



NOAA Marine Fisheries and Research



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Jim Murphy, Alaska Fisheries Science Center

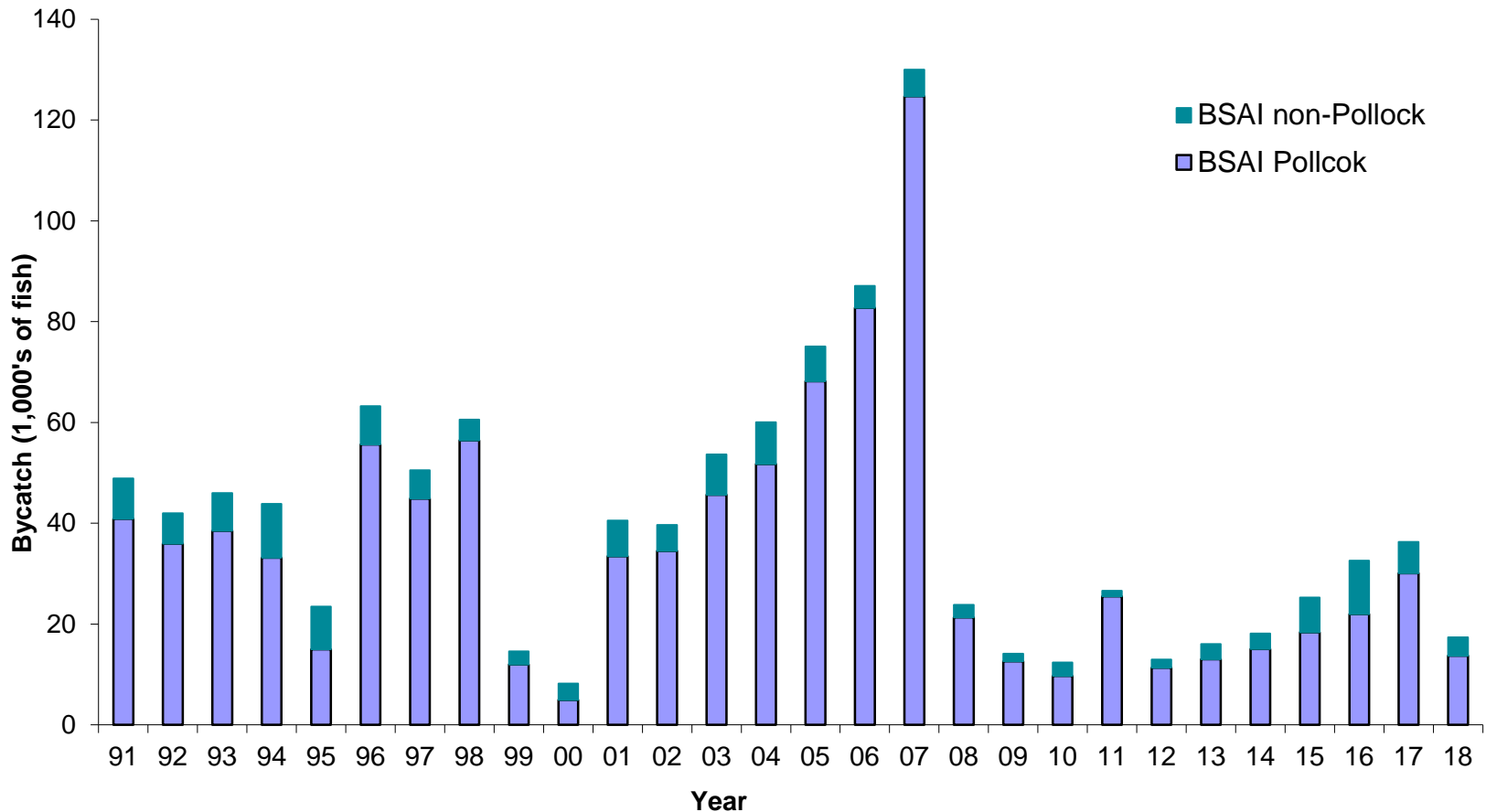
Fall 2018 Yukon River Panel
Anchorage, AK

Dec 12, 2018

Salmon Bycatch and Bycatch Management in BSAI Groundfish Fisheries



Chinook Salmon Bycatch in the Bering Sea-Aleutian Islands (BSAI) Groundfish Fisheries (through Nov 29, 2018)



https://alaskafisheries.noaa.gov/sites/default/files/reports/chinook_salmon_mortality2018.pdf

Sources:

BSAI Salmon Bycatch Management

Magnuson-Stevens Fishery Conservation and Management Act Amendments 91 and 110

Amendment 91 (2011): Bering Sea Aleutian Islands (BSAI) Pollock Fishery

Enables the use of approved incentive plan agreements (IPAs) by the fishing industry for Chinook salmon bycatch avoidance and implements IPAs through a two cap policy (60,000 hard cap, 47,591 performance standard).

Amendment 110 (2016) (BSAI pollock fishery) Salmon Bycatch Plan

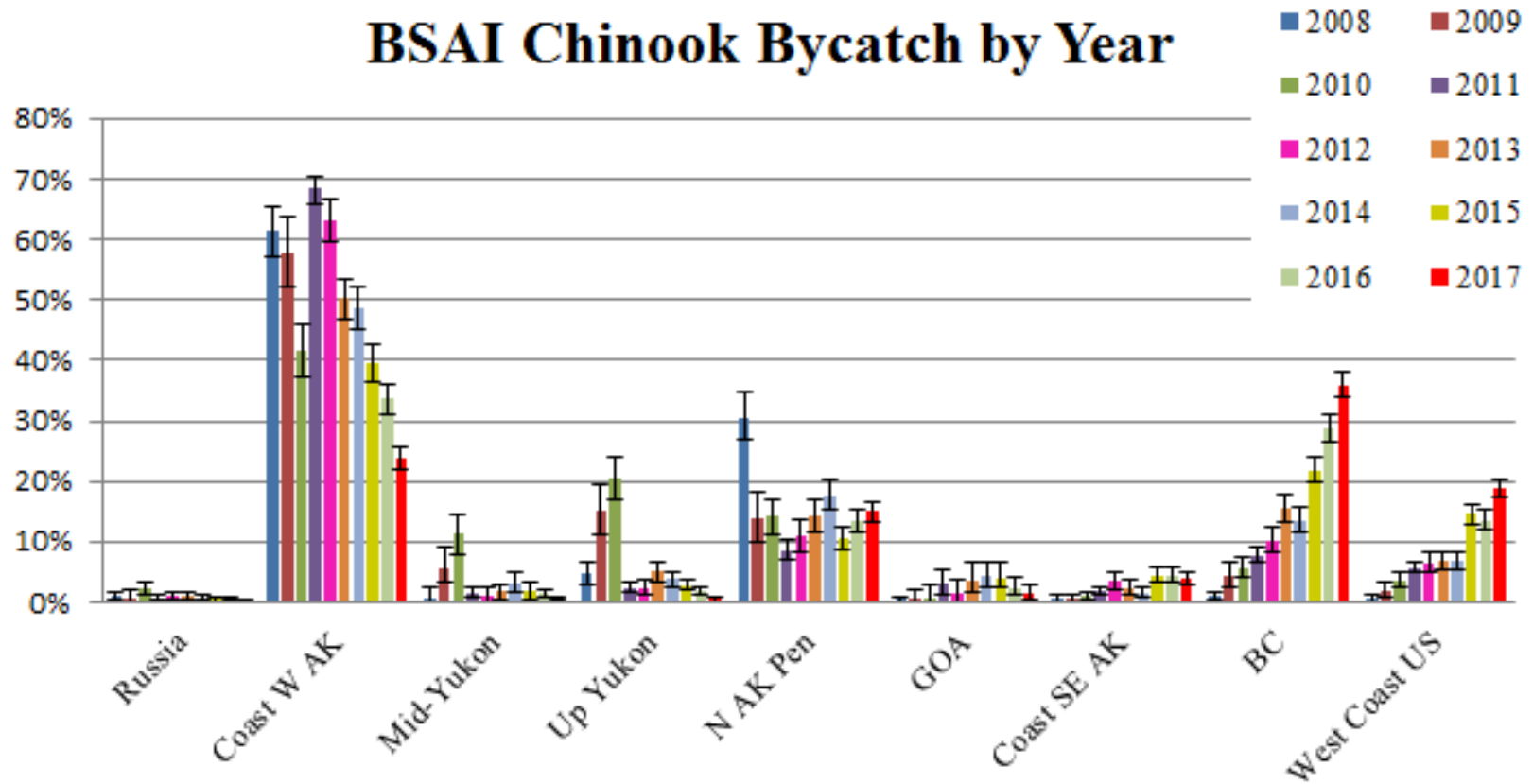
- Integrated Chum and Chinook Salmon bycatch IPAs are developed and bycatch monitoring is improved.
- Bycatch incentives are increased and allocation on pollock quota are adjusted to improve bycatch avoidance of Chinook salmon.
- Abundance-based bycatch caps are implemented for Chinook salmon.
 - During years of low abundance (three system index $\leq 250,000$), the bycatch hard cap is reduced to 47,591 and the performance standard is reduced to 33,318.
 - The three system index is the total run size of the Unalakleet, Upper Yukon, and Kuskokwim River stock groups.

BSAI Chinook Salmon Bycatch Management 2018 In-Season BSAI Incentive Plan Agreements (IPA)

Sector	Allocation	Bycatch*	% Taken
Inshore	33,390	7,029	21%
Catcher Processor	17,040	4,670	27%
Mothership	4,674	739	16%
CDQ	4,896	1,291	26%
Total	60,000	13,729	23%
*Through 24-Nov-18			

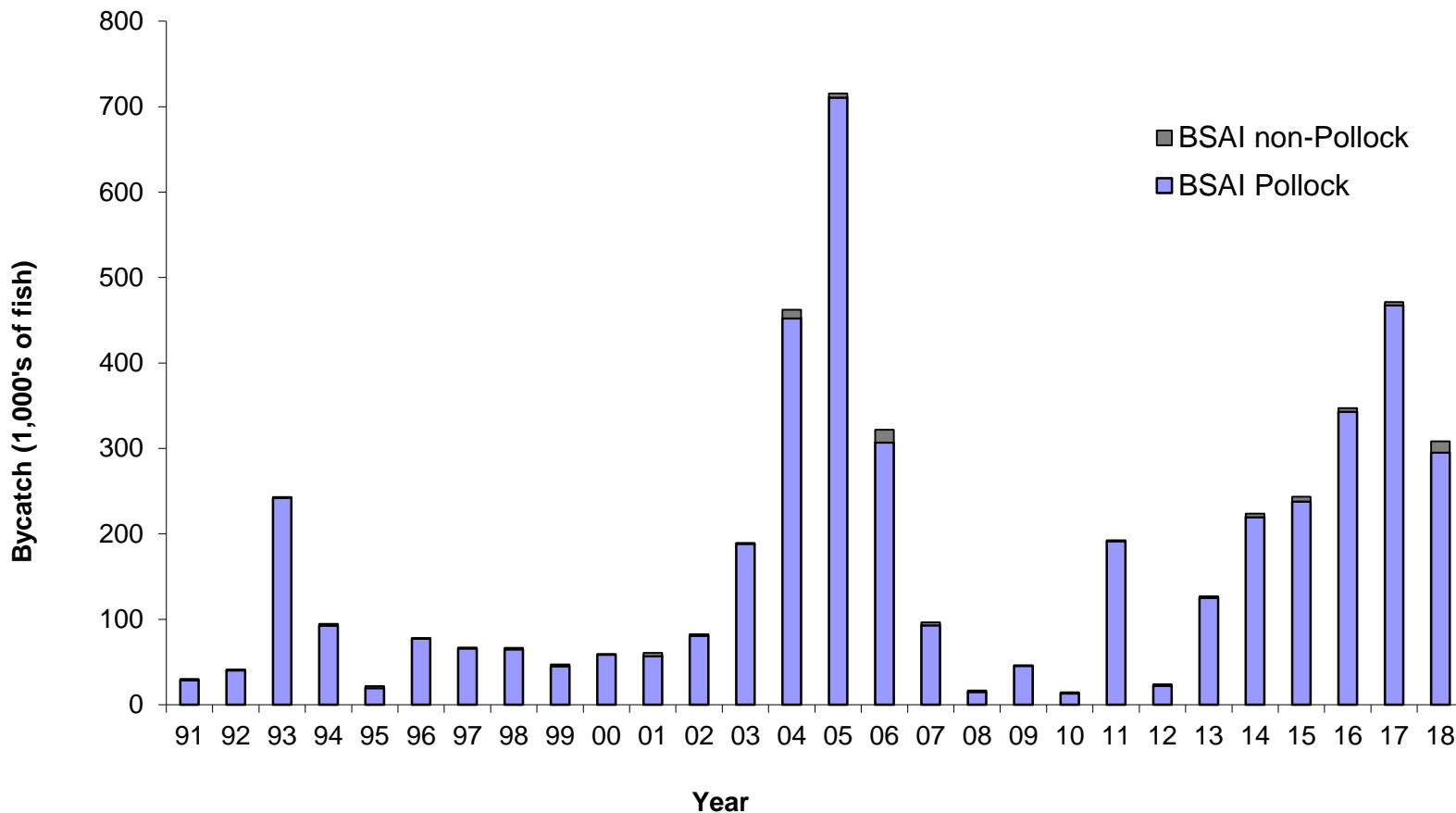
https://alaskafisheries.noaa.gov/sites/default/files/reports/car180_bs_with_cdq2018.pdf

BSAI Chinook Salmon bycatch stock composition



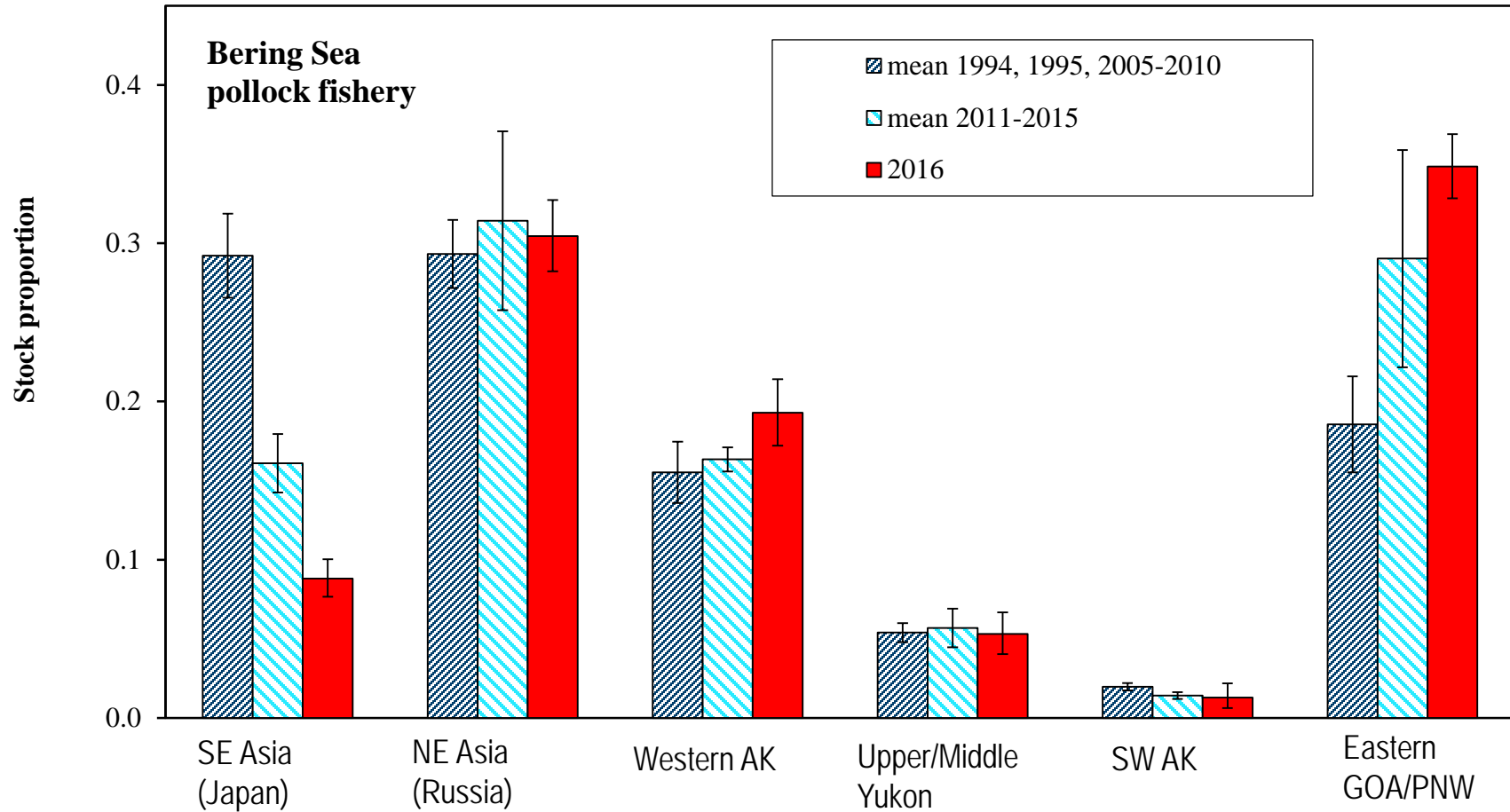
Source: Guthrie et al. in prep

Non-Chinook Salmon Bycatch in the Bering Sea-Aleutian Islands (BSAI) Groundfish Fisheries (through Nov 29, 2018)



Sources: https://alaskafisheries.noaa.gov/sites/default/files/reports/chum_salmon_mortality2018.pdf

BSAI non-Chinook salmon bycatch stock mixtures



Source: Whittle et al. 2018. <https://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-366.pdf>

2018 Marine Research Highlights

Yukon River Subyearling Chinook
Murphy et al. (R&M: 2018-2019)

Bering Sea PSAT Studies
Seitz et al. (PCCRC: 2017-2018)
Garcia et al.

2018 NBS Bottom Trawl Survey
AFSC-RACE Groundfish Assessment

2017 NBS Surface Trawl Survey
Howard et al. (AKSSF: 2016-2018)

2018 NBS Surface Trawl Survey
(Joint ADFG/NOAA Survey)

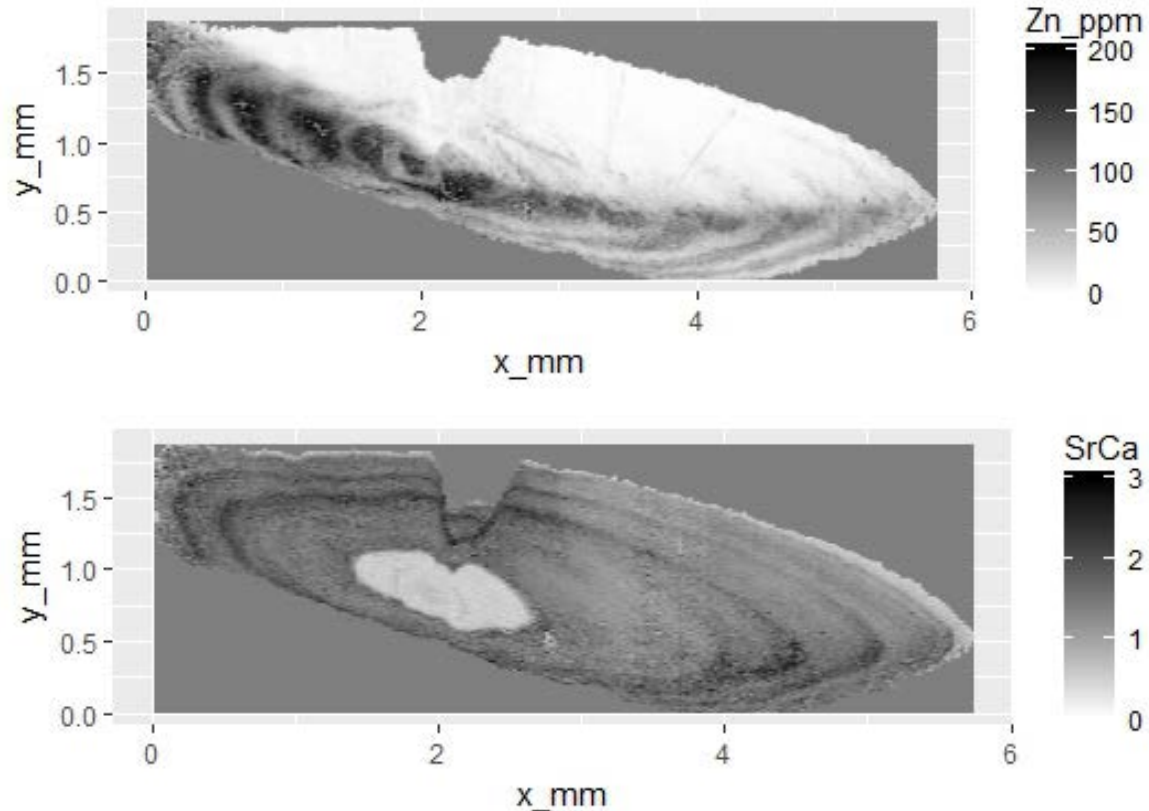


Yukon River Subyearling Chinook Salmon

Yukon River Research and Management (R&M) Fund (2018-2019)

J. Murphy, T. Helser, K. Severin, K. Spaleta, M. Rogers, R. Brown, T. Dann

- (1) Examine trace elements as a tool for otolith age assignment in Chinook salmon.
- (2) Use otolith trace elements to assist Chinook salmon age assignments in northern Bering Sea during 2015.
- (3) Estimate genetic origin of subyearling Chinook salmon in 2015.
- (4) Compare stable isotopes of subyearling and yearling Chinook salmon in 2015.



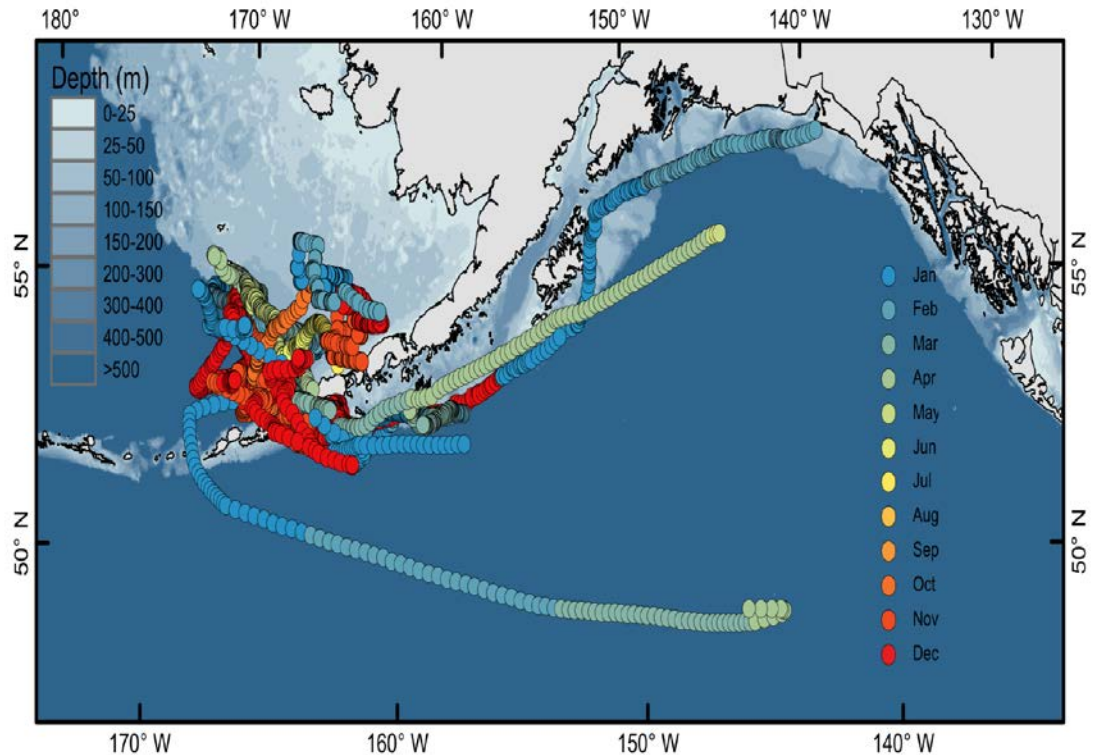
Teslin River Chinook Salmon Otolith Chemistry

Movement, Behavior, and Predation of Chinook Salmon in the Bering Sea

Pollock Conservation Cooperative Research Center (2017-2018)

A. Seitz and M. Courtney

Investigate marine ecology of Chinook salmon in Bering Sea using Pop-up Satellite Archival Tags (PSAT)



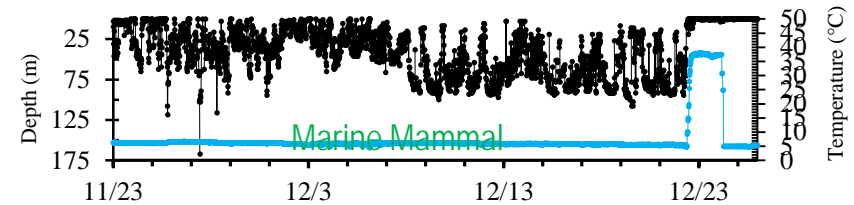
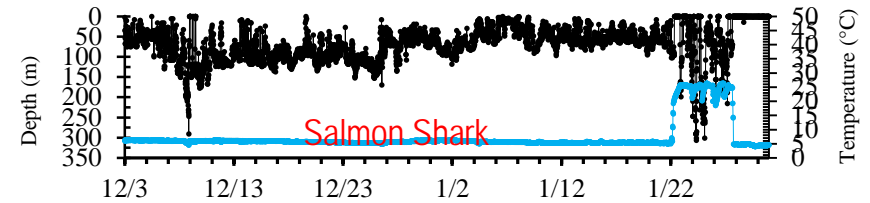
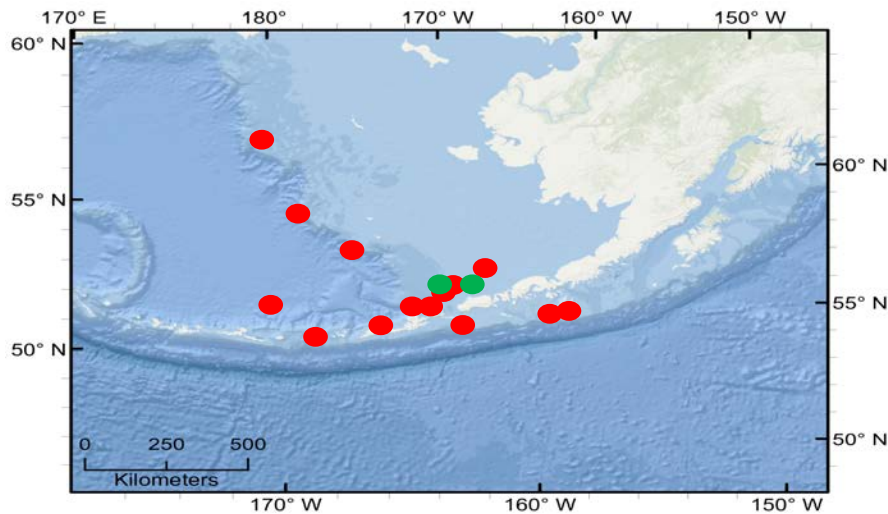
Dispersal Patterns of Chinook Salmon

Movement, Behavior and Predation of Chinook Salmon in the Bering Sea (Seitz and Courtney)

26 of 35 Chinook salmon experienced mortality, including:

salmon shark predation (n = 14)

marine mammal predation (n = 2)



Salmon shark migration in the Bering Sea

Sabrina Garcia¹, Michael Courtney², Andy Seitz²

Objectives:

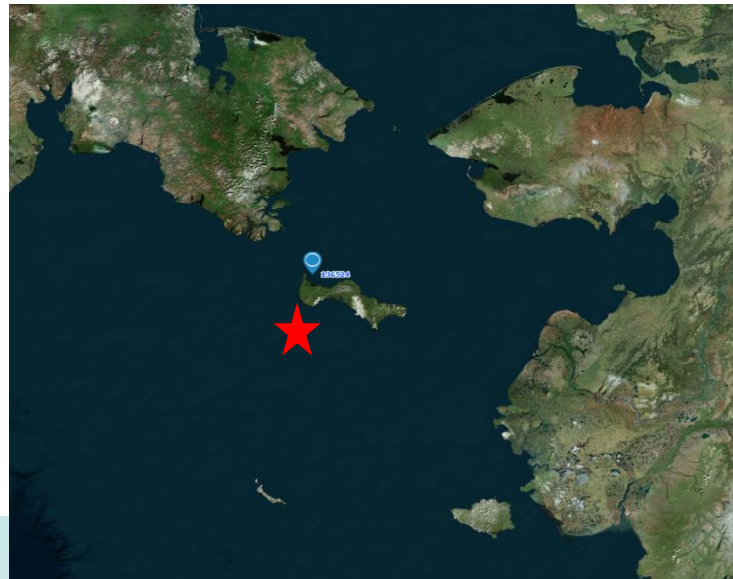
- Deploy satellite tags on salmon sharks caught during NBS surveys for 1-year deployment to assess migration patterns
- Link salmon shark movement to prey availability to understand foraging ecology

Results:

Shark tagged in Sep 2017 (red star)
Tag popped off in Sep 2018 (blue pin)
Awaiting analyzed data from tag manufacture

Future Work:

Deploy tags during 2019 and 2020 surveys

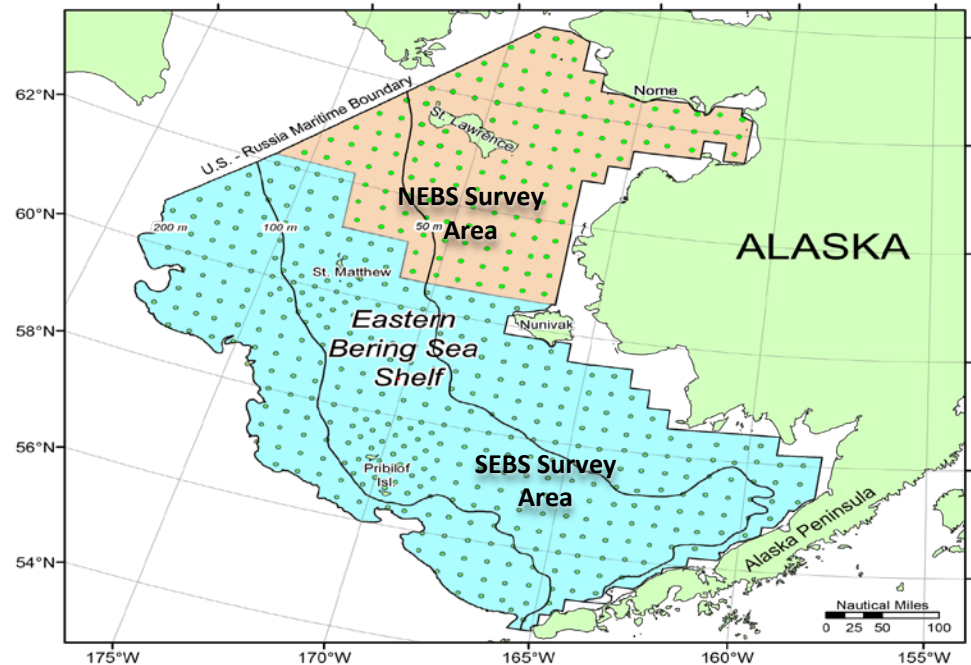


Northeastern Bering Sea Bottom Trawl Surveys

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GROUNDFISH ASSESSMENT PROGRAM

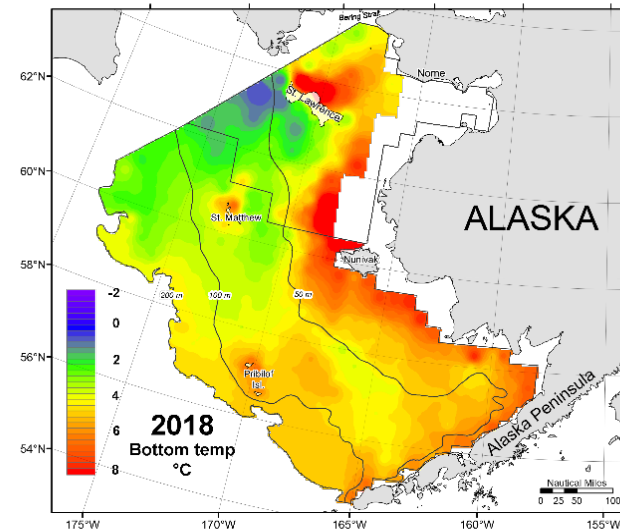
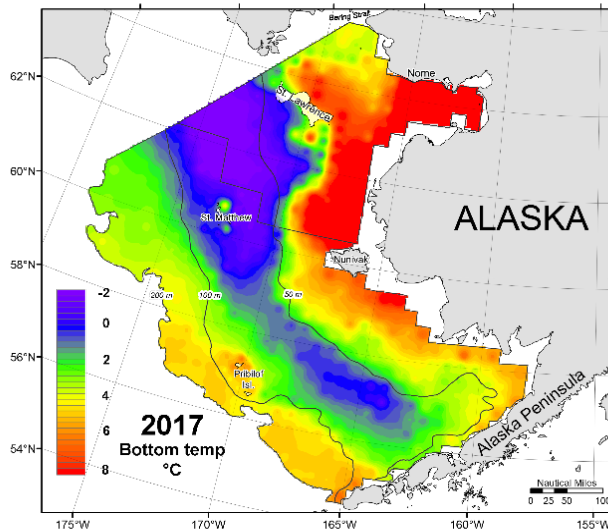
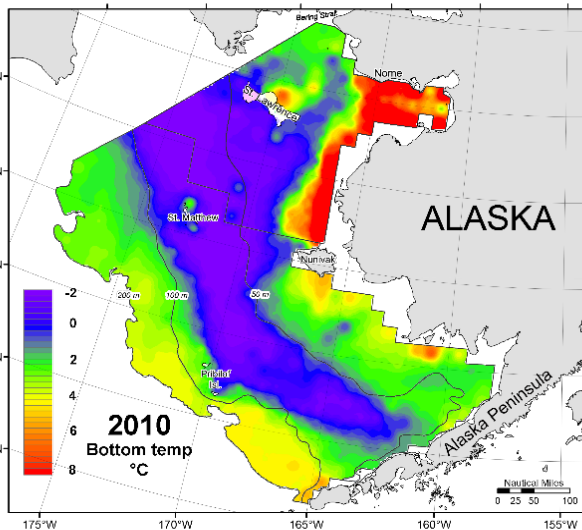


- **Frequency:**
 - SEBS: Annually 1982-Present
 - NEBS: 2010, 2017
 - Biennial Going Forward
 - NEBS Rapid Response 2018
- **Timing:** August – early September
- **Goals:**
 - Understand movement of fishes and seafloor invertebrates
 - Monitor and document changes throughout Bering Sea ecosystem
 - Monitor changes in Bering Sea food web
 - Monitor changes associated with loss of seasonal sea ice



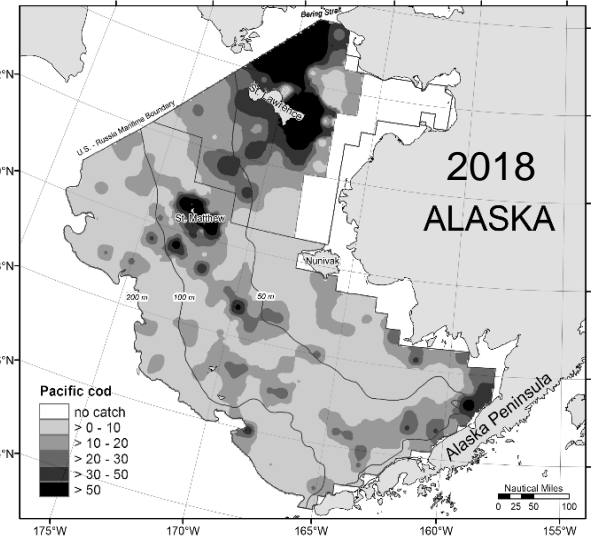
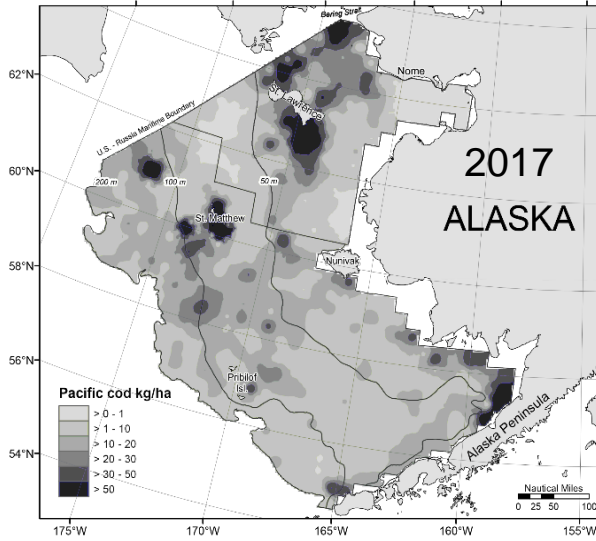
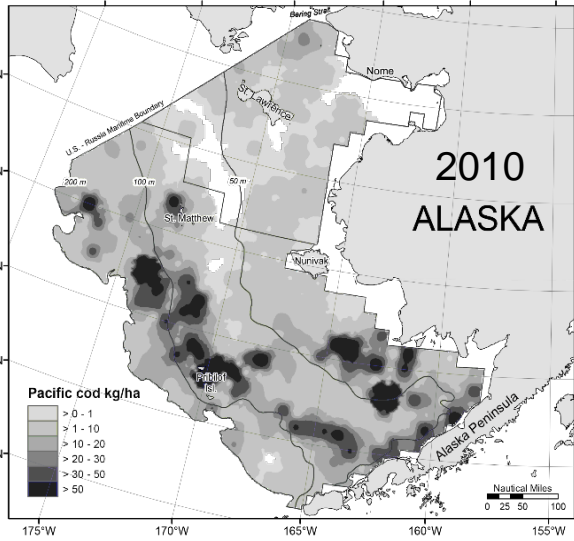
NEBS & SEBS Seafloor (Bottom) Temperatures

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Change in Distribution-Pacific Cod

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NEBS Biomass (Estimate of Total Weight of All Pacific Cod in the Area) in Metric Tons

26,140 mt

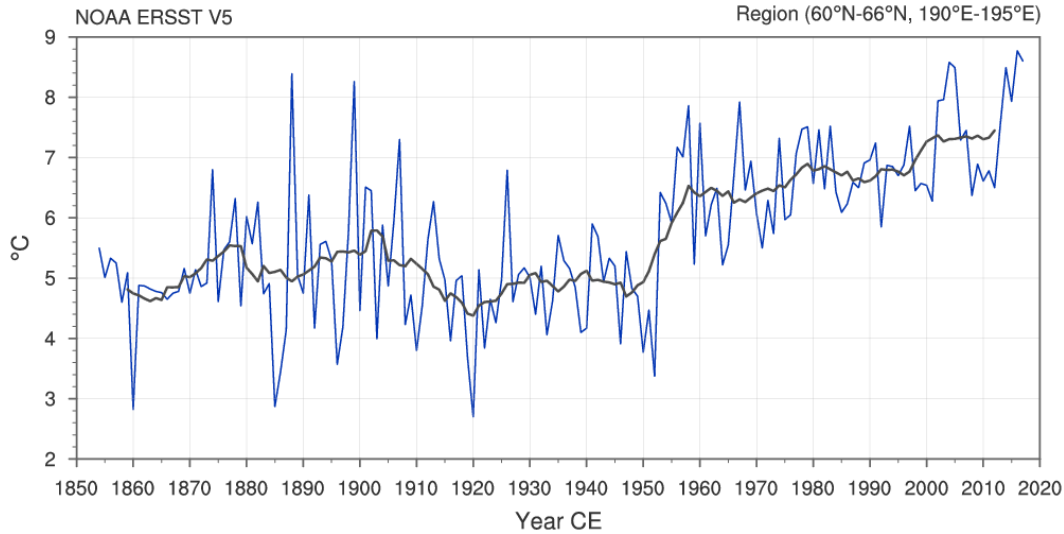
289,264 mt
 +907%

564,684 mt
 +2,060%

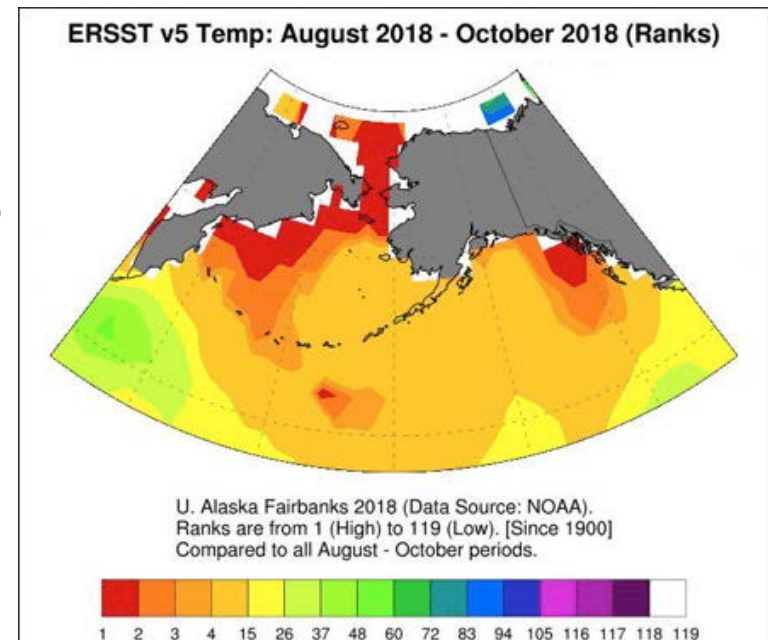
Warm Northern Bering Sea Summer 2018

1854-2017

JJA Sea Surface Temperature



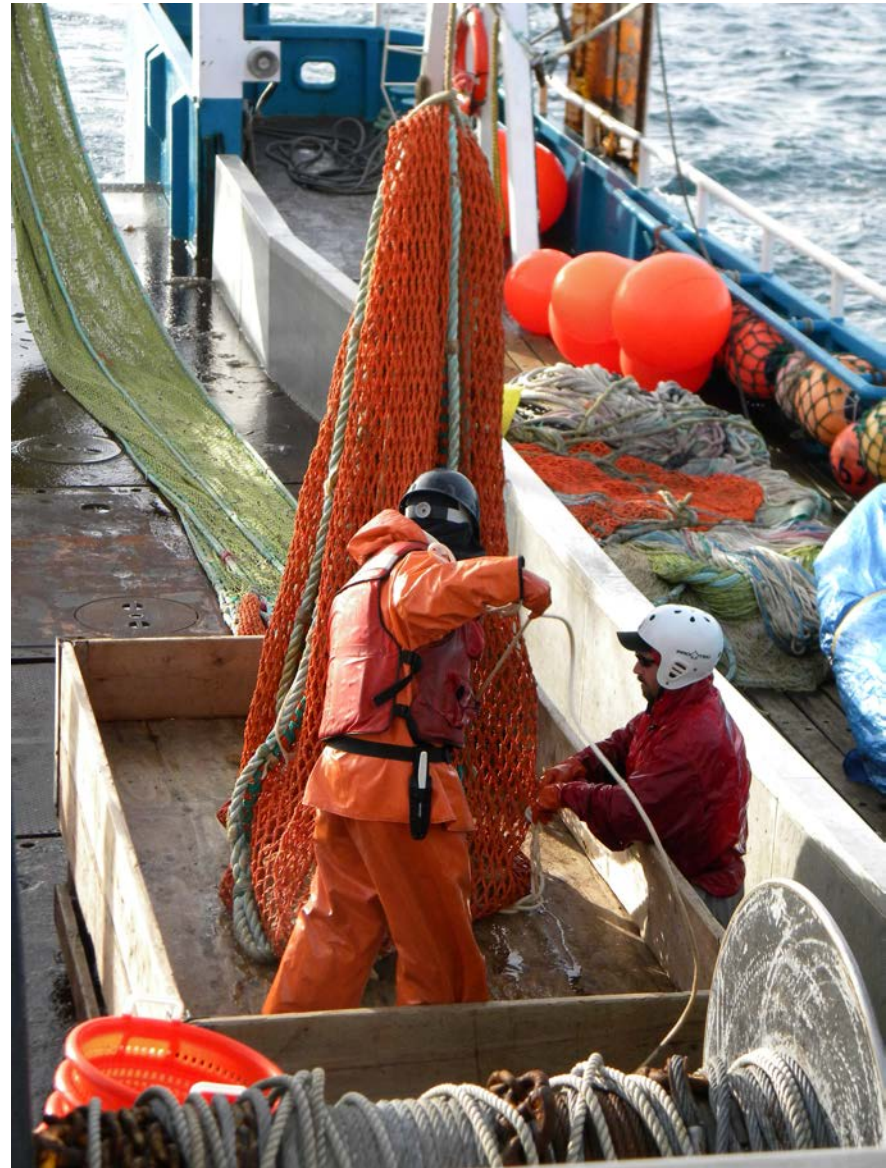
2018 (Rick Thoman, UAF)



Northern Bering Sea Surface Trawl Surveys

2017 Survey Report

2018 Survey Results
(Preliminary)



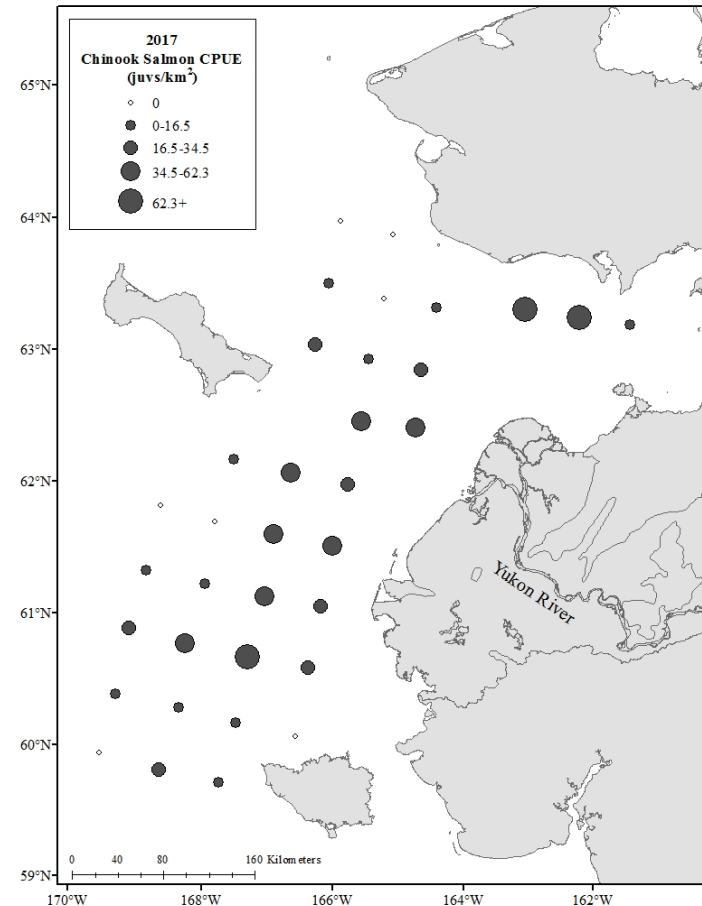
2017 NBS Surface Trawl Survey (AKSSF: 2016-2018)

Howard, Garcia, Murphy, Dann. 2018. Northeastern Bering Sea Juvenile Salmon Survey, 2017. ADFG Fishery Data Series No. yy-xx.

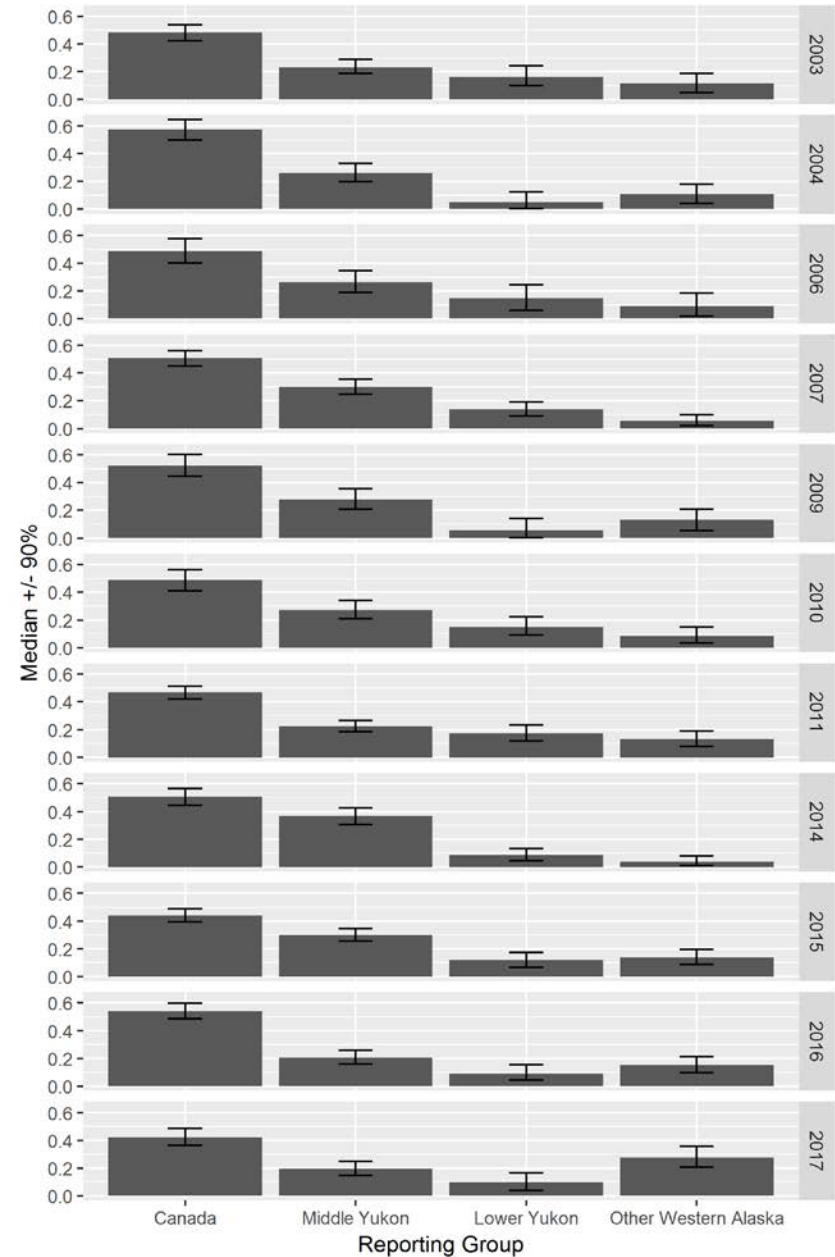
J. Chinook Salmon

Objectives:

- Estimate stock-specific juvenile Chinook salmon abundance in the NBS during 2017
- Forecast run size of Canadian-origin Yukon River Chinook salmon.
- Develop a run forecast model for total Yukon River Chinook salmon.

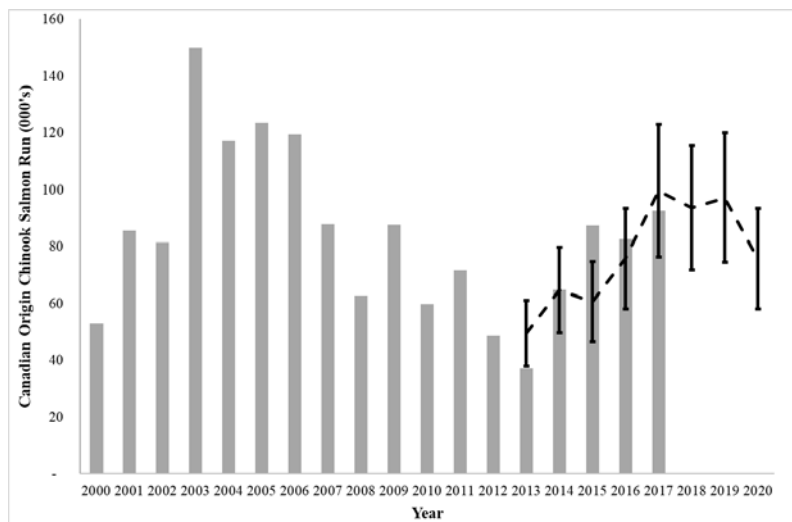


Juvenile Chinook stock mixtures in the NBS (Howard et al. 2018)

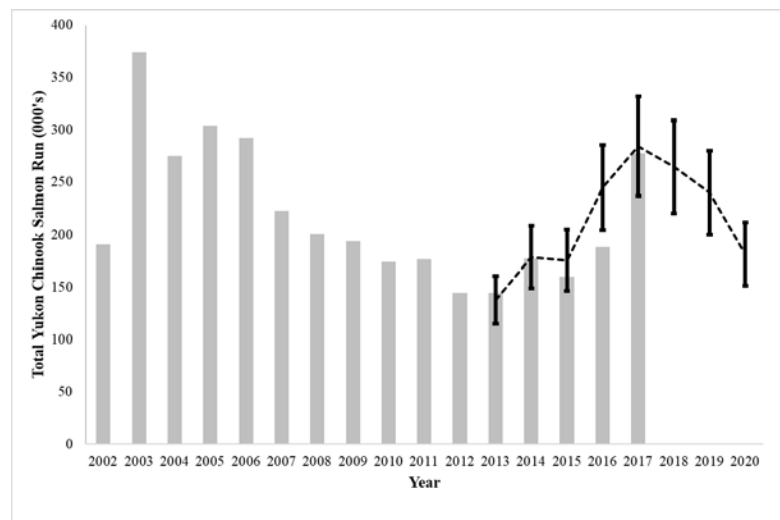


Yukon Chinook Salmon Run Forecast Models

(Howard et al. 2018)



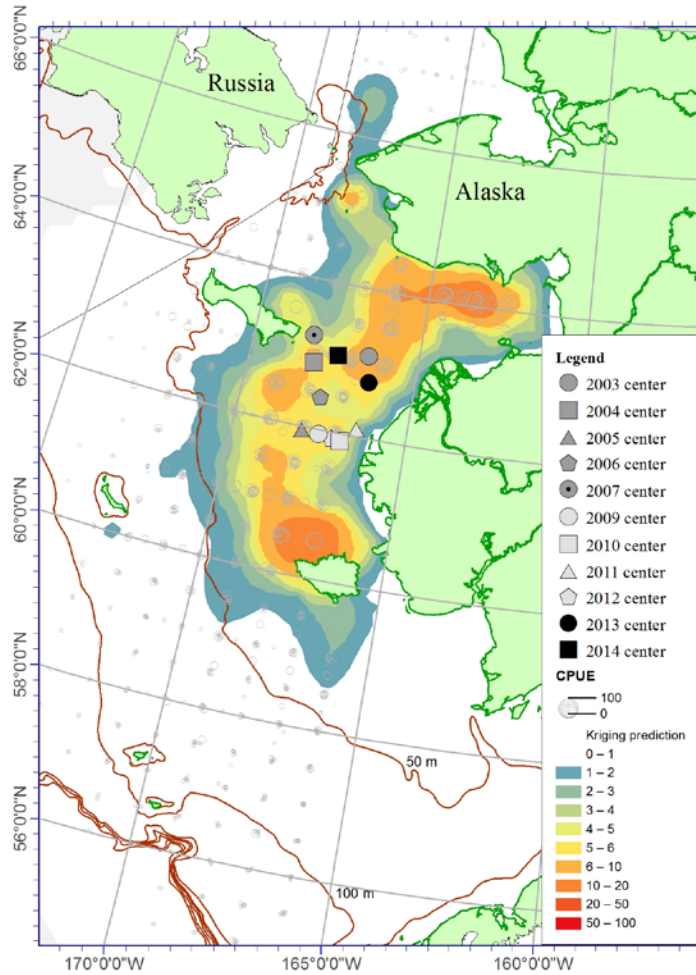
Canadian-origin Run Forecast Model



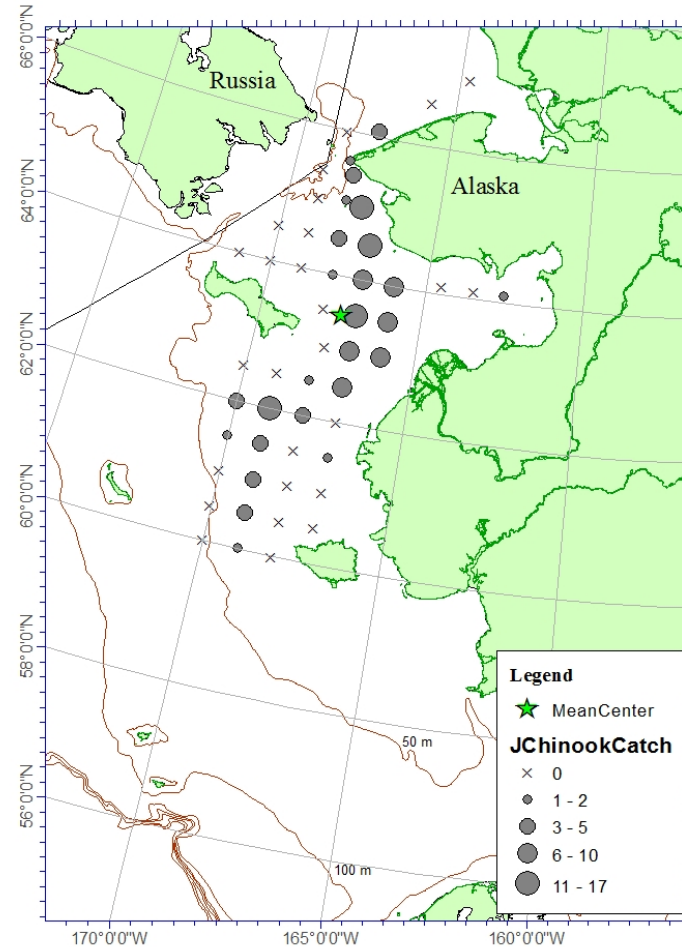
Total Yukon Run Forecast Model

2018 NBS Trawl Survey (Joint NOAA/ADFG Survey)

(2003 – 2014)

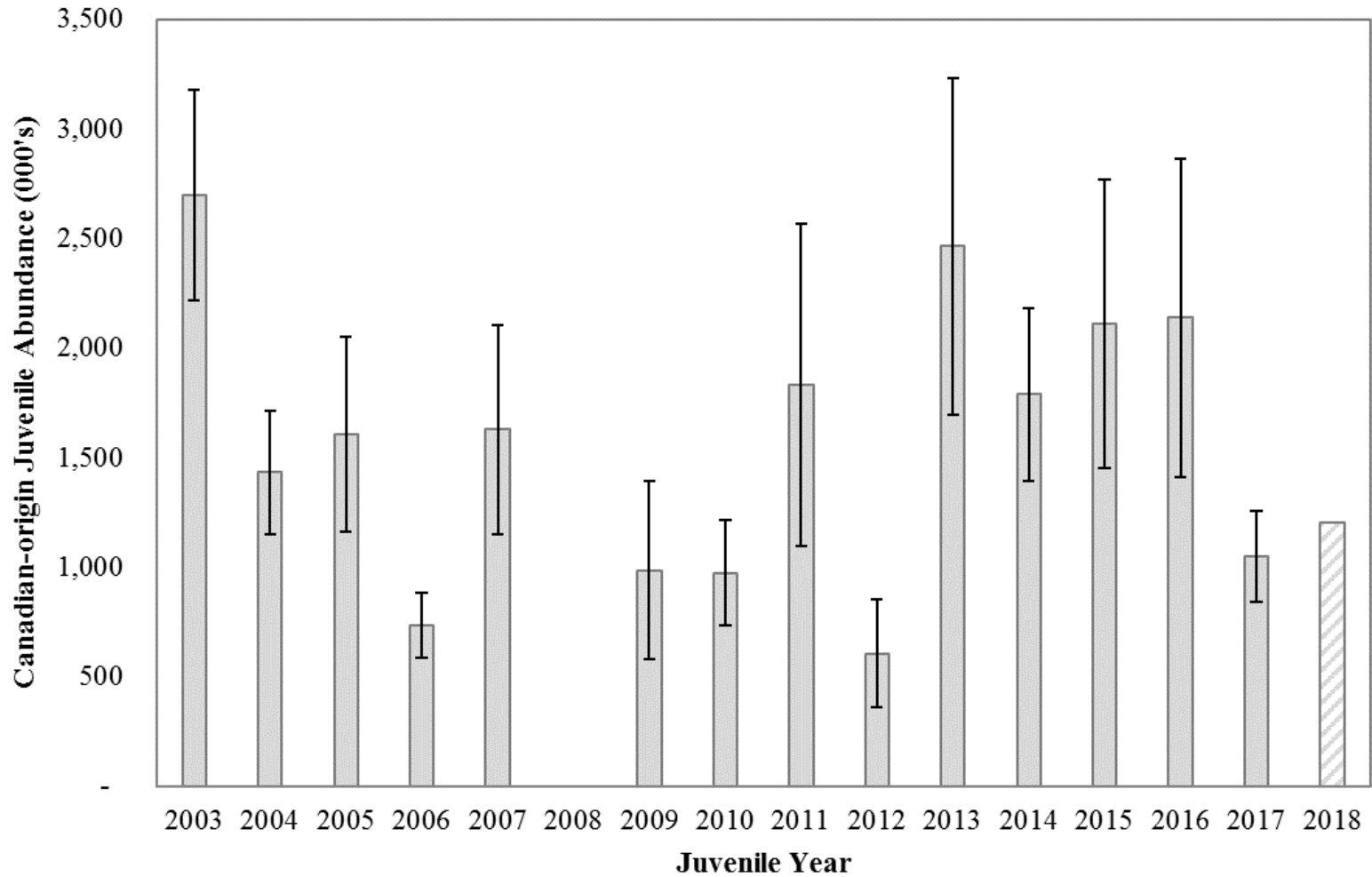


(2018)



(Murphy et al. 2017)

Canadian-origin juvenile Chinook salmon abundance (2003-2018)



Canadian-origin juveniles-per-spawner and spawner abundance (2003-2018)

