CO27 – Center for Biological Diversity

BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

In the Matter of the Application of:	)	Docket No: CP17-178-000
	)	FERC/EIS-0296D
Alaska Gasline	)	
Development Corporation	)	

Comments on the Draft Environmental Impact Statement on the Alaska LNG Project

The Center for Biological Diversity (the "Center") submits the following comments to the Federal Energy Regulatory Commission ("FERC") on the draft environmental impact statement ("Draft EIS") for the Alaska LNG project, 84 Fed. Reg. 32,451 (July 8, 2019). The Alaska LNG project is a massive fossil fuel infrastructure project that involves drilling and fracking for gas in the Arctic; the construction and operation of new gas processing facilities; the construction and operation of an 807-mile pipeline and associated compressor stations; the construction and operation of an LNG facility in Cook Inlet; and the shipping of LNG abroad. The Alaska LNG project would have an annual average inlet design capacity of up to 3.7 billion standard cubic feet per day and a 3.9 billion standard cubic feet per day peak capacity. CO27-1

The project would exacerbate the climate crisis; cause significant, irreversible environmental damage; harm threatened and endangered species already struggling to survive; negatively impact subsistence practices; and threaten public health. Indeed, FERC itself admits that the project will cause numerous significant, permanent environmental impacts to sensitive permafrost, forests, and thousands of acres of wetlands; cause significant impacts to the Central Arctic caribou herds; likely adversely affect six threatened or endangered species, including polar bears and Cook Inlet beluga whales; and result in harmful air quality impacts. Approval of the project would therefore be inconsistent with FERC's statutory mandates under the Natural

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CO27-1 Comment noted. Also, see the response to comment CO26-2 and the responses to the specific comments below.

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Gas Act to ensure projects are in the public interest. The Center urges FERC to adopt the no action alternative and reject this dirty, dangerous project. CO27-1

At the very least, FERC must substantially revise its Alaska LNG Project Draft Environmental Impact Statement FERC/EIS-0296D ("Draft EIS") and reissue the document for public notice and comment. The Draft EIS suffers from several fatal flaws that fail to meet the strict standards of NEPA. In particular, the Draft EIS is missing a slew of important information; has an inadequate purpose and need; and fails to adequately examine the numerous direct, indirect, and cumulative impacts of the project, including impacts related to climate change, impacts on threatened and endangered species, and the risk of a spill or other accident, among others. FERC's Draft EIS also fails to examine a reasonable range of alternatives and fails to properly examine the impacts on environmental justice communities. Allowing the applicant to submit crucial information only weeks and days before the comment period is due, without extending that period to allow the public an opportunity to review and respond to that information, also fundamentally undermines the NEPA process. Accordingly, FERC will be in flat violation of the National Environmental Policy Act ("NEPA"), 42 U.S.C. § 4321, *et seq.,* if it moves forward with the project but fails to substantially revise and recirculate a Draft EIS for public notice and comment—including both (a) addressing the issues raised here and in other comments, as well as (b) incorporating all relevant additional information from the applicant— CO27-2 CO27-3

I. The Draft EIS fails to properly examine whether the project is in the public interest.

FERC's Draft EIS fails to properly consider whether the Alaska LNG project is in the public interest. The Natural Gas Act vests FERC with authority over the siting, construction, and operation of onshore LNG terminals. 15 U.S.C. § 717b(a). Under the Natural Gas Act, "an LNG proposal 'shall' be authorized unless the proposal 'will not be consistent with the public CO27-4

CO27-2 See the response to comment CM6-4.

CO27-3 See the responses to comments CM3-1, CM3-7, and CM6-4.

CO27-4 See the response to comment CO26-2.

interest…'" *Id.* As such, before approving a project, FERC must determine whether the project is in the public interest. CO27-4

In evaluating whether a project is in the public interest, FERC should "consider conservation, environmental, and antitrust questions." *Nat'l Ass'n for the Advancement of Colored People v. Fed. Power Comm'n*, 425 U.S. 662, 670 n.4 (1976). Courts have explained that the public interest determination "can be made only after an exploration of all issues relevant to the 'public interest,' including future power demand and supply, alternate sources of power, the public interest in preserving reaches of wild rivers and wilderness areas, the preservation of anadromous fish for commercial and recreational purposes, and the protection of wildlife." *Udall v. Fed. Power Comm'n*, 387 U.S. 428, 450 (1967) (interpreting a public interest provision applicable to the approval of hydroelectric power project). Similarly, "economic, social and political factors" are also "encompassed within the 'public interest' concept." *N. Nat. Gas Co. v. Fed. Power Comm'n*, 399 F.2d 953, 977 (D.C. Cir. 1968).

Just as FERC can use information gained through the NEPA process to "deny a pipeline certificate [under section 7 of the Natural Gas Act] on the ground that the pipeline would be too harmful for the environment," *Sierra Club v. FERC*, 867 F.3d 1357, 1372 (D.C. Cir. 2017), FERC can also use such information to deny an LNG project as inconsistent with the public interest. *See* Jordan Cove Energy Project, L.P., 154 FERC ¶ 61,190, at ¶ 44 (Mar. 11, 2016) (finding that "[w]hile the Certificate Policy Statement [under section 7] does not specifically apply to facilities authorized under NGA section 3, the Commission is still required to conclude that authorization of such facilities will not be inconsistent with the public interest" and that "without a pipeline connecting it to a source of gas to be liquefied and exported, the proposed

Jordan Cove LNG Terminal can provide no benefit to the public to counterbalance any of the impacts which would be associated with its construction.").

Here, as described below, the project will have numerous environmental impacts, including exacerbating the effects of the climate crisis and harming threatened and endangered species already struggling to survive. Yet FERC's Draft EIS does not sufficiently examine these impacts. CO27-5

Moreover, FERC's Draft EIS fails to properly examine numerous other factors relevant to the public interest determination. According to the applicant, the Alaska LNG project "would be the largest LNG project constructed in the United States and has an estimated cost of $40 to $45 billion."[1] The applicant—the Alaska Gasline Development Corporation ("AGDC")—is an independent, public corporation of the State of Alaska structured within the Department of Commerce, Community, and Economic Development.[2] CO27-6

As Alaska's State Senate President recently stated, "for a state government to fund the whole thing is just not logical."[3] Three of the project's former partners—BP, ConocoPhilips, and ExxonMobil—pulled out of the project after a report from Wood MacKenzie commissioned by the oil companies found the Alaska LNG project "one of the least competitive" LNG projects in the world.[4] According to the former head of the federal office for Alaska North Slope natural gas pipeline projects, other LNG projects, such as the Shell-lead LNG Canada venture and projects

[1] Application at 2.
[2] *Id.*
[3] Isaac Stone Simonellimar, The LNG Saga, Alaska Business Magazine, Mar. 16, 2019, https://www.akbizmag.com/industry/oil-gas/the-lng-saga/.
[4] *Id.*; *see also* Wood Mackenzie, Alaska LNG Competitiveness Study, Aug. 2016, https://www.alaskapublic.org/wp-content/uploads/2016/08/160824-Wood-Mackenzie-AKLNG-competitiveness-study.pdf. BP has since pulled out of Alaska and sold its assets to Hilcorp. E.g., SABRINA SHANKMAN, BP's Selling Off Its Alaska Oil Assets. The Buyer Has a History of Safety Violations, Inside Climate News, Aug. 28, 2019, https://insideclimatenews.org/news/28082019/bp-hilcorp-sale-alaska-oil-gas-pipeline-prudhoe-bay-safety-concerns

CO27-5 Comment noted. See the responses to the specific comments below.

CO27-6 See the responses to comments CO1-1 and CO26-2.

in the Gulf of Mexico, Mozambique, and Russian Arctic, "are more economical or viable and more ready than [the Alaska LNG project]."[5] Thus, AGDC is currently the only project proponent. CO27-6

In response to the Center's request to intervene in this proceeding, AGDC claimed that the project is *ipso facto* in the public interest precisely because it is being proposed by an arm of state government.[6] This defies all logic, since FERC must take a much broader view of the public interest than only considering the parochial economic interest of the applicant, regardless of whether that applicant is a private company or a government entity. Moreover, while the Draft EIS discusses the purported economic benefits of the Alaska LNG project, it fails to address the potential downsides to taxpayers in Alaska from the project being fully or partially funded by a state entity.

The Draft EIS also fails to properly evaluate whether the project is in the public interest in light of the current LNG market, and whether there is a sufficient demand for the gas. Indeed, officials involved with the Alaska LNG project have admitted that "there is no shortage of natural gas in the world,"[7] and the applicant has not demonstrated a need for this particular project. Moreover, studies have demonstrated that the growing use of clean energy could erode gas-fired plant revenue within 10 years and the current "rush to gas" will burden both ratepayers and shareholders with billions of dollars in stranded gas assets.[8] The Draft EIS fails to consider or analyze these realities.

[5] Simonellimar, The LNG Saga.
[6] *See* AGDC Answer To Protests at 3-4 (June 6, 2017).
[7] *Id*.
[8] Mark Dyson, Alexander Engel, & Jamil Farbes, The Economics of Clean Energy Portfolios: How Renewable and Distributed Energy Resources are Outcompeting and Can Strand Investment in Natural Gas-Fired Generation at 5, RMI (May 2018), https://rmi.org/insight/the-economics-of-clean-energy-portfolios/; *see also* Jeff McMahon, The 'Rush to Gas' Will Strand Billions As Renewables Get Cheaper, Study Says, FORBES (May 21, 2018), https://www.forbes.com/sites/jeffmcmahon/2018/05/21/the-rush-

Finally, as explained further below, the Draft EIS fails to consider the public interest in reducing greenhouse gas emissions and FERC's role in facilitating, or undermining, that interest. For example, as explained by the Energy Information Administration, the United States began rapidly increasing exports of gas in 2014, and FERC has facilitated by this expansion by approving various LNG exports.[9] The amount of U.S. LNG exported quadrupled from 2016 to 2017, with FERC authorizing the export of 1.94 billion cubic feet per day.[10] The United States became a net exporter of natural gas in 2017 and is expected to become the world's largest exporter of natural gas by 2022.[11] Building new fossil fuel infrastructure to facilitate LNG exports is inconsistent with the need to move away from natural gas drilling and toward a renewable energy future. Moreover, methane—the primary component of gas—is a far more potent greenhouse gas than carbon dioxide and can make the use of gas as harmful to the climate as coal.[12] Indeed, recent studies have determined that current rates of methane leakage during CO27-7

to-gas-will-cost-billions-in-stranded-assets-as-renewables-get-cheaper-institute-says/#4b8230e23a0d; see also Robert McCullough, et al., The Questionable Economics of Jordan Cove LNG Terminal 1, MCCULLOUGH RESEARCH, June 5, 2019, available at http://www.mresearch.com/wp-content/uploads/20190605-Jordan-Cove.pdf ("As nuclear plants begin to come back online in Japan, and the global LNG supply has expanded, the premium prices at JKM have begun to fall back in line with other natural gas markets around the world." JMK refers to the "Platts JKM (Japan/Korea Marker) price index.").

[9] Energy Information Administration, U.S. Natural Gas Exports and Re-Exports by Point of Exit, released Aug. 30, 2019, https://www.eia.gov/dnav/ng/NG_MOVE_POE2_A_EPG0_ENG_MMCF_A.htm.

[10] Energy Information Administration, U.S. liquefied natural gas exports quadrupled in 2017, Mar. 27, 2018, https://www.eia.gov/todayinenergy/detail.php?id=35512.

[11] Energy Information Administration, Annual Energy Outlook 2019 with projections to 2050, Jan. 24, 2019, https://www.eia.gov/outlooks/aeo/pdf/aeo2019.pdf; David Reid, US on course to become world's largest exporter of natural gas: IEA, CNBC, July 13, 2017, https://www.cnbc.com/2017/07/13/us-become-worlds-largest-natural-gas-exporter.html.

[12] Ramon A. Alvarez, et al., Assessment of methane emissions from the U.S. oil and gas supply chain, SCIENCE, Vol. 361, at 186–88 (July 2018); *see also* Steven Muffson, Methane leaks offset much of the climate change benefits of natural gas, study says, Washington Post, June 24, 2018 ("The U.S. oil and gas industry emits 13 million metric tons of methane from its operations each year — nearly 60 percent more than current estimates and enough to offset much of the climate benefits of burning natural gas instead of coal, according to a study published Thursday in the journal Science.").

CO27-7 GHG emissions associated with operation of the Project are quantified in section 4.15.5 of the final EIS.

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production, liquification, and transportation make the production and export of LNG as harmful as the use of coal.[13] CO27-7

II. FERC cannot properly evaluate the environmental impacts of the Alaska LNG Project in light of missing information.

FERC's Draft EIS is missing substantial and key pieces of information. Over and over again, the Draft EIS simply states that the applicant should submit missing information "[p]rior to the end of the draft EIS comment period" or "prior to construction of final design,"[14] without any suggestion that information submitted near the end of the comment period will result in a comment period extension, or how even later-submitted information will be treated under NEPA. AGDC submitted more information as recently as just a few weeks ago.[15] And while several parties have on that basis requested a comment period extension, none have been granted. CO27-8

However, without a meaningful opportunity to review both late-submitted information and crucial information that remains missing, FERC cannot evaluate how the Alaska LNG project will affect the environment or how its impacts will be mitigated, and it has not provided for meaningful public comment as NEPA requires. FERC must therefore prepare a revised draft EIS and release it for public comment. 40 C.F.R. § 1502.9(a).

As the Supreme Court has recognized, NEPA serves two primary functions. First, it "ensures that … [an] agency, in reaching its decision, will have available, and will carefully consider, detailed information concerning significant environmental impacts." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989). Second, it "guarantees that the

[13] *Id.*; *see also* R. A. Alvarez, et al., Greater focus needed on methane leakage from natural gas infrastructure. Proc. Natl. Acad. Sci. U.S.A.109, 6435–6440 (2012).
[14] *E.g.*, DEIS at 5-50 to 5-63 (identifying more than *twenty-five* (25) categories of additional information the applicant was allowed to submit any time before the end of the comment period, and other information that can be submitted even later).
[15] *See, e.g.,* Sept. 25, 2019 submission of air quality and other data.

CO27-8 See the responses to comments CM3-1, CM3-7, CM6-4, and CO22-38.

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relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process and the implementation of that decision." *Id.* In other words, the "[p]ublication of an EIS, both in draft and final form, also serves a larger informational role. It gives the public the assurance that the agency 'has indeed considered environmental concerns in its decisionmaking process,'. . . and, perhaps more significantly, provides a springboard for public comment." *Id.* (citations omitted). Accordingly, "[w]hen relevant information 'is not available during the [EIS] process and is not available to the public for comment . . . the [EIS] process cannot serve its larger informational role, and the public is deprived of [its] opportunity to play a role in the decision-making process." *N.C. Wildlife Fed'n v. N.C. DOT*, 677 F.3d 596, 604-05 (4th Cir. 2012) (quoting *N. Plains Res. Council v. Surface Transp. Bd.*, 668 F.3d 1067, 1085 (9th Cir. 2011)). CO27-8

In spite of these requirements, FERC's Draft EIS is missing a substantial amount of information. Indeed, FERC's Draft EIS often reads like a request for information from AGDC rather than the in-depth, comprehensive environmental analysis required by law. For example, the Draft EIS requests that AGDC provide, among other information: CO27-9

- an updated gravel sourcing plan that "identifies the material volumes to be acquired from each material site," including "measures for testing material sites for potential acid rock drainage and presence of contaminants . . . that may not be suitable fill material for construction of granular fill pads and access roads;"[16]
- a modified pipeline operation and maintenance plan that specifies the locations of the facilities and equipment and monitoring procedures;[17]
- an analysis of potential hydrologic hazards at certain locations and how the main pipeline will be engineered and constructed to avoid impacts to the pipeline;[18]
- installation design and drilling plans for DMT crossings outlining bedrock and permafrost characterization with proposed mitigation measures;[19]

[16] DEIS at 4-20.
[17] DEIS at 4-43.
[18] DEIS at 4-46.
[19] DEIS at 4-50.

CO27-9 See the response to comment CM6-4.

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- a revised DMT plan detailing the revised trenchless method, feasibility crossing studies, and potential impacts and mitigation specific to the selected crossing method for each trenchless crossing;[20] CO27-9
- revised studies that provide site-specific information for various river crossings;[21]
- a revised construction schedule to reduce the time between pre-clearing and active construction schedule, or explanation why the current proposed schedule is the only practicable schedule;[22]
- a revegetation and invasives plan for the main pipeline and associated facilities, and other project facilities;[23]
- an updated blasting plan, including an updated list of minimum filing requirements for site-specific blasting plans and details on ice content and permafrost distribution needed to properly design each blast in permafrost;[24]
- a comprehensive table of waterbodies to be crossed or affected by various aspects of the project[25] and a final water use plan, including final water volumes, source and discharge locations, and proposed treatments;[26]
- information regarding whether AGDC will conduct maintenance mowing or clearing during the migratory bird nesting season;[27]
- additional fish surveys because AGDC did not conduct any for 51 percent of the waterbodies that would be crossed by the Mainline Pipeline and 69 percent of the waterbodies that would be crossed by the PTTL;[28]
- a fisheries conservation plan;[29]
- information regarding the amount of acreage of designated polar bear critical habitat to be impacted by the project;[30]
- updated construction emission calculations, including for criteria pollutants, HAPs, and GHG emissions for all proposed Project facilities;[31] and
- final design for the pipeline at the LNG facility.[32]

[20] DEIS at 4-51.
[21] DEIS at 4-52, 4-54.
[22] DEIS at 4-94.
[23] DEIS at 4-95, 4-272.
[24] DEIS at 4-111.
[25] DEIS at 4-147.
[26] DEIS at 4-210.
[27] DEIS at 4-326.
[28] DEIS at 4-389.
[29] DEIS at 4-407.
[30] DEIS at 4-473.
[31] DEIS at 4-898.
[32] DEIS at 4-1068.

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In short, FERC's authorization for AGDC to submit this and other information "prior to the end of the draft EIS comment period" or prior to starting construction does not allow for meaningful consideration by FERC itself or a meaningful public comment opportunity, in clear violation of NEPA. CO27-10

III. FERC's Draft EIS contains an unlawful purpose and need.

FERC's stated purpose and need fails to comply with NEPA. NEPA's implementing regulations provide that an environmental document must "specify the underlying purpose and need to which the agency is responding in proposing the alternative including the proposed action." 40 C.F.R. § 1502.13. This purpose and need inquiry is crucial for a sufficient environmental analysis because "[t]he stated goal of a project necessarily dictates the range of 'reasonable' alternatives." *Carmel-by-the-Sea v. U.S. Dep't of Transp.,* 123 F.3d 1142, 1155 (9th Cir. 1997). As courts have explained, "[a]n agency may not define the objectives of its action in terms so unreasonably narrow that only one alternative from among the environmentally benign ones in the agency's power would accomplish the goals of the agency's action, and the EIS would become a foreordained formality." *Friends of Se's Future v. Morrison*, 153 F.3d 1059, 1066 (9th Cir. 1998). In other words, "an agency cannot define its objectives in unreasonably narrow terms" without violating NEPA. *Carmel-by-the-Sea*, 123 F.3d at 1155; *see also Colo. Envtl. Coal. v. Dombeck*, 185 F.3d 1162, 1175 (10th Cir. 1999) ("the statements of purpose and need drafted to guide the environmental review process" may not be "unreasonably narrow"). CO27-11

Yet that is just what FERC has done here. FERC's stated purpose and need is "to commercialize the natural gas resources of Alaska's North Slope (North Slope), by converting the existing natural gas supply to liquefied natural gas (LNG) for export and providing gas for

CO27-10 See the response to comment CM6-4.

CO27-11 As indicated in section 1.1 of the final EIS, FERC does not plan, design, build, or operate natural gas infrastructure. As an independent regulatory commission, FERC reviews proposals developed by other entities. Accordingly, the Project proponent is the source for identifying the purpose for developing and constructing the Project. AGDC's purpose and objectives in proposing the Project were defined in its application to FERC.

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users within the State of Alaska."[33] This purpose and need is inadequate because FERC necessarily considered an unreasonably narrow range of reasonable alternatives. The Natural Gas Act charges FERC with ensuring that the Alaska LNG project is "consistent with the public interest." 15 U.S.C. § 717b(a). Accordingly, FERC should have focused its purpose and need inquiry on objectives that comport with these statutory duties, rather than solely on the desire of the applicant. *See Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 196 (D.C. Cir. 1991) ("agencies must look hard at the factors relevant to the definition of purpose," including the views of Congress in authorizing the agency to act, and define goals accordingly"); *League of Wilderness Defs. v. U.S. Forest Serv.*, 689 F.3d 1060, 1070 (9th Cir. 2012) (similar). CO27-11

Moreover, NEPA evaluation must take place "*before* decisions are made and *before* actions are taken." 40 C.F.R. § 1500.1(a) (emphasis added). Such an approach ensures that agencies will take the requisite "hard look" at environmental consequences *before* approving any major federal action. *Kleppe v. Sierra Club,* 427 U.S. 390, 410, n. 21 (1976); *see also* 40 C.F.R. § 1502.5 (analysis must "not be used to rationalize or justify decisions already made"). But FERC's purpose and need statement indicates that it did just the opposite. The purpose and need statement demonstrates FERC has already made the decision to allow the Alaska LNG project and that its entire analysis was framed in a way to support that pre-determined outcome. FERC's backward approach reflects a fundamental misunderstanding of its legal obligations at the expense of our environment and climate.

IV. The Draft EIS fails to consider the Projects' reasonably foreseeable greenhouse gas emissions, and consequent effects on climate change, in the manner required by NEPA.

NEPA mandates that FERC address the reasonably foreseeable direct and indirect CO27-12

[33] Draft EIS at ES-1.

CO27-12 See the response to comment CO24-2.

environmental impacts of the project, and that FERC address these issues "in proportion to their significance." 40 C.F.R. § 1502.2(b). "Indirect effects" include effects that "are caused by the action and are later in time or farther removed in distance," which includes "growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems." *Id.* § 1508(b). The U.S. EPA has determined that greenhouse gases are an "air pollutant" that endanger public health and welfare, particularly in light of their contribution to climate change.[34] CO27-12

As discussed below, climate change is the most significant issue of our time, and as a result, one of the most significant issues the EIS must address is the effects of this project on greenhouse gas emissions and climate change. That will require a much more robust analysis than FERC has undertaken thus far.

A. The Draft EIS fails to meaningfully address the role of this project in fueling the climate crisis.

An overwhelming body of scientific work demonstrates that anthropogenic climate change is causing immediate, devastating impacts to communities across the country, and that these harms will worsen as greenhouse gas pollution continues to rise. Scientific research has established that greenhouse gas emissions are making the earth's climate hotter and more extreme; climate change and ocean acidification are harming biodiversity, ecosystems services, CO27-13

[34] *See* U.S. EPA [U.S. Environmental Protection Agency], Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act; Final Rule, 74 Fed. Reg. 66,496 (2009) (codified at 40 C.F.R.R. ch. 1). The EPA made the endangerment finding for "the mix of six long-lived and directly-emitted greenhouse gases: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6)." Id.; see also Duffy, Philip B. et al., Strengthened Scientific Support for the Endangerment Finding for Atmospheric Greenhouse Gases, Science doi: 10.1126/science.aat5982 (2018) at 1.

CO27-13 Comment noted.

and public lands; and climate change is now affecting human health and morbidity, the U.S. economy, and national security. CO27-13

In October 2018, the Intergovernmental Panel on Climate Change ("IPCC") issued a Special Report ("Report") on the state of the crisis.[35] Key findings of the Report include:

- *First*, "human-induced warming reached approximately 1°C (±0.2°C likely range) above pre-industrial levels in 2017, increasing at 0.2°C (±0.1°C) per decade."[36]
- *Second*, "[m]ean sea level is increasing . . . with substantial impacts already being felt by coastal ecosystems and communities . . . These changes are interacting with other factors such as strengthening storms, which together are driving greater storm surge, infrastructure damage, erosion and habitat loss."[37]
- *Third*, "[t]he ocean has absorbed about 30% of the anthropogenic carbon dioxide, resulting in ocean acidification and changes to carbonate chemistry that are unprecedented in 65 million years at least."[38]
- *Fourth*, greenhouse gas emissions are principally responsible for global warming and climate change.[39]
- And *finally*, "[t]he rise in global CO_2 concentration since 2000 is about 20 ppm/decade, which is up to 10 times faster than any sustained rise in CO_2 during the past 800,000 years."[40]

Similarly, in late 2017, U.S. government scientists issued Volume I of the Fourth National Climate Assessment, the *Climate Science Special Report* (hereinafter "Fourth NCA"), a scientific synthesis prepared by hundreds of U.S. scientific experts and reviewed by the National Academy of Sciences, NOAA, NASA and many other federal agencies. The Fourth NCA concludes that the earth "is now the warmest in the history of modern civilization" and that "the

[35] *See* IPCC, "Global Warming of 1.5°C, an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty" (Oct. 6, 2018) ("IPCC 2018"), http://www.ipcc.ch/report/sr15/.
[36] *Id*. at Chapter 1: Framing and Context.
[37] *Id*. at Chapter 3: Impacts of 1.5ºC global warming on natural and human systems, at 3-82.
[38] *Id*.
[39] *Id*. Chapter 1, at 1-15 – 1-16.
[40] *Id*. at 1-8.

last three years have been the warmest years on record for the globe."[41] It also reiterates that "[t]housands of studies conducted by researchers around the world have documented changes in surface, atmospheric, and oceanic temperatures; melting glaciers; diminishing snow cover; shrinking sea ice; rising sea levels; ocean acidification; and increasing atmospheric water vapor." The Fourth NCA finds that global atmospheric CO_2 concentrations have "now passed 400 parts per million ("ppm"), a level that last occurred about 3 million years ago, when both global average temperature and sea level were significantly higher than today."[42] CO27-13

Critically, in the Fourth NCA, the U.S. government decisively recognizes the dominant role of fossil fuels in driving climate change. In particular, the NCA finds that "fossil fuel combustion accounts for approximately 85% of total U.S. greenhouse gas emissions,"[43] which is "driving an increase in global surface temperatures and other widespread changes in Earth's climate that are unprecedented in the history of modern civilization."[44]

Volume II of the Fourth NCA also emphasizes that climate change is already leading to substantial economic losses in the U.S. and that these losses will be much more severe under higher emissions scenarios, impeding economic growth. In particular, Volume II explains that (1) "[w]ithout substantial and sustained global mitigation and regional adaptation efforts, climate change is expected to cause growing losses to American infrastructure and property and impede the rate of economic growth over this century;"[45] (2) "[u]nder scenarios with high emissions and CO27-14

[41] USGCRP [U.S. Global Change Research Program], Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J. et al. (eds.)], U.S. Global Change Research Program, Washington, D.C. (2017), https://science2017.globalchange.gov/ ("4th NCA, Vol. I").
[42] *Id.*; *see also* NRC [National Research Council], Climate Stabilization Targets: Emissions, Concentrations, and Impacts over Decades to Millennia, Washington, DC: National Academies Press (2011), http://www.nap.edu/catalog/12877.html.
[43] U.S. Global Climate Change Research Program, at 60.
[44] *Id.* at 39.
[45] USGCRP [U.S. Global Change Research Program], Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II (Reidmiller, D.R. et al. eds.), U.S. Global Change

CO27-14 Comment noted.

limited or no adaptation, annual losses in some sectors are estimated to grow to hundreds of billions of dollars by the end of the century;" and (3) "some physical and ecological impacts will be irreversible for thousands of years, while others will be permanent."[46] CO27-14

The Fourth Assessment also makes clear that the harms of climate change are long-lived, and the choices we make in the next few years to reduce GHG pollution will affect the severity of climate change damages in the coming decades and centuries. Specifically, the NCA explains that while "[t]he impacts of global climate change are already being felt in the United States and are projected to intensify in the future," "the severity of future impacts will depend largely on actions taken to reduce greenhouse gas emissions and to adapt to the changes that will occur."[47] In particular, "[m]any climate change impacts and associated economic damages in the United States can be substantially reduced over the course of the 21st century through global-scale reductions in greenhouse gas emissions, though the magnitude and timing of avoided risks vary by sector and region."[48] CO27-15

Similarly, in addition to detailing the causes and scope of the climate crisis, recent scientific reports also make it absolutely clear that GHG emissions must be drastically reduced in the next several decades to avoid the worst impacts of climate change.[49] For example, the IPCC

Research Program, Washington, DC, USA (2018), https://nca2018.globalchange.gov/, at Summary Findings, p. 25.
[46] *Id*. at 1347.
[47] *Id*. at 34.
[48] Martinich, J., B.J. DeAngelo, D. Diaz, B. Ekwurzel, G. Franco, C. Frisch, J. McFarland, and B. O'Neill, 2018: Reducing Risks Through Emissions Mitigation. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 1346–1386. doi: 10.7930/NCA4.2018.CH29 at 1347; *see also* IPCC, 2019: Summary for Policymakers. In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [H.- O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, M. Nicolai, A. Okem, J. Petzold, B. Rama, N. Weyer (eds.)].
[49] *See, e.g.*, IPCC Special Report, "Headline Statements from the Summary for Policymaker," at 2, available at https://www.ipcc.ch/site/assets/uploads/sites/2/2018/07/sr15_headline_statements.pdf.

CO27-15 Comment noted.

CO27 – Center for Biological Diversity (cont'd)

Special Report provides overwhelming and compelling evidence that climate hazards are more urgent and more severe than previously thought and shows precisely why aggressive reductions in emissions are critical within the coming few decades. CO27-15

To be more specific, the IPCC Report concludes that pathways to limit warming to 1.5°C with little or no overshoot require "a rapid phase out of CO_2 emissions and deep emissions reductions in other GHGs and climate forcers."[50] In pathways consistent with a 1.5°C temperature increase, global net anthropogenic CO_2 emissions must be reduced by nearly half by 2030 and reach net zero by around 2050.[51] Moreover, to meet the 1.5°C target, the remaining budget for U.S. emissions has been estimated at 25 $GtCO_2eq$ to 57 $GtCO_2eq$ on average.[52] In 2018 U.S. fossil fuel CO_2 emissions increased by 2.5 percent, reaching 5.4 $GtCO_2$,[53]—meaning the remaining U.S. carbon budget for limiting warming to 1.5°C is rapidly being consumed due to U.S. failure to reduce its fossil fuel production and use.

In the face of this overwhelming scientific record, the Draft EIS's three page treatment of climate change fundamentally fails to comply with NEPA.[54] Rather, while that section briefly summarizes some climate science and briefly touches on some of the anticipated impacts of CO27-16

[50] IPCC 2018 at Chapter 2, 2-28.
[51] IPCC Special Report at Summary for Policymakers, at 12 and Chapter 2 at 95.
[52] *See, e.g.,* Robiou du Pont et al., Equitable mitigation to achieve the Paris Agreement goals, 7 Nature Climate Change 38 (2017), at Supplemental Table 1. Robiou du Pont et al. (2017) averaged across IPCC sharing principles to estimate the U.S. carbon budget from 2010 to 2100 for a 50 percent chance of returning global average temperature rise to 1.5°C by 2100, based on a cost-optimal model. The study estimated the U.S. carbon budget consistent with a 1.5°C target at 25 $GtCO_2eq$ by averaging across four equity principles: capability, equal per capita, greenhouse development rights, and equal cumulative per capita. The study estimated the U.S. budget at 57 $GtCO_2eq$ when averaging across five sharing principles, adding the constant emissions ratio to the four above-mentioned principles. However, the constant emissions ratio, which maintains current emissions ratios, is not considered to be an equitable sharing principle because it is a grandfathering approach that privileges today's high-emitting countries when allocating future emission entitlements. Quantities measured in $GtCO_2eq$ include the mass emissions from carbon dioxide ("CO_2") as well as the other well-mixed greenhouse gases (CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and SF6) converted into CO_2-equivalent values.
[53] LeQuéré, Corinne et al., Global carbon budget 2018, 10 Earth Syst. Sci. Data 2141 (2018).
[54] DEIS at 4-1160 – 1162.

CO27-16 See the response to comment CO24-2.

climate change in the project area, FERC claims it is "not able to assess potential GHG-related impacts attributable to this Project."[55] CO27-16

To the contrary, FERC must confront the total greenhouse emissions associated with the project, as discussed below, and then consider and disclose how those emissions—when considered alongside reasonably anticipated emissions from other projects—will inevitably contribute to consuming the remaining carbon budget for the U.S. to keep the planet from the worst impacts of climate change. Indeed, in his recent article, Commissioner Glickman himself explained FERC's obligations in this regard.[56] If the Final EIS does not analyze this critical issue, it will violate NEPA. *See, e.g., Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1200 (9th Cir. 2008) (rejecting agency's failure to address greenhouse gas emissions associated with action at issue).

B. The Draft EIS fails to adequately consider greenhouse gas emissions.

In addition to failing to confront the reasonably anticipated effects of the project on climate change, the Draft EIS also fundamentally fails to meaningfully confront the scope of the greenhouse gas emissions that will result from this massive project.

1. *The Draft EIS fails to properly consider the impacts of induced gas production.* CO27-17

FERC's Draft EIS fails to analyze the indirect impacts of induced gas production, including the added risks of hydraulic fracking, or "fracking." Indirect effects are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable." 40 C.F.R. § 1508.8(b). "Indirect effects are defined broadly, to 'include growth inducing effects

[55] DEIS at 4-1162.
[56] *See* Rich Glick and Matthew Christiansen, "FERC and Climate Change," Energy Law Journal, Vol. 40, at 39-45 (2019).

CO27-17 See the response to comment CO26-47.

and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.'" *Nat. Res. Def. Council v. U.S. Army Corps of Eng'rs*, 339 F. Supp. 2d 386, 404 (S.D.N.Y. 2005) (quoting 40 C.F.R. § 1508.8(b)). CO27-17

Induced production is precisely the type of indirect NEPA requires FERC to consider in its analysis of the environmental impacts of the Alaska LNG project. Indeed, the Interstate Natural Gas Association of America has stated that "[s]ufficient infrastructure goes hand in hand with well-functioning markets. Insufficient infrastructure can constrain market growth and strand supplies . . . and that the cost of pipeline transport is a relatively small cost compared with the revenues lost as a result of price reductions or well shut-ins that occur when transport from producing areas to liquid pricing points is constrained."[57] Reports from the Energy Information Administration ("EIA") also demonstrate that infrastructure projects can facilitate an increase in gas production. For example, in a recent report, EIA stated that "[e]thane production is increasing as midstream infrastructure projects become operational and ethane recovery and transport capacities grow."[58] Moreover, AGDC itself has stated that "the Project may, and in fact is intended to, spur additional development and drilling on the North Slope in the future."[59]

Nevertheless, FERC fails to analyze the impacts of gas production. FERC claims that the Alaska LNG project will not induce production in the initial years of its operation because gas is already produced by existing operations on the North Slope and reinjected, and the Alaska LNG project would be a means of getting this already-produced gas to market.[60] However, the existing

[57] INGAA, North American Midstream Infrastructure through 2035: Capitalizing on Our Energy Abundance, Executive Summary, Mar. 18, 2014, http://www.ingaa.org/file.aspx?id=21498.
[58] EIA, Hydrocarbon Gas Liquids (HGL): Recent Market Trends and Issues, Nov. 2014, http://www.eia.gov/analysis/hgl/pdf/hgl.pdf.
[59] *See* AGDC Answer To Protests at 6 (June 6, 2017).
[60] DEIS at 4-1108.

CO27 – Center for Biological Diversity (cont'd)

operations on the North Slope reinject the gas to bolster reservoir pressure and enhance oil recovery.[61] FERC's assumption that the Alaska LNG project will not induce any gas production because it is already being produced is unsupported, as the existence of the project provides incentive to produce more gas. Moreover, it is inconsistent with the analysis and assumptions of other federal agencies that oil companies will continue to inject gas into reservoirs to enhance oil recovery.[62] CO27-17

As for induced production after the initial years of operation of the project, FERC claims the need and timing of such impacts are too uncertain and therefore not reasonably foreseeable.[63] This is improper. "[W]hen the *nature* of the effect is reasonably foreseeable but its *extent* is not, [an] agency may not simply ignore the effect." *Mid States Coal. for Progress v. Surface Transp. Bd.*, 345 F.3d 520, 549 (8th Cir. 2003). Accordingly, courts have often found these indirect effects must be meaningfully analyzed. *See, e.g., WildEarth Guardians v. Zinke*, 368 F. Supp. 3d 41, 73 (D.D.C. 2019); *San Juan Citizens All. v. United States Bureau of Land Mgmt.*, 326 F. Supp. 3d 1227, 1244 (D.N.M. 2018); *Wilderness Workshop v. U.S. Bureau of Land Mgmt.*, 342 F. Supp. 3d 1145, 1155 (D. Colo. 2018). CO27-18

Contrary to FERC's assertion, it is not necessary to know all the precise details of induced gas production to analyze the potential impacts. FERC provides the total capacity of the pipeline in the Draft EIS. The region from which gas will be supplied is generally known given the location of the pipeline. Average production rates and production methods from wells in the North Slope can be obtained from state and federal databases, which could then be used to CO27-19

[61] *Id.*; Bureau of Land Management, Willow Master Development Plan, Environmental Impact Statement: Draft, Aug. 2019, at 2-8, available at https://eplanning.blm.gov/epl-front-office/projects/nepa/109410/20002247/250002672/Willow_MDP_DEIS_Vol_1_508-2019-08-23.pdf
[62] Bureau of Land Management, Willow Master Development Plan, at 2-8.
[63] DEIS at 4-1108.

CO27-18 See the response to comment CO26-47.

CO27-19 See the response to comment CO26-47.

CO27 – Center for Biological Diversity (cont'd)

estimate the number of wells and the type of equipment and production methods necessary to supply the full pipeline capacity. CO27-19

As the D.C. Circuit has explained, "[r]easonable forecasting and speculation is … implicit in NEPA, and we must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as 'crystal ball inquiry.'" *Del. Riverkeeper Network v. FERC*, 753 F.3d 1304, 1310 (D.C. Cir. 2014) (citations omitted). Yet that is just what FERC has done here, despite abundant available information regarding the impacts of the gas drilling that would be facilitated by construction of the Alaska LNG project.

2. The Draft EIS also fails to reasonably disclose the emissions that will result from the project itself

As the Draft EIS recognizes, the massive project itself will also release massive quantities of greenhouse gases, both as a result of the gas generated and from the inevitable fugitive emissions that will occur.[64] However, as discussed below, the Draft EIS enormously underestimates the scope of these emissions, both from the gas to be produced from the project as well as from fugitive emissions. FERC must address these emissions in its EIS to comply with NEPA. CO27-20

a. The Draft EIS Woefully Underestimates Emissions From The Natural Gas The Project Will Put Into Production

According to the Draft EIS, once the project is operating it is likely to generate something on the order of 6 million tons of CO_2 annually.[65] But of course, this only looks narrowly at the emissions coming from the operations itself and entirely ignores the massive emissions that will

[64] DEIS at 4-895 – 912.
[65] DEIS at 4-912.

CO27-20 See the response to comment CO24-2.

CO27 – Center for Biological Diversity (cont'd)

result from burning 3.9 billion cubic feet of natural gas the project is expected to produce each day. CO27-20

Indeed, the greenhouse gas emissions that will result from project exceed 90 million tons per year, which means that, over a decade, it will release *900 million tons of greenhouse gases into the environment*—more than hundreds of coal-fired power plants.[66] Again, given the U.S. carbon budget necessary to protect from the worst impacts of climate change, the Draft EIS must fully disclose these emissions and their contribution to climate change. Such disclosure is particularly important considering that the Alaska LNG project could release of nearly one billion tons of greenhouse gas emissions—a significant portion of the remaining U.S. carbon budget—over the exact time period (the next decade) during which the U.S. must cut its GHG gas emissions by half or more to meet the 1.5C target.[67]

Moreover, as we discuss elsewhere in these comments, FERC cannot ignore these critical impacts on the grounds that the applicant—or someone else—will extract and burn the fuel in some other way if FERC does not approve this project. Indeed, there would be no purpose to considering NEPA alternatives if an agency could simply ignore impacts on the grounds that they will occur with or without the project. Rather, to comply with its fundamental NEPA obligations, FERC must confront, analyze, and disclose the greenhouse gases released because of the the Alaska LNG project over the entire life of the project. CO27-21

[66] *See* EPA's Carbon Equivalencies Calculator, available at https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator. And with the project anticipated to last for 30 years, Draft EIS at 1-36, FERC must address the fact that, as planned, the project will emit 3 times even that massive amount.

[67] Indeed, one study found that "all Arctic resources should be classified as unburnable," because "development of [oil and gas] resources in the Arctic . . . [is] incommensurate with efforts to limit average global warming to 2 degrees C." McGlade, Christophe and Paul Ekins, The geographical distribution of fossil fuels unused when limiting global warming to 2°C, 517 Nature 187 (2015).

CO27-21 See the responses to comments CO24-2 and CO27-12.

CO27 – Center for Biological Diversity (cont'd)

b. The Draft EIS estimates regarding fugitive emissions are both far too low, and internally contradictory.

Aside from the greenhouse gas emissions that the project's gas production would cause, there would be enormous fugitive emissions of natural gas. The Draft EIS also fails to meaningfully address this vital issue. CO27-22

As a threshold matter, the applicant provided additional information about anticipated greenhouse gas emissions in submissions filed as recently as September 25, 2019.[68] The public has had no meaningful time to analyze that data and provide comment. This follows the pattern discussed earlier of FERC allowing the applicant to disclose important information during the comment period without a corresponding extension of time for the public to respond, but this is especially egregious given how close to the end of the period the material was submitted. Accordingly, and again, FERC must extend the comment period 60 days, as multiple parties formally requested, or FERC will be in flat violation of NEPA. CO27-23

In any event, the information about fugitive emissions in particular provided in the Draft EIS is woefully insufficient, for multiple reasons. First, the data source for the estimated fugitive emissions from the more than 860 miles of pipeline associated with the project is 2005 data from the Interstate National Gas Association of America database. [69] CO27-24

In the 15 years since this report, however, the best available science shows that the industry has seriously underestimated the quantity of fugitive emissions that occur. Indeed, a much more recent study indicates the industry has been underestimating the scope of fugitive emissions by as much as 60%.[70] Another recent report further demonstrates that leaks are much

[68] *See* Multiple Sept. 25, 2019 AGDC Filings.
[69] DEIS at 4-912 – 915 (citing "Interstate Natural Gas Association of America. 2005. Interstate National Gas Association of America database. Available online at https://www.ingaa.org/").
[70] Alvarez, et al., Assessment of methane emissions from the U.S. oil and gas supply chain.

CO27-22 Fugitive GHG emissions associated with operation of the Project are quantified in section 4.15.5 of the final EIS.

CO27-23 See the responses to comments CM3-1, CM3-7, and CM6-4.

CO27-24 Comment noted.

CO27 – Center for Biological Diversity (cont'd)

more widespread than previously assumed.[71] Accordingly, FERC must re-evaluate the fugitive emission estimates for the project based on up-to-date and accurate scientific information and modeling, and re-disclose them with an opportunity for the public to comment. CO27-24

Second, even the information disclosed in the Draft FEIS does not withstand scrutiny on its own terms. According to the Draft EIS, the one-mile Prudhoe Bay pipeline is anticipated to experience 29 tons per year (tpy) of fugitive CO2e emissions, but the exponentially larger 806-mile Mainline Pipeline will only have 272 tpy of these emissions.[72] The Draft EIS does not even begin to explain why there is not some correlation between the pipeline length and anticipated fugitive emissions. Indeed, given the correlation between pipeline length and fugitive emissions, if one mile of pipeline will lead to 29 tpy of fugitive emissions, over 800 miles would result in more like over 20,000 tpy of emissions—not less than 300 tpy.[73] Thus, FERC (and the applicant) must fundamentally reassess its estimates of anticipated fugitive emissions to comply with NEPA. CO27-25

Third, although the Draft EIS acknowledges that the project will be subject to EPA's oil and gas fugitive emissions performance standards,[74] FERC must also take into account all relevant developments related to the Trump Administration's efforts to roll-back the existing regulations aimed at successfully detecting fugitive methane emissions from the oil and gas CO27-26

[71] "Leaks Threaten Safety – And Success – Of American's Top Natural Gas Exporter" (Inst. For Public Integrity 2017), available at https://publicintegrity.org/environment/leaks-threaten-safety-and-success-of-americas-top-natural-gas-exporter/.
[72] Compare DEIS at 4-912 with DEIS at 4-915.
[73] *See* Boothroyd, et al., "Assessing fugitive emissions of CH4 from high-pressure gas pipelines in the UK," Science of the Total Environment 1638, 1646-47 (2018) (discussing reported pipeline leak densities in the United States), available at https://www.sciencedirect.com/science/article/pii/S0048969718306399. While the pipeline diameters differ, see DEIS at 1-1, that difference also cannot explain this marked discrepancy, and if there is some other basis for it, it must be disclosed to the public with a further opportunity to comment.
[74] DEIS at 4-891.

CO27-25 The potential for pipeline fugitive emissions is based on a variety of factors, including the number of valves and other components with leak potential. Additional fugitive emissions associated with the operation of the Mainline Pipeline are included in the emission inventories for the compressor stations and heater station in section 4.15.5 of the final EIS.

CO27-26 We are not able to speculate on the potential impacts of future performance standards on Project emissions. As noted by the commenter, the fugitive emission estimates provided by AGDC used data developed in 2005 prior to the implementation of the NSPS Subpart OOOOa. Therefore, we believe that the current estimates and summary of regulatory requirements associated with fugitive methane emissions adequately reflect Project operations.

sector, which are all summarized in EPA's latest proposal to weaken these standards. *See* 84 Fed. Reg. 50,244 (Sept. 24, 2019). CO27-26

Finally, the Draft EIS entirely fails to explain how limiting vegetative removal to once per year could be sufficient to ensure that there is successful monitoring for fugitive emissions.[75] Rather, it is self-evident that this protocol will prove entirely inadequate—particularly given that the Draft EIS cites absolutely no reference for this protocol and the abundance of plant life in the North Slope[76]—and if FERC decides to propose something more stringent, it must do so with an opportunity for public comment. CO27-27

V. The Draft EIS fails to take a hard look at the risks and impacts of spills and other accidents.

FERC's Draft EIS fails to properly analyze the risk and impacts of a spill or other accident from the main pipeline, LNG facility, and other project components. While the Draft EIS acknowledges that a spill of hazardous materials could occur, it dismisses it as unlikely because the facilities would be designed and operated in compliance with state and federal regulations.[77] CO27-28

The Draft EIS fails to properly analyze the increased risk of spills or other accidents in the face of climate change. Alaskan shorelines are eroding at an accelerating rate due to the combined effects of sea-ice loss, increasing sea surface temperatures, increasing terrestrial permafrost degradation, rising sea levels, and increases in storm power and corresponding wave

[75] DEIS at 2-85 ("To facilitate periodic corrosion and leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline would be maintained annually in an herbaceous state").
[76] *See*, *e.g.*, Alaska Dep't of Wildlife Mgmt, "Common Plants of the North Slope," available at http://www.northslope.org/assets/images/uploads/Common_Plants_North_Slope_webpages_Draft_1_reduced_size.pdf.
[77] *E.g.*, DEIS at 2-87, 4-184, 4-186 to 4-187.

CO27-27 Annual maintenance of a 10-foot-wide herbaceous corridor centered on the pipeline would ensure the corridor is accessible from the ground and visible from the air for regular surveys during Project operation. This requirement is included in the Project Procedures, which is based on the FERC Procedures. Instructions for accessing both the Project Procedures and FERC Procedures were provided in section 2.2 of the draft EIS and likewise are provided in section 2.2 of the final EIS.

CO27-28 As stated in section 4.18.6.2 of the final EIS, we identified and assessed risks posed by the sources listed in the comment. As examples, we discussed potential impacts posed by coastal erosion (thermal and mechanical), ice, flooding associated with rising sea level, permafrost degradation, and meteorological natural hazards (hurricanes, tornados, etc.). Though we did not ascribe an origin to these risks, we acknowledged and analyzed them with a probabilistic safety and reliability paradigm.

CO27 – Center for Biological Diversity (cont'd)

action.[78] Indeed, coastal erosion rates have doubled in the past 50 years along the Beaufort Sea shoreline.[79] Yet the Draft EIS fails to adequately discuss or analyze the risks of the project in light of increased sea level rise, permafrost melt, sea-ice melt, coastal erosion, and increasing storms and wave action. Instead, while the Draft EIS acknowledges these impacts are occurring, it states that climate change impacts on the project operation, such as melting permafrost, will be similar to those that have occurred on TAPS—an oil pipeline constructed *in 1975*.[80] But historical data does not account for future changes in the face of climate change. FERC's EIS must analyze the risks from the project in light of future projections on sea-level rise, erosion, permafrost melt, and increased storm and wave severity in Alaska. CO27-28

FERC's Draft EIS underestimates the extent to which spills occur in oil and gas operations in Alaska. For example, a report completed in November 2010 reviewed over 6,000 North Slope spills from 1995–2009.[81] The report showed that there were 44 loss-of-integrity spills each year, with 4.8 of those each year greater than 1,000 gallons. This means that a spill of CO27-29

[78] Jones, B. M., C. D. Arp, M. T. Jorgensen, K. M. Hinkel, J. A. Schmutz, and P. L. Flint. 2009. Increase in the rate and uniformity of coastline erosion in Arctic Alaska. Geophysical Research Letters 36, L03503, doi:10.1029/2008GL036205; Charles D. Kovena et al. 2011. Permafrost carbon-climate feedbacks accelerate global warming. PNAS 108, no. 36, pp. 14769-14774; Neal J. Pastick, et al., Distribution of near-surface permafrost in Alaska: Estimates of present and future conditions, Remote Sensing of Environment 168 (2015) 301–315, http://dx.doi.org/10.1016/j.rse.2015.07.019; K. R. Barnhart et al. 2014. The effect of changing sea ice on the physical vulnerability of Arctic coasts. The Cryosphere, 8, 1777–1799, 2014; Barnhart, K. R., R. S. Anderson, I. Overeem, C. Wobus, G. D. Clow, and F. E. Urban (2014), Modeling erosion of ice-rich permafrost bluffs along the Alaskan Beaufort Sea coast, J. Geophys. Res. Earth Surf., 119, 1155–1179, doi:10.1002/2013JF002845.

[79] Lantuit, H., and W. H. Pollard. 2008. Fifty years of coastal erosion and regrossive thaw slump activity on Herschel Island, southern Beaufort Sea, Yukon Territory, Canada. Geomorphology 95:84-102; Mars, J. C., and D. W. Houseknecht. 2007. Quantitative remote sensing study indicates a doubling of coastal erosion rate in past 50 yr along a segment of the Arctic coast in Alaska. Geology 35:583-586; Jones et al. 2009.

[80] *E.g.*, Draft EIS at 4-104.

[81] Nuka Research & Planning Group, LLC, North Slope Spills Analysis: Final Report on North Slope Spills Analysis and Expert Panel Recommendations on Mitigation Measures, for the Alaska Department of Environmental Conservation, Nov. 2010, available at dec.alaska.gov/media/7570/nssa-final-report.pdf.

CO27-29 The report referenced by the commenter (Nuka Research & Planning Group, LLC, 2010) is regarding crude oil spills from pipelines. The Alaska LNG Project involves a natural gas pipeline, which presents a lower risk to the environment. The risk of a release of natural gas or other hazardous materials and the resulting impacts are addressed in section 4.18.10.5 of the final EIS. We conducted an assessment of the risks, potential impacts, and mitigation of a release of hazardous substances in multiple sections, including, but not limited to, sections 2.5, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, and 4.18 of the final EIS.

CO27 – Center for Biological Diversity (cont'd)

1,000 gallons or more occurs nearly every two months.[82] There have also been several recent incidents that demonstrate FERC's arbitrary dismissal of the risk of spills and other accidents. For example, "in February 2015, Hilcorp spilled nearly 10,000 gallons of crude oil and produced water onto 40,000 square feet of arctic tundra and gravel pad. The spill resulted from a leak in the bottom of a pipeline from Hilcorp's Milne Point Tract 14 production line." [83] Additionally, "in April 2014, BP spilled approximately 700 gallons of natural gas, crude oil, and produced water onto 33 acres of arctic tundra and gravel pad. The spill was caused by a freezing rupture in the dead leg section of BP's H Pad Well 8 three-phase flowline."[84] And in 2016, despite being subject to U.S. and Alaska contingency planning requirements, a tug hauling an empty fuel barge from Ketchikan, Alaska, back to British Columbia was grounded and spilled 26,000 gallons of diesel fuel and other fluids, contaminating subsistence clam beds and preventing them from being harvested.[85] CO27-29

FERC's Draft EIS also improperly assumes that impacts from a spill will be minimal because any spill would likely be cleaned up.[86] Cleaning up fuel oil and other spills in the Arctic is near impossible. According to the Canadian National Energy Board, in the Arctic, cleanup would be impossible on average three to five days of each week.[87] Ice coverage significantly CO27-30

[82] *Id.* at 21, 23.
[83] EPA, News Release, BP Exploration Alaska and Hilcorp Alaska Settle with EPA and State of Alaska for North Slope Oil Spills (July 14, 2016), https://19january2017snapshot.epa.gov/newsreleases/bp-exploration-alaska-and-hilcorp-alaska-settle-epa-and-state-alaska-north-slope-oil_.html.
[84] *Id.*
[85] *See* Alaska Public Media, B.C. tribe sues U.S. barge company over 2016 spill, Oct. 11, 2018, https://www.alaskapublic.org/2018/10/11/b-c-tribe-sues-u-s-barge-company-over-2016-spill. The spill could have been far worse if the attached fuel barge had still been carrying its 10,000-ton (approx. 3 million-gallon) fuel cargo. See Hakai Magazine, The Lingering Legacy of the Nathan E. Stewart, April 10, 2017, https://www.hakaimagazine.com/news/lingering-legacy-nathan-e-stewart.
[86] *E.g.*, Draft EIS at 4-186 to 4-187.
[87] *See* J. George, Most Arctic Oil Spills Impossible to Clean Up: WWF, NUNATSIAQ NEWS (Sept. 8, 2011); see also S. L. Ross Environmental Research Ltd., Spill Response Gap Study for the Canadian Beaufort Sea and the Canadian Davis Strait at 28 (July 12, 2011) (noting that, from July through October,

CO27-30 See the response to comment CO27-29.

increases mechanical containment and hinders recovery strategies. According to one report, in broken ice conditions, oil spill recovery rates drop dramatically to between 1% to 20% depending on the extent of ice coverage if responding during ice freeze-up or break-up.[88] Following offshore spill exercises in the Beaufort Sea in 2000,[89] the Nuka Research and Planning Group explained, "the limit to mechanical recovery with containment booms and skimmers in ice-infested waters is generally considered to be 20-30% ice coverage . . . However, the 2000 offshore response exercises in the Alaska Beaufort Sea demonstrated that the actual operating limits were closer to 10%."[90] A 2014 review by the National Research Council confirms these findings, stating, for example, "Conventional booms and skimmers become increasingly ineffective as ice concentrations increase. . . The presence of ice interferes with boom operation and reduces flow to the skimmer head, greatly reducing overall effectiveness."[91]

CO27-30

Cleaning up spills, including gas leaks, in Cook Inlet is also extremely difficult, as a recent gas leak in Cook Inlet demonstrates. On February 7, 2017, Hilcorp reported a natural gas leak in Cook Inlet.[92] The source of the leak, which was 98.67% methane, was later identified as an 8-inch transmission pipeline, and a flow analysis conducted after Hilcorp discovered the leak revealed that the pipeline began leaking in late December 2016.[93] Hilcorp was unable to investigate or repair the leak *for nearly four months* due to broken ice, tidal flows, and limited

conditions in the nearshore Beaufort Sea would be favorable for cleanup only 32 to 77 percent of the time; at other times of year, "active response would be deferred until the following melt season").
[88] Minerals Management Service, Arctic Oil Spill Response Research and Development Program, A Decade of Achievement at 14 (2009) ("5 to 30% for open ocean response without broken ice").
[89] *See* T. L. Robertson & E. DeCola, Joint Agency Evaluation of the Spring and Fall 2000 North Slope Broken Ice Exercises (Dec. 18, 2000).
[90] Nuka Research & Planning Group, LLC, Oil Spill Response Mechanical Response Recovery Systems for Ice-Infested Waters: Examinations of Technologies for the Alaskan Beaufort Sea at 58 (June 2007).
[91] National Research Council, Committee on Responding to Oil Spills in the U.S. Arctic Marine Environment, Responding to Oil Spills in the U.S. Arctic Marine Environment at 92 (2014).
[92] PHMSA, In the Matter of Hilcorp Alaska, LLC, CPF No. 5-2017-0004S, Notice of Proposed Safety Order (Mar. 3, 2017).
[93] *Id*. at 2-4.

daylight.[94] It is estimated that the pipeline leaked 193,000 (at its lowest leakage rate) to 325,000 (at its highest leakage rate) cubic feet of natural gas every day until the leak was finally reported repaired on April 14, 2017.[95] CO27-30

A gas leak would have significant impacts on a variety of wildlife. High concentrations of methane and other components of natural gas create dead zones in water by promoting localized hypoxia (low oxygen) around release sites, affecting the survival of marine species.[96] Similarly, natural gas concentrations can create hypoxic conditions above the bubbling site.[97] High concentrations of methane can trigger the growth of microbes (metanothophs) that break up methane molecules and also consume large amount of oxygen.[98] In cold waters, methane may react with water molecules to form hydrates.[99] Methane hydrates can be trapped and accumulate CO27-31

[94] *Id*. at 7.
[95] S. Shankman, Natural Gas Leak in Cook Inlet Stopped, Effects on Marine Life Not Yet Known, Inside Climate News (Apr. 15, 2017), https://insideclimatenews.org/news/14042017/hilcorp-alaska-cook-inlet-temporary-fix-made-pipeline; Alaska Department of Environmental Conservation, Hilcorp Natural Gas Leak from 8-inch Pipeline, Situation Report #1 (Feb. 15, 2017); Alaska Department of Environmental Conservation, Hilcorp Natural Gas Leak from 8-inch Pipeline, Situation Report #3 (Mar. 1, 2017); Alaska Department of Environmental Conservation, Hilcorp Natural Gas Leak from 8-inch Pipeline, Situation Report #6 (Mar. 14, 2017); Hilcorp Alaska, LLC, Middle Ground Shoal Gas Leak Sampling and Monitoring Plan, Mar. 2017.
[96] Goldenberg, S., Inside Climate News, Methane Dead Zones in Gulf Waters Confirmed, Gas Levels 100,000 Times Normal, July 1, 2010, https://insideclimatenews.org/news/20100701/methane-dead-zones-gulf-waters-confirmed-gas-levels-100000-times-normall; Joye, S. B., I. R. MacDonald, I. Leifer, and V. Asper. 2011. Magnitude and oxidation potential of hydrocarbon gases released from the BP oil well blowout. Nature Geoscience 4:160–164.
[97] Yvon-Lewis, S. A., L. Hu, and J. Kessler. 2011. Methane flux to the atmosphere from the Deepwater Horizon oil disaster. Geophysical Research Letters 38; Duncan, I. J. 2015. Does methane pose significant health and public safety hazards?—A review. Environmental Geosciences 22:85–96.
[98] Kessler, J. D., D. L. Valentine, M. C. Redmond, M. Du, E. W. Chan, S. D. Mendes, E. W. Quiroz, C. J. Villanueva, S. S. Shusta, L. M. Werra, S. A. Yvon-Lewis, and T. C. Weber. 2011. A Persistent Oxygen Anomaly Reveals the Fate of Spilled Methane in the Deep Gulf of Mexico. Science 331:312–315; Redmond, M. C., and D. L. Valentine. 2012. Natural gas and temperature structured a microbial community response to the Deepwater Horizon oil spill. Proceedings of the National Academy of Sciences 109:20292–20297.
[99] Law, C. S., S. D. Nodder, J. J. Mountjoy, A. Marriner, A. Orpin, C. A. Pilditch, P. Franz, and K. Thompson. 2010. Geological, hydrodynamic and biogeochemical variability of a New Zealand deep-water methane cold seep during an integrated three-year time-series study. Marine Geology 272:189–208; Yang, M., Z. Fu, L. Jiang, and Y. Song. 2017. Gas recovery from depressurized methane hydrate deposits with different water saturations. Applied Energy 187:180–188.

CO27-31 Comment noted.

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under the ice in winter and convert to methane gas as water temperatures rise in spring. Additionally, if natural gas contains sulfides, it is much more highly toxic to marine life.[100] CO27-31

Methane molecules can rapidly penetrate the bodies of fish, causing direct damage to gills, skin, and eyes, and filling up the gas bladder, which compromise the capacity of fishes to control buoyancy, impacting fitness and survival.[101] With 15 to 20 minutes of exposure to 1 mg/l, fish show signs of acute poisoning followed by death within one to two days of exposure.[102] Impacts to fish from gas leaks would have ripple effects up the food chain, including on critically endangered Cook Inlet beluga whales that depend on the availability of healthy fish prey for their survival.[103] CO27-32

A fuel oil spill could also have significant impacts on a wide variety of wildlife. For example, seabirds and shorebirds suffer high mortality rates and a host of long-term negative impacts.[104] Seabirds' foraging habits, resting requirements, and preening behavior lead to frequent contact with surface oil and opportunities for internal oil exposure.[105] As summarized by Haney, Geiger, and Short: CO27-33

> 'Typically, surface slicks are assumed to be lethal to wildlife (mammals, seabirds).' Even a thin sheen compromises plumage integrity and hence chances for survival. Self-cleaning prospects for birds contaminated with small specks of oil (<10% of plumage) are considered 'rarely successful' or even 'impossible,' with long-term survival prospects scored as 'bleak' or 'none.' Consequently, any contact with macroscopically evident oil by seabirds is typically assumed to lead to mortality.[106]

[100] Wang, R. 2012. Physiological implications of hydrogen sulfide: a whiff exploration that blossomed. Physiological reviews 92:791–896.
[101] Patin, Stansilav. 1999. Environmental impact of the offshore oil and gas industry. Chapter 5:Biogeochemical and Ecotoxicological Characteristics of Natural Gas in the Marine Environment.
[102] *Id.*
[103] 76 Fed. Reg. 20180 (April 11, 2011); NMFS, Recovery Plan for the Cook Inlet Beluga Whale, Dec. 2016.
[104] Haney, J. Christopher, Harold J. Geiger & Jeffrey W. Short. 2014a. Bird mortality from the Deepwater Horizon oil spill. I. Exposure probability in the offshore Gulf of Mexico. Marine Ecology Progress Series 513:225-237.
[105] *Id.*
[106] *Id.*

CO27-32 Impacts on fish from potential spills are discussed in section 4.7.1.6 of the final EIS. Impacts on Cook Inlet beluga prey are discussed in section 7.4.2.4 of the Biological Assessment, which is provided as appendix O of the final EIS.

CO27-33 Impacts from a fuel oil spill on wildlife and aquatic species are discussed in sections 4.6, 4.7, and 4.8 of the final EIS.

Additionally, inhalation of volatile hydrocarbons can result in neurological damage, pneumonia, and absorption of cancer-causing chemicals.[107] Other oil-induced diseases include hemolytic anemia, cachexia, and aspergillosis.[108] CO27-33

In addition to the immediate effects from oiling, birds experience many delayed and/or chronic effects from oil spills, including those related to PAH toxicity. PAHs are believed to underlie the problems associated with "internal oiling" of seabirds following oil spills when birds ingest oil from preening and feeding.[109] Effects of internal oiling "include pathological changes in the intestinal tract, lungs, liver, kidneys and salt gland leading to dysfunction, reproductive toxicity, haemolytic anemia, immunotoxicity and endocrine disruption."[110] Chronic PAH toxicity and lack of weight gain (due in part to PAH impacts on thyroid function) appear to be the primary cause of mortality in oiled birds.[111] Likewise, exposure to contaminants can have myriad negative impacts to marine mammals, including critically endangered Cook Inlet beluga whales. Indeed, the species recovery plan lists exposure to contaminants such as PAHs as a significant threat to beluga whales' survival and recovery.[112] But FERC arbitrarily dismisses the possibility of a spill and thus the significance of these impacts.

[107] University of California, Davis. Veterinary Medicine: Oiled Wildlife Care Network, https://owcn.sf.ucdavis.edu/effects-oil-wildlife (last visited Sept. 20, 2019).
[108] Haney, J. Christopher, Harold J. Geiger & Jeffrey W. Short. 2014b. Bird mortality from the *Deepwater Horizon* oil spill. II. Carcass sampling and exposure probability in the coastal Gulf of Mexico. Marine Ecology Progress Series 513:239-252.
[109] Troisi, G., S. Barton & S. Bexton. 2016. Impacts of oil spills on seabirds: unsustainable impacts of non-renewable energy. 41 International Journal of Hydrogen Energy 16,549.
[110] *Id.*
[111] *Id.*
[112] National Marine Fisheries Service, Recovery Plan for the Cook Inlet Beluga Whale, Dec. 2016 at III-22

VI. The Draft EIS fails to properly consider the impacts of the project on wildlife, including imperiled species.

The Alaska LNG project will adversely affect a wide array of species, including species listed under the ESA. While FERC's Draft EIS discusses some of these impacts, it fails to take the hard look NEPA mandates. FERC's analysis of the project's impacts on polar bears, Cook Inlet beluga whales, North Pacific right whales, and salmon is particularly lacking.

A. FERC's Draft EIS does not take a hard look at the impacts of the project on polar bears.

While FERC's Draft EIS acknowledges that the Alaska LNG project could adversely affect polar bears,[113] never does it take a hard look at these impacts. Specifically, the Draft EIS fails to adequately consider the effects of increasing energetic costs, nutritional stress, vulnerability to conflicts with humans, and long-distance swimming in the face of climate change. FERC also fails to properly consider that, absent significant reductions in GHG pollution, the Southern Beaufort Sea (SBS) polar bear population faces a high probability of extirpation within this century. Nor does the Draft EIS analyze how the GHG pollution from the Alaska LNG project and other oil and gas development projects in the Arctic will frustrate recovery efforts.

Polar bears are dependent upon Arctic sea ice for survival.[114] Polar bears need sea ice as a platform from which to hunt, to make seasonal migrations between the sea ice where they feed and their terrestrial denning areas, and to find mates.[115] Additionally, female polar bears give birth in snow dens excavated either on land or in the snow on top of the drifting sea ice.[116]

CO27-34

[113] *E.g.*, DEIS at ES-7.
[114] 73 Fed. Reg. 28,212 (May 15, 2008).
[115] *Id.* at 28,214.
[116] *Id.* at 28,215.

CO27-34 Impacts from increased human presence on polar bears are discussed in section 6.7.2.2 of the Biological Assessment, which is provided as appendix O of the final EIS. As discussed in section 6.7.1 of the Biological Assessment, we acknowledge that reductions in sea ice from climate change are a threat to the polar bear, but we are unable to calculate the Project's contributions to loss of sea ice due to climate change and the subsequent risks to survival and recovery of the polar bear.

Because of their specialized habitats and life history, polar bears are particularly vulnerable to sea ice loss. Research by the USGS concluded that reduced sea ice would result in the loss of approximately two-thirds of the world's polar bears within 50 years, and Alaska's polar bears will likely be extirpated if business as usual emission scenarios occur.[117] These studies, and others, led the U.S. Fish and Wildlife Service to list polar bears as threatened under the Endangered Species Act in 2008.[118] But these impacts are not just predictions or future threats; they are already occurring and documented. In fact, the SBS population has suffered from dramatic sea ice losses and is in decline.[119] The most recent population estimate for the SBS population was 900 bears in 2010, representing a roughly 40 percent decline since the 1980s.[120] Yet FERC's Draft EIS fails to adequately consider the perilous state of polar bears generally or the SBS population in particular, or how the direct, indirect, and cumulative impacts of the Alaska LNG project will exacerbate these threats.

CO27-34

1. *The DEIS fails to take a hard look at the impacts of the Project on polar bears in light of Increasing energetic costs and nutritional stress.*

The Draft EIS fails to adequately consider the impacts of the Alaska LNG project on polar bears in light of increasing energetic costs and nutritional stress in the face of climate change. For example, a recent study found that radio-tracked adult female polar bears in the SBS population increased their activity time and/or their travel speed to compensate for rapid westward ice drift in recent years, as ice drift rates increased due to reduced ice thickness and

[117] S.C. Amstrup, et al., Forecasting the Range-wide Status of Polar Bears at Selected Times in the 21st Century, U.S. Geological Survey Administrative Report (2007).
[118] 73 Fed. Reg. at 28,212.
[119] USGS, Southern Beaufort Sea Polar Bear Population Declined in the 2000s, Nov. 17, 2014.
[120] J.F. Bromaghin et al., Polar bear population dynamics in the southern Beaufort Sea during a period of sea ice decline, 25 Ecological Applications 634 (2015); E.V. Regehr et al., Polar bear population status in the southern Beaufort Sea, Open-File Report 2006-1337 at 1 (2006).

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extent.[121] This additional activity increased their estimated annual energy expenditure and "likely exacerbate[s] the physiological stress experienced by polar bears in a warming Arctic."[122] CO27-34

Another recent study found that Beaufort Sea polar bears cannot use a hibernation-like metabolism to meaningfully prolong their summer fasting period and that bears are susceptible to deleterious declines in body condition, and ultimately survival, during the lengthening period of ice melt and food deprivation.[123] Scientists at the U. S. Department of the Interior interpret these observations as a prelude to mass polar bear mortality events in the future: "As changes in habitat become more severe and seasonal rates of change more rapid, catastrophic mortality events that have yet to be realized on a large scale are expected to occur."[124]

The Draft EIS also fails to acknowledge the fact that polar bears are increasing long-distance swimming, which results in drowning, cub mortality, and physiological stress. For example, one study documented an adult female making a 687-km continuous swim over nine days to reach the distant sea-ice edge, followed by an 1800-km walk and swim, during which time she lost 22 percent of her body mass and her yearling cub.[125] The study "indicates that long distance swimming in Arctic waters, and travel over deep water pack ice, may result in high energetic costs and compromise reproductive fitness" and that "[a]ssociated declines in body CO27-35

[121] G.M. Durner et al., Increased Arctic sea ice drift alters adult female polar bear movements and energetics, 23 Global Change Biology 3460 (2017).
[122] *Id.*; *see also* J.V. Ware et al., Habitat degradation affects the summer activity of polar bears, 184 Oecologia 87 (2017) (finding that SBS bears were substantially more active than Chukchi Sea bears in lower quality habitat types and that on land, SBS bears exhibited relatively high activity associated with the use of subsistence-harvested bowhead whale carcasses); Pagano et al., High-energy, high-fat lifestyle challenges an Arctic apex predator, the polar bear Science 359, 568–572 (2018).
[123] J.P. Whiteman et al., Summer declines in activity and body temperature offer polar bears limited energy savings, 349 Science 295 (2015).
[124] Convention on Int'l Trade in Endangered Species, CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II, Sixteenth meeting of the Conference of the Parties, Bangkok (Thailand), 3-14 March 2013, Prop. 3 at 5.1.
[125] G.M. Durner et al., Consequences of long-distance swimming and travel over deep-water pack ice for a female polar bear during a year of extreme sea ice retreat, 34 Polar Biology 975 (2011).

CO27-35 See response to comment CO27-34.

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mass and losses of dependent young may ultimately become an important mechanism for influencing population trends."[126] Satellite telemetry records from 76 bears in the Beaufort Sea during 2007–2012, coupled with earlier results, indicated that the frequency of long-distance swims increased with (a) increases in the distance of the pack ice edge from land, (b) the rate at which the pack ice edge retreated, and (c) the mean daily rate of open water gain between June and August. [127] These results indicate that "long-distance swimming by polar bears is likely to occur more frequently as sea ice conditions change due to climate warming."[128] FERC must consider all of these effects, together with those of the Alaska LNG project. CO27-35

2. *The DEIS fails to adequately consider threats from increased human-bear interactions, including oil and gas development.*

The Draft EIS also fails to properly address the fact that, as the sea ice continues to melt, polar bears are increasingly using marginal habitats and will become increasingly vulnerable to interactions with humans and encounters with oil and gas development. For example, one recent study found that during the annual sea ice minimum between 1989 to 2014, adult female polar bears in the SBS population spent less time in their preferred, prey-rich, shallow-water sea ice habitat in recent years—corresponding with declines in availability of this preferred habitat type—and spent more time in lower-quality habitat(meaning land and sea ice off the continental shelf), where they have reduced access to prey.[129] The study concluded that "[t]he substantially higher use of marginal habitats by SB bears is an additional mechanism potentially explaining why this subpopulation has experienced negative effects of sea ice loss."[130] Another recent study CO27-36

[126] *Id.*; *see also* Griffen, et al. Modeling the metabolic costs of swimming in polar bears (Ursus maritimus) Polar Biol (2018) 41:491–503.
[127] N.W. Pilfold, et al., Migratory response of polar bears to sea ice loss: to swim or not to swim, 40 Ecography 189 (2017).
[128] *Id.* at 189.
[129] Ware et al. 2017.
[130] *Id.* at 87.

CO27-36 Impacts on polar bears are discussed in section 6.7 of the Biological Assessment, which is provided as appendix O of the final EIS. More specifically, impacts from increased human interaction are discussed in section 6.7.2.2 of the Biological Assessment, and impacts on habitat are discussed in section 6.7.2.1 of the Biological Assessment.

finds that an alternative foraging strategy is emerging among SBS bears as sea ice disappears, represented by 'coastal' bears, which remain near shore for much of the year and use bowhead whale bone piles, in contrast to typical 'pelagic' bears, which hunt seals on sea ice.[131]

CO27-36

The percentage of bears coming ashore and staying for at least 21 days has more than sextupled[132] as those bears are arriving earlier, staying later, and staying longer than ever before.[133] The more time bears spend on shore, the more likely they are to be negatively affected by industry. Data from oil companies support this: according to one company, from 2014-2016 there was almost double the number of polar bear sightings at its operations than the previous three years (2011-2013).[134]

This higher rate of encounters has led, and will continue to lead, to a drastic increase in the harassment of polar bears. According to one oil company, hazing at its facilities in and around the Beaufort Sea has more than tripled in the last three years compared to the three years prior, with 14 bears harassed in 2016 alone.[135] Though hazing in theory decreases the number of polar bears killed in defense of life or property, it is well known that polar bears have extremely high energy demands, and conserving energy is vital to their survival.[136] As such, harassment

[131] M.C. Rogers et al., Diet of female polar bears in the southern Beaufort Sea of Alaska: evidence for an emerging alternative foraging strategy in response to environmental change, 38 Polar Biology 1035 (2015).
[132] An average of 5.8% was recorded from 1986-1999 with an average of 20% from 2000-2014 and a high point of 37% in 2013. T. C. Atwood et al., Rapid environmental change drives increased land use by an arctic marine predator, 11 PLoS ONE e0155932 at 9 (2016).
[133] *Id.* at 12.
[134] Eni US Operating Co. Inc., Initial Exploration Plan, Harrison Bay Block 6423 Unit Proposed Drilling of Leases OCS-Y-1753, OCS-Y-1754, and OCS-Y-1757 at App. O at 62 (Mar. 2017).
[135] *Id.*
[136] *See, e.g.*, S. Schliebe et al., Range-wide Status Review of the Polar Bear (Ursus maritimus) at 15, 76, 85 (Dec. 21, 2006).

that results in movement, as hazing is intended to do, could lead to significant metabolic costs, especially if the metabolic response is sustained over an extended period of time.[137] CO27-36

Harassment causing bears to run will always have a high metabolic cost.[138] Moving at even relatively slow speeds results in bears expending 13 times more energy than they otherwise would.[139] Female polar bears that are energetically stressed may forgo reproduction, rather than risk incurring the energetic costs of an unsuccessful reproductive process, and the persistent deferral of reproduction could cause a declining population trend, further threatening a species with an intrinsically low rate of growth.[140]

Additionally, polar bears in the SBS are increasingly denning on land in the winter.[141] This frequency of denning on land is directly linked to the distance that sea ice has retreated from land, hence this shift in denning habitat is predicted to continue.[142] Bears that are forced to den on land are increasingly vulnerable to human development, and denning mothers subjected to human disturbances and hydrocarbon development may abandon their dens, causing the death of cubs.[143]

The Draft EIS also fails to consider information that den detection methods—one of the primary ways in which the federal government attempts to mitigate impacts to denning bears—are *not effective* at protecting polar bears because of their low rate of den detection. The most effective form of den surveying is forward-looking infrared radar ("FLIR"). However, as CO27-37

[137] P. D. Watts et al., Energetic output of subadult polar bears (Ursus maritimus): resting, disturbance, and locomotion, 98 Comparative Biochemistry and Physiology Part A: Physiology 191 (1991).
[138] *Id.* at 192.
[139] Schliebe 2006 at 75.
[140] *Id.* at 20.
[141] A.S. Fischbach et al., Landward and eastward shift of Alaskan polar bear denning associated with recent sea ice changes, 30 Polar Biology 1395 (2007).
[142] J. W. Olson et al., Collar temperature sensor data reveal long-term patterns in southern Beaufort Sea polar bear den distribution on pack ice and land, 564 Marine Ecology Progress Series 211 (2017).
[143] *See, e.g.*, S. C. Amstrup, Human disturbances of denning polar bears in Alaska, 46 Arctic 246 (1993).

CO27-37 We recognize that FLIR surveys are not 100 percent accurate; therefore, we have determined that there could still be effects to polar bears in dens from project activities.

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described in various studies, even when surveyors know exactly where a den is located, FLIR is effective at detecting those dens *only half* the time. For example, the Amstrup, et al. (2004) evaluated the effectiveness of FLIR for detecting maternal polar bear dens by flying multiple survey flights over 23 dens for which exact locations were known in advance of the surveys. Although these known dens were visited multiple times, four of them (17%) were never detected, and just two of four dens that were visited on only one occasion were detected; the study recognized that even under ideal conditions and with multiple surveys, some dens would never be detected with FLIR due to snow conditions or interference.[144] CO27-37

Nevertheless, FERC's Draft EIS fails to quantify projected levels of intentional or incidental harassment of polar bears from the Alaska LNG project, other Arctic oil and gas operations, and other interactions with humans. This is a significant omission considering available information indicating that increasing harassment is likely having, and will continue to have, negative impacts on polar bears at the same time sea ice loss is increasing energetic and nutritional stress.

3. *The Draft EIS fails to take a hard look at the impacts of GHG pollution from the Alaska LNG Project on polar bear recovery.*

The Draft EIS fails to properly analyze the effects of the greenhouse gas pollution resulting from the Alaska LNG project in isolation, or in combination with other oil and gas activities in the Arctic, on the survival and recovery of polar bears. CO27-38

[144] Amstrup, S., et al., Detecting Denning Polar Bears with Forward-Looking Infrared (FLIR) Imagery, 54:4 BioScience 337–344 (2004); York, G., et al., U.S.G.S., Using Forward Looking Infrared (FLIR) Imagery to Detect Polar Bear Maternal Dens Operations Manual, Sept. 2004; Robinson, R., et al., Factors Influencing the Efficacy of Forward-Looking Infrared in Polar Bear Den Detection, 64:8 BioScience 735–42 (2014); Smith, et al, Efficacy of aerial forward-looking infrared surveys for detecting polar bear 3 maternal dens, bioRxiv (2019).

CO27-38 See response to comment CO27-34.

The U.S. Fish and Wildlife Service's Final Polar Bear Conservation Management Plan includes a threats-based recovery criterion calling for stabilization of sea ice loss so that the ice-free period does not exceed a certain threshold.[145] According to the plan, the criterion will be met when the best available science shows that in each recovery unit, (1) the average ice-free period is expected to either (a) not exceed 4 months over the next 100 years or (b) stabilize at longer than 4 months over the next 100 years, and (2) polar bears can meet certain demographic criteria during that longer ice-free period.[146] CO27-38

While the Draft EIS acknowledges that polar bears are threatened by sea ice loss, it does not acknowledge how the direct, indirect, and cumulative impacts of the Alaska LNG project will affect the likelihood of sea ice loss stabilizing at the established recovery thresholds. And the Draft EIS otherwise fails to adequately consider the high probability of the extirpation of the SBS polar bear population without significant reductions in GHG pollution to stem sea ice loss. For example, Amstrup et al. (2010) evaluated the future range-wide population status of polar bears under five GHG-emissions scenarios.[147] Under the A1B, B1, and "mitigation" emissions scenarios (where the "mitigation scenario" was characterized by 450 ppm CO_2, radiative forcing of ~3.5 watts/m^2, and mean global temperature rise limited to ~1.75ºC above preindustrial temperatures by 2100), extinction was the dominant outcome in the Divergent ecoregion (where sea ice pulls away from the coast in summer and polar bears must be on land or move with the ice as it recedes north) encompassing the SBS population.[148] When the mitigation scenario was combined with the best-possible on-the-ground management to reduce threats from harvest, bear-

[145] U.S. Fish and Wildlife Service, Polar Bear (Ursus maritimus) Conservation Management Plan, Final, U.S. Fish and Wildlife Service, Region 7, Anchorage, Alaska at 18 (2016).
[146] *Id.*
[147] S.C. Amstrup et al., Greenhouse gas mitigation can reduce sea-ice loss and increase polar bear persistence, 468 Nature 955 (2010).
[148] *Id.* at 3.

human interactions, and oil and gas activities, reduced population was the dominant outcome for the Divergent ecoregion, although the probability of an extinction outcome was still substantial at 24% by 2100.[149]

CO27-38

A 2016 study by Atwood et al. updated the model used by Amstrup et al. (2010) with updated sea ice forecasts and new information about stressors.[150] The study concluded that polar bears in the Divergent ecoregion (where the SBS population lives)[151] attained a clearly dominant probability of greatly decreased survival at all future decadal time periods for all three GHG forcing scenarios (RCP 2.6, 4.5, and 8.5).[152] And another recent study used statistical models and computer simulation to project changes in the global polar bear population under three approaches relating polar bear abundance to sea ice extent, concluding the probability of reductions in the median global polar bear population would be greater than 30%, 50%, and 80% over three generations (35–41 years) at 0.71 (range 0.20–0.95), 0.07 (range 0–0.35), and less than 0.01 (range 0–0.02), respectively.[153]

However, as explained above, increased oil and gas development will increase GHG pollution, thereby increasing the primary threat to polar bears and frustrating recovery. FERC's Draft EIS fails to acknowledge this reality or otherwise address how new oil and gas development can be consistent with the recovery of polar bears.

[149] *Id.*
[150] T.C. Atwood et al., Forecasting the relative influence of environmental and anthropogenic stressors on polar bears, 7(6) Ecosphere e01370 at 14 (2016).
[151] DEIS at 5-35.
[152] Atwood et al. (2016) at 12.
[153] E. V. Regehr et al., Conservation status of polar bears (Ursus maritimus) in relation to projected sea-ice declines, 12 Biology Letters 20160556 at 4 (2016).

B. FERC's Draft EIS fails to take a hard look at the impacts of the project on Cook Inlet beluga whales.

CO27-39

FERC's Draft EIS fails to properly analyze the impacts of the project on critically endangered Cook Inlet beluga whales. The National Marine Fisheries Service ("NMFS") concluded that the death or serious injury of even one Cook Inlet beluga whale will impede the recovery of this species.[154] Cumulative and synergistic impacts—including most notably noise—pose serious threats to these belugas.[155]

Cook Inlet beluga whales are in an extremely precarious state, with a declining population trend and no signs of recovery. In 2015, Cook Inlet belugas became one of NMFS's eight "Species in the Spotlight," which prioritizes species at the highest risk of extinction. NMFS considers these Species in the Spotlight a "recovery priority #1." A recovery priority #1 species is one whose extinction "is almost certain in the immediate future because of a rapid population decline or habitat destruction, whose limiting factors and threats are well understood and the needed management actions are known and have a high probability of success, and is a species that is in conflict with construction or other developmental projects or other forms of economic activity."[156] NMFS developed five-year action plans for each of the eight species that outline short-term efforts vital for stabilizing their populations and preventing their extinction. The first of the "Key Actions Needed 2016–2020" NMFS identifies in its related Five-Year Action Plan is "Reduce the Threat of Anthropogenic Noise in Cook Inlet Beluga Whale Habitat."[157]

[154] NMFS, Stock Assessment Report: Beluga Whale (Delphinapterus leucas) Cook Inlet Stock (December 30, 2018) ("even one take every 2 years may still impede recovery").
[155] See Francis, C.D. and J. R. Barber. 2013. A Framework for understanding noise impacts on wildlife: an urgent conservation priority, Front Ecol Environ 2013; 11(6): 305–31.3.
[156] NMFS, Species in the Spotlight Priority Actions: 2016–2020 Cook Inlet Beluga Whale Delphinapterus leucas, at 1, n.1 (2015).
[157] *Id.* at 4.

CO27-39 See the responses to comments CO26-11, CO26-12, CO26-13, CO26-14, CO26-15, CO26-16, and CO26-17.

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The species' recovery plan, finalized in December 2016, concludes that the significant impacts of noise on beluga whales are cause for great concern. The recovery plan notes that Cook Inlet beluga whale's "high auditory sensitivity . . . and dependence upon sound to navigate, communicate, and find prey and breathing holes in the ice make belugas vulnerable to noise pollution, which may mask beluga signals or lead to temporary or permanent hearing impairment."[158] The Plan summarized that noise threats to the belugas can also cause habitat degradation; is localized and range-wide; is continuous, intermittent, and seasonal; is increasing overall; and is of high relative concern. It notes that, "[i]n the long term, anthropogenic noise may induce chronic effects altering the health of individual CI belugas, which in turn have consequences at the population level."[159] The U.S. Marine Mammal Commission has repeatedly recommended that the Service "defer issuance of incidental take authorizations and regulations until it has better information on why the population has not showed signs of recovery . . . and has a reasonable basis for determining that authorizing additional takes by harassment would not contribute to or exacerbate [the species'] decline."[160] CO27-40

The Alaska LNG project will exacerbate impacts to Cook Inlet beluga whales, including through noise pollution generated by construction of the main pipeline and LNG facility, as well as operation of the project from increased vessel traffic, pile driving, excavation, anchor handling, dredging, and aircraft, and other activities. CO27-41

Some of these activities will reach Level A (injury) and Level B (disturbance) harassment of Cook Inlet belugas.[161] These activities can interfere with essential beluga life behaviors

[158] National Marine Fisheries Service, Recovery Plan for the Cook Inlet Beluga Whale, Dec. 2016 at III-3.
[159] *Id.* at II-52.
[160] Peter O. Thomas, Executive Director, Marine Mammal Commission letter to Jolie Harrison, Chief of Permits and Conservation Division, National Marine Fisheries Service (Aug. 5, 2019).
[161] DEIS at O101-04, O108.

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CO27-40 See the responses to comments CO26-11, CO26-12, CO26-13, CO26-14, CO26-15, CO26-16, and CO26-17.

CO27-41 See the responses to comments CO26-11, CO26-12, CO26-13, CO26-14, CO26-15, CO26-16, and CO26-17. Due to the potential impacts on Cook Inlet beluga whales, we have determined that the Project is Likely to Adversely Affect this species and its designated critical habitat.

CO27 – Center for Biological Diversity (cont'd)

(feeding, breeding, and rearing of calves), communication, and predator avoidance.[162] Proposed mitigation measures (*e.g.,* ramp-ups) fall short of adequately protecting this species and necessary, feasible protections (*e.g.,* full adherence to time/area closures and use of PAM/night-vision devices to add in observation) are not, but should be, required. CO27-41

For example, the majority of the Cook Inlet beluga whale population (~83%) uses the western side of Cook Inlet near the Susitna Delta during the summer months.[163] NMFS thus recommends that any activities in the Susitna Delta Exclusion Zone be avoided from April 15-October 15.[164] Citing the need to operate during ice-free periods, FERC recommends restricting certain activity only during June-July—a mere one-third of the recommended space/time closure.[165] During the remainder of this critical period, Cook Inlet beluga whales would be exposed to noise sufficient to cause Level A (injury) and Level B (disturbance) harassment.[166] CO27-42

Pile driving, for example, would occur between April and August (with the possible exception of June and July) when Cook Inlet belugas are present.[167] This pile driving would cause Level A harassment (injury) to Cook Inlet beluga whales within 443' of the disturbance and Level B harassment (disturbance) to whales up to 13.4 miles from the activity.[168] Trenching, echosounders, sonar, and dredging also stand to harass Cook Inlet beluga whales, with dredging expected to exceed NMFS's established noise level thresholds.[169]

[162] DEIS at O108.
[163] DEIS at O22.
[164] DEIS at O22.
[165] DEIS at O22.
[166] DEIS at O22.
[167] DEIS at O102.
[168] DEIS at O102.
[169] DEIS at O102.

CO27-42 Comment noted.

CO27 – Center for Biological Diversity (cont'd)

FERC acknowledges that Cook Inlet belugas are sensitive to aircraft overflights.[170] The agency notes behavioral responses such as longer dive times and swimming away from aircraft disturbance, but says the whales "are generally less disturbed by aircraft when feeding."[171] This statement is misleading. Belugas may not exhibit the same behavioral responses to aircraft while feeding, but that does not necessarily mean they "are generally less disturbed." Stress responses, including increases in stress hormones, may still be impacting beluga whales. Their perceived failure to respond may simply be a result of the fact that the whales need to eat a seasonally available food resource when possible—and they have nowhere else to go.[172] The same is true of noise pollution from vessels.[173] CO27-43

Nevertheless, FERC fails to take a hard look at the impacts of the project as mandated by NEPA because it assumes any take will be authorized by NMFS under the Marine Mammal Protection Act and the impacts will be sufficiently mitigated through that process. This is improper. For example, the Draft EIS acknowledges that numerous tugs will accompany each LNG tanker.[174] The Draft EIS, however, fails to properly consider the impacts of the additional noise pollution generated by both the tankers and the tug boats. Such a failure is particularly arbitrary considering that NMFS lists noise from tug boats as the most important threat among all the "wide variety of anthropogenic noise sources that could potentially interfere with recovery . . . present in CI beluga habitat," a finding based on "signal characteristics and the spatio-temporal acoustic footprint."[175] Indeed, the Draft EIS says that some of the impacts from vessel CO27-44

[170] DEIS at O103.
[171] DEIS at O103.
[172] Forney, Karin A. et al. Nowhere to go: noise impact assessments for marine mammal populations with high site fidelity. 32 Endangered Species Research 391 (2017).
[173] *See infra*, Sec. VI.D.1.
[174] *E.g.*, DEIS at 2-89.
[175] DEIS at III-11.

CO27-43 The statement that Cook Inlet beluga whales are generally less disturbed by aircraft when feeding is supported by Norman (2011).

CO27-44 We did not rely on the MMPA process to determine mitigation measures for Cook Inlet beluga whales. The mitigation measures identified by AGDC and our additional recommendations to reduce impacts are discussed in sections 4.6.3.2 and 4.6.3.3 of the final EIS and section 2.3 of the Biological Assessment, which is provided as appendix O of the final EIS. Vessel noise impacts on Cook Inlet beluga whales, including impacts from tugs and barges, are discussed in section 7.4.2.2 of the Biological Assessment.

noise will be limited because "[v]essel noise could cause marine mammals to avoid the area near the transiting vessel,"[176] but the Draft EIS fails to consider that avoidance of an area constitutes harassment under the Merina Mammal Protection Act and could cause further harm to the species, particularly considering that Cook Inlet belugas cannot escape to quiet waters. Indeed, a recent study by NMFS scientists found that (1) there was not a single day free of human-caused noise in Cook Inlet and (2) much of the noise was above the harassment thresholds set by NMFS.[177] CO27-44

Relatedly, FERC cannot dismiss impacts to Cook Inlet beluga whales under the theory that the whales have habituated to noise. As one study explained, "the sustained presence of animals in an area under development is an insufficient indicator of the absence of adverse impacts, particularly given the challenges of detecting population trends. Some animals may have limited abilities to move elsewhere, and their decision to remain in an area *may likely reflect tolerance (i.e. persisting in an important area despite the cost) rather than habituation.*"[178] Moreover, the best available science shows that the impact thresholds NMFS used are not sufficiently protective. For example, a new study shows that beluga whales have sensitive hearing.[179] And another new publication by Tyack and Thomas (2019) provides additional support for the conclusion that the calculation of a single-threshold approach (such as used by NMFS for Level B acoustic harassment) underestimates the number of animals

[176] DEIS at 4-373.
[177] CASTELLOTE, et al. 2018. Anthropogenic Noise and the Endangered Cook Inlet Beluga Whale, Delphinapterus leucas: Acoustic Considerations for Management, https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/mfr8033_0.pdf.
[178] Nowacek, et al., Marine seismic surveys and ocean noise: time for coordinated and prudent planning, 13(7) Front Ecol Environ 378–386 (2015), doi:10.1890/130286.
[179] Mooney, T. Aran, et al. Variation in Hearing within a Wild Population of Beluga Whales (Delphinapterus Leucas) Journal of Experimental Biology, 221: jeb171959 (2018).

affected.[180] Current exposure criteria also fail to reflect the best available science or the cumulative effects of noise pollution and stressors on marine mammals.[181] CO27-44

The Alaska LNG project, as proposed, would irreversibly damage Cook Inlet beluga whale critical habitat. Beluga Critical Habitat Area 2 is the proposed site of a number of Alaska LNG facilities, including the Mainline, Mainline MOF, Marine Terminal, PLF, Marine Terminal MOV, dredging for the Marine Terminal, and dredged material disposal sites.[182] The region from the Beluga River to the Little Susitna River is a particularly sensitive area within critical habitat that NMFS has designated as an "exclusion zone" between April 15-October 15.[183] However, as noted above, AGDC would not abide by this exclusion zone and would instead conduct project-related activities during two-thirds of the closure period. FERC describes habitat loss and degradation associated with the Alaska LNG project as follows: CO27-45

> Project-related activities could cause permanent habitat loss from installation of in-water structures, and temporary foraging loss due to dredging activities and temporary facilities. The Marine Terminal PLF, Mainline MOF, and Mainline Pipeline would cause permanent loss of habitat; the Mainline MOF, Mainline, Marine Terminal PLF, Marine Terminal MOF, and dredging would cause temporary loss of habitat for Cook Inlet beluga whales in Cook Inlet. Permanent structures, such as the Mainline MOF, Marine Terminal, and PLF could affect flows and habitat characteristics which would make the habitat unsuitable for Cook Inlet beluga whales to use for feeding, resting, or reproduction. Cook Inlet beluga whales may avoid the area immediately around the Marine Terminal Facilities due to the additional disturbance from vessel traffic and human presence during construction and operation. The Mainline MOF would be left in place after use by this Project, and could continue to be used. These habitats could become unsuitable for Cook Inlet beluga whales due to habitat loss and noise from

[180] Tyack, P. and L. Thomas, Using dose–response functions to improve calculations of the impact of anthropogenic noise Aquatic Conserv: Mar Freshw Ecosyst. 2019; 29(S1):242–253.
[181] Nowacek, et al. 2015.
[182] DEIS at O105.
[183] DEIS at O105.

CO27-45 See the responses to comments CO26-11, CO26-12, CO26-13, CO26-14, CO26-15, CO26-16, CO26-17, and CO27-44.

CO27 – Center for Biological Diversity (cont'd)

human activity, and would not likely be used by Cook Inlet beluga whales for feeding, resting, or reproduction.[184] CO27-45

The repeated references to a loss of "feeding, resting, and reproduction" habitat underscore the significance of these habitat losses to the small, vulnerable, and isolated Cook Inlet beluga population.

In addition, year-round noise associated with project-related increased vessel traffic would further degrade habitat in the already-industrialized Cook Inlet.[185] Cook Inlet beluga whales demonstrate a preference for quieter habitats such as the Susitna River mouth,[186] and this project would further reduce the whales' ability to refuge. Noise associated with docking LNG carriers is expected to exceed threshold values for injury and harassment of Cook Inlet beluga whales, with other activities also contributing to level B harassment.[187] The proposed noise-related mitigation measures for beluga whales are insufficiently protective and some, like ramp-ups, may in fact be harmful.[188] CO27-46

Project-related anthropogenic noise including (but not limited to) vessel traffic may further impact Cook Inlet beluga whale survival and recovery by negatively impacting their preferred prey species.[189] Habitat degradation would affect preferred beluga whale prey species—including four species of Pacific salmon (Chinook, chum, coho, and sockeye), Pacific eulachon, Pacific cod, walleye pollock, saffron cod, and yellowfin sole—in some cases

[184] DEIS at O100; see also id. at O22 (noting that the proposed Mainline Pipeline would cross designated Cook Inlet beluga whale critical habitat, and that offshore segments of this pipeline would be trenched, increasing such impacts).
[185] DEIS at O101.
[186] DEIS at O101.
[187] DEIS at O101.
[188] Forney et al. 2017.
[189] DEIS at O101.

CO27-46 See the responses to comments CO26-11, CO26-12, CO26-13, CO26-14, CO26-15, CO26-16, CO26-17, and CO27-44.

CO27 – Center for Biological Diversity (cont'd)

temporarily (*e.g.,* from construction-related turbidity) and in some cases permanently (*e.g.,* due to erosion, destruction of benthic habitat, or shading from the facility).[190] According to FERC, CO27-46

> In-stream activities could have both direct and indirect effects on fish species and their habitats, including increased sedimentation and turbidity, alteration or removal of aquatic habitat cover, streambank erosion, impingement or entrainment of fish and other biota associated with the use of water pumps, downstream scouring, and the potential for spills. … Construction activities along the shoreline for the Liquefaction Facilities' Marine Terminal Facilities and the two MOFs would occur in spring and summer, *during birthing and feeding times for Cook Inlet beluga whales*. In particular, activities at the Mainline MOF *would interfere with Cook Inlet beluga whales' ability to access food resources in the Susitna Exclusion Zone*.[191]

Project-related activities also would impede beluga whales' transit between critical habitat zones, hindering the ability of mothers with young to find prey during the critical summer period.[192] CO27-47

Given how little suitable habitat remains for Cook Inlet beluga whales,[193] and given the severity of the anticipated impacts of the Alaska LNG project on this population, construction and operation of the Alaska LNG will jeopardize the continued existence of this imperiled whale population and adversely modify its critical habitat.

C. FERC's Draft EIS fails to take a hard look at the impacts of the project on North Pacific Right Whales

The North Pacific right whale is one of the most critically endangered whales in the world. The population hovers around 26-31 individuals.[194] Their Atlantic-based cousins experience substantial mortality from ship strikes,[195] and the proposed Alaska LNG CO27-48

[190] DEIS at O104-05, O108.
[191] DEIS at O105 (emphases added). (See also id. ("Impacts on habitat near anadromous river mouths, such as for the Mainline MOF, could affect the ability of Cook Inlet beluga whales to find prey in locations they normally visit in the summer.")
[192] DEIS at O108; see also DEIS at O109; Castellote et al. 2018.
[193] Shelden, K.E.W. *et al*. Aerial surveys, abundance, and distribution of beluga whales (*Delphinapterus leucas*) in Cook Inlet, Alaska, June 2016. AFSC Processed Rep. 2017-09 (2017).
[194] Muto, M.M. et al. Alaska Marine Mammal Stock Assessments, 2018. NOAA Tech. Memo. NMFS-AFSC-393 (2019).
[195] *Id.*

CO27-47 Comment noted.

CO27-48 Vessel strikes are addressed in section 7.8.2.2 of the Biological Assessment, which is provided as appendix O of the final EIS. While vessel strikes may not be specifically quantified, due to lack of strike data from the Project area, the risk of impacts is addressed. With a population of about 26 individuals, the risk of strikes on North Atlantic right whales is low due to the low density of the species and the fact that vessels would avoid transiting through critical habitat where the whales may congregate at certain times of the year. Noise impacts on North Atlantic right whales are addressed in section 7.8.2.1 of the Biological Assessment. Noise impacts from transiting vessels would be infrequent and short-lived as vessels travel past whales, if present, in the vicinity of transiting vessels.

CO27 – Center for Biological Diversity (cont'd)

transportation route cuts through the North Pacific right whale's range adjacent to critical habitat.[196] Despite this risk, FERC fails to appreciate the risk of vessel strikes to this whale, citing both lack of data and low population density.[197] This is unacceptable given the potentially catastrophic consequences of the loss of even one whale from this population—particularly if it is a reproductive-aged female. CO27-48

FERC's Draft EIS also fails to properly assess the risks of vessel noise on the species. Recent research reveals that chronic stress in North Atlantic right whales is associated with exposure to low frequency noise from ship traffic. Specifically, "the adverse consequences of chronic stress often include long-term reductions in fertility and decreases in reproductive behavior; increased rates of miscarriages; increased vulnerability to diseases and parasites; muscle wasting; disruptions in carbohydrate metabolism; circulatory diseases; and permanent cognitive impairment."[198] These findings have lead researchers to conclude that "over the long term, chronic stress itself can reduce reproduction, negatively affect health, and even kill outright."[199] North Pacific right whales likely suffer in the same ways.

D. FERC's Draft EIS fails to otherwise properly consider impacts to marine mammals. CO27-49

FERC's Draft EIS otherwise fails to take a hard look at the impacts on marine mammals by discounting risks of ship strikes and ship noise, relying too much on ramp-up technologies, and failing to properly consider mitigation measures.

[196] DEIS at O122, Fig. 7.8.1-1; see also Wright, Dana L. et al. Acoustic detection of the critically endangered North Pacific right whale in the northern Bering Sea. 35 Marine Mammal Science 311 (2019).
[197] DEIS at O123.
[198] Rolland, R, S. Parks, K. Hunt, M. Castellote, P. Corkeron, D. Nowacek, S. Wasser, and S. Kraus. 2012. Evidence that ship noise increases stress in right whales. Proceedings of the Royal Society B. February 8, 2012.
[199] Rolland, R. et al., The inner whale: hormones, biotoxins and parasites. In: Kraus S.D. and R.M. Rolland, (eds.). The Urban Whale: North Atlantic Right Whales at the Crossroads. Harvard University Press, Cambridge, MA (2007).

CO27-49 Ramp up technologies are not relevant to vessel noise. The risk of vessel noise and strikes on marine mammals and mitigation measures to reduce impacts are discussed in section 4.6.3.2 of the final EIS and sections 6.0 and 7.0 of the Biological Assessment (provided as appendix O of the final EIS). Vessel strike estimates are not available for Prudhoe Bay and the Bering, Chukchi, and Beaufort Seas.

1. FERC's Draft EIS does not properly consider the harms posed by ship noise and ship strikes.

FERC's Draft EIS fails to consider the seriousness of the harms that ship noise and ship strikes pose to the threatened and endangered marine mammals would be impacted by the Alaska LNG project. While broadly acknowledging these threats,[200] the agency largely dismisses the significance of both. With respect to ship noise, the agency states that the "ephemeral nature" of transiting vessels would render vessel noise impacts "minor."[201] If this rationale were to be accepted, then noise from transiting ships would never impact marine mammals because the disturbance is always "ephemeral." A robust body of scientific research undermines this conclusion.[202] The cumulative effect of "ephemeral" ship noise from different vessels can lead to significant and disruptive noise in the marine environment.[203] CO27-49

With respect to ship strikes, FERC again acknowledges the problem but proceeds to dismiss its potential significance.[204] FERC repeatedly states that ship strikes pose no real threat to marine mammal species because "the risk … would be minimized with implementation of vessel traffic conservation measures."[205] These vessel conservation measures are nowhere

[200] DEIS at O86, O92.
[201] DEIS at O88, O137.
[202] *See, e.g.*, Sousa-Lima, Renata S. & Christopher W. Clark. Modeling the effect of boat traffic on the fluctuation of humpback whale singing activity in the Abrolhos National Marine Park, Brazil. 36 Canadian Acoustics 174 (2008).; Castellote, Manuel et al. Anthropogenic noise and the endangered Cook Inlet beluga whale, Delphinapterus leucas: acoustic considerations for management. 80 Marine Fisheries Review 63 (2018); Clark, Christopher W. et al. Acoustic masking in marine ecosystems: intuitions, analysis, and implication. 395 Marine Ecology Progress Series 201 (2009).; Melcón, Mariana L. et al. Blue whales respond to anthropogenic noise. PLoS ONE 7:e32681 (2012); Bas, Aylin Akkaya et al. The effects of marine traffic on the behaviour of Black Sea harbour porpoises (Phocoena phocoena relicta) within the Istanbul Strait, Turkey. PLoS ONE 12:e0172970 (2017).
[203] *See, e.g.*, Castellote et al. 2018 (noting that commercial ships were the most prominent source of anthropogenic noise across Cook Inlet, accounting for 63% of overall anthropogenic noise time)).
[204] *See, e.g.*, DEIS at O90 (discussing ship strike risk to blue whales)
[205] *See, e.g.*, DEIS at O91, O95, O112, O116, O123, O131, O133, O140.

CO27 – Center for Biological Diversity (cont'd)

described in the agency's biological assessment, leaving the public to wonder what they are and how they might help adequately reduce the risk. CO27-49

FERC rightly states that the primary factor determining lethality of a ship strike is vessel speed and that slower vessel speeds reduce lethality, but the agency also acknowledges that vessels associated with the project will travel at speeds up to 26 knots—more than twice the speed that reduces risk of lethal harm to marine mammals.[206] The agency further describes substantial increases in overall vessel traffic as a result of the project; for example, vessel traffic in Cook Inlet will increase 74% over baseline levels should the Alaska LNG project proceed, increasing the risk of strikes for the critically endangered Cook Inlet beluga whale and other marine mammal species that use the Cook Inlet area.[207]

FERC's computation of the number potential strikes on various marine mammal species as a result of the Alaska LNG project likewise is faulty because it neither takes into account the full geographic or operational scope of the project nor does it use account for undetected strikes. First, FERC lowballs the potential harm by only considering potential strikes in Cook Inlet and the Gulf of Alaska, omitting Prudhoe Bay and the Bering, Chukchi, and Beaufort seas.[208] Even in Cook Inlet, the agency omits strikes related to certain activities such as pipelaying.[209]

FERC further and inappropriately minimizes ship-strike risk to whales by not taking unreported whale strikes into account. While noting that ship strikes often go unreported,[210] the agency fails to address this issue when determining how many whales are likely to be struck by Alaska LNG-associated vessels. It uses known strike data to reach the numbers provided in

[206] *See, e.g.*, DEIS at O90.
[207] DEIS at O109.
[208] DEIS at O90.
[209] DEIS at O104.
[210] DEIS at O104.

Table 7.2.2-1. At the very least, the agency should acknowledge that the numbers provided in Table 7.2.2-1 and throughout the text of its biological assessment are minimum numbers of anticipated strikes, and that—taking undetected and unreported strikes into account—the numbers likely will higher. CO27-49

Finally, the agency discounts ship strike risk to multiple species. The agency declines to estimate strikes of bearded seals, ringed seals, Stellar sea lions, blue whales, bowhead whales, North Pacific right whales, and sei whales, citing lack of data (though noting their vulnerability per the scientific literature).[211] The agency thus writes off potential impacts of vessel strikes on these species, again under the assurance that "vessel traffic conservation measures" will be sufficiently protective. The agency further fails to take into account behavioral attributes that may make certain species more vulnerable to ship strikes. For example, humpback whales spend more time at or near the surface during migration, feeding, and calving.[212] This places them right in the path of transiting vessels; unsurprisingly, there were over 100 confirmed humpback whale strikes in Alaska between 1978 and 2011.[213] The agency should describe what "vessel traffic conservation measures" will address whales whose behaviors place them more squarely in harm's way.

2. *FERC's Draft EIS fails to take a hard look at impacts on marine mammals by overrelying on "ramp-ups"*

FERC places a great deal of emphasis on "ramp-ups" and "soft-starts" as a means of minimizing harm to marine mammals from noise-producing activities. These techniques, which gradually increase sound level, are used under the theory that animals will flee an area before the sound reaches full (and potentially injurious) volume. Their use is precautionary and theoretical; CO27-50

[211] DEIS at O90, O94.
[212] DEIS at O116.
[213] DEIS at O119.

CO27-50 As discussed in section 4.6.3.2 of the final EIS, ramp up or soft-start procedures would be used for impact pile driving and are not the only method of reducing noise exposure to marine mammals. A number of other mitigation measures are described in section 4.6.3.2 of the final EIS, including the use of PSOs to shut down activities if marine mammals approach noise-generating activities.

there is a dearth of scientific evidence discussing the efficacy of such mitigation measures and some research even suggests these measures may be harmful.[214] According to Compton et al. (2008), CO27-50

> The effectiveness of the soft-start method is likely to vary between species and circumstances, and there is concern that this procedure may lead to habituation …. Habituation leading to long-term exposure to high sound levels may lead to chronic auditory damage.[215]

In addition, the initial weak sounds used in ramp-ups may counterintuitively attract animals.[216] This has been shown with sperm whales, who oriented toward low received sounds rather than away from them.[217]

The problems associated with ramp-ups may be especially acute for animals that exhibit high site fidelity, such as Cook Inlet beluga whales. As explained by Forney et al. (2017),

> Most mitigation efforts attempt to minimize injury by enabling animals to move away as noise levels are increased gradually. Recent experiences demonstrate that this approach is inadequate or even counterproductive for small, localized marine mammal populations, for which displacement of animals may itself cause harm.[218]

Such harms "likely include increased stress and reduced foraging success, with associated effects on survival and reproduction."[219] The authors suggest "explicit … consider[ation of the]

[214] Canadian Science Advisory Secretariat. Review of the potential hydrophysical-related issues in Canada, risks to marine mammals, and monitoring and mitigation strategies for seismic activities. Research document 2004/121 (2004); Weir, Caroline R. & Sarah J. Dolman. Comparative review of the regional marine mammal mitigation guidelines implemented during industrial seismic surveys, and guidance towards a worldwide standard. 10 J. Int'l Wildlife Law & Policy 1 (2007); Compton, Ross et al. A critical examination of worldwide guidelines for minimizing the disturbance to marine mammals during seismic surveys. 32 Marine Policy 255 (2008); Ainslie, Michael A. & Alexander M. Von Benda-Beckmann. Optimal soft start and shutdown procedures or stationary or moving sound sources. 17 Proceedings of Meetings on Acoustics, ECUA 2012 11th European Conference on Underwater Acoustics UW156 (2013); Forney, et al. 2017.
[215] Compton et al. 2008.
[216] *Id.*
[217] *Id.*
[218] Forney et al. 2017.
[219] *Id.*

CO27 – Center for Biological Diversity (cont'd)

biological risk posed by displacement during … planning, monitoring, and mitigation."[220] Such consideration is particularly critical for extremely imperiled populations like the Cook Inlet beluga whale. CO27-50

No such consideration of downfalls of ramp-ups and soft starts is provided in FERC's biological assessment or Draft EIS. FERC must discuss the potential shortcomings of its proposed mitigation measures and should consider requiring a more effective suite of measures, including strict adherence to recommended time and area closures (*e.g.*, the season exclusion zone for beluga whales (April 15-October 15) near the Susitna River).

E. FERC's Draft EIS fails to take a hard look at the impacts on Chinook Salmon and Steelhead Trout

FERC's analysis of the potential effects of the Alaska LNG project on Chinook salmon and steelhead trout evolutionarily significant units (ESU) falls short. Habitat loss stands to be significant for these ESUs. CO27-51

Habitat degradation from the Alaska LNG project would result from both physical processes (*e.g.*, from turbidity or dredging; the harms may be temporary or permanent, as described above) and from noise pollution. Both short- and long-term exposure to anthropogenic noise can cause a host of temporary or permanent harms to fish species, including behavioral changes, masking, physiological stress, swim bladder damage, hearing loss, injury, reduced fitness, and mortality.[221] While on one hand NMFS relies on the supposed ability of salmon and trout to relocate during a soft start as sufficient mitigation for noise exposure, on the other the agency acknowledges that "[t]he long duration of noise impacts from these activities in the same area over multiple years could make the habitat unsuitable for fish."[222] Given the significant,

[220] *Id.*
[221] DEIS at O141.
[222] DEIS at O22.

CO27-51 Most impacts on fish habitat would be temporary, with the exception of habitat near the Marine Terminal, which could become unsuitable for some fish as discussed in section 4.7.1.6 of the final EIS. We have concluded that impacts on fish would not be significant.

CO27 – Center for Biological Diversity (cont'd)

long-term consequences of the Alaska LNG project for these fish species, as well as their importance to other listed species (*e.g.,* Cook Inlet beluga whales), NMFS must take a closer look at the population-level consequences of the proposed project. CO27-51

F. FERC's Draft EIS fails to take a hard look at the impacts of fragmentation, land-based noise pollution, and climate change on wildlife.

FERC's Draft EIS also fails to properly consider the impacts of the project in light of habitat fragmentation from the main pipeline and other project facilities on caribou, polar bears, and other species, and noise pollution. Scientists are deeply concerned about the long-term consequences of such significant landscape alteration on wildlife.[223] For example, studies have shown that fragmentation of forests causes "irreversible alterations to the forest ecosystem" that "can result in increased predation, brood parasitism, altered light, wind, and noise intensity, and spread of invasive species."[224] In addition, FERC's Draft EIS fails to properly consider the noise pollution generated by ongoing operations, such as noise from compressor stations, which can have impacts long-beyond the construction phase.[225] CO27-52

FERC's Draft EIS also fails to properly analyze the impacts to wildlife in light of climate change. While occasionally noting that climate change presents a threat to various species, FERC fails to analyze how the Alaska LNG project will contribute to this threat through the production CO27-53

[223] Slonecker, E.T., Milheim, L.E., Roig-Silva, C.M., and Malizia, A.R. 2013. Landscape consequences of natural gas extraction in Allegheny and Susquehanna counties, Pennsylvania, 2004-2010. USGS Open-File Report 2013-1025, 34pp, http://pubs.usgs.gov/of/2013/1025/OFR2013_1025.pdf; Drohan, P. J., M. Brittingham, J. Bishop, and K. Yoder. 2012. Early trends in landcover change and forest fragmentation due to shale-gas development in Pennsylvania: a potential outcome for the Northcentral Appalachians. Environmental Management 49:1061-1075; Drohan, P. J., J. C. Finley, P. Roth, T. M. Schuler, S.L. Stout, M. C. Brittingham, N.C. Johnson. 2012. Oil and Gas Impacts on Forest Ecosystems: findings gleaned from the 2012 Goddard Forum at Penn State University. Environmental Practice 14:394-399.

[224] Abrahams, L.S., Griffin, W.M., and Matthews, H.S. 2015. Assessment of policies to reduce core forest fragmentation from Marcellus shale development in Pennsylvania. Ecological Indicators, Vol. 52, Pp. 153-160.

[225] Brittingham, M.C., et al., Ecological Risks of Shale Oil and Gas Development to Wildlife, Aquatic Resources and their Habitats, Environmental Science & Technology, pp. 11035-11037 (Sept. 4, 2014); Keyel, et al. 2017, Evaluating anthropogenic noise impacts on animals in natural areas, BioRxiv.

CO27-52 Impacts from habitat fragmentation on terrestrial wildlife and birds are discussed in sections 4.6.1.2 and 4.6.2.3 of the final EIS, respectively. Habitat fragmentation is also discussed in section 4.5.3.2 of the final EIS. Noise impacts on terrestrial wildlife and birds due to operation of Project facilities are discussed in sections 4.6.1.2 and 4.6.2.3 of the final EIS, respectively.

CO27-53 We acknowledge that climate change is a threat to wildlife, including to the federally listed eider, but we are unable to calculate the Project's contributions to climate change effects in the region and the subsequent specific effects on wildlife.

CO27 – Center for Biological Diversity (cont'd)

of fossil fuels and their consumption through construction and operation activities. This is especially improper considering Alaska and the Arctic already are experiencing dramatic climate-change related effects. The agency must describe how Alaska LNG-related activities will accelerate climate change and affect both wildlife and their prey.[226] CO27-53

For example, FERC notes that "[c]limate change has also been documented as a potential threat to the Alaska-breeding Steller's eider" and that if Alaska's Arctic experiences 2.7°F (1.5°C) warming by 2040, "then potential habitat will significantly decrease for several Arctic species, including Alaska-breeding Steller's eiders."[227] Yet according to the Alaska Climate Research Center, total change in mean seasonal and annual temperature in the Arctic from 1949 to 2018 (as measured in Barrow) is already 6.8°F.[228] FERC must use the best available science to discuss how activities associated with the Alaska LNG project might exacerbate climate change and its effects on the Steller's eider and other species.

VII. The Draft EIS fails to examine a reasonable range of alternatives. CO27-54

FERC's Draft EIS fails to analyze a reasonable range of alternatives. FERC fails to consider numerous alternatives that would reduce the environmental impacts of the Alaska LNG project, including a renewable energy alternative.

A. NEPA requires FERC to consider a reasonable range of alternatives.

NEPA's implementing regulations, which are binding on all federal agencies, provide that the consideration of alternatives for reducing adverse impacts "is the heart" of an EIS. 40 C.F.R. § 1502.14. Accordingly, EISs "should present the environmental impacts of the proposal

[226] Markon, C. et al. Ch. 26: Alaska, in Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Vol. II (2018).
[227] DEIS at O34.
[228] Alaska Climate Research Center (ACRC). Temperature Changes in Alaska (last visited Sept. 27, 2019), available at http://climate.gi.alaska.edu/ClimTrends/Change/TempChange.html.

CO27-54 The generation of electricity from renewable energy sources is not a viable alternative for the Project because it does not meet the objectives of the Project.

and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public." *Id.*

CO27-54

NEPA requires a "detailed statement" of "alternatives to the proposed action." 42 U.S.C. § 4332(2)(c). The purpose of this section is "to insist that no major federal project should be undertaken without intense consideration of other more ecologically sound courses of action, including shelving the entire project, or of accomplishing the same result by entirely different means." *Envtl. Def. Fund v. U.S. Corps of Eng'rs*, 492 F.2d 1123, 1135 (5th Cir. 1974).

In the alternatives analysis, the agency must "provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact." 40 C.F.R. § 1508.9. The analysis must "rigorously explore and objectively evaluate all reasonable alternatives." *Id.* § 1502.14. While an agency is not obliged to consider every alternative to every aspect of a proposed action, the agency must "consider such alternatives to the proposed action as may partially or completely meet the proposals goal." *Nat. Res. Def. Council, Inc. v. Callaway*, 524 F 2d. 79, 93 (2d Cir. 1975). The EIS must "[i]nclude reasonable alternatives not within the jurisdiction of the lead agency," but that may nonetheless meet the overall objectives of the action while ameliorating environmental impacts. 40 C.F.R. § 1502.14. "The existence of a viable but unexamined alternative renders an [EIS] inadequate." *Ala. Wilderness Recreation & Tourism Ass'n v. Morrison*, 67 F.3d 723, 729 (9th Cir. 1995) (citations omitted).

As explained above, FERC's Draft EIS is based on the unlawful premise that the applicant's objectives are the only objectives that it must consider. For example, FERC's Draft EIS states that "[t]he Project objective is to commercialize North Slope natural gas reserves by treating and liquefying the gas and then exporting it to foreign markets, while also providing for

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in-state deliveries. An alternative that cannot achieve the Project objective cannot be considered an acceptable replacement for the Project."[229] This approach arbitrarily results in an alternatives analysis under which the only alternatives given serious consideration are those resulting in the construction of a major LNG facility and gas pipeline. CO27-54

B. FERC must fully and meaningfully consider an alternative that would avoid the Project's projected greenhouse gas emissions and other pollution.

As discussed below, FERC must consider a meaningful "no action" alternative, under which FERC does not approve the project and it is not completed. However, in addition to a no action alternative, FERC must also consider reasonable alternatives that would fulfill the project's goal of producing energy, without a massive new fossil fuel project. As it stands now, FERC is violating NEPA by restricting the project's purpose to LNG production rather than framing it more broadly to look at the actual energy production needs and potential. CO27-55

1. *In order to avoid the worst dangers of climate change, FERC must consider a renewable energy and energy conservation alternative under which new fossil fuel production and infrastructure is halted.* CO27-56

As discussed earlier, and we reiterate here, scientific research has established that there is no room in the global carbon budget for new fossil fuel extraction if we are to avoid the worst dangers from climate change. Instead, new fossil fuel production and infrastructure must be halted and much existing production must be phased out to meet the Paris Agreement climate targets and avoid catastrophic climate damages.

As noted, the United States has committed to the climate change target of holding the long-term global average temperature "to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels" under the

[229] DEIS at 3-1.

CO27-55 See the responses to comments CO26-67 and CO27-54.

CO27-56 See the response to comment CO24-2.

Paris Agreement.[230] The Paris Agreement established the 1.5°C climate target given the evidence that 2°C of warming would lead to catastrophic climate harms.[231] Scientific research has estimated the global carbon budget—the remaining amount of carbon dioxide that can be emitted—for maintaining a likely chance of meeting the Paris climate targets, providing clear benchmarks for the United States and global climate action.[232] CO27-56

Importantly, a 2016 global analysis found that the carbon emissions from burning the oil, gas, and coal in the world's currently operating fields and mines would fully exhaust and exceed the carbon budget consistent with staying below 1.5°C.[233] The reserves in currently operating oil and gas fields alone, even excluding coal mines, would likely lead to warming beyond 1.5°C.[234] An important conclusion of the analysis is that no new fossil fuel extraction or infrastructure should be built, meaning governments should grant no new permits for extraction and infrastructure. Furthermore, many of the world's existing oil and gas fields and coal mines will

[230] United Nations Framework Convention on Climate Change, Conference of the Parties, Nov. 30-Dec. 11, 2015, Adoption of the Paris Agreement Art. 2, U.N. Doc. FCCC/CP/2015/L.9 (December 12, 2015), http://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf ("Paris Agreement"). The United States signed the Paris Agreement on April 22, 2016 as a legally binding instrument through executive agreement, and the treaty entered into force on November 4, 2016.
[231] IPCC 2018.
[232] The 2018 IPCC special report on *Global Warming of 1.5°C* estimated the carbon budget for a 66 percent probability of limiting warming to 1.5°C at 420 $GtCO_2$ and 570 $GtCO_2$ from January 2018 onwards, depending on the temperature dataset used. At the current emissions rate of 42 $GtCO_2$ per year, this carbon budget would be expended in just 10 to 14 years. *See id.* at Summary for Policymakers at 12.
[233] Oil Change International, The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production (September 2016), http://priceofoil.org/2016/09/22/the-skys-limit-report/ at Table 3. According to this analysis, the CO_2 emissions from developed reserves in existing and under-construction global oil and gas fields and existing coal mines are estimated at 942 Gt CO_2, which vastly exceeds the 1.5°C-compatible carbon budget estimated in the 2018 IPCC report on *Global Warming of 1.5°C* at 420 $GtCO_2$ to 570 $GtCO_2$.
[234] The CO_2 emissions from developed reserves in currently operating oil and gas fields alone are estimated at 517 Gt CO_2, which would likely exhaust the 1.5°C-compatible carbon budget estimated in the 2018 IPCC report on *Global Warming of 1.5°C* at 420 $GtCO_2$ to 570 $GtCO_2$.

need to be closed before their reserves are fully extracted in order to limit warming to 1.5°C.[235] In short, the analysis established that there is no room in the carbon budget for new fossil fuel extraction or infrastructure anywhere, including in the United States, and much existing fossil fuel production must be phased out to avoid catastrophic damages from climate change.[236] A 2019 analysis underscored that the United States must halt new fossil fuel extraction and rapidly phase out existing production to avoid jeopardizing our ability to meet the Paris climate targets and avoid the worst dangers of climate change.[237] The analysis showed that the U.S. oil and gas industry is on track to account for 60 percent of the world's projected growth in oil and gas production between now and 2030—the time period over which the IPCC concluded that global carbon dioxide emissions should be roughly halved to meet the 1.5°C Paris Agreement target.[238] Between 2018 and 2050, the United States is poised to unleash the world's largest burst of CO_2 emissions from new oil and gas development—primarily from shale and largely dependent on fracking—estimated at 120 billion metric tons of CO_2, which is equivalent to the lifetime CO_2 emissions of nearly 1,000 coal-fired power plants. Based on a 1.5°C IPCC pathway, U.S. production alone would exhaust nearly 50 percent of the world's total allowance for oil and gas by 2030 and exhaust more than 90 percent by 2050. Additionally, if U.S. coal production is to be phased out over a timeframe consistent with equitably meeting the Paris goals, at least 70 percent

CO27-56

[235] Oil Change International, The Sky's Limit California: Why the Paris Climate Goals Demand That California Lead in a Managed Decline of Oil Extraction (2018), http://priceofoil.org/ca-skys-limit at 7, 13.
[236] This conclusion was reinforced by the IPCC Fifth Assessment Report which estimated that global fossil fuel reserves exceed the remaining carbon budget (from 2011 onward) for staying below 2°C (a target incompatible with the Paris Agreement) by 4 to 7 times, while fossil fuel resources exceed the carbon budget for 2°C by 31 to 50 times. *See* Bruckner, Thomas et al., 2014: Energy Systems *in* Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press (2014), at Table 7.2.
[237] Oil Change International, Drilling Toward Disaster: Why U.S. Oil and Gas Expansion Is Incompatible with Climate Limits (January 2019), http://priceofoil.org/drilling-towards-disaster.
[238] IPCC 2018 at Summary for Policymakers at 12.

of U.S. coal reserves in already-producing mines must stay in the ground. In short, if not curtailed, U.S. fossil fuel expansion will impede the world's ability to meet the Paris climate targets and preserve a livable planet. CO27-56

These analyses highlight that the United States has an urgent responsibility to lead in the transition from fossil fuel production to 100 percent clean energy, particularly as a wealthy nation with ample financial resources and technical capabilities, and due to its dominant role in driving climate change and its harms. The U.S. is currently the world's largest oil and gas producer and third-largest coal producer.[239] The U.S. is also the world's largest historic emitter of greenhouse gas pollution—responsible for 25% of cumulative global CO_2 emissions since 1870—and is currently the world's second highest emitter on an annual and per capita basis.[240] The U.S. must focus its resources and technology to rapidly phase out extraction while investing in a just transition for affected workers and communities currently living on the front lines of the fossil fuel industry and its pollution.[241]

Research on the U.S. carbon budget and the carbon emissions locked in U.S. fossil fuels similarly establishes that the United States must halt new fossil fuel production and rapidly phase out existing production to avoid the worst dangers of climate change. An analysis of U.S. fossil fuel resources demonstrates that the potential carbon emissions from already leased fossil fuel resources on U.S. federal lands would essentially exhaust the remaining U.S. carbon budget consistent with the 1.5°C target. This 2015 analysis estimated that recoverable fossil fuels from

[239] Oil Change International, Drilling Toward Disaster, January 2019 at 5.
[240] LeQuéré, Corinne et al., Global carbon budget 2018, 10 Earth System Science Data 2141 (2018) at Figure 5, 2167; Global Carbon Project, Global Carbon Budget 2018 (published on 5 December 2018) https://www.globalcarbonproject.org/carbonbudget/18/files/GCP_CarbonBudget_2018.pdf at 19 (Historical cumulative fossil CO_2 emissions by country).
[241] Piggot, Georgia et al., Realizing a just and equitable transition away from fossil fuels, Discussion brief, Stockholm Environment Institute (January 2019), https://www.sei.org/publications/just-and-equitable-transition-fossil-fuels/.

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U.S. federal lands would release up to 349 to 492 $GtCO_2eq$ of carbon emissions if fully extracted and burned.[242] Of that amount, already leased fossil fuels would release 30 to 43 $GtCO_2eq$ of emissions, while as yet unleased fossil fuels would emit 319 to 450 $GtCO_2eq$ of emissions. Thus, carbon emissions from already leased fossil fuel resources on federal lands alone (30 to 43 $GtCO_2eq$) would essentially exhaust the U.S. carbon budget for a 1.5°C target (25 to 57 $GtCO_2eq$),[243] if these leased fossil fuels are fully extracted and burned. The potential carbon emissions from unleased federal fossil fuel resources (319 to 450 $GtCO_2eq$) would exceed the U.S. carbon budget for limiting warming to 1.5°C many times over.[244] This does not include the additional carbon emissions that would be emitted from fossil fuels extracted on non-federal lands, estimated up to 500 $GtCO_2eq$ if fully extracted and burned.[245] In 2018, the U.S. Geological Survey and Department of the Interior estimated that carbon emissions released from extraction and end-use combustion of fossil fuels produced on federal lands alone—not including non-federal lands—accounted for approximately one-quarter of total U.S. carbon emissions during 2005 to 2014.[246] This research further establishes that the United States must halt new fossil fuel projects and close existing fields and mines before their reserves are fully extracted to achieve the Paris climate targets and avoid the worst damages from climate change. CO27-56

Research that models the pathways needed to meet the Paris climate targets also shows that a rapid end to fossil fuel extraction is critical. The 2018 IPCC special report concluded that

[242] Ecoshift Consulting, et al., The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels, Prepared for Center for Biological Diversity & Friends of the Earth (2015).
[243] Robiou du Pont, Yann et al., Equitable mitigation to achieve the Paris Agreement goals, 7 Nature Climate Change 38 (2017), at Supplemental Table 1.
[244] Ecoshift Consulting, et al., 2015 at 4.
[245] *Id.* at 3 ("the potential GHG emissions of federal fossil fuels (leased and unleased) are 349 to 492 Gt CO2e, representing 46 percent to 50 percent of potential emissions from all remaining U.S. fossil fuels").
[246] Merrill, Matthew D. et al., Federal lands greenhouse gas emissions and sequestration in the United States—Estimates for 2005–14: U.S. Geological Survey Scientific Investigations Report 2018–5131 (2018) at 8.

pathways to limit warming to 1.5°C with little or no overshoot require "a rapid phase out of CO_2 emissions and deep emissions reductions in other GHGs and climate forcers."[247] In pathways consistent with 1.5°C, global net anthropogenic CO_2 emissions must decline by about 45% from 2010 levels by 2030 and reach net zero around 2045 or 2050.[248] Additionally, 1.5°C-consistent pathways require a full decarbonization of the power sector by mid-century.[249] The 2018 IPCC report makes clear the necessity of immediate, deep greenhouse gas reductions to avoid devastating climate-change-driven damages. It also underscores the high costs of inaction or delays, particularly in the next crucial decade, in making these cuts.

CO27-56

Ending the approval of new fossil fuel production and infrastructure is also critical for preventing "carbon lock-in," where approvals and investments made now can lock in decades-worth of fossil fuel extraction that we cannot afford. New approvals for wells, mines, and fossil fuel infrastructure—such as pipelines and marine and rail import and export terminals—require upfront investments that provide financial incentives for companies to continue production for decades into the future.[250] As summarized by Green and Denniss (2018),

> When production processes require a large, upfront investment in fixed costs, such as the construction of a port, pipeline or coalmine, future production will take place even when the market price of the resultant product is lower than the long-run opportunity cost of production. This is because rational producers will ignore 'sunk costs' and continue to produce as long as the market price is sufficient to cover the marginal cost (but not the average cost) of production. This is known as 'lock-in.'"[251]

[247] IPCC 2018 at Chapter 2 at 95.
[248] *Id.* at Summary for Policymakers at 12.
[249] *Id.* at Chapter 2 at 112.
[250] Davis, Steven J. and Robert H. Socolow, Commitment accounting of CO_2 emissions, 9 Environmental Research Letters 084018 (2014); Erickson, Peter et al., Assessing carbon lock-in, 10 Environmental Research Letters 084023 (2015); Erickson, Peter et al., Carbon lock-in from fossil fuel supply infrastructure, Stockholm Environment Institute, Discussion Brief (2015); Seto, Karen C. et al., Carbon Lock-In: Types, Causes, and Policy Implications, 41 Annual Review of Environmental Resources 425 (2016); Green, Fergus and Richard Denniss, Cutting with both arms of the scissors: the economic and political case for restrictive supply-side climate policies, 150 Climatic Change 73 (2018).
[251] Green, Fergus and Richard Denniss, 2018 at 78.

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Given the long-lived nature of fossil fuel projects, ending the approval of new fossil fuel projects is necessary to avoid the lock-in of decades of fossil fuel production and associated emissions. CO27-56

A 2019 study highlighted the importance of immediately halting all new fossil fuel infrastructure projects to preserve a livable planet. The study found that phasing out all fossil fuel infrastructure at the end of its design lifetime, starting immediately, preserves a 64% chance of keeping peak global mean temperature rise below 1.5°C.[252] This means replacing fossil fuel power plants, cars, aircraft, ships, and industrial infrastructure with zero carbon alternatives at the end of their lifespans, starting now. The study found that delaying mitigation until 2030 reduces the likelihood that 1.5°C would be attainable to below 50 percent, even if the rate of fossil fuel retirement accelerates. In other words, every year of delay in phasing out fossil fuel infrastructure makes "lock-in" more difficult to escape and the possibility of keeping global temperature rise below 1.5°C less likely. The study concluded that although difficult, "1.5°C remains possible and is attainable with ambitious and immediate emission reduction across all sectors."

2. FERC's refusal to consider a renewable energy alternative violates NEPA.

As FERC acknowledges, during the scoping process commenters urged FERC to consider renewable energy alternatives.[253] However, rather than give any consideration to this crucial issue, the Draft EIS simply states that it is "out of scope."[254] CO27-57

[252] Smith, Christopher J. et al., Current fossil fuel infrastructure does not yet commit us to 1.5°C warming, Nature Communications, doi.org/10.1038/s41467-018-07999-w (2019).
[253] DEIS at 1-13 (noting comments addressing the "[n]eed for alternative energy resources due to climate change and impact of fossil fuels").
[254] DEIS at 1-16. We note that at page 1-13, FERC states this issue is actually addressed in Draft EIS Section 1.3.3, but the Draft EIS contains no such section. In the event FERC intended to include a Section 1.3.3 it must be issued as part of a revised Draft EIS for public comment, so the public has an opportunity to respond.

CO27-57 See the responses to comments CM4-19 and CO27-11.

As a threshold matter, this once again raises FERC's inappropriate purpose and need, addressed earlier. Once the purpose is properly defined, it becomes obvious that FERC must consider whether the energy this project will produce could be provided through a combination of renewable energy and energy conservation. Moreover, the fact that FERC does not necessarily have jurisdiction over such an alternative is irrelevant for NEPA purposes.[255] CO27-57

It is not the obligation of commenters to do FERC's analysis for the agency, but suffice to say there are ample resources at FERC's disposal to explore the availability of renewable resources and energy efficiency to serve the project's *actual* purpose. Solar jobs are growing faster than any other job sector, and wind and solar energy continue to account for the largest areas of new energy growth across the economy.[256] Moreover, technologies exist today that allow for the rapid build out of renewable energy resources without the need to develop costly and polluting new fossil fuel projects like this one.[257] Accordingly, to comply with NEPA FERC must conduct a robust analysis of a clean energy alternative under which the real purpose of this project can be fulfilled without completing this environmentally destructive project.

[255] *See* 40 C.F.R. § 1502.14(c) (2003) (an EIS must "[i]nclude reasonable alternatives not within the jurisdiction of the lead agency").
[256] *See* Bureau of Labor Statistics, Occupational Outlook Handbook (Sept. 4, 2019) (finding that "solar photovoltaic installers" and "wind turbine service technicians" will be the two fastest growing occupations through 2026) (available at https://www.bls.gov/ooh/fastest-growing.htm); MIT Technology Review, Jan. 8, 2018 (explaining that renewables "will be the fastest-growing professions by percentage over the next 10 years") (available at https://www.technologyreview.com/s/609644/five-jobs-that-are-set-to-grow-in-2018/).
[257] *See, e.g.*, Jacobson *et al.*, 100% Clean and Renewable Wind, Water, and Sunlight All-Sector Energy Roadmaps for 139 Countries of the World," Joule (2017) (setting out roadmaps that "envision 80% conversion by 2030 and 100% by 2050"); Millar, *et al.*, "Emission budgets and pathways consistent with limiting warming to 1.5," Nature Geoscience Sept. 2017; Jacobson *et al*., "100% clean and renewable wind, water, and sunlight (WWS) all-sector energy roadmaps for the 50 United States," Energy Environ. Sci. (2015); S. Pacala & R. Socolow, Stabilization Wedges: Solving the climate problem for the next 50 years with current technologies, 305 SCI. 968, 968 (2004).

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C. FERC has also ignored other alternatives in violation of NEPA.

CO27-58

FERC's Draft EIS also arbitrarily fails to consider several other reasonable alternatives. For example, the action alternatives FERC examined only consider use of existing facilities or alternative locations for various project components, such as a different pipeline route or different LNG facility location. FERC failed to examine alternatives that would reduce the overall amount of activity under the project and thus lessen the overall environmental impacts, such as reducing the amount of LNG to be exported, the amount of gas to be processed into LNG, or the number of trips LNG tankers could take each year. This violates NEPA. As courts have explained, FERC must "give proper consideration to logical alternatives which might serve the public interest *better* than any of the projects outlined in the applications." *N. Nat. Gas Co.*, 399 F.2d at 973; *see also N.M. ex rel. Richardson v. BLM.*, 565 F.3d 683, 710–11 (10th Cir. 2009) (holding an agency's alternatives analysis improper where it failed to examine an alternative that would have reduced the amount of oil and gas development allowed under a land management plan); *W. Watersheds Proj. v. Abbey*, 719 F.3d 1035, 1051 (9th Cir. 2013) (questioning "how an agency can make an informed decision on a project's environmental impacts when each alternative considered would authorize the same underlying action).

Additionally, the Draft EIS acknowledges project-related noise and ship strikes could impact marine mammals , and it suggests that reduced vessel speed can decrease the risk of and reduce noise impacts,[258] but the Draft EIS fails to examine an alternative that would require vessels associated with the project to slow to 10 knots or less to reduce impacts to endangered whales and other marine life.[259] The Draft EIS has no alternatives that would otherwise reduce

[258] DEIS at 4-381.
[259] *Cf.*, 50 C.F.R. § 224.105 (requiring ships 65 feet in length and longer to slow to 10 knots or less in certain areas at certain times of year to protect North Atlantic right whales).

CO27-58 See the responses to comments CM4-19 and CO27-11. The final EIS identifies numerous mitigation measures proposed by AGDC and/or recommended by FERC staff that would mitigate impacts on environmental resources, including Cook Inlet beluga whales.

the impacts to marine mammals from construction and operation of the project in Cook Inlet. For example, the Draft EIS fails to consider an alternative that would prohibit pile driving or pipe laying and trenching during times when beluga whales aggregate near the MOF area or pipeline corridor; prohibit activities at night when it is much harder for observers to see marine mammals; or require additional protected species observers or improved Passive Acoustic Monitoring and thermal imaging technologies to increase the chances of observation particularly at night.[260] CO27-58

VIII. The Draft EIS fails to examine a true no action alternative.

In addition to failing to examine a reasonable range of alternatives, FERC's Draft EIS fails to examine a true no action alternative in violation of NEPA. Evaluation of a no action alternative is vitally important to NEPA's purposes. A no action alternative "allows policymakers and the public to compare the environmental consequences of the status quo to the consequences of the proposed action." *Ctr. for Biological Diversity v. U.S. Dep't of the Interior*, 623 F.3d 633, 642 (9th Cir. 2010). Where the agency is evaluating a proposal for a project, "'no action' . . . would mean the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward." Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. 18,026, 18,027 (Mar. 23, 1981). CO27-59

[260] *See, e.g.* Horton, T.W., A. Oline, N. Hauser, T.M. Khan, A. Laute, A. Stoller, K. Tison, and P. Zawar-Reza. 2017. Thermal Imaging and Biometrical Thermography of Humpback Whales. Front. Mar. Sci. 4:424. doi: 10.3389/fmars.2017.00424; Zitterbart D.P., L. Kindermann, E. Burkhardt, O. Boebel. 2013. Automatic Round-the-Clock Detection of Whales for Mitigation from Underwater Noise Impacts. PLoS ONE 8(8): e71217. doi:10.1371/journal.pone.0071217; Press, R. 2015. Automatic Whale Detector, version 1.0, Feb. 2015, https://phys.org/news/2015-02-automatic-whale-detector-version.html (describing thermal imaging cameras in use by NMFS to track gray whales throughout the day and night).

CO27-59 See response to comment CO26-67.

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Here, FERC's no action alternative does not do so. Instead, FERC assumes that if the Alaska LNG project was not approved, AGDC would construct another project in its place and the environmental impacts would still occur.[261] As such, FERC dismissed the no action alternative from further consideration.[262] But this approach "avoid[s] the task actually facing [FERC]. In assuming that, no matter what, the proposed activities would surely occur, [FERC is] neglecting to consider what would be a true 'no action' alternative." *Conservation Council of Hawaii v. NMFS*, 97 F. Supp. 3d 1210, 1236 (D. Haw. 2015). CO27-59

IX. The Draft EIS fails to properly examine the cumulative impacts in light of other ongoing and reasonable foreseeable projects in Alaska.

FERC's Draft EIS fails to properly evaluate the cumulative impacts of the Alaska LNG project. Cumulative impacts are impacts that "result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." 40 C.F.R. § 1508.7. CO27-60

But a cumulative impacts analysis "must be more than perfunctory; it must provide a useful analysis of the cumulative impacts of past, present, and future projects." *Klamath-Siskiyou Wildlands Ctr. v. BLM*, 387 F.3d 989, 994 (9th Cir. 2004). FERC's Draft EIS wholly fails to conduct a "quantified assessment of their [other projects] combined environmental impacts," and "objective quantification of the impacts" from other existing and proposed activities in the region, as required by NEPA and Ninth Circuit precedent. *Great Basin Mine Watch v. Hankins*, 456 F.3d 955, 971-974 (9th Cir. 2006).

[261] DEIS at 3-2.
[262] *Id.*

CO27-60 Most of the oil and gas projects listed in the comment are included in our analysis of cumulative impacts in section 4.19 of the final EIS; those that are not (e.g. the potential reversal of protections in the Integrated Activity Plan for Special Areas in the National Petroleum Reserve) are speculative or poorly defined. We additionally note that our analysis incorporates input from the ADNR, the state agency responsible for tracking and permitting oil and gas projects.

There are several oil and gas projects in the Arctic that are highly relevant to FERC's cumulative impacts analysis for the Alaska LNG project. These include(1) the State of Alaska's Arctic Strategic Transportation and Resources project, which includes a proposal to construct a series of gravel roads or rights-of-ways spanning portions of the North Slope Borough;[263] (2) oil and gas exploration, development, and production in the Arctic National Wildlife Refuge;[264] (3) the proposed Willow project in the National Petroleum Reserve-Alaska (Reserve);[265] (4) development and production at ConocoPhillips' other Reserve projects, including Colville Delta 5 (CD-5), GMT-1, and GMT-2; (5) winter seismic, exploration drilling, and associated activities in the Greater Mooses Tooth and Bear Tooth Units, and adjacent parts of the Reserve; (6) exploration, development, and production of recent oil and gas discoveries, including Caelus's Smith Bay and Oil Search's Pikka-Horseshoe;[266] and (7) potential reversal of protections in the Integrated Activity Plan for Special Areas in the Reserve, including the Teshekpuk Lake Special Area, leading to oil and gas leasing, exploration, development, and production in sensitive areas.[267] Similarly, there are several mining projects in Alaska that must also be considered in FERC's cumulative impacts analysis on the Alaska LNG project, including Pebble Mine. While FERC's Draft EIS mentions some of these projects, it does so in a cursory manner without actually analyzing what the cumulative impacts would be.

CO27-60

CC-752

[263] Shady Grove Oliver, Cost Comes Into Focus Amid ASTAR Testimony, ARCTIC SOUNDER, Apr. 27, 2018, available at http://www.thearcticsounder.com/article/1817cost_comes_into_focus_amid_astar_testimony.
[264] 84 Fed. Reg. 50,472 (Sept. 25, 2019).
[265] *See* Notice of Intent To Prepare an Environmental Impact Statement for the Willow Master Development Plan Oil and Gas Prospect, Alaska, 83 Fed. Reg. 38725 (Aug. 7, 2018); Bureau of Land Management, Willow Master Development Plan, 2019.
[266] *See* Alex DeMarban, Driller boosts potential at big Alaska discovery by hundreds of millions of barrels, Anchorage Daily News, Aug. 23, 2018, https://www.adn.com/business-economy/energy/2018/08/23/driller-boosts-potential-at-big-alaska-discovery-by-hundreds-of-millions-of-barrels/.
[267] *See* Alex DeMarban, Trump Administration, North Slope Borough Eye Protected Teshekpuk Area for Drilling, Anchorage Daily News, Aug. 14, 2018, https://www.adn.com/business-economy/energy/2018/08/14/trump-administration-north-slope-borough-eye-protected-teshekpuk-area-for-drilling/.

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For example, FERC dismisses any real analysis of cumulative impacts to marine mammals because projects would be required to comply with the Marine Mammal Protection Act.[268] Likewise, FERC dismisses any real analysis of the cumulative impacts of air emissions because such emissions would be required to comply with state and federal permitting requirements and the emissions would contribute to only a small portion of emissions in relation to overall emissions.[269] FERC also dismisses impacts to terrestrial wildlife because the amount of habitat impacted is supposedly small compared to the overall available habitat.[270] This is improper. CO27-61

X. FERC's Draft EIS fails to adequately consider environmental justice issues. CO27-62

From air pollution to subsistence hunting, FERC's proposal raises significant environmental justice issues. But FERC's Draft EIS fails to adequately address these significant impacts. On February 11, 1994, President Clinton issued Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations." The Executive Order makes it the responsibility of each Federal agency to "make achieving environmental justice part of its mission in identify and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Accompanying this order was a Presidential Memorandum stating that "each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by the [National Environmental Policy Act]." The CEQ has also issued guidance on

[268] DEIS at 4-1137.
[269] DEIS at 4-1157.
[270] DEIS at 4-1133.

CO27-61 Comment noted.

CO27-62 Impacts on Environmental Justice populations are discussed in section 4.11.8 of the final EIS. As discussed in section 4.13.2 of the final EIS, FERC provided information on the Project to 38 federally recognized tribes, including the Inupiat Community of the Arctic Slope. See also the discussions regarding impacts on subsistence practices and resources in section 4.14 of the final EIS.

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incorporating environmental justice considerations in the NEPA process. The guidance states in part: CO27-62

> Early and meaningful public participation in the federal agency decision making process is a paramount goal of NEPA. CEQ's regulations require agencies to make diligent efforts to involve the public throughout the NEPA process. Participation of low-income populations, minority populations, or tribal populations may require adaptive or innovative approaches to overcome linguistic, institutional, cultural, economic, historical, or other potential barriers to effective participation in the decision-making processes of Federal agencies under customary NEPA procedures.

FERC's actions to date undercut efforts to inform and engage environmental justice communities. The North Slope of Alaska is home to communities that are generally rural, contain many low-income households, and have a majority Iñupiat population. The North Slope is also home to a variety of oil and gas infrastructure, including several active development and exploration projects. Oil and gas activities on the North Slope disproportionately impact these communities, many of which are already bearing the brunt of climate disruption. FERC's approval of the project will exacerbate these impacts by leading to more drilling and fracking, more gas toxic air pollution, and more greenhouse gas emissions.

While FERC acknowledges that the Alaska LNG project "could disproportionately affect some environmental justice populations due to impacts on subsistence practices and public health effects," it fails to properly analyze these impacts. For example, FERC largely dismisses the import of the additional air pollution that could result from the Alaska LNG project because there is already significant oil and gas-related infrastructure on the North Slope and harmful air pollution as a result, and any emissions would need to comply with state and regulatory permitting requirements.[271] This approach undercuts the purpose of a hard-look analysis, CO27-63

[271] DEIS at 4-1157.

CO27-63 Impacts on Environmental Justice populations are discussed in section 4.11.8 of the final EIS. AGDC prepared an HIA (see appendix V of the final EIS) to supplement the environmental justice discussion and provide additional detail regarding potential health impacts, including air emissions-related health effects, as summarized in section 4.17 of the final EIS. Section 4.15 of the final EIS discusses air quality regulations and potential impacts and mitigation.

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including cumulative impacts, and efforts to inform and engage environmental justice communities. CO27-63

For example, the pollutants that will be emitted by compressor stations are documented as causing severe health effects and will do so for many years. NOx and VOCs are known to harm respiratory, cardiological, neurological, and kidney functions and can cause premature death. Even small levels of NOx can cause nausea, irritated eyes and nasal passages, fluid in the lungs, and shortness of breath. Higher levels of NOx and VOCs can cause burning spasms, throat swelling, reduced oxygen intake, lung damage, dizziness, nausea, fatigue, nosebleeds, and cancer. Furthermore, NOx is a major contributor to the formation of fine particulate matter ("PM") and ozone. Fine PM is linked to increased heart attacks, aggravated asthma, decreased lung function, and premature death for people with heart or lung disease. Ozone can cause coughing, chest pain, and throat irritation as well as exacerbating bronchitis, emphysema, and asthma.[272] Consideration of air quality problems are especially important in the Arctic where the extremely cold temperatures and strong surface-based temperature inversions can trap local emissions.[273] CO27-64

XI. FERC's Draft EIS fails to take a hard look at other direct, indirect, and cumulative impacts from the Alaska LNG project.

FERC's Draft EIS does not adequately disclose or analyze numerous other harmful impacts from the Alaska LNG project, including impacts from black carbon and from ice and gravel roads. CO27-65

[272] *See, e.g.*, Southeast Pennsylvania Environmental Health Project, Summary on Compressor Stations and Health Impacts, Feb. 24, 2015), https://www.environmentalhealthproject.org/sites/default/files/assets/downloads/summary-compressor-station-emissions-and-health-impacts-02.24.2015.pdf.
[273] J. Schmale, et al., Local Arctic Air Pollution: A Neglected but Serious Problem, 6 Earth's Future 1385–1412 (2018); see also Univ. of Utah, Arctic clouds highly sensitive to air pollution, Jan. 3, 2018, https://www.sciencedaily.com/releases/2018/01/180103101136.htm.

CO27-64 Section 4.15.5.2 of the final EIS provides ambient air quality analyses associated with the operation of the compressor stations. These analyses show that operation of the aboveground facilities associated with the Project would not cause or contribute to violations of the NAAQS/AAAQS, which are protective of human health.

CO27-65 Cumulative impacts on air quality and climate change are discussed in sections 4.19.4.15 and 4.19.4.18 of the final EIS. Black carbon is not a regulated pollutant, but is a component of particulate matter, which is included in the emission estimates and air quality impact analysis provided for the Project.

Black carbon, or soot, consists of particles or aerosols released through the inefficient burning of fossil fuels, biofuels, and biomass.[274] Diesel engines are a particularly important source, with up to 80% of its sub-2.5 micrometer particulate matter (PM2.5) composed of black carbon.[275] Black carbon warms the atmosphere, but it is a solid, not a gas. Unlike greenhouse gases, which warm the atmosphere by absorbing longwave infra-red radiation, soot has a warming impact because it absorbs shortwave radiation, or visible light.[276] Black carbon is an extremely powerful greenhouse pollutant. Scientists have described the average global warming potential of black carbon as about 500 times that of carbon dioxide over a 100-year period.[277] This powerful warming impact is remarkable given that black carbon remains in the atmosphere for only about four to seven days, with a mean residence time of 5.3 days.[278] Black carbon contributes to Arctic warming through the formation of "Arctic haze" and through deposition of particles on snow and ice, which transforms heat-reflecting surface into heat-absorbing surface and thereby increases heat absorption.[279] CO27-65

Soot also contributes to heating when it is deposited on snow because it reduces reflectivity of white snow and instead tends to absorb radiation. A recent study indicates that the direct warming effect of black carbon on snow can be three times as strong as that due to carbon

[274] Quinn, P.K., T.S. Bates, E. Baum, N. Doubleday, A. Fiore, M. Flanner, A. Fridlind, T. Garrett, D. Koch, S. Menon, D. Shendell, A. Stohl, and S.G. Warren. 2007. Short-lived pollutants in the Arctic: Their climate impact and possible mitigation strategies.
[275] Rao, R. and J.H. Somers. Undated. Black Carbon as a Short-Lived Climate Forcer: A Profile of Emission Sources and Co-Emitted Pollutants. Environmental Protection Agency. https://www3.epa.gov/ttnchie1/conference/ei19/session5/rao.pdf.
[276] Chameides, W.L., and M. Bergin, Soot takes center stage., 297 Science 2214-2215 (2002).
[277] Hansen, J., et al. 2007. Dangerous human-made interference with climate: a GISS modelE study. Atmospheric Chemistry and Physics 7:2287-2312; see also Reddy, M.S., and O. Boucher. 2007. Climate impact of black carbon emitted from energy consumption in the world's regions. Geophysical Research Letters 34, L11802, doi:10.1029/2006GLO28904.
[278] Reddy and Boucher 2007.
[279] Quinn et al. 2007; Reddy and Boucher 2007.

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dioxide during springtime in the Arctic.[280] Black carbon emissions that occur in or near the Arctic contribute the most to melting conditions in the far north.[281] CO27-65

In recognition of the harms of black carbon emissions, the eight-nation Arctic Council in April 2015 adopted a framework agreement to hasten reduction of black carbon and methane emissions, in which those nations (including the U.S.) committed to taking "enhanced, ambitious, national and collective action to accelerate the decline in our overall black carbon emissions."[282] 596 The Framework established an Expert Group on Black Carbon and Methane, which met in 2017 and recommended "that black carbon emissions be further collectively reduced by at least 25-33 percent below 2013 levels by 2025.[283]

Allowing black carbon emissions to increase in the Arctic as the result of oil and gas development would accelerate Arctic warming and consequent loss of seasonal sea ice, leading to the extinction of the polar bear and other species. Yet FERC's Draft EIS fails to analyze the significant impacts from the emissions of black carbon. CO27-66

FERC's Draft EIS also fails to adequately consider the numerous harmful impacts from the ice and gravel roads that would be constructed to support project activities. Studies have shown that roads and pipelines rapidly expand flooding and thermokarst, which expanded at 9.2 CO27-67

[280] Flanner, M. G., C. S. Zender, J. T. Randerson, and P. J. Rasch (2007), Present-day climate forcing and response from black carbon in snow. J. Geophys. Res., 112, D11202, doi:10.1029/2006JD008003.
[281] Reddy and Boucher 2007; Quinn et al. 2007.
[282] Enhanced Black Carbon and Methane Emissions Reductions: An Arctic Council Framework for Action. Annex 4. IQALUIT 2015 SAO Report to Ministers, available at https://oaarchive.arctic-council.org/bitstream/handle/11374/610/ACMMCA09_Iqaluit_2015_SAO_Report_Annex_4_TFBCM_Framework_Document.pdf?sequence=1&isAllowed=y.
[283] Arctic Council Secretariat, 2017. Expert Group on Black Carbon and Methane: Summary of progress and recommendations, available at https://oaarchive.arctic-council.org/bitstream/handle/11374/1936/EDOCS-4319-v1-ACMMUS10_FAIRBANKS_2017_EGBCM-report-complete-with-covers-and-colophon-letter-size.pdf?sequence=5&isAllowed=y.

CO27-66 Sections 4.15.4 and 4.15.5 of the final EIS quantifies PM_{10} and $PM_{2.5}$ emissions associated with construction and operation of the Project and analyze the potential impacts associated with these emissions. Particulate associated with combustion of diesel fuel is included in these estimates.

CO27-67 Impacts from ice and gravel roads are discussed throughout the EIS. As noted in section 4.4.3.1 of the final EIS, ice road and pad construction would be conducted in accordance with permitting requirements from the ADNR-DMLW, which imposes standards to minimize impacts on wetlands and tundra.

hectares a year.[284] Gravel roads cause permanent hydrological changes to the landscape, altering permafrost freeze-and-thaw cycles and creating issues related to thermokarst. These effects can include deeper permafrost thaw, earlier snowmelt in close proximity to the road, and alterations to hydrology.[285] Gravel roads also generate significant amounts of dust; studies suggest the dust can affect soil and vegetation nearly 3,280 feet away.[286] The dust can smother vegetation and lead to a warming effect that can increase thaw in the summer, which in turn can lead to changes in geomorphology.[287] Ice roads can also have major impacts that persist into other seasons, severely altering hydrology and natural thermal regimes, and causing a wide variety of other ecological impacts.[288] CO27-67

[284] Raynolds et al. 2014. Cumulative geoecological effects of 62 years of infrastructure and climate change in ice-rich permafrost landscapes, Prudhoe Bay Oilfield, Alaska, Global Change Biology 20:1211-24.
[285] *E.g.*, Walker, D. A., M. Kanevskiy, Y. L. Shur, M. K. Raynolds, J. L. Peirce, M. Buchhorn, K. Ermokhina, and L. A. Druckenmiller. 2018. 2016 ArcSEES Data Report: Snow, thaw, temperature, and permafrost borehole data from the Colleen and Airport sites, Prudhoe Bay, and photos of Quintillion fiber optic cable impacts, North Slope, Alaska. Alaska Geobotany Center Data Report AGC18-01, https://www.geobotany.uaf.edu/library/pubs/ WalkerDA2018_agc18-01_datarpt.pdf; A; Raynolds, M.K., Walker, D.A., Kofinas, G.P., & Ambrosius, K.J. (2012). Sixty years of landscape change within an arctic oilfield, Prudhoe Bay, Alaska. In A. Colpaert, T. Kumpula, & L. Mononen (Eds.), 12th International Circumpolar Remote Sensing Symposium, https://www.geobotany.uaf.edu/ library/pubs/WalkerDA2014_agc14-01.pdf; BENJAMIN SULLENDER, AUDUBON ALASKA, ECOLOGICAL IMPACTS OF ROAD AND AIRCRAFT-BASED ACCESS TO OIL INFRASTRUCTURE 16–17 (2017), https://ak.audubon.org/sites/g/files/amh551/f/road_aircraft_access_report_final.pdf.
[286] Kumpula, T., A. Pajunen, E. Kaarlejärvi, B. C. Forbes, and F. Stammler. 2011. Land Use and Land Cover Change in Arctic Russia: Ecological and Social Implications of Industrial Development. Global Environmental Change 21:550-562; Myers-Smith, I. H., B. K. Arnesen, R. M. Thompson, and F. S. Chapin III. 2006. Cumulative Impacts on Alaskan Arctic Tundra of a Quarter Century of Road Dust. Ecoscience 13:503-510.
[287] *E.g.*, D.A. Walker & K.R. Everett, Road Dust and Its Environmental Impact on Alaskan Taiga and Tundra, 19(4) ARCTIC & ALPINE RESEARCH 479 (1987); Ackerman, et al. Road dust biases NDVI and alters edaphic properties in Alaskan arctic tundra, 9 Nature: Scientific Reports 214 (2019).
[288] Sullender, 2017, supra.

XII. Conclusion

The massive Alaska LNG project would have massive environmental impacts that are squarely against the public interest. FERC should reject the project. At the very least, FERC must substantially revise the Draft EIS and reissue the document for public notice and comment due to the numerous flaws highlighted above. Failure to do otherwise would violate NEPA, its implementing regulations, and the public interest.

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CERTIFICATE OF SERVICE

I hereby certify that on October 3, 2019, I caused the foregoing document to be served by electronic mail upon each person designated on the official service list compiled by the Secretary in this proceeding.

/s/ Kristen Monsell