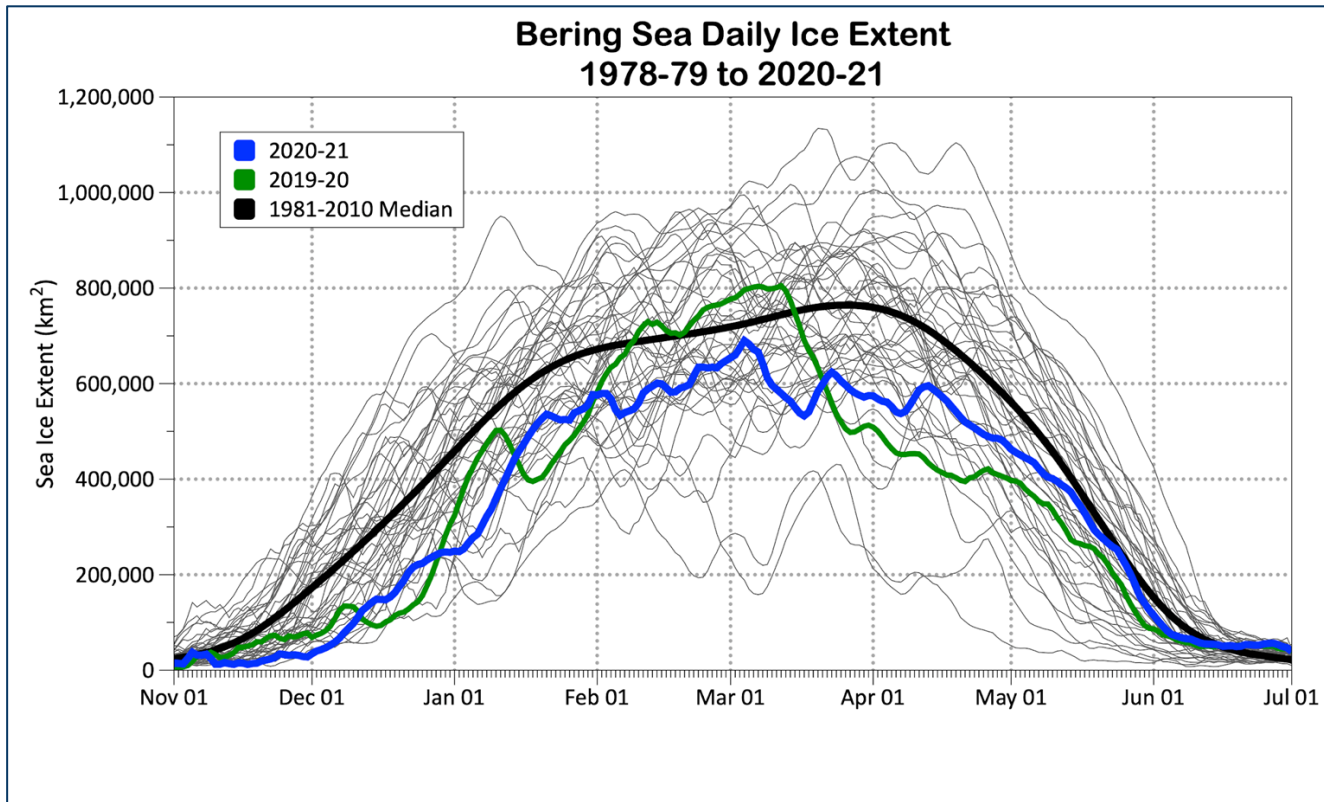


# Eastern Bering Sea Ecosystem Status Report Preview: Crab Edition



# Bering Sea Ice Extent

Thoman

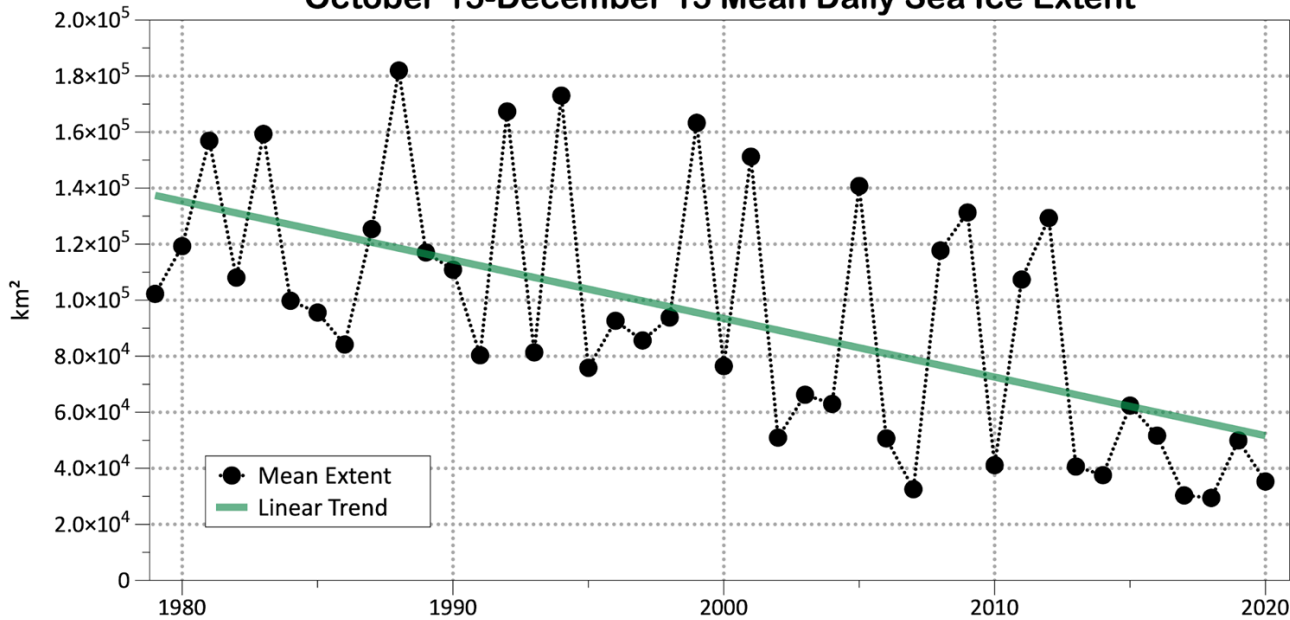


- Residual warmth delayed freeze-up into winter.
- Cooling in Dec/Jan resulted in a rapid build-up of sea ice.
- Ice advance stalled at end of January.
- Ice was steady February through early April.

# Bering Sea Ice Extent

Thoman

Bering Sea, 1979-2020  
October 15-December 15 Mean Daily Sea Ice Extent

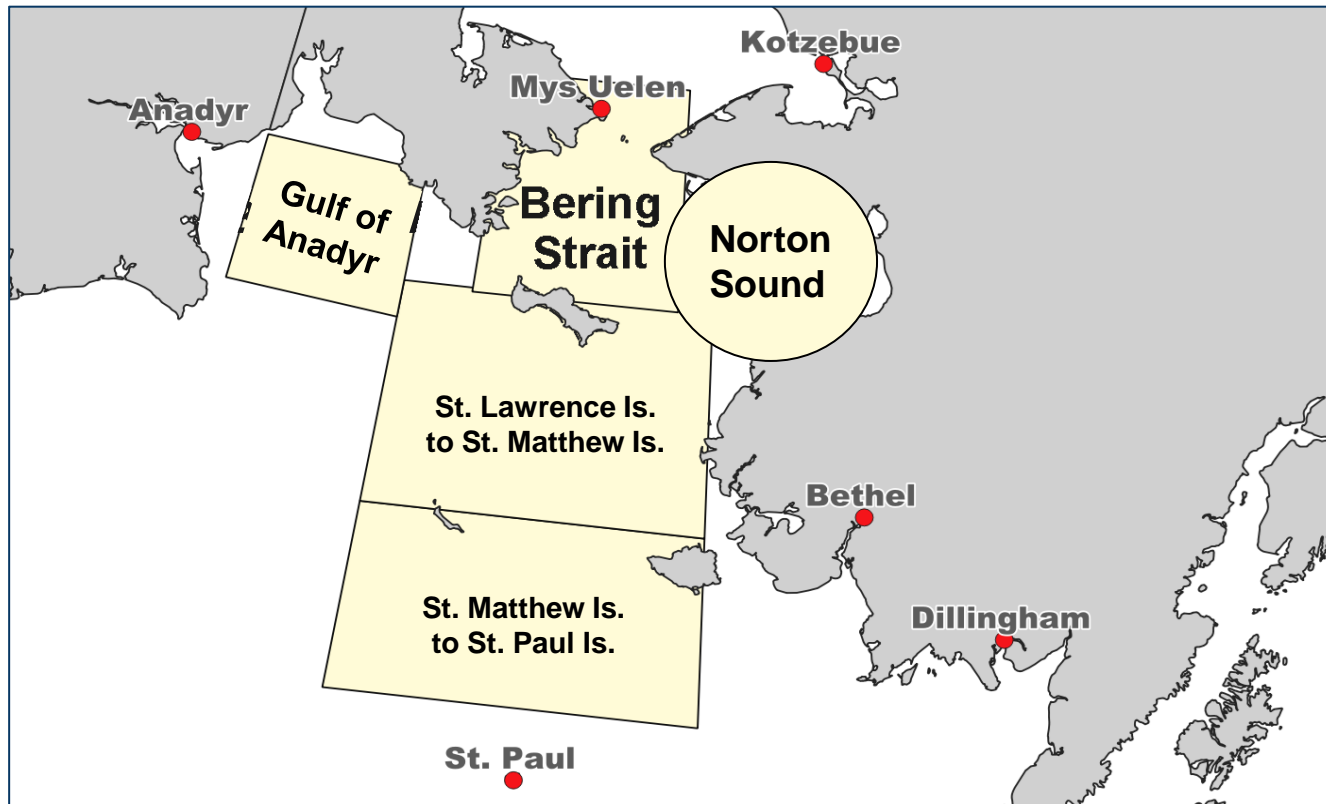


- Residual warmth delayed freeze-up into winter.
- “New normal”.
- Shortened ice season.
- Impacts to:
  - ice thickness
  - ice-associated algae
  - stratification
  - cold pool extent



# Bering Sea Ice Thickness

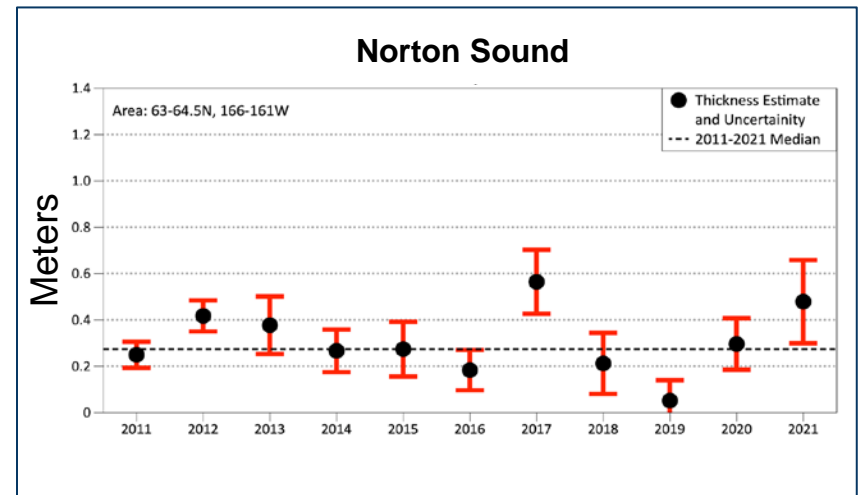
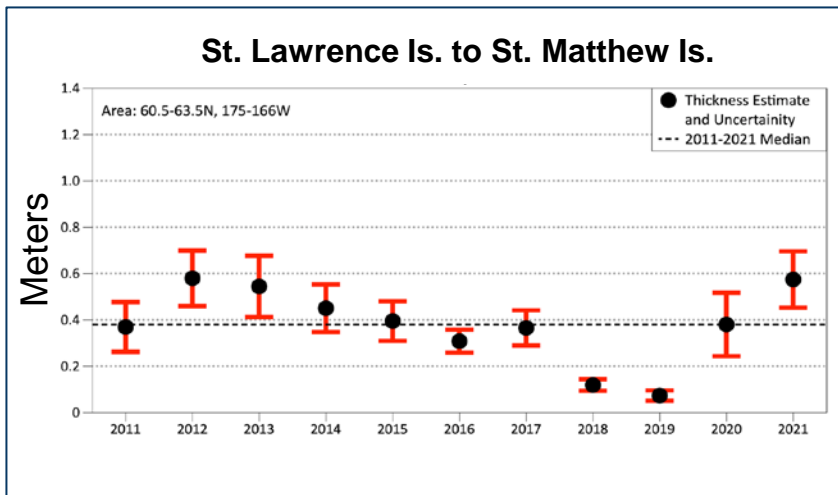
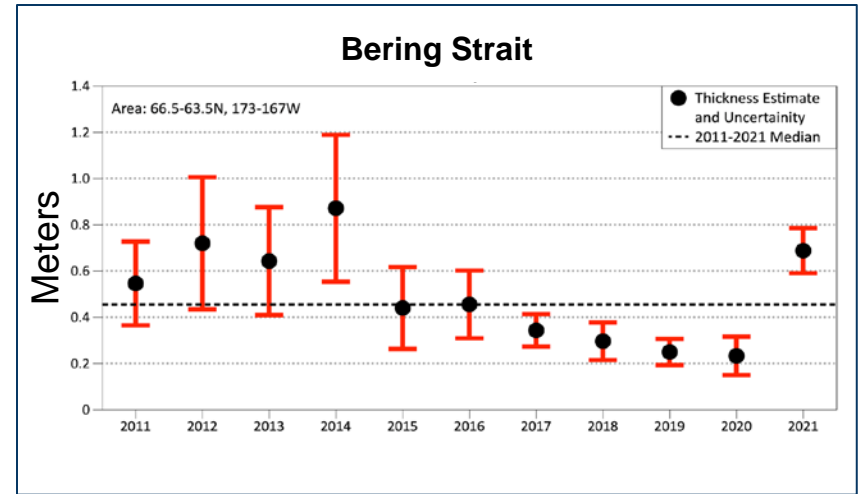
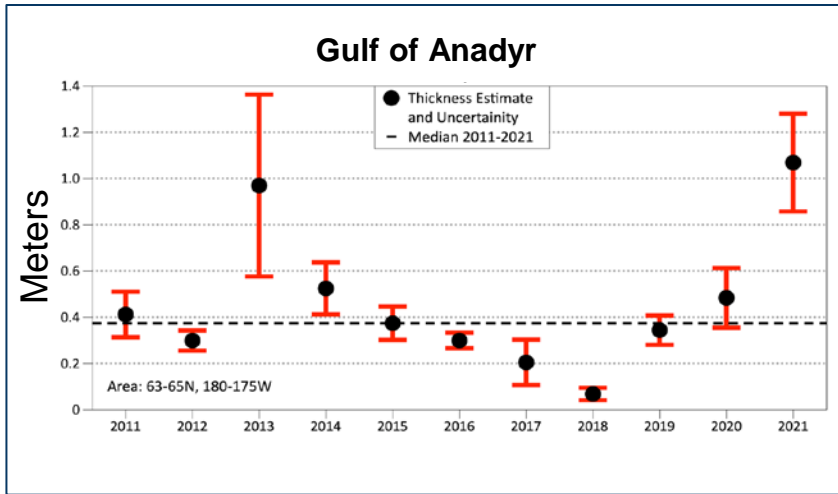
Thoman



- 3<sup>rd</sup> week of March.
- Ice thickness is related to duration of ice over the shelf.
- Impacts to:
  - ice-associated algae
  - stratification
  - cold pool extent

# Bering Sea Ice Thickness

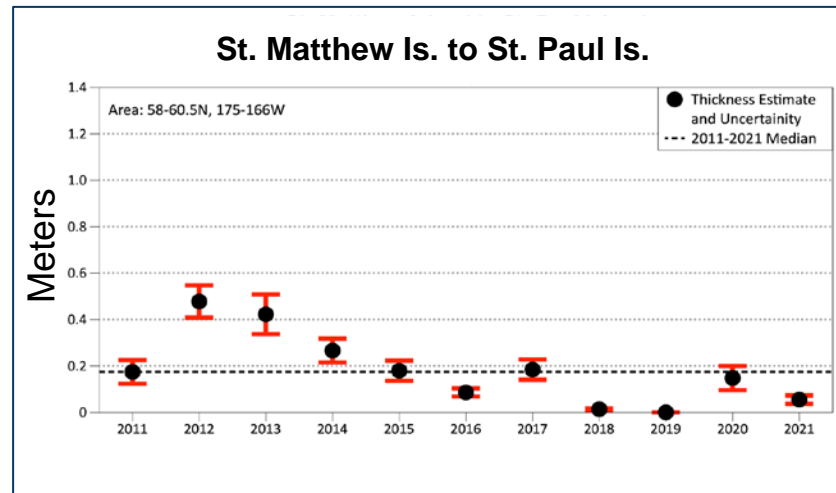
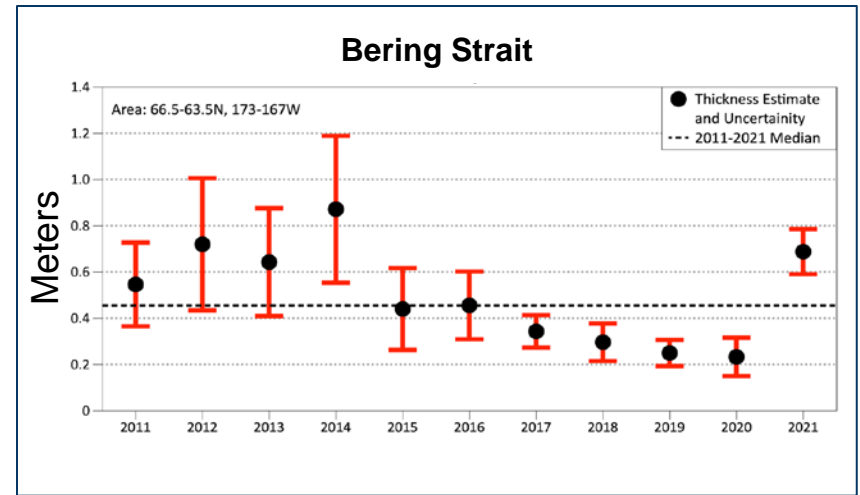
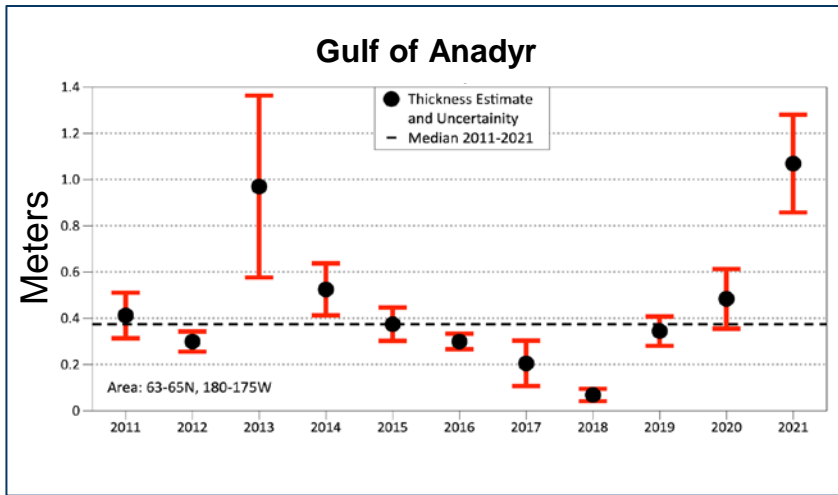
Thoman



Northern and western areas had *increased* ice thickness in 2021.

# Bering Sea Ice Thickness

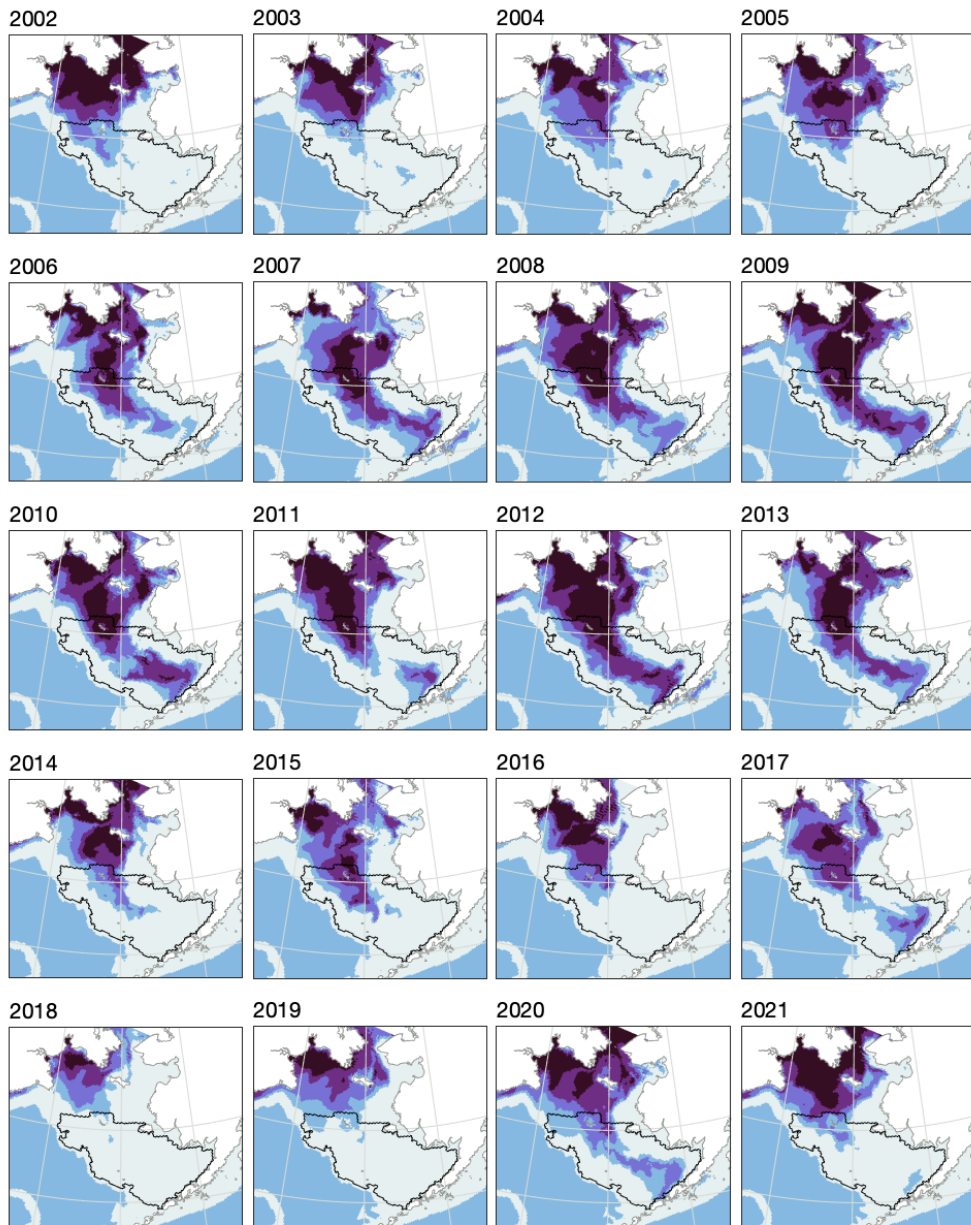
Thoman



South of St. Matthew Is. continued to have **decreased** ice thickness in 2021.



# Bottom Temperatures and Cold Pool Extent Kearney



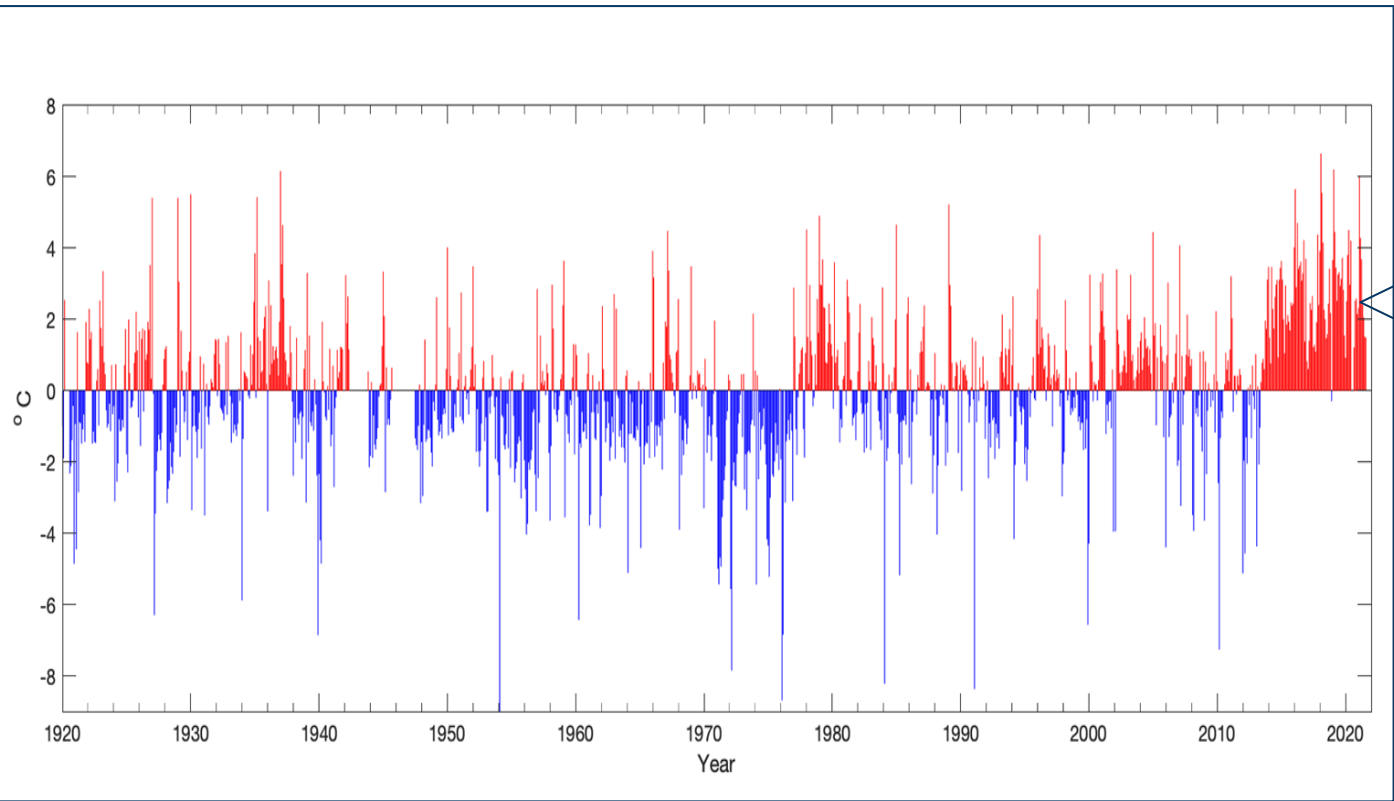
Bering 10K ROMS hindcast



- 2021 was a warm year, but not excessively warm.
- 2021 cold pool extent is similar to previous warm years of 2002-2005.
- Impacts to:
  - Species distributions
  - Predator-prey overlap

# St. Paul Air Temperature Anomalies

Wang



Increased duration and magnitude of current warm period.

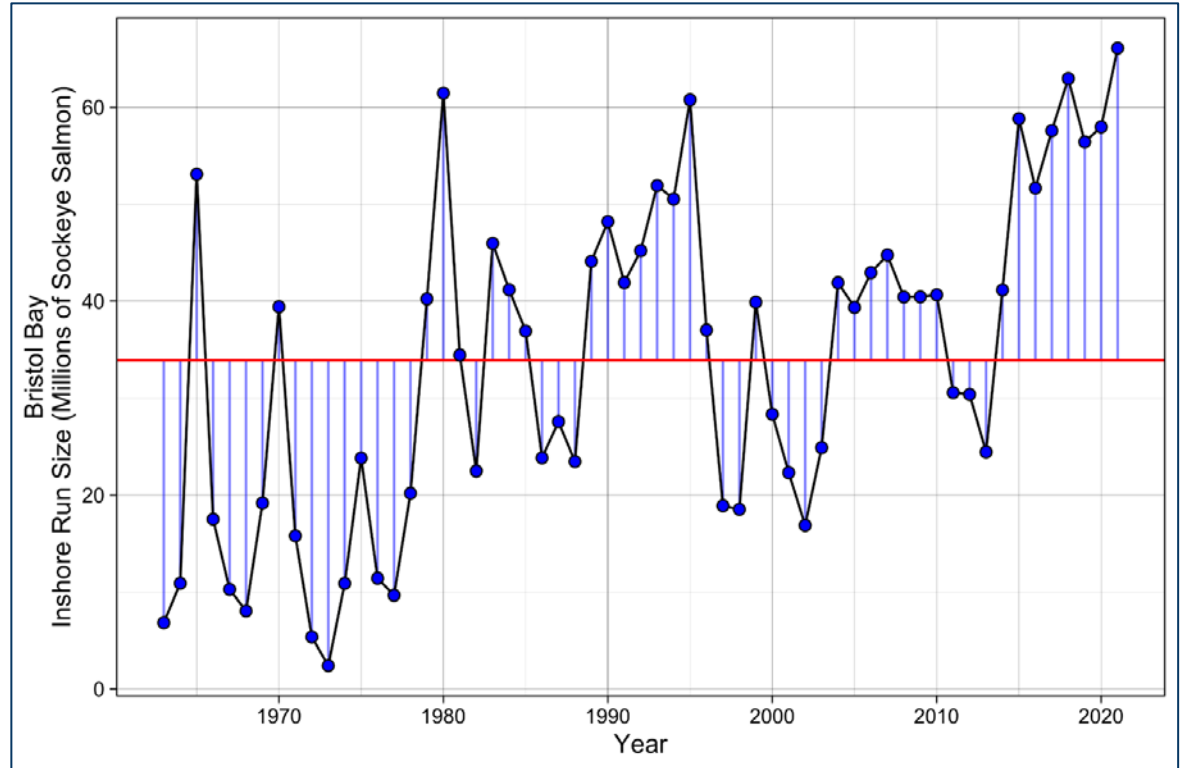
“Is the Bering Sea more vulnerable to continued change with thinner and less sea ice?” - Jim Overland



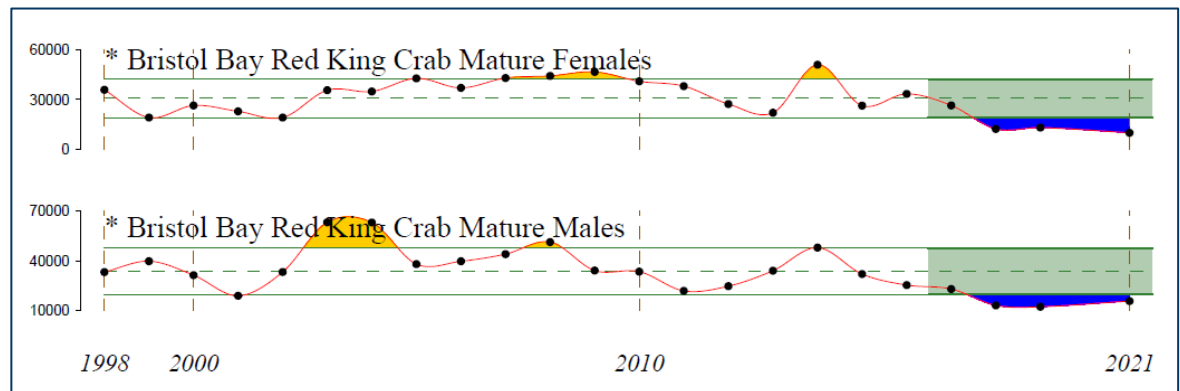
# PRELIMINARY 2021 Bristol Bay Sockeye Salmon

## Cunningham

- 2021 is the largest inshore run on record.
- Juvenile sockeye feed on zooplankton and age-0 pollock in warm years; adults feed on zooplankton and krill.



- Are there system-wide impacts?



# There is more to the story...

## Ecosystem trifecta

- 1) Crab population declines
- 2) Salmon run failures in the AYK
- 3) Seabird die-off event in the NBS

- There is no 'smoking gun' explanation.
- Common thread is the marine environment in the NBS.
- Concerns about carrying capacity of the NBS since 2018.
- Has the resiliency of the system eroded?

