



LIVING MARINE RESOURCES PROGRAM

Anu Kumar
Program Manager

MISSION

LMR is a 6.4 applied RDTE program focused on addressing Navy research needs affecting at-sea environmental compliance to improve the understanding of marine mammals in regard to occurrence, exposure, response, and consequences

Key points of the LMR mission are:

- Improve the best available science regarding the potential impacts to marine species from Navy activities
- Expand the technology and methods available to the U.S. Navy marine species monitoring program
- Preserve core Navy readiness capabilities.

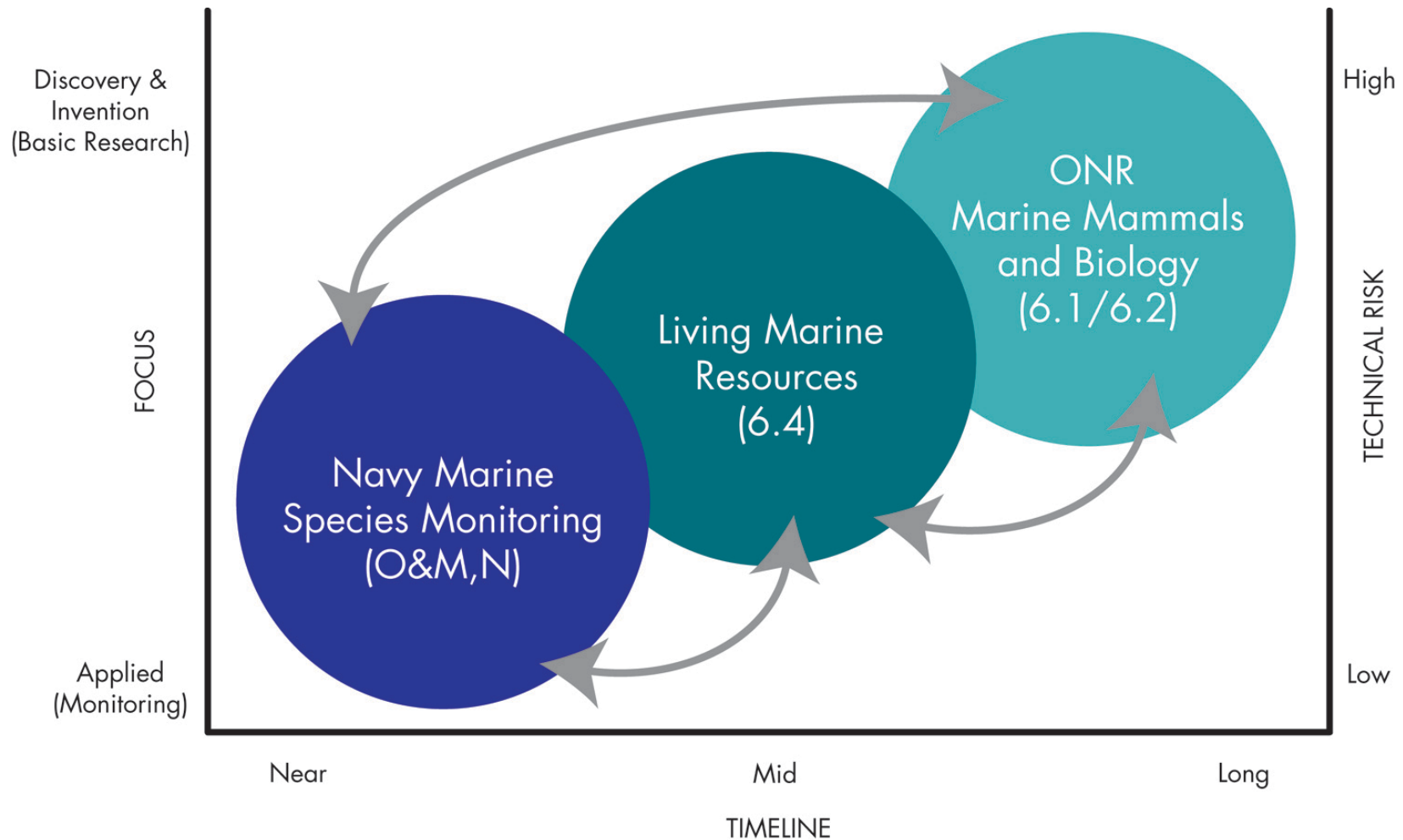


SCIENCE • STEWARDSHIP • NAVY READINESS

- **LMR Transferred** to NAVFAC EXWC in Port Hueneme CA in 2012
 - Formally managed by Dr. Frank Stone through NPS
 - Management and business plan were revised by Dr. Bob Gisiner
 - Structured to reflect expanding research need across Navy
 - CNO N45 remains resource sponsor, managed at EXWC
 - LMR Advisory Committee (LMRAC) represents Navy interests
- **Key Differences From ONR**
 - Focus mostly on applied research meeting specific Navy needs
 - Annual call for proposals on specific topics
 - Need topics and proposals selected by committee

LMR CHANGES REFLECT EXPANDING NAVY RESEARCH NEEDS

US NAVY MARINE RESOURCE INVESTMENTS

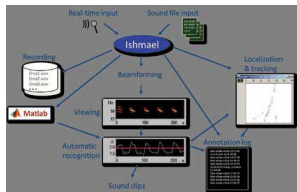
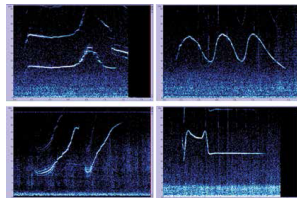


CURRENT INVESTMENT AREAS

1. Data to Support Risk Threshold Criteria
2. Improved Collection and Processing of Protected Species Data in Areas of Navy Interest
3. Monitoring and Mitigation Technology Demonstrations
4. Standards and Metrics
5. Education and Outreach, Emergent Opportunities



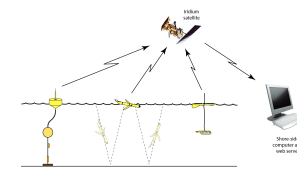
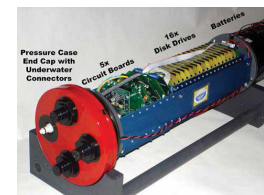
Improved Collection and Processing of Protected Species Data in Areas of Navy Interest



Title	Principal Investigator	Project
Marine Mammal Monitoring on Navy Ranges (M3R)	Dave Moretti (Naval Undersea Warfare Center)	<u>Purpose:</u> Developing behavioral risk function criteria for compliance documentation Developing fine scale monitoring tools to assess behavioral response using existing range assets and collecting response data to sonar on a broad scale, increasing sample size
Improving the Navy's Automated Methods for Passive Underwater Acoustic Monitoring of Marine Mammals	Tyler Helble (Space and Naval Warfare Systems Center—Pacific)	<u>Purpose:</u> Increase detection capability for humpbacks on PMRF and enable high fidelity tracking to identify individual movements Results will enable an avenue for assessment of behavioral response of humpback whale
Development of Automated Whistle and Click Detectors and Classifiers for Odontocete Species in the Pacific and Atlantic Oceans. (Co-fund ONR)	Julie Oswald (Bio-waves, Inc.)	<u>Purpose:</u> Enable classification of odontocete species to increase PAM processing effectiveness Allows for further studies of additional species using PAM technology
Simple Performance-Characterized Automatic Detection of Marine Mammal Sounds	David Mellinger (Oregon State University)	<u>Purpose:</u> Enable efficient PAM processing of monitoring data and increase access to technically advance tools

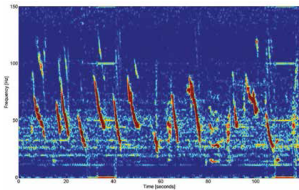
Monitoring and Mitigation Technology Demonstrations

Title	Principal Investigator	Project
Integrated Real-Time Autonomous Passive Acoustic Monitoring (IRAP) System	Philip Abbot (Ocean Acoustical Services and Instrumentation Systems)	<u>Purpose:</u> Enable remote, off range monitoring, increasing survey coverage while reducing costs Evaluate performance in comparison with existing methods
Demonstration of Commercially Available High-Performance PAM Glider and Profiler Float	Haru Matsumoto (Oregon State University)	<u>Purpose:</u> Enable remote, off range monitoring, increasing survey coverage while reducing costs Evaluate performance in comparison with existing methods
Technology Demonstration for Fleet Passive Acoustic Monitoring	John Hildebrand (Scripps Institution of Oceanography)	<u>Purpose:</u> Expand capability of highly utilized PAM collection method for the Navy's monitoring efforts and reduce deployment/recovery costs
Passive acoustic monitoring of baleen whales from autonomous platforms (Co-Fund w/ ESTCP, NEFSC)	Cara Hotchkin (NAVFAC Atlantic)	<u>Purpose:</u> Enable remote, off range monitoring, increasing survey coverage while reducing costs Evaluate performance in comparison with existing methods and best practices in setting up survey design



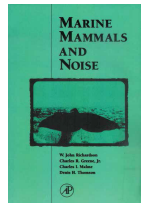
LMR CURRENTLY FUNDED PROJECTS

Standards and Metrics



Title	Principal Investigator	Project
Database and Metrics for Testing Automated Signal Processing for Passive Acoustic Monitoring in Naval Training Ranges	John Hildebrand (Scripps Institution of Oceanography)	Purpose: Enable comparison of automated PAM processing tools allowing for the identification of best tools for Navy monitoring

Education and Outreach



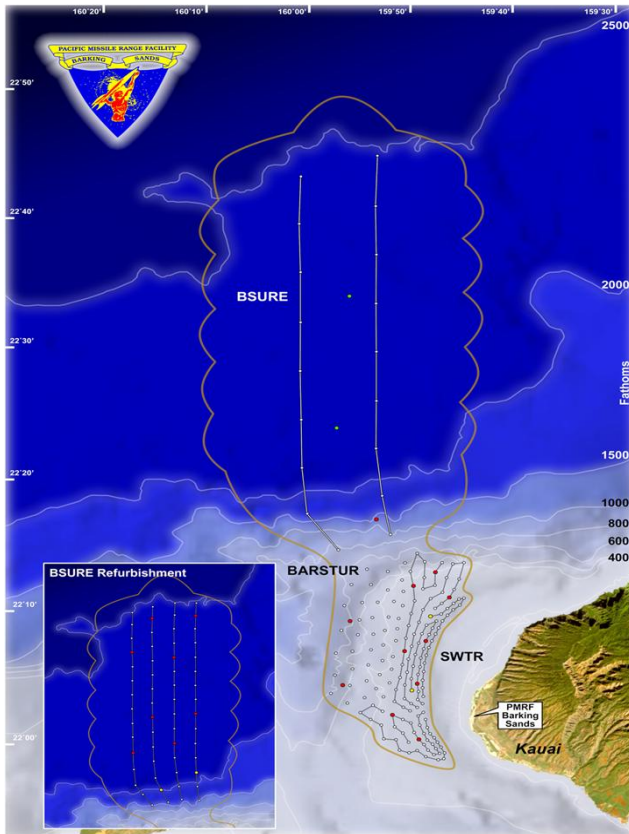
Title	Principal Investigator	Project
The Effects of Noise on Marine Mammals —A Book (Leveraged project with support from	Christine Erbe (Curtin University, Centre for Marine Science & Technology)	Purpose: Support the revision of the most widely used book in marine mammal acoustic impacts enabling an updated resource for compliance analysis LMR is funding two chapters and the database to support the development of the book



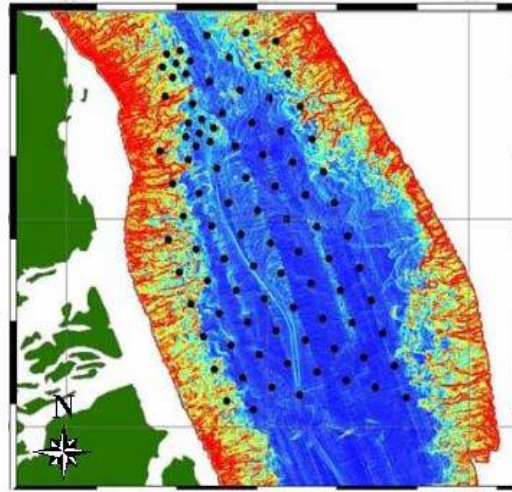
FY15 PLANNED NEW STARTS

Title	Principal Investigator	Highlights
Passive Acoustic Density Estimation of Baleen Whales: Using Sonobuoys to Estimate Call Rate Correction Factors	Shannon Rankin (Southwest Fisheries Science Center)	Leverages existing data collected by SWFSC
Blue and Fin Whale Density Estimation in the U.S. Pacific Fleet Southern California Offshore Range using PAM Data	Ana Sirovic (University of San Diego)	Call rate data from tagging effort applicable to many future projects. Leveraged project with ONR initial effort
DECAFTEA: Density Estimation for Cetaceans from Acoustic Fixed sensors in Testing and Evaluation Areas	Len Thomas (University of Saint Andrews)	Demonstration/ validation of PAM density methods for remote PAM. Leveraging M3R at SCORE
Acoustic Metadata Management for Navy Fleet Operations	Marie Roch (San Diego State University)	Tethys development was funded by a NOPP. It is gaining popularity with NMFS SC. Navy interested in developing acoustic metadata standards in collaboration with all interested agencies

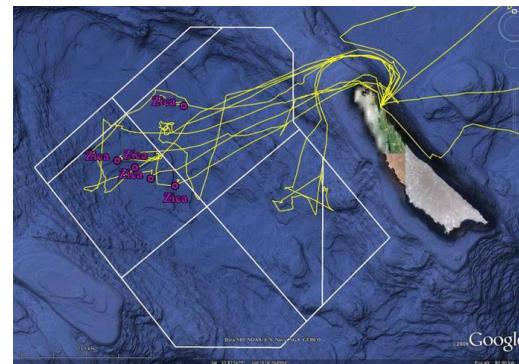
RANGE ASSET DATA: POSSIBLE DCLDE DEVELOPMENT



Pacific Missile Range Facility (PMRF)



Atlantic Undersea Test and Evaluation Center (AUTEC)

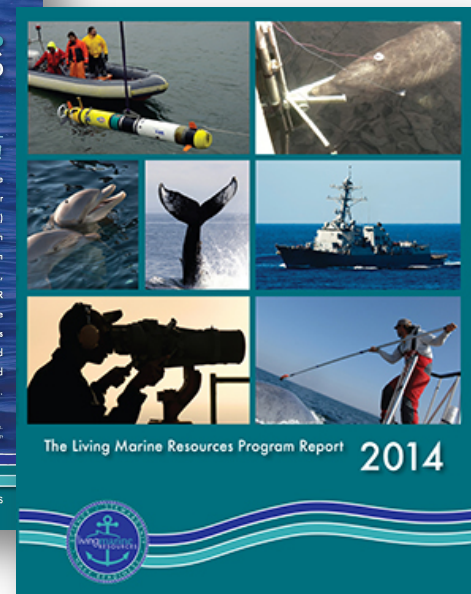
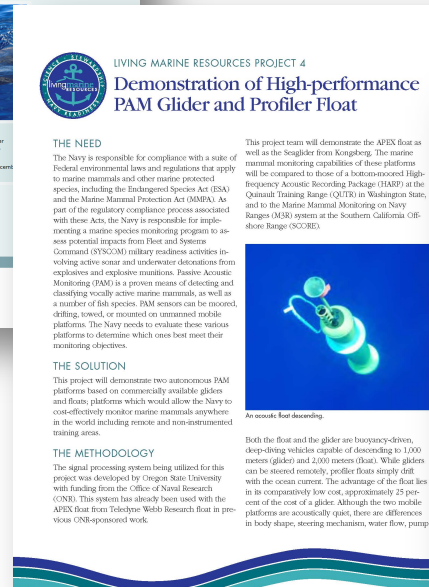


Southern California Antisubmarine warfare Range (SOAR)

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SPAWAR- Tyler Helble, Elizabeth Henderson, Steve Martin



***FY 16-17 CALL FOR PROPOSALS THIS SUMMER**

www.lmr.navy.mil
www.navy.marinespeciesmonitoring.us