CHAOZ: 2012 Field Season

Abstract
With the western Arctic climate rapidly changing, risks to marine mammals are rising. The extended open water season caused by the severe retreat in sea ice allows not only for a longer oil and gas exploration period each year, but a greater range expansion among marine mammals. In order to better understand these risks, an in-depth year-round knowledge of marine mammal distribution within the Chukchi Sea is needed. The CHAOZ (CHukchi Acoustic, Oceanographic, and Zooplankton) study began in 2010 and includes four components: oceanography, passive acoustics, zooplankton, and climate modeling aimed at determining marine mammal presence in the Chukchi Sea and their response to environmental change. During the 2012 field season (Aug 15th – 31st) 749 miles of trackline were visually observed and 101 sonobuoys were deployed. Of the 101 buoys deployed, 91 transmitted successfully. The visual observers had 36 sightings of 49 cetaceans consisting of six species (only one whale sighted was not positively identified) and 131 sightings of 423 pinnipeds, of which 43% were walrus sightings. Additionally one polar bear was sighted. The most common species detected acoustically were humpback and fin whales, heard on 11% and 8% of the buoys, respectively. Notably no seismic airguns were detected. In addition to the real time monitoring of the area, long term (year-long) AURAL (Autonomous Underwater Recorder for Acoustic Listening, Multi-Électronique, Rimouski, QC, Canada) recorders were deployed starting in August 2010. The recorders were deployed in clusters of five at three locations (40, 70, and 120 miles) off Icy Cape. A single recorder from each cluster deployed from 2010 to 2011 has been analyzed for the presence of bearded seal, beluga, fin whale, and bowhead whale.

Highlights
• 30 min analysis bin
• 4 min analysis segments
• Marked Y/N/M for each species calls

CHAOZ: Long-term Acoustic Monitoring

Recorders
- AURLs (Autonomous Underwater Recorder for Acoustic Listening, Multi-Électronique, Inc.)
- Year long deployments (Aug-Aug)
- Clusters of five recorders at three locations off Icy Cape, AK (40, 70, and 120 miles)
- Sampling rate of 16384 Hz
- 32% duty cycle
- 4 min analysis segments
- 30 min analysis bin
- Marked Y/N/M for each species calls
- Will skip to next 30 min bin if 4 min segment marked Y

Analysis
- In house Matlab program
- Real-time monitoring using Ishmael, Matlab-based code used to convert output of demultiplexing software (citation) and plot whale fixes.

Visual Observations
- Rotating team of 3 observers
- Observed from 0800 until 2000
- No seismic airguns detected
- Weather allowed

2010/2011 Results
- A single recorder from each cluster analyzed for bowhead whales, belugas, bearded seals, and fin whales

2012 CHAOZ cruise: Scientific and R/V crews

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- Stephenie Grassia for fin whale analysis on the B and C moorings
- Jessica Thompson for fin whale analysis on the B and C moorings

CHAOZ 2012 Acoustic Detections

NHM 2012

CHAOZ 2010

Visual Observations
- Rotate team of 3 observers
- Observed from 0800 until 2000
- Big eyes (25x) used when weather allowed
- On effort: horizon visible, boat speed of ~9 knots, and Beaufort 5 or lower
- Fog effort: poor visibility (i.e., no horizon visible) and Beaufort 5 or lower (sightings specified with dot in symbol)
- WINCRUZ used to record all data

WINCRUZ

Highlights
• Bowhead whale,
• Bearded seal, Beluga
• 30 min analysis bin
• 4 min analysis segments
• Marked Y/N/M for each species calls

CHAOZ 2012 Species

Short- and Long-term Distribution of Marine Mammals in the Chukchi Sea
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CHAOZ: 2012

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Communities of the North Slope

Captain and crew of research vessels

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Photo by: Amy Kennedy (NOAA/AFSC/NMML)

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