The NOAA LMRCSC and its Multifaceted Approaches to Facilitate Student Development and Diversity in the Marine Environment

**Abstract**

NOAA Living Marine Resources Cooperative Science Centers (NOAA LMRCSC) work collaboratively with educators from partner institutions to create immersive, interdisciplinary, hands-on learning and research experiences. The LMRCSC leverage several approaches and programs to meet its goals:

- **Enhance** academic programs and activities of the Center
- **Geared toward** rising Sophomore students
- **Research** experiences for students
- **Hands on** learning in a marine setting

**GOALS OF THE LMRCSC**

**Education Goals**

1. Enhance academic programs and activities of the Center
2. Geared toward rising Sophomore students
3. Research experiences for students
4. Hands on learning in a marine setting
5. Communication

**Research Goals**

1. Institution & Seafood Safety
2. Economic Development
3. Social Science
4. Informed and Engaged Citizenry
5. Marine Ecosystems

**Support Goals**

1. Find and retain talent
2. Showcase results
3. Professional Development
4. Increase Co-OPS (co-op, part-time, summer, student)

**Programs**

- **SSU**
- **UMES**
- **NOAA**
- **Geosciences Bridge**

**Evaluation of the Workshop**

Two clusters of workshop modules emerged as statistically significant in student scoring. Participants reported significant differences in their levels of knowledge of NOAA Fisheries after the workshop.

**Acknowledgments**

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The NOAA LMRCSC and its Multifaceted Approaches to Facilitate Student Development and Diversity in the Marine Sciences

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The number of graduate and undergraduate students, particularly underrepresented minority (URM) groups, choosing careers in ocean, earth and atmospheric sciences remains very low compared to the other scientific disciplines. The NOAA Living Marine Resources Cooperative Science Center (LMRCSC) recruits, trains, and retains students, particularly those who are underrepresented in marine and fisheries science disciplines, by delivering content, instruction, and experiences that provide students with career-ready skills. Faculty and staff in the LMRCSC leverage several approaches and programs to meet these objectives. A cohort workshop was developed to enhance students’ literacy in NOAA Fisheries related disciplines, increase their knowledge of NOAA mission science and the LMRCSC goals and objectives, and build systems-awareness for each student cohort across the LMRCSC institutions. The workshop content focused on socio-economics, ecosystem science, stock assessments, and aquaculture. Instructors for each short course module included NOAA scientists and LMRCSC faculty. Nineteen students (M.S. and Ph.D.) who participated in the 2018 workshop indicated strong perceptions that the workshop met its goals (p≤ .05). Faculty and staff working in the NOAA LMRCSC have wide-ranging experience in STEM education as mentors and program directors in a variety of programs, including the National Science Foundation (NSF) Research Experiences for Undergraduates (REU) at multiple partner sites, LMRCSC-funded Rising Sophomore Experiential Training Program (RSETP), IMET’s Summer Undergraduate Program, Geoscience Bridge programs and, summer camp programs for K-12 students. The interns in the REU in Marine Estuarine Sciences Program and interns in the RSETP at UMES participate in a joint program that includes individual research projects. The program employs a peer-led writing workshop that utilizes best practices for peer review and prepares students for professional writing through the process of guiding them to produce posters, oral presentations, and manuscripts about their research. The IMET Summer Internship Program provides students with individual research projects, training in science communication/visualization and exposure to pitching ideas for start-up environmental companies. The Geosciences Bridge Program trains rising freshmen in various areas of geosciences and strengthen their math skills. The marine science summer camp was begun in 2007 to serve as a pipeline for students to pursue STEM education and careers at the NOAA LMRCSC. Curriculum focus for the marine science program includes the ocean literacy principles in addition to the state science standards. The summer camp incorporates best practices used in the NOAA LMRCSC cohort experience and REU programs to engage K-12 students in experiencing science. Throughout these undergraduate and K-12 programs, graduate students are involved as mentors and instructors, thus providing supervised mentorship and teaching experience. These multi-tiered approaches engage small cohorts and broad assemblages of students at different levels of the academic development, incorporate NOAA and academic mentors and culminate by reinforcing competencies that will assist students in any STEM field.