sound in either the particle velocity, or both particle velocity and pressure gradient energy. This paper extrapolates the particle velocity data from the fish threshold conditions to determine if there is some conformity to ambient noise levels in either or both the particle and pressure gradient realms.

1:30

3pAB3. High-frequency hearing in seals and sea lions and the implications for detection of ultrasonic coded transmitters. Kane A. Cunningham (Department of Ocean Sciences, University of California at Santa Cruz, 100 Shaffer Rd., Santa Cruz, CA 95060, kacunningham413@yahoo.com), Sean A. Hayes (Fisheries Ecology Division, NOAA National Marine Fisheries Service, Southwest Fisheries Science Center, Santa Cruz, CA), Michelle W. Rub (Fish Ecology Division, NOAA National Marine Fisheries Service, Northwest Fisheries Science Center, Seattle, WA), and Colleen Reichmuth (Institute of Marine Sciences, Long Marine Laboratory, University of California, Santa Cruz, CA)

In order to better understand the ability of pinnipeds to detect acoustic signals from ultrasonic coded transmitters (UCTs) commonly used in fisheries research, high-frequency hearing thresholds were obtained from a trained Pacific harbor seal (*Phoca vitulina*) and a trained California sea lion (*Zalophus californianus*). Using a 69 kHz, 500 ms, narrow-band FM sweep stimulus, detection thresholds for the harbor seal and the sea lion were determined to be 106 dB and 112 dB re 1 μPa respectively. While the harbor seal threshold falls within the range of existing data, the sea lion threshold is 33 dB lower than expected based on previous reports. This finding indicates that sea lions may be more sensitive to the output of UCTs than previously thought, and allows for the possibility that acoustically tagged fish may be selectively targeted for predation by sea lions as well as seals. These hearing thresholds, combined with ongoing work on the effect of signal duration on high-frequency hearing, will help estimate the ranges at which certain UCTs can be detected by these species. Detection range estimations, in turn, will allow fisheries researchers to better understand how fish survivorship data obtained using UCTs may be skewed by pinniped predation.

1:45

3pAB4. Animal-borne active acoustic tags: A new paradigm to conduct minimally invasive behavioral response studies? Holger Klinck (Cooperative Institute for Marine Resources Studies, Oregon State University and NOAA Pacific Marine Environmental Laboratory, Hatfield Marine Science Center, 2030 SE Marine Science Drive, Newport, OR 97365, Holger.Klinck@oregonstate.edu), Markus Horning, David K. Mellinger (Oregon State University, Newport, OR), Daniel P. Costa (University of California, Santa Cruz, CA), Selene Fregosi (Oregon State University, Newport, OR), David A. Mann (Loggerhead Instruments, Sarasota, FL), Kenneth Sexton (The Sexton Company, Salem, OR), and Luis Huckstadt (University of California, Santa Cruz, CA)

In 2011 a pilot study was begun to evaluate the potential of animal-borne active acoustic tags for conducting minimally-invasive behavioral response studies on pinnipeds. A basic prototype tag was developed and tested on juvenile northern elephant seals (Mirounga angustirostris) during translocation experiments at Año Nuevo State Park, CA, USA in spring 2012. The principal scientific questions of this pilot study were these: (1) do sounds emitted from an animal-borne low acoustic intensity tag elicit behavioral responses, and (2) are potential animal responses related to signal content (e.g., threatening vs. non-threatening). Although the sample size was small, preliminary results indicate that (1) low-intensity sounds emitted by animal-borne tags elicit distinct behavioral responses, (2) these responses appear related to signal content, and (3) the responses may differ based on depth, bathymetry, and location. The results of the conducted study show the promise of this approach as a minimally-invasive and cost-effective method to investigate animal responses to underwater sounds, as well as a method to develop mitigation strategies. Future efforts would increase the sample size, range of acoustic stimuli, and age/sex classes of tagged seals. [Funding from NOAA/NMFS Ocean Acoustics Program.]

2:00

3pAB5. Tracking calling depths and movements of North Atlantic right whales using multipath localization. Robert D. Valtierra (Mech. Engineering, Boston University, 110 Cummington St., Boston, MA 02215, rvaltier@bu.edu), Sofie M. VanParijs (Northeast Fisheries Science Center, National Oceanic and Atmospheric Administration, Woods Hole, MA), R. G. Holt (Mech. Engineering, Boston University, Boston, MA), and Danielle M. Cholewiak (Northeast Fisheries Science Center, National Oceanic and Atmospheric Administration, Woods Hole, MA)

The track and calling depths of a North Atlantic right whale (NARW) recorded by 10 bottom-mounted Autonomous Acoustic Recording Units (ARUs) in the Stellwagen Bank National Marine Sanctuary was determined using the Direct Reflected Time Difference of Arrival (DRTD) localization method. An autocorrelation technique was used to extract direct-reflected time difference of arrival information from recorded NARW up-calls containing several overlapping multipath signal arrivals. The method's feasibility was tested using data from play back transmissions to localize an acoustic transducer at a known depth and location. The method was then used to track an hour of movements and depths of a single NARW using periodic up-calls for localization purposes.

2:15

3pAB6. Passive acoustic monitoring on the North Atlantic right whale calving grounds. Melissa Soldevilla, Lance Garrison (NOAA-NMFS Southeast Fisheries Science Center, 75 Virginia Beach Dr., Miami, FL 33149, melissa.soldevilla@noaa.gov), and Christopher Clark (Bioacoustics Research Program, Cornell University, Ithica, NY)

Shallow water environments, such as the North Atlantic right whale calving grounds, pose a challenge to cetacean passive acoustic monitoring due to high variability in ambient noise and environmental conditions. In this region of high shipping traffic and increased ship-strike risk, passive acoustic monitoring may reduce right whale ship strikes. This study describes temporal variability in right whale call detections, ambient noise sources, and environmental conditions on the right whale calving grounds during 2009-2010 and 2010-2011. Right whale detections occurred between November 19 and March 11, on up to 25% of days per deployment with increased nocturnal call detections, and increased acoustic presence off Jacksonville, FL during 2010-2011. Shipping noise was most common off Jacksonville, detected in up to 74% of minutes, with a diurnal peak, while tidally-associated broadband impulses were detected in up to 43% of minutes off Savannah GA. Environmental conditions including SST, wind, waves, and tidal height varied on daily and semi-diurnal scales. While sightings were higher in 2009-2010, the fewer sightings in 2010-2011 were more narrowly distributed within the depth range of the acoustic instruments. Passive acoustic monitoring is effective for detecting right whales in this environment, especially at night when they cannot be seen.

2:30

3pAB7. Comparison of the first-year response of beaked and sperm whale populations to the Northern Gulf oil spill based on passive acoustic monitoring. Natalia Sidorovskaia (Physics, Univ. of Louisiana, P.O. Box 44210, Lafayette, LA 70504-4210, nas@louisiana.edu), Azmy Ackleh (Mathematics, Univ. of Louisiana, Lafayette, LA), Christopher Tiemann (Applied Research Laboratories, UT Austin, Austin, TX), Juliette Ioup, and George Ioup (Physics, Univ of New Orleans, New Orleans, LA)

This paper continues a discussion on using passive acoustic methods to study the environmental impact of the recent oil spill in the Northern Gulf of Mexico on resident populations of marine mammals. The Littoral Acoustic Demonstration Center, possessing several broadband acoustic datasets collected near the spill site before and after the event, is in a unique position for monitoring long-term environmental impacts in the vicinity of the incident The pre-spill recordings provide a baseline which, when combined with post-spill measurements, give important indicators of changes in the local populations. Ackleh et al., J. Acoust. Soc. Am. 131, 2306-2314, provide a comparison of 2007 and 2010 measurements showing a decrease in acoustic activity and abundance of sperm whales at the 9-mile distant site, whereas acoustic activity and abundance at the 25-mile distantsite has clearly increased. This may indicate that some sperm whales have relocated farther away from the spill subject to food source availability. This paper reports on applying