

Alaska Bycatch Review Task Force

Salmon Research Recommendations

Much of the salmon research identified was similar for both the Bering Sea/Aleutian Island and the Gulf of Alaska. Listed below is the research identified for Western Alaska salmon and research which is unique for the Gulf of Alaska.

Western Alaska Salmon

Research Goals:

- Research to improve our ability to determine the stock of origin of chum and Chinook salmon taken as bycatch.
- Research to reduce bycatch through improved understanding of distribution and migration of W. AK chum and Chinook salmon stocks migration patterns to better predict and therefore avoid bycatch “hot spots” in the BSAI region.

Two areas of research were identified.

1. Research that helps us understand the relative importance of particular mechanisms for driving abundance of Western Alaska Chinook and chum

Studies that help us understand the relative role of marine interceptions and bycatch

a) Improved information on marine migration patterns and its relation to fishery locations and timing

1. The projects AFSC mentioned that Sabrina (Chinook) and Wes (chum) are leading in the Bering Sea: *Model ocean distribution and migration of AK Chum and Chinook salmon stocks in the Bering Sea to predict distribution and hotspots.*
2. A tagging project of immature chum salmon in the North Pacific Ocean to help us understand their destination, timing and maturity.
3. A synthesis of marine migration information from fishery dependent data sources, marine surveys, and tagging studies, and how these patterns have changed with a changing climate.

b) Improved information on the characteristics of fishery catches

1. There are still improvements that can be made in the ability to assess age, and specifically stock-specific age of Chinook and chum salmon caught in any marine fisheries.

c) Improved information to help understand fishery impacts

1. Improved AEQ modeling through ‘stock specific’ chinook and chum salmon bycatch. Particularly for western AK chum salmon, AEQ analyses are limited by:

a) age classification data gaps in adult chum abundance across all of the WAK stock reporting group. Studies that improve the ability to estimate abundance of all chum in the WAK stock reporting group. Continued genetics work is needed.

b) and/or the ability to break up that reporting group. This might be remedied by using technologies that go beyond genetic assignment alone (use of pathogens, stable isotopes, etc.).

2. Research that can provide an additional (non-adult) abundance estimate

This will be really powerful for helping triangulate which life stages are most important for determining good or poor productivity. The committee recommends that research should span the life-cycle of the salmon species.

a) Understand critical survival periods for western Alaska salmon through integrated ecosystem assessment surveys including expansion of the northern Bering Sea pelagic trawl survey into the near shore waters north of the Yukon River including Norton Sound

1. Similar research is being planned in the southern Bering Sea to have a more comprehensive assessment of Western Alaska Chinook and chum.

NOTE: Neither of these projects are funded beyond 2023

2. Ecosystem indicators: summer sea temperature, phytoplankton/zooplankton community structure; salmon and pelagic fish catch per unit effort, distribution, energy density for fitness, size, stomach contents. These indicators are being utilized to understand climate impact on the northern Bering Sea ecosystem, fish fitness and survival. The recent information from the northern Bering Sea pelagic trawl survey suggests that the marine heat wave within the NBS during 2016 to 2019 negatively affected juvenile Chum salmon fitness (shift to low quality prey, increased metabolic rates due to higher SST), likely leading to high winter mortality. The data suggest that Chinook salmon abundance is impacted by factors affecting them in freshwater and early marine residence.

b) Studies that help understand how ocean/climate conditions impact future runs

1. Marine pelagic trawl surveys in the northern and southern Bering Sea can help us address this (see above)

2. NOAA and ADF&G are collaborating on using International Year of the Salmon (IYS) catches and samples to examine immature AYK chum salmon in the North Pacific Ocean during winter. **(This is not yet funded.)**

3. Immature salmon surveys (like the IYS surveys) in the Bering Sea and North Pacific Ocean. **(There is currently no funding support for charter vessel to conduct the survey, collecting and processing samples or paying for gear and supplies.)**

c) Studies that help us understand the role of diet, health and disease on the survival and spawning success of Western AK Chinook and chum

1. Understanding vectors of Ichthyophonus infection for Yukon Chinook salmon, and whether it is causing significant en route mortality during the spawning migration
2. Understanding diet, nutrition and condition of Western AK Chinook and chum stocks at juvenile (marine pelagic trawl surveys in the northern and southern Bering Sea – see above), immature (IYS surveys, industry catches, etc.), and adult life stages (returning samples from lower river test fisheries- pilot work started for Yukon Chinook, but only funded through 2022)

(Above research is applicable to the Gulf of Alaska, but items below are specific to Gulf of Alaska Chinook salmon)

Gulf of Alaska Chinook Salmon

Conduct annual genetic and spatial assessment of Gulf of Alaska (GOA) Chinook salmon. This recommendation is intended to include, in addition to the genetic assessment that is currently taking place, that efforts should be made to produce estimates of both the spatial and temporal bycatch of Alaskan stocks of Chinook salmon, as well as characterizations of the age, sex and size of the bycatch of Chinook salmon identified as stocks of Alaska origin. If further progress can be made towards identifications of stock of origin of Alaskan Chinook taken as bycatch, that too should be pursued.

ADF&G Priorities:

a) Studies that help us understand the relative role of marine interceptions and bycatch

1. Improved information on marine migration patterns and its relation to fishery locations and timing. Extend the distribution and timing projects using bycatch data in the Bering Sea to include the western GOA.
2. Improved demographic information that will enable assessment of stock specific impacts
 - i. Collect samples to improve demographic information such as stock, age, sex, size and maturity for Chinook and chum salmon caught in any marine fisheries.
 - ii. Improved information to help understand fishery impacts through AEQ or similar analyses.

b) Research that can provide an additional (non-adult) abundance estimate. This is powerful for helping triangulate which life stages are most important for determining productivity

1. Juvenile salmon surveys – A survey occurs annually in the eastern GOA to monitor SEAK salmon stocks (Southeast Coastal Monitoring project).

i. ADF&G will pilot a juvenile salmon survey in the western Gulf of Alaska in 2023. This will align with surveys in the northern and southern Bering Sea and Southeast Alaska to give a comprehensive assessment of Alaska Chinook and chum early in the marine life stage.

NOTE: (Neither the GOA nor the Bering Sea projects are funded beyond 2023)

c) Studies that help us understand how ocean/climate conditions impact future runs

1. Marine pelagic trawl surveys in the Bering Sea and Gulf of Alaska (including western/central Alaska and SEAK surveys)

2. Immature salmon surveys (like the IYS surveys) in the Bering Sea, Gulf of Alaska, and North Pacific Ocean