LMR news

SPRING 2021

SCIENCE • STEWARDSHIP • NAVY READINESS

Welcome!

Welcome to the latest issue of *LMR News*—the newsletter from the Living Marine Resources (LMR) program. Our goal is to provide you with the latest information about program operations, significant accomplishments and future focus areas for the LMR program. We hope you will find the content useful and that it provides insights into our efforts to improve our understanding of how Navy at-sea training and testing activities could affect marine species—their occurrence in training areas and potential exposure, response and consequences.

NAVFAC Naval Facilities Engineering Command
ENGINEERING AND EXPEDITIONARY WARFARE CENTER

INSIDE THIS ISSUE

WHO WE ARE

The LMR program is one of the U.S. Navy's applied research (6.4) programs, sponsored by the Chief of Naval Operations Energy and Environmental Readiness Division (OPNAV N45) and managed by the Naval Facilities Command Engineering and Expeditionary Warfare Center (NAVFAC EXWC) in Port Hueneme, CA. The LMR program's fundamental mission is to support the Navy's ability to conduct uninterrupted training and testing, which preserve core Navy readiness capabilities. Our efforts to achieve that mission include working to improve the best available science regarding the potential impacts to marine species from Navy activities, demonstrating and validating projects ready for applied research, and broadening and improving the technology and methods available to the U.S. Navy Marine Species Monitoring Program.

Anu Kumar
Program Manager

PROGRAM OFFICE INSIGHTS

Activities during this past quarter included completing the remaining full proposal reviews for Fiscal Year 2021 (FY21) funding. We will announce final FY21 projects in the next newsletter. There is one FY21 project we can share, Project 48 Collection of *in situ* Acoustic Data for Validation of U.S. Navy Propagation Models of Ship Shock Trial Sound Sources.

Due to the Navy schedule for completing the ship shock trials of the new aircraft carrier USS *Gerald R. Ford* (CVN 78) this summer, we fast-tracked one of the need topics (N-0226-21: Ship shock trial acoustic measurement) and started the project in late April. Additional information on the project is provided in the LMR Project Spotlight section of this issue.

We are glad to announce that our 2020 report on the LMR program is now available online. If you did not receive an email with a digital copy of the report, you can find it at the Annual Reports tab on our website (www.navfac.navy.mil/lmr/annual_reports). This annual document reviews the program's mission and history, provides updates on LMR projects and lists publications that became available during 2020. Among the projects presented in the report are four completed projects, two new start projects and 21 ongoing projects. The report includes a case study highlighting advances in digital acoustic tracking devices (DTAGs). All this work is critical to ensuring the Navy can meet its environmental compliance needs and maintain training.

Mandy Shoemaker
Deputy Program Manager

We also want to note that field work on multiple projects has been re-started as researchers have been able to travel again. See the Program Participants Updates section for highlights from two projects.

Recent LMR publications are also provided in this issue as well as in the updated Publications spreadsheet on our website, www.navfac.navy.mil/lmr.

IN-PROGRESS REVIEW

As a reminder to PIs and LMRAC members, our 2021 IPR is scheduled for November 15 to 18, 2021. We are proceeding with plans to hold this in-person and are investigating options to add virtual options for those who will not be able to travel. More details will follow.

PROGRAM PARTICIPANT UPDATES

As pandemic travel restrictions ease, LMR principal investigators are getting back into the field to collect data. Two of the projects are noted below.

Project 22—Hearing and Estimated Acoustic Impacts in Three Species of Auk: Implications for the Marbled Murrelet

Aran Mooney, PI

After the COVID-19 pandemic prevented planned field work during 2020, the team has been making up for lost time. Team members, in coordination with the local U.S. Fish and Wildlife office in Alaska, completed field-based auditory evoked potential (AEP) tests on 11 marbled murrelets. The murrelets are not endangered in Alaska. Following the Alaska field work, the team traveled to Iceland to conduct field-based AEPs on 11 common murres. The data are currently being analyzed.

Marbled murrelet.

Project 37—Collection of Auditory Evoked Potential Hearing Thresholds in Minke Whales

Dorian Houser, PI

The project team is currently conducting the first field effort of this project in Norway. The start to this project, co-funded with Office of Naval Research, Bureau of Ocean Energy Management, National Marine Fisheries Service and Marine Mammal Commission, was postponed from 2020 due to COVID-19 pandemic travel restrictions.

LMR PROJECT SPOTLIGHT

Wondering about some of the LMR-supported projects? This section provides a brief overview of one or more projects underway in the LMR program.

For this issue we present an overview of a new Fiscal Year 2021 project under Investment Area 5: Emergent Topics.

Collection of *in situ* Acoustic Data for Validation of U.S. Navy Propagation Models of Ship Shock Trial Sound Sources

Each new class (or major upgrade) of surface ships constructed for the Navy undergoes an at-sea ship shock trial, a series of underwater detonations at various distances from the ship to simulate near misses during combat. While the Navy collects data on the acoustic shock waves effects on the ship and equipment and estimates the impact to the environment though acoustic models, there have been few *in situ* measurements of the extent of the acoustic propagation within the marine environment. The Navy needs *in situ* data on acoustic shock wave propagation through the surrounding marine environment to enhance the Navy's predictive acoustic modeling methods.

A rockhopper acoustic recording device ready to be deployed for a research project.
Shyam Madhusudhana

This project is collecting relevant *in situ* data on the acoustic shock wave propagation from the full ship shock trial of the new Navy aircraft carrier, USS *Gerald R. Ford* (CVN-78). The project team is led by principal investigators (PIs) Kerri Seger (Applied Ocean Sciences) and Shyam Madhusudhana and Holger Klinck (both with the K. Lisa Yang Center for Conservation Bioacoustics at Cornell University). Prior to the first of three planned detonations, field operations personnel from the project team deployed moored autonomous underwater recorders (Rockhoppers) in late May. These devices, capable of being deployed for long periods, were deployed at the near- and far-field locations around the ship shock trial zone to capture *in situ* data. The recorders will remain deployed for a sufficient time period to

The aircraft carrier USS *Gerald R. Ford* (CVN 78) completes the first scheduled explosive event of Full Ship Shock Trials.
Seaman Riley McDowell

ensure that retrieval occurs well after the final detonation and are programmed to record for even longer than the projected trial period to ensure that data can be collected if there are unexpected delays in the schedule.

To determine optimal locations for the recording devices, the team analyzed physical environmental data—including water column structure, depth, wave height and wind speed, bathymetry, bottom sediment type—as well as anticipated (modeled) received level maps. All recorders were largely configured the same way at all sites to ensure that measurements can be easily standardized across devices. The deployed device settings do differ in the hydrophone sensitivities and gain control settings based on proximity to the ship shock trial location (i.e., near-field or far-field).

The first detonation of the ship shock trial was conducted June 18, 2021, off the U.S. East Coast. Following the completion of additional detonations expected later in the summer, the field operations team will retrieve the devices and deliver the data to the Navy for security screening. Once the data screening is complete, the project team will begin analyses of the acoustic shock wave propagation and estimated received levels at each of the recorders. If the data supports doing so, the team will also document any observations of acoustical behavior changes by surrounding marine mammals.

These *in situ* data will provide measurements of received levels and estimated source levels and spectra to support the Navy's efforts to validate the Navy Acoustic Effects Model acoustic propagation model with ship shock trial explosive sources. These data will ensure that the Navy's estimates of acoustic impacts from explosive sources are as accurate as possible.

RECENT PUBLICATIONS

This section includes recent publications and reports resulting from projects that are or have been partially or fully funded by the LMR program. The information provided in the publications is of significant value to the Navy's at-sea environmental compliance process and directly feeds into the National Environmental Policy Act, Marine Mammal Protection Act and Endangered Species Act compliance documentation.


Sperm whale.

And as a reminder, the full and updated Spring-21 publication spreadsheet, which includes these entries, is available on our website.

Bravington, M.V., Miller, D.L. and Hedley, S.L. (2021). Variance propagation for density surface models. *Journal of Agricultural, Biological and Environmental Statistics*, 26(2):306–323. DOI: 10.1007/s13253-021-00438-2.

Kastelein, R.A., Helder-Hoek, L., Cornelisse, S.A., Defillet, L.N., Huijser, L.A.E., and Gransier, R. (2021). Temporary hearing threshold shift in a harbor porpoise (*Phocoena phocoena*) due to exposure to a continuous one-sixth-octave noise band centered at 0.5 kHz. *Aquatic Mammals*, 47(2):135–145. DOI: 10.1578/AM.47.2.2021.135.

Ruscher, B., Sills, J.M., Richter, B.P. and Reichmuth, C. (2021). In air hearing in Hawaiian monk seals: implications for understanding the auditory biology of Monachinae seals. *Journal of Comparative Physiology A*. DOI: 10.1007/s00359-021-01498-y.

von Benda-Beckmann, A. M., Isojunno, S., Zandvliet, M., Ainslie, M. A., Wensveen, P. J., Tyack, P. L., Kvadsheim, P. H., Lam, F. P. A. and Miller, P. J. O. (2021). Modeling potential masking of echolocating sperm whales exposed to continuous 1–2kHz naval sonar. *The Journal of the Acoustical Society of America*, 149(4):2908. DOI: 10.1121/10.0004769.

*Barlow, J., Fregosi, S., Thomas, L., Harris, D. and Griffiths, E.T. (2021). Acoustic detection range and population density of Cuvier's beaked whales estimated from near-surface hydrophones. *The Journal of the Acoustical Society of America*, 149(1):111. DOI: 10.1121/10.0002881.

**LMR acknowledged*

LMR INVESTMENT AREAS

The LMR program focuses its research funding in five investment areas:

1. Data to support risk threshold criteria

Collect data to improve the Navy's acoustic and explosive impact assessments and validate mitigation requirements, information critical to the Navy's environmental compliance and permitting process. This includes data on how well animals can hear, how and when animals may be exposed to acoustic and explosive sources, and how animals respond or are affected when exposed. Projects in this area can include hearing studies, sound exposure and behavioral response studies.

2. Data analysis and processing tools

Make required monitoring program data processing and analysis more efficient and cost-effective. This includes developing tools to automate the processing of large amounts of data to reduce costs, increase efficiency and provide consistency. These tools support the Navy's environmental compliance process and permitting process. Projects in this area can include new detection and classification algorithms, improvements to software programs, or development of novel analytical methods.

3. Monitoring technology demonstrations

Continue to develop and demonstrate technologies that can improve field data collection methods. The technologies enable efficient and cost-effective implementation of the Navy's Marine Species Monitoring program. Examples include new monitoring technologies and platforms, including sensors, tags, moored devices, buoys, gliders and REMUS 600s.

4. Standards and metrics

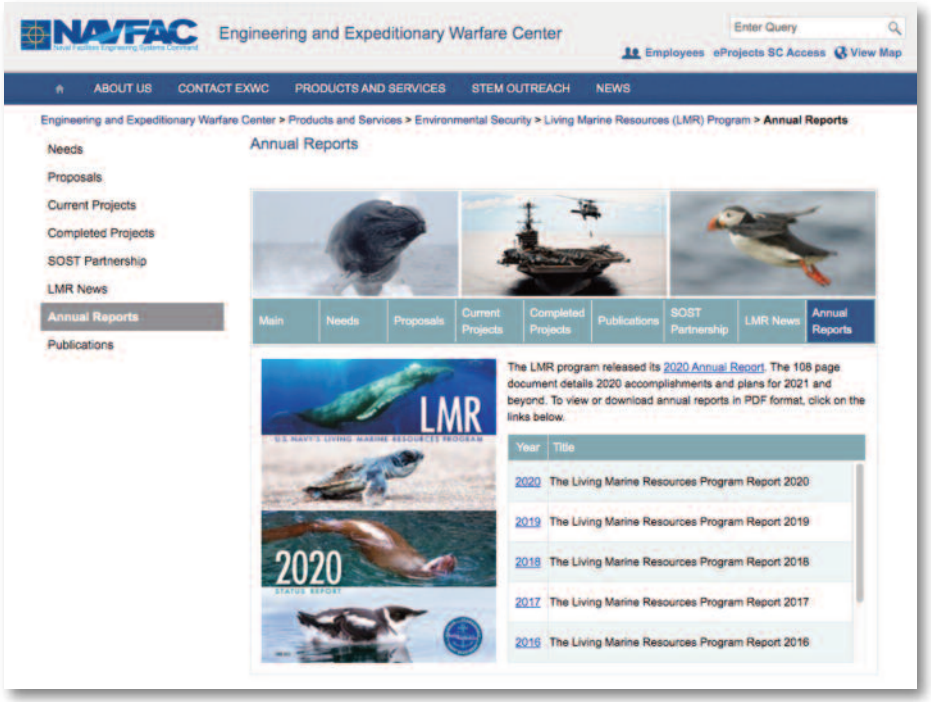
Work to establish interagency and scientific community standards and metrics for data collection, management and analysis. This promotes data comparability and enables data aggregation from different data sets. It ensures consistent, agreed-upon standards and metrics in order to provide cost-effective improvements to data and results that can be incorporated into the environmental compliance process. Projects in this area can include standards for data collection methods, standardized data management tools, and new metrics for reporting performance of data analysis methods.

5. Emergent topics

This investment area is reserved for other priority topics needed by the Navy that may come up and do not fall within the preceding topics.

OUR WEBSITE

You can find links to all of our informational materials, including fact sheets, an updated publication spreadsheet and our most recent annual report, at our website—www.navfac.navy.mil/lmr.



PROGRAM SCHEDULE

No.	What	When
1.	Proposal Solicitation & Review	
a.	FY21 full proposal decisions	May 2021
b.	FY22 needs submittal deadline	June 11, 2021
c.	FY22 needs approved	August 2021
2.	Quarterly Status Reports (QSR)	
a.	Submit summer QSR	July 30, 2021 (effort from April–June)
b.	Submit fall QSR	October 29, 2021 (effort from July–September)
c.	Submit winter QSR	January 31, 2022 (effort from October–December)
d.	Submit spring QSR	April 29, 2022 (effort from January–March)
3.	In-progress Review	November 15–18, 2021

LMR-RELATED PHOTOS—KEEP THEM COMING

We encourage all LMR participants to share photos of marine mammals, survey efforts, personnel who were involved and the equipment used. We'd like to include some of those images in a future issue of *LMR News* and give you credit—right there with your photo.


Red-eared slider.
Andria Salas

Surely among all of those photos from field work you have a few that you're particularly proud of. Please send them along, accompanied by a caption, photo credit and permit number (as applicable) and be sure that the photos are in high resolution format. Who knows, you may see one of those photos in a future issue of the LMR newsletter. Submit your photos via email to: exwc_lmr_program@navy.mil.

HELP WITH OUR MAILING LIST

If you want to subscribe to, or unsubscribe from, *LMR News*, please send your email address to Eric Rasmussen at eric.rasmussen@navy.mil.

CONTACT THE LMR PROGRAM

For more information about the LMR program and its operations, contact Anu Kumar, Program Manager, at exwc_lmr_program@navy.mil and 805-982-4853.

IN THE NEXT ISSUE OF *LMR NEWS*

Our next issue will provide available information on FY21 projects, ongoing project updates and other program news.

www.navfac.navy.mil/lmr