BOEM
Bureau of Ocean Energy Management

SCIENCE NOTES

Applied science for informed decision making

March 9, 2015

Dear Reader:

In August 2014, BOEM published a *Science Note* addressing a few fundamentals about impacts of seismic air gun surveys on marine mammal populations. The surveys are used to characterize sub-seabed geology, including oil and gas resources but are also used for our marine minerals program and renewable energy. One sentence in the *Science Note* has generated some dialogue: "To date, there has been no documented scientific evidence of noise from air guns used in geological and geophysical (G&G) seismic activities adversely affecting animal populations."

BOEM's conclusion regarding the impact of these surveys is in stark contrast with public statements citing BOEM research and asserting that many thousands of marine mammals will be killed or injured through these surveys. For example, one web posting states that "Seismic air gun testing currently being proposed in the Atlantic will injure 138,000 whales and dolphins and disturb millions more, according to government estimates." This characterization of our conclusion, however, is not accurate; that is actually not what we estimate. I hope that providing background and discussion on BOEM's conclusion and the numbers may help those who follow this issue to understand our position. I'll begin with an overview of a few key legal terms.

Terms of the Marine Mammal Protection Act (MMPA)

Three MMPA terms are key to this conversation. First, a "take" of a marine mammal under the MMPA is defined as follows: "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." The MMPA defines the term "harassment" to mean

> "[A]ny act of pursuit, torment, or annoyance which - (i) has the potential to injure a marine mammal or marine mammal stock in the wild [referred to in the MMPA as 'Level A harassment']; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [referred to in the MMPA as 'Level B harassment']." MMPA Sec. 3 (18).

In other words, a "take" can mean an act that kills or injures a marine mammal, but it can also mean an act that does no more than have the potential to disturb a marine mammal.

Second, it is important to recognize that the MMPA prohibits the take of marine mammals as a result of permitted activities - referred to in the statute as "incidental take" -- unless that take will have no more than "negligible impact." In particular, section 101 (5) of the MMPA prohibits incidental "taking" of a marine mammal, including Level A and Level B harassment, unless the Secretary of Commerce, acting through the National Oceanic and Atmospheric Administration (NOAA), determines that the taking will have no more than "negligible impact" on the species or stocks affected. NOAA regulations define negligible impact to mean "an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival." By definition, then, the impact analysis is measured on the "species or stock," not on an individual animal.

Our bureau has stated publicly that it will not consider issuing any air gun seismic survey permits in the Atlantic unless applicants have first obtained an MMPA authorization from NOAA, including the required finding of no adverse effect on marine mammal species or stocks.

"Optimum sustainable population" or OSP is a third key MMPA concept. Obtaining optimum sustainable populations is a stated goal of the MMPA, and OSP is defined by the statute to mean, "with respect to any population stock, the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element." OSP is about populations, not individuals.

No Documented Scientific Evidence of Adverse Effects on Population Sustainability

With these three terms in mind, it is critically important to understand that BOEM's conclusion in our August 2014 *Science Note, and* its *Programmatic Environmental Impact Statement (PEIS),* refers to effects on population sustainability, rather than effects on individual animals. We know from studies by BOEM and others that marine mammals can react to sound, sometimes moving away and sometimes changing their vocalizations. One prominent concern is whether anthropogenic sounds may "mask" communications between some marine mammals. However, as BOEM concluded in the PEIS, and reiterated in the 2014 *Science Note*, potential links between these effects and the sustainability of species or stocks have not been demonstrated. For example, because of its abundance, the bottlenose dolphin heads the class in number of potential exposures to air gun sound levels with potential effects on behavior. Yet Federal stock assessments for the dolphin do not identify air gun seismic surveys as adversely impacting stock sustainability in the Gulf of Mexico, where air gun surveys are routine.

It is also important to understand that BOEM does not expect that 138,000 individual marine mammals, or anything close to that number, will have their hearing injured by air guns if seismic surveys are permitted on the Atlantic Outer Continental Shelf. BOEM published numbers for potential air gun survey "takings" of marine mammals in its PEIS. The highest numbers estimated for a particular species are for the bottlenose dolphin, as noted above, and in its case the PEIS estimated potential for Level A takings of up to 11,748 individual bottlenose dolphins a year from air gun surveys and potential for up to 1,151,442 Level B takings. But the number of modeled "takes" in the PEIS is by design highly over-estimated to err on the side of protection, and it does not consider key mitigation measures that will be required to prevent "taking." One such requirement, for example, is that seismic survey vessels maintain "exclusion zones" around vessels whose boundaries are set to avoid any injury to marine mammal hearing. If a marine mammal enters the zone, or appears on a course to enter, trained observers call for immediate shut down of the air guns until the animals are clear of the area. Therefore, even those numbers included in the PEIS are far in excess of those takes we anticipate, given the mitigation measures that will be employed.

Need for More Research

A final point warrants mention. BOEM does not and should not assume that lack of evidence for adverse population-level effects of air gun surveys means that those effects may not occur. What we know is a function of the effort and intelligence put into evaluating effects as well as what is actually happening in nature. Since 1998, BOEM has invested over $50 million on protected species and noise-related research, including marine mammals. We have also convened workshops for acoustic experts to help us identify questions for future research. But BOEM needs to keep looking -- hard and well -- for adverse effects of offshore oil and gas activities on the environment, including sound. And we have asked our environmental studies program to make this a priority.

I'll conclude by noting that BOEM's 2014 *Science Note* has been cited publicly by both industry and environmental NGOs alike in presenting their respective positions on seismic surveys. BOEM is responsible for providing environmental safeguards in development of offshore resources, and our Science Note was intended to help the public understand our thinking on that task. I hope this follow-on *Science Note* is a helpful explanation.

As always, your feedback is important to us, so please feel free to contact us.

Sincerely,

William Y. Brown

Chief Environmental Officer, Bureau of Ocean Energy Management

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The Bureau of Ocean Energy Management (BOEM) promotes energy independence, environmental protection and economic development through responsible, science-based management of offshore conventional and renewable energy resources.