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The Marine World: No Longer Silent

When American biologist Roger Payne released Songs of the Humpback Whale, the 1970 album of whale vocalizations shook the world. Arguably the most popular nature album in history, Songs of the Humpback Whale sparked the “Save the Whales” movement and inspired legislation that banned commercial whaling. Nor was its impact limited to whale conservation alone; the surge in interest widened the field of whale acoustics.

Whale acoustics is the study of whale calls, the primary mechanism for whale communication. By placing hydrophones, or underwater microphones, on the seafloor, scientists can record whale sounds then analyze the recordings for different properties, among these frequency, or pitch, and amplitude, or loudness. Based on this data, scientists can then identify whale species, migratory movements, and breeding patterns. Research indicates that whale songs are not arbitrary but repetitions of a theme that typically lasts for around ten seconds and can be repeated for several minutes. Multiple themes compose a song, which may, in turn, last for up to 30 minutes and be repeated for days on end.

I see whale acoustics as an inspirational field because of its potential to open our ears and eyes to the marine world. The ocean is not as Jacques Costeau once termed it, “The Silent World”, but a world of sound, the understanding of which not only impacts our view of the marine ecosystem but of our own. The subject is especially relevant to the Navy and Marine Corps, contributing to developments in underwater technologies.

Among those studying whale acoustics is Dr. Regina Guazzo, a biological oceanographer. From the age of five, Dr. Guazzo wanted to be a marine biologist. In college at Rutgers University, she discovered bioacoustics. After completing her Ph.D. at Scripps University, Dr. Guazzo joined the Naval Information Warfare Center (NIWC) Pacific, where she studies whale calls.

I admire Dr. Guazzo’s curiosity and open-mindedness. Though knowledgeable in her field, Dr. Guazzo continues to ask questions, diving deeper and deeper into the subject. Second, even though marine biology was her longstanding interest, Dr. Guazzo stayed open to other fields and even considered a career in music. Bioacoustics is a field tailored to both her interests, demonstrated when Dr. Guazzo played her bass to illustrate the science behind whale calls. Had she narrowed her focus to one discipline, she might not have discovered bioacoustics. Dr. Guazzo’s open-mindedness is also seen in her approach to computer programming. Though she initially disliked programming, she persevered and found fulfillment in programming after realizing its value in analyzing whale calls. While I may not follow in Dr. Guazzo’s footsteps, I see her curiosity and open-mindedness as key traits in any career. Like Dr. Guazzo, I also find myself with competing interests in the sciences and the humanities. Her story is encouraging to me because by staying open to different fields, Dr. Guazzo found a career that involved both her interests.

Whale acoustics is not only an intellectually stimulating topic but also has practical applications. Through whale calls, researchers and citizens can learn more about whale migration patterns, then take steps to avoid disrupting migratory paths. Meanwhile, changes in migratory patterns could signal a change in environment to be examined by researchers. Through whale acoustics, researchers can also investigate how anthropogenic, or human-made sounds affect whale behavior. For instance, if research revealed that signals communicated by submarines negatively impact whale communication, this could prompt changes in how submarines transmit data.

Advances stemming from whale acoustics research in the next 15 to 20 years could also impact the Navy and Marine Corps. Refining underwater technology like hydrophones not only makes it easier to accurately capture whale calls but to capture sounds produced underwater, as a whole. In the Navy and Marine Corps, device sensitivity would improve the detection of foreign and domestic submarines and ships. Understanding how whales and other marine life produce sound could also lead to the development of quieter vehicles harder for foreign countries to detect. Third, through accurate tracking, the Navy and Marine Corps could design communication pathways and supply routes that are more efficient while avoiding foreign interception. As tracking technology advances, so may the production of unmanned submarines, with the capabilities to travel farther into zones that are too dangerous for manned vehicles.

These developments would also impact civilian daily life in the year 2040. Through accurate sensors, civilians would have access to more accurate weather forecasts, which has a direct impact on outdoor activities. With increasingly efficient supply routes, civilians would receive what they need within a shorter period. For athletes like swimmers and divers, underwater technologies could provide better means to analyze, then improve technique. For medical experts, these same technologies could provide insight into sound technologies that monitor patient health.

Whale acoustics is a field with transformative potential. This is as evident in 1970, when Sounds of the Humpback Whale galvanized the whale conservation movement, as it is evident today, as studies reveal patterns in whale communication that change the way we view the marine world. The impact of future research lies not only in the marine arena but also in technologies for the Navy and Marine Corps that will impact daily life. The marine world is no longer silent. What will it tell us?