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4 March 2019

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Dear Ms. Hayes,

Thank you for considering my comments on the Coastal Plain Oil and Gas Leasing Draft Environmental Impact Statement (draft EIS) (DOI-BLM-AK-0000-2018-0002-EIS). This draft EIS describes a program of oil and gas leasing on the Coastal Plain of the Arctic National Wildlife Refuge in Alaska. This leasing program was specified in Section 20001 of Public Law 115-97 (PL 115-97). I present my comments in two sections; General Comments that apply to multiple sections of the draft EIS, and Specific Comments that apply to specific sections. Many of my specific comments provide detailed suggestions about how to make appropriate or necessary revisions in specific sections.

Thank you as well for extending the public comment period for the draft EIS from 11 February to 13 March. This extension from 45 to 75 days was helpful, but I urge you to consider extending the comment period to a full 90 days, the usual period allotted to public comment for projects with similar levels of complexity, controversy, and environmental consequence. Given the context of the release of the draft EIS during the Holiday season and the disruption associated with the prolonged government shutdown during the public comment period, the currently specified comment period of 75 days is too short and should be extended or reopened for at least an additional 15 days. Public comment on the draft EIS is a critical step in the decision-making process for a program of National significance such as this one. Controversial programs such as this one often benefit from extending public comment on their draft EISs to 120 days to promote a wide spectrum of public involvement.

My comments identify serious deficiencies in the structure, content, and analyses presented in the draft EIS. These systemic deficiencies need to be remedied before the final EIS is issued in order to fully inform decision makers selecting a preferred alternative, and to fully disclose to the

public the likely effects of the proposed program. I recommend major revision and re-release of a revised draft EIS that has:

- An adequate range of alternatives, including an appropriate least environmentally damaging practicable alternative,
- Coherent effects analyses for all affected resources that are consistent with Appendices B and F,
- Cumulative effects analyses consistent with Appendices B and F,
- Increased assurances regarding implementation of resource protection measures,
- A system for tracking and disclosing surface disturbance acres, and
- Considered and responded to public comments on the current draft EIS.

Please also allow at least 60 days for public comment on this revised draft EIS.

I believe that a revised draft EIS that includes analysis of an appropriate least environmentally damaging practicable alternative would lead to the conclusion that this new action alternative should be the preferred alternative. This alternative could fulfill the requirements of PL 115-97 while minimizing impacts on local communities, as well as other Refuge resources and objectives.

Based on my review of the draft EIS, I believe that a decision to proceed to identifying a preferred alternative and issuing a final EIS based on the current action alternatives would have high legal vulnerability. In this context, issuing a revised draft EIS could ultimately be more efficient. If, however, decision-makers choose this approach, I recommend selecting Alternative D-2 as the preferred alternative. Among the current action alternatives, D-2 will impose the least severe adverse impacts on local communities and will subvert the objectives of the Arctic National Wildlife Refuge, articulated in the Refuge's Comprehensive Conservation Plan, less than the other action alternatives.

General Comments

1. *The range of alternatives in the draft EIS is inadequate.* Current action alternatives call for oil and gas leasing on 66 to 100 percent of the coastal plain. Please develop and analyze an alternative that includes no more than 51 percent (2 times 400,000 acres as mandated in PL 115-97, divided by the 1,560,000 acre total area of the coastal plain) or less of the coastal plain as a least environmentally damaging practicable alternative. Alternative B represents a "bookend" alternative on the most impactful end of the spectrum, but the draft EIS does not include a corresponding least-impact bookend (both sub-alternatives D1 and D2 go beyond minimum requirements in PL 115-97). Given the high level of controversy surrounding drilling on the ANWR coastal plain, it would be appropriate to develop and fully analyze an alternative that is designed to be a least environmentally damaging practicable alternative. Decision makers need

the information that would be generated by such an analysis in order to make a well informed selection of a preferred alternative.

The program is proposed in the Arctic National Wildlife Refuge, a special designation that has other objectives described in its Comprehensive Conservation Plan (CCP) that should be respected. The least environmentally damaging practicable alternative legitimately could be considered the leading candidate to become the preferred alternative, because it would reduce the conflicts between the proposed oil and gas program and other Refuge objectives.

While developing a least environmentally damaging practicable alternative for the revised draft EIS, please include:

- Fewer or no exemption pathways for circumventing lease stipulations and Required Operating Procedures (ROPs),
- Additional ROPs designed to address a wider range of issues and resource protection needs raised during scoping (please see my specific comments below for potential new or enhanced ROPs),
- Additional ROPs regarding use of best available science and technology, especially approaches to oil and gas development in other National Wildlife Refuges that have been tested and found to be most consistent with the CCPs of these other Refuges.

The range of alternatives is also inadequate because alternatives were developed with a strong and appropriate focus on caribou summer habitat, but little apparent regard for the wide range of other important resource issues identified during scoping. In particular, the currently proposed action alternatives do not adequately address the program's adverse effects on subsistence use and environmental justice.

2. *The effects analysis in Chapter 3 lacks depth and continuity.* Appendix B in Volume 2 of the draft EIS presented the BLM's hypothetical development scenario. This scenario identified five phases in this proposed action; (1) leasing, (2) exploration, (3) development, (4) production, and (5) abandonment and reclamation. Different types of activities will occur during each of these phases, and differences in the temporal overlap and spatial juxtaposition of sites in each of these phases across the Coastal Plain will yield a shifting pattern of effects through time. This potentially very complex pattern of variation is exactly what I assumed the BLM's hypothetical development scenario was meant to address. Amid the resulting "cloud" of potential effects, the hypothetical development scenario would provide a representative "point" that could be the focus of a standardized analytical approach. This typology of phases and standardized analytical approach for dealing with spatial and temporal variation makes sense and sets up an expectation for readers about the structure and content of the corresponding effects analyses.

Similarly, Appendix F lists resource impacts and indicators. Combined with Appendix B, this further refines the reader's expectations about the structure and content of analyses of program

effects on resources by identifying resource-specific impact mechanisms and the indicators that will be used to measure relative impacts across action alternatives. Again, this analytical framework is a sensible approach for dealing with the broad uncertainty inherent in a programmatic draft EIS such as this one.

The effects analyses in Chapter 3, however, do not fulfill the expectations established by this framework. Execution of the sensible approach intended by appendices B and F is extremely inconsistent. For example, the first resource analysis in Chapter 3 is for Air Quality. Rather than adopt the phases identified in the hypothetical development scenario, the air quality analysis introduces a new typology of phases, including; (1) seismic survey, (2) exploratory drilling, (3) development, and (4) production (pg. 3-13), but omits the important phase (5) abandonment and reclamation (in general, this phase of the program is largely ignored throughout the draft EIS, despite its potential to result in significant impacts). It uses virtually none of the timelines, spatial predictions, or assumptions that are included in the hypothetical development scenario to refine estimates of the magnitude and duration of effects, and makes only one reference to the scenario. Actions and impacts presented in Appendix F, section F.4.2 are tracked in the narrative with moderate fidelity, but the analysis includes only one sentence that deals with temporal aspects of impacts (pg. 3-14; Thus, potential emissions in the short term would be less than emissions in the long term, assuming that exploration ultimately led to the buildout of oil and gas facilities as described by the hypothetical development scenario (**Appendix B**). The next resource analyzed, Acoustic Environment, makes no reference to the hypothetical development scenario, and is written in a way that suggests the authors of this analysis were unaware of the existence of the scenario. Similarly, the analysis of effects to the acoustic environment does not mention important indicators listed in Appendix F, section F.4.3 such as sound intensity index and distance to inaudibility. It's as if each discipline is analyzing their own unique version of the proposed program. This pattern of incomplete fidelity or total disregard for the Appendices B and F continues throughout Chapter 3, leading to an effects analysis that is an incomprehensible hodge-podge, casting doubt on the credibility of the analysis, and thwarting any attempt to integrate effects across resources analyzed – a central role of decision-makers.

Chapter 3 needs to be completely revised with a focus on using the hypothetical development scenario in Appendix B and the impacts and indicators in Appendix F as central organizing themes. As suggested in the Introduction to the draft EIS, this is a reasonable approach for a programmatic draft EIS, but to be effective, it must be implemented properly.

The analysis of program effects in Chapter 3 also generally does not consider temporal aspects of effects from the program. Types of effect are described, sometimes the relative magnitudes of effects are estimated, at least qualitatively, but almost no attempt is made to estimate the frequency or duration of effects. Temporal factors strongly influence the potential significance of impacts. The hypothetical development scenario contains sufficient detail to allow reasonable estimates of temporal aspects of impacts. Again, Chapter 3 needs to be revised to incorporate

consideration of the frequency and duration of impacts. Temporal aspects of effects are important and should be elaborated whenever possible to inform decision-makers and the public.

3. *Inadequate Cumulative Effects Analyses.* Appendix F, pages F-4 to F-11 lays-out the expected structure and content of cumulative effects analyses in the draft EIS. The material presented in Appendix F provides a sound framework for cumulative effects analysis. In practice, however, cumulative effects analyses for specific resources presented in each section of the draft EIS generally do not conform to this framework and generally do not provide thoughtful and thorough analyses of the potential cumulative effects associated with other projects and ongoing and planned activities listed in Appendix F (pgs. F-5 to F-11). For example, why don't any of the cumulative effects analyses for any of the resources considered include analysis of the liquid natural gas transport pipeline scheduled to come on-line in 2025, which is described in Appendix B (pg. B-17) and Appendix F (pg. F-9)? Appendix B is titled "Reasonably Foreseeable Development Scenario for Oil and Gas Resources in the Public Law 115-97 Coastal Plain, Alaska," clearly indicating that this liquid natural gas pipeline is a reasonably foreseeable action. The description on pages B-17 and B-18 indicates that if natural gas is found in the program area, it is likely to be transported via this proposed pipeline, establishing a clear connection between this pipeline and the Coastal Plain oil and gas program. This is just one of many examples of profound deficiencies in cumulative effects analyses in the draft. Please revise cumulative effects analyses throughout the draft EIS to conform to the structure and content presented in Appendix F.

4. *Uncertainty surrounding implementation and effectiveness of environmental protections.*

Three sources contribute to an unacceptable level of uncertainty regarding environmental protections associated with the proposed action alternatives; (1) unconstrained exemption opportunities, (2) excessive reliance on subsequent planning processes to define environmental protection measures, and (3) lack of attention in the draft EIS to monitoring and enforcement.

Regarding unconstrained exemptions, most of the lease stipulations in the action alternatives provide opportunities for the stipulation to be circumvented after further review of proposed case-by-case exemptions. Similarly, nearly all ROPs included in Table 2-2 include some sort of exemption provision that grants the BLM Authorized Officer the discretion to circumvent the requirement/standard and potentially jeopardize meeting the objectives of that ROP. I understand the need for an exemption process from the perspective of practical implementation of the program. But clear disclosure of the standards that must be met in order for an exemption to be granted is needed to reduce uncertainty about whether lease stipulations and ROP will in fact be implemented. The appearance or broad discretion to grant exemptions introduces considerable uncertainty surrounding the implementation fidelity and effectiveness of ROPs in limiting impacts, especially given the lack of emphasis of monitoring in the draft EIS.

Please amend all Lease Stipulations and ROPs that include delegated discretionary authority to the BLM Authorized Officer with statements that describe, in as much detail as possible, the

sideboards and limits on the Officer's discretion. Please develop and include in the draft EIS a process for public notification and involvement in the process of approving all non-emergency cases in which the BLM Authorized Officer is considering an exemption from any Lease Stipulation or ROP.

Clearly, the BLM Authorized Officer will have great responsibility for the proper implementation of this program. Arguably, this Officer may have too much responsibility. To reduce the potential for arbitrary or capricious exemptions, please provide in the revised draft EIS clear evidentiary and practical standards that would need to be met in order for a request for an exemption from a Lease Stipulation or an ROP to be considered warranted. These criteria would be useful for both lease applicants and would provide assurances to entities interested in environmental protection. Please also develop and include in the revised draft EIS a process for engaging a local oversight committee and panels of technical experts to provide recommendations to the BLM Authorized Officer regarding exemptions, as well as subsequent plans (see below). This local and technical input will improve decisions made by the BLM Authorized Officer and will help to reduce uncertainty surrounding the implementation process for Lease Stipulations and ROPs.

Finally, given the important role of the BLM Authorized Officer in implementing this oil and gas program, please add to the introduction to Chapter 2 a clear and thorough explanation of the qualifications that make candidates eligible to serve as the BLM Authorized Officer.

Regarding excessive reliance on subsequent planning efforts to minimize environmental impacts, the draft EIS calls for the subsequent development, review, and refinement of many management, mitigation, and resource protection plans. The draft EIS, however, does not describe who will create these plans or how the public might be involved in their development. These plans will play an important role in the day-to-day protection of natural, cultural, and social resources during implementation of the oil and gas program. The draft EIS needs to include assurances that these plans will include best-available measures, effective remedies, and meaningful penalties for non-compliance.

Please include in the revised draft EIS a thorough description of the process for developing, approving, and implementing subsequent management, mitigation, and resource protection plans. This description should include who will be involved in developing these plans and the opportunities for public involvement that will be provided. Again, I recommend including in this process explicit mechanisms for gaining input from scientific societies with expertise in the respective disciplines covered in different plans. Involvement of scientific societies as collaborators in plan development or as peer reviewers could enhance inclusion of best available information and technology in these plans. I also recommend specifying which regulatory agencies will be invited to participate in development of each plan, and which of these agencies must be involved in order to develop an effective plan.

Regarding monitoring and compliance, this is another essential tool for providing assurances that the program will be implemented as described. A robust program of implementation and effectiveness monitoring, reporting, and ongoing adaptive management of the program will be critical to ensuring that non-compliance is detected early and effective remedies are promptly implemented.

The current draft EIS mentions subsequent development of monitoring and compliance plans, but provides no details about this process. I understand that the current programmatic draft EIS is not the place for articulating a detailed monitoring and compliance plan. But I recommend incorporating in the revised draft EIS an appendix that provides a description of the basic content of appropriate monitoring plans, with outlines and examples whenever possible. As I recommended for management, mitigation, and resource protection plans above, this description of monitoring and compliance plans should include who will be involved in developing these plans and the opportunities for public involvement that will be provided. Again, I recommend including in this process explicit mechanisms for gaining input from scientific societies and regulatory agencies with expertise in the respective disciplines covered in different monitoring and compliance plans.

All of the plans discussed here require funding adequate to develop, refine, and implement them. In the case of monitoring and compliance plans, funding needs to include salary for staff to develop and carry out all aspects of the monitoring program. Funding for staff should include enforcement officers, operating in the field, who are charged with ensuring environmental compliance with the EIS and all subsequent management, mitigation, and resource protection plans. Presence of field-going enforcement staff is central to maximizing both the opportunity to coordinate with program operations staff to find creative solutions, and to increase the potential to detect and remedy non-compliance in a timely and effective way. I recommend that the pre-disturbance bond be used to guarantee adequate funding for the monitoring and compliance program.

(Participating in the development, implementation, and monitoring of these plans will constitute a considerable workload for responsible staff within the BLM, but also the USFWS, NMFS and other regulatory agencies. Although not necessarily a topic for the draft EIS, I recommend careful consideration of the increased workload associated with administering this oil and gas program and beginning the process of hiring the additional manpower needed to ensure the planning and regulatory compliance aspects of this program are completed in a competent and timely manner (please see my specific comment 69 below for additional suggestions).)

5. Accounting for the limit of 2,000 acres of disturbance. Section 20001 of Public Law 115-97 includes the following language: “(3) SURFACE DEVELOPMENT.—In administering this section, the Secretary shall authorize up to 2,000 surface acres of Federal land on the Coastal Plain to be covered by production and support facilities (including airstrips and any area covered by gravel berms or

piers for support of pipelines) during the term of the leases under the oil and gas program under this section.”

The quantitative criterion of 2,000 acres will justifiably be the object of considerable industry interest and public scrutiny. This quantitative criterion is also very amenable to monitoring. While the draft EIS may not be the place for articulating a comprehensive monitoring and compliance plan, I believe it is the place to spell-out, in as much detail as possible, how this 2,000-acre limitation on surface development will be tracked.

Transparency about what rules will govern the monitoring and accounting program for this criterion is essential. This information will enable lease applicants to plan accordingly, and will provide environmental interests some assurance that this is a meaningful criterion. Early disclosure of these rules will allow them to be subjected to public comment, refined, and clarified before issuance of a Record of Decision; an approach that will build trust. In contrast, leaving disclosure of the monitoring and accounting rules for surface disturbance to an unspecified later date will foster uncertainty, distrust, and suspicion.

I urge the BLM to include in the revised draft EIS a clear and thorough description of the rules surrounding the 2,000-acre limitation. This description in its entirety should be presented in a single location in Chapter 2, or an appendix, and should at minimum include:

- A comprehensive list of program features that will be counted toward the 2,000-acre limit (please see my specific comments below for details).
- A clear protocol for field monitoring of the total acreage disturbed at any given time, including a typical annual schedule for monitoring activities, and the parties responsible for completing the monitoring activities and reporting the results.
- Description of the reporting process, including public disclosure of validated monitoring results. I recommend a web-based platform, releasing monitoring results on a schedule as close to real-time as possible.
- A thorough discussion of the internal controls regarding data quality that will be applied to the monitoring and reporting program.
- A thorough discussion of the external controls, including audits and other forms of external oversight that will be implemented. I recommend identifying the specific entities that will be responsible for conducting audits and performing oversight functions.
- A clear and complete description of the process for responding to monitoring results that indicate the program has exceeded the 2,000-acre limit. This outcome would be a violation of Public Law 115-97. Public Law 115-97 does not prescribe penalties for violations, making it incumbent on the BLM to articulate how they intend to handle this situation. This process is essential information for all parties interested in the oil and gas program.
- A clear protocol for monitoring abandonment and reclamation activities. This should include clear performance standards regarding the ecological function of reclaimed acres

that, when achieved, would allow these acres to be deducted from the total of disturbed acres.

6. *Weak or missing scientific support for design criteria in action alternatives.* Many of the lease stipulations and required operating procedures in the draft EIS's action alternatives include numeric criteria, which is desirable from the perspective of monitoring and compliance. Most of these numeric criteria, however, are not supported with citations, a clear and logical rationale, or other evidence of a scientific basis or a history of implementation effectiveness. This leaves the impression that these numeric criteria are arbitrary and potentially ineffective.

Please be explicit and transparent about the scientific basis underlying all numeric criteria and clearly identify when criteria are based on best professional judgement or a similar standard. For example, in Lease Stipulation 1, what is the scientific basis for the setback distances specified, and why are they applied only to surface occupancy and not other activities? What evidence supports these distances being effective for meeting Stipulation 1's objective? For criteria based on best professional judgement, please also provide a narrative rationale explaining why each criterion could be expected to meet the objectives for which it was specified.

7. *Public access to relevant information.* Please include all analyses from previous EISs that are incorporated by reference in this EIS on the program's "documents" page on the web or as appendices in volume 2.

Specific Comments

8. Introduction, Section 1.9.1. The language in PL 115-97 regarding surface development is: (3) SURFACE DEVELOPMENT.—In administering this section, the Secretary shall authorize up to 2,000 surface acres of Federal land on the Coastal Plain to be covered by production and support facilities (including airstrips and any area covered by gravel berms or piers for support of pipelines) *during the term of the leases* [italics added] under the oil and gas program under this section.

Section 1.9.1 of the draft EIS states:

The BLM interprets this provision of PL 115-97 as limiting to 2,000 the total number of surface acres of *all* Federal land across the Coastal Plain, regardless of whether such land is leased, which may be covered by production and support facilities *at any given time*.

Accepting the invitation in the draft EIS to comment on this interpretation, I have to ask, why does the BLM interpret "during the term of the leases" to mean "at any given time"? In my opinion, these do not mean the same thing. BLM's interpretation appears to allow more surface development than intended by Congress. Please provide and explain the BLM's rationale underlying their interpretation. Please also specify in detail the level of reclamation, including specific performance measures or metrics, especially regarding re-grading and revegetation, that the BLM will use to determine when a given acre no longer counts toward the total of 2,000 acres under development.

Also in this section, BLM excludes gravel mines from consideration as contributing to the 2,000 acre total, offering the analogy that gravel mines are like steel mills in that they simply provide raw materials. This analogy is flawed in that the gravel mines are likely to be located on the Coastal Plain, unlike steel mills. In the absence of the oil and gas development program, existing gravel mines on the coastal plain would expand at some background rate associated with ongoing activities that require gravel. Any increase in the expansion of existing gravel mines beyond this background rate that can be attributed to development of oil and gas infrastructure, and any new gravel mines that provide material for oil and gas infrastructure can and should be counted against the 2,000 acres of development associated with the oil and gas program.

9. Table 2-2, page 2-4. Alternative D includes in its objective, “impacts on hunting and recreation; and impacts on scenic and other resource values.”

Presumably this was intended to mean, *minimize* impacts on hunting and recreation; and *minimize* impacts on scenic and other resource values. Please clarify.

If in fact the objective of this alternative is to minimize impacts on these resources, increasing setbacks by the proposed amounts is unlikely to achieve this objective. On the flat terrain of the coastal plain, with low-growing vegetation, increasing setbacks by one or two miles will slightly reduce impacts to these resources, but impacts will still be considerable. The specified setbacks appear to be arbitrarily selected. What is the scientific rationale supporting the proposed setbacks? To effectively achieve an objective of minimizing impacts on hunting, recreation, and scenic resources, setbacks should be determined based on scientifically supported setback distances for these activities in similar environments.

At a minimum, setbacks based on the visual and auditory features of the proposed development in the coastal plain could be devised analytically. For example, regarding visual impacts, including artificial lighting, the geographic range associated with the expected height of oil and gas program infrastructure could be used to calculate setbacks that would shield hunters and recreationist from views of program infrastructure. Similarly, for audible disturbance, the distance at which the noises generated by oil and gas development activities attenuate to ambient levels in still, cold air could be calculated. The noises likely to have the greatest sound pressure levels could be analyzed, including blasting, seismic testing, noise generated by aircraft and watercraft, as well as motorized ground-based equipment used for all prospecting, construction, and operations and maintenance activities. Following such an analysis, setback distances could be established that would alleviate impacts from the majority of visual and auditory stimuli.

Finally, setbacks in lease stipulation 1 are defined from the active floodplain (defined as “The flat area along a water body where sediments are deposited by seasonal or annual flooding; generally demarcated by a visible high water mark. Coastal plain rivers are very dynamic through time in their floodplains. Leases may be active for relatively long periods of time (i.e., greater than 20 years). In this context, consider specifying that any setbacks from the listed floodplain rivers begin at the edge of the historic floodplain as defined by historic channel scars detected using LIDAR (light detection and ranging) or other means. The geomorphic criteria for recognizing the historic floodplain is typically the presence of terraces at the edges of the geomorphic floodplain. Consider replacing references to the “active floodplain” in Alternative D with “historic floodplain.”

10. Table 2-2, ROP 1, page 2-16. Consider revising the Requirement/Standard to read: Areas of operation would be left clean of all debris *at all times*. This change would reduce the potential for debris or trash accumulations to develop that attract wildlife and produce a negative visual impact.

11. Table 2-2, ROP 5, page 2-17. The objective of this ROP is to reduce air quality impacts. The sole requirement/standard specified is the use of ultra-low sulfur fuel in diesel powered vehicles and equipment. This appears to be an error in table formatting because air quality requirements and standards appear to be presented under ROP 6. Please revise.

12. Table 2-2, ROP 6, pages 2-17 to 2-18. The objective of this ROP includes prevention of undue or unnecessary degradation of the lands affected by oil and gas development. There appears to be an error of omission in that no applicable requirements/standards are given. The standards presented in Table 2-2 under this ROP appear to be associated with ROP 5. ROP 6 provides an opportunity to clarify and elaborate on the BLMs interpretation of the 2,000 acre cap on disturbed area specified in the Tax Act. This would be an excellent place to articulate operational expectations about types and patterns of land use under the 2,000 acre limit, as well as rehabilitation and revegetation standards that apply to disturbed areas. Many other potential standards would also be appropriate here and may have been inadvertently omitted.

13. Table 2-2, ROP 7, page 2-19. ROP 7 is about human health risks associated with contaminants in subsistence foods. The requirement/standard currently includes the following: "the BLM Authorized Officer may require changes in the operator's processes to reduce or eliminate emissions of the contaminant." Consider revising as follows; to reduce or eliminate emissions of the contaminant, *including cessation of all operations at facilities producing the contaminants in question*. After appropriate studies are completed, the remedies available to the BLM Authorized Officer to protect human health should be broad, decisive, and effective.

14. Table 2-2, ROPs 8 and 9, pages 2-19 to 2-20. ROPs 8 and 9 are about water use. Please add a requirement/standard specifying all water withdrawal methods employed on waterbodies found suitable for Wild and Scenic status according to the ANWR CCP must be conducted in ways that are consistent with Wild and Scenic status.

Please be explicit about whether areas disturbed for the purposes of water withdrawal or removal of ice aggregate are included in the 2,000 acre disturbance limit. In my opinion, these disturbances should be included.

15. Table 2-2, ROP 10, pages 2-20 to 2-21. ROP 10 is about winter overland moves and seismic work. Alternative D, item (b) under this ROP specifies that a survey of polar bear dens and seal birthing lairs should be conducted before winter overland moves and seismic work. It does not specify, however, how the results of these surveys would be used. Please include a detailed procedure that clearly indicates how specific survey results may prompt specific changes in operation, potentially including delay of the proposed activity, deferral to subsequent winter seasons, or denial or cancellation of the proposed activity.

16. Table 2-2, ROPs 16 and 17, pages 2-24 to 2-25. These ROPs deal with exploratory drilling. The only requirements/standards offered here are concerned with exploratory drilling in streams and construction of temporary roads. Please supplement these ROPs with an explicit statement that cross references all of the other ROPs which also apply to exploratory drilling activities. Please also be explicit about how acres affected by exploratory drilling will be included in the accounting toward the 2,000 acre limit on ground disturbance.

17. Table 2-2, ROPs 19 and 28. Both ROPs refer to permanent features of the oil and gas program. For example, ROP 19 refers to “*permanent* [italics added] oil and gas facilities, including roads, airstrips, and pipelines.” Does the proposed action analyzed in this draft EIS contemplate permanent infrastructure, or is all of it subject to removal at the end of the lease period, with subsequent rehabilitation of disturbed areas. Is the assumed 70-year production timeline or the 130-year timeline to abandonment in Appendix B considered “permanent.” Please clarify.

18. Table 2-2, ROP 30, pages 2-29 to 2-30. Allowing up to 100 cubic yards of material to be removed from rock outcrops with evidence of raptor nesting is not an effective way to minimize loss of nesting habitat for cliff nesting raptors (the objective of this ROP). Please revise this standard to prohibit removal of any materials from outcrops with evidence of raptor nesting.

19. Table 2-2, ROP 33, page 2-30. This ROP includes the first mention of monitoring. Please see my general comment (4) above regarding monitoring. The spatial information required in this ROP as stated represents a solid starting point. The specific role, however, of the requested information in an integrated and comprehensive monitoring program is unclear. What specific questions or performance measures will this spatial data be used to address? How will the results of monitoring be used in ongoing modification and adaptive management of the oil and gas program? As indicated in my general comment, a comprehensive monitoring and compliance plan is perhaps the most important program element that will be the subject of a subsequent planning effort. The revised draft EIS should include more details about the likely structure and content of this monitoring plan that is based on examples of effective monitoring plans that have been implemented successfully in similar contexts.

20. Table 2-2, ROP 35, page 2-32. Consider amending the requirement/standard to include gravel mines. Regardless of whether or not these features are counted toward the 2,000-acre disturbance limit, the ability of areas used as gravel mines to fulfill their previous ecological and hydrological functions could be accelerated by proper reclamation.

21. Table 2-2, ROP 35, page 2-32. The requirement/standard included for Alternative D is a sound foundation for developing the specified abandonment and reclamation plan. This plan will be another key piece in the successful implementation of the oil and gas program and will need to be carefully developed with clear objectives, timelines, performance criteria, monitoring, and remedies associated with non-attainment of standards and objectives. During development of this plan, consider engaging a scientific society with expertise in arctic ecological restoration to provide scientific input and/or peer review. Funding for full implementation of the abandonment

and reclamation program, including monitoring and reporting, should be secured from lessees before ground-disturbing activities begin.

22. Table 2-2, ROP 41, page 2-35. Regarding summer vehicle tundra access, consider including in this requirement/standard explicit cross references to other lease stipulations and ROPs that limit access. Be as explicit as possible about the limits on the discretion of the BLM Authorized Officer to grant summer vehicle tundra access (see general comment (4) above).

23. Section 2.3, page 2-39. From the perspective of offering decision makers an alternative that genuinely comports with the objectives of a least environmentally damaging practicable alternative, the BLM should develop an alternative that offers 800,000 acres for lease. In my opinion, the arguments offered in this section for why such an alternative was eliminated from further analysis appear arbitrary, particularly the contention that increasing the lease area by more than 200,000 acres, at least a 20 percent increase, is inconsequential. Not including an 800,000 acre alternative is a serious deficiency in this draft EIS (please see general comment (1) above).

24. Chapter 3; section 3.2.1, Affected Environment. This section and subsequent sections of Chapter 3 reference the Greater Mooses Tooth 2 (GMT2) Development Project Final Supplemental Environmental Impact Statement (GMT2 Final SEIS), issued in August 2018 (BLM 2018a). This important background document, however, was not provided on the documents web page established for the Coastal Plain Oil and Gas Program Draft EIS. Please make this background analysis more readily available to the public.

25. Chapter 3; section 3.2.2, page 3-13, Air Quality. The effects analysis for Alternative A, the no-action alternative, includes the statement, "Local and regional air emission sources, described above under *Affected Environment*, would continue to contribute air pollutants at levels commensurate with the increase or decrease in these emission sources over time." Does this mean that no trends in air quality are reasonably certain to occur across the time interval when leased areas on the Coastal Plain might be in some phase of the program? In order to make the effects analysis of Alternative A to be useful as a comparative baseline it needs to include meaningful analysis of environmental trends likely to impact the Coastal Plain for the term of the proposed action. If no trends in air quality can be discerned, the factors that contribute to uncertainty should be described. It is meaningless to state that air pollutants in the area may go up or down depending on whether pollutant generating activities go up or down. Please make your analysis of Alternative A as a control as meaningful as possible, for the Air Quality resource, and all other resources analyzed.

26. Chapter 3; section 3.2.2, page 3-16, Air Quality. Please consider referring to the hypothetical development scenario here and explaining in greater detail why using this scenario to analyze air quality effects does not reveal differences among the action alternatives. Because this is the first effects analysis encountered by readers of the draft EIS, we arrive here with the reasonable expectation that the hypothetical development scenario will be central to all effects analyses. Beginning with an unusual case in which the hypothetical development scenario is not informative requires explanation.

27. Chapter 3; section 3.2.2, page 3-16 to 3-17, Air Quality Cumulative Effects. This analysis is entirely inadequate. As presented, the analysis appears to refer to past EIS analyses like that for the GMT2 project as the best available baseline, and then goes on to say that no cumulative effects analysis for air quality that includes the Coastal Plain has been done, but studies are being developed. The purpose of this EIS is to present that cumulative analysis, now, using current best available information. You can't simply say, "We're working on it," and claim that as a meaningful cumulative effects analysis. Please see general comment (3) above.

28. Chapter 3; section 3.2.3, page 3-21. Acoustic Environment Effects. The analysis provided does not include any consideration of effects to the freshwater or marine acoustic environment associated with construction and operation of the seawater treatment plant and the barge landing and storage facilities, as well as boat traffic described in the hypothetical development scenario. These acoustic effects on human receivers should be included here (noting that effects to terrestrial wildlife and marine wildlife are described in subsequent sections).

29. Chapter 3; section 3.2.4, pages 3-23 to 3-27. Physiography. Clear, straightforward analysis, with clear adherence to the hypothetical development scenario. Thank you.

30. Chapter 3; section 3.2.5, page 3-34. Geology and Minerals. The analysis of direct and indirect effects of the program on this resource includes the statement, "Oil and gas exploration, development, and production could also affect the risk of several geologic hazards identified in the *Affected Environment* section, including seismicity, slope failure, subsidence, flooding, and river ice jams." The ensuing analysis identifies an ROP that would be effective at mitigating risk to crossing structures due to flooding and river ice jams, but not for other aspects of program infrastructure. The analysis does identify technologies that have been found to be effective at mitigating some of the other risks identified.

Considering the severe environmental impacts that could result from exposure of oil and gas infrastructure, especially production wells and pipelines, to seismicity, slope failure, subsidence, flooding, and river ice jams, please include additional ROPs in all action alternatives that specifically require the use of best available risk-reduction technologies such as those mentioned in this analysis.

31. Chapter 3; section 3.2.6, pages 3-38 to 3-39. The effects analysis for Petroleum Resources includes the following:

In the NPR-A the average crude oil spill rate from 1985 to 2010, for large (500 barrels or greater) spills is 0.65 spills per BBO produced, with an average spill size of 1,229 barrels. During that time the North Slope produced a total of 12.40 BBO. The historic small (less than 500 barrels) crude oil spill rate from 1989 to 2009 for the Alaska North Slope is 187 spills per billion barrels produced, with an average spill size of 2.8 barrels (117.6 gallons). During this time 9.4 BBO were produced (BLM 2012).

With an estimated 3.4 BBO of production anticipated from the Coastal Plain, and assuming the same spill rates as NPR-A, it is reasonable to anticipate a program area spill total of approximately 1,780 barrels of oil spilled in approximately 636 small spills and a total of approximately 2,716 barrels spilled in two or three large spills. In addition to damage to the environment, spills represent a loss of petroleum resources from productive use. Using a high case scenario and a USGS estimate that 9.3 BBO would be economically recoverable (Attanasi and Freeman 2009), it could be expected that there would be

approximately 1,739 small spills with a total of approximately 4,869 barrels spilled, and approximately 6 large spills with a total spill size of 7,374 barrels, if the spill rate stays consistent over time. The rate of spills may decrease over time as industry practices improve.

This analysis uses data about spills through 2010. Are no more recent data available? Given the importance of spills as a potential environmental effect of this program, the most complete time series of information about the rate and magnitude of this effect should be included here. A longer time series may also allow a comparative analysis to determine if the hypothesized decrease in the rate and size of spills over time due to improvements in technology is supported by data from the North Slope.

32. Chapter 3; section 3.2.8, pages 3-46 to 3-48. Soils. The section that introduces direct and indirect effects of the program to soils lists the construction of ice roads and pads as an impact mechanism and goes on to describe the general types of effects that emanate from development of these features. This discussion is not included in the "Effects Common to All Action Alternatives" section, suggesting there will be a differential analysis of effects from these features in the description of each alternative. In the comparative analysis of alternatives, however, no quantitative assessment of the differential extent of ice roads and pads under each alternative is offered. It seems reasonable that the extent of ice road and pad features would differ among action alternatives, and because these features are not included in the 2,000-acre disturbance cap, estimates of variation in their extent under each alternative should be used to estimate differences in effects. Please clarify and elaborate the analysis of effects associated with these features.

In general, the analyses of effects to soils for each alternative are qualitative and superficial, appearing not to use estimates and assumptions in the hypothetical development scenario to provide a more refined picture of differences in soil effects among alternatives. The analyses for each alternative also appear to include ice roads and pads in the 2,000-acre disturbance limit, which is not correct. Considering the profound and lasting effects that the program is likely to have on soils, and the fundamental influence of soils on hydrology, as well as the productivity and diversity of vegetative communities, the effects analysis of this critical resource should be thoroughly revised and elaborated to give the public and decision-makers a more complete picture of how alternatives differ. See also general comment (2) above.

33. Chapter 3; section 3.2.9, pages 3-49 to 3-50. Sand and Gravel Resources. The estimated acreage of impact here appears only to account for the pits (pg. 3-49 to 3-50), and does not include access roads and staging/stockpiling areas. Please refine this estimate to include all impacts associated with sand and gravel mining.

The large estimated spatial extent of sand and gravel pits and their lasting effects on Water Resources described in the next section suggest these pits may be among the most environmentally impactful aspects of this program. The analysis of effects presented here, including the estimates of the spatial extent of sand and gravel pits for each action alternative (all exceeding 300 acres), support the inclusion of sand and gravel pits in the 2,000 acre disturbance limit.

34. Chapter 3; section 3.2.10, page 3-61. Water Resources. After providing a good description of effects common to all action alternatives, the differential analysis for all action alternatives is completed in half a page. One key purpose of doing analyses of environmental effects under NEPA is to inform better decisions. Superficial analyses of action alternatives, such as the one provided here, do not disclose to the public and decision makers important differences that may influence their choice of a preferred alternative. Like soils, water resources are another critical component of the Coastal Plain environment that warrants more detailed analysis. Again, I recommend that details and assumptions provided in the hypothetical development scenario be used to distinguish as many differences in effects among the action alternatives as possible, especially for key resources. Please see general comment (2) above.

35. Chapter 3; section 3.3.1, pages 3-67 to 3-75. Vegetation and Wetland Resources. Thank you for a resource analysis that has a structure consistent with the hypothetical development scenario and sufficient analytical content to allow the reader to distinguish differences among the action alternatives.

The analysis for this resource, however, does not include consideration of the effects associated with the abandonment and reclamation phase of the program. Reclamation can involve use of heavy equipment, multiple re-entries to an area across an extended time line, and the scope of reclamation activities needed is likely to vary among the action alternatives. These differences should be estimated and analyzed.

Given that currently the program area is largely undisturbed, and wetland structure and function are intact, I recommend describing the degree to which reclamation can be successful at restoring wetland structure and function, and the time frames associated with restoration of function in this environment.

36. Chapter 3; section 3.3.1, pages 3-67 to 3-75. Vegetation and Wetland Resources. Has a wetland mitigation plan for the program been developed? If so, please include a cross reference to it in this section and include the plan on the documents page of the program's website.

37. Chapter 3; section 3.3.2, pages 3-75 to 3-84. Fish and Aquatic Resources. This section provides a reasonable qualitative analysis, but it does not refer to the hypothetical development scenario and thereby misses the opportunity to provide a more detailed and quantitative assessment of program effects. Again, differences in effects associated with different phases of development are presented in a way that makes them difficult to integrate. Please consider revising this analysis to include consideration of all activities, assumptions, and timelines in the hypothetical development scenario (please see general comment (2) above).

38. Chapter 3; section 3.3.2, page 3-80. Fish and Aquatic Resources. A marine barge landing or dock could remove marine habitat. Potential direct aquatic habitat loss would be adverse and long term and would occur in the fill footprint. Quite surprisingly, this is the first clear assertion of an adverse effect in the draft EIS. Thank you for the clear identification of multiple adverse effects in your analysis.

39. Chapter 3; section 3.3.3, pages 3-85 to 3-103. Birds.

Pg. 3-86. The ARCP represents a substantial portion of the Beaufort Sea coastline in Alaska. Accordingly, it also supports a large number of birds during the important nesting, rearing, and migration staging periods. For these reasons, the ARCP and adjacent marine waters are recognized as important bird areas by the American Bird Conservancy, Audubon, and Birdlife International. Because the ARCP completely encompasses it, the program area is considered part of the important bird areas. Prior studies (summarized in USFWS 2015a) have demonstrated that at least several hundred thousand breeding and nonbreeding birds use the ARCP and program area during the short arctic summer.

This is an excellent summary of the importance of the Coastal Plain for birds.

Regarding the analysis of direct and indirect effects to this important resource, please see general comment (2) above, as well as my previous specific comment (37) regarding Fish and Aquatic Resources. Please use the hypothetical development scenario to refine your analysis of differences in effects to birds among alternatives through each of the phases of program implementation.

40. Chapter 3; section 3.3.3 (Birds), page 3-93. Throughout this section would be a good place to refer to the hypothetical development scenario in Appendix B and explain how that scenario was used to analyze differences among alternatives regarding the four mechanisms of impact listed on page 3-92. The hypothetical development scenario contains many of the assumptions and quantitative estimates of the scope and pace of development that are needed to allow more quantitative estimates of potential effects and estimate differences in impacts among alternatives.

I am bewildered by the emphasis here on effects associated with pads. More extensive effects may be associated with linear features like roads and pipelines. If you intend to focus on effects associated with pads, why doesn't your analysis of indirect effects include consideration of effects associated with noise and artificial light, which will likely have a much larger zone of influence than the 328-foot extent cited for fugitive dust, gravel spray, thermokarsting, and impoundments? Please clarify the structure and logic of your analysis of program effects on birds.

41. Chapter 3; section 3.3.3 (Birds), pages 3-94 to 3-95. Habitat impacts due to sand and gravel mining are estimated here at 320 acres. This estimated acreage, however, only accounts for the pits (pg. 3-49 to 3-50), and does not include access roads and staging/stockpiling areas. Please refine this estimate to include all impacts to bird habitats associated with sand and gravel mining.

42. Chapter 3; section 3.3.3 (Birds), page 3-98. The detailed description of snow goose response to overflights is a welcome detail regarding an abundant species in the program area. Is similar information available about the response of snow geese to other aspects of the proposed action? Given the importance of the Coastal Plain to snow geese, consider elaborating on other potential program effects on this species.

In this section on Disturbance and Displacement, please include an analysis of effects associated with noise and artificial light, especially during the production phase of program implementation. Similarly, the abandonment and reclamation phase of program implementation can involve extensive use of heavy equipment and can be a prolonged and very disruptive activity.

See general comment 2 above regarding the limited attention in the draft EIS to consideration of the duration of effects. Please try to include more information, wherever possible, about the frequency and duration of program impacts to birds.

43. Chapter 3; section 3.3.3 (Birds), page 3-101. Assuming a maximum of 2,000 acres of facility footprints (excludes material sites), potential long-term loss and alteration of habitat from direct effects of gravel deposition and indirect effects of dust, thermokarsting, and impoundments under Alternative B would occur over 1 percent of the entire program area. Potential disturbance and displacement of breeding birds in tundra habitats could occur over about 2 percent of the area available for leasing. Please revise this paragraph to include consideration of the spatial area affected by all program activities, not just surface occupancy. What proportion of the program area will likely be affected if you include overflights, artificial light, noise, pipelines, ice roads, sand and gravel pits and access routes to them, seawater treatment plants, and barge infrastructure? If you made full use of estimates and assumptions in the hypothetical development scenario, a more comprehensive evaluation of effects would be possible, and this estimate could provide a more useful metric for comparing action alternatives.

44. Chapter 3; section 3.3.3 (Birds), page 3-102. Consider developing an ROP or timing limitation developed expressly for the purpose of reducing program impacts on staging snow geese. At minimum, this ROP could be incorporated into alternative D or some other appropriate least environmentally damaging practicable alternative developed in response to comments (please see general comment (1) above).

45. Chapter 3; section 3.3.3 (Birds), pages 3-102 to 3-103. Thank you for the first thoughtful cumulative effects analysis for any resource analyzed in the draft EIS.

46. Chapter 3; section 3.3.4, pages 3-103 to 3-122. Terrestrial Mammals. The Introduction to the draft EIS and Appendix B, the hypothetical development scenario, establish expectations about the likely structure and content of subsequent analyses of different environmental resources affected by the program. The analysis of effects for Terrestrial Mammals is laudable and noteworthy in that it most closely approaches fulfilling these structure and content expectations. Nonetheless, it also omits critical aspects of analysis, omissions similar to those found in most other analyses of effects to other resources (please see my general comment (2) above). In particular, potential impacts from the "abandonment and reclamation" phase of the program are not analyzed, and except for the inclusion of qualitative duration information in Table 3-19, little information is provided about temporal aspects of program effects.

The Terrestrial Mammal analysis is also noteworthy because it includes consideration of some activities such as blasting at sand and gravel pit sites and installation of power lines (pg. 3-113). If these activities are reasonably foreseeable aspects of the proposed program, they should have been described in Appendix B and analyzed in sections that dealt with other resources, for example "Birds." Please revise.

47. Chapter 3; section 3.3.4, page 3-108. Terrestrial Mammals. The description of carnivore baseline conditions on page 3-108 includes the following statement: "Increasing predator populations, with the associated higher predation rates on prey populations (especially migrant birds),

has been a perennial concern around the North Slope oilfields (Day 1998)." The subsequent analysis of program effects on mammals, however, does not include the following impact mechanism that was included in the effects analysis for birds (pg. 3-92); "attraction of predators and scavengers (including both mammals and birds) to human activity or facilities, with subsequent changes in predator abundance." Please explain why this impact mechanism was not considered relevant to the analysis of program effects on mammals.

48. Chapter 3; section 3.3.4, pages 3-113 to 3-116. Terrestrial Mammals. Thank you for the thorough analysis of the potential demographic effects of the program on caribou.

49. Chapter 3; section 3.3.4, page 3-116. Terrestrial Mammals. Most program-related aircraft operators would maintain minimum flight altitudes to reduce disturbance of wildlife and subsistence hunters. Lease Stipulation 7 and ROP 34 are a useful start, but rather than rely on voluntary compliance or an aircraft use plan to be developed subsequently, please consider elaborating ROP 34 to specify timing limitations and minimum requirements for altitudes and flightlines that would be effective at minimizing disturbance to caribou and other bird and wildlife species. Include this ROP, at minimum, in Alternative D and an appropriate least environmentally damaging practicable alternative developed in response to comments (please see general comment (1) above). Please also see general comment (4) above regarding excessive reliance on subsequent planning efforts to minimize environmental impacts.

50. Chapter 3; section 3.3.4, pages 3-117. Terrestrial Mammals. Approximately 500 line miles of seismic data are expected to be collected, with receiver lines spaced 330 to 1,320 feet apart. Please explain how this relates to the following information from Appendix B, pg. B-12: The BLM estimates that approximately 900 square miles would be surveyed by 3D seismic vehicles.

51. Chapter 3; section 3.3.4, pages 3-117. Terrestrial Mammals. Appendix B, pg. B-12 states: Seismic operations would be accompanied by ski-mounted camp buildings towed by bulldozers or other tracked vehicles. There could be two to three strings with four to eight modular buildings in each string. Camps are assumed to move weekly. Please include a preliminary analysis of the potential effects on terrestrial mammals from camp activities. I understand a separate environmental analysis of the seismic exploration program is underway. Nonetheless, the details provided in Appendix B of this draft EIS for the entire program contains sufficient information for a more comprehensive preliminary analysis here of seismic exploration effects.

52. Chapter 3; section 3.3.5, pages 3-122 to 3-149. Marine Mammals. Along with the analysis of program effects on terrestrial mammals, this analysis for marine mammals is among the most thorough in the draft EIS. Thank you for the thoughtful effort.

53. Chapter 3; section 3.3.5, page 3-129. Marine Mammals. Consider developing an ROP that requires use of best available sensing and modeling approaches to survey polar bear habitat before seismic exploration or other potentially disturbing activities. Include this ROP, at minimum, in Alternative D and an appropriate least environmentally damaging practicable alternative developed in response to comments (see general comment (1) above). Please see my general comment (4) above regarding excessive reliance on subsequent planning efforts to minimize environmental impacts.

54. Chapter 3; section 3.3.5, page 3-135. Marine Mammals. What effects would other aspects of the program described in Appendix B such as a construction and operation of a seawater treatment plant, a barge landing, and gravel staging, mining, and stockpile areas (pg. B-12) have on loss and alteration of polar bear habitat, including designated critical habitat? Please see my general comment (2) above regarding Appendix B, and expand the analysis of effects common to all action alternatives to include consideration of all the reasonably foreseeable activities described in Appendix B that have the potential to affect each marine mammal species present in the program area.

55. Chapter 3; section 3.3.5, page 3-136. Marine Mammals. Similarly, during winter 2000–2001, two females denned successfully within 1,312 feet and 2,625 feet of remediation activities being conducted on Flaxman Island (MacGillivray et al. 2003), located just northwest of the Arctic Refuge boundary.

Thank you for including at least one mention of the potential effects associated with the “abandonment and reclamation” phase of the program as described in Appendix B (pg. B-19). This phase of the program is largely ignored throughout the draft EIS, despite its potential to result in significant impacts.

56. Chapter 3; section 3.3.5, page 3-136. Marine Mammals. Pile driving is mentioned as a potential construction activity here and in Appendix F (pg. F-24), but is not described in Appendix B as a reasonably foreseeable activity. If pile driving is a reasonably foreseeable aspect of the proposed program, it should be described in Appendix B and its effects analyzed for other potentially impacted resources, for example “Fish and Aquatic Resources” and “Birds.”

57. Chapter 3; section 3.3.5, page 3-137. Marine Mammals. The potential effects of short-term behavioral disturbance are likely to be negligible on the SBS population. Please provide some supportive rationale for this conclusion and an explanation of how disturbance effects from the program can be considered short-term at the population scale.

Similarly, Behavioral disturbance on the productivity of polar bears in the program area is likely to be low. Please clarify and provide some supportive rationale for this conclusion.

58. Chapter 3; section 3.3.5, page 3-145. Marine Mammals. Thank you for Tables 3-23 and 3-24, the most thorough attempt to compare quantitatively the differential effects of action alternatives on a resource in the draft EIS.

59. Chapter 3; section 3.4.5, pages 3-193 to 3-202. Environmental Justice. Throughout the comparison of alternatives in this section, the magnitude of effects is often expressed as less than alternative B. Whenever possible, please elaborate on such relative statements by further describing the degree to which mitigation measures move the program on the overall spectrum of severity of effects; for example whether mitigation measures reduce the level of effect from adverse to negligible, or from severely adverse to less adverse. Understanding where on the spectrum of effects each alternative lays will provide useful information to decision makers and other interested parties.

60. Chapter 3; section 3.4.5, page 3-197. Environmental Justice. Overall, future development in the program area would have potential lasting adverse effects on cultural practices, values, and beliefs through its impacts on subsistence.

This is a very significant effect that will be very challenging, if not impossible, to mitigate.

61. Chapter 3; section 3.4.5, pages 3-201 to 3-202. Environmental Justice. Please see my general comment (3) above regarding cumulative effects, and my next specific comment regarding recreation. I believe your analysis of Environmental Justice impacts would benefit from consideration of a potentially large decrease in recreational visitation and associated economic activity.

62. Chapter 3; section 3.4.6, pages 3-205. Recreation.

Impacts Common to All Action Alternatives. Protective measures intended to limit ground disturbance and associated impacts on resources would *improve* [really? italics added] recreation by limiting or prohibiting surface-disturbing activities that could diminish the quality of recreation experiences, conflict with recreation opportunities, or displace visitors and subsistence users. The magnitude of potential impacts on recreation would be directly related to the type and extent of proposed lease stipulations or ROPs under each alternative. In general, maintaining or improving resource conditions increases the quality of recreation (Dorwart et al. 2009).

The program area offers recreationists primitive recreation experiences, such as expedition-length float hunts and polar bear viewing, that are unique on a global scale and that depend largely on the physical setting. Visual quality contributes to the physical setting and directly influences recreationists' satisfaction with recreation in the program area. Undisturbed landscapes contribute to higher-quality recreation opportunities. Protective measures attached to leases, such as NSOs, which prevent surface disturbance and the placement of aboveground infrastructure, would *eliminate* [really? italics added] the potential for changes to visual quality and associated physical setting. Where aboveground development is allowed, lease stipulations that minimize the visual contrast of new development, such as by requiring design elements that complement the predominant natural features of the characteristic landscape, would reduce the intensity of visual impacts and associated change to the recreation setting.

As someone who has recreated on the Coastal Plain in the program area, I find these statements to be gross misrepresentations of the potential impact of the program on recreation. In particular, one impact common to all action alternatives is likely to be a large decrease in the number of people who come to the Coastal Plain to recreate. In my opinion, the proposed program may nearly eliminate participation in most of the listed recreation activities. Estimating the magnitude of changes in recreational participation would be an important aspect of this effects analysis, especially given the amount of economic activity associated with each visitor to this remote destination. The statement on pg. 206, permanent infrastructure would displace all types of visitors year-round and over the long term, alludes to this effect, but does not attempt to estimate its magnitude. The North Slope is a difficult destination to reach, and given that difficulty, many people simply won't make the effort if their perception is that their experience will be diminished by the presence of oil and gas infrastructure. This is a major factor that needs to be incorporated throughout the recreation analysis, and should also be considered in the sections on Environmental Justice (3.4.5) and Economy (3.4.10).

63. Chapter 3; section 3.4.6, pages 3-202 to 3-209. Recreation. Along the same lines as my previous comment, the effects analysis should consider the degree to which the proposed program may shift recreational use toward the Kongakut River. How will visitor experiences on the Kongakut be affected by more concentrated use?

64. Chapter 3; section 3.4.6, page 3-205. Recreation.

Protective measures that prevent the placement of aboveground infrastructure or that specify the use of downcast lighting or other light trespass mitigation measures would minimize impacts on the quality of nighttime recreation.

I agree that such measures could be effective at reducing impacts of artificial light, but no such mitigation measures are included in the action alternatives. Consider including ROPs regarding artificial lighting that are consistent with International Dark Sky guidelines. At minimum, all program lighting should:

- Only be on when needed,
- Only light the area that needs it,
- Be no brighter than necessary,
- Minimize blue light emissions,
- Be fully shielded (pointing downward).

65. Chapter 3; section 3.4.6, page 3-207. Recreation.

Four-mile NSO setbacks from rivers, such as the Canning and Hulahula Rivers, would maintain recreation opportunities and avoid the displacement of visitors in those popular recreation corridors. The potential for user conflicts in river corridors would be the same as Alternative A. This is because the wide corridor setbacks would support visitor dispersion in the corridor without being constrained by development.

Where unobstructed by topography or vegetation, infrastructure and vehicle traffic would be visible from the rivers. This would alter the recreation setting and could contribute to diminished user experiences. Where vegetation and topography provide screening, impacts would be nearly the same as under Alternative A. The exception would be at nighttime, when artificial lighting skyward of any new facilities would be visible, which would affect recreation, as described under *Impacts Common to All Action Alternatives*, above. A narrower 1-mile setback along the Jago River would result in the same impacts as Alternative B. Outside the river corridor setbacks, the potential for displacing visitors and limiting access would be the same as Alternative B and as described under *Impacts Common to All Action Alternatives*, above.

These two paragraphs appear to be contradictory. The first paragraph seems to say Alternative C would result in no effects to recreation, with no data of meaningful narrative support for this assertion. The second paragraph provides a more reasonable description of likely impacts, in my opinion. Please reconcile these seemingly contradictory paragraphs.

66. Chapter 3; section 3.4.6, page 3-208. Recreation cumulative effects.

Under all alternatives, there would be an increased demand for recreation use in the program area. Please provide data or narrative support for this assertion.

67. Chapter 3; section 3.4.7, pages 3-209 to 3-217. Special Designations.

All four of the original objectives of the Arctic National Wildlife Refuge listed in Table 3-31 are mutually consistent, complementary, and can therefore be implemented in a way that is coherent

and successful. The oil and gas program is neither consistent nor complementary to the other objectives; it is contrary to the other objectives. The proposed leasing program fundamentally subverts all of the Refuge's other objectives and relegates them to subordinate status for the term of the leasing program, which is estimated to last up to 130 years according to the hypothetical development scenario in Appendix B.

Please consider revising the effects analysis regarding Special Designations to include more plain statements about how contrary the proposed program is to the CCP. In a pristine and sensitive environment like the Coastal Plain, we cannot pretend to have our cake and eat it, too. This program represents a choice of one use over others. We shouldn't pretend that we can design the action, mitigate its effects, or remediate its impacts in ways that are consistent with other Refuge objectives.

A parallel argument applies to all other special designations discussed in this section (Marine Protected Areas, Wild and Scenic Rivers, Wilderness Areas). Impacts associated with the proposed oil and gas program are contrary to successfully meeting the objectives of these other designations. All proposed action alternatives represent a choice to prioritize oil and gas production over the values prioritized by all other special designations.

Please see my general comment (1) above regarding a least environmentally damaging practicable alternative. I recommend development of such an alternative as the best way to reduce the dominant and over-riding effects of the oil and gas program on the objectives of other special designations. Again, I recognize this new alternative would also be inconsistent with objectives of other special designations, but it could reduce the degree to which the objectives of other special designations are subverted by implementation of the oil and gas program.

68. Chapter 3; section 3.5, pages 3-247 to 3-248. Unavoidable Adverse Effects

The list of unavoidable adverse effects provided here should either be labeled as a partial list, or the list should be expanded to represent a comprehensive summary of unavoidable adverse effects identified throughout the draft EIS, which is the approach I'd recommend as most informative to decision-makers and other interested parties.

69. Chapter 3; section 3.5, pages 3-247 to 3-248. Unavoidable Adverse Effects

The pre-disturbance bond required for the proposed program should be calculated with careful attention to the objectives of other special designations that will be subverted by implementation of the proposed oil and gas program. The bond should include funding for activities that minimize impacts throughout program implementation, as well as typical abandonment and reclamation procedures. This means the bond should be sufficient to:

- Fund a robust program of implementation and effectiveness monitoring, reporting, and ongoing adaptive management of the program to ensure that non-compliance is detected early and effective remedies are immediately implemented (see general comment (4) above). Funding needs to include salary for staff to develop and carry out the monitoring program. Funding for staff should include enforcement officers who are charged with ensuring environmental compliance with the EIS and all subsequent management, mitigation, and resource protection plans, and who are present in the field as much as

possible to maximize the opportunity to coordinate with program operations staff and the potential to detect and remedy non-compliance.

- Support fully the additional workload this program will impose on the BLM Authorized Official. This includes development, review, and ongoing refinement of all management, mitigation, and resource protection plans described in the draft EIS. This process is likely to require engaging technical support and input from external experts and scientific societies to ensure best available information and technology is incorporated in these plans. Calculation of funding for this activity should include consideration of the costs associated with tapping this external expertise.
- Support fully the additional workload this program will impose on regulatory agencies. This means providing funds for hiring regulatory liaisons dedicated to this program. These regulatory personnel should be fully engaged in the development of all management, mitigation, and resource protection plans, as well as the process of reviewing and approving these plans in their final form. Again, funding calculations should incorporate the need to engage technical support and input from external experts and scientific societies.
- Support reclamation of any sand and gravel pit sites, pit access roads, and material stockpile sites used to provide materials for program activities.

70. Table 2-2, Lease Stipulation 1. Alternative D includes in its objective; "impacts on hunting and recreation; and impacts on scenic and other resource values."

Presumably this was intended to mean, *minimize* impacts on hunting and recreation; and impacts on scenic and other resource values. Please clarify.

If in fact the objective is to minimize impacts on these resources, increasing setbacks by the proposed amounts is unlikely to achieve this objective. On the flat terrain of the coastal plain, increasing setbacks by one or two miles will slightly reduce impacts to these resources, but impacts will still be considerable. To effectively minimize impacts on the resources listed, setbacks should be determined based on whichever distance is greatest among the following potential impacts; for visual impacts, including artificial lighting, the geographic range associated with the height of oil and gas program infrastructure; for audible disturbance, the distance at which the noises generated by oil and gas development activities with the greatest sound pressure levels attenuate to ambient levels in still air, including noise generated by helicopters, fixed-wing aircraft, drones, motorized ground-based equipment, and all operations and maintenance activities.

Thank you for considering my comments on the Coastal Plain Oil and Gas Leasing Draft Environmental Impact Statement. I hope you find my comments constructive and useful in your decision-making process. I look forward to further opportunities to comment on the proposed program.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Karl Halupka', with a stylized flourish at the end.

Karl Halupka, Ph.D