification for the issue they would like to address. The SEDM harvest of

Chignik bound sockeye has decreased since the change in regulation (Figure 7) and the proportion of Chignik bound salmon in relation to Chignik and Igvak has decreased over time (Figure 8). The repeal and replacement of the June Salmon Management Plan and re-adoption of the management plan in place prior to 2001 will decrease harvest opportunity for our fishermen in the SEDM Area which will create an economic hardship on them. Being able to commercial fish in our historical fishery affords people in the SEDM fishery the ability to live in our rural communities, support their families, and provide economic opportunities for other individuals.

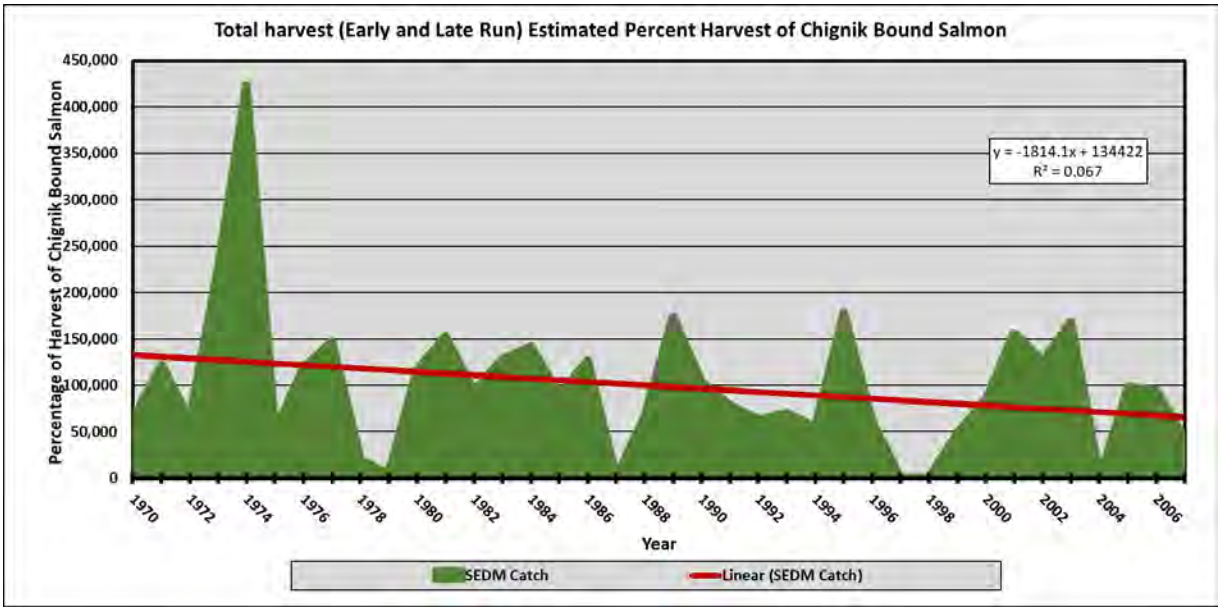

Figure 7. This figure depicts the percent harvest of Chignik bound sockeye salmon from the SEDM area which has decreased over time.

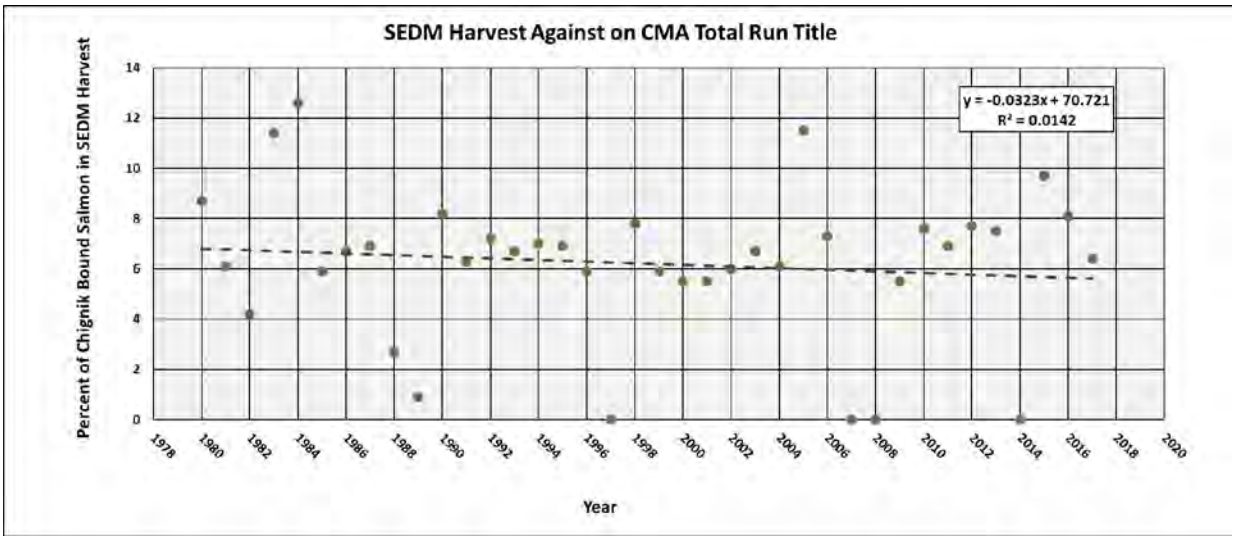

Figure 8. This figure depicts the percent harvest of Chignik bound sockeye salmon from the SEDM area. The percent harvest of Chignik bound salmon harvested from SEDM fisherman has a negative correlation.

Proposal 135
Recommendation: Oppose

The Aleut Corporation Comments:

The Aleut Corporation opposes Proposal 135 which would repeal the current South Unimak and Shumagin Islands June Salmon Management Plan and readopt an amended version of the management plan in place prior to 2001.

The current management plan adequately manages the harvest of salmon. The change requested by the proponent is in regard to Chinook salmon and their assertation that there is excessive harvest of migrating stocks of concern by fishermen in the South Unimak and Shumagin Islands June fishery is unsubstantiated. The harvest of Chinook salmon stocks in this area is nominal and would likely not have an effect recruitment. The average harvest of Chinook in the South Unimak and Shumagin Islands June salmon fishery from 1997-2016 is 5,494 Chinook Salmon and the average Chinook salmon harvest from 2007-2016 is 7,939 Chinook salmon (Figure 9).

Further the proponent's request to limit harvest based on the ratio of sockeye to chum salmon is not supported by harvest data compiled by ADF&G. The ratio of sockeye to chum salmon harvest has rarely fallen below a 2 to 1 harvest of sockeye to chum salmon. The average ratio of sockeye to chum salmon in the South Unimak and Shumagin Islands June Salmon fishery from 1997-2016 is 3.4 and the chinook salmon and the average from 2007-2016 is also 3.4 sockeye to chum (Figure 10).

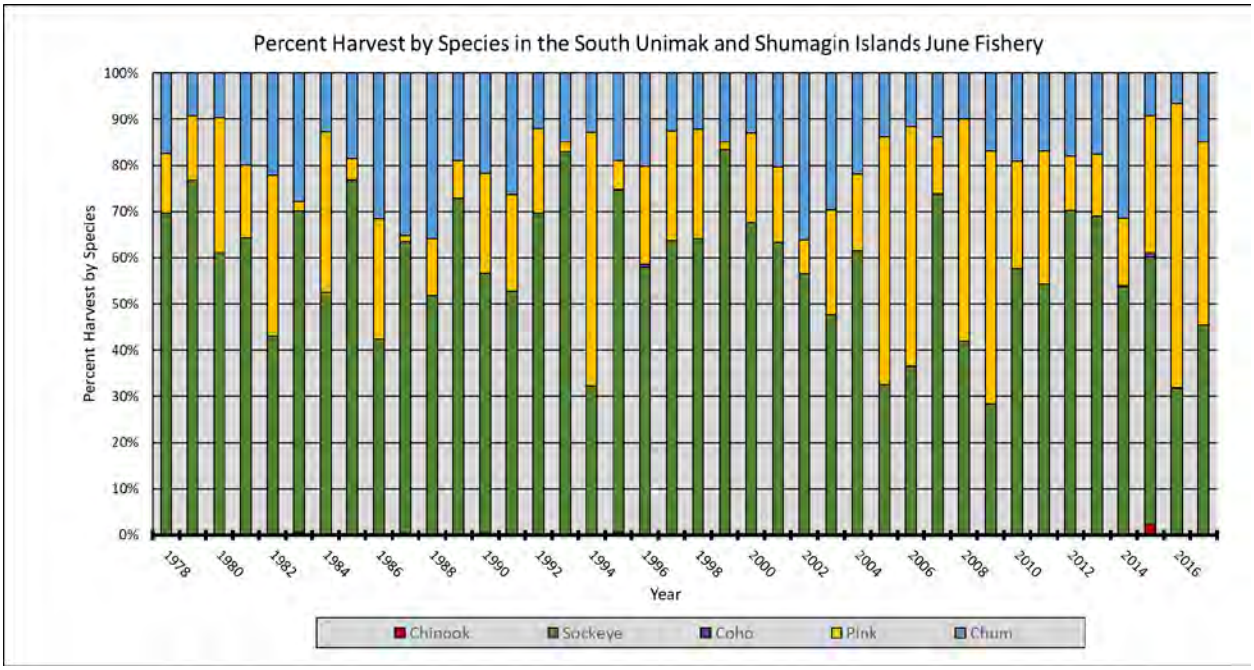

Figure 9. This figure depicts the percent harvest of salmon by species from the South Unimak and Shumagin Islands June fishery. This shows the percent harvest of chinook salmon is nominal and sockeye salmon are the primary species harvested followed by chums and pinks, depending on pink year cycle.

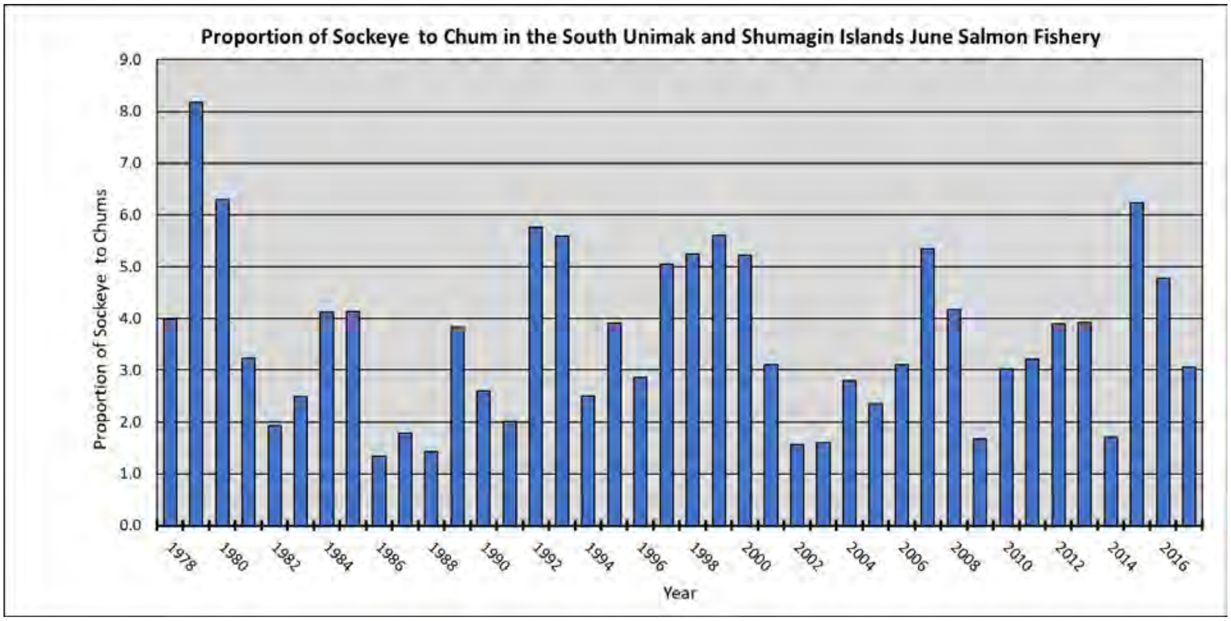

Figure 10. This figure depicts the proportion of sockeye to chum in the South Unimak and Shumagin Islands June Salmon Fishery. The ratio of sockeye to chum has rarely fallen below a 2 to 1 harvest of sockeye to chum salmon. The average ratio of Sockeye to chum salmon in the South Unimak and Shumagin Islands June salmon fishery from 1997-2016 is 3.4 and the chinook salmon and the average from 2007-2016 is also 3.4 sockeye to chum.

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Proposal 136

Recommendation: Oppose

The Aleut Corporation Comments:

The Aleut Corporation opposes Proposal 136 which would amend the South Unimak and Shumagin Islands June Salmon Management Plan so that fishing periods are structured with 24-hour windows where commercial salmon fishing gear is in the water.

The suggested changes to the South Unimak and Shumagin Islands June salmon are an attempt to close the fishery piece by piece. The proponent requests to include 24-hour closures to all fishing for each gear type which will have a dramatic effect on the fishermen from the SEDM area. The current management plan decreases the amount of nets in the water at one time which allows salmon to migrate through and reduces gear conflict. Our people have fished in these waters for centuries and being able to commercial fish in our historical fishery affords people in the SEDM fishery the ability to live in our rural communities, support their families, and provide economic opportunities for other individuals.

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Proposal 137
Recommendation: Oppose

The Aleut Corporation Comments:
The Aleut Corporation opposes Proposal 137 which would expand geographic scope of the Dolgoi Island Area as defined in the South Unimak and Shumagin Islands June Salmon Management and Post June Salmon Management Plan for the South Alaska Peninsula. The suggested changes to the South Unimak and Shumagin Islands June Salmon are unneeded.

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Proposal 138
Recommendation: Oppose

The Aleut Corporation Comments:
The Aleut Corporation opposes Proposal 137 which would amend the South Unimak and Shumagin Islands June Salmon Management Plan and the Post-June Salmon Management Plan for the South Alaska Peninsula to reduce commercial salmon fishing opportunity in the Dolgoi Island Area.

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Proposal 139
Recommendation: Support

The Aleut Corporation Comments:
The Aleut Corporation supports Proposal 139 which would repeal Dolgoi Island Area-related regulations from the South Unimak and Shumagin Islands June Salmon Management Plan and the Post-June Salmon Management Plan for the South Alaska Peninsula.

According to WASSIP harvest rate data, the 'Dolgoi area' catch of Chignik bound salmon had a minimal (from less than 1% to a maximum of 7.4%) impact on the overall Chignik run for years 2006-2008. The salmon fishing area impacted by these regulations is situated directly between the communities of King Cove and Sand Point. While the department carried out the new 2016 regulations as written, and fishermen followed them, the closure that was predicted to happen only 3 or 4 times out of every 10 years based on historical data occurred every year since implementation as of this date. We believe that the attainment of the trigger of 191,000 sockeye each year has more to do with the recent 50,000,000+ Bristol Bay runs than Chignik sockeye intercept.

We have reviewed past Chignik daily harvest reports including report since the 2016 implementation of the 'Dolgoi area' regulations. Looking at the data, we see a direct connection between Chignik Management Area commercial harvest and CMA sockeye escapement, however we do not find a

definitive link with the annual Dolgoi closure and an increase in Chignik sockeye escapement. The regulations are being implemented as intended but are not accomplishing the intended purpose to increase Chignik escapement/harvest. The regulations are unnecessary and overly burdensome on Area M fishermen.

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Proposal 140
Recommendation: Support

The Aleut Corporation Comments:
The Aleut Corporation supports Proposal 140 which would include the area from Cape Tolstoi to McGinty Point in the area open to commercial fishing for salmon under the South Unimak and Shumagin Islands June Salmon Management Plan. Commercial fishing is the livelihood of the community members from the Aleut region. This is lost fishing opportunity.

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Proposal 141
Recommendation: Support

The Aleut Corporation Comments:
The Aleut Corporation supports Proposal 141 which would repeal closed waters in the South Alaska Peninsula Area. Commercial fishing is the livelihood of the community members from the Aleut region.

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Proposal 143
Recommendation: Support

The Aleut Corporation Comments:
The Aleut Corporation supports Proposal 143 to repeal the immature salmon test fishery in the Shumagin Islands Section.

The 1991 Board decision to allow commercial salmon fishing in limited areas within South Alaska Peninsula waters was made partially due to concerns for immature chinook, sockeye, and chum salmon that were inadvertently gilled during purse seine gear fishing operations (McCullough and Shaul 1992). The presence of immature salmon in South Alaska Peninsula waters, which ADF&G first became aware of in 1962, has warranted restrictions to commercial fishing in some years. These restrictions were applied to all gear types in affected areas from late June into July in 1963, 1968,

1969, 1974, and 1979, and for purse seine fishing only during the 1989–1992, 1999, 2001, 2003, 2008, 2015, 2016, and 2017 seasons (Fox et al.2018, Appendix A16). In the Shumagin Islands Section, there is concern regarding catching a high incidence of immature salmon in purse seine gear. Under current regulations, seine mesh size may not exceed 3½ inches except for the first 25 meshes above the lead line, which may not exceed 7 inches (5 AAC 09.332(a)). Set gillnet gear has larger mesh size (minimum of 5¼ inches; 5 AAC 09.331(b)(3)), which allows immature salmon to pass through the gear. Immature salmon usually migrate out of the area by July 23, although in 1992 closures were necessary until July 29. In 1990. The ADF&G test fishing program was instituted in the Shumagin Islands to determine presence and abundance of immature salmon in South Alaska Peninsula waters prior to July commercial fishing periods. In the Shumagin Islands Section, most purse seine fishing effort has occurred in the nearshore waters of Popof Island, from Popof Head to Red Bluff, and thus test fishing sites were established in those areas (Appendix D4).

In 2001, the Board adopted a regulation that defined immature salmon and required ADF&G to conduct an immature salmon test fishery in July (5 AAC 09.366(i), Appendix D3).

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Proposal 144
Recommendation: Oppose

The Aleut Corporation Comments:

The Aleut Corporation opposes Proposal 144 which would restrict commercial fishing for salmon in areas both along the coast and in open seaward waters of the Outer Port Heiden Section and the open seaward waters of the Ilnik Section when the preseason Bristol Bay sockeye salmon forecast is 30 million fish or less.

Forecasting is an educated estimate that has a large range. Salmon have a complicated life cycle spending portions of their life in fresh water and salt water where they are exposed to biotic and abiotic variables. Fishermen from both along the coast and in open seaward waters of the Outer Port Heiden Section and the open seaward waters of the Ilnik Section harvest fish from multiple systems therefore restricting their harvest based on a forecast of a number of systems in not meaningful.

The proponents stated that "*preseason closure of waters in the Ilnik and Outer Port Heiden Sections when the Bristol Bay preseason forecast is 30M salmon or less may be relaxed based on inseason assessment of the run.*" However, fishermen who fish the areas along the coast and in open seaward waters of the Outer Port Heiden Section and the open seaward waters of the Ilnik Section may lose out on a majority of their economic income because the fish would have likely passed during the inseason assessment.

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Proposal 145
Recommendation: Oppose

The Aleut Corporation Comments:
The Aleut Corporation opposes Proposal 145 which would restrict commercial fishing for salmon along the coast and in offshore waters of the Outer Port Heiden Section and restrict fishing in offshore waters of the northeast portion of the Ilnik Section because they would unnecessarily restrict fishermen in this area.

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Proposal 153
Recommendation: Support

The Aleut Corporation Comments:
The Aleut Corporation opposes Proposal 153 which would prohibit commercial fishing for salmon in the Perryville District and Mitrofania Section when the Southeastern District is closed to commercial fishing for salmon.

If the SEDM area is closed to fishing until escapement goals are reached, the Mitrofania section and Perryville district who target the same westbound fish should also close to commercial salmon fishing. It makes no sense to close one area due to conservation concerns while allowing others to stay open as they are harvesting the same fish.

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Literature Cited

Fox, E. K. C., L. K. Stumpf, and C. J. Whiteside. 2018. South Alaska Peninsula salmon annual management report, 2018 and the 2017 subsistence fisheries in the Alaska Peninsula, Aleutian Islands, and Atka-Amlia Islands management areas. Alaska Department of Fish and Game, Regional Information Report No. 4K19-01, Kodiak.

Wilburn, D. M., and R. L. Renick. 2018. Chignik Management Area salmon annual management report, 2018. Alaska Department of Fish and Game, Fishery Management Report No. 18-32, Anchorage.

Sincerely,

Thomas Mack
CEO/President
The Aleut Corporation

Submitted By
Dimitri Philemonof
Submitted On
2/7/2019 3:55:14 PM
Affiliation
Aleutian Pribilof Islands Association

Dear Chairman Morisky,

The Aleutian Pribilof Islands Association is the regional non-profit consortium for the 13 Aleut Tribes. We provide a wide range of direct services including: public safety, cultural heritage, education, environmental services and health. Our Fisheries Committee has directed us to provide comment as the Board of Fisheries considers this year's proposals. Due to our historic and continuing dependence on the region's salmon fisheries, we request the continuation of current management practices. Under the current salmon management, we have been able to sustain our people and communities for many years. Our economies rely on these fisheries, as well as our cultural and subsistence practices. Any significant changes will have detrimental ripple effects throughout our region and we ask that the Board continue to allow our communities to support themselves.

Thank you for your consideration,

Dimitri Philemonof

AKUTAN • COLD BAY • NELSON LAGOON
ALEUTIANS EAST
BOROUGH
FALSE PASS • KING COVE • SAND POINT

February 7, 2019

Chairman Reed Morisky
Alaska Board of Fisheries
Alaska Department of Fish and Game
Boards Support Section
Via E-mail: dfg.bof.comments@alaska.gov

Chairman Morisky,

The Aleutians East Borough is a Second Class Borough of the State of Alaska encompassing six local communities: Akutan, Cold Bay, False Pass, King Cove, Nelson Lagoon and Sand Point. The Alaska Peninsula Salmon Management Area M is largely within our Borough boundaries and Area M salmon management regulations impact all of our residents. While our commercial fishermen and women fish every opportunity including fishing for cod, crab, herring, pollock and halibut, our communities are built on a foundation of commercial salmon fishing. Our region has a long history and tradition of commercial salmon fishing, and the Aleut people have subsisted on salmon for thousands of years. We ask that you allow our salmon fisheries to continue.

The Aleutians East Borough depends on taxes on fish to provide for our schools, and for marine and other transportation infrastructure; our investments in our communities support the fishing industry. There are major seafood processing plants in the Aleutians East Borough: Trident operates plants in Akutan, Sand Point and False Pass, Peter Pan Seafoods has a seasonal salmon plant in Port Moller and a year-round facility in King Cove, and Silver Bay Seafoods is currently building a plant in False Pass. Seafood processors have invested at least 100 million dollars in plant improvements in just the past year. Our region provides important seafood processing employment opportunities and contributes to the State economy, providing jobs and contributions to the State Fisheries Business Tax. Continued opportunity for salmon fishing is critical to continued success of this economy.

Current regulations provide strong measures for the conservation of the salmon resource. Area M fishermen share in the burden of conservation; in particular, the Southeast District Mainland and Dolgoi Island area salmon fishery regulations provide adequate protections for Chignik Bound salmon in our mixed stock salmon fishery. The Alaska Department of Fish & Game does a great job managing our salmon fisheries and managers maintain emergency order authority over fisheries if needed.

We are hopeful that your actions at this meeting are not detrimental to our economy. In most of the proposals before you, we believe status quo or no action is the best course of action. We ask that you pay attention to the science and listen to the testimony of our fishermen. Allowing Aleutians East Borough salmon fisheries to maintain as is, will continue to yield positive results for the region and the State.

Sincerely,

Alvin D. Osterback, Mayor

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KING COVE OFFICE • P.O. Box 49 • King Cove, AK 99612 • (907) 497-2588 • *Fax:* (907) 497-2386
SAND POINT OFFICE • P.O. Box 349 • Sand Point, AK 99661 • (907) 383-2699 • *Fax:* (907) 383-3496

THE IMPORTANCE OF SALMON FISHING TO AREA M:

REPORT TO THE ALEUTIANS EAST BOROUGH

January 2019

Katherine Reedy, Ph.D., Department of Anthropology, Idaho State University

EXECUTIVE SUMMARY

This Executive Summary briefly summarizes a socioeconomic report on the importance of salmon and salmon fishing to the communities of the Aleutians East Borough, and Sand Point and King Cove in particular. That analysis and description of the effects of changes in salmon management to Aleutians East Borough communities has been prepared in response to a request by the Aleutians East Borough Natural Resources Department in anticipation of the Alaska Board of Fisheries (BOF) Alaska Peninsula meeting in February 2019. The author encourages all readers to access the full document for more complete information, which can be found here: http://www.aebfish.org/reedyfeb2019.pdf

The goal of the report is to describe the historical and present engagements of fishermen in Sand Point, King Cove, and False Pass in salmon fishing; demonstrate their many millennia-long place in the region as indigenous fishermen and hunters; situate the local communities within the development of commercial salmon fishing; describe the current villages, fleets, processors and their interdependencies; characterize social and economic change over time; describe the intimate relationship between commercial fishing and subsistence harvesting; and make a speculative forecast for how the Aleutians

East Borough, Sand Point, King Cove, and False Pass would fare under drastic cuts to Area M salmon fishing opportunity.

The report draws on two decades of social science research in the Alaska Peninsula and Aleutian communities by the author. This work has largely been ethnographic, combining participant observation, surveys, and interviews over the courses of multiple projects to characterize the histories and current engagements of these local salmon fishermen, the communities more broadly, and the processors in the Aleutians East Borough. This long-term research has focused on the sustainability of coastal communities and their relationships to their natural resources that support that sustainability. The primary developments and conditions that are pertinent to salmon management and the long-term socioeconomic health of Area M communities are as follows:

SOCIOECONOMIC CONDITIONS

- Salmon permit holders are currently 83% of the total permit holders in Sand Point and 84% of the total permit holders in King Cove.
- In Sand Point, salmon have constituted between 13% (2000) and 57% (2017) of the estimated total pounds landed, and between 20% (2003) and 76% (2017) of the total earnings from fishing.
- In King Cove, salmon have constituted between 19% (2012) and 71% (2008 and 2009) of the estimated total pounds landed, and between 26% (2002) and 76% (2017) of the total earnings from fishing.
- In both King Cove and Sand Point, fishing participation has been fairly steady and stable while salmon pounds landed and earnings have varied between seasons.
- Of all permit holders in the Aleutians East Borough, salmon permit holders have been 78% of the total on average in the region since 2000.
- Salmon fishermen have constituted on average 76% of the number of persons fishing in the AEB.
- Salmon have been on average 36% of the estimated total pounds landed in the Borough since 2000.
- Estimated earnings from salmon fishing in the Borough are 45% of the total earnings from fishing since 2000, and 58% in the past five years.
- Huge investments in processing in the Aleutians East Borough have been made, more recently by Silver Bay and Trident in False Pass and Peter Pan Seafoods in Port Moller.
- Processing supplies the operating tax base for the Aleutians East Borough, municipalities, and local services.
- Salmon landings are of particular importance to King Cove and Sand Point for the tax bases.
- Population trends show that small villages have lost residents while Sand Point and King Cove have shown population growth. Even so, school enrollments have declined in Sand Point and King Cove since 2003.
- Subsistence and commercial fishing are combined in such a way that a restriction in commercial fishing time and area translates into a restriction on subsistence harvesting of salmon and almost all other species except perhaps berries, other plants, and trout. Several households reported not getting as much sockeye as they needed.

- Groceries are 28% (King Cove) and 34% (Sand Point) of household expenses. Groceries and Rent/Mortgage expenses are more than half of total household expenses in both communities.
- Sockeye salmon are the most valued, most harvested, and most shared subsistence food in Sand Point and King Cove.
- Concern over future generations sustaining the commercial fishing economy and lifestyle was expressed universally in all AEB communities. Local permit and vessel ownership are critical to that future.
- The state's Limited Entry permit program of 1973 has over time resulted in a shift in Area M from predominately local Aleut salmon permit holders at the initial distribution to much larger percentage of non-Aleut, non-local transients in the salmon fleets.

Relevant Community Features and Historical Developments

- The majority of resident Area M fishermen are Aleut/Unangan vessel owners, captains, and crewmen. Fishing operations in these communities are composed of large family networks.
- Commercial salmon fishing is foundational to identity and family relationships in Area M communities.
- Subsistence security depends upon the health of commercial salmon fishing, since most subsistence is performed in the context of commercial fishing.
- The people of the Aleutians East Borough celebrate 9,000 years of Aleut/Unangan heritage as indigenous fishermen and hunters.
- From 1150 AD and 1741 (Bering's Expedition) Aleut villages coalesced to become larger communities than in the centuries before, and they relocated around sockeye spawning lakes and fishing streams, and shifted emphasis to salmon fishing and storage.
- Russian and American interest in the region brought disease, violence, Russian Orthodoxy, and commercial sea otter economies, throughout which the Aleut culture persisted and survived.
- Resident Aleut and Scandinavian immigrants were central to the development of commercial cod fisheries in the late 1800s, and the development of commercial salmon fisheries in the early 1900s in the present-day Area M region.
- The modern villages were formed around salmon canneries that were set up in the early 1900s.

Predictions

If there are no changes to the current management plans, the Area M fishermen can expect to continue to withstand the volatility of salmon returns, costs, market changes, climatic effects, and unknown factors that make each year of salmon fishing a gamble. Residents of Sand Point, King Cove, and False Pass are deeply entrenched in their communities and have weathered a great deal of volatility in fishing, and salmon fishing in particular. They draw on their heritage as indigenous peoples and as descendants of pioneering cod fishermen. As coastal fishing communities, there are no lucrative economic alternatives to possibly engage in.

In projecting the effects on the communities of Sand Point, King Cove, fishermen and families, and AEB of restrictions, a Forecasting section in the full report considers salmon dependencies of the *past five*

years. If the salmon fisheries were to be closed down, although an extreme scenario, captains and crew would *lose 55% of their fishing income in Sand Point* and *61% would be lost in King Cove*. The Aleutians East Borough would *lose between 14% and 29% of their tax revenue* that supports governance and social services in the region. Sand Point and King Cove would lose the vast majority of their fishing fleets. Fish taxes from commercial salmon fishing in King Cove and Sand Point are *92% of the total salmon landing taxes* accrued by those communities to the Aleutians East Borough since 2014 and *18% of the total taxes from all fishing* in the Borough since 2014. Adding in False Pass, and salmon landing taxes from these three communities are *99% of the total salmon taxes in the Borough and 19% of the total taxes* from all fishing since 2014 in the Borough. These funds also keep schools open in under-enrolled communities, ultimately keeping young families in their home villages and maintaining strong traditions.

Every fishery is critical to these communities for their survival. Because of the volatility of salmon fisheries, one mother in Sand Point said in 2017, "These communities live and survive off groundfish now. Everything does. PenAir, the stores, schools. We have a hell of a time keeping kids in schools. We get X amount of dollars from the state. False Pass and Cold Bay are teetering. Everybody is moving out. This all trickles down to all other thing if there is no [salmon] fishing. If we don't get fish, your wife doesn't work at the store; your daughter doesn't work at PenAir."

In the event of a major decline in access to the salmon fisheries, we can expect Sand Point and King Cove to experience massive outmigration and be reduced to only a few families. We can expect a break in cultural and historical traditions, and connections to the land and sea, which would constitute a major loss to the Aleut people. Smaller communities such as False Pass would likely close down and people would be forced to relocate to the other villages or to Anchorage. Negative population trends and school enrollments in the Aleutians East Borough would accelerate. This outmigration would shift a burden on social services to Anchorage. The processing workforces would be cut dramatically and the plants likely would not be able to operate year round as they currently do in Sand Point and King Cove. Vessels would be sold or left to rust. People would default on loans. Families in Anchorage and elsewhere who depend upon villagers to supply them with subsistence foods would be disconnected from the foods of home.

Most of the men in these communities grew up on the boats and learned the skills of fishing. They are hard workers, but not formally trained in other skills, very few have college degrees, and they would have to start completely over somewhere else. Although not every Aleutians East child wants to grow up to be a fisherman, every child has a profound understanding of the business of fishing and what it means to the future of their villages. These children and the older generations would lose that foundation and encounter a way of life they do not want to engage in, and in places they do not want to live. Fear and uncertainty is already a constant condition in the salmon fishing business. It is the hope of these communities that policy decisions support their culture, lifestyle, community health, emotional health, and financial well-being. It is further the hope of these communities that the Board of Fisheries takes a long-view of the management plans, recognizes their conservation success overall, and does not reallocate fish away to other areas because of short-term changes in the ecosystem.

The report demonstrates a long and valuable heritage of indigenous Alaskan fishermen surviving and thriving on the ocean, a heritage that is threatened by ecological shifts and politics. The Gulf of Alaska is currently experiencing ecosystem-wide change and Borough fishermen contend that they are not to blame for the downturn in the Chignik fishery. Aleutians East Borough fishermen, their families, communities, and processors also endure the volatility of salmon returns, ocean conditions, and market changes that they cannot control on top of the political criticisms from other regions of Alaska.

Alaska Board of Fisheries
Board Support Section
P.O. Box 115526
Juneau, AK 99811-5526

February, 7, 2019

Dear Mr. Chairman and members of the Board of Fisheries.

Subject; Chignik Commercial, Sport, Personal Use and Subsistence Salmon Fishery.

The Chignik Commercial Salmon Fishery appears to me to have a serious critical rearing habitat problem at Black Lake/Chignik Lake and tributaries. In 1990, Greg Ruggerone, NRC Consultants and myself completed a Black Lake winter study by airboat to suspend baited minnow traps under the ice at various locations throughout Black Lake, Chignik Lake and Alec River wye. Catches yielded very few sockeye smolt in both Chignik lake, Black lake and Alec river wye. More trout, some Coho smolt, 3 and 9 spine sticklebacks and isopods. The last few warmer winters I observed predators, all species of ducks and birds of fresh and salt water, seals, sea otters feeding through-out winter. Lakes and tributaries are ice free at the time of this writing. Smolt that have traditionally overwintered at Chignik and Black Lake may be spending more time rearing in Chignik Lagoon. Chignik Lagoon habitat is sparsely overgrown with thick eel grass and kelp. Salmon smolt typically migrate to better rearing conditions as part of their survival skills.

Chignik river weir counting methods using underwater video may be too accurate. Local residents see a lot of male sockeye and smaller immature fish being counted as part of the escapement goals. Common sense mindfulness would indicate a higher number percentage of males and immature sockeye mean less return per spawner. One solution may be to raise the escapement goals for early and late sockeye runs by 25% of the 30-year historical average.

The Chignik salmon fishery can no longer support a shore-based processing plant. Lake & Peninsula Borough and the City of Chignik both depend on raw fish tax for their annual operating budget. City of Chignik, Chignik Lagoon, Chignik Lake, Perryville, Ivanof and non-residents that winter in Alaska, Washington, Oregon and many other states depend upon annually. Village employment opportunities are essentially non-exist, the Lake and Peninsula School district employs local teachers, substitute teachers, librarians and gym teachers. Younger generations are forced to move to the cities to find employment or trade skills. Low school enrollment is putting schools in jeopardy of closing by not meeting the State of Alaska minimum student enrollment guidelines.

Spawning, critical rearing habitat, ocean survival and allocations of returning salmon by all user groups are a very important part of the existence of all salmon. All users need to share in the burden of conservation the Chignik commercial, sport, personal use and subsistence salmon fishery is near extinction. Minimum escapements with no harvest opportunity is unacceptable to our way of life.

Sincerely, Alvin Pedersen

Alvin Pedersen, P.O. Box 29, Chignik Lagoon, Alaska 99565

WRITTEN COMMENTS to the Alaska Board of Fisheries

From Amy and Jack Foster Jr., P. O. Box 254, Sand Point, Alaska 99661

February 6, 2019

PROPOSAL 132

5AAC 09.360. **SOUTHEASTERN DISTRICT MAINLAND SALMON MANAGEMENT PLAN.** Revise the Southeast District Management Plan to allow commercial salmon fishing with set gill net gear and after July 11 seine gear concurrent to open commercial fishing periods for salmon in the Chignik Management Area ….

My husband and I are of Aleut Native Unangan descent with a mix of Scandinavian ancestry. We both come from prominent indigenous villages that are currently abandoned today. Amy from Unga (original Aleut name "OUGNAGOK"), with parents and grandparents from Squaw Harbor, Pirate Cove and Korovin Island and Jack's family from Sanak Island. The area is rich in cultural history with an abundance of fish and marine life ideal for subsistence and commercial use. Economic necessity forced these residents to move and all these villages are abandoned today with the majority of the former residents moving to Sand Point and elsewhere. If people could leave such spectacular places as these old historical town sites that are dependent off the sea then no town or village is secure and we must strive to maintain viable sustainable communities that we currently live in.

Our Indigenous Aleut (Unangan) native people within the area have traditionally fished for salmon for several thousand years. Our Unanagn People developed a variety of fishing techniques but these basic techniques used by our ancestors are utilized today in our fishery in regards to basic catching techniques of traps, gillnets, seines and hooks.

Also to be noted is the fact that my father, uncle's and grandfathers have salmon fished from Kodiak, Mitrofania, and the Aleutians onwards northward into Bristol Bay. Catching Salmon began for me when I was 12 until I graduated from High School. Every summer during the first week of June my family would pack us three kids all up and we would travel via boat to the fishing grounds in the SEDM set net fishing in Fox Bay. Since before limited-entry my father fished mainly on the SEDM summer after summer for over seventy years.

Jack has been fishing since he was young with over 50 years' experience in all three-gear types of salmon fisheries. Drifting and seining Jack has done. In 2000 Jack decided to switch from seining to the set net fishery. A few years later his wife joined him in set netting along with their three children. Family, but not all, to this day is still fishing onboard the boat with a crew and grandchildren easing their way into crewing in the set net fishery.

Many set netters have recorded DNR shore fishery leases that are paid yearly to the State of Alaska and some of those leases are in the SEDM. The majority of those shore fishery leases have been in place in the same location for over 100 years. The only difference is hands have changed on who holds title to the shore fishery lease; the locations are still the same throughout the years.

A brief description of the management of the SEDM fishery:

"Under the current SEDM Salmon Management Plan (5AAC09.360) states:

1. *The percentage of Chignik bound sockeye salmon allocated to the SEDM fishery is 7.6% of the total number of sockeye salmon harvested in the CMA through July 25.*
2. *From June 1 through July 25, 80% of the sockeye salmon caught in the SEDM are considered to be Chignik bound salmon, excluding NWSS after July 1.*
3. *Beginning July 1, sockeye salmon caught in NWSS will not be counted toward the Chignik allocation. Fishing periods in NWSS after June 30 will be based on sockeye salmon escapement into Orzinkee Lake….*
4. *The Board of Fish established a closed waters area encompassing Kupreanof Point from July 6 through August 31. 5AAC09.350(371) ADF&G may extend the closed waters area through the end of the season by emergency order when the waters specified in 5AAC 15.350(20) are closed to conserve Coho salmon.*
5. *From July 26 through October 31, the fishery is managed for local pink, chum and Coho salmon stocks.*
6. *From July 26 through October 31, the fishery will be closed for at least one 36 hour period within a seven day period."*

Also, we have to contend with another regulation that is hindering any viable efforts to fish on the SEDM, which is creating havoc and a huge negative impact on the SEDM fishery, which is the Chignik River Sockeye Salmon harvest forecast, and SEDM Allocation: "*ADF&G will manage the fisheries so that the number of sockeye salmon harvested in CMA, for both runs combined, will be at least 600,000 fish and the harvest of sockeye salmon considered to be Chignik bound in the SEDM will approach as near as possible, 7.6% of the total CMA sockeye salmon harvest through July 25. If the Chignik River early run fails to develop as predicted, the department will curtail fishing in the SEDM, excluding Orzinski Bay, until at least 300,000 sockeye have been harvested in the CMA through July 8. From approximately June 26 through July 8, the strength of the Chignik River sockeye salmon late run cannot be accurately evaluated due to the mixing of early and late run stocks. During this transition period, ADF&G may close or restrict commercial salmon fishing in SEDM until the strength of the late run has been determined. After July 8 if at least 300,000 sockeye salmon have been harvested in the CMA and escapement objectives are being met for the Chignik late run, the department will manage the fishery so that the number of sockeye salmon harvested in the CMA is at least 600,000. The number of sockeye salmon harvested in the SEDM before July 25 will be managed so the 7.6% of the total harvest of Chignik River sockeye salmon is taken in the SEDM. However, the harvest in SEDM at any time*

before July 25 may be permitted to fluctuate above or below 7.6% of the Chignik Area harvest."

One thing that should also be noted which wasn't included in our original proposal is the fact that SEDM is set gill net only from June 1 through July 10. From July 11 on it is open to seine and set gillnetting gear. In the SEDM it is assumed that 80% of salmon are Chignik bound through July 25 and in the Northwest Stepovak Section through June 30 despite the fact that the most recent genetic study in the SEDM shows that this number when averaged across the 3 study years (2010-2012) is closer to 66% not 80%.

There are several items that are wrong with the current SEDM regulations.
First I would like to point out that our neighbors in Chignik had a very big bust in their fisheries last year. Noted also is the fact that it wasn't a good season for many boats and fishermen in our area last year either. We would also like to point out to the board that under the current regulations of the SEDM for fishermen that historically fish **in the SEDM it is a bust for us also** not only last year but for several intermittent years since these regulations have been implemented.

Listed below are SEDM closures that are pulled from the ADFG's Annual Management Reports for the Alaska Peninsula and Chignik:

SEDM Closures

1997 – No harvest in SEDM except NWSS CMA opening on June 17 delayed because fishermen were on strike for higher prices. The next opening was on June 27 – June 28, reopened July 1-July 7, then again July 11-14.

2007 – No harvest in SEDM

2008 - No **harvest in SEDM**

2014 - No harvest in SEDM

2018 – No harvest in SEDM

We fishermen along with some from the Chignik area moved to another area trying to scrape away a season moving away from a historical, traditional area of fishing.

If nothing is done the local set netters will continue to be denied access to historical fishery areas, which is affecting the viability of set netting in the region and continues to overcrowd within the islands. Also, the value of the permits will continue to drop along with the viability of a stable historical set net fishery. The islands have very few good producing set net sites to be shared by too many.

I would also like to make it clear that there are similarities and differences between our proposal and 129-131. These proposals seek to correct numbers in regulations that are obviously wrong now that we have the WASSIP results. They address how many fish of Chignik origin are presumed to be in our catches.

The main problem addressed in our proposal is that we are limited in time to fish in many years or like last year and in 2014 we don't get to fish at all due to the fact that some prior board decided to tie SEDM/Cape Igvak fishing into CMA harvest, despite the fact that no other fishery operates that way.

There was one year in 2011 Chignik fishermen realized historic returns of red salmon despite continuous fishing in the SEDM by the set net fleet. The set net fleet only realized moderate returns with no impact or obvious effect on Chignik. The SEDM mainland fishery was open in June for over 30 days with set net fishermen catching very low numbers of red salmon daily not making an impact on our neighboring Chignik fishery.

The idea brought forth to fish at the same time as Chignik openings is just the minimum fishing time solution. The SEDM fishery presents no risk to conservation or management of the Chignik run even if it were open on a regular schedule like the rest of the South Peninsula.

The SEDM fishery for June and July should be given back to the set netters. Chignik has had several record runs and met their escapement goal every year besides last year. One missed escapement goal does not prove that we have a huge impact on their fishery.

Another item of concern for the set net fishermen is short periods of an opener, anything shorter than what we have presently in place will have economic, harmful effects upon a set net fisherman. For our set net operation under ideal fair weather conditions it takes at least an hour to set our nets in the water once the clock is ready for the opener not including the prep time of getting the gear ready to be set into the water and we start picking up our nets 4 to 6 hours before the season is closed, we have no weather grace factors in our fishery, if the seas are 15 feet or more and the tides strong we still need to be at our nets retrieving our gear in open 18 or 21 foot skiffs operated with an outboard motor.

How can it be that Chignik can control as much of the area in Area M as the entire Chignik area? How can another area manage our area on arbitrary factors and numbers?

Chignik area has experienced record runs these past 20 years, with the exception of last year. Fishing stocks affected in that area have increased due to moving from a Lagoon fishery to a Cape fishery.

How do we change a management plan on the SEDM when we are managed under Chignik, should we then be able to fish the same as Chignik? The fishermen fishing in SEDM have been squeezed out of an area. If we are managed under the Chignik Plan we should be able to benefit from that fishery and be able to have the same opportunities to harvest the Chignik fish. We are being treated like Chignik permit holders when the fact is that we are set netters fishing old sites that have been fished for over 100 years. These proposals, both current and past proposals that Chignik fishermen are putting in to restrict our area is basically putting us slowly out of business if there is no diversity or regular consistent openings in our area.

This board is going to act on this issue at this meeting one way or another. Is it right to shut down one area to guarantee their neighbors millions of dollars' worth of priority to a public resource? Our families, our fishermen, our community has depended on this resource for many decades and years, 1915 is over 100 years but then again if you think of our Unangan (Aleut) ancestors it's thousands upon thousands of years of utilizing the resources of the SEDM. Please don't let a single bad season in Chignik stop you from giving us a chance to fish where our families have fished for generations. The severe economic binders the board has placed on the Southeastern District Mainland should be removed. The salmon are a state resource that the fishermen in this area have as much a right as anyone else to harvest.

This board also needs to address the science or lack thereof in their deliberation rather than the political pressures by outside influences and address the blatant catch 22 management plan that was devised in the past. There is new scientific data that should be calculated into the SEDM considering that this proposal and others only ask for what has been in place before in this area, fishing time this area originally had.

Things are compromised and we need an overhaul, yes a huge overhaul, so that the once profitable historical fishery is returned in the SEDM and no more undue hardship is put upon us.

PROPOSAL 148

5AAC15.357 CHIGNIK AREA SALMON MANAGEMENT PLAN

Amend the Chignik Area Salmon Management Plan so that pink, chum, and Coho salmon stocks in the Western and Perryville sections of Area L will be managed based on the strength of the pink, chum, and Coho salmon stocks in the Stepovak Sections of Area M **deleted Shumagin Islands from original proposal**.

For many years local set net and seine fishermen have been denied access to harvesting salmon in July, August and September these past few years due to low numbers of westward returning chum and pink salmon in the Stepovak Area

(SEDM). In past years at the same time Area M fishermen are shut down and not able to fish while Chignik fishermen are fishing day after day catching and producing high numbers of Pink and Chum Salmon which may be also destined to the Stepovak Area while Area M fishermen are shut down and salmon are not returning to the local streams. When pink stocks and chum stocks have low escapements within the Stepovak Area of the SEDM during July, August and September the Perryville District and the Western District will be closed until there are significant returns of salmon in the streams in Area M in the SEDM district and Area M fishermen are able to commercial fish. In early July and August there should be at least one closed period within a seven-day period in order to maintain healthy fish stocks in the SEDM.

An option for adoption would be A. From July 9 through September 30, (1) the department shall manage the Chignik fishery for the Perryville and Western Districts of the fishery based on the abundance of pink, chum and coho salmon stocks in the Stepovak area of the SEDM. (2) When fish stocks of pink, chum and coho salmon have low escapement in the Stepovak Area of the SEDM Area during July, August and September the Perryville District 275-40, 275-50, 275-60, and the Western District 273-74, 273-80, 273-90 will be closed, and there are significant returns of salmon in the streams and Area M fishermen are able to commercial fish in the SEDM. (3) In July and August in Perryville District and Western District there shall be at least one closed period within a seven day period; however, one great avenue to address our current problems is to get the right management plan for Area M, ignoring Chignik. Or another approach would be to tag along with Chignik because that's better than what we currently have. Most people think we can't fix the present plan so we have to go with option B. and that would be to Fight to Fix or basically get rid of it.

In years past while fishing in July a short 48 hour opener while sitting in the wheelhouse listening to the VHF radio fishermen from Area L fishing in the Western District converse back and forth talking about the numbers of salmon they are catching, how good the sets were, and where the tenders to offload at were. At the same time, we are closed the majority of the month of July thereafter with no openings in August. With this fishery being just a few miles away how can we not wonder with no fishing access or time on the SEDM is this having an impact on the escapement of the streams on the SEDM? In essence we feel we are bearing 100% of the conservation costs. How can we not wonder if the Western Districts of CMA are catching fish destined for SEDM by referencing the department themselves stating that Kupreanof is a mixing zone for both areas in past meetings and actions that have been taken at Kupreaneof?

In summary we would like to be able to fish in the SEDM area and change the SEDM management plan to enable the fishermen to fish in a historical fishing area and not be so severely limited in time to fish or not fish at as has been the case for many years in the SEDM.

Submitted By
Ben Allen
Submitted On
2/7/2019 10:53:59 PM
Affiliation
Chignik Fisherman

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Mr. Chairman, members of the board,

We have an issue that is not being looked at, the impact of interception on terminal fisheries needs to be addressed as well as the cumulative effect of many regulation changes. Currently it seems you look at individual factors and try to adjust for each thing that is perceived as wrong and limit your view to the area without adding up the cumulative and outreaching effects.

The Board needs to understand that in reality Area M sockeye and chinook fisheries are an extension of two other fisheries, one on either side of them, but with no accountability in anyway to the terminal fisheries that support their fishery(except SEDM). Having no significant sockeye or chinook runs of their own and with the ability to fish every day, the impact on these runs must be considered. The Area M fishery has changed over the years, as shown as in Appendix B1 of the current South Peninsula AMR. There were windows of opportunity for the fish to travel through unencumbered but as each change has happened individually, a cumulation of events have occurred that have created a windowless fishery. If this fishery is managed by calendar date regulation, without opportunity for salmon to have some kind of open water or catch limit, like the previous GHL, what is to protect the salmon as they return to the river systems they are traveling to, or leave enough fish for Chignik, Bristol Bay and AYK with opportunity to have viable and robust fisheries? The agenda change request that was submitted last summer to the board by the Chignik AC, would be a good start to the necessary return to the previous protective regulations that existed in the 1980's. In figure 1 of this ACR, the calendar with the fishing blocks shows how difficult it is for fish to move through that area now, to continue on to their terminal areas.

Area M terminal stocks are managed differently than area L. In area M the bays are shut down in order to ensure local stock return but the capes and outside fishing area is still opened. Once the escapement is met, the bays are then opened to allow for fishing of local stocks, but all other areas are still available for fishing regardless of the impact to other terminal areas. In area L the bays, capes and outside fishing area is closed until escapement is met. If the terminal stock of a specific inner bay is met, but there are other areas without appropriate escapement, then only that bay might open, without access to any other fish. It is said that area M is managed on local stocks during certain times of the year, which may be true, but it fails to mention the complete disregard of the migrating nonlocal salmon stocks that are being targeted when they fish outside the bays and the lagoons. If they were truly being managed on local stocks they would be pressed up inside the inner bays where they would be able to concentrate their fishing effort on the local stocks. This being the case consideration of the stocks that they are intercepting needs to be required because they are largely an extension of the terminal fisheries on either side of them.

Impact comparison is something that should be considered more heavily. To simplify the impact that the South Peninsula has on the two terminal fisheries the average catch numbers for Bristol Bay is approximately 24 million every year and Chignik's total is approximately 1.4 million. Using these numbers the impact equivalent should be 16 Bristol Bay bound sockeye to 1 Chignik bound sockeye caught in the South Pen. fishery (a 16/1 ratio), but catch numbers during the WASSIP study years were (0.68/1) in 2006, (6.9/1) in 2007, and (6.8/1) in 2008. This is a greater impact on Chignik stocks, 23.9 times greater in 2006, 2.3 in 2007 and 2.4 in 2008. Due to the lack of the GHL of 6.8% Unimak and 1.5% Shumagin that ended in 2001, the concentration of the fishery shifted to the Shumagin island area, creating more of an impact on Chignik bound and east of WASSIP bound sockeye. In 2007 the offset of gear type fishing created a lack of windows and endless June fishing, unlike 1984 season, the board placed a limit on fishing time, not to exceed 96 hours per week and not more than 72 consecutive hours in order to allow "escapement windows." (appendix B1, 2018 South Peninsula Salmon AMR), thus further impacting Chignik and east of WASSIP bound sockeye.

It's my understanding that the fisheries in the South-Central area were minimal pre 2001 and now have become a more significant part of the fishing area to the degree of putting caps on this fishery and yet this still has not made a significant enough of an impact.

For understanding, 2017 was a large mixed fish year for Chignik, if the sockeye did not make it to the river as was in 2018 we would have had no opportunity to go out and catch the other species; because the South Pen opens by date the opportunity is available every year without accountability.

Year after year, as the fishing vessels have grown, weather has also been less of a restriction. Each of these things has made a significant difference in the impact of the amount of fish that are Chignik bound, but when are all added together, they have helped to create the devastation that is now Chignik. This is not unlike the parable of the 10,000 paper cuts: one thing does not cause devastation but many little things can cause complete annihilation. Ocean conditions, weather patterns, small fry returning to the ocean, freezing river conditions, and large smolt die offs are not something that can be repaired by this board but they do also factor in to the difficulty of returning stocks. I don't expect you to adjust for Mother Nature as its impacts are shared by the South Penn and the terminal area fisheries but I do expect you to do your job and to ensure the run that was whittled down by your predecessors and some of you can return to its terminal area and in a volume that Chignik can have a viable fishery. Please take serious note of the ACR constructed by the Chignik AC, it was not designed to punish the South Penn fishery nor is it a tit-for-tat proposal, it was designed in the best interest of both groups to ensure both will have a fishery and if necessary, return fishing pressure back to the plentiful Bristol Bay bound fish. Also please do not forget that the entire area M fishery is an extension of two other fisheries but with no accountability to the survival of either.

This board has the opportunity again to help change the outcome of an area on the verge of now collapsing.

Thank you for taking the time to read this and understand our plight. I agree with the Chignik AC pertaining to the proposals of this meeting. I ask you to sincerely consider voting in the direction of the Chignik AC as it will stabilize the Chignik fishery. If you have any questions please don't hesitate to call or email.

Sincerely,

Benjamin Allen

February 5, 2019

Alaska Board of Fisheries,

Chignik fisheries was such as depressing and unbelievable year for all Commercial fisherman that solely depend of the fishing income to support their family. I was born and raised in Chignik. My grandfather was one of the first fisherman here in Chignik. I have always been proud to be able to support my family in a lifestyle that I grew up doing and love.

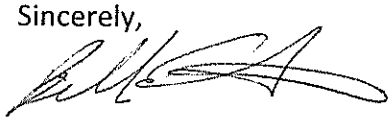
The Chignik fisherman have been voicing our concerns about our fisheries for years and it has fallen on deaf ears. I hope that all the Alaska Board of Fisheries members have their ears wide open now. It is a shame it took a "Declaration of Economic Disaster" to take place and a total failure of a salmon run to hopefully get the Board of Fisheries attention.

There is a definite need for the conservation burden to be shared by all fisherman in every area of Alaska Salmon water. It still amazes me that Alaska Department of Fish & Game allowed such poor management over Area M and Area L until it reached such a peak disaster. The interception of fish in the Shumagins and Dolgoi Island area has got to be stopped. There needs to be limited day of fishing of ALL GEAR so windows can be established. Chignik Management Area needs to have not only their escapement needs met but a certain amount of fish harvested in order to build up our Chignik sockeye fisheries before fishing is allowed in the Shumigans and the dolgois Island.

BOF needs to consider that before State of Alaska adopted the limited entry management the fisherman of south Alaska Peninsula received dual permits for both seine and gillnet. Sold and transferred permits INCREASED EFFORTS IN THE SEDM FISHERIES. There is twice as many permits being used and the impact has caused devastation to other area especially since it a fact that 80 % of the fish traveling through the SEDM is Chignik Bound.

It's is past time to start managing the CMA properly and keep it a sustainable fishery.

Sincerely,



Billy Anderson/ Chignik Fisherman

ALASKA BOARD OF FISHERIES
ALASKA PENINSULA/CHIGNIK/BERING SEA-ALEUTIAN ISLANDS FINFISH
February 21-26, 2019

Alaska Board of Fisheries Proposals
WRITTEN COMMENTS

BY

The Bristol Bay Economic Development Corporation

February 7, 2018

Board Meeting: February 21-26, 2019

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STATEMENT OF SUPPORT FOR THE CHIGNIK COMMUNITY

Bristol Bay Economic Development Corporation (BBEDC) supports the efforts of the Chignik communities in rebuilding the sockeye salmon runs that originate in the Chignik-Black Lakes system that drain into Chignik Lagoon. Accordingly, BBEDC supports, in concept, those Alaska Peninsula proposals that restrict fisheries that intercept Chignik-origin sockeye salmon, such as, Proposals 128, 134, 135,136, 137, and 138.

Additionally, BBEDC opposes, in concept, those Alaska Peninsula proposals that liberalize fisheries that intercept Chignik-origin sockeye salmon, such as, Proposals 129, 130, 131, 132, 133, 139, 140, 141,142, and 143.

South Unimak and Shumagin Islands June Salmon Management Plan

(Proposals 135, 136, 140, 143)

PROPOSAL 135 – 5 AAC 09.365. South Unimak and Shumagin Islands June Salmon Management Plan

Proposed by: Axel Kopun

Recommendation: SUPPORT.

Proponent Issue Statement: The inclusion of the entire Southwestern District and West and East Pavlof Bay Sections into the South Unimak June Fishery (Figure 1) Management Plan has had a severely detrimental impact on Chignik Fishermen due to high interception rates of Chignik bound sockeye in areas historically closed during the South Unimak June fishery. In essence, the Board created a new, expansive interception fishery on fully allocated Chignik stocks that has severely damaged all Chignik fishermen and the entire Chignik region.

What would this proposal do?

This would return the South Unimak District to its pre-2001 status. It would remove the entire Southwestern District and the West and East Pavlof Bay Sections of the South-Central District from the South Unimak District. Return the Southwestern District and the West and East Pavlof Sections of the South-Central District to their pre-2001 June South Peninsula management plan for those areas.

Current regulations

5 AAC 09.365. South Unimak and Shumagin Islands June Salmon Management Plan

(b) The South Unimak fishery takes place in the Unimak District, the Southwestern District, the East Pavlof Bay and the West Pavlof Bay Sections of the South Central District, and the Bechevin Bay Section of the Northwestern District.

BBEDC COMMENTS: BBEDC SUPPORTS Proposal 135.

In February 2004, the Board established:

1. a new, expanded fishing schedule,
2. removed previously enacted chum salmon harvest restrictions,
3. and the South Unimak fishery was expanded to include the entire Southwestern District and the West and East Pavlof Bay sections of the South-Central District.

BBEDC believes that the Alaska Board of Fisheries (Board) erred in expanding the South Unimak fishery on stocks that were fully allocated. The inclusion of the entire Southwestern District and West and East Pavlof Bay Sections into the South Unimak June Fishery (Figure 1) Management Plan has had a severely detrimental impact on Chignik Fishermen due to high interception rates of Chignik bound sockeye in areas historically closed during the South Unimak June fishery. WASSIP data indicate that the harvest of Chignik-origin salmon ranged from 4,087 in the Ikatan Area (South Western District) in 2007 to 170,920 sockeye salmon in the Dolgi Island Area (South Central District) in 2006 (Table 1). Harvest or exploitation rate on Chignik-origin sockeye salmon by the June Fishery ranged from 3.4% in 2007 to 13.3% in 2006, and averaged 6.8% over the years of the WASSIP study, 2006-2008 (Table 1).

Table 1. Chignik-origin sockeye salmon harvested in the June South Alaska Peninsula by harvest area and District. The Dolgi Islands represent the South-Central District and the Ikatan Area represents the South Western District. WASSIP, 2006-2008.

WASSIP: 206-208

Chignik -Origin Salmon	Median Harvest Estimate				Contribution to Fishery Harvest (%)				Regional Stock Harvest Rate (%)			
Fishery	2006	2007	2008	Avg	2006	2007	2008	Avg	2006	2007	2008	Avg
Shumagin Islands	76,798	22,488	27,711	42,332	17.4	2.6	4.3	8.1	3.3	1.4	1.8	2.2
Dolgi Isands	170,920	18,226	12,168	67,105	70.3	22.7	34.4	42.5	7.4	1.1	0.8	3.1
Ikatan Area	7,723	4,087	5,438	5,749	19.9	2.2	3.0	8.3	0.3	0.3	0.4	0.3
Unimak District	50,360	11,409	11,412	24,394	24.1	2.4	1.3	9.3	2.2	0.7	0.7	1.2
Totals: June South Alaska Peninsula	305,407	56,518	57,193	139,706	32.8	3.6	3.3	13.2	13.3	3.4	3.7	6.8

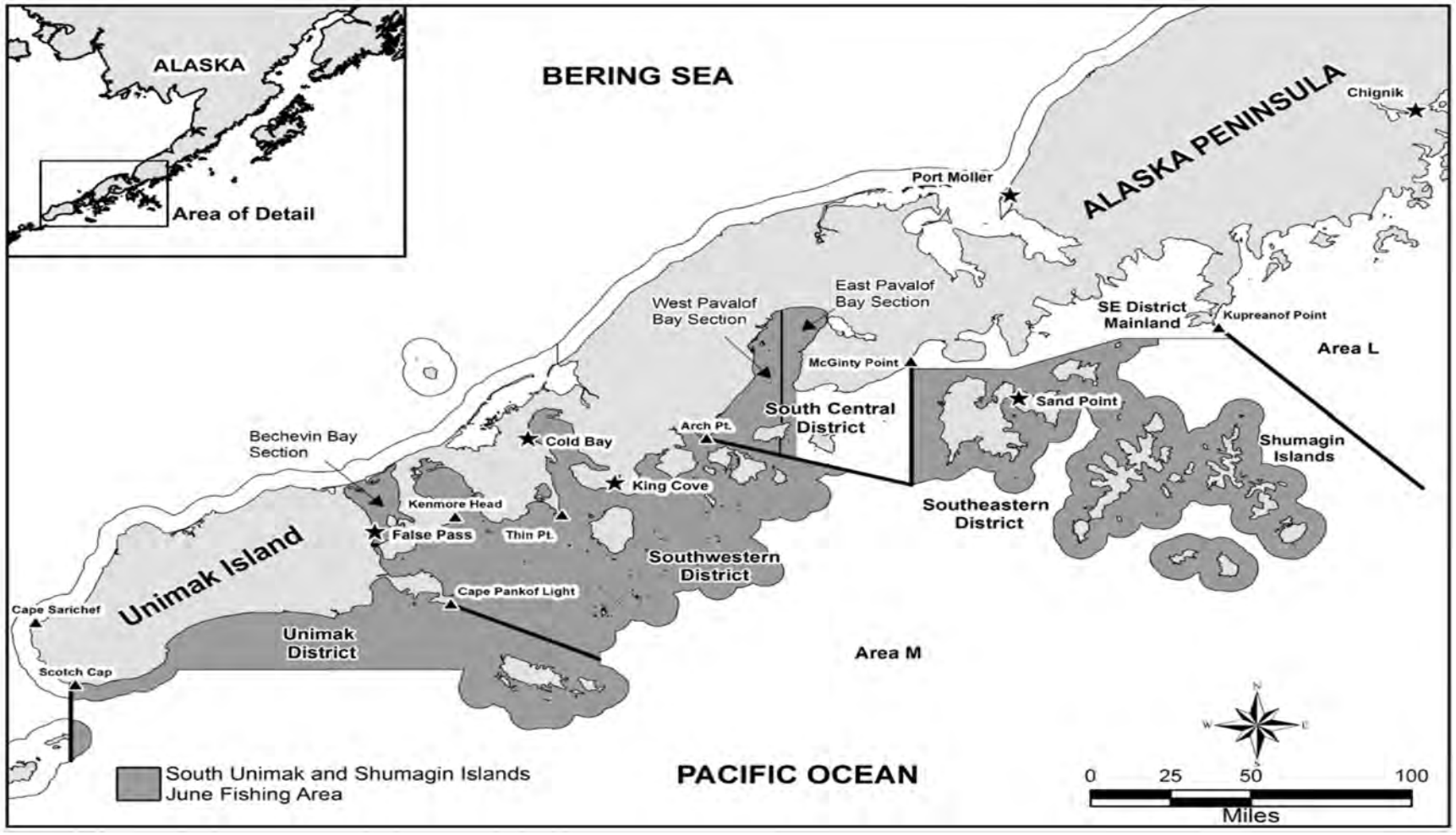

Figure 1. Map of the South Alaska Peninsula Management Area and the locations of the South Unimak and Shumagin Islands June fisheries, 2018.

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PROPOSAL 136 – 5 AAC 09.365. South Unimak and Shumagin Islands June Salmon Management Plan.

Proposed by: Fairbanks Fish and Game Advisory Committee

BBEDC Recommendation: <u>SUPPORT</u>

Proponent Issue Statement: Excessive harvest of migrating discrete stocks of concern in the Cook Inlet, Bristol Bay, and AYK areas.

What would this proposal do?

This proposal would repeal the current South Unimak and Shumagin Islands June Salmon Management plan and replace it with selected portions of the South Unimak and Shumagin Islands June Management plan by the Board in January 2001. Specifically, the proposal would:

1. recognize that Chinook salmon are harvested in this mixed stock fishery;
2. may eliminate certain areas within the South-Central and South Western District from this fishery;
3. changes the ending date for both the drift gillnet and seine fishery and the set gillnet fishery from June 27 and 28, respectively to June 30 for both fisheries.
4. Dramatically changes the fishing schedule :
    a. reduced seine and drift GN fishing time by 59%;
        i. Beginning June 10 through June 30, the commissioner may open, by emergency order, commercial fishing periods for purse seine and drift gillnet gear as follows:
        (1) commercial fishing periods may occur only from 6:00 a.m. to 10:00 p.m. and may not be open for more than
            (A) three days in any seven-day period;
            (B) 16 hours per day;
            C) 48 hours in any seven-day period;
            (D) two consecutive 16-hour fishing periods in any seven-day period;
    b. reduced set GN fishing time by 19%
        i. Beginning June 10, the commissioner may open, by emergency order, commercial fishing periods for set gillnet gear in both the South Unimak and Shumagin Islands fisheries as follows:
            1. from June 10 through June 30,
            2. (A) commercial fishing periods may occur only from 6:00 a.m. to 10:00 p.m.

This proposal does not reinstate the chum salmon harvest regulations that were part of the 2001-2003 management plan.

The major thrust of this proposal is to dramatically change the fishing schedule for these fisheries. The 2019 fishing schedule under current regulations is presented in Figure 2, The proposed fishing schedule is presented in Figure 3.

BBEDC COMMENTS: <u>BBEDC SUPPORTS Proposal 135.</u>

In addition to intercepting Bristol Bay, Cook and AYK sockeye and chum salmon stocks, this mixed stock fishery may also intercept migrating AYK, Bristol Bay and Cook Inlet Chinook salmon stocks. Based on the WASSIP study, this mixed stock fishery primarily harvest Bristol Bay sockeye salmon stocks. During the years, 2006-2008, Bristol Bay-origin sockeye salmon average contribution to the specific area harvest ranged from 29.9% in the Dolgi Islands Area to 81.0% in the Ikatan Area, with an overall average for the total June fishery of 71.1%. Average number of Bristol Bay-origin salmon ranged from 20,317 salmon in the Dolgi Islands Area to 500,270 salmon in the Shumagin Islands Area . The average harvest for the June fishery during 2006-2008 was 1,072,773 Bristol Bay-origin sockeye salmon.

The current June fishing can commence on June 7 for the set gillnet fishery and June 10 for the seine and drift gillnet fishery (Figure 2). The current maximum fishing schedule allows for four 88-hour fishing periods, followed or separated by 32- hours of fishery closure for both the seine and drift gillnet and set net fisheries (Figure 2). Additionally, the set gillnet fishery also has one 64-hour, ending on June 29 at 10:00 pm (Figure 2). Although the fishing schedule stipulate a 32-hour closure between 88-hour fishing periods, there is no time, from June 7 through June 29 that commercial fishing gear is not in the water, fishing on migrating salmon stocks (Figure 2). Consequently, there is no true windows where migrating salmon can move through these fisheries unmolested.

BBEDC is concerned that the continuous fishing in the South Unimak and Shumagin Island fisheries does not allow adequate time for portions of salmon stocks to escape the fishery. This may especially be true for salmon stocks of concern. In the past, AYK-origin chum salmon stocks of concern prompted the Board to reduce the harvest of these stocks. The Board passed regulations that either limited the chum salmon harvest or closed or delayed fishing periods because of low sockeye to chum ratio in test fisheries. Because some people suspected that fishermen participating in these fisheries were discarding chum salmon to either keep within the chum salmon harvest cap or to increase the sockeye to chum ratio, these chum salmon-saving regulations were terminated in 2001. The current proposed fishing schedule allows no fishing for any gear type daily, between the hours of 10:00 pm to 6:00 am (Figure 3). Because the seines and drift gillnet fleets fish farther offshore than the set gillnet fleet, the reduced number of hours allowed for the seine and drift gillnet fishery of 48 hours during any seven-day period, along with the true daily windows between the hours of 10:00 pm to 6:00 am, allows for portions of the migrating salmon runs to pass through the fishery with less exploitation. We believe that portions of all migrating fish runs, especially salmon stocks of concern, should be able to escape theses fisheries. Therefore, we strongly support the passage of Proposal 135.

Current Regulations: South Unimak and Shumagin Islands Fishing Schedule							hrs / week	
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Set GN	Drift GN&PS
						1		
							0	0
2	3	4	5	6	7	8	42	0
9	10	11	12	13	14	15	134	106
16	17	18	19	20	21	22	106	136
23	24	25	26	27	28	29	134	110
30							0	0
						Totals	416	352

Set GN Fishing Schedule Seine & Drift GN Fishing Schedule

Figure 2. Maximum number of hours of fishing for the set gillnet and seine and drift gillnet fisheries, under current regulations, 5 AAC 09.365, for the South Unimak and Shumagin Islands June fishery, 2019 season. For each fishery, 88 hours of fishing is followed by a 32-hour closure.

Proposals 135							hrs / week	
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Set GN	Drift GN&PS
						1		
							0	0
2	3	4	5	6	7	8	0	0
9	10	11	12	13	14	15	96	48
16	17	18	19	20	21	22	112	48
23	24	25	26	27	26	29	112	48
30							16	
								0
						Totals	336	144

Set GN Fishing Schedule Seine & Drift GN Fishing Schedule

Figure 3. Maximum number of hours of the fishing for the set gillnet and seine and drift gillnet fisheries, under proposed regulations, Proposal 135, for the South Unimak and Shumagin Islands June fishery, 2019 season. Note that two of the three fishing periods in any seven-day period may be consecutive.

Table 2. Bristol Bay-origin sockeye salmon harvested in the June South Alaska Peninsula by harvest area and District. The Dolgi Islands represent the South-Central District and the Ikatan Area represents the South Western District. WASSIP, 2006-2008.

WASSIP: 2006-2008

Bristol Bay-Origin Salmon	Median Harvest Estimate				Contribution to Fishery Harvest (%)				Regional Stock Harvest Rate (%)			
Fishery	2006	2007	2008	Avg	2006	2007	2008	Avg	2006	2007	2008	Avg
Shumagin Islands	231,737	752,185	516,889	500,270	52.5	88.3	79.6	73.5	0.5	1.6	1.2	1.1
Dolgi Isands	16,262	27,362	17,326	20,317	6.7	34.1	49.0	29.9	0.0	0.1	0.0	0.0
Ikatan Area	24,518	162,689	169,300	118,836	63.1	87.3	92.5	81.0	0.1	0.3	0.4	0.3
Unimak District	125,940	407,755	771,919	435,205	60.3	86.6	91.2	79.4	0.3	0.9	1.8	1.0
Total: June South Alaska Peninsula	397,917	1,347,599	1,472,802	1,072,773	42.7	84.8	85.9	71.1	0.9	2.9	3.5	2.4

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PROPOSAL 140 – 5 AAC 09.365. South Unimak and Shumagin Islands June Salmon Management Plan

Proposed by: Sand Point Fish and Game Advisory Committee

BBEDC Recommendation: OPPOSE

Proponent Issue Statement: Areas in the south peninsula June fishery that are closed for no reason, causing loss of fishing opportunities

What would this proposal do?

This proposal would add the area from Cape Tolstoi to McGinty Point (Figure 4) to the Shumagin Island fishery. This area is in the South-Central District and is currently closed to fishing in June.

BBEDC COMMENTS: BBEDC OPPOSES Proposal 140.

The salmon stocks that contribute to the South Unimak and Shumagin fisheries are fully allocated. Although these stacks are fully allocated, over the years, the Board has added new areas to the South Unimak fishery. In 2014, the Board not only added area to this fishery, they substantially increased fishing time for both the South Unimak and Shumagin Island fisheries. These fisheries are currently on a concurrent fishing schedule. The addition of area and time to the management plan probably contributed to the overharvest of the Chignik-origin salmon. At this time when conservation of Chignik-origin salmon stocks is necessary to rebuild these stocks, adding this area, or even maintaining the areas and fishing schedules enacted by the Board to the South Unimak fishery in 2004, is not in the best interest of the Chignik-origin salmon and the people who depend on these stocks

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PROPOSAL 143 – 5 AAC 09.366. Post-June Salmon Management Plan for the South Alaska Peninsula

Proposed by: Sand Point Fish and Game Advisory Committee

BBEDC Recommendation: OPPOSE

Proponent Issue Statement: Lost fishing time and money caused by closures brought on the immature test fishery. What fish are being saved? Where are they going?

What would this proposal do?

This proposal would repeal the immature salmon test fishery in the Shumagin Islands Section (Figure 4) , 5 AAC 09.366 (i). Currently, if 100 or more immature salmon are gilled in the test fishery seine web, the department will close commercial fishing by seines in an area determined by the department. If this regulation is repealed, the commercial fisheries managed under the Post-June salmon management plan for the South Alaska Peninsula would be managed based on salmon abundance. Immature salmon will be harvested and discarded.

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BBEDC COMMENTS: BBEDC OPPOSES Proposal 143. BBEDC supports the regulation that limits commercial fisheries in certain areas where immature salmon are present in numbers that cause concern. BBEDC further understands that the origins of these immature salmon are presently unknown. Immature salmon are unmarketable and their catch results in the loss of adult catch in future years. BBEDC supports efforts to minimize the harvest of immature salmon in the federally-managed fisheries in the Bering Sea and the Gulf of Alaska. Accordingly, BBEDC also supports efforts to minimize harvest of immature salmon in state-managed fisheries.

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Northern District Salmon Fisheries Management Plan

Proposals 144-145

PROPOSAL 144 – 5 AAC 09.369. Northern District Salmon Fisheries Management Plan

Proposed by: Lower Bristol Bay Fish and Game AC

BBEDC Recommendation: SUPPORT

Proponent Issue Statement: Sharing the conservation of Bristol Bay sockeye salmon. Currently, in both Ilnik and the Outer Port Heiden Sections, conservation action on Bristol Bay salmon is only taken after a conservation closure occurs in Bristol Bay.

What would this proposal do?

This proposal seeks to restrict commercial fishing in areas both along the coast and in open seaward waters of the Outer Port Heiden (Figure 5) and the open seaward waters of the Ilnik Section when the preseason Bristol Bay forecast is 30M salmon or less. The purpose of these area restrictions when the Bristol Bay preseason forecast is 30M salmon or less is twofold. First to appropriately spread the conservation of the Bristol Bay sockeye salmon amongst all users when the preseason forecast is 30M salmon or less; and secondly, when the Bristol Bay preseason forecast is 30M salmon or less., to direct more commercial fishing on local Northern Peninsula sockeye salmon stocks, particularly the Meshik River and Ilnik River stocks, that migrate within known channels in each section. This proposal seeks to further limit the distance open to commercial fishing seaward in both fishing sections. When the Bristol Bay preseason forecast is 30M salmon or less, the seaward boundary limit would be 1.5 miles seaward throughout these two Sections.

BBEDC COMMENTS: BBEDC SUPPORTS Proposal 144. The purpose of the Northern District Salmon Management plan is to provide guidelines to the department for the management of salmon stocks in the Northern District of the Alaska Peninsula Management Area. It directs the department to manage the Northern District salmon fisheries on the basis of salmon abundance as determined by escapement information and catch-per-unit-effort information. In the SW Ilnik Section, commercial salmon fishing is permitted based on the abundance of Ilnik River sockeye salmon. In the NE Ilnik Section, commercial salmon fishing is permitted based on the abundance of Meshik River and Ilnik River sockeye salmon combined. The commercial fisheries in the Outer Port Heiden Section are managed based on the abundance of Meshik River sockeye salmon. However, if the commissioner closes the portion of the Egegik District as specified in 5 AAC 06.359(c) for the conservation of Ugashik River sockeye salmon stocks, the commissioner may, by emergency order, close the Ilnik and Outer Port Heiden Sections, and immediately reopen these Sections, with additional fishing restrictions that the commissioner determines necessary.

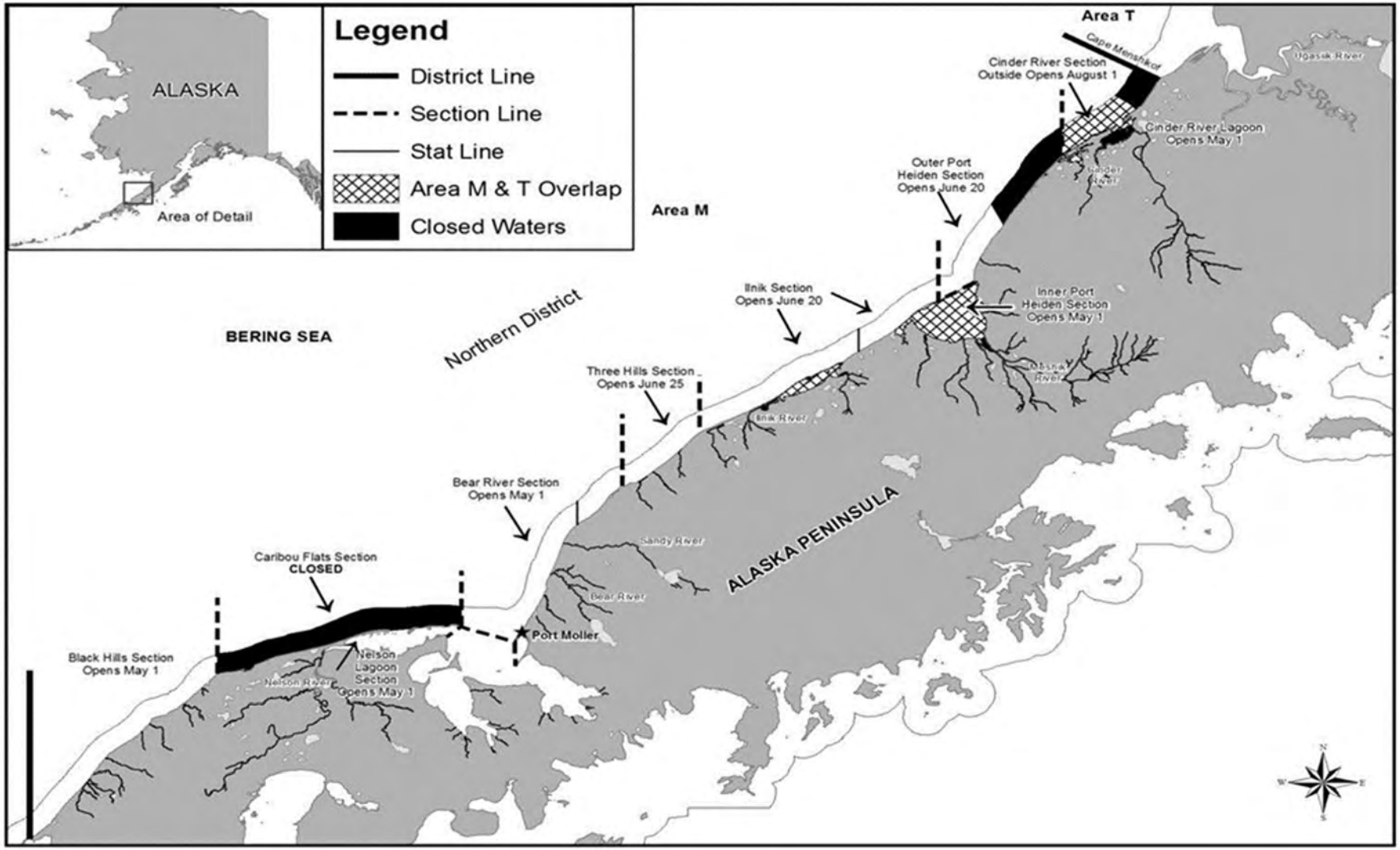

Figure 4. Map of the Northern District of the Alaska Peninsula Area showing districts, Area M & T overlap and closed waters, 2018.

Figure 5. Google Earth map of the open and closed waters of the Outer Port Heiden Section with the proposed closure line (latitude *56 E59.68' N. lat'*} for Proposals 144 and 145, Northern District of the Alaska Peninsula. Closed waters are to the north and east of the proposed closure line.

Although the Ilnik and Outer Port Heiden Section commercial fisheries are managed based on the abundance of local salmon stocks, the harvest of these sections is dominated by Bristol Bay-origin salmon (Table 3). The average contribution of Bristol Bay-origin salmon increases from the SW Ilnik Section to the Outer Port Heiden Section (Table 3, Figure 6). Likewise, the contribution of Bristol-Bay-origin salmon increases in the all the Northern District fisheries from the most southwestern fisheries, to the northeastern fisheries, with the lowest contribution of Bristol Bay-origin salmon occurring in the Bear River Section fishery harvest, while the highest contribution of Bristol Bay-origin salmon occurs in the fisheries closest to Bristol Bay, the Outer Port Heiden Section fisheries (Figure 6).

Table 3. Bristol Bay-origin sockeye salmon harvested in the SW Ilnik Section, NW Ilnik Section and Outer Port Heiden Section fisheries, WASSIP, 2006-2008.

WASSIP: 2006-2008

Bristol Bay-Origin Salmon	Median Harvest Estimate				Contribution to Fishery Harvest (%)				Regional Stock Harvest Rate (%)			
Fishery	2006	2007	2008	Avg	2006	2007	2008	Avg	2006	2007	2008	Avg
linik Section SW Area	366,210	514,497	162,912	347,873	47.2	50.0	46.7	48.0	0.8	1.1	0.4	0.8
linik Section NE Area	367,493	407,925	398,481	391,300	67.8	54.6	74.2	65.6	0.8	0.9	0.9	0.9
Outer Port Heiden		282,061	262,543	272,302		72.7	81.6	77.2		0.6	0.6	0.6

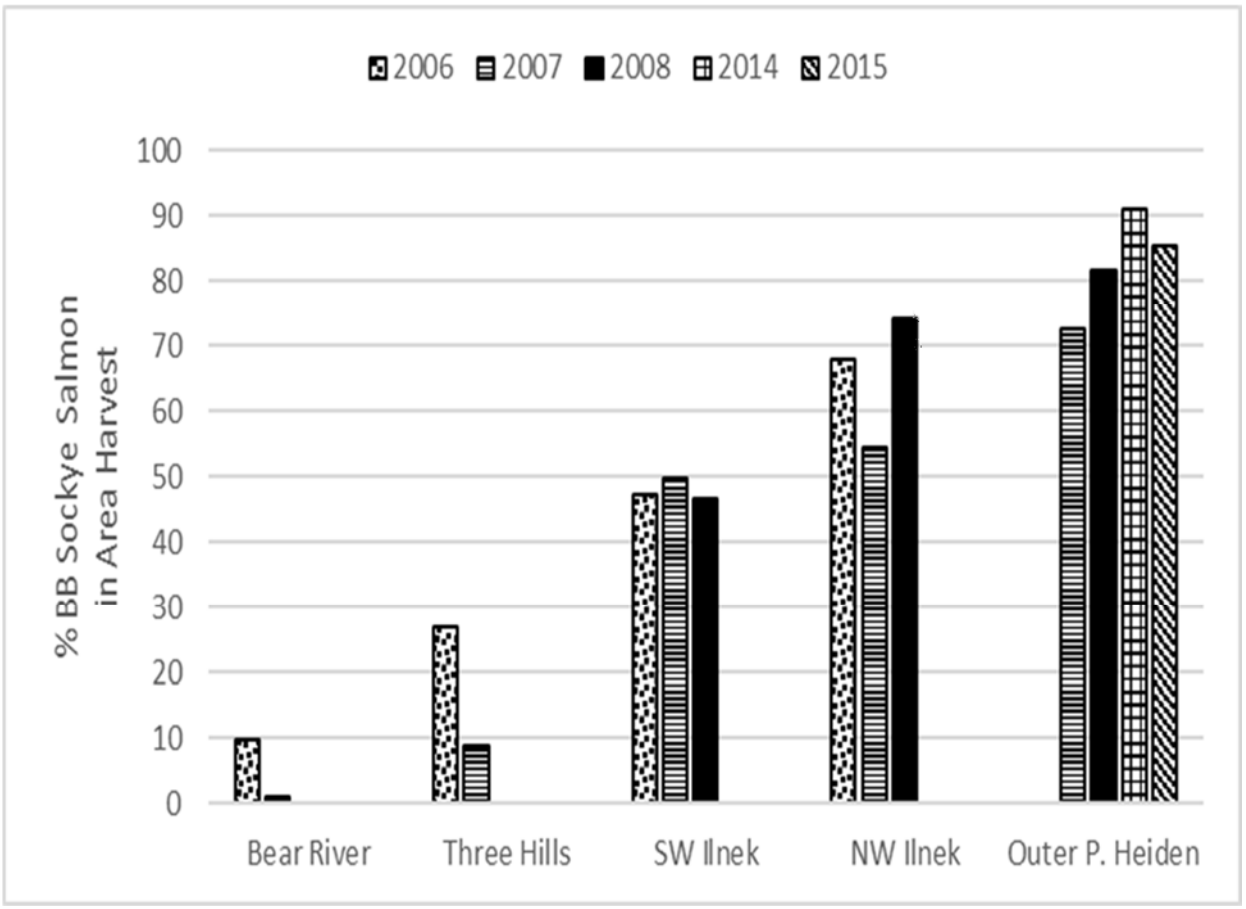

Figure 6. Contribution of Bristol Bay-origin salmon to the Northern District fisheries during the WASSIP years, 2006-2008. Additional data for the Outer Port Heiden Section in 2014 and 2015 obtained from Boatright, et al. 2016. Note: The Bear River Section is the most southwestern section and farthest from Bristol Bay, while the Outer Port Heiden fishery is the most northeastern section and closest to Bristol Bay,

Recall that the SW Ilnik commercial fishery is managed based on the abundance of Ilnik River-origin salmon; the NE Ilnik commercial fishery is managed based on the abundance of Ilnik and Meshik River-origin salmon combined, and the Outer Port Heiden commercial fishery is managed on the abundance of Meshik River-origin salmon. However, the contribution of these local salmon stocks to the aforementioned fisheries is very small. Based on WASSIP, the contribution of Ilnik-origin salmon to the SW Ilnik commercial harvest ranged from 2.7% in 2008 to 9.0% in 2007 (Figure 7). In the NW Ilnik Section, the contribution of Ilnik-origin and Meshik-origin salmon, combined, to the commercial harvest ranged from 7.5% to 11.3% (Figure 7). In the Outer Port Heiden Section fisheries, the contribution of Meshik-origin salmon to the commercial harvest in that section 6.7% to 13.9% based on WASSIP data and 0.0% to 0.4% for samples taken in 2014 and 2015, respectively, in association with the Boatright et al. (2016) study (Figure 7).

In our opinion, the Norther District Management Plan for the NW Ilnik and Outer Port Heiden Sections are fatally flawed because management of commercial fisheries is based on the

abundance of the local salmon stocks, Ilnik River- and Meshik River-origin salmon, that were very minor contributors to the Ilnik and Outer Port Heiden Section harvest during the WASSIP years. Additionally, in the Outer Port Heiden Section it appears that Meshik River-origin salmon were basically not present in the 2014 and 2015 assessment of stocks available for harvest in the Open (within 1.5 miles of shore) and Closed Areas (the area from 1.5miles to 3 miles from shore) of the Outer Port Heiden Section (Boatright et al. 2016).

Because of the good negative correlation between the contribution of Bristol Bay-origin salmon to harvests and the distance these fisheries are from Bristol Bay (Figure 6), it would follow that within the Outer Port Heiden Section, as occurs in the Ilnik Section, the harvest taken in the extreme northeastern portion of the section would most likely contain a higher percentage of Bristol-Bay origin salmon than catches near the SW boundary (Figure 4 and 5). Local knowledge indicates that most of the harvest from the Outer Port Heiden is taken near the current northeast closure line (Figure 4 and 5). Therefore, to conserve Bristol Bay-origin salmon when the preseason forecast for the Bristol Bay run is equal to or less than 30 M salmon, the area, both off shore and along the beach are restricted (Figure 5) to increase the harvest on local stocks, particularly, Meshik River-origin salmon.

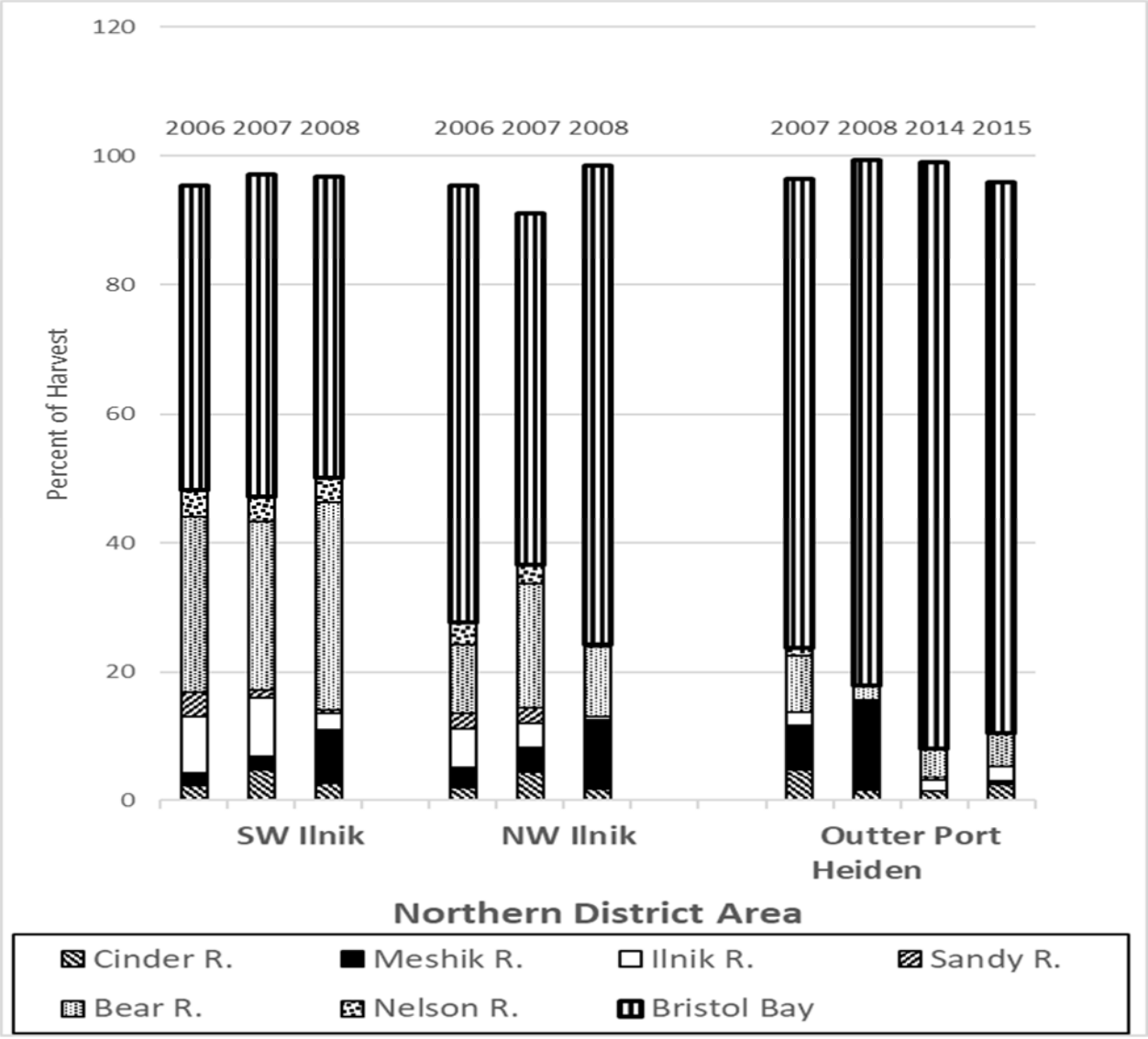

Figure 7. Percent harvest composition of the SW Ilnik (2006-2008), NW Ilnik (2006-2008) and Outer Port Heiden (2007-2008 and 2014-2015) Sections. Data taken from WASSIP for the years 2006-2008 and from Boatright et al. 2016 for years 2014-2015. Total harvest composition does not total 100% because of the contribution of other smaller salmon stocks, such as stocks originating in the Chignik Area, Kuskokwim Area, and East of WASSIP, in the harvest.

There is little doubt that the local Ilnik River-origin and Meshik River-origin salmon could sustain more harvest. Aerial survey estimates of sockeye salmon to these rivers have exceed the upper bound of the Sustainable Escapement Goal (SEG) for the last 3 years for the Ilnik River and for the last 4 years for the Meshik River (Figure 8). The highest escapement on record for both rivers was observed in 2017 (Figure 8). Note also that to determine the total run for these rivers in the WASSIP study, the aerial survey counts were multiplied by approximately 2.5 to

account for fish present on the grounds but not counted by the aerial survey observer. So, the harvestable surplus from these rivers is approximately 2.5 times the salmon excess to escapement in these rivers.

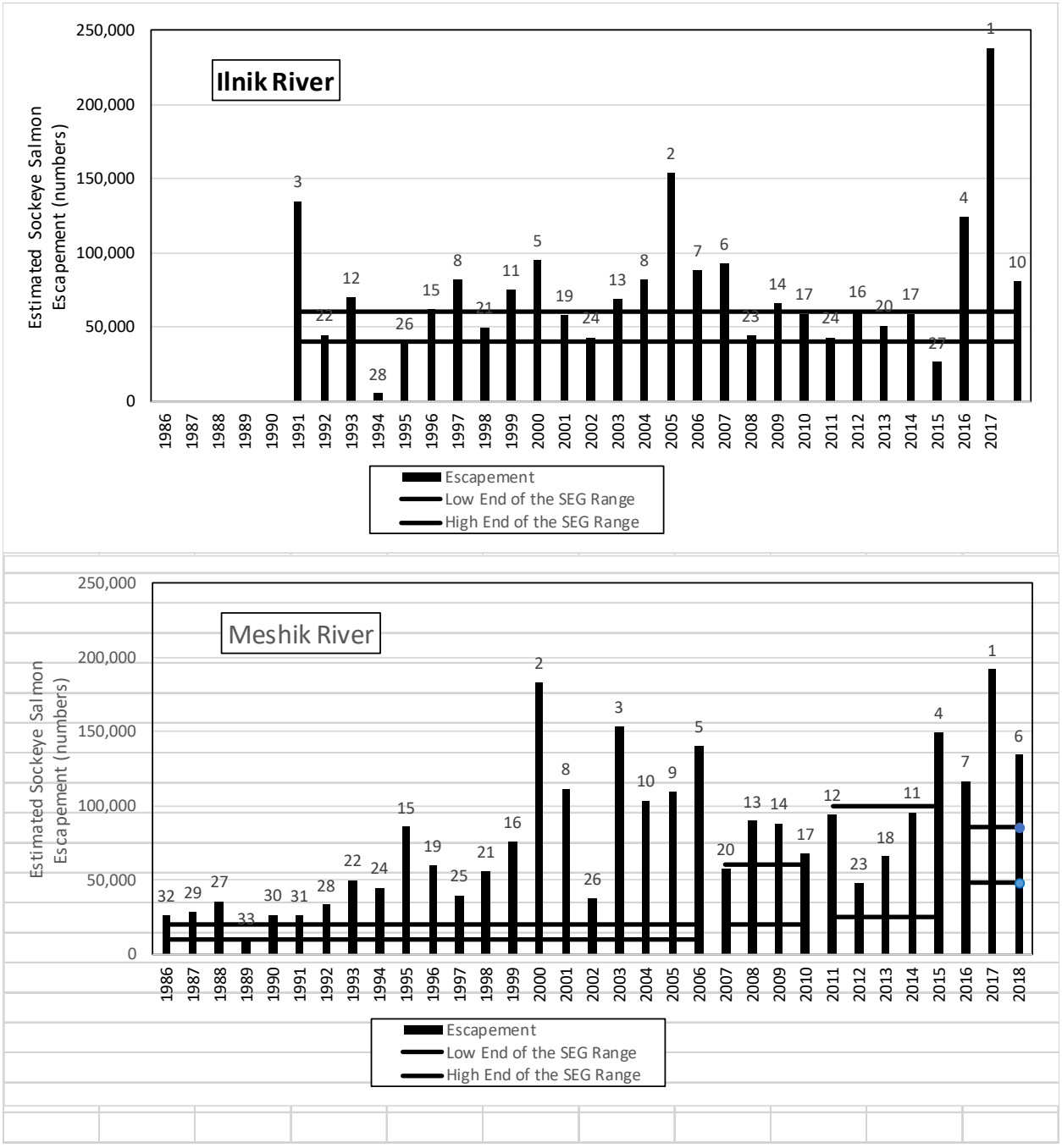

Figure 8. Sockeye salmon estimated escapement to the Ilnik (1991-2018) and Meshik (1986-2018) Rivers and associated escapement goals. Estimates are arial survey counts of salmon. Numbers above bars indicate the rank of the relative size of the escapement, with 1 associated with the largest escapement and the largest number, or rank, associated with the smallest escapement.

Literature Cited:

Boatright, C., W. Larson, L. Seeb, and R. Hilborn. 2016. Estimating the Stock Composition of Sockeye Salmon in the Outer Port Heiden and Ilnik Sections of Alaska's North Peninsula Fishery, 2014-15, Prepared for Bristol Bay Science and Research Institute, Alaska Salmon Program, School of Aquatic and Fishery Sciences, University of Washington

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PROPOSAL 145 – 5 AAC 09.369. Northern District Salmon Fisheries Management Plan

Proposed by: Lower Bristol Bay Fish and Game AC

BBEDC Recommendation: SUPPORT

Proponent Issue Statement: Restrict commercial fishing for salmon along the coast and in offshore waters of the Outer Port Heiden Section and restrict fishing in offshore waters of the northeast portion of the Ilnik Section. . Local knowledge indicates that the commercial drift gillnet fleet concentrates their fishing efforts near the current NW boundary of the Outer Port Heiden Section (Figure 5). The proponent also states that these closures will also improve fish quality because of a shorter transport from fishery to processor and also provide for the harvest of Meshik and Ilnik River sockeye salmon stocks

What would this proposal do?

This proposal restricts the NW Ilnik and Outer Port Heiden Sections of the Northern District (Figure 4 and 5). The Northern boundary of the OPH is south of Reindeer Creek (Figure 5) and extends seaward on the latitude line for 3 miles. At the boundary line that separates the SW Ilnik and NW Ilnik sections (Figure 5) the open area is 2 miles from shore. The boundary line that indicates open water is a straight line between the proposed Outer Port Heiden boundary at 3.0 miles to the NW SW boundary line of the Ilnik Section at 2 miles from shore. This proposal would restrict fishing both along the coast and in offshore waters of the Outer Port Heiden Section (Figure 5) and restrict fishing in offshore waters of the NE portion of the Ilnik Section.

BBEDC COMMENTS: BBEDC SUPPORTS Proposal 145.
(See BBEDC comments for Proposal 144). The majority of the comments provided for Proposal 144 also apply to Proposal 145.

BBEDC supports this proposal because this proposal would allow for more harvest on local salmon stocks and minimize interception on other salmon stocks, primarily Bristol Bay-origin salmon. This would be accomplished by moving the Outer Port Heiden closure line farther to the southwest and closer to shore. This closure line would be the same line as defined in Proposal 144 (Figure 5). Local stocks are not being harvested to their fully capacity. Escapement goals are being exceeded on a regular basis (Figure 8).

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Dear Mr. Chairman and members of the board,

I think that Chignik is suffering due to the lack of fish this season. It is harder for parents to feed their families. The villages are suffering and we need help. The economy suffered with the horrible fishing season last year, this led to some city staff being laid off. Those people need their jobs to support their family and pay the bills. A lot depends on our fishing economy, please help make it fair for everyone.

Sincerely,
A student from Chignik Bay

Dear Mr. Chairman and Board of Fish Members,

Due to the horrible fishing season last year the economy in Chignik Bay is in bad condition. Our city can not function properly without the yearly fish tax, so they had to lay off most of their workers. The laid off workers need those jobs to pay their bills. It's getting harder to afford food and just to live here. We need some type of solution for Chignik for desperate times and desperate measures.

- From a Chignik Bay ninth grader

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February 7, 2019

Alaska Board of Fisheries
Board Support Section
PO Box 115526
Juneau, AK 99811-5526

Re: Chignik Fisheries – Area L

Dear Board of Fish Committee:

The City of Chignik would like to express its deepest concern pertaining to the 2018 disastrous sockeye salmon fishing season in our area, Area L. The City of Chignik relies heavily on the sockeye revenue generated by the Fishery to sustain its operations, to include: Electric, Water, Sewer, Waste, Road Maintenance, Harbor Operations and general upkeep of the entire community.

Due to the lack of fish tax revenue the City is struggling to stay operational. Lack of funds has forced the City to lay off the majority of its employees, which in turn devastates the local economy. Not only did this hurt Chignik Bay it also hurt Chignik Lagoon, Chignik Lake, Perryville and Ivanof Bay in that this fishery is the main source of income in all these communities.

The City of Chignik is very concerned on the future of the Fishery that holds us together and hopes that the Board of Fish will do what they can to manage not only the Chignik area but the intercept fisheries as well, namely that in the Dolgoi and Shumagin Island areas, which should also share in the burden of conservation and allocation limits for the future of the fishery not just for Chignik but for the future of ALL that depend on Chignik's Terminal Fishery.

Sincerely,

Peter Anderson, Mayor
City of Chignik

Submitted By
Jordan Keeler
Submitted On
2/5/2019 10:54:13 AM
Affiliation
City Administrator - Sand Point

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907.274.7561
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3380 C Street
Suite 205
Anchorage, Alaska 99503

On behalf of the City of Sand Point, a first-class city in the Aleutians East Borough, I am writing in opposition of the proposal before you that would limit fishing opportunities for the residents of Sand Point who rely on commercial fishing for their livelihood. Most notably, Proposal 128, 134, 135, 137 and 138 would have a significant deleterious impact on our fishery and the City.

The City of Sand Point relies heavily on our 2% raw fish tax that has been approved by residents, including many who actively participate in the summery fishery. The City uses funds from the raw fish tax to provide services including public safety, public works and to help cover the costs of our water and wastewater system. The provision of these services is the cornerstone of local government and ensures that our 950 year-round residents have a healthy, functional community. The City has always been financially conservative and any decrease in raw fish tax would force us to reduce or eliminate vital community services.

The City, along with others in Area M, has already absorbed reductions in winter fishing from both state and federal fisheries. The loss of fishing opportunities has been a significant financial blow to our residents and the City has also felt the effects of lowered revenue from raw fish taxes. This loss is further compounded by a steep reduction in state funding for capital projects, a situation that is likely to continue.

When our residents have the opportunity to fish and provide for themselves and their families, they do so with an unrivaled skill and enthusiasm that stems from the rich 120 plus years of fishing in Sand Point. Their hard work and prosperity enables the City to provide services at the level our community deserves and has earned. Our residents and the City have overcome many obstacles and continue to thrive and we simply ask that we are allowed the opportunity to support ourselves and community.

Sincerely,

/s/

Jordan F. Keeler

City Administrator, Sand Point

CONCERNED AREA M FISHERMEN

35717 Walkabout Road, Homer, Alaska 99603
(907) 235-2631

Reed Morisky, Chairman
Alaska Board of Fisheries
P.O. 25526
Juneau, Alaska 99802-5526

February 7, 2019

Re: Alaska Peninsula Proposals

Dear Mr. Morisky and Board Members:

Concerned Area M Fishermen (CAMF) submit these comments on proposals you will be considering at the upcoming meeting concerning fisheries of the Alaska Peninsula, also known as Area M. CAMF represents the interests of drift gillnet fishermen who fish in Area M. Our membership includes approximately 75 % of the permit holders active in the fishery.

CAMF members participate in the drift gillnet fishery on the North Alaska Peninsula, which is managed under the provisions of the Northern District Salmon Fisheries Management Plan, 5 AAC 09.369, and the fisheries along the South Peninsula, including the South Unimak and Shumagin Islands June Salmon Fishery (the June Fishery), 5 AAC 09.365, and the Post-June Fishery, 5 AAC 09.366. CAMF has been active in the Board process for over 30 years, contributing to the development of these management plans, and we look forward to working with you again this year.

These comments are in two parts. The first part will review the South Peninsula June fishery, including the history and importance of the fishery and prior Board actions and findings. We will also state CAMF's position on specific South Peninsula proposals. Secondly, we provide an overview of the North Peninsula fishery, including a discussion of prior Board actions, WASSIP results, some history of the fishery, the management structure, and the importance to the economy of the region. Here, too, we will outline our position on some specific proposals.

In addition, regarding proposals submitted by Chignik stakeholders for restrictions on the South Peninsula June fishery, CAMF will also be working with a broader coalition of Area M groups regarding those proposals, and anticipate that a set of comments supported by all of them will be presented to the Board at your meeting.

Thank you for taking the time to review these comments. We welcome the opportunity to discuss with you the particulars of the drift gillnet fisheries in which our members participate, and to answer any questions you may have regarding our position on specific proposals.

Sincerely,

Steve Brown, President

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The June Fishery

Bristol Bay-bound sockeye have been harvested at South Unimak and in the Shumagin Islands during the month of June for nearly a century. There's a reason for this: the sockeye we catch are in prime condition and of the highest quality, bringing top dollar in the market. The June fishery is very valuable to its participants, to the Alaska Peninsula economy, and to the State, and deserves to be managed in a manner that recognizes and enhances its economic and social importance. This is especially critical in this time of competition with farmed salmon and as Alaska seeks to generate greater revenues from its natural resources. Past Boards have understood the value of the June fishery and have been committed to assuring us a viable sockeye harvest.

In 2004, the Board adopted significant changes to the South Unimak and Shumagin Islands June Salmon Management Plan, 5 AAC 09.365. These revisions simplified the management approach, ending a two-decade long experiment of imposing increasingly complex and untested regulations aimed at constraining our harvest of migrating salmon, especially chum salmon. That experiment culminated in 2001 with the adoption of a management plan that drastically cut our fishing time and severely impaired the area managers' ability to maintain a reasonable sockeye harvest. The Board in 2004 recognized multiple problems with the prior plans – not the least of which is that the various limits imposed on the June fishery over time had no effect on the fisheries intended to benefit from such limits – and opted instead for a straightforward management regime of scheduled openings that give us enough time on the water to sustain a reasonable harvest while providing a balance of closed periods. We encourage Board members to review the findings prepared by the Board in 2004 (2004-229-FB).

In adopting these changes to the June fishery management plan, the key question the Board asked was whether the fishery would still perform within historical levels of harvest. The Department answered yes. Experience under the 2004 plan confirms that the Department was correct. The harvest of sockeye in the June fishery has ranged from roughly 1.95 million fish in 2017 to 660,000 in 2014, while the harvest of chum salmon has averaged around 407,000 fish for period 2008-2017.[1] These harvest levels are in the lower middle range of our historical catches for both species, and are **smaller** than the error in estimates of the size of the Bristol Bay sockeye and AYK chum runs after the season is over. Harvests of this magnitude are biologically insignificant.

Nor did the 2004 plan result in any significant increase in the amount of effort. The number of permits fished remained relatively constant from prior years, and is considerably lower than the number of permits that fished during the 1980s and 1990s.

Area M fishermen well understand the need to control their harvest of chum salmon and have taken several steps toward this end. For instance, the commercial fleet participates in "chum harvest pools" where all chum we catch are pooled then divided equally among the fleet. This eliminates any incentive for an individual to target chum. In addition, the fleet has

[1] *See* South Alaska Peninsula Annual Management Report, 2018, Regional Information Report 4K19-01 (January 2019), at 63, Appendix B4.

voluntarily stood down and not fished when there has been an abundance of chums present. But it must also be recognized that occasionally there will be years when the presence of chum in Area M waters is so continuous that they are hard to avoid, and that at some point, vessels need to fish if they are to maintain a reasonable sockeye harvest. It is also important to dispel the notion advanced by some that the chum harvest in the June fishery should only be considered as by-catch to our harvest of sockeye. Chum salmon have been harvested in the June fishery as long as it has existed and constitute an important economic component of the fishery.

Detractors of the June fishery have long asserted that the mixed stock nature of the fishery risks adverse biological impacts. We disagree. Based on a number of studies of the June fishery – including tagging; genetic stock identification (GSI), including the recent Western Alaska Salmon Stock Identification Program (WASSIP); and mark-recapture – certain conclusions have become clear:

1. Bristol Bay sockeye stocks in the fishery are highly mixed, and there is no risk that we will tap into a vein of fish from one river and have a disproportionate impact on a single stock;

2. The chum salmon harvested in our fishery originate from a wide geographic area – Japan, Russia, the AYK, Bristol Bay, the Alaska Peninsula, South-central Alaska – and only about a third are AYK summer chum;

3. Yukon fall chum, whose declines in the mid-1980s were cited as the basis for imposing the first chum cap, are not even present in the June fishery; and

4. Only a fraction of any migrating runs pass through the area of the June fishery, with the rest returning through Aleutian passes to the west. An international tagging study immediately west of the fishery shows that AYK chum runs pass through Aleutian Island passes with similar run timing.

5. Chignik bound sockeye are present in June fishery harvests, however harvest rates are low.

Proposal 135 aims to have the Board reinstate the failed 2001 management plan for the June fishery, but adds a new twist by adding Chinook salmon as one of the species taken in the fishery. The Fairbanks AC tried this tack in 2016, through a petition for emergency rule-making it filed in March and in an ACR filed in September 2016. The Board rejected both of these attacks on our fishery, and for good reason. The best available scientific evidence suggests that AYK Chinook salmon are not harvested in the June fishery. A recent genetic stock composition study of Chinook salmon bycatch in three Gulf of Alaska trawl fisheries in 2014, on the south side of the Alaska Peninsula, in the vicinity of the June fishery, indicates that 95 percent of the fish originated in areas to the south and east of the Alaska Peninsula, mostly from British Columbia and the West Coast of the U.S.[2] This report demonstrated that there were no – repeat,

[2] Guthrie, *et al.*, "Genetic Stock Composition Analysis of the Chinook Salmon Bycatch Samples from the 2014 Gulf of Alaska Trawl Fishery," NOAA Technical Memorandum NMFS -

no – Yukon River Chinook salmon present in the bycatch samples. This presents a situation not unlike that for Yukon fall chum salmon, which may be the closest analog to Yukon River king salmon. Yukon fall chum were for many years cited as the basis for restricting the June fishery, until their absence from the fishery was confirmed by numerous studies, including WASSIP. The Board should not simply assume that Yukon River Chinook salmon are caught in the June fishery when the best available scientific evidence points to a contrary conclusion.

We also note that western Alaska chum salmon runs have improved considerably since the 1990s and are abundant. The lone remaining chum salmon stock of yield concern in the AYK region, Norton Sound subdistricts 2 and 3, was recently recommended for removal from this status by ADF&G. The improved performance of AYK chum runs, notwithstanding the 2004 June fishery management plan, confirms what Boards have recognized in past findings, that the June fishery has little measurable impact on chum salmon returns in western Alaska. *See, e.g.,* Findings 92-132 FB (formerly 92-01 FB) ("impact of the June fishery on AYK chums "so minimal, if detectable at all, as to be insignificant"); 94-150-FB (formerly 94-04-FB) at 6 (savings "would be totally undetectable in areas as large as Northern Norton Sound or the Yukon River"); and 96-164-FB (formerly 96-08-FB) at 5 ("further reductions in the June Area M fishery would not alleviate the remaining conservation concerns" for AYK rivers).

In sum, the June fishery has little biological impact on the salmon runs migrating through the South Peninsula area and there is no conservation risk from permitting a viable fishery to be prosecuted there. Proposals seeking to further restrict the Area M fisheries are based on the myth that there is, or should be, a priority allocation for stakeholders closer to the stream of origin of salmon stocks. This attitude is in direct conflict with the position of the State of Alaska as signatory of the Pacific Salmon Treaty, which recognizes the intrinsic equity claim for fisheries near waters where salmon grow to maturity. The State vigorously maintains that there is at least as much, if not more right to harvest based on the idea of contributions to growth in contrast to stream of origin. Within Alaska salmon are a common property resource that 'belong' to everyone, not just those nearest the stream of origin.

The current June fishery management plan is working well, and data from WASSIP confirm the basis for prior Board actions and findings. We strongly urge the Board to resist any calls for a return to the unworkable and unreasonable management plans and policies of the past. In particular, we OPPOSE proposals 134 and 135, which call for the repeal of the current June fishery management plan and a return to the failed management plan that was in place in 2001. We especially object to proposal 135, which was submitted by the Fairbanks Advisory Committee. The Fairbanks AC has been submitting proposals to repeal the June fishery management plan for many board cycles, all of which have been soundly rejected. The Fairbanks AC's continual attack on our fishery is a dubious use of the Board process and its role as an AC, and we ask the Board to oppose their ongoing effort to interfere in the sound management of our fishery that currently prevails.

AFSC-311 (January 2016). This report was presented to the North Pacific Fishery Management Council at its April 2016 meeting and can be found in full on the Council's website.

PROPOSAL 134

5 AAC 09.365. South Unimak and Shumagin Islands June Salmon Management Plan. Repeal the current *South Unimak and Shumagin Islands June Salmon Management Plan* and readopt the management plan in place prior to 2001, as follows:

Return the South Unimak District to its pre-2001 status. Remove the entire Southwestern District and the West and East Pavlof Bay Sections of the South Central District from the South Unimak District. Return the Southwestern District and the West and East Pavlof Sections of the South Central District to their pre-2001 June South Peninsula management plan for those areas.

What is the issue you would like the board to address and why? In February 2004, the BOF modified the South Unimak and Shumagin Islands June Fisheries Management Plan (5 AAC 09.365). The Board established a new, expanded fishing schedule, removed previously enacted chum salmon harvest restrictions, and the ***South Unimak fishery was expanded to include the entire Southwestern District and the West and East Pavlof Bay sections of the South Central District.*** The inclusion of the entire Southwestern District and West and East Pavlof Bay Sections into the South Unimak June Fishery Management Plan has had a severely detrimental impact on Chignik Fishermen due to high interception rates of Chignik bound sockeye in areas historically closed during the South Unimak June fishery. In essence, the Board created a new, expansive interception fishery on fully allocated Chignik stocks that has severely damaged all Chignik fishermen and the entire Chignik region.

PROPOSED BY: Axel Kopun (EF-F18-058)

****

CAMF POSITION: AGAINST

COMMENTS: Proposals seeking to further restrict the Area M fisheries are based on the myth that there is or should be a priority allocation for stakeholders closer to the stream of origin of salmon stocks. This attitude is in direct conflict with the position of the State of Alaska as signatory of the Pacific Salmon Treaty which recognizes the intrinsic equity claim for fisheries near waters where salmon grow to maturity. The State vigorously maintains that there is at least as much, if not more right to harvest based on the idea of contributions to growth in contrast to stream of origin. Within Alaska salmon are a common property resource that 'belong' to everyone, not just those nearest the stream of origin. Furthermore, this leads into the myth in Alaska that somehow terminal fishery management (which is assumed to be single stock fishing) is the standard and preferred management technique. In reality, terminal fisheries are the exception (Chignik Lagoon and Nelson Lagoon may be the only ones that are close actually), whereas mixed stock fisheries are the rule (SE, Kodiak, Cook Inlet, Yukon, even the BB districts, etc). And these mixed stock fisheries on common property resources are not only common, but also historically relevant, and deserve the recognition and protection of the BOF.

- Chart of the current area open in June the board opened in 2004. Source ADFG (Fig. 1)
- Chart of previous SUSI area open in June. Two figures from 2004 report to BOF (Shaul). (Fig.2 and Fig. 3)

- The premise that the SUSI fishery "has severely damaged all Chignik fisherman and the entire Chignik region" are false. Except for the 2004 and 2018 seasons Chignik Sockeye escapements have been met since 1980. (Fig 4)
- Chignik permit values and average earnings per permit have varied by year but show no indication that a pattern of damage has occurred. Average Earnings before and after the change have remained steady. (Fig. 5)
    - Average Earnings 1977-2003 $152,361
    - Average Earnings 2004-2017 $186,373
- WASSIP determined that most sockeye returned to the Chignik Management Area. (Fig. 6 and Fig 7)
    - Black Lake
        - 2006 67%
        - 2007 89%
        - 2008 89%
    - Chignik Lake
        - 2006 79%
        - 2007 83%
        - 2008 83%

Figure 1. Chart of current area open in June. (Source ADF&G)

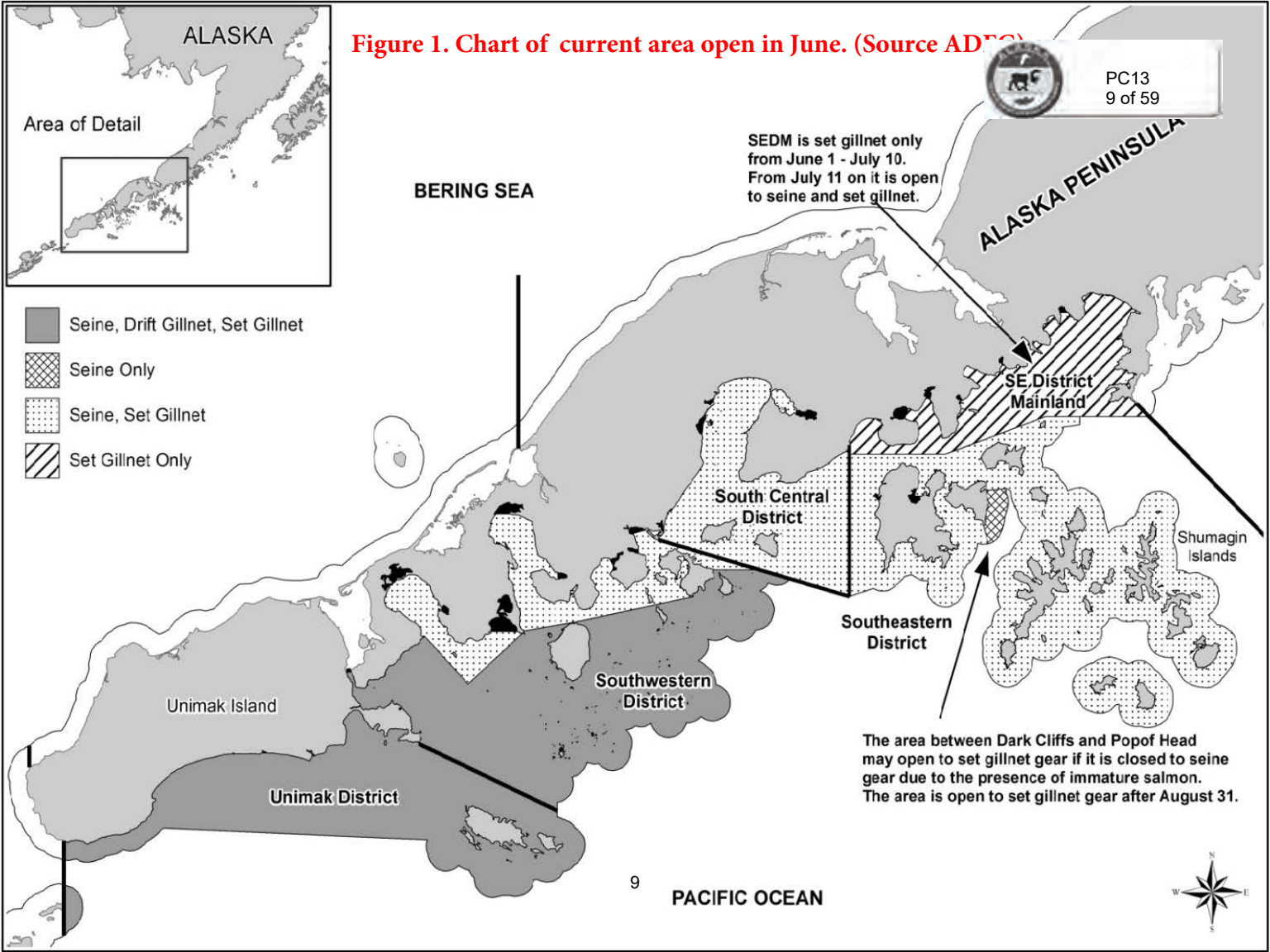


Figure 2. Chart of the South Unimak fishery in 2004 as presented in a report to BOF. (Sou 4)

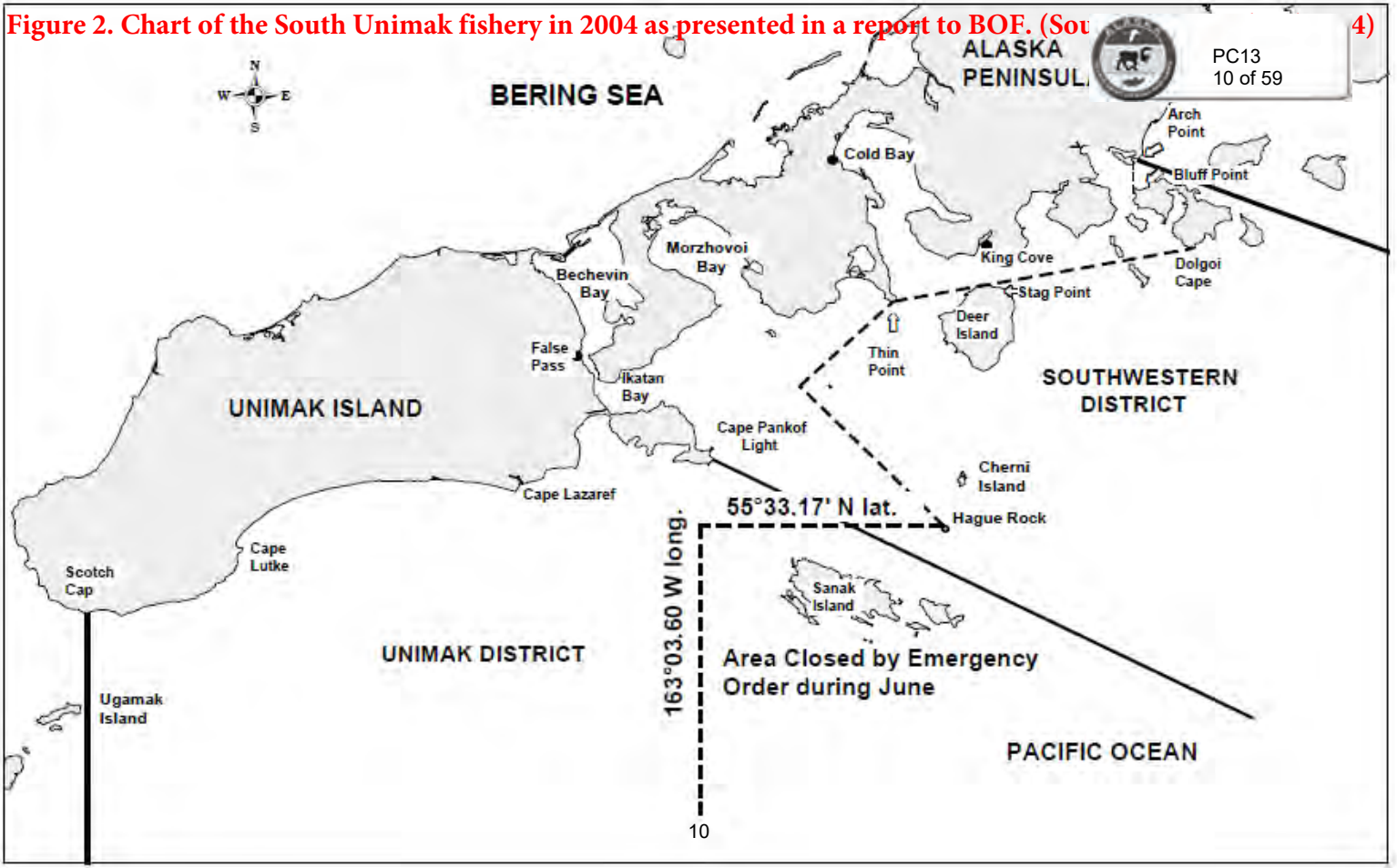


Figure 3. Chart of the Shumagin Island fishery in 2004 as presented in a report to BOF. (Source: ADFG Shaul 2004)

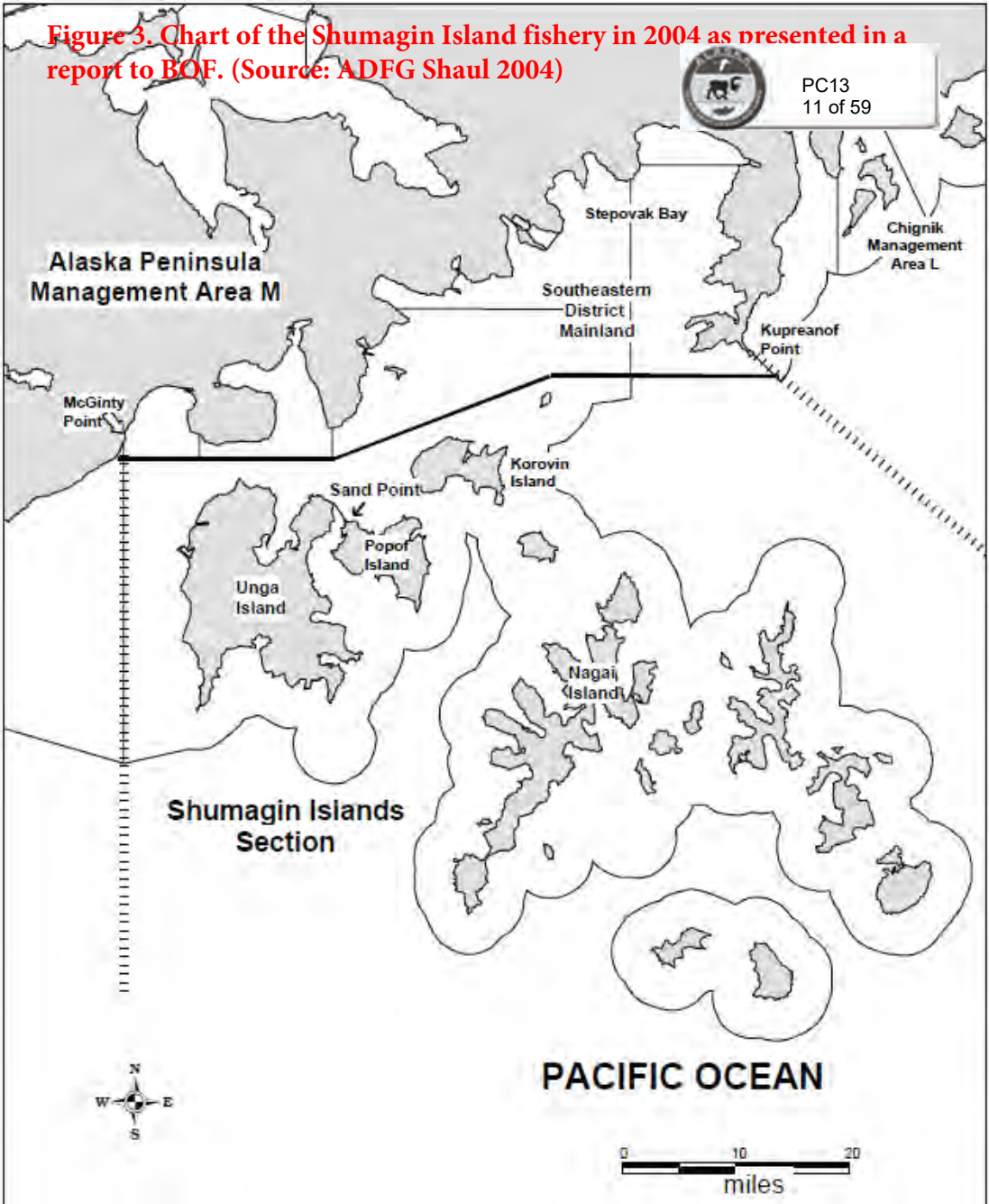


Figure 4. The premise that the SUSI fishery "has severely damaged all Chignik fisherman and the entire Chignik region" are false. Except [illegible] 2018 seasons Chignik Sockeye escapements have been met since 1980.

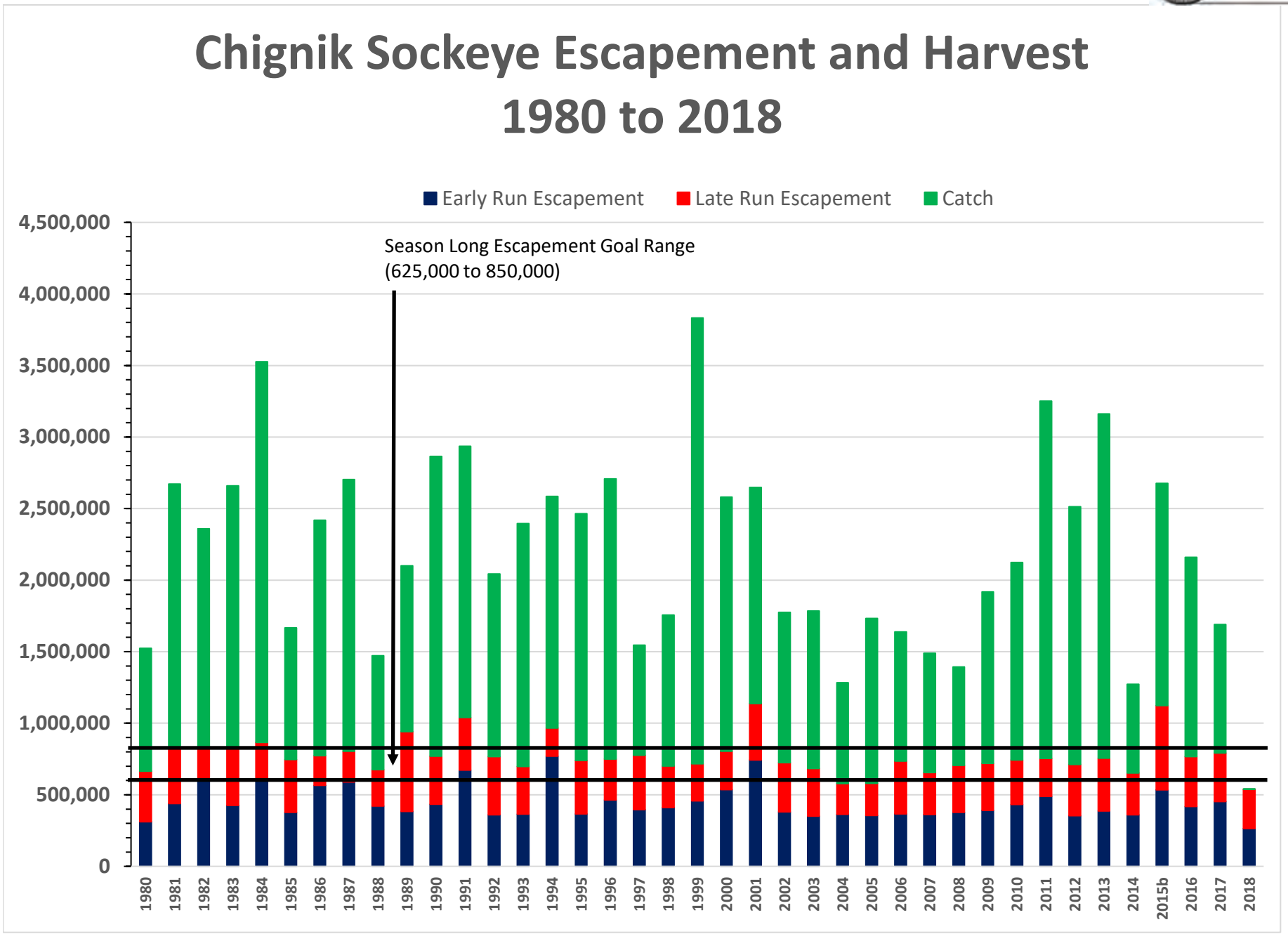


Figure 5. Chignik permit values and average earning per permit 1975 to 2017. (Source CFEC)

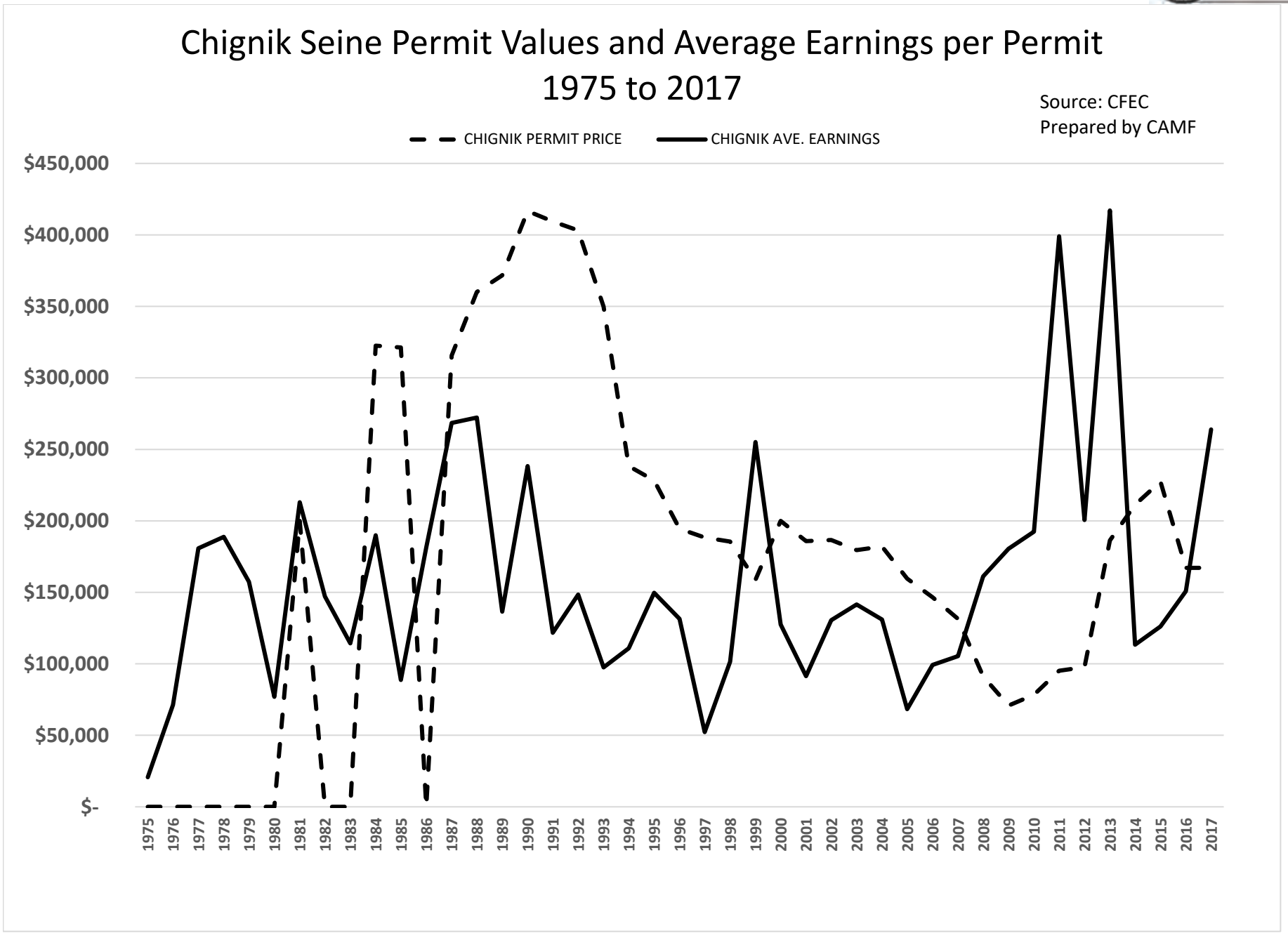
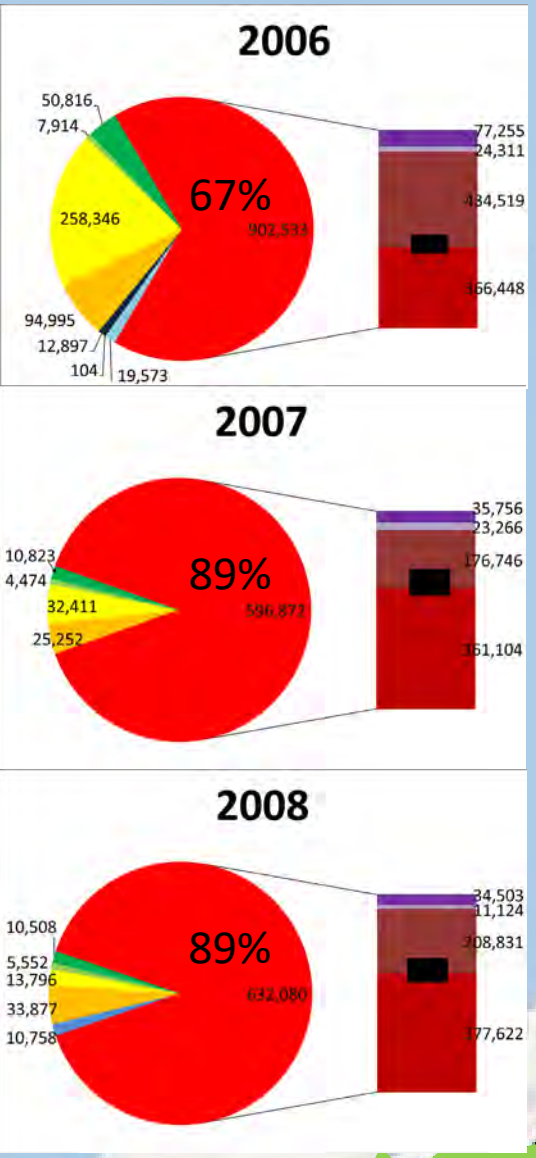


Figure 6. Sockeye returning to Chignik Management Area

Black Lake Reporting Stock (WASSIP Total Run)

Median catch estimates shown for each area each year

Ikatan, Dolgoi I. and Shumagin Is.
Include
Harvest in June and Post-June



Sockeye Returning to Chignik Management Area

Escapement

Escapement Goal Range 350K to 400K

Escapement
2006 366,448
2007 361,104
2008 377,573

Chignik Bay
2006 434,519
2007 176,746
2008 208,831

Central
2006 77,255
2007 35,756
2008 34,503

Chignik Bay

Central

Escapement

E. Stepovak

NW Stepovak

SW Stepovak

Western and Perryville

West Perry
2006 24,311
2007 23,266
2008 11,124

Dolgoi Island

Dolgoi Island

	June	Post-June
2006	171,745	86,601
2007	16,051	16,360
2008	11.248	2,548

Shumagin Is.

Shumagin Islands

	June	Post-June
2006	73,914	21,081
2007	15,618	9,634
2008	26,992	6,885

Ikatan

Unimak

Ikatan

	June	Post-June
2006	7,736	178
2007	3,946	528
2008	10,508	99

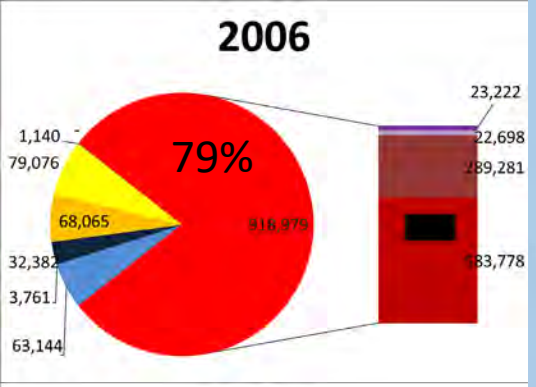
Source ADFG WASSIP Median Values
Prepared by Tom Wooding

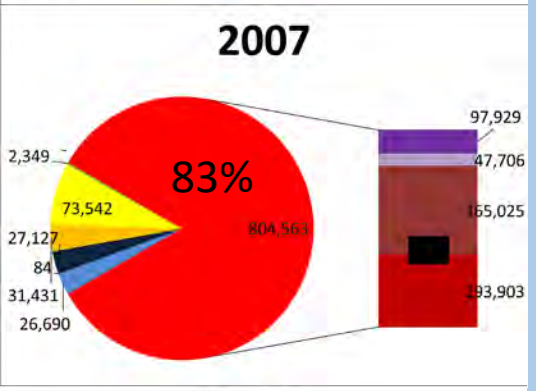
Figure 7. Sockeye returning to Chignik Management Area

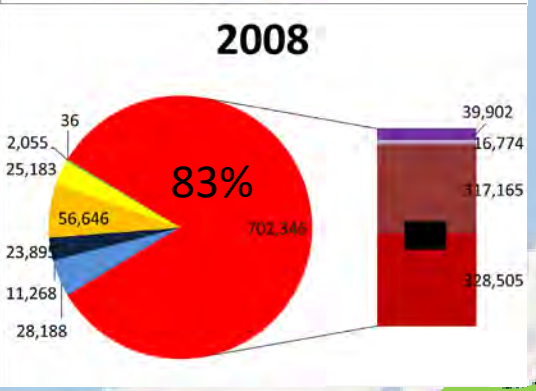
Chignik Lake Reporting Stock (WASSIP Total Run)

Ikatan, Dolgoi I. and Shumagin Is. Include Harvest in June and Post-June

Median catch estimates shown for each area each year







Sockeye Returning to Chignik Management Area

Escapement

Escapement Goal Range 250K to 400K

Escapement
2006 583,778
2007 293,903
2008 328,505

Chignik Bay
2006 289,281
2007 365,025
2008 317,165

Central
2006 23,222
2007 97,929
2008 39,902

Chignik Bay

Central

Escapement

E. Stepovak

NW Stepovak

SW Stepovak

Western and Perryville

West Perry
2006 22,698
2007 47,706
2008 16,774

Dolgoi Island

Dolgoi Island	June	Post-June
2006	5	79,071
2007	2,303	71,239
2008	1,025	2,548

Shumagin Is.

Shumagin Islands	June	Post-June
2006	3,536	64,529
2007	6,836	24,595
2008	0	56,646

Ikatan

Unimak

Ikatan	June	Post-June
2006	0	1,140
2007	1	2,348
2008	0	2,055

Source ADFG WASSIP Median Values
Prepared by Tom Wooding

PROPOSAL 135

5 AAC 09.365. South Unimak and Shumagin Islands June Salmon Management Plan. Repeal the current *South Unimak and Shumagin Islands June Salmon Management Plan* and readopt an amended version of the management plan in place prior to 2001, as follows:

Erase all of the current 5 AAC 09.365 and replace with the following, edited language from the 2001-2003 plan;

5 AAC 09.365. SOUTH UNIMAK AND SHUMAGIN ISLANDS JUNE SALMON MANAGEMENT PLAN (2001-2002).

(a) The South Unimak and Shumagin Islands June fisheries harvest [BOTH] **chinook salmon,** sockeye salmon and chum salmon in a mixed stock fishery. These stocks of salmon are bound for Bristol Bay and the Arctic-Yukon-Kuskokwim region, as well as other areas across the North Pacific Ocean. These salmon stocks have historically been intercepted in significant numbers along the Alaska Peninsula. To ensure that none of these salmon stocks are overharvested, it is necessary to restrain the interception of these stocks as provided in the management plan in this section, and consistent with the Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222) and Policy for the Management of Mixed Stock Salmon Fisheries (5 AAC 39.220)

(b) The South Unimak fishery takes place in the Unimak District, the Ikatan Bay Section in the Southwestern District, and the Bechevin Bay Section in the Northwestern District, plus the following waters of the Southwestern District located outside of the Ikatan Bay Section and not described as closed waters in 5 AAC 09.350;

(1) waters north and west of a line from Cape Pankof Light to Thin Point (54° 57.32' N. lat., 162° 33.50' W. long.); and

waters enclosed by a line from Thin Point (54° 57.32' N. lat., 162 ° 33.50' W. long.) to the northernmost tip of Stag Point (54° 59.10' N. lat., 162° 18.10' W. long.) on Deer Island to the southernmost tip of Dolgoi Cape (55 ° 03.15' N. lat., 161 ° 44.35' W. long.) on Dolgoi Island and from the northernmost tip of Bluff Point (55° 09.93' N. lat.,161° 53.72' W. long.) on Dolgoi Island to ArchPoint Light (55° 12.30' N. lat., 161 ° 54.30' W. long.).

(c) The Shumagin Islands fishery takes place in the Shumagin Islands Section.

(d) Beginning June 10 **through June 30**, the commissioner may open, by emergency order, commercial fishing periods for purse seine and drift gillnet gear as follows:

(1) commercial fishing periods may occur only from 6:00 a.m. to 10:00 p.m. and may not be open for more than

(A) three days in any seven-day period;

(B) 16 hours per day;

(C) 48 hours in any seven-day period;

(D) two consecutive 16-hour fishing periods in any seven-day period;

[(2) THROUGH JUNE 24, COMMERCIAL FISHING PERIODS IN THE SHUMAGIN ISLANDS AND SOUTH UNIMAK FISHERIES WILL OCCUR AT THE SAME TIME;

(3) AFTER JUNE 24, THE PROVISIONS OF (F) APPLY.]

(e) Beginning June 10, the commissioner may open, by emergency order, commercial fishing periods for set gillnet gear in both the South Unimak and Shumagin Islands fisheries as follows:

(1) from June 10 through [JUNE 24] **June 30**,

(A) commercial fishing periods may occur only from 6:00 a.m. to 10:00 p.m.;

[(B) THE FISHERY WILL BE CLOSED FOR ONE PERIOD IF, DURING THE PRECEDING PERIOD, THE RATIO OF SOCKEYE SALMON TO CHUM SALMON IS NOT EQUAL TO OR GREATER THAN THE RECENT 10 YEAR AVERAGE;

(2) AFTER JUNE 24, THE SCHEDULE OF OPENINGS AND CLOSINGS OF FISHING PERIODS SHALL COINCIDE WITH THE SCHEDULE FOR SEINE AND DRIFT GILLNET GEAR AS SPECIFIED IN (F) OF THIS SECTION.

(F) AFTER JUNE 24, IN EITHER THE SOUTH UNIMAK OR SHUMAGIN ISLANDS FISHERIES,

(1) IF THE RATIO OF SOCKEYE SALMON TO CHUM SALMON IS TWO TO ONE OR LESS ON ANY DAY, THE NEXT DAILY FISHING PERIOD FOR SEINE AND DRIFT GILLNET GEAR SHALL BE OF SIX-HOUR DURATION IN THAT FISHERY;

(2) IF THE RATIO OF SOCKEYE SALMON TO CHUM SALMON IS GREATER THAN TWO TO ONE, THE COMMISSIONER MAY EXTEND THE FISHING PERIOD BY EMERGENCY ORDER, TO A MAXIMUM OF 16 HOURS AS DESCRIBED IN (D)(L) OF THIS SECTION;

(3) IF THE RATIO OF SOCKEYE SALMON TO CHUM SALMON IS TWO TO ONE OR LESS FOR TWO CONSECUTIVE FISHING PERIODS, THE FISHERY SHALL CLOSE FOR ALL GEAR TYPES.]

(g) All salmon caught by a CFEC permit holder must be retained, and each CFEC permit holder must report the number of salmon caught, including those taken but not sold, on an ADF&G fish ticket. For the purposes of this subsection, "caught" means brought on board the vessel.

What is the issue you would like the board to address and why? Excessive harvest of migrating discrete stocks of concern in the Cook Inlet, Bristol Bay, and AYK areas.

PROPOSED BY: Fairbanks Fish and Game Advisory Committee (EF-F18-099)
****

CAMF POSITION: OPPOSSED

COMMENTS: The premise that the SUSI fishery has an excessive harvest of stock of concern is unfounded. The proposers have been submitting this type of restrictive proposal in some shape or form for generations. CAMF believes that the there's a true misunderstanding of the migration of salmon and the nature of the fishery. Sockeye leave the size of a thumb worth nothing and return with value years later.

Figure 8. Picture of a maturing sockeye and a smolt.

- Figure 9. 15 years of ocean research depicts 1st year at sea migrations of sockeye. (Source INPFC Bulletin #34 research from 1956 to 1971.)

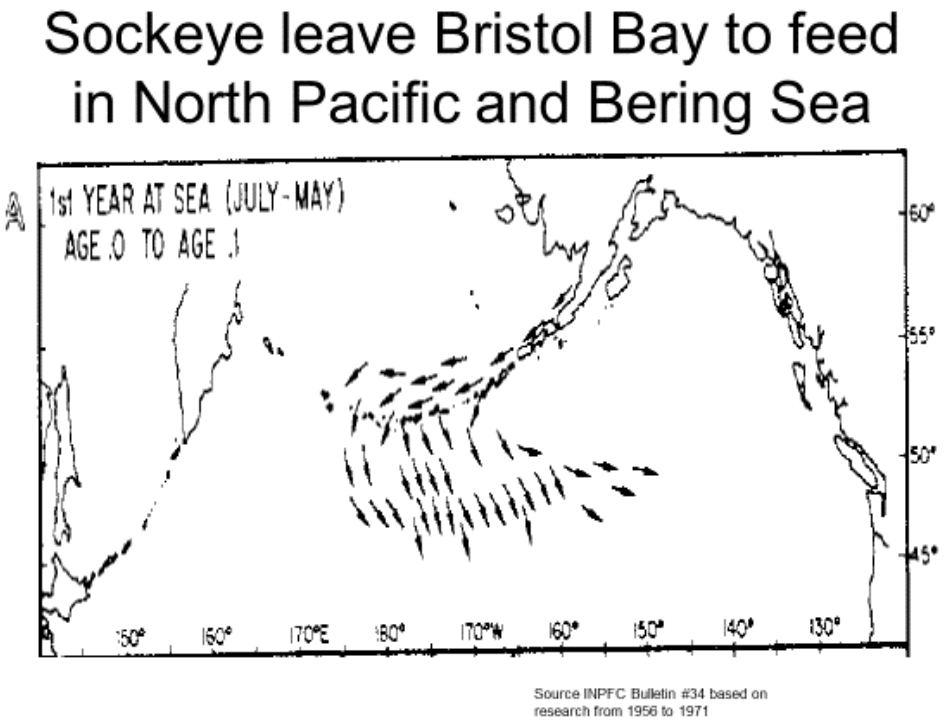


Figure 10. As sockeye mature, they move and mix for food. Food is more plentiful in the Bering Sea where zooplankton is more abundant. (Source INPFC Bulletin #34 research from 1956 to 1971

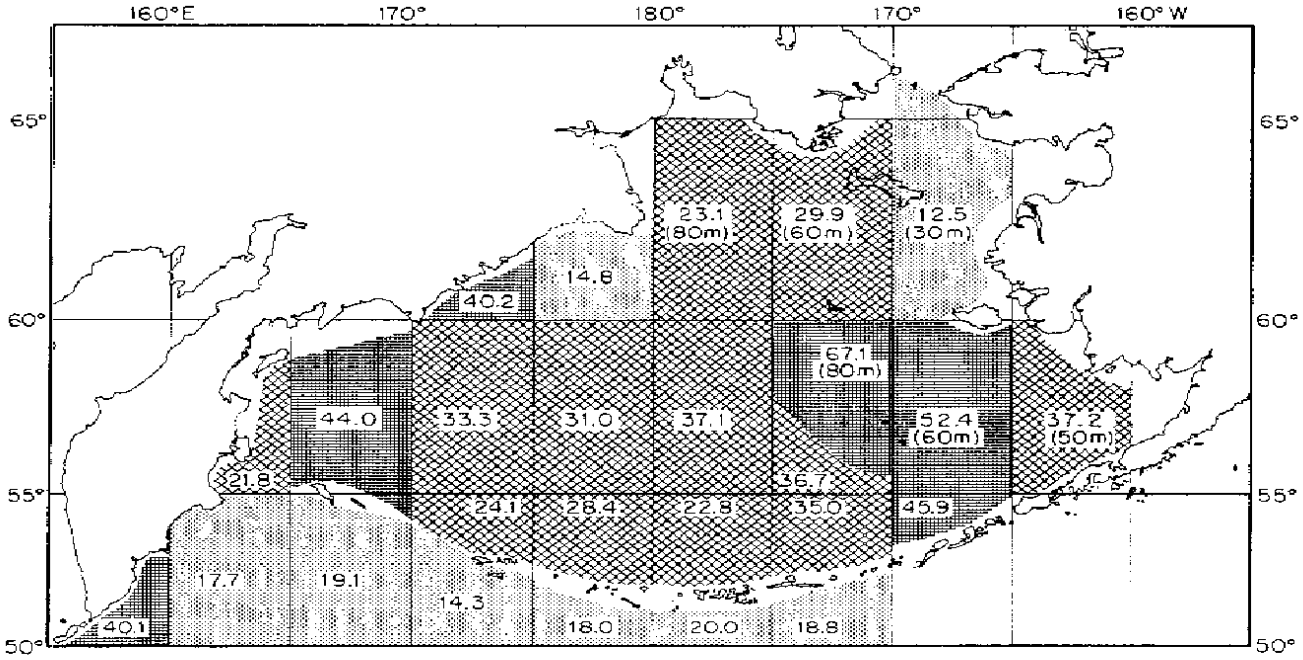


Fig. 30. Mean wet weight ($g.m^2$) of zooplankton taken with vertical tows in the summers of 1956 to 1970 (from Motoda, 1972). Unless otherwise shown, the water column sampled was from 0–80 m.

The mixture was confirmed by ADFG. ADFG Genetic Lab report "Migration patterns of sockeye salmon in the Bering Sea (October 2004)" Figure 11. Distribution of August immature sockeye.

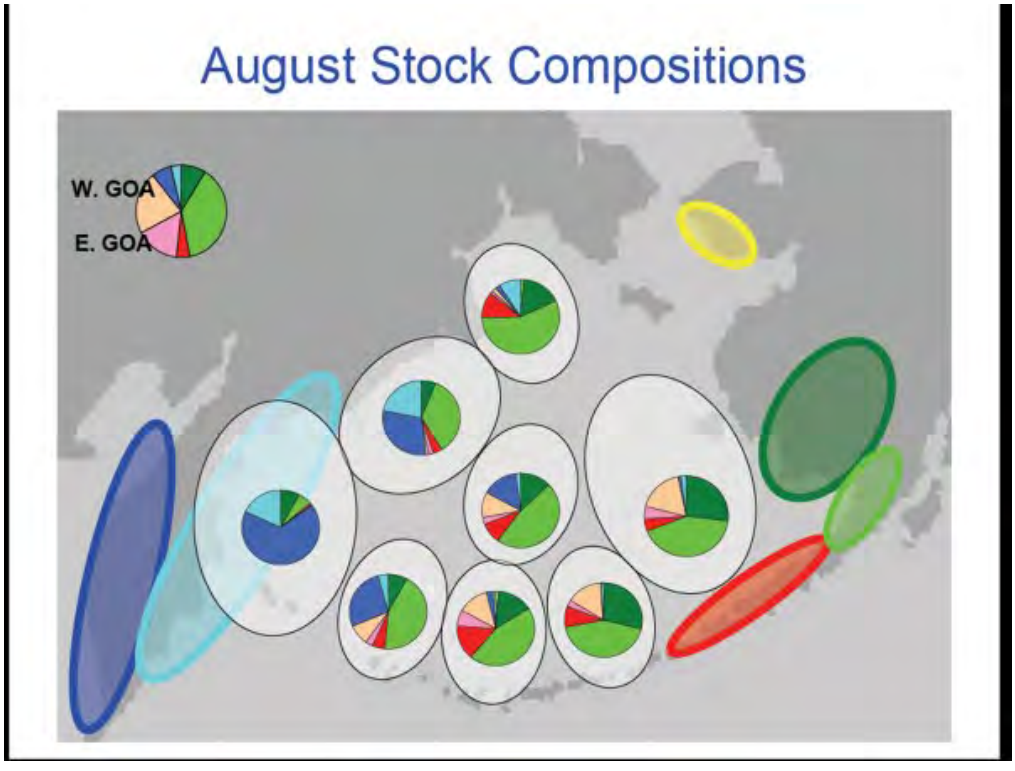


Figure 12. Chums are mixed also. Source: NPAFC Bulletin No. 1 "Genetic Stock ID of Chum Salmon Harvested Incidentally in 1994 and 1995 Bering Sea Trawl Fishery" (Wilmot et al, NOAA)

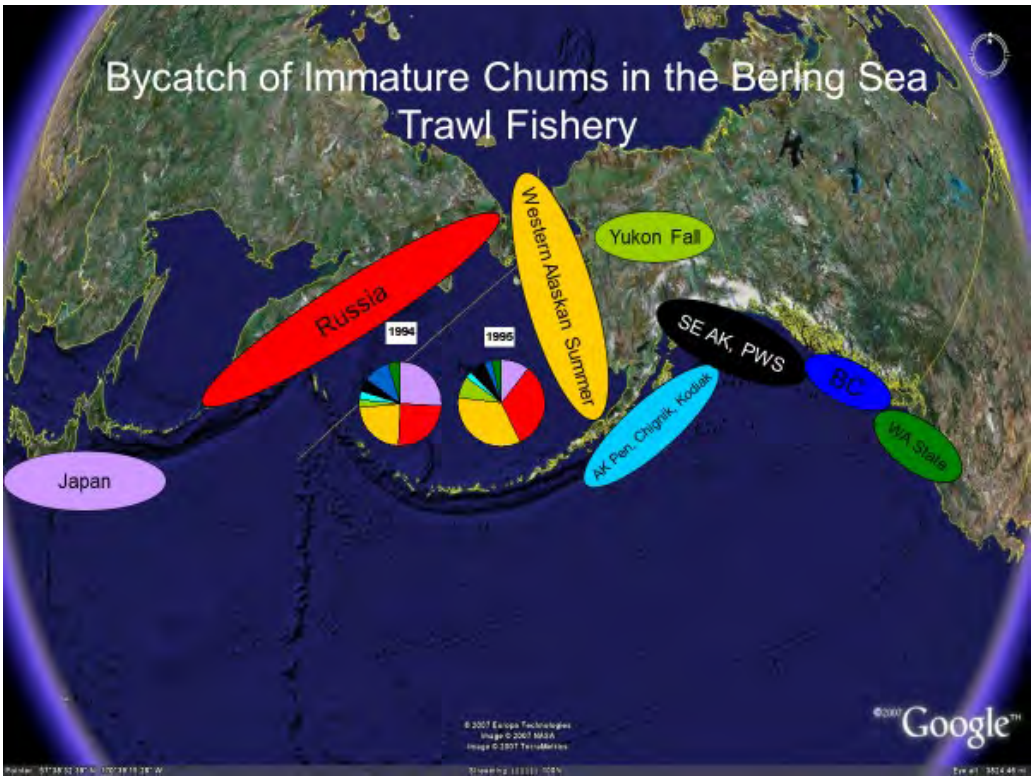


Figure 13. Movement of salmon for Bering Sea to Pacific.

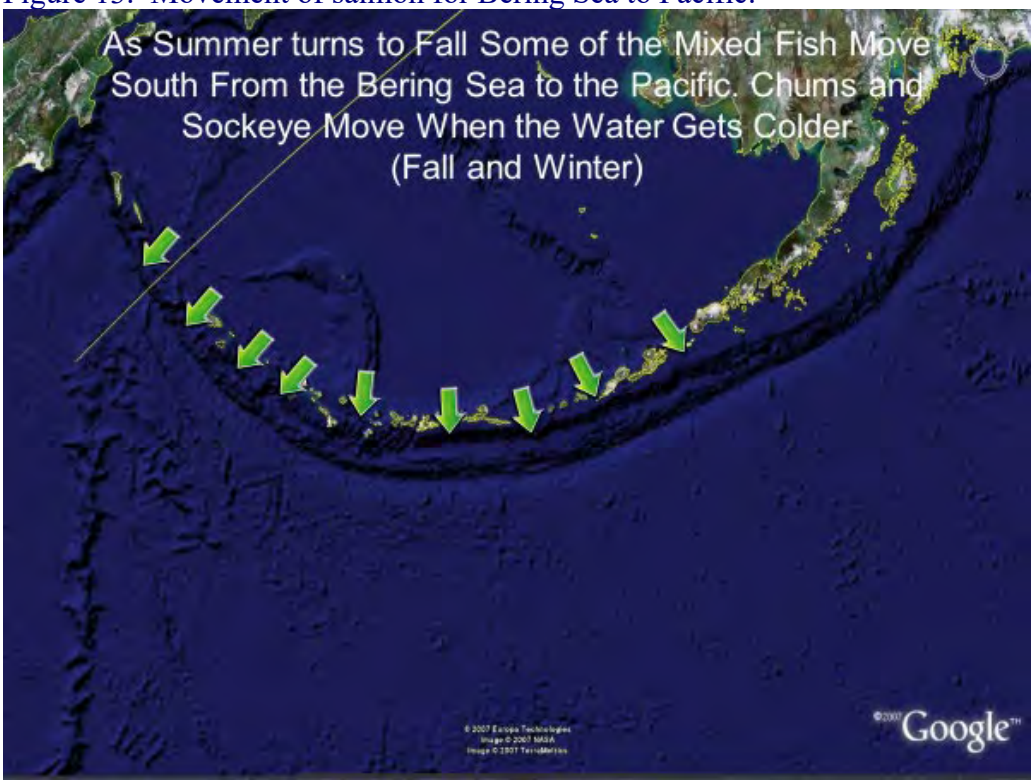


Figure 14. Don Rogers' depiction of Late Winter and Spring Migrations of Maturi[illegible] Salmon 1.6 million square mile range.

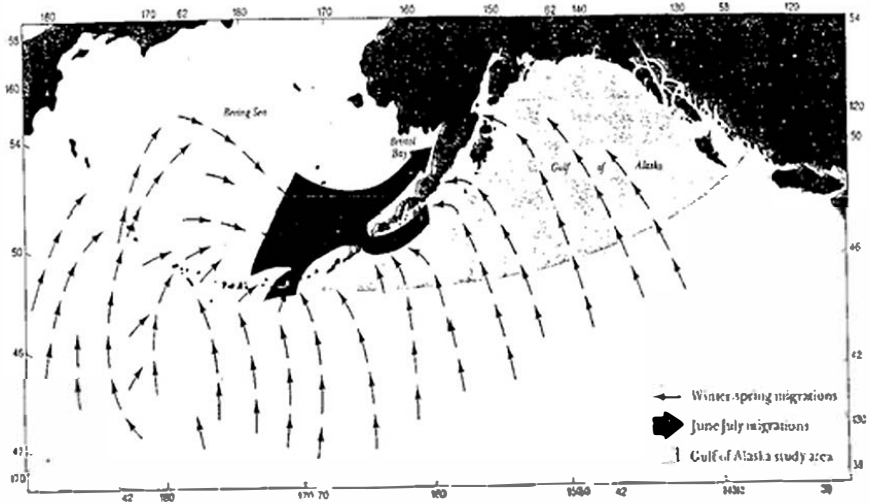
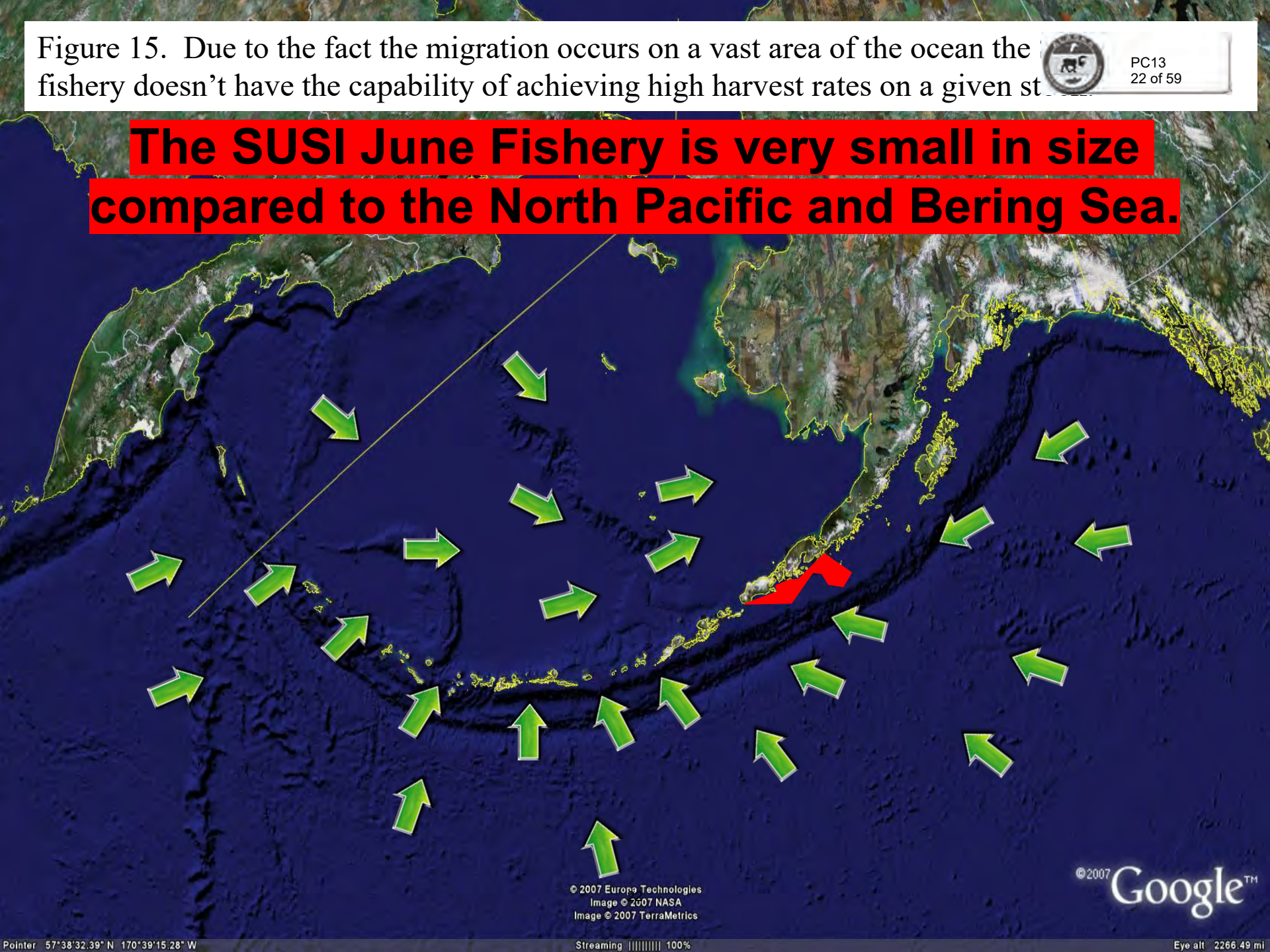


Figure 15. Due to the fact the migration occurs on a vast area of the ocean the
fishery doesn't have the capability of achieving high harvest rates on a given st

The SUSI June Fishery is very small in size compared to the North Pacific and Bering Sea.



WASSIP confirmed the harvest rates are small and in fact smaller than ability to count the run after th over. The following graphs compare estimated total run size, SUSI June Fishery harvest, and error in for both (in red) for both sockeye and chums. The vertical red error bar (error in counting the run) is of greater magnitude than the solid black column (June harvest) Figures 16 thru 21.

Figure 16.

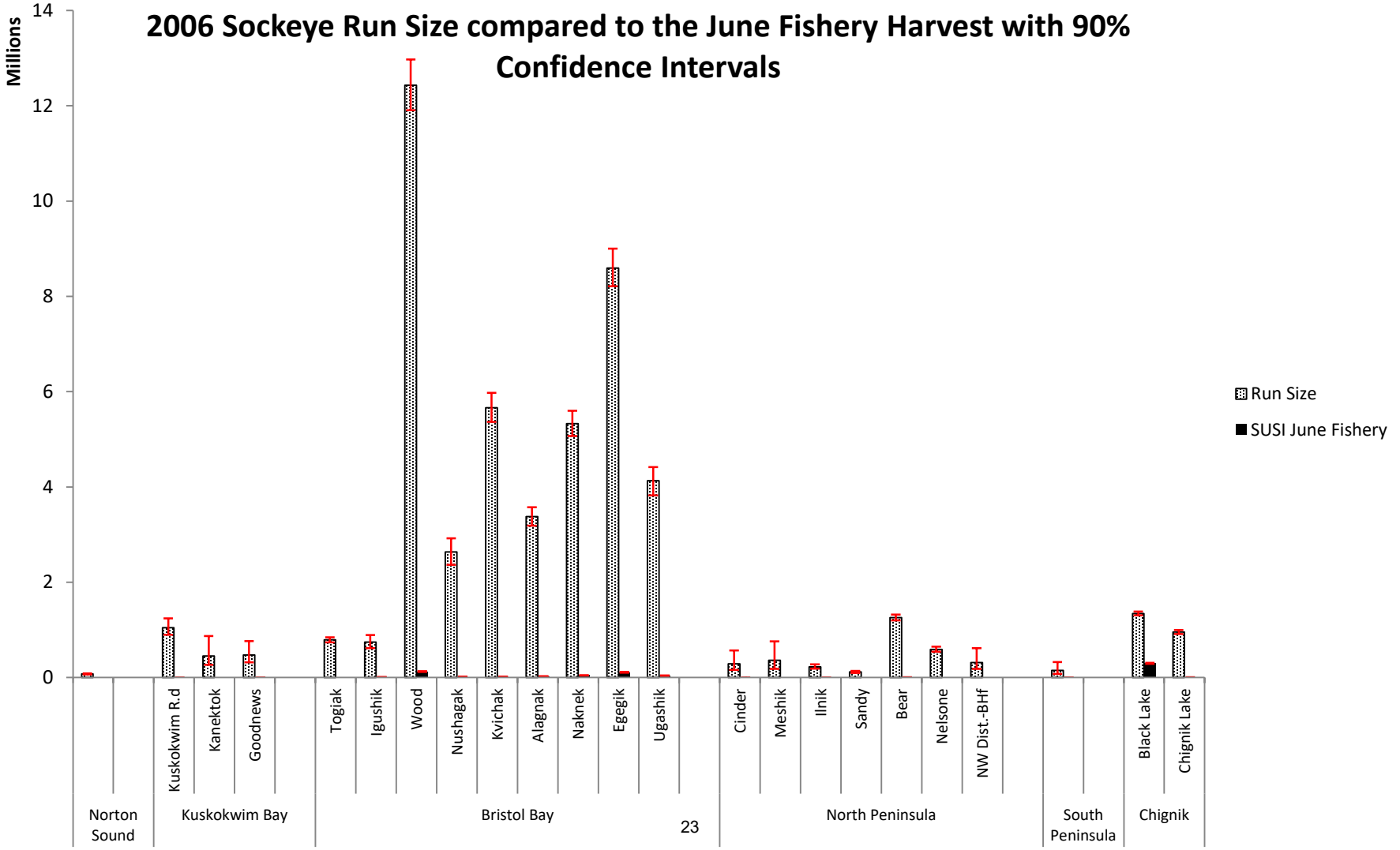


Figure 17.

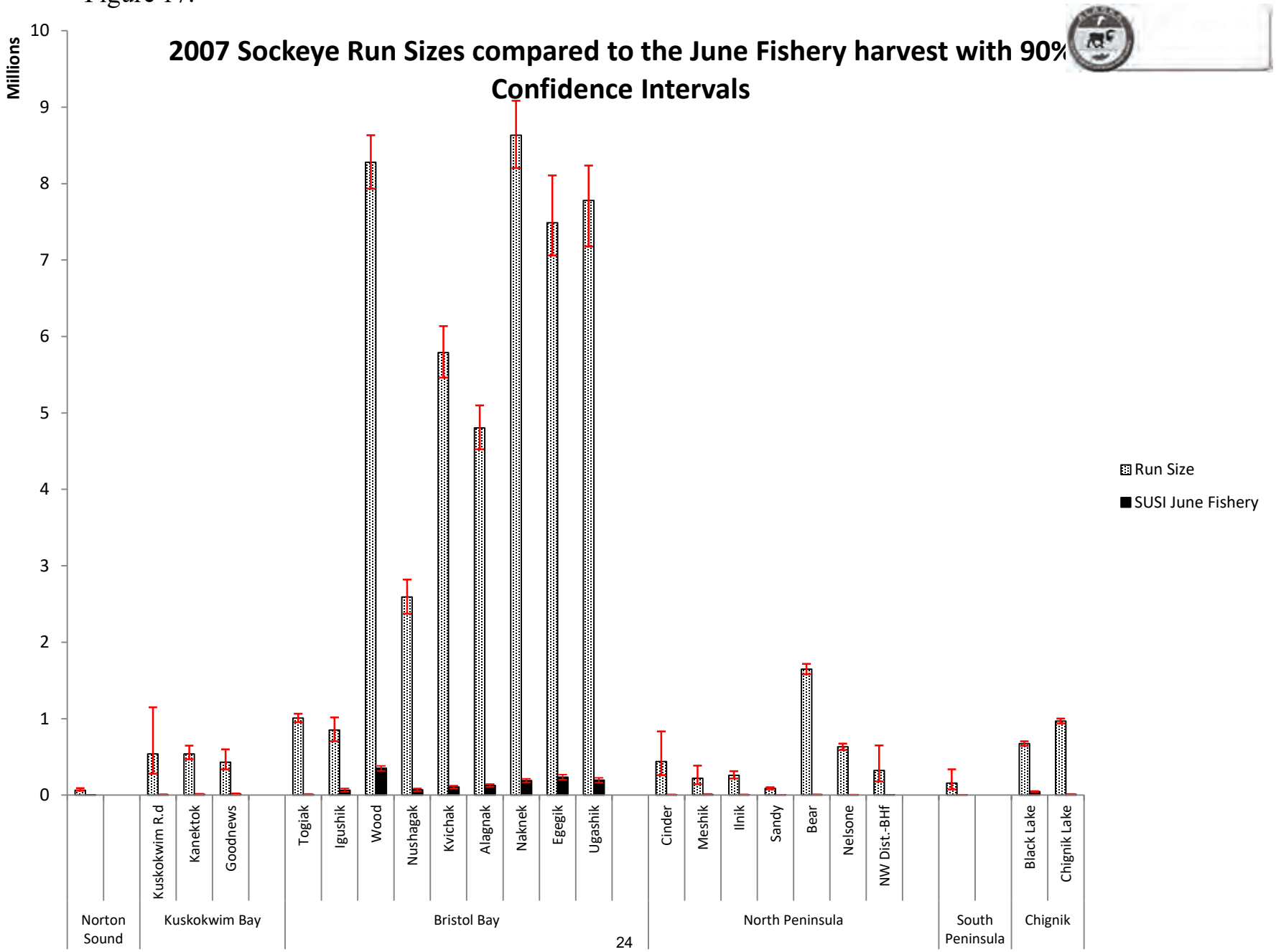

2007 Sockeye Run Sizes compared to the June Fishery harvest with 90% Confidence Intervals
Millions
10
9
8
7
6
5
4
3
2
1
0
Run Size
SUSI June Fishery
Norton Sound
Kuskokwim R.d
Kanektok
Goodnews
Kuskokwim Bay
Togiak
Igushik
Wood
Nushagak
Kvichak
Alagnak
Naknek
Egegik
Ugashik
Bristol Bay
Cinder
Meshik
Ilnik
Sandy
Bear
Nelsone
NW Dist.-BHf
North Peninsula
South Peninsula
Black Lake
Chignik Lake
Chignik

Figure 18.

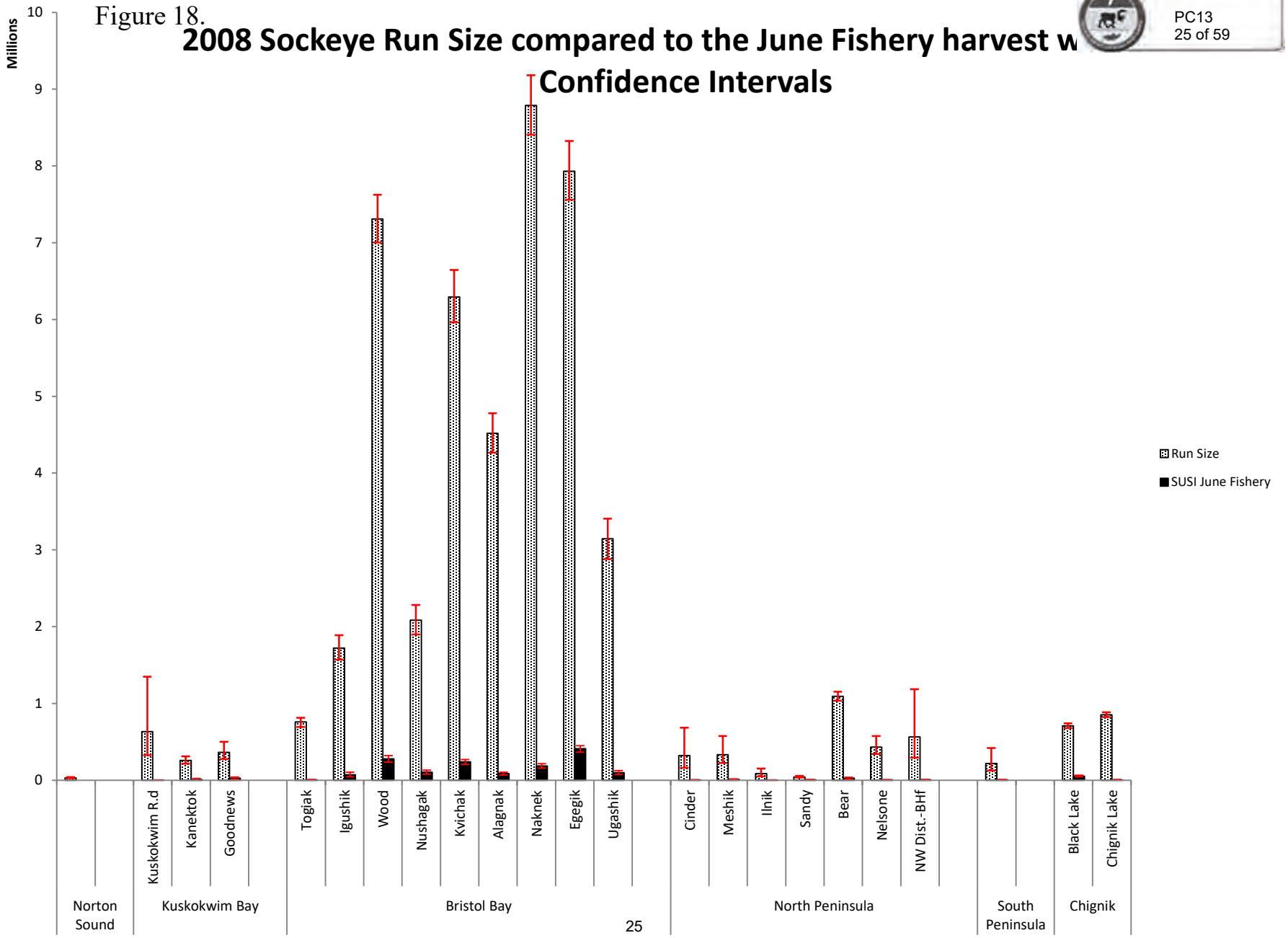

2008 Sockeye Run Size compared to the June Fishery harvest w
Confidence Intervals
Millions
10
9
8
7
6
5
4
3
2
1
0
Run Size
SUSI June Fishery
Kuskokwim R.d
Kanektok
Goodnews
Togiak
Igushik
Wood
Nushagak
Kvichak
Alagnak
Naknek
Egegik
Ugashik
Cinder
Meshik
Ilnik
Sandy
Bear
Nelsone
NW Dist.-BHf
Black Lake
Chignik Lake
Norton Sound
Kuskokwim Bay
Bristol Bay
North Peninsula
South Peninsula
Chignik

Figure 19.

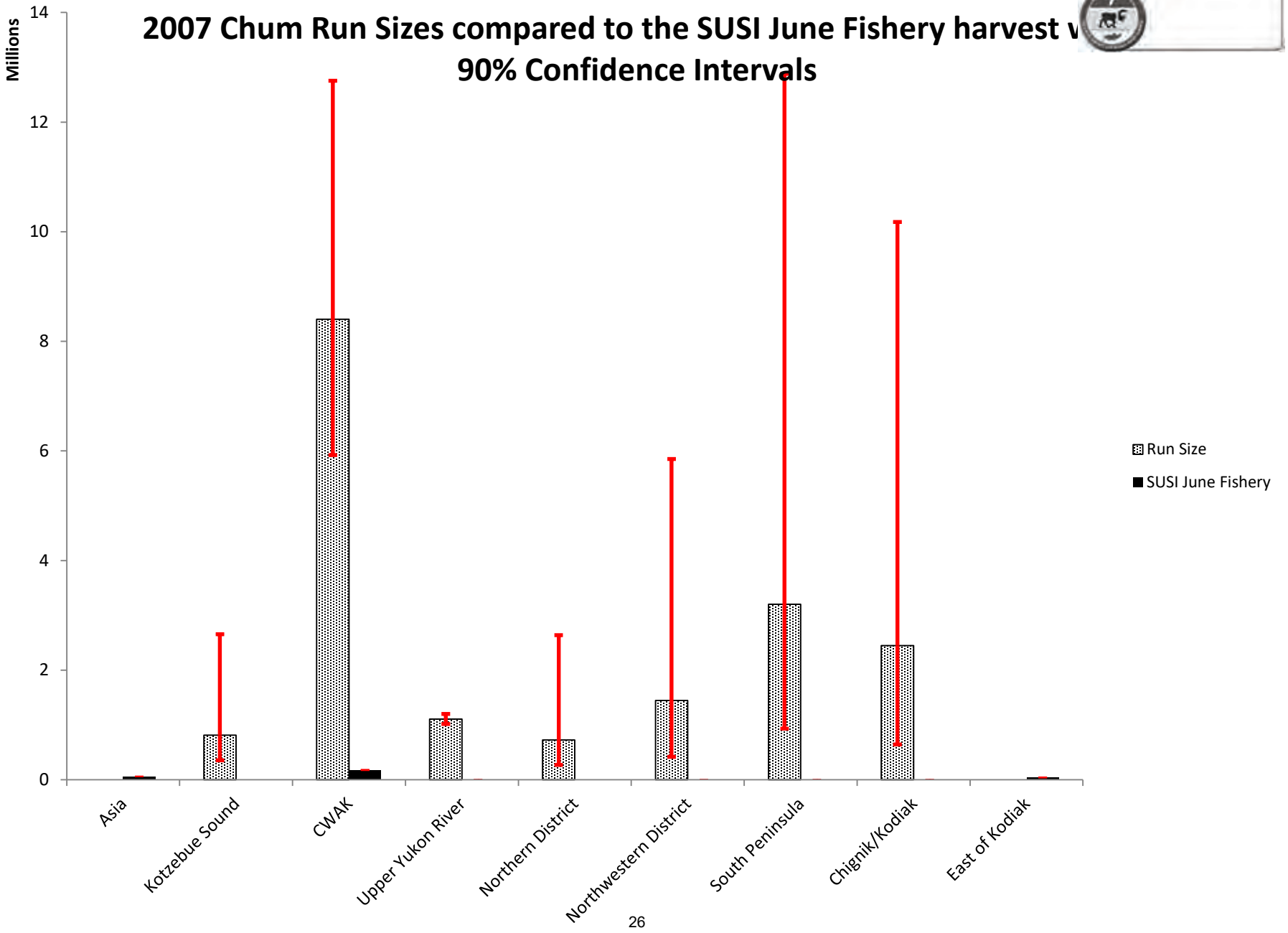

2007 Chum Run Sizes compared to the SUSI June Fishery harvest v
90% Confidence Intervals
Millions
14
12
10
8
6
4
2
0
Asia
Kotzebue Sound
CWAK
Upper Yukon River
Northern District
Northwestern District
South Peninsula
Chignik/Kodiak
East of Kodiak
Run Size
SUSI June Fishery

Figure 20.

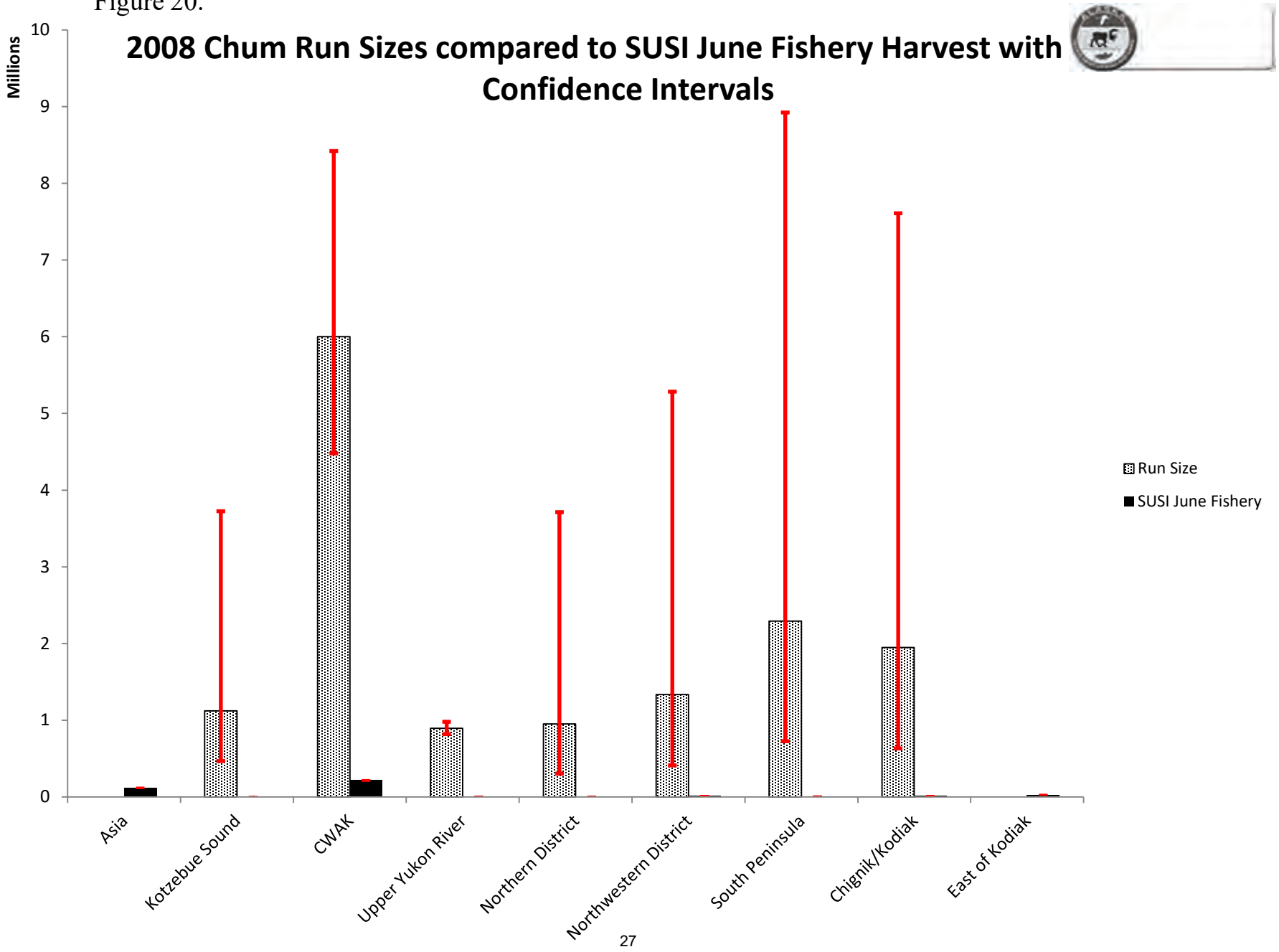
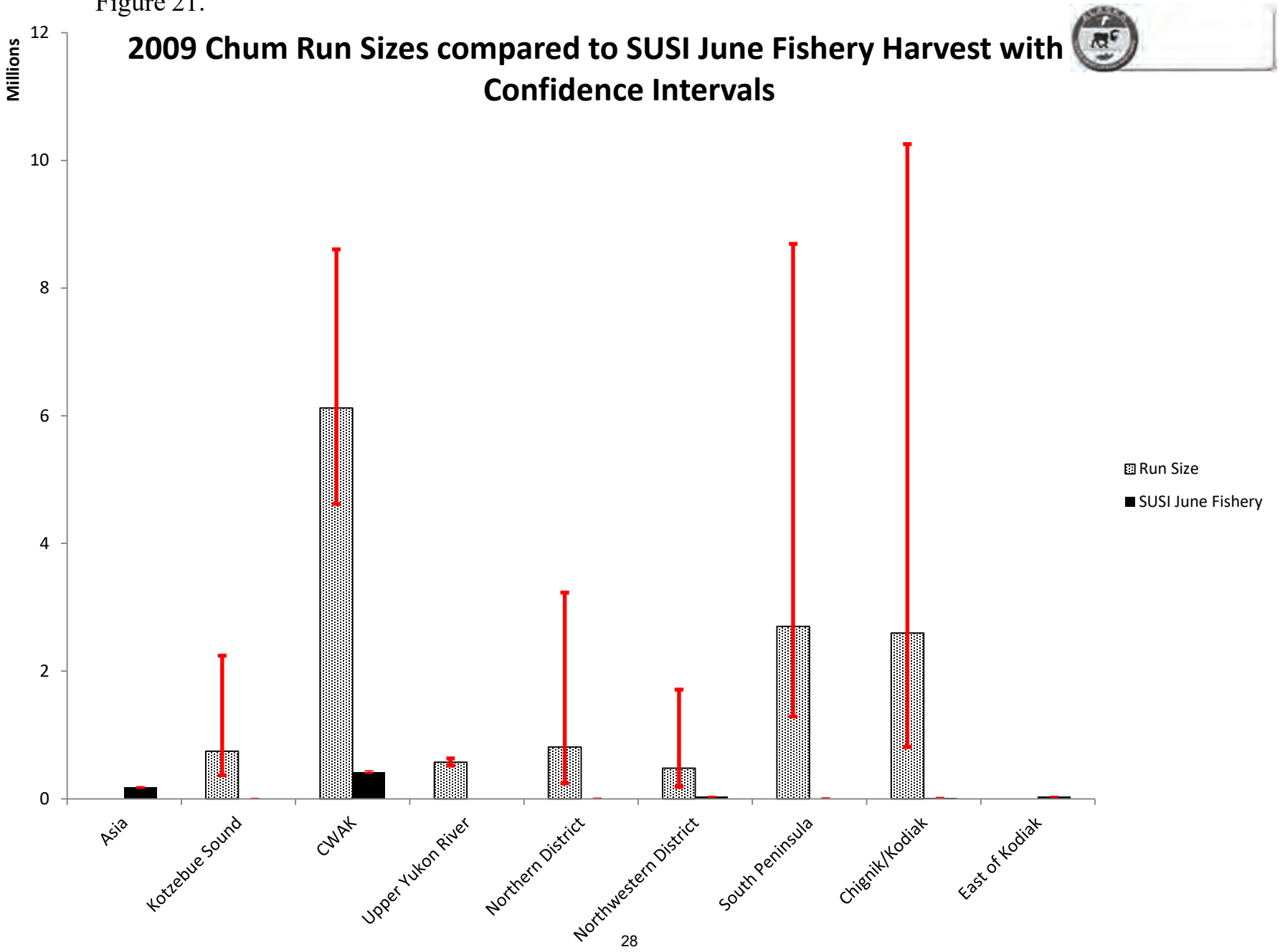
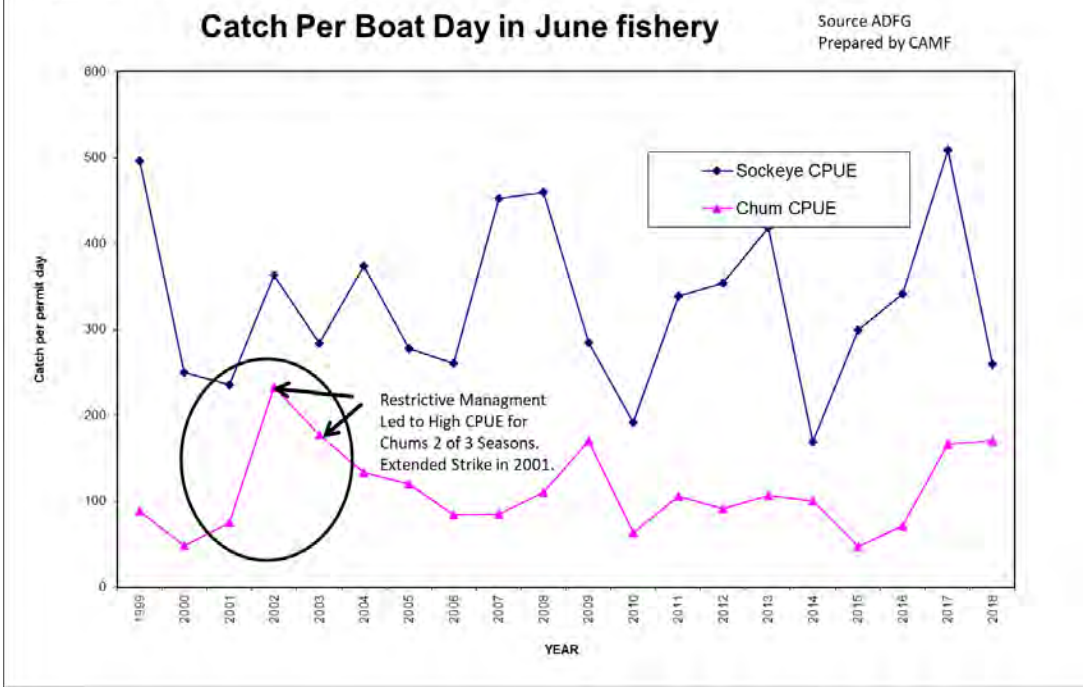

2008 Chum Run Sizes compared to SUSI June Fishery Harvest with Confidence Intervals
Millions
10
9
8
7
6
5
4
3
2
1
0
Run Size
SUSI June Fishery
Asia
Kotzebue Sound
CWAK
Upper Yukon River
Northern District
Northwestern District
South Peninsula
Chignik/Kodiak
East of Kodiak

Figure 21.


2009 Chum Run Sizes compared to SUSI June Fishery Harvest with Confidence Intervals
Millions
12
10
8
6
4
2
0
Asia
Kotzebue Sound
CWAK
Upper Yukon River
Northern District
Northwestern District
South Peninsula
Chignik/Kodiak
East of Kodiak
Run Size
SUSI June Fishery

Restrictive management increased CPUE for chums by making chum avoidance practices harder to accomplish. Fig 22.

Figure 22. CPUE for SUSI June Fishery.



The June fishery has performed in historic ranges since 2004. Fig 23 and 24.

Figure 23. June SUSI Sockeye and Chum Catches 1975 to 2018.

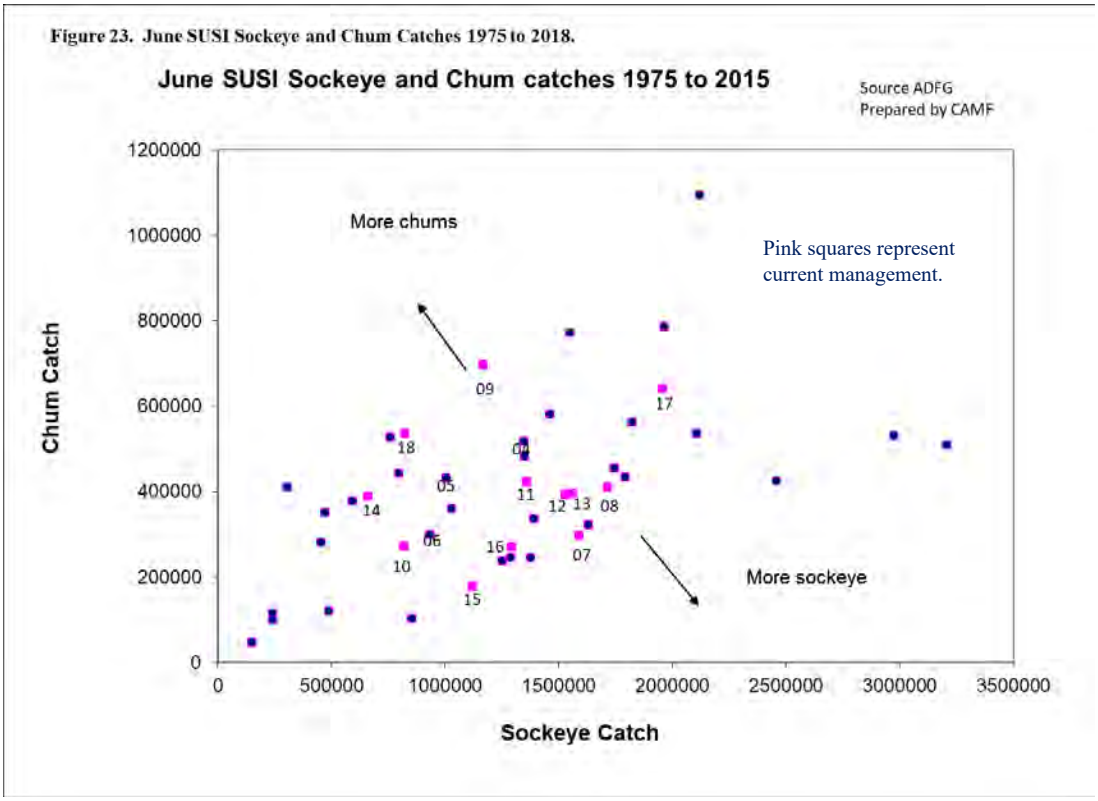
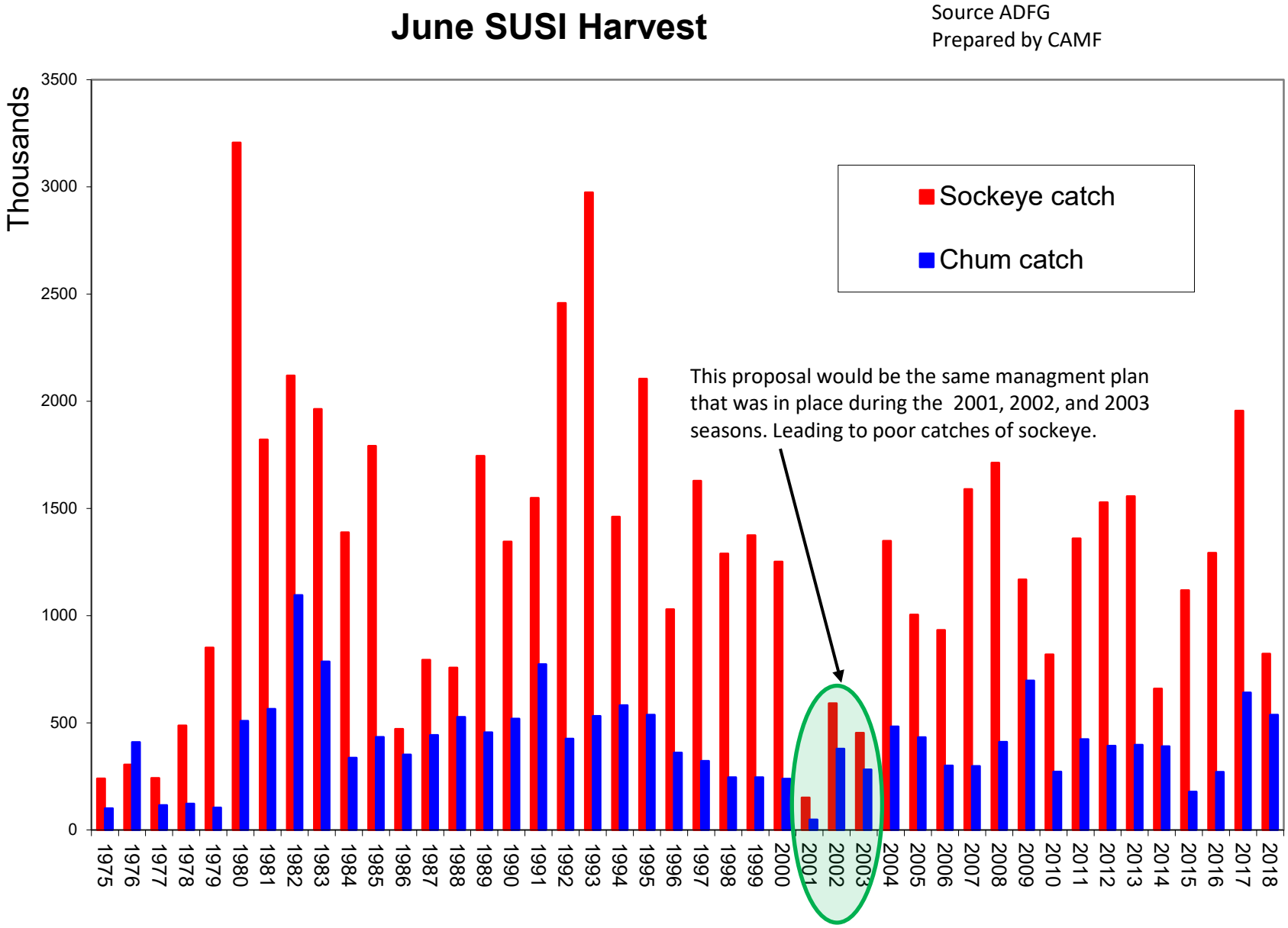


Figure 24. June SUSI Harvest 1975 to 2018



PROPOSAL 136

5 AAC 09.365. South Unimak and Shumagin Islands June Salmon Management Plan. Amend the *South Unimak and Shumagin Islands June Salmon Management Plan* so that fishing periods are structured with 24-hour windows where commercial salmon fishing gear is in the water, as follows:

Amend regulation 5 AAC 09.365. South Unimak and Shumagin Islands June Salmon Management Plan to allow for at least a 24 hour closure between the openings for each gear type in the Southwestern District and the West and East Pavlof sections of the South Central District so Chignik bound sockeye have an opportunity to pass through the area. The regulation would read like this:

5 AAC 09.365 **(g) notwithstanding (d) of this section;**
(1) For set net gear,

(A) **Beginning June 7, commercial fishing periods in the Southwestern District and the West and East Pavlof Bay sections of the South Central District will begin at 6 a.m. and run 42 hours until midnight the next day; commercial fishing will then close for 54 hours and reopen at 6 a.m. three days later**.

(2) For seine and drift gillnet gear,

(A) Beginning June 10, commercial fishing periods in the Southwestern District and the West and East Pavlof Bay sections of the South Central District will begin at 6 a.m. and run 42 hours until midnight the next day; commercial fishing will then close for 54 hours and reopen at 6 a.m. three days later.

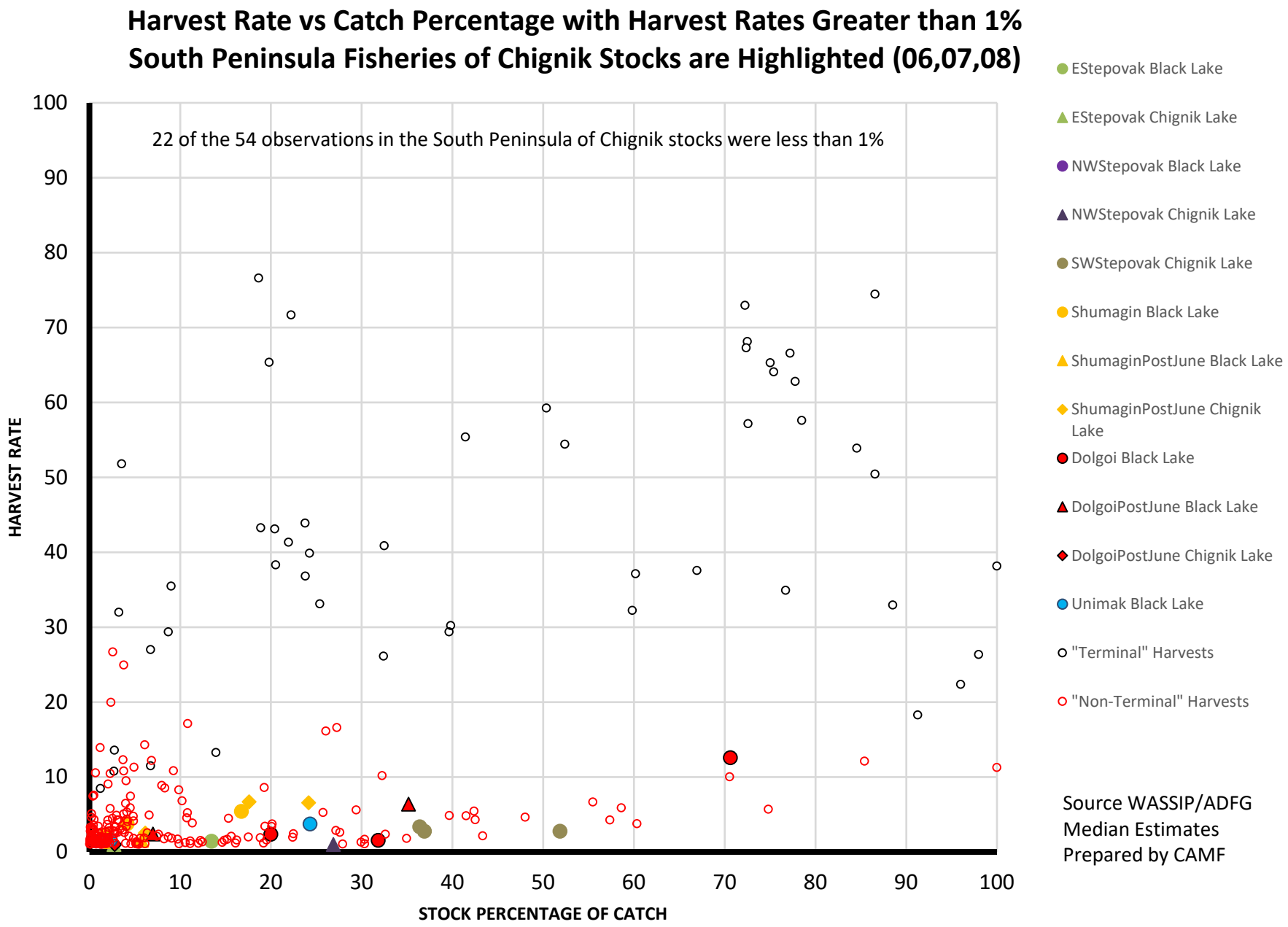
What is the issue you would like the board to address and why? The South Unimak and Shumagin Islands June Salmon Management Plan, as written, adopted and implemented in 2004, results in fishing gear being in the water continuously from June 7 to June 29. When the set-netters are closed, the seiners and drifters are open. Then when the seiners and drifters close, the set-netters are fishing. The result is continuous fishing from June 7 through June 29. When coupled with the fact the Board expanded the South Unimak fishery to include the entire Southwestern District and the West and East Pavlof Bay sections of the South Central District at the same time, the result is Chignik bound sockeye are harvested continually throughout the month of June as they pass through the Southwestern District, the West and East Pavlof Bay sections of the South Central District and the Shumagin Islands. This has resulted in a tremendous surge in the interception of Chignik bound sockeye, which are abundant in the area at this time.

PROPOSED BY: Gary Anderson (EF-F18-066)
****

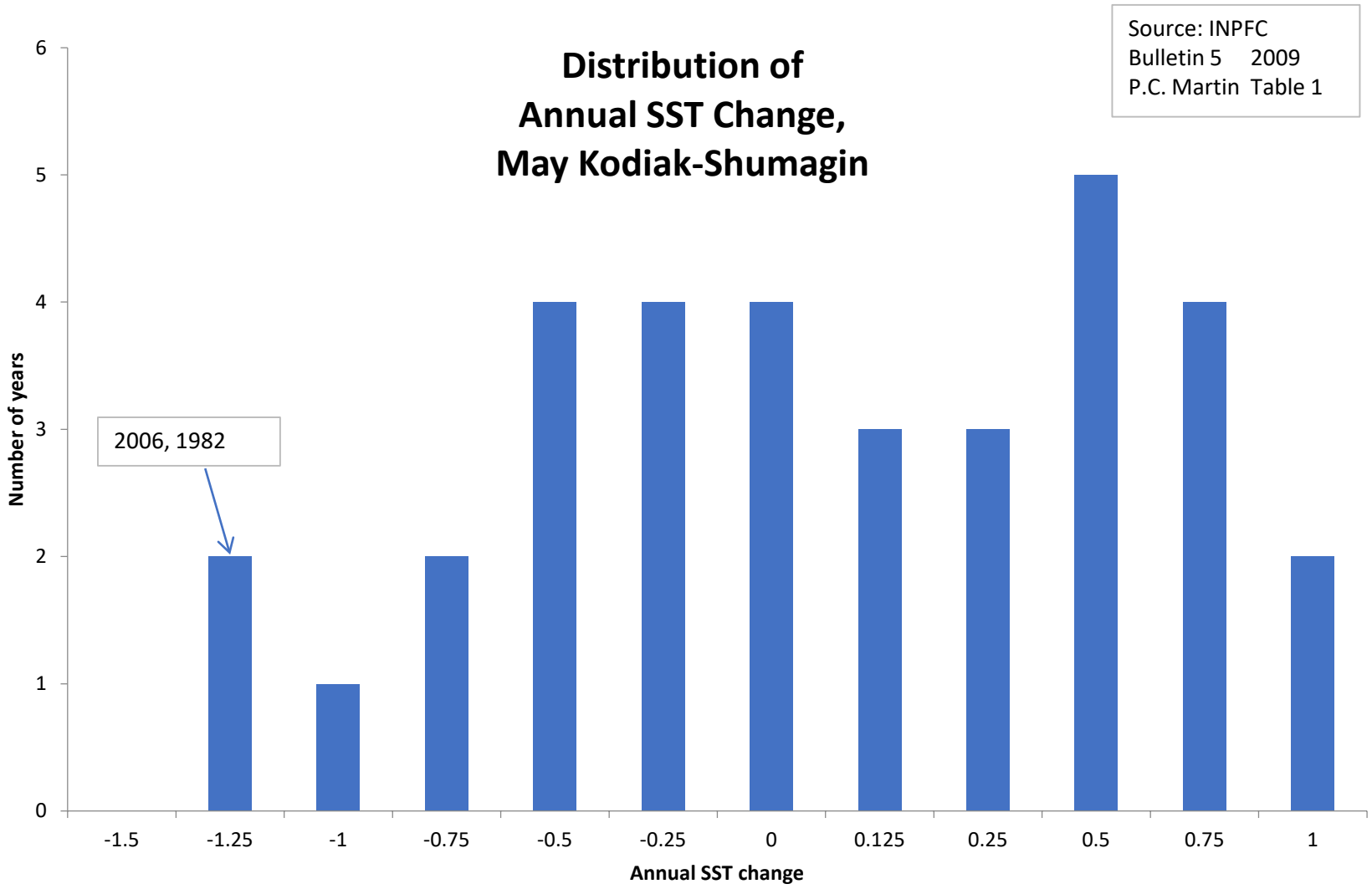
CAMF POSITION: OPPOSE
COMMENTS:

- Please refer to comments on Proposals 134 and 135
- Unnecessary restrictions that would seriously affect the Area M fisherman and the local economy for little gain to Chignik.
- Harvest rates in the South Peninsula fisheries of Chignik stocks in WASSIP are similar with other non-terminal fisheries. Figure 25.

Figure 25.


Harvest Rate vs Catch Percentage with Harvest Rates Greater than 1%
South Peninsula Fisheries of Chignik Stocks are Highlighted (06,07,08)
22 of the 54 observations in the South Peninsula of Chignik stocks were less than 1%
HARVEST RATE
STOCK PERCENTAGE OF CATCH
0
10
20
30
40
50
60
70
80
90
100
EStepovak Black Lake
EStepovak Chignik Lake
NWStepovak Black Lake
NWStepovak Chignik Lake
SWStepovak Chignik Lake
Shumagin Black Lake
ShumaginPostJune Black Lake
ShumaginPostJune Chignik Lake
Dolgoi Black Lake
DolgoiPostJune Black Lake
DolgoiPostJune Chignik Lake
Unimak Black Lake
"Terminal" Harvests
"Non-Terminal" Harvests
Source WASSIP/ADFG
Median Estimates
Prepared by CAMF

A unusual drop in Sea Surface Temperature in 2006 may have contributed to a greater harvest rate of the that season. Only two years of 35 (1972 to 2008) have had drops in SST in this range. Figure 26



B. The North Peninsula Fishery

The fishery in the Northern District of Area M is primarily a drift gillnet fishery, and is managed under the Northern District Salmon Fisheries Management Plan, 5 AAC 09.369. Operating out of Port Moller, our fleet fishes in the Bear River, Three Hills, Ilnik, and Outer Port Heiden Sections, and targets sockeye returning to local rivers. The North Peninsula fishery is orderly and well-managed. The Board has consistently rejected proposals from Bristol Bay fishermen and groups to restrict our fishery, and we request that you do so again this year.

We believe it would be helpful to review and summarize several aspects of the North Peninsula fishery, including prior Board action and the biology, history, and management of the fishery.

1. Prior Board Action

We first refer you to Board Findings 96-165-FB (formerly 96-09-FB) prepared at the meeting in January 1996. The Board had considered North Peninsula issues many times before that meeting, but this was the first time the Board prepared a set of findings to explain its actions. The findings summarize the comments of staff and the public, and provide the Board's rationale for rejecting all the proposals aimed at greatly restricting the North Peninsula fishery. The findings conclude (at page 3):

> Like past Boards that have rejected proposals to restructure the North Peninsula fisheries, the Board found no reason to reduce fishing districts, seasons or harvests in the Northern District. The Board recognizes that there may be some amount of interception of Bristol Bay fish in the Northern District. The Board further finds that the Northern District fishery is not an expanding fishery, and does not warrant action under the Board's mixed stock policy.

Consistent with these findings, the Board at its meeting in January 1998 again rejected proposals to restrict the North Peninsula fishery. The main action taken was to adopt the Northern District Salmon Fisheries Management Plan, 5 AAC 09.369. This plan confirmed the Board's and the Department's commitment to maintaining a management regime that has succeeded in achieving escapements, sustaining production, and allowing a steady harvest of high quality fish. In fact, the principal action the Board took in 1998 was to adopt a regulation (5 AAC 09.369(j)) permitting us earlier access to the harvestable surplus from the Ilnik River, so that the fishery better fits the timing of the run.

Northern District proposals were next considered by the Board at its meeting in January 2001. As usual, Bristol Bay stakeholders advocated drastic restructuring of our fishery, relying primarily on their concerns for the status of Kvichak sockeye. Kvichak sockeye have since been removed from stock of concern list. The Board committee that reviewed the 2001 proposals found "There are no new or expanding fisheries on these stocks," and recommended status quo for the Northern District fisheries (RC # 384,

January 29, 2001). The Board unanimously voted in favor of this recommendation and rejected all the Bristol Bay proposals for our area.

The Board in 2004 made additional revisions to the Northern District plan, including easing restrictions regarding when our fleet could fish in the Ilnik Section. These changes were intended to provide additional management flexibility for the Department to harvest local runs while assuring that escapements are met.

In 2007 the Board responded to information presented by the Department showing a foregone harvest of more than 100,000 sockeye annually in the Meshik River. Our fleet has always fished this run, but restrictions on fishing in this area resulted in escapements that consistently exceeded the Department's goal. The Board opened up a portion of the Outer Port Heiden Section to the drift fleet, allowing us to fish on the north side of Port Heiden. The Board also authorized openings in the Ilnik Section northeast of Unangashak Bluffs, to better access returns to the Ilnik River, which likewise has experienced significant excess escapements. These regulatory change succeeded in harvesting the available surplus and bringing escapements in line with the established goals. At your meeting in 2010, the Board considered proposals to roll back these provisions. The Department, while neutral on the allocation aspects of these proposals, opposed them because they could result in decreased management flexibility and lost harvest opportunity. The Department recognized that since the opening of the Outer Port Heiden Section, "excessive surplus escapements into Meshik River have not occurred." *See* 2010 Staff Comments (RC 2). It should also be noted that the fishing schedule in this area is conservative, allowing us to fish only 2 ½ days per week, not continuously as implied by some.

At the 2013 meeting, the Board did make changes to the Northern District management plan that imposed some restrictions on our fishery in the Outer Port Heiden and Ilnik Sections, including a provision for rolling closures and a limit on how far from shore we could fish. These restrictions were largely repealed at the ensuing meeting in 2016. The Board's action in removing these unnecessary restrictions came in response to an agreement between CAMF and the Nelson Lagoon Advisory Committee that resolved many of the disputes in this area.

In sum, the Board over the years has taken several steps to improve management in our area and provide the Department the necessary management flexibility to harvest local runs while assuring that escapements are met. These actions should be seen as an endorsement of, and a demonstration of confidence in, the current management regime.

2. Harvest Rates

The 9-year, 9-million dollar WASSIP study shows that Bristol Bay stocks are mixed in our North Peninsula catches to a higher extent than previous analyses suggested. However, the WASSIP results also show that our overall harvest rate on Bristol Bay stocks in the North Peninsula fishery was between 1.9% and 2.6%. This low harvest rate indicates that the impact of the North Peninsula fishery on Bristol Bay sockeye is

minimal. By comparison, the error in knowing the size of the Bristol Bay return after the season is over is in the range of 3 – 4 %, roughly double the impact of the North Peninsula fishery. Any suggestion that the North Peninsula fishery poses conservation or management concerns for Bristol Bay sockeye is not well grounded. Bristol Bay stocks, it now seems clear, have always been a component of our harvests along the North Peninsula, and are of great importance to the economy of the Alaska Peninsula region and to the survival of the Port Moller cannery. The Bristol Bay fishery is the largest sockeye fishery in the world, and it is unrealistic to expect that no Bristol Bay sockeye will be harvested in the nearby and far smaller North Peninsula fishery.

3. History of Fishing

Area M drift gillnetters have fished the Northern District since statehood. As early as 1915, harvests of sockeye on the North Peninsula exceeded 2 million fish. The 1960 Annual Management Report shows that as many as 50 vessels fished the Ilnik Section (as it was then defined). The amount of effort in the Ilnik and Three Hills Sections increased in the early 1980s, but this was primarily a function of increased returns to the North Peninsula. The same phenomenon also occurred in the Ugashik and Egegik Districts of Bristol Bay, where returns to those systems resulted in nearly identical percentage increases in effort and harvest. Since 1983 our harvest has been relatively stable and has not increased out of proportion to the size of North Peninsula escapements. As the quote from the 1996 findings shows, the Board specifically found that the North Peninsula fishery was not new and expanding and did not require action under the mixed stock policy. The North Peninsula fishery has existed for many years and has been examined intensely by past Boards, none of which found any justification for adopting the kind of restrictions advocated by interests from Bristol Bay.

4. Dispersed Management

The North Peninsula drift fishery is very orderly and well-managed. By keeping our boats dispersed along the beach instead of concentrated around stream termini, area managers are able to avoid costly and management-intensive pulse fishing. This approach allows the managers to obtain a steady stream of escapement throughout the season. Our season lasts from June to mid-September, three or four times longer than the majority of Bristol Bay fisheries. The long coastline in our area is completely exposed to westerly weather, and fishing is inevitably interrupted in-season. If the fleet fished only in small areas in front of river mouths, these interruptions would produce excess escapement. Because of the small size of our rivers we do not have the flexibility to move in-river to reduce over-escapement. Dispersing the fleet over a larger area provides a crucial buffer of time between weather interruptions and the build-up of fish in front of rivers as they prepare to move upstream.

The arguments by Bristol Bay interests for boxing in the North Peninsula fishery rest largely on the premise that terminal management, the way their fishery is managed in the Bay, should be applied elsewhere. This rationale ignores the differences between the fisheries in the two areas and the nature of our respective fleets. The majority of the

vessels in our fleet are larger, deep draft vessels built to handle an open ocean fishery. Forcing our fleet to fish in boxes around river termini will create a serious safety issue for our fishermen. Dispersing the fleet also minimizes conflicts among boats vying for sets and removes incentive for line violations. We have developed a system of self-regulation in which those who want to fish the line take turns making drifts. The result is a high quality product – exactly what the state should support in light of the modern market for salmon. Terminal management is the exception rather than the rule in Alaska, and for good reason. Orderly fisheries and quality products can best be maintained by other management methods.

For these reasons, we urge the Board again to reject all proposals that seek to restrict our North Peninsula fishery, in particular, proposals 144 and 145. These proposals target fishing in the Outer Port Heiden and Ilnik Sections, and are little more than a rehash of the regulations the Board repealed in 2016. North Peninsula runs are well managed, with annual escapements of about 1 million fish. We turn out a high quality product, and we don't experience many of the management and enforcement problems encountered in the Bay.

Furthermore, Bristol Bay has been enjoying record or near record productivity the past several years. Indeed, the 2018 sockeye return to Bristol Bay was the largest on record and the ex-vessel earnings of the commercial permit holders in 2018 was the highest in the 100+ year history of the Bristol Bay sockeye fishery. There is substantial surplus production in Bristol Bay that goes underutilized in the form of over escapement into many Bristol Bay systems. There is nothing "broken" nor is there anything to "fix" on the North Peninsula relative to the Bristol Bay resource management, which is clearly successful. Therefore, in our opinion, there is no legitimate basis for the Board to adopt either of these proposals.

PROPOSAL 144

5 AAC 09.369. Northern District Salmon Fisheries Management Plan.

Restrict commercial fishing for salmon in areas both along the coast and in open seaward waters of the Outer Port Heiden Section and the open seaward waters of the Ilnik Section when the preseason Bristol Bay sockeye salmon forecast is 30 million fish or less, as follows:

This proposal seeks to restrict commercial fishing in areas both along the coast and in open seaward waters of the Outer Port Heiden and the open seaward waters of the Ilnik Section when the preseason Bristol Bay forecast is 30M salmon or less. The purpose of these area restrictions when the Bristol Bay preseason forecast is 30M salmon or less is twofold. First to appropriately spread the conservation of the Bristol Bay sockeye salmon amongst all users when the preseason forecast is 30M salmon or less; and secondly, when the Bristol Bay preseason forecast is 30M salmon or less., to direct more commercial fishing on local Northern Peninsula sockeye salmon stocks, particularly the Meshik River and Ilnik River stocks, that migrate within known channels in each section. This proposal seeks to further limit the distance open to commercial fishing seaward in both fishing Sections. When the Bristol Bay preseason forecast is 30M salmon or less, the seaward boundary limit would be 0.5 miles seaward throughout these two Sections.

5 AAC 09.369. Northern District Salmon Fisheries Management Plan

(j) In the Ilnik Section,

(1) notwithstanding 5 AAC 09.320(a)(4), from June 20 through July 20,

(A) commercial salmon fishing will be permitted in the Ilnik Section

(i) southwest of the Unangashak Bluffs based on the abundance of Ilnik River sockeye salmon;

and

(ii) northeast of the Unangashak Bluffs based on the abundance of Meshik River and Ilnik River sockeye salmon, combined;

(B) If the preseason Bristol Bay sockeye salmon forecast is 30M salmon or less, fishing will be allowed seaward for 1.5 miles.

(i) If inseason assessment indicates a run larger than 30M salmon, the commissioner may, by emergency order, close the Ilnik Section, and immediately reopen the Ilnik Section, with fishery restrictions that the commissioner determines appropriate

(C) [(B)] notwithstanding (B) if the commissioner closes that portion of the Egegik District specified in 5 AAC 06.359(c) for conservation of Ugashik River sockeye salmon stocks, the commissioner may, by emergency order, close the Ilnik Section and immediately reopen the Ilnik Section, with additional fishing restrictions that the commissioner determines necessary;

(I) The Outer Port Heiden Section is open from June 20 through July 31 to commercial salmon fishing in those waters west of a line from 57 _E0S.52' N. lat., 158_E34.45' W. long. to 57 _E0S.85' N. lat., 158_E37.50' W. long. based on the abundance of Meshik River sockeye salmon.

(A) If the preseason Bristol Bay sockeye salmon forecast is for 30M salmon or less, the Outer Port Heiden Section is open from June 20 through July 31 to commercial salmon fishing in those waters west of a line from 56 59.68 N. lat., 158 E40.45' w. long. Under this scenario, this section will be open to commercial fishing seaward for 1.5 miles.

(i) If inseason assessment indicated a run lager than 30M salmon, the commissioner may, by emergency order, close the Outer Port Heiden Section, and immediately reopen the Outer Port Heiden Section, with fishery restrictions that the commissioner determines appropriate

(B) notwithstanding (A), If the commissioner closes the portion of the Egegik District as specified in 5 AAC 06.359(c) for the conservation of Ugashik River sockeye salmon stocks, the commissioner may, by emergency order, close the Outer Port Heiden Section, and immediately reopen the Outer Port Heiden Section, with additional fishing restrictions that the commissioner determines necessary.

What is the issue you would like the board to address and why? Sharing the conservation of Bristol Bay sockeye salmon. Currently, in both Ilnik and the Outer Port Heiden Sections, conservation action on Bristol Bay salmon is only taken after a conservation closure occurs in Bristol Bay. Specifically, closure of that portion of the Egegik District specified in 5 AAC 06.359(c) for conservation of Ugashik River sockeye salmon stocks will prompt the commissioner to take unspecified conservation action in the Ilnik and Outer Port Heiden Sections. This delayed fishery management conservation action in the Ilnik and Outer Port Heiden Sections will no doubt cause the conservation of Bristol Bay salmon to be mis apportion to the Bristol Bay fishers. Because the Bristol Bay preseason forecast has been fairly accurate, we believe that it is prudent and precautionary to base conservation efforts in the Ilnik and Outer Port Heiden Sections on the Bristol Bay preseason forecast. Because Bristol Bay fishery managers are ultimately responsible for meeting subsistence needs and escapement goals, no additional conservation regulations are necessary for the Bristol Bay Management Area.

We recommend closing substantial portions of the Ilnik and Outer Port Heiden Sections to commercial fishing when the preseason Bristol Bay sockeye salmon forecast is 30M salmon or less. The 30M salmon preseason forecast represents an anticipated escapement of approximately 7.2M salmon, leaving approximately 22.8M for potential harvest. The estimated total Bristol Bay escapement of 7 .2M salmon from a run of 30M salmon would provide for escapements that would fall near the midpoint of the low range of the individual system escapement goals. Note also that since 1996, the total run Bristol Bay sockeye salmon has only fallen below 30 M salmon in 6 of the 22 years of record. The median run size during the period, 1996-2017, is approximately 39.4M salmon. Incorporation of this trigger in the Northern District fishery management plan will assure that conservation of Bristol Bay sockeye salmon, when necessary, will be more appropriately shared among all commercial fishers that harvest Bristol Bay sockeye salmon. This recommendation to the management plan may preclude or possibly reduce additional inseason restrictions deemed necessary by the commission if a closure of that portion of the Egegik District specified in 5 AAC 06.359(c) for conservation of Ugashik River sockeye salmon stocks occurs. Accordingly, we propose that fishing be restricted both in shore length and seaward extension in the Outer Port Heiden Section and the seaward extension in the Ilnik Section. This would not only limit the area open to fishing in both Sections but may also focus fishing pressure on local salmon stocks, Meshik and Ilnik River stocks, that may or may not be affected by factors affecting the Bristol Bay sockeye salmon projection. Both Ilnik and Outer Port Heiden Section fisheries are to be managed on the abundance of local sockeye salmon stocks, Ilnik and Meshik River stocks.

If nothing is done, fishing may continue in the Ilnik and Outer Port Heiden Sections until it becomes obvious that restrictions are necessary because of closures in the Egegik District (Ugashik District). At that time, it will be too late to appropriately share conservation of Bristol Bay salmon amongst all commercial fishers. Bristol Bay Managers may be forced to restricted fishing periods or close the fisheries because of the need to meet subsistence needs and escapement goals. Additionally, if Northern Peninsula stocks are not affected by the factors negatively affecting Bristol Bay stocks, escapements to the Meshik and Ilnik Rivers could be well over the targeted escapement because of the lack of fishing pressure directed on these stocks. This preseason closure of waters in the Ilnik and Outer Port Heiden Sections when the Bristol Bay preseason forecast is 30M salmon or less may be relaxed based on inseason assessment of the run.
Other solutions considered was to substantially reduce fishing time in both the Port Heiden and Ilnik Sections based on the preseason forecast of less than or equal to 30M Bristol Bay sockeye salmon. This may be a viable alternative or a combination of area and time restrictions. Another solution was to dramatically reduce the area opened to fishing within the Outer Port Heiden and Ilnik Sections so that the major harvest would consist of local stocks. These restrictions could possibly be relaxed on inseason assessment of the Bristol Bay run. Finally, we considered setting various triggers, based on the Bristol Bay preseason sockeye salmon forecast (30M, 25M, 20M salmon), that would stipulate increased closed waters and/or fishing time in the Outer Port Heiden and Ilnik Sections, commensurate with the pre-season Bristol Bay forecast.
Note that the WASSIP study found that Northern Peninsula sockeye salmon stocks contributed an average of 48% to the SW Ilnik harvest (3 years); 30% to the NE Ilnik harvest (3 years); and 21 % to the Outer Port Heiden Section harvest (2 years).
PROPOSED BY: Lower Bristol Bay Fish and Game Advisory Committee (HQ-F18-022)
****

CAMF POSITION: OPPOSE

- Figure 27 is the description of area in question. Figure 27b. highlights OPH Section

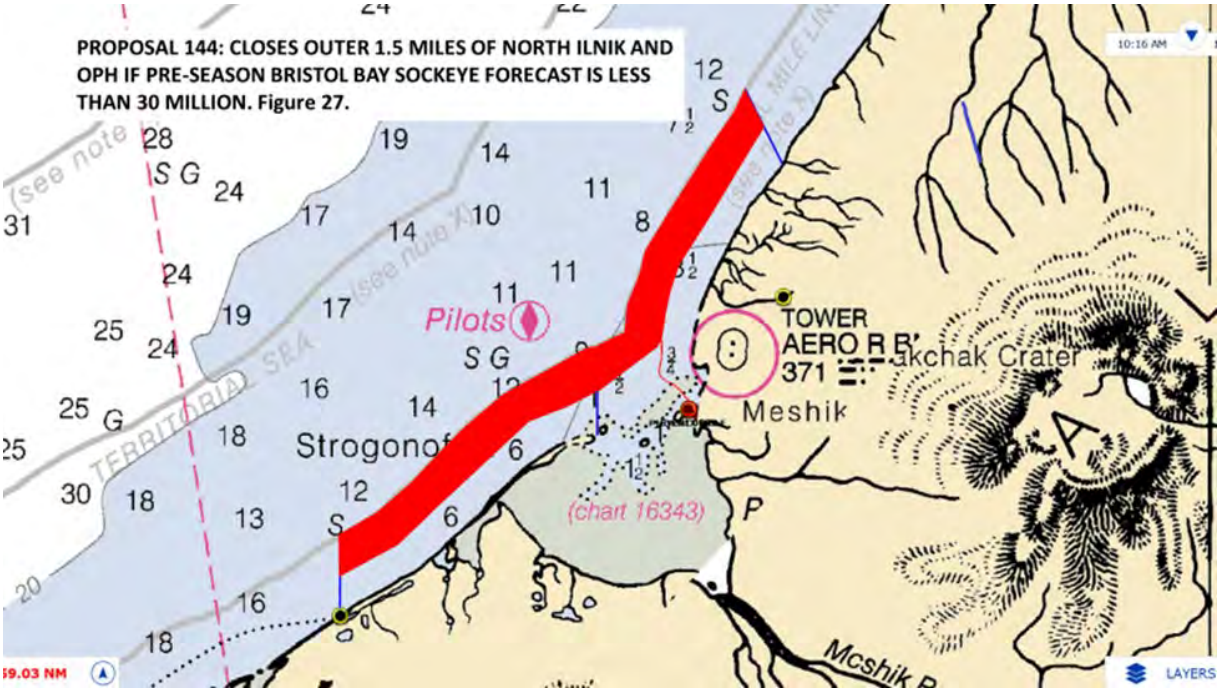
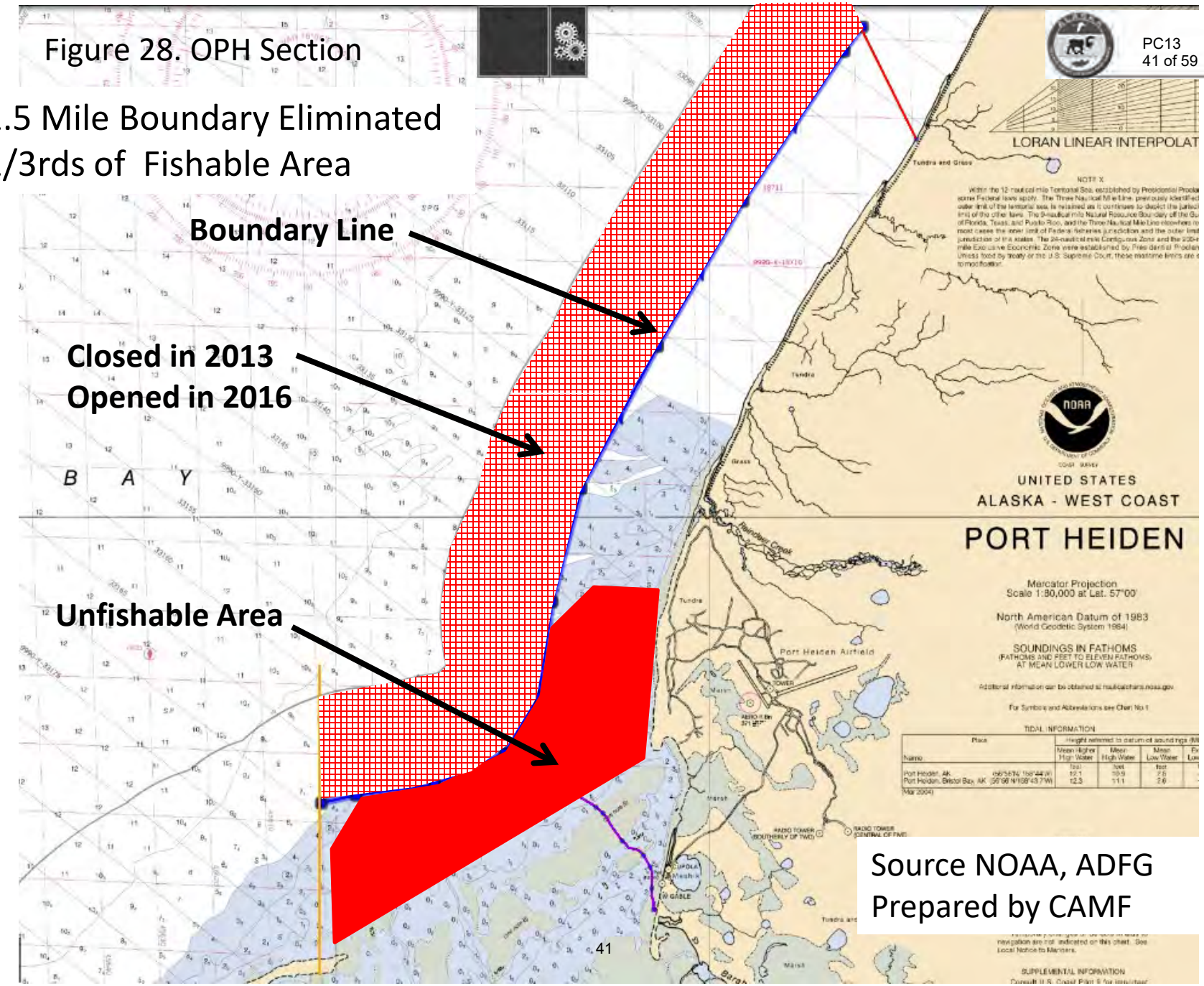


Figure 28. OPH Section

1.5 Mile Boundary Eliminated
2/3rds of Fishable Area



Source NOAA, ADFG
Prepared by CAMF

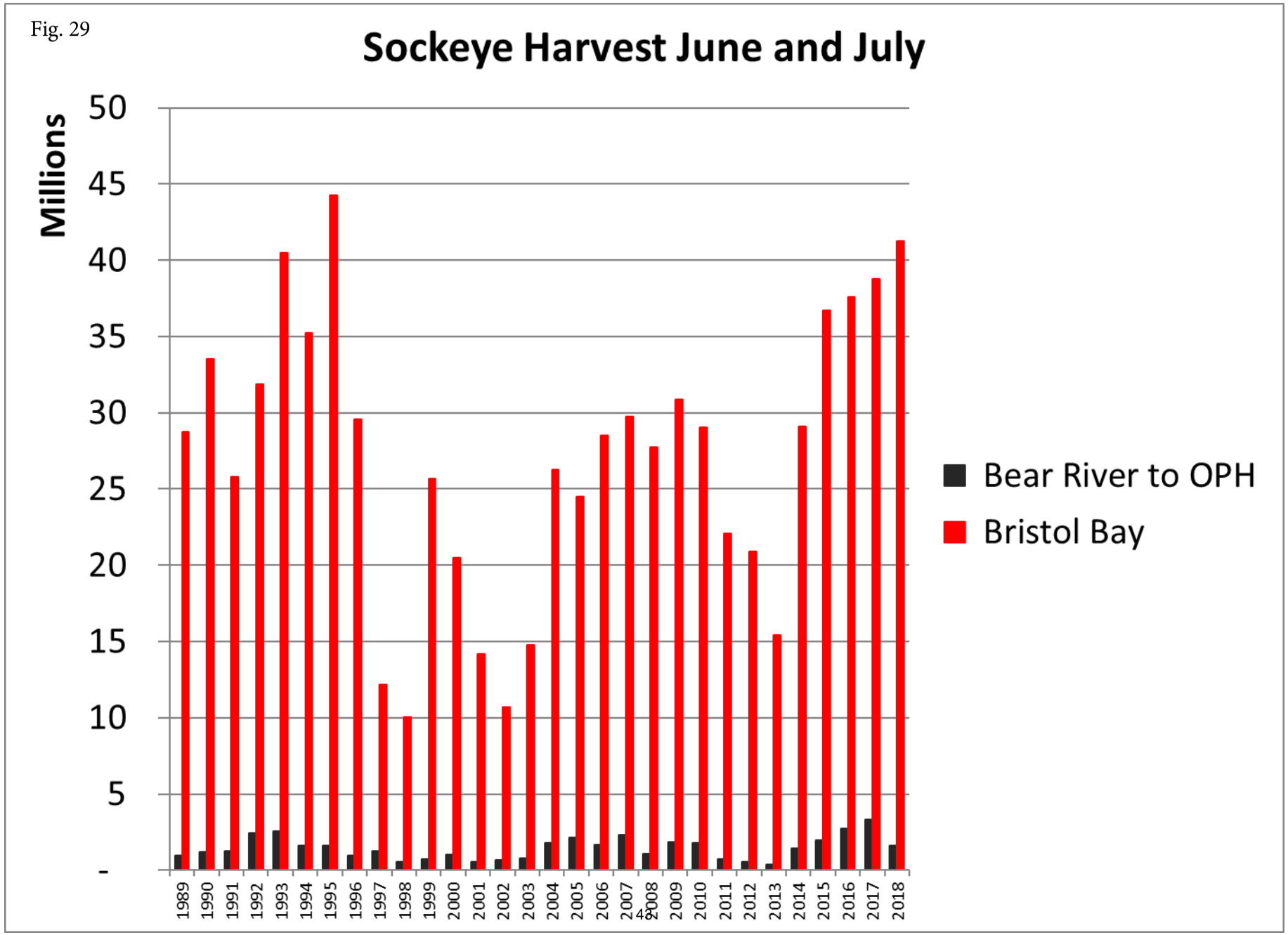
CAMF COMMENTS:

- If enacted it would create a serious safety issue for the fleet. One of the reasons that in 2016 the BOF re-opened the same area in the OPH Section after being closed in 2013.
- As stated in the 2019 Bristol Bay Sockeye Salmon Forecast dated 11/9/2018:

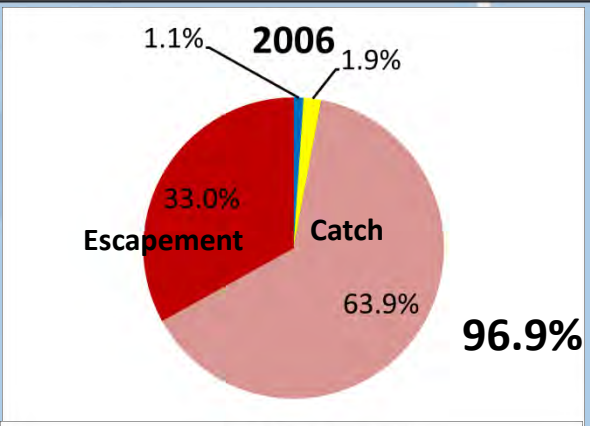
"Forecasting future salmon returns is inherently difficult and uncertain. We have used similar methods since 2001 to produce the Bristol Bay sockeye salmon forecast which have performed well when applied to Bristol Bay as a whole. Since 2001, our forecasts have, on average, under-forecast the run by 11% and have ranged from 44% below actual run in 2014 to 19% above actual run in 2011. Forecasted harvests have had a mean absolute percent error of 14% since 2001."

- Size of the Bear River to OPH Harvest is much smaller than the Bristol Bay Harvest (Figure 29)
- In the three years of WASSIP Harvest rates are very low on the total BB run. 2006 1.9%, 2007 2.6%, and 2008 1.9% (Figure 30)
- WASSIP data shows that Harvest Rate of given fishery on a certain reporting stock is dependent on the distance from that stock. Harvest rates diminish drastically with distance. Notice that Egegik and OPH, which are about the same distance from Ugashik, have similar harvest rates on the Ugashik stock. (Figure 31)
- Vast majority of the Ugashik reporting stock returns to Ugashik (Figure 32)
- Over 30 years of meeting escapement goal (Figure 33)
- A BBSRI sponsored Report presented at the 2016 BOF meeting came to the conclusion that there were no differences in stock compositions between inside 1.5 miles and outside 1.5 miles in the fishery. Study can be found at the link below. http://www.aebfish.org/ilnikreport012816.pdf

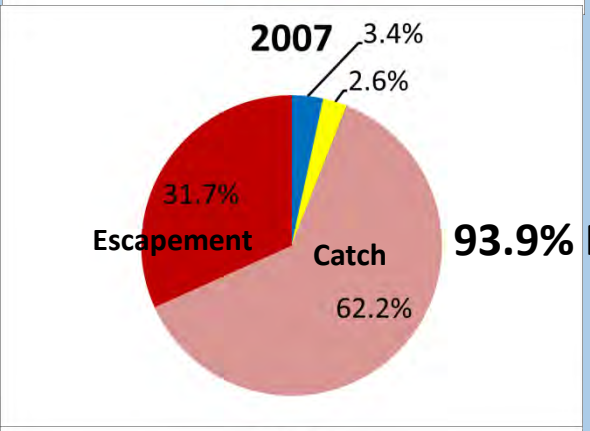
Fig. 29


Sockeye Harvest June and July
Millions
50
45
40
35
30
25
20
15
10
5
-
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Bear River to OPH
Bristol Bay

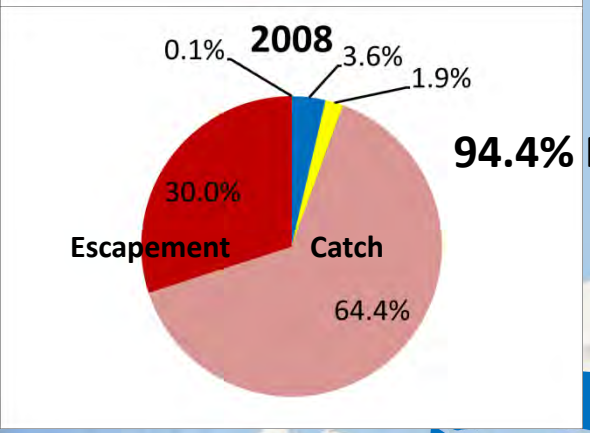
Bristol Bay Reporting Stock
WASSIP (Total Run) Fig.30



96.9% Returning to BB



93.9% Returning to BB



94.4% Returning to BB

Bristol Bay Catch

Bristol Bay Escapement

North Peninsula

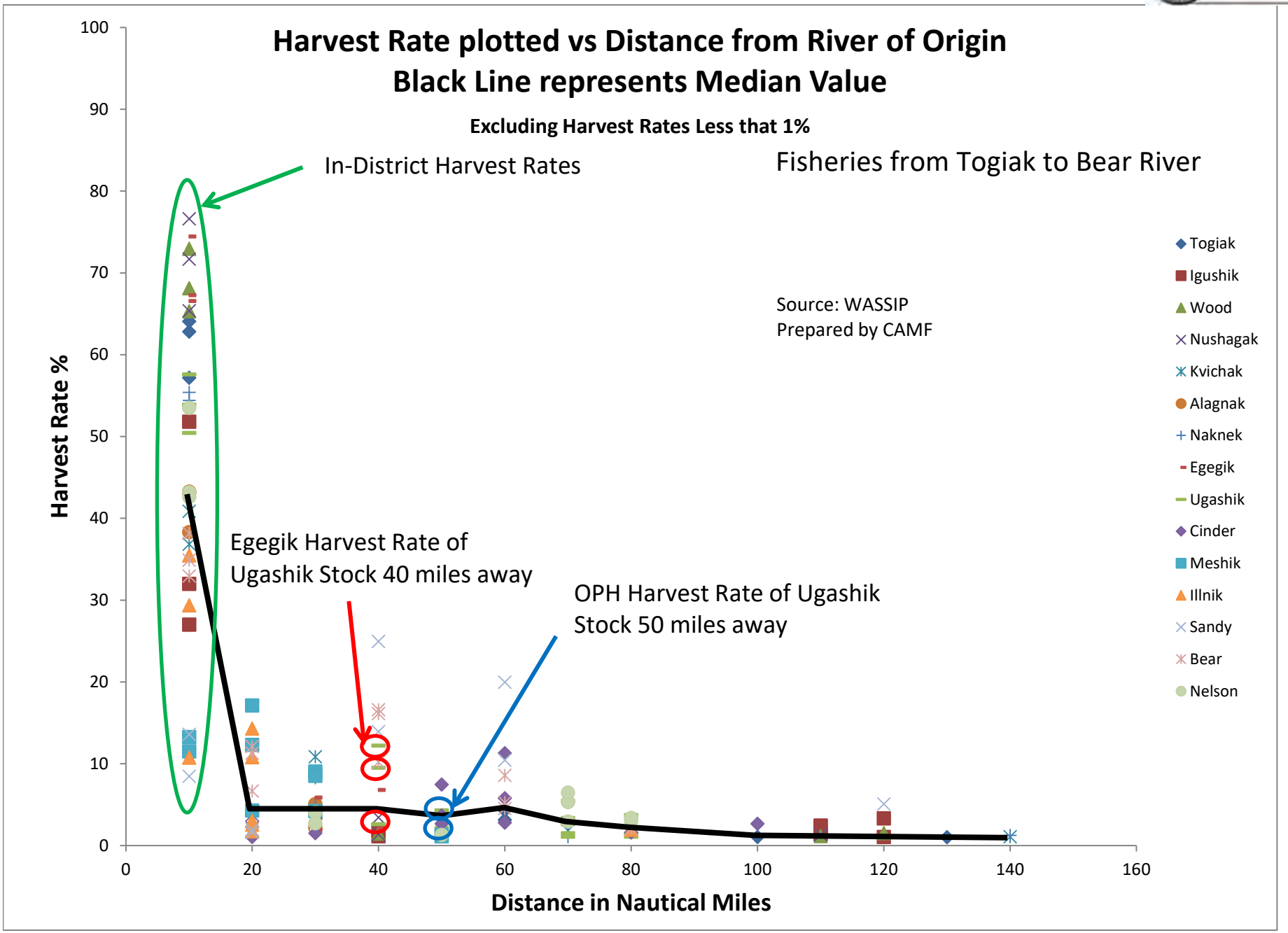
Chignik

South Peninsula
June and Post June

Source: ADFG WASSIP (median estimates)
Prepared by CAMF

0 45 90 180

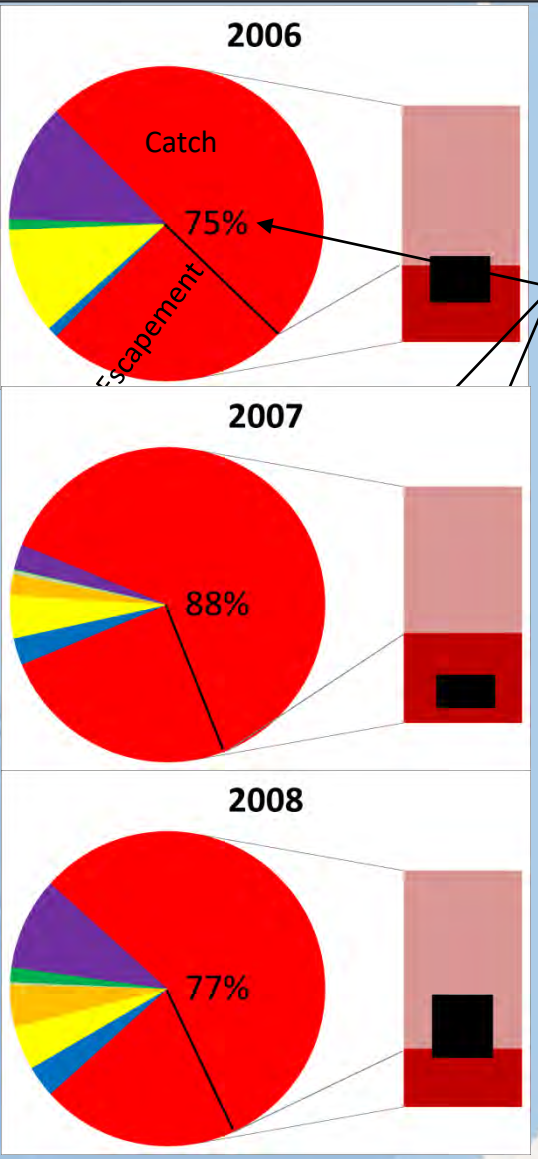
Figure 31. Harvest Rates decrease drastically when distance from origin increases.



Prepared by CAMF
Source ADFG WASSIP

Figure 32. Most of the Ugashik Run returns to U

Ugashik Reporting Stock WASSIP



Percent returning to Ugashik

Sockeye Returning to Ugashik (Catch+Escapement)

Ugashik District Catch of Ugashik Reporting Group

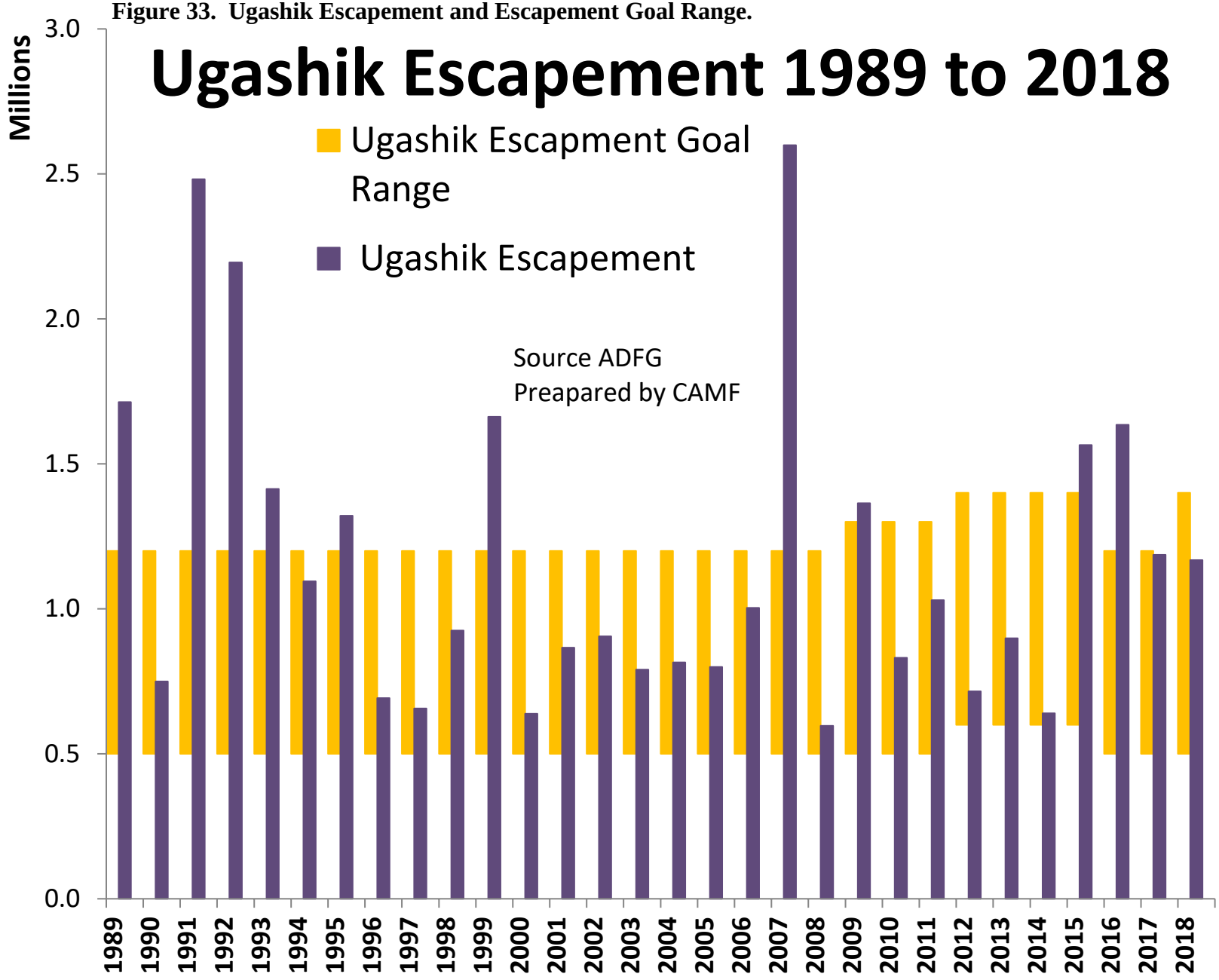
Ugashik Escapement

Ugashik Escapement Goal Range 500K to 1.2M

Source: ADFG WASSIP (median estimates)
Prepared by CAMF

0 45 90 180

Figure 33. Ugashik Escapement and Escapement Goal Range.



PROPOSAL 145

5 AAC 09.350. Closed waters and 09.369. Northern District Salmon Fisheries Management Plan.

Restrict commercial fishing for salmon along the coast and in offshore waters of the Outer Port Heiden Section and restrict fishing in offshore waters of the northeast portion of the Ilnik Section, as follows:

This proposal seeks to restrict fishing both along the coast and in offshore waters of the Outer Port Heiden Section and restrict fishing in offshore waters of the NE portion of the Ilnik Section. The purpose of these area restrictions as to direct more commercial fishing on local Northern Peninsula sockeye salmon stocks, particularly the Meshik River and Ilnik River stocks, that migrate within known channels in each Section. This proposal seeks to further limit the distance open to commercial fishing along the shore and offshore in the Outer Port Heiden Section and off shore in the NE portion of the Ilnik Section. The offshore boundary limit would be from 3 miles at the newly described northern open water boundary of the Outer Port Heiden Section (see below for location) to 2 miles offshore at the line that separates the SW and NE portions of the Ilnik Section at Unangashak Bluffs (159°10.25' W. long.).

These closures will also improve fish quality because of a shorter transport from fishery to processor and also provide for the harvest of Meshik and Ilnik River sockeye salmon stocks.

5 AAC 09.350. Closed waters. Salmon may not be taken in the following locations:
(3) Outer Port Heiden: waters of the Outer Port Heiden Section

(A) repealed 6/5/2016;

(B) east of a line from **56 E59.68' N. lat., 158 E46.45 W. long** [57 E05.52' N. LAT., 158_E34.45' W. long.] to 57_E08.85' N. lat., 158_E37.50' W. long.;
also, seaward waters are open to commercial fishing within the Outer Port Heiden and Ilnik Sections from a 3 miles seaward from a point on the shore 56 E59.68'N lat., 158 E34.45' W. long., to 2 miles seaward from the point on the shore, 159 10.25' W. long., that describes the line that separates the SW from the NE portions of the Ilnik Section.

5 AAC 09.369. Northern District Salmon Fisheries Management Plan
(j) In the Ilnik Section,

(1) notwithstanding 5 AAC 09.320(a)(4), from June 20 through July 20, (A) commercial salmon fishing will be permitted in the Ilnik Section

(i) southwest of the Unangashak Bluffs based on the abundance of Ilnik River sockeye salmon; and

(ii) northeast of the Unangashak Bluffs based on the abundance of Meshik River and Ilnik River sockeye salmon, combined; **Commercial salmon fishing will be permitted in seaward waters within the Outer Port Heiden and Ilnik Sections from a 3 miles seaward from point on the shore 56 E59.68'N lat., 158 E34.45', to 2 miles seaward from the point 159 10.25' W. long that describes the line that separates the SW from the NE portions of the Ilnik Section.**

(I) The Outer Port Heiden Section is open from June 20 through July 31 to commercial salmon fishing in those waters west of a line from **56 E59.68' N. lat., 158 E46.45 W. long** [57 E05.52' N. lat., 158_E34.45' W. long.] to 57 _E0S.85' N. lat., 158_E37.50' W. long. **within a line 3 miles**

seaward from a point on the shore 56 E59,68'N lat., 158 E34.45' W. long., to 2 miles seaward from the point on the shore, 159 10.25' W. long., that describes the line that separates the SW from the NE portions of the Ilnik Section, based on the abundance of Meshik River sockeye salmon. If the commissioner closes the portion of the Egegik District as specified in 5 AAC 06.359(
c) for the conservation of Ugashik River sockeye salmon stocks, the commissioner may, by emergency order, close the Outer Port Heiden Section, and immediately reopen the Outer Port Heiden Section, with additional fishing restrictions that the commissioner determines necessary.

What is the issue you would like the board to address and why? 1. Overescapement of sockeye salmon into the Meshik and Ilnik Rivers. Escapements into the Meshik River have exceeded the high end of the current SEB of 86,000 salmon the last 4 years, 2014-2017, ranging from 95,500 in 2014 to 191,725 in 2017. In the Ilnik River, sockeye salmon escapements have exceeded the high end of the current SEG of 60,000 sockeye salmon in 2016 and 2017. In 2016, 124,000 salmon escaped to spawn; in 2017 a record 238,000 sockeye salmon escaped to spawn. This escapement is nearly 4 times the upper end of the current SEG. This proposal seeks to adjust the Sections so that more local Northern Peninsula salmon stocks are harvested, resulting in more appropriate escapement to the Meshik and Ilnik Rivers. Note also that WAS SIP indicated that Northern Peninsula sockeye salmon stocks contributed and average of 48% to the SW Ilnik harvest (3 years); 30% to the NE Ilnik harvest (3 years); and 21% to the Outer Port Heiden Section harvest (2 years).

2. Quality of delivered fish that are harvested in the Outer Port Heiden Section; Most fishers are fishing very near the northern boundary of the Outer Port Heiden district. Delivery of these fish is delayed by the long travel distance from the point of harvest to the processor, resulting in degraded quality salmon.

3. Additionally, frequent very rough seas within the Outer Port Heiden Section makes it very difficult to fish and to transport fish to processor, resulting in waste and fish being delivered that are poor quality.

If nothing is done, escapements to the Meshik and Ilnik Rivers will continue to exceed the upper end of the SEB. Additionally, poor quality fish will continue to be delivered to processors because of the long travel distance and time. Other solutions considered was to close the northern portion of the Outer Port Heiden Section, as described above, but limit fishing to 1.5 miles from shore in both the open portion of the Outer Port Heiden and the NW portion of the Ilnik Sections, but this would eliminate much of the Outer Port Heiden Section to fishing because of shallow water.

PROPOSED BY: Lower Bristol Bay Fish and Game Advisory Committee (HQ-F18-023)
****

CAMF POSITION: OPPOSE

- Assumed Description of area in question. (Figure 34)
- Considerable safety issue for the fleet during winds from any W direction (SSW to NNW). Fishing area is limited just outside Port Heiden which is shallow with breakers. Which in turn would increase escapement and accomplish the exact opposite the proposer wants to do which is reduce escapement. (Fig 35)
- Please reference CAMF comments for Proposal 144.
- Area Managers only open the fishery a maximum of 60 hours out of 168 per week.
- Restricting area in OPH and Ilnik North would put a burden on North Peninsula fisherman, further difficulty in achieving escapement goal (Fig.39) with little benefit to anyone. Figs.(37,38)

Figure 34. Assumed Description of area in question.

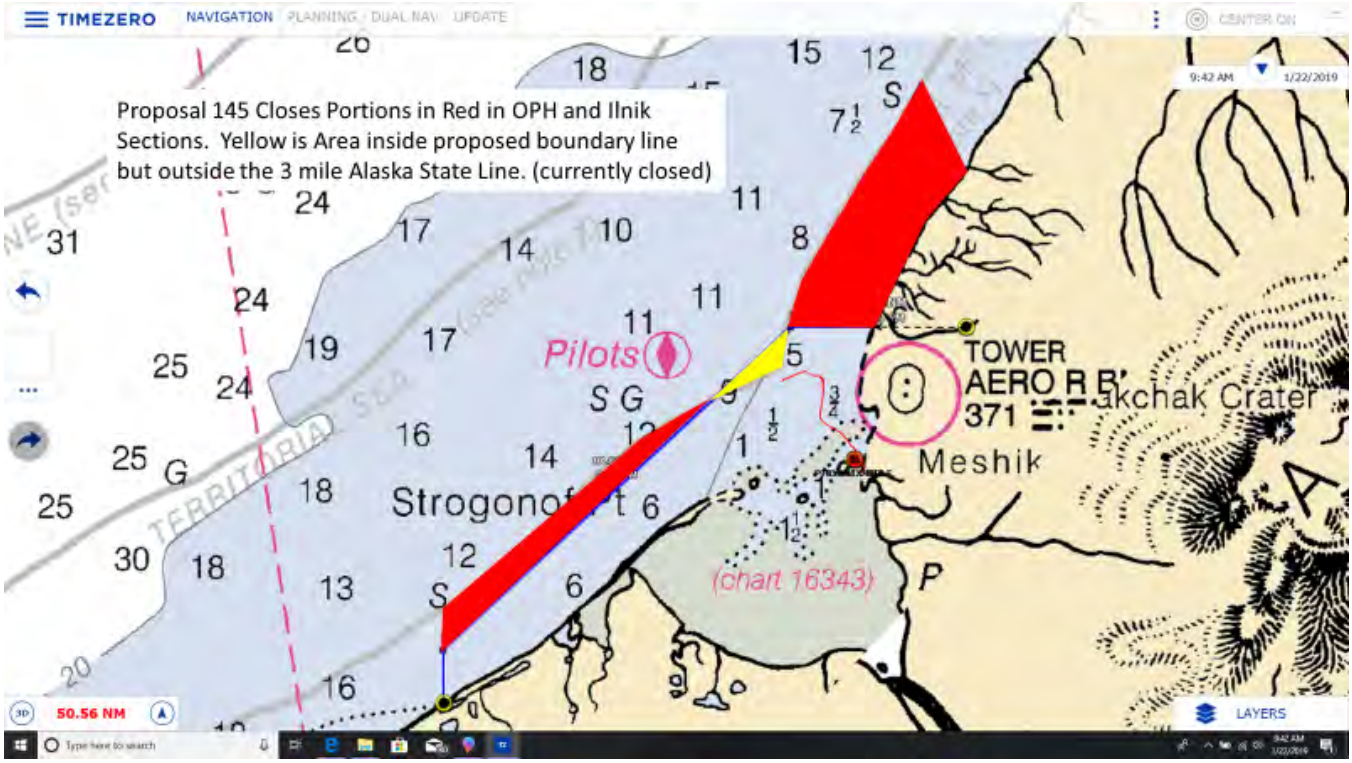


Figure 35. OPH Section described in the proposal

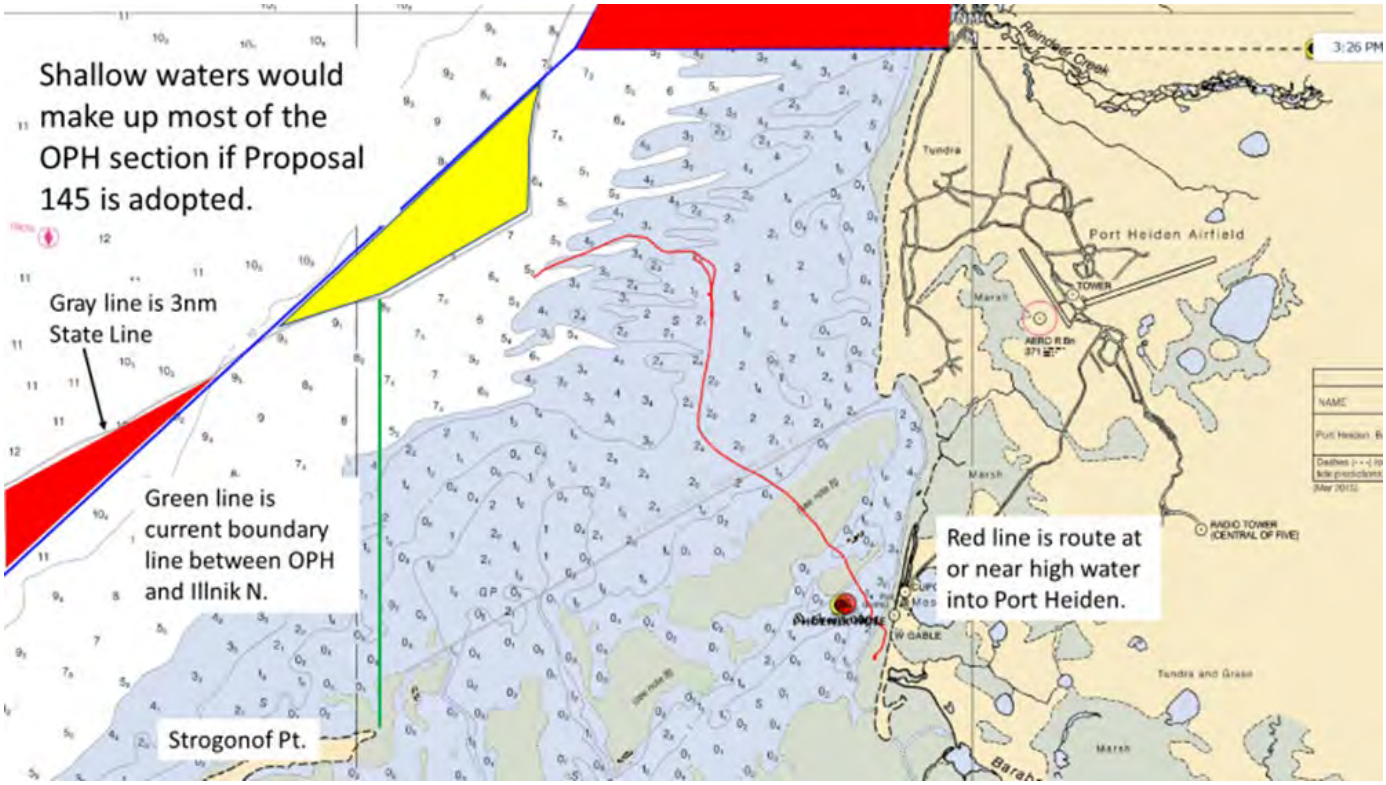


Figure 36. Sockeye gain all their value at sea. Smolt and Adult and the difference in size.

Figure 37. When OPH was opened during the WASSIP years the gain would be minimal to Ugashik.

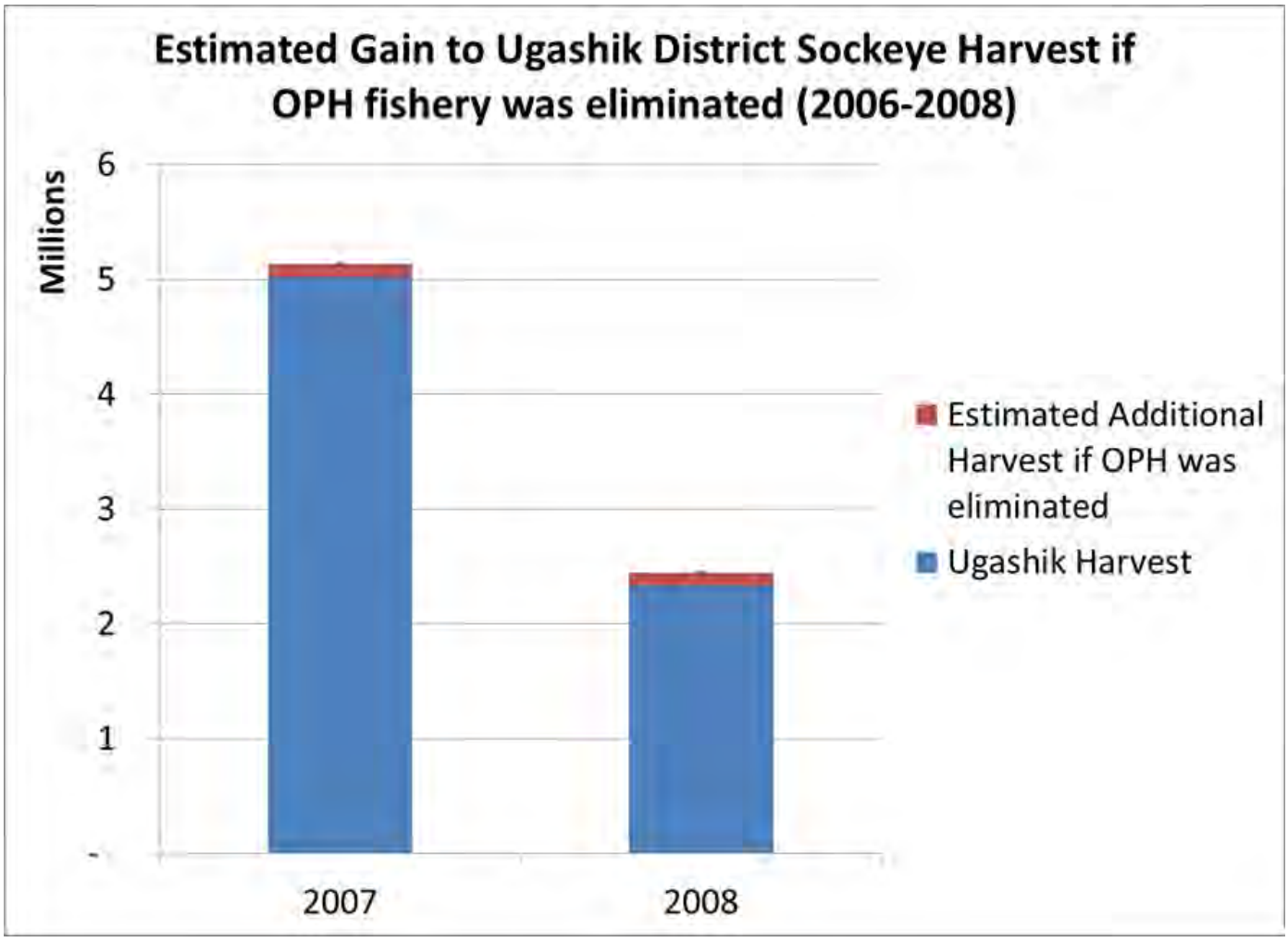


Fig 38. Restricting the OPH section would provide little gain for Ugashik.

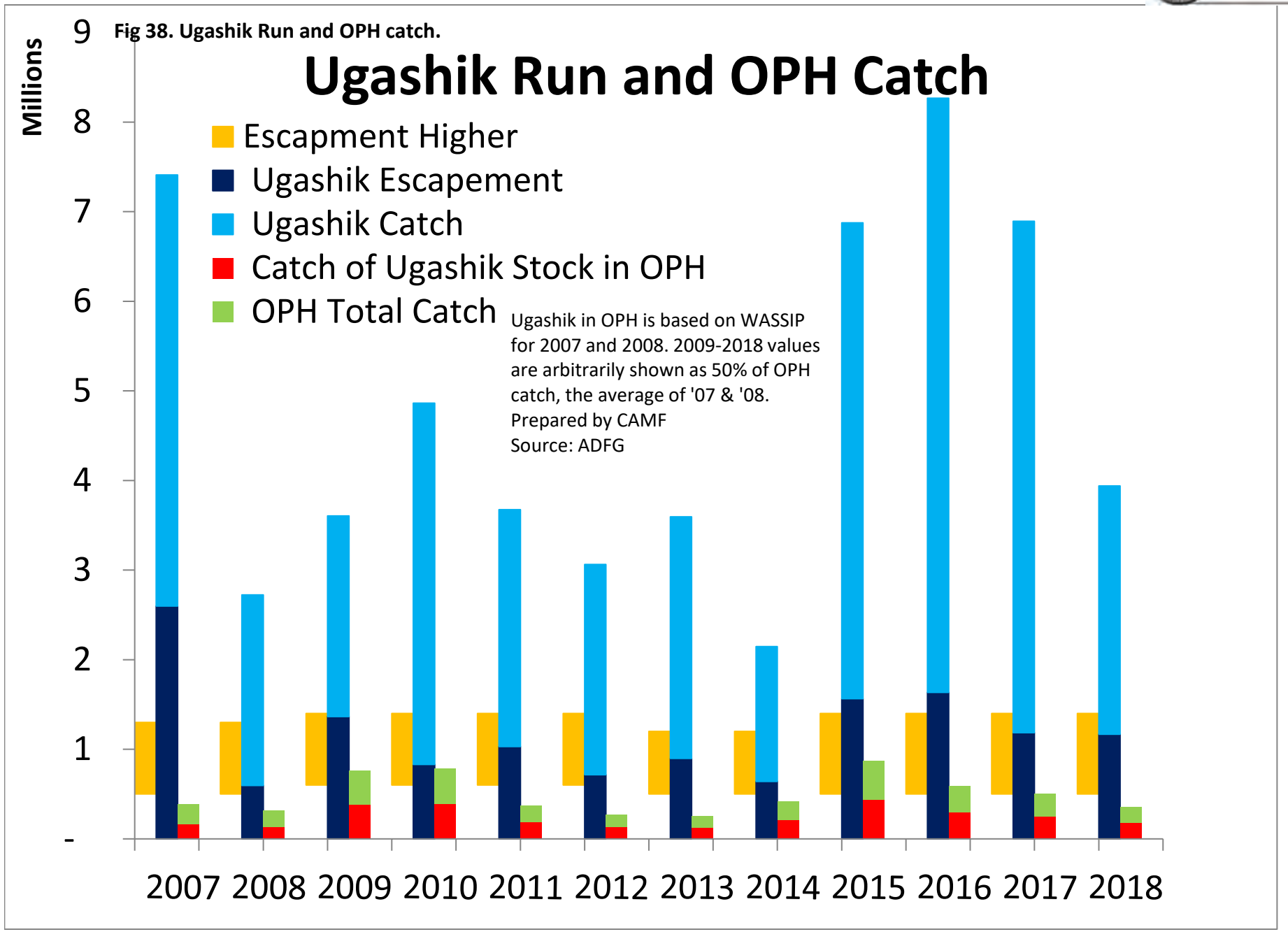
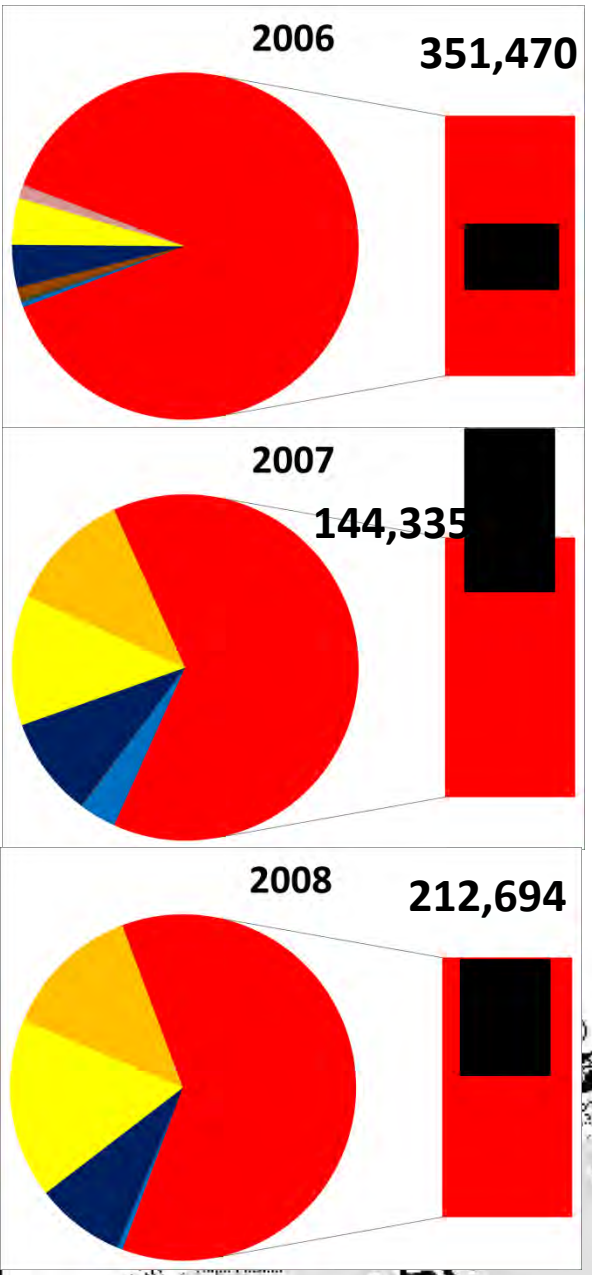


Figure 39. Three fold increase in Meshik harvest rate when OPH was opened in 2007. The Gold Section of the pie graph would be forgone harvest if the section was not opened.



Meshik Run Utilization

WASSIP

Meshik Escapement

Meshik Escapement Goal Expanded Range 118K to 212K

OPH

Other BB

PC13
53 of 59

Cinder River Section

Outer Port Heiden Section

Ilnik Section

Three Hills Section

Three Hills

Cape Seniavan

PENINSULA

Bear River Section

Port Moller Bight Section 314-12

314-30

Chignik and South Peninsula catch represented in Blue

Source: ADFG WASSIP (median estimates)
Prepared by CAMF

PROPOSAL 146

5 AAC 09.369. Northern District Salmon Fisheries Management Plan.

Close portions of the Northern District to commercial fishing for salmon when escapement goals are not met for two consecutive years, as follows:

5 AAC 09.369 (n): If the escapement goal for the Bear or Nelson Rivers is not met for two consecutive years from June 20 through July 31, the department shall manage the Bear River, Three Hills, and Ilnik Sections to conserve Bear River and Nelson River sockeye salmon stocks by allowing the passage of sockeye salmon from the northeast to the southwest of the Northern District as described in this subsection. Notwithstanding the provisions of 5 AAC 09.320, from June 20 through July 31, the commissioner shall, by emergency order, establish fishing periods for the Bear River and Three Hills Sections and that portion of the Ilnik Section between the longitude of Unangashak Bluffs at 159° 10.25' W. long., and the longitude of Three Hills at 159° 49.45' W. long., during which the waters that are between the three-mile seaward boundary line, described in 5 AAC 09.301, and a line that is one and one-half miles shoreward of the three-mile seaward boundary are closed for one 24-hour period during a seven-day period. The waters located to the southwest of the open waters where a 24-hour closure has occurred will have sequential closures that allow fishing only in the waters out to the one and one-half mile line described in this subsection for the first 24 hours of an open fishing period. When the department is assured that the escapement goal will be met for the river that did not meet the escapement goal for two consecutive years, then the rolling closures will no longer be in effect.

What is the issue you would like the board to address and why? To provide protection for the Nelson and Bear Rivers in the management of the Northern District fishery. If the escapement at Nelson or Bear Rivers is not met for two consecutive years, management action will be taken from Unangashak Bluffs in the Ilnik Section, as well as the Three Hills, and Bear River Sections to conserve stocks by implementing rolling closures.

PROPOSED BY: Nelson Lagoon Fish and Game Advisory Committee (HQ-F18-053)

****

CAMF POSITION: OPPOSE

BACKGROUND: The concept of "Rolling closures" was adopted during the 2013 BOF meeting following the flood event that effected the 2010 to 2012 seasons. During the 2016 BOF meeting an agreement between user groups was achieved. This agreement removed the North Ilnik Section of the Northern District from the original plan. It also included an agreement that ended "Rolling closures" in all Sections of the Northern District starting for the 2019 season.

INDEX OF PROPOSALS WITH CAMF POSITION ON EACH

Southeastern District Mainland Salmon Management Plan (6 proposals)

PROPOSAL 128

Increase Chignik Management Area sockeye salmon harvest and escapement thresholds in the *Southeastern District Mainland Salmon Management Plan*.

CAMF POSITION: CURRENTLY OPPOSED, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 129

Decrease the Chignik River-origin sockeye salmon harvest composition from 80 percent to 66 percent of harvest in the *Southeast District Mainland Salmon Management Plan*.

CAMF POSITION: CURRENTLY SUPPORT, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 130

Decrease the Chignik River-origin sockeye salmon harvest composition from 80 percent to 60 percent of harvest in the *Southeast District Mainland Salmon Management Plan*.

CAMF POSITION: CURRENTLY SUPPORT, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 131

Increase the Southeast District Mainland allocation of Chignik River-origin sockeye salmon from 7.6% to 10%.

CAMF POSITION: CURRENTLY NEUTRAL, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 132

Revise the *Southeastern District Mainland Salmon Management Plan* to allow commercial salmon fishing with set gillnet gear concurrent to open commercial fishing periods for salmon in the Chignik Management Area.

CAMF POSITION: CURRENTLY NEUTRAL, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 133

Open the Southeastern District to commercial fishing for salmon in concurrence with Western and Perryville district open commercial salmon fishing periods from June 1 through July 13. CAMF POSITION: CURRENTLY NEUTRAL, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

South Unimak and Shumagin Islands June Salmon Management Plan (8 proposals)

PROPOSAL 134

Repeal the current *South Unimak and Shumagin Islands June Salmon Management Plan* and readopt the management plan in place prior to 2001.

CAMF POSITION: OPPOSED, REFER TO CAMF COMMENTS

PROPOSAL 135

Repeal the current *South Unimak and Shumagin Islands June Salmon Management Plan* and readopt an amended version of the management plan in place prior to 2001.

CAMF POSITION: OPPOSED, REFER TO CAMF COMMENTS

PROPOSAL 136

Amend the *South Unimak and Shumagin Islands June Salmon Management Plan* so that fishing periods are structured with 24-hour windows where commercial salmon fishing gear is in the water.

CAMF POSITION: OPPOSED, REFER TO CAMF COMMENTS

PROPOSAL 137

Expand geographic scope of the Dolgoi Island Area as defined in the *South Unimak and Shumagin Islands June Salmon Management* and *Post June Salmon Management Plan for the South Alaska Peninsula*.
CAMF POSITION: CURRENTLY OPPOSED, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 138

Amend the *South Unimak and Shumagin Islands June Salmon Management Plan* and the *Post-June Salmon Management Plan for the South Alaska Peninsula* to reduce commercial salmon fishing opportunity in the Dolgoi Island Area.

CAMF POSITION: CURRENTLY OPPOSED, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 139

Repeal Dolgoi Island Area-related regulations from the *South Unimak and Shumagin Islands June Salmon Management Plan* and the *Post-June Salmon Management Plan for the South Alaska Peninsula*.
CURRENTLY SUPPORT, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 140

Include the area from Cape Tolstoi to McGinty Point in the area open to commercial fishing for salmon under the *South Unimak and Shumagin Islands June Salmon Management Plan*.

CURRENTLY SUPPORT, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 141

Repeal closed waters in the South Alaska Peninsula Area.

CURRENTLY SUPPORT, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

Post-June Salmon Management Plan for the South Alaska Peninsula (2 proposals)

PROPOSAL 142

Establish commercial salmon fishing periods by emergency order from July 14 through July 31 in the South Alaska Peninsula. CURRENTLY SUPPORT, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 143

Repeal the immature salmon test fishery in the Shumagin Islands Section.

CURRENTLY NEUTRAL, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

Northern District Salmon Fisheries Management Plan (3 proposals)

PROPOSAL 144

Restrict commercial fishing for salmon in areas both along the coast and in open seaward waters of the Outer Port Heiden Section and the open seaward waters of the Ilnik Section when the preseason Bristol Bay sockeye salmon forecast is 30 million fish or less.

CAMF POSITION: OPPOSED, REFER TO CAMF COMMENTS

PROPOSAL 145

Restrict commercial fishing for salmon along the coast and in offshore waters of the Outer Port Heiden Section and restrict fishing in offshore waters of the northeast portion of the Ilnik Section.

CAMF POSITION: OPPOSED, REFER TO CAMF COMMENTS

PROPOSAL 146

Close portions of the Northern District to commercial fishing for salmon when escapement goals are not met for two consecutive years.

CAMF POSITION: OPPOSED, REFER TO CAMF COMMENTS

Chignik Area Salmon Management Plan (8 proposals)

PROPOSAL 147

Reduce the inriver goal for sockeye salmon above the Chignik River weir for August and September.
CURRENTLY NEUTRAL, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 148

Amend the *Chignik Area Salmon Management Plan* so that pink, chum, and coho salmon stocks in the Western and Perryville sections of Area L will be managed based on the strength of the pink, chum, and coho salmon stocks in the Stepovak and Shumagin Islands sections of Area M.

CURRENTLY NEUTRAL, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 149

Increase commercial salmon fishing opportunity in the Western and Perryville districts.

CAMF POSITION: CURRENTLY NEUTRAL, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 150

Open the Western District to commercial fishing for salmon for up to 48 hours each week from June 1 to July 5.

CAMF POSITION: CURRENTLY NEUTRAL, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 151

Increase commercial salmon fishing opportunity in the Western and Perryville districts from June 1 through July 5.

CAMF POSITION: CURRENTLY NEUTRAL, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 152

Prohibit commercial fishing for salmon in the Perryville District and Mitrofania Section until the Orzinski Lake sockeye escapement goal is met.

CURRENTLY NEUTRAL, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 153

Prohibit commercial fishing for salmon in the Perryville District and Mitrofania Section when the Southeastern District is closed to commercial fishing for salmon.

CURRENTLY NEUTRAL, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 154

Adopt a large fish escapement goal for king salmon.

CURRENTLY NEUTRAL, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

Gear Specifications and Operations (4 proposals)

PROPOSAL 155

Allow the shoreward end of a set gillnet to be anchored other than on the beach above low tide.

CAMF POSITION: CURRENTLY NEUTRAL, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 156

Repeal minimum mesh size requirement for set gillnets in the South Alaska Peninsula Area. CAMF POSITION: CURRENTLY SUPPORT, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 157

Allow two legal limits of set gillnet gear to be transported by a single vessel as long as both limited entry permit holders owning the gear are onboard the vessel.

CAMF POSITION: CURRENTLY NEUTRAL, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

PROPOSAL 158

Increase the maximum length of purse seines from 225 to 250 fathoms in the Eastern, Central, Western, and Perryville Districts.

CAMF POSITION: CURRENTLY NEUTRAL, FINAL POSITION WILL BE IN AGREEMENT WITH AREA M WORKING GROUP AT THE BOF MEETING.

Groundfish and Herring (2 proposals)

PROPOSAL 159

Change season start dates and allocation between drift gillnet and purse seine gear groups in the Dutch Harbor food and bait herring fishery. CAMF POSITION: NEUTRAL

PROPOSAL 160

Allow pot gear to be longlined during the South Alaska Peninsula Area state-waters sablefish fishery. CAMF POSITION: NEUTRAL

February 6, 2019

To Alaska Board of Fisheries,

I am a fourth generation fishermen from Chignik, Bay. I have been fishing for my whole life, and I have seen our run slowly deteriorate over the past years. 80% of the fish traveling through the Shumagins and Dolgi Island are Chignik bound, yet we did not have a fishing season last year and still nothing has changed. This cannot just be brushed under the rug!

The escapement was low and Chignik bound fish were still being intercepted while we are in the harbor, this is just poor management. Our escapement numbers must improve before it is just too little too late.

Dakota Anderson

Captain F/V Alaska Rose

Submitted By
Daniel Grunert
Submitted On
2/7/2019 9:02:23 AM
Affiliation

Phone
9077174763
Email
chignikgrunert@gmail.com
Address
P.O. Box 8
Chignik Lagoon, Alaska 99565

My name is Daniel Grunert and I am a Chignik Lagoon Commercial fisherman. I am a fourth-generation fisherman from this community that I have lived in my entire life. Fishing has always been a way for my father and his father before him to provide for their families and now my time has come to do the same. The 2018 salmon season has made me question if this will actually be a way for me to tend to my responsibilities as a family man, as well as question the reasons for our failing salmon run. There have always been ups and downs with fishing, its something to expect and plan for and it's just a part of this industry. The 2018 season has proven to be a very unique season since our escapement goals were not close to being met and there was no commercial fishing done leaving everyone in the communities devastated and wanting change. The Chignik area has two large intercept fisheries on both sides and anybody can look at a map and see that its very easy for either one if given a chance to over harvest our Chignik bound fish. I believe that Area M has irresponsibly been harvesting anything that comes into their reach and its now starting to show the consequences. Listening in to meetings on this issue I've noticed that people who are assigned to prevent this from happening are ignoring important facts and local knowledge, more eager to blame poor escapement on warming waters and changing weather. I realize that the unusual warm weather we have been getting does play a big part in all of this, but I don't want it to be a convenient scape goat. Our salmon escapement suffered and just southwest of us a fishery was able to stay open indefinitely, this is without a doubt a severe breakdown in responsible area management and it should have been stopped immediately; Instead it was allowed to happen. I don't want to see any area shutdown completely and not allow fisherman to provide for their family, the same thing I do not want done to me and my fellow Chignik area fisherman. If there are not major changes to the management of these fisheries, I do believe this will be an extermination of the Chignik salmon run and massive damage to the surrounding wildlife and communities. We cannot survive another disastrous year and I for one do not want to see the community I grew up in and all the communities surrounding to fade away just because another fishery wanted more and people who had the power to fix it just didn't care. All of us Alaskans have a responsibility to preserve and protect our states natural resources, now it's your turn. Thank you for your time.

Darren Platt
10708 Birch Cir
Kodiak, AK 99615

Alaska Board of Fisheries

Board Support Section

I'm writing in **opposition to proposals 149, 150, 151, and 158** concerning the salmon seine fisheries in Chignik.

Proposals **149, 150 and 151** are all designed to increase harvest in two of Chignik's primary intercept fishery districts. The WASSIP study recorded high harvest rates of non-local stocks in these areas including substantial harvest of Bristol Bay and "East of Chignik" stocks. Bristol Bay stocks comprised up to 35.5% of the harvest and "East of WASSIP" harvest (likely Kodiak and Cook Inlet stocks) was as high as 38.8% of sockeye caught in these areas for some sample strata.

An increase in fishing opportunities in these areas would result in substantial re-allocation of non-local stocks to Chignik fishermen. While the adjacent management areas, Area M and Kodiak, are rigidly managed for non-local stocks, including Chignik-bound sockeye, Chignik fishermen have enjoyed the privilege of prosecuting a mixed stock fishery without any restrictions or conservation burdens placed on their interception of non-local fish.

Despite clear documentation of substantial non-local harvest in Chignik, Kodiak fishermen have had to bear the sole burden of conservation of Kodiak stocks, including decades-long efforts to restore the Karluk sockeye runs as well as pink and chum stocks in the Mainland District. While Karluk has just recently shown signs of recovery, providing rewards to Chignik fishermen who have evaded any conservation burden for these fish, the mainland fisheries are still far from restored. None of these fisheries should be further imperiled by increasing fishing time in the central and south peninsula.

Chignik fishermen have consistently advocated for further reductions in fishing opportunities in adjacent areas under the false premise that Chignik is simply a terminal harvest fishery, and thus deserving of additional protections not afforded to other areas. These fishermen should be held to the same standards that they promote for other fishing areas, and their management plan should be consistent with the values that they themselves espouse at Kodiak and Area M BOF meetings. While I would not advocate imposing any *new* conservation burdens on Chignik fishermen in order to protect Bristol Bay, Cook Inlet, and Kodiak stocks, as such efforts would likely be ineffective and cause undue harm to Chignik fishermen, I also believe that it would be imprudent for the board to expand intercept fisheries in the area.

I'm **opposed to proposal 158,** which would increase the seine length and thus the fishing capacity of Chignik fishermen, essentially resulting in a re-allocation of non-local fish to Chignik fishermen by allowing them to use larger and thus more effective nets in areas of high harvest of non-local stocks. Any increase in the fishing capacity of a fleet should be balanced by a proportionate reduction of fishing opportunity to ensure that there are no allocative results in the management change due to increased harvest rates. The proposal included no measure to reduce fishing time in the effected areas and thus would necessarily result in increased harvest of non-local stocks.

Sincerely,

Darren Platt

December 4, 2018

Alaska Board of Fisheries
Board Support Section
P.O. Box 115526
Juneau, AK 99811-5526

Don Bumpus
PO Box 167
Chignik Lagoon, AK 99565
(907)840-4020

Subject: Chignik Salmon Management and Shumagin Fishery Concerns

Dear Honorable Chairmen and Board Members,

The Chignik salmon fishery and resource are in serious trouble. While there is no one thing that can totally arrest the economic and conservation problems currently occurring there are things that the Board of Fisheries (BOF) and the Department can do to assist.

Chignik is a totally dependent now on salmon, primarily on sockeye salmon. While the sockeye fishery was always a mainstay there were some alternatives in the past. At the peak of the shrimp fisheries, in the 70's, the catch was 80 million. By the 80's the fisheries were gone in the western districts, never to return. The king crab disappeared in the 70's. The tanner fishery started in the early 70's and by the mid 80's they were gone. It only took 20 years to reduce the halibut to the state it's in now. There are no alternatives left, and the two Chignik River sockeye runs are no longer able to support a healthy local fishery. Needed is improved management in Chignik and limits to the interception of Chignik sockeye migrating through the South Peninsula, mainly in the Shumagins.

Here is part of the problem. The Department use to manage Chignik's' two sockeye runs by applying the best available science. Strangely it appears that is no longer their desire as evident with their unwillingness to apply inseason genetic sampling results to separate the two runs as clearly evident this last season. For managing the 2018 Chignik fishery, they selected to test a model that had all the makings of a 11th grade science-fair project, and it failed miserably by under assigning the late run escapement. To their credit they did take near weekly genetic samples. However they purposely chose NOT to process them until late and defiantly elected not to analyze the last genetic sample collected in early August. To my knowledge, even after many requests by several Chignik fishing groups, they continue to refuse to process the August sample even though private funding has been offered.

Another example of degraded management is that they have chosen to include an overabundance of jacks and other males in the escapements goal counts. While I do acknowledge that males are needed, quality escapement should be the order and this means a good showing of females in the escapement. Another example of misguided management is that they elected to include an overabundance (about 140 k) of Cook Inlet sockeye, as determined by genetics, as Chignik sockeye salmon and use those Cook Inlet fish in forecasting the 2017 Chignik runs. Where is the oversight in the Department

and do they really care or is Chignik just a paycheck? We need better management---it is only right. I can understand that management would like simplicity in evaluating the Chignik sockeye runs so as to allow easy decision making on inseason fishery calls including the inception fisheries but Chignik deserves better, and I would hope that the Board would agree. A tune-up and maybe a staff change are warranted. Also needed is a better understanding of the consequences of too many Coho salmon entering the Chignik system? At the CRAA meeting, as a Board member, I listen to FRI defining through several studies that Coho salmon fry in too many numbers can readily suppress Chignik sockeye production especially on our late run. The Chignik staff should consider this instead of saying that Coho predation on sockeye fry may not be any problem as stated at our pre-season fishery meeting in Chignik Lagoon last spring.

Further the Board should be aware that at the July 17th BOF meeting, the Department was given direction that there was to be no fishing until after Aug. 8th in the Shumagins if Chignik was not meeting escapement. In defiance, the Department manipulated Chignik escapement numbers so they could prosecute an opening in the Shumagins even though they knew from the early genetics samples that the late run was not meeting escapement. To date they remain unwilling to analyze the early August sample or to apply the results from the earlier samples most probably because they do not want to admit any error or bias. Until this Dept. has some oversight this practice will most likely keep repeating itself.

After reading the 2018 Chignik Season Summery you would think that Chignik had a successful second run. The fleet caught 125 sockeye, and our subsistence fishery was shut down. After years of considering that the first run stopped on July 31 it makes me think just how skewed the numbers have been. This is why we need to know what the numbers are on the Aug. 8th sampling. I hope the Board will ask the Dept. why the genetic sampling is not public information.

After these last several years of irresponsible management the people of the Chigniks are the ones paying for it. If the Dept. doesn't start looking at this problem now and make some radial changes in managing and rebuilding the Chignik runs and fishery, it is going to be the beginning of the end our way of life, and we are darn near there already.

The second major problem and one that the Board can solve is that Chignik needs urgent relief from the untethered Shumagin fishery. There are no windows in the June fishery and no management or conservation tie to Chignik in June or July to ensure that Chignik escapement occurs and a reasonable harvest of Chignik sockeye happens in Chignik waters. It only seems reasonable that a fishery that harvests Chignik sockeye salmon should participate in the sharing of conservation and sustainability.

Hopefully the Board understands that Chignik needs relief not welfare or status quo salmon management.

Sincerely, Don Bumpus

Fishing Meet Letter

Dear Mr. Chairman and members of the Board,

My name is Dylan Intagliata-Campbell. I live in Chignik Bay, Alaska and I fish every summer on a fishing vessel calling "Patti Ann." I have only worked on a that fishing boat for two years and what I saw was a huge downfall. In the year of 2017, the humpies saved the fishing season and we made enough money to make a living. However in 2018, there was no fish. It was the first time that had ever happened. According to kdlg.org, it states, "The Board of Fish already declared the sockeye salmon fishery a disaster in early July. Then the governor declared it an economic disaster in August. This report from Fish and Game confirms that the entire fishery only brought about $3000 dollars between the six permit holders who fished. KDLG's Avery Lill has more." In the 70s, in the Area L, fishing was very busy. From the "Chignik Regional Comprehensive Salmon Plan" it states the 10-year average harvest from 1981 to 1990, it says there were 1,636,158 sockeyes caught in that period. In 2018, there was only 540,000 fish which is the lowest record. There was only over 100 sockeyes caught in a two day fishing period in early July. In 2017, I was out on the boat at Kajulik Bay and we saw some many jumpers, they looked like rainfall. We would even hear them when we were sleeping. However in 2018, we went back out in Kajulik Bay and we didn't see a single jumper. In September of 2018, there was a five day opening period for silvers but everyone already left. It was to late, that no one went out for that opener. As for Sand Point, they make an unfair amount compared to Chignik. They take a lot of Chignik's fish. I'm sure they know of the disaster of 2018 and they probably don't care. I'm sure they'll continued to take Chignik's fish and not care. If our fishing industry gets shut down because of them, then lots of people will be mad at Sand Point. We all should make an equal amount of money from fishing. No cities has to shut down to make fishing better. I believe Sand Point should take it easy with their fishing and give us a chance. I don't think this should even be an issue with Sand Point in the first place, but now I believe we should fix as soon as possible. The community of Chignik relies on fishing taxes and even though I believe they should not, it seems impossible for that to happen. The community of Chignik has relied on fishing taxes for a long time. If fishing won't be any better, it looks like we won't be able to rely on fishing taxes anymore. We'll have to rely on different jobs but we can't because the city is broke. I hope for the sake for 2019 fishing season, a miracle will happen and we should start an emergency back-up for taxes if we have another disaster on fishing again. Thank you for your time.

Sincerely,
Dylan

Eastern Interior Alaska Subsistence Regional Advisory Council
c/o Office of Subsistence Management
1011 East Tudor Road, MS 121
Anchorage, Alaska 99503-6199
Phone: (907) 786-3888, Fax: (907) 786-3989
Toll Free: 1-800-478-1456

RAC/EI 18030.KW

JAN 3 1 2019

Mr. Reed Morisky, Chair
Alaska Board of Fisheries
Alaska Department of Fish and Game
Boards Support Section
1255 West 8th Street
Juneau, Alaska 99811-5526

Re: Comments on Alaska Board of Fisheries 2018/2019 Proposal 135

Dear Chairman Morisky:

I am writing to you on behalf of the Eastern Interior Alaska Subsistence Regional Advisory Council (Council) to submit its comments on Alaska Board of Fisheries (BOF) 2018/2019 proposal 135 to be discussed at the BOF meeting concerning the Alaska Peninsula/Chignik/ Bering Sea-Aleutian Islands Finfish proposals scheduled to be held on February 21-27, 2019. The Council deliberated this proposal during its fall 2018 public meeting held on October 11-12, 2018.

The Council represents subsistence harvesters of fish and wildlife resources on Federal public lands and waters in the Eastern Interior Region. The Councils were established by the authority in Title VIII of the Alaska National Interest Lands Conservation Act (ANILCA) and chartered under the Federal Advisory Committee Act. Section 805 of ANILCA established the Council's authority to initiate, review and evaluate proposals for regulations, policies, management plans, and other matters related to subsistence uses of fish and wildlife within the region. The Council also reviews resource management actions occurring outside its region that may impact subsistence resources critical to communities served by the Council. The Council provides a forum for the expression of opinions and recommendations regarding any matter related to the subsistence uses of fish and wildlife within the region.

Proposal 135: 5 AAC 09.365. South Unimak and Shumagin Islands June Salmon Management Plan.

Repeal the current *South Unimak and Shumagin Islands June Salmon Management Plan* and readopt an amended version of the management plan in place prior to 2001.

Council recommendation: Support

Council comments: The Area M fishery harvests migrating stocks that are heading north. This intercept fishery has a direct impact on Chum and Chinook Salmon stocks that migrate up the Yukon River. Several tagging and genetic stock studies that demonstrate that this fishery is intercepting Yukon River fish. As many as 25 percent of the Chum Salmon tagged in Area M returned to the Yukon River. Test fisheries also showed that up to 15 percent of the Chum Salmon caught in Area M originated from the Yukon River.

This intercept fishery also catches a lot of Chinook Salmon, but there have not been any genetic studies done to determine the origins of those Chinook Salmon. However, tagging studies have shown a connection between the Chinook Salmon caught in the Area M fishery and those harvested on the Yukon River.

The BOF should revert to the 2001 management plan for the Area M fisheries. It is understood that there are many problems in the marine environment related to the productivity of salmon. For this Council, the two main issues that affect resources in the Eastern Interior Region are competition for food among species of salmon and interception of salmon. This proposal, if adopted into regulation, would provide three 16-hour periods of fishing a week. In-season monitoring of Area M salmon stocks is important to avoid targeting stocks of concern, especially when the upriver fisheries are monitored closely by in-season managers, and fishing opportunities are limited for those fisheries.

The Council is sharing this letter with the BOF and the Federal Subsistence Board to emphasize the importance of these issues to the subsistence needs of the people of the Eastern Interior Region. Any questions regarding this letter can be addressed directly to me through our Subsistence Council Coordinator, Katerina "Katya" Wessels, at (907) 786-3885 or katerina_wessels@fws.gov.

Sincerely,

Susan L. Entsminger
Chair

cc: Federal Subsistence Board
Assistant Regional Director, Office of Subsistence Management
Deputy Assistant Regional Director, Office of Subsistence Management
Subsistence Policy Coordinator, Office of Subsistence Management
Supervisory Program Analyst, Office of Subsistence Management,
Fisheries Division Supervisor, Office of Subsistence Management
Anthropology Division Supervisor, Office of Subsistence Management
Subsistence Council Coordinator, Office of Subsistence Management
Special Projects Coordinator, Alaska Department of Fish and Game
Regional Coordinator, Interior Region, Board Support Section
Alaska Department of Fish and Game
Eastern Interior Alaska Subsistence Regional Advisory Council
Interagency Staff Committee
Administrative Record

Edward Robert Krause Jr

2/7/2019

Chignik bay school, Ak

5th grade

Dear Mr. chairman and the members of the board,

Hi my name is Edward, but my town has no money because we didn't get any fish. and the city had to lay off some workers because we have no money. We are desperate for help can you and the board of fish help with finding a solution for that? We need a miracle to happen for our money. My dad is one of those who were working at the city and got laid off. So I want you to do something about it please, can you send us some fish to sell so my dad can go back to work. I need somewhere to sleep, I need food, a home with heat. So we all are depending on it so can you send us fish to sell. We got 540,000 fish last year in the summer, in a normal year we get 1,636,158. I am in Chignik bay. I what you to sell us some fish that is all we need.

Love

Edward

PS I am 11 years old.

WASSIP Data Types

Eric Volk, Aleutians East Borough

The Western Alaska Salmon Stock Identification Program (WASSIP) will be referenced frequently during the 2019 Area M/Area L Board of Fisheries meeting as stakeholders and board members discuss proposals.There are two fundamental data metrics found in WASSIP reports:

- *stock composition* in fisheries catch strata[1] and,
- *annual stock-specific harvest rates* among all time strata in broad and fine scale fisheries[2]

- **Stock composition.** Genetic stock proportions are estimated percentages of fish from any stock (genetic reporting group) in sampled harvests from a given time and place. Multiplying proportions by total harvest in those time and area strata delivers stock-specific catch. Stock composition estimates for temporal strata across fisheries are necessary to estimate stock-specific harvest and rates. These numbers are likely sensitive to changing relative abundance of stocks in the sampled strata.

- **Harvest Rates.** Harvest rates in WASSIP carry a specific meaning; the proportion of a given run (harvest + escapement) represented by any stock-specific fishery harvest. It is the most appropriate metric for evaluating real fisheries impacts on particular stocks, especially in the context of a conservation discussion. WASSIP harvest rates are over-estimates of the true value because estimates of stock-specific escapement are likely lower than reality and harvest of the stock by fisheries outside of WASSIP area are not accounted for. If those terms are biased low, the estimate of stock-specific harvest rate is biased high.

Stock composition provides estimates of stock-specific harvest for fishery time and area strata, while harvest rates describe annual fishery impacts to the stock's total run. Use of appropriate metrics in discussions of allocation or stock conservation is crucial. To illustrate, among six sampled time strata for OPH fisheries in WASSIP, 2007-2008, Bristol Bay stocks represented 65%-90% of harvests.[1] In contrast, harvest rates of the OPH fishery on combined Bristol Bay stocks for the same two years were less than 1%.[2] The distinction is central to WASSIP results.

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[1]Stock composition of sockeye salmon harvests in fisheries of WASSIP, 2006-2008, ADF&G SP12-22

[2]Harvest and harvest rates of sockeye salmon stocks in fisheries of WASSIP, 2006-2008, ADF&G SP12-24

Submitted By
George Alex Orloff Sr.
Submitted On
2/7/2019 9:19:18 PM
Affiliation
F/V Michelle Lee

Dear Board of Fish,
Never in my lifetime would I have thought I would see a summer that I didn't get to fish at all. I have been fishing all my life in Chignik, and have owned and operated many boats in my lifetime. Last summer was devastating and no matter what anyone says, I know its not global warming, because all the fisheries are striving and many fish were caught all around us. Bristol Bay had a record year and so did the South Peninsula. Kodiak even had an okay season. I don't like to complain about other fisheries and I'm usually in support of all fisheries, but when it comes to jeopardizing my livelihood, the only job I've ever had and something that I taught my Children and my Grandchildren I have to speak up.
I was born in Port Moller, AK and started out working in a cannery in King Cove as a teenager before I got offered my first fishing job in Chignik. This is the only job I know now, if I had the choice for another job, I would still choose Commercial fishing, its in my blood. Being that I'm not originally from Chignik but its where I started my career as a young Captain, it is my home and home fishing grounds and I am worried about the future of the Chignik Sockeye Salmon run for my friends and family and the future generations. That is why I would like you to put yourself in my shoes and protect this fishery as if its your own. This fishery is by far being mismanaged and if continued to be overfished or mismanaged it will be no more.
I'm not saying that no one else can take fish that are Chignik-bound but to at least try to share in the responsibility of making sure there is enough escapement of Sockeye so there is enough to keep this fishery up for future generations. Not only for Chignik fisherman, but for all. I just want people to open their eyes and realize this could be an abundant, prospering fishery for a long time, but only if its not being overtaken by greed and ignorance. We should all want to find ways to keep this fishery strong. If Chignik is limited to openers due to escapement numbers being low, so should the fisheries that intercept Chignik-bound reds. Its been proven in studies by ADF&G that many Chignik-bound fish are caught in the Dolgoi and Shumagin Islands, up to 80% at times. This is so wrong to not have management over that, especially if you know that there is a risk of overfishing this area.
I ask for not only myself but all the families in involved in the Chignik Fishery, from Ivanof Bay, Perryville, Chignik Bay, Chignik Lagoon and Chignik Lake, that more attention is given to this dire situation or else this could mean that our future and the future of generations to come, will never get to live the subsistence lifestyle that we enjoy and they won't get to know the passion for that jumper coming into your seine and making a living off of it. It is a great lifestyle and job to have and it would be sad to lose it.
If the Board continues to ignore what a catastrophic effect this can have if something doesn't change, are you willing to take the responsibility of knowing you could have had the power to preserve this Fishery and you didn't? Regulations and rules shouldn't just apply to Chignik fisherman, where they cannot even put their seine in the water, but it should apply to all. If this was the only job you knew, wouldn't you want the people that have supervision over it, to take care of it, for job security purposes like any other Supervisor does. I just ask to please consider the obvious and put better regulations and rules on all.

Thank you for your time,

Life-long Chignik Captain ,
George Alex Orloff Sr.

George Anderson
PO BOX 168
Chignik Lagoon, Alaska 99565

Alaska Board of Fisheries
Board Support Section
P.O. Box 115526
Juneau, AK 99811-5526

Subject: South AK Peninsula- Shumagin and Dolgoi Area Fisheries

It's really important to recognize that the affect of this year's terrible sockeye returns permeates every aspect of our lives in the Chignik villages. The economic impact of our local sockeye fishery failing has trickled down through the entire Chignik region and beyond. Everyone feels the impact – our Borough, our cities, our tribes, and every individual in our communities, whether they are fishermen or not. We all rely on our local salmon fishery founded on the back of our two-sockeye salmon runs to the Chignik River system.

For decades Chignik area fishermen have had to deal with an inequitable conservation and economic burden of interception fishing. Namely it has been mostly Area M on the south side of the Alaska Peninsula that pickoff Chignik-bound sockeye salmon being the problem. Last summer their fisheries remained open, even if somewhat limited, while we were shut down to ensure escapements. Our commercial fishery harvest was less than 130 sockeye salmon--- a total and unprecedented economic disaster. Current regulations that allow inception fishing in Area M on the south side need to be changed to ensure resource sustainability and stock conservation on non-local traveling fish. It is only fair. To intercept traveling fish bound for terminal fisheries and systems outside of Area M, with the only limit being time and area fished------ is antiquated management. It's inequitable to place a conservation and economic burden of a poor sockeye return – entirely on Chignik fisherman and their families. We do not have a fall-back—salmon fishing is Chignik's single industry.

During the February meeting we will be asking the AK Board of Fisheries to revise the commercial salmon fishing regulations in June and July for the Shumagins and other key areas salmon interception fisheries on the South side of the AK Peninsula where Chignik-bound sockeye salmon are harvested. Requested is that the Board address stock conservation and sustainability on migrating sockeye stocks not just when they are low, weak, or destitute. Right now, the June and July salmon management plans for Area M on the south side are grounded on the presumption of healthy and unlimited traveling stocks. But if what Chignik saw this last summer and in 2017 is the new normal, those management plans need to be revisited and updated to ensure responsible resource stewardship and a reasonable sharing of the wealth on strong run years and limited fishing in low run years. We need relief.

Sincerely,

George Anderson

Submitted By
Ilane Ashby
Submitted On
2/7/2019 9:58:35 PM
Affiliation
Chignik Resident

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Address
PO Box 56
Chignik, Alaska 99564

Alaska Board of Fisheries

Board Support Section P.O. Box 115526
Juneau, AK 99811

February 7, 2019

Subject: South AK Peninsula-Shumigan and Dogoi Area Fisheries

Dear Mr. Chairman and Members of the Board,

I'm a longtime resident of Chignik Bay. I'm seeing the decline of our village economy falling to pieces. The recent disaster has left our villages devastated for income, stability, and families in need of financial support. My husband and son who are employed by the City of Chignik were recently layed off from work because the city is broke and cannot pay all of their employees. The city counts on the raw fish tax and are usually sustainable. This disaster has caused the city to go under a great deal of financial hardship right now. Families are impacted and struggling to make ends meet everyday. Our villages were blessed with the outpoor of those who brought everyone food supplies to help our families. The struggle is real when there's not enough money to pay fuel, utilities, house payments, GCI cell phones and internet. This is how disasterous it is to the Chignik Fishery and my family. The Shumigans and Dolgoi island area must change to better management. Take responsibility, Do what is right and limit the take of Chignik Sockeye! My family depends on the Chignik Fishery. Please let us see positive results! Thank you.

Sincerely,

Ilane, Guy, Wesley, Warren and Shawnee Ashby

January 24, 2019

Alaska Board of Fisheries

I am Jason Alexander. I have been fishing in Chignik since 1973. I have 5 children and 5 grandchildren. My grandson Louie is going on 12, lives in Chignik and is a fifth generation Chignik fisherman. I hope there is a future in the fishery for him and the rest of the residents in Chignik.

I've seen the Chignik fleet become more efficient over the years. We used to hand purse the lead line in Chignik Lagoon, no purse line. The improved gear in the Chignik fleet has redistributed the fish among the Chignik fisherman who have upgraded. The improved gear in the Area M seine fleet has resulted in making more hauls per day resulting in a higher rate of interception in an unallocated fishery such as the Shumagin Islands. Where a seiner could bring his seine back aboard in 18 to 20 minutes now its 10 minutes or less. Resulting in 16-20 hauls per day instead of 10-12.

To our east, Kodiak was given a 15% allocation of Chignik bound sockeye in the Cape Igvak Management Plan. The district to our west, Area M, was given a 7.6% allocation in the Southeast District Mainland Management Plan. This should be enough interception of Chignik sockeye.

However the Shumagin Island's fishery is on a time and area basis. It is an unregulated, outdated fishery with no regard or accountability for any sockeye caught.

Genetic studies show that Chignik stocks are a high percentage of the sockeye passing through these waters. The fishery opens in early June and once it opens there is a seine or gill net in the water most days through the end of July.

The Dolgoi Island harvest cap is not working either. In 2017 185,500 sockeye had been harvested by mid July out of 191,000 limit. ADF&G gave a 48 hour opening to catch the remaining 5,500 sockeye under the cap regulation and went over by 50,000. The Chignik River was already below the escapement threshold to allow an opening and this 50,000 overage caught at Dolgoi Island delayed the Chignik fleet from fishing sockeye for 10-14 days due to lack of escapement.

There are serious concerns about the exploitation of the Chignik sockeye run in Area M and something needs to happen now to allow more sockeye get past Area M so the Chignik River stays healthy and Chignik fisherman have a future.

I am in favor of 72 hour windows in the Shumagin Islands to allow salmon to pass through without nets in the water.

I am in favor of the entire Dolgoi Island under the current harvest cap area, not just a portion of the island.

I am in favor of more fishing time in Chignik in the Western and Perryville districts targeting Chignik terminal stocks.

Sincerely yours,

Jason D Alexander

Jason D. Alexander

Jeffrey Moore
P.O. Box 130
Chignik Lagoon
Alaska 99565
February 7th 2019

Alaska Board of Fisheries
Board Support Section
P.O. Box 115526
Juneau, AK 99811-5526

Subject: South AK Peninsula-Shumigan and Dogoi Area Fisheries

Dear Members of BOF,

I would like to express my sincerest thanks to all of you for your actions last summer in ruling on petitions seeking relief with regards to an emergency declaration, and an emergency order to place restrictions on Area M commercial salmon fisherman intercepting Chignik bound sockeye salmon.

The second run chignik sockeye salmon minimum escapement goals were only met because of your efforts. Unfortunately the first run minimum goal escapements were not met because of the interception of the first run sockeye catches before the alamaringly low run development could be addressed with regulating Area M and Area K fisherman intercepting chignik bound sockeye salmon.

The Chignik sockeye fishery is in tough shape, and the board needs to devolpe a management plan with the adequate and appropriate tools for the ADF&G biologists to manage, and execute the fisheries for the South AK Peninsula interception sockeye fishery as well as the Chignik sockeye fishery, and the Kodiak intreception sockeye fisheries. It should not be that these fisheries should have to resort to emergency measures on a regular basis.

Manageing the South AK Peninsula fleets by date and time without regards to interceprion, and run strengths is out dated.

If the Chignik fleet harvests one million sockeye the average catch per

fishing vessel is approximate 15,000 sockeye per boat. At 6.5 lb. avearge per fish this is under 100,000 lbs per boat for a three month long season. If the catch is 1.5 million it is under 150,000 lbs., and if it is a very good season with a 2milion accumulated sockey catch it is under 200,000 lbs.

In the history of manageing the state of Alaska commercial salmon fisheries different elements have been implemented to manage the catch, and escapements. Commercial salmon openings of time and date were in place state wide. Using this tool for manageing the fleets has been replaced in every oother salmon seine vessel fisheries to incorporate openings also predicated on run strength and escapements. The Area M South AK Peninnsula seine vessel fleet as well as the set net, and drift net gill fleets do not include run strengths and escapements because they are almost strictly an interception fishery. Allowing this interception fishery to not have to have the fishery managed for considerations of managing the stocks that this fleet intercepts is out of date, and considerations of the catches in this interception fishery need to have the mangement tools to address this.

The Area M fleet argues that they are a historical fishery, and thus as an established historical interception fishery, and they continually advocate that they should be allowed to catch fish without regards to how their efforts effect the terminal fisheries that the fish they intercepting. Chignik has had a contentious salmon fishery starting in 1878. This predates a fishery in Area M. Last season was a first for Chignnk to not have a fishery do to lack of eascapement.

Other management tools have been gear sizes in length, and depth of nets, and vessel sizes, with the seine vessel limit set at 58 feet in length. Here is a link to an 8 page PDF file regarding how the vessel size limit of 58 feet as not limited the size of the vessels. Here is another link to the state of Alaska CFEC pdf file detailing the size of 58 foot vessels that they label, “Super 8’s”.

The Area M seine vessels have evolved to become wider and wider and can participate in multiple fisheries throughout the calendar year to fish cod, pollock, crab, halibut, blackcod, and tender fish also. These Super 8 vessels fish holds can pack between 120,000 lbs to 200,000 lbs. These vessels can hold an entire three month season of a what Chignik seine vessel catches on the best of years. These wide 58 foot boats can and have got a boat load of sockeye salmon on just one, or two tides.

The interception of Chignik bound sockeye in the South AK Peninsula fleet has increased in scope along with the increase in vessel size.

Chignik catches have been impacted drastically in some years more than others. There is not enough fish caught in the Chignik fishery on a consistent basis anymore for many years now that allow a processor to operate a processing facility in Chignik and to be profitable. Consequently there has not been a processing facility operating in Chignk and the salmon are all tendered out to Kodiak, and if there is a decent pink salmon run a floating processor can buy fish after the Bristol bay sockeye season winds down.

There is no opportunity for Chignik area fisherman to fish the smaller amounts of other fisheries such as halibut, cod, and crab. The fleet used to be able to fish these species as well as herring, and shrimp.

Area M on the other hand has seen recent increases in capacity. Trident Seafoods has purchased the APICA plant in False Pass and has added more freezing capactiy. It will now be able to process and freeze has much salmon as their Sand Point facility.

Silver Bay Seafoods will be operating a new plant starting in 2019 in False Pass that will be able to do twice as much the Trindent Plant. Peter Pan will also have a new plant on line for 2019 in Port Moller that will be able to do twice as much daily production as the old plant. Peter Pan has the largest canning operation on the whole west coast of North America in King Cove, and Trident can tender salmon to Akutan to their facilty, which is the largest fish processing facility in all of North America.

The raw fish tax money that is deposited in the Aleutian Easst Borough from all of the Bering Sea fisheries has allowed the borough to hire natural resource managers to advocate and lobby on behalf of the salmon fleets so that they preserve the status of their interception salmon catches, and advocate for more without regards and concerns of the impact of their efforts on the terminal areas of the salmon that they are intercepting.

Several of these nAleutian East natural resource consultants have been previous commisioners of theADF&G, or they have become comminsioners for ADF&G after lobbying for the borough.

Politacally with the state of Alaska and the board of fish process the Chignik area fisherman have much less of a voice to advoacte for their fishery.

I ask of all members of the board to diligently work with all of the parties to manage these fisheries on a sustainable basis not only for the biology of the stocks, but as well as the suastaiblity of the communites that these fisheries support on a even handed basis.

The five native villages in the Chignk salmon management area ar all soverign nations, and if their concerns are not adequately addressed through the board of fish process they will investigate to seek relief as a soverign nation in an internationl forum. They will also investigate to join forces with other soveirn nations in western Alaska and Canada that the Aream M fintercept fisheries are impacting.

This past season the sockeye escapements were so low that the subsistence fishery was closed. My wife and kids family as well a a majority of the local residents in the five villages can trace their roots back to 10,000 years of harvesting for their subsistence purposes sockeye salmon.

My wife's gandfather Pete pedersen along with the Carlson family patriarch of Chignik Bay and three natives were the first seine vessel skippers in 1937 when Harry Crosby was the first salmon processor that did not own fish traps provided them a market.

The Chignik sockeye salmon fishery was establised in 1878, after the territory of Alaska was purchased from Russia in 1867. My wife's family ancestory has two waves of Russians that were harvesting fish before the territory was purchased.

Last year was the very worst salmon season in recorded history going back to the Russian ownership. The aborginal rights of the local people so that they were not able to even subsistence fish is unpreceedented. Escapement goals for kings, pinks, and chums were also not met. There is serious issues for the salmon fisheries, and an updated management plan for the fleets is required to address the situation.

The only salmon spieces that made the escapemnent goal were coho salmon, and the management plan to harvest this spieces is presently impacted so that there is no fishery in order to provide a fall sockaye escapement goal.

I have attached several scientific papers in regards to the interelationship of the coho sockey fall fishery.

The fall fishery has not been executed in quite a few years with the goal of building of the fall sockeye run by providing more escapement. According to the attached studies this is impacting the sockeye runs in a very negative manner.

This management plan allows the coho to go unharvested, and the increase escapements of coho, which the coho smolt is a major predator of the sockeye smolt. Please reiew the attachments that address this.

The Chignik Lagoon fleet fishing Chignik Lagoon could harvest coho, and release the sockeye with out bringing the sockeye aboard. The only issue is a haul would have to be executed to not haul on flood tides in areas of sea grass and kelp deposits. These are locally know as, “shit hauls“, and fish are picked out of large amounts of kelp that can suffacate the fish. The outside fisheries of South AK Peninsula and Chignik are not the protected waters like Chignik Lagoon, and they bring the fish aboard, and work nets that are twice the length, and up to four times more in depth., and these vessels would require the use of salmon recovery boxes.

The management plan should reflect harvesting the coho, and releasing the sockeye, and this will help increase the sockey returns for bot the Chignik, and South AK salmon fleets. Here is a list of attachments.

Gregory T Ruggerone Profile
Ruggerone, Rogers- Chignik coho predation
Walsworth Chignik Coho Ecosystem
Ryan Kapp 58 ft Law Fleet Capacity
CFEC Super 8’s
Six attachments regarding recovery boxes

Thank you again for your service and the tough job that you have in addressing these issues, and the changing the maneamnet plan for these fisheries.

Sincerely,

Jeffrey, Diana, and Jaime Moore

Gregory T. Ruggerone

Salmon Scientist (NRC President)

Salmon Research – Dr. Greg Ruggerone, President of NRC, has over 35 years' experience in the Pacific Northwest and Alaska. Most of his career has been spent working with stakeholders and partners investigating salmon recovery processes, salmon life history, carrying capacity of watersheds and the ocean to support salmon, hatchery/wild salmon interactions, forecasting salmon run-sizes and migration timing, salmon habitat needs and restoration, fish passage barriers, and salmonid population responses to environmental conditions. An ongoing research focus is the interaction of pink salmon with other species of salmon in the North Pacific. Much of this effort involved collaborations with native Alaskans to improve access to salmon. Greg has authored over 200 journal articles and technical reports on salmon, and has guided graduate student salmon research at the UW's Alaska Salmon Program and the University of Alaska. Greg frequently is an invited speaker for conferences, provides scientific review for 29 journals and research organizations, and is the previous Chair of the Columbia River Independent Scientific Advisory Board (ISAB) and the Columbia River Independent Scientific Review Panel. He evaluates management of salmon fisheries in Alaska, Canada, Russia, and the west coast for the Marine Stewardship Council and Monterey Bay Aquarium.

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Predation on Sockeye Salmon Fry by Juvenile Coho Salmon in the Chignik Lakes, Alaska: Implications for Salmon Management

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Abstract.—The consumption of recently emerged sockeye salmon *Oncorhynchus nerka* by juvenile coho salmon *O. kisutch* in Chignik Lake, Alaska, was estimated for 15 May–5 August, 1985–1987. Estimated daily consumption of sockeye salmon fry by individual coho salmon in Chignik Lake, based on a stomach evacuation method, increased from about 2.0 fry in late May to 3.3 fry in June, then it declined in July and early August to 1.1 fry. Average consumption during each year, based on a bioenergetic approach, was within 14% (range, 15–20%) of the stomach evacuation method estimates, whereas bioenergetic estimates on a given day generally were within 30% of the stomach evacuation method estimates. Few coho salmon were captured in nearby Black Lake, where consumption of sockeye salmon fry per juvenile coho salmon was low. Estimates of sockeye salmon fry consumed by coho salmon in Chignik Lake, based on two independent estimates of juvenile coho salmon abundance, were 68 million, 24 million, and 78 million, which represented approximately 59% of the average population of sockeye salmon fry for 1985, 1986, and 1987. Numbers of adult sockeye salmon returning per spawner in Chignik Lake were generally high during brood years 1971–1976 relative to 1977–1984. This pattern was opposite that of sockeye salmon adults returning to Black Lake and other sockeye salmon systems in western and central Alaska. Greater abundance of juvenile coho salmon in the Chignik lakes during recent years, as indicated by greater abundance of adult coho salmon, and the large number of sockeye salmon fry consumed by coho salmon in this field study suggest that juvenile coho salmon reduced returns of sockeye salmon to Chignik Lake. A management strategy resulting in a fixed spawning escapement of coho salmon, combined with the currently fixed escapement of sockeye salmon, is recommended to reduce and stabilize predation by juvenile coho salmon on sockeye salmon fry in Chignik Lake.

An important goal of salmon biologists has been to identify the relative importance of mortality agents affecting Pacific salmon (*Oncorhynchus* spp.) during incubation, freshwater residence, seaward migration, and marine residence (Thompson 1962; Larkin 1988). Of the 1,300–12,000 eggs produced by a salmon (Healey 1986), typically less than 1% survive to become reproductive adults. Control of known mortality agents may be used by fishery managers to enhance salmon production. For example, attempts have been made to improve salmon survival by regulating salmon spawning density (Ricker 1954), reducing streamflow fluctuations during incubation (West 1978), improving rearing habitat (Canada Department of Fisheries and Oceans and B.C. Ministry of the Environment 1980), adding nutrients to enhance salmon growth in streams (Mundie 1974) and lakes (Rogers et al. 1980; Hyatt and Stockner 1985), and removing predators of salmon (Foerster and Ricker 1941; Meacham and Clark 1979).

Predation is generally believed to be a major source of mortality for salmon after emergence from gravel (Foerster and Ricker 1941; Ricker 1941; Ruggerone and Rogers 1984); therefore, control of salmonid predators might lead to improved production. A special case of predator control may exist when both the predator and its prey are commercially valuable. For example, piscivorous coho salmon *O. kisutch* often is sympatric with pink salmon *O. gorbuscha,* chum salmon *O. keta,* and sockeye salmon *O. nerka.* Coho salmon may consume sockeye salmon in many lakes of Alaska and British Columbia (e.g., Cultus and Karluk lakes: Ricker 1941; McIntyre et al. 1988), whereas pink and chum salmon generally are attacked by coho salmon in coastal areas (Parker 1968, 1971; Hargreaves 1988; Jones et al. 1988). Management of salmon fisheries with information on predator–prey interactions might lead to improved returns of salmon when intervention results in reduced predation mortality.

In Chignik and Black lakes, Alaska, sockeye salmon are carefully managed according to daily estimates of spawning escapement and harvest, and they have supported a substantial commercial fishery since the late 1800s (mean = 960,000 adult fish/year; INPFC 1979). Fewer coho salmon have been harvested (mean = 38,100 fish/year since 1910) by less effort, and no consideration has been given to their possible impacts on sockeye salmon. Annual harvest rates of sockeye and coho salmon

from 1973 to the present, when spawning escapement estimates have been available for both species, have averaged 65 and 40%, respectively (Ruggerone 1989a). Before 1982 most fishing vessels stopped fishing prior to the peak coho salmon run on about 1 September because total catch of salmon declined. Roos (1960) first noted that juvenile coho salmon in Chignik Lake consumed juvenile sockeye salmon and suggested that coho salmon might reduce sockeye salmon abundance. Predation by coho salmon on sockeye salmon in the lakes may have increased substantially in recent years, given that the estimated average run size of adult coho salmon increased 155% during 1979–1988 (mean ± SE = 168,000 ± 33,000 fish) relative to the previous 6 years (66,000 ± 6,000 fish; Ruggerone 1989a).

The primary objective of this investigation was to estimate the importance of predation by juvenile coho salmon on sockeye salmon abundance in Chignik and Black lakes and on subsequent returns of adult sockeye salmon. Sockeye salmon mortality was estimated from two independent estimates of daily food consumption by coho salmon and from two independent estimates of coho salmon abundance. A secondary objective was to compare the bioenergetic (Kitchell et al. 1977; Hewett and Johnson 1987) and stomach evacuation (Bajkov 1935; Eggers 1979) methods of estimating daily food consumption.

Study Site

The Chignik lakes consist of two connected lakes on the Alaska Peninsula (56°16′N, 158°50′W) that drain south to the Gulf of Alaska. Situated between precipitous mountains, Chignik Lake is small (22 km^2) and relatively deep (64 m), whereas Black Lake (41 km^2) is a shallow depression (<4 m) on the north side of the peninsula. Breakup of ice generally occurs in March to early May in Chignik Lake and about 1 month earlier in Black Lake. Surface water temperature from May through July ranges from 5 to 14°C in Chignik Lake and from 9 to 16°C in Black Lake. Frequent, strong winds continually mix the water columns of these lakes. Water transparency in both lakes decreases from spring to summer and is generally low (<1–4 m according to Secchi disk measurements) because levels of primary productivity (Burgner et al. 1969), glacial runoff, and wind-induced mixing are high.

Each fall approximately 270,000 sockeye salmon pass through a counting weir before spawning in Chignik Lake (Ruggerone 1989a); they spawn primarily along littoral areas lacking features (e.g., macrophytes or large rocks) that might provide refuge for emerging sockeye salmon fry. Approximately 390,000 sockeye salmon spawn in tributaries of Black Lake. Since 1973, an estimated average 76,000 coho salmon have spawned each fall in the Chignik lakes, but the relative distribution of these late-spawning fish is unknown. (Adult coho salmon return to the lakes after the weir is removed; their abundance is estimated with a relationship between catch per unit effort in Chignik Lagoon and sockeye salmon escapement past the weir: Brannian 1982; Ruggerone 1989a).

Methods

Sampling of juvenile coho salmon in lakes and stomach content analysis.—Juvenile coho salmon and other fishes were sampled by beach seine (35 m long × 4 m maximum depth, 17-m lead line, 3-mm mesh) with a stratified design during 1985–1987. Sampling stratification in Chignik Lake was based on the presence or absence of spawning habitat for sockeye salmon and on physical characteristics of the littoral area. Six stations representing two shoreline spawning areas and an additional six stations representing three nonspawning areas were each fished once approximately every 10 d from mid-May to early August, 1986–1987 (Figure 1). Sampling of the two spawning areas and three nonspawning areas represented 5.6 and 12.4 km, or 15 and 35% of the lake perimeter, respectively. An additional 55 beach-seine sets were made at 10 nonspawning locations representing the remaining 50% of the lake to assess whether predation was equivalent to that in routinely sampled areas. Most sampling occurred between 1000 and 1600 hours. In 1985, the Hatchery Beach and Delta Beach spawning areas were sampled twice and once every 10 d, respectively; the three nonspawning areas were each sampled once every 10 d. Coho salmon in Black Lake were sampled by beach seine at 10 stations approximately every 14 d during 1985–1987 (Figure 1).

Captured fishes at each beach-seine station were enumerated. Digestion and evacuation of prey from coho salmon stomachs were reduced by immediately injecting 50% buffered formalin (~1 mL) into the stomach cavity of the dead fish before the entire specimen was preserved in 10% buffered formalin. Lengths of all coho salmon at each station were analyzed approximately 48 h after capture, when postmortem shrinkage of body length was considered complete (Rogers 1964). Stomach

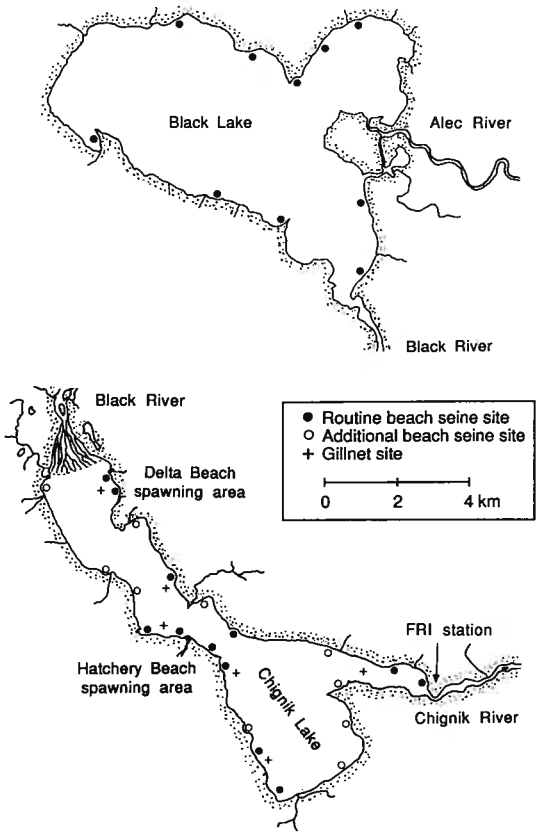

FIGURE 1.—Locations of beach-seine and gill-net stations at Chignik and Black lakes. The distance between the lakes is 13 km. FRI = Fisheries Research Institute.

contents of at least 10 coho salmon that were 70 mm (the length at which piscivory begins) or longer also were analyzed. Prey were identified as sockeye salmon fry, other fish (age-1 sockeye salmon, coastrange sculpin *Cottus aleuticus*, coho salmon fry, or unidentified fish), insects, or uncommon prey; then the prey were blot-dried and weighed separately to the nearest milligram. Live coho salmon weight (W_c, g) was estimated from fork lengths (L, mm) of preserved fish with the regression ($N = 453$, $r^2 = 0.99$):

$$W_c = 0.00001888\ L^{2.896}.$$

The ages of approximately 60 coho salmon from each 10-d sampling period were estimated from scales to determine the age–weight–length relationship at each sampling period. Age-specific growth of coho salmon during each year, which is a necessary parameter for the bioenergetic method of estimating food consumption, was estimated by regressing coho salmon weight against time.

Distribution of coho salmon in Chignik Lake.—The horizontal and vertical distribution of coho salmon in Chignik Lake were assessed as part of the estimation procedure for coho salmon abundance. Three surface gill nets (2.6-cm stretch mesh, 2 × 30 m) were placed 20, 50, 100, or 150 m from shore at six beach-seining areas during late May to early July, 1986–1988 (Figure 1). Most nets were set parallel to shore and fished continuously for 24 h or more. Coho salmon were counted and removed twice daily (at ~0900 and 2200 hours) for approximately 18 d at each distance from shore. A vertical gill net (2.6-cm stretch mesh; Knight and Margraf 1982) was also deployed overnight on 2 July 1986. The proportion of coho salmon inhabiting the nearshore area (Pr) sampled by the beach seine was estimated by the following equation:

$$\mathrm{Pr} = \frac{(f_{20})(25)}{(f_{20})(25) + \sum_{i=1}^{3} (f_i)(50)(1/V)}; \qquad (1)$$

f_{20} and f_i are the average numbers of coho salmon captured in the nearshore (20 m from shore) and offshore (50, 100, 150 m) sets of horizontal gill nets; 25 and 50 are multipliers based on the offshore distance represented by the four gill nets; and V is an estimate of the proportion of coho salmon sampled in the entire water column of offshore stations relative to the nearshore station. The correction factor V was included because the offshore gill nets were in deeper water than were the nearshore gill nets (10–30 versus ~3 m) and because they sampled a smaller proportion of the vertically distributed coho salmon.

Mortality of sockeye salmon fry in Chignik Lake.—Daily consumption of sockeye salmon fry by coho salmon was estimated with two independent methods. The first method (the direct method) used stomach content data from each sampling location, gastric evacuation rates, and Eggers' (1979) food consumption model:

$$\text{daily meal} = 24(W_s)(r_e); \qquad (2)$$

W_s is the average weight of sockeye salmon fry per coho salmon, and r_e is the exponential rate of gastric evacuation. A diel feeding pattern was not observed for Chignik coho salmon (Ruggerone 1989b), so their observed stomach contents were assumed to represent the daily average. Exponential gastric evacuation rates of coho salmon feeding on sockeye salmon fry were estimated in the lab-

oratory; coho salmon were fed one or two fry at four temperatures, and the data on temperature (T) and prey weight (W_p) were used in the following equation (Ruggerone 1989b, 1989c):

$$r_e = 0.133 + 0.021T - 0.402W_p. \quad (3)$$

Surface temperature was measured at each sampling location, and prey weight was the average of total prey consumed by those coho salmon feeding on sockeye salmon at each station in the lake. The range in prey weights used to develop the relationship between evacuation rate, temperature, and prey weight (equation 3) was restricted to 0.169–0.500 g. Daily consumption of sockeye salmon fry per coho salmon was based on $W_s = 0.169$ g/fry, which was estimated from sizes of fry consumed by coho salmon.

The second method for estimating daily consumption of sockeye salmon by coho salmon was based on a bioenergetic approach (Kitchell et al. 1977; Stewart et al. 1981, 1983; Hewett and Johnson 1987). This method used estimates of predator growth, caloric densities of predator and prey, ambient temperature, relative prey composition, and a temperature-dependent algorithm for estimating food consumption (Thornton and Lessem 1978). Age-specific growth of coho salmon between late May and mid-July was estimated from average coho salmon weight during each sampling period. After mid-July, growth of coho salmon could not be estimated from weight-frequency data, because larger coho salmon migrated to sea before smaller coho salmon did. Therefore, consumption estimates for coho salmon after mid-July were based on daily calories consumed during the last day that growth data were available, the temperature-dependent algorithm, and the proportion of sockeye salmon fry in the diet. Average daily consumption for the coho salmon population was estimated by weighting the age-specific consumption values by the proportion of age-1 and age-2 coho salmon in the beach-seine samples for each period.

Caloric density values (± SEs) of sockeye salmon fry and coho salmon parr were 811 ± 9 and 1,000 ± 22 cal/g wet weight, respectively (Ruggerone 1989a). Caloric density of insects, primarily chironomids, was assumed to be 655 cal/g wet weight (Cummins and Wuycheck 1971; Elliott 1976). The caloric densities of other prey, which were minor components in the diet of coho salmon, were assumed to be equivalent to that of sockeye salmon fry.

Two independent estimates of coho salmon abundance were used to estimate numbers of sockeye salmon fry consumed by coho salmon in Chignik Lake during spring and summer. First, coho salmon abundance was estimated by extrapolating beach-seine catches to a predetermined habitat area based on the area swept by the beach seine (~500 m^2). Daily mortality of sockeye salmon fry (M_s), based on the area-swept method for estimating coho salmon abundance, was estimated from 15 May to 5 August by the following equation:

$$M_s = 1.6 \sum_{i=1}^{5} F_i C_i B_i D; \quad (4)$$

F_i is the average number of fry consumed per coho salmon per day in habitat i (estimated from the direct or bioenergetic method), C_i is the average number of coho salmon 70 mm or longer in the beach-seine set, B_i is the ratio of total area in habitat i to area swept by a beach seine, and D is a multiplication factor based on the offshore distribution of coho salmon captured in the gill nets—that is, the reciprocal of equation (1). We assumed that beach-seine efficiency was 100% and that the five sampled habitats represented 50% of the lake perimeter. Sockeye salmon fry consumed per coho salmon per day in the remaining portion of the lake was estimated to be equal to that in the routinely sampled habitats (the ratio of sockeye salmon fry consumed per coho salmon [± SE] at nonroutine versus routine stations was 1.01 ± 0.27), but coho salmon abundance was estimated to be 60% of that at routine stations based on 55 beach-seine sets at 10 additional locations (Figure 1). Thus, the sockeye salmon fry mortality in 50% of the lake was multiplied by 1.6 rather than by 2. Daily consumption of sockeye salmon fry by coho salmon between sampling dates was estimated by linear interpolation.

The second method (the reconstruction method) for estimating juvenile coho salmon abundance in Chignik Lake was based on adult coho salmon run size (catch and spawning escapement) during the following year, because maturing coho salmon spend only 1 year at sea. This method of estimating sockeye salmon fry mortality is summarized by the following equation:

$$M_s = \frac{\sum_{i=1}^{5} F_i C_i B_i D}{\sum_{i=1}^{5} C_i B_i D} (0.2\, A \cdot 0.55\, P_k + N_k). \quad (5)$$

The fractional part of the equation represents the weighted mean fry consumed per coho salmon per day. Sockeye salmon fry mortality was also estimated by substituting bioenergetic estimates of

daily food consumption by coho salmon. Abundance of presmolt coho salmon (i.e., coho salmon rearing in the lake prior to seaward migration) was estimated from the run size of adult coho salmon during the following year (A), an assumed marine survival of 20% (Holtby 1989; T. Flint, Washington Department of Fisheries, personal communication), and the proportion of presmolts in Chignik Lake (0.55) relative to Black Lake. The proportion of coho salmon in Chignik Lake relative to Black Lake was estimated from beach-seine catches of coho salmon 70 mm or longer and the proportion of coho salmon habitat sampled by the seine in each lake. Coho salmon habitat in Black Lake was assumed to include the entire lake (41.1 km^2) because the lake is shallow and coho salmon were captured in offshore gill nets. Coho salmon habitat in Chignik Lake was estimated from gillnet catches. The proportion of the presmolt population remaining in the lake on day k (P_k) was estimated from timing of coho salmon smolt migration in Chignik River (Ruggerone 1989a). An estimated 78 and 8% of the piscivorous, presmolt population remained in the lake on 1 July and 1 August, respectively. Abundance of piscivorous yearling coho salmon that did not migrate (N_k) was estimated from the proportion of yearling coho salmon smaller than 70 mm (i.e., nonsmolts) in the lake on or near 1 June and the time those fish needed to exceed 70 mm (i.e., the length when piscivory becomes common; Ruggerone 1989a), based on an estimated growth rate of 0.42 mm/d for age-1 coho salmon.

Predation effects on sockeye salmon run size.—Trends in relative production of adult sockeye salmon in each lake (return per spawner), run size of adult coho salmon, and the corresponding harvests of sockeye salmon from western and central Alaska were compared for sockeye salmon brood years 1971–1984. Because most predation on emerging sockeye salmon was by presmolt coho salmon before their seaward migration, and because coho salmon spend one winter at sea, returns of sockeye salmon from brood year t were compared with the adult coho salmon run 2 years later ($t + 2$). For example, sockeye salmon fry produced by the 1980 brood would have been consumed primarily by coho salmon that returned to the Chignik lakes as adults in 1982. Approximately 80% of adult sockeye salmon return to Chignik and Black lakes at age 1.3 and age 2.3. Dahlberg (1968) described the methodology for compiling brood tables and production rates for Chignik salmon.

Results

Sampling of Juvenile Coho Salmon in Lakes and Stomach Content Analysis

More than 268 beach-seine hauls for coho salmon in Chignik Lake and 84 hauls in Black Lake were examined during 1985–1987. Juvenile coho salmon (≥70 mm) in Chignik Lake were readily captured (~42 coho salmon per set) during each year, and the stomach contents of 2,141 coho salmon were examined (Table 1). In contrast, fewer than three coho salmon per beach-seine set typically were captured in Black Lake, and only 150 coho salmon were examined for stomach contents (Table 2). In Black Lake the weight and number of sockeye salmon fry observed per coho salmon averaged 0.01 g and less than 0.1 fry. Daily consumption of sockeye salmon fry by coho salmon in Black Lake was not estimated because few coho salmon were captured. We were unable to catch many coho salmon probably because they were distributed throughout the shallow lake, as suggested by the capture of coho salmon in offshore gill nets. Relatively few sockeye salmon fry in Black Lake appeared to be consumed by the coho salmon population.

During 1985–1987 in Chignik Lake, the average number of sockeye salmon fry observed per coho salmon stomach increased from about 0.7 in late May to 1.7 in June, then it declined throughout July and early August to 0.3 (Figure 2). Average weight of sockeye salmon fry per coho salmon stomach followed a similar seasonal trend: 0.08 g in late May, 0.19 g in June, and 0.04 g in July and early August. The highest average number and weight of sockeye salmon fry per coho salmon stomach were observed during 1985 (1.4 fry, 0.16 g), the next highest during 1987 (0.9 fry, 0.08 g), and the lowest during 1986 (0.4 fry, 0.04 g).

Numbers of sockeye salmon fry consumed per day by coho salmon were nearly three times higher than the numbers of fry observed in coho salmon stomachs, based on the average fry weight of 0.169 g. For 1985–1987, daily consumption of sockeye salmon fry, based on observed prey weight and stomach evacuation rates of coho salmon (direct method), averaged 2.0 fry in late May, 3.3 fry in June, and 1.1 fry in July and early August (Figure 3). Average sockeye salmon fry consumed per coho salmon per day was greater in 1985 (2.8 fry) and 1987 (2.4 fry) than in 1986 (1.0 fry).

Daily consumption of sockeye salmon fry by coho salmon based on the bioenergetic method followed a seasonal trend similar to that shown by

TABLE 1.—Summary of catch statistics for juvenile coho salmon (≥70 mm) from beach-seine hauls in Chignik Lake.

Date	Number of stations	Sampling time (hours)	Average temperature (°C)	Average Secchi depth (m)	Number of fish examined[a]	Average fish length (mm)	% age-2 fish	Fish per set ± SE
				1985				
25 May	5	1530–1900	4.6	4.0	63	97	11	152 ± 132
31 May	5	1115–1500	5.7	3.6	56	102	78	17 ± 10
10 Jun	6	1045–1530	5.8	3.0	48	110	82	27 ± 20
19 Jun	6	1200–1700	8.6	2.6	66	111	89	241 ± 200
27 Jun	5	1130–1515	8.4	2.3	76	108	89	69 ± 51
7 Jul	6	1530–2115	11.1	1.7	64	116	76	48 ± 11
16 Jul	5	1215–1515	10.0	1.8	63	116	67	18 ± 4
26 Jul	5	1300–1630	11.7	1.5	83	101	23	14 ± 4
2 Aug	6	1130–1515	12.4	2.2	51	95	16	9 ± 3
1 Sep	6	1130–1530	10.4	1.2	20	86	9	4 ± 1
				1986				
17 May	11	1030–1700	6.2	3.1	43	81	15	5 ± 3
24 May	12	1000–1800	7.7	3.7	82	77	21	28 ± 12
4 Jun	18	0800–2400	6.0	3.3	228	89	47	57 ± 24
14 Jun	11	1040–1515	5.6	2.2	52	90	33	7 ± 3
25 Jun	11	1100–1450	6.9	1.4	36	98	39	4 ± 2
6 Jul	12	1030–1445	8.9	1.9	95	108	41	10 ± 2
16 Jul	12	1100–1545	9.4	2.2	74	102	20	15 ± 5
26 Jul	12	1000–1345	10.8	1.3	55	100	7	7 ± 3
3 Aug	12	0930–1400	11.0	1.1	29	81	0	3 ± 1
				1987				
21 May	12	1100–1800	7.2	2.8	92	95	52	54 ± 20
3 Jun	18	0600–2400	7.8	2.8	290	99	51	163 ± 44
11 Jun	12	1015–1545	7.9	2.3	84	100	42	24 ± 10
22 Jun	12	1030–1500	7.1	2.4	123	108	36	52 ± 23
1 Jul	12	1000–1445	8.0	2.3	68	109	38	9 ± 3
9 Jul	12	1100–1530	10.8	1.6	97	98	5	24 ± 12
19 Jul	12	1100–1530	10.2	2.3	85	94	17	18 ± 7
27 Jul	12	1130–1630	14.3	0.8	18	96	7	6 ± 2

[a] Stomach content analysis only; does not include all coho salmon measured.

TABLE 2.—Summary of catch statistics for juvenile coho salmon (≥70 mm) from beach-seine hauls in Black Lake.

Date	Number of stations	Sampling time (hours)	Average temperature (°C)	Average Secchi depth (m)	Number of fish examined[a]	Average fish length (mm)	% age-2 fish	Fish per set ± SE	Sockeye salmon fry content per fish stomach	
									Number of fry	Weight of fry (g)
					1985					
27 May	2	1130–1230	10.0	1.5	1	87	0	<1	0.0	0.0
1 Jun	6	1200–1800	8.6	1.4	0		0	0		
20 Jun	6	1845–2200	10.9	1.8	22	108	59	4 ± 2	0.1 ± 0.1	0.08 ± 0.07
11 Jul	9	1315–2345	16.3	2.4	20	97	30	3 ± 2	0.0	0.0
22 Jul	12	1315–2030	13.2	0.9	44	81	0	4 ± 2	<0.1	<0.01
					1986					
7 Jun	10	1145–1615	8.8	0.8	7	80	0	<1	0.0	0.0
28 Jun	10	1230–1600	10.0	0.8	9	84	0	<1	0.3 ± 0.3	0.03 ± 0.03
24 Jul	10	1230–1700	14.9	1.5	24	103	0	6 ± 5	0.0	0.0
					1987					
20 Jun	10	1400–1845	10.0	1.5	2	68	0	<1	0.0	0.0
7 Jul	9	1645–2000	14.0	1.6	21	79	0	6 ± 4	0.0	0.0

[a] Stomach content analysis only; does not include all coho salmon measured.

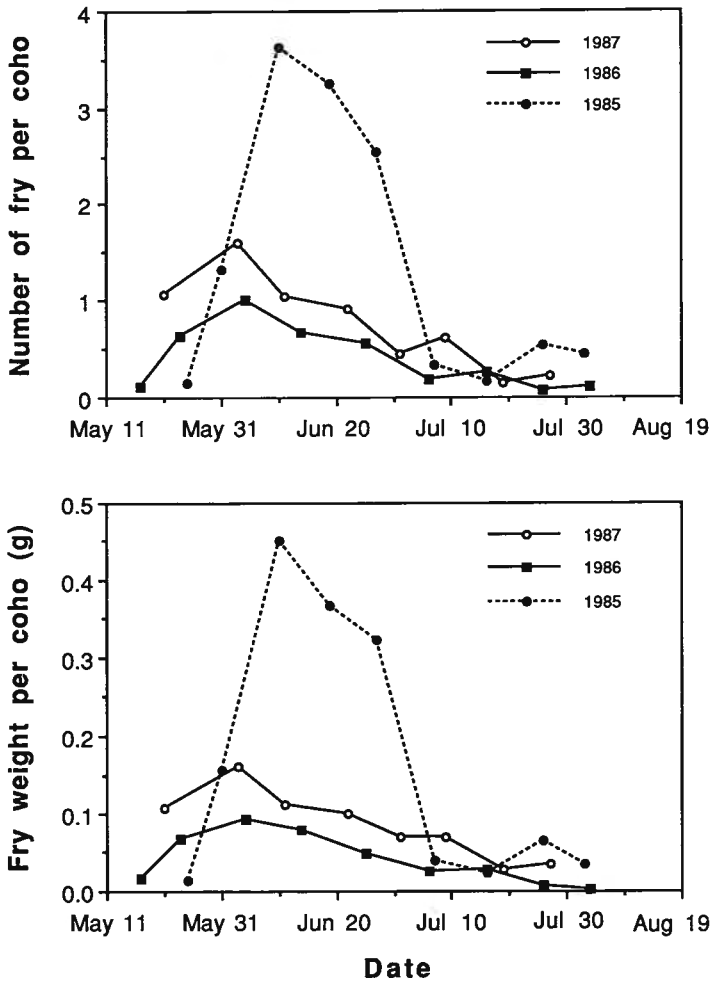

FIGURE 2.—Number and weight of sockeye salmon fry observed in stomachs of coho salmon at Chignik Lake, 1985–1987.

the direct method (Figure 3). Bioenergetic estimates of average consumption during each year were within 14% (range, 5–20%) of the direct method estimates (absolute mean difference = 0.25 fry/d), whereas bioenergetic estimates (± SD) on a given day were within 30 ± 18% of the direct estimates. Statistical differences in food consumption estimates by the two methods were evaluated with three paired t-tests rather than with an analysis of variance (ANOVA) because estimates between each year were made on different dates and estimates within a year were made on the same date. To reduce the probability of a type I error during three t-tests, the level of significance (α) was lowered from 0.05 to 0.02 (Zar 1984). Daily fry consumption estimated from the bioenergetic and direct methods was not significantly different for 1985 ($P = 0.29$, df = 8) and 1987 ($P = 0.59$, df = 7) but was different for 1986 (mean difference = 0.19 fry/d, $P = 0.014$, df = 8).

Distribution of Coho Salmon in Chignik Lake

Catches from gill nets set 20, 50, 100, and 150 m from the lake shoreline indicated that coho salmon were most abundant near shore. In total, 768 coho salmon were captured by gill nets during 1986–1988. Per 24 h, approximately 45 coho salmon were captured in the nearshore gill net, compared with 12 coho salmon at 50 m, 10 coho salmon at 100 m, and 6 coho salmon at 150 m from shore (Figure 4A). In 1988 sockeye salmon fry were consumed by 69% of the coho salmon in the nearshore gill net, compared with 57% of the

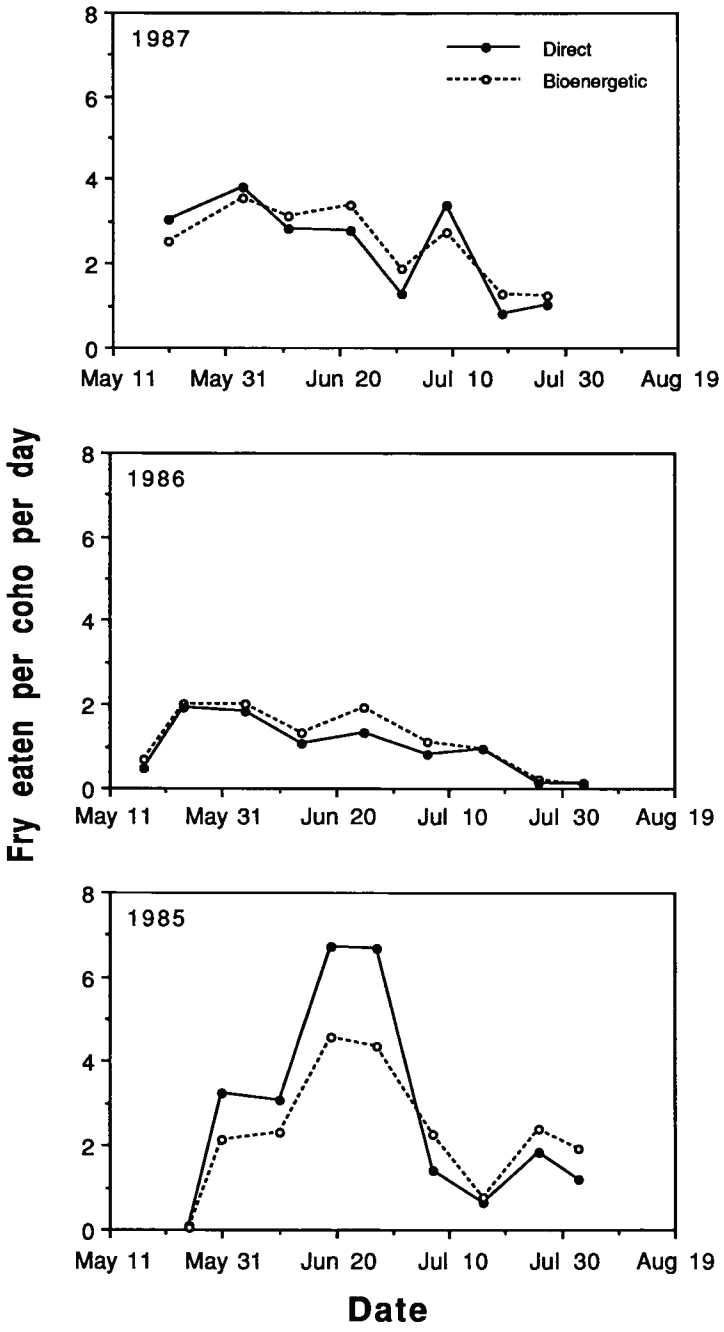

FIGURE 3.—Number of sockeye salmon fry (based on average fry weight of 0.169 g) consumed per coho salmon per day in Chignik Lake during 1985–1987, estimated with the direct (stomach evacuation rate) and bioenergetic methods.

coho salmon in the offshore nets, suggesting either little difference in the consumption of sockeye salmon with distance from shore or frequent movement of coho salmon between onshore and offshore areas. Data from the night of sampling for vertical distribution of coho salmon suggested that approximately 50% of the coho salmon (36 fish captured) were within 2 m of the surface; all

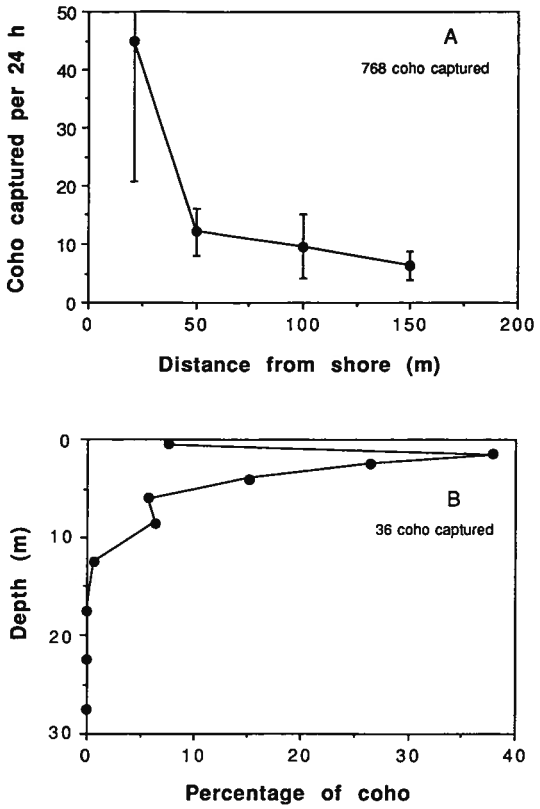

FIGURE 4.—Horizontal and vertical distributions of juvenile coho salmon in Chignik Lake. Values are daily mean catches (± SEs) of coho salmon in gill nets.

coho salmon were in the top 15 m of the 30-m vertical gill net (Figure 4B).

From the gill-net catches of coho salmon and from equation (1), we estimated the average distribution of coho salmon relative to shore during peak and postpeak emergence of fry. The estimated proportion of vertically distributed coho salmon sampled by the offshore gill nets relative to the nearshore net (V in equation 1) was 0.67. Coho salmon within 25 m of the shore represented an estimated 33% of the coho salmon population in the lake. Therefore, beach-seine catches of coho salmon, which extended 25 m offshore, were multiplied by three to estimate coho salmon abundance by the area-swept method (i.e., $D = 3$ in equations 4 and 5).

Estimates of Coho Salmon Abundance

Estimated coho salmon abundance in Chignik Lake differed markedly depending on the method of estimation and year. Before the seaward migration of coho salmon in early July of each year (1985–1987), coho salmon abundance (those ≥70 mm) ranged from 100,000 to 400,000 fish based on the area swept by the beach seine, and from 450,000 to 670,000 fish based on reconstruction of coho salmon abundance from adult run size during the following year (Figure 5). Coho salmon abundance declined in mid-June when many began migrating seaward, and by late July approximately 30% of the initial piscivorous coho salmon population (≥70 mm) remained in Chignik Lake, including nonsmolting coho salmon. The abundance estimates of coho salmon from the reconstruction method averaged about 100% greater than estimates from the area-swept method.

Mortality of Sockeye Salmon Fry in Chignik Lake

Four partially independent estimates of daily sockeye salmon fry mortality, calculated approximately every 10 d, were based on two independent methods for estimating daily food consumption per coho salmon and two independent methods for estimating daily coho salmon abundance. The number of sockeye salmon fry consumed daily by the coho salmon population (the average of the four types of estimates for 1985–1987) increased from about 0.66 million fry in late May to 1.35 million fry in June, then it declined throughout July and early August of each year to 0.24 million fry (Figure 6). Annual consumption of sockeye salmon fry by the coho salmon population between 15 May and 5 August, based on the four estimates, averaged 68 million, 24 million, and 78 million fry during 1985, 1986, and 1987, respectively (Table 3). Mortality estimates based on the direct and bioenergetic methods were nearly identical in 1986 and 1987 (<10% difference), whereas in 1985 bioenergetic estimates of mortality were 70% of the direct-method estimates. Estimates of mortality based on the area-swept method of estimating coho salmon abundance were approximately 55% less than those estimated from the reconstruction method. Approximately 90% of sockeye fry mortality was attributed to coho salmon that migrated to sea during the year of investigation.

The percentage of the sockeye salmon fry population consumed by coho salmon was estimated from fry mortality estimates and initial fry abundance. Abundance of sockeye salmon fry was estimated from the number of sockeye salmon spawners in Chignik Lake (P. Probasco, Alaska Department of Fish and Game, personal com-

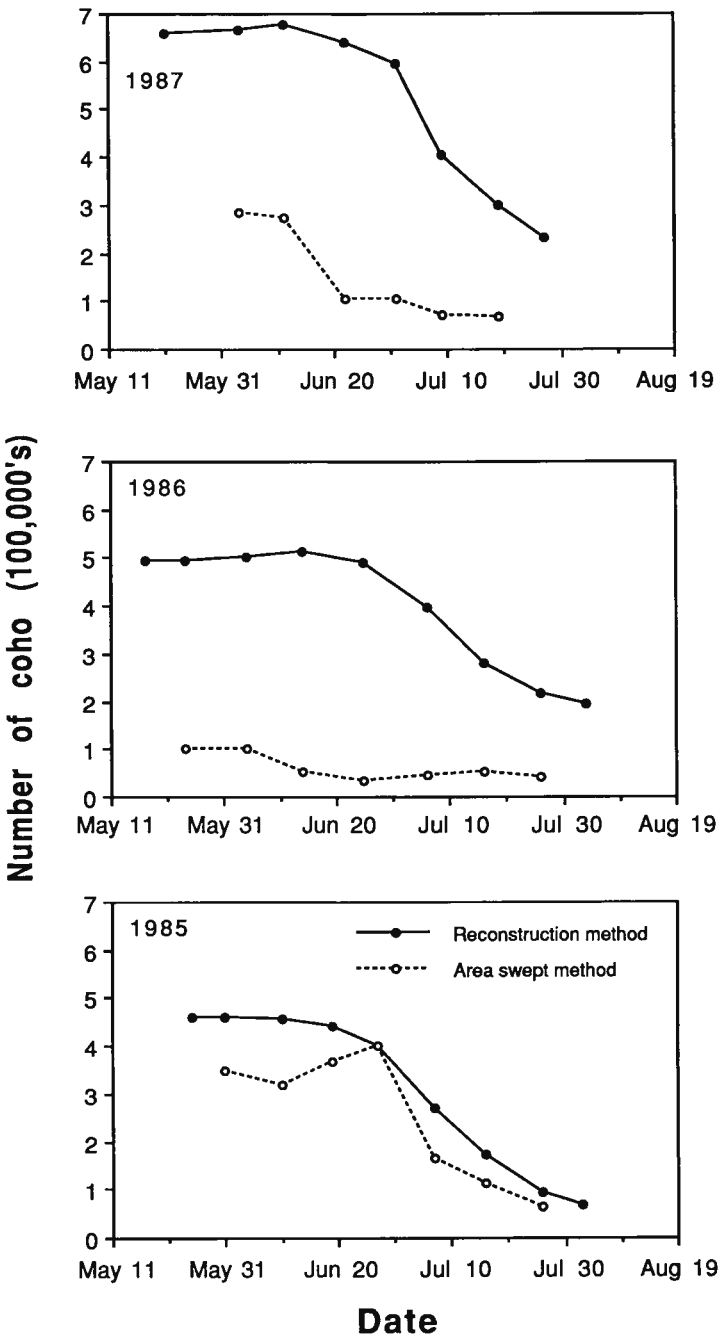

FIGURE 5.—Number (hundred thousands) of coho salmon 70 mm or longer in Chignik Lake, 1985–1987, based on the area swept by the beach seine and the reconstruction of juvenile coho salmon abundance from data on adult coho salmon run size during the following year. Area-swept data are smoothed by a moving average of three.

munication), average fecundity (e.g., Wells and Parr 1971), and an assumed egg-to-fry survival of 20% (Foerster 1968; Drucker 1970; West and Mason 1987). Survival from egg to fry is highly variable but was probably high in Chignik Lake because of excellent spawning gravel associated with the nests along the lake shoreline. Approximately 550 million, 591 million, and 410 million eggs were de-

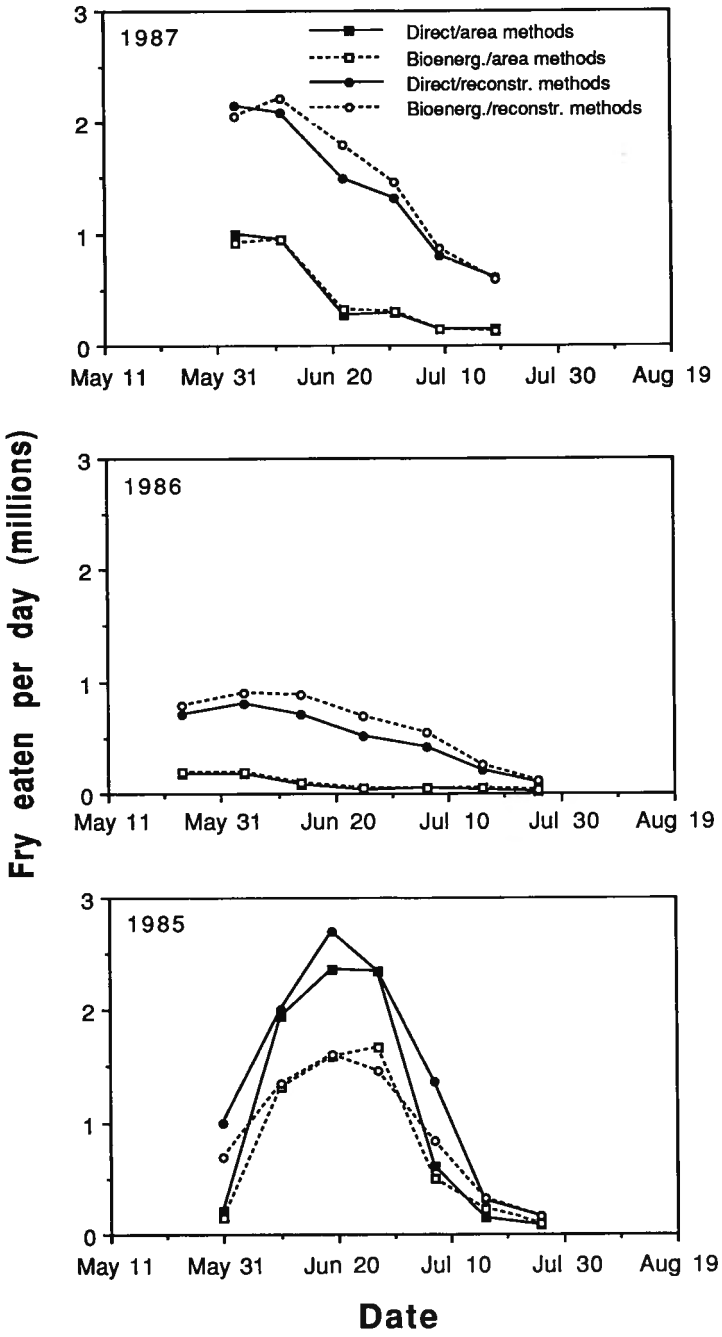

FIGURE 6.—Number (millions) of sockeye salmon fry consumed per day by coho salmon in Chignik Lake, 1985–1987, based on the direct–area-swept, direct–reconstruction, bioenergetic–area-swept, and bioenergetic–reconstruction methods (see Table 3). Data are smoothed by a moving average of three.

posited by sockeye salmon during 1984, 1985, and 1986, respectively (based on spawning densities of 268,000, 353,000, and 207,000 sockeye salmon and estimates of fecundity calculated from fish length and age composition; Ruggerone 1989a). The estimated average percentage of emerging sockeye salmon fry consumed by coho salmon was 59% during 1985–1987.

TABLE 3.—Numbers (millions) of sockeye salmon fry consumed by coho salmon in Chignik Lake from 15 May to 5 August during 1985–1987. Estimates were generated by combinations of four methods: the direct method (stomach evacuation rate) and the bioenergetic method, which both estimate daily consumption of sockeye salmon per coho salmon; and the area-swept method (area swept by the beach seine) and the reconstruction method (data on adult coho salmon run size), which both estimate coho salmon abundance.

	Method combination				
Year	Direct–area-swept	Direct–reconstruction	Bioenergetic–area-swept	Bioenergetic–reconstruction	Average
1985	69	93	50	61	68
1986	7	39	7	44	24
1987	42	114	40	116	78

Predation Effects on Sockeye Salmon Run Size

The trend of adult sockeye salmon returning to Chignik Lake during the past 14 years differs from that of coho salmon returning to the Chignik lakes and of sockeye salmon returning to Black Lake and other systems in western and central Alaska. The average number of sockeye salmon returning to Chignik Lake per spawner declined 20% (4.70 versus 3.76) between brood years 1971–1976 and 1977–1984, whereas return per spawner in Black Lake increased 79% (2.26 versus 4.05), for a net difference in production of 99% between the two lakes (G. Ruggerone, unpublished data). Before the 1990 sockeye salmon run, which was part of the record sockeye salmon run in North America (D. Rogers, unpublished data), the difference in production between the two lakes was 129%. In contrast to the runs of sockeye salmon to Chignik Lake, harvests of adult sockeye salmon returning to Bristol Bay increased from 16 million to 25 million fish per year during the corresponding years of return (1976–1981 versus 1982–1990; Alaska Department of Fish and Game, unpublished data). In central Alaska average annual catches of sockeye salmon increased from 6 million to 12 million.

The numbers of adult coho salmon returning to Chignik and Black lakes indicate that juvenile coho salmon were more numerous in Chignik Lake during recent years when production of adult sockeye salmon in Chignik Lake was relatively low. Average run size (± SE) of adult coho salmon returning to the Chignik lakes, corresponding to predation by juvenile coho salmon during the 1971–1976 and 1977–1984 brood years of sockeye salmon increased from 66,000 ± 6,000 to 160,000 ± 33,000 fish. These data, coupled with the unique production trend of Chignik Lake sockeye salmon relative to other stocks and the large estimated numbers of sockeye salmon consumed by coho salmon in this field study, suggest that predation by juvenile coho salmon perhaps reduced the number of adult sockeye salmon returning to Chignik Lake in recent years.

Discussion

For each year, average daily predation rates of juvenile coho salmon calculated by the bioenergetic model were within 5–20% of those calculated by the direct (stomach evacuation rate) method. However, absolute differences in daily fry consumption were approximately 16% greater when daily values were compared in a paired analysis. Thus, the two methods converged on a similar estimate for seasonal food consumption but agreed less when used to estimate food consumption on a given day. As expected, the bioenergetic estimates were less variable than the direct estimates, probably because the bioenergetic method used a constant growth rate to estimate food consumption. Nevertheless, differences in seasonal food consumption estimated from the two methods were small given the complexity of fish energetics, food processing, and food assimilation (Kapoor et al. 1975; Brett 1983; Ruggerone 1989c; Smith 1989). The estimates from both methods closely resembled the seasonal pattern of fry emergence along the shoreline (G. Ruggerone, unpublished data).

Few studies have compared independently derived estimates of fish food consumption. Beauchamp et al. (1989) reported that bioenergetic and field-derived estimates of seasonal consumption rates for juvenile sockeye salmon in Lake Washington and Lake Dalnee were similar. Rice and Cochran (1984) demonstrated that total food consumption by largemouth bass *Micropterus salmoides,* based on a similar bioenergetic model, was within 8.5% of direct field estimates during spring and summer. However, daily food consumption estimates based on the field estimates often deviated markedly from the bioenergetic es-

timates because the latter method averaged food consumption over time, as in the present study.

The greatest sources of error in estimating numbers of sockeye salmon fry consumed by coho salmon were the estimates of coho salmon abundance. Population estimates of fish generally are subject to large error; therefore, we estimated coho salmon abundance from two indepndent methods. The area-swept method probably underestimated coho salmon abundance because the fish tried to avoid the net. Furthermore, catches of coho salmon in 1986 declined 80% after a severe flood in mid-June, presumably because of reduced seine efficiency during the exceptionally high water. In contrast, the reconstruction of coho salmon abundance from adult run size may have overestimated mortality of sockeye salmon because coho salmon were not fully recruited to the littoral area in mid-May. The average of the area-swept and reconstruction estimates was judged to provide reasonable estimates of coho salmon abundance for the purpose of estimating the magnitude of predation.

The large number of sockeye salmon fry consumed by juvenile coho salmon in Chignik Lake during 1985–1987 suggests that coho salmon could have influenced stock-specific traits in Chignik Lake sockeye salmon. Emerging sockeye salmon moved offshore, where coho salmon were less abundant, then returned to littoral areas after they reached sizes that were less vulnerable to predation (Ruggerone 1989a). This behavior may have evolved to reduce predation. Also, coho salmon consumed sockeye salmon that were significantly smaller than average, potentially selecting for large sockeye salmon size at emergence in Chignik Lake relative to other sockeye salmon populations (Ruggerone 1989a). Coho salmon was the major predator on sockeye salmon in the Chignik lakes (Roos 1959, 1960; Ruggerone 1989a).

The percentage of sockeye salmon fry consumed by coho salmon in Chignik Lake compares favorably with predation estimates for salmon in other systems (up to 85%; Ruggerone and Rogers 1984). In contrast to these high predation rates, predation by coho salmon in Black Lake appeared to be low. Sockeye salmon in Black Lake were probably less vulnerable to coho salmon because sockeye salmon there do not emerge along the lake shoreline and growth is relatively great. Predation in Black Lake could have occurred when emerging fry migrated downriver; however, relatively few piscivorous coho salmon appear to inhabit tributaries during spring and summer.

During the 1977–1984 brood years, the average production of adult sockeye salmon decreased in Chignik Lake, whereas production increased in Black Lake and other sockeye salmon systems in western and central Alaska. This contrast suggests that unique sources of mortality have occurred in Chignik Lake. Predation by juvenile coho salmon could influence production of adult sockeye salmon, although predation by coho salmon in some years might be offset by reduced intraspecific competition and consequently enhanced growth and survival of remaining juvenile sockeye salmon. Additionally, the return of sockeye salmon to Chignik Lake might be reduced by the commercial fishery in the Shumagin Islands 200 km west of Chignik; the origins of the fish caught there are unknown, but the late run timing suggests that Chignik, Kodiak, and Cook Inlet stocks are harvested.

The large number of sockeye salmon fry consumed by coho salmon during 1985–1987 and the potential effects of coho salmon predation on adult sockeye salmon returns suggest that a reduction in adult coho salmon during years of large run size might enhance sockeye salmon abundance. Eradication of the coho salmon population is not reasonable, because the greater abundance of emerging sockeye salmon fry that would result could reduce growth (Narver 1966; Parr 1972) and marine survival (Hyatt and Stockner 1985; Koenings and Burkett 1987) of sockeye salmon with no gain in adult returns. Furthermore, indirect effects of predation on prey populations are complicated, and removal of a predator population could lead to unexpected negative effects (Hubbs 1940; Kerfoot and Sih 1987). Dolly Varden *Salvelinus malma* and, to a lesser extent, coastrange sculpin consume sockeye salmon fry in Chignik Lake; these fish might increase their predation rates if additional sockeye salmon were available as a result of reduced predation by coho salmon. However, predation by Dolly Varden is not consistent over time or by location and appears to be controlled by factors in addition to fry abundance. Coho salmon rarely consume Dolly Varden or sculpin; therefore, fewer coho salmon would not directly lead to more of these predators.

Sockeye salmon runs to Chignik lakes might be enhanced if harvests of adult coho salmon were managed to limit the number of spawning coho salmon when run strength is strong. Presently, harvest management of coho salmon consists of 2–3-d fishery closures each week. This management scheme causes a relatively constant annual rate of exploitation and allows more coho salmon to spawn

during years of greater coho salmon run size. For example, the estimated average runs of coho salmon during 1973–1978 and 1979–1988 were 66,000 and 168,000, respectively, and the corresponding average escapements were 40,000 and 97,000 coho salmon (Ruggerone 1989a). A fixed spawning population of coho salmon would stabilize the coho salmon : sockeye salmon spawning ratio (sockeye salmon escapement is relatively fixed) and reduce potentially high predation rates during years of high coho salmon production. Additional research is needed to determine a spawning escapement range for coho salmon based on predation by coho salmon, density-dependent growth of juvenile sockeye salmon, and compensatory effects by other predators.

Consideration of predator–prey interactions may provide unique opportunities to enhance runs of salmon. Measures to control predation may include net-pens to enclose piscivores during periods of prey vulnerability (Meacham and Clark 1979); screens or synthetic lines below hydroelectric dams or hatcheries, where salmon smolts are vulnerable to avian predators (Ruggerone 1986); maintenance of sufficient salmon spawning escapements to swamp predators with fry or smolts (Peterman and Gatto 1978); and release of large numbers of hatchery fish either at night, when predators are less active, or before the aggregation of predators at prey bottlenecks (Ruggerone and Rogers 1984). Alternatively, piscivorous coho salmon or chinook salmon *O. tshawytscha* could be released from hatcheries after the fry of pink and chum salmon enter the ocean and grow to less vulnerable sizes (Jones et al. 1988). When both predator and prey are commercially valuable, as are coho and sockeye salmon at Chignik, managers may use harvests to reach an optimal balance between the spawning fishes and the projected abundance of progeny. Such controlled harvests may be applicable to many systems throughout Alaska, British Columbia, Washington, and Oregon where juvenile coho salmon prey on juveniles of other salmon.

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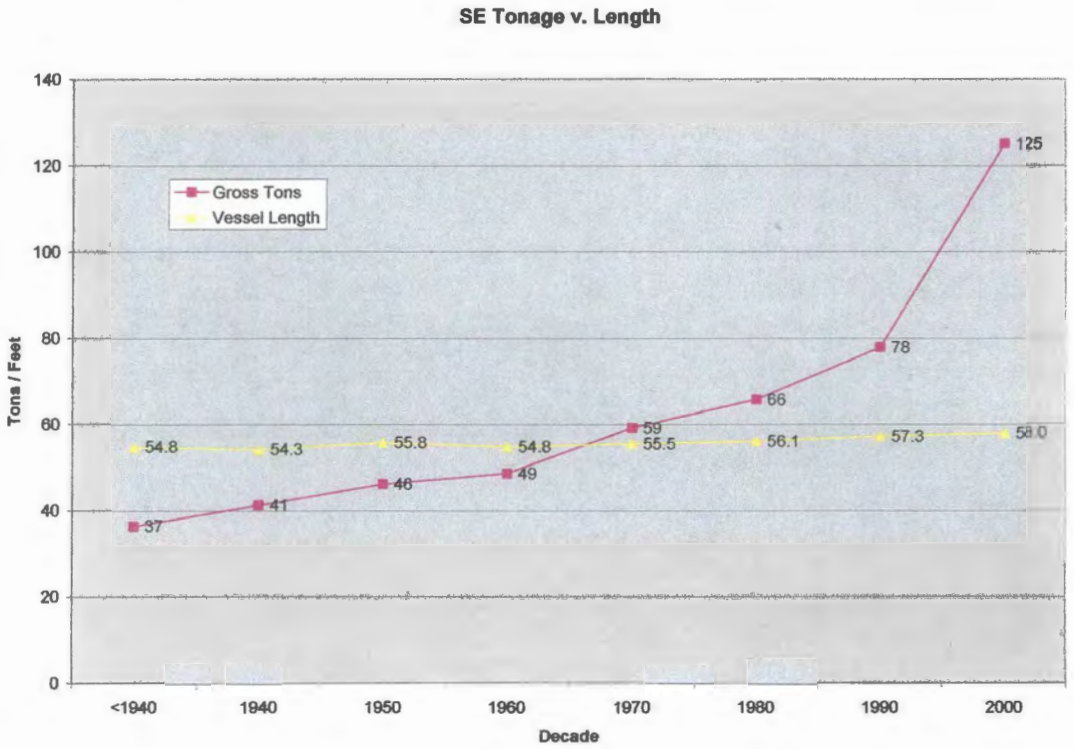
The 58 foot law did not limit fleet capacity.

The original intent of the 58 foot limit was to constrain the capacity of the seine fleet. Many years have passed and it can now be seen that limiting length alone did not ultimately constrict or limit fishery capacity. The salmon seine vessel has been held to 58 feet but the vessels have grown considerably in both width and depth. Today's vessels are being constructed with widths of 25-28ft and depths of 11-13ft. This is a far cry from the vessels of fifty years ago and it must have been unforeseen at the time. The chart below demonstrates the change in seine vessels over time:



The above chart shows average vessel tonnage and length in the decade that vessel was built in. The average tonnage of a vessel built before the 1960's was about 45 tons and the average tonnage of a vessel built in the last decade was 125 tons or approximately 3 times the tonnage of a boat built 50 or more years ago. The design of a 58 foot seine vessel has definitely changed over time because of the length limitation. If the limitation did not exist, or was removed after limited entry, it could be argued that today's salmon seiner would be longer instead of wider using more traditional length to width ratios. The following pages demonstrate the changes of 58 foot seine vessels and also include some vessels over 58 feet for comparison:

The following vessel comparisons are done using the simplified method for calculating capacity: Length x Width x Depth x .0067 = Vessel Tonnage.

Vessel built: Pre - 1940
58 x 14.5 x 6.4 = 5382
5382 x 0.0067 = 36

36 tons

Vessel Built 1966
58 x 17 x 7.5 = 7395
7395 x 0.0067 = 50

50 tons

Vessel Built 1979
58 x 19 x 9 = 9918
9918 x 0.0067 = 66

66 tons

Vessel Built 1981
58 x 22 x 10.5 = 13398
13398 x 0.0067 = 90

90 tons

Ryan Kapp RC 29

Vessel Built 2008
58 x 25 x 12.5 = 18125
18125 x 0.0067 = 121

121 tons

Vessel Built 1981
65 x 22 x 10.5 = 15015
15015 x 0.0067 = 101

101 tons

Vessel Built 1989
73 x 23 x 9.8 = 16454
16454 x 0.0067 = 110

110 tons

Vessel Built 1976 / 1989
65 x 21.5 x 8.9 = 12438
12438 x 0.0067 = 83

83 tons

Submitted by Jeffrey Moore

After looking at the previous examples it becomes apparent limiting length alone does not control fleet capacity. Below is a selection from a fishing publication article referring to a recently built 58 foot vessel:

..."We built her as big as we could. **We built an 85-footer that's only 58 feet long**," he says. Still, she's a small boat, and to help dampen the pitching and rolling motion, there's a bulbous bow and rolling chocks.
... It wasn't easy working up the lines for a boat that deep and wide without ending up with something that looks like a shoebox. ..."It was tricky getting a 26-foot beam into a boat and make it look like something."
Working within the constraints of a 58-foot overall length... "you end up standing the bow stem almost vertical," and it's hard to bring the stern in at all...
Not being able to lean the bow out to accommodate a goodly amount of flair or taper in the hull lines leading back to the transom means **you are not going to have as shapely a hull form as you would for a longer boat, a hull that would track much easier through the water. However... "That's the nature of a super wide boat."** (Vessel names and Sources of quotes have been removed. Bold type added for emphasis)

The few 58 foot vessels constructed today now have greater capacities than many vessels longer than 58 feet but are less efficient moving through the water. Is there still a need for a 58 foot limit on salmon seine vessels? Vessels have been allowed to get wider and deeper but not longer. Why? Hull efficiency is an important thing today because fuel prices are soaring and adding width, even with a bulbous bow, is not as efficient as adding length to a vessel. The following are facts of design from the Navy concerning hull efficiencies and length to width ratios:

2.1 Displacement Ships
2.1.1 Hydrostatic Displacement: Ships
2.1.1.1 Historical Origin

It is impossible and unnecessary to present here a history of the development of the displacement hull form. Let it suffice to point out that this hull concept dates to prehistoric times.

2.1.1.2 Dominant Physics

The lift/drag performance of displacement ships at high speeds is dominated by wave making drag. A displacement form moving through the water pushes the water aside as it moves. This disturbance of the water requires energy, specifically propulsive energy from the ship.
Two major parameters affect the wavemaking resistance of the ship: Speed and Slenderness. Ship wavemaking drag increases rapidly with increasing speed. It is not possible to state a specific law for this increase - a law that holds true for all ships - but it is common to refer to a cubic increase in drag with speed. Specifically, it is commonly understood that ship propulsive power will increase as the cube of ship speed. Thus a doubling of ship speed will require an octupling ($8=2_3$) of installed power.
1 Transport Factor is a measure of merit developed by Dr. Colen G. Kennell of the David Taylor Model basin. Dr. Kennell's paper "Design Trends in High Speed Transport" was distributed to workshop attendees. Transport Factor is defined as:
TF = 1.6878 / 550 * 2240 * (Full Load Displ. in Long Tons) * (Speed in knots) / (Total Installed SHP)
This cubic relationship is close to true for "normal" speeds. But at very high displacement speeds the curve becomes even more steep. It is common for naval architects to limit their investigation of displacement ships to a speed length ratio of about 1.30. (Speed length ratio is the ratio of ship speed in knots divided by the square root of the ship's length in feet. This is also known as the

Taylor quotient Tq, after ADM David W. Taylor.) Above a speed-length ratio of 1.3 the increase in drag with increasing speed becomes greater-than-cubic.
Speeds greater than 1.3 are present in some displacement hull designs. The dominant question is "how important is wavemaking?" for the particular design. If one can make the wavemaking problem of lesser importance overall, then one may more readily consider speeds higher than Tq=1.3. The tool (or "one tool") for this is ship slenderness. A slender ship disturbs the water less, and thus has less wavemaking drag. It also has more surface area and thus more frictional drag, but this does not suffer the same steep growth with speed as does the wavemaking drag. Slenderness is measured as the Length over Displacement ratio ($L/\nabla_{1/3}$).

Is the 58 foot limit still important in today's fishery? It forces boats to be modified or constructed in a way which makes them less efficient than allowing boats with more conventional length to width ratios. The inefficiencies of a wider hull design were recognized by the Board in allowing bulbous bows to extend beyond the 58 foot limit to try and gain efficiency. This was a good thing but, under that same premise, why not remove the limit entirely and open up even more options for fishermen to gain efficiencies in their business?

EVOLUTION OF SEINE VESSEL CONSTRUCTION AND DESIGN

Old Seiner Built 1914

In the early years most seiners were of wooden construction and built to a length of 58 feet because a rule put in place many years ago said they had to be. There were a few longer boats "grandfathered" in but not really that many. As time went on the boats changed.

Seiners built with a "traditional" house.

58 foot boats made of wood that were originally built to be 14 or 15 feet wide in time became 16 or 17 feet wide. Fiberglass and steel construction with widths of 19- 22 feet came next and most recently 24 to 26 feet. All the while there were lots of boats built less than the 58 foot limit.

Seiners smaller than 58 feet

Boat designers began to use a "raised fo'c'sle" design. This increased length to the deck space without sacrificing accommodation space. More recently, as an alternative to the large expense of new construction, vessels that were built at, for example, 18 feet of width are now being widened.

"Raised Fo'c'sle" seiners

Why, after all of this transition and change took place, is a limit on vessel length still necessary? Clearly the limit was never about vessel capacity because nothing kept boats from becoming wider and deeper. The limit on length should have been done away with long ago. When the law was first written did the authors realize what these vessels would morph into?

- The new wide designs are a more inefficient than longer boats which is why most add a bulbous bow. Why not build longer?
- If a "raised fo'c'sle" design was created due to a need for additional deck space. Why not build longer?
- Boats were allowed without limitation to be wider and deeper. Why not build longer?

Submitted by Jeffrey Moore

The 58' limit on salmon seiners related to length limits in other fisheries.

Many seiners in Southeast Alaska also participate in fisheries other than seining. As a matter of fact, according to CFEC data, around half of the SE seine fleet also participates in other fisheries during the year. The long legacy of the 58 foot limit for salmon seining has influenced regulation in these other fisheries. The state has incorporated 58 and 60 foot vessel length limits into fisheries all around the state such as:

- Sablefish in Prince William Sound
- Cod fisheries in Cook Inlet, Kodiak, Chignik, South Alaska Peninsula, Aleutian Islands, and Bering Sea.
- King and Tanner crab fisheries in the Aleutians, Chignik, and South Peninsula.

There are also 60 foot limits in these federally managed fisheries:

- BSAI Cod fisheries
- Aleutian Islands Pollock.
- C class IFQs
- Gulf of Alaska Pacific Cod fisheries

The fisheries for these species above are not seine fisheries. They are harvested by trawl, pot, jig, or long line. There are vast differences between these harvest methods and seining. These other harvest methods give some advantage to a larger vessel over a smaller one in the actual harvesting of fish.

- **Trawling** involves towing a net on cables directly behind the vessel. The fish are caught in the net when the vessel overtakes them. Larger boats have an advantage as they generally have more horsepower and better sea keeping ability so therefore they can keep fishing in conditions where it is no longer feasible for smaller, less horsepower, vessels to continue fishing because they lack the power to tow the net at the proper speed.
- **Pot** fishing is done by setting traps on the sea floor to catch the fish or shellfish. The fish is harvested by pulling the trap to the vessel and emptying it. Larger vessels have the ability to keep pulling their traps and harvesting in weather that may be too rough for smaller vessels to do the same.
- **Jig** fishing is done by positioning the vessel over fish and putting hooks down in the water to catch the fish. The larger vessel is able to maintain harvesting in worse weather compared to a smaller boat.
- **Long lining** involves setting a line with many baited hooks attached to it which catch the fish. The harvest occurs when the line with the hooks attached to it is drawn aboard the vessel. The large vessel has ability to keep harvesting in rougher weather than the smaller vessel due to better sea keeping ability.

In contrast, **seining** involves manipulating a net between the vessel and its skiff which holds the other end of the net in place. The net is then towed upon to hold its position to trap the fish that swim in between the vessel and skiff. The vessel and skiff then come together so the net encircles the fish, the net is brought in, and the bottom of the net is closed up to prevent the fish from escaping. The

harvest takes place when the fish in the bunt end of the net are brought aboard the vessel. In this method the harvesting of the fish more depends on the proper functioning of the net rather than the size of the vessel involved. For a seine to be fished effectively it requires more finesse than power. The net harvests the fish, not the boat. Larger boats may be safer in rough seas but they still have the same difficulties operating a seine when weather is not cooperative. Larger boats catch more wind and are harder for a skiff to assist when weather conditions worsen. The larger boat drifts faster which causes the purse line to "fly" greatly reducing the nets ability to catch fish. If anything a bigger boat is more likely to break things like purse lines and cork lines in these conditions than a smaller vessel.

The other difference between these fisheries is in the way they are managed. The salmon seine fishery is managed by forecasting returns based on parent year escapement and other variables. During the season the return is constantly evaluated and the season is opened and closed in various areas based on observed escapements. The fishermen all use the same gear in the same areas for the exact same amount of time. The other fisheries are managed by a quota based on biomass estimates completed for each particular fishery. The fishery is opened and is closed when the allowed quota has been reached for that season. Also, many of these other fisheries take place during times of the year when the weather conditions are not as good as they are during the summer salmon season. Some of these fisheries are on an IFQ system so the fisherman with quota shares can go fishing when it is appropriate to do so.

Because the harvest methods, management, and economies of the other fisheries are vastly different compared to salmon seining it is hard to tell exactly where they fit in as an argument for or against removing the 58 foot limit for seining in Southeast Alaska because whether or not the limit is removed for salmon seining the other fisheries will remain unchanged. Additionally, many of the fisheries mentioned above are not done by fishermen who seine in Southeast. The fisheries with the most participation by those who also seine in Southeast are long lining for halibut and sablefish.

Alaska's sablefish and halibut fisheries

An outgrowth of the 58 foot restriction is the federal 35, 60, and 125 foot categories which National Marine Fisheries Service used to determine when observers needed to be aboard vessels and to prevent a full scale reorganization of the fleet which might have resulted from rationalizing the sablefish and halibut fisheries. The 58 foot limit influenced this and thus a 60 and 125 foot limit was used for regulation of observer coverage. But observer coverage is changing to include vessels under 60 feet. Electronic observer coverage may come into play as well. Once observer coverage is expanded the 60ft regulation may no longer be necessary because every fisherman has personal quota so the size of the vessel the fisherman catches it on should not matter.

Super 8 Vessels for CFEC In-house Use

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Abstract

In recent popular commercial fishing periodicals, some newly built fishing vessels are referred to as '*Super 8s'*. This indicates the vessel is at or below 58 feet in length overall, and fits as an Alaska salmon limit seiner, but also has dimensions and attributes which are 'super-sized' relative to the length. The Alaska Commercial Fisheries Entry Commission (CFEC) needs to identify such vessels in order to better understand their use and their capabilities in Alaska. Linear discriminant function analysis was used to help make determinations of which commercial fishing vessels registered with CFEC are *Super 8s*.

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Super 8 Vessels for CFEC In-house Use

Introduction

In recent popular commercial fishing periodicals, some newly built vessels are referred to as '*Super 8s'*. This indicates the vessel is at or below 58 feet in length overall, and fits as a salmon limit seiner[1], but also has dimensions and attributes which are 'super-sized' relative to the length. The chief super-sized dimensions may be the beam, hull depth, and net and gross tonnages. Simply put, a *Super 8* appears enormous when compared side by side at the dock with a traditionally dimensioned salmon limit seiner.

The North Pacific Fisheries Management Council (NPFMC) has explored vessel capacity as a means to limit entry into certain Federally managed fisheries in the Gulf of Alaska. As part of that effort, the NPFMC looked at various alternatives, including using a length-to-width ratio of less than 3:1 as a determinant for high capacity vessels[2]. They were unable to come to any consensus on what is 'high capacity'[3]. The NPFMC has since backed away from the vessel capacity issue, and has no formal definition for *Super 8*.

For the State of Alaska's limitation program, CFEC has advocated that fishing capacity constraints should go hand in hand with limiting a fishery. The concern is that without capacity constraints in place to go along with limitation, subsequent improvements could still result in increases to catching power leading to problems down the road – the reemergence of the race for fish, overcapitalization, and need for conservation of the fishery resource. This is especially true of vessel size: a larger vessel is generally more effective and can catch more fish than a smaller vessel.

Vessel length has been constrained to the 58 foot limit by law for Alaskan salmon fisheries, and by regulation in many limited and non-limited fisheries - the Chignik Area Pacific cod pot and jig fisheries are examples[4]. However, many other vessel attributes are not constrained at all. In the *Super 8*s, the attributes typical to a 58 foot salmon limit seiner have seemingly been stretched to the maximum extent possible by marine architecture. The super-sized dimensions are cited above, but there are others as well – the expansive aft deck space found on a *Super 8* for example. Unfortunately, the size of the aft deck is not data collected by CFEC; neither are other provisional vessel attributes which tend to be bigger and better in a *Super 8*: the size of the wheel house, engine room size, galley size, and perhaps even the existence of an onboard laundry facility. Such bigger and better attributes likely benefit the fishing effectiveness of a *Super 8*: the expansive aft deck space can allow for storage of more fishing pots and other gear; a larger sized wheel house can accommodate more electronics for better navigation and telemetry for finding fish; a larger sized engine room can accommodate redundant propulsion systems and electricity generation systems for safety, and other sophisticated engineering such as centrifugal fuel filters which help keep the vessel longer on the fishing grounds; and, last but not least, greater amenities and creature comforts can help the crew be more responsive and effective during long fishing

[1] AS 16.05.835(a)
[2] Discussion paper 'Vessel Capacity Limits' from the NPFMC meeting in Anchorage, Alaska, June 3 – 9, 2009.
[3] Anecdotally, it was whether to include Delta Series-59, the so-called 'Fat-Boy Deltas'.
[4] 5 AAC 28.537(h)(D)

trips. Taken together, these super-size dimensions along with bigger and better attributes enhance the capability for a *Super 8* to go to sea farther, stay out longer, and catch, hold, and deliver more fish.

It behooves CFEC to better understand the use and capabilities of such vessels in Alaska. The first task for CFEC, the object of this paper, is just to identify *Super 8s*. It was apparently problematic for the NPFMC to define 'high capacity'. Rather than invent a definition for *Super 8* which could then be open to interpretation and argument, I instead started with the premise that there are already *Super 8s* recognized as such and not subject to interpretation. Fred Wahl Marine Construction, located in Reedsport, Oregon, is widely recognized for building *Super 8*s. The corollary premise is that there are modern salmon limit seiners which are not *Super 8s* but which are more traditionally dimensioned and with traditional attributes. Delta Marine Industries, located in Seattle, Washington, is widely recognized for producing a veritable standard among 58-foot salmon limit seiners – the Delta Series-58 (does *not* include Delta Series-59, the so-called 'Fat-Boy Deltas'). With these two known and distinct vessel groupings, I developed a linear discriminant function model for separating all CFEC registered commercial fishing boats into two classes – the vessels most similar to Wahl *Super 8s*, versus the vessels most similar to Delta Series -58. With the results from the model, I determined the full representation of *Super 8s* operating in Alaska waters.

Data

All commercial fishing vessels must be licensed annually with CFEC. The licensing procedure captures data on vessels and owners, including vessel attributes reported voluntarily by the owner, and is known as the CFEC Vessel File[5]. In the CFEC Vessel File, some data were missing or were out-of-range and not valid. Of the missing data, some could be filled in using other sources - the U.S. Coast Guard (USCG) vessel documentation website[6] or other websites[7] and various periodicals[8]. Out-of range vessel data were not used in the analyses. The CFEC Vessel File was also augmented with data for USCG registered hull depth of the vessel and USCG registered hull breadth.

Methods

Corrected and augmented data from the CFEC Vessel File were used to determine which vessels are *Super 8s*. The determination was a two-step process: linear discriminant function analysis, followed by a cutpoint analysis.

The linear discriminant function analysis was done with a SAS Institute Inc. (SAS) procedure - proc discrim - which builds a discriminant model that best predicts a categorical dependent variable. The dependent variable was 'super-ness', i.e., whether a vessel's attributes are sufficiently super-sized to be a potential *Super 8*. The independent variables for the model were from the following list of vessel

[5] CFEC Vessel Extract File includes the vessel name, ADFG number, USCG number, overall length, make, year built, net and gross tonnage, fuel tank(s) capacity, fish hold(s) capacity, engine type and horsepower, hull construction, hull ID, and vessel value, among the total of 119 variables.
[6] http://www.st.nmfs.noaa.gov/st1/CoastGuard/VesselByName.html
[7] As examples: http://www.fredwahlmarine.com and http://www.shipbuildinghistory.com
[8] For example: Pacific Fishing magazine October 2012.

attributes: gross tonnage, fish hold(s) capacity, year built, fuel tank(s) capacity, engine horsepower, USCG registered hull depth, and USCG registered hull breadth.

In order to make the discrimination, two sets of knowns were constructed. Fred Wahl Marine Construction, located in Reedsport, Oregon, is widely recognized for building *Super 8*s. Wahl design/build vessels beginning with F/V Arctic Fox[9] were used for a dataset of *Known Super 8s*. Delta Marine Industries, located in Seattle, Washington, is widely recognized for producing a modern 58-foot salmon limit seiner – the Delta Series-58 (does *not* include Delta Series-59, the so-called 'Fat-Boy Deltas'). Produced from the late 1970s to the late 1980s, Delta Series-58s were well suited for use in a wide variety of Alaskan fisheries, not just salmon, and became known as 'combination boats'. The Delta Series-58s were used for a dataset of the *Known Traditionals*.

The discrimination was performed on a third dataset, the *Unknowns*, consisting of all CFEC registered commercial fishing vessels from the years 2000 to 2014 (but with the two sets of knowns removed). Only vessels between 49 feet and 58 feet in overall length were included. Further restrictions also applied to the *Unknowns*: no vessels used exclusively as tenders or used exclusively as charter boats; only vessels with engine horsepower ranging between 100HP and 1000HP; only vessels with gross tonnages in excess of 7 (to avoid any confusion with USCG documentation requirements starting at 5 net tons); only vessels with fish hold(s) sized greater than 32 cubic feet (greater than the size of a fish tote); and vessels with fuel tank(s) less than 31,000 gal. (less than a Boeing 777-200 jet). The above restrictions yielded 958 unique vessels in the *Unknowns* to be classified by the discriminant function analysis.

I performed the discriminant function analysis using a stepwise procedure available in SAS proc discrim. Out of the seven vessel attributes cited above, SAS selected four as the independent variables for the discriminant model: USCG registered hull breadth, CFEC vessel fish hold(s) capacity, USCG registered hull depth, and CFEC gross tonnage. The primary predictor for 'super-ness' was USCG registered hull breadth with a partial r-squared value of 0.9879. The model was weighted to account for the difference in the group sizes of the knowns – *Known Super 8s* (n = 13) and *Known Traditionals* (n = 56). The classification matrix showed no classification errors. *Unknowns* with missing data for one or more of the independent variables were unable to be classified by the model, and out of 533 *Unknowns* having complete data, 38 were classified with 'super-ness' (Appendix A).

[9] Of Wahl design/build vessels: built in 2006, the F/V Arctic Fox is conceded as their first *Super 8* (dimensions of 58' length by 26' beam). Some Wahl design/build vessels have other dimensions similar to Delta Series-59 vessels, so are not included in the *Known Super 8s*, but instead are included in the pool of unknowns to be classified. F/V April Lane and F/V Loui M are two such examples.

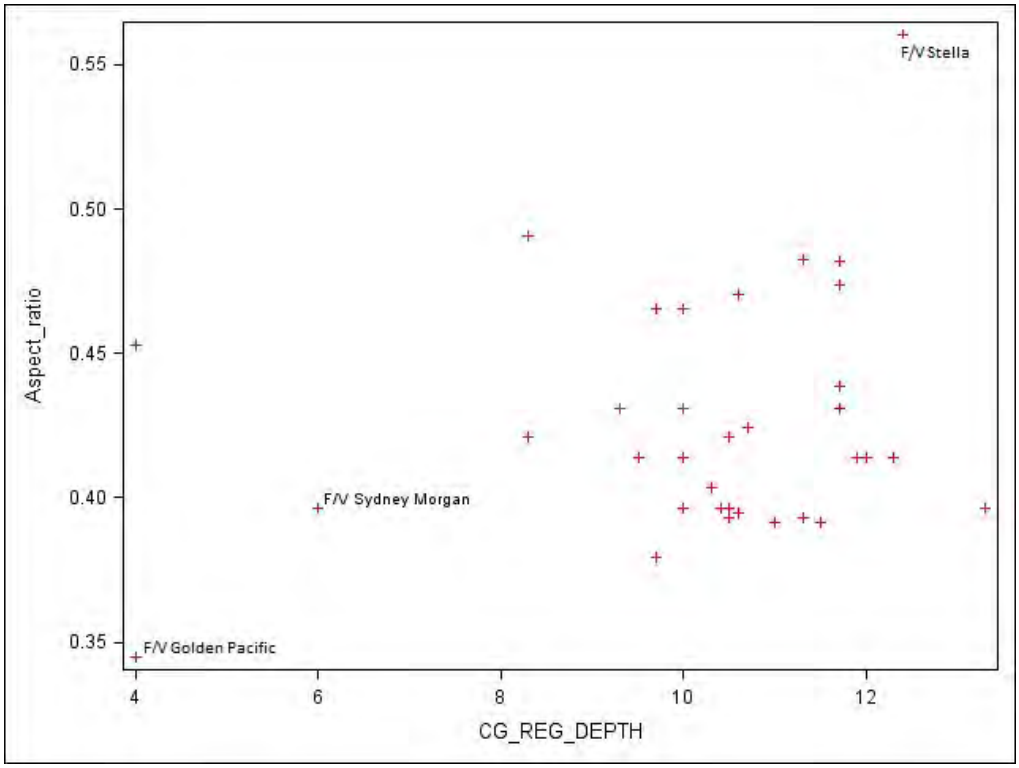

Figure 1. Unknowns classified with 'super-ness' by discriminant function analysis.

Figure 1 presents a scatterplot of the 38 vessels classified with 'super-ness' by the discriminant function analysis. The scatterplot shows the aspect ratio versus USCG registered hull depth for a vessel. The aspect ratio is a vessel's width-to-length ratio used in marine architecture (aside: it is a mathematical reciprocal of the length:width ratio used by the NPFMC to potentially determine 'high capacity'). When aspect ratio and USCG registered hull depth are taken together, it is a standard measurement of the volume of a vessel's hull, and a good proxy for the physical size of a vessel. Note the variability in size of the vessel in the scatterplot: from the smallest vessel (F/V Golden Pacific) in the lower left to the largest vessel (F/V Stella) in the upper right.

Some vessels in Figure 1 arguably should not be *Super 8s*. Take the F/V Sydney Morgan as an example: built in 2010 primarily as a salmon/herring vessel, it has a wide beam (23 feet) but a relatively shallow hull depth (6 feet), and would likely not perform well as a combination boat in open ocean conditions found in the Gulf of Alaska or the Bering Sea. Although somewhat intangible, this is a key trait for a *Super 8* – the capability to operate in all waters in any fishery in Alaska.

Further analysis was necessary on the 38 *Unknowns* classed with 'super-ness' to restrict them to the capability to operate in all waters in any fishery in Alaska. Figure 2 is a scatterplot for a pool of 51 vessels, the 13 *Known Super 8s* together with the 38 *Unknowns* classed with 'super-ness'. Density plots are also shown for the scatterplot's dependent and independent variables. The *Known Super 8s* have cookie cutter attributes and are tightly grouped in the scatterplot. The *Unknowns* classified with 'super-ness' are more widely dispersed. Vessels of greatest physical size would be in the upper right of the

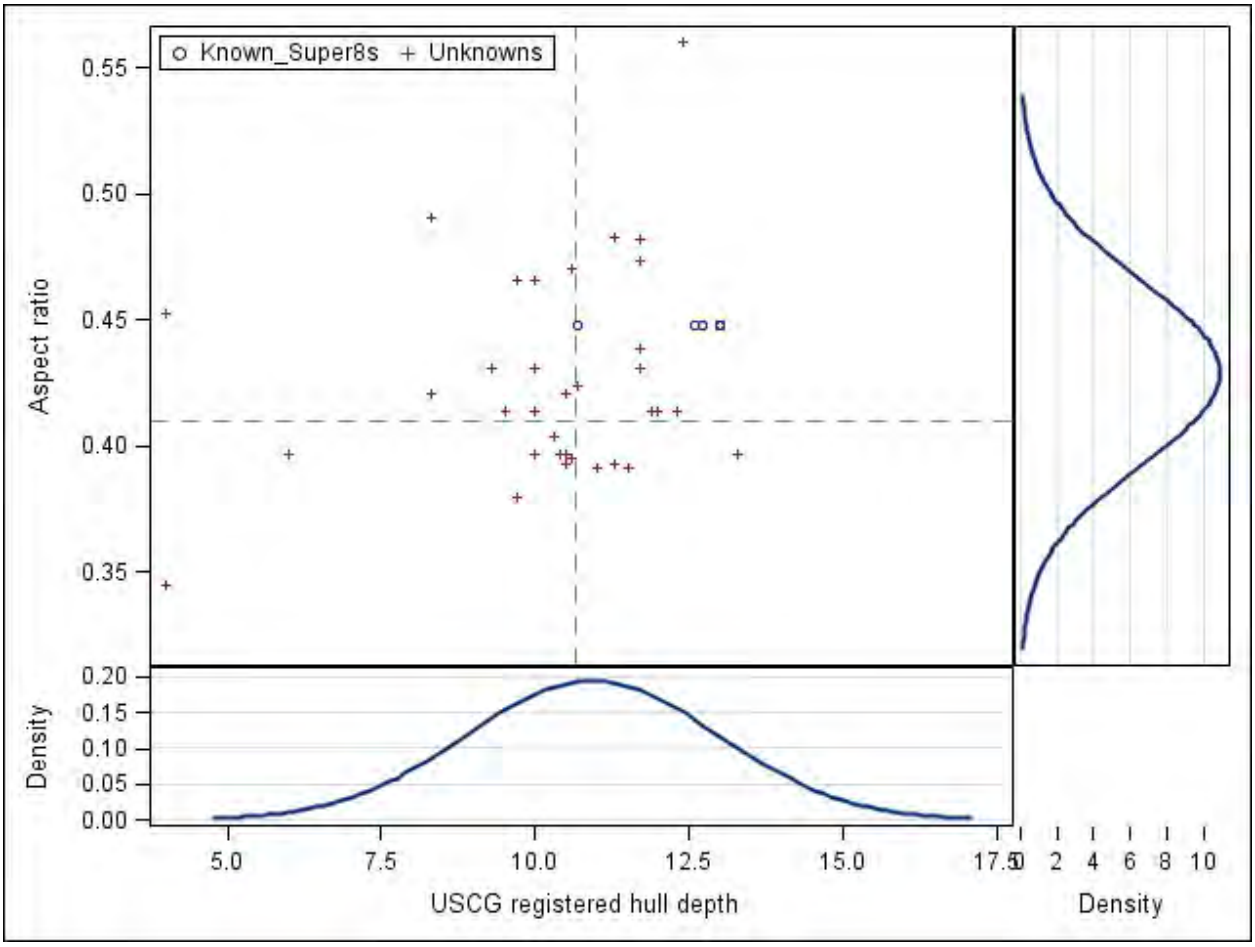

Figure 2. Density curves of scatterplot data on the pool of 51 vessels with 'super-ness'.

scatterplot. I established cutpoints (the dashed lines) near the highest densities – an aspect ratio of greater than 0.41 and a USCG registered hull depth of at least 10.7 feet. The cutpoints and dashed lines are liberal to the extent that they isolate an upper right domain of the scatterplot which is somewhat greater in size than a true quadrant. The upper right domain is the final determinant for *Super 8s*.

Results

Table 1 is a list of the 23 *Super 8s* determined from the above analyses. Thirteen are Wahl design/build vessels (the *Known Super 8s*). Of the remaining ten vessels, four are Jensen design, four are Hockema design, one is Northern Marine design/build, and one was built by the Hansen Boat Company in Marysville, WA, but the designer is unknown.

There is variability in attributes among the *Super 8s*. Most were built after 2006; however, the F/V Infinity was built in 1995, and the F/V Stella was built in 1998. The F/V Stella was later widened via a boatyard sponson, and is well known as the 'beamiest' of the *Super 8*s with a USCG registered hull breadth of 32.5 feet. The F/V Infinity and F/V Redemption both have beams of 24 feet, the smallest in

the group. USCG registered hull depths range from 10.7 feet (which is the cutpoint) to 13.0 feet. The F/V Optimus has the smallest gross tonnage (71), but this may be inaccurate as the USCG vessel documentation also records a net tonnage of only 17. To no surprise, the F/V Stella has the largest gross tonnage (156), and it has the largest fish hold capacity (5455 cubic feet[10]). The F/V Intrepid has the smallest fish hold capacity in the group at 3,000 cubic feet, which translates to 150,000 pounds of fish using a standard 50 pounds of fish per cubic foot.

Although Table 1 shows some *Super 8s* are home-ported outside of Alaska, all were active in Alaska fisheries in 2014 with the exception of the F/V Capt'n Andrew. F/V Capt'n Andrew went aground in 2011, but was salvaged and is awaiting major repairs yet to be done.

The *Super 8s* in Table 1 are from an exhaustive search of CFEC vessel data. It is a conservative rendering of *Super 8s* in Alaska in 2014 (using a cutpoint analysis over and above the linear discriminant function analysis). Likely, more *Super 8s* will yet be built and/or newly participate in fisheries in Alaska. CFEC Research will need to maintain and add to the list in Table 1 for any new vessels which meet the criteria established in this report. Other agencies or people may have different ideas on which vessels get labelled as *Super 8s*.

[10] No specific data was provided to CFEC; the estimation is derived from a delivery of over 300,000 pounds of fish at a conservative 55 pounds of fish per cubic foot.

Table 1. The Super 8s and selected vessel attributes.

			CFEC Vessel Data						USCG Vessel Data		
ADFG	Name	Design	Year built	Length	Gross tons	Hold (ft^3)	HP	Home port	ID	Hull Breadth	Hull Depth
67579	INFINITY	JENSEN	1995	58	111	3527[11]	515	ANACORTES, WA	1031059	24	12
71208	STELLA	JENSEN	1998	58	156[1]	5455[12]	700	KODIAK	1070580	32.5	12.4
74991	ARCTIC FOX	WAHL	2006	58	129	3100	700	PETERSBURG	1187928	26	12.6
75343	ALASKAN DREAM	WAHL	2007	58	128	3324	640[13]	KODIAK	1196955	26	13
75473	SAINT PAUL	WAHL	2008	58	128	3300	640	ST PAUL ISLAND	1211672	26	13
75676	CAPT'N ANDREW	WAHL	2008	58	128	3400[11]	640[14]	KING COVE	1215338	26	12.7
75701	INTREPID	WAHL	2009	58	108	3000	640[15]	HOMER	1216688	26	10.7
75998	ICY MIST	WAHL	2009	58	128	3300	650	KODIAK	1221114	26	12.7
76034	CYNOSURE	HOCKEMA	2009	58	122	3700	660	DUTCH HARBOR	1218080	27	11.7
76319	REDEMPTION	JENSEN	2009	58	114	3527	600	PETERSBURG	1220458	24	12.3
76355	ROBERT MAGNUS	WAHL	2011	58	129	3309	500	PETERSBURG	1230071	26	13
76584	ALASKAN STAR	WAHL	2011	58	131	4000	625	KODIAK	1230782	26	13
76769	SAINT PETER	WAHL	2011	58	131	3330	660	SAINT PAUL ISLAND	1235623	26	13
76787	KAIA	WAHL	2011	58	128	3330[16]	750	MOUNT VERNON, WA	1236357	26	13
76842	ANTHEM	HANSEN	2012	58	117	3400	750	KODIAK	1238032	28	11.3
76858	AFOGNAK STRAIT	WAHL	2012	58	131	3330	600	KODIAK	1236804	26	13
77144	MAGNUS MARTENS	WAHL	2013	58	131[17]	3330[16]	660	JUNEAU	1245684	26	13
77211	CERULEAN	HOCKEMA	2013	56	119	3600	660	DUTCH HARBOR	1249334	27	11.7
77327	ISLE DOMINATOR	WAHL	2013	58	131	3330	500	KODIAK	1246391	26	13
77403	BROOKE MICHELLE	JENSEN	2011	58	109	3242	750[18]	BELLINGHAM, WA	1233421	24.6	10.7
77559	OPTIMUS	NORTHERN MARINE	2013	58	71	3800	750	SITKA	1244552	24.3[19]	12.0[19]
89173	INTANGIBLE	HOCKEMA	2009	58	113	3200	600	PETERSBURG	1219625	25	11.7
89178	ADAMANT	HOCKEMA	2013	58	113	3600	750	PETERSBURG	1245437	25	11.7

[11] CFEC data from other than 2014
[12] Estimated from 300,000 pounds of fish
[13] Estimated from report on Cummins K19
[14] Proxy F/V Saint Paul
[15] Estimated from report on Cummins QSK19
[16] From www.FredWahlMarine.com accessed 2/13/2015
[17] USCG vessel documentation
[18] From Facebook mendicinosportsplus accessed 2/13/2015
[19] From www.NorthernMarine.com accessed 2/13/2015

APPENDIX

Discriminant function analysis results: 38 vessels classified with 'super-ness'.

Table A1. Discriminant function analysis results: 38 vessels classified with 'super-ness'.

		CFEC Vessel Data							USCG Vess		
ADFG	Name	Make	Year built	Length	Gross tons	Hold (ft^3)	HP	Home port	ID	Hull Breadth	Hull Depth
17076	TERN		1966	51	70	1735	340	SAND POINT	504131	24	10.6
20970	STARLIGHT	RAFFAEL	1986	58	88	1800	401	BLAINE	900453	24	9.5
21040	SPECTRE	JENSEN	1996	58	96	1700	500	SEWARD	1048304	23	10.5
25171	NICHOLAS MICHAEL		1974	58	89	2700	365	JUNEAU	558684	25	10
31083	OLIVIA M	CUSTOM	1980	53	36	1200	375	SITKA	617673	24	4
37508	HEIDI SUE		1974	53	63	1800	325	COOS BAY	545998	26	8.3
38727	ARCTIC ICE	UNION BAY	1979	58	63	1400	400	KODIAK	608177	27	10
41056	JOHNNY A	CUSTOM	1980	58	105	2000	500	HOONAH	625595	22	9.7
46701	KAREN EVICH		1983	58	81	2400	750	BELLINGHAM	656716	25	9.3
47952	EXCELLER		1983	58	92	2396	640	KODIAK	659770	24	10
53403	PACIFIC NOMAD		1979	57	77	1500	325	SEATTLE	614803	24	8.3
61324	ALASKAN FRONTIER		1991	58	93	2400	465	CHIGNIK LAGOON	971241	23	10
61395	TEMPTATION	DELTA	1990	58	99	2300	520	SAND POINT	971543	22.8	11.3
61660	PACIFIC RAIDER	DELTA	1991	58	96	2500	540	VENTURA	972638	22.7	11
62288	MARAUDER		1991	58	93	2676	540	SEATTLE	975597	22.8	10.5
62844	DECISION	DELTA	1991	58	99	2700	540	SAND POINT	980422	22.8	11.3
62922	LADY JOANNE		1991	58	94	2600	504	JUNEAU	979063	22.9	10.6
65119	CAPE RELIANT	SEINER	1994	58	118	2400	630	PETERSBURG	1000086	23	13.3
67579	INFINITY	VAN PEER	1995	58	111	2500	515	ANACORTES	1031059	24	12
69625	KONRAD I	MIDCOAST	1994	58	101	2500	600	JUNEAU	1000203	27	9.7
70135	SHUYAK	FRED WAHL	1997	58	92	2400	450	KODIAK	1055256	23	10.4
71208	STELLA	JENSEN	1998	58	156	5993	700	KODIAK	1070580	32.5	12.4
73568	KODIAK ISLE	FREDWAHL	2003	58	93	2620	500	KODIAK	1143510	23	10.5
76034	CYNOSURE	SEINER	2009	57	122	3700	660	DUTCH HARBOR	1218080	27	11.7
76319	REDEMPTION	SEINER	2009	58	114	3527	600	PETERSBURG	1220458	24	12.3
76436	SYDNEY MORGAN	HOWARD MOE	2010	58	50	2500	1000	KODIAK	1225596	23	6
76477	CLAIRE OCEANA	LIMITSEINE	2011	58	93	2600	500	SEWARD	1231859	23.4	10.3
76673	GOLDEN PACIFIC	MODUTECH	2011	58	90	2600	660	LATOOCHE	1233049	20	4
76842	ANTHEM	HANSEN	2012	58	117	3400	750	KODIAK	1238032	28	11.3
76992	SEQUEL		2012	58	101	2700	500	VALDEZ	1240846	22.7	11.5
77211	CERULEAN	LONGLINER	2013	56	119	3600	660	DUTCH HARBOR	1249334	27	11.7
77227	INVINCIBLE	DELTAMARIN	2013	58	101	2700	500	KODIAK	1244073	22.7	11.5
77241	ARIANNA SAGE	HOQUIAM	2013	57	96	2200		CHIGNIK LAGOON	1244398	24	10.5
77246	RISING SUN	DELTA	2013	58	102	3200	600	WESTPORT	1244677	22.7	11.5
77403	BROOKE MICHELLE	VANPEER	2011	58	109	3242		BELLINGHAM	1233421	24.6	10.7
77559	OPTIMUS	NORTHERN M	2013	58	71	3800	750	SITKA	1244552	24	11.9
89173	INTANGIBLE	WESTMAN	2009	58	113	3200	600	PETERSBURG	1219625	25	11.7
89178	ADAMANT	PLATYPUS	2013	57	113	3600	750	PETERSBURG	1245437	25	11.7

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Constrained by markets: processing costs limit potential for managing predator–prey interactions in a commercial fishery

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Summary

1. Selective fisheries may impact non-target species as well as limit the productivity of target species if their predators are not harvested. The outcomes of multi-species harvest strategies that include targeting predators depend on ecological and economic constraints, although the development of ecosystem-based management plans has typically focused on ecological constraints.

2. In Chignik, Alaska, sockeye salmon support a valuable commercial fishery and, as juveniles, are preyed upon by coho salmon, a species not subject to a targeted harvest. Whether exploitation of coho salmon would enhance overall fishery value by releasing sockeye salmon from predation constraints is not understood. We employ simulation models to examine the ecological and economic conditions necessary for directly targeting coho salmon to benefit fishers and seafood processors, two distinct but inter-dependent stakeholders in this ecosystem.

3. Model results indicate fishers are likely to experience increased value regardless of economic constraints, as long as coho salmon predation negatively affects sockeye salmon productivity. However, seafood processors are much more limited in the conditions which produce increased economic value, constrained by greater operation costs required to process harvested coho salmon.

4. *Synthesis and applications*. The unique economic constraints and opportunities of different stakeholders can present contrasting outlooks on the potential benefits of alternative harvest strategies, even if the alternative strategies are predicted to increase yield. The findings herein demonstrate the importance of considering multiple stakeholders when considering alternative management strategies. Depending on the level of risk stakeholders are willing to accept, an active adaptive management strategy reducing coho salmon escapement to low levels could provide valuable information about ecosystem structure as well as potentially providing the greatest economic benefit to the fishery.

Key-words: adaptive management, bioeconomics, ecosystem-based management, lagged effects, multiple stakeholders, *Oncorhynchus kisutch*, *Oncorhynchus nerka*, predator–prey fishery, salmon

Introduction

Resource management agencies are increasingly called upon to shift towards more ecosystem-based approaches to managing renewable resources (Pikitch *et al.* 2004; Patrick & Link 2015). Ecosystem-based approaches explicitly consider the trade-offs among different ecosystem components and stakeholders (Link 2010). Ecosystem-based approaches therefore are concerned with linkages among biological components, such as among species or between habitats and populations. In addition to 'natural' components, ecosystem-based approaches explicitly consider human systems and the distinct values and objectives of different stakeholders in social-ecological systems. Integrating multiple economic and ecological components into models used for management planning allows for assessments of holistic management of ecosystems.

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Ecological and economic constraints can drive a fishery to exert asymmetric pressure on ecosystem components through selective removal of target species. Selective harvest strategies may indirectly limit the overall productivity of the aggregate fishery, as species interactions can limit the productivity and abundance of other valuable species (e.g. Carpenter, Kitchell & Hodgson 1985; Link 2002). For example, harvesting predators or competitors of target species may result in increased fishery productivity (Larkin 1963; May *et al*. 1979). Multi-species harvest strategies may reveal novel approaches to achieving maximum economic and social benefits that would not be found in single-species strategies. However, whether such a multi-species harvest approach makes sense in a given fishery depends on many ecological and economic constraints (e.g. the ability to influence predation effect through adult predator harvest; Rieman & Beamesderfer 1990; Beamesderfer 2000; Yodzis 2001), the economic structure of the fishery (Clark 2010) or time delays in population response to change in harvest strategy (Frank *et al*. 2011; Walsworth & Schindler 2016).

Fisheries are integrated social-ecological systems in which managers attempt to indirectly manage target stocks by managing human behaviours for desired social outcomes (e.g. maximum sustained harvest, profit or employment; Gordon 1954; Rosenberg 2003; Hilborn & Walters 1992). Achieving new management goals can be difficult without consideration for the economic effects of management across a range of stakeholders. Rational economic behaviour may produce unanticipated dynamics in the social-ecological ecosystem (Gordon 1954), and political resistance to proposed changes may inhibit their implementation (Matulich, Mittelhammer & Reberte 1996; Rosenberg 2003). Many ecosystem-based management models incorporate bioeconomic components to assess alternative management strategies for both conservation of biodiversity and generation of economic and social benefits from harvest. The bioeconomic analyses typically incorporated into fisheries management focus narrowly on the economic effects of management on the harvesters in the fishery (e.g. Sanchirico & Wilen 2001; Clark 2010). However, in many fisheries the fish processing sector is distinct from the harvesting sector (Matulich, Mittelhammer & Reberte 1996; Weninger 1999), having different constraints on their operations (e.g. number of employees, vessel size, alternative revenue sources) and, therefore, cost and revenue structures. Thus, management changes will likely affect processing sectors differently than harvesting sectors. Consideration of multiple sectors within the broader commercial fishery is likely critical for assessing the economic and ecological effects of alternative management strategies but it is rarely done (but see Matulich, Mittelhammer & Reberte 1996).

Alaska's Pacific salmon (*Oncorhyncus* spp.) fisheries are widely considered among the best managed fisheries in the world from a biological perspective, as large commercial harvests have been sustained for over a century from many rivers. While these fisheries are biologically sustainable and productive, economic issues continue to plague them (Hilborn 2006; Eagle, Naylor & Smith 2004). Substantial declines in salmon prices in recent decades, driven by increased production of farmed salmon world-wide, is one of the primary economic challenges to Alaska's salmon fisheries (Eagle, Naylor & Smith 2004; Asche *et al*. 2005; Knapp, Roheim & Anderson 2007). Thus, even with recent large harvests, fishers in Alaska have struggled economically due to low prices.

The Chignik Lakes watershed, on the Alaska Peninsula, supports productive runs of sockeye salmon (*Oncorhynchus nerka*, hereafter 'sockeye') that support commercial and subsistence fisheries (Clark *et al*. 2006). While harvest and management efforts in Chignik focus on sockeye, five species of Pacific salmon are present in the system, including coho salmon (*Oncorhynchus kisutch*, hereafter 'coho') that use the same freshwater habitats as the sockeye for juvenile rearing. Coho are not currently targeted for commercial harvest for economic and logistical reasons. Coho do not demand as high of a price from consumers, so processors pay fishers lower ex-vessel prices for this species. The low market value of coho in the Chignik fishery is partly due to a lack of access to markets for fresh fish from the remote region, as there are no airport runways capable of landing jets large enough for transporting fresh seafood products to markets. Additionally, the smaller run size of coho limits the potential overall benefit from harvesting coho, when considered in a single-species context.

In the Chignik system, coho spend from 0 to 3 years (typically 2 years) in freshwater before migrating to the ocean to mature, and are capable of consuming sockeye fry after their first winter in freshwater. While juvenile coho are traditionally considered to reside primarily in streams (Sandercock 1991), they are primarily found in lake habitats preferred by sockeye in the Chignik system. Previous research in the watershed showed that juvenile coho prey heavily on sockeye juveniles (Roos 1960), consuming over half of the emerging fry annually (Ruggerone & Rogers 1992). Thus, predation by coho may limit the productivity of sockeye populations, thereby limiting the profitability of the aggregate commercial fishery (Ruggerone & Rogers 1992). While diet and bioenergetics data demonstrate strong predation pressure (Ruggerone & Rogers 1992), coho escapement to the watershed (as an index of subsequent juvenile abundance) does not have an unambiguous negative association with sockeye recruitment (Walsworth & Schindler 2016). However, estimated predation impacts are hindered by substantial recruitment stochasticity in sockeye and observation error in coho abundance estimates, making it difficult to detect even strong predation effects in the system (Oken & Essington 2015; Walsworth & Schindler 2016).

With limited ability to detect the effect of predation on fishery productivity in available data, managers may

adopt an active adaptive management strategy to explore how the system responds to increased coho harvest (Walters 1986, 1997). Simulations of active adaptive management strategies to detect increased productivity of sockeye resulting from increased harvest of coho suggest that long time frames (a decade or longer, depending on harvest strategy and predation strength) would be needed to detect the effects of coho predation (Walsworth & Schindler 2016). The ecological and economic performance of the fishery during the extended transition period thus becomes a critical consideration for determining the potential viability of alternative harvest strategies.

Here, we examine ecological and economic conditions under which active adaptive management directly targeting coho for harvest could be beneficial to stakeholders in the Chignik salmon fishery. We extend a previous model of the ecological and fishery harvest components of the Chignik system (Walsworth & Schindler 2016) with a model incorporating costs and revenues for both fishers and the processor in a combined bioeconomic model of the Chignik fishery. We use this model to examine the long-term value, to seafood processors and to harvesters, of alternative harvesting strategies incorporating directed coho harvest, across the range of uncertainty in ecological and economic conditions. The results of these analyses provide stakeholders with information regarding trade-offs among alternative harvest strategies in the long term under different assumptions about ecosystem and fishery structure.

Materials and methods

STUDY SITE

The Chignik River salmon fishery is located on the south side of the Alaska Peninsula, approximately 400 km SW of Kodiak, AK (Fig. 1). While the fishing district is further divided into five subdistricts, the majority of sockeye harvests occur in the Bay and Central districts. Many coho harvested outside of the Bay district are of unknown origin (i.e. it is not known whether they are from a population which spawns in the Chignik River) and are potentially migrating along the coast. Thus, we have limited our consideration of historical coho harvest to those in the Bay district.

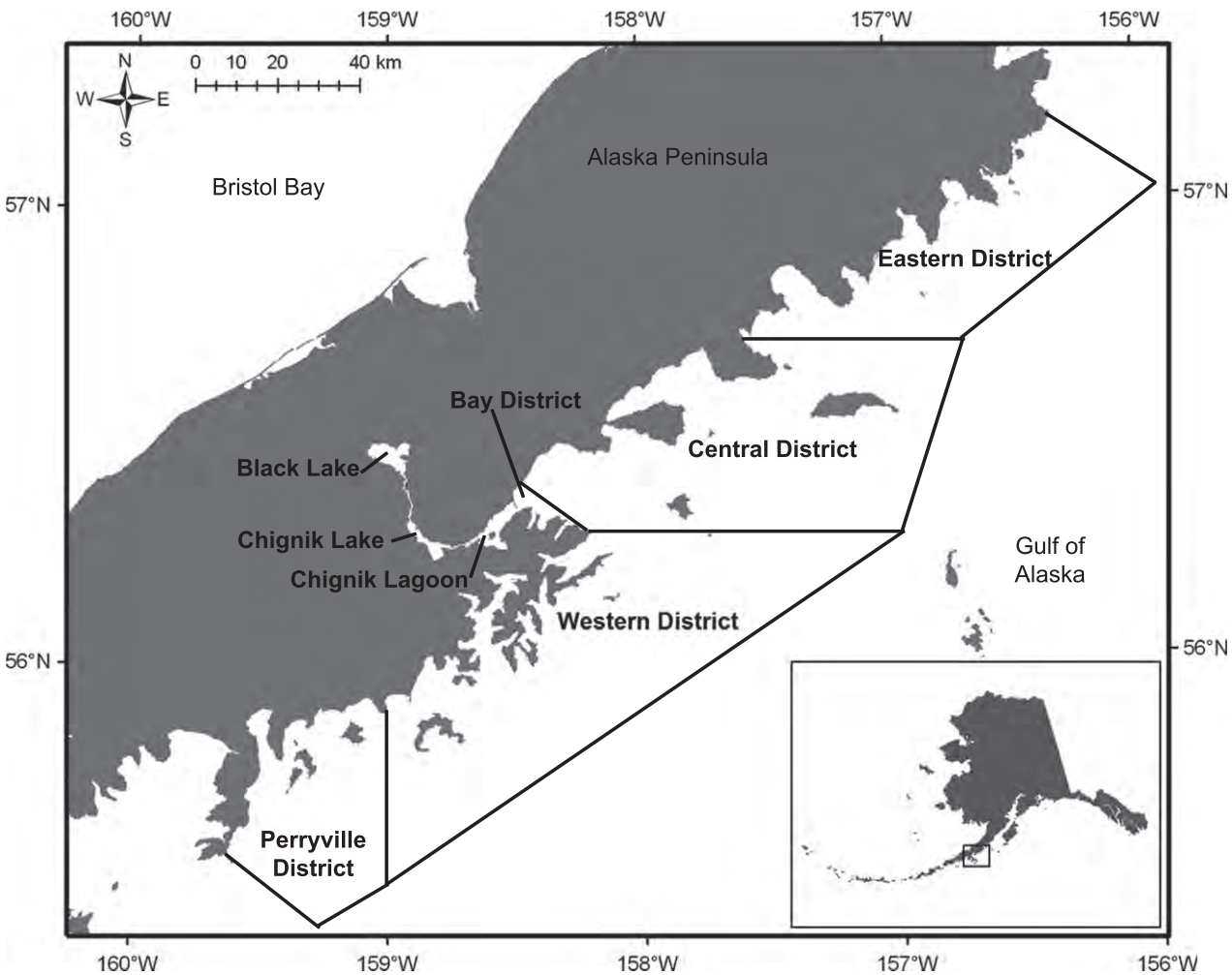

Fig. 1. Map of the Chignik Management Area on the Alaska Peninsula. The Chignik River and the two sockeye salmon rearing lakes (Black and Chignik Lakes) are labelled.

The Alaska Department of Fish and Game (ADFG) manages the fishery for escapement to produce sustainable yields from each of the two sockeye stocks that spawn in the Chignik watershed. The sockeye fishery typically opens in early June and continues through the end of August. Coho are not directly targeted in the fishery and, therefore, are not managed (i.e. no escapement goals are present for Chignik coho). Because coho typically migrate into the Chignik River after the sockeye migration is largely over, current exploitation rates on coho are low [mean (SD) harvest rate for 1999–2011 = 16% (11%) – estimated from ADFG harvest data and coho escapement estimates; Walsworth & Schindler 2015).

Approximately 100 limited entry permits are present in the commercial fishery, and most permits participate every season. Historically, multiple processing companies operated in Chignik, although the majority of salmon are currently processed by a single company operating a floating processor ship brought to the region each year during the salmon fishery.

DATA

Sockeye spawner abundance, recruitment and harvest data are available from weir counts on the Chignik River from 1922 to present. Coho spawner abundance and recruitment data are taken from a prior analysis (Walsworth & Schindler 2015). From these data, stock-specific Ricker production functions were developed to relate the number of returning fish to the number of spawners that produced those individuals (Walsworth & Schindler 2016). Ex-vessel prices for sockeye and coho were obtained from annual reports distributed by ADFG. Due to the confidential nature of economic data in commercial fisheries, all operating costs were simulated across a range spanning potential values. Informal discussions with fishers provided some confirmation that the true values were captured by the ranges considered here.

SIMULATION MODEL – PRODUCTION AND HARVEST

Salmon population dynamics, as well as fishery harvest and escapement, were simulated using the model from Walsworth & Schindler (2016). Population dynamics were simulated from Ricker production functions fit to stock-specific empirical data from Chignik. Escapement was calculated as the escapement goal multiplied by log-normal implementation error. For coho simulations without an escapement goal, harvest values were drawn from a beta distribution fit to historical data. Model details are provided in Appendix S1 and Fig. S1, Supporting Information. Because there is uncertainty in the predation effect, we conducted a sensitivity analysis across a range of predation intensities (Walsworth & Schindler 2016).

SIMULATION MODEL – ECONOMICS

Fishing effort (boat days) was calculated using point estimates from a regression between harvest rate and the number of active permits fit to empirical data from the Chignik fishery. Fishing costs were calculated as:

$$C_{ft} = v_f B_t d_t + F_{sf} B_t, \qquad \text{eqn 1}$$

where C_{ft} is the daily fishing cost (subscript f denotes parameters relating to fishers), v_f is the variable cost to fishers (i.e. daily operating costs), B_t is the average number of boats fishing per day, d_t is the total number of days fished in year t and F_f is the fixed cost to fishers. Variable costs for fishers are comprised primarily of fuel and grocery prices, while fixed costs include permit costs, off-season vessel maintenance and insurance. Costs to fishers were estimated from interviews with Chignik salmon fishers (McDowell Group, *in* Knapp 2007).

Fishers receive a substantially lower ex-vessel value for coho than for sockeye in the Chignik fishery. We used a range of ex-vessel prices for sockeye and coho encompassing recent observed prices in the Chignik fishery. While salmon prices are variable among years (e.g. Hilborn 2006), we assumed that future salmon prices were constant in each scenario. The patterns resulting from our analyses across a range of ex-vessel prices can provide information about the effects of changing salmon prices in the future. We assumed a constant weight per individual of each species throughout all simulations (3 2 kg for sockeye and 4 1 kg for coho). Fishers' annual profit was calculated as:

$$\pi_{pt} = \sum_i p_{fi} H_{it} w_i \quad C_{ft}, \qquad \text{eqn 2}$$

where π_{pt} is the profit to the fishing fleet in year t, p_{fi} is the ex-vessel price (\$ per kg) paid by processors for species i, H_{it} is the numerical harvest of species i in year t, w_i is the round weight for species i and C_{ft} is the cost of fishing in year t.

Processor effort was defined as the number of days from when the floating processor arrived in the region until it stopped purchasing fish. As coho migrate after sockeye, we assumed that the processors operated from 4 June to 27 August when no directed coho fishery was present and from 4 June to 30 September when a directed coho fishery was present. Variable costs to the processor involved a base rate (e.g. food and housing for employees, electricity, maintenance and management and administration costs) as well as a cost of processing fish which scaled linearly with mass processed per day. Revenue was considered as the first wholesale value minus the ex-vessel value paid to fishermen. We assumed that processors made a constant profit-per-kg of salmon processed. The processing model was defined as:

$$\begin{aligned} v_{pti} &= b_p + c_p \frac{H_{it} w_i}{d_{ti}}, \\ c_p &= r_{sp} \quad p_{sp}, \\ C_{pt} &= F_p + \sum_i v_{pti} d_{ti}. \end{aligned} \qquad \text{eqn 3}$$

where v_{pti} is the average daily cost of operating for the processor in year t during the harvest of species i (subscript p denotes parameters related to the processor), b_p is the base daily operating cost, c_p is the cost of processing each kg of salmon, r_{sp} is the revenue-per-kg of sockeye processed (minus ex-vessel value paid to fishers), p_{sp} is the profit-per-kg of sockeye processed and F_p is the annual fixed cost of operating for the processor. We assumed that variable and fixed costs did not change for both processors and fishers throughout the duration of each simulation, and we assumed no opportunity costs to either stakeholder group for continuing to fish for coho.

Fish mass is lost during processing, as heads, guts, etc. are discarded. We assumed a constant per cent retention of mass for each species (74% for sockeye, 75% for coho; Knapp, Roheim & Anderson 2007). The annual profit to the processing firm was calculated as:

$$r_{pc} = r_{ps} \quad 2\ 2,$$
$$\pi_{pt} = \sum_i r_{pi} H_{it} w_i \rho_i \quad C_{pt}, \qquad \text{eqn 4}$$

where r_{pc} is the processor revenue-per-kg of coho sold, π_{pt} is the profit to processors in year t, r_{pi} is the revenue-per-kg sold by processors for species i, ρ_i is the percentage of round weight for species i that is retained after processing, C_{pt} is the cost of processing in year t, and all other parameters are as described previously. We assume that processors can sell coho for \$2 20 less per kg (\$1 00 less per lb) than sockeye at wholesale.

Net present value (NPV) is an estimate of the long-term value of an asset, accounting for the discounted rate of future value (i.e. people value an asset more highly now than an asset of the same nominal value obtained in the future). We calculated the NPV of the fishery for each stakeholder in each simulation:

$$\mathrm{NPV}_u = \sum_t^Y \frac{\pi_{ut}}{(1+\delta)^t}, \qquad \text{eqn 5}$$

where NPV_u is the net present value of the fishery for stakeholder u, π_{ut} is the annual profit to stakeholder u in year t, δ is the discount rate, and Y is the final year of the simulation. We assumed an annual discount rate of 0 05.

SCENARIOS AND SENSITIVITY ANALYSIS

A status quo scenario assumed that coho were harvested incidentally and lightly during directed sockeye fishing. Alternative scenarios assumed that stakeholders extended their operating seasons and harvested (or processed) coho returning in excess of the escapement goal. We examined directed harvest scenarios with coho escapement goals ranging from 5000 (correlates with equilibrium harvest rate of 0 73) to 25 000 (correlates with equilibrium harvest rate of 0 62). Previous simulation analyses (Walsworth & Schindler 2016) indicate that sockeye harvest increases only when coho are harvested to levels below their MSY escapement goal (~34 000 salmon). Therefore, we do not include a strategy managing coho for single-species MSY in this analysis.

To address uncertainty, we simulated the fishery across different values of six parameters for each management scenario: strength of the coho predation effect β_c, variable cost to fishers v_f, base daily operating cost to processors b_p, processor profit-per-kg of sockeye p_{sp}, sockeye ex-vessel value p_{sf} and coho escapement goal G_c (Table 1). Every possible combination of these parameter values was examined across 100 simulations spanning 50 years after the onset of alternative harvest strategies with stochastic recruitment. The predation effect strengths are within the range of probable estimates for Chignik (Walsworth & Schindler 2016). Directed coho harvest strategies were considered economically advantageous when the NPV of the directed coho harvest strategy was greater than the NPV of the status quo harvest strategy.

To demonstrate the potential of decision analysis to guide stakeholder actions, we generated a decision table (Hilborn & Walters 1992) using the mean (across all price and cost scenarios) simulated NPV for each predation strength-by-coho escapement goal combination. The across-model average values were calculated using the probabilities of different predation strength values estimated by Walsworth & Schindler (2016). We assigned the probability of all predation strength estimates beyond the range examined in this study to either the strongest (β_c = 0 2) or weakest (β_c = 0) predation strength values. The harvest strategy with the greatest expected NPV across models is interpreted as the most valuable strategy for each stakeholder.

Table 1. Parameter values used in different simulation scenarios; coho salmon predation effect strength (β_c, units = $\ln(R_s/S_s)/C_z$), wholesale profit-per-kg of sockeye salmon (p_{sp}, US\$ per kg), sockeye salmon ex-vessel value (p_{sf}, US\$ per kg), processor base daily operation cost (b_p, US\$ per day), fishers' daily operation cost (v_f, US\$ per day) and coho salmon escapement goal (G_c, salmon). All combinations of parameters were simulated, resulting in 3125 unique scenarios

Parameter	Value
β_c	0 2, 0 15, 0 1, 0 05, 0
p_{sp}	0 44, 0 88, 1 32, 1 76, 2 20
p_{sf}	1 76, 2 31, 2 87, 3 42, 3 97
b_p	5000, 15 000, 25 000, 35 000, 45 000
v_f	200, 400, 600, 800, 1000
G_c	5000, 10 000, 15 000, 20 000, 25 000

We use the term 'risk' to describe the per cent of simulations of a given scenario in which stakeholders achieve a reduced NPV under a directed coho harvest than under the current strategy. All simulations and analyses were conducted in the R Statistical Programming Environment (R Core Development Team 2015).

Results

SIMULATION EXAMPLES

Simulations of status quo harvesting conditions produced salmon abundance and harvest trajectories representative of the range of sockeye population dynamics observed historically. Here, we describe the results from one iteration of the simulation model under each of six different harvest and predation conditions (Fig. 2). Black Lake sockeye returns and harvest were more variable than those of Chignik Lake sockeye, driven by higher recruitment stochasticity in the Black Lake stock (Fig. 2a,b). Sockeye harvests and profits were higher in a given year under directed coho harvest strategies (example shown has G_c = 5000 coho) than under the current harvest strategy, but only after a delay of about 10 years (Fig. 2d,e,g). Coho dynamics are difficult to compare to historical data, as little historical data have been collected at the necessary scale (e.g. combined harvest data for transient coho and those making spawning migrations, limited escapement counts). However, simulated coho returns under status quo harvest conditions reflect values consistent with the escapement estimates of Walsworth & Schindler (2015). Coho returns ranged between approximately $2\,0 \times 10^4$ and $2\,2 \times 10^5$ salmon under status quo harvest (Fig. 2c), and harvests were low in each year (Fig. 2f). Under a directed coho harvest strategy (G_c = 5000 coho), coho harvest was very high for a short period before declining to levels similar to status quo scenarios as the stock became limited by spawner abundance (Fig. 2f).

The annual value of the coho harvest to the processor was always positive during incidental harvest (as the processor was already processing sockeye and incurred no additional costs to process coho). However, under directed coho harvest, the value of the coho harvest was always negative to the processor (Fig. 2h).

FISHER NPV ACROSS SCENARIOS

Regardless of the predation effect magnitude (β_c) assumed in the model, the most valuable strategy to fishers was always to either maintain the status quo (no targeted coho harvest) or to manage coho for the lowest

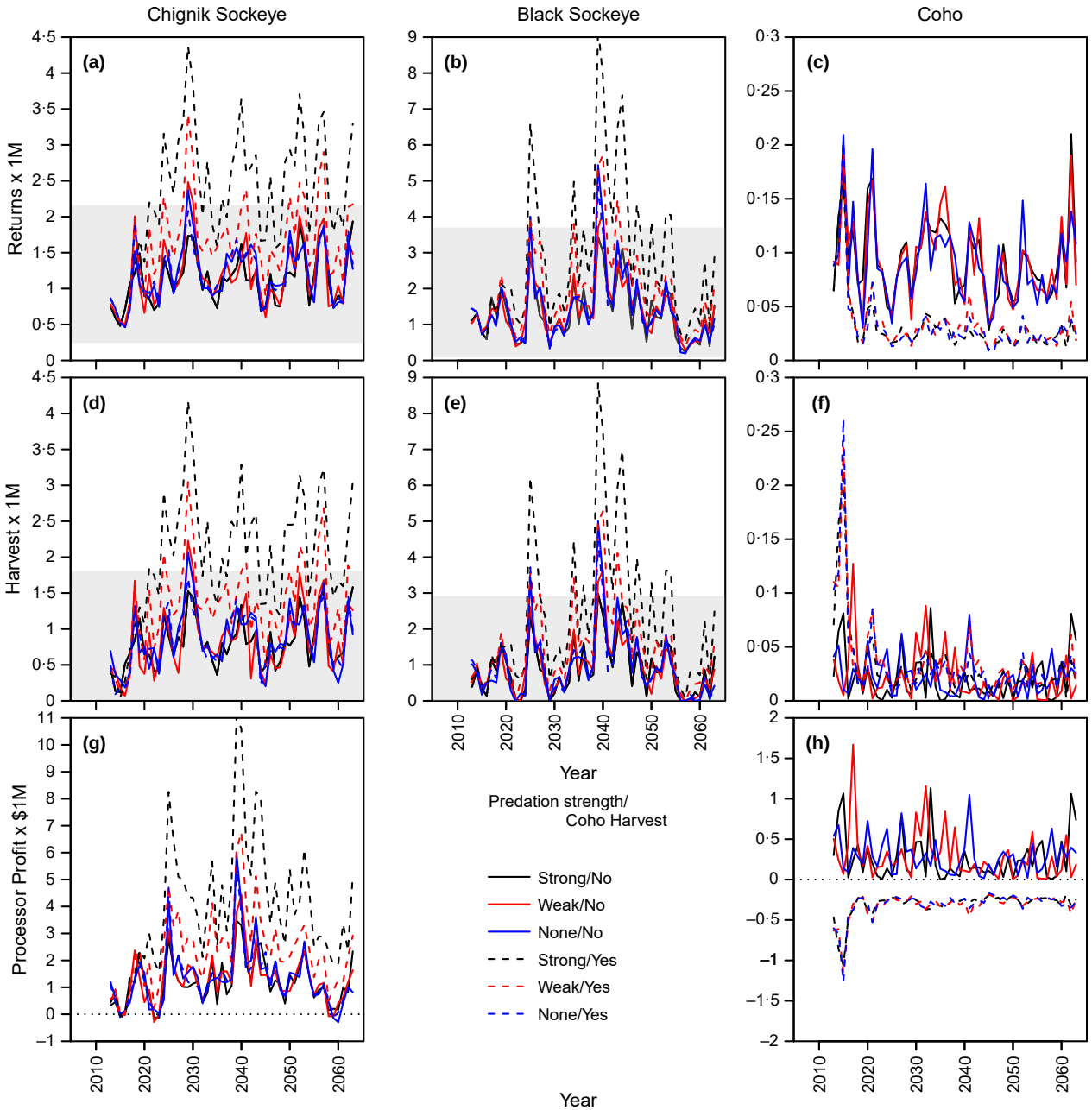

Fig. 2. Example of salmon return (a–c), harvest (d–f) and processor profit (g, h) trajectories from a single iteration of the fishery simulation models for Black Lake sockeye salmon (a, d, g), Chignik Lake sockeye salmon (b, e, g) and coho salmon (c, f, h). Note that (g) is the profit summed across both the Chignik and Black Lake sockeye stocks. Each of the simulations used to generate these trajectories had b_p = 10 000, processor profit-per-kg sockeye sold p_{sp} = 0·44 and a coho escapement goal G_c = 5000 when coho were directly targeted. Trajectories from six scenarios are presented in each panel, with strong, moderate or no effect of coho on sockeye productivity, and either status quo (no directed coho harvest) or directed coho harvest. Line labels are presented as 'predation strength scenario/directed coho harvest scenario' (e.g. the solid blue line labelled 'None/No' represents a scenario with no effect of coho predation on sockeye productivity and no directed coho fishery). Grey region (a, b, d, e) represents the range of observed sockeye returns and harvest for the Chignik and Black Lake stocks.

escapement goal examined in this study (i.e. 5000 salmon; Table 2a). This result is obviously contingent on the assumption that the processors would always buy the coho harvested. The change in NPV to fishers from directly targeting coho for harvest was generally positive across all ranges of parameters considered in these simulations (Table 2a, Fig. 3). Only when there was no predation effect was the status quo strategy most valuable to fishers (Table 2a). Accounting for the uncertainty in predation strength, targeting coho escapement at 5000 salmon generated the greatest expected value for fishers, averaged across all price and cost scenarios examined (Table 2a).

The effect of fisher's variable cost (v_f) was strongest at weak predation effect (β_c) levels, as additional profits from sockeye harvests swamped out minor increases in costs to harvest coho when β_c values were large (Fig. 3). The effects of sockeye ex-vessel prices (p_{sf}) and coho escapement goal on change in NPV to fishers were greatest under strong predation effects (Fig. 3). Similar patterns of benefit were detected at equilibrium conditions (Fig. S2). If fishers were unlikely to risk a greater than 10% chance of reduced NPV, the potentially beneficial scenarios became more limited than when examining the median change in NPV (Fig. S3).

Table 2. Example of decision tables for fishers (a) and the processor (b) regarding coho harvest strategies. Values indicate net present value in USD $\times 10^7$. Grey shading indicates the harvesting strategy (coho escapement goal) with the greatest NPV given the assumed β_c value. The across-model average value is weighted by the posterior probability of the β_c values estimated in Walsworth & Schindler (2016). These example decision tables were generated using the mean NPV across all price and cost scenarios for a given combination of predation strength and escapement goal scenarios. Similar tables could be generated for individual price and cost combinations as needed by stakeholder groups

Coho escapement goal	β_c value					Across model average
	0 20	0 15	0 10	0 05	0 00	
(a) Fishers						
Status quo (NA)	21 8	22 1	22 3	22 6	22 9	22 7
25 000	28 0	26 5	25 0	23 6	22 3	23 1
20 000	30 4	28 2	26 1	24 1	22 3	23 4
15 000	33 8	30 5	27 5	24 8	22 3	23 8
10 000	39 2	34 1	29 7	25 8	22 3	24 5
5000	50 2	41 2	33 7	27 5	22 4	25 9
(b) Processor						
Status quo (NA)	4 92	5 00	5 09	5 19	5 30	5 24
25 000	4 99	4 43	3 91	3 41	2 94	3 22
20 000	5 86	5 05	4 30	3 60	2 95	3 34
15 000	7 09	5 90	4 83	3 86	2 97	3 51
10 000	9 03	7 23	5 64	4 24	3 00	3 79
5000	12 97	9 79	7 14	4 91	3 05	4 33
$P(\beta c)$*	0 08	0 04	0 05	0 05	0 79	

*Probabilities of β_c values derived from Walsworth & Schindler (2016).

PROCESSOR NPV AMONG SCENARIOS

As with the fishers, the most valuable strategy to the processor was always either to maintain the status quo or to manage coho for the lowest escapement goal examined in this study, regardless of the strength of the predation effect (β_c) assumed in the model (Table 2b). However, the change in NPV to the processor demonstrated more variable responses to alternative harvest strategies than for fishers (Fig. 4). Accounting for the uncertainty in predation strength, a status quo harvesting strategy generated the greatest expected value for the processor, when averaged across all price and cost scenarios examined (Table 2a).

Directed coho fisheries were never beneficial to the processor when there was no predation effect on sockeye (Fig. 4). The benefit of alternative harvesting strategies to the processor increased with stronger predation effects (β_c), decreasing coho escapement goals, decreasing variable costs (b_p) and increasing wholesale profit-per-kg (p_{sp}). When variable costs (v_p) were high, a directed coho fishery could be beneficial to the processor when there was a strong predation effect and either low coho escapement or high wholesale profit-per-kg for sockeye (Fig. 4). When variable costs were low, processors could benefit from a directed coho fishery under any level of predation strength examined, although the benefit still depended on wholesale profit-per-kg and the coho escapement goal (Fig. 4). Under conditions of very strong coho predation effects on sockeye productivity, the processor could benefit from a directed coho fishery at any variable cost examined in this study, depending on coho escapement goal and wholesale profit-per-kg of sockeye (Fig. 4). At equilibrium, a wider range of conditions were beneficial to processors than when considering the transient dynamics (Fig. S4). The risk of reduced NPV processors were willing to accept determined where potentially beneficial conditions exist, as lower probability of reduced NPV required lower coho escapement goals, stronger predation effects, lower variable costs, or greater wholesale profit-per-kg of sockeye than would be required given the median predicted values (Fig. S5). For example, at a given coho escapement goal, predation effect and variable cost, processors would need to increase their wholesale profit-per-kg by approximately \$0 45 to have 10% chance of reduced NPV relative to a 50% chance of reduced NPV.

Discussion

We demonstrate how selective harvest in a predator–prey system can limit the overall profitability of a multi-species fishery. However, lagged effects (e.g. how quickly fish populations respond to changing harvest strategy) and stakeholder-specific economic constraints ultimately limit the overall economic performance of adapting a more ecosystem-based approach to management. By implementing a directed coho fishery to alleviate predation pressure

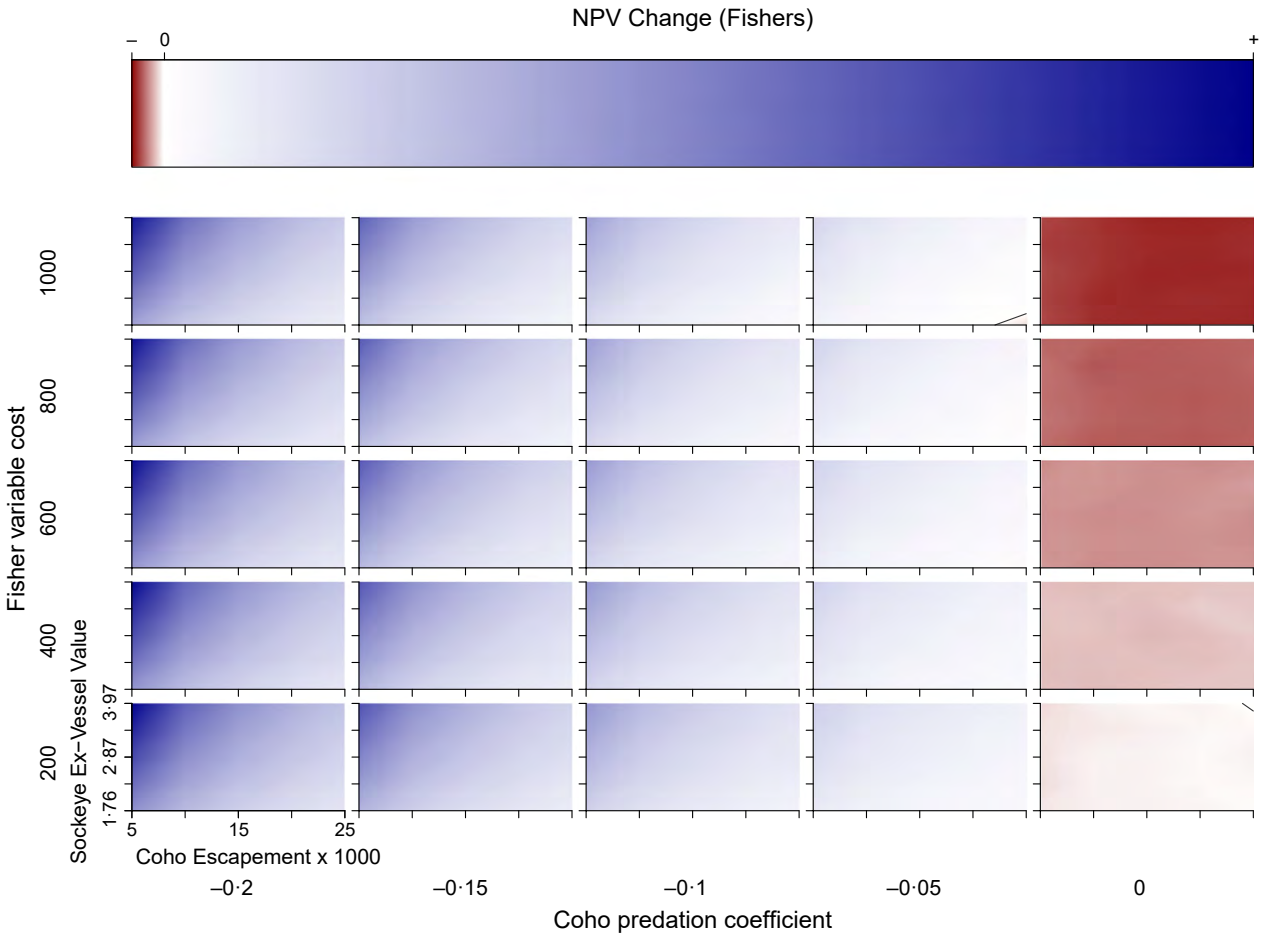

Fig. 3. Median relative change in net present value (NPV) to fishers between the current harvesting scenario and alternative scenarios with directed coho fishing. Red values indicate conditions in which directly targeting coho would result in lower NPV for fishers, blue shades indicate conditions in which fishers would expect higher NPV from directly targeting coho, and white areas indicate no change from current. Contour line denotes zero difference between fishery value under current harvest strategies and directed coho harvesting.

on valuable sockeye stocks, fishers are expected to realize economic benefits under virtually any scenario in which predation has a negative effect on sockeye productivity. However, the processor is much more limited in its ability to realize economic benefits. Processors have higher variable costs than fishers, and due to the low market value of coho, require substantial increases in sockeye productivity to offset the additional cost of extending their operating season to process coho. Thus, the processor decision of whether to support the alternative harvest strategy is likely the key step towards implementing an ecosystem-based management approach in this ecosystem.

Bioeconomic analyses of fisheries management have historically focused narrowly on the economics of harvesters (Clark *et al*. 2006; but see Clark & Munro 1980; Weninger 1999). Our estimates of benefits accrued to fishers may be conservative, as fewer boats than estimated may be able to harvest enough coho to reduce predation pressure on sockeye. We developed our effort relationship from sockeye harvest data, when more fishers than would be strictly necessary to harvest the fish are operating (Knapp 2008; Deacon, Parker & Costello 2013). As the Chignik salmon fishery is a terminal fishery, a small number of boats could harvest most of the coho by fishing at the mouth of the river (Fig. 1, Knapp 2008). If sufficiently few boats could harvest coho at a high enough exploitation rate, fishers could profit even without subsequent increases in sockeye productivity (Deacon, Parker & Costello 2008; Knapp 2008; Deacon, Parker & Costello 2013).

Had we only considered the economics of the harvesting sector, the model would have suggested that a targeted coho harvest would benefit the combined fishery under virtually any scenario in which coho predation negatively affects recruitment of sockeye. However, harvesting and processing sectors have distinct constraints and incentives in commercial fisheries (e.g. Clark & Munro 1980; Weninger 1999). In our simulations, the processor expects the most value from status quo harvest operations when accounting for the uncertainty in predation strength. Due to the late seasonal arrival of coho to the fishery at Chignik, processing fish from a directed coho fishery would require the processor to incur daily operational and maintenance costs for an additional month beyond the current harvest season, while processing low volumes

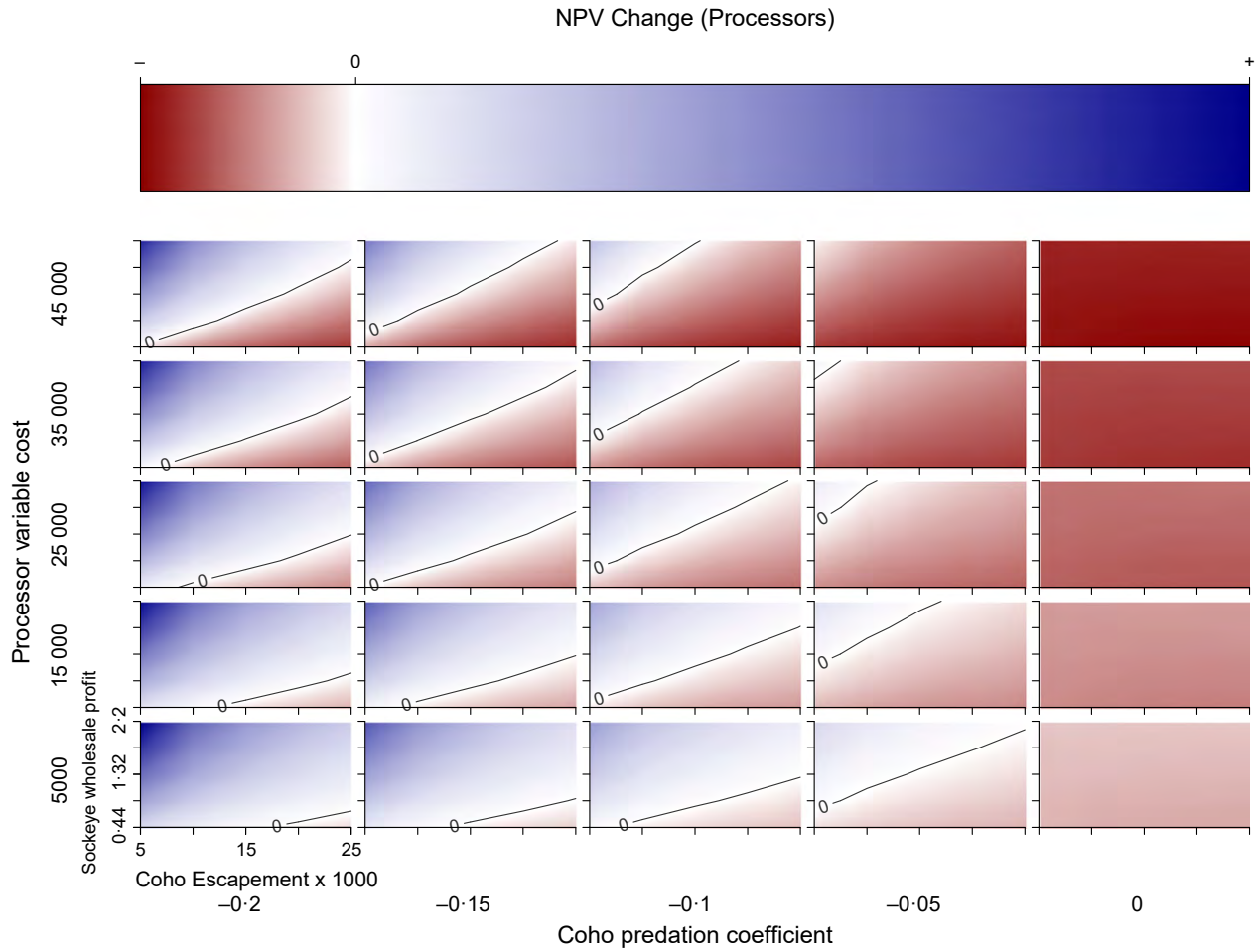

Fig. 4. Median simulated relative change in net present value (NPV) to processors between the current harvesting scenario and alternative harvesting scenarios with directed coho fishing. Red values indicate conditions in which directly targeting coho would result in lower NPV for fishers, blue shades indicate conditions in which fishers would expect higher NPV from directly targeting coho, and white areas indicate no change from current. Contour line denotes zero difference between fishery value under current harvest strategies and directed coho harvesting.

of lower value fish. Additional profit from eventual increases in sockeye production must outweigh these losses from processing coho for the processor to benefit from targeting coho. If the processor elects not to participate in dedicated coho processing, fishermen would not be able to sell their catch. Therefore, both processors and harvesters would likely need to anticipate a benefit for any alternative harvest strategy to be adopted. Furthermore, at equilibrium, the model suggests that alternative harvest strategies would benefit processors under a broader range of scenarios than when accounting for transient dynamics with NPV. When stakeholders are expected to sacrifice benefits in the short term, it is critical to consider the influence of short-term dynamics on the overall value of potential alternative management strategies (Clark 1973; Smith *et al.* 2010).

Much of the uncertainty in whether a directed coho fishery will increase the value of the overall fishery derives from uncertainty about the relationship between coho abundance and sockeye productivity (Walsworth & Schindler 2016). If there is a subsequent, stronger source of mortality after coho predation, or if sockeye survival is strongly compensatory, reducing coho predation pressure on sockeye fry may have little effect on sockeye recruitment to the fishery. Obtaining accurate estimates of the coho predation effect is difficult in natural populations due to stochastic processes effecting recruitment and observation errors in coho escapement, masking the true effects of predation (Oken & Essington 2015; Walsworth & Schindler 2016). Reducing this uncertainty requires long-term, accurate data collection, which is expensive to the management agency. From a societal stakeholder perspective, it would be important to consider the benefits to the fishery from a better characterization of predation effects relative to the increased management and monitoring costs required to obtain the estimate. This study could be extended to account for the costs of managing the extended duration of commercial fishing in Chignik.

Economic analyses of predator–prey fisheries often find that if the prey species is more valuable than the predator

the optimal management strategy is to eradicate the predator, releasing prey species from top-down control (Clark 2010). While such strategies would be legally and politically impossible to implement, strategies in which predators are harvested to reduced abundance may be more tenable for stakeholders. Our analyses reveal that the greatest benefits to both fishers and the processor would occur under the lowest coho escapement goal. Active adaptive management strategies are expected to reveal the most information about ecosystem structure and function when management actions push the ecosystem to conditions unobserved in the historical data (Walters 1986). Depending on the level of risk of reduced profits stakeholders are willing to take, it may benefit the fishery to experimentally reduce coho escapement through directed harvest. As the Chignik fishery is a small part of the processor's asset portfolio, they may be more willing to accept risk of reduced profits than fishers. Beyond the potential economic benefits, such an experiment would provide valuable information regarding the relationship between coho abundance and sockeye productivity.

While an important first step in discerning the potential value of alternative harvest strategies in the Chignik salmon fishery, this study has several limitations. The importance of the transient dynamics that make the short-term losses outweigh long-term gains depends on the discount rate chosen (Brown, Abdullah & Mumby 2015). We assumed a discount rate of 5% for both fishers and processers, a value within the range commonly used in fisheries analyses (e.g. Larkin *et al.* 2006). Fishers are often thought to use higher discount rates than processing firms, given lower capital availability to weather poor fishery performance in the short term. A higher discount rate would reduce the benefit realized by fishers by implementing a directed coho harvest. As such, fewer economic and ecological scenarios would be beneficial to fishers if a higher discount rate were used. Additionally, fish processors are often limited by their capacity to process fish during peaks of runs (Hilborn 2006). In our model we assumed unlimited processing capacity, and that processing costs were constant. Limiting processing capacity in our model could reduce the benefit realized by processors from larger sockeye returns. However, if processors expected additional sockeye to be available, they could invest in greater processing capacity, relaxing this constraint. Finally, a more comprehensive exploration of developing an ecosystem-based approach to fishery management should also assess the potential value of coho and sockeye in the Chignik watershed where they support subsistence fisheries and several ecosystem functions such as serving as prey for wildlife.

The different opportunities and constraints of various stakeholders generate complexities requiring consideration prior to implementation of alternative harvest and management strategies. While our model suggests that fishers would benefit from targeting coho for harvest, the processor is not expected to necessarily benefit from such a strategy. As both stakeholders rely on the other for the fishery to operate, the constraint on one stakeholder essentially constrains the entire fishery from benefiting from the more ecosystem-based approach. In the presence of ecological uncertainty, it may be more beneficial for all stakeholders to work to improve the value of their product or reduce the costs of harvesting and processing than to attempt to increase the productivity of the exploited stocks. Furthermore, changes to the economic conditions of different stakeholders can change the opportunities presented by alternative harvest strategies. As fisheries continue to move towards more ecosystem-based approaches to management, considerations of the economic impacts of alternative harvest strategies on multiple stakeholders, operating under different economic and social constraints, can reveal limiting factors prior to the onset of costly implementation procedures.

Authors' contributions

All authors conceived the ideas and designed the methodology; T.W. ran the analyses and led the writing of the manuscript. All authors contributed critically to the drafts and gave final approval for publication.

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Data accessibility

R code and simulation initialization values are included in the Appendices S2–S4.

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Supporting Information

Details of electronic Supporting Information are provided below.

Appendix S1. Production and harvest model description.

Appendix S2. Simulation model R Code.

Appendix S3. Required functions for simulation model R code.

Appendix S4. Initialization data for simulation model.

Fig. S1. Conceptual diagram of modelling approach.

Fig. S2. Change in fishery value at year 50 for fishers under direct coho harvest.

Fig. S3. Per cent of simulations in which an alternative strategy benefits the fishers.

Fig. S4. Change in fishery value at year 50 for processor under direct coho harvest.

Fig. S5. Per cent of simulations in which an alternative strategy benefits the processor.

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Pilot Study:

SURVIVAL OF CHINOOK SALMON CAPTURED AND RELEASED BY A PURSE SEINE VESSEL IN SOUTHEAST ALASKA

July 12, 1996

Prepared for:

SOUTHEAST ALASKA SEINERS ASSOCIATION

PURSE SEINE VESSEL OWNERS' ASSOCIATION

Prepared by:

Gregory T. Ruggerone and Jeffrey June

NATURAL RESOURCES CONSULTANTS, INC.

INTRODUCTION

Harvests of salmon by commercial fishers may be constrained by the presence of a "weak" stock or species of salmon in the harvest area. In order to reduce harvests of weak stocks, harvest managers may control harvests through time and area closures or they may impose harvest quotas on the weak stocks.

Another approach to harvest management of weak stocks that mix with healthy stocks is the use of nonlethal harvest methods. Capture of salmon by purse seine vessels is generally believed to be somewhat benign; salmon on the high seas have been captured and released by purse seine vessels for years in order to describe salmon migration patterns (Major et al. 1978, Ruggerone et al. 1991). Thus, mortality of "weak" species captured incidentally by commercial purse seine vessels targeting other stocks could be potentially reduced if an effort was made by fishermen to quickly release the "weak" species. Successful release of "weak" species could enable purse seine fishermen to operate for longer periods and with fewer constraints, if survival of "weak" species captured and released by seiners could be shown to be relatively high.

Commercial purse seine fishermen in Southeast Alaska are confronted by reduced overall catch quotas of chinook salmon because many of these fish are returning to British Columbia, Washington and Oregon where native chinook runs are declining. Limits on catch quotas on chinook salmon can reduce harvests of targeted salmon such as pink and chum salmon which have experienced exceptionally strong runs since the mid-1970s. Thus, purse seine fishermen are interested in the successful release of chinook salmon captured in fisheries that target other species. However, estimates of chinook survival from commercial purse seine vessels are needed, if commercial fishermen are to be allowed credit for the live release of these fish.

The objective of this investigation was to conduct a pilot study to estimate the short-term survival of chinook salmon captured and released by a purse seine vessel targeting chum salmon in Southeast Alaska.

STUDY AREA

The investigation was conducted near the Hidden Falls Hatchery located on Baranof Island bordering Chatham Strait in northern Southeast Alaska (Fig. 1). The area is characterized by precipitous mountains plunging to depths of 100 fathoms or more within 0.5 mile of the shore. Most chinook salmon captured in this study were returning to the hatchery. At the time of this study, approximately 35,000 lbs of chinook salmon were harvested in the hatchery cove (Kasnyku Bay) as part of the hatchery cost recovery program; numerous commercial trollers and several sport boats also targeted the returning chinook salmon. Although chinook salmon were abundant in the area, the most abundant salmon was chum salmon. The investigation was conducted immediately before the first commercial chum salmon opening for purse seine vessels on 23 June. Approximately 3 to 4 million chum salmon were expected to return to Hidden Falls Hatchery in 1996.

METHODS

Survival of chinook salmon was estimated from salmon catches on F/V *Secure* during 21-22 June, 1996. F/V *Secure* is a 58' steel power block seiner. The size of the purse seine was 250 fathoms long and approximately 15 fathoms deep. Mesh size was 3.5 inches (bar). When large catches of salmon were made by the vessel (e.g., ~4,000 lbs or more), the crew employed a technique that effectively separated the catch into smaller bundles before rolling them over the side of the vessel.

The crew of the F/V *Secure* was instructed to fish for salmon as they normally would. They were to search for chinook salmon among the catch, as if they were trying to release them alive. However, instead of releasing chinook salmon overboard, they placed the fish in one of two 200 gallon tanks located on the deck. Seawater was pumped into the two tanks via a small pump (a larger pump burned out at the beginning of the investigation). The high volume deck hose was sprayed into the tanks to insure that oxygen levels were adequate. Initially, we planned to hold only five chinook salmon per tank; but after careful observation of the fish we decided that more salmon could be held for brief periods (up to 1 hr).

After capturing 10 or more chinook salmon, the F/V *Secure* transported the salmon to a saltwater net pen (40' x 40' x 15' deep) located in a protected cove at the hatchery. Surface water temperature at the net pen was 9.0 °C.

A NRC scientist observed the capture and handling of the chinook salmon, but he did not assist with the search and release of fish into the holding tank. The scientist recorded information on the time of the set, duration of towing (e.g., time from complete net in water to initial net retrieval), hauling time (initial net retrieval to enclosed bag of fish along side of vessel), time in the seine bag (bunt end) prior to being landed, and time on the deck before transfer to the holding tank. Injuries to the fish and scale loss were noted. Salmon placed in the holding tanks were not handled again until transfer to the net pen using a dip net.

Chinook salmon held in the net pen were inspected by the scientist each morning for up to three days after capture. This inspection was accomplished by pulling one side of the net onto the deck until the depth of the pen was <2 m (water clarity was ~4 m). At the end of the study period, all chinook salmon were removed from the net pen, inspected for injuries, scaling and survival, and measured for total length. The salmon were delivered to a tender where total weight was estimated. Chinook and chum salmon captured in this study were used for hatchery cost recovery.

RESULTS AND DISCUSSION

Weather during the study period was mild. Wind was negligible and swell was nonexistent. Air temperature was approximately 65-70°F.

Ninety-one chinook salmon and approximately 6,300 chum salmon (~75,000 lbs) were captured and examined during 16 sets on 21-22 June[1]. Approximately 718 salmon, on average, were captured per set (range: 9 to 2,000 fish). The largest

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[1]One chinook salmon was not placed in the holding tank at the beginning of the study because we wanted to insure that all chinook placed in the holding tank had adequate oxygen and were not stressed; ten fish were already in the holding tanks. This fish was excluded from the study.

chinook catches occurred adjacent to the rocky shore, whereas larger chum catches tended to be farther offshore.

The most critical periods in terms of chinook survival were assumed to be when fish were held in the seine bag next to the boat or dewatered on the boat deck. Time in the bag averaged 2.7 minutes (range: 0.25 - 13.0 minutes). Time on the deck averaged 1.7 minutes (range: 0.2 - 6.0 minutes) (Table 1). Towing and hauling of the seine averaged 13 and 17 minutes, respectively. Time in the onboard holding tanks averaged 44 minutes (range: 16 - 124 minutes). Salmon captured on 21 June and 22 June were held for approximately 1.9 and 2.8 days, respectively.

Ninety chinook salmon out of ninety-one captured (98.9%) survived capture by the purse seine and holding in the net pen. The 95% confidence interval for this survival rate estimate is 93.2% - 99.6%. The fish that died was a small (41 cm), maturing male (jack) that was buried on the deck under many chum salmon. This fish was not observed by the fishermen for 6 minutes after it was landed; approximately 50% of the scales were lost, possibly a result of being thrashed by other fish. It was nearly dead by the time it reached the holding tank.

Of the salmon that survived, all but one were upright within five minutes or less after entering the onboard holding tank. One salmon was lethargic upon entering the net pen; it moved to the bottom of the pen as did most other salmon.

Examination of the captured chinook salmon each morning indicated that all fish that entered the net pen appeared vigorous and healthy. On the last day of the study, we examined and measured each fish. Only one live salmon had some scale loss (~15%). Four fish had slight tears near the mandible that may have been caused by the seine; no bleeding was observed and the injuries did not appear to be serious.

Of the 91 chinook salmon captured, 10 fish (11%) had wounds near the mouth that were likely caused by fish hooks. One fish still had a troll hook in its mouth. These observations indicated that some chinook salmon captured in this study were drop-offs from the commercial troll fishery operating near the hatchery. These fish appeared to be fairly healthy after being captured for a second time.

Average length of chinook salmon captured during this study was 83.3±1.1 cm (mean ± SE). The range in total chinook lengths was 41-99 cm. Average chinook weight was 14.8 lbs. In comparison, average weight of chum salmon was 11.5 lbs according to reports from the fish tenders.

CONCLUSIONS

The Hidden Falls area is ideal for conducting an investigation of chinook salmon survival after capture and release by purse seine vessels. Chinook salmon are fairly abundant among large numbers of chum salmon returning to the hatchery. This scenario allowed us to examine chinook survival when captured in large catches of other salmon.

Survival of chinook salmon captured and released by the purse seine vessel in this study was exceptionally high (98.9%), indicating the potential for successfully releasing nontarget chinook salmon when targeting other salmon species.

RECOMMENDATIONS

1. Conduct this study again using different purse seine vessels in order to examine variability of chinook survival among the fleet. Holding of the fish appears to be a viable option given the ideal conditions of the net pen at Hidden Falls Hatchery. Other studies have shown that most mortality occurs during the first 24 hours (Wertheimer 1988, 1989, NRC 1993, Candy et al. in press); however, survival estimates can be more accurate if the fish are held for a longer time period.

2. Consider the use of ultrasonic tags to track chinook salmon after being captured and released in order to evaluate their behavior and survival in a more realistic setting.

3. Salmon may become hardier when approaching the time to enter their natal stream. For example, scale loss is less likely while handling

maturing fish. Because most chinook captured in this experiment were migrating to nearby Hidden Falls Hatchery, a survival study that involved migratory salmon further from their natal stream should be considered.

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net pen facilities for holding the salmon and sleeping facilities for the biologist; Bruce also assisted with sampling of chinook salmon at the end of the study period. Icicle Seafoods transported the biologist via float plane from Hidden Falls Hatchery to Petersburg. The Purse Seiner Vessel Owners' Association (PSVOA) provided insurance for the biologist while on the vessel. This study was funded by the Southeast Alaska Seiners Association through PSVOA.

Table 1. Summary of statistics for Hidden Falls chinook salmon captured by purse seine and held in a net pen.

Time of set	Minutes Towing	Minutes Hauling	Total salmon landed in set	Number chinook	Max minutes in net "bag"	Max minutes on deck	Minutes boat tank	Hours net pen	Total days observed	Comments
					20-Jun-96					
9:08	18	19	58	1	0.25	1.0	96	70.5	3.0	Gear problems with 1st set of year
				6	2.00	2.0	92	70.5	3.0	caused increased time in bag
10:06	19	17	125	3	1.00	1.0	38	70.5	3.0	
12:00	15	15	550	7	1.50	2.5	89	67.5	2.9	
13:02	20	16	100	2	0.50	0.5	24	67.5	2.8	1 king had troll hook in mouth
14:42	13	17	82	6	1.00	1.0	124	64.5	2.8	
15:28	14	18	50	0	0.50					No chinook captured
16:20	15	16	40	1	1.00	0.2	19	64.5	2.7	
				1	1.00	4.0	23	64.5	2.7	~40 cm chinook not quickly seen
17:50	18	19	300	18	0.50	2.5	22	63.0	2.6	1 king had ~ 15% scale loss
				1	0.50	8.0	17	63.0	2.6	
					21-Jun-96					
7:15	14	15	100	1	1.00	0.2	68	48.5	2.1	
8:02	10	16	400	10	0.50	1.5	23	48.5	2.0	
9:13	15	18	9	2	1.00	0.5	70	47.0	2.0	
10:02	5	19	600	2	0.50	2.0	23	46.5	2.0	
				4	6.50	1.0	22	46.5	2.0	
				3	9.00	0.5	22	46.5	2.0	
11:33	5	18	750	0	1.25					No chinook captured in split bag
				1	4.75	0.8	79	44.0	1.9	
12:27	13	16	300	1	1.00	0.5	22	44.0	1.8	
				1	1.00	6.0	16	44.0	1.8	41 cm chinook dead at net pen; 50% scale loss
14:40	4	18	900	0	2.00					No chinook captured in split bag
				3	4.25	1.5	97	41.0	1.8	
				2	4.25	3.5	95	41.0	1.8	
15:35	11	17	2,000	3	1.00	1.0	41	41.0	1.7	20 chinook held in boat tanks
				3	4.50	0.5	37	41.0	1.7	
				2	8.00	0.5	34	41.0	1.7	
				3	9.50	0.5	33	41.0	1.7	
				2	12.00	0.5	31	41.0	1.7	
				2	13.00	0.5	30	41.0	1.7	
Total:			6,364	91						
Mean:	13	17	718	5.7	2.70	1.7	44	50	2.1	
Min:	4	15	9	0	0.25	0.2	16	41	1.7	
Max:	20	19	2,000	18	13.00	6.0	124	71	3.0	

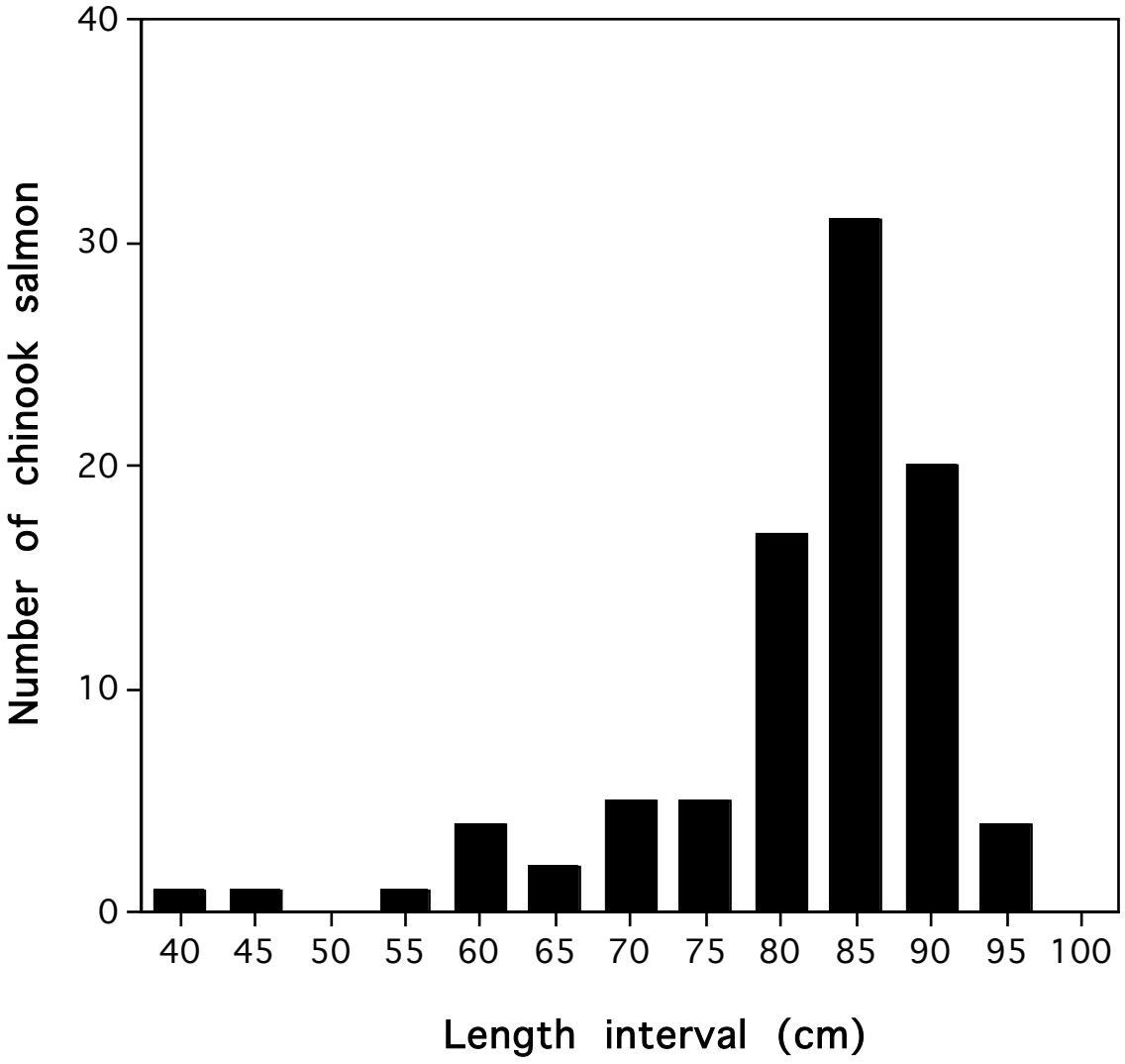

Fig. 2. Length frequency distribution of chinook salmon captured near Hidden Falls Hatchery, 1996. Length intervals are 5 cm beginning with the value show on the axis.

Not available in electronic copy

Fig. 1. Location of the study area in Chatham Strait, Southeast Alaska.

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Pilot Study:

SURVIVAL OF CHINOOK SALMON CAPTURED AND RELEASED BY A PURSE SEINE VESSEL IN SITKA SOUND, ALASKA

September 10, 1997

Prepared for:

SOUTHEAST ALASKA SEINERS ASSOCIATION

PURSE SEINE VESSEL OWNERS' ASSOCIATION

Prepared by:

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SUMMARY

Chinook salmon were captured by purse seine and held in a net pen near Sitka, Alaska during June 18-22, 1997. Sixty-nine of 76 chinook salmon (90.8%) survived the holding period of three to five days. Survival of chinook salmon captured near Cape Edgecumbe (71.4%) was significantly lower than chinook captured in inner Sitka Sound (95.2%). However, the sample size of chinook salmon captured at Cape Edgecumbe was small (14 fish) and the 95% confidence interval about the mean survival estimate was wide (42.0% - 90.4%). Chinook captured near Cape Edgecumbe were "brighter" and scale loss was greater, presumably because these fish were further from spawning than fish captured in inner Sitka Sound. Of 67 chinook salmon tagged and released from the net pens, 22 chinook (33%) were recaptured up to 71 days after the initial capture by purse seine. Six of these recaptured fish were caught by hook and line indicating some of the fish had recovered sufficiently to attack a lure.

This study and the 1996 study near Hidden Falls Hatchery (98.9% survival of 91 chinook salmon) suggests that chinook salmon may experience lower catch and release survival if they are further from the time when they enter freshwater. We recommend that additional chinook salmon be sampled along the capes of Southeast Alaska in order to enhance the precision of the survival estimate for these migratory salmon.

INTRODUCTION

Harvests of salmon by commercial fishermen can be constrained by the presence of "weak" salmon stocks in the harvest area. In order to reduce harvests of weak stocks, harvest managers may control harvests through time and/or area closures, impose maximum harvest quotas of the weak stocks, or employ selective harvest gear.

Alternatively, harvesters may live-release weak salmon stocks if the harvest method is generally non-lethal. Capture of salmon by purse seine vessels is generally believed to be somewhat benign; salmon on the high seas have been captured and released by purse seine vessels for years in order to describe salmon migration patterns (e.g., Major et al. 1978, Ruggerone et al. 1990). Thus, mortality of "weak" species captured incidentally by commercial purse seine vessels targeting other stocks could be potentially reduced if fishermen quickly released the "weak" species. Successful release of "weak" salmon species could enable purse seine fishermen to operate for longer periods and with fewer constraints, if survival of "weak" species captured and released by seiners was shown to be relatively high.

Commercial purse seine fishermen in Southeast Alaska are confronted by reduced overall catch quotas of chinook salmon because many of these fish are returning to British Columbia, Washington, Oregon and Idaho where native chinook runs have declined (Nehlsen et al. 1991, PFMC 1997, Slaney et al. 1996, 1997). Limits on catch quotas of chinook salmon can reduce harvests of targeted salmon such as pink and chum salmon which have experienced exceptionally strong runs since the mid-1970s. Thus, purse seine fishermen are interested in the successful release of chinook salmon captured in fisheries that target other species. However, survival estimates of chinook salmon released from commercial purse seine vessels are needed if commercial fishermen are to be given credit for the live-release of these fish.

During June 1996, Natural Resources Consultants (NRC) conducted a pilot study to estimate survival of chinook salmon captured and released by a purse seiner operating up to approximately 5 miles from Hidden Falls Hatchery. Ninety of 91 chinook salmon captured by seine gear survived the 1.9 to 2.8-day holding period

(98% survival) even though many of the chinook salmon were captured in sets that contained up to approximately 2,000 salmon (Ruggerone and June 1996). However, the investigators noted that most chinook salmon in the Hidden Falls study were maturing fish returning to the nearby hatchery. Survival of these fish might be greater than chinook salmon captured further from the spawning grounds because relatively few scales might be lost and because salmon are typically much hardier after entry to freshwater.

The objective of this investigation was to estimate the short-term survival of migratory chinook salmon captured and released by a purse seine vessel in the Sitka Sound region of Southeast Alaska (Fig. 1).

STUDY AREA

The investigation was conducted in Sitka Sound in northern Southeast Alaska during June 18-22, 1997. The area is characterized by numerous islands and precipitous mountains. Seine sets were made primarily in three areas of Sitka Sound: the Eastern Channel area (~6.5-10 miles from Medvejie Hatchery in Silver Bay), Cape Edgecumbe in outer Sitka Sound (~27.5 miles from the hatchery), and the Biorka Island area in outer Sitka Sound (~23 miles from the hatchery) (Fig. 1).

During the investigation period, a commercial troll fishery and a sport fishery operated in the Sitka Sound region. The commercial troll fishery was restricted to inner Sitka Sound (Eastern Channel area) where they targeted chinook salmon returning to Medvejie Hatchery in Silver Bay. Analysis of coded-wire-tag (CWT) recoveries in the troll fishery indicated approximately 60% of the captured chinook salmon were returning to Medvejie Hatchery, whereas the remaining 40% were migrating elsewhere (B. Bachen, Northern Southeast Regional Aquaculture Association, pers. comm.). Thus, approximately 40% of the chinook salmon captured by the purse seiner in the Eastern Channel area during this study may have not have been returning to the nearby hatchery. However, Bachen noted that the CWT analysis may have underestimated the harvest attributed to Medvejie Hatchery.

Approximately, 20,000 chinook salmon were expected to return to Medvejie Hatchery in 1997, primarily during mid-June to mid-July, although some chinook may return in August and September. During the study, numerous chinook salmon milled in Bear Cove adjacent to the hatchery and the first cost recovery harvest of the hatchery fish occurred on 20 June. Most sport vessels operated in outer Sitka Sound and in waters beyond Cape Edgecumbe.

METHODS

Survival of chinook salmon was estimated from salmon catches on F/V *Secure* , the same vessel that was used in the Hidden Falls study in 1996. F/V *Secure* is a 58' steel power block seiner. The size of the purse seine was 250 fathoms long and approximately 15 fathoms deep. Mesh size was primarily 3.5 inches (bar). When large catches of salmon were made by the vessel, the crew employed a technique that effectively separated the catch into smaller bundles before rolling them over the side of the vessel. It should be noted that seiners may employ other methods to bring salmon over the side. For example, some purse seine vessels may employ a brailer to dip smaller numbers of salmon from a large catch. Brailing is generally believed to have a lesser impact on salmon compared to the technique of rolling the entire bunt end of the seine over the side of the vessel.

The crew of the F/V *Secure* was instructed to fish for salmon as they normally would. They searched for chinook salmon among the catch, as if they were trying to release them alive. However, instead of releasing chinook salmon overboard, they held the fish while the biologist inserted a numbered "spaghetti" tag into the fish. After tagging, the fish was placed into the vessels forward holding tank, which contained approximately 7,500 gallons of sea water. Surface sea water was pumped into the tank at a rate of approximately 3,500 gallons per hour. Oxygen content of water in the holding tank was near saturation (>90%).

At the end of the day, all captured chinook salmon (up to 44 fish) were transferred to a saltwater net pen (40' x 40' x 15' deep) located at Medvejie Hatchery in Bear Cove, Silver Bay. Water temperature at the net pens ranged from 11.5°C at 1 m to 10.5 °C at 3 m; salinity ranged from 21.5‰ at 1 m to 29‰ at 4 m. During transport of 44 salmon to the net pen and water drawdown in the vessel holding

tank, dissolved oxygen declined to 76% of saturation (57% oxygen can cause sublethal effects, Davis 1971, Ruggerone 1996). To reduce low oxygen effects, water in the holding tank was aerated with a high pressure seawater hose during transfer of fish to the net pen. Nevertheless, the combination of moderately low oxygen and stress caused approximately 10 salmon to lay on their side during transfer to the net pen; all but one of these fish recovered within approximately 10 minutes after transfer to the net pen.

In addition to tagging the salmon, the NRC scientist recorded information on the time of the set, duration of towing (e.g., time from complete net in water to initial net retrieval), hauling time (initial net retrieval to enclosed bag of fish along side of vessel), time in the seine bag (bunt end) prior to being landed, and time on the deck before transfer to the holding tank. Injuries to the fish and scale loss were noted.

Chinook salmon held in the net pen were inspected each morning for up to 5.5 days after capture. This inspection was accomplished by pulling one side of the net onto the dock until the bottom of the pen was visible (water clarity was ~5 m). At the end of the study period, all live chinook salmon were released into Bear Cove. Recovery of tagged salmon in local waters was enhanced by cooperation of the processors that purchased cost recovery salmon in Sitka, the Northern Southeast Regional Aquaculture Association (NSRAA), and the Alaska Department of Fish and Game.

RESULTS AND DISCUSSION

Weather during the study period ranged from rainy and calm on the first day, rainy and slight breeze on the second day, to sunny and calm on the third day of fishing. Swell was negligible on the first and third days, but was approximately 3-5 ft when fishing the Cape Edgecumbe area on the second day. Air temperature was approximately 15.6-21.1°C.

Seventy-six chinook salmon were captured and examined during 21 sets on 18-20 June (Table 1). Approximately 11 salmon (all species), on average, were captured per set (range: 0 to 71 fish). Sixty-two chinook salmon were captured in the inner

Sitka Sound area and the remaining 14 chinook salmon were captured near Cape Edgecumbe in outer Sitka Sound.

Harvests in inner Sitka Sound were typically accompanied by 200-1,000 lbs of jellyfish, whereas harvests in the outer waters typically contained less than 50 lbs of jellyfish. Salmon captured along with numerous jellyfish appeared to remain lower in the net apparently to avoid jellyfish. The effect of jellyfish nematocysts on gills of salmon is not known, but presumably it might have some negative effect. Such an effect was not detected from the mortality estimates.

The most critical periods in the survival of chinook captured by purse seine are when the seine encloses fish into a crowded bag next to the boat and when fish become dewatered on the boat deck. During this study, time in the bag averaged one minute (range: 0.5 - 2.1 minutes). Time on the deck averaged 1.9 minutes (range: 1.0 - 3.6 minutes) (Table 1). Towing and hauling of the seine averaged 22 and 18 minutes, respectively. Time in the onboard holding tanks averaged 4.5 hrs (range: 1.8 - 10.3 hrs).

We attempted to tag all chinook captured by the purse seiner. Tagging enabled the identification of capture location of chinook that died or survived the holding period in the net pen. Tagging also offered the opportunity to recapture chinook released from the net pens in an effort to further examine longevity after capture by purse seine and to record region of recapture. The latter information might provide information on whether the fish was headed for nonlocal streams. Therefore, tagging was an important aspect of the investigation. However, a significant drawback to tagging was the negative effect it may have had on chinook survival. Tagging undoubtedly increased handling time and stress on the deck prior to release into the vessel's hold, although we did not observe an obvious trend between time on deck and mortality. Additional scale loss was encountered during tagging, especially near the caudal peduncle where fishermen typically gripped the fish. We attempted reduce handling time by inverting chinook during tagging because salmon typically become more sedate in an upside down position. Nevertheless, tagging stress may have contributed to the mortality of some chinook observed in this study.

Sixty-nine of 76 chinook salmon (90.8%) survived capture by the purse seine in Sitka Sound and holding in the net pen for three to five days (Table 2). Of the seven mortalities, four were from sets made near Cape Edgecumbe in outer Sitka Sound and three were from sets made in inner Sitka Sound (Table 3). Survival of chinook salmon captured near Cape Edgecumbe (71.4%) was significantly lower than chinook captured in inner Sitka Sound (95.2%) ($\chi^2 = 7.693$, $p = 0.006$). However, the sample size of chinook salmon captured at Cape Edgecumbe was small (14 fish) and the 95% confidence interval about the mean survival estimate was wide (42.0% - 90.4%). In comparison, survival of 91 chinook salmon captured by purse seine near Hidden Falls Hatchery in 1996 was 98.9%.

Chinook salmon captured near Cape Edgecumbe exhibited characteristics different from those captured in inner Sitka Sound. At Cape Edgecumbe, chinook salmon were relatively "bright" in color and lost approximately 10-20% of their scales on the deck of the vessel, whereas most chinook in inner Sitka Sound had a slight tinge of color and they typically did not loose scales. One mortality among the Cape Edgecumbe sample contained immature testes and likely would have spawned in 1998 rather than 1997. These observations support the belief that chinook captured near Cape Edgecumbe were further from spawning than those captured in inner Sitka Sound.

Jellyfish were exceptionally abundant in inner Sitka Sound, whereas few were encountered near Cape Edgecumbe. Salmon appeared to avoid jellyfish in the seine bag by remaining low in the water column. Nevertheless, salmon became completely submerged in jellyfish as the bag was brought onboard. The effect of stinging nematocysts on chinook salmon, especially their gills, is unknown. However, survival of chinook salmon captured among jellyfish was high (95.2%).

Of the 76 chinook salmon captured, at least three fish (4%) had wounds near the mouth that were likely caused by fish hooks. These observations indicated that some chinook salmon captured in this study were drop-offs from either the commercial troll fishery or the sport fishery that operated during the study period.

A total of 67 tagged chinook salmon were released from the net pens into Bear Cove on 23 June, 1997 (two untagged fish captured in the Eastern Channel were also released). As of 8 September, 22 (33%) of these tagged chinook have been

recovered by sport and commercial fishermen; no tagged chinook were recovered at Medvejie Hatchery where 1,450 chinook were examined for tags and spawned[1]. Fifteen chinook (68% of recoveries) were recovered by purse seine from the cost recovery effort in Bear Cove, one chinook was recovered from a sport vessel in Bear Cove, two chinook were recovered by commercial troll in the Eastern Channel, three chinook were recovered by commercial troll in outer Sitka Sound/Inner Pt area, and one was recovered by purse seine in the Deep Inlet/Eastern Channel cost recovery area. All recovered chinook were initially captured by the purse seiner in the Eastern Channel area (Silver Pt, Cobb I., Luce I.). None of the 10 tagged and released chinook from the Cape Edgecumbe area were recovered suggesting these fish may have been migrating away from the Sitka area. Of the recovered chinook, 13 fish were recovered within 4-8 days of capture and 9 chinook were recaptured 10-46 days after capture. A total of 6 chinook (29% of recoveries) were recaptured by hook and line, indicating that some fish had sufficiently recovered to attack a lure. One tagged chinook (915 mm), recaptured by a commercial troll vessel in Eastern Sound, contained a coded-wire-tag (CWT, head #040685), which indicated this fish was released as a smolt from Medvejie Hatchery (1991 brood year). This fish was initially captured by the seiner near Cobb Island. In total, six chinook salmon initially captured by seiner near the Eastern Channel were recaptured more than 7 miles from the release location (Medvejie Hatchery), indicating some of the chinook salmon captured in the Eastern Channel were not yet attracted to freshwater.

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[1]As of 23 July, 1997, the following harvests of chinook in the Sitka area had been tabulated in each fishery: 9,293 troll-caught, 11,866 common property (sport, gillnet, seine), 20,647 cost recovery, and 1,450 Medvejie rack (J. Seeland, Medvejie Hatchery manager, pers. comm.). The total was 43,256 chinook salmon.

CONCLUSIONS

This study supports the results of the 1996 Hidden Falls investigation where survival was high among chinook salmon captured and released by purse seine gear. However, this study supports the hypothesis that salmon approaching freshwater are hardier than those migrating long distances before reaching freshwater. Greater hardiness of maturing salmon is probably in response to greater physical abuses likely to be encountered in freshwater, including redd preparation and defense, mate selection, predation by bears and other animals, and water turbulence in streams. Further sampling is needed to enhance the precision of the survival estimate for chinook salmon migrating along capes in Southeast Alaska.

RECOMMENDATIONS

This study should be repeated in order to enhance sample size of chinook salmon migrating along capes in Southeast Alaska. Given the excellent net pen facilities at Medvejie Hatchery, Cape Edgecumbe could be a good location if sufficient catches (30-40 fish) can be made each day. Alternatively, the study might be conducted near Noyes Island where migratory chinook may be relatively abundant.

As an alternative to holding fish in a net pen, fish could be held individually in "brood stock tubes". Brood stock tubes were successfully used by NRC during capture and release studies involving chinook and coho salmon captured by commercial troll and sport vessels off the Oregon coast in 1997. Use of numbered tubes would eliminate the need to tag fish at the time of capture. Chinook salmon could be tagged at the time of release in order to gain additional information on survival and subsequent recovery location.

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ACKNOWLEDGMENTS

NRC wishes to thank a number of individuals and organizations that contributed to this project. Bob Thorstenson, Jr., S.E. Seiners Association, organized logistic support. Randy Stewart, skipper of F/V *Secure*, and his fine crew (Pete, Seth, Rachel, and Jodie) captured and handled the chinook salmon and helped with the transfer of fish to the net pens. Northern Southeast Regional Aquaculture Association Inc. provided net pen facilities for holding the salmon and sleeping facilities for the biologist. Rich Phillips (NSRAA) assisted with the sampling of fish and water quality at the net pens. Chip Blair (NSRAA), Mike Vaughn (ADFG), and Bruce White (ADFG) assisted with the recovery of salmon tags. The Purse Seiner Vessel Owners' Association (PSVOA) provided insurance for the biologist while on the vessel. This study was funded by the S.E. Alaska Seiners Association through a contract with PSVOA.

Table 1. Summary of harvest statistics during chinook salmon catch and release survival study in Sitka Sound. Time in net bag and on vessel deck refer only to chinook salmon unless no chinook were caught.

Location	Time of set	Minutes Towing	Minutes Hauling	Number of salmon captured: Chum	Pink	Sockeye	Coho	Chinook	Total	Max min. in net "bag"	Max min. on deck	Hrs boat tank	Total days observed	Comments
Inner Sitka Sound							*18-Jun-97*							
Long I.	8:20	16	19.5	0	0	0	0	0	0					jellyfish
Emgeten I.	9:21	17	17.7	8	0	0	0	2	10	0.5	1.0	9.0	5.5	Not tagged, jellyfish
Berry I.	10:20	18	21	0	0	0	0	0	0					jellyfish
Luce I.	12:13	20	17	0	0	0	0	4	4	0.5	1.5	6.1	5.4	jellyfish
Emgeten I.	13:40	17	16	0	1	0	0	1	2	0.5	1.0	4.7	5.3	Hook wound, jellyfish
Emgeten I.	14:30	18	21	0	0	0	0	0	0					jellyfish
Cobb I.	15:20	30	18	5	0	1	0	7	13	0.3	3.2	3.0	5.2	1 slight bleeding (gills), jellyfish
Cobb I.	16:35	24	18	6	1	0	0	4	11	0.5	3.6	1.8	5.2	2 chinook w/hook wounds jellyfish
Outer Sitka Sound							*19-Jun-97*							
Edgecumbe Pt	8:15	20	17	3	2	6	3	7	21	1.0	1.3	10.3	4.6	~10-20% scale loss
Edgecumbe Pt	9:15	21	16	41	4	18	2	6	71	0.5	2.0	9.3	4.5	~10-30% scale loss, 1 w/o tag #1377-injured gill while handling
Edgecumbe Pt	10:15	40	24	0	1	1	1	1	4	0.5	1.3	8.3	4.5	15% scale loss, seine snagged
Edgecumbe Pt	11:15	18	17	1	3	0	0	0	4	0.5	0.4			jellyfish
Edgecumbe Pt	13:40	22	17	12	6	3	3	0	24	0.2	1.0			fish swam off at release
St. Lazaria I.	15:30	18	16	1	0	0	0	0	1	0.3	0.3			jellyfish
Outer Sitka Sound							*20-Jun-97*							
L. Biorka I.	7:20	set aborted due to snag on bottom												
L. Biorka I.	8:35	19	17	2	0	0	2	0	4	0.3	0.5			
Biorka Ch.	9:50	23	17	0	0	0	0	0	0					
Inner Sitka Sound														
Long I.	12:10	22	16	2	0	0	0	0	2	1.0	0.5	5.8	3.4	jellyfish
Silver Pt	13:25	23	18	4	0	0	0	7	11	0.5	1.8	4.5	3.3	1 slight bleeding, jellyfish
Silver Pt	14:20	23	17	1	0	1	0	4	6	0.5	1.0	3.8	3.3	jellyfish
Silver Pt	15:00	24	18	3	0	0	0	7 14	24	0.9 2.1	1.2 2.4	3.0	3.3	1 slight bleeding, jellyfish
Silver Pt	16:00	24	18	2	0	0	0	6 6	14	0.5 2.1	1.6 1.5	2.0	3.2	jellyfish
Total:				91	18	30	11	76	226					
Mean:		22	18	4.3	0.9	1.4	0.5	3.6	10.8	1.0	1.9	4.5	4.0	
Min:		16	16						0	0.5	1.0	1.8	3.2	
Max:		40	24						71	2.1	3.6	10.3	5.5	

Table 2. Survival estimates of chinook salmon captured and released by purse seine gear in Sitka Sound and near Hidden Falls Hatchery.

Capture Location	Date	Days Held	Sample Size	Survival (%)	95% C.I.	Comments
Hidden Falls	Jun-96	2.1	91	98.9%	93.2 - 99.9	Most fish returning to hatchery; captured w/ up to 2,000 chum per set
Inner Sitka Sound	Jun-97	3.9	62	95.2%	85.6 - 98.7	CWT analysis indicates 60% returning to hatchery 6.5-10 miles away
Outer Sitka Sound	Jun-97	4.5	14	71.4%	42.0 - 90.4	Chinook appear to be migratory; 27.5 miles from Medvejie Hatchery
Total Sitka Sound	Jun-97	4.0	76	90.8%	81.4 - 95.9	Weighted average

Note: days held in net pen is a weighted mean.

Table 3. Characteristics of chinook salmon mortalities. Scale loss shown here was recorded at time of necropsy and may reflect additional scaling caused by rubbing against the net pen.

Area Captured	Minutes on deck	Hours in boat tank	Days to Mortality	Sex	Length (cm)	Scale loss	Color	Comments
Edgecumbe Pt	1.3	10.3	2.0	M	62	35%	bright	Immature
Edgecumbe Pt	1.3	10.3	3.6	F	80	80%	bright	deteriorated in net pen
Edgecumbe Pt	2.0	9.3	2.0	M	88	60%	bright	
Edgecumbe Pt	2.0	0.4	0.4	M	83	20%	bright	
Inner Sitka Sound	1.0	3.8	2.3	F	94	40%	bright	deteriorated in net pen
Inner Sitka Sound	1.8	0.2	0.2	F	90	0%	tinge	
Inner Sitka Sound	2.4	3.0	0.8	F	96	0%	tinge	slight bleeding-gills

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Addendum to:

SURVIVAL OF CHINOOK SALMON CAPTURED AND RELEASED BY A PURSE SEINE VESSEL IN SITKA SOUND, ALASKA

by G.T. Ruggerone and J. June. 1997.

The following tagged chinook have been recovered since publication of this report:

Tag #1374: chinook salmon captured by purse seine near Cape Edgecumbe (i.e., "migratory" fish) on June 18, 1997, held in net pen in Bear Cove until release on June 23, 1997. Recovered at Gastineau Salmon Hatchery rack on September 8, 1997 by Steve Schick.

Submitted By
JJ Orloff
Submitted On
2/7/2019 11:59:56 PM
Affiliation
Previous Chignik Fisherwoman and Now Chignik City Clerk

Phone
907-512-1991
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marjonette8@gmail.com
Address
8 Castle Cape Drive
Chignik, Alaska 99564

Board of Fish Commissioner and Board:

My name is JJ Orloff and I started fishing with my Dad, George Orloff here in Chignik, AK when I was a very young girl. Commercial fishing has always been my favorite job with all the best memories and if I could physically continue to commercially fish I would, unfortunately I can't and I chose to go to school and pursue alternative jobs in an office setting and not the beautiful outdoors on the water, where it is much more peaceful. Let me tell you I would rather, but I'm glad my family is still involved.

My Grandfather George Naumoff from Afognak was a great fisherman, my Grandfather from Port Moller was a great fisherman and my Dad is still a great Chignik fisherman and doesn't ever want to retire. I admire them all and I am proud to be a part of this industry and I'm glad to have my entire family involved. When I grew up my Mom and Dad and two sisters and two brothers all fished on the F/V Marjonette and it was a great way to grow up learning to work hard and earn your own money and to put fish away for the winter months through our Subsistence lifestyle. Now that I have my own family and my significant other has a boat and permit here in Chignik, and my three boys and daughter fish as well, this is why I am writing this letter, I want this to keep this in my family for generations to come. My kids all started at a very young age as well and its just how we grew up and have passed on our work ethic and want to from generation to generation.

I would like for this occupation and subsistence lifestyle to always be there for my kids and the people from this region. We all support each other here in gathering fish for drying, smoking, pickling and canning. It was a rough year last year when we couldn't get enough reds to put away for canned salmon for our home pack or even frozen fillets for our winter supply which we rely heavily on to get us through the winter. We have wintered here in Chignik Bay for the past 7 years and even when we lived in Kodiak, we made sure we had enough fish to make it through the winter. It is a definite staple in our diet and with the low numbers of sockeye salmon we chose to not put any away the year before, we only put away (spawned out) red salmon for drying. As for this year, we canned only a few cases and put one bucket away, just because we knew this was going to be a tough winter, especially since we lost our main source of income. Now I'm having to pick up the load of supporting our entire family because of this devastating fishing season and its difficult to make ends meet, especially with the lack of jobs and funds available to keep the City employees busy. This is very disheartening and very hard to see families struggling to pay for fuel, electricity, water/sewer and even food. Its heart-breaking to know that our elders are struggling and families with young children that have no back-up plan because fishing is all they know and are trying to come up with ways to feed their children.

The City of Chignik runs off of a 1% fish tax and a 2% processing tax that has kept this City alive and running since its incorporation in 1983. It has always been able to keep the City operations going on just that with little help from grants and other resources, but in the past few disastrous seasons, we have found it harder and harder to make ends meet and since the utilities were usually just sustainable we are finding that we can't pull from other sources to cover where we are lacking in the loss of this huge gap in revenue loss. I have only been the City Clerk for the past three years and it has been a tumultuous three years with the extreme highs and lows from first the low fishing numbers to the processing tax being close to nil, due to not having a shore based plant and the refusal of any Processor to build here, but that is besides the point if we don't have any fish to process.

Since I have been here in Chignik every summer since I was 2 years old, I pretty much know everyone and to see the people here struggling when they aren't used to that, is very difficult to see and having to deal with it on a daily basis by people asking for fuel that they can't pay for, asking for power for their house when they can't afford it, and for food credit at our only City owned small scale store when we know they have no income coming in, it is very hard to say "no" to.

This is very hard emotionally because not only has this affected my personal home life but my professional life as well. I feel like I'm drowning in despair and want to somehow turn this negative energy that has been surrounding this entire region due to this catastrophic 2018 fishing season and hopefully turn it into a positive energy to help sway the Board to help come up with a solution to change this around to save this fishery for the people involved, the communities involved and the future of the people and children. The schools here are hurting, people are moving out, when they actually want to stay and live here. They are being forced to leave home due to lack of jobs and a way to feed their families and schools are close to being shut down.

My kids are just as passionate as I am about fishing and its so sad to see them not being able to get out there and do a job that they LOVE. You don't see that very often anymore and now I feel like something good is going to be taken over by something politically charged and we will be shut down without letting us have a voice. I know majority rules in a lot of cases, which I'm sure that the Board will be swayed to listen to the bigger party, but in actuality, if the rules don't apply to all to watch the escapement goals for incoming Sockeye to Chignik and they keep getting overfished. No one will win. The MAJORITY of the fish will be gone to the point that they will be gone

forever. Then what? The political fight will have been for nothing. This isn't a war against each other, this is a fight that we should all be in together, to come up with ways to conserve this fishery. To come up with new ways to manage the escapement so all surrounding areas, not only hear the escapement but also have to comply with holding off on fishing until the goals are met, just like the area where the fish are coming back home to spawn has to. To work together to find better ways to manage the openers and closures to make it fair and equitable for all. I know we can't always agree on everything, but why can't the Board of Fish at least hear both sides of the story and TRY to be fair for both sides.

We all know what the facts are and we can't keep ignoring them like they don't exist. The WASSIP study was completed and we know the Chignik sockeye salmon are being intercepted in the Shumagin Islands and Dolgoi. The late Morey Jones was adament about making it known and no one listened to him. We didn't have power in numbers because of how small our numbers of permits are in Chignik compared to the number in the South Peninsula and the little support we have. I just ask that the Board consider the facts and consider the future and all involved and maybe come up with new regulations to try to conserve this fishery for all involved and for the future generations to come.

Thank you,

JJ Orloff

PC28
1 of 1

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Dear Sirs:

I'm writing in regards to our Sad fishing season, in Chignik You need to change how the Shumigan + Wolgoi Island areas are managed Area M Their getting the fish coming our way. Fishing is our only means of income for the year. My husband Harvey Kalmakoff Sr. lived for fishing. I fished along side him for over 35 yrs. as a crewmember we also family fished. Our means of paying our bills, electricity fuel groceries water/sewer etc... in Chignik and our permanent home Perryville, Alaska-99648. This is all I have to say on the matter. You have to start regulating the fishery better We as Chignik fishermen are losing out in the long run. Every year, and now it comes [redacted] down to this year. All we as a family cared about was making it to the next season. Also I wanted one of our 4 boys to follow in their dads footsteps. But not if fishing is like this year.

Sincerely Joan K + Boys
F/V Ocean Spray
BX133

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BOARD OF FISH

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KELSIN_MICHAEL@OUTLOOK.COM

FEBRUARY, 2019

Dear Mr.Chairman,

I am a fifteen year old full-time resident of Chignik Bay and I have been commercial seining since I could remember. This past 2018 salmon season was a surprise to us all, a surprise that we could have avoided, and a surprise that left families struggling. Even the non-fishing families rely on the salmon to show up. This whole town relies on the salmon.

Our community usually receives fish tax, which gives more of a budget for local employment opportunities. Since last year I have noticed a population decrease, people who depend on jobs here in town, fisherman, and school students, who are unfortunately forced to move out in need of a job in order to survive. Those who can't even afford to move away to find better jobs, struggle to pay house bills, and if they can't pay their bills then the City of Chignik doesn't have a wealthy enough budget;that is capable of employing residents. Also, we are only four students away from the school shutting down completely, due to students leaving. It's all a downwards spiral, and we need to do something about it now, before the salmon run is gone for good.

Now I would like you all to imagine that you were in our shoes and we were in yours. You are the hope that we need in order to make a change in the fishery. If your family was struggling and the future of your livelihood, town, and lifestyle was at my sake, I would do everything it takes to do what is right.

Sincerely, Kelsin Orloff

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February 7, 2019

Chairman Reed Morisky
Alaska Board of Fisheries
Alaska Department of Fish and Game
Boards Support Section
1255 W. 8th Street
Juneau, AK 99811-5526

Chairman Morisky,

Like many communities in Alaska, salmon fishing is the heart of our community of King Cove, has always been, and hopefully will always be. I am asking you to consider our people, our traditions, our economy and the survival of all we hold dear as you consider proposals the would make changes to our salmon fishery. While there are some proposals worthy of consideration, we would be relieved if the Board of Fisheries takes no drastic actions that would threaten our community. We believe we can survive under the current fishery management regime. Major regulatory changes could decimate our small fishing town.

Changes in the climate and ocean conditions in the Gulf of Alaska make for an uncertain future for native Alaskans and commercial fishermen. Changes in our salmon fishing regulations will add to that uncertainty and are mostly unnecessary. ADFG salmon fishery managers already have emergency order authority, and use it when they see a need. Our fishermen share in the burden of conservation for Chignik bound stocks in the existing Dolgoi and SEDM regulations. Our fishermen are likewise mindful of Chum salmon bound for western Alaska and participate in a chum salmon pool during the month of June, which encourages chum salmon conservation. Fishing in the King Cove area dates back over 100 years, and native people have fished here for thousands of years. We are proud of our heritage of sustainable fisheries locally and our contributions to sustainable salmon fisheries statewide.

Thank you for the opportunity to comment. Please remember that lives and livelihoods depend on your decisions at this meeting.

Sincerely,

Della Trumble, CEO

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

February 7, 2019

RE: **January 24, 2019 Non-Regulatory proposals memo**

Dear Chairman Morisky and Board Members,

Kodiak Regional Aquaculture Association requests that you do not take up the four non-regulatory proposals forwarded to you by your Executive Director on January 24th, 2019 during your upcoming Alaska Peninsula/Chignik/BSAI Board meeting. These four proposals were not discussed during your work session agenda, which is current practice, nor were they previously published. Consequently, public notice has not been adequate. Perhaps, for the Alaska Peninsula/Chignik/BSAI meeting it could be argued that the Chignik escapement goal and the Alaska Peninsula test fish proposals are timely for discussion due to their subject matter but the Salmon Enhancement Forum and the Sitka sac roe working group proposals are clearly outside of the subject matter scope noticed for your upcoming meeting.

Moving to the merits, the hatchery forum proposal would supplant existing joint-protocols and, perhaps, supersede the Board's hatchery committee. The Board has the authority to establish forums of this nature as needed on an ad-hoc basis and has frequently done so. It seems unlikely the Board would wish to saddle yourselves with a regulatory requirement that you MUST have regular meetings to discuss "production trends", "management issues" and "updates on the hatchery planning efforts, wild and hatchery stock interactions, biological considerations and research." These issues seem to be accurately described and addressed as part of the upcoming agenda for Board's Hatchery Committee meeting on March 8. Two meetings, should action be taken to place this proposal in regulation, one of which would be required on an annual basis, both on the same topics, would be redundant and is not needed.

KRAA appreciates the Alaska Board of Fisheries desire to better understand Alaska's enhancement programs. However, we believe the Board's committee process is adequate for the Board's purposes and that requiring an annual public forum for "hatchery issues" is unnecessary.

If you have any additional questions regarding KRAA's position on these issues, please do not hesitate to contact me.

Tina Fairbanks
Executive Director

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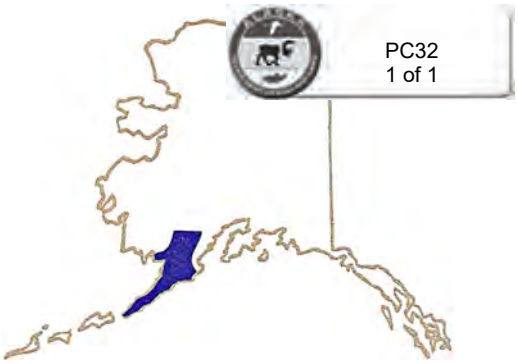

February 7, 2019

Alaska Board of Fisheries
Board Support Section
P.O. Box 115526
Juneau, AK 99811-5526

Regarding: Selected Chignik and Area M South AK Peninsula Proposals

The Lake and Peninsula Borough highly appreciates your attention to the fishery proposals that are before you at your February meeting in Anchorage. Many involve the Chignik Management Area (CMA). The 2018 sockeye fishery there was totally disastrous with only 128 as the season total harvest for sockeye salmon. In the previous year 2017 the sockeye harvest was better but only about one-half of Chignik's long term average. If it was not for the record high 2017 pink and chum returns in the CMA that year the Chignik salmon fleet would, for most the part, be completely out-of- business due to the high costs of insurance, travel, boat maintenance and crew necessities(groceries & gear). We request the BOF take an in-depth review of the June and July interception fisheries on the South Alaska Peninsula and consider imposing regulations so that resource sustainability and sharing the burden of conservation are completely and thoroughly addressed in their management plans and especially in the Shumagin fishery where there appears to be little if any accountability on the harvest of non-local sockeye salmon especially those bound for the CMA.

As to specific proposals the following comments are offered:

Proposal 128: Chignik is in dire straits as its only industry is salmon fishing. Needed is an increase in terminal harvest opportunity, and this proposal would go a long ways by increasing the minimal terminal harvest requirement from 600k to 1 million as addressed in SEDM management plan.

Proposal 136: Amend: needed are more than minimal closure windows (e.g. 72 hours closed per week) to permit reasonable passage of transient sockeye salmon in the Shumagins during June and further a requirement that seine and gillnet gear fish concurrently and not alternately to where continuous fishing is occurring at all times.

Proposal 138: The Dolgoi Islands Area fishery in June and July is a significant harvest area on Chignik-bound sockeye salmon traveling east. It is purely an intercept fishery that has expanded and the current sockeye cap of 191k is ineffective when Chignik run failures occur. The Dolgoi Area should fall under the SEDM plan thereby ensuring a minimal harvest opportunity and escapement for Chignik.

Sincerely,

Glen R Alsworth, Sr.
Mayor

Submitted By
LAURA PEDERSEN-STEPANOFF
Submitted On
2/2/2019 10:41:16 PM
Affiliation

Phone
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We live in Chignik Lagoon from May to October each year. With the 2018 disaster and the lack of fish in the past few years we have no more future in the Chignik fisheries. If something is not changed at this meeting and the Board of Fish and Game continue letting other areas kill off our ahistorical fisheries our fisheries will take to long to recover. This will devastate communities that rely on the Chignik Fisheries. It will force the people to leave there villages. This will closes schools and clinics and force the Tribal Office to charge more for their services. In the last few years we have fished with out getting our full escapement and no amount of fish being caught in the test fisheries When we call Fish and Game Chignik we are told that the prediction is high this year so the fish are still coming. So we fish for nothing and then other areas open and take our fish. Then our weir is playing catchup while we sit on the beach. The Chignik Weir should count every half hour for one season to see what the difference is from the year before. Some of the old way that the Department of Fish and Game know longer work for all areas. We want fish up our weir not ghost fish. We want to know about our opening before Kodiak does so we dont get calls telling us that we going fishing before we have a notice of a opening. When marker areas are closed that they are announce clearly to the fishermen. We want a good test fishery before a opening. We would like all opening in the day light or right before day light if possible. The Chignik Department of Fish and Game needs to run its fishing area with out help from other departments in the state. Our weir has gone down hill in the last few years. We aren't worry about the weir getting the numbers of fish perfect as long as we are getting enough for a good return. Every year can't blamed on the environment and global warming. Its time to clean house and make changes to the Chignik fisheries. Our livelihood relies on this meeting. Thank you Laura Stepanoff

Submitted By
Matthew Siemion
Submitted On
12/8/2018 11:31:11 AM
Affiliation
CRAA

December 04, 2018

RE: Chignik Finfish - Proposals 128, 137, & 138

Dear Board of Fisheries,

My name is Matt Siemion, and I'm a second generation Chignik Fisherman and an Alaska Native. I've been fishing in Chignik since 1975 when I started fishing with my father at 12 years of age. A lot has changed in the Chignik fishery since then, and not for the better.

The 2017 and 2018 sockeye fisheries in Chignik have been a disaster. The outlook for Chignik sockeye is dire. Area M, our "naughty neighbor" to the west, needs further restrictions in the Shumagin and Dolgoi Island fishing areas; these areas do not share in the conservation burden, and they are habitually allowed to harvest fish regardless of the escapement numbers associated with the migrating stocks they are harvesting: Chignik, Kodiak, and Cook Inlet (per WASSIP). Last season, Area M was restricted because the Chignik escapement was less than half of the bottom escapement objective, but future restrictions are warranted. It is foreseeable that in 2019 Chignik fishermen will sit on the beach and will be unable to terminally harvest returning sockeye salmon, as Area M continues to fish target non-local, migrating sockeye.

The last couple of seasons (2016 & 2017), and well before that, it has been noticeable that the first and second runs arrive to Chignik in irregular patterns in relation to what the historic norm has been. The fortunate fish that do arrive have gillnet marks and often lack diversity in size and fecundity, since they have been targeted by gillnets with a set mesh size. For example, one day the fishing in Chignik is good and uniform throughout the tide, and the next day it is spotty and unbalanced. Historic catch patterns are nonexistent. In short, what I've noticed is that as the South Peninsula and Kodiak get better at targeting Chignik bound sockeye, those lucky fish that do make it back to Chignik waters arrive in non-historic patterns: spotty catches, gillnet marked fish, and erratic size, sex, and weight.

I respectfully request that the Board of Fisheries restrict commercial fishing in the Shumagin and the Dolgoi Island fishing areas of the South Alaska Peninsula until the Chignik early and late sockeye salmon run minimum escapement numbers have been achieved. The justification is strong. Such action is required for the conservation of Chignik bound early-run and late-run sockeye salmon; area M needs to share in the conservation burden of Chignik sockeye. It is common knowledge that the Shumagin Islands and Dolgio Island areas are a well-established late-June and July migration corridor for Chignik sockeye per the Department's three-year WASSIP Investigation (2006-08). In that study for 2006 Chignik sockeye salmon comprised 67.0% of the July or post-June catch, in 2007 37.2%, and in 2008 47.3%.

Most importantly, windows need to be adopted into the management plans to ensure that there are periods when no fishing gear of any type is in the water in the Shumagin and Dolgio fishing areas during June and July. Along with this, the Dolgoi cap needs to apply to the entire Dolgoi area rather than to one small, specific statistical area.

Please join in the effort to protect the Chignik sockeye salmon fishery.

Sincerely, Matt Siemion

Submitted By
Michael Macaluso
Submitted On
2/4/2019 11:06:57 AM
Affiliation

Board of Fish Members,

I am Michael Macaluso, a Chignik seine permit holder and owner/operator of the F/V Wave Walker. Thank you for your hard work for Alaska and its fisheries. I hope this meeting will prove with science, economics, and reason that the Area M fishery must become more accountable to conservation and sustainability in its management and policies regarding Chignik. While my interest lies in Chignik, I do wish for all fisheries, communities and fisherman in all areas to be able to make a living and keep their fisheries healthy. There is little doubt that our oceans and enviornments are constantly changing and I believe that this is one of the reasons the Board of Fisheries exist, to adapt policies with changing climatic, ocean, economic and fishery conditions.

I am baffled by many of the proposals in favor of Area M. The proponents of these proposals are making bolder and bolder efforts to increase their interception power without regard to sustainability and accountability. Many of their proposals are in direct contradiction of the BoF policy for the Management of Sustainable Salmon Fisheries as well as the BoF policy against Expanding Interception Fisheries. Area M is a thriving fishery that will be expanding its fleet with the processor Silver Bay. Silver Bay is building a plant and a whole other fleet in the region creating substantially more catching power in the region. **There will be substantial more pressure on Chignik stocks because of this alone.** Area M is coming off the biggest season in all of Alaska history in 2017 where the average seine vessel made approximately $715,285 compared to Chignik's average of $263,970. The top 7 boats in 2017 Area M averaged an incredible $1,470,000, according to the Commercial Fisheries Entry Commission quartile tables for statistical earnings. https://www.cfec.state.ak.us/quartile/X_S01M.HTM The quartile reports are not out for 2018 but we know that Chignik was essentially $0 while Area M produced an average season according to catch reports for the year provided by ADF&G. While Chignik was closed the entire season, struggling to meet escapement, Area M intercepted Chignik sockeye along with other salmon destined for other areas to have a respectable seasson. The growing disproportion between the two fisheries is more evidence that policy and management need to change. Area M has a thriving fishery. For proposals to make such bold and greedy grabs with false statements and facts at an already struggling neighboring fishery and its communities, is a grave insult, and one that I hope is recognized by the Board.

I **oppose** Proposals 129 and 130. It falsely states that only 60% of sockeye are bound for Chignik. A previous tagging study results concluded 80% sockeye are Chignik bound and ADF&G has stated that the 80% composition is "not inconsistent" with findings from a GIS study.

I **oppose** Proposal 131. Chignik is struggling and is already the most intercepted fishery in the state. And to ask for an increase in allocation is ludicrous and greedy.

I **oppose** Proposal 132. To expand the interception fishery that is SEDM is contrary to BoF policy. Another greedy proposal.

I **oppose** Proposal 133. If SEDM fisherman wish to fish the same openers as Chignik they should buy a Chignik permit.

I **oppose** Proposal 134. The arguement made in this propsal is that on some years there is more Bristol Bay sockeye than Chignik. To that I would say of course. Bristol Bay is having their biggest runs in history the last few years while Chignik is having some of their worst. That would make sense. But as indicated by WASSIP the interception rate of Chignik sockeye does have a major impact on escapement and Chignik harvest. On weak Bristol Bay years and strong Chignik years there would be substantially more Chignik fish harvested in the region than Bristo Bay fish. Its common sense. And lets not forget that the Chignik fish caught here are traveling east. And if they are not harvested here they are harvested in the Shumagains where there are nets in the water 24 hours a day, 7 days a week. (Also the WASSIP data was observed during below than average Chignik runs. So on an average year the WASSIP numbers of Chignik fish would be higher than the numbers we are all currently using.)

I **oppose** Proposals 139 and 140. This area is one of the major causes of interception that does not share in the accountability of the fish they intercept. The WASSIP study clearly shows this is a major pathway for Chignik sockeye. The area as defined is not big enough in scope and should be expanded to include the whole area. All one needs to do is look at a map and see that if one can not fish in one area they move to the next point or down the beach to catch the same fish. This area should share some of the responsibility for conservation when Chignik is below escapement and/or has a weak harvest.

I **oppose** Proposal 141. It would increase the interception fishery even more through major migration corridors negatively impacting not only Chignik but fisheries and systems in other parts of the state.

I **oppose** Proposal 142. Another grab at unrestricted fishing on non-local stocks and zero accountability.

I **oppose** Proposal 148. Another irrational proposal. The WASSIP study shows the opposite of what this is suggesting. It shows that the SEDM fishery intercepts Chignik area chums not the other way around! There is no evidence that Chignik intercepts SEDM chums. The more rational proposal is to have SEDM and the Shumagains to open only when Chignik's Perryville and Western district are open.

I **oppose** Proposal 152. Under this logic then all of Area M should be closed when Chignik sockeye have not reached escapement. This proposal is effectively saying there needs to be accountability in adjoining areas which I do not disagree. It is the whole point behind some of Chignik's proposals. The difference is there is no evidence that Chignik catches any Orzinski sockeye. And for comparison the Orzinski sockeye system needs only 15,000 escapement compared to 625,000 escapement for Chignik. If the proposer really cares for the escapement of the Orzinski then it should focus on shutting down Dolgoi and the Shumagains.

I **oppose** Proposal 153. The proposal would severely limit Chignik's ability to harvest its local stocks. There are 46+ local salmon producing streams in the Perryville and Western districts which are important to Chignik.

I **support** Proposal 128. 600k Chignik harvest before SEDM can fish is very inadequate. 600k fish harvest is extremely small for the fleet size economically. Average boats are still not "breaking even" . With say a 65 Chignik boat fleet that's an average of only 9,200 sockeye a boat. At a 5 1/2 lb average that's 50,700 lbs per boat. At $1.20/lb that's $60,900 average gross per boat. As an owner/ operator I don't get out of the red until I start grossing $120,000. Only when harvest levels reach 1 million or more do some operations start to get out of the red. Chignik sockeye is the primary source of income for Chignik fisherman. There is the odd year when pinks may show up, but as a fisherman we rely on Chignik sockeye to pay our bills.

I **support** Propsal 134. This would reign back in the expanding Area M interception fishery to the way it is was managed before 2001. This area should never have opened in the first place. It is a proven major interception area for primarily Chignik sockeye and also for sockeye bound for Kodiak, Cook Inlet and other areas.

I **support** Proposal 136. There needs to be some windows of time for migrating fish to pass through the region. Chignik fish are abundant in the region during this time. As currently manged there is not a time in Area M where Chignik fish are not harvested from June 7 through the 29th. Last year when Chignik was closed due to poor escapement, these areas in Area M were fishing Chignik sockeye everyday until the emergemcy closure. The curent plan was adopted in 2004. This proposal would in effect regin back in to more sustainable, conservative and accountable management of the past.

I **support** Proposal 137. The initial approved proposal at the last BoF to have a Dolgoi management plan was a good start but it did not reach far enough in scope to make much of a difference. All one needs to do is look at a map and see that its a long corridor through the region for migrating fish and if its closed in one area, just move down the corridor to where it is open. Its proven that Dolgoi is an interception fishery with an average of 50% of all passing fish heading to Chignik according to WASSIP. To still ensure ample harvest opportunity for Area M fisherman and ensure accountability and protection of Chignik bound sockeye I encourage the entire Dolgoi area operate under the SEDM management plan. This would also ensure more Chignik bound fish to pass through SEDM giving more opportunity in that area as well.

I **support** Proposal**s** 149, 150, and 151. It gives more harvest opportunity of Chignik sockeye in Chignik areas, gives ADF&G more flexibility in management and it reduces over crowding of boats in the current areas.

I **support** Proposal 158. Area M seiners have a maximum net length of 400 fathoms. Kodiak has a max length of 250 fathoms. And Chignik is only 225 fathoms.

Again I would like all fisherman involved in the state's fisheries to make a living off the amazing resource that is Alaska salmon. There is a balance that can be achieved. Area M has an extremely large area and many different fishing opportunities throughout the region. Area M fisherman can fish multiple areas including the Unimak District and the north side of the AK Peninsula and terminal areas designated for their local stocks. In Chignik we do not have multiple opportunities as a terminal fishery. We do not have interception as a "plan b" if our local stocks fail. We rely solely on what the Chignik area can produce, All the while our neighboring areas to the east and west intercept Chignik fish. The allocation can be argued and it will continue to be as long as there is salmon. But what should not be an argument is accountability for unrestricted interception when entire runs are failing across the state. I believe one of the functions of the Board of Fish and its revolving meetings is to adapt and confront changes as they arise in each fishery and to help make economic sustainability possible for all areas. I appreciate your thoughtfulness and consideration to these proposals.

Sincerely,
Michael Macaluso

2\7\2019

Dear Mr. Chairman and board members,
I'm hoping you are having a good time and that that you are thinking well. I hope that you know what you are doing. And I'm thankful that you are helping with the fish and game and getting the fish in Chignik. I'm glad your trying to help families get enough money to survive. We didn't get any money fishing and we need help getting fish. I really like fishing and miss it. I am praying for your fishing and game meeting and all the fishermen and families.

Miya Allen
3rd grade

Myles Purington
PO Box 521
Homer, AK 99603
February 7, 2019

Alaska Board of Fisheries
Board Support Section
PO Box 115526
Juneau, AK 99801-5526

Subject: South Alaska Peninsula- Shumagin and Dolgoi Area Fisheries

Hello,
My name is Myles Purington. I am a young fisherman in the process of buying a boat and entering a stakeholder role in our state's salmon fishery for the first time. In two seasons running a boat and years before that spent crewing, I have found Chignik to be a challenging but deeply rewarding fishery to participate in.

I believe that with fair, rational management of the resource, every salmon fishery in the state is capable of allowing motivated individuals to earn a living. We all can agree that there are better and worse seasons in any fishery. Unfortunately, the reality is that what happened in Chignik in 2018 transcends even economics. If the sockeye fishery is not guarded against future run failures, it will be lost, and everyone will suffer- even those intercepting Chignik-bound sockeye.

My support falls behind proposals that can help more escapement-bound fish make it back to the Chignik district. In particular, we need to ensure that future regulation of the Dolgoi Island and Shumagin fisheries respects the same management ideals as Chignik's. We should all be able to agree that 99% of Chignik's sockeye harvest taking place outside of the district is a clear indicator of how dysfunctional the present regulations can manifest themselves.

I also stand behind proposals that help Chignik salmon fishermen make the most of the other local opportunities to help stabilize their season among erratic first and second-run sockeye returns.

I **support** proposals **149, 150, 151,** as they will help diversify fishing opportunities during the middle of the season.

I **support** proposal **147,** as it will increase late-season fishing opportunity in Chignik Lagoon, which is historically important to village residents.

I **oppose** proposal **148.** The terminal runs surrounding the villages of Ivanof Bay and Perryville deserve to be managed independently from those west of Kupreanof.

I **oppose** proposals **129, 130, 131, 132, 152**, and **153**, as these measures will represent an obvious increase in interception of Chignik sockeye. This is completely inappropriate given the struggles of the Chignik fishery.

It is time to recognize that the fates of the Chignik and Area M salmon fisheries are diverging too rapidly. Evidence shows that it's not a coincidence. Lifelong fishermen should not have to lose their operation to prove it.

Thank you for your time.

Myles Purington

Patrick E. Kosbruk
P.O. Box 110
Perryville, Alaska 99648

Alaska Board of Fisheries
Board of support section
P.O. Box 115526
Juneau, Alaska 99811-5526

Subject: South AK Peninsula- Shumagin & Dolgoi Area Fisheries

I am very concerned about the disastrous season I had as a boat & permit owner in Chignik, as well as a subsistence user. I did not deliver one salmon this past season, yet I had an obligation to pay the state on a loan I acquired to purchase the boat and permit. I've heard over and over, one of the reasons the salmon did not return was partially because of the "Blob". In my opinion, this alone calls for a more stringent management approach to the management of our salmon resources wherever significant numbers of Chignik sockeye are harvested. I do not believe it to be fair, that Chignik bears the burden of conservation of the Chignik sockeye run and is not allowed to fish commercially while studies prove that the Chignik salmon are being intercepted in the South Alaska Peninsula-Shumagins and Dolgoi area fisheries with zero or totally ineffective controls.

Not only were we not able to fish commercially, there was a Federal subsistence closure on our salmon as well. That impacted our ability to subsist on salmon. Yet, our salmon were being harvested by the South AK peninsula-Shumagin and Dolgoi area fisheries. Although we were allowed two outer district openers to try to explore for early pinks & chums, we were so heavily restricted to protect sockeye that the total season Chignik salmon harvest was a mere 128 red salmon, 1 coho, 6 pinks, and 924 chum. More of the Chignik bound sockeye salmon were harvested in Area M than in Chignik, without the restrictions we have to bear. We didn't even reach our low escapement goals.

A few years back, I sat on a Board of Fisheries informal negotiating committee, and to this day it blows my mind to think of it. The objective was to find a solution for the Dolgoi area fishery interception of Chignik salmon. I, as well as everyone else, that sat on the two opposing committees, were not biologists, and to ask two groups with such completely opposed interests to do what we were asked to do was just wrong. There are well established management tools that the Board and the department can use as tools to more appropriately share the burden of conservation of Chignik sockeye salmon stocks. These tools need to be used to curb this unmanaged interception of Chignik bound sockeye salmon. Things have changed in my community because of the disastrous season. Less salmon for consumption, I don't ever recall it being this bad. Our young fishermen having to rely on welfare, our school funding crashed, and delinquent boat payments.

The fishing industry has changed as well, fisherman naturally become better at their trade therefore their ability to catch fish increases year after year. That's why the regulations need to change as well. Status quo is just not going to work anymore. South AK Peninsula-shumagin and Dolgoi area fisheries must bear some of the conservation burden on Chignik salmon.

Sincerely,

Patrick E. Kosbruk

Submitted By
Peter T Anderson
Submitted On
2/7/2019 10:41:54 PM
Affiliation
F/V Patti Ann

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ptanderson780@yahoo.com
Address
PO Box 37
Chignik, Alaska 99564

Capt. Peter Anderson

F/V Patti Ann

Chignik, Ak

Dear Mr. Chairman and Board of Fish,

I am a 3rd generation fishermen from Chignik, born and raised. This last salmon season was a disaster, and the year before wasn't that great either, but not nearly as catastrophic as this. We didn't really notice the low numbers of sockeye last year because we were blinded by all of the humpies that showed. I almost wish the Pinks had not come for the fact that we would be a year closer to hopefully fixing this problem. And yes, this is a problem of mismanagement, we have had no second run for years now. We have some what of a bumper on the Kodiak side but there is no buffer or any safety net for area M. They have only one terminal sockeye river that only produces less than 20,000 in full return. So that being said, they are almost a total intercept fishery for sockeye.

I grew up dreaming of running my own boat and am very proud that I was able to do so. I am saddened by the fact that if the fishery is mismanaged any longer i'll will never be able to watch my sons fish alongside me as I did with my Dad.

I really hope that the Board of Fish will read these letters and realize how many people depend on this salmon-run. I am just one, of many who are in desperate need of better seasons ahead. I believe that with the right mind-set, the people of this fishery and the Board of Fish can come together and do what's right for the sake of the future generation fisherman. We all need to come up with a resolution for this problem so that it doesn't happen again.

Thank you for your time

February 6, 2019

Mr. Chairman and Members of the Board,

A great disparity can be seen as of late on the Alaska Peninsula. Last summer, sockeye salmon stocks were depressed. Many fishermen were faced with smaller catches and waiting for diminished returns. We all know how important fishing is in Alaska. But in Chignik there was no fishing. Escapement was not met day after day all summer. We were patient, sure that the salmon were coming because they always have and yet we were apprehensive from waiting so often on the beach for escapement to catch up in the past decades. The fisheries on both sides of us were fishing. They must be late. Then there was hope for the second run. Soon fear for the rivers escapement, that we know sustains our villages in future years, began to grip us. The reality of the situation set in. Some with other means went to other areas to fish in August. Those of us left wondered how we will make ends meet this winter. We just paid out tens of thousands of dollars in insurance, fuel, crew travel, groceries and licensing for nothing. We quietly went hunting and put the boats up.

All the while, the fisheries (one overwhelmingly interception) on either side of Chignik put in reasonable albeit smaller seasons. This disparity didn't just effect sockeye stocks either. Our Chinook escapement was nearly half of its minimum at 825. In the Shumagins, 14,999 Chinook were caught. There isn't even a Chinook run in the entire South Pen. Either, the Shumagin fishery is very and overly effective, or the kings were traveling east, as the rest of the S. Pen including S. Unimak only caught 2,028 kings. I suspect both. But I have digressed.

What I would ask is that you would look at and address the cumulative effects from many regulation changes delivered from past Boards. Each regulation change was always coupled with the caveat that it would be negligible impact to Chignik. That it could be revisited. With all due respect, a lot of negligible impact has amounted to devastation in 2018 when coupled with possible environmental factors. For us in Chignik to not fish a season while those around us do is unfair at best.

One such change for the South Peninsula is that between 1989 and 2000, the average first opener was about June 15th rather than June 7th as it is now. This certainly afforded a week more of open water for Chignik stocks to transit through.

Before this, as far back as 1975, the board had implemented a GHL based on the Bristol Bay forecast due to controversy between South Pen and Bristol Bay fisherman. Inadvertently, or in their wisdom the board protected areas to the east of the South Pen. by shifting the majority of the harvest (81.9%) to the South Unimak area, thus focusing harvest, even more so, on Bristol Bay sockeye. What's more, conservation was boosted with four time periods that would trigger closures if a large number of migrating sockeye were caught. This helped mitigate impact on lesser migrating stocks so as to not be over harvested.

It is of note that in 1974, the South Pen. was closed in June due to anticipated wea Bristol Bay. If only that concern would be shown for Chignik on actual week runs.

In 1984 escapement windows were added. This also had a positive effect on Chignik returns.

In 1986 chum catch ceilings were added which also inadvertently let Chignik stocks travel unencumbered during much of June.

As I understand it, the chum ceilings were immensely restrictive to the South Pen fisheries. From 1989 forward, regulations that afforded Chignik protection were slowly eliminated.

In 1998, gone was the windows regulation. In 1991, the chum cap was raised, dropping only slightly in1992.

In 1994, fishing was allowed prior to June 13th but not before June 11th.

In 2001, the most devastating blow to Chignik was the loss of the GHL which allowed more fish harvest in the Shumagins, right across the border from Chignik, however the implication was not noticed as there were many other restrictions added then. These were removed or softened in 2004 and any chum requirements were removed. In 2013, windows of gear free water were eliminated as gear types fishing was staggered. They had all fish concurrently.

The point is that all but maybe the implementation of the GHL using 6.8 and 1.5% was with a view of fisheries to the west. No real consideration went to impacts on Chignik. What we are left with now is a much higher harvest rate on Chignik stocks with no shared burden of conservation except in SEDM. The GHL at least mitigated that lack. The delayed opening dates, the windows, the chum caps, the concurrent gear types fishing all helped maintain the Chignik sockeye returns. Everyone of them is gone now. Now if the migration patterns favor to the west of Chignik (and they do vary) there is nothing to protect the over harvest in the Shumagins of Chignik stocks. The cap in the Dolgois does very little and should be shored up as well.

When all harvest rates in the South Pen are added up on Chignik stocks in 2006, it was nearly 30% in 2006. That year Chignik Bay's (essentially the Lagoon) harvest rate on Chignik fish was only 31.4% with 0% on other reporting groups. In all fairness, not all WASSIP years were that high of harvest rates on Chignik. 2007 was 14.4% and 2008 was 14.2%. But on years of a primarily migration from the west to Chignik, the importance of gear free windows, or effort being shifted out of the Shumagins is extremely important. Having those protections will not stop the catch of west bound stocks, it will only change the location of where they are harvested.

Contrasting the impact on Chignik stocks by the South Pen. to the impact on Bristol Bay stocks was 1% in 2006, 3.4% in 2007, and the highest impact was in 2008 at 3.5% harvest rate. The S. Pen fishery, which had been managed and curtailed based on Bristol Bay in the past, has only about 1/8th of the impact on Bristol Bay stocks as it has on Chignik stocks. Uniquely, by having 6.8% of the harvest be caught in S. Unimak, it shifted the pressure off Chignik and at least in June the harvest rates and impact to each terminal area were more equitable.

So of course, I would ask that you either adopt the ACR submitted by the Chignik AC or proposal 134 or 135. We need protection and relief. If we don't find any, we may very well be

on the beach again, as we are looking at another smaller run. Because we are man[illegible] terminal fishery (and for good reason) it will preclude the fleet from fishing on the pinks, chum, and coho in the area. We have no other open areas to fish while we wait for escapement unlike in the fisheries neighboring us. Without a reasonable return of sockeye to harvest we need the other salmon to sustain our businesses and local economy and yet if the escapement is low, we can't pursue them. Our hands are tied. What protects us from the ocean condition of interception?

During last season alone, the escapement approached 10% gillnet marked sockeye at times. I'm sure the fishing gear was by far more effective than the almost 10% that untangled themselves. How many more must have been caught by seines? Interception is happening and we aren't fishing.

Also, as of late, the run timing appears to be shifting later and while we have good management practices in Chignik, they cannot address the cause which may be from interception practices such as earlier openings; only respond to it.

Seiners are faster, bigger, and more efficient now. I have a boat built in 1972 and without all the equipment of larger newer boats, others can pull their gear so fast as to make at least 4 more sets a day. This allows them to leave prime haul spots for new less productive areas, and still have a decent catch for the day. I've seen the Area M fleet at Kupreanoff, before it was closed there, and they already had by far faster gear hauling abilities and bigger boats able to fish rougher weather than the Chignik fleet.

Essentially, if Chignik were to get bigger boats, longer nets, and more fishing area, we would still be limited by the sockeye escapement goals necessary to the future returns. There is no such limitation in Area M as an interception fishery except in SEDM and that is clearly not the only place Chignik fish are caught as shown in the WASSIP study.

Chignik is at a disadvantage now. I am in favor of the actions and opinions of the Chignik AC. I request you look to Chignik as well as Bristol Bay when making decisions in the S. Pen intercept fishery and hope you will heed the Chignik AC's requests. In closing, I plan to attend the meeting in Anchorage and welcome further dialog about these issues. Thank you for your consideration and time. It is greatly appreciated.

Sincerely,

Raechel Allen

Raechel Allen
Chignik Fisherman since 1981
Chignik AC Secretary

Raymond Erickson
February 7th, 2019

To whom it may concern,

I was born and raised in Chignik Lagoon. I have been on boats and/or fishing my whole life.

I have seen a thriving community slowly crippled and dying due to the decline in salmon returns overall for the last couple decades.

With the regulation of our fishery being based on conservation, I have always been happy to allow returns for escapement to the Chignik River System to ensure the preservation of our run, livelihood, and continued survival of our local villages.

It is hard to even imagine a fishery being permitted to fish without any burden of conservation being shared by an intercept fishery. I know that Area M does ensure preservation of their pink and chum salmon streams in their area but that fails to affect their primary fishery that is primarily based on the intercept of other areas fish.

I'm not asking for them to be completely shut down. I know they have family to support same as we do. All I ask is that they share in the burden of conservation just as all other areas in the state are now doing. If they were regulated for windows in fishing periods that would let fish get past it would allow for escapement and fishing in terminal fisheries whose stock pass the area M to proceed to their natural spawning locations.

This would benefit ALL areas of fishing (including area M) due to larger more consistent returns. Please give careful consideration to the proposals issued by the Chignik fishermen and make decisions that help all fishermen.

Thank you for all your time and effort being put into these issues.

Sincerely,

Raymond Erickson
Owner/Operator Midnight Sun Fisheries
Chignik Lagoon, AK

Submitted By
Roderick Carlson
Submitted On
2/7/2019 3:48:38 PM
Affiliation

February 7, 2019

Alaska Board of Fisheries

Board Support Section

P.O. Box 115526

Juneau, AK 99811-5526

Subject: South AK Peninsula-Shumagin and Dolgoi Area Fisheries

I was born in Chignik Bay in 1944, and spent my whole life with my family commercial fishing there. Although now retired, my family and I still depend on the Chignik Salmon Fishery for income and subsistence use.

The Chignik Fishery is deeply ingrained in the culture of our village and neighboring villages. It defines us as a people and has sustained the people in our communities for as long as I can remember. Last summer, 2018, was the first time in history that Chignik did not have a commercial salmon fishery, and our people barely got enough for subsistence use. This has had a negative impact on the health, well-being, and economy of the people in Chignik Bay and other villages in the Chignik region. People are leaving our villages to find work in order to provide food, clothing, and other needs for their families.

All my life in Chignik, I have never witnessed the entire Chignik Salmon fishery shut-down for under escapement in the first and second runs. While Chignik Fishermen sat on the beach, Area M fishermen continued to fish. It has been documented that in 2018, Area M fishermen took about 99% of the Chignik bound sockeye salmon while only 128 sockeye salmon were caught in the Chignik Management Area even with the BOF actions to limit the Shumagin Island fishery.

Please assist our people and communities efforts to make our fishery whole again by limiting the interception of Chignik bound sockeye salmon. The unregulated interception of Chignik bound sockeye salmon in the South Peninsula, Shumagin Islands and Dolgoi Island Areas MUST be controlled! The Area M fishermen MUST share the conservation burden and be responsible for helping the Chignik sockeye salmon meet the escapement goals.

Thank you for your time.

Respectfully,

Roderick Carlson, Tribal President

Chignik Bay Tribal Council

Submitted By
Ron carmon
Submitted On
11/10/2018 1:24:52 PM
Affiliation
Resident

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Board of fish : I ask that you all step down. Remove your self from this roll you serve ! The fish,in the cookinlet area has been miss manage,for a long time now. And your job , can't do the cookinlet any good anymore.

The red salmon are plankton eater, they help keep the ph of our oceans ,at a exceptional level to sustain life in the ocean, these fish are more than just a sport fish,a personal use fish,a native fish,a commercial fish fish.

For years now ,fish and game has used the board of fish to regulate the fishery for maximum sustained yield for all user groups ,and that of course has killed our run of fish, to almost extinction.

When these plankton eater are gone ,our ocean will die.

And I believe you will ,take these fish to that demise.

So I ask you all to leave,I ask that fish and game go the way of the dough dough bird.

We must run this fishery,in away to save our fishery.

Not ruin it.

And it's being ruined,by greed,and lust ,of sport and personal use.

7million fish taken by personal use, 6million taken sport fishing.

Alll at the mouth of the rivers,and spawning grounds.

This can't last.

And you won't look at what you've done.

So I ask you all to leave.

Please don't make things worse,you all need to resign.

Submitted By
Sean Alexander
Submitted On
2/7/2019 12:45:21 AM
Affiliation
Chignik Salmon Skipper/Permit Owner

My name is Sean Alexander, I am a fourth generation Chignik salmon fishermen. I graduated from A.J. Dimond High in Anchorage and also attended UAA. I grew up fishing with my Uncle Morry Pedersen, on his boat, the Kaisha LeNae. By the time I was 12 years old, he gave me a shot at full-time deck hand. By the time I reached the age of 17, I started fishing with my Dad, Jason Alexander, on the Capt'n Jay. At the age of 25, I started running my own boat as a tender in Chignik Lagoon. By age 28, I had a Chignik Salmon permit.

Chignik has always been a special place for me and my family, fishing with my two brothers, Kyle and Jay. Last season, my rights to fish Chignik were taken away from the interception fishery by our neighbors in Area M.

Chignik river system couldn't even obtain minumim sockeye escapement goals. That is extremely terrifying and the State allowed it to happen. I was forced out of my hometown to try and make a living somewhere else. I eventually traveled to Prince William Sound to try and salvage my salmon season, in a area which I was not familiar with. Leaving Chignik was heartbreaking for me, not knowing what my future may unfold.

For the 2019 Chignik Salmon season, I've hired my second cousin, Alec Pedersen, Alec is 16 and a 5th generation Chignik Salmon fisherman. His Grandpa, Morry Pedersen, gave me my first shot at fishing and I'm going to give Alec his.

If the Board of Fish cannot agree on a resolution to a outdated under-managed Area M fishery, there will be no more generations of Chignik fisherman. We are becoming an extinct fishery, brushed to the wayside in favor of a pirate fishery, that is known scientificly by marine biologists and Area M locals, to target Chignik bound sockeye. Proof is in the DNA and scale samples don't lie.

In August 2017, in Sand Point, I was told by a Area M high-liner, "The best way to catch Chignik sockeye is to buy a Area M Permit." Well the fact is, if this is going to be continually allowed and not changed immediately to a more controlled and updated way of dealing with interception, there won't be anymore Chignik sockeye for anyone.

If the Board of Fish cannot come to a resolution to help the community of Chignik, I won't be fishing there anymore, as I cannot afford another summer of waiting on the beach. I am being starved out of my fishery and will be forced to sell out and fish somewhere else. But with these unfortunate events, Chignik Salmon permits will become deadweight and worthless if one cannot harvest.

Therefore, I am in favor of the entire Dolgoi Island under the current harvest cap area, not just a portion of the island.

I am in favor of 72 hour windows in the Shumagin Islands to allow salmon to pass through with no nets in the water.

I am in favor of more fishing time in Chignik in the Western and Perryville Districts targeting Chignik terminal stocks.

Sincerely,

Sean Alexander

Submitted By
Timothy Murphy
Submitted On
1/27/2019 2:16:21 PM
Affiliation

To the Chairman and members of the State of Alaska Board of Fisheries;

Starting with Proposal 128;
From a common sense standpoint, as well as having spent almost every summer of my life in Chignik, this is necessary.
Current regulations do not take into account the advances in fishing equipment and vessels and the killing power now present in intercept fishery fleets on either side of the CMA, when these regulations were created the ability to harvest was nowhere what it is today. As seen in the WASSIP genetic study 50% of one of Chignik's ENTIRE returns was taken in an intercept fishery in one of the years studied. An increase in the threshold is NECESSARY, the Chignik seine fleet cannot survive on 300,000-600,000 sockeye. This number is too low and does not offer the participants in the Chignik Fishery adequate access to resource.
I strongly support increasing these thresholds.

Proposal 129;
This is a greedy fish grab.
And so is Proposal 130.

And so is Proposal 131.

Proposal 132;
Also a greedy fish grab. However, I think something can be done with this proposal.
The author asks for concurrent openings in SEDM with the CMA for setnets. I would ask that the language be created for conservation purposes that SEDM be closed concurrently with the CMA. Nothing to do with their allocation of 7.6%, allocation will be harvested when the CMA re opens to commercial fishing.
The Chignik seine fleet bears the SOLE BURDEN of conservation, you may ask how I can say that, you may say there are conservation ties
in S. AK. Pen. regulations. Allocated, but when the CMA is closed due to a lull in escapement, and neighboring intercept fisheries are in fact harvesting the same resource the CMA is shut down for that shows a lack of parity, even shows favoritism between one Alaskan fisherman and the next. Were both Alaskan fishermen, we both harvest the same resource, but I have to stop and the other fisherman doesn't? It is inequitable policy, there is a disconnect in common sense that there is a small window of opportunity for stocks to be harvested, and for escapement in Chignik.
If fairness isn't on the agenda, then make it about conservation.
We in the CMA have to stop fishing while
intercepts, especially using drift and gillnet web will more than likely harvest the larger females and contribute further to a low quality male heavy escapement compliment we have been seeing in recent years.

Proposal 132;

The author is again asking for concurrent openings in SEDM tied to the CMA's Western and Perryville districts.
I believe they have a management plan in place, and I would only like to see SEDM tied to the CMA with concurrent closures for conservation reasons. Im opposed to anything other than SEDM closing concurrently with CMA closures.

Proposal 134;
I agree and support the proposal, EVEN WITH the shortened fishing periods in the S. AK. Pen. in June and July in 2018 they still had access to an abundant resource, not only that, Bristol Bay managed to have it's largest return in history with the shortened fishing periods in the S. AK. Pen.

Proposal 135;
I agree and support the proposal, the fishery in the Shumagin Islands needs to be reduced to allow non local stocks to transit the area.

Proposal 136;
I agree and support the proposal, lets be realistic, how do you expect non local stocks to do anything but get caught if there's 3 gear types in the water one right after the other?

Proposal 137;
I agree and support this proposal, however when this language was adopted in 2016, a sockeye harvest cap of 160,000 was originally requested in proposal 186.
In the regulations first implementation in the 2016 salmon season in the S. AK. Pen. there was an overharvest in the amount of 277,000 before ADFG closed the fishery. I personally do not understand how ADFG can manage cod fisheries and close them without overharvest of the TAC and are unable to do the same regarding salmon.
I believe if the cap is lowered, there will be LESS of an overharvest, as ADFG management is unable to prevent overharvest.
Were the cap reduced to 160,000, MAYBE the overharvest would be closer to the 191,000 in current regulations.

Proposal 138;

I agree and support this proposal, the emergency regulations imposed in June and July 2018 still gave the S. AK. Pen. fishing fleet access to their fishery, and also helped non local stocks transit the area, again I believe Bristol Bay achieved the massive return in 2018 in part of this reduced fishing time as well.
It is my opinion that had these regulations been in place earlier in June escapement might not have been so weak in Chignik.

Proposal 139;
The only way I would support this proposal is if S. AK. Pen. fishers agreed to create a buyback program for my Chignik permit.
So, I am opposed to proposal 139.
The author is trying to state there is no negative effect from fishing in this area on Chignik. Stating there is no correlation between the two. Creating regulations to concurrently close intercept areas in the S. AK. Pen. when the CMA has to close for escapement is a good way to show a corellation of the effect the intercept fishery has on the Chignik salmon fishery and lack thereof.

Proposal 140;
I am opposed to opening more area or giving more time to intercept fishing.

Proposal 141;
The author states lost fishing time and area as the basis for this proposal.
Harvest in the S. AK. Pen. in 2018 was still healthy, even WITH the emergency regulations used in June and July.
I had 0 days of harvest opportunity in Chignik in 2018. The July 7 inner bay opening ADFG stated they saw no fish in the bays they opened. My fleet manager in Kodiak asked if I was going to go, and couldn't understand why anyone would. My processor sent 2 tenders and took 4300 (fourty three hundred) lbs (pounds) of mixed fish from that harvest opportunity.
With the total sockeye harvest being 128 fish for 2018.
There was a September 3rd fishery as well, with 0 (zero) harvest. So, the argument will more than likely be made, that there was harvest opportunity.

Proposal 142;
I oppose this proposal, as there is a management plan in place for Post June S. AK. Pen.
If anything, adopt the emergency regulations created in June and July 2018 as standard management practices.

Proposal 143;
I oppose this proposal. The author wants to do away with an immature test fishery, asking what fish are being saved and where are those fish going? Someone has to care about future stocks.

Proposal 147;
I agree and support this proposal, it is unrealistic to have such high escapement goals as were implemented in 2016, which can and will reduce any potential harvest opportunity, and have no impact on subsistence as long as ADFG is getting adequate, reasonable escapement. Keep in mind SEDM is un allocated post July 25, we in Chignik no longer have healthy returns of sockeye into August and September.

Proposal 148;
I oppose this proposal, it appears to be nothing more than trying to put a spin on who's intercepting who's fish.
S. AK. Pen. has management plans in place, as does the CMA's Western and Perryville districts.
What could be done with this proposal instead is place a June 1 - September 15 conservation tie that whenever the CMA is closed the areas in the S. AK. Pen. mentioned by the author close concurrently to allow non local stocks to transit intercept fishery waters.

Proposal 149;
I agree and support proposal 149, the entire western district is only available to CMA participants for 2 48 hour openings in June.
It helps spread out the fleet, makes it better for all participants in the CMA.

Proposal 150;
I agree and support this proposal, it is fishing area that is virtually off limits in the CMA except for a totoal of 96 hours in June by regulation.

Proposal 151;
I agree and support this proposal, asking for more fishing time through June in the Western and Perryville districts.

Proposal 152;
This proposal appears to be another spin on who is intercepting who's fish. If you look at harvest statistics year after year, the fishers in the S. AK. Pen. are probably intercepting all the Orzinski bound sockeye.
In 2018 per the ADFG website, the CMA harvested a whopping 128 sockeye, while Orzinski Lake escaped a record low 2817 sockeye.
It is highly unlikely the subsistence users in Chignik took the remainder of the Orzinski Lake escapement.
If S. AK. Pen. intercept fishery areas were to close concurrently with CMA closures, it is my belief more Orzinski lake stocks would be able to return to terminal areas in the S. AK. Pen.

Proposal 153;
This is also another attempt at putting a spin on who is intercepting who's fish, asking to impose closures in the CMA based on SEDM post July 25 escapemnt. I oppose this proposal, however I will support this proposal IF June 1- July 25 SEDM shall close concurrently with CMA closures and Post July 25 the following EO regulation be added to every fishing period in SEDM while managed

on pink and chum stocks that IF NUMBERS OF SOCKEYE ARE HARVESTED POST JULY 25, THE FISHERY WILL BE CLOSED ON SHORT NOTICE.
In the CMA pink and chum targeted fishing periods ADFG includes this language to close the fishery if it looks like sockeye are being harvested.

Proposal 154;
I agree and support this proposal, it is actually shocking to learn ADFG counts JACKS as part of the Chinook escapement in Chignik. Chinook of certain size are returned to the water when ADFG determines a low return of Chinook. Just off the top of my head, what was the Chinook harvest in the S. AK. Pen. in 2018?

Proposal 155;
I oppose this proposal, regulations are in effect for this gear type. Commercial fishing is a very dangerous occupation, there are other professions that are less dangerous. Each and every one of us who participates in a commercial fishery has had to stand down or alter our fishing operations due to bad weather.

Proposal 156;
I oppose this proposal, regulations regarding mesh size have been created for a reason. Commercial fishing is a costly business to participate in.

Proposal 157;
I oppose this proposal, it appears the author is asking that 2 permit holders be allowed to fish 400 fathoms of gear from one vessel? Bad weather is a fact of life for all fishermen of Alaska, allowing permit stacking doesn't make it any safer.
We all have to adjust to the weather. I know of tenders that will tow peoples small boats and give them rides in the event of bad weather.

Proposal 158;
I support this proposal, as long as the full 225 fathom seine may be standard mesh size minimum 3.5" to 4".
The number participating in this fishery and the majority being mostly terminal fishers using the 125 fathom "Lagoon Seine" I do not believe it would have a negative impact other than small boats would have a hard time fitting a larger net on board.

I began attending Board of Fisheries conferences in 2013, when I had first seen the amount of Chignik bound sockeye taken in Area M, per the WASSIP study.
I saw the "fish grab" proposals submitted by Area M fishers. Since I began attending, I've come to the conclusion that all they have to say is "historical fishery", and "it works". Well, the management schemes used in area K, L, and M do not work for my "historical fishery". The lack of sockeye in Chignik in 2014, and now 2018 has been a systematic regional starvation imposed upon us and had absolutely nothing to do with "the blob" (warmer waters in the Pacific Ocean), Bristol Bay just had the LARGEST SOCKEYE RETURN IN ITS
HISTORY, AREA M STILL HARVESTED A HEALTHY AMOUNT OF SOCKEYE and more than likely intercepted all of the S. AK. Pen. sockeye
escapement, Kodiak had a HEALTHY sockeye harvest and made all of it's sockeye escapements, Cook Inlet sockeye were LATE.
I have it on good authority from PWS fishermen that Copper River sockeye were over escaped drastically leading to no fishery in 2018.
PWS still had a decent sockeye harvest not including the Copper River.
"The Blob" didn't cost Chignik it's fishery and escapement in 2018 as some will try to blame.

There was a management change implemented in the Chignik salmon fishery in 2018 regarding in season genetic sampling, they were going to manage without it. When I learned they were going away from using best practices/tools for management and taking one more step in managing this fishery "afer the fact" I call it, I posed the question to ADFG asking- were they doing this because they were expecting a weak run such as we had in 2014?

ADFG pulled the Chignik weir MUCH earlier than usual in 2018 and relied on sonar for monitoring escapements, historically in August and September Chignik has a large stock compliment of coho, sometimes a higher percentage than the sockeye during that run timing. The escapements in this run timing do not realistically reflect the historical stock composition we are used to seeing, they were escaping virtually ALL SOCKEYE after the Chignik Weir was removed. When I took my gillnet out in September again- mostly coho. Trying to make things look better on paper is doing us a disservice in Chignik.

A 2018 story quoting ADFG Chignik staff attempts to put a spin on things in Chignik that there is a "silver lining" for the fishery.
In the story, large numbers of coho spotted in an aerial survey are quoted- 0 coho harvested unfortunately. From my understanding 2 boats went out to look for fish to harvest, not 5 or 6 boats as quoted in the story.
Nearly a million sockeye were harvested in Chignik in 2017, quoted in the story... 897,000 is CLOSE to a million, and I guess a million sounds better than 900,000. The story quotes 499,000 sockeye were escaped in 2018, while I feel the need to say that number is an estimated 499,000 and probably over inflated by the removal of the weir and coho being called sockeye in August and Septemeber, it appears to me a spin is being put on how bad things are in Chignik.

The communities and fishing fleet in Chignik couldn't afford to have ONE run failure, when the next occurs, it will force whoever can afford to try to keep fishing into other areas, and those that can't afford to try to keep fishing will default on their state loans, and lose their livelihoods and what is left of the communities in the Chigniks will become ghost towns.
Adequate regulatory change, and management that will enforce the regulations to the intent they are created, are necessary now.

I'll be at the conference if you want my input,

Timothy Murphy
(Possibly FORMER Chignik fisherman)

Submitted By
Wallace W. Hinderer
Submitted On
2/6/2019 9:56:31 PM
Affiliation
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Phone
907-749-4057
Email
wallyandgail@msn.com
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PO Box 13
Williams St Lot # 11
Chignik, Alaska 99564

Mr Chairman and Members of the Board,

I am writing to you to stress the dire situation the Chignik fishery is in. Last season Chignik didn't reach its escapement goals, which resulted a totally closed fishery. This of course totally disrupted the economy of Chignik. Why did this happen? Some say ocean mortality. Others say freshwater in stream mortality. Mortality by interception whether allocated or not allocated. When the board set up limited entry ,they made a determination that the Chignik Fishery would support the number of permits that they issued.

Then the Board of Fish started to allocate fish from the Chignik fishery. They recognized a fishery at Cape Igvak and authorized Kodiak Fishermen to catch 15% of the Chignik harvest. These figures were tweaked further till the 15% of the Chignik harvest became 15% of the entire Chignik run. More Chignik sockeye were allocated to Area M. Newer stronger nets and vessels assisted interception. The fish and game managed the fishery on the come of the predicted run, which put Chignik fishermen in the position of having to catch up to the intercepted fish that were already in the processors freezers. This last year not enough sockeye returned to Chignik to satisfy the the minimum escapement to bring back a viable run of sockeye. The reasons for this situation vary, however, the fact remains, Chignik sockeye are in serious trouble, and likewise so are the residents of Chignik.

It behooves every user of the Chignik resource to share in the conservation of the Chignik sockeye salmon run. It behooves the Board of Fish to revisit and rethink the management of fisheries that intercept Chignik sockeye. It behooves the Board of Fish to manage so that all users share in conservation of Chignik sockeye.

Sincerely,

Wallace W. Hinderer