

Passive acoustic, visual, and satellite telemetry results from the first ARCWEST cruise, 2013

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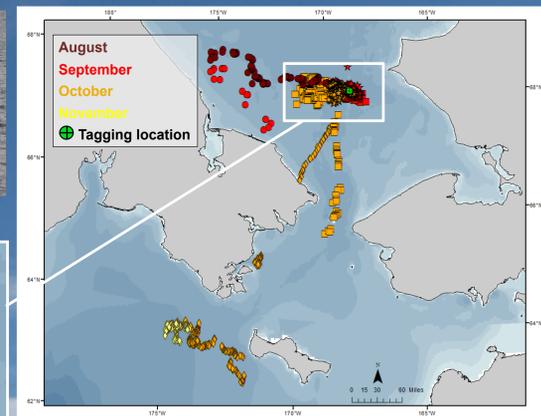
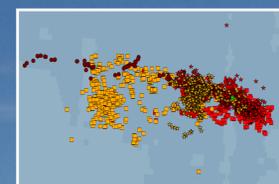


ABSTRACT

The Arctic Whale Ecology Study (ARCWEST) is a multi-disciplinary project that seeks to determine the relationship between currents and prey distribution in the Chukchi Sea, as well as to define the relationship between cetacean distribution and habitat use as it relates to prey availability within this area. To this end, CTD and zooplankton sampling as well as daytime visual and near-24 hour passive acoustic monitoring (sonobuoys) was conducted. In addition, archival implantable satellite tags were deployed on gray whales to determine movement patterns of individuals in the study area, and year-long passive acoustic, oceanographic, and zooplankton moorings were deployed. The combination of visual observations, passive acoustic monitoring, and satellite telemetry is extremely useful for evaluating the short-term distribution and movements of marine mammals, and these results are the focus of this poster. These visual-acoustic surveys complement data obtained by long-term moored recorders, and help contribute to the overarching goals of the ARCWEST study. The first ARCWEST survey took place from 13 August to 17 September, 2013 on the R/V *Aquila*. A total of 1,663 miles were visually observed, 248 sonobuoys were deployed (for a total of 346 hours of acoustic monitoring), and four satellite tags were deployed on gray whales. Results from the visual observations include a total of 220 sightings (421 individuals) of 7 confirmed cetacean species, 120 walrus sightings (1158 individuals), 17 sightings (721 individuals) of sea otters, and three polar bear sightings. The most common species acoustically detected were fin and humpback whales, detected on 70 and 24 (31% and 11%, respectively) of 225 successfully deployed buoys, followed by killer whales (8.5%) and gray whales (6.7%). Other species detected include bowhead whales (4%), walrus (5%), bearded seals (1%), and sperm whales (0.5%). Seismic airguns were detected on 2% of buoys. Spatial distribution maps of these visual and acoustic results will be presented as well as the individual movement tracks for the four gray whales satellite tagged off Point Hope. [Work supported by the Bureau of Ocean Energy Management]

Satellite Telemetry

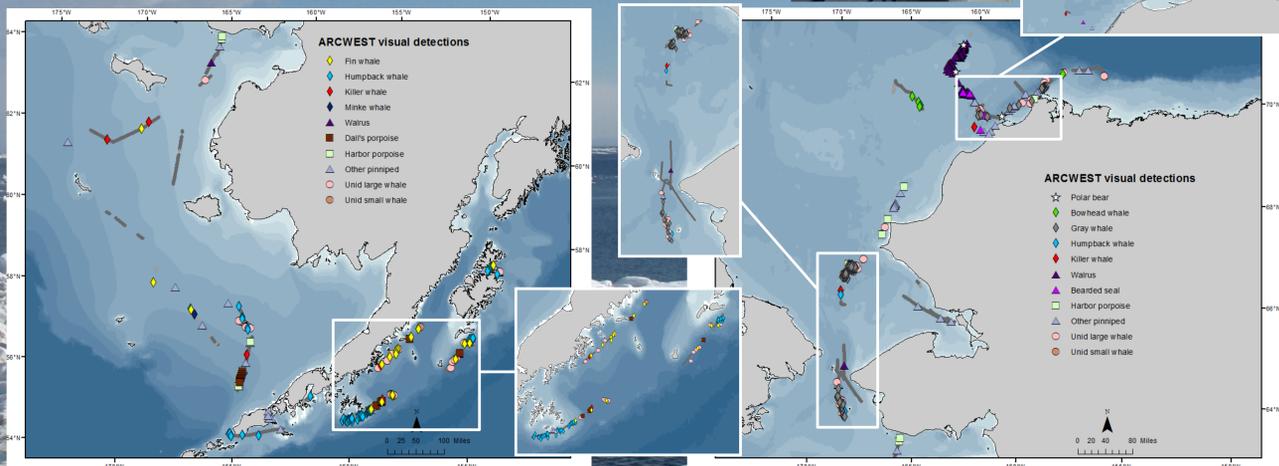
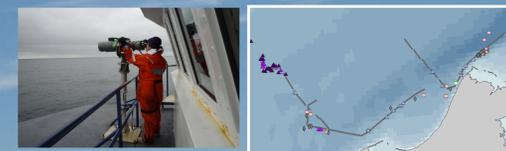
- RHIB positioned ~5m perpendicular from target animal
- Satellite transmitters attached to side of body
 - Air Rocket Transmitter System (ARTS)
- SPOT 5 and MK-10a transmitters used (Wildlife Computers)
 - Tags duty-cycled to record from 02:00-08:00 and 14:00-20:00 GMT daily to maximize battery life
- Follow-up of behavior assessment and tag placement



Deployment	PTT #	Map symbol	Tag Type	# of days transmitted
8/24/2013	84485	○	Spot5	11
9/7/2013	87636	◇	mk10a	67
9/7/2013	84484	☆	Spot5	51
9/8/2013	84482	□	Spot5	41

Visual observations

- Observations from 0900 to 2100, rotating team of three observers scan 60° port to 60° starboard
- Weather permitting, 25x Big Eye binoculars with reticles were used
- Observations made in off-effort mode during inclement weather (Beaufort sea state of 5+)
- WINCRUZ used to record all sightings and environmental data



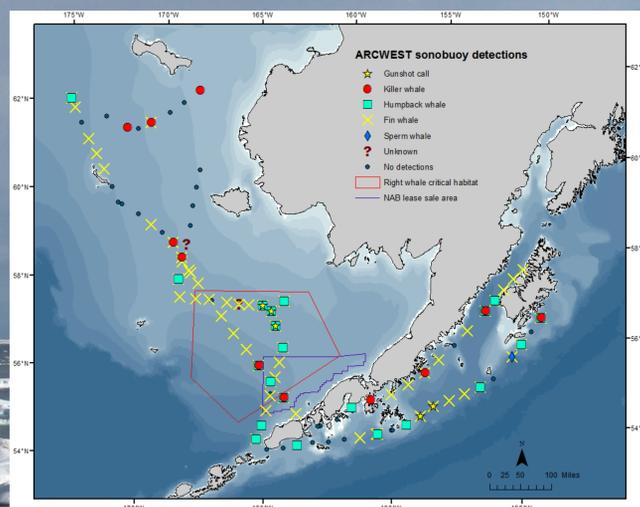
Cruise specifics

• August 13 – September 17, 2013

• R/V *Aquila*

• 5 main components:

- Passive acoustic mooring deployments
- Oceanographic and biophysical mooring deployments
- Hydrography and zooplankton stations
- Visual and acoustic surveys
- Satellite tagging of marine mammals

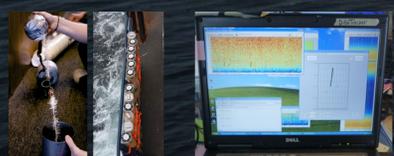


Sonobuoys

- Three main types used: 53D, 53F, and 77C
- Sonobuoys modified to obtain shallower deployment depths
- Sonobuoys deployed with DiFAR (Directional Frequency Analysis and Recording) option selected

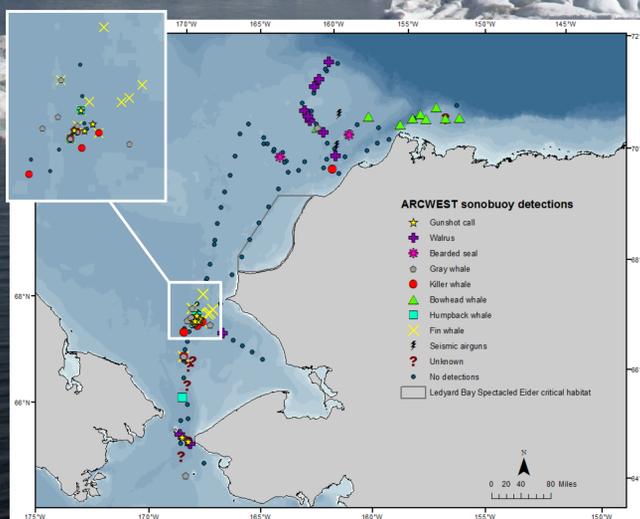
Monitoring

- Three WINRADIO receivers for multi-channel recording
- Omni-directional and directional VHF antennas
- MOTU UltraLite mk3 audio interface
- Custom-designed monitoring and tracking program in Matlab
- DiFAR demultiplexing software from Greeneridge Sciences, Inc.
- GPS provided date, time and position of ship and sonobuoy deployment



Modified 77C (left) and sonobuoy staging area (right)

Acoustic monitoring and tracking software screenshot.



The recommendations and general content presented in this poster do not necessarily represent the views or official position of the Department of Commerce, the National Oceanic and Atmospheric Administration, or the National Marine Fisheries Service.

CONCLUSIONS

- 16 confirmed species and 491 sightings observed**
 - 207 cetacean, 281 pinniped, 3 polar bear
- Additional 161 sightings of unidentified marine mammals**
 - 80 cetacean, 81 pinniped
- 5 gray whales tagged, 4 successfully transmitted locations**
 - Tags transmitted for 11-67 days
- Most common acoustically detected species include:**
 - Balaenoptera physalus*
 - Balaena mysticetus*
 - Odobenus rosmarus*



Acknowledgments: The authors would like to thank the captain and crew of the F/V *Alaskan Enterprise*. We are also extremely grateful to Jeff Leonard (Naval Surface Warfare Center, Crane Division), Theresa Yost (Naval Operational Logistics Support Center) and Robin Brake (I&E Director Marine Science, Office of the Assistant Secretary of the Navy) for providing us with newer surplus sonobuoys, which performed remarkably well.