

activities adversely affecting marine animal populations or coastal communities. This technology has been used for more than 30 years around the world. It is still used in U.S. waters off of the Gulf of Mexico with no known detrimental impact to marine animal populations or to commercial fishing.

In <http://www.boem.gov/BOEM-Science-Note-August-2014/> (*Science Notes*, Aug. 22, 2014); *see also* <https://www.boem.gov/BOEM-Science-Note-March-2015/> (*Science Notes*, Mar. 9, 2015) (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”); DPEIS at 4-57 (“There are multiple factors that indicate that the potential for repeated exposures are unlikely to result in reduced fitness in individuals or populations ... G&G surveys have been ongoing in the northern GOM for many years, with no direct information indicating reduced fitness in individuals or populations.” (emphasis added)).¹³ Moreover, the BOEM Environmental Studies Program has spent more than \$50 million on protected species and sound-

¹³ There are well-documented examples of long-term exposures of acoustically sensitive species where no biologically significant chronic or cumulative impacts have occurred. For example, oil and gas seismic exploration activities have been regularly conducted in the Beaufort and Chukchi Seas of the Arctic Ocean for decades, with regular monitoring and reporting to NMFS under the auspices of MMPA incidental take authorizations issued since the early 1990s. During this lengthy period of acoustic exposures, and despite annual lethal takes by Alaska Natives engaged in subsistence activities, bowhead whales have consistently increased in abundance to the point that they are believed to have reached carrying capacity. *See, e.g.*, 84 Fed. Reg. 25,830, 25,837 (May 1, 2012) (“There is no specific evidence that exposure to pulses of air-gun sound can cause PTS [physical injury] in any marine mammal, even with large arrays of air-guns.”); *id.* at 25,838 (“To date, there is no evidence that serious injury, death, or stranding by marine mammals can occur from exposure to air-gun pulses, even in the case of large air-gun arrays.”); *id.* at 25,839 (“Thus, the proposed activity is not expected to have any habitat-related effects on prey species that could cause significant or long-term consequences for individual marine mammals or their populations.”); 75 Fed. Reg. 49,760, 49,795 (Aug. 13, 2010) (“To date, there is no evidence that serious injury, death or stranding by marine mammals can occur from exposure to air-gun pulses, even in the case of large air-gun arrays.”); *see also* Reichmuth, C., Ghoul, A., Sills, J., Rouse, A. and B. Southall. 2016. Low-frequency temporary threshold shift not observed in spotted or ringed seals exposed to single air gun impulses, *J. Acoust. Soc. Am.*, 140: 2646-2658 (“There was no evidence that these single seismic exposures altered hearing including in the highest exposure condition, which matched previous predictions of temporary threshold shift (TTS) onset The absence of observed TTS confirms that regulatory guidelines (based on M-weighting) for single impulse noise exposures are conservative for seals.”).

related research over more than four decades without finding evidence of adverse effects. See <http://www.boem.gov/BOEM-Science-Note-August-2014/> (*Science Notes*, Aug. 22, 2014) (“Since 1998, BOEM has partnered with academia and other experts to invest more than \$50 million on protected species and noise-related research.”). The geophysical and oil and gas industries, the National Science Foundation, the U.S. Navy, and others have spent a comparable amount of funds on researching potential impacts of seismic surveys on marine life and have found no evidence of significant effects. See http://www.scandoil.com/moxie_issue-bm2/bm.doc/sogm_1-2-16_sml-jip.pdf; www.soundandmarinelife.org. None of this is meaningfully discussed in the DPEIS.

Third, the DPEIS fails to evaluate the accumulated observational data collected by Protected Species Observers (“PSOs”) on survey vessels in the GOM as part of the DPEIS’s effects analysis. This information is relevant to the assessment of marine mammal effects by seismic vessels operating in the GOM. Not surprisingly, the PSO data indicate a negligible level of effects that undermines the results of the exposure modeling presented in Appendix D. For example, the DPEIS implausibly concludes that many thousands of marine mammals will experience incidental take as a result of seismic activities. These estimates would result in tens of thousands of shutdown events per year. However, based on actual monitoring data, as reported in relatively recent environmental assessments, an average of only 55 shutdowns per year occur in the GOM with operations conducted under the Standard Mitigation Measures. See also Barkaszi et al. (2012) (reporting a total of 144 shutdowns from 2002 to 2008, or 24 per year); Attachment B.¹⁴ The PSO data must be fully disclosed and evaluated in the DPEIS and the effects analysis must be substantially revised to account for the available PSO data. See *Gas Appliance Mfrs. Ass’n*, 998 F.2d 1041, 1045 (D.C. Cir. 1993) (“Since the accuracy of any computer model hinges on whether the underlying assumptions reflect reality . . . [t]he agency’s burden [to demonstrate the reasonableness of a model] becomes heavier when a method of prediction is being relied on to overcome adverse actual test data.” (quotations and alteration omitted)).

4. Conclusions—Marine Mammal Effects Analysis

As set forth above, the DPEIS’s analysis of the effects of seismic activities on marine mammals is unrealistic, flawed, incomplete, and unlawful. The effects analysis is almost exclusively based upon a modeling exercise that uses a cascading series of conservatively biased assumptions for all uncertain parameter inputs. These assumptions lead to accumulating bias as the cumulative conservative assumptions add up to increasingly unlikely statistical probabilities not representative of real-world conditions. Consequently, the results quickly become little more

¹⁴ A study of more than a decade’s worth of marine mammal observation data performed by the Joint Nature Conservation Committee (“JNCC”) demonstrates that mitigation measures significantly reduce the effects of seismic activities on marine mammals. The JNCC study’s results should be addressed in the DPEIS. See <http://jncc.defra.gov.uk/page-6985>.