



Marine Birds and a Warming Ocean: Working Together to Witness Change

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Seabird mortality events: normal or not?

Oregon, late fall 2015

NORMAL

- Post-breeding mortality



NOT-NORMAL

Seabird mortality events:
normal or not?

- Food stress
- Molt

St. Paul Island, fall 2016



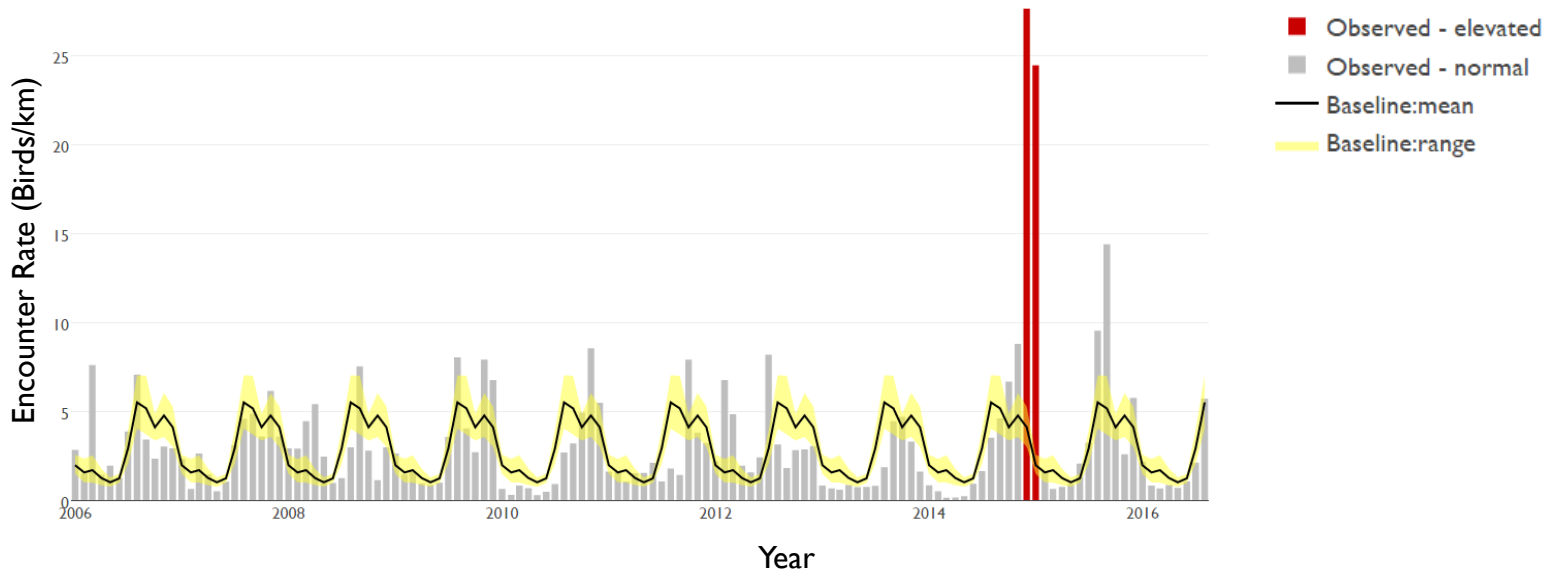
Identifying unusual mortality events

Within COASST

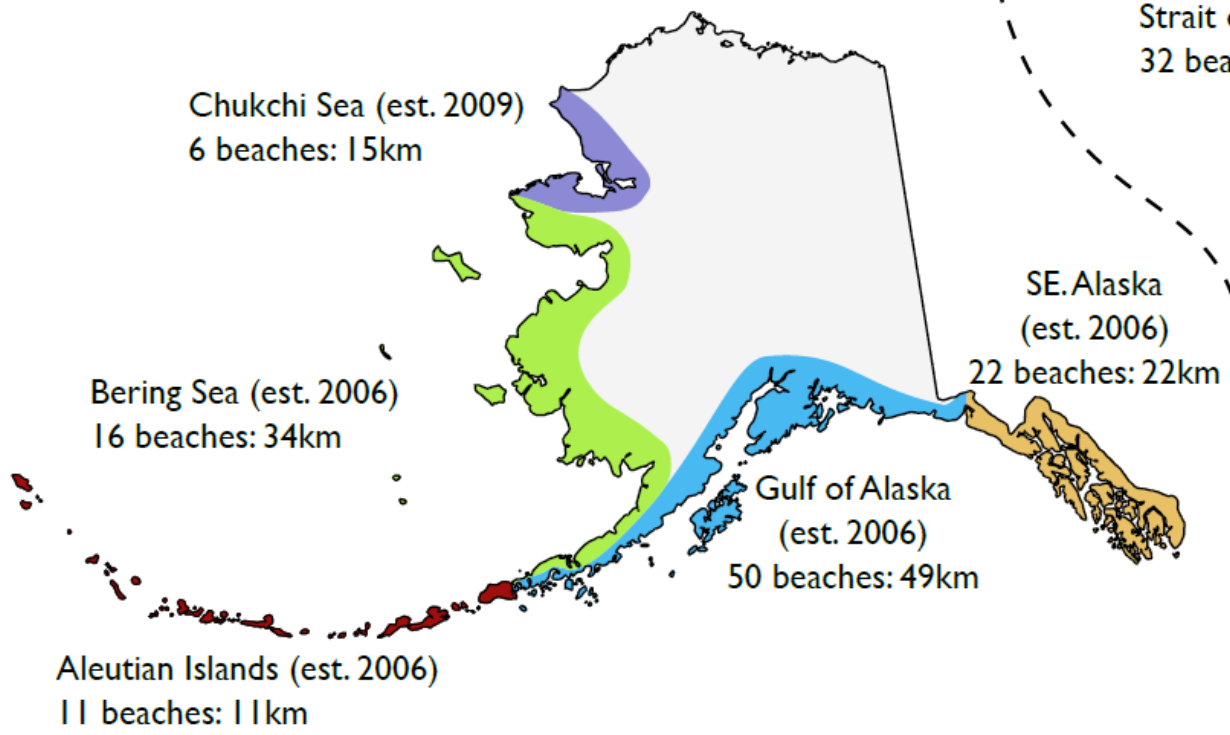
- Baseline - month-averaged encounter rate (ER - carcasses per km) for each COASST region
- Unusual/mass mortality events defined as periods with $ER > 5 \times \text{baseline}$

Outside Data

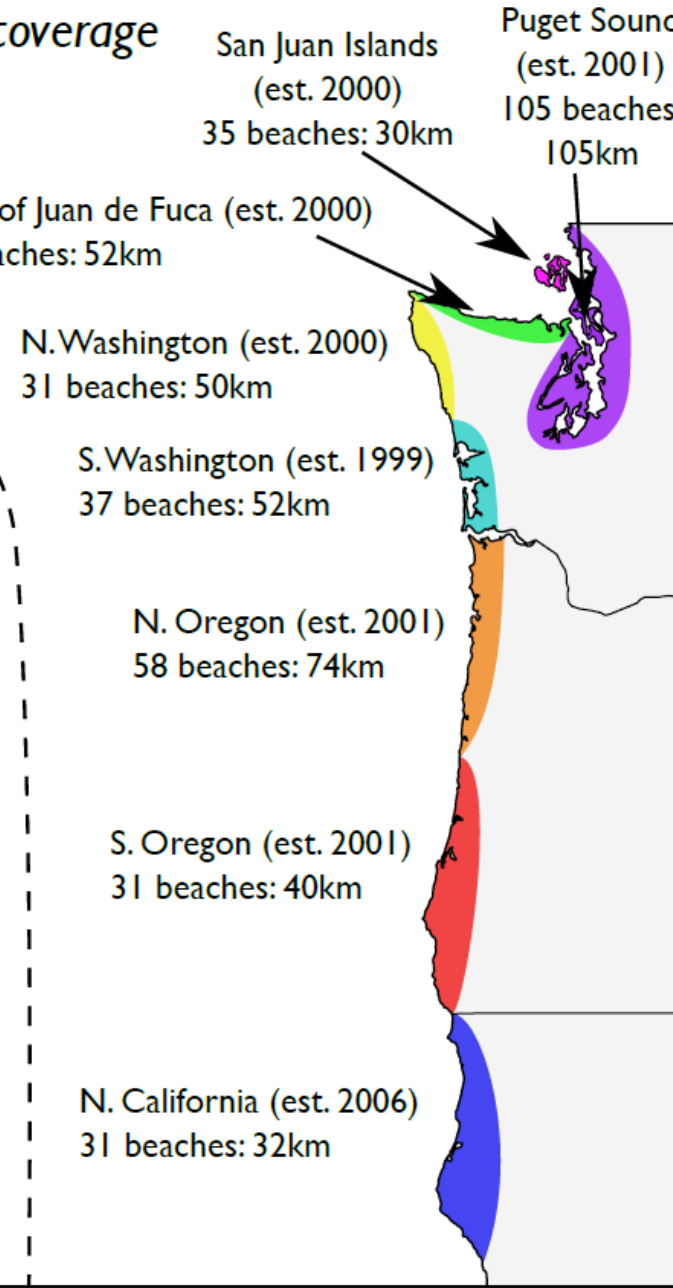
- Partner with other beached bird programs
- Reports from coastal communities submitted to USFWS and other opportunistic reporting



Alaska coverage



Lower 48 coverage



COAST

19 years old
3,000 people trained
900 current participants
465 active beaches
77,500 carcasses found
183 species found

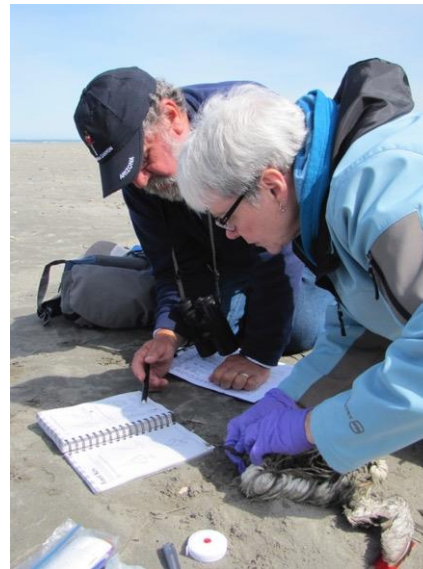


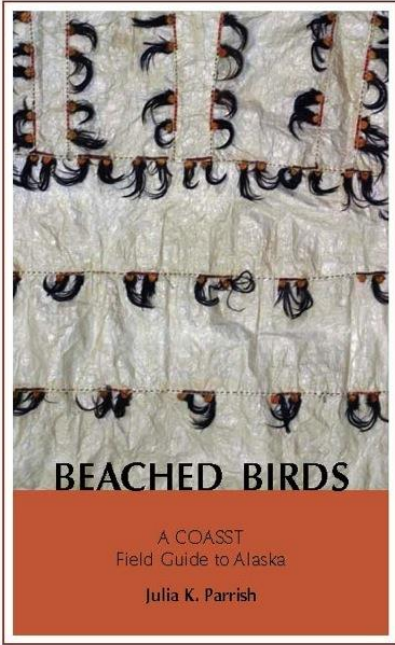
Beached Birds

What does it mean to participate?

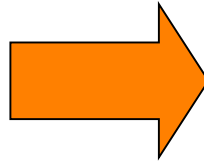
*(5-6 hour training; then 1-5 hours/month,
depending on the beach)*

- **survey** for beachcast carcasses of marine birds on *your* beach monthly
- **measure, collect condition information, identify** and **photograph** carcasses





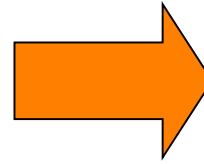
COASST Bird ID



Foot Key

Q1 Are the front toes free, lobed or webbed?

22



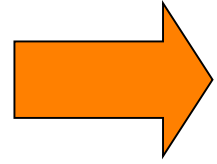
Thick-billed Murre

EA sakies, WA ulgutzat, YUACU alpa *Uria lomvia*

PLUMAGE VARIATION: A-I, B-NB, M-F

- BILL**
dark, smooth, straight
B: thin white moustache
- HEAD**
B: dark
NB & I: dark face, white chin
- WING**
white-tipped SS (missing in young chicks)
- UNDERWING**
white linings (missing in young chicks)

AL5



Alcids

FT: Alcids
murre, puffins, guillemots, auklets, murrelets

FOOT DESCRIPTION: 3 webbed toes

WING CHORD:
 we > 15 cm: Large Alcids
 we < 15 cm: Small Alcids (continued on next page)

BILL COLOR & SHAPE:
 dark, slender, featureless
 yellow to dark orange, w/ grooves or hoar

UPPERWING:
 dark, w/ trailing white SS
 Common Murre, AL3
 Thick-billed Murre, AL5
 dark, w/ large white patch
 Pigeon Guillemot, AL7
 Black Guillemot, AL7
 dark, w/ pale smudge along leading edge
 Tufted Puffin, AL9
 Horned Puffin, AL11
 Rhinoceros Auklet, AL13

AL1



Die-off Alert

What does it mean to participate?

(1.5 hour training; then dependent on mortality event, the beach, the weather and your time)

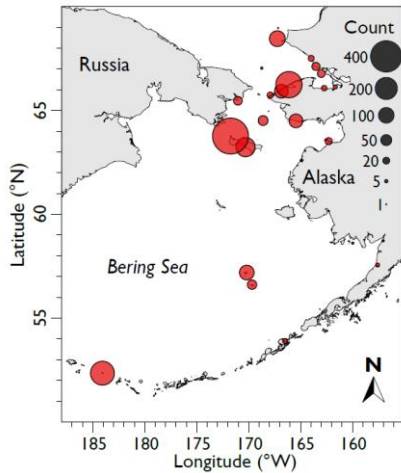
- **search** for beachcast carcasses of marine birds on *your* beach **during die-offs**
- **arrange** and **photograph** carcasses



Identifying unusual mortality events

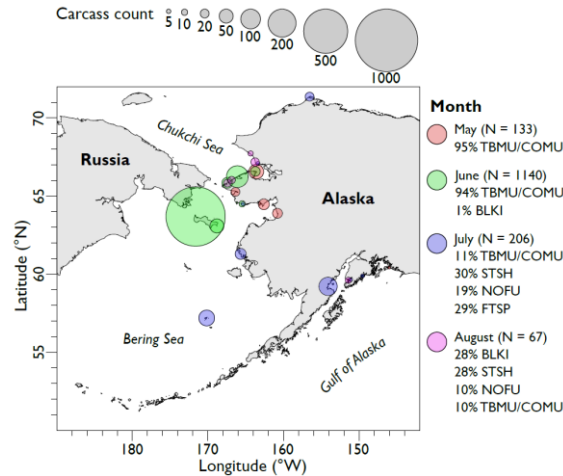
Within COASST

- Baseline - month-averaged encounter rate (ER - carcasses per km) for each COASST region
- Unusual/mass mortality events defined as periods with ER > 5×baseline



Outside Data

- Partner with other beached bird programs, agencies
- Reports from coastal communities submitted to USFWS and other opportunistic reporting







Center for Alaskan Coastal Studies
Homer, Alaska

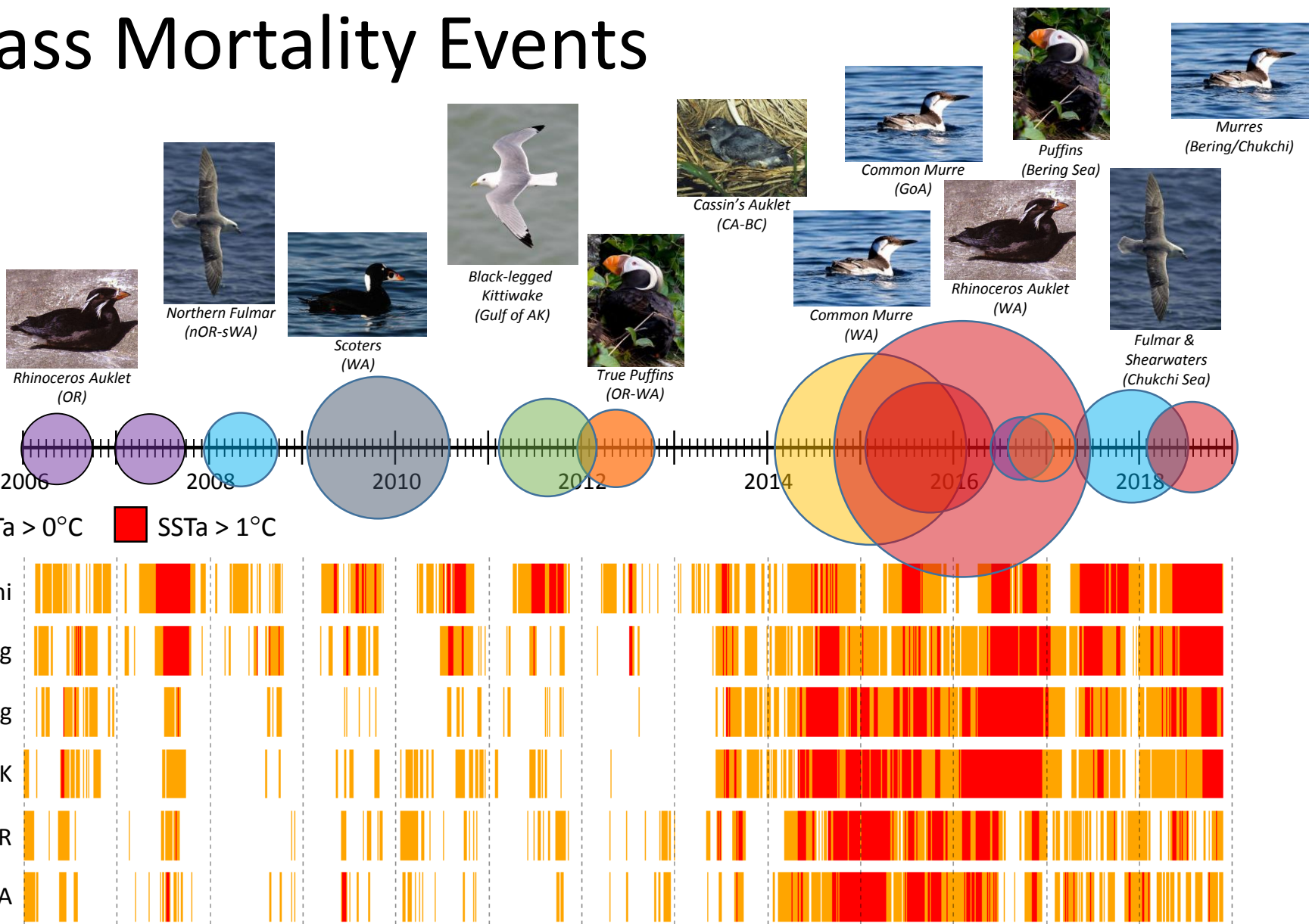


Washington Department of FISH and WILDLIFE



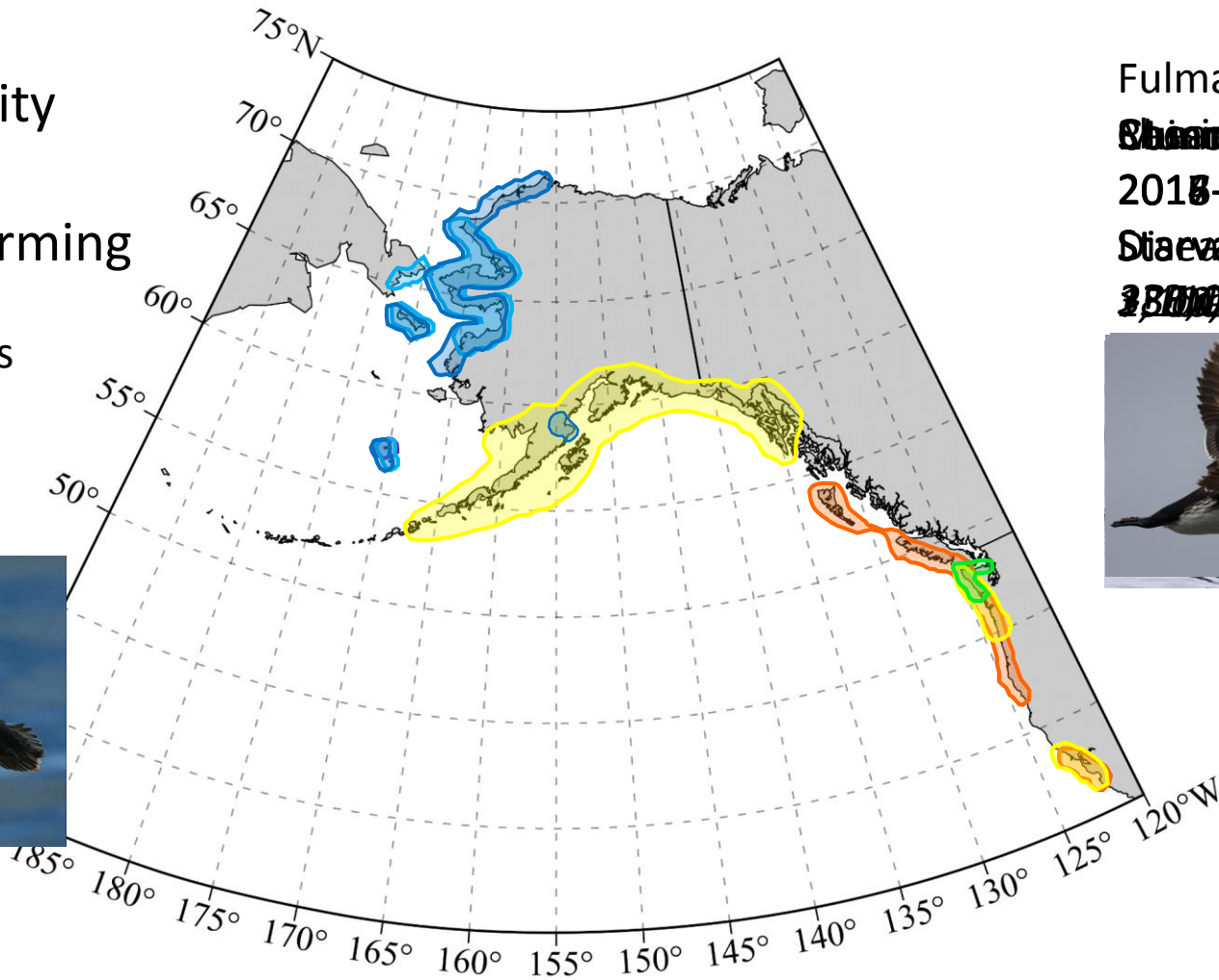
COASST participants and coastal community members who contribute their observations!

Mass Mortality Events



fine print: bubbles scaled to peak regional encounter rate estimate. smallest: RHAU@2.7 carcasses/km, largest: COMU in AK@61 carcasses/km. Average sea-surface temperature anomaly (SSTa) by day for each region (≤ 300 km from shore). Relative to SST climatology 1971-2000. NOAA High Resolution SST data provided by the NOAA/OAR/ESRL PSD, Boulder, Colorado, USA, from their website at <https://www.esrl.noaa.gov/psd/>

Marine Bird
 Mass Mortality
 Events
 Assoc. w Warming
 2014-2018
 Tufted Puffins
 2016-17
 Starvation
 6,800+ died



Fulmars &
 Shearwaters
 2018-19
 Starvation
 3,800+ died



Roles and Responsibilities during a Die-off

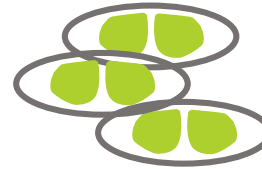
- **Community Members** – make observations, conduct photo-surveys and text or email information
- **Trained COASST Participants** – conduct standardized surveys, ID birds
- **Local Points of Contact** (may be an individual or an organization) – communication hub
- **USFWS** – determines need for and coordinates diagnostic tests, regulatory authority
- **USGS** and others – perform necropsies as requested by federal agencies involved (e.g., USFWS, NOAA)
- **COASST Office** – coordination of COASST participants; data compilation and event documentation; communication with state, federal and tribal agencies and councils as needed

Die-off CSI

Disease



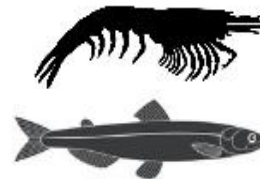
HABs



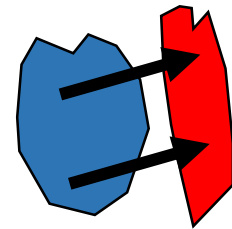
Storms



Prey



Distribution shifts



North Pacific MMEs 2014-2018 – a summary

- Predominantly Alcids
 - Species diversity higher for later/more northern events
- Transition to warmer conditions
 - ‘Blob’ – El-Niño
 - Early retreat/lower ice cover in Bering/Chukchi
 - Altered prey available
 - Biological, physical & behavioural pathways possible

Cassin's Auklets – 2014/15



Tufted Puffins 2016



Conclusions and open questions

- Seabird MMEs infrequent prior to 2014
- Since 2014 increase in
 - Magnitude
 - Frequency
 - Duration
- Coincident with warm conditions
- Open questions
 - Why predominantly Alcids?
 - Why do moribund individuals come to shore?
 - What ecological lags/buffering are in effect?

Cassin's Auklets – 2014/15



Tufted Puffins 2016





Thank you!

