

**CENTER FOR REGULATORY EFFECTIVENESS (“CRE”) COMMENTS ON
NATIONAL MARINE FISHERIES SERVICE’S (“NMFS”)
DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR EFFECTS OF OIL AND GAS ACTIVITIES IN THE ARCTIC OCEAN (“DEIS”),
<http://www.gpo.gov/fdsys/pkg/FR-2012-01-18/pdf/2012-823.pdf> ,
AVAILABLE ONLINE AT http://www.nmfs.noaa.gov/pr/pdfs/permits/arctic_deis.pdf .
COMMENTS FILED BY EMAIL ON FEBRUARY 24, 2012, TO
arcticeis.comments@noaa.gov**

I. Executive Summary

More stringent regulation is unnecessary to protect marine mammals from oil and gas seismic operations in the Arctic because marine mammals have flourished and increased during and oil and gas operations under current regulation.

The DEIS should be revised to discuss Information Quality Act (“IQA”) Requirements, which also apply to any third-party information that is used or relied on to regulate oil and gas operations.

CRE agrees with NMFS that Active Acoustic Monitoring should be further studied, but is not yet ready to be imposed as a mitigation measure.

Passive Acoustic Monitoring (“PAM”) is already routinely being required by NMFS under the Marine Mammal Protection Act (“MMPA”), or under the Endangered Species Act (“ESA”), during the Service’s regulation of offshore seismic and sonar. Because NMFS is already requiring PAM as a monitoring or mitigation requirement, we recommend that the Service emphasize the availability of PAMGUARD, which is an open source, highly tested and well documented version of PAM. NMFS should encourage use of PAMGUARD by noting its availability in all NMFS’ actions requiring or recommending the use of PAM. These notices should also state that PAMGUARD is an acceptable method of meeting any PAM requirements or recommendations.

***II. Marine Mammals Have Flourished and Increased
During Oil and Gas Seismic Operations***

The DEIS discusses whether more stringent mitigation provisions, including operational area restrictions, are necessary in order to protect marine mammals from oil and gas seismic operations in the Arctic. The answer to this question is no.

BOEM recently issued a Final Supplemental Environmental Impact Statement for Gulf of Mexico OCS Oil and Gas Lease Sale: 2012; Central Planning Area Lease Sale 216/222; Mexico

OCS Oil and Gas Lease Sale: 2012; Central Planning Area Lease Sale 216/222 (“SEIS”). This final SEIS for the GOM correctly concluded that, despite more than 50 years of oil and gas seismic and other activities, “there are no data to suggest that activities from the preexisting OCS Program are significantly impacting marine mammal populations”:

“Overall, within the CPA [Central Planning Area], there is a long-standing and well-developed OCS Program (more than 50 years); there are no data to suggest that activities from the preexisting OCS Program are significantly impacting marine mammal populations. Therefore, in light of the above analysis on the proposed action and its impacts, the incremental effect of the proposed action on marine mammal populations is not expected to be significant when compared with all other past, present, and reasonably foreseeable future activities.”¹

This final SEIS for the GOM further states that

“NTL 2007-G02, “Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program,” minimizes the potential of harm from seismic operations to sea turtles and marine mammals; these mitigations include onboard observers, airgun shut-downs for whales in the exclusion zone, ramp-up procedures, and the use of a minimum sound source. Therefore, no significant cumulative impacts to sea turtles would be expected as a result of the proposed exploration activities when added to the impacts of past, present, or reasonably foreseeable oil and gas development in the area, as well as other ongoing activities in the area.”²

The NAS’ National Research Council has agreed with MMS/BOEM and concluded with regard to the entire OCS that:

“[T]here have been no known instances of injury, mortality, or population level effects on marine mammals from seismic exposure but... the potential for these types of impacts may exist without appropriate mitigation measures. The MMS-approved seismic surveys include mitigation measures designed to reduce the potential for effects to occur.”³

NMFS has reached a similar conclusion about seismic in the Arctic. For example, a recent NMFS Biological Opinion concluded that marine mammals are flourishing and increasing in the Arctic despite increasing oil and gas seismic activities there:

¹ Page 4-231 of document available online at <http://www.boem.gov/Environmental-Stewardship/Environmental-Assessment/NEPA/nepaprocess.aspx> .

² *Id.*, page 4-242.

³ See, e.g., Outer Continental Shelf Oil & Gas Leasing Program, 2007-2012 Final Environmental Impact Statement, page V-64 (MMS April 2007), available online at <http://www.boemre.gov/5-year/2007-2012DEIS/VolumeII/5and6-ConsultationPreparers.pdf>

“Data indicate that bowhead whales are robust, increasing in abundance, and have been approaching (or have reached) the lower limit of their historic population size at the same time that oil and gas exploration activities have been occurring in the Beaufort Sea and, to a lesser extent, the Chukchi Sea.”

“To our knowledge, no whales or other marine mammals have been killed or injured by these past seismic operations, and the BCB population of bowhead whales continues to increase at an annual rate estimated more than 3 percent.

Because the Western Arctic bowhead whale population is approaching its pre-exploitation population size and has been documented to be increasing at a roughly constant rate for over 20 years, the impacts of oil and gas industry on individual survival and reproduction in the past have likely been minor (Angliss and Outlaw 2010). These activities are unlikely to have any effect on the other four stocks of bowhead whales. Similarly, only the western North Pacific stock of humpback whales and the Northeast Pacific stock of fin whales would be potentially affected by oil and gas leasing and exploration activities in the Chukchi Sea. The described work would have no effect on the remaining worldwide stocks of humpback or fin whales. No injury or lethal takes are anticipated from these activities, nor are population level consequences to the stocks expected. Most impacts would be due to harassment of whales, which may lead to behavioral reactions from which recovery is fairly rapid. Mitigative measures will be recommended to reduce harassment and the possibility of harm or lethal takes.”⁴

NMFS has correctly emphasized that “to date, there is no evidence that serious injury, death, or stranding by marine mammals can occur from exposure to airgun pulses, even in the case of large airgun arrays.”⁵

In sum, the agencies’ identification of a preferred alternative in the final EIS should reflect the fact that marine mammals have thrived during many years of seismic and other oil and gas activities. There is neither need nor basis for any significant change in the mitigation measures which produced that positive result.

⁴ Pages 64-65, ENDANGERED SPECIES ACT: SECTION 7 CONSULTATION BIOLOGICAL OPINION, Incidental harassment authorization to allow for incidental takes of marine mammals during shallow hazards survey in the Chukchi Sea, Alaska, 2011 (NMFS 2011), available online at http://www.nmfs.noaa.gov/pr/pdfs/permits/statoil_biop2011.pdf .

⁵ 75 FR 49795-96 (Aug. 13, 2010), page 49795, available online at <http://edocket.access.gpo.gov/2010/2010-19962.htm> .

III. The DEIS Should Be Revised to Discuss Information Quality Act Requirements

The DEIS discusses “**Federal Laws and Other Requirements Applicable to Oil and Gas Activities in the Arctic Ocean.**”⁶

This section of the DEIS should be revised in the final EIS to include a discussion of the IQA and IQA Guidelines requirements because they also apply to federal Government regulation of oil and gas activities in the Arctic Ocean.

For example, the DEIS should discuss NMFS’ IQA Guidelines.⁷

The DEIS should also be revised to discuss NMFS’ ***Instruction on NMFS DATA DOCUMENTATION***, which states at pages 11-12 that all NMFS data disseminations must meet NMFS’ IQA guidelines.⁸

The DEIS should also be revised to discuss NMFS’ ***Instruction on SECTION 515 PRE-DISSEMINATION REVIEW AND DOCUMENTATION FORM.***⁹

The DEIS should also be revised to reference NMFS’ ***Instruction on GUIDELINES FOR AGENCY ADMINISTRATIVE RECORDS***, which states at pages 2-3 that:

“The AR [Administrative Record] first must document the process the agency used in reaching its final decision in order to show that the agency followed required procedures. For NOAA actions, procedural requirements include...the Information Quality Act....”¹⁰

⁶ Pages 1-15 to 1-21 (emphasis in the original), available online at http://www.nmfs.noaa.gov/pr/pdfs/permits/arctic_deis.pdf.

⁷ NMFS’ IQA guidelines are available online at ***Policy Directive on Policy on the Data Quality Act, available online at*** <https://reefshark.nmfs.noaa.gov/f/pds/publicsite/documents/policies/04-108.pdf>. See also ***NMFS INSTRUCTION on Data Quality Act, SECTION 515 PRE-DISSEMINATION REVIEW AND DOCUMENTATION GUIDELINES***, available online at <https://reefshark.nmfs.noaa.gov/f/pds/publicsite/documents/procedures/04-108-03.pdf>, which also applies and which should also be discussed in the DEIS.

⁸ This NMFS ***Instruction*** is available online at <https://reefshark.nmfs.noaa.gov/f/pds/publicsite/documents/procedures/04-111-01.pdf>.

⁹ This NMFS ***Instruction*** is available online at <https://reefshark.nmfs.noaa.gov/f/pds/publicsite/documents/procedures/04-108-02.pdf>.

¹⁰ This NMFS ***Instruction*** is available online at <https://reefshark.nmfs.noaa.gov/f/pds/publicsite/documents/procedures/30-123-01.pdf>.

The DEIS should also be revised to discuss NMFS' *DIRECTIVE on Data and Information Management*, which states at page 3:

“(General Policy and Requirements

A. Data are among the most valuable public assets that NMFS controls, and are an essential enabler of the NMFS mission. The data will be visible, accessible, and understandable to authorized users to support mission objectives, in compliance with OMB guidelines for implementing the “Information Quality Act” (IQA)...”¹¹

The DEIS should also be revised to state that these IQA requirements apply to any third party information that NMFS uses or relies on in the DEIS/EIS, or in otherwise regulating oil and gas activities in the Arctic Ocean.¹²

If NMFS believes that any of the above-cited NMFS IQA requirements do not apply to this ICR, then we ask that NMFS say so and explain why in a response to CRE's comments.

We also ask that the DEIS be revised to discuss any and all NMFS or BOEM IQA requirements/guidance that apply to oil and gas activities in the Arctic Ocean, but which are not cited or referenced in CRE's comments.

IV. CRE Agrees with NMFS that Active Acoustic Monitoring Should Not Yet be Imposed as a Mitigation Measure

With regard to marine mammals, the DEIS concludes that

“An active acoustic monitoring (AAM) system...can detect animals that are not producing sounds. To do so, however, requires introducing sound into the environment, which can cause behavioral disturbances....Use of AAM remains in the realm of research and development (Bingham 2011).”¹³

We agree with NMFS' conclusion about AAM. We also encourage continuing research into AAM.

¹¹ This NMFS *Directive* is available online at <https://reefshark.nmfs.noaa.gov/f/pds/publicsite/documents/policies/04-111.pdf> .

¹² See, e.g., NMFS letter to CRE available online at http://thecre.com/pdf/NOAA-IWC_Letter.pdf .

¹³ http://www.nmfs.noaa.gov/pr/pdfs/permits/arctic_deis.pdf at pages 4-153 to 4-155.

V. NMFS Should Encourage the Use of PAMGUARD

The “Additional Mitigation Measure” section of the DEIS discusses the efficacy of Passive Acoustic Monitoring (“PAM”) with regard to specific marine mammal species. This discussion states that there are some limitations on PAM’s usefulness:

“Bowhead Whales – The efficacy of real-time passive acoustic monitoring (PAM) in the Arctic depends on species, frequency and source level of calls, how often the marine mammals call, and choosing the right array and software to match these variables. PAM has been successful at detecting higher frequency clicks of toothed whales where the frequency is well above that of the seismic and tow ship. In the Arctic, most of the calls are low frequency calls, such as from bowheads, which overlap with the seismic marine mammals, particularly in such a large area where visual sightings are often limited. However, there are significant technical challenges for using this system from moving vessels with their own noise source within the frequency range of the bowhead whales. There has been success in detecting bowhead whale calls from long-term passive acoustic recording devices that are placed on the seafloor bottom for a certain amount of time. However, these devices are not monitored in real-time.

PAM systems only work if an animal produces a sound that can be detected by the system.”

“The Sound and Marine Life Joint Industry Programme (JIP) is currently funding ongoing research on the use of real-time acoustic identification of cetaceans and the use of active acoustics technologies for use in mitigation and monitoring marine mammals during offshore exploration activities (JIP 2009). The technology, although not yet proven in Arctic conditions, has the potential for future application, pending continued research and modifications.”

“Beluga Whales – The efficacy of real-time PAM in the Arctic at this time depends on species, frequency and loudness of calls, how often the marine mammals call, and choosing the right array and software to match these variables. PAM has been successful at detecting higher frequency clicks of toothed whales where the frequency is well above that of the seismic and tow ship. These technologies have the potential to greatly improve the detection of marine mammals, particularly in such a large area where visual sightings are often limited. The 2010 Statoil seismic survey program did detect beluga whales on the towed PAM array by JASCO (NMFS 2011b), but localizing the animals is difficult because the system must have very good received signal-to-noise ratio to localize beluga whales.

PAM systems are only effective for detecting animals that are emitting sounds.”

“Other Cetaceans – The efficacy of real-time PAM in the Arctic currently depends on species, frequency and source level of calls, how often the marine mammals call, and choosing the right array and software to match these variables. PAM has been successful at detecting higher frequency clicks of toothed whales where the frequency is well above that of the seismic and tow ship. In the Arctic, most of the calls are low frequency calls, such as from bowhead whales, which overlap with seismic sounds (NMFS 2010). Fin, gray and humpbacks whales also vocalize in lower frequencies. These technologies have the potential to greatly improve the detection of marine mammals, particularly in such a large area where visual sightings are often limited. However, there are significant technical challenges for using this system from moving vessels with their own noise source within the frequency range low-frequency whales. This is less problematic for higher frequency toothed whales. Several vessels are required to collect acoustic information from different angles to allow the calculation of animal locations and all of this data must be combined and analyzed in real-time to be useful. Additional Mitigation Measure would impact other cetaceans the same as it would bowhead whales.”

“Pinnipeds – This additional mitigation measure would require use of technology such as ...passive acoustic monitoring to improve real-time detection of marine mammals. These technologies have the potential to greatly improve the detection of marine mammals, at least under certain conditions, and could provide more information about potential interactions and actual behavioral responses to disturbance. However, there are significant technical challenges for using passive acoustic monitoring to provide real-time locations of animals in relation to moving vessels which would be useful to monitor appropriate safety radii. Several vessels are required to collect acoustic information from different angles to allow the calculation of animal locations and all of this data must be combined and analyzed in real time to be useful. In addition, only animals that are vocalizing can be detected with passive arrays. Bearded seals often vocalize and can be detected during the spring-summer breeding season but other seals do not vocalize frequently and could be missed even if present. Active acoustic systems may also be useful in locating animals in real-time but they introduce additional sounds into the marine environment that may cause behavioral reactions in the animals they are intended to monitor. These types of systems are subjects of continuing research to determine their efficacy and practical limitations.”

Walrus – The effects of this additional mitigation measure on walrus would be the same as described for pinnipeds in Section 4.5.2.4.12.

Polar Bears – The effects of this additional mitigation measure on polar bears would be the same as described for pinnipeds in Section 4.5.2.4.12.”¹⁴

¹⁴ Pages 4-153 to 4-155, available online at http://www.nmfs.noaa.gov/pr/pdfs/permits/arctic_deis.pdf .

The few cited references in the DEIS do not support NMFS' assertions that PAM has limitations. Nor is there any support for NMFS' assertion that PAMGUARD needs "continued research and modifications" to work in Arctic conditions. We recommend that if the final EIS includes the same or similar assertions, then NMFS should provide references supporting those assertions.

We are also puzzled by NMFS' description of PAM as a possible additional mitigation measure that may in the future be required under the MMPA and/or ESA. We are puzzled because NMFS already routinely includes PAM as a monitoring or mitigation requirement in IHAs, LOAs or rules that NMFS issues under the MMPA.

A published article by NMFS' staff discusses NMFS' currently required uses of PAM.¹⁵

In just the year 2011, NMFS included PAM requirements in, *e.g.*:

- An L-DEO seismic survey in the Western Gulf of Alaska, available online at <http://www.nsf.gov/geo/oc/envcomp/shillington-2011-final-ea-23-may.pdf>, and issued permit at http://www.nmfs.noaa.gov/pr/pdfs/permits/ideo_wgoa_issued_iha.pdf ;

- An industry seismic survey in Cook Inlet, Alaska, available online at http://www.nmfs.noaa.gov/pr/pdfs/permits/apache_ak_iha_application2011.pdf ;

- A University of Alaska Geophysics Institute seismic survey in the Arctic Ocean, using PAM , available online at http://www.nmfs.noaa.gov/pr/pdfs/permits/uagi_iha_issued.pdf ;

- An industry seismic IHA for the Chukchi, available online at http://www.nmfs.noaa.gov/pr/pdfs/permits/statoil_iha_issued2011.pdf ; and

- An USGS seismic survey in Central Gulf of Alaska, available online at http://www.nmfs.noaa.gov/pr/pdfs/permits/usgs_goa_iha2011.pdf .

If PAM is so limited for use in the Arctic and Alaska, then why is NMFS routinely requiring its use in the Arctic and Alaska?

The Navy and NMFS are also requiring that PAM be used with Navy sonar. With NMFS' concurrence, the Navy stated that "Passive acoustic monitoring for low frequency sounds generated by marine mammals will be conducted when SURTASS [sonar] is deployed."¹⁶

¹⁵“The use of acoustic monitoring in the National Marine Fisheries Service marine mammal incidental take authorizations,” Shane Guan, Office of Protected Resources, NOAA/NMFS, presented at 160th Meeting of the Acoustical Society of America (Nov. 15 – 19, 2010), Session 1pAB: Animal Bioacoustics, available online at <http://scitation.aip.org/getpdf/servlet/GetPDFServlet?filetype=pdf&id=PMARCW00001100001010002000001&idtype=cvips&doi=10.1121/1.3606451&prog=normal>

¹⁶ <http://www.surtass-lfa-eis.com/Measures/index.htm> .

In addition, BOEM regulates offshore oil & gas seismic operations primarily through *Notice to Lessees and Operators* (“NTL”) 2007-G02. This NTL has a section which encourages, but does not require, the voluntary or “experimental” use of Passive Acoustic Monitoring:

“**Experimental Passive Acoustic Monitoring**”

Whales, especially sperm whales, are very vocal marine mammals, and periods of silence are usually short and most often occur when these animals are at the surface and may be detected using visual observers. However, sperm whales are at the greatest risk of potential injury from seismic airguns when they are submerged and under the airgun array. Passive acoustic monitoring appears to be very effective at detecting submerged and diving sperm whales, and some other marine mammal species, when they are not detectable by visual observation. MMS strongly encourages operators to participate in an experimental program by including passive acoustic monitoring as part of the protected species observer program. Inclusion of passive acoustic monitoring does **not** relieve an operator of any of the mitigations (including visual observations) in this NTL **with the following exception**: Monitoring for whales with a passive acoustic array by an observer proficient in its use will allow ramp-up and the subsequent start of a seismic survey during times of reduced visibility (darkness, fog, rain, etc.) when such ramp-up otherwise would not be permitted using only visual observers. If you use passive acoustic monitoring, include an assessment of the usefulness, effectiveness, and problems encountered with the use of that method of marine mammal detection in the reports described in this NTL. A description of the passive acoustic system, the software used, and the monitoring plan should also be reported to MMS at the beginning of its use.”¹⁷

Similarly, the 2010 seismic guidelines for the UK’s Joint Nature Conservation Committee (“JNCC”) state that

“In addition to the visual mitigation provided by MMOs, if seismic surveys are planned to start during hours of darkness or low visibility it is considered best practice to deploy Passive Acoustic Monitoring (PAM).”¹⁸

Because NMFS is already requiring PAM, we recommend that the Service emphasize the availability of PAMGUARD, which is an open source, highly tested and well documented version of PAM.

The JNCC Guidelines include the following section encouraging the use of PAMGUARD:

¹⁷ NTL 2007-G02, available online at http://sero.nmfs.noaa.gov/sf/deepwater_horizon/Appendix_A_Seismic_NTL_2007-G02.pdf (emphasis in the original).

¹⁸ JNCC Guidelines for Minimising the Risk of Injury and Disturbance to Marine Mammals from Seismic Surveys (August 2010), Introduction, available online at http://jncc.defra.gov.uk/pdf/JNCC_Guidelines_Seismic%20Guidelines_August%202010.pdf

“In the last few years, software that processes and analyses cetacean sounds has been developed. PAMGUARD is open source software that has been developed as part of the International Association of Oil and Gas Producers Joint Industry Project (JIP). JNCC recognises that PAMGUARD is currently in a transition period between use as a research tool and widespread adoption as a monitoring technique. Moreover, JNCC recognises the need to balance proactive implementation of PAM with the need to further develop its capability, for example to include species recognition and baleen whale detection, and therefore encourages users of these systems to actively contribute to their development and refinement.”¹⁹

PAMGUARD has been developed by the International Association of Oil and Gas Producers Joint Industry Project (“JIP”). The PAMGUARD web site discusses PAMGUARD in considerable detail, and provides free, public access to PAMGUARD.²⁰ The site is worth quoting at some length:

“Background

The PAMGUARD project was set up to provide the world standard software infrastructure for acoustic detection, localisation and classification for mitigation against harm to marine mammals, and for research into their abundance, distribution and behaviour. Many marine activities involve underwater sound emissions. These may be a by-product of the activity (e.g. piling or explosives), or a tool (e.g. air guns used for seismic surveys in oil and gas exploration, or military/commercial sonar). To mitigate against harm to marine mammals, observers are often employed to visually scan the sea surface for the presence of animals. In the event of a sighting, procedures such as suspension/delay of activities may be implemented to avoid harm.

Current Methods

Visual observations play a vital role, but marine mammals are difficult to spot on the sea surface, especially when weather and light conditions are poor. However, many marine mammals produce loud and distinctive vocalisations, which can often be detected more reliably than visual cues. For these species, passive acoustic monitoring (PAM) offers an effective means of detection. Furthermore, the creatures do not need to be on the surface to be detected.

¹⁹ JNCC Guidelines for Minimising the Risk of Injury and Disturbance to Marine Mammals from Seismic Surveys (August 2010), Section 4,1, available online at http://jncc.defra.gov.uk/pdf/JNCC_Guidelines_Seismic%20Guidelines_August%202010.pdf .

²⁰ The industry-sponsored PAMGUARD website is available online at <http://www.PAMGUARD.org/home.shtml> .

Why do we need PAMGUARD?

While PAM software already exists, the source code is not freely available for others to help to expand and improve. This means that assumptions, and therefore margins for error, are not readily understood, that code evolves more slowly, or not at all, and source code improvements are at the mercy of the time and resources that the few responsible developers can commit. In the case of the military and some commercial organisations, detection, classification and localisation (DCL) technologies are in-house and protected. What is needed is an environment which raises the profile of PAM and creates a means of tapping into the intellectual resources of the research community. Industry and marine environmentalists are well aware of the need to upgrade and modernize.”²¹

The Joint Industry Program Annual Report for 2009 also contains extensive, detailed documentation of PAMGUARD.²² The report explains that

“A software package called PAMGUARD has been released that can interpret and display calls of vocalising marine mammals, locate them by azimuth and range and identify some of them by species. These abilities are critical for detecting animals within safety zones and enabling shut-down.”²³

PAMGUARD was discussed at a recent IAGC meeting, which strongly encouraged the industry to use PAMGUARD and explained why.²⁴ One power point slide explains the “PAMGUARD Vision”:

- “•Create an integrated real-time PAM software infrastructure
- Open source
- Platform independent
- Freely available to all PAM users for the benefit of the marine environment.

²¹ PAMGUARD site available online at <http://www.pamguard.org/background.shtml> .

²² See 2009 Report, pages 1, 2, and 3, available online at <http://www.soundandmarinelife.org/Site/Basics/AnnRep3.pdf> .

²³ *Id.*, page 1.

²⁴ See, beginning with slide 9, power point presentation at http://iagc.org/attachments/contentmanagers/9530/6%207%20IAGC_HSESForum_pres_MarEnv_SMLWkgrpUpdate_V01_2011_09_27.pdf .

●Establish a reliable/robust industry standard interface tool in preparation for PAM being mandated”²⁵

VI. Conclusion and Recommended Actions

The final EIS should conclude that more stringent regulation is not necessary to protect marine mammals from oil and gas seismic operations in the Arctic because marine mammals have flourished and increased during and oil and gas operations. The agencies’ identification of a preferred alternative in the final EIS should reflect this conclusion.

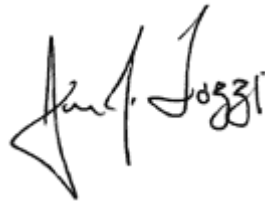
The final EIS should discuss Information Quality Act Requirements, and should state that these IQA requirements also apply to any third-party information that the agencies use or rely on to regulate oil and gas operations.

The final EIS should state that Active Acoustic Monitoring should be further studied, but is not yet ready to be imposed as a mitigation measure.

The final EIS should emphasize the availability of PAMGUARD, and encourage its use. The final EIS should also state that PAMGUARD is an acceptable method of meeting any PAM requirements or recommendations.

We thank you for the opportunity to submit these comments, and we look forward to the agencies’ response to them.

Respectfully Submitted,

A handwritten signature in black ink that reads "Jim Tozzi". The signature is stylized with a large, sweeping initial "J" and "T".

Jim Tozzi
Member, Board of Advisors

²⁵ *Id.*, Slide 11.