FOR PUBLICATION

UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

NATIVE VILLAGE OF POINT HOPE; INUPIAT COMMUNITY OF THE ARCTIC SLOPE; ALASKA WILDERNESS LEAGUE; CENTER FOR BIOLOGICAL DIVERSITY; NATIONAL AUDUBON SOCIETY; NATURAL RESOURCES DEFENSE COUNCIL; NORTHERN ALASKA ENVIRONMENTAL CENTER; OCEANA; PACIFIC ENVIRONMENT; RESISTING ENVIRONMENTAL DESTRUCTION ON INDIGENOUS LANDS, A PROJECT OF THE INDIGENOUS ENVIRONMENTAL NETWORK (REDOIL); SIERRA CLUB; THE WILDERNESS SOCIETY; WORLD WILDLIFE FUND; DEFENDERS OF WILDLIFE, *Plaintiffs-Appellants*, v. SALLY JEWELL, Secretary of the Interior; BUREAU OF OCEAN ENERGY MANAGEMENT; TOMMY BEAUDREAU, Director of the Bureau of Ocean Energy Management, *Defendants-Appellees*,	No. 12-35287 D.C. No. 1:08-cv-00004-RRB OPINION

SHELL GULF OF MEXICO, INC.; CONOCOPHILLIPS COMPANY; STATE OF ALASKA; STATOIL USA E&P, INC.,

Intervenor-Defendants-Appellees.

Appeal from the United States District Court
for the District of Alaska
Ralph R. Beistline, Chief District Judge, Presiding

Argued and Submitted
March 5, 2013—Seattle, Washington

Filed January 22, 2014

Before: Ferdinand F. Fernandez, William A. Fletcher, and Johnnie B. Rawlinson, Circuit Judges.

Opinion by Judge W. Fletcher;
Partial Concurrence and Partial Dissent by Judge Rawlinson

SUMMARY*

Environmental Law

The panel reversed the district court's summary judgment entered in favor of federal defendants in an action challenging the government's environmental impact statements analyzing the environmental effects of proposed leases for oil and gas development in the Chukchi Sea of the northwest coast of Alaska.

The panel held that the Final Environmental Impact Statement and Supplemental Environmental Impact Statement prepared by the federal defendants properly took account of incomplete or unavailable information. The panel held, however, that the reliance in the Final Environmental Impact Statement on a one million barrel estimate of total economically recoverable oil was arbitrary and capricious. The panel remanded for further proceedings.

Judge Rawlinson concurred in part and dissented in part. Judge Rawlinson agreed with most of the majority opinion, but she did not agree that the federal Bureau of Ocean Energy Management, Regulation and Enforcement acted arbitrarily in selecting one billion barrels of oil as the benchmark for analyzing the environmental affects of the proposed leases.

* This summary constitutes no part of the opinion of the court. It has been prepared by court staff for the convenience of the reader.

COUNSEL

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OPINION

W. FLETCHER, Circuit Judge:

The Bureau of Ocean Energy Management ("BOEM")[1] of the Department of the Interior has sought to lease "excellent prospects" for oil and gas development in the Chukchi Sea off the northwest coast of Alaska. The parcels available for lease are cumulatively known as Lease Sale 193. Pursuant to the National Environmental Policy Act ("NEPA"), BOEM prepared a Final Environmental Impact Statement ("FEIS") analyzing the environmental effects of the proposed leases.

[1] Earlier incarnations of the agency have been the Minerals Management Service and the Bureau of Ocean Energy Management, Regulation and Enforcement. For simplicity, we refer to the agency, including its earlier incarnations, as BOEM.

BOEM based its environmental analysis on the assumption that if oil development actually occurs, one billion barrels of oil will be economically recoverable.

Plaintiffs argued in the district court that BOEM abused its discretion by failing to account for essential missing information in the FEIS. Plaintiffs also argued that BOEM's estimate of one billion barrels is arbitrary and capricious. They contended that the potential economically recoverable oil from the lease sale is far higher than one billion barrels, and that BOEM had not given an adequate explanation for using its lower estimate. The district court initially rejected the FEIS for failing to account for the missing information. After remand, BOEM prepared a Supplemental EIS ("SEIS") addressing the missing information. Based on the FEIS and SEIS, the district court granted summary judgment to defendants.

We largely agree with the district court that the agency did not abuse its discretion in its analysis of the missing information. However, we agree with plaintiffs that the agency's estimate of one billion barrels was chosen arbitrarily, and that this arbitrary decision meant that the agency based its decision on inadequate information about the amount of oil to be produced pursuant to the lease sale.

I. Background

The Chukchi Sea is a southern arm of the Arctic Ocean between Alaska and Russia. The Sea contains a wide variety of animals, including bowhead whales, polar bears, pacific walrus, seals, fish, and birds. Some of these animals provide subsistence for native Inupiat communities along the Alaskan coast. Some of the animals are listed under the Endangered

Species Act ("ESA") as endangered or threatened. Five exploratory wells were drilled in the Sea between 1989 and 1991. They had "positive shows" but did not lead to commercial production.

The Outer Continental Shelf Lands Act ("OCSLA") prescribes four steps the federal government must take in order to pursue offshore oil and gas development: "'(1) formulation of a five year leasing plan by the Department of the Interior; (2) lease sales; (3) exploration by the lessees; [and] (4) development and production.'" *Edwardsen v. U.S. Dep't of the Interior*, 268 F.3d 781, 784 (9th Cir. 2001) (quoting *Sec'y of the Interior v. California*, 464 U.S. 312, 337 (1984)). At the "lease sale" stage, the Secretary of the Interior selects the parcels that will be offered for lease, accepts bids from parties, and collects funds from parties with winning bids. The Department of the Interior must review and approve specific exploration and development plans before winning bidders can "proceed with full exploration, development, or production" of oil or gas. *Sec'y of the Interior*, 464 U.S. at 339. However, successful bidders have the right to undertake "ancillary activities" in the field such as geological and geophysical surveys and studies that "model potential oil and hazardous substance spills." 30 C.F.R. § 550.207.

A. NEPA

NEPA "protect[s] the environment by requiring that federal agencies carefully weigh environmental considerations and consider potential alternatives to the proposed action before the government launches any major federal action." *Barnes v. U.S. Dep't of Transp.*, 655 F.3d 1124, 1131 (9th Cir. 2011) (internal quotation marks

omitted). "'NEPA imposes procedural requirements designed to force agencies to take a "hard look" at environmental consequences'" of major federal action. *Id.* (quoting *Earth Island Inst. v. U.S. Forest Serv.*, 351 F.3d 1291, 1300 (9th Cir. 2003)). The statute requires federal agencies to "consider every significant aspect of the environmental impact of a proposed action" and to "inform the public that [they] ha[ve] indeed considered environmental concerns in [their] decisionmaking process." *Balt. Gas & Elec. Co. v. Natural Res. Def. Council, Inc.*, 462 U.S. 87, 97 (1983) (internal quotation marks omitted).

NEPA requires that federal agencies prepare an EIS for any "major Federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4332(2)(C). An agency must consider:

> (i) the environmental impact of the proposed action,
>
> (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
>
> (iii) alternatives to the proposed action,
>
> (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
>
> (v) any irreversible and irretrievable commitments of resources which would be

> involved in the proposed action should it be implemented.

Id. An agency must take into account all "reasonably foreseeable significant adverse effects" of the proposed action in its analysis of environmental effects. 40 C.F.R. § 1502.22; *see also id.* § 1508.7. NEPA also requires an agency to analyze missing and incomplete information. As we explain in greater detail below, an agency must either obtain information that is "essential to a reasoned choice among alternatives" or explain why such information was too costly or difficult to obtain. *Id.* § 1502.22.

An agency is required to comply with NEPA at various stages of the oil and gas development process. An agency is not required at the lease sale stage to analyze potential environmental effects on a site-specific level of detail. *N. Alaska Envtl. Ctr. v. Kempthorne*, 457 F.3d 969, 975–76 (9th Cir. 2006). To some degree, lease sale analyses may be based on information that is uncertain or missing at the time of the sale when that information can be obtained at a "later stage[] of the exploration process." *Tribal Vill. of Akutan v. Hodel*, 869 F.2d 1185, 1192 (9th Cir. 1988). At the same time, the agency cannot shirk its responsibility to "consider[] all foreseeable direct and indirect impacts" of the proposed action in its EIS. *N. Alaska Envtl. Ctr.*, 457 F.3d at 975 (internal quotation marks omitted). The agency also must "discuss[] . . . adverse impacts" without "improperly minimiz[ing] negative side effects." *Id.*

B. Lease Sale 193

After completing a five-year leasing plan for the Chukchi Sea, BOEM decided to offer a large portion of the Sea for oil

and gas leasing. The FEIS analyzed four alternatives for the lease sale: (1) a 34-million acre proposed lease option covering 6,156 blocks of the Chukchi Sea; (2) a no-lease option; (3) a proposed lease option excluding 1,765 blocks extending along a corridor about 60 miles from the Alaskan coast; and (4) a proposed lease option excluding 795 blocks extending along a corridor between 25 and 50 miles from the Alaskan coast.

The National Marine Fisheries Service recommended that the Secretary of the Interior select the third alternative, under which development would be farther from the coast, based on its conclusion that numerous endangered and threatened species living close to shore would be adversely affected by oil development. The Secretary of the Interior accepted BOEM's recommendation and selected the fourth alternative, under which development would be closer to the coast.

The lease sale occurred on February 6, 2008. The federal government collected over $2.6 billion from the winning bidders. At the time of the lease sale, there were no active leases in the Sea.

C. Procedural History

Plaintiffs filed suit, alleging seven deficiencies in the FEIS:

> 1. [The FEIS] does not adequately analyze and present the impacts of Lease Sale 193 on the environment and human communities;
>
> 2. [It] fails to include essential missing information about the Chukchi Sea and the

> potential impacts of the lease sale, or explain why excluding this information is justified;
>
> 3. [It] fails to adequately analyze the impact of the lease sale in the context of a warming climate;
>
> 4. [It] understates the potential impacts of oil and gas development pursuant to the leases by analyzing a limited development scenario;
>
> 5. [It] understates the risks of an oil spill;
>
> 6. [It] fails to fully analyze the cumulative impacts to threatened eiders of the lease sale and other oil and gas development in threatened eiders' Arctic habitat; and
>
> 7. [It] provides a misleading analysis of the effects of seismic surveying.

The parties cross-moved for summary judgment.

The district court agreed with defendants that much of the FEIS complied with NEPA, including the FEIS's assumption that there would be one billion barrels of economically recoverable oil. However, the court concluded that the FEIS's analysis was flawed in three respects: it "failed to analyze the environmental impact of natural gas development, despite industry interest and specific lease incentives for such development"; it "failed to determine whether missing information identified by the agency was relevant or essential under 40 C.F.R § 1502.22"; and it "failed to determine whether the cost of obtaining the missing information was

exorbitant, or the means of doing so unknown." The district court granted in part plaintiffs' motion for summary judgment, issued a limited injunction, and remanded to BOEM for further proceedings.

After remand from the district court, BOEM prepared an SEIS. The SEIS analyzed the consequences of natural gas exploration and production. In the aftermath of the Deepwater Horizon oil spill in the Gulf Coast, it also analyzed the environmental impacts of a very large oil spill. Finally, BOEM prepared an appendix analyzing "whether the information gaps that were identified in the Sale 193 FEIS were relevant and necessary to evaluate reasonably foreseeable significant adverse effects." Based on the FEIS, now supplemented by the SEIS, the Secretary of Interior again chose the fourth alternative for oil and gas leasing.

Based on the FEIS and SEIS, the district court granted BOEM's motion for summary judgment. The court found that "BOEM has identified missing or incomplete information and has adequately evaluated it in a manner that is clearly sufficient at this stage of the development process to satisfy the requirements of 40 C.F.R. § 1502.22." The court gave "considerable deference . . . to BOEM's expertise." Plaintiffs timely appealed.

II. Standard of Review

Our review of an EIS is governed by the Administrative Procedure Act ("APA"). "Under the APA, we may set aside an agency decision if it is 'arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.'" *Native Ecosystems Council v. U.S. Forest Serv.*, 428 F.3d 1233, 1238 (9th Cir. 2005) (quoting 5 U.S.C. § 706(2)(A)). "Review

under the arbitrary and capricious standard is narrow, and we do not substitute our judgment for that of the agency." *Lands Council v. McNair* (*Lands Council II*), 537 F.3d 981, 987 (9th Cir. 2008) (en banc) (alterations and internal quotation marks omitted). However, an agency's decision can be set aside if:

> the agency relied on factors Congress did not intend it to consider, entirely failed to consider an important aspect of the problem, or offered an explanation that runs counter to the evidence before the agency or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.

Id. (internal quotation marks omitted). Such actions would be "clear error[s] of judgment that would render [the agency's] action arbitrary and capricious." *Id.* at 993 (internal quotation marks omitted).

We "may affirm a summary judgment only if, viewing the evidence in the light most favorable to the party against whom it is granted, we find no genuine issue of material fact, and we find that the prevailing party is clearly entitled to judgment as a matter of law." *California v. Watt*, 683 F.2d 1253, 1258 (9th Cir. 1982), *rev'd on other grounds sub nom. Sec'y of the Interior v. California*, 464 U.S. 312 (1984).

III. Discussion

On appeal, plaintiffs argue that BOEM abused its discretion in two respects. First, they argue that "essential" information is missing from the FEIS and SEIS, in violation of 40 C.F.R. § 1502.22. Second, they argue that the FEIS and

SEIS underestimate the adverse environmental impact of the lease sale because they use an unrealistically low estimate of the economically recoverable oil. We disagree with plaintiffs' first argument, but agree with their second argument.

A. Essential Information

An agency's obligation with respect to incomplete or unavailable information is spelled out in 40 C.F.R. § 1502.22. The agency "shall always make clear that . . . information is lacking." *Id.* If the missing information is "relevant to reasonably foreseeable significant adverse impacts" and is "essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant," the agency must include that information in the EIS. *Id.* § 1502.22(a). If the missing information "cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known," the agency must include the following in the EIS: (1) a statement that such information is "incomplete or unavailable"; (2) a statement of the "relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment"; (3) a "summary of existing credible scientific evidence . . . relevant to evaluating the reasonably foreseeable adverse impacts"; and (4) the agency's "evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community." *Id.* § 1502.22(b). Section 1502.22(b) clarifies that reasonably foreseeable effects "include[] impacts which have catastrophic consequences, even if their probability of occurrence is low."

Much of the information missing from the EIS concerns animal populations potentially affected by oil exploration and production under the leases. The missing information concerns such things as population levels of various species of animals in the Chukchi Sea, including endangered or threatened animals; the locations of various animal populations during the year; the feeding and breeding habits of various animal populations; and the vulnerability of various animal populations to drilling and other exploration and production-related activities.

With respect to the potential environmental harm from a large oil spill, BOEM concluded that the missing information was not essential to a reasoned choice among the alternatives. It wrote in the SEIS, "[I]n the unlikely event of a large oil spill, it is well-understood that environmental impacts could be severe. The severity of potential impacts would be nearly identical under any action alternative; therefore, very specific types of information relevant to species, particular life history traits, or behavior do not help substantially in distinguishing among alternatives." With respect to other activities or events with potential adverse impacts on the animal populations in the Chukchi Sea, BOEM concluded that sufficient protections would be provided by the requirements of other environmental statutes, such as the Clean Air Act, the Marine Mammal Protection Act ("MMPA"), and the ESA, and by the requirement under NEPA to provide site-specific analyses at later stages of development.

Based on these conclusions, BOEM stated in the SEIS that it did not consider any of the incomplete or unavailable information at issue to be "essential to a reasoned choice among alternatives" at this stage of the development process. 40 C.F.R. § 1502.22(a). BOEM therefore did not determine

whether the information was unobtainable "because the overall costs of obtaining it are exorbitant or the means to obtain it are not known." *Id.* § 1502.22(b). Nor did BOEM go through the steps required by § 1502.22(b) if it had found "essential" information to be unobtainable. Instead, BOEM specifically relied in the SEIS on what it characterized as its "understanding that certain items of presently missing or incomplete information will be known (and utilized to avoid or minimize adverse impacts) at a later stage of OCS Lands Act environmental review." BOEM promised in the SEIS that it "would thoroughly review specific development & production plans at Step 4 ['development and production'], if and when a project proponent actually submits a plan. Thus, while certain information may, in fact, be essential at a later stage of OCS Lands Act [review], such information may not be essential to a reasoned choice among alternatives at this lease sale stage."

In *Village of False Pass v. Clark*, 733 F.2d 605 (9th Cir. 1984), we reviewed an EIS of an oil and gas lease sale under OCSLA. The plaintiff had argued that the commitment made by the government when entering into leases under OCSLA is so substantial that a fully exhaustive environmental analysis under NEPA had to be performed at the lease sale stage. We disagreed, writing:

> NEPA may require an environmental impact statement at each stage: leasing, exploration, and production and development. Furthermore, each stage remains separate. The completion of one stage does not entitle a lessee to begin the next.

Id. at 614. We wrote to the same effect in *Northern Alaska Environmental Center*:

> [P]rojects [for the development of oil and gas natural resources] generally entail separate stages of leasing, exploration and development. At the earliest stage, the leasing stage we have before us, there is no way of knowing what plans for development, if any, may eventually materialize.

457 F.3d at 977.

A lease sale under OCSLA is analogous to a "programmatic" plan. The required level of analysis in an EIS is different for programmatic and site-specific plans. We wrote in *Friends of Yosemite Valley v. Norton*, 348 F.3d 789 (9th Cir. 2003):

> An agency's planning and management decisions may occur at two distinct administrative levels:
>
> > (1) the "programmatic level" at which the [agency] develops alternative management scenarios responsive to public concerns, analyzes the costs, benefits and consequences of each alternative in an [EIS], and adopts an amendable [management] plan to guide management of multiple use resources; and (2) the implementation stage during which individual site specific projects,

> consistent with the [management] plan, are proposed and assessed.
>
> *Ecology Ctr., Inc. v. United States Forest Serv.*, 192 F.3d 922, 923, [n.2] (9th Cir. 1999). An EIS for a programmatic plan . . . must provide 'sufficient detail to foster informed decision-making,' but 'site-specific impacts need not be fully evaluated until a critical decision has been made to act on site development.' *N. Alaska Envtl. Ctr. v. Lujan*, 961 F.2d 886, 890–91 (9th Cir. 1992).

Id. at 800 (alterations in original).

Regardless of whether a programmatic or site-specific plan is at issue, NEPA requires that an EIS analyze environmental consequences of a proposed plan as soon as it is "reasonably possible" to do so. We wrote in *Kern v. U.S. Bureau of Land Management*, 284 F.3d 1062 (9th Cir. 2002), with respect to a programmatic plan:

> Once an agency has an obligation to prepare an EIS, the scope of its analysis of environmental consequences in that EIS must be appropriate to the action in question. NEPA is not designed to postpone analysis of an environmental consequence to the last possible moment. Rather, it is designed to require such analysis as soon as it can reasonably be done. If it is reasonably possible to analyze the environmental consequences in an EIS for [a Resource

> Management Plan], the agency is required to perform that analysis.

Id. at 1072 (citation omitted); *see also Pac. Rivers Council v. U.S. Forest Serv.*, 689 F.3d 1012, 1025–27, 1029–30 (9th Cir. 2012), *dismissed as moot*, 133 S. Ct. 2843 (2013). This is not to say that an agency must provide the most extensive environmental analysis possible at the earliest possible moment, for an agency has some flexibility in deciding the level of analysis to be performed at a particular stage. We will defer to the agency's judgment about the appropriate level of analysis so long as the EIS provides as much environmental analysis as is reasonably possible under the circumstances, thereby "provid[ing] sufficient detail to foster informed decision-making" at the stage in question. *Friends of Yosemite Valley*, 348 F.3d at 800 (internal quotation marks omitted).

In the case before us, we conclude that BOEM has reasonably concluded that the missing information from the FEIS and SEIS is not "essential" to informed decisionmaking at the lease sale stage. We agree with BOEM that compliance with statutes such as the MMPA and the ESA will provide protection for animals covered by those statutes. The MMPA generally prohibits the "take" of marine mammals. 16 U.S.C. § 1371(a). A "take" encompasses any act of "torment" or "annoyance" that "has the potential to injure . . . or . . . disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering." *Id.* § 1362(13), (18)(A)(i)–(ii). Unlawful "takes" trigger civil and criminal penalties. *Id.* § 1375(a)(1), (b). Further, under the ESA § 7(a)(2), 16 U.S.C. § 1536(a)(2), BOEM must consult with the

National Marine Fisheries Service and the U.S. Fish and Wildlife Service to "insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species." If an action is likely to jeopardize a species, the acting agency must determine whether any "reasonable and prudent alternatives" exist that will avoid jeopardizing that species. 16 U.S.C. § 1536(b)(3)(A). We recognize that BOEM has already consulted with these agencies at the lease sale stage. It may well have to consult with them again at the development and production stage when specific plans have been proposed and site-specific activities are contemplated. (We note that it may also have to consult again at the lease sale stage, once it has performed a proper analysis of the estimated overall oil production.) Because these statutes provide additional protections for animals in the Chukchi Sea, they support BOEM's conclusion that missing information about these animals was not "essential" at this stage.

We also agree with BOEM that further environmental analysis will be appropriate at a later stage. In BOEM's words, "certain items of presently missing or incomplete information will be known (and utilized to avoid or minimize adverse impacts) at a later stage of OCS Lands Act environmental review." That is, "when a project proponent actually submits a plan," BOEM will be required under NEPA to perform a plan- or site-specific environmental analysis of that proposed plan. At that stage, missing or incomplete information that has not been "essential to a reasoned choice among alternatives" at the lease sale stage may later become essential. If there is "essential" information at the plan- or site-specific development and production stage, BOEM will be required to perform the

analysis under § 1502.22(b) that it has not performed in the FEIS and SEIS now before us.

Of course, we recognize that our discussion and decision in the next Section regarding BOEM's one billion barrel estimate may have some effects upon the remainder of the FEIS. But we will not at this time speculate about the extent of those effects, if any. The Defendants are in the best position to analyze those effects, if any, and have the duty to analyze them in the first instance.

B. One Billion Barrel Estimate

Plaintiffs contend that BOEM chose an arbitrary number for the total barrels of economically recoverable oil from Lease Sale 193. The FEIS estimated the amount of recoverable oil by estimating production from the "first offshore oil field" that would be developed within the area of the leases. BOEM did not make any estimate of recoverable oil from additional fields that might be developed. The FEIS specified that the "recoverable oil resources from this field are assumed to be 1 billion barrels (Bbbl)." The FEIS then used the one billion barrel estimate as the basis for its environmental analysis.

We must determine whether BOEM has articulated a rational basis for its decision to use the one billion barrel estimate. *Mora-Meraz v. Thomas*, 601 F.3d 933, 939 (9th Cir. 2010). We must reverse a decision as arbitrary and capricious if

> the agency relied on factors Congress did not intend it to consider, entirely failed to consider an important aspect of the problem,

> or offered an explanation that runs counter to the evidence before the agency or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.

Lands Council II, 537 F.3d at 987 (internal quotation marks omitted). For the reasons that follow, we conclude that BOEM's one billion barrel estimate is arbitrary and capricious.

1. The Selection of One Billion Barrels

BOEM first announced it was developing an EIS in preparation for Lease Sale 193 in July 2005. According to internal BOEM emails, BOEM analyst Jim Craig was assigned to provide "resource estimates and a scenario" which other BOEM scientists would use to analyze environmental effects. Craig emailed his supervisor, Deborah Cranswick, stating that he believed that "[t]he reasonably foreseeable scenario" should include "oil production from the first field only, not the full economic potential." Craig's reason for focusing on the first field production was practical; he would have to wait for about two months to have information that would allow him to develop a scenario for the entire area covered by the lease sale. Craig stated in his email, "You realize that we won't have the 2005 resource assessment numbers until Sept, so we must base the scenario on the 'first development' not the total economic potential." Craig also indicated that this emphasis on the first oil field was a "departure from previous work."

Craig asked Cranswick whether the scenario should employ a single estimate of oil production from that first

field, or whether it should employ a range. Cranswick responded by email that she preferred a range. Craig then suggested, in a July 29 email, a range from 500 million barrels to 1.5 billion barrels. Craig emphasized in his email that the scenario should assume "equal probability for any volume within the range" so that one billion barrels "does not become the de facto most-likely" outcome. Craig's draft scenario also noted, with respect to recoverable oil in the Chukchi Sea, that "[o]ur current petroleum assessment indicates that recoverable oil resources could range from 3.6 to 11.8 billion barrels."

There is a gap in the email chain in our record, so we do not know Cranswick's next response to Craig. But we do know that in a subsequent email from Craig to Cranswick on August 2, Craig proposed a single one billion barrel estimate as an alternative to using a range that was "too broad":

> Attached is a table with E&D data. If this represents too broad of a range, then I think we should fall back to a single volume (1.0 Bbbl) for the EIS analysis with a corresponding set of single E&D numbers. It's hard to have it both ways (very narrow range) when these figures are entirely speculative.
>
> There are two clear options:
>
> > 1) 500-1500 MMbbl, as a uniform distribution (every point in range is equally likely). This will require a low and high case analysis.

> 2) 1.0 Bbbl as a single point estimate with no confidence interval. This will require a mostly likely case analysis only.
>
> Although it would be nice to propose a recoverable oil volume of 932 MMbbl +/- 134 MMbbl in a 90% confidence interval, we don't have any data to support it.
>
> Pick (1) *or* (2), but not (1) *and* (2).

On August 3, Cranswick emailed Craig a data chart reflecting Craig's second option. It contained only a single one billion barrel estimate.

On that same day, Craig emailed to Cranswick a draft scenario relying on the one billion barrel estimate of oil production. This draft explained:

> The scenario assumed for environmental analysis involves the discovery, development, and production of the first oil field in the Chukchi sale area. Ultimately recoverable oil resources from this field are assumed to be 1 billion barrels (Bbbl). Smaller oil volumes are not likely to be economic to produce and single pools containing larger volumes are increasingly rare. If oil prices drop below $30.00 per barrel (they are above $50.00 when this scenario was written), exploration in the Chukchi OCS is expected to be minimal and oil discoveries may not be developed.

The draft also pointed out that "the mean recoverable oil resource [in the Chukchi Sea] is 12 Bbbl with a 5% probability of 29 Bbbl." Craig also prepared a chart for Cranswick comparing the numbers Craig had selected for the Lease Sale 193 EIS to an EIS prepared for the Chukchi Sea and Hope Sea Basin for the 2002–2007 Five Year Oil and Gas Leasing Program. That previous EIS had estimated a range for economical oil production from 0.96 billion barrels to 2.42 billion barrels.

On August 10, Cranswick circulated the Lease Sale 193 EIS scenario to other BOEM scientists who would be working on the EIS. The scenario contained the one billion barrel estimate. Cranswick explained in an email that

> [t]he scenario is based on a one mid-range economic resource number (note - this is *not* necessarily the most likely. A lower volume is more likely to occur but less likely to be developed from an economic standpoint; a higher volume is less likely to occur but more likely to be developed).

Several BOEM employees expressed concern with the agency's proposed scenario. For example, one NEPA analyst employed by BOEM, Dee Williams, wrote, "I don't understand why [the agency] doesn't use their sophisticated assessment indices to impose a more definitive likely scenario. Clearly, it is impossible to predict 'with certainty', but the narrative needs to inspire greater public confidence by explaining the parameters of reasonable expectations." Williams further stated:

> If it becomes economical to build one platform to produce an estimated 1 billion barrels, and there is between 12 and 29 billion barrels that are recoverable, why is the scenario not compelled to imagine more than one platform (i.e. is a single platform *always* the initial scenario, in which case maybe we should just explain that)?

Cranswick responded that "the initial scenario is one platform because we can't have only a partial platform if that is all that the resource estimate support[s]." At the same time, Cranswick suggested that smaller oil developments would be associated with the first oil platform. "Once the first platform goes in, it is likely that additional satellite subsea completions would be developed before another host platform would be considered."

Once the draft EIS was completed, BOEM sought comments from other agencies and from the public. Numerous outside commentators expressed concern about the scenario BOEM had developed. For example, the Environmental Protection Agency wrote that

> the hypothetical development scenario that is used in the document add[s] additional layers of uncertainty regarding the probabilities of exploration, production and development activities and the risks associated with those activities. . . . EPA is concerned that, overall, the depth and diversity of uncertainties presented in the document resulted in the lack of adequate support for many of the document's conclusions.

The Division of Migratory Bird Management at the U.S. Fish and Wildlife Service ("FWS") similarly challenged the one billion barrel estimate as inaccurate:

> The basic assumptions used in the analysis of effects are flawed with regards to the size of development scenarios. The [Draft EIS ("DEIS")] states that the current petroleum assessment indicates a mean recoverable oil resource of 12 billion barrels; yet all environmental analyses reported in the DEIS are based on a development of 1 billion barrels, thereby significantly underestimating likely scenarios.

The Division recommended that BOEM not proceed with the lease sale until problems with the EIS were corrected. Public commentators similarly pointed to flaws in employing a one billion barrel production estimate, including that such an estimate was "based on a price of oil at half the current market value," that the estimate "severely understates the true cumulative impacts" of oil production, and that it was "nowhere . . . justified with scientific analysis." Despite these criticisms, BOEM continued to rely on its one billion barrel estimate. The one billion barrel estimate was the basis for the entire FEIS, including its analysis of the risk of a large oil spill. For example, BOEM instructed the FWS to rely on that estimate in that agency's analysis of whether the lease sale would jeopardize listed threatened species such as the spectacled and Steller's eiders. Had FWS made a jeopardy finding, BOEM either would not have been able to proceed with the Lease Sale under the ESA or would have had to obtain an exemption from the "no jeopardy" rule. 16 U.S.C. § 1536(a)(2).

2. Arbitrary and Capricious

Plaintiffs contend that the one billion barrel estimate was chosen arbitrarily, and that BOEM did not provide an adequate explanation for its selection. We agree for three reasons.

First, BOEM has not justified its choice of the lowest possible amount of oil that was economical to produce as the basis for its analysis. The draft EIS scenario stated that the agency chose to focus on a one billion barrel estimate in part because any volume lower than one billion barrels would not be economical to produce. At the same time, BOEM was well aware that if any oil was produced from Lease Sale 193, the economically recoverable oil was very likely to exceed one billion barrels. In an August 18, 2005, email commenting on the in-progress draft EIS, Jim Craig wrote, "We assume 1 billion bbl for the first field, but there is another 11 Bbbl that is economic at $70." Craig attached a table to a December 2005 email, listing "Estimates for Speculative Oil and Gas Reserves," specifying a range between 1.0 and 6.1 billion barrels for the "Chukchi Shelf." Finally, in a May 2006 email Craig wrote, "The '1-billion barrel, first field' assumption is subjective ('for purposes of analysis') and represents only a fraction of the full economic resource potential in the Chukchi (which was recently published)."

The mean estimate of economical oil production, at the center of the distribution curve, is by definition a more likely occurrence than is the lowest estimate of viable oil production. Previous EISes in the Chukchi Sea had used the mean estimate of oil production as the basis for their analyses, and those EISes had also included low and high

estimates. For example, BOEM previously leased portions of the Chukchi Sea in now-expired Lease Sale 109. The parcels leased in Lease Sale 109 overlap substantially with the parcels leased in Lease Sale 193. Documents prepared in advance of Lease Sale 109 stated that "[t]he mean resource estimate . . . is 2.68 billion barrels of oil with a 20 percent chance of a discovery of commercially recoverable oil." In estimating the effects of oil spills from Lease Sale 109, BOEM "assume[d] the full development of the resource estimate of 2.68 billion barrels." In contrast, while estimates in the record about the economically recoverable amount of oil from Lease Sale 193 vary, nowhere is the mean amount of economical production calculated to be less than 2.37 billion barrels. But the FEIS for Lease Sale 193 uses one billion rather than 2.37 billion barrels as the basis for its analysis of environmental consequences.

BOEM's primary explanation for using its low-end estimate for oil production is that this scenario overestimates the likely amount of production. BOEM emphasizes that because of the remoteness of the area and the risk of economic failure, any oil production activity is an unlikely result of the lease sale. More specifically, BOEM estimates that there is a less than 10 percent likelihood that oil development in the region will occur. Defendants argue that since the most likely foreseeable outcome is no oil development at all, one billion barrels of oil production is actually a generous estimate.

This analysis is flawed. The assumption that there is a 10 percent chance of commercial oil development is itself without a rational basis in the record. Jim Craig first developed the estimate "off the top of [his] head" in an email exchange. That calculation contradicts estimates used earlier

in the EIS, as well as estimates used in past EISes for the Chukchi Sea. Further, BOEM conflates the likelihood of oil and gas production with the likelihood of environmental effects if such production occurs. Based on its responsibility to "'consider[] all foreseeable direct and indirect impacts'" of the proposed action, *N. Alaska Envtl. Ctr.*, 457 F.3d at 975 (citation omitted), BOEM concluded that oil production was "reasonably foreseeable." There is a substantial basis for this in the record because, as noted by BOEM, "the area has high oil resource potential and there is existing transportation infrastructure to move oil from northern Alaska to distant markets." Once BOEM made the determination that production is reasonably foreseeable, it was required to consider the full cumulative impact of that production. *See* 40 C.F.R. § 1508.7. Put differently, BOEM might well be right that the most likely outcome is that there will be no oil development in the Chukchi Sea. But that fact should have made no difference to BOEM's analysis of the reasonably foreseeable environmental effects of oil development, if such development *does* occur.

Second, the FEIS did not take into account variation in oil prices in arriving at the estimate that one billion barrels of oil are economically recoverable. An assumption of stable prices ignores the fact that the amount of economically recoverable oil varies substantially depending on oil prices. This may be seen, for example, in a 2006 report of the Minerals Management Service (a prior incarnation of BOEM), which estimated economically recoverable oil from the Chukchi Shelf at different prices. At $30 per barrel, the mean estimate was 0 barrels; at $46 per barrel, the mean estimate was 2.37 billion barrels; at $60 per barrel, the mean estimate was 8.38 billion barrels; at $80 dollars per barrel, the mean estimate was 12 billion barrels.

Third, BOEM has not provided an adequate explanation for its decision to base its EIS only on the amount of oil expected to be produced from the first field in the leased area of the Chukchi Sea. It is unclear from the record how BOEM initially estimated that the first field would produce one billion barrels of oil. Jim Craig himself suggested that his calculations regarding that first development were "entirely speculative." But even assuming that one billion barrels is an accurate estimate of the amount of oil to be produced from the first field, it is unclear why BOEM assumed that only one oil field would be developed in the lease area. The FEIS itself acknowledges that "[w]hen the first project overcomes the cost, logistical, and regulatory hurdles, more projects are . . . likely to follow."

The FEIS explains that it is unlikely that "all economically viable resources will be developed" in the Sea due to the difficulties in operating in a frontier area of oil production. But the FEIS does not explain why production would be expected to stop if the first oil field is developed. The primary explanation for that assumption suggested by the record is that data to analyze "the full economic potential" of the lease sale would not be available until about two months after Jim Craig initially proposed an estimate based on the first field. Previous evaluations of Chukchi Sea oil development had assumed that multiple oil fields would develop once commercial development was viable. In a technology assessment of Chukchi Sea petroleum development performed in 1983 for BOEM, the Bureau of Land Management had used a 1.5 billion barrel estimate to measure prospects in "the central Chukchi shelf." That assessment assumed that two oil fields would be developed: one of one billion barrels and one of 0.5 billion barrels. On the record before us, it remains unclear why BOEM chose to

analyze the lowest amount of oil that could be produced in the Chukchi Sea from the smallest number of oil fields that could be developed.

Defendants contend that any error resulting from using the one billion barrel estimate can be corrected through site-specific EISes later in the development process. We disagree. An agency is required to analyze the environmental effects in an EIS as soon as it is "reasonably possible" to do so. *Kern*, 284 F.3d at 1072. An appropriate time to estimate the total oil production from the lease sale is the time of the lease sale itself. Under NEPA, BOEM is required to take into account the full environmental effects of its actions when deciding whether and in what manner to pursue the lease sale. 42 U.S.C. § 4332(2)(C). A later project or site-specific environmental analysis is an inadequate substitute for an estimate of total production from the lease sale as a whole. It is only at the lease sale stage that the agency can adequately consider cumulative effects of the lease sale on the environment, including the overall risk of oil spills and the effects of the sale on climate change. It is also only at the lease sale stage that the agency can take into account the effects of oil production in deciding which parcels to offer for lease.

We also disagree with defendants that our decisions in *Akutan*, 869 F.2d at 1191–92, *False Pass*, 733 F.2d at 617, and *Watt*, 683 F.2d at 1267–68, compel a contrary result. In *False Pass*, plaintiffs challenged the agency for failing to consider the *worst* case scenario for oil development. 773 F.2d at 614. In the circumstances presented there, we held that there was a rational explanation for not considering the worst case at the lease sale stage. Here, in contrast, the BOEM considered only the *best* case scenario for

environmental harm, assuming oil development. A best case scenario "skew[s]" the data toward fewer environmental impacts, and thus impedes a "full and fair discussion of the potential effects of the project." *Native Ecosystems Council v. U.S. Forest Serv.*, 418 F.3d 953, 965 (9th Cir. 2005) (citation and internal quotation marks omitted).

Unlike in *Akutan*, BOEM's estimate did not merely inform an assessment of the likelihood of an oil spill. 869 F.2d at 1192. Among other things, its estimate informed an assessment of seismic effects, habitat effects, oil production, and the cumulative effects of the sale on global warming. BOEM's estimate also informed FWS's determination that Lease Sale 193 would not jeopardize listed species. The record suggests that FWS was close to finding, even under the one billion barrel assumption, that the lease sale would jeopardize the spectacled and Steller's eiders. Had BOEM not selected the least amount of oil necessary for production, FWS may well have concluded that the listed species were in jeopardy. *See* 16 U.S.C. § 1536(a)(2).

Finally, the degree of error in the estimation of total oil production is greater here than in our earlier cases. In *Watt*, the agency was ready to publish its EIS when newly available figures suggested that oil reserves were "roughly twice those originally estimated." 683 F.2d at 1267. We held in *Watt* that the agency had acted reasonably when it decided not to supplement its EIS with last-minute analysis of the risk of an oil spill based on the new figures. *Id.* at 1267–68. In the case before us, BOEM was fully aware from the very beginning that if one billion barrels could be economically produced, many more barrels could also be economically produced. Indeed, at current oil prices, it would be economical to

recover twelve times the one billion barrel estimate used by BOEM. This is a far more dramatic difference than in *Watt*.

We do not criticize BOEM's decision to estimate the total amount of economically recoverable oil from the lease sale. Given the uncertainties involved in the Chukchi Sea, BOEM had no choice but to make an estimate. But having decided that oil production was reasonably foreseeable, NEPA required BOEM to base its analysis on the full range of likely production if oil production were to occur. It did not do so here.

Conclusion

We conclude that the FEIS and SEIS properly took account of incomplete or unavailable information. However, we conclude that reliance in the FEIS on a one billion barrel estimate of total economically recoverable oil was arbitrary and capricious.

We **REVERSE** and **REMAND** to the district court for further proceedings consistent with this opinion.

RAWLINSON, Circuit Judge, concurring in part and dissenting in part:

I agree with most of the majority opinion, including that the missing information from the final environmental impact statement (FEIS) and the Supplemental Impact Statement (SEIS) is not essential to informed decisionmaking at the lease sale stage, and that further environmental analysis will be more appropriate at a later stage. However, I do not agree

that the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEM) acted arbitrarily in selecting one billion barrels of oil as the benchmark for analyzing the environmental affects of the proposed leases.

I begin with a reminder that our review of the agency's analysis of technical data is extremely limited. *See Lands Council v. McNair*, 537 F.3d 981, 987 (9th Cir. 2008) (en banc), *overruled on other grounds as recognized by Am. Trucking Ass'ns v. City of Los Angeles*, 559 F.3d 1046, 1052 (9th Cir. 2009) ("Review under the arbitrary and capricious standard is narrow, and we do not substitute our judgment for that of the agency. . . .") (citation, alteration and internal quotation marks omitted). We should also keep in mind that the National Environmental Policy Act (NEPA) "does not mandate particular results." *Dep't of Transp. v. Pub. Citizen*, 541 U.S. 752, 756 (2004). Rather, the statute "imposes only procedural requirements on federal agencies . . ." *Id.* Under NEPA, "[w]e review an [Environmental Impact Statement] under a rule of reason to determine whether it contains a *reasonably thorough* discussion" of the potential environmental effects of a planned federal action. *Edwardsen v. Department of the Interior*, 268 F.3d 781, 784 (9th Cir. 2001) (citation omitted).

The majority opinion takes issue with the agency's selection of one billion barrels of oil as the benchmark amount for assessing potential environmental effects of the oil leases. However, our review is at its most deferential when we consider a predictive estimate such as BOEM's estimate of the amount of oil recovery that should be included in the environmental effects analysis. *See Lands Council*, 537 F.3d at 993 ("[W]e are to conduct a particularly deferential review of an agency's predictive judgments about

areas that are within the agency's field of discretion and expertise . . .) (citations and internal quotation marks omitted). Our task is only to ensure that the agency has not:

> relied on factors which Congress has not intended it to consider, entirely failed to consider an aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or an explanation that is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.

Id. (citations, alteration, and internal quotation marks omitted).

The majority does not intimate that BOEM relied on factors Congress did not intend it to consider, or that BOEM entirely failed to consider an aspect of the problem. The majority opinion also cannot be fairly read to describe BOEM's benchmark choice as so implausible that it could not be ascribed to a difference in view or the product of agency expertise. In fact, the majority opinion discusses the different view and agency expertise brought to bear on this issue. *See Majority Opinion*, pp. 21–26 (discussing the differing views from within and without the agency). So it appears that the basis for the majority's ruling is that BOEM's benchmark estimate runs counter to the evidence before the agency. But it doesn't.

The potential size of commercially extractable oil deposits in the Chukchi Sea is a quintessential example of a predictive judgment uniquely within BOEM's area of expertise. Indeed, we have previously recognized that

"[p]rior to exploration, it is difficult to make so much as an educated guess as to the volume of oil likely to be produced . . . Without this information, an oil spill risk analysis can never be more than speculative, *regardless of what methodology is used*. . . ." *Tribal Village of Akutan v. Hodel*, 869 F.2d 1185, 1192 (9th Cir. 1989), *as amended*.

It is beyond dispute that the Chukchi Sea contains oil deposits well in excess of one billion barrels. But that is not the point. The point is whether the selection of one billion barrels as the benchmark was the product of agency expertise. *See Lands Council*, 537 F.3d at 993. After considering the available evidence, BOEM concluded that substantial obstacles to oil development in the region made it unlikely that future production would "ever reach the full economic potential" in the Chukchi Sea. Five explorations had already tested some of the largest prospective sites without discovering a "commercial-size" oil source. With these circumstances in mind, BOEM ultimately selected one billion barrels as the benchmark estimate because lower oil volumes were not likely to be economically feasible. Rather than relying on general resource assessments as was done previously, BOEM opted for the more "realistic" benchmark tied to the discovery/development of the initial commercially viable offshore oil field. BOEM explained that the unique, remote, and previously unexplored nature of the Chukchi region required analysis of the "statistically most-likely development activity associated with a reasonable range of resources . . . given the uncertainties of geology, engineering, and economics that exist now" and the "streamlined" environmental impact statement (EIS) undertaken at the leasing stage of the process. *See Akutan*, 869 F.2d at 1192 ("We are the least troubled by what may seem to be incomplete or speculative data at the lease sale stage. . . .").

The majority is of the view that BOEM's "analysis is flawed." *Majority Opinion*, p. 28. But we do not sit as a panel of super scientists to dissect the agency's analysis. Rather, we only review the process for reasonable thoroughness. *See Edwardsen*, 268 F.3d at 784 (establishing the role of the reviewing court to determine whether the agency's environmental impact statement "contains a reasonably thorough discussion"). Not only was BOEM's discussion of the selected benchmark "reasonably thorough," *id*., its selection of the benchmark was within the range of alternatives contained in the record. As the majority opinion acknowledges, a previous EIS had estimated a range of economical oil production from 0.96 billion barrels to 2.42 billion barrels. *See Majority Opinion*, p. 24. One billion barrels is certainly within that range. The same is true for the "range between 1.0 and 6.1 billion barrels" referenced at page 27 of the Majority Opinion and for the 10 percent estimate of the chance of commercial oil development. *See Majority Opinion*, p. 28 (noting the EIS's earlier reference to a 10–20 percent estimate and past estimates of 20 percent likely).

I readily acknowledge that there was disagreement in the scientific community concerning the selected benchmark. But disagreement does not render the chosen estimate irrational. Rather, it typifies the "difference in view" that we have established as a safe harbor against successful attack under NEPA. *See Lands Council*, 537 F.3d at 993. There is no such thing as a perfect estimate and BOEM was not required to adopt a different benchmark in the face of its critics. *See Environmental Defense Center, Inc. v. EPA*, 344 F.3d 832, 872 (9th Cir. 2003) ("We defer to an agency decision not to invest the resources necessary to conduct the perfect study . . ."). BOEM explained its reasons for selecting its benchmark estimate, and we are uniquely

unqualified to second-guess that selection. As the D.C. Circuit recognized in *City of L.A. v. Dep't of Transp.*, 165 F.3d 972, 977 (D.C. Cir. 1999): "[That some or many [experts] would disapprove of [BOEM's] approach does not answer the question presented to us. In reviewing [BOEM's EIS], we do not sit as a panel of referees on a professional [scientific] journal, but as a panel of generalist judges obliged to defer to a reasonable judgment by an agency acting pursuant to congressionally delegated authority. . . .") (citations omitted).

Because of the deference due the agency, and because BOEM's chosen benchmark was reasonably selected and adequately explained, our work here is done. We should afford BOEM's EIS the deference due and affirm the district court's order of dismissal.

I respectfully dissent.