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DO ETHICS MATTER? ADDRESSING UNFORSEEN ETHICAL, LEGAL AND REGULATORY IMPLICATIONS OF NEW OCEAN SCIENCE TECHNOLOGY

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In the past decade, developments in marine science technology have revolutionized the way research is conducted. Technologies developed through the Census of Marine Life (CoML) have made it easier and more efficient to study, monitor, and accurately track the health of the ocean and the life within it. Marine scientists now use suites of instrumentation, including *in-situ* sensors, remotely and autonomously operated vehicles, DNA barcoding, real-time species tracking and remote sensing, all of which offer more novel and exciting views of ocean life and ecological processes than ever before. New advances in acoustic sensing, which allow researchers to track animals at scales tens of thousands of times greater than previously possible, have led to the discovery of a school of fish the size of Manhattan off the eastern seaboard. Elephant seals fit with tiny sensors and satellite tags have gathered more data and given us more insight into our ocean and the migratory and feeding patterns of these animals than any past or current research effort. Along with the utilization of these advances, the internet has allowed scientists and researchers to share their data and results in near-real time with ever-increasing numbers of other researchers, students, and managers, and even the general public.

Today, using these new technologies, we know more about the migratory patterns of marine wildlife, the ecosystem's physical, chemical and biological makeup and how these environmental parameters affect habitat use. But what if all this information is suddenly used in ways we've never considered? Real time tracking data of commercial fish species can allow for enhanced and improved management, but could also aid destructive or illegal fishing methods. Some technologies have major implications for marine life and resource conservation, while others may carry national security risks. We now have to address, and possibly predict, the additional responsibilities that researchers must bear with the use of new and emerging tools. Often the application of data solves problems, has positive results on societal problems, and can be used to influence the regulatory process, but it is unclear how much more has to be done to address the growing number of negative or unintended consequences of communicating our knowledge.

In this session, we will consider and examine new technologies and advancements developed through CoML and explore the ethical, regulatory, and potentially legal ramifications as they pertain to marine research, conservation, and management. With open access data and knowledge shared to enhance the depth of our research,

management of our coasts and oceans, and the policies put in place to protect them, we need to be more careful than ever in how this information is utilized. As more scientists realize the benefits of using technologies like DNA barcoding, real-time tracking and remote sensing as tools in their research, what are the basic ethical questions that arise and how should they be addressed? This session will discuss the added burden and responsibility that every scientist, researcher, and user must bear, as new and ever more groundbreaking technology is developed in the future.

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