

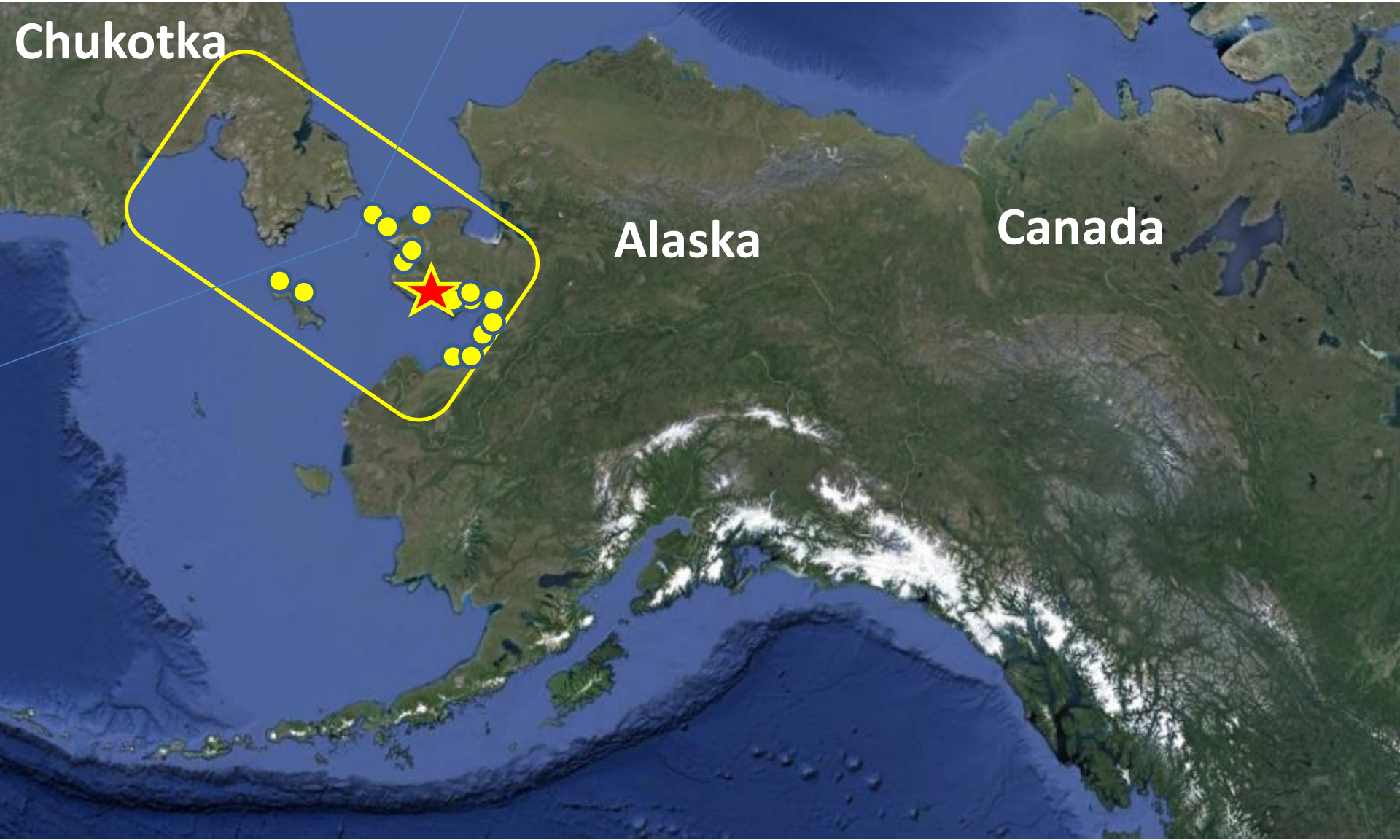
# **Rapid Change: 2019 in Northwest Alaska's Oceans and Impacts to Ecosystems**

**One Health Group  
Gay Sheffield  
UAF-CFOS Alaska Sea Grant (Nome)  
December 2019**

Chukotka

Alaska

Canada





# Bering Strait





Photo: G. Kuunuka



## Non-commercial acquisition of marine resources - essential



Photos: G. Sheffield

# Sea ice



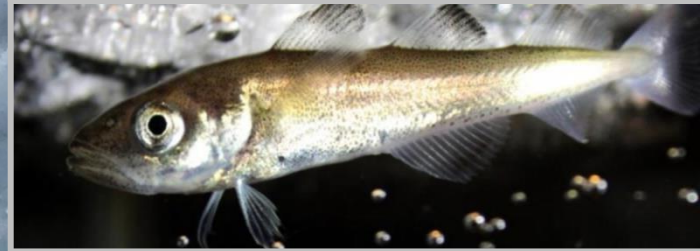
**Thermal barrier - two ecosystems**

# Sea ice



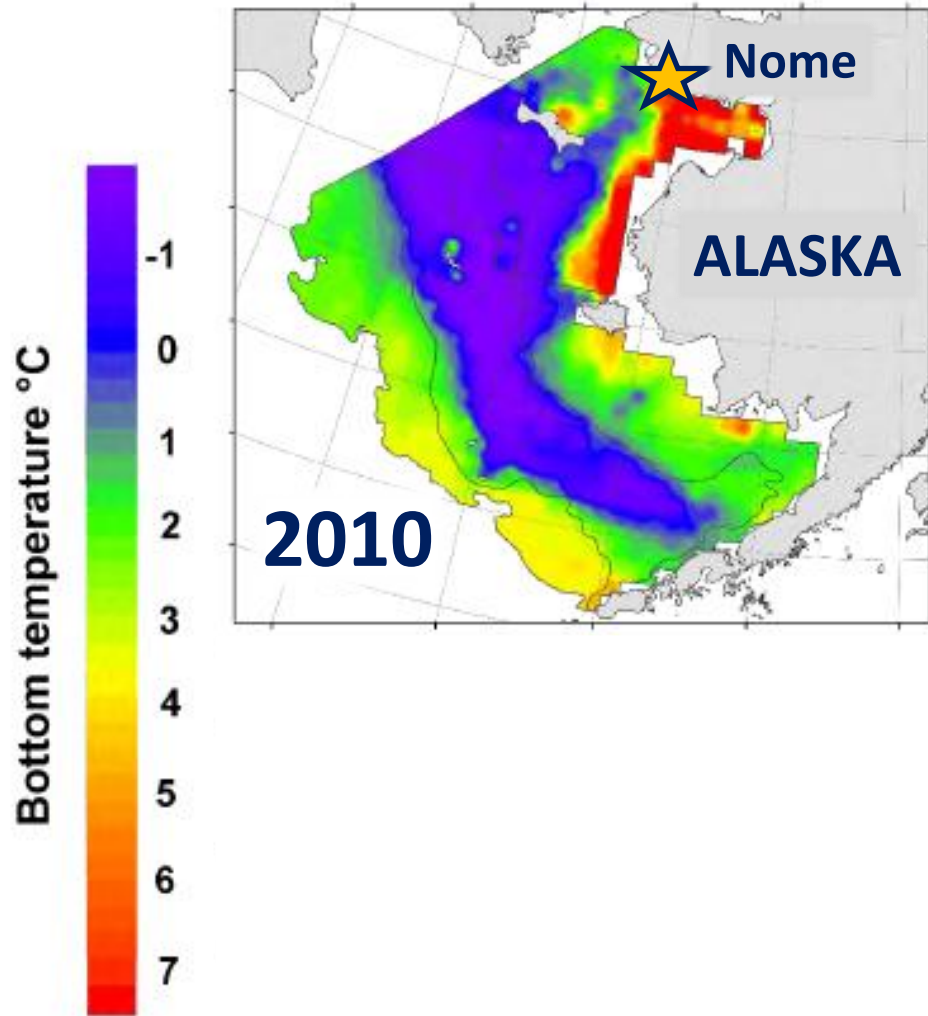
**Thermal barrier - two ecosystems**

# Sea Ice



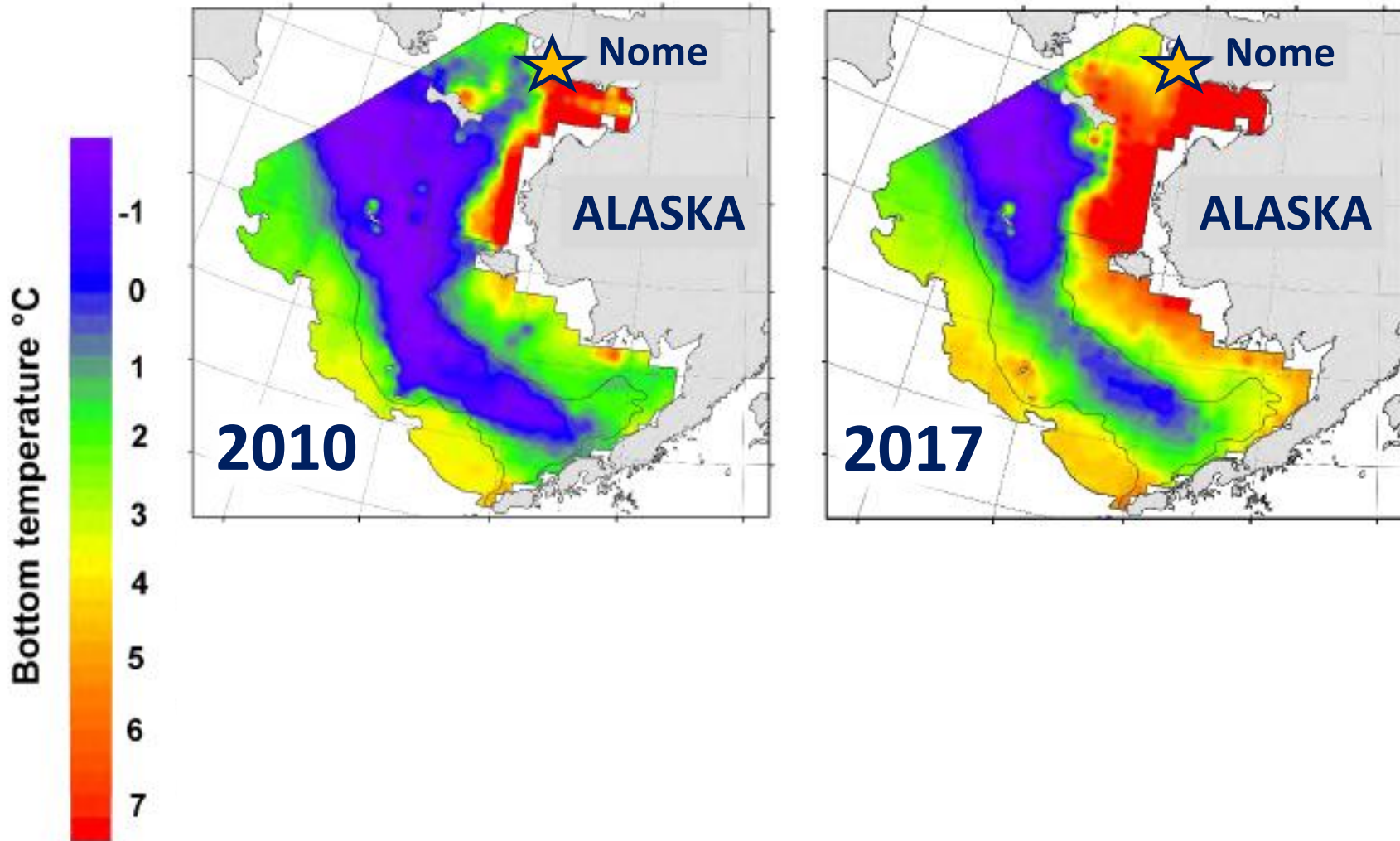
**Algae feeds the food chain**

# Bering Sea: Bottom Water Temperatures





# Bering Sea: Bottom Water Temperatures



# Bering Strait: 2010-2017...

## EVENTS

### Diseases

- *Ice Seal UME*
- *Avian Cholera*
- *Saxitoxin..?*
- *Starvation*

### Invasive / Extension Oil-Fouling / Debris



Photo: T. Akeya



Photo: Public



Photo: L. Tungiyon



Photo: G. Sheffield



Photo: M. James



Photo: G. Sheffield



F/V Kapitan Bulsinovski (2012)

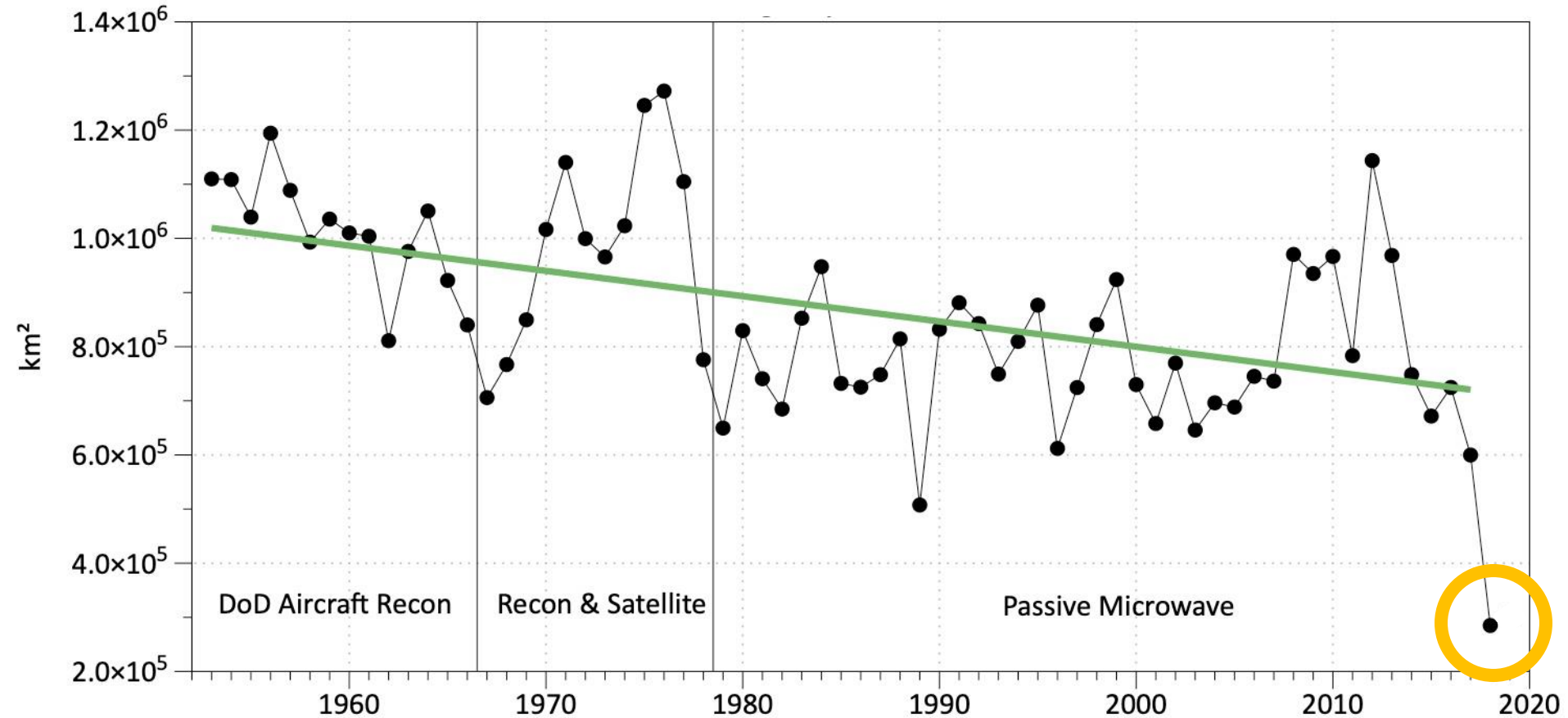
**February 2018 happened...**



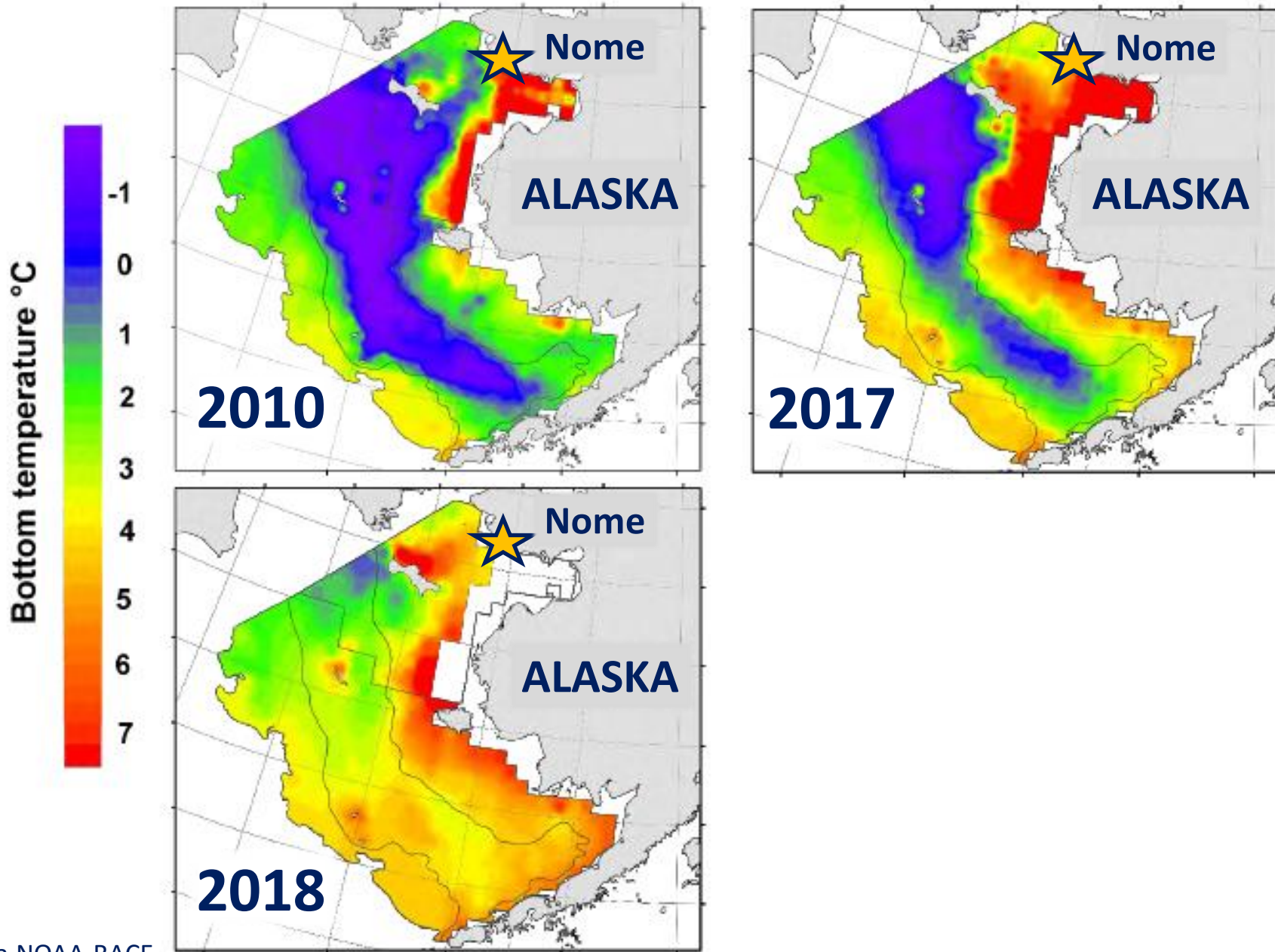
Photo: C. Ahkvaluk

# Loss of Sea Ice: 1953-2018

## February-April: Bering Sea Ice Extent



# Bering Sea: Bottom Water Temperatures



# Bering Strait: 2018 Events

## NO THERMAL BARRIER

- *Massive ecological shifts*
- *Mass strandings (seals)*
- *Seabird die-off*
- *HAB concerns (walrus)*

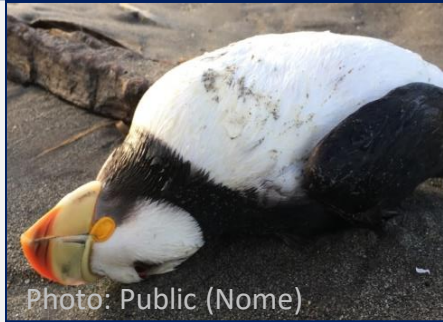


Photo: Public (Nome)



Photo: S. Komonaseak Jr.



Photo: B. Ahmasuk



Photo: A. Angqatenganwan



Photo: NOAA

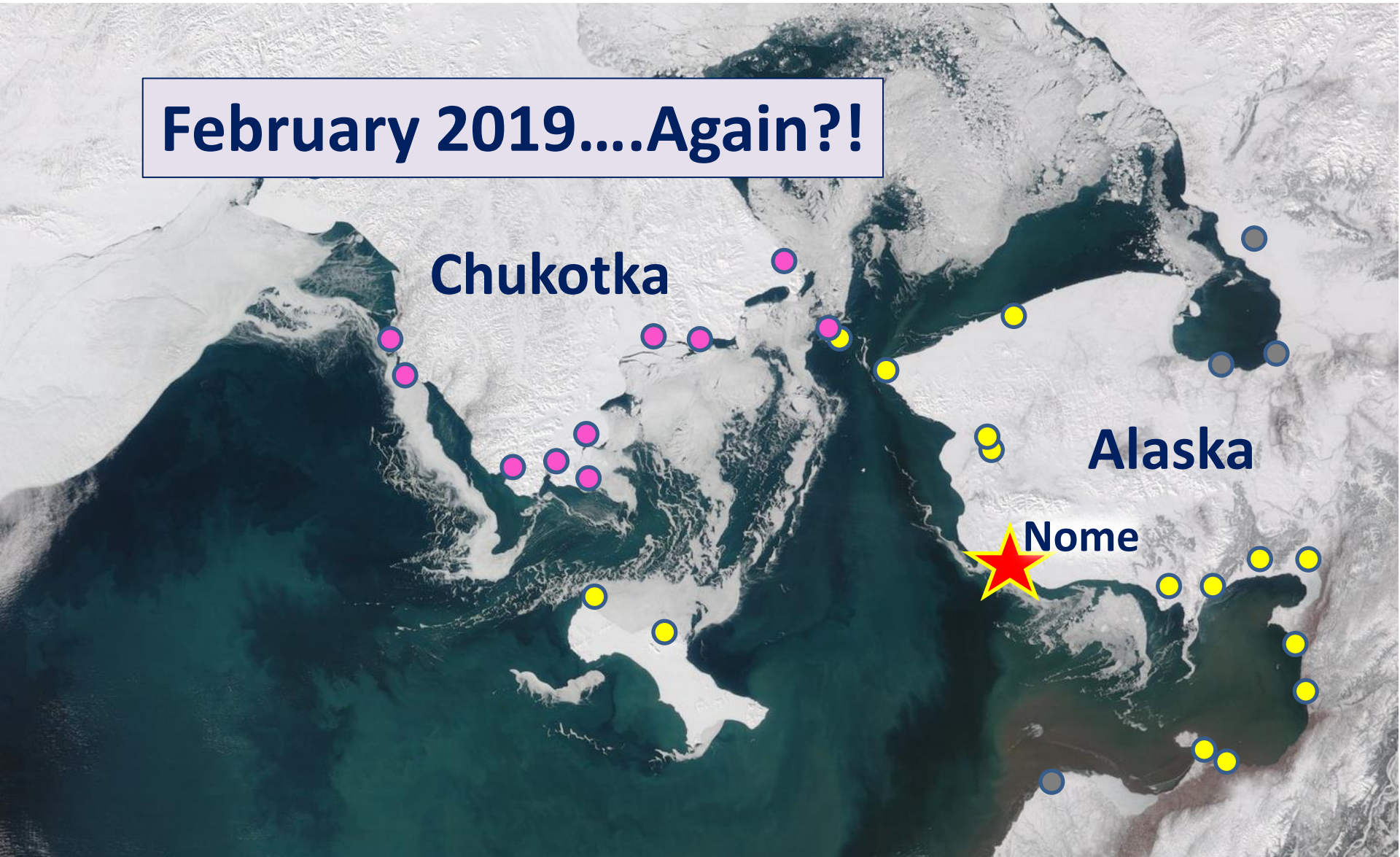


Photo: E. Apassingok



Photo: M. Rauzon

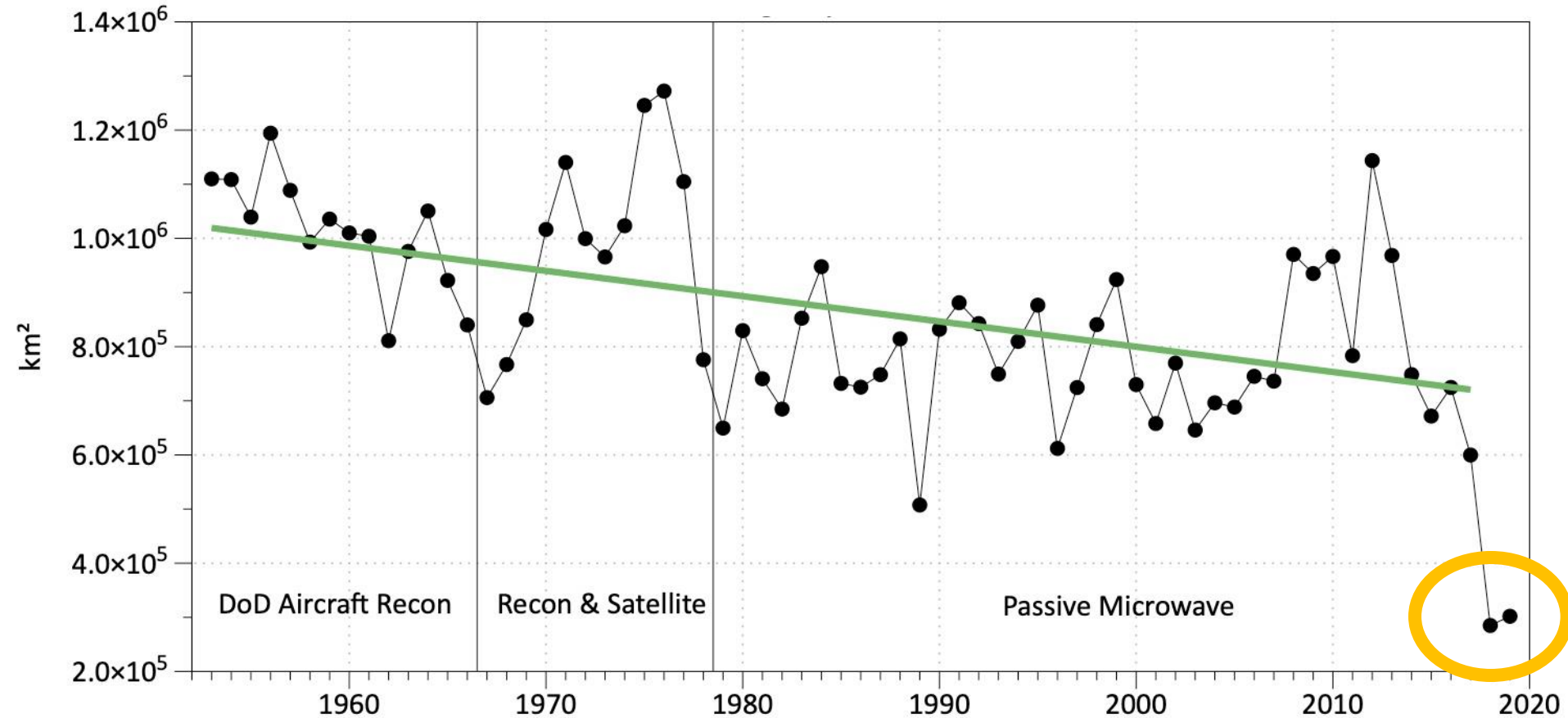
**February 2019....Again?!**



**April 4, 2019**

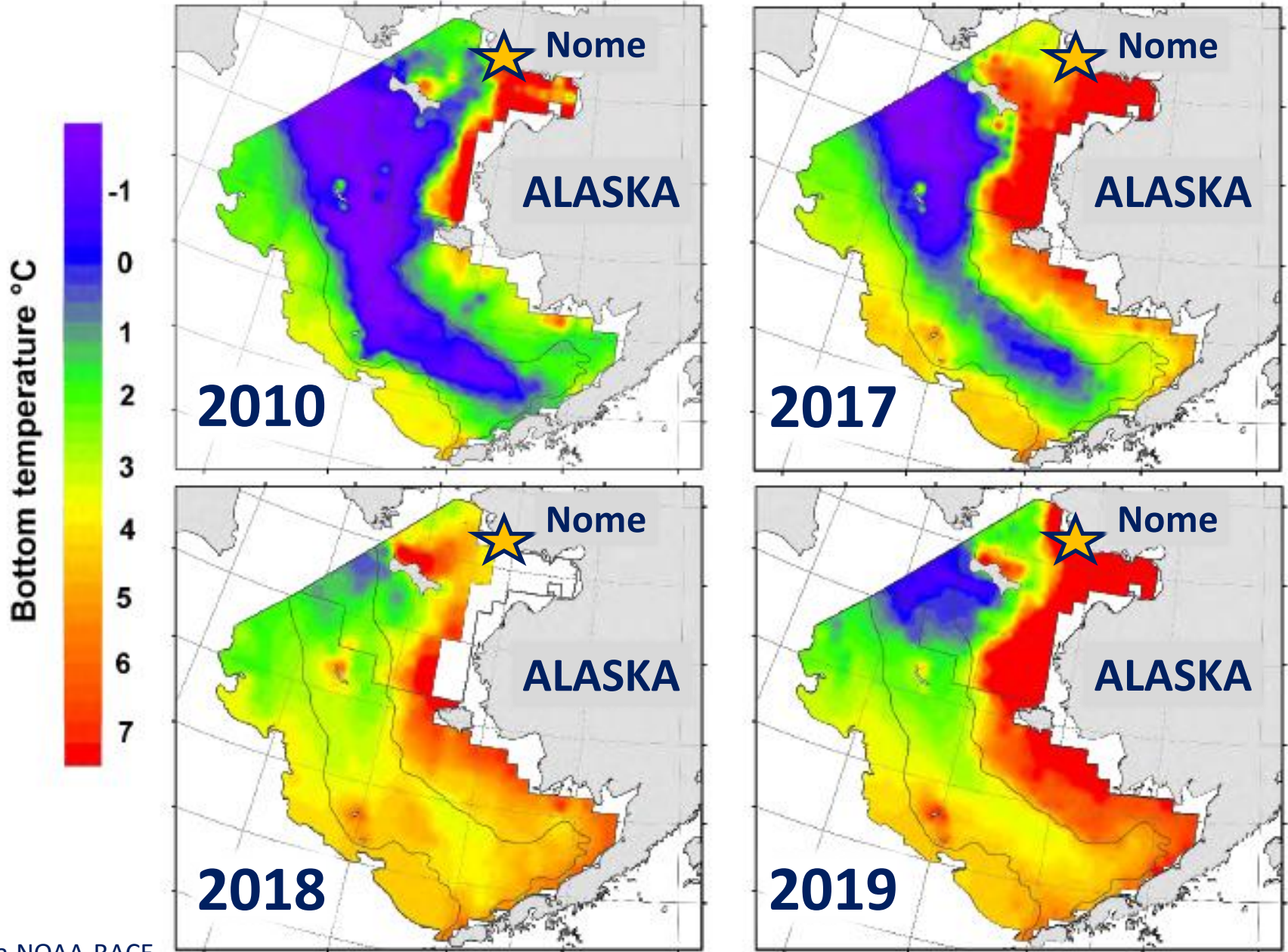
# Loss of Sea Ice: 1953-2019

## February-April: Bering Sea Ice Extent





# Bering Sea: Bottom Water Temperatures



# Bering Strait: 2018-2019 Events

**NO THERMAL BARRIER**  
 - *Massive ecological shifts*



Photo: B. Ahmasuk

NOAA – RACE Div.      **NBS: Biomass (mt)**

	2010	2017	2019	Change
<b>Pollock</b>	21,141	1,319,062	1,167,099	5,421%
<b>Pacific Cod</b>	29,124	287,535	364,982	1,153%
<b>Smelts</b>	16,377	5,260	4,891	-70 %
<b>Arctic Cod</b>	37,861	3,906	47	-100 %

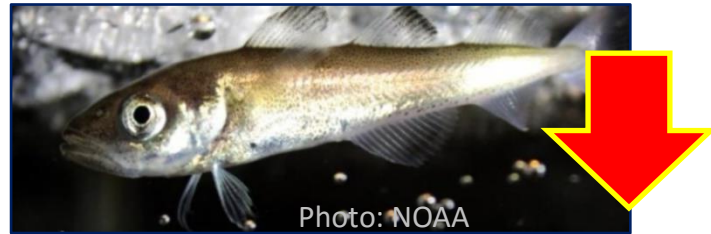


Photo: NOAA

# Bering Strait: 2018-2019 Events

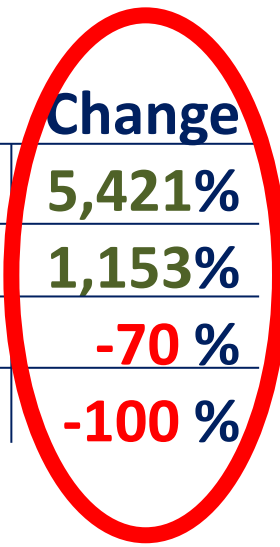
**NO THERMAL BARRIER**  
 - Massive ecological shifts  
 - Mass strandings (UME)



NOAA – RACE Div.

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# Bering Strait: 2018-2019 Events

**NO THERMAL BARRIER**

- Massive ecological shifts
- Mass strandings (UME)
- Seabird die-off



Photo: V. Ongtowsruk



Photo: B. Ahmasuk

NOAA – RACE Div.

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# Bering Strait: 2018-2019 Events

## NO THERMAL BARRIER

- Massive ecological shifts
- Mass strandings (UME)
- Seabird die-off
- HAB Events, "Hot" clams

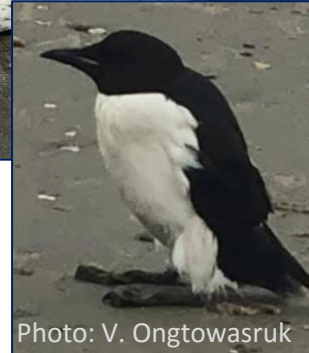


Photo: V. Ongtowsruk



Photo: B. Ahmasuk

NOAA – RACE Div.

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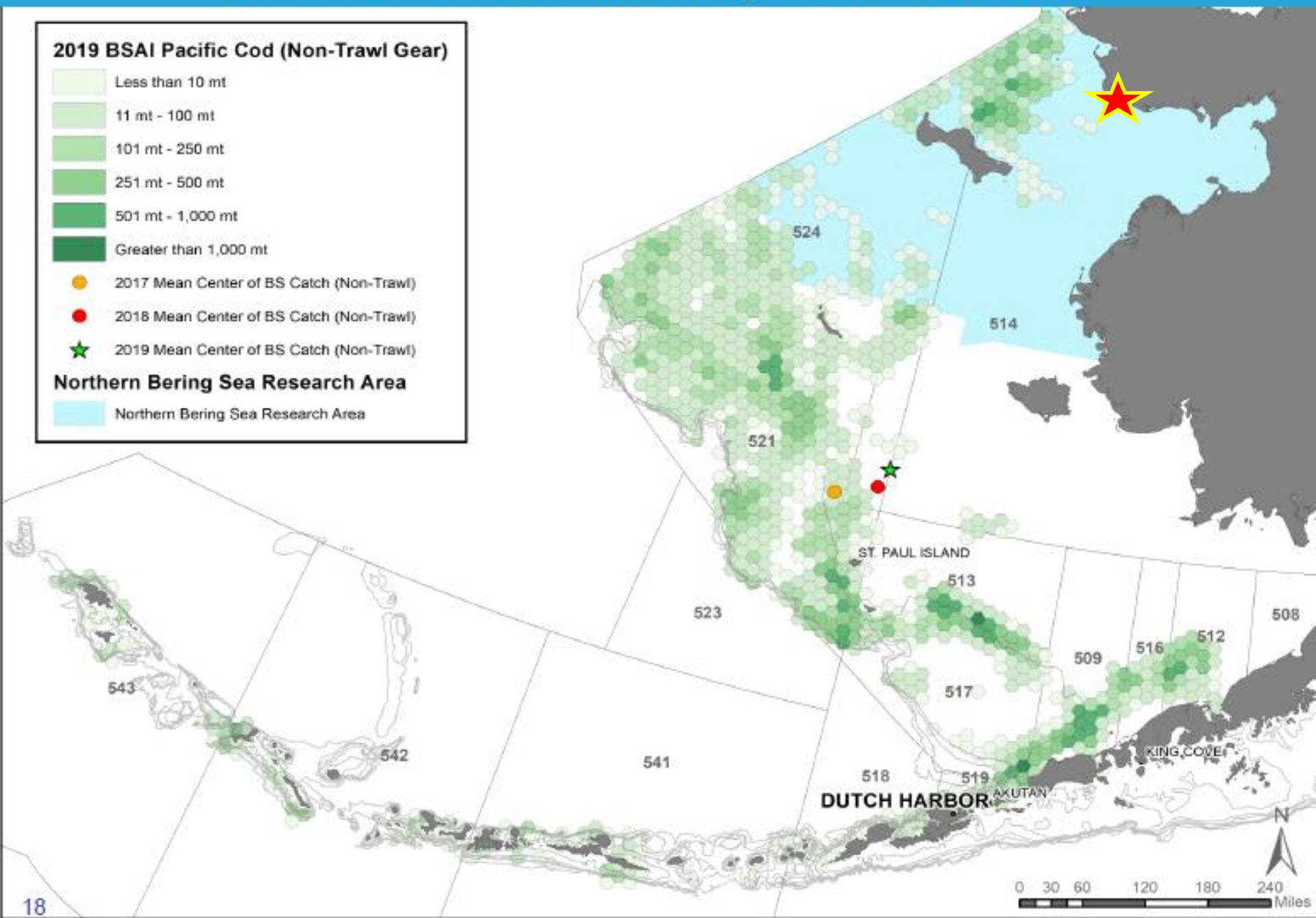
# 2019 Pacific Cod Catch by Non-Trawl Gear

## 2019 BSAI Pacific Cod (Non-Trawl Gear)



## Northern Bering Sea Research Area

Northern Bering Sea Research Area





# SEVENTEENTH DISTRICT



## Migration of Fishing Activity Challenges USCG Capability

### Primary CG Concerns:

- SAR/MRO
- Enforcement
- Arctic Closed Area

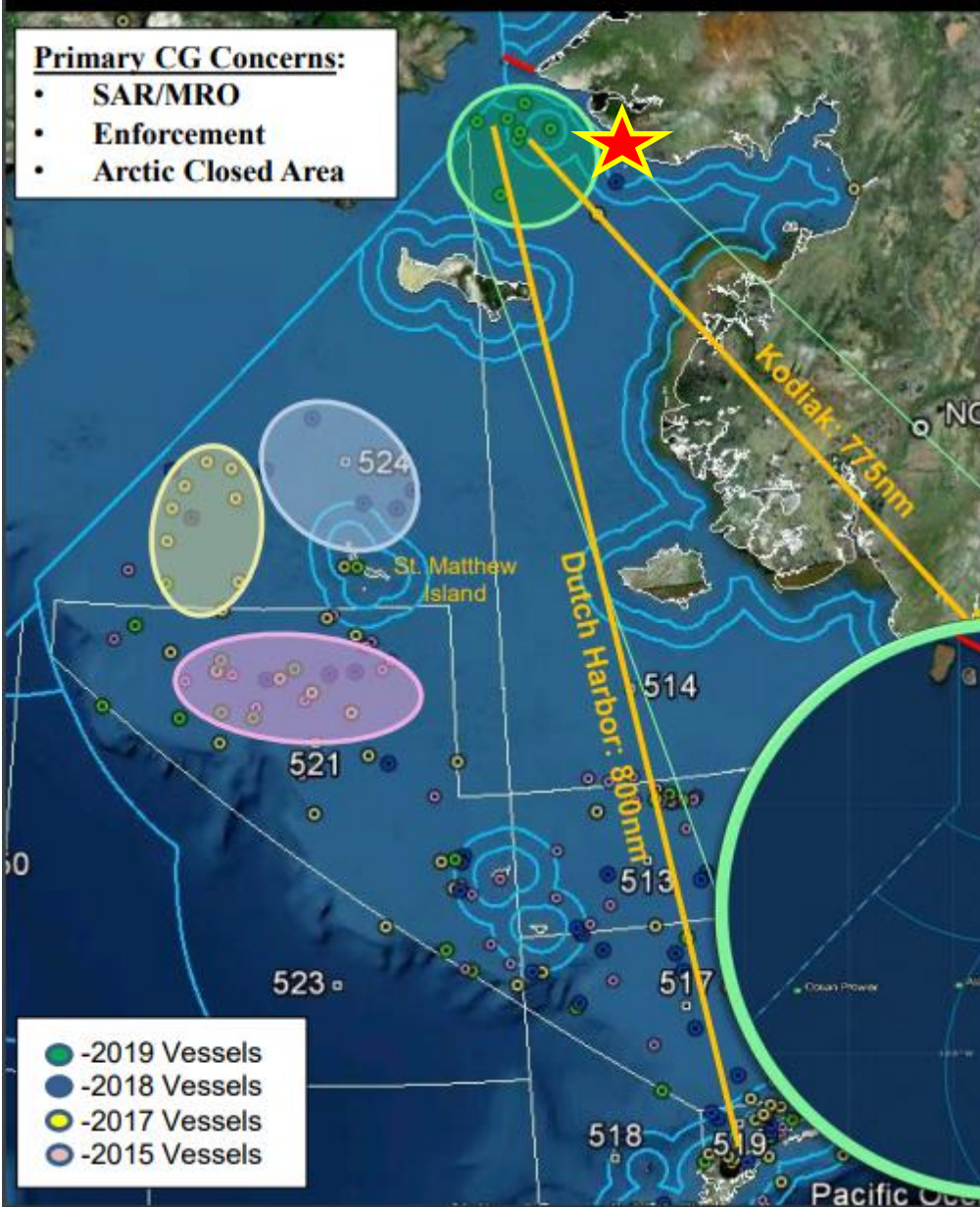
### Freezer Longline Fleet: Targeting Pacific Cod

- Unprecedented Northern Concentration (*validated through USCG, NOAA SF, Arctic Biologist*)
- 25nm from Arctic Closed Area
- 775-800nm from SAR/LE Support (2 day cutter transit)
- Supports scientific research on the effects of climate change

### Analysis:

- Less sea ice
- Cold pool shrinking in Bering Sea
- Fish stocks moving north
- More productive fishing

C-130 Flight: 15 Nov  
F/V Arctic Prowler- 119ft 20 POB



- -2019 Vessels
- -2018 Vessels
- -2017 Vessels
- -2015 Vessels

# Bering Strait: 2018-2019 Events

## NO THERMAL BARRIER

- Massive ecological shifts
- Mass strandings (UME)
- Seabird die-off
- HAB Events, “Hot” clams
- Bowhead movements...



Photo: G. Sheffield



ALASKA PUBLIC MEDIA  

Whalers in Utqiagvik can't remember hunting this late without landing a bowhead



## **SUMMARY: Northern Bering Sea**

**Loss of sea ice = transitioning marine ecosystem**

- **Lack of thermal barrier**
- **Less algae...less primary production...**
- **Two entire ecosystems in flux**
- **Cascading responses (ex. unusual movements, body condition, etc.**
- **Food security / public health concerns**
- **Industry in transition...**

**Current conditions: Late freeze-up...winter 2019?**

