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
Seabird mortality events: normal or not?

St. Paul Island, fall 2016

NOT-NORMAL

- Food stress
- Molt
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
- Reports from coastal communities submitted to USFWS and other opportunistic reporting
Alaska coverage

- Chukchi Sea (est. 2009)
  - 6 beaches: 15km
- Bering Sea (est. 2006)
  - 16 beaches: 34km
- Aleutian Islands (est. 2006)
  - 11 beaches: 11km

Lower 48 coverage

- San Juan Islands (est. 2000)
  - 35 beaches: 30km
- Strait of Juan de Fuca (est. 2000)
  - 32 beaches: 52km
- N. Washington (est. 2000)
  - 31 beaches: 50km
- S. Washington (est. 1999)
  - 37 beaches: 52km
- N. Oregon (est. 2001)
  - 58 beaches: 74km
- S. Oregon (est. 2001)
  - 31 beaches: 40km
- N. California (est. 2006)
  - 31 beaches: 32km

COAST

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

as of March 2018
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

BEACHED BIRDS
A COASST Field Guide to Alaska
Julia K. Parrish

Foot Key
Q1: Are the front toes free, lobed or webbed?

- Free (go to Q2)
- Lobed (go to Q3)
- Webbed (go to Q4)

Thick-billed Murre
HAB: arctic, WA, CA; habitat: Tundra

Wing Color:
- Dark, striped, mirror
- Light, striped, mirror

Uncommon
white wings
amazing in young chick

AL1

Alcids
HAB: Alcids
HAB: Tundra, Arctic

Wing Color:
- Dark, striped, mirror
- Light, striped, mirror

Uncommon
white wings
amazing in young chick

AL5
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
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

- **Cassin’s Auklets**
  - 2014-15
  - Starvation
  - 385,000 died

- **Common Murres**
  - 2015-16
  - Starvation
  - >500,000 died

- **Rhinoceros Auklets**
  - 2016-17
  - Disease
  - 1,100 found ??? died

- **Tufted Puffins**
  - 2016-17
  - Starvation
  - 6,800+ died

- **Fulmars & Shearwaters**
  - 2017-18
  - Starvation
  - ??? died

- **Murres**
  - 2018
  - Starvation
  - ??? 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

Storms

Prey

HABs

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
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?
Thank you!