IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS

SEAFREEZE SHORESIDE, INC. *et al.,* Plaintiffs, v. THE UNITED STATES DEPARTMENT OF THE INTERIOR *et al.,* Defendants, and VINEYARD WIND 1, LLC, Intervenor-Defendant.	Civil Action No. 1:22-cv-11091-IT

DEFENDANTS' MEMORANDUM IN OPPOSITION TO PLAINTIFFS SEAFREEZE SHORESIDE, INC. ET AL.'S MOTION FOR SUMMARY JUDGMENT AND IN SUPPORT OF CROSS-MOTION FOR SUMMARY JUDGMENT

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BA	Biological Assessment
BiOp	Biological Opinion
BOEM	U.S. Bureau of Ocean Energy Management
COP	Construction and Operations Plan
Corps	U.S. Army Corps of Engineers
CEQ	Council on Environmental Quality
CWA	Clean Water Act
DEIS	Draft Environmental Impact Statement
DoD	U.S. Department of Defense
EA	Environmental Assessment
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FWS	U.S. Fish & Wildlife Service
IHA	Incidental Harassment Authorization
JROD	Joint Record of Decision
MMPA	Marine Mammal Protection Act
NEPA	National Environmental Policy Act
NM	Nautical Mile
NMFS	National Marine Fisheries Service
NMFS/GAR	NMFS Greater Atlantic Region Office
NMFS/OPR	NMFS Office of Protected Resources
NORAD	North American Aerospace Defense Command
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
RHA	Rivers and Harbors Act
RODA	Responsible Offshore Development Alliance
RPA	Reasonable and Prudent Alternative
SAP	Site Assessment Plan
SDEIS	Supplemental Draft Environmental Impact Statement

INTRODUCTION

The Vineyard Wind Project ("the Project") is an offshore wind energy project planned for an area on the Outer Continental Shelf more than 14 miles from the coasts of Martha's Vineyard and Nantucket Island. The Project will have the capacity to generate approximately 800 megawatts of electricity, which would supply renewable energy to about 400,000 homes in Massachusetts. Vineyard Wind obtained an offshore wind lease for the area in early 2015, and, over the next several years, it gathered extensive data regarding the environmental conditions and uses of the area. The data included information regarding the suitability of seafloor to support wind turbines, the wind conditions in the area, marine mammal and fish species, and the use of the area and adjacent areas for fishing. After gathering all of this information and preparing several reports for the Bureau of Ocean Energy Management's ("BOEM") review, Vineyard Wind submitted a Construction and Operations Plan ("COP") for BOEM's approval.

In cooperation with the National Marine Fisheries Service ("NMFS"), the U.S. Army Corps of Engineers ("Corps"), the U.S. Coast Guard, and several other federal and state agencies, BOEM prepared an environmental impact statement ("EIS") to evaluate the impacts of the Project. The EIS evaluated the potential impacts of the Project on a range of resources and uses of the area, including marine mammals, fish species, commercial fishing, and national security issues. BOEM also obtained substantial input from the public, including the fishing industry, regarding the issues evaluated in the EIS. Through this extensive process and the preparation of lengthy EIS, BOEM met its obligations under the National Environmental Policy Act ("NEPA"). Further, by carefully evaluating the impacts of the Project and determining that it could be conducted safely, would contain appropriate mitigation to avoid and minimize environmental impacts, and would not unreasonably interfere with other uses of the area, BOEM complied with the Outer Continental Shelf Land Act ("OCSLA").

Environmental reviews also included consultation between BOEM, as well as other Federal action agencies, and the National Marine Fisheries Service's Greater Atlantic Region ("NMFS/GAR") under the Endangered Species Act ("ESA"). NMFS/GAR reasonably concluded in its 2021 biological opinion ("BiOp"), based on the best available scientific information, that BOEM's approval of the construction and operations plan with conditions, as well as the actions by other Federal agencies, are not likely to jeopardize the North Atlantic right whale ("right whale"). Vineyard Wind also applied to the National Marine Fisheries Services' Office of Protected Resources ("NMFS/OPR") for an incidental harassment authorization ("IHA") issued pursuant to the Marine Mammal Protection Act ("MMPA") for pile driving activities during Project construction. NMFS/OPR issued an IHA to Vineyard Wind on May 21, 2021. Based on the COP, Final EIS ("FEIS"), IHA, and BiOp, BOEM mandated numerous measures to avoid, minimize, reduce, or eliminate effects on right whales when it approved Vineyard Wind's COP with conditions in July 2021.

In sum, the record before the Court establishes that Federal Defendants complied with all applicable laws, and the Court should enter summary judgment in favor of Federal Defendants.

LEGAL BACKGROUND

I. Renewable Energy Leasing Under the Outer Continental Shelf Lands Act

The outer continental shelf consists of the submerged lands beneath the ocean, generally from 3 to 200 miles seaward of the coastline. *Ctr. for Biological Diversity v. Jewell*, 563 F.3d 466, 472 (D.C. Cir. 2009); 43 U.S.C. § 1331(a). Under OCSLA, the United States holds the outer continental shelf as a "vital national resource reserve . . . for the public," which Congress declared "should be made available for expeditious and orderly development, subject to environmental safeguards." 43 U.S.C. § 1332(3). Congress enacted OCSLA in 1953 to authorize

oil and gas leasing. *Sec'y of the Interior v. California*, 464 U.S. 312, 336 (1984). In 2005, Congress amended OCSLA to authorize the Secretary of the Interior to issue leases on the outer continental shelf to "support production, transportation, storage, or transmission of energy from sources other than oil and gas," including wind energy. 43 U.S.C. 1337(p)(1)(C); *see also* Energy Policy Act of 2005 § 388, Pub. L. 109-58, 119 Stat. 594, 744-45 (2005).

Pursuant to subsection 8(p) of OCSLA, the Secretary, in consultation with the U.S. Coast Guard and other relevant federal agencies, may grant a lease, easement, or right-of-way on the Outer Continental Shelf for the purpose of renewable energy production. 43 U.S.C. § 1337(p)(1)(C). OCSLA requires the Secretary to ensure that "any activity" that she authorizes is "carried out in a manner that provides for" 12 specific enumerated goals. *Id.* § 1337(p)(4)(A)-(L). Those include: safety; protection of the environment; conservation of natural resources; "prevention of interference with reasonable uses (as determined by the Secretary)" of the outer continental shelf; and consideration of other uses of the sea and seabed, including the use of the area for fishing and marine navigation. . *Id.*; *see also* 30 C.F.R. § 585.102(a). Interior has interpreted section 8(p) to mean that "OCSLA imposes a general duty on the Secretary to act in a manner providing for the subsection's enumerated goals," but the Secretary "retains wide discretion to determine the appropriate balance between two or more goals that conflict or are otherwise in tension." BOEM_0072956 (Solicitor's M-Opinion M-37067).

Pursuant to the authority granted by Congress, *see* 43 U.S.C. § 1337(p)(8), BOEM has issued regulations governing the leasing process and management of offshore renewable energy projects. *See* 74 Fed. Reg. 19,638 (Apr. 29, 2009); 30 C.F.R. Pt. 585. Under the regulations, BOEM may publish a notice to solicit interest in renewable energy leasing on the outer continental shelf, 30 C.F.R. § 585.210, and may publish a call for information and nominations

of potential lease areas, *id.* § 585.211(a) . Based on information and nominations received and the agency's own consideration of relevant factors, BOEM will then "identify areas for environmental analysis and consideration for leasing." *Id.* § 585.211(b) . In so doing, BOEM "will evaluate potential effects of leasing on the human, marine, and coastal environments," *id.* § 585.211(b)(2) , and will consult with "appropriate Federal agencies, States, local governments, affected Indian Tribes, and other interested parties." *Id.* § 585.211(b)(3); *see also* 74 Fed. Reg. 19,638, 19,659 (Apr. 29, 2009).

After identifying "wind energy areas," BOEM may proceed to offer the identified areas or portions of those areas for lease sale by auction. 30 C.F.R. §§ 585.215, 585.216. Prior to issuing any lease, BOEM will coordinate and consult with relevant federal agencies and other governmental entities, as directed by OCSLA or other relevant Federal laws. *Id.* § 585.203. "BOEM will determine the size for each lease based on the area required to accommodate the anticipated activities." *Id.* § 585.206(a) . Under BOEM's renewable energy program, a lease does not authorize the development of a wind energy facility; instead, a lessee's right to "install and operate facilities" for the "production of energy from a renewable energy source," is still "subject to obtaining the necessary approvals" from BOEM. 30 C.F.R. § 585.200(a)(2); *see also* BOEM_0000765 (Lease § 2(c)). In other words, in order for any development to occur, a lessee must first gather site characterization at the site and obtain BOEM's approval of a site assessment plan ("SAP") and later a construction and operations plan ("COP"). *Id*. § 585.600.

Before conducting "any site assessment activities," *i.e.*, deployment of meteorological buoys or installation of meteorological towers for data collection, on a leasehold, a lessee must submit and obtain BOEM approval of a SAP in accordance with BOEM's regulations. 30 C.F.R. §§ 585.600, 585.605–585.613) . If BOEM approves the SAP, then the lessee has a period of five

years to conduct site assessment activities and gather other data. *Id.* § 585.235(a)(2) . After gathering the necessary data, the lessee must then prepare a proposal for the development of a wind energy facility on the outer continental shelf and submit an application for a COP. *Id.* §§ 585.600, 585.620–585.629. At this stage, BOEM must prepare "an appropriate NEPA analysis." *Id.* § 585.628. After reviewing the application to ensure compliance with OCSLA and BOEM's regulations, BOEM may "approve, disapprove, or approve [the plan] with modifications." 30 C.F.R. §§ 585.613(e), 585.628(f) .

II. National Environmental Policy Act

Congress enacted NEPA to establish a process for federal agencies to consider the environmental impacts of their actions. *Vt. Yankee Nuclear Power Corp. v. Nat. Res. Def. Council, Inc.*, 435 U.S. 519, 558 (1978). NEPA is a strictly procedural statute. It does not mandate particular results; rather, "it simply prescribes the necessary process for preventing uninformed—rather than unwise—agency action." *Allen v. Nat'l Insts. of Health*, 974 F. Supp. 2d 18, 36 (D. Mass. 2013) (quoting *Robertson v. Methow Valley Citizens Council,* 490 U.S. 332, 333 (1989)). After completing the necessary environmental review, "NEPA does not prevent agencies from then deciding that the benefits of a proposed action outweigh the potential environmental harms: NEPA guarantees process, not specific outcomes." *Town of Winthrop v. FAA*, 535 F.3d 1, 4 (1st Cir. 2008). NEPA's procedural requirements obligate federal agencies to "take a 'hard look' at environmental consequences." *Beyond Nuclear v. U.S. NRC*, 704 F.3d 12, 19 (1st Cir. 2013). Council on Environmental Quality ("CEQ") regulations guide NEPA implementation.[1] *See* 40 C.F.R. §§ 1500-1508.

[1] The CEQ promulgated regulations implementing NEPA in 1978, 43 Fed. Reg. 55978 (Nov. 29, 1978), and made a minor substantive amendment to those regulations in 1986, *see* 51 Fed. Reg. 15618 (Apr. 25, 1986). The CEQ revised the regulations again in 2020. *See* 85 Fed. Reg. 43304

III. Endangered Species Act

Consistent with this Court's instructions that the parties limit duplicative briefing among the various cases challenging the Project, Federal Defendants incorporate by reference the legal background regarding the ESA set forth in their summary judgment brief filed contemporaneously in *Responsible Offshore Development Alliance v. U.S. Department of the Interior ("RODA")*, No. 1:22-cv-11172-IT.

IV. Marine Mammal Protection Act

Federal Defendants incorporate by reference the legal background regarding the Marine Mammal Protection Act ("MMPA") set forth in their summary judgment brief filed in *RODA*.

STATEMENT OF MATERIAL FACTS

Federal Defendants' Statement of Material Facts and Response to Plaintiffs' Statement of Material Facts, which are filed concurrently with this memorandum, are incorporated by reference.

STANDARD OF REVIEW

Claims challenging federal agency action are reviewed pursuant to the Administrative Procedure Act ("APA"), 5 U.S.C. §§ 701-706. Doc. No. 1 ¶ 26; *Mass. ex rel. Div. of Marine Fisheries v. Daley*, 170 F.3d 23, 28 (1st Cir. 1999); *Allen*, 974 F. Supp. 2d at 36. Under the APA, a court may set aside "agency action, findings, and conclusions" that it finds to be "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." *Airport Impact Relief, Inc. v. Wykle*, 192 F.3d 197, 202 (1st Cir. 1999). Review under this standard is to be

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(July 16, 2020). More recently, the CEQ published a new rule, effective May 20, 2022, further revising the regulations. 87 Fed. Reg. 23453 (Apr. 20, 2022). The claims in this case arise under the 1978 regulations, as amended in 1986. *See* BOEM_0068440. All citations to the Council's regulations in this brief refer to those regulations as codified at 40 C.F.R. §§ 1500-1508 (2018). For the Court's convenience, a copy of the 1978 regulations is attached as Ex. 1.

"searching and careful" but "narrow," and a court is not to substitute its judgment for that of the agency, *Marsh v. Or. Nat. Res. Council*, 490 U.S. 360, 378 (1989), but should make its determination based solely on the record on which the decision was made. *Citizens to Pres. Overton Park v. Volpe*, 401 U.S. 402, 419 (1971). Review under this standard is highly deferential, and "is especially marked in technical or scientific matters within the agency's area of expertise." *Citizens Awareness Network v. U.S. NRC*, 59 F.3d 284, 290 (1st Cir. 1995); *see also Baltimore Gas & Elec. Co. v. NRDC*, 462 U.S. 87, 103 (1983).

ARGUMENT

I. Plaintiffs' Claims of Injury Fall Outside NEPA's Zones of Interest

The Court need not reach Plaintiffs' NEPA claims because Plaintiffs lack standing to bring them. In addition to establishing that it has Article III standing, a plaintiff must also satisfy prudential concerns by establishing that its claimed injuries "fall within the zones of interest protected by the law invoked." *Lexmark Intern. v. Static Control Components, Inc.*, 572 U.S. 118, 129 (2014) (citation omitted). Plaintiffs claim that, if the Vineyard Wind Project moves forward, it will cause them to suffer economic injury. Those economic injuries fall outside NEPA's zone of interests.

NEPA is an environmental law that Congress enacted to promote environmental interests. 42 U.S.C. § 4321; *see Am. Waterways Operators v. U.S. Coast Guard*, 2020 WL 360493, at *6 (D. Mass. Jan. 22, 2020). As a result, numerous courts have concluded that purely economic interests fall outside NEPA's zone of interest. *Id.* (collecting cases); *Mountain States Legal Found. v. Glickman*, 92 F.3d 1228, 1235-36 (D.C. Cir. 1996) (NEPA's zone of interests "do not include purely monetary interests").

Here, Plaintiffs are each commercial fisheries or associations of commercial fisheries. Their concerns, and allegations of injury, center on alleged threat to their businesses and

profits—purely economic injuries that fall outside NEPA's zones of interest. Plaintiffs cannot cure their lack of prudential standing by relying on claims that their non-plaintiff owners have individual aesthetic or environmental interests. *See* Doc. No. 67 at 13 (describing alleged aesthetic interests of David Aripotch, a non-plaintiff owner of Plaintiff Old Squaw Fisheries). Mr. Aripotch's aesthetic interests are not "environmental interest[s] which [plaintiffs] as a business enjoy." *Pacific Northwest Generating Co-op v. Brown*, 38 F.3d 1058, 1063 (9th Cir. 1994) (corporations could not assert aesthetic or environmental interests of employees or members because those interests were not germane to corporate purpose). Plaintiffs therefore lack "prudential standing" to challenge the Project under NEPA.

II. Plaintiffs' Challenges to the Smart from the Start Initiative, Issuance of the Lease, and Approval of the Site Assessment Plan Lack Merit

Plaintiffs' NEPA and OCSLA challenges to the Smart from the Start initiative, issuance of the lease, and approval of the SAP are barred on jurisdictional grounds and lack merit.[2]

A. The Smart from the Start Initiative Is Not a Reviewable Final Agency Action

Plaintiffs begin by challenging Interior's Smart from the Start initiative as unlawful and contrary to the major questions doctrine. Plaintiffs have no legal basis for these arguments. As an initial matter, it is unclear what federal action Plaintiffs are challenging. The APA permits suits against final agency actions. *See Trafalgar Capital, Assocs., Inc. v. Cuomo*, 159 F.3d 21, 35 (1st Cir. 1998). A final agency action is one that completes the agency decisionmaking process and is a "definitive statement of the agency's position with direct and immediate consequences." *Id.* (quoting *FTC v. Standard Oil Co.*, 449 U.S. 232, 241 (1980)) (cleaned up). Plaintiffs refer to press releases issued on November 23, 2010 and February 1, 2011. *See* Doc. No. 68 ¶¶ 27-29. As

[2] Heading II in Plaintiffs' brief refers to the ESA, but there are no arguments regarding the ESA in that section of the brief. Plaintiffs' ESA arguments are addressed in section VII, *infra*.

Plaintiffs correctly state, however, Interior never issued a regulation based on those press releases. *See* Doc. No. 67 at 19. In order for an agency policy document to be a reviewable final agency action, it must "purport[] to bind both applicants and the Agency with the force of law." *Gen. Elec. Co. v. EPA*, 290 F.3d 377, 380 (D.C. Cir. 2002); *see also Molycorp, Inc. v. EPA*, 197 F.3d 543, 545 (D.C. Cir. 1999) (the "ultimate focus of the inquiry is whether … it has the force of law"). Where a policy has no such binding effect and the "agency remains free to exercise discretion," it is not reviewable under the APA. *Ctr for Auto Safety v. Nat'l Highway Traffic Safety Admin.*, 452 F.3d 798, 809 (D.C. Cir. 2006). The Smart from the Start initiative and Plaintiffs' cited press releases have no such binding effect and therefore are not a reviewable final agency action. Moreover, even if the 2011 press release and initiative they reference could otherwise be challenged, such a challenge would be time barred based on the six-year statute of limitations for civil actions against the United States. *See* 28 U.S.C. § 2401(a).[3]

B. The Smart from the Start Initiative Does Not Implicate the Major Questions Doctrine

In any event, even if the Court were to consider the merits of Plaintiffs' challenge to the Smart from the Start initiative, it would fail as a matter of law. Plaintiffs assert that the Smart from the Start initiative violated the major questions doctrine because it permitted BOEM to prepare an environmental assessment ("EA") rather than an EIS at the leasing stage. Doc. No. 67 at 19-23 (citing *West Virginia v. U.S. EPA*, 142 S. Ct. 2587, 2609 (2022)). Plaintiffs do not seriously dispute that Interior has the legal authority to approve the development of offshore wind projects on the outer continental shelf. Indeed, with the passage of the Energy Policy Act of

[3] Plaintiffs assert that the statute of limitations should be disregarded because they have characterized their challenge to the Smart from the Start initiative as an *ultra vires* claim. *See* Doc. No. 67 at 19. However, the case they cite does not stand for that proposition. *See La. Pub. Serv. Comm'n v. FCC*, 476 U.S. 355, 374 (1986)).

2005, Congress expressly authorized the Secretary of the Interior to approve renewable energy projects on the outer continental shelf. *See* 43 U.S.C. § 1337(p)(1) ("The Secretary . . . may grant a lease, easement, or right-of-way on the outer Continental Shelf for activities not otherwise authorized in this subchapter . . . ."); *see also* Energy Policy Act of 2005 § 388, Pub. L. No. 109-58, 119 Stat. at 744-45. Further, Congress delegated to Interior the authority to develop regulations governing renewable energy development. 43 U.S.C. § 1337(p)(8).

Instead, Plaintiffs' major questions doctrine argument is based on the premise that BOEM was required to prepare an EIS analyzing the environmental impacts of the development of the Project prior to issuing a lease. Plaintiffs do not explain how the major questions doctrine would apply to this issue. In *West Virginia v. EPA*, the Supreme Court explained that the major questions doctrine may apply in "extraordinary cases in which the history and the breadth of the authority that the agency has asserted, and the economic and political significance of that assertion, provide a reason to hesitate before concluding that Congress meant to confer such authority" through ambiguous statutory language. 142 S. Ct. at 2608 (cleaned up). As such, the major questions doctrine does not apply where the statutory language clearly delegates authority to the agency to take the challenged action. *See id.* Moreover, because the major questions doctrine focuses on the scope of an agency's authority to affirmatively regulate a given activity, it does not extend to how the agency complies with the procedural requirements of other statutes, such as NEPA, and Plaintiffs offer no authority for such a proposition. Therefore, all of Plaintiffs' arguments based on the major questions doctrine, *see* Doc. No. 67 at 21-22, 33, 35, 42, fail as a matter of law.

Plaintiffs' argument that an EIS was required also is contradicted by the only circuit court decision to squarely address the issue. *See Fisheries Survival Fund v. Haaland*, 858 F. App'x.

371 (D.C. Cir. 2021). In *Fisheries Survival Fund*, a group of plaintiffs representing fishing interests challenged BOEM's decision to issue a lease for the New York Wind Energy Area. *Id.* at 371-72. BOEM prepared an EA prior to its leasing decision, and the plaintiffs argued that the EA was insufficient to comply with NEPA because it did not analyze the impacts of constructing and operating the Project. *Id.*; *see also Fisheries Survival Fund v. Jewell*, No. 16-cv-2409 (TSC), 2018 WL 4705795, at *2-3 (D.D.C. Sept. 30, 2018), *affirmed sub nom. Fisheries Survival Fund v. Haaland*, 858 F. App'x. 371 (D.C. Cir. 2021). The D.C. Circuit held that the agency's obligation to comply with NEPA had not matured because the agency had not made an "irreversible and irretrievable commitment of resources" towards authorizing the development of an offshore wind project. *Fisheries Survival Fund*, 858 F. App'x. at 372 (quoting *Center for Biological Diversity v. Dept. of the Interior*, 563 F.3d 466, 480 (D.C. Cir. 2009)).

The D.C. Circuit's ruling is consistent with a longstanding line of cases holding that NEPA claims are not ripe unless the agency takes an action that will result in an irreversible and irretrievable commitment of resources. *See Ctr. for Biological Diversity*, 563 F.3d at 480 ("[A]n agency's NEPA obligations mature only once it reaches a 'critical stage of a decision which will result in irreversible and irretrievable commitments of resources' to an action that will affect the environment.'") (quoting *Wyo. Outdoor Council v. U.S. Forest Serv.*, 165 F.3d 43, 49 (D.C. Cir. 1999)); *see also Ctr. for Sustainable Econ. v. Jewell*, 779 F.3d 588, 599-600 (D.C. Cir. 2015). An agency makes such a commitment when, for example, "it no longer retains the authority to preclude all surface disturbing activities subsequent to issuing of an oil and gas lease." *Wyo. Outdoor Council*, 165 F.3d at 49 (quoting *Sierra Club v. Peterson*, 717 F.2d 1409, 1415 (D.C. Cir. 1983)) (quotations omitted).

Here, the Court should reach the same conclusion regarding Plaintiffs' argument that

NEPA required BOEM to prepare an EIS analyzing the impacts of the Project at the leasing stage. Like the lease at issue in *Fisheries Survival Fund*, the Vineyard Wind Lease grants Vineyard Wind only the "exclusive right and privilege" to submit a SAP and a COP for BOEM's approval and reserves BOEM's "right to disapprove a SAP or a COP based on [BOEM's] determination that the proposed activities would have unacceptable environmental consequences, would conflict with the requirements set forth in subsection 8(p)(4) of [OCSLA], or for other reasons" pursuant to BOEMs' regulations, 30 C.F.R. § 585.613(e)(2), 585.628(f)(2). *Compare* BOEM_0000765 (Vineyard Wind Lease §§ 2(a), 3(b)) *with Fisheries Survival Fund*, 858 F. App'x. at 372 (quoting the New York area lease terms). Thus, just as in *Fisheries Survival Fund*, BOEM did not, at the leasing stage, make an irreversible and irretrievable commitment of resources towards the approval of a wind energy project and therefore was not required to prepare an EIS analyzing the impacts of developing a project at that time.

C. Plaintiffs' NEPA Challenge to the Lease EA Is Time Barred and Lacks Merit

To the extent Plaintiffs are raising a separate NEPA challenge to the EA supporting BOEM's leasing decision, such a challenge is time barred and also is without merit. The claim is time barred because the EA was completed in June 2014 and the lease was issued on March 5, 2015. BOEM_0000092 (EA); BOEM_0000770 (lease). Thus, Plaintiff should have challenged the lease no later than March 2021. *See* 28 U.S.C. § 2401(a) (six-year statute of limitations).

If the Court nonetheless addresses the claim, it is without merit. The purpose of the lease EA was not to evaluate the potential impacts of developing a wind energy project, which at that stage had not yet been proposed. Instead, the EA analyzed what it was the lease would authorize: the impacts of "site characterization activities (i.e., surveys of the lease area), and site assessment activities within the [wind energy area] (i.e., construction and operation of meteorological towers

[and] buoys." BOEM_0000114. The lease EA and the COP EIS served two entirely different purposes. The former analyzed the environmental impacts of issuing a lease and site assessment activities, and the latter analyzed the reasonably foreseeable impacts of constructing and operating an offshore wind farm. *See* Legal Background § I, *supra*, *Fisheries Survival Fund*, 858 F. App'x. at 372. Indeed, BOEM made clear when it announced the preparation of the initial EA that it would analyze the impacts "associated with issuing commercial wind leases and approving site assessment activities on those leases." 77 Fed. Reg. 5,830 (Feb. 6, 2012). BOEM also explained, that "[i]f a lessee proposes development activity, the specific proposal will be given full environmental review at that time." *Id.*; *see also id.* at 5,831 (explaining the scope of the proposed action and analysis); BOEM_0000118-19 (lease EA scope of analysis). Given the stepwise nature of BOEM's approval process, Plaintiffs' argument that after preparing the EIS, "BOEM should have rescinded the original EA," Doc. No. 67 at 23, makes no legal sense.

Given the scope of the EA, it contained an appropriate analysis of impacts that were reasonably foreseeable at the time. *See* BOEM_0000172-0000425. Plaintiffs argue that the analysis of cumulative impacts was inadequate because it was limited to a five-year period from 2014 to 2019. *See* Doc. No. 67 at 24. The temporal scope of analysis was limited to five years because, under BOEM's regulations, site evaluation activities must take place within five years. *See* 30 C.F.R. § 585.235(a)(2); BOEM_0000356. In light of the regulatory requirement to submit a COP within those five years, BOEM's selection of a five-year temporal scope was reasonable and is entitled to deference. *See Selkirk Conservation All. v. Forsgren*, 336 F.3d 944, 962 (9th Cir. 2003). Moreover, the EA considered in its cumulative impacts analysis the Block Island Wind Farm, site assessment activities on the outer continental shelf offshore of Rhode Island and Massachusetts, and the Cape Wind Project (which was approved, but never developed).

BOEM_0000357-39. Plaintiffs do not identify any other offshore wind projects or related activities that were reasonably foreseeable at the time of the lease EA. Instead, they return to their argument that BOEM was required to prepare an EIS analyzing the impacts over the life of the Project at the time of lease issuance. Doc. No. 67 at 25. This argument was rejected in *Fisheries Survival Fund*, 858 F. App'x. at 372.

D. Plaintiffs' OCSLA Challenge to the Issuance of the Lease is Time Barred

Plaintiffs also argue that BOEM violated OCSLA at the leasing stage by not ensuring compliance with the factors enumerated in section 8(p)(4). *See* Doc. No. 67 at 25-27. This claim is time barred because BOEM issued the lease over six years before Plaintiffs filed this case. *See* 28 U.S.C. § 2401(a) (six-year statute of limitations).

E. Plaintiffs' OCSLA Challenge to the Approval of the Site Assessment Plan Is Barred for Failure to Comply with the 60-Day Notice Requirement

The challenge to the SAP also should be rejected because Plaintiffs failed to provide the congressionally required 60-day notice in advance of any challenge to the SAP. *See* 43 U.S.C. § 1349(a)(2)(A). The submission of a 60-day notice letter prior to suit is mandatory. *Garcia v. Cecos Int'l.*, 761 F.2d 76, 79 (1st Cir. 1985); *Allco Renewable Energy Ltd. v. Haaland*, No. 1:21-cv-11171-IT, 2022 WL 2373914, at *1 (D. Mass. June 30, 2022) (Talwani, J.). Plaintiffs submitted a 60-day notice letter on September 17, 2021, Doc. No. 1-1. The letter asserts claims under OCLSA, but none against the SAP. *See id.* at 4-23. Because Plaintiffs failed to comply with the 60-day notice requirement, the challenge to the SAP is barred. *Allco Renewable Energy*, 2022 WL 2373914, at *2; *Fisheries Survival Fund*, 858 F. App'x. at 373-74.[4]

[4] The claim also fails because the complaint, Doc No. 1 at 35-78, contains no claim challenging the SAP. *See Katz v. Belveron Real Estate Partners, LLC*, 28 F.4th 300, 310 (1st Cir. 2022).

F. BOEM's Issuance of the Lease and Approval of the Site Assessment Plan Complied with OCSLA

If the Court, nevertheless, reaches the merits of Plaintiffs' OCSLA claims regarding the lease and SAP, they are without merit because BOEM complied with OCSLA during all stages of the approval process. BOEM's OCSLA compliance at a particular stage of a multi-stage process must be viewed in the context of the entire process. *See PEER v. Beaudreau*, 25 F. Supp. 3d 67, 107 (D.D.C. 2014), *rev'd in part on other grounds*, 827 F.3d 1077 (2016) ("[T]he Secretary's overall obligation under 43 U.S.C. § 1337(p)(4) to provide for safety is an obligation that applies not only to approving individual steps of the process, such as the timing of the collection of survey data, *but rather to the entirety of the leasing process*." (emphasis added)). Plaintiffs fail to demonstrate the BOEM violated either OCSLA section 8(p), 43 U.S.C. § 1337(p), or section 3, 43 U.S.C. § 1332(2), when it issued the lease or approved the SAP.

Section 8(p) requires the Secretary to ensure that "any activity" that she authorizes is "carried out in a manner that provides for" twelve enumerated factors, including safety, protection of the environment, and consideration of other uses of the sea and seabed, including for use as a fishery. 43 U.S.C. § 1337(p)(4)(A)-(L). Section 3(2) provides that activities on the outer continental shelf shall be conducted in a manner such that "the right to navigation and fishing therein shall not be affected." *Id.* § U.S.C. 1332(2); *see also* section V, *infra*. The First Circuit has interpreted this subsection 3(2) to mean only that, in granting mineral leasing rights, Interior may not interfere with "the legal right to fish." *Massachusetts v. Andrus*, 594 F.2d 872, 889 (1st Cir. 1979). Plaintiffs fail to demonstrate that the issuance of the lease and approval of the SAP, which do not authorize the lessee to develop a project, violated the requirements of OCSLA in any way. Instead, the pages of the EA that Plaintiffs cite show that BOEM was taking its OCSLA obligation seriously at all steps of the approval process. *See*, *e.g.*, BOEM_0000156-

57, 229-31, 385-87.

Moreover, BOEM designated the wind energy area offshore of Massachusetts through extensive cooperation with multiple stakeholder groups, including the Fisheries Working Group on Offshore Renewable Energy and the Massachusetts Habitat Working Group on Offshore Renewable Energy. BOEM_0076941; BOEM_0000120-21. BOEM hosted several public meetings between 2009 and 2012 and met with the working groups five times between 2011 and 2012. BOEM_0076941; BOEM0000121-22. As a result of these meetings, the wind energy area was reduced by 50% to avoid areas used for shipping, recreational and commercial fishing, and the Nantucket Lightship Habitat Closure Area. BOEM_0076941; BOEM_0000123; *see also* BOEM_0000001. BOEM analyzed the resulting wind energy area in the EA, assessing the impacts of leasing and site assessment activities. *See* BOEM_0000172-391 (EA). Thus, BOEM appropriately considered OCSLA's requirements at the leasing stage, at which point no development activities were authorized and no actual project had been proposed.

The same is true at the site assessment phase. BOEM approved Vineyard Wind's site assessment plan in May 2018. BOEM_0013366. BOEM's approval of the SAP required Vineyard Wind to abide by several conditions designed to protect the environment, conserve natural resources, and avoid conflicts with other users of the area. BOEM_0013366-75. Further, the SAP itself analyzes potential impacts to the environment and natural resources that would be affected by the planned site assessment activities, and mitigation measures to avoid such impacts. *See* Vineyard Wind SAP at 21-69, attached as Ex. 2.[5] Plaintiffs fail to show that BOEM's issuance of the lease and subsequent approval of the SAP violated OCSLA.

[5] Plaintiffs complain that the SAP was not included in the administrative record, but they did not bring a claim challenging the approval of the SAP, and when they filed a motion requesting supplementation of the record, Plaintiffs did not mention the SAP. *See* Doc. No. 57.

III. The Temporary Withdrawal of the Construction and Operations Plan and Subsequent Resumption of the Review Process Did Not Violate NEPA or OCSLA

Plaintiffs also take issue with BOEM's temporary suspension of the review of the COP and subsequent resumption of the review process. But BOEM's process was lawful. Vineyard Wind requested that BOEM suspend its review because the company had selected General Electric ("GE") to provide wind turbines for the Project and wanted to ensure that the technical aspects of GE's turbines did not require further analysis beyond the impacts that had been analyzed in the Supplemental Draft Environmental Impact Statement ("SDEIS"). BOEM_0067649; BOEM_0067677. Vineyard Wind conducted an internal technical review and found that the specifications of the GE turbines fit within the parameters that were analyzed in the SDEIS. BOEM_0067698-701. BOEM also reviewed the technical information regarding the new turbines and determined that they fell within the design envelope analyzed in the SDEIS. BOEM_0067703-04 (explanation and chart comparing the design parameters analyzed previously with those of the GE turbines); *see also* BOEM_0068440 n.3, 68466. Indeed, following the temporary withdrawal of the COP, RODA—the plaintiffs in a companion case—submitted a letter saying that the project design envelope already encompassed the new GE Turbines. BOEM_0067665. BOEM then resumed its review of the COP under NEPA and other statutory requirements. 86 Fed. Reg. 12,494 (Mar. 3, 2021); *see also* BOEM_0067709-10.

Plaintiffs offer no cogent explanation as to why BOEM's temporary pause and subsequent resumption of the review process violated NEPA or OCSLA. Indeed, Plaintiffs do not identify any statutory or regulatory provision that would have limited BOEM's inherent discretion to do so. Nor is there is any basis for the assertion that the inclusion of the GE turbines into the project design required supplemental NEPA analysis. *See* 40 C.F.R. § 1502.9(c)(1) (supplemental NEPA analysis is required if "[t]he agency makes substantial changes in the

proposed action that are relevant to environmental concerns" or [t]here are significant new circumstances or information relevant to environmental concerns"). BOEM reviewed the new technical specifications and determined that they fell within the specifications already analyzed in the SDEIS, *i.e.*, the new turbines would not have a greater generating capacity and would be no taller or wider than the previously analyzed turbines. BOEM_0067703; BOEM_0068466; *see also* BOEM_0068443-44 (setting forth the design envelope parameters). The number of turbines (62) would also be on the lower end of the number previously analyzed (57-100). *Id.* For the same reason, there was no requirement for an additional public process after the review process resumed. There was already a public comment period on the SDEIS regarding the changes in the design envelope. BOEM_0056972; BOEM_69181. NEPA did not require BOEM to engage in an additional public comment process when there was no significant new information bearing on the project design or environmental impacts. 40 C.F.R. § 1502.9(c)(1).

BOEM also did not violate OCSLA by resuming the review process. Plaintiffs argue that BOEM had "no power to unilaterally restart review of a withdrawn COP," but they provide no citation to BOEM's regulations or other legal authority to support that claim. Doc. No. 67 at 33. BOEM independently reviewed the changes in the design specifications and determined that they were within the parameters that BOEM had already analyzed. BOEM_0067703; BOEM_0068466. Therefore, there is no basis for Plaintiffs' assertion that, when it resumed the review process, BOEM did not evaluate those parameters and determine that the Project would be conducted in accordance with the requirements of 43 U.S.C. § 1337(p)(4).

IV. BOEM's Approval of the Construction and Operations Plan Complied With NEPA

A. The FEIS Contains a Valid Purpose and Need Statement and Analyzes a Reasonable Range of Alternatives

1. The FEIS's purpose and need statement properly balanced Congressional policy and the objectives of the project proponent

Plaintiffs begin their NEPA challenge to BOEM's COP approval by contending that the FEIS's purpose and need statement was overly narrow in violation of NEPA. See Doc. No. 67 at 29, 37-38. As shown in section III.D. of Federal Defendants summary judgment brief in *RODA*, the FEIS's purpose and need statement fully complies with NEPA and in no way predetermined Federal Defendants' actions. In addition to the arguments advanced by RODA, the Seafreeze Plaintiffs argue that Vineyard Wind somehow "ensure[d] that the 'purpose' of its project would focus not on any federal purpose or need but rather 'solely' on its own pecuniary interests." Doc. No. 67 at 38.

Plaintiffs' argument lacks any basis in the record or in the law. It lacks a basis in the record because the FEIS never adopted Vineyard Wind's economic interests as the purpose of BOEM's action. Instead, the FEIS makes clear that the purpose and need of BOEM's action was "to determine whether to approve, approve with modifications, or disapprove the COP" submitted by Vineyard Wind. BOEM_0068466. That purpose is consistent with BOEM's statutory obligations under 43 U.S.C. §§ 1332(3), 1337(p) .

And as a legal matter, "[w]hen an agency is asked to sanction a specific plan," it "should take into account the needs and goals of the parties involved in the application." *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 196 (D.C. Cir. 1991). BOEM did that here by crafting a purpose and need statement that considered whether to approve, modify, or disapprove of the project Vineyard Wind had proposed, consistent with BOEM's duty to make the OCS "available

for expeditious and orderly development, subject to environmental safeguards." BOEM_0068466.

2. BOEM analyzed a reasonable range of alternatives

Like RODA, the Seafreeze Plaintiffs also challenge the range of alternatives that BOEM analyzed in the FEIS. Courts "uphold an agency's definition of objectives so long as the objectives that the agency chooses are reasonable, and [they] uphold its discussion of alternatives so long as the alternatives are reasonable and the agency discusses them in reasonable detail." *Busey*, 938 F.2d at 196; *see also* 40 C.F.R. § 1502.14(a) (applicable CEQ regulations); 43 C.F.R. § 46.420(a)(2) (BOEM's NEPA regulation regarding alternatives). Because their arguments largely overlap, Federal Defendants incorporate the arguments made in section V.D.2., and separately address the arguments made solely by Seafreeze.

The Seafreeze Plaintiffs contend that BOEM improperly excluded several alternatives, including to "increase the spacing between turbines, reorient the turbines, or limit the project's size (among other things)." Doc. No. 67 at 31. According to Plaintiffs, that was improper because BOEM "allowed Massachusetts' electricity distributors and Vineyard Wind to dictate what the federal government would consider as reasonable alternatives." *Id.* Similarly, Plaintiffs contend that BOEM erred by "limiting its consideration of reasonable alternatives only to those within the lease area." *Id.* at 35; 47-48.[6]

Plaintiffs are incorrect. Courts, including the First Circuit, have repeatedly recognized that where, as here, "the agency is not itself the project's sponsor, 'consideration of alternatives may accord substantial weight to the preferences of the applicant.'" *Beyond Nuclear*, 704 F.3d at

[6] Plaintiffs' arguments with respect to BOEM's selection of alternatives are also found throughout various sections of their brief. *See* Doc. No. 67 at 31, 35, 47-48. For the Court's convenience, we treat them together.

19 (citing *City of Grapevine v. Dep't of Transp.*, 17 F.3d 1502, 1506 (D.C. Cir. 1994)). That makes sense because an agency need only consider alternatives that are "technically and economically practical or feasible." *Theodore Roosevelt Conservation P'ship v. Salazar*, 661 F.3d 66, 69 (D.C. Cir. 2011). A project proponent's goals necessarily are relevant to the question of which alternatives are practical and feasible because an alternative that is contrary to or inconsistent with a project proponent's goals might so defeat the purpose of the Project to be nonviable. As BOEM explained in the SDEIS, selecting such an alternative would "effectively be the same as selecting Alternative G (No Action)." BOEM_0057321.

The same is true of each of the alternatives Plaintiffs identify. For example, BOEM decided not to include for further analysis in the FEIS an alternative that would have required the Project to be constructed outside the Vineyard Wind lease area because doing so would have been nonresponsive to Vineyard Wind's proposal, which was limited to constructing a facility within its lease area. BOEM_0057321. That decision was reasonable: as BOEM explained, it "would consider proposals on other existing leases through a separate regulatory process." *Id.* But doing so as part of the present NEPA process was not necessary because such an alternative would not have been economically or practically feasible for Vineyard Wind, which could not develop a project in areas for which it had not acquired a lease. *See Busey*, 938 F.2d at 195 ("If licensing the Vernon reactor is meant . . . to stimulate the Vernon job market, licensing a reactor in Lake Placid would be far less effective. The goals of an action delimit the universe of the action's reasonable alternatives."). BOEM never committed to ensuring that Vineyard Wind could satisfy Vineyard Wind's own project objectives. Rather, in evaluating the potential effects associated with any approval of Vineyard Wind's COP, BOEM properly analyzed alternatives that were both compatible with the COP that they had been asked to consider, and consistent

with BOEM's duty to make the OCS "available for expeditious and orderly development, subject to environmental safeguards." BOEM_0068466. That approach is fully consistent with NEPA. *Beyond Nuclear*, 704 F.3d at 19.

BOEM's selection of alternatives is entitled to substantial deference, *Busey*, 938 F.2d at 196. Plaintiffs have offered no valid basis for invalidating that selection here.[7]

B. The EIS Appropriately Analyzes Impacts to Fishing

The FEIS contains a thorough analysis of potential impacts on fishing. Plaintiffs argue that BOEM's analysis shows that the Project will have "devastating" effects on commercial fishing, and argue that BOEM has somehow downplayed those effects. Doc. No. 67 at 30, 34. Neither is true. BOEM analyzed over several years the Project's potential impacts on fishing, conducted substantial public engagement, and gathered a substantial amount of data. BOEM took the required hard look at the potential impacts of the Project, disclosed those potential impacts to the public, and therefore complied with NEPA. *United States v. Coal. for Buzzards Bay*, 644 F.3d 26, 31 (1st Cir. 2011). Plaintiffs' arguments to the contrary are without merit.

To analyze the impacts on fishing, the FEIS evaluates a large area of the ocean extending

[7] Plaintiffs' citation to *Nat'l Ass'n of Home Builders v. Defs. of Wildlife*, 551 U.S. 644, 658 (2007), is inapposite. Doc. No. 67 at 48. The language Plaintiffs cite had nothing to do with an agency's analysis of alternatives under NEPA. *See Nat'l Assoc. of Home Builders*, 551 U.S. at 658 (addressing EPA's interpretation of its ESA consultation obligations "regarding the effect of a permitting transfer on listed species."). Nor have Plaintiffs identified any impermissible factors that BOEM supposedly considered in selecting which alternatives to analyze. While Plaintiffs speculate that BOEM "felt compelled" to analyze only alternatives within the Vineyard Wind lease area "in order to meet the timing requirements of Vineyard Wind's contract with Massachusetts," Doc. No. 67 at 48, the portions of the record that Plaintiffs cite offer no support for that speculation. In the ROD, BOEM explained that alternatives not analyzed were excluded "because they did not meet the purpose and need or did not meet other screening criteria." BOEM_0076809. And the other record cite—0057320-22—is a letter from Vineyard Wind describing elements of its contract with Massachusetts. As explained above, BOEM reasonably selected alternatives that were compatible with Vineyard Wind's objectives and obligations. *Beyond Nuclear*, 704 F.3d at 19.

from Maine to North Carolina and 200 miles offshore. BOEM_0068700; *see also* BOEM_0068804, 68835. As explained in the FEIS, fishing in federal waters off the New England coast is a significant source of revenue, generating $1.6 billion on average annually from 2009 to 2018. BOEM_0068700. The waters of the Northeast are known for producing scallop, clam, lobster, squid, and other species. *Id.* Fishing is important economically to the region through direct employment in the fishing industry and in jobs that support fishing. BOEM_0068701. The FEIS contains a thorough analysis of fishing traffic through the area based on sets of data collected by the State of Rhode Island and by NMFS. BOEM_0068701-02. BOEM used these figures to analyze the fishing revenue that may be affected by the Project. *See* BOEM_0068702-07. The annual overall value of fish landings in the wind development area from 2008 to 2009 generally ranged from $300,000 to $600,000, but there was a peak of $1.3 million in 2016. BOEM_0068706.

The construction of the Project could affect fishing in a number of ways, as explained in the FEIS. BOEM_0068714-29. The placement of cable and maintenance activities, for example, could temporarily prevent fishing activities. BOEM_0068715-16. In addition, the presence of structures, primarily the wind turbines, creates a risk that fixed or mobile fishing gear may become entangled and the risk of allisions with project structures. BOEM_0068717-18. To mitigate the risk of allisions, turbines and the electrical service platforms would be equipped with navigational aids, including marking, lighting, and automatic identification system ("AIS") transponders. BOEM_0068718; *see also* BOEM_0069225-27. Although fishing in the project area will be more difficult than before, it will be possible to fish. BOEM_0068718. The degree to which fishing is impacted will depend on the type of gear that fishermen are using. *Id.* Fishing with mobile gear that is pulled across the seafloor presents a greater risk of snagging on

structures and undersea cables than fixed gear fishing. *Id.* Nevertheless, a navigational risk assessment prepared for the Project found that trawling vessels would be able to operate within the turbine array because they are able to do 180-degree turns within 0.16 to 0.86 nautical miles ("nm"). BOEM_0068718, 68743; *see also* BOEM_0063764-65 (navigational risk assessment showing turning radius data for trawling vessels). During the NEPA process, fishing industry groups indicated that the turbines would need to be 1 nm apart in order to operate safely, BOEM_0068718, and BOEM later adopted that separation distance. BOEM_0076822. In addition, the project area is located so as to avoid other more densely fished areas. *See* BOEM_0069134-36 (FEIS maps showing fishing intensity); BOEM_0063762-63, 63768-70 (maps showing trawling vessel data in the vicinity of the project area).

The FEIS also analyzed the potential impacts of the project structures on marine radar. BOEM_0068717. The presence of the structures could make the use of radar more difficult due to the potential for structures to obscure smaller vessels and duplication of radar images in certain weather conditions, such as heavy fog. *Id.* The U.S. Coast Guard evaluated this issue in the Areas Offshore of Massachusetts and Rhode Island Port Access Route Study ("MARIPARS") and concluded that there were no authoritative scientific studies showing that the presence of wind turbines would degrade marine vessel radar. BOEM_0068739, 0068744; BOEM_0054795. Should radar interference occur, such effects can be mitigated through proper training of radar operators, proper placement of radar equipment on vessels, marked turbines, and the use of AIS transponders to aid in locating the turbines. BOEM_0068744; BOEM_0054795. Vineyard Wind has committed to incorporating mitigation into the project design, such as equipping the turbines with marking, lighting, and electronic signaling devices, in order to enable safe navigation within the turbine array. BOEM_0068744; BOEM_69225-27.

Notwithstanding the fact that BOEM's analysis shows that fishermen will be able to operate within the project area, BOEM recognized that some fishermen would be reluctant to do so. BOEM_0068719. In order to address the lost revenue from any interference with fishing in the turbine array and lost gear and other costs arising from fishing within the turbines, Vineyard Wind has committed to establishing compensation funds through agreements with Rhode Island and Massachusetts, which total $25.4 million, and a compensation fund for other states of $3.3 million. BOEM_0068719-21. This funding is more than sufficient to offset the $14.4 million expected revenue loss from commercial fishing within the project area over the next thirty years (the life of the project plus five years of decommissioning). BOEM_0068721. Vineyard Wind has also committed to an additional $12.5 million fund to support the fishing industry by providing funds for updated equipment, new gear, radar equipment, and training in order to enable fishing within the project area. BOEM_0068721; BOEM_0068728. The company would also commit to establishing a similar $1.75 million fund for Massachusetts, bringing the total amount of compensation funding to over $40 million. BOEM_0068728. Thus, in the FEIS, BOEM thoroughly analyzed and disclosed potential impacts to fishing within the project area and mitigation to minimize those impacts.

Plaintiffs raise a number of arguments regarding BOEM's analysis of fishing impacts, but none has any merit. They argue that the FEIS downplayed the impacts to commercial fishing, Doc. No. 67 at 34, but that is simply belied by the record. The FEIS contains a thorough analysis of impacts to fishing, as discussed above. Far from downplaying those impacts, BOEM thoroughly analyzed them, as well as mitigation to minimize those impacts. BOEM_0068700-35. Contrary to Plaintiffs' assertion, Doc. No. 67 at 34, the FEIS characterizes the impacts on commercial fishing from the Vineyard Wind Project to be moderate, but the impacts on fishing

from the Project *and* other planned projects would be major. BOEM_0068452. Plaintiffs also argue that BOEM relied on the eventual decommissioning of the Project in an attempt to minimize the impacts of the Project, Doc. No. 67 at 35. But the cited page merely states that impacts to commercial fishing would not be irreversible because, after the Project is decommissioned, it would no longer pose any obstacle to fishing. BOEM_0069185. Plaintiffs have failed to show that the FEIS downplayed any impacts on fishing.

Plaintiffs also argue that BOEM violated NEPA by not giving sufficient consideration to Alternative F, the transit lane alternative proposed by commercial fishermen. *See* Doc. No. 67 at 29-30. To the contrary, BOEM fully analyzed the transit lane alternative in the FEIS, *see e.g.*, BOEM_0068491-96, 68732-34, 68749-52; *see also* BOEM_0068496 ("BOEM elected to *fully evaluate* RODA's proposed layout in the [SDEIS] and in the FEIS.") (emphasis added). Ultimately, BOEM decided not to select this alternative based on comments from the offshore wind industry, non-governmental organizations, the Commonwealth of Massachusetts, and individuals. BOEM_0076823. Vineyard Wind also provided information showing that the transit lanes would increase the cable length, thus leading to a loss in the transmission of electricity, and other technical complexities. *Id.* Plaintiffs may disagree with BOEM's decision, but NEPA requires no substantive outcome.[8] *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989) ("[I]t is now well settled that NEPA itself does not mandate particular results, but simply prescribes the necessary process."). BOEM thoroughly analyzed the transit lane alternative and that is all that NEPA requires. *See Dubois v. U.S. Dept. of Agric.*, 102 F.3d 1273,

[8] The record belies the notion that BOEM simply acquiesced to Vineyard Wind's demands. In the same letter in which Vineyard Wind laid out its objections to the transit lanes, it also objected to an east-west configuration with 1-nm spacing between the turbines. BOEM_0038225-28. BOEM nevertheless adopted that configuration in the ROD. BOEM_0076822.

1286-87 (1st Cir. 1996). To the extent Plaintiffs are claiming that BOEM's rejection of the transit alternative violated OCSLA, such a claim should be rejected. *See* sections V.C.-D., *infra*.

In addition, Plaintiffs point to comments that NMFS raised regarding the DEIS. BOEM_0037615; Doc. No. 67 at 30. NMFS did raise a number of points in that letter, but BOEM addressed them in the SDEIS. Specifically, in the SDEIS, BOEM provided additional analysis of impacts on fishing and cumulative impacts. BOEM_56977-57150. And NMFS concurred in the FEIS. BOEM_0066945. In other words, the NEPA process worked, and that process benefitted from the valuable input that NMFS and others provided. Plaintiffs' suggestion that this demonstrates a violation of NEPA has no legal basis.

Finally, Plaintiffs are wrong that their comments at various stages of the NEPA process have been ignored. In Seafreeze's scoping comments, they asked for a detailed study of the socioeconomic impacts on the fishing industry and that Vineyard Wind set up a compensation fund for lost gear and lost revenue. BOEM_0078090. BOEM has analyzed such impacts and Vineyard Wind has agreed to substantial compensation funds. BOEM_0068719-29. Further, BOEM developed alternatives D1 and D2 based on scoping comments submitted by the fishing industry and ultimately adopted the 1-nm spacing and east-west configuration in alternative D2. BOEM_0070712. In addition, BOEM responded to Seafreeze's and RODA's comments on the DEIS and SDEIS. BOEM_0069601-23 (response to RODA's comments on DEIS); BOEM_0069631-32, 69760-73 (response to Seafreeze's comments on the DEIS); BOEM_0070468-97 (response to Seafreeze's comments on the SDEIS); BOEM_0070704-24 (response to RODA's comments on the SDEIS). BOEM considered and responded to Plaintiffs' comments, as required by NEPA. *See Norfolk v. U.S. EPA*, 761 F. Supp. 867, 878 (D. Mass. 1991) ("the court must determine whether the agency reasonably addressed public comments").

C. The EIS Appropriately Analyzed Potential Impacts on the Environment

Plaintiffs argue that BOEM failed to adequately analyze the potential impacts on the environment and natural resources within the project area. Doc. No. 67 at 34. Contrary to Plaintiffs' assertions, BOEM did not downplay these impacts, but thoroughly analyzed them in the FEIS. BOEM analyzed the potential impacts to the benthic environment, BOEM_0068519-42, fish species, BOEM_0068542-71, marine mammals, BOEM_0068571-603, and sea turtles, BOEM_0068603-24. BOEM also analyzed the potential impacts of hurricanes, BOEM_0068497-98, 69238-39, and impacts on national security. BOEM_0068765-69. Plaintiffs' vague claims that BOEM did not sufficiently analyze such impacts are without merit.

D. BOEM Was Not Required to Wait Until NMFS Issued the 2021 BiOp Prior to Making a Decision Regarding the COP.

Plaintiffs next argue that BOEM's approval of the COP while reinitiated consultation with NMFS was ongoing was arbitrary or capricious. This is incorrect. As explained in section IV.A. of Federal Defendants' brief in *RODA*, NMFS issued a Biological Opinion in September 2020, which concluded that the proposed project "may adversely affect but is not likely to jeopardize the continued existence of" several marine species, including right whales. NMFS_00016027. BOEM relied on that conclusion and its underlying analysis when analyzing the potential effects of the Project in the FEIS, which was released in March 2021. *See, e.g.*, BOEM_0068590.

On May 7, 2021, BOEM requested reinitiation of consultation with NMFS/GAR under ESA Section 7. BOEM_0076721-22. Along with its request for reinitiation, BOEM transmitted to NMFS/GAR a supplement to BOEM's 2019 Biological Assessment ("BA Supplement"). BOEM_0076723-49. BOEM explained that its purpose in seeking reinitiation was to consider any potential impacts of fisheries monitoring surveys, which BOEM had proposed as conditions

of COP approval. *Id.* BOEM also observed that the BA Supplement contained updated information about the status of the right whale. *Id.* In particular, the BA Supplement assessed a January 2021 publication that reduced the estimated right whale population by four animals between 2020 and 2021.[9] The BA Supplement also included newly available models of right whale densities in the wind development area. *Id.* The BA Supplement assessed that updated information and concluded it did not change BOEM's prior conclusions about potential impacts of the Project on right whales. *Id.*

On the same day that it requested reinitiation, BOEM also documented its "determination that, while [it] ha[d] reinitiated formal consultation on the fishery monitoring plan," approval of the remainder of the Project would not "jeopardize the continued existence of ESA listed species." BOEM_0208700-11. BOEM further concluded that reinitiated consultation would not "provide any new information" about the impacts of construction, operation, and decommissioning activities that had already been analyzed in the still-operative 2020 BiOp. BOEM_0208709. BOEM explained that it would not authorize the monitoring surveys for which it had reinitiated consultation during the reinitiation period, and that "commencement of any monitoring activities would be conditioned on the conclusion of this reinitiated consultation." *Id.*

On July 15, 2021, BOEM approved the COP, with the express condition that its approval would be "subject to any terms and conditions and reasonable and prudent measures resulting from a BOEM reinitiated consultation for the Project's BiOp." BOEM_0077152. In October 2021, NMFS concluded the reinitiated consultation and issued a new biological opinion ("2021

[9] *See* BOEM_0076728 (discussing North Atlantic right whale Report Card (Pettis et al. 2021)). The population size estimate is provided as a range, and the 2021 report reduced the range by four animals, from a likely range of 343-727 in 2020, to a likely range of 339-723 in 2021. *Id.*

BiOp"). BOEM_0077276-0077779. The 2021 BiOp also reached a "no jeopardy" conclusion with respect to right whales, as NMFS had reached in the 2020 BiOp. BOEM_0077657.

Plaintiffs claim that BOEM erred in approving the COP while the reinitiated consultation was ongoing, in violation of 40 C.F.R. § 1502.22(a)-(b). Doc. No. 67 at 45.[10] Section 1502.22 applies if, "[w]hen an agency is evaluating reasonably foreseeable significant adverse effects," the agency determines that "there is incomplete or unavailable information." Plaintiffs' argument fails because they have not identified any incomplete or unavailable information with respect to "reasonably foreseeable significant adverse effects" that BOEM failed to disclose. In fact, Plaintiffs never contend that the monitoring surveys were at all likely to result in reasonably foreseeable significant effects. Nor could they: in the BA Supplement, BOEM assessed potential impacts of the monitoring surveys and concluded that they were not likely to adversely affect any ESA-listed species. *See* BOEM_0076743 (Table 3, summarizing findings). BOEM also concluded that the new information about right whales would not alter the impacts analysis in the FEIS. BOEM_0076728 ("Notably, impacts do not increase in numbers or magnitude."). And, in the end, NMFS's estimates of the number of right whales to be incidentally harassed as a result of pile-driving noise during Project construction (up to 20 right whales) remained unchanged between the 2020 BiOp and the 2021 BiOp. *Compare* NMFS 16179 (2020 BiOp) and NMFS 17366 (2021 BiOp).

Although the reinitiated consultation was ongoing when BOEM approved the COP, there was no incomplete or unavailable information about reasonably foreseeable significant adverse

[10] Plaintiffs also claim, without any explanation, that BOEM's COP approval violated 40 C.F.R. § 1501.3(b). Doc. No. 67 at 37. But that regulation addresses when an environmental assessment must be prepared, and subsection (b) simply states that an agency may prepare an environmental assessment "on any action at any time." 40 C.F.R. § 1501.3(b). It is not applicable to Plaintiffs' arguments here concerning BOEM's COP approval.

effects as defined by 40 C.F.R. § 1502.22(a)-(b). BOEM reasonably proceeded with approving the COP, subject to the condition that the applicant comply with all terms and conditions of the forthcoming 2021 BiOp. BOEM_0077152.

E. The EIS Appropriately Analyzes Cumulative Impacts

Plaintiffs are also incorrect that the FEIS's cumulative impacts analysis violated NEPA. As explained in section III.A. of Federal Defendants' brief in *RODA*, the FEIS analyzed cumulative impacts of reasonably foreseeable future offshore wind actions. That discussion is incorporated here, and Plaintiffs' arguments should be rejected for the same reasons as RODA's.

Plaintiffs here make two additional arguments concerning cumulative impacts that are not raised by RODA: (i) Plaintiffs claim that the FEIS "removed most cumulative impact analysis that was present in the Draft EIS," and "left out any analysis of the foreseeable cumulative impacts of BOEM's established plans to approve multiple wind farms near the Vineyard Wind project," Doc. No. 67 at 35-36, and (ii) that FEIS's cumulative impact analysis "underestimated the amount of offshore wind anticipated by 8 [gigawatts]," *id.* at 48-49. These arguments contradict one another as well as the record, and should be rejected by this Court.

First, BOEM did not remove its cumulative impact analysis in the FEIS. The SDEIS describes how BOEM developed its cumulative impacts analysis, beginning at BOEM_0056977; *see also* SDEIS Appendix B, BOEM_0057214-39 (analyzing various impact producing factors associated with offshore wind facilities). That information was carried over to the FEIS, which expressly analyzes potential cumulative effects of other reasonably foreseeable future offshore wind projects. FEIS Appendix A explains BOEM's methodology for analyzing cumulative impacts. BOEM_0068796-0068975. The main body of the FEIS discusses cumulative impacts for each resource for which the Project may have greater than minor impacts, including to

commercial and for-hire fisheries. FEIS Section 3.10.1.1, BOEM_0068707-14; *see also* Federal Defendants' brief in *RODA* section III.A.

Second, Plaintiffs argue that the cumulative impact analysis in the FEIS was inadequate because it supposedly "understated the amount of offshore wind anticipated by 8 [gigawatts]." Doc. No.67 at 48. This argument relies on a speech that the President gave in May 2021, in which he stated that his administration hopes to "deploy 30 gigawatts of offshore wind in the United States by 2030." Seafreeze SOMF ¶ 96. According to Plaintiffs, BOEM therefore erred by assuming for purposes of its cumulative impact analysis that only 22 gigawatt's ("GW") worth of future projects were reasonably foreseeable. Doc. No. 67 at 48. But BOEM explained why it arrived at the 22 GW assumption in the FEIS. Specifically, BOEM stated that state pledges for offshore wind capacity totaled "about 29 GW" at the time the FEIS was published—a figure that included "awarded, scheduled, and planned but unscheduled procurements." BOEM_0068800-01. BOEM further explained that "[s]tate goals that are planned but do not have a scheduled award or procurement dates could occur as a series of procurements, or simply not be met if future cost reductions do not meet the states' award criteria," or if there is a "lack of available lease area or technical capacity." BOEM_0068801. As a result, BOEM made the reasoned decision to consider only 22 GW of state capacity commitments to be reasonably foreseeable for purposes of its cumulative impacts analysis. *Id.* Plaintiffs offer no explanation why that decision was arbitrary, or even inconsistent with the administration's goal of reaching even higher capacity. All the more so given that courts have concluded that goals do not qualify as reasonably foreseeable projects for purposes of cumulative impacts analyses under NEPA. 43 C.F.R. § 46.30 (reasonably foreseeable actions are those "for which there are existing decisions, funding, or proposals," but that are not "highly speculative or indefinite"). Plaintiffs' cumulative

impacts arguments lack merit and this Court should reject them.

F. The EIS Otherwise Complies With the NEPA Regulations

Plaintiffs make three additional NEPA arguments, each of which lacks merit.[11] *First*, Plaintiffs argue that Federal Defendants violated 40 C.F.R. § 1506.6, which requires an agency to "make diligent efforts to involve the public in preparing and implementing their NEPA procedures," by (a) failing to provide a separate notice and comment period after Vineyard Wind decided to use its "prototype turbines" in the Project, and by (b) supposedly ceding public engagement to state agencies and other boards, which failed to engage with portions of the public. Doc. No. 67 at 46. Plaintiffs are wrong on both fronts. The public had ample opportunity to comment on anticipated turbine size. The SDEIS stated that turbines could be as large as 14 megawatts. BOEM_0056958. Vineyard Wind ultimately selected turbines that were slightly smaller than that maximum amount. BOEM_0067698; BOEM_0076926. And BOEM received and responded to several comments regarding the final turbine size in Volume IV of the FEIS, including from Seafreeze itself. *See, e.g.*, BOEM_0070471-72 (Seafreeze comment regarding turbine size and BOEM's response); BOEM_0070476 (same); BOEM_0070482 (same).

More generally, there can be no serious question that BOEM fully complied with its obligation under section 1506.6(a). The FEIS Appendix C details BOEM's extensive efforts to involve the public in the NEPA process for this project. BOEM_0069178-82. Throughout that

[11] Several of the arguments Plaintiffs raise in Sections VII and VIII of their brief also appear in other sections. Section VII.A addresses BOEM's request to reinitiate consultation with NMFS—a topic also addressed in Section III.E.1. Doc. No. 67 at 36-37, 45-46. Section VIII.A challenges BOEM's selection of alternatives, a topic previously discussed at various prior points in Plaintiffs' brief. Doc. No. 67 at 31, 35, 47-48. Finally, Section VIII.B duplicates (and in some respects contradicts) Plaintiffs' prior arguments challenging to BOEM's cumulative impact analysis. *See* Doc. No. 67 at 35-36, 48-49. For brevity, we address each those issues just once, *see* sections IV.A.,D., E., and do not repeat them here.

process, BOEM held fifteen public meetings and received thousands of public comments.[12] Plaintiffs fail to show that BOEM violated section 1506.6 in any respect.[13]

Second, Plaintiffs argue that Federal Defendants violated 40 C.F.R. § 1503.4[14] because they supposedly did not sufficiently explain why certain comments they received did not merit further response (beyond the responses BOEM provided), and by supposedly failing to attach substantive comments to the FEIS. But the very comments Plaintiffs claim were omitted are in fact addressed in Volume IV of the FEIS. In particular, Plaintiffs claim that BOEM failed to respond to their comment, made in a July 27, 2020 letter, that Seafreeze vessels operating trawl gear will be unable to operate safely within a wind facility. Doc. No. 67 at 46. But that comment, and BOEM's corresponding response, appears in Index No. 13102-056, BOEM_0070487. Likewise, the FEIS summarized the comments from RODA that Plaintiffs cite, and the FEIS provided BOEM's response. *See* index no. 13185-017-13185-018, BOEM_0070711.

Section 1503.4(b) expressly permits agencies to include summaries of substantive comments rather than the comments in their entirety. In the end, the FEIS Volumes III and IV include more than 1,400 pages of such summaries. BOEM was well within its discretion to

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[12] *See* BOEM_0076803-04 (BOEM held five public scoping meetings concerning its notice of intent to prepare an environmental impact statement, held five in-person public meetings, received 341 public comments on the draft environmental impact statement, held five virtual meetings, and received approximately 3,500 unique public comments on the supplement to the draft environmental impact statement).

[13] Plaintiffs' vague complaint that they were "not included in mitigation negotiations," Doc. No. 67 at 46 (citing Lapp Decl. ¶¶ 15-23), lacks any legal basis. Plaintiffs do not, and cannot, cite any statute or regulation that entitles them to directly negotiate with the parties identified in the Lapp declaration (Vineyard Wind, the Governor of Rhode Island, the Rhode Island Coastal Resources Management Council, the Fisherman's Advisory Board). Nor can Plaintiffs seriously contend that they were excluded from participation given their extensive comment letters and BOEM's corresponding responses. *See* section IV.B., *supra*.

[14] Section 1503.4 requires agencies to respond to comments in one of several specifically enumerated ways, and to "stat[e] its response in the final [environmental impact] statement."

include summaries rather than each separate comment letter in the FEIS, and the FEIS evidences BOEM's diligent efforts to involve the public in its NEPA process.

Third, Plaintiffs contend that Federal Defendants impermissibly failed to use the NEPA regulations as revised by the CEQ in July 2020. Doc. No. 67 at 46-47. According to Plaintiffs, "[n]othing allows the Federal Defendants" to utilize the prior version of the regulations "simply because they state their NEPA review began before the regulations were altered." *Id.* Plaintiffs are mistaken. In the preamble to the July 2020 Final Rule, CEQ stated: "For NEPA reviews in process that agencies began before the final rule's effective date, agencies may choose whether to apply the revised regulations or proceed under the 1978 regulations and their existing agency NEPA procedures." 85 Fed. Reg. 43304, 43340 (July 16, 2020). BOEM, in turn, clearly explained in the introduction to the FEIS that, because its NEPA review began prior to the September 14, 2020 effective date of the revised regulations, "this FEIS was prepared under the previous version of the regulations (1978, as amended in 1986 and 2005)." BOEM_0068440 n.1. That decision was fully consistent with the applicable CEQ regulations and with NEPA.

V. BOEM's Approval of the Construction and Operations Plan Complied With OCSLA

Plaintiffs also assert that BOEM's approval of the COP was contrary to section 8(p)(4) of OCSLA, 43 U.S.C. § 1337(p)(4). Here, too, Plaintiffs are wrong. Section 8(p)(4) requires BOEM, when approving a renewable energy project on the outer continental shelf, to ensure that the proposed project is "carried out in a manner that provides for" twelve enumerated factors, including safety, protection of the environment, and other uses of the sea and seabed, including sea lanes and fisheries. *Id.* § 1337(p)(4)(A)-(L) . Given the many factors that must be evaluated, the Secretary of the Interior has substantial discretion to weigh these factors and strike a rational balance among them, considering Congress's direction to authorize renewable energy

development on the outer continental shelf. *See Norton v. S. Utah Wilderness All.*, 542 U.S. 55, 66 (2004) (explaining that the broad statutory mandate in the Federal Land Policy and Management Act is "mandatory as to the object to be achieved, but . . . it leaves [the agency] with a great deal of discretion in deciding how to achieve it"); *Andrus*, 594 F.2d at 889 ("[W]here . . . sets of interests conflict, . . . the Secretary must determine which interests must give way, and to what degree, in order to achieve a proper balance."); BOEM_0072954-56 (Solicitor's M-Opinion interpreting OCSLA section 8(p)(4)). As discussed below, BOEM struck a reasonable balance among all of the enumerated factors in section 8(p)(4) when approving the COP. BOEM's decision should therefore be upheld.

A. Safety

BOEM ensured that the Vineyard Wind Project would be conducted in a manner that provides for safety. *See* 43 U.S.C. § 1337(p)(4)(A). BOEM has required Vineyard Wind to comply with engineering and technical conditions in order to ensure that the Project meets or exceeds industry standards. BOEM_0076931; BOEM_0076827; BOEM_0076901-21. BOEM engineers have reviewed the geophysical and geotechnical information provided by Vineyard Wind and determined that the conditions present in the area allow for the safe construction and operation of the Project. BOEM_0076931. Further, BOEM's continued oversight of the Project and review of the facility design report and fabrication and installation report will ensure that the Project will be carried out safely. *Id.*; BOEM_0076827. BOEM also consulted with the Bureau of Safety and Environmental Enforcement, the Coast Guard, the Federal Aviation Administration, and NOAA regarding safety issues relating to the project. BOEM_0076931-32. Vineyard Wind also will use the best and safest technology available, use best management practices, and employ properly trained personnel. BOEM_0076933; BOEM_76901-21.

Nevertheless, Plaintiffs argue that BOEM has overlooked the potential for a hurricane to hit the project area. Plaintiffs are mistaken; BOEM addressed the issue. The Project will be designed to be able to withstand sustained winds up to 112 miles per hour ("mph") and wind gusts up to 157 mph, and the turbines would shut down if wind speeds exceeded 69 mph. BOEM_0068497. The turbines also will be able to withstand waves over sixty feet high. *Id.* These parameters are in accordance with International Electrotechnical Commission standards, which require that project components be able to withstand an extreme weather event that has a 2% chance of occurring in a year. BOEM_0034067; BOEM_0069549; *see also* BOEM_0023259-60. Given the ability of the turbines to withstand wind and waves of these magnitudes, it is highly unlikely that the turbines would collapse or fall apart during extreme weather. BOEM_0068497-98. Over the past 160 years, there have been several hurricanes that passed through the project area, but none was above a category 3. BOEM_0069238-39. The project would be designed to withstand a category 3 hurricane. BOEM_68497, 69475, 69549-50; BOEM_0023259-60. Therefore, BOEM has reasonably implemented its duty to ensure that the project will be conducted safely and has accounted for the risk of hurricanes in the project area.

B. Protection of the Environment and Conservation of Natural Resources

BOEM also acted reasonably in its efforts to ensure that the Project will be carried out in a manner that ensures the protection of the environment and conservation of natural resources. *See* 43 U.S.C. §§ 1337(p)(4)(B), (D). In order to analyze the potential impacts of the project on the environment, BOEM initiated a NEPA process in March 2018. BOEM_0076928. The Corps, NMFS, Interior, BSEE, U.S. Coast Guard, and the U.S. EPA were cooperating agencies. *Id.* The FEIS analyzed the potential impacts of the project on the environment across a number of topics, including potential impacts to benthic species, fish, marine mammals, and marine ecosystems.

BOEM_0068519-624. Potential impacts to the marine environment and particular species of fish and marine mammals range from negligible to moderate with some potentially beneficial impacts. BOEM_0076928; BOEM_0068452-53. BOEM also required mitigation measures to avoid and minimize potential impacts on the environment. BOEM_0076934; BOEM_0069166-221 (FEIS App. D); BOEM_0076854-87 (ROD App. A); BOEM_0077177-221 (COP approval letter). BOEM also engaged in consultation with NMFS/GAR regarding threatened and endangered species. BOEM_0076934-35. In September 2020, NMFS issued a Biological Opinion concluding that the Project was not likely to jeopardize the continued existence of listed marine mammal species, including the right whale, or sea turtles. BOEM_0076935.

Plaintiffs argue that BOEM's decision to approve the project in May 2021 violated OCSLA because NMFS subsequently issued a separate BiOp in October 2021. *See* Doc. No. 67 at 36-37. BOEM reviewed the 2020 BiOp before issuing its decision in May 2021. BOEM_0076935. BOEM also prepared a Biological Assessment Supplement in May 2021 and concluded that planned monitoring surveys were not likely to adversely affect right whales. BOEM_0076723-49; *see also* BOEM_0208700-10 (BOEM memorandum documenting its conclusion that project would not jeopardize listed species or destroy or adversely modify their habitat). Following the reinitiated consultation, NMFS still found that the federal actions were not likely to jeopardize the continued existence of listed species. NMFS_0017558 (2021 BiOp); *see also* NMFS_0017686-87 (NMFS Oct. 15, 2021 transmittal letter). Moreover, BOEM accounted for the reinitiation of consultation with NMFS by conditioning its approval of the COP on Vineyard Wind's compliance with "any terms and conditions and reasonable and prudent measures resulting from a BOEM reinitiated consultation for the Project's BiOp." BOEM 0077152; *see also* BOEM_0077789. Accordingly, BOEM reasonably ensured the

protection of the environment and conservation of natural resources in approving the COP.

C. Marine Navigation

Nor did BOEM act arbitrarily in its efforts to ensure that the Project would not unreasonably interfere with sea lanes and marine navigation. *See* 43 U.S.C. § 1337(p)(4)(I), (J). Primary vessel traffic and commercial shipping lanes to and from major ports in the geographic region are located outside of the project area. BOEM_0076941. In order to minimize impacts to marine navigation, BOEM selected an alternative that was consistent with the U.S. Coast Guard's recommendations in the Areas Offshore of Massachusetts and Rhode Island Port Access Route Study ("MARIPARS"). BOEM_0076942; BOEM_0054765. In that report, the Coast Guard recommended that: (1) "[l]anes for vessel transit be oriented in a northwest to southeast direction, 0.6 to 0.8 NM wide;" (2) "[l]anes for commercial fishing vessels actively engaged in fishing should be oriented in an east to west direction, 1 NM wide;" and (3) "[l]anes for [search and rescue] operations should be oriented in a north to south and east to west direction, 1 NM wide." BOEM_0054808. BOEM adopted these features in its selected alternative, BOEM_0076942; *see also* BOEM_0076822-24. BOEM also required a suite of mitigation measures, including the appropriate lighting and marking of turbines, equipping the turbines with AIS transponders, and enabling the shutdown of the turbines in the event of an emergency. BOEM_0076890, 76892-95 (ROD App. A); BOEM_0077170-74 (COP Approval Letter).

By adopting the Coast Guard's recommendations, BOEM reasonably ensured that there would not be unreasonable interference with marine navigation. The Coast Guard is the expert agency charged by multiple statutes with promoting navigational safety on the nation's waterways. *See Collins v. Nat'l Transp. Safety Bd.*, 351 F.3d 1246, 1253 (D.C. Cir. 2003); *see also* Coast Guard Act, 14 U.S.C. § 102(1) ("The Coast Guard shall – . . . enforce or assist in the

enforcement of all applicable Federal laws on, under, and over the high seas and waters subject to the jurisdiction of the United States."); Ports and Waterways Security Act, 46 U.S.C. § 70001 *et seq.*; Maritime Transportation Act of 2002, Pub. L. 107-295, 116 Stat. 2064 (2002). The Coast Guard's determinations regarding marine navigational safety are entitled to a high degree of deference. *See Cassidy v. Chertoff*, 471 F.3d 67, 84 (2d Cir. 2006) ("Expert determinations by the Coast Guard . . . , which are based on an explicit Congressional delegation of legislative authority . . . are entitled to significant deference."); *see also Wilmina Shipping AS v. U.S. Dept. of Homeland Security*, 934 F. Supp. 2d 1, 13 (D.D.C. 2013). Further, the transit lane alternative proposed by commercial fishermen, which would have included a 2- or 4-mile transit lane through the project area, *see* BOEM_0068491-96, was not among the Coast Guard's recommendations, *see* BOEM_0054808, and therefore it was reasonable for BOEM not to include it. BOEM_0076823.

D. Fishing

BOEM likewise acted reasonably in its efforts to ensure that the Project would not unreasonably interfere with commercial and recreational fishing. *See* 43 U.S.C. 1337(p)(4)(I), (J). Section 8(p)(4)(I) of OCSLA requires the U.S. Department of the Interior to ensure that it prevents "interference with reasonable uses (as determined by the Secretary) of the exclusive economic zone, the high seas, and the territorial seas." 43 U.S.C. § 1337(p)(4)(I). Interior has reasonably interpreted this provision to mean that not *all* interference with fishing is precluded. BOEM_0072952 (Solicitor's M-Opinion 37067). Instead, Interior's regulations provide that, when approving a COP, BOEM should ensure that the planned project will "not unreasonably interfere with other uses of the [outer continental shelf]." 30 C.F.R. § 585.621(c). Interior's interpretation of OCSLA—in an area where it was expressly directed by Congress to regulate—

is entitled to deference. *Flock v. U.S. Dept. of Transp.*, 840 F.3d 49, 54-55 (1st Cir. 2016). Section 8(p)(4)(J) requires Interior to consider "any other use of the sea or seabed, including for use as a fishery . . . ." BOEM's approval of the COP complied with OCSLA by considering the use of the area for fishing and by preventing unreasonable interference with fishing.

Fishing will not be precluded in the turbine array. BOEM_0076944. By adopting the recommendations of the MARIPARS report, including the 1-nm wide, east-west fishing lanes for commercial fishing vessels, BOEM's decision reduces the potential impacts on fishing. *Id.* And consistent with the Coast Guard's report, the navigational risk assessment prepared for the project shows that it is feasible for fishing vessels with mobile gear to navigate through the turbine array. BOEM_0076942; BOEM_0068718 ("[T]rawling vessels require 180-degree turning diameters between 0.16 [NM] and 0.86 [NM] in good weather and sea conditions (larger diameters would be required in poor weather and sea conditions."); *see also* BOEM_0063764-65). To be sure, BOEM found in the FEIS that there would be impacts to fishing. For example, fishing gear may become entangled in the protective gear placed over cables or around the turbines and electrical services platform. BOEM_0068718. Fishing with fixed gear, such as with hook and line, lobster pots, and gill nets, is not likely to be affected as much as fishing with mobile gear. BOEM_0076944; BOEM_0068718.

In addition to adopting the Coast Guard's recommendations, BOEM's decision reduces the level of interference with fishing by removing six turbines in the northernmost portion of the wind energy area, which is an area used by commercial fishermen for scallop, surf clam, and ocean quahog fishing. BOEM_0076944. This was in addition to the roughly 50% reduction in the wind energy area prior to the issuance of the lease. BOEM_0076941. Further, the project location avoids more densely fished areas. *See* BOEM_0069134-36; BOEM_0063762-63,

63768-70. BOEM has also restricted the time of year in which Vineyard Wind is allowed to conduct construction impacts in order to reduce impacts on fishing. BOEM_0076945. Moreover, BOEM required extensive mitigation to enable fishermen to operate within the project area, including the appropriate marking of turbines, a two-way communication channel between fishermen and Project operators, and sharing of electronic chart information showing the Project structures with the fishing community. BOEM_0076890-95 (ROD App. A); BOEM_0077170-74, 77222-24 (COP Approval Letter).

Notwithstanding the steps that BOEM has taken to reduce impacts to fishing, BOEM anticipates that, due to the potential risks of navigating within the turbine array, some fishing vessels may avoid the project area. BOEM_0076944. In order to compensate fishermen and other business owners who rely on fishing, Vineyard Wind will establish compensation funds totaling $26.7 million. BOEM_0076946. Vineyard Wind has also reached agreements with Massachusetts and Rhode Island for additional funds totaling $14.25 million, bringing the total compensation funding to $40.9 million. *Id.* Thus, BOEM has not only taken measures to reduce impacts to fishing, it has also ensured that fishermen will not suffer economic losses due to the project. This is more than sufficient to comply with section 8(p)(4)(I) and (J) of OCSLA.

Moreover, there is no basis for Plaintiffs' assertion that BOEM violated section 3 of OCSLA. 43 U.S.C. § 1332. Section 3 is a broad declaration of policy regarding the potential development of mineral resources on the outer continental shelf. *Id.* The First Circuit has interpreted subsection 3(2) to mean only that, in granting mineral leasing rights, Interior may not interfere with "the legal right to fish." *Andrus*, 594 F.2d at 889 (citing Convention on the Continental Shelf, Apr. 29, 1958, 15 U.S.T. 471, T.I.A.S. No. 5578). And, more broadly, the Secretary has the discretion "to achieve a proper balance" between fishing interest and mineral

leasing. *Id.* Thus, assuming that section 3 applies in the offshore wind context, BOEM has satisfied its requirements through compliance with section 8(p)(4) of OCSLA.

Plaintiffs' argument that BOEM violated OCSLA in approving the COP relies on a statement in the Corps' ROD that has since been corrected. They argue that the "Federal Defendants" stated in the ROD that the entire project area would be "abandoned" by commercial fishermen. Doc. No. 67 at 39 (quoting BOEM_0076837). BOEM never made that statement; instead, it was made in the Corps' portion of the ROD. BOEM_00768376. In the BOEM portion of the ROD, BOEM explained that it had selected a combination of alternatives C, D2, and E. BOEM_0076821. Alternative D2 contained the east-west fishing lanes and 1-nm spacing between turbines recommended by the Coast Guard, and alternative E reduced the size of the project and consequently reduced impacts to fishing. BOEM_0076822-23. The FEIS explained that alternative D2 would improve the ability of fishing vessels to maneuver within the project area and minimize the conflict between vessels using mobile and fixed gear. BOEM_0068730. The FEIS also found the alternative E would reduce impacts to fishing because there would be 16 fewer turbines. BOEM_0068731. In addition, the FEIS expressly found that fishing vessels would be able to navigate within the turbine array. BOEM_0068718, 68743. Thus, there is no basis for Plaintiffs' assertion that *BOEM* ever concluded that fishermen would abandon the project area.

In any event, as Plaintiffs are well aware, the Corps clarified that its statement in the ROD was "based solely upon comments of interested parties submitted to BOEM during the public comment period for the [DEIS]," not based on an independent analysis conducted by the Corps. USACE_AR_014374; *see also*, *e.g.*, BOEM_0069602 (RODA comments asserting that it would not be possible for commercial fishermen to operate within the turbine array). Plaintiffs'

efforts to strike the clarification should be rejected because the Corps' clarification is consistent with the record. *See* Doc. No. 58 at 13-16. But even if the Court were to strike it, the one statement in the ROD does not outweigh the lengthy analysis in the FEIS showing that fishermen will be able to fish within the project area.

Plaintiffs are also incorrect that BOEM did not consider the potential impacts on marine radar. The FEIS acknowledges the potential for turbines to affect radar by causing clutter, particularly in poor weather. BOEM_0068717; BOEM_0068739. The Coast Guard evaluated the issue in the MARIPARS report and concluded that there were no authoritative scientific studies showing that the presence of wind turbines would degrade marine vessel radar. BOEM_68739; BOEM_0054795. In general, there are several types of interference with radar that may occur, such as false targets, multiple reflections, and blocking of objects in the line of sight of the radar, but these are not unique to wind farms. BOEM_0054795. Radar operators must be properly trained to identify these issues, and the location of the radar onboard a vessel may affect the ability of the radar to detect objects. *Id.* But studies in the United Kingdom have shown that "mitigation measures, such as properly trained radar operators, properly installed and adjusted equipment, marked wind turbines and the use of [an onboard transponder], enable safe navigation with minimal loss or radar detection." *Id.* The Coast Guard's findings within an area of its technical expertise are entitled to deference. *See Cassidy*, 471 F.3d at 84.

E. National Security

BOEM also reasonably ensured that the project would be carried out in a manner that would protect national security interests. *See* 43 U.S.C. 1337(p)(4)(F). BOEM consulted with the U.S. Department of Defense ("DoD") at every stage of the process, beginning with the request for interest in December 2010. BOEM_0076938. A portion of the wind energy area is within the

military's Narragansett Bay Operating Area, and most of the area is within the U.S. Navy's Aviation Warning Area. BOEM_0076938-39. BOEM consulted with DoD about these issues, and DoD concluded that any issues could be addressed through mitigation. BOEM_0076939. BOEM requested review of the COP by multiple DoD agencies, and as a result of this review, the U.S. Air Force, North American Aerospace Defense Command ("NORAD"), and the U.S. Navy requested that BOEM require the adoption of certain measures. BOEM did so and indicated that it would include in the COP approval any additional mitigation requested by DoD. BOEM_0076939; *see also* BOEM_0068765-69 (FEIS analyzing impacts to military and national security issues and explaining the coordination with DoD); BOEM_0063225-26 (letter from DoD regarding potential impacts to the Air Force's 104th fighter wing training and NORAD's radar systems); BOEM_0077175 (COP approval letter incorporating mitigation from DoD).

VI. Federal Defendants Complied with the Clean Water Act

Federal Defendants incorporate by reference the arguments regarding the Clean Water Act in section V of their summary judgment brief filed in *RODA*.

VII. BOEM's Decision To Approve The Vineyard Wind COP Complied With the ESA (Ninth Claim, Tenth Claim) and the MMPA (Twenty-First Claim, Twenty-Second Claim)

As a threshold matter, BOEM was the only Federal agency that approved the Vineyard Wind COP, so to the extent Plaintiffs suggest that any other Federal agency approved the Vineyard Wind COP, *see* Doc. No. 67 at 42, the claim must be dismissed. To the extent that Plaintiffs challenge any of the Federal Defendants' decisions to rely on the 2021 BiOp, Plaintiffs failed to satisfy the mandatory pre-suit notice requirement as to such claims. 16 U.S.C. § 1540(g)(2)(A)(i).[15]

[15] Plaintiffs filed their pre-suit notice on September 17, 2021. Doc. No. 1-1. The operative 2021 BiOp was issued on October 18, 2021, and was subsequently corrected on November 1, 2021.

If the Court reaches the merits of any of Plaintiffs' ESA, the relevant issue is whether BOEM's approval of the Vineyard Wind COP, with conditions based on its chosen NEPA-related mitigation as well as the MMPA take authorization "*reasonably would be expected*, directly or indirectly, to reduce appreciably *the likelihood* of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." 50 C.F.R. § 402.02[16] (emphasis added) (definition of "jeopardize the continued existence of"), *cited in Ctr. for Biological Diversity v. NMFS,* 977 F. Supp. 2d 55, 72 (D.P.R. 2013). The 2021 BiOp analyzes "effects of the action" including all consequences to listed species or critical habitat that are caused by the proposed action, defined as:

> all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur.

50 C.F.R. § 402.02. Based on the effects analysis considered in the context of the status of the species, environmental baseline, and cumulative effects, the 2021 BiOp reasonably concludes that the Federal actions for the Vineyard Wind Project are not likely to jeopardize the continued existence of the right whale. NMFS 17558.[17]

Plaintiffs conflate "incidental taking"[18] with jeopardy when they suggest that NMFS

NMFS 17176. Any ESA claims concerning Federal Defendants' reliance on the 2021 BiOp are subject to dismissal due to Plaintiffs' failure to provide the requisite pre-suit notice. *See, e.g.*, *Sw. Ctr. for Biological Diversity v. U.S. Bureau of Reclamation*, 143 F.3d 515, 520-22 (9th Cir. 1998) (notice letter must alert the recipients to the actual violation alleged in a subsequently filed complaint).

[16] All references to 50 C.F.R. sections are to the 2022 version.

[17] Plaintiffs continue to assert that the 2021 BiOp is not properly part of the administrative record and the Court should strike references to it. Doc. No. 67 at 23-24 n.1. Federal Defendants incorporate their arguments in response to Plaintiffs' Motion to Strike. Doc. No. 58.

[18] "Take" as defined by the ESA means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct." 16 U.S.C. § 1532(19). Take

should have identified reasonable and prudent alternatives ("RPAs") to avoid taking right whales or destroying their critical habitat pursuant to 50 C.F.R. § 402.14(h). *See* Doc. No. 67 at 43. RPAs are developed where necessary to avoid jeopardy to a species or adverse modification of critical habitat, not to avoid incidental take. *See* 16 U.S.C. § 1536(b)(3)(A). Here, the 2021 BiOp anticipated the harassment of some individual right whales, but no deaths or injuries or other types of harm that would reduce the numbers, reproduction, and distribution of right whales are anticipated. NMFS 17530.[19] Based on its determination that the actions were not likely to appreciably reduce the likelihood of the survival and recovery of right whales, *id,* NMFS/GAR reasonably concluded that the Federal actions are not likely to jeopardize the right whale. NMFS 17558. The 2021 BiOp further concluded that the Federal actions will have "no effect" on right whale critical habitat. *Id.* Because in the 2021 BiOp NMFS/GAR reached "no jeopardy" and "no adverse modification conclusions," *see* NMFS 17558, no RPAs were required and Plaintiffs' discussion of them is simply misplaced.

Plaintiffs' citation to *Tennessee Valley Authority v. Hill*, 437 U.S. 153, 184-185 (1978) ("*TVA*"), is inapposite because the record in that case established that the challenged agency action would jeopardize the continued existence of the endangered snail darter. *See Weinberger v. Romero-Barcelo*, 456 U.S. 305, 314 (1982) (noting that the issue of elimination of an endangered species by destruction of its habitat was conceded in *TVA*). Here, by contrast, the 2021 BiOp properly evaluates Federal actions with regard to cumulative effects, *see* NMFS

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incidental to federal actions that is "reasonably certain to occur" can be exempted from liability as part of the consultation process in an incidental take statement ("ITS") in a biological opinion. 16 U.S.C. § 1536(b)(4); 50 C.F.R. § 402.14(g)(7).

[19] Plaintiffs fail to present any evidence to suggest that injury or death of right whales are reasonably certain to occur. Therefore, Plaintiffs cannot show that it was arbitrary and capricious for NMFS/GAR to determine that incidental take by harassment of 20 right whales is reasonably certain to occur. NMFS 17561.

17504-05, 17688-89, which have different meanings under the ESA and NEPA, and the environmental baseline. *Conservation Congress v. U.S. Forest Serv.*, 720 F.3d 1048, 1055 (9th Cir. 2013). As explained in Federal Defendants' *Ack Residents* summary judgment briefs, Doc. Nos. 96 at 19-20 and 114 at 15, the effects of future Federal actions such as other wind energy projects in the MA/RI WEA will undergo ESA Section 7 consultation later, if and when they occur. As a Section 7 consultation is completed on a windfarm, "the effects of the action associated with that project would be considered in the Environmental Baseline for the next one in line for consultation." NMFS 17292. *See also* NMFS 17688-17689. Thus, it was unnecessary to include the effects of future wind energy projects as part of the environmental baseline or cumulative effects sections of the 2021 BiOp.[20]

The 2021 BiOp considered the best available scientific information on the status of the right whale, its population trends, and threats including operational noise. NMFS 17230-42. NMFS/GAR adequately explained why it relied on one study over another, a scientific and technical choice that is entitled to deference. NMFS 17683. Finally, NMFS/GAR integrated the information presented in the BiOp and reasonably concluded that the effects of the action in the context of the right whale's status, the environmental baseline, and cumulative effects, are not reasonably expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or

[20] "The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process." 50 C.F.R. § 402.02. "Cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." *Id.* Since future wind projects will be subject to ESA section 7 consultation, they are considered future federal activities, so would not be included in a cumulative effects analysis.

distribution of that species. NMFS 17527-17532. In fact, NMFS/GAR reasonably concluded that the action was not expected to reduce right whale numbers, reproduction, or distribution at all. Under these circumstances, the "no jeopardy" conclusion was scientifically sound, well-supported, and satisfies all legal requirements. *Id.* BOEM and the Corps complied with their respective ESA obligations by reviewing and adopting the new BiOp, and incorporating its reasonable and prudent measures[21] ("RPMs") and their implementing terms and conditions as conditions of Project approval. The JROD notes that "any mitigation measures requiring additional consultation under the ESA will not be authorized to be conducted until said consultation is completed." BOEM_0076852. *See also* BOEM_0077152 ("Activities authorized herein will be subject to any terms and conditions and reasonable and prudent measures resulting from a BOEM-reinitiated consultation for the Project's BiOp."); USACE_AR_012636 ("Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take of the attached BO, and any future BO that replaces it, which terms and conditions are incorporated by reference in this permit.").[22]

[21] Reasonable and prudent measures refer to those actions "necessary or appropriate to minimize" the amount or extent of incidental take caused by the proposed action. 50 C.F.R. § 402.02; 16 U.S.C. § 1536(b)(4)(B).

[22] In response to Plaintiffs' Ninth and Tenth Claims, Federal Defendants incorporate by reference the ESA-related arguments set forth in Federal Defendants' *Ack Residents* summary judgment briefing. *See ACK Residents Against Turbines, et al. v. U.S. Bureau of Ocean Energy Mgmt., et al.,* Case No. 1:21-cv-11390-IT, Doc. Nos. 96 and 114, as well as the responses to arguments made by the Plaintiffs in Section III.E., *supra.* In response to Plaintiffs' Twenty-First and Twenty-Second Claims, Federal Defendants hereby incorporate by reference the arguments regarding the MMPA as set forth in Federal Defendants' summary judgment briefing in the ALLCO case. *See Melone v. Coit et al.*, Case No. 1:21-cv-11171-IT, Doc. No. 153.

VIII. Summary Judgment Should Be Granted to Federal Defendants On All Remaining Claims

To the extent that Plaintiffs have not briefed claims that were pled in their complaint, summary judgment should be granted to Federal Defendants on all such claims. *See Grenier v. Cyanamid Plastics, Inc.*, 70 F.3d 667, 678 (1st Cir. 1995).

IX. If the Court Finds a Legal Error, It Should Remand Without Vacatur

If the Court were to find any legal deficiency, however, it should exercise its discretion to remand the agency decision(s) without vacatur. A court's decision to remand without vacatur "depends inter alia on the severity of the errors, the likelihood that they can be mended without altering the order, and on the balance of equities and public interest considerations." *Central Maine Power Co.*, 252 F.3d 34, 48 (1st Cir. 2001) (citing *Int'l Union, United Mine Workers of Am. v. Fed. Mine Safety & Health Admin.*, 920 F.2d 960, 966-67 (D.C.Cir.1990)). Here, even if Plaintiffs had demonstrated that the agencies committed any legal errors, the errors they allege to have occurred could be corrected without altering the ultimate decision. The equities and public interest also would favor allowing this Project to proceed during the course of any remand. To the extent there is any doubt on this score, Federal Defendants request that the Court provide an opportunity for arguments as to any appropriate remedy.

CONCLUSION

For the foregoing reasons, summary judgment should be granted to Federal Defendants on all claims.

Respectfully submitted,

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Of Counsel:

PEDRO MELENDEZ-ARREAGA
Lead Attorney-Advisor

TODD KIM
Assistant Attorney General
Environment & Natural Resources Division
U.S. Department of Justice

/s/ Perry M. Rosen

Offshore Renewable Energy Team
Division of Mineral Resources
Office of the Solicitor
U.S. Department of the Interior
1849 C Street, NW
Washington, D.C. 20240
(202) 513-7759
pedro.melendez-arrea@sol.doi.gov

MATTHEW J. HARRIS
Assistant District Counsel
U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742
(978) 318-8244
matthew.j.harris@usace.army.mil

LEA TYHACH
Attorney - Advisor
National Oceanic and Atmospheric Administration
Office of General Counsel
Northeast Section
55 Great Republic Drive
Gloucester, MA 01930
(978) 281-9242
lea.tyhach@noaa.gov

PERRY M. ROSEN
Environmental Defense Section
P.O. Box 7611
Washington, DC 20044-7611
Tel: (202) 353-7792
E-mail: perry.rosen@usdoj.gov

/s/ Mark Arthur Brown
MARK ARTHUR BROWN
Senior Trial Attorney
Wildlife and Marine Resources Section
P.O. Box 7611
Washington, D.C. 20044-7611
Tel: (202) 305-0204
Fax: (202) 305-0275
E-mail: mark.brown@usdoj.gov

/s/ Luther L. Hajek
LUTHER L. HAJEK
ANGELA ELLIS
Trial Attorney
Natural Resources Section
999 18th St., South Terrace, Suite 370
Denver, CO 80202
Tel: (303) 844-1376
Fax: (303) 844-1350
E-mail: luke.hajek@usdoj.gov

Attorneys for Federal Defendant

CERTIFICATE OF SERVICE

I hereby certify that the foregoing document was electronically filed with the Clerk of the Court using the CM/ECF system, which will send notification of said filings to the attorneys of record for Plaintiffs and all other parties, who have registered with the Court's CM/ECF system.

So certified this 20th day of December, 2022 by

/s/ *Luther L. Hajek*
Luther L. Hajek
U.S. Department of Justice

PART 1500—PURPOSE, POLICY, AND MANDATE

Sec.

AUTHORITY: NEPA, the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C. 4371 *et seq.*), sec. 309 of the Clean Air Act, as amended (42 U.S.C. 7609) and E.O. 11514, Mar. 5, 1970, as amended by E.O. 11991, May 24, 1977).

SOURCE: 43 FR 55990, Nov. 28, 1978, unless otherwise noted.

§ 1500.1 Purpose.

(a) The National Environmental Policy Act (NEPA) is our basic national charter for protection of the environment. It establishes policy, sets goals (section 101), and provides means (section 102) for carrying out the policy. Section 102(2) contains ''action-forcing'' provisions to make sure that federal agencies act according to the letter and spirit of the Act. The regulations that follow implement section 102(2). Their purpose is to tell federal agencies what they must do to comply with the procedures and achieve the goals of the Act. The President, the federal agencies, and the courts share responsibility for enforcing the Act so as to achieve the substantive requirements of section 101.

(b) NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA. Most important, NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail.

(c) Ultimately, of course, it is not better documents but better decisions that count. NEPA's purpose is not to generate paperwork—even excellent paperwork—but to foster excellent action. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment. These regulations provide the direction to achieve this purpose.

§ 1500.2 Policy.

Federal agencies shall to the fullest extent possible:

(a) Interpret and administer the policies, regulations, and public laws of the United States in accordance with the policies set forth in the Act and in these regulations.

(b) Implement procedures to make the NEPA process more useful to decisionmakers and the public; to reduce paperwork and the accumulation of extraneous background data; and to emphasize real environmental issues and alternatives. Environmental impact statements shall be concise, clear, and to the point, and shall be supported by evidence that agencies have made the necessary environmental analyses.

(c) Integrate the requirements of NEPA with other planning and environmental review procedures required by law or by agency practice so that all such procedures run concurrently rather than consecutively.

(d) Encourage and facilitate public involvement in decisions which affect the quality of the human environment.

(e) Use the NEPA process to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment.

(f) Use all practicable means, consistent with the requirements of the Act and other essential considerations of national policy, to restore and enhance the quality of the human environment and avoid or minimize any possible adverse effects of their actions upon the quality of the human environment.

§ 1500.3 Mandate.

Parts 1500 through 1508 of this title provide regulations applicable to and binding on all Federal agencies for implementing the procedural provisions of the National Environmental Policy Act of 1969, as amended (Pub. L. 91–190, 42 U.S.C. 4321 *et seq.*) (NEPA or the Act)

except where compliance would be inconsistent with other statutory requirements. These regulations are issued pursuant to NEPA, the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C. 4371 *et seq.*) section 309 of the Clean Air Act, as amended (42 U.S.C. 7609) and Executive Order 11514, Protection and Enhancement of Environmental Quality (March 5, 1970, as amended by Executive Order 11991, May 24, 1977). These regulations, unlike the predecessor guidelines, are not confined to sec. 102(2)(C) (environmental impact statements). The regulations apply to the whole of section 102(2). The provisions of the Act and of these regulations must be read together as a whole in order to comply with the spirit and letter of the law. It is the Council's intention that judicial review of agency compliance with these regulations not occur before an agency has filed the final environmental impact statement, or has made a final finding of no significant impact (when such a finding will result in action affecting the environment), or takes action that will result in irreparable injury. Furthermore, it is the Council's intention that any trivial violation of these regulations not give rise to any independent cause of action.

§ 1500.4 Reducing paperwork.

Agencies shall reduce excessive paperwork by:

(a) Reducing the length of environmental impact statements (§ 1502.2(c)), by means such as setting appropriate page limits (§§ 1501.7(b)(1) and 1502.7).

(b) Preparing analytic rather than encyclopedic environmental impact statements (§ 1502.2(a)).

(c) Discussing only briefly issues other than significant ones (§ 1502.2(b)).

(d) Writing environmental impact statements in plain language (§ 1502.8).

(e) Following a clear format for environmental impact statements (§ 1502.10).

(f) Emphasizing the portions of the environmental impact statement that are useful to decisionmakers and the public (§§ 1502.14 and 1502.15) and reducing emphasis on background material (§ 1502.16).

(g) Using the scoping process, not only to identify significant environmental issues deserving of study, but also to deemphasize insignificant issues, narrowing the scope of the environmental impact statement process accordingly (§ 1501.7).

(h) Summarizing the environmental impact statement (§ 1502.12) and circulating the summary instead of the entire environmental impact statement if the latter is unusually long (§ 1502.19).

(i) Using program, policy, or plan environmental impact statements and tiering from statements of broad scope to those of narrower scope, to eliminate repetitive discussions of the same issues (§§ 1502.4 and 1502.20).

(j) Incorporating by reference (§ 1502.21).

(k) Integrating NEPA requirements with other environmental review and consultation requirements (§ 1502.25).

(l) Requiring comments to be as specific as possible (§ 1503.3).

(m) Attaching and circulating only changes to the draft environmental impact statement, rather than rewriting and circulating the entire statement when changes are minor (§ 1503.4(c)).

(n) Eliminating duplication with State and local procedures, by providing for joint preparation (§ 1506.2), and with other Federal procedures, by providing that an agency may adopt appropriate environmental documents prepared by another agency (§ 1506.3).

(o) Combining environmental documents with other documents (§ 1506.4).

(p) Using categorical exclusions to define categories of actions which do not individually or cumulatively have a significant effect on the human environment and which are therefore exempt from requirements to prepare an environmental impact statement (§ 1508.4).

(q) Using a finding of no significant impact when an action not otherwise excluded will not have a significant effect on the human environment and is therefore exempt from requirements to prepare an environmental impact statement (§ 1508.13).

[43 FR 55990, Nov. 29, 1978; 44 FR 873, Jan. 3, 1979]

§ 1500.5 Reducing delay.

Agencies shall reduce delay by:

(a) Integrating the NEPA process into early planning (§ 1501.2).

(b) Emphasizing interagency cooperation before the environmental impact statement is prepared, rather than submission of adversary comments on a completed document (§ 1501.6).

(c) Insuring the swift and fair resolution of lead agency disputes (§ 1501.5).

(d) Using the scoping process for an early identification of what are and what are not the real issues (§ 1501.7).

(e) Establishing appropriate time limits for the environmental impact statement process (§§ 1501.7(b)(2) and 1501.8).

(f) Preparing environmental impact statements early in the process (§ 1502.5).

(g) Integrating NEPA requirements with other environmental review and consultation requirements (§ 1502.25).

(h) Eliminating duplication with State and local procedures by providing for joint preparation (§ 1506.2) and with other Federal procedures by providing that an agency may adopt appropriate environmental documents prepared by another agency (§ 1506.3).

(i) Combining environmental documents with other documents (§ 1506.4).

(j) Using accelerated procedures for proposals for legislation (§ 1506.8).

(k) Using categorical exclusions to define categories of actions which do not individually or cumulatively have a significant effect on the human environment (§ 1508.4) and which are therefore exempt from requirements to prepare an environmental impact statement.

(l) Using a finding of no significant impact when an action not otherwise excluded will not have a significant effect on the human environment (§ 1508.13) and is therefore exempt from requirements to prepare an environmental impact statement.

§ 1500.6 Agency authority.

Each agency shall interpret the provisions of the Act as a supplement to its existing authority and as a mandate to view traditional policies and missions in the light of the Act's national environmental objectives. Agencies shall review their policies, procedures, and regulations accordingly and revise them as necessary to insure full compliance with the purposes and provisions of the Act. The phrase ''to the fullest extent possible'' in section 102 means that each agency of the Federal Government shall comply with that section unless existing law applicable to the agency's operations expressly prohibits or makes compliance impossible.

PART 1501—NEPA AND AGENCY PLANNING

Sec.

AUTHORITY: NEPA, the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C. 4371 *et seq.*), sec. 309 of the Clean Air Act, as amended (42 U.S.C. 7609, and E.O. 11514 (Mar. 5, 1970, as amended by E.O. 11991, May 24, 1977).

SOURCE: 43 FR 55992, Nov. 29, 1978, unless otherwise noted.

§ 1501.1 Purpose.

The purposes of this part include:

(a) Integrating the NEPA process into early planning to insure appropriate consideration of NEPA's policies and to eliminate delay.

(b) Emphasizing cooperative consultation among agencies before the environmental impact statement is prepared rather than submission of adversary comments on a completed document.

(c) Providing for the swift and fair resolution of lead agency disputes.

(d) Identifying at an early stage the significant environmental issues deserving of study and deemphasizing insignificant issues, narrowing the scope of the environmental impact statement accordingly.

(e) Providing a mechanism for putting appropriate time limits on the environmental impact statement process.

§ 1501.2 Apply NEPA early in the process.

Agencies shall integrate the NEPA process with other planning at the earliest possible time to insure that planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts. Each agency shall:

(a) Comply with the mandate of section 102(2)(A) to ''utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decisionmaking which may have an impact on man's environment,'' as specified by §1507.2.

(b) Identify environmental effects and values in adequate detail so they can be compared to economic and technical analyses. Environmental documents and appropriate analyses shall be circulated and reviewed at the same time as other planning documents.

(c) Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act.

(d) Provide for cases where actions are planned by private applicants or other non-Federal entities before Federal involvement so that:

(1) Policies or designated staff are available to advise potential applicants of studies or other information foreseeably required for later Federal action.

(2) The Federal agency consults early with appropriate State and local agencies and Indian tribes and with interested private persons and organizations when its own involvement is reasonably foreseeable.

(3) The Federal agency commences its NEPA process at the earliest possible time.

§ 1501.3 When to prepare an environmental assessment.

(a) Agencies shall prepare an environmental assessment (§1508.9) when necessary under the procedures adopted by individual agencies to supplement these regulations as described in §1507.3. An assessment is not necessary if the agency has decided to prepare an environmental impact statement.

(b) Agencies may prepare an environmental assessment on any action at any time in order to assist agency planning and decisionmaking.

§ 1501.4 Whether to prepare an environmental impact statement.

In determining whether to prepare an environmental impact statement the Federal agency shall:

(a) Determine under its procedures supplementing these regulations (described in §1507.3) whether the proposal is one which:

(1) Normally requires an environmental impact statement, or

(2) Normally does not require either an environmental impact statement or an environmental assessment (categorical exclusion).

(b) If the proposed action is not covered by paragraph (a) of this section, prepare an environmental assessment (§1508.9). The agency shall involve environmental agencies, applicants, and the public, to the extent practicable, in preparing assessments required by §1508.9(a)(1).

(c) Based on the environmental assessment make its determination whether to prepare an environmental impact statement.

(d) Commence the scoping process (§1501.7), if the agency will prepare an environmental impact statement.

(e) Prepare a finding of no significant impact (§1508.13), if the agency determines on the basis of the environmental assessment not to prepare a statement.

(1) The agency shall make the finding of no significant impact available to the affected public as specified in §1506.6.

(2) In certain limited circumstances, which the agency may cover in its procedures under §1507.3, the agency shall make the finding of no significant impact available for public review (including State and areawide clearinghouses) for 30 days before the agency makes its final determination whether to prepare an environmental impact statement and before the action may begin. The circumstances are:

(i) The proposed action is, or is closely similar to, one which normally requires the preparation of an environmental impact statement under the procedures adopted by the agency pursuant to § 1507.3, or

(ii) The nature of the proposed action is one without precedent.

§ 1501.5 Lead agencies.

(a) A lead agency shall supervise the preparation of an environmental impact statement if more than one Federal agency either:

(1) Proposes or is involved in the same action; or

(2) Is involved in a group of actions directly related to each other because of their functional interdependence or geographical proximity.

(b) Federal, State, or local agencies, including at least one Federal agency, may act as joint lead agencies to prepare an environmental impact statement (§ 1506.2).

(c) If an action falls within the provisions of paragraph (a) of this section the potential lead agencies shall determine by letter or memorandum which agency shall be the lead agency and which shall be cooperating agencies. The agencies shall resolve the lead agency question so as not to cause delay. If there is disagreement among the agencies, the following factors (which are listed in order of descending importance) shall determine lead agency designation:

(1) Magnitude of agency's involvement.

(2) Project approval/disapproval authority.

(3) Expertise concerning the action's environmental effects.

(4) Duration of agency's involvement.

(5) Sequence of agency's involvement.

(d) Any Federal agency, or any State or local agency or private person substantially affected by the absence of lead agency designation, may make a written request to the potential lead agencies that a lead agency be designated.

(e) If Federal agencies are unable to agree on which agency will be the lead agency or if the procedure described in paragraph (c) of this section has not resulted within 45 days in a lead agency designation, any of the agencies or persons concerned may file a request with the Council asking it to determine which Federal agency shall be the lead agency.

A copy of the request shall be transmitted to each potential lead agency. The request shall consist of:

(1) A precise description of the nature and extent of the proposed action.

(2) A detailed statement of why each potential lead agency should or should not be the lead agency under the criteria specified in paragraph (c) of this section.

(f) A response may be filed by any potential lead agency concerned within 20 days after a request is filed with the Council. The Council shall determine as soon as possible but not later than 20 days after receiving the request and all responses to it which Federal agency shall be the lead agency and which other Federal agencies shall be cooperating agencies.

[43 FR 55992, Nov. 29, 1978; 44 FR 873, Jan. 3, 1979]

§ 1501.6 Cooperating agencies.

The purpose of this section is to emphasize agency cooperation early in the NEPA process. Upon request of the lead agency, any other Federal agency which has jurisdiction by law shall be a cooperating agency. In addition any other Federal agency which has special expertise with respect to any environmental issue, which should be addressed in the statement may be a cooperating agency upon request of the lead agency. An agency may request the lead agency to designate it a cooperating agency.

(a) The lead agency shall:

(1) Request the participation of each cooperating agency in the NEPA process at the earliest possible time.

(2) Use the environmental analysis and proposals of cooperating agencies with jurisdiction by law or special expertise, to the maximum extent possible consistent with its responsibility as lead agency.

(3) Meet with a cooperating agency at the latter's request.

(b) Each cooperating agency shall:

(1) Participate in the NEPA process at the earliest possible time.

(2) Participate in the scoping process (described below in §1501.7).

(3) Assume on request of the lead agency responsibility for developing information and preparing environmental analyses including portions of the environmental impact statement concerning which the cooperating agency has special expertise.

(4) Make available staff support at the lead agency's request to enhance the latter's interdisciplinary capability.

(5) Normally use its own funds. The lead agency shall, to the extent available funds permit, fund those major activities or analyses it requests from cooperating agencies. Potential lead agencies shall include such funding requirements in their budget requests.

(c) A cooperating agency may in response to a lead agency's request for assistance in preparing the environmental impact statement (described in paragraph (b)(3), (4), or (5) of this section) reply that other program commitments preclude any involvement or the degree of involvement requested in the action that is the subject of the environmental impact statement. A copy of this reply shall be submitted to the Council.

§1501.7 Scoping.

There shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. This process shall be termed scoping. As soon as practicable after its decision to prepare an environmental impact statement and before the scoping process the lead agency shall publish a notice of intent (§1508.22) in the FEDERAL REGISTER except as provided in §1507.3(e).

(a) As part of the scoping process the lead agency shall:

(1) Invite the participation of affected Federal, State, and local agencies, any affected Indian tribe, the proponent of the action, and other interested persons (including those who might not be in accord with the action on environmental grounds), unless there is a limited exception under §1507.3(c). An agency may give notice in accordance with §1506.6.

(2) Determine the scope (§1508.25) and the significant issues to be analyzed in depth in the environmental impact statement.

(3) Identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (§1506.3), narrowing the discussion of these issues in the statement to a brief presentation of why they will not have a significant effect on the human environment or providing a reference to their coverage elsewhere.

(4) Allocate assignments for preparation of the environmental impact statement among the lead and cooperating agencies, with the lead agency retaining responsibility for the statement.

(5) Indicate any public environmental assessments and other environmental impact statements which are being or will be prepared that are related to but are not part of the scope of the impact statement under consideration.

(6) Identify other environmental review and consultation requirements so the lead and cooperating agencies may prepare other required analyses and studies concurrently with, and integrated with, the environmental impact statement as provided in §1502.25.

(7) Indicate the relationship between the timing of the preparation of environmental analyses and the agency's tentative planning and decisionmaking schedule.

(b) As part of the scoping process the lead agency may:

(1) Set page limits on environmental documents (§1502.7).

(2) Set time limits (§1501.8).

(3) Adopt procedures under §1507.3 to combine its environmental assessment process with its scoping process.

(4) Hold an early scoping meeting or meetings which may be integrated with any other early planning meeting the agency has. Such a scoping meeting will often be appropriate when the impacts of a particular action are confined to specific sites.

(c) An agency shall revise the determinations made under paragraphs (a) and (b) of this section if substantial changes are made later in the proposed

action, or if significant new circumstances or information arise which bear on the proposal or its impacts.

§ 1501.8 Time limits.

Although the Council has decided that prescribed universal time limits for the entire NEPA process are too inflexible, Federal agencies are encouraged to set time limits appropriate to individual actions (consistent with the time intervals required by §1506.10). When multiple agencies are involved the reference to agency below means lead agency.

(a) The agency shall set time limits if an applicant for the proposed action requests them: *Provided*, That the limits are consistent with the purposes of NEPA and other essential considerations of national policy.

(b) The agency may:

(1) Consider the following factors in determining time limits:

(i) Potential for environmental harm.

(ii) Size of the proposed action.

(iii) State of the art of analytic techniques.

(iv) Degree of public need for the proposed action, including the consequences of delay.

(v) Number of persons and agencies affected.

(vi) Degree to which relevant information is known and if not known the time required for obtaining it.

(vii) Degree to which the action is controversial.

(viii) Other time limits imposed on the agency by law, regulations, or executive order.

(2) Set overall time limits or limits for each constituent part of the NEPA process, which may include:

(i) Decision on whether to prepare an environmental impact statement (if not already decided).

(ii) Determination of the scope of the environmental impact statement.

(iii) Preparation of the draft environmental impact statement.

(iv) Review of any comments on the draft environmental impact statement from the public and agencies.

(v) Preparation of the final environmental impact statement.

(vi) Review of any comments on the final environmental impact statement.

(vii) Decision on the action based in part on the environmental impact statement.

(3) Designate a person (such as the project manager or a person in the agency's office with NEPA responsibilities) to expedite the NEPA process.

(c) State or local agencies or members of the public may request a Federal Agency to set time limits.

PART 1502—ENVIRONMENTAL IMPACT STATEMENT

Sec.

AUTHORITY: NEPA, the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C. 4371 *et seq.*), sec. 309 of the Clean Air Act, as amended (42 U.S.C. 7609), and E.O. 11514 (Mar. 5, 1970, as amended by E.O. 11991, May 24, 1977).

SOURCE: 43 FR 55994, Nov. 29, 1978, unless otherwise noted.

§ 1502.1 Purpose.

The primary purpose of an environmental impact statement is to serve as an action-forcing device to insure that the policies and goals defined in the

Act are infused into the ongoing programs and actions of the Federal Government. It shall provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment. Agencies shall focus on significant environmental issues and alternatives and shall reduce paperwork and the accumulation of extraneous background data. Statements shall be concise, clear, and to the point, and shall be supported by evidence that the agency has made the necessary environmental analyses. An environmental impact statement is more than a disclosure document. It shall be used by Federal officials in conjunction with other relevant material to plan actions and make decisions.

§ 1502.2 Implementation.

To achieve the purposes set forth in § 1502.1 agencies shall prepare environmental impact statements in the following manner:

(a) Environmental impact statements shall be analytic rather than encyclopedic.

(b) Impacts shall be discussed in proportion to their significance. There shall be only brief discussion of other than significant issues. As in a finding of no significant impact, there should be only enough discussion to show why more study is not warranted.

(c) Environmental impact statements shall be kept concise and shall be no longer than absolutely necessary to comply with NEPA and with these regulations. Length should vary first with potential environmental problems and then with project size.

(d) Environmental impact statements shall state how alternatives considered in it and decisions based on it will or will not achieve the requirements of sections 101 and 102(1) of the Act and other environmental laws and policies.

(e) The range of alternatives discussed in environmental impact statements shall encompass those to be considered by the ultimate agency decisionmaker.

(f) Agencies shall not commit resources prejudicing selection of alternatives before making a final decision (§ 1506.1).

(g) Environmental impact statements shall serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made.

§ 1502.3 Statutory requirements for statements.

As required by sec. 102(2)(C) of NEPA environmental impact statements (§ 1508.11) are to be included in every recommendation or report.

On proposals (§ 1508.23).

For legislation and (§ 1508.17).

Other major Federal actions (§ 1508.18).

Significantly (§ 1508.27).

Affecting (§§ 1508.3, 1508.8).

The quality of the human environment (§ 1508.14).

§ 1502.4 Major Federal actions requiring the preparation of environmental impact statements.

(a) Agencies shall make sure the proposal which is the subject of an environmental impact statement is properly defined. Agencies shall use the criteria for scope (§ 1508.25) to determine which proposal(s) shall be the subject of a particular statement. Proposals or parts of proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement.

(b) Environmental impact statements may be prepared, and are sometimes required, for broad Federal actions such as the adoption of new agency programs or regulations (§ 1508.18). Agencies shall prepare statements on broad actions so that they are relevant to policy and are timed to coincide with meaningful points in agency planning and decisionmaking.

(c) When preparing statements on broad actions (including proposals by more than one agency), agencies may find it useful to evaluate the proposal(s) in one of the following ways:

(1) Geographically, including actions occurring in the same general location, such as body of water, region, or metropolitan area.

(2) Generically, including actions which have relevant similarities, such

as common timing, impacts, alternatives, methods of implementation, media, or subject matter.

(3) By stage of technological development including federal or federally assisted research, development or demonstration programs for new technologies which, if applied, could significantly affect the quality of the human environment. Statements shall be prepared on such programs and shall be available before the program has reached a stage of investment or commitment to implementation likely to determine subsequent development or restrict later alternatives.

(d) Agencies shall as appropriate employ scoping (§ 1501.7), tiering (§ 1502.20), and other methods listed in §§ 1500.4 and 1500.5 to relate broad and narrow actions and to avoid duplication and delay.

§ 1502.5 Timing.

An agency shall commence preparation of an environmental impact statement as close as possible to the time the agency is developing or is presented with a proposal (§ 1508.23) so that preparation can be completed in time for the final statement to be included in any recommendation or report on the proposal. The statement shall be prepared early enough so that it can serve practically as an important contribution to the decisionmaking process and will not be used to rationalize or justify decisions already made (§§ 1500.2(c), 1501.2, and 1502.2). For instance:

(a) For projects directly undertaken by Federal agencies the environmental impact statement shall be prepared at the feasibility analysis (go-no go) stage and may be supplemented at a later stage if necessary.

(b) For applications to the agency appropriate environmental assessments or statements shall be commenced no later than immediately after the application is received. Federal agencies are encouraged to begin preparation of such assessments or statements earlier, preferably jointly with applicable State or local agencies.

(c) For adjudication, the final environmental impact statement shall normally precede the final staff recommendation and that portion of the public hearing related to the impact study. In appropriate circumstances the statement may follow preliminary hearings designed to gather information for use in the statements.

(d) For informal rulemaking the draft environmental impact statement shall normally accompany the proposed rule.

§ 1502.6 Interdisciplinary preparation.

Environmental impact statements shall be prepared using an inter-disciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts (section 102(2)(A) of the Act). The disciplines of the preparers shall be appropriate to the scope and issues identified in the scoping process (§ 1501.7).

§ 1502.7 Page limits.

The text of final environmental impact statements (e.g., paragraphs (d) through (g) of § 1502.10) shall normally be less than 150 pages and for proposals of unusual scope or complexity shall normally be less than 300 pages.

§ 1502.8 Writing.

Environmental impact statements shall be written in plain language and may use appropriate graphics so that decisionmakers and the public can readily understand them. Agencies should employ writers of clear prose or editors to write, review, or edit statements, which will be based upon the analysis and supporting data from the natural and social sciences and the environmental design arts.

§ 1502.9 Draft, final, and supplemental statements.

Except for proposals for legislation as provided in § 1506.8 environmental impact statements shall be prepared in two stages and may be supplemented.

(a) Draft environmental impact statements shall be prepared in accordance with the scope decided upon in the scoping process. The lead agency shall work with the cooperating agencies and shall obtain comments as required in part 1503 of this chapter. The draft statement must fulfill and satisfy to the fullest extent possible the requirements established for final statements

in section 102(2)(C) of the Act. If a draft statement is so inadequate as to preclude meaningful analysis, the agency shall prepare and circulate a revised draft of the appropriate portion. The agency shall make every effort to disclose and discuss at appropriate points in the draft statement all major points of view on the environmental impacts of the alternatives including the proposed action.

(b) Final environmental impact statements shall respond to comments as required in part 1503 of this chapter. The agency shall discuss at appropriate points in the final statement any responsible opposing view which was not adequately discussed in the draft statement and shall indicate the agency's response to the issues raised.

(c) Agencies:

(1) Shall prepare supplements to either draft or final environmental impact statements if:

(i) The agency makes substantial changes in the proposed action that are relevant to environmental concerns; or

(ii) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.

(2) May also prepare supplements when the agency determines that the purposes of the Act will be furthered by doing so.

(3) Shall adopt procedures for introducing a supplement into its formal administrative record, if such a record exists.

(4) Shall prepare, circulate, and file a supplement to a statement in the same fashion (exclusive of scoping) as a draft and final statement unless alternative procedures are approved by the Council.

§ 1502.10 Recommended format.

Agencies shall use a format for environmental impact statements which will encourage good analysis and clear presentation of the alternatives including the proposed action. The following standard format for environmental impact statements should be followed unless the agency determines that there is a compelling reason to do otherwise:

(a) Cover sheet.

(b) Summary.

(c) Table of contents.

(d) Purpose of and need for action.

(e) Alternatives including proposed action (sections 102(2)(C)(iii) and 102(2)(E) of the Act).

(f) Affected environment.

(g) Environmental consequences (especially sections 102(2)(C)(i), (ii), (iv), and (v) of the Act).

(h) List of preparers.

(i) List of Agencies, Organizations, and persons to whom copies of the statement are sent.

(j) Index.

(k) Appendices (if any).

If a different format is used, it shall include paragraphs (a), (b), (c), (h), (i), and (j), of this section and shall include the substance of paragraphs (d), (e), (f), (g), and (k) of this section, as further described in §§ 1502.11 through 1502.18, in any appropriate format.

§ 1502.11 Cover sheet.

The cover sheet shall not exceed one page. It shall include:

(a) A list of the responsible agencies including the lead agency and any cooperating agencies.

(b) The title of the proposed action that is the subject of the statement (and if appropriate the titles of related cooperating agency actions), together with the State(s) and county(ies) (or other jurisdiction if applicable) where the action is located.

(c) The name, address, and telephone number of the person at the agency who can supply further information.

(d) A designation of the statement as a draft, final, or draft or final supplement.

(e) A one paragraph abstract of the statement.

(f) The date by which comments must be received (computed in cooperation with EPA under § 1506.10).

The information required by this section may be entered on Standard Form 424 (in items 4, 6, 7, 10, and 18).

§ 1502.12 Summary.

Each environmental impact statement shall contain a summary which adequately and accurately summarizes the statement. The summary shall stress the major conclusions, areas of controversy (including issues raised by agencies and the public), and the issues to be resolved (including the choice

among alternatives). The summary will normally not exceed 15 pages.

§ 1502.13 Purpose and need.

The statement shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action.

§ 1502.14 Alternatives including the proposed action.

This section is the heart of the environmental impact statement. Based on the information and analysis presented in the sections on the Affected Environment (§ 1502.15) and the Environmental Consequences (§ 1502.16), it should present the environmental impacts of the proposal 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. In this section agencies shall:

(a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.

(b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.

(c) Include reasonable alternatives not within the jurisdiction of the lead agency.

(d) Include the alternative of no action.

(e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.

(f) Include appropriate mitigation measures not already included in the proposed action or alternatives.

§ 1502.15 Affected environment.

The environmental impact statement shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration. The descriptions shall be no longer than is necessary to understand the effects of the alternatives. Data and analyses in a statement shall be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced. Agencies shall avoid useless bulk in statements and shall concentrate effort and attention on important issues. Verbose descriptions of the affected environment are themselves no measure of the adequacy of an environmental impact statement.

§ 1502.16 Environmental consequences.

This section forms the scientific and analytic basis for the comparisons under § 1502.14. It shall consolidate the discussions of those elements required by sections 102(2)(C)(i), (ii), (iv), and (v) of NEPA which are within the scope of the statement and as much of section 102(2)(C)(iii) as is necessary to support the comparisons. The discussion will include the environmental impacts of the alternatives including the proposed action, any adverse environmental effects which cannot be avoided should the proposal be implemented, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented. This section should not duplicate discussions in § 1502.14. It shall include discussions of:

(a) Direct effects and their significance (§ 1508.8).

(b) Indirect effects and their significance (§ 1508.8).

(c) Possible conflicts between the proposed action and the objectives of Federal, regional, State, and local (and in the case of a reservation, Indian tribe) land use plans, policies and controls for the area concerned. (See § 1506.2(d).)

(d) The environmental effects of alternatives including the proposed action. The comparisons under § 1502.14 will be based on this discussion.

(e) Energy requirements and conservation potential of various alternatives and mitigation measures.

(f) Natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures.

(g) Urban quality, historic and cultural resources, and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures.

(h) Means to mitigate adverse environmental impacts (if not fully covered under §1502.14(f)).

[43 FR 55994, Nov. 29, 1978; 44 FR 873, Jan. 3, 1979]

§1502.17 List of preparers.

The environmental impact statement shall list the names, together with their qualifications (expertise, experience, professional disciplines), of the persons who were primarily responsible for preparing the environmental impact statement or significant background papers, including basic components of the statement (§§1502.6 and 1502.8). Where possible the persons who are responsible for a particular analysis, including analyses in background papers, shall be identified. Normally the list will not exceed two pages.

§1502.18 Appendix.

If an agency prepares an appendix to an environmental impact statement the appendix shall:

(a) Consist of material prepared in connection with an environmental impact statement (as distinct from material which is not so prepared and which is incorporated by reference (§1502.21)).

(b) Normally consist of material which substantiates any analysis fundamental to the impact statement.

(c) Normally be analytic and relevant to the decision to be made.

(d) Be circulated with the environmental impact statement or be readily available on request.

§1502.19 Circulation of the environmental impact statement.

Agencies shall circulate the entire draft and final environmental impact statements except for certain appendices as provided in §1502.18(d) and unchanged statements as provided in §1503.4(c). However, if the statement is unusually long, the agency may circulate the summary instead, except that the entire statement shall be furnished to:

(a) Any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved and any appropriate Federal, State or local agency authorized to develop and enforce environmental standards.

(b) The applicant, if any.

(c) Any person, organization, or agency requesting the entire environmental impact statement.

(d) In the case of a final environmental impact statement any person, organization, or agency which submitted substantive comments on the draft.

If the agency circulates the summary and thereafter receives a timely request for the entire statement and for additional time to comment, the time for that requestor only shall be extended by at least 15 days beyond the minimum period.

§1502.20 Tiering.

Agencies are encouraged to tier their environmental impact statements to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision at each level of environmental review (§1508.28). Whenever a broad environmental impact statement has been prepared (such as a program or policy statement) and a subsequent statement or environmental assessment is then prepared on an action included within the entire program or policy (such as a site specific action) the subsequent statement or environmental assessment need only summarize the issues discussed in the broader statement and incorporate discussions from the broader statement by reference and shall concentrate on the issues specific to the subsequent action. The subsequent document shall state where the earlier document is available. Tiering may also be appropriate for different stages of actions. (Section 1508.28).

§1502.21 Incorporation by reference.

Agencies shall incorporate material into an environmental impact statement by reference when the effect will be to cut down on bulk without impeding agency and public review of the action. The incorporated material shall be cited in the statement and its content briefly described. No material

may be incorporated by reference unless it is reasonably available for inspection by potentially interested persons within the time allowed for comment. Material based on proprietary data which is itself not available for review and comment shall not be incorporated by reference.

§ 1502.22 Incomplete or unavailable information.

When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking.

(a) If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.

(b) If the information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency shall include within the environmental impact statement:

(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 which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment, and (4) the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. For the purposes of this section, ''reasonably foreseeable'' includes impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason.

(c) The amended regulation will be applicable to all environmental impact statements for which a Notice of Intent (40 CFR 1508.22) is published in the FEDERAL REGISTER on or after May 27, 1986. For environmental impact statements in progress, agencies may choose to comply with the requirements of either the original or amended regulation.

[51 FR 15625, Apr. 25, 1986]

§ 1502.23 Cost-benefit analysis.

If a cost-benefit analysis relevant to the choice among environmentally different alternatives is being considered for the proposed action, it shall be incorporated by reference or appended to the statement as an aid in evaluating the environmental consequences. To assess the adequacy of compliance with section 102(2)(B) of the Act the statement shall, when a cost-benefit analysis is prepared, discuss the relationship between that analysis and any analyses of unquantified environmental impacts, values, and amenities. For purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations. In any event, an environmental impact statement should at least indicate those considerations, including factors not related to environmental quality, which are likely to be relevant and important to a decision.

§ 1502.24 Methodology and scientific accuracy.

Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements. They shall identify any methodologies used and shall make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement. An agency may place discussion of methodology in an appendix.

§ 1502.25 Environmental review and consultation requirements.

(a) To the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with environmental impact analyses and related surveys and studies required by the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq.*), the National Historic Preservation Act of 1966 (16 U.S.C. 470 *et seq.*), the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*), and other environmental review laws and executive orders.

(b) The draft environmental impact statement shall list all Federal permits, licenses, and other entitlements which must be obtained in implementing the proposal. If it is uncertain whether a Federal permit, license, or other entitlement is necessary, the draft environmental impact statement shall so indicate.

PART 1503—COMMENTING

Sec.

AUTHORITY: NEPA, the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C. 4371 *et seq.*), sec. 309 of the Clean Air Act, as amended (42 U.S.C. 7609), and E.O. 11514 (Mar. 5, 1970, as amended by E.O. 11991, May 24, 1977).

SOURCE: 43 FR 55997, Nov. 29, 1978, unless otherwise noted.

§ 1503.1 Inviting comments.

(a) After preparing a draft environmental impact statement and before preparing a final environmental impact statement the agency shall:

(1) Obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved or which is authorized to develop and enforce environmental standards.

(2) Request the comments of:

(i) Appropriate State and local agencies which are authorized to develop and enforce environmental standards;

(ii) Indian tribes, when the effects may be on a reservation; and

(iii) Any agency which has requested that it receive statements on actions of the kind proposed.

Office of Management and Budget Circular A–95 (Revised), through its system of clearinghouses, provides a means of securing the views of State and local environmental agencies. The clearinghouses may be used, by mutual agreement of the lead agency and the clearinghouse, for securing State and local reviews of the draft environmental impact statements.

(3) Request comments from the applicant, if any.

(4) Request comments from the public, affirmatively soliciting comments from those persons or organizations who may be interested or affected.

(b) An agency may request comments on a final environmental impact statement before the decision is finally made. In any case other agencies or persons may make comments before the final decision unless a different time is provided under § 1506.10.

§ 1503.2 Duty to comment.

Federal agencies with jurisdiction by law or special expertise with respect to any environmental impact involved and agencies which are authorized to develop and enforce environmental standards shall comment on statements within their jurisdiction, expertise, or authority. Agencies shall comment within the time period specified for comment in § 1506.10. A Federal agency may reply that it has no comment. If a cooperating agency is satisfied that its views are adequately reflected in the environmental impact statement, it should reply that it has no comment.

§ 1503.3 Specificity of comments.

(a) Comments on an environmental impact statement or on a proposed action shall be as specific as possible and may address either the adequacy of the statement or the merits of the alternatives discussed or both.

(b) When a commenting agency criticizes a lead agency's predictive methodology, the commenting agency should describe the alternative methodology which it prefers and why.

(c) A cooperating agency shall specify in its comments whether it needs additional information to fulfill other applicable environmental reviews or consultation requirements and what information it needs. In particular, it shall specify any additional information it needs to comment adequately on the draft statement's analysis of significant site-specific effects associated with the granting or approving by that cooperating agency of necessary Federal permits, licenses, or entitlements.

(d) When a cooperating agency with jurisdiction by law objects to or expresses reservations about the proposal on grounds of environmental impacts, the agency expressing the objection or reservation shall specify the mitigation measures it considers necessary to allow the agency to grant or approve applicable permit, license, or related requirements or concurrences.

§ 1503.4 Response to comments.

(a) An agency preparing a final environmental impact statement shall assess and consider comments both individually and collectively, and shall respond by one or more of the means listed below, stating its response in the final statement. Possible responses are to:

(1) Modify alternatives including the proposed action.

(2) Develop and evaluate alternatives not previously given serious consideration by the agency.

(3) Supplement, improve, or modify its analyses.

(4) Make factual corrections.

(5) Explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position and, if appropriate, indicate those circumstances which would trigger agency reappraisal or further response.

(b) All substantive comments received on the draft statement (or summaries thereof where the response has been exceptionally voluminous), should be attached to the final statement whether or not the comment is thought to merit individual discussion by the agency in the text of the statement.

(c) If changes in response to comments are minor and are confined to the responses described in paragraphs (a)(4) and (5) of this section, agencies may write them on errata sheets and attach them to the statement instead of rewriting the draft statement. In such cases only the comments, the responses, and the changes and not the final statement need be circulated (§ 1502.19). The entire document with a new cover sheet shall be filed as the final statement (§ 1506.9).

PART 1504—PREDECISION REFERRALS TO THE COUNCIL OF PROPOSED FEDERAL ACTIONS DETERMINED TO BE ENVIRONMENTALLY UNSATISFACTORY

Sec.

AUTHORITY: NEPA, the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C. 4371 *et seq.*), sec. 309 of the Clean Air Act, as amended (42 U.S.C. 7609), and E.O. 11514 (Mar. 5, 1970, as amended by E.O. 11991, May 24, 1977).

§ 1504.1 Purpose.

(a) This part establishes procedures for referring to the Council Federal interagency disagreements concerning proposed major Federal actions that might cause unsatisfactory environmental effects. It provides means for early resolution of such disagreements.

(b) Under section 309 of the Clean Air Act (42 U.S.C. 7609), the Administrator of the Environmental Protection Agency is directed to review and comment publicly on the environmental impacts of Federal activities, including actions for which environmental impact statements are prepared. If after this review the Administrator determines that the matter is ''unsatisfactory from the standpoint of public health or welfare or environmental quality,'' section 309 directs that the matter be referred to the Council (hereafter ''environmental referrals'').

(c) Under section 102(2)(C) of the Act other Federal agencies may make similar reviews of environmental impact statements, including judgments on the acceptability of anticipated environmental impacts. These reviews

must be made available to the President, the Council and the public.

[43 FR 55998, Nov. 29, 1978]

§ 1504.2 Criteria for referral.

Environmental referrals should be made to the Council only after concerted, timely (as early as possible in the process), but unsuccessful attempts to resolve differences with the lead agency. In determining what environmental objections to the matter are appropriate to refer to the Council, an agency should weigh potential adverse environmental impacts, considering:

(a) Possible violation of national environmental standards or policies.

(b) Severity.

(c) Geographical scope.

(d) Duration.

(e) Importance as precedents.

(f) Availability of environmentally preferable alternatives.

[43 FR 55998, Nov. 29, 1978]

§ 1504.3 Procedure for referrals and response.

(a) A Federal agency making the referral to the Council shall:

(1) Advise the lead agency at the earliest possible time that it intends to refer a matter to the Council unless a satisfactory agreement is reached.

(2) Include such advice in the referring agency's comments on the draft environmental impact statement, except when the statement does not contain adequate information to permit an assessment of the matter's environmental acceptability.

(3) Identify any essential information that is lacking and request that it be made available at the earliest possible time.

(4) Send copies of such advice to the Council.

(b) The referring agency shall deliver its referral to the Council not later than twenty-five (25) days after the final environmental impact statement has been made available to the Environmental Protection Agency, commenting agencies, and the public. Except when an extension of this period has been granted by the lead agency, the Council will not accept a referral after that date.

(c) The referral shall consist of:

(1) A copy of the letter signed by the head of the referring agency and delivered to the lead agency informing the lead agency of the referral and the reasons for it, and requesting that no action be taken to implement the matter until the Council acts upon the referral. The letter shall include a copy of the statement referred to in (c)(2) of this section.

(2) A statement supported by factual evidence leading to the conclusion that the matter is unsatisfactory from the standpoint of public health or welfare or environmental quality. The statement shall:

(i) Identify any material facts in controversy and incorporate (by reference if appropriate) agreed upon facts,

(ii) Identify any existing environmental requirements or policies which would be violated by the matter,

(iii) Present the reasons why the referring agency believes the matter is environmentally unsatisfactory,

(iv) Contain a finding by the agency whether the issue raised is of national importance because of the threat to national environmental resources or policies or for some other reason,

(v) Review the steps taken by the referring agency to bring its concerns to the attention of the lead agency at the earliest possible time, and

(vi) Give the referring agency's recommendations as to what mitigation alternative, further study, or other course of action (including abandonment of the matter) are necessary to remedy the situation.

(d) Not later than twenty-five (25) days after the referral to the Council the lead agency may deliver a response to the Council, and the referring agency. If the lead agency requests more time and gives assurance that the matter will not go forward in the interim, the Council may grant an extension. The response shall:

(1) Address fully the issues raised in the referral.

(2) Be supported by evidence.

(3) Give the lead agency's response to the referring agency's recommendations.

(e) Interested persons (including the applicant) may deliver their views in writing to the Council. Views in support of the referral should be delivered

not later than the referral. Views in support of the response shall be delivered not later than the response.

(f) Not later than twenty-five (25) days after receipt of both the referral and any response or upon being informed that there will be no response (unless the lead agency agrees to a longer time), the Council may take one or more of the following actions:

(1) Conclude that the process of referral and response has successfully resolved the problem.

(2) Initiate discussions with the agencies with the objective of mediation with referring and lead agencies.

(3) Hold public meetings or hearings to obtain additional views and information.

(4) Determine that the issue is not one of national importance and request the referring and lead agencies to pursue their decision process.

(5) Determine that the issue should be further negotiated by the referring and lead agencies and is not appropriate for Council consideration until one or more heads of agencies report to the Council that the agencies' disagreements are irreconcilable.

(6) Publish its findings and recommendations (including where appropriate a finding that the submitted evidence does not support the position of an agency).

(7) When appropriate, submit the referral and the response together with the Council's recommendation to the President for action.

(g) The Council shall take no longer than 60 days to complete the actions specified in paragraph (f)(2), (3), or (5) of this section.

(h) When the referral involves an action required by statute to be determined on the record after opportunity for agency hearing, the referral shall be conducted in a manner consistent with 5 U.S.C. 557(d) (Administrative Procedure Act).

[43 FR 55998, Nov. 29, 1978; 44 FR 873, Jan. 3, 1979]

PART 1505—NEPA AND AGENCY DECISIONMAKING

Sec.

AUTHORITY: NEPA, the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C. 4371 *et seq.*), sec. 309 of the Clean Air Act, as amended (42 U.S.C. 7609), and E.O. 11514 (Mar. 5, 1970, as amended by E.O. 11991, May 24, 1977).

SOURCE: 43 FR 55999, Nov. 29, 1978, unless otherwise noted.

§ 1505.1 Agency decisionmaking procedures.

Agencies shall adopt procedures (§ 1507.3) to ensure that decisions are made in accordance with the policies and purposes of the Act. Such procedures shall include but not be limited to:

(a) Implementing procedures under section 102(2) to achieve the requirements of sections 101 and 102(1).

(b) Designating the major decision points for the agency's principal programs likely to have a significant effect on the human environment and assuring that the NEPA process corresponds with them.

(c) Requiring that relevant environmental documents, comments, and responses be part of the record in formal rulemaking or adjudicatory proceedings.

(d) Requiring that relevant environmental documents, comments, and responses accompany the proposal through existing agency review processes so that agency officials use the statement in making decisions.

(e) Requiring that the alternatives considered by the decisionmaker are encompassed by the range of alternatives discussed in the relevant environmental documents and that the decisionmaker consider the alternatives described in the environmental impact statement. If another decision document accompanies the relevant environmental documents to the decisionmaker, agencies are encouraged to make available to the public before the decision is made any part of that document that relates to the comparison of alternatives.

§ 1505.2 Record of decision in cases requiring environmental impact statements.

At the time of its decision (§ 1506.10) or, if appropriate, its recommendation to Congress, each agency shall prepare a concise public record of decision. The record, which may be integrated into any other record prepared by the agency, including that required by OMB Circular A–95 (Revised), part I, sections 6(c) and (d), and part II, section 5(b)(4), shall:

(a) State what the decision was.

(b) Identify all alternatives considered by the agency in reaching its decision, specifying the alternative or alternatives which were considered to be environmentally preferable. An agency may discuss preferences among alternatives based on relevant factors including economic and technical considerations and agency statutory missions. An agency shall identify and discuss all such factors including any essential considerations of national policy which were balanced by the agency in making its decision and state how those considerations entered into its decision.

(c) State whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not. A monitoring and enforcement program shall be adopted and summarized where applicable for any mitigation.

§ 1505.3 Implementing the decision.

Agencies may provide for monitoring to assure that their decisions are carried out and should do so in important cases. Mitigation (§ 1505.2(c)) and other conditions established in the environmental impact statement or during its review and committed as part of the decision shall be implemented by the lead agency or other appropriate consenting agency. The lead agency shall:

(a) Include appropriate conditions in grants, permits or other approvals.

(b) Condition funding of actions on mitigation.

(c) Upon request, inform cooperating or commenting agencies on progress in carrying out mitigation measures which they have proposed and which were adopted by the agency making the decision.

(d) Upon request, make available to the public the results of relevant monitoring.

PART 1506—OTHER REQUIREMENTS OF NEPA

Sec.

AUTHORITY: NEPA, the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C. 4371 *et seq.*), sec. 309 of the Clean Air Act, as amended (42 U.S.C. 7609), and E.O. 11514 (Mar. 5, 1970, as amended by E.O. 11991, May 24, 1977).

SOURCE: 43 FR 56000, Nov. 29, 1978, unless otherwise noted.

§ 1506.1 Limitations on actions during NEPA process.

(a) Until an agency issues a record of decision as provided in § 1505.2 (except as provided in paragraph (c) of this section), no action concerning the proposal shall be taken which would:

(1) Have an adverse environmental impact; or

(2) Limit the choice of reasonable alternatives.

(b) If any agency is considering an application from a non-Federal entity, and is aware that the applicant is about to take an action within the agency's jurisdiction that would meet either of the criteria in paragraph (a) of this section, then the agency shall promptly notify the applicant that the agency will take appropriate action to insure that the objectives and procedures of NEPA are achieved.

(c) While work on a required program environmental impact statement is in progress and the action is not covered by an existing program statement,

agencies shall not undertake in the interim any major Federal action covered by the program which may significantly affect the quality of the human environment unless such action:

(1) Is justified independently of the program;

(2) Is itself accompanied by an adequate environmental impact statement; and

(3) Will not prejudice the ultimate decision on the program. Interim action prejudices the ultimate decision on the program when it tends to determine subsequent development or limit alternatives.

(d) This section does not preclude development by applicants of plans or designs or performance of other work necessary to support an application for Federal, State or local permits or assistance. Nothing in this section shall preclude Rural Electrification Administration approval of minimal expenditures not affecting the environment (e.g. long leadtime equipment and purchase options) made by non-governmental entities seeking loan guarantees from the Administration.

§ 1506.2 Elimination of duplication with State and local procedures.

(a) Agencies authorized by law to cooperate with State agencies of statewide jurisdiction pursuant to section 102(2)(D) of the Act may do so.

(b) Agencies shall cooperate with State and local agencies to the fullest extent possible to reduce duplication between NEPA and State and local requirements, unless the agencies are specifically barred from doing so by some other law. Except for cases covered by paragraph (a) of this section, such cooperation shall to the fullest extent possible include:

(1) Joint planning processes.

(2) Joint environmental research and studies.

(3) Joint public hearings (except where otherwise provided by statute).

(4) Joint environmental assessments.

(c) Agencies shall cooperate with State and local agencies to the fullest extent possible to reduce duplication between NEPA and comparable State and local requirements, unless the agencies are specifically barred from doing so by some other law. Except for cases covered by paragraph (a) of this section, such cooperation shall to the fullest extent possible include joint environmental impact statements. In such cases one or more Federal agencies and one or more State or local agencies shall be joint lead agencies. Where State laws or local ordinances have environmental impact statement requirements in addition to but not in conflict with those in NEPA, Federal agencies shall cooperate in fulfilling these requirements as well as those of Federal laws so that one document will comply with all applicable laws.

(d) To better integrate environmental impact statements into State or local planning processes, statements shall discuss any inconsistency of a proposed action with any approved State or local plan and laws (whether or not federally sanctioned). Where an inconsistency exists, the statement should describe the extent to which the agency would reconcile its proposed action with the plan or law.

§ 1506.3 Adoption.

(a) An agency may adopt a Federal draft or final environmental impact statement or portion thereof provided that the statement or portion thereof meets the standards for an adequate statement under these regulations.

(b) If the actions covered by the original environmental impact statement and the proposed action are substantially the same, the agency adopting another agency's statement is not required to recirculate it except as a final statement. Otherwise the adopting agency shall treat the statement as a draft and recirculate it (except as provided in paragraph (c) of this section).

(c) A cooperating agency may adopt without recirculating the environmental impact statement of a lead agency when, after an independent review of the statement, the cooperating agency concludes that its comments and suggestions have been satisfied.

(d) When an agency adopts a statement which is not final within the agency that prepared it, or when the action it assesses is the subject of a referral under part 1504, or when the statement's adequacy is the subject of

a judicial action which is not final, the agency shall so specify.

§ 1506.4 Combining documents.

Any environmental document in compliance with NEPA may be combined with any other agency document to reduce duplication and paperwork.

§ 1506.5 Agency responsibility.

(a) *Information.* If an agency requires an applicant to submit environmental information for possible use by the agency in preparing an environmental impact statement, then the agency should assist the applicant by outlining the types of information required. The agency shall independently evaluate the information submitted and shall be responsible for its accuracy. If the agency chooses to use the information submitted by the applicant in the environmental impact statement, either directly or by reference, then the names of the persons responsible for the independent evaluation shall be included in the list of preparers (§ 1502.17). It is the intent of this paragraph that acceptable work not be redone, but that it be verified by the agency.

(b) *Environmental assessments.* If an agency permits an applicant to prepare an environmental assessment, the agency, besides fulfilling the requirements of paragraph (a) of this section, shall make its own evaluation of the environmental issues and take responsibility for the scope and content of the environmental assessment.

(c) *Environmental impact statements.* Except as provided in §§ 1506.2 and 1506.3 any environmental impact statement prepared pursuant to the requirements of NEPA shall be prepared directly by or by a contractor selected by the lead agency or where appropriate under § 1501.6(b), a cooperating agency. It is the intent of these regulations that the contractor be chosen solely by the lead agency, or by the lead agency in cooperation with cooperating agencies, or where appropriate by a cooperating agency to avoid any conflict of interest. Contractors shall execute a disclosure statement prepared by the lead agency, or where appropriate the cooperating agency, specifying that they have no financial or other interest in the outcome of the project. If the document is prepared by contract, the responsible Federal official shall furnish guidance and participate in the preparation and shall independently evaluate the statement prior to its approval and take responsibility for its scope and contents. Nothing in this section is intended to prohibit any agency from requesting any person to submit information to it or to prohibit any person from submitting information to any agency.

§ 1506.6 Public involvement.

Agencies shall:

(a) Make diligent efforts to involve the public in preparing and implementing their NEPA procedures.

(b) Provide public notice of NEPA-related hearings, public meetings, and the availability of environmental documents so as to inform those persons and agencies who may be interested or affected.

(1) In all cases the agency shall mail notice to those who have requested it on an individual action.

(2) In the case of an action with effects of national concern notice shall include publication in the FEDERAL REGISTER and notice by mail to national organizations reasonably expected to be interested in the matter and may include listing in the *102 Monitor*. An agency engaged in rulemaking may provide notice by mail to national organizations who have requested that notice regularly be provided. Agencies shall maintain a list of such organizations.

(3) In the case of an action with effects primarily of local concern the notice may include:

(i) Notice to State and areawide clearinghouses pursuant to OMB Circular A–95 (Revised).

(ii) Notice to Indian tribes when effects may occur on reservations.

(iii) Following the affected State's public notice procedures for comparable actions.

(iv) Publication in local newspapers (in papers of general circulation rather than legal papers).

(v) Notice through other local media.

(vi) Notice to potentially interested community organizations including small business associations.

(vii) Publication in newsletters that may be expected to reach potentially interested persons.

(viii) Direct mailing to owners and occupants of nearby or affected property.

(ix) Posting of notice on and off site in the area where the action is to be located.

(c) Hold or sponsor public hearings or public meetings whenever appropriate or in accordance with statutory requirements applicable to the agency. Criteria shall include whether there is:

(1) Substantial environmental controversy concerning the proposed action or substantial interest in holding the hearing.

(2) A request for a hearing by another agency with jurisdiction over the action supported by reasons why a hearing will be helpful. If a draft environmental impact statement is to be considered at a public hearing, the agency should make the statement available to the public at least 15 days in advance (unless the purpose of the hearing is to provide information for the draft environmental impact statement).

(d) Solicit appropriate information from the public.

(e) Explain in its procedures where interested persons can get information or status reports on environmental impact statements and other elements of the NEPA process.

(f) Make environmental impact statements, the comments received, and any underlying documents available to the public pursuant to the provisions of the Freedom of Information Act (5 U.S.C. 552), without regard to the exclusion for interagency memoranda where such memoranda transmit comments of Federal agencies on the environmental impact of the proposed action. Materials to be made available to the public shall be provided to the public without charge to the extent practicable, or at a fee which is not more than the actual costs of reproducing copies required to be sent to other Federal agencies, including the Council.

§ 1506.7 Further guidance.

The Council may provide further guidance concerning NEPA and its procedures including:

(a) A handbook which the Council may supplement from time to time, which shall in plain language provide guidance and instructions concerning the application of NEPA and these regulations.

(b) Publication of the Council's Memoranda to Heads of Agencies.

(c) In conjunction with the Environmental Protection Agency and the publication of the 102 Monitor, notice of:

(1) Research activities;

(2) Meetings and conferences related to NEPA; and

(3) Successful and innovative procedures used by agencies to implement NEPA.

§ 1506.8 Proposals for legislation.

(a) The NEPA process for proposals for legislation (§ 1508.17) significantly affecting the quality of the human environment shall be integrated with the legislative process of the Congress. A legislative environmental impact statement is the detailed statement required by law to be included in a recommendation or report on a legislative proposal to Congress. A legislative environmental impact statement shall be considered part of the formal transmittal of a legislative proposal to Congress; however, it may be transmitted to Congress up to 30 days later in order to allow time for completion of an accurate statement which can serve as the basis for public and Congressional debate. The statement must be available in time for Congressional hearings and deliberations.

(b) Preparation of a legislative environmental impact statement shall conform to the requirements of these regulations except as follows:

(1) There need not be a scoping process.

(2) The legislative statement shall be prepared in the same manner as a draft statement, but shall be considered the ''detailed statement'' required by statute; *Provided*, That when any of the following conditions exist both the draft and final environmental impact statement on the legislative proposal shall be prepared and circulated as provided by §§ 1503.1 and 1506.10.

(i) A Congressional Committee with jurisdiction over the proposal has a

rule requiring both draft and final environmental impact statements.

(ii) The proposal results from a study process required by statute (such as those required by the Wild and Scenic Rivers Act (16 U.S.C. 1271 *et seq.*) and the Wilderness Act (16 U.S.C. 1131 *et seq.*)).

(iii) Legislative approval is sought for Federal or federally assisted construction or other projects which the agency recommends be located at specific geographic locations. For proposals requiring an environmental impact statement for the acquisition of space by the General Services Administration, a draft statement shall accompany the Prospectus or the 11(b) Report of Building Project Surveys to the Congress, and a final statement shall be completed before site acquisition.

(iv) The agency decides to prepare draft and final statements.

(c) Comments on the legislative statement shall be given to the lead agency which shall forward them along with its own responses to the Congressional committees with jurisdiction.

§ 1506.9 Filing requirements.

(a) Environmental impact statements together with comments and responses shall be filed with the Environmental Protection Agency, attention Office of Federal Activities, EIS Filing Section, Ariel Rios Building (South Oval Lobby), Mail Code 2252–A, Room 7220, 1200 Pennsylvania Ave., NW., Washington, DC 20460. This address is for deliveries by US Postal Service (including USPS Express Mail).

(b) For deliveries in-person or by commercial express mail services, including Federal Express or UPS, the correct address is: US Environmental Protection Agency, Office of Federal Activities, EIS Filing Section, Ariel Rios Building (South Oval Lobby), Room 7220, 1200 Pennsylvania Avenue, NW., Washington, DC 20004.

(c) Statements shall be filed with the EPA no earlier than they are also transmitted to commenting agencies and made available to the public. EPA shall deliver one copy of each statement to the Council, which shall satisfy the requirement of availability to the President. EPA may issue guidelines to agencies to implement its responsibilities under this section and §1506.10.

[70 FR 41148, July 18, 2005]

§ 1506.10 Timing of agency action.

(a) The Environmental Protection Agency shall publish a notice in the FEDERAL REGISTER each week of the environmental impact statements filed during the preceding week. The minimum time periods set forth in this section shall be calculated from the date of publication of this notice.

(b) No decision on the proposed action shall be made or recorded under §1505.2 by a Federal agency until the later of the following dates:

(1) Ninety (90) days after publication of the notice described above in paragraph (a) of this section for a draft environmental impact statement.

(2) Thirty (30) days after publication of the notice described above in paragraph (a) of this section for a final environmental impact statement.

An exception to the rules on timing may be made in the case of an agency decision which is subject to a formal internal appeal. Some agencies have a formally established appeal process which allows other agencies or the public to take appeals on a decision and make their views known, after publication of the final environmental impact statement. In such cases, where a real opportunity exists to alter the decision, the decision may be made and recorded at the same time the environmental impact statement is published. This means that the period for appeal of the decision and the 30-day period prescribed in paragraph (b)(2) of this section may run concurrently. In such cases the environmental impact statement shall explain the timing and the public's right of appeal. An agency engaged in rulemaking under the Administrative Procedure Act or other statute for the purpose of protecting the public health or safety, may waive the time period in paragraph (b)(2) of this section and publish a decision on the final rule simultaneously with publication of the notice of the availability of the final environmental impact statement as described in paragraph (a) of this section.

(c) If the final environmental impact statement is filed within ninety (90) days after a draft environmental impact statement is filed with the Environmental Protection Agency, the minimum thirty (30) day period and the minimum ninety (90) day period may run concurrently. However, subject to paragraph (d) of this section agencies shall allow not less than 45 days for comments on draft statements.

(d) The lead agency may extend prescribed periods. The Environmental Protection Agency may upon a showing by the lead agency of compelling reasons of national policy reduce the prescribed periods and may upon a showing by any other Federal agency of compelling reasons of national policy also extend prescribed periods, but only after consultation with the lead agency. (Also see §1507.3(d).) Failure to file timely comments shall not be a sufficient reason for extending a period. If the lead agency does not concur with the extension of time, EPA may not extend it for more than 30 days. When the Environmental Protection Agency reduces or extends any period of time it shall notify the Council.

[43 FR 56000, Nov. 29, 1978; 44 FR 874, Jan. 3, 1979]

§1506.11 Emergencies.

Where emergency circumstances make it necessary to take an action with significant environmental impact without observing the provisions of these regulations, the Federal agency taking the action should consult with the Council about alternative arrangements. Agencies and the Council will limit such arrangements to actions necessary to control the immediate impacts of the emergency. Other actions remain subject to NEPA review.

§1506.12 Effective date.

The effective date of these regulations is July 30, 1979, except that for agencies that administer programs that qualify under section 102(2)(D) of the Act or under section 104(h) of the Housing and Community Development Act of 1974 an additional four months shall be allowed for the State or local agencies to adopt their implementing procedures.

(a) These regulations shall apply to the fullest extent practicable to ongoing activities and environmental documents begun before the effective date. These regulations do not apply to an environmental impact statement or supplement if the draft statement was filed before the effective date of these regulations. No completed environmental documents need be redone by reasons of these regulations. Until these regulations are applicable, the Council's guidelines published in the FEDERAL REGISTER of August 1, 1973, shall continue to be applicable. In cases where these regulations are applicable the guidelines are superseded. However, nothing shall prevent an agency from proceeding under these regulations at an earlier time.

(b) NEPA shall continue to be applicable to actions begun before January 1, 1970, to the fullest extent possible.

PART 1507—AGENCY COMPLIANCE

Sec.

AUTHORITY: NEPA, the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C. 4371 *et seq.*), sec. 309 of the Clean Air Act, as amended (42 U.S.C. 7609), and E.O. 11514 (Mar. 5, 1970, as amended by E.O. 11991, May 24, 1977).

SOURCE: 43 FR 56002, Nov. 29, 1978, unless otherwise noted.

§1507.1 Compliance.

All agencies of the Federal Government shall comply with these regulations. It is the intent of these regulations to allow each agency flexibility in adapting its implementing procedures authorized by §1507.3 to the requirements of other applicable laws.

§1507.2 Agency capability to comply.

Each agency shall be capable (in terms of personnel and other resources) of complying with the requirements enumerated below. Such compliance may include use of other's resources, but the using agency shall itself have sufficient capability to evaluate what others do for it. Agencies shall:

(a) Fulfill the requirements of section 102(2)(A) of the Act to utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decisionmaking which may have an impact on the human environment. Agencies shall designate a person to be responsible for overall review of agency NEPA compliance.

(b) Identify methods and procedures required by section 102(2)(B) to insure that presently unquantified environmental amenities and values may be given appropriate consideration.

(c) Prepare adequate environmental impact statements pursuant to section 102(2)(C) and comment on statements in the areas where the agency has jurisdiction by law or special expertise or is authorized to develop and enforce environmental standards.

(d) Study, develop, and describe alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources. This requirement of section 102(2)(E) extends to all such proposals, not just the more limited scope of section 102(2)(C)(iii) where the discussion of alternatives is confined to impact statements.

(e) Comply with the requirements of section 102(2)(H) that the agency initiate and utilize ecological information in the planning and development of resource-oriented projects.

(f) Fulfill the requirements of sections 102(2)(F), 102(2)(G), and 102(2)(I), of the Act and of Executive Order 11514, Protection and Enhancement of Environmental Quality, Sec. 2.

§ 1507.3 Agency procedures.

(a) Not later than eight months after publication of these regulations as finally adopted in the FEDERAL REGISTER, or five months after the establishment of an agency, whichever shall come later, each agency shall as necessary adopt procedures to supplement these regulations. When the agency is a department, major subunits are encouraged (with the consent of the department) to adopt their own procedures. Such procedures shall not paraphrase these regulations. They shall confine themselves to implementing procedures. Each agency shall consult with the Council while developing its procedures and before publishing them in the FEDERAL REGISTER for comment. Agencies with similar programs should consult with each other and the Council to coordinate their procedures, especially for programs requesting similar information from applicants. The procedures shall be adopted only after an opportunity for public review and after review by the Council for conformity with the Act and these regulations. The Council shall complete its review within 30 days. Once in effect they shall be filed with the Council and made readily available to the public. Agencies are encouraged to publish explanatory guidance for these regulations and their own procedures. Agencies shall continue to review their policies and procedures and in consultation with the Council to revise them as necessary to ensure full compliance with the purposes and provisions of the Act.

(b) Agency procedures shall comply with these regulations except where compliance would be inconsistent with statutory requirements and shall include:

(1) Those procedures required by §§ 1501.2(d), 1502.9(c)(3), 1505.1, 1506.6(e), and 1508.4.

(2) Specific criteria for and identification of those typical classes of action:

(i) Which normally do require environmental impact statements.

(ii) Which normally do not require either an environmental impact statement or an environmental assessment (categorical exclusions (§ 1508.4)).

(iii) Which normally require environmental assessments but not necessarily environmental impact statements.

(c) Agency procedures may include specific criteria for providing limited exceptions to the provisions of these regulations for classified proposals. They are proposed actions which are specifically authorized under criteria established by an Executive Order or statute to be kept secret in the interest of national defense or foreign policy and are in fact properly classified pursuant to such Executive Order or statute. Environmental assessments and environmental impact statements

which address classified proposals may be safeguarded and restricted from public dissemination in accordance with agencies' own regulations applicable to classified information. These documents may be organized so that classified portions can be included as annexes, in order that the unclassified portions can be made available to the public.

(d) Agency procedures may provide for periods of time other than those presented in §1506.10 when necessary to comply with other specific statutory requirements.

(e) Agency procedures may provide that where there is a lengthy period between the agency's decision to prepare an environmental impact statement and the time of actual preparation, the notice of intent required by §1501.7 may be published at a reasonable time in advance of preparation of the draft statement.

PART 1508—TERMINOLOGY AND INDEX

Sec.

AUTHORITY: NEPA, the Environmental Quality Improvement Act of 1970, as amended (42 U.S.C. 4371 *et seq.*), sec. 309 of the Clean Air Act, as amended (42 U.S.C. 7609), and E.O. 11514 (Mar. 5, 1970, as amended by E.O. 11991, May 24, 1977).

SOURCE: 43 FR 56003, Nov. 29, 1978, unless otherwise noted.

§ 1508.1 Terminology.

The terminology of this part shall be uniform throughout the Federal Government.

§ 1508.2 Act.

Act means the National Environmental Policy Act, as amended (42 U.S.C. 4321, *et seq.*) which is also referred to as ''NEPA.''

§ 1508.3 Affecting.

Affecting means will or may have an effect on.

§ 1508.4 Categorical exclusion.

Categorical exclusion means a category of actions which do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in procedures adopted by a Federal agency in implementation of these regulations (§1507.3) and for which, therefore, neither an environmental assessment nor an environmental impact statement is required. An agency may decide in its procedures or otherwise, to prepare environmental assessments for the reasons stated in §1508.9 even though it is not required to do so. Any procedures under this section shall provide for extraordinary circumstances in which a normally excluded action may have a significant environmental effect.

§ 1508.5 Cooperating agency.

Cooperating agency means any Federal agency other than a lead agency which has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major Federal action significantly affecting the quality of the human environment. The selection and responsibilities of a cooperating agency are described in §1501.6. A State or local agency of similar qualifications or, when the effects are on a reservation, an Indian Tribe, may by agreement with the lead agency become a cooperating agency.

§ 1508.6 Council.

Council means the Council on Environmental Quality established by title II of the Act.

§ 1508.7 Cumulative impact.

Cumulative impact is the impact on the environment which results 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.

§ 1508.8 Effects.

Effects include:

(a) Direct effects, which are caused by the action and occur at the same time and place.

(b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include 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.

Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.

§ 1508.9 Environmental assessment.

Environmental assessment:

(a) Means a concise public document for which a Federal agency is responsible that serves to:

(1) Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact.

(2) Aid an agency's compliance with the Act when no environmental impact statement is necessary.

(3) Facilitate preparation of a statement when one is necessary.

(b) Shall include brief discussions of the need for the proposal, of alternatives as required by section 102(2)(E), of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted.

§ 1508.10 Environmental document.

Environmental document includes the documents specified in § 1508.9 (environmental assessment), § 1508.11 (environmental impact statement), § 1508.13 (finding of no significant impact), and § 1508.22 (notice of intent).

§ 1508.11 Environmental impact statement.

Environmental impact statement means a detailed written statement as required by section 102(2)(C) of the Act.

§ 1508.12 Federal agency.

Federal agency means all agencies of the Federal Government. It does not mean the Congress, the Judiciary, or the President, including the performance of staff functions for the President in his Executive Office. It also includes for purposes of these regulations States and units of general local government and Indian tribes assuming NEPA responsibilities under section 104(h) of the Housing and Community Development Act of 1974.

§ 1508.13 Finding of no significant impact.

Finding of no significant impact means a document by a Federal agency briefly presenting the reasons why an action, not otherwise excluded (§ 1508.4), will not have a significant effect on the human environment and for which an environmental impact statement therefore will not be prepared. It shall include the environmental assessment or a summary of it and shall note any other environmental documents related to it (§ 1501.7(a)(5)). If the assessment is included, the finding need not

repeat any of the discussion in the assessment but may incorporate it by reference.

§ 1508.14 Human environment.

Human environment shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment. (See the definition of ''effects'' (§ 1508.8).) This means that economic or social effects are not intended by themselves to require preparation of an environmental impact statement. When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment.

§ 1508.15 Jurisdiction by law.

Jurisdiction by law means agency authority to approve, veto, or finance all or part of the proposal.

§ 1508.16 Lead agency.

Lead agency means the agency or agencies preparing or having taken primary responsibility for preparing the environmental impact statement.

§ 1508.17 Legislation.

Legislation includes a bill or legislative proposal to Congress developed by or with the significant cooperation and support of a Federal agency, but does not include requests for appropriations. The test for significant cooperation is whether the proposal is in fact predominantly that of the agency rather than another source. Drafting does not by itself constitute significant cooperation. Proposals for legislation include requests for ratification of treaties. Only the agency which has primary responsibility for the subject matter involved will prepare a legislative environmental impact statement.

§ 1508.18 Major Federal action.

Major Federal action includes actions with effects that may be major and which are potentially subject to Federal control and responsibility. Major reinforces but does not have a meaning independent of significantly (§ 1508.27). Actions include the circumstance where the responsible officials fail to act and that failure to act is reviewable by courts or administrative tribunals under the Administrative Procedure Act or other applicable law as agency action.

(a) Actions include new and continuing activities, including projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by federal agencies; new or revised agency rules, regulations, plans, policies, or procedures; and legislative proposals (§§ 1506.8, 1508.17). Actions do not include funding assistance solely in the form of general revenue sharing funds, distributed under the State and Local Fiscal Assistance Act of 1972, 31 U.S.C. 1221 *et seq.*, with no Federal agency control over the subsequent use of such funds. Actions do not include bringing judicial or administrative civil or criminal enforcement actions.

(b) Federal actions tend to fall within one of the following categories:

(1) Adoption of official policy, such as rules, regulations, and interpretations adopted pursuant to the Administrative Procedure Act, 5 U.S.C. 551 *et seq.;* treaties and international conventions or agreements; formal documents establishing an agency's policies which will result in or substantially alter agency programs.

(2) Adoption of formal plans, such as official documents prepared or approved by federal agencies which guide or prescribe alternative uses of Federal resources, upon which future agency actions will be based.

(3) Adoption of programs, such as a group of concerted actions to implement a specific policy or plan; systematic and connected agency decisions allocating agency resources to implement a specific statutory program or executive directive.

(4) Approval of specific projects, such as construction or management activities located in a defined geographic area. Projects include actions approved by permit or other regulatory decision as well as federal and federally assisted activities.

§ 1508.19 Matter.

Matter includes for purposes of part 1504:

(a) With respect to the Environmental Protection Agency, any proposed legislation, project, action or regulation as those terms are used in section 309(a) of the Clean Air Act (42 U.S.C. 7609).

(b) With respect to all other agencies, any proposed major federal action to which section 102(2)(C) of NEPA applies.

§ 1508.20 Mitigation.

Mitigation includes:

(a) Avoiding the impact altogether by not taking a certain action or parts of an action.

(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

(e) Compensating for the impact by replacing or providing substitute resources or environments.

§ 1508.21 NEPA process.

NEPA process means all measures necessary for compliance with the requirements of section 2 and title I of NEPA.

§ 1508.22 Notice of intent.

Notice of intent means a notice that an environmental impact statement will be prepared and considered. The notice shall briefly:

(a) Describe the proposed action and possible alternatives.

(b) Describe the agency's proposed scoping process including whether, when, and where any scoping meeting will be held.

(c) State the name and address of a person within the agency who can answer questions about the proposed action and the environmental impact statement.

§ 1508.23 Proposal.

Proposal exists at that stage in the development of an action when an agency subject to the Act has a goal and is actively preparing to make a decision on one or more alternative means of accomplishing that goal and the effects can be meaningfully evaluated. Preparation of an environmental impact statement on a proposal should be timed (§ 1502.5) so that the final statement may be completed in time for the statement to be included in any recommendation or report on the proposal. A proposal may exist in fact as well as by agency declaration that one exists.

§ 1508.24 Referring agency.

Referring agency means the federal agency which has referred any matter to the Council after a determination that the matter is unsatisfactory from the standpoint of public health or welfare or environmental quality.

§ 1508.25 Scope.

Scope consists of the range of actions, alternatives, and impacts to be considered in an environmental impact statement. The scope of an individual statement may depend on its relationships to other statements (§§ 1502.20 and 1508.28). To determine the scope of environmental impact statements, agencies shall consider 3 types of actions, 3 types of alternatives, and 3 types of impacts. They include:

(a) Actions (other than unconnected single actions) which may be:

(1) Connected actions, which means that they are closely related and therefore should be discussed in the same impact statement. Actions are connected if they:

(i) Automatically trigger other actions which may require environmental impact statements.

(ii) Cannot or will not proceed unless other actions are taken previously or simultaneously.

(iii) Are interdependent parts of a larger action and depend on the larger action for their justification.

(2) Cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement.

(3) Similar actions, which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental

consequencies together, such as common timing or geography. An agency may wish to analyze these actions in the same impact statement. It should do so when the best way to assess adequately the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single impact statement.

(b) Alternatives, which include:

(1) No action alternative.

(2) Other reasonable courses of actions.

(3) Mitigation measures (not in the proposed action).

(c) Impacts, which may be: (1) Direct; (2) indirect; (3) cumulative.

§ 1508.26 Special expertise.

Special expertise means statutory responsibility, agency mission, or related program experience.

§ 1508.27 Significantly.

Significantly as used in NEPA requires considerations of both context and intensity:

(a) *Context.* This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

(b) *Intensity.* This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

(1) Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

(2) The degree to which the proposed action affects public health or safety.

(3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

(4) The degree to which the effects on the quality of the human environment are likely to be highly controversial.

(5) The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

(6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

(7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

(8) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

(9) The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

(10) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

[43 FR 56003, Nov. 29, 1978; 44 FR 874, Jan. 3, 1979]

§ 1508.28 Tiering.

Tiering refers to the coverage of general matters in broader environmental impact statements (such as national program or policy statements) with subsequent narrower statements or environmental analyses (such as regional or basinwide program statements or ultimately site-specific statements) incorporating by reference the general discussions and concentrating solely on the issues specific to the statement

subsequently prepared. Tiering is appropriate when the sequence of statements or analyses is:

(a) From a program, plan, or policy environmental impact statement to a program, plan, or policy statement or analysis of lesser scope or to a site-specific statement or analysis.

(b) From an environmental impact statement on a specific action at an early stage (such as need and site selection) to a supplement (which is preferred) or a subsequent statement or analysis at a later stage (such as environmental mitigation). Tiering in such cases is appropriate when it helps the lead agency to focus on the issues which are ripe for decision and exclude from consideration issues already decided or not yet ripe.

Index to Parts 1500 Through 1508

EDITORIAL NOTE: This listing is provided for information purposes only. It is compiled and kept up-to-date by the Council on Environmental Quality, and is revised through July 1, 2014.

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PART 1515—FREEDOM OF INFORMATION ACT PROCEDURES

PURPOSE

Sec.

ORGANIZATION OF CEQ

PROCEDURES FOR REQUESTING RECORDS

OCS-A 0501 MASS USA

VINEYARD WIND

Site Assessment Plan (SAP)
Vineyard Wind Lease OCS-A 0501

Massachusetts Offshore Wind Energy Area

Vineyard Wind, LLC
700 Pleasant St. Suite 510
New Bedford, MA 02740

November 22, 2017
Addendum Submitted May 17, 2018

EXHIBIT 2

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APPENDICES

1.0 PROJECT INFORMATION (585.610(A))

1.1 Project Overview

This section describes basic project information.

1.1.1 Contact Information (585.610(a)(1))

Rachel Pachter
VP Permitting Affairs, Vineyard Wind, LLC
700 Pleasant St. Suite 510
New Bedford, MA 02740
Tel: 508-717-8964
e-mail: rpachter@vineyardwind.com

1.1.2 Concept (585.610(a)(2))

The general concept is to install and maintain up to two Meteorological (MET) and/or oceanographic buoys, hereafter referred to as MET/ocean buoy(s), within the Massachusetts Wind Energy Area (WEA) of the Atlantic Ocean, as designated by the Bureau of Ocean Energy Management (BOEM) and leased to OffshoreMW, LLC (OffshoreMW). Offshore MW is in the process of changing its name to Vineyard Wind, LLC (Vineyard Wind); however, it is the same entity that currently holds the lease and will be referred to as Vineyard Wind throughout this document.

The devices to be deployed have not yet been selected, but will be limited to either a floating Light Detection and Ranging (LiDAR) buoy or wave and current buoy. The buoy and LiDAR are floating and moored to the seafloor. The proposed locations for the MET/ocean buoy(s) (SAP-1 and SAP-2) are shown in Figure 1.2.1 Location Plat; coordinates and water depths are presented below.

SAP-1	SAP-2
Latitude: 41.072588	Latitude: 41.006427
Longitude: -70.482501	Longitude: -70.477654
Depth (m): 41	Depth (m): 44

The information collected from the MET/ocean buoy(s) will be used during the wind turbine pre-installation, installation, and commissioning period to supplement existing met-ocean measurement data available in the vicinity of the Massachusetts WEA. Historical and ongoing collection of meteorological and oceanographic data in the region will inform the project and COP submittal in support of engineering and design of the WTG foundations and above water components. The MET/ocean buoy(s) will likely be removed and decommissioned shortly after final commissioning of the wind farm.

Installation of the MET/ocean buoys(s) is planned for March 2018. The installation process is expected to take two weeks, from arrival of the work platforms in the port of operations to the time the buoy(s) enter the water and mooring weights are placed on the seafloor. The total duration of the MET/ocean buoy(s) deployment for data collection is anticipated to be approximately 5 years.

1.1.3 Designation of Operator (585.610(a)(3))

Vineyard Wind intends to be the sole operator of the MET/ocean buoy(s) in compliance with the stipulations stated in the Lease and described in Section 1.1.4, as they relate to the Site Assessment Plan (SAP) and SAP activities.

1.1.4 Lease Stipulations and Compliance (585.610(a)(4))

The lease issued to OffshoreMW (for the Massachusetts Wind Energy Area is posted on the BOEM website at https://www.boem.gov/Lease-OCS-A-0501/. As indicated above, Offshore MW is in the process of changing its name to Vineyard Wind; however, it is the same entity that currently holds the lease and will continue to comply with the stipulations in this lease as they relate to the development and approval of this SAP and SAP activities.

Vineyard Wind completed SAP survey activities as described in Section 2.0 in accordance with a pre-survey meeting and SAP Survey Plan approved by BOEM on August 26, 2016. Vineyard Wind also conducted a tribal pre-survey meeting, as specified in the lease prior to conducting SAP survey activities, and consulted with United States Fleet Forces (USFF) N46 and the Fleet Forces Atlantic Exercise Coordination Center (FFAECC), which coordinates all regional military/other agency activities (both sea and air) for the Narragansett Bay operating area (OPAREA) and ensures events are de-conflicted.

Vineyard Wind will conduct the activities described in this SAP as approved by BOEM. Vineyard Wind proposes to conduct SAP activities in a manner that will not unreasonably interfere with or endanger other approved activities, will not cause any undue harm or damage to the environment, will not create hazardous or unsafe conditions, and will not adversely affect resources of historic, cultural or archaeological significance in the lease area. Measures that will be implemented to avoid, minimize, and/or mitigate potential impacts associated with SAP activities, as required by the lease, are described in Section 3.0 of the SAP.

Furthermore, Vineyard Wind will comply with the federal regulations and associated SAP guidelines regarding the items listed in Table 1.1.4 below, as stated in the table and outlined in this SAP.

Table 1.1.4 Compliance with Regulations

Regulation	Description	Compliance Statement
585.105 (a)	Design your projects and conduct all activities in a manner that ensures safety,	Vineyard Wind will comply with the requirements of 585.105(a). Project design standards and company HSE policies in place to ensure safe working conditions for people, *in situ* equipment, and all activities occurring on the Lease and for the project,
	and will not cause undue harm or damage to natural resources, including their physical, atmospheric, and biological components to the extent practicable;	with further design protocols and safety measures to prevent any impacts to the environment,
	and take measures to prevent unauthorized discharge of pollutants	and operational rules and safeguards against any discharge from vessels working on the project, in the Lease area

	including marine trash and debris into the offshore environment.	and all surrounding waterways connecting to the port.
585.606 (a)	(1) Conforms to all applicable laws, regulations, and lease provisions of your commercial lease	Vineyard Wind will comply with the requirements of 585.606(a). Applicable laws, regulations, and provisions in Lease OCS-A 0501 will be followed.
	(2) Is safe	Vineyard Wind has planned and is prepared to conduct all site assessment activities in a safe manner following company HSE policies (Vineyard Wind's and subcontractors).
	(3) Does not unreasonably interfere with other uses of the OCS, including those involved with National security or defense	Activities will not interfere with other uses of the OCS and Lease area; Vineyard Wind and its contractors will continue to communicate with the USCG, appropriate entities, and other users of the OCS; and get approval from Navy Fleet Forces Atlantic that the OCS is clear for SAP activities.
	(4) Does not cause undue harm or damage to natural resources; life (including human and wildlife); property; the marine, coastal, or human environment; or sites, structures, or objects of historical or archaeological significance	Vineyard Wind has and will continue to conduct due diligence efforts to protect all facets of the environment during offshore and upland project activities, as well as any cultural resources identified in our work areas. Refer to Section 3 of this document regarding the analysis of site characteristics, potential impacts, and avoidance and mitigation measures.
	(5) Uses best available and safest technology	MET/ocean equipment and mooring designs are standard, accepted systems being utilized for other offshore wind SAP monitoring, and represent the best available and safest technologies for the environment at this time.
	(6) Uses best management practices	Vineyard Wind will continue to use best management practices (BMP) regarding all project tasks. Some of the BMPs specific to the SAP activities include, but are not limited to; • avoidance of impacts to benthic and nektonic habitats, • avoidance of impacts to marine mammals, seals, and turtles, • installation activities only during approved months to avoid impacts to fisheries and marine mammals, • avoid any bottom disturbance during installation except the weight for the mooring itself, • use of approved USCG lighting and marking of mooring buoys to avoid impacts to the commercial fishing industry,

		• design of the buoys to minimize avian perching, • design of the moorings to avoid entanglement by marine mammals, turtles, and seals, • routine inspection of the moorings to ensure structural integrity and minimal seabed disturbance, • combine vessel trips for inspection, maintenance, and data downloads to minimize environmental impact, • prepare and execute an oil spill response plan, • exercise responsible and safe behavior during all site activities.
	(7) Uses properly trained personnel	Vineyard Wind will ensure that suitably experienced personnel will be employed for all facets of SAP activities, meeting company and HSE standards for the work to be performed.

1.2 Proposed Activity

1.2.1 General Structure and Project Design, Fabrication, and Installation (585.610(a)(6))

As outlined in Section 1.1.2, a maximum of two bottom mounted devices are anticipated to be installed within the Massachusetts WEA during the development and installation period of the wind farm. These devices will be installed in SAP Area 1 at 41 m (134.5 ft.) water depth at position Latitude: 41.072588 Longitude: -70.482501, and at SAP Area 2 at 44 m (144.4 ft.) water depth at position Latitude: 41.006427 Longitude: -70.477654 (see location plat, Figure 1.2.1). Vineyard Wind proposes to collect the relevant met-ocean data using either a floating Lidar such as the AXYS WindSentinel™ and/or the AXYS TRIAXYS Wave and Current Buoy. Both instruments are off-the-shelf products and are widely applied in the offshore industry. The measurement devices and their components under consideration are described in Tables 1.2.1 and 1.2.2. Components of these buoys and moorings including the gravity-based anchor and the chain that affixes the buoy to the anchor, are further described below. Detailed technical information about the floating LiDAR buoy and the wave and current buoy are provided in Appendix A.

More specifically, both the AXYS WindSentinel™ and AXYS TRIAXYS buoys will be mounted to the seafloor using a steel chain connected to a gravity based device (mooring weight). Typical mooring weights consist of a cement clump or steel anchor with a steel chain (specifications in the tables below).

The following sections provide detailed descriptions of the proposed devices including their associated mooring designs, instruments, and anticipated seafloor impact.

Buoyancy calculations and mooring calculations for the two deployment systems have been made available for Vineyard Wind by AXYS, based on existing met-ocean data for the Vineyard Wind site. These site specific values for the mooring design are included in Tables 1.2.1 and 1.2.2.

The mooring design and materials are site specific and take the following factors into consideration:

- Water depth
- Current speed
- Tides
- Waves
- Winds
- Type of deployment vessel and equipment available on board
- Desired length of life of the mooring
- Vessel traffic in the vicinity of the mooring

The buoy(s) will be equipped with the proper safety lighting, markings and signal equipment per United States Coast Guard (USCG) Private Aids to Navigation (PATON) requirements. Coordination with the USCG is presently underway.

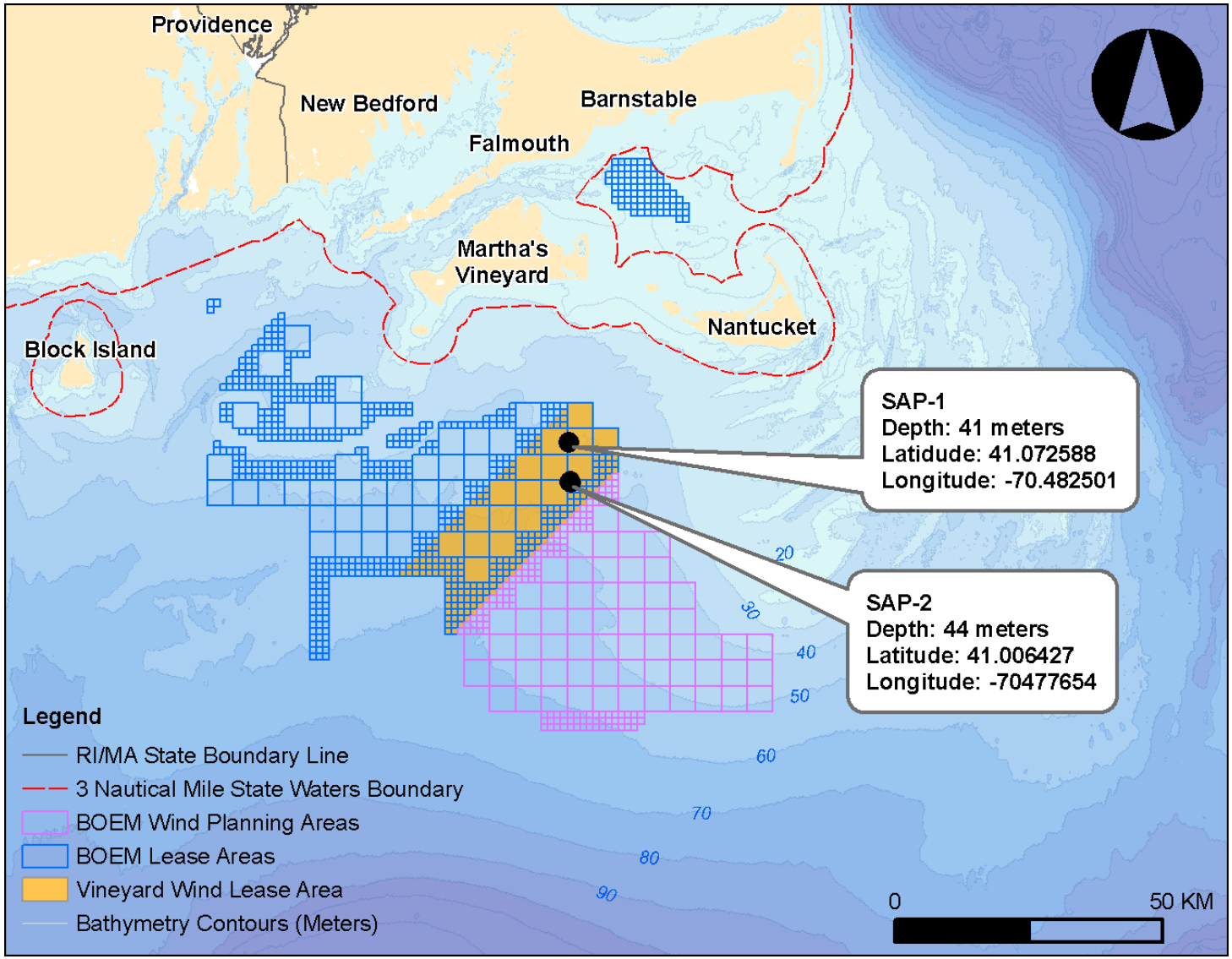
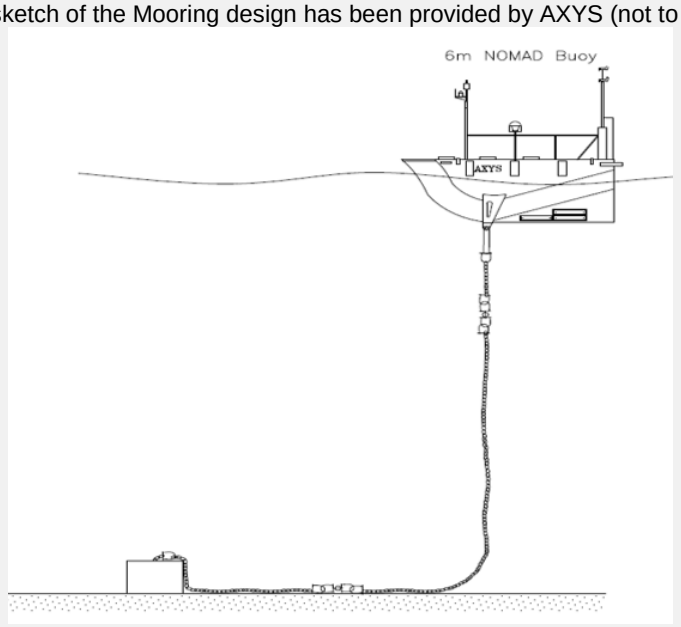


Figure 1.2.1. *Location Plat showing location of SAP Areas. Sources: BOEM, Wind Energy Areas, 2015; NOAA, Raster Navigational Charts, 2013; Mass GIS, State Outline, 1991.*

Table 1.2.1. Summary Description of the AXYS WindSentinel buoy system

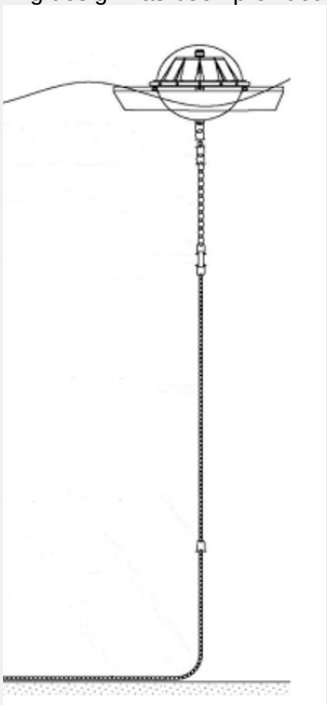
AXYS WindSentinel™ Floating LiDAR (also referred to as "Flidar", a commercial name by AXYS)	
	The AXYS WindSentinel™ is a marine buoy equipped with LiDARs specifically suited for marine conditions. Specific details of the device can be found in Appendix A. This summary table only addresses key technical data.
Overall dimension	Length: 6.30m (248 inches) Width: 3.2m (126 inches) Height to Deck Hatch: 2.85m (112 inches)
Weight	Bare Hull Weight (BHW) with no batteries, fuel or payload: *Approx. 6,800 kg (15,000 lbs) (includes 1,000 #/454kgs ballast)* BHW + 40 batteries + full payload + 240 gallons fuel *Approx. 10,000 kg (21,800 lbs)*

Mooring design	The Device will be secured to the seafloor using a simple mooring design. This design facilitates only very limited seafloor impact. The Device will be attached to the seafloor by means of a single concrete clump anchor. The concrete clump anchor will have a total weight of 5,000-6,000 kg (11,000-13,000 lbs) and the following dimensions. Height of approx. 0.6 m (2.3 ft) and Width/Length of approx. 2.0 m (6.7 ft). The mooring will consist of one cement clump weight interconnected to the device with all steel chains. Initial mooring analysis have been conducted and the mooring chain as standard all steel chain mooring with open links with 32mm-40mm nominal diameters. The steel chains will be mounted to the device using a steel mooring yoke. The steel chains will have a yielding strength of ca 1000 kN and a weight of ca. 40 kg/m. Due to the weight of the steel chain and general design no entanglement of the chain is expected. Below sketch of the Mooring design has been provided by AXYS (not to scale):  The total mooring length will be ca. 160m from bottom of the device to concrete clump anchor attachment. The device will have a total radius range of approx. 155m relative to the main anchor weight centre. The mooring chain will have a maximum length seafloor attachment radius of 115m. The maximum horizontal radius of the anchor sweep chain contacting the seafloor will not be more then 115m and will be within the 300m x 300m surveyed area. Any impact from installation vessels will be very limited, as the installation will be performed without anchoring.
Seafloor impact	Vertical penetration of the anchor clump depends on the weight, outer dimensions and seabed conditions. A total seafloor penetration during the deployment period for the concrete clump anchor weight is anticipated to be conservatively calculated up to approx. 2.5m (8 ft). Only very limited scour development of approx. 0.3m or 1 ft around the concrete clump anchor is expected due to minimal currents and relatively cohesive seabed conditions. These conditions have been considered as part of the planning of the installation, operations and decommissioning.

Tracking and Recovery	Tracking of the buoy will be done by means of the GPS and AIS devices. AXYS maintains a list of known and pre-validated vessel providers. In case of an emergency recovery, the availability of the closest suitable vessels is confirmed. Some drag or walking of the anchor weight may be expected in an extreme storm situation. AXYS has run mooring simulations to capture an approximation of the maximum mooring tension we would experience at the anchor. The size of the anchor is designed to be slightly larger than the design tension. The buoy tracks the GPS location of the system and sends an alert if the buoy moves outside a predefined circle. .
Maintenance activities	Planned on-site maintenance for the WindSentinel™ Buoy is scheduled at 6 and 12 months and will be completed by a vessel comparable to the support vessel used for installation. Planned maintenance activities will occur at 6-month intervals and will include replacement of consumables, service of sensors, data retrieval, and cleaning of solar panels and wind turbines, A detailed service, which will include all 6-month activities, as well as cleaning of biofouling and review and maintenance of the mooring system, will be performed at 12-month intervals.

Table 1.2.2. Summary Description of the AXYS TRIAXYS Wave and Current Buoy

AXYS Technology - TRIAXYS Wave and Current Buoy	
	The AXYS TRIAXYS is a marine buoy measuring sea state conditions and sub surface currents. • Specific details of the device can be found in Appendix A. This summary table only addresses key technical data.
Overall dimension	Buoy Diameter: 1.10m (43 inches) With Floatation Ring 2.20m (86 inches) Height: 1.10m (43 inches)
Weight	Weight (including batteries): 230 kg (510 lbs)

Mooring design	The Device will be secured to the seafloor using a simple mooring design. This design facilitates only very limited seafloor impact. The TRIAXYS buoy will be mounted with a floating ring to ensure sufficient buoyance capacity. The buoy hull dome and floating ring are constructed from stainless steel and impact resistant polycarbonate. The Device will be attached to the seafloor by means of a single heavy steel chain interconnected with open link chain between the buoy and single heavy chain on the bottom. The heavy steel chain will have a total weight of approx. 500kg (1,100 lbs) and a length of approx.15m. Mooring analyses have been conducted and the mooring chain as a standard steel chain mooring with open links 16-20 mm nominal diameter. The steel chain will be attached to the device using a steel mooring yoke. A floatation collar mounted under the device will be utilized to provide the required buoyancy for the chain. The mooring system will have a yielding strength of ca 800 kN and a weight of ca. 6 kg/m. Due to the weight of the chain, the mooring assembly will be kept straight and vertical, and no entanglement of the mooring system is expected. Below sketch of the Mooring design has been provided by AXYS (not to scale):  The total mooring length will be approx. 75m (246 ft) from bottom of the device to the seafloor heavy chain. The device will have a total radius range of approx. 155m relative to the main anchor slap centre. The mooring chain will have a maximum length seafloor attachment radius of 65m. The maximum horizontal radius of the chain contacting the seafloor will not be more then 35m (114 ft) with in the 300m x 300m deployment area. Any impact from installation vessels will be very limited, as the installation will be performed without anchoring.

Seafloor impact	Vertical penetration of the heavy steel depends on the weight, outer dimensions and seabed conditions. A total seafloor penetration during the deployment period for the chain anticipated to be approx. 0.5m (1.6 ft). Little to no scour development around the chain is expected due to minimal currents and relatively cohesive seabed conditions.
Tracking and Recovery	Tracking of the buoy will be done by means of the GPS and AIS devices. AXYS maintains a list of known and pre-validated vessel providers. In case of an emergency recovery, the availability of the closest suitable vessels is confirmed. Drag or walking of the heavy chain may be expected in an extreme storm situation. AXYS has run mooring simulations in an attempt to capture an approximation of the maximum mooring tension we would experience at the anchor. The size of the anchor chain is designed to be slightly larger than the design tension. The buoy tracks the GPS location of the system and sends an alert if the buoy moves outside a predefined circle. .
Maintenance activities	Planned on-site maintenance for the TRIAXYS Buoy is scheduled every 3 months for the first year of operation and will be completed by a vessel comparable to the support vessel used for installation. Planned maintenance activities at the first 3-month interval would include cleaning of the ADCP sensor and cleaning of the buoy dome and hull if necessary. The 6-month maintenance will include all three-month maintenance activities, as well as visual inspection of the mooring system. At 12 months the mooring will be recovered and carefully inspected. If required, it will be changed out during the 12-month maintenance period.

1.2.1.1 MET/Ocean Datasets Supporting Mooring Design

For the specific design of the anchoring systems for both the AXYS WindSentinel and AXYS TRIAXYS buoys Vineyard Wind have provided detailed information about specific met-ocean conditions. A number of met-ocean time series have been used for analyzing the site conditions in the wind farm area and these datasets are summarized here.

Locations of the datasets utilized for these calculations are shown in Figure 1.2.1.1.

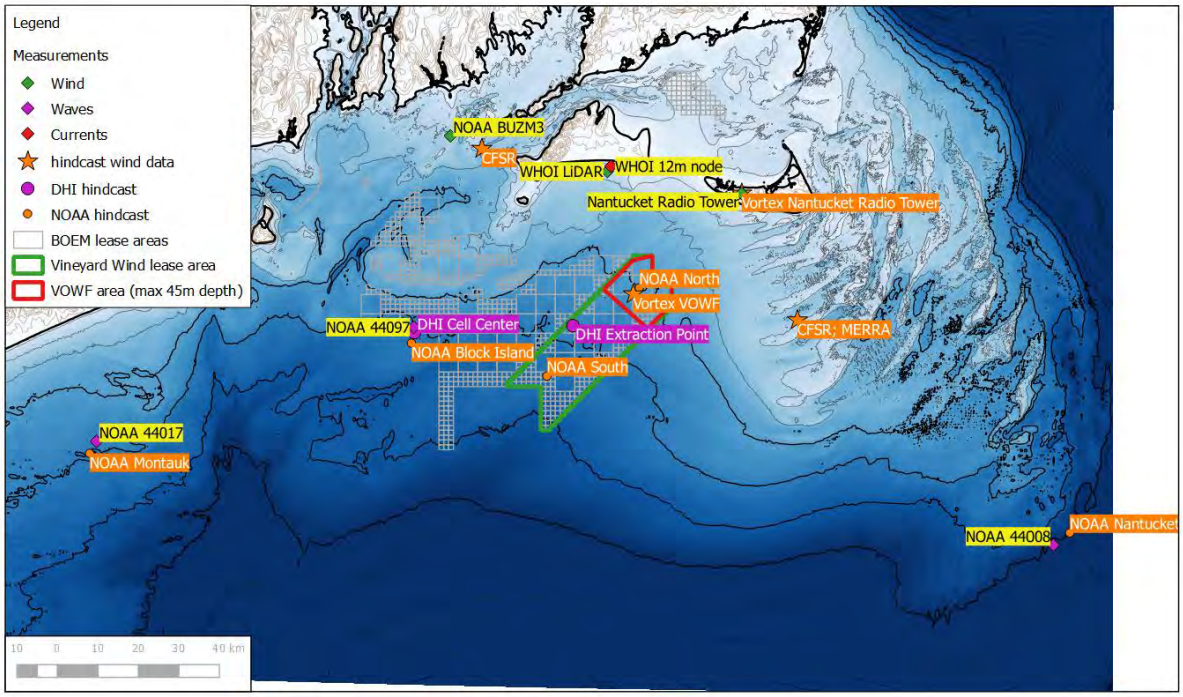


Figure 1.2.1.1: Location of the primary and secondary met-ocean data time series that were used as part of the Met-ocean analysis. Measurement locations are highlighted in yellow. Water depth contour lines are provided every 10mMSL.

- The DHI hindcast met-ocean times series dataset has been extracted within the lease area, and is considered to be representative for the complete lease area.
- Wave measurement datasets: the wave measurements at the NOAA wave buoys 44097 (Block Island Waverider) and 44017 (Montauk 3-meter discus buoy) have been used by DHI for calibrating the hindcast time series, and by the assessment of the specific met-ocean conditions.
- Wind measurement datasets: the short-term Nantucket Radio Tower and WHOI LiDAR time series were used together with the long-term NOAA C-MAN platform BUZM3 data (Buzzards Bay).
- Hindcast wind data: nearby reanalysis (CFSR, MERRA) long-term time series, as well as two short-term mesoscale time series were used in conjunction with the measured wind data to estimate the temporal- (multidecadal)- and spatial variation of the wind resource.

In Figure 1.2.2.2 below the non-extreme sea state conditions are shown.

In addition for the extreme wave conditions an overview of the significant wave height time series from DHI is shown in Figure 1.2.2.3, and the largest 3-hour H_{m0} values occurring during the following storms are:

- Hurricane Gloria 1985 (12.0 m)
- Hurricane Bob 1991 (8.0 m)
- December 1992 Nor'easter 1992 (8.7 m)
- Superstorm (also referred to as Great Blizzard) of March 1993 (12.0 m)
- Hurricane Floyd 1999 (9.3 m)
- Hurricane Irene 1991 (9.9 m)
- Hurricane Sandy 2012 (9.1 m)

Please note that among those are two non-tropical storms, see Figure 1.2.2.4 for an overview of the storm tracks.

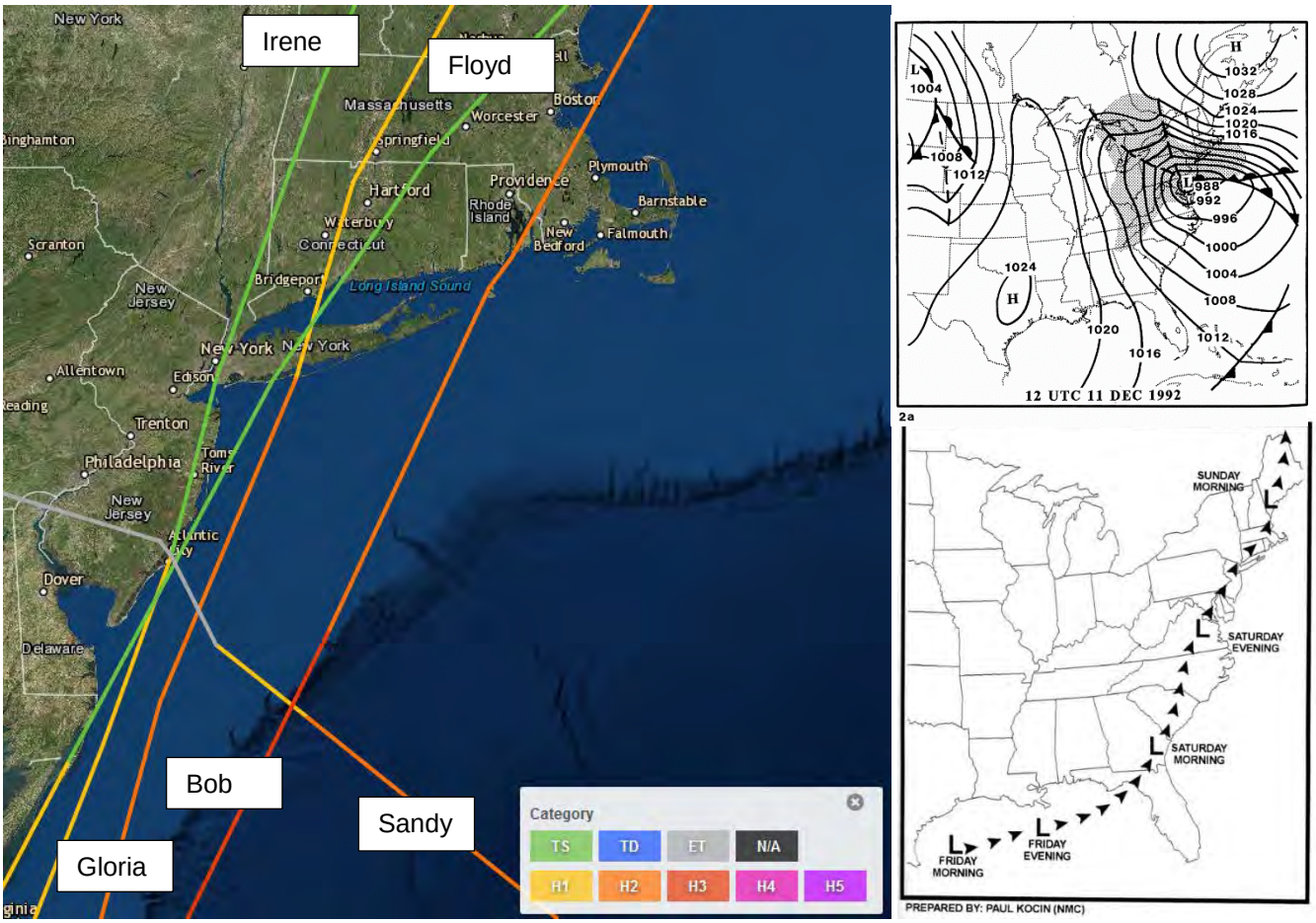


Figure 1.2.2.4: Left: Tracks of the major hurricanes during the hindcast period (September 1979 – December 2016). Top-right: Track of the Great Blizzard of 1993. Bottom-right: Track of the 1992 Nor'easter.

There are no long-term wave measurements covering the entire hindcast period. Two measurement locations have been selected for validating the extreme values of the hindcast data: the NOAA buoy 44097 (Block Island Waverider), and the NOAA buoy 44008 (Nantucket), see Figure 1.2.2.5. The NOAA Montauk wave buoy was either not yet installed, or not measuring at the times of the major storms.

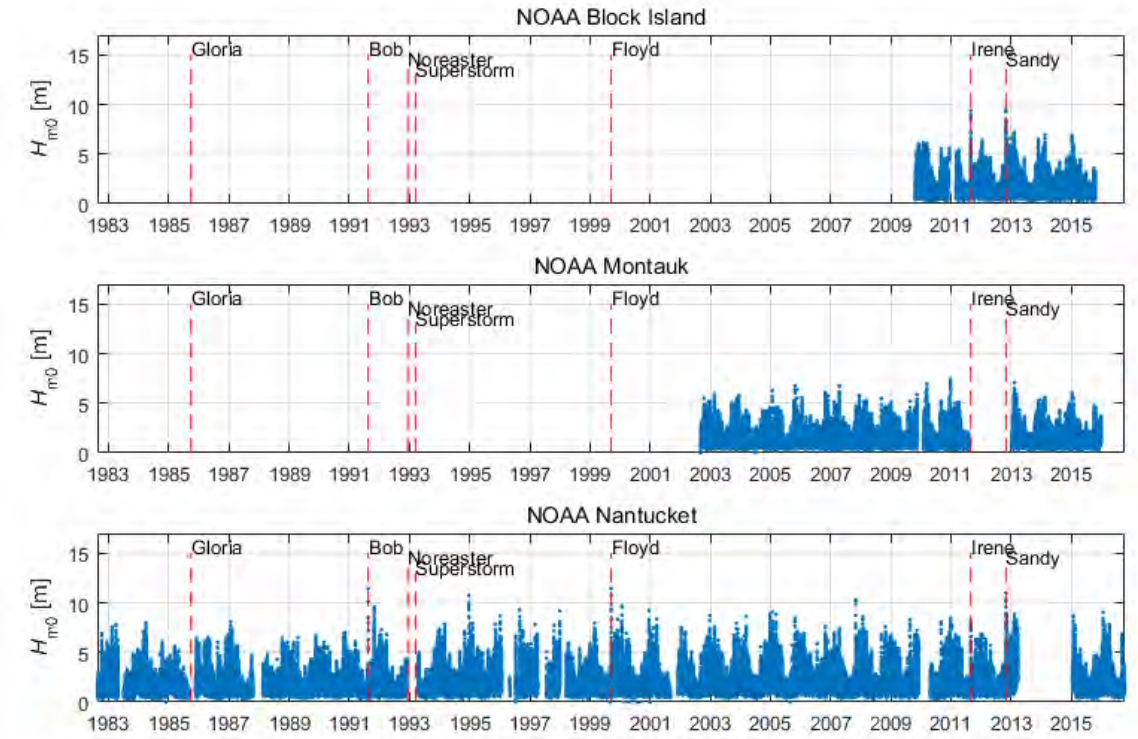


Figure 1.2.2.5: Time series of measured significant wave height at the three NOAA buoys close to the VOWF site. Please note that hurricane Gloria, and the two winter storms have not been captured by the Nantucket buoy, and that there are no data from the Montauk buoy during hurricanes Sandy and Irene.

For each of the storms listed above, the DHI time series and NOAA hindcast time series have been compared to the NOAA Block Island and NOAA Nantucket measurements (when available). The DHI time series consists of hourly 3-hour averages, while the NOAA hindcast consists of 3-hourly 3-hour averages, and hourly 1-hour averages[1]. The measurements are provided as hourly 1-hour averages, this can therefore explain some of the discrepancies between the simulated and measured data. The following observations are consistent with the validation study carried out:

- The DHI hindcast overestimates the maximum significant wave height by ca. 1.0 m (Irene, Sandy).
- The NOAA hindcast underestimates the maximum significant wave height by far more than the effect of averaging from 1-hour to 3-hour (Bob: ca. 1 m underestimation, Floyd: ca. 4 m).

In order to determine the 50-year significant wave height, subsets of extreme values belonging to independent storms (separated in time by more than one day) were extracted from the hindcast time series, using different H_{m0} threshold values. For each of these subsets, a generalized Pareto- and a two-

[1] For the evaluation of extreme values, and in order to better understand the model behavior in storm conditions, the hourly 1-hour NOAA time series were downloaded for the Nantucket buoy location. Those temporally refined data are only available at some selected locations (corresponding with NDBC historical measurement buoys), whereas the 3-hourly 3-hour time series are available at all the locations displayed in Figure 1.2.1.1. See the NOAA hindcast documentation for more details: http://polar.ncep.noaa.gov/mmab/papers/tn302/MMAB_302.pdf.

parameter Weibull-distribution have been fitted to the histograms of extreme significant wave heights. The different analysis leads to a 50-year value of significant wave height of [redacted] and the following extreme wave conditions apply:

[redacted]

The range of associated period is derived:

[redacted]

The peak period is estimated based on experience as:

[redacted]

1.2.2 Deployment Activities (585.610 (a)(7))

Detailed procedures for deployment of the two devices are provided in Appendix A. The instrument is likely to be deployed using an installation vessel and a support vessel. Specifications of potential deployment vessels are also provided in Appendix A. The installation period for both devices is expected to be a maximum two-day effort for each. It is anticipated that the deployment activities will be conducted from New Bedford Harbor, Massachusetts or a similar suitable port in the area. All devices will need scheduled and unscheduled service during the deployment period. Such service activities will be made with service vessels with sufficient crane capacity. Any device that suffers from malfunction or collision will be replaced with a similar device.

1.2.3 Mitigation Measures (585.610 (a)(8))

The Project will implement best practices and comply with all applicable regulations to eliminate or minimize the potential for adverse environmental impacts during buoy installation, operation, and decommissioning. This will include measures to avoid and prevent accidental events such as fuel spills. These measures will ensure that any unavoidable impacts are negligible. Mitigation measures are described in detail in Section 3.3.

1.2.4 Decommissioning and Site Clearance Procedures (585.610 (a)(11))

Device recovery will be undertaken by vessels similar to those used during commissioning. The recovery of the MET/ocean buoy(s) will typically proceed by decoupling the buoy from the mooring and conducting a standard marine mooring recovery process. The buoy will then be moved to shore and decommissioned. As part of the decommissioning process, local authorities (Coast Guard, maritime authorities) will be advised of the removal of the devices from the area.

1.2.5 CVA nomination (585.610 (a)(9)

The installation, operation, and decommissioning of a standard MET/ocean buoy does not qualify as a complex or significant activity; therefore, nomination of a Certified Verification Agent (CVA) is not required and Vineyard Wind requests a waiver of the CVA requirement according to 30 CFR § 585.705(c). The proposed MET/ocean buoys for deployment are standardized devices and commercially available and have been deployed in similar and significantly more harsh conditions than

on the Vineyard Wind lease. The mooring design will be internally checked and assessed by Vineyard Wind ensuring third party evaluation and review of design documentation. In addition, all installation and maintenance activities will be performed under surveillance by key experts representing Vineyard Wind.

1.3 Regulatory Framework (585.610(a)(13))

1.3.1 List of Permits/Authorizations

Vineyard Wind will apply for approvals and/or authorizations as shown in Table 1.3.1 to conduct site assessments activities (MET/ocean buoy installation, operation, and decommissioning):

Table 1.3.1. Vineyard Wind SAP Permitting Plan

Agency	Permit / Approval	Expected Filing Date
Bureau of Offshore Energy Management (BOEM)	Site Assessment Plan (SAP) • National Environmental Policy Act (NEPA) • MA Coastal Zone Management (CZM) Consistency • National Historic Preservation Act Review & State Historic Preservation Act Consultation	March 31, 2017
US Army Corps of Engineers (USACE)	Section 10/404 Permit via Nationwide Permit 5 – Scientific Collection Device	Fall 2017
US Coast Guard (USCG)	Private Aid to Navigation Local Notice to Mariners	Fall 2017
DOD Fleet Forces Command / Narragansett Bay Operating Area (OPAREA)	Department of Defense Consultation	Fall 2017

1.3.2 Completed and Anticipated Agency Correspondence (585.610(a)(14))

Vineyard Wind has conducted or will conduct outreach with the following local, state, and federal agencies via meetings and/or correspondence. This outreach will address planned site assessment and development activities for the Vineyard Wind Offshore Wind Project, including the proposed MET/ocean buoy(s). These agencies include:

- BOEM
- National Marine Fisheries Service (NMFS)
- USACE
- USCG, District Commander
- MA CZM
- US Navy – Fleet Forces

Vineyard Wind will continue to provide notifications as required (i.e. to BOEM, USACE, USCG) during deployment and operation of the MET/ocean buoy(s), and prior to decommissioning.

1.3.3 Consistency Certification (585.611(b)(9))

BOEM has performed a consistency review and issued a Regional Consistency Determination (CD) finding that SAP activities anticipated for the Rhode Island and Massachusetts WEAs, including the

installation, operation and decommissioning of MET towers and buoys, are consistent with the provisions of the Coastal Management Programs of the State of Rhode Island and Commonwealth of Massachusetts (BOEM 2013). The SAP activities proposed by Vineyard Wind are consistent with the activities anticipated in the BOEM consistency review; therefore, no further consistency review certification should be required.

1.4 Financial Assurance Information (585.610(a)(15))

In compliance with BOEM regulations (30 CFR 585.610(a)(15)), prior to SAP approval, Vineyard Wind will provide Surety Bond, issued by a primary financial institution, or other approved security, as required in (30 CFR 585.515) and (30 CFR 585.516) in order to guarantee the commissioning obligation.

1.5 Other Information (585.610(a)(16)) – *As requested by BOEM*

No other information has been requested by BOEM at this time relative to the proposed site assessment activities.

2.0 SURVEY RESULTS (585.610(B))

The surveys conducted to date are summarized below and included as appendices, as necessary.

2.1 Geotechnical Survey (585.610(b)(1))

Geotechnical survey data were not collected and not considered necessary for the installation of a MET/ocean buoy. This approach was agreed upon with BOEM in our approved survey plan (Appendix B). High Resolution Geophysical (HRG) survey data, as discussed below, were evaluated to verify that the seabed could support the proposed MET/ocean buoy(s).

2.2 Geological Survey and Shallow Hazards (585.610(b)(4)), (585.610(b)(2))

Alpine Ocean Seismic Survey, Inc. (Alpine), a Gardline company, conducted HRG surveys in the SAP Area on behalf of Vineyard Wind. Surveys were conducted between September and October 2016 in accordance with the Vineyard Wind Survey Plan approved by BOEM on September 15, 2016. Data acquired included bathymetry, side scan sonar, magnetometer, and shallow and medium penetration sub-bottom profiler data. The detailed methodologies and results of the survey are included as Appendix C and summarized in Section 3.1.1.

2.3 Archeological Resources (585.610(b)(3))

Gray & Pape, Inc. conducted a Phase I archeological assessment to identify potential archeological resources within the SAP Area. This work was performed to assist Vineyard Wind in compliance with Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, and its implementing regulations 36 Code of Federal Regulations (CFR) 800, entitled Protection of Historic Properties. All work was performed in accordance with the NHPA of 1966, as amended; the National Environmental Policy Act of 1969, as amended, and its implementing regulations (36 CFR Part 800); and the Archeological Resources Protection Act of 1979.

Gray & Pape's report, titled Marine Archaeological Resource Assessment in Support of the Vineyard Wind Offshore Wind Energy Project off Martha's Vineyard, Massachusetts, is provided in Appendix D. This report follows BOEM's *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR § 585*, dated July 2015. The report's findings are summarized in Section 3.1.8.

2.4 Biological Survey (585.610(b)(5))

The biological surveys utilized to prepare this document are described below in the resource sections with biological relevance.

3.0 SITE CHARACTERIZATION AND IMPACT ASSESSMENT (585.611(B))

3.1 Environmental Baseline

3.1.1 Geologic Setting

The proposed MET/ocean buoy location(s) will be located within the Massachusetts WEA, located on the Atlantic Outer Continental Shelf (OCS). The sediments found along the OCS are recently deposited and re-worked glacial materials (i.e., Pleistocene and Holocene in age) that were formerly exposed during lower sea-level stages. These outwash plains were extensively re-worked by meltwater discharges while a rising sea-level would ultimately drown much of the coastal plain region.

Based on the results of the HRG survey (as described in Appendix C) and site-specific investigations, the geological setting in the SAP Area is characterized as an overall depositional environment dominated by re-worked Late Pleistocene and Holocene sediments with localized areas of erosion. A net deposition or non-erosive environment is interpreted over most of the area based on the finer grained sediments (fine sand and silt) that prevail on the seabed, and exhibit either a flat-lying, featureless topography (SAP-2) or a “pitted” nature (localized small scale depressions) which may be caused by bioturbation (SAP-1). Localized erosion and/or reworking exists in the form of rippled scour areas which have minimal seabed relief (typically less than 0.5 m). Only one of these scour features was observed, in SAP-1, with dimensions of 5-10 m wide and greater than 50 m in length.

Hazard Assessment (585.611(b)(1))

The HRG data were reviewed for potential seafloor, subsurface, and man-made hazards that may adversely impact installation and operation of the proposed MET/ocean buoy(s) within the SAP Areas (Appendix C). Seafloor and subsurface hazards, including, steep slopes, bedforms, rock/ hard-bottom, diapiric structures, faults, gas or fluid expulsion, scour, and channels, were not identified within the SAP Area. Man-made hazards, including shipwrecks, debris, cables, pipelines, and ordnance, were also not detected within the SAP Areas. There was evidence of small sand ripples (centimeter level) in SAP-1; however, these are not anticipated to pose a risk to MET/ocean buoy installation or operation.

3.1.2 Coastal Habitats

The MET/ocean buoy(s) will be located approximately 30 km (19 nmi) offshore of Martha’s Vineyard and therefore is not likely to affect coastal habitats. Increased vessel traffic associated with SAP activities could affect coastal habitats and terrestrial mammals due to wake erosion and associated sediment disturbance; however, this is unlikely, as described in Section 3.2.1.

3.1.3 Water Quality (585.611(b)(2))

Water quality in coastal waters is controlled primarily by the anthropogenic inputs of land runoff, land point source discharges, and atmospheric deposition. Regionally, the condition of Northeast coastal waters (Maine to Virginia), as measured by the EPA water quality index (WQI), is good to fair, based on results of the 2010 National Coastal Condition Assessment (US EPA 2010). The coastal waters of Massachusetts (south of Cape Cod) and nearby waters in Rhode Island (Block Island Sound) are generally in good condition, as measured by the WQI. More specifically, nitrogen, chlorophyll *a*,

dissolved oxygen, and transparency levels are assessed as good, while phosphorus levels are considered to be fair.

With increasing distance from shore (including marine waters of the OCS), oceanic circulation patterns play an increasingly larger role in dispersing and diluting anthropogenic contaminants and determining water quality. Water quality data available for OCS marine waters in and near the MA WEA include chlorophyll *a*, turbidity, temperature, and salinity.

Chlorophyll *a*

Chlorophyll *a* concentrations, an indicator of primary productivity, vary substantially between locations in southern New England marine waters. Levels are highest at the Nantucket Shoals with chlorophyll *a* concentrations declining near the MA WEA (The Nature Conservancy 2016). Seasonal variation in chlorophyll *a* is significant in the region but more muted in the MA WEA lease area, where median chlorophyll concentrations peak at 0.64 mg/m^3 in winter and reach their lowest levels (0.31 mg/m^3) in summer (Table 3.1.3-1).

Table 3.1.3-1. Seasonal Variation in Chlorophyll a Concentration Within the Vineyard Wind Lease Area from 2003 to 2015

Season	Chlorophyll *a* concentration (mg/m3)		
	Median	Minimum	Maximum
Spring	0.54	0.43	0.68
Summer	0.31	0.22	0.44
Fall	0.37	0.23	0.60
Winter	0.64	0.45	0.91

Source: Derived from The Nature Conservancy (2016)

Turbidity

Limited turbidity data are available for the MA WEA. However, turbidity casts completed in 2009 and 2010 in adjacent waters to the west indicate background turbidities generally below 1.25 nephelometric turbidity units (NTU). Although measured turbidity levels were highest in December and lowest in June, the data reveal only minimal seasonal variation (Ullman and Codiga 2010).

Existing factors affecting turbidity levels in and around the SAP areas include natural phenomenon such as the tides and currents during normal weather (minimal to no impact), and intense storm systems from adverse weather (hurricanes, nor'easters) that are capable of more significant bottom disturbance. Anthropogenic sources of increased turbidity include primarily bottom fishing activity (trawlers, draggers).

Potential increased turbidity due to suspended sediment may be associated with the installation of the mooring weights that maintain the MET/ocean buoy(s) on location. This will be very localized to the near field zone of impact where the weights touch down on the seafloor and is expected to be dissipated quickly by the bottom currents. The disturbance is anticipated to be less than the effect of a fishing trawler operating across the SAP area. Grain size of the sediments in the SAP areas (predominantly fine sand) also indicates the material will settle out of suspension a short distance from the bottom impact, with no long term effects to water quality.

Water Temperature

Based on data collected during Northeast Fisheries Science Center (NEFSC) multispecies bottom trawl surveys from 2000 to 2016 (Table 3.1.3-2), water temperatures in the MA WEA and surrounding area are characterized by the following:

1. Bottom temperatures are substantially colder in winter and spring than fall, on average
2. Surface water temperatures are warmer and more variable in fall than winter or spring
3. Differences in surface and bottom temperatures indicate that thermal stratification within the water column is greatest in the fall with a nearly isothermal profile through winter and spring;

National Data Buoy Station 44097 is located approximately 22 km (12 nmi) southwest of the Vineyard Wind lease area and provides additional data on the seasonal variation in water temperatures. These data reflect a seasonal range in surface temperatures similar to the Northeast Fisheries Science Center (NEFSC) multispecies bottom trawl survey (Table 3.1.3-2).

Table 3.1.3-2. Seasonal Water Temperature Data Summary

Season	Layer	Temperature (°C)	
		NEFSC[a] (mean ± 1 SD)	Buoy 44097 [b] (mean)
Spring	Surface	6.3 ± 2.0	7.7
	Bottom	7.2 ± 2.9	No data
Summer	Surface	No data	19.6
	Bottom	No data	No data
Fall	Surface	17.5 ± 3.2	17.0
	Bottom	12.7 ± 3.1	No data
Winter	Surface	5.4 ± 1.6	8.5
	Bottom	7.5 ± 3.3	No data

[a] Winter survey data available only for the 2000 – 2007 period
[b] Sea surface temperature data were not available between July 13, 2010 and November 5, 2010.
Sources: NEFSC multispecies bottom trawl surveys (2000-2016)
NOAA National Data Buoy Station 44097 (2009-2016)

Salinity

In contrast, NEFSC multispecies bottom trawl survey data indicate only minimal seasonal variability in salinity (Table 3.1.3-3). This is particularly evident at the surface, where the salinity averaged the same in spring, fall, and winter. Additionally, vertical salinity gradients in the water column were consistently small in spring, fall, and winter (<1.0 practical salinity unit [psu] from surface to bottom).

Table 3.1.3-3. Seasonal Salinity Data Summary

Season	Average Depth (m)	Layer	Salinity[a] (psu - mean ± 1 SD)
Spring	94.0	Surface	32.9 ± 0.7
		Bottom	33.5 ± 1.1
Summer	No data	Surface	No data
		Bottom	No data
Fall	87.9	Surface	32.9 ± 1.1
		Bottom	33.4 ± 1.2
Winter	103.7	Surface	32.9 ± 0.5
		Bottom	33.8 ± 1.1

[a] Winter survey data available only for the 2000 – 2007 period
Source: NEFSC multispecies bottom trawl surveys (2000-2016)

3.1.4 Benthic Resources (585.611(b)(3-5))

This section describes the benthic resources present in and adjacent to the SAP Area. A review of regional benthic resources is presented for context, followed by a summary of results from a site-specific benthic field survey.

Regional Characterization

Benthic habitat in the Massachusetts WEA is generally characterized by fine- and medium-grained sand (BOEM 2014). No state-managed artificial reefs have been documented within the MA WEA and other types of potentially sensitive or unique benthic habitat types, such as hard bottom, live bottom, and SAV, are unlikely to be present.

The benthic community in the region of the MA WEA includes amphipods and other crustaceans, polychaetes, bivalves, sand dollars, burrowing anemones, and sea cucumbers (BOEM 2014). Recent video surveys of benthic epifauna indicate that the common sand dollar (*Echinarachnius parma*) is abundant within the MA WEA; this species occurred in up to 75-100% of samples in the northern portion of the Vineyard Wind Lease Area (SMAST 2016). Hermit crabs, moon snails, sea stars, hydrozoans, bryozoans, and sponges were also targeted during this study, but were found to be very uncommon in the Vineyard Wind Lease Area.

Benthic infaunal assemblages within the lease area are likely dominated by polychaete worms, amphipod crustaceans, and bivalve mollusks. Infaunal sampling in areas south of Martha's Vineyard and Nantucket in September 2011 found that oligochaetes, polychaetes, and nemertean ribbon worms were the most widely distributed taxa (AECOM 2012). A total of 128 different families were identified from the samples with an average of 23 (SD ± 7) taxa per location. Organism density ranged from 12 to over 1,000 individuals per sample, with an average density of 599.5 (SD ± 712.1) organisms per 0.04 m^2. Nut clams, small bivalves in the family Nuculidae, were the most abundant taxon, and comprised over 24% of all organisms. Capitellid polychaetes and four-eyed amphipods (Ampeliscidae) were also abundant, comprising 16.0% and 9.0% of organisms, respectively.

Benthic Field Survey

A site-specific field survey of benthic resources, focused on four locations near the location of the proposed MET/ocean buoy(s), was conducted on November 10, 2016 (Figure 3.1.4). The field survey involved the collection of four benthic grab samples. Benthic macrofauna were sorted, identified, and enumerated from each sample. Full results of the benthic sample analysis are presented in Appendix E.

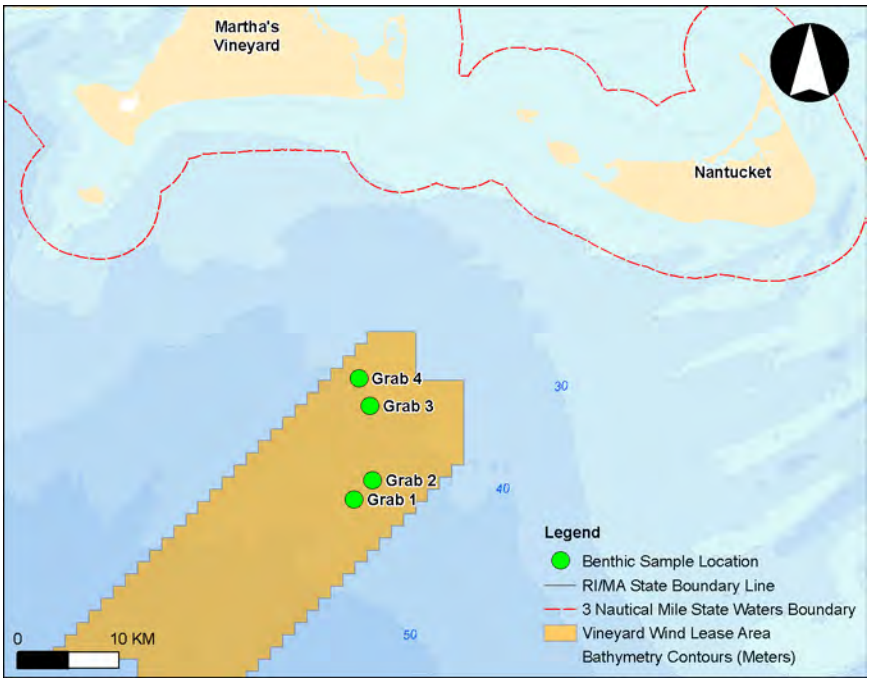


Figure 3.1.4. *Locations of the grab samples collected during the benthic field survey*

Overall, 32 taxa were identified from the four benthic grab samples (Table 3.1.4-1). Taxa richness per sample ranged from 6 (Grab 4) to 19 (Grab 1) taxa per grab, with a mean richness of 15 taxa per grab.

The mean macrofaunal density for the analyzed samples was 118,370 individuals/m^3 (Table 3.1.4-1). The highest macrofaunal density (234,409 individuals/m^3) was found in Grab 4, while macrofaunal density was lowest (48,227 individuals/m^3) in Grab 2. Of the four samples analyzed, three were characterized by densities of 90,000 individuals/m^3 or more.

The benthic macrofaunal assemblage in the analyzed samples consisted of polychaete worms, crustaceans, mollusks, echinoderms, and nemertean ribbon worms (Table 3.1.4-1). The most speciose taxonomic group was polychaete worms, which contributed approximately 44% of the taxa documented in the analyzed samples.

The taxonomic group with the highest density was polychaete worms, followed by nematode roundworms and crustaceans (Table 3.1.4-1). The most abundant macrofaunal taxa observed were the lumbrinerid polychaete *Scoletoma* sp. and a paraonid polychaete (Paraonidae). Some meiofaunal organisms such as nematode roundworms (Nematoda), were also observed at high abundances. Together, these taxa accounted for more than 50% of all individuals identified in this study.

Most of the benthic macrofaunal taxa observed in the site-specific benthic grab samples were small burrowing or tube-building taxa. The most commonly observed polychaete taxa, *Scoletoma sp*. and Paraonidae, are both typical of sandy shelf habitats (Pollock 1998). The most abundant crustaceans (four-eyed [ampeliscid] amphipods) are also shallow burrowers (Bousfield 1973, Weiss 1995). No shellfish of commercial importance were observed in the site-specific benthic grab samples.

Table 3.1.4-1. Summary of Key Statistics from the Site-specific Benthic Field Survey

Statistic	Value
Number of Samples	4
Mean Density per Cubic Meter (±1 SD)	118,370 ± 80,581
Mean Taxa Richness (±1 SD)	15 ± 6
Total Number of Taxa	32
Number of Taxa Observed by Taxonomic Group	
Polychaete worms	14
Crustaceans	9
Mollusks	4
Echinoderms	1
Nemertean ribbon worms	3
Nematode roundworms*	1
Percent of Total Abundance by Taxonomic Group	
Polychaete worms	47.7%
Crustaceans	23.6%
Mollusks	2.5%
Echinoderms	0.6%
Nemertean ribbon worms	1.8%
Nematode roundworms*	23.8%

***Meiofaunal taxa (i.e., smaller than 500 µm)

Taxonomic Classification of Benthic Habitat in the SAP Area

Benthic habitat within the SAP Areas for the proposed MET/ocean buoy is typical of the WEA, consisting primarily of fine sands with various quantities of silt and shell hash (Appendix E**)**. Water depths range from 36.2 m to 50.4 m (118 ft. and 165 ft.). Sensitive or unique benthic habitats such as hard bottom, live bottom and SAV do not appear to be present. Bottom conditions at the two proposed MET/ocean buoy locations are described as predominantly flat and featureless, with sand ripples and depressions at centimeter level in scale (Appendix E).

Given the information available through prior characterizations and the site-specific benthic, geophysical, and geotechnical investigations conducted, benthic habitat in the SAP Area has been classified to the lowest achievable taxonomic level under the Coastal and Marine Ecological Classification System (CMECS), as presented below in Table 3.1.4-2.

Table 3.1.4-2. Benthic Habitat Classification

Biogeographic Setting
Realm: Temperate North Atlantic
Province: Cold Temperate Northwest Atlantic
Ecoregion: Virginian
Aquatic Setting
System: Marine
Subsystem: Marine Offshore
Tidal Zone: Subtidal Zone
Water Column Component
Water Column Layer: Marine Offshore Lower Water Column
Salinity Regime: Euhaline Water
Temperature Regime: Moderate Water (Seasonal Variation from Cold to Warm)
Geoform Component
Tectonic Setting: Passive Continental Margin
Physiographic Setting: Continental Shelf
Geoform Origin: Geologic
Level 2 Geoform: Sediment Wave Field
Substrate Component
Substrate Origin: Geologic Substrate
Substrate Class: Unconsolidated Mineral Substrate
Substrate Subclass: Fine Unconsolidated Substrate
Substrate Group: Sand
Co-occurring Element: Substrate Subclass: Shell Hash
Biotic Component
Biotic Setting: Benthic Biota
Biotic Class: Faunal Bed
Biotic Subclass: Soft Sediment Fauna
Biotic Group: Small Surface-Burrowing Fauna
Co-occurring Element: Biotic Group: Small Tube-Building Fauna
Co-occurring Element: Biotic Group: Mobile Crustaceans on Soft Sediments
Co-occurring Element: Biotic Group: Sand Dollar Bed

3.1.5 Fisheries and Essential Fish Habitat (585.611(b)(3-5))

The Massachusetts WEA is located in the northern Mid-Atlantic Bight (MAB) of the Northeast U.S. Shelf Ecosystem. This sub-region is also occasionally referred to as the Southern New England, as described by Stevenson et al. (2004). This region has a very diverse and abundant fish assemblage that is generally categorized according to life habits or preferred habitat associations, such as pelagic, demersal, and highly migratory. A list of major fish assemblages is presented in Table 3.1.5-1 and described in more detail below. Species with Essential Fish Habitat (EFH) designations in the WEA, as defined by the Magnuson- Stevens Fishery Conservation and Management Act, are also included in Table 3.1.5-1 and described below.

There are also important shellfish that may be found in the area of the WEA. These species are addressed in Section 3.1.4, Benthic Resources. The economic importance of managed fish and shellfish species in the Massachusetts WEA is further discussed in Section 3.1.9, Commercial and Recreational Fishing.

Table 3.1.5-1. Major Fish Species Potentially Occurring in the MA WEA

Species	EFH	Listing Status	Commercial / Recreational Importance	Habitat Association
Acadian redfish (*Sebastes fasciatus*)			●	Demersal
Alewife (*Alosa pseudoharengus*)		C/S	●	
American sand lance (*Ammodytes americanus*)			●	Demersal
Atlantic bluefin tuna *(Thunnus thynnus)*	●	S		Pelagic
Atlantic butterfish *(Peprilus triacanthus)*	●		●	Demersal / Pelagic
Atlantic cod *(Gadus morhua)*	●			Demersal
Atlantic mackerel *(Scomber scombrus)*	●			Pelagic
Atlantic sea herring *(Clupea harengus)*	●		●	Pelagic
Atlantic yellowfin tuna *(Thunnus albacares)*	●			Pelagic
Basking shark (*Cetorhinus maximus*)	●	C		Pelagic
Beardfish (*Polymixia lowei*)			●	Demersal
Black sea bass *(Centropristis striata)*	●		●	Demersal
Blue shark (*Prionace glauca)*	●			Pelagic
Bluefin tuna *(Thunnus thynnus)*			●	Pelagic
Bluefish *(Pomatomus saltatrix)*	●			Pelagic
Cobia *(Rachycentron canadum)*	●			Pelagic
Common Thresher shark *(Alopias vulpinus)*	●			Pelagic
Dusky shark *(Carcharhinus obscurus)*	●	S		Pelagic
Fourspot flounder (*Hippoglossina oblonga*)			●	Demersal
Golden Tilefish *(Lopholatilus chamaeleonticeps)*			●	Demersal
Haddock *(Melanogrammus aeglefinus)*	●		●	Demersal
King mackerel *(Scomberomorus cavalla)*	●			Pelagic
Little skate *(Leucoraja erinacea)*			●	Demersal
Monkfish *(Lophius americanus)*	●		●	Demersal
Northern sand lance (*Ammodytes dubius*)			●	Demersal
Northern sea robim *(Prionotus carolinus)*			●	Demersal
Ocean pout *(Macrozoarces americanus)*	●			Demersal
Pollock *(Pollachius pollachius)*			●	Demersal
Red hake *(Urophycis chuss)*	●			Demersal
Round herring (*Etrumeus teres*)			●	Pelagic
Sandbar shark *(Carcharhinus plumbeus)*	●			Pelagic
Scup *(Stenotomus chrysops)*	●		●	Demersal/ Pelagic
Shortfin mako *(Isurus oxyrinchus)*	●			Pelagic
Shortnose greeneye (*Chlorophthalmus agassizi*)			●	Demersal
Silver hake (*Merluccius bilinearis*)			●	Demersal
Spanish mackerel *(Scomberomorus maculatus)*	●			Pelagic
Spiny dogfish *(Squalus acanthias)*	●		●	Demersal

Species	EFH	Listing Status	Commercial / Recreational Importance	Habitat Association
Striped bass *(Morone saxatilis)*			●	Pelagic
Summer flounder *(Paralichthys dentatus)*	●		●	Demersal
Swordfish *(Xiphias gladius)*			●	Pelagic
Tiger shark (*Galeocerdo cuvier)*	●			Pelagic
White hake *(Urophycis tenuis)*			●	Demersal
Whiting *(Merluccius bilinearis)*	●			Demersal
Windowpane flounder *(Scopthalmus aquosus)*	●			Demersal
Winter flounder *(Pseudopleuronectes americanus)*	●		●	Demersal
Winter skate *(Leucoraja ocellata)*			●	Demersal
Witch flounder *(Glyptocephalus cynoglossus)*	●		●	Demersal
Yellowtail flounder *(limanda ferruginea)*	●		●	Demersal

*C= candidate, S= species of concern

Pelagic Fishes

Pelagic species spend most of their lives swimming in the water column, rather than occurring on or near the bottom. Many coastal pelagic species rely on coastal wetlands, seagrass habitats, and estuaries to provide habitat for specific life stages and many of these species migrate north and south along the Atlantic Coast during some periods of the year. In general, these fish use the highly productive coastal waters within the Atlantic region during the summer months and migrate to deeper and/or more distant waters during the rest of the year. Important pelagic finfish in the area of the WEA, include forage species, such as Atlantic herring (*Clupea harengus*), and predatory fish, such as Atlantic bluefin tuna (*Thunnus thynnus*), yellowfin tuna (*Thunnus albacares*), king mackerel (*Scomberomorus maculates*), and whiting (*Merluccius bilinearis*).

Demersal Fishes

Demersal fish (groundfish) are those fish that spend at least a portion of their life cycle in association with the ocean bottom. Demersal fish are often found in mixed species aggregations that differ depending upon the specific area and time of year. Many demersal fish species have pelagic eggs or larvae that are sometimes carried long distances by oceanic surface currents. The WEA supports both the intermediate and shallow demersal finfish assemblages defined by Overholtz and Tyler (1985). Many of the fish species in these assemblages are important because of their value in the commercial and/or recreational fisheries. Important demersal fish in the area include winter flounder (*Pseudopleuronectes americanus*), yellowtail flounder (*Limanda ferruginea*), and monkfish (*Lophius americanus*).

The NMFS NEFSC has been conducting fishery- independent Autumn Bottom Trawl Surveys annually since 1963. Two metrics derived from this survey, total biomass and species richness, have been used to show the relative distribution of fish in the area of the WEA relative to surrounding locations. Total biomass of fish is low across the WEA; however, species richness appears relatively high in the vicinity of the WEA (BOEM 2014).

Highly Migratory Fishes

Highly migratory fish often migrate from southern portions of the South Atlantic to as far north as the Gulf of Maine. Examples of these species include Atlantic bluefin tuna (*Thunnus thynnus*) and yellowfin

tuna (*Thunnus albacares*). Other than some tuna species which exhibit schooling behavior, many of the highly migratory species occur either singly or in pairs.

Threatened and Endangered Fish

There are three fish species that are federally listed as endangered or endangered that may occur off the mid-Atlantic coast, including the shortnose sturgeon (*Acipenser brevirostrum*), Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), and Atlantic salmon (*Salmo salar*) (Table 3.1.5-2).

Additional species that have been proposed for endangered status and not deemed candidates—or are currently candidates for listing and the status determination has not been made yet; are known as Federal "species of concern" and are included in Table 3.1.5-2.

Table 3.1.5-2. List of Threatened and Endangered Species and Species of Special Concern

Species (Scientific Name)	ESA Status
Atlantic salmon (*Salmo salar)*	Endangered
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered
Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)	Endangered/ Threatened
Atlantic Bluefin tuna (*Thunnus thynnus*)	Species of concern
Atlantic Halibut (*Hippoglossus hippoglossus*)	Species of concern
Atlantic wolfish (*Anarhichas lupus*)	Species of concern
Dusky shark (*Carcharhinus obscurus*)	Species of concern
Porbeagle shark (*Lamna nasus*)	Species of concern
Rainbow smelt (*Osmerus mordax*)	Species of concern
Sand tiger shark (*Carcharias taurus*)	Species of concern
Thorny skate (*Amblyraja radiata*)	Species of concern
Alewife (*Alosa pseudoharengus*)	Candidate species/ species of concern
Blueback herring (*Alosa aestivalis*)	Candidate species/ species of concern
Cusk (*Brosme brosme*)	Candidate species/ species of concern
American eel (*Anguilla rostrata*)	Candidate species
Basking shark (*Cetorhinus maximus*)	Candidate species
Great hammerhead shark (*Sphyrna mokarran*)	Candidate species
Scalloped hammerhead shark (*Sphyrna lewini*)	Candidate species

Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*)

The Atlantic sturgeon is an anadromous species that resides for much of its life in estuarine and marine waters throughout the Atlantic Coast, but ascends coastal rivers in spring to spawn in flowing freshwater. Sturgeon eggs are adhesive and attach to gravel or other hard substrata. Larvae develop as they move downstream to the estuarine portion of the spawning river, where they reside as juveniles for years. Subadults will move into coastal ocean waters where they may undergo extensive

movements usually confined to shelly or gravelly bottoms in 10 to 50 m (33 to 164 ft.) water depths (Dunton et al., 2010).

Atlantic sturgeon distribution varies by season; they are primarily found in shallow coastal waters (bottom depth <20 m [<66 ft.]) during the summer months (May to September) and move to deeper waters (20-50 m [66-165 ft.]) in winter and early spring (December to March) (Dunton et al., 2010).

Primary threats to Atlantic sturgeon include bycatch in trawl and gillnet fisheries, habitat degradation and loss, ship strikes, and general depletion from historical fishing. A status review for Atlantic sturgeon indicated that all five distinct population segments (DPSs) occur in the vicinity of the Massachusetts WEA (NOAA 2016a; BOEM 2014). In Massachusetts waters, Atlantic sturgeon have been captured in offshore trawl and gillnet fisheries, but this species rarely seen in State or Federal fishery-independent surveys (BOEM 2014).

Shortnose Sturgeon (*Acipenser brevirostrum*)

The shortnose sturgeon is an anadromous species found in larger rivers and estuaries of the North America eastern seaboard from the St. Johns River in Florida to the St. Johns River in Canada. In the northern portion of its range, shortnose sturgeon are found in the Chesapeake Bay system; Delaware River; the Hudson River; the Connecticut River; the lower Merrimack River; and the Kennebec River to the St. John River in New Brunswick, Canada. Shortnose sturgeon occur primarily in fresh and estuarine waters and occasionally enter the coastal ocean. Adults ascend rivers to spawn from February to April; eggs are deposited over hard bottom, in shallow, fast-moving water (Dadswell et al., 1984). Because of their preference for fresh and estuarine waters, shortnose sturgeon are unlikely to be found in the vicinity of the MA WEA.

The shortnose sturgeon was listed as endangered in 1967 because the U.S. Fish and Wildlife Service (USFWS) concluded that the fish had been eliminated from the rivers in its historic range (except the Hudson River) and was in danger of extinction because of pollution, loss of access to spawning habitats, and direct and incidental overfishing in the commercial fishery for Atlantic sturgeon (NMFS 2010a; NOAA 2015). Distinct Population Segments (DPS) are currently identified in North Carolina, South Carolina, Georgia, and northern Florida river systems (NOAA 2015).

Atlantic Salmon (*Salmo salar*)

Atlantic salmon is an anadromous species that historically ranged from northern Quebec southeast to Newfoundland and southwest to Long Island Sound. The Gulf of Maine Distinct Population Segment (DPS) of the Atlantic salmon that spawns within eight coastal watersheds within Maine is federally listed as endangered. In 2009 the DPS was expanded to include all areas of the Gulf of Maine between the Androscoggin River and the Dennys River (NOAA 2016b).

The life history of Atlantic salmon consists of spawning and juvenile rearing in freshwater rivers to extensive feeding migrations in the open ocean. Adult Atlantic salmon ascend the rivers of New England in the spring through fall to spawn. Suitable spawning habitat consists of gravel or rubble in areas of moving water Juvenile salmon remain in the rivers for 1-3 years before migrating to the ocean. The adults will undertake long marine migrations between the mouths of U.S. rivers and the northwest Atlantic Ocean, where they are widely distributed seasonally over much of the region. Typically, most Atlantic salmon spend two winters in the ocean before returning to freshwater to spawn (NOAA 2016b).

It is possible that adult Atlantic salmon may occur off the Massachusetts coast while migrating to rivers to spawn. However, only certain Gulf of Main populations are listed as endangered, and Gulf of Maine salmon are unlikely to be encountered south of Cape Cod (BOEM 2014).

Commercially and Recreationally-Important Fish

Many of the fish species found off the Massachusetts coast are important due to their value as commercial and/or recreational fisheries. U.S. fisheries landings data from 2015 indicate that the following species were the top valued commercial finfish in Massachusetts: haddock, goosefish, Atlantic herring, winter flounder, silver hake, Atlantic cod, Pollock, redfish, bluefin tuna, and white hake. Massachusetts recreational fishery landings from 2015 were dominated by Atlantic cod, striped bass, Atlantic mackerel, Pollock, and bluefish (NMFS 2017).

Fishing effort within the Massachusetts WEA varies seasonally and is concentrated in the central and western regions (BOEM 2014). Peak vessel trips typically occur from May to September (AIS 2017); however, vessels likely cross the WEA in transit between scallop fishing grounds on George's Bank and the major scallop port of New Bedford MA (BOEM 2014)

A detailed description of fishing activities and the economic value of fisheries is provided in Section 3.1.9, Commercial and Recreational Fisheries.

Essential Fish Habitat

The Magnuson-Stevens Act requires Federal agencies to consult on activities that may adversely affect EFH designated in fishery management plans. Additionally, fishery management councils identify habitat areas of particular concern (HAPCs) within fishery management plans. HAPCs are discrete subsets of EFH that provide extremely important ecological functions or are especially vulnerable to degradation. There is no HAPC identified for any listed finfish species within the Massachusetts WEA.

EFH has been designated for the following species for one or more life stages near the MA WEA (Table 3.1.5-3.

Table 3.1.5-3. EFH Designated Species in MA WEA

Species	Eggs	Larvae	Juveniles	Adults
Atlantic butterfish *(Peprilus triacanthus)*		●	●	●
Atlantic cod *(Gadus morhua)*	●	●	●	●
Atlantic mackerel *(Scomber scombrus)*	●	●		
Atlantic sea herring *(Clupea harengus)*		●	●	●
Basking shark (*Cetorhinus maximus*)			●	●
Black sea bass *(Centropristis striata)*			●	●
Blue shark (*Prionace glauca)*			●	●
Bluefin tuna *(Thunnus thynnus)*			●	●
Bluefish *(Pomatomus saltatrix)*			●	●
Cobia *(Rachycentron canadum)*	●	●	●	●
Common thresher shark *(Alopias vulpinus)*		●	●	●
Dusky shark *(Carcharhinus obscurus)*			●	

Species	Eggs	Larvae	Juveniles	Adults
Haddock *(Melanogrammus aeglefinus)*	●	●		●
King mackerel *(Scomberomorus cavalla)*	●	●	●	●
Long finned squid *(Loligo pealeii)*			●	●
Monkfish *(Lophius americanus)*	●	●	●	●
Ocean pout *(Macrozoarces americanus)*	●	●	●	●
Ocean quahog *(Artica islandica)*			●	●
Red hake *(Urophycis chuss)*	●	●	●	●
Redfish *(Sebastes fasciatus)*				
Sandbar shark *(Carcharhinus plumbeus)*			●	●
Scup *(Stenotomus chrysops)*			●	●
Short finned squid *(Illex illecebrosus)*				
Shortfin mako shark *(Isurus oxyrinchus)*		●	●	●
Spanish mackerel *(Scomberomorus maculatus)*	●	●	●	●
Spiny dogfish *(Squalus acanthias)*			●	●
Summer flounder *(Paralichthys dentatus)*	●	●		●
Surf clam *(Spisula solidissima)*				●
Tiger shark (*Galeocerdo cuvieri*)			●	
Whiting *(Merluccius bilinearis)*	●	●	●	●
Windowpane flounder *(Scophthalmus aquosus)*	●	●	●	●
Winter flounder *(Pseudopleuronectes americanus)*	●	●	●	●
Witch flounder *(Glyptocephalus cynoglossus)*	●	●		
Yellowfin tuna (*Thunnus albacares*)			●	●
Yellowtail flounder *(Limanda ferruginea)*	●	●	●	●

3.1.6 Marine Mammals and Sea Turtles (585.611(b)(3-5))

A total of 38 marine mammal species are known to occur in the Northwestern Atlantic (OCS) (BOEM 2014). All of these species are protected under the Marine Mammal Protection Act (MMPA), and 5 are listed as endangered under the Endangered Species Act (ESA). A total of 5 sea turtles could occur in Northwestern Atlantic OCS waters, all of which are protected under the ESA. The following subsections describe these species.

Marine Mammals

Many of the marine mammal species that inhabit the Northwestern Atlantic are not likely to be found in the Lease Area, as they either do not commonly occur in this region of the Atlantic (blue whale, Atlantic spotted dolphin, white-beaked dolphin, beaked whales, hooded seal), or commonly occur only further offshore in shelf edge/slope habitats (Risso's dolphin) (BOEM 2014). Harp seals are considered annual vagrants in southern Massachusetts waters, and this region is the extralimital extent of their range (BOEM 2014, NOAA 2016c).

The marine mammal species that are considered common in OCS and/or coastal waters offshore of Massachusetts (BOEM 2014) include:

- North Atlantic right whale
- fin whale
- minke whale
- humpback whale
- sperm whale
- long-finned pilot whale
- Atlantic white-sided dolphin
- short-beaked common dolphin
- bottlenose dolphin
- harbor porpoise
- harbor seal
- gray sea

Of the 12 species described above, 4 are baleen whales, 6 are toothed whales, and 2 are seals. All ESA-listed species known to be present in the northwestern Atlantic OCS are included, except the blue whale and sei whale. These species are not classified as commonly occurring in the region, and are unlikely to be found within the relatively shallow waters of the Lease Area, and so were excluded from further analysis (BOEM 2014). Though sperm whales also generally prefer deeper waters than are found within the Lease Area, this species has been included as it is common within the Western North Atlantic, and has been sighted with increasing frequency in recent years. The following table summarizes the status and distribution of the 12 species listed above.

Table 3.1.6-1. Marine Mammals Likely to Occur

Species	Status[1]	General Occurrence in North Atlantic	Typical Habitat			Average Density in SAP Area and Adjacent Waters (#/10 km grid square)[2]	Best Abundance Estimate[3]
			Coastal	Shelf	Slope/ Deep		
Order Cetacea							
Family Balaenidae							
North Atlantic right whale (*Eubalaena glacialis*)	E/D	Common	•	•	•	0.323	476
Family Balaenopteridae							
Humpback whale (*Megaptera novaeangliae*)		Common	•	•	•	0.188	823
Fin whale (*Balaenoptera physalus*)	E/D	Common	•	•	•	0.356	1,618
Minke whale (*Balaenoptera acutorostrata*)		Common	•	•	•	0.109	20,741
Family Delphinidae							
Long-finned Pilot Whale (*Globicephala melas*)[4]		Common		•	•	1.355	27,151
Short-beaked common dolphin (*Delphinus delphis*)		Common		•	•	6.429	173,486

Species	Status[1]	General Occurrence in North Atlantic	Typical Habitat			Average Density in SAP Area and Adjacent Waters (#/10 km grid square)[2]	Best Abundance Estimate[3]
			Coastal	Shelf	Slope/ Deep		
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)		Common		●	●	6.076	48,819
Bottlenose dolphin (*Tursiops truncatus*)		Common	●	●	●	1.991	77,532
Sperm whale (*Physeter macrocephalus*)	E/D	Common		●	●	0.015	2,288
Harbor porpoise (*Phocoena phocoena*)		Common	●	●		8.784	79,833
Order Carnivora							
Family Phocidae							
Harbor seal (*Phoca vitulina*)		Common	●	●		9.743	75,834
Gray seal (*Halichoerus grypus*)		Common	●	●		14.116	331,000

Source of Status, General Occurrence in North Atlantic, and Typical Habitat: BOEM EA 2014.
[1]Status: E/D – Endangered (ESA)/Depleted (MMPA)
[2]Average Density: Average of the monthly data provided in MDAT 2016 and Roberts et al. 2016 (Order Cetacea), except for species which only have annual data (long-finned pilot whale); average of the seasonal data provided in Navy 2007 (Order Carnivora).
[3]Best Abundance Estimate: Waring et al. 2016.
[4] Density and abundance estimates for long-finned pilot whales are combined estimates including both long-finned pilot whales and short-finned pilot whales.

For the purposes of this document, the marine mammals addressed in detail are the species in Table 3.1.6-1 that commonly occur in and around the Lease Area, typically utilize coastal and shelf habitats, and are protected under the MMPA, including the three large whale species (North Atlantic right whale, fin whale, and sperm whale). The sea turtles addressed are those commonly occurring in the Western Atlantic, which are also protected under the ESA (as shown in Table 3.1.6-2). For detailed information on other species not addressed herein, refer to the EA (2014) and the Final Programmatic Environmental Impact Statement for Alternative Energy Development and Production and Alternate Use of Facilities on the Outer Continental Shelf (MMS 2007).

Section 3.1.6.2 contains detailed information about the abundance, distribution, and habitat use patterns for the North Atlantic right whale, fin whale, and sperm whale.

Sea Turtles

Of the 5 species of sea turtles likely to occur in the Northwest Atlantic OCS, only 4 species are likely to be encountered in the Massachusetts WEA (Table 3.1.6-2). These species include the loggerhead sea turtle, green sea turtle, Kemp's ridley sea turtle, and leatherback sea turtle. The hawksbill sea turtle is not likely to occur in the viscinity of the project area and therefore is not addressed further in this document.

Table 3.1.6-2. Sea Turtles Likely to Occur

Order Testudines (turtles)	Relative Occurrence in WEAs[1]	ESA Status	Max Density in WEA and Adjacent Waters (SPUE)[3]	Best Abundance Estimate
Family Cheloniidae (hardshell sea turtles)				
Loggerhead sea turtle (*Caretta caretta*)	Common	Threatened[4]	6.19	
Green sea turtle (*Chelonia mydas*)	Unknown	Threatened[2]	0	
Kemp's Ridley sea turtle (*Lepidochelys kempii*)	Rare	Endangered	-	
Family Dermochelyidae (leatherback sea turtle)				
Leatherback sea turtle (*Dermochelys coriacea*)	Common	Endangered	29.14	

[1]The occurrence category is based upon research conducted in support of the Rhode Island Ocean Special Area Management Plan and summarized in the BOEM EA (2014).

[2]North Atlantic Distinct Population Segment (DPS)

[3]SPUE (sightings per unit effort) values represent the number of animals sighted per 1,000 km of survey track (BOEM EA, 2014). For a detailed description of SPUE values refer to the BOEM EA, page 130.

[4]Northwest Atlantic Ocean DPS

Section 3.1.6.3 contains detailed information about the abundance, distribution, and habitat use patterns for the loggerhead sea turtle, leatherback sea turtle, Kemp's Ridley sea turtle, and green sea turtle.

3.1.6.1 Data Sources

Abundance, distribution, and habitat use patterns for the species of concern was derived primarily from the following sources, and data specific to the Lease Area were used, where available.

Northeast Large Pelagic Survey

The Northeast Large Pelagic Survey collaborative aerial and acoustic surveys for large whales and sea turtles were conducted for the Massachusetts Clean Energy Center (MassCEC) and Bureau of Ocean Energy Management (BOEM) by the Large Pelagic Survey Collaborative (comprised of the New England Aquarium, Cornell University's Bioacoustics Research Program, the University of Rhode Island and the Center for Coastal Studies) (Kraus et al. 2016). This study was designed to provide a comprehensive baseline characterization of the abundance, distribution, and temporal occurrence of marine mammals, with a focus on large endangered whales and sea turtles, in the Rhode Island/Massachusetts (RIMA) and MA WEAs and surrounding waters. Information was collected using line-transect aerial surveys and passive acoustic monitoring from October 2011 to June 2015 in the MA WEA, and from December 2012 to June 2015 in the RIMA WEA. A total of 76 aerial surveys were conducted, and Marine Autonomous Recording Units were deployed for a total of 1,010 calendar days, during the study period. For survey methodologies and details please refer to: https://www.boem.gov/RI-MA-Whales-Turtles/.

Vineyard Wind 2016 G&G Surveys

Vineyard Wind conducted preliminary geotechnical and geophysical (G&G) surveys within the boundaries of the Lease Area in the fall of 2016. Activities occurred onboard the Research Vessel (RV) Shearwater and the RV Ocean Researcher over a total of 11 survey days

(excluding weather). Protected species observers (PSOs) monitored the areas surrounding the survey boats for marine mammals and sea turtles using visual observation and passive acoustic monitoring.

Marine Mammal Stock Assessment Reports

Under the 1994 amendments of the Marine Mammal Protection Act (MMPA), the USFWS and the NMFS are required to generate stock assessment reports for all marine mammal stocks in waters within the U.S. Exclusive Economic Zone (Waring et al. 2016, Waring et al. 2015). These Marine Mammal Stock Assessment reports are updated annually for all strategic stocks, and revisited every three years for all other stocks. These publications provide general information about species habitat use patterns, population size, and estimates of annual human-caused serious injury and mortality.

Northeast Ocean Data Portal

The Marine-Life Data and Analysis Team, in collaboration with the Northeast Regional Planning Body and expert work groups composed of over 80 regional scientists and managers, produced a series of data products presented on the Northeast Ocean Data Portal (Roberts et al. 2016, MDAT 2016). This resource provides modeled estimates of the predicted distribution and abundance of 151 different marine mammal, bird, and fish species in the Western North Atlantic.

Rhode Island Ocean SAMP Surveys

The estimated occurrence of various turtles in and near the SAP areas (Table 3.1.6-2) was obtained from an analysis of existing data collected for the Rhode Island Ocean Special Area Management Plan (Kenney and Vigness-Raposa, 2010).

3.1.6.2 Marine Mammal Species Profiles

North Atlantic Right Whale (*Eubalaena glacialis*)

North Atlantic right whales (NARW) are among the rarest of all marine mammal species in the Atlantic Ocean. They average approximately 15.25 meters (50 feet) in length (NOAA 2016d). They have stocky, black bodies with no dorsal fin, and bumpy, coarse patches of skin on their heads called callosities. NARW feed mostly on zooplankton and copepods belonging to the *Calanus* and *Pseudocalanus* genera (Waring et al. 2016). Right whales are slow moving grazers that feed on dense concentrations of prey at or below the water's surface, as well as at depth (NOAA 2016d). Research suggests that NARW must locate and exploit extremely dense patches of zooplankton to feed efficiently (Mayo and Marx 1990). These dense zooplankton patches are likely a primary characteristic of the spring, summer, and fall NARW habitats (Kenney et al. 1986, Kenney et al. 1995). Historically, the population suffered severely from commercial overharvesting and has more recently been threatened by incidental fishery entanglement and ship strikes. The NARW is a strategic stock and is listed as endangered under the ESA.

These baleen whales have two separate stocks: the eastern and western Atlantic stocks. The NARW occurring in U.S. waters belong to the western Atlantic stock. The western NARW population ranges primarily from calving grounds in coastal waters of the southeastern United States to feeding grounds in New England waters and the Canadian Bay of Fundy, Scotian

Shelf, and Gulf of St. Lawrence (Waring et al. 2016). The size of this stock is considered to be extremely low relative to its Optimum Sustainable Population (OSP) in the U.S. Atlantic Exclusive Economic Zone (EEZ). In the Western North Atlantic, right whales are subject to relatively high levels of injury and mortality from collisions with vessels and entanglement in fishing gear (Knowlton and Kraus 2001, Kraus et al. 2005). The minimum rate of annual human-caused mortality and serious injury to right whales averaged 4.3 per year for the period of 2009 through 2013 (Waring et al. 2016). The best estimate of the NARW population size is a minimum of 476 individuals based on photo-ID recapture data from 2011; however, recent population estimates of 526 individuals were published in the NARW annual report card (Waring et al. 2016; Pettis and Hamilton 2015).

The NARW is a strongly migratory species which travels from high-latitude feeding waters to low-latitude calving and breeding grounds. These whales undertake a well-defined, strongly seasonal migration from their northeast feeding grounds (generally spring, summer and fall habitats) south along the U.S. east coast to their sole known calving and wintering grounds in the waters of the southeastern U.S. (Kenney and Vigness-Raposa 2010). NARWs are usually observed in groups of less than 12 individuals, and most often as single individuals or pairs. Larger groups may be observed in feeding or breeding areas (Jefferson et al. 2008). Surveys have demonstrated the existence of seven areas where Western North Atlantic right whales congregate seasonally: the coastal waters of the southeastern United States; the Great South Channel; Jordan Basin; Georges Basin along the northeastern edge of Georges Bank; Cape Cod and Massachusetts Bays; the Bay of Fundy; and the Roseway Basin on the Scotian Shelf (Waring et al. 2016). NMFS has designated two critical habitat areas for the NARW: the Gulf of Maine/Georges Bank region, and the Southeast calving grounds from North Carolina to Florida. Two additional critical habitat areas in Canadian waters, Grand Manan Basin and Roseway Basin, were identified in Canada's final recovery strategy for the North Atlantic right whale (Brown et al. 2009).

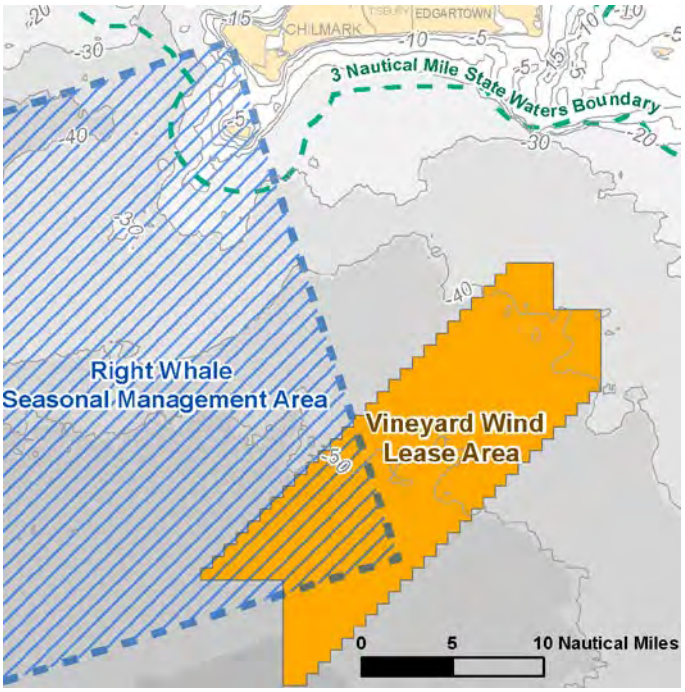


Figure 3.1.6.2 Right Whale Seasonal Management Area

Kraus et al. (2016) sighted right whales during winter and spring aerial surveys in the MA WEA. Though right whales were visually observed within the Lease Area only in spring, NARW were detected acoustically within this area during all months of the year. NARW exhibited notable seasonal variability in acoustic presence, with maximum occurrence in the Lease Area in winter and spring (January-March), and minimum occurrence in summer (July, August, and September). A total of 77 unique

individual NARW were observed in the study area over the duration of the Northeast Large Pelagic Survey (October 2011-June 2015). This species was not detected visually or acoustically in the Lease Area during the 2016 G&G surveys for the Project (unpublished data). Roberts et al. (2016) and MDAT (2016) indicate that the highest density of NARW in the SAP Area and adjacent waters occurs in April at 21.478 individuals per 10 km (5.4 nmi) grid square.

In order to protect this species, Seasonal Management Areas (SMAs) for reducing ship strikes of NARWs have been designated in the U.S. and Canada. All vessels greater than 19.8 meters (65 feet) in overall length must operate at speeds of 10 knots or less within these areas during seasonal time periods. The closest SMA overlaps with the southern portion of the Lease Area (Figure 3.1.6.2) and becomes active between November 1 and April 30 each year.

Fin Whale (*Balaenoptera physalus*)

Fin whales are the second-largest species of baleen whale, with a maximum length of about 75 feet in the Northern Hemisphere (NOAA 2016e). These whales have a sleek, streamlined body with a V-shaped head making them fast swimmers. This species has a distinctive coloration pattern: the dorsal and lateral sides of the body are black or dark brownish gray and the ventral surface is white. Fin whales feed on krill, small schooling fish (e.g. herring, capelin and sand lance) and squid by lunging into schools of prey with their mouths open (Kenney and Vigness-Raposa 2010). They occur year-round in a wide range of latitudes and longitudes, but the density of individuals in any one area changes seasonally NOAA 2016e). Fin whales are the most commonly sighted large whales in continental shelf waters from the mid-Atlantic coast of the United States to Nova Scotia (Sergeant 1977, Sutcliffe and Brodie 1977, CeTAP 1982, Hain et al. 1992). The fin whale is listed as an endangered species under the ESA.

Fin whales off the eastern United States, Nova Scotia and the southeastern coast of Newfoundland are believed to constitute a single stock under the present International Whaling Commission (IWC) scheme (Donovan 1991), which has been called the Western North Atlantic stock. The best abundance estimate available for the Western North Atlantic fin whale stock is 1,618 individuals (Waring et al. 2016). The status of this stock relative to OSP in the U.S. Atlantic EEZ is unknown, but the North Atlantic population is listed as a strategic stock under the MMPA. Like most other whale species along the U.S. east coast, ship strikes and fisheries entanglements are perennial causes of serious injury and mortality. For the period 2009 through 2013, the minimum annual rate of human-caused mortality and serious injury to fin whales was 3.55 per year (Waring et al. 2016).

The fin whales' range in the Western North Atlantic extends from the Gulf of Mexico and Caribbean Sea, to the southeastern coast of Newfoundland in the north (Waring et al. 2016). Fin whales are common in waters of the U. S. Atlantic EEZ, principally from Cape Hatteras northward. While fin whales typically feed in the Gulf of Maine and the waters surrounding New England, mating and calving (and general wintering) areas are largely unknown (Hain et al. 1992, Waring et al. 2016). It is likely that fin whales occurring in the U.S. Atlantic EEZ undergo migrations into Canadian waters, open-ocean areas, and perhaps even subtropical or tropical regions. However, the popular notion that entire fin whale populations make distinct annual migrations like some other mysticetes has questionable support (Waring et al. 2016). Based on an analysis of neonate stranding data, Hain et al. (1992) suggested that calving takes place

during October to January in latitudes of the U.S. mid-Atlantic region. Fin whales are the dominant large cetacean species during all seasons from Cape Hatteras to Nova Scotia, having the largest standing stock, the largest food requirements, and therefore the largest influence on ecosystem processes of any cetacean species (Hain et al. 1992, Kenney et al. 1997). There are currently no critical habitat areas established for the fin whale.

Kraus et al. (2016) suggests that, compared to other baleen whale species, fin whales have a high multi-seasonal relative abundance in the MA and RIMA WEAs and surrounding areas. Fin whales were sighted in the Lease Area in spring and summer. This species was observed primarily in the offshore (southern) regions of the study area during spring, and found closer to shore (northern areas) during the summer months. Although fin whales were largely absent from visual surveys in the winter months, acoustic data indicate that this species is present in the study area during all months of the year. Acoustic detection data indicate a lack of seasonal trends in fin whale abundance; acoustic presence was lowest in the months of April-July, but overall monthly variation was minimal. As the detection range for fin whale vocalizations is in excess of 200 km (108 nmi), some detected signals may have originated from areas outside of the MA and RI WEAs (though the arrival patterns of many fin whale vocalizations indicate that received signals originated from within the study area). This species was not detected visually or acoustically in the Lease Area during the 2016 G&G surveys for the Project (unpublished data). Roberts et al. (2016) and MDAT (2016) indicate that the highest density of fin whales in the SAP Area and adjacent waters occurs in July and is estimated to be 0.465 individuals per 10 km (5.4 nmi) grid square.

Sperm Whale (*Physeter macrocephalus*)

The sperm whale is the largest of all toothed whales; males can reach 16 m (52 ft) in length and weigh over 45 tons (40,823 kg), and females can attain lengths of up to 11 m (36 ft) and weigh over 15 tons (13,607 kg) (Perrin et al. 2002). Sperm whales have extremely large heads, which account for 25-35% of the total length of the animal. This species tends to be uniformly dark gray in color, though lighter spots may be present on the ventral surface. Sperm whales frequently dive to depths of 400 m (1,300 ft) in search of their prey, which includes large squid, fishes, octopus, sharks, and skates (Perrin et al. 2002). This species can remain submerged for over an hour and reach depths as great as 1,000 m (3,280 ft). Sperm whales have a worldwide distribution in deep water and range from the equator to the edges of the polar ice packs (Whitehead 2002). Sperm whales form stable social groups and exhibit a geographic social structure; females and juveniles form mixed groups and primarily reside in tropical and subtropical waters, whereas males are more solitary and wide-ranging and are found at higher latitudes (Whitehead 2002; Whitehead 2003). This species is listed as endangered under the ESA.

The International Whaling Commission recognizes only one stock of sperm whales for the North Atlantic, and Reeves and Whitehead (1997) and Dufault et al. (1999) suggest that sperm whale populations lack clear geographic structure. Current threats to the sperm whale population include ship strikes, exposure to anthropogenic noise and toxic pollutants, and entanglement in fishing gear (though entanglement risk for sperm whales is relatively low compared to other, more coastal whale species) (NOAA 2016f, Waring et al. 2015). Though there is currently no reliable estimate of total sperm whale abundance in the entire Western

North Atlantic, the most recent population estimate for this region is 2,288 individuals (Waring et al. 2015). This estimate was generated from the sum of surveys conducted in 2011, and is likely an underestimate of total abundance, as these surveys were not corrected for sperm whale dive-time. Total annual estimated average human caused mortality to this stock during the period from 2008 to 2012 was 0.8 sperm whales (Waring et al. 2015). The status of the North Atlantic sperm whale stock relative to OSP is unknown, but this stock is classified as depleted and strategic under the MMPA.

Sperm whales mainly reside in deep-water habitats on the outer continental shelf, along the shelf edge, and in mid-ocean regions (NMFS 2010b). However, this species has been observed in relatively high numbers in the shallow continental shelf areas of southern New England (Scott and Sadove 1997). Sperm whale migratory patterns are not well defined, and no obvious migration patterns have been observed in certain tropical and temperate areas. However, general tends suggest that most populations move poleward during summer months (Waring et al. 2015). In U.S. Atlantic EEZ waters, sperm whales appear to exhibit seasonal movement patterns (CeTAP 1982**,** Scott and Sadove 1997). During the winter, sperm whales are concentrated to the east and north of Cape Hatteras. This distribution shifts northward in spring, when sperm whales are most abundant in the central portion of the mid-Atlantic bight to the southern region of Georges Bank. In summer, this distribution continues to move northward, including the area east and north of Georges Bank and the continental shelf to the south of New England. In fall months, sperm whales are most abundant on the continental shelf to the south of New England and remain abundant along the continental shelf edge in the mid-Atlantic bight. There are no critical habitat areas designated for the sperm whale.

Kraus et al. (2016) suggests that sperm whales occur infrequently in the MA and RIMA WEAs and surrounding areas. Sperm whales were sighted during aerial surveys in the study area only during the summer and autumn, and were not detected acoustically. Sperm whales, traveling singly or in groups of 3 or 4, were observed three times in August and September of 2012, and once in June of 2015. Effort-weighted average sighting rates could not be calculated, as sperm whales were only observed on 4 occasions throughout the duration of the study (Autumn 2011 to Summer 2015). This species was not detected visually or acoustically in the Lease Area during the 2016 G&G surveys for the Project (unpublished data). Roberts et al. (2016) and MDAT (2016) indicate that the highest density of sperm whales in the SAP Area and adjacent waters occurs in July and is estimated to be 0.022 individuals per 10 km (5.4 nmi) grid square.

3.1.6.3 Sea Turtle Species Profiles

Loggerhead Sea Turtle (*Caretta caretta*)

Loggerhead sea turtles can reach 1 meter (3 feet) in length, have a reddish-brown, slightly heart shaped carapace, and feed primarily upon hard-shelled prey including whelks and conch (NOAA 2016g). This species has a circumpolar distribution, and inhabits continental shelves, bays, estuaries, and lagoons throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans (Dodd 1988). Loggerheads occur in continental shelf waters of the Northwest Atlantic from Florida to Nova Scotia (NMFS and USFWS 2008), although their presence varies seasonally due to changes in water temperature (Shoop & Kenney 1992, Epperly et al. 1995a, Epperly et al. 1995b, Braun-McNeill et al. 2008). Loggerhead sea turtles in the Northwest Atlantic Ocean DPS are listed as threatened under the ESA.

The most recent regional abundance data for the loggerhead turtle was collected in 2010. The preliminary regional abundance was approximately 588,000 individuals based on only positive identifications of loggerhead sightings, and approximately 801,000 individuals based on positive identifications and a portion of unidentified turtles from the survey (NMFS NEFSC, 2011).

During spring and summer months, loggerhead turtles are abundant in coastal waters off New York and the Mid-Atlantic states, and a small number of individuals may reach as far north as New England. These turtles first appear in significant numbers in the waters around New England in early June, and can be found in this region throughout the summer (Morreale and Standora 1989). In late September through mid-October, Loggerhead turtles begin to migrate southward to coastal areas off the south Atlantic states, particularly from Cape Hatteras, North Carolina, to Florida (Morreale and Standora 1989; Musick et al. 1994). Nearly all loggerheads remaining in northern waters after the beginning of November are cold-stunned and were likely caught by rapidly declining water temperatures during their southward migration (Morreale and Standora 1989). During the winter, loggerhead turtles tend to aggregate in warmer waters along the western boundary of the Gulf Stream off Florida (Thompson 1988) or hibernate in bottom waters and soft sediments in channels and inlets along the Florida coast (Ogren and McVea 1981; Butler et al. 1987). In the winter and spring, loggerheads congregate off southern Florida before migrating northward to their summer feeding ranges (CeTAP 1982). There are 38 critical habitat areas designated for the Northwest Atlantic Ocean DPS of loggerhead sea turtles, including nearshore reproductive habitat, sargassum habitat, migratory corridors, breeding areas and wintering habitat. All critical habitat areas are located well to the south of the Vineyard Wind Lease Area.

Loggerheads were the second most commonly observed species of sea turtle in the MA and RIMA WEAs and surrounding waters during recent multi-year surveys and were sighted a total of 78 times over three years (Kraus et al. 2016). This species was detected within the Vineyard Wind Lease Area during the spring, summer, and autumn. Nearly all loggerhead observations occurred during the months of August and September. This species was not sighted in the Vineyard Wind Lease Area during the 2016 G&G surveys for the Project (unpublished data). Roberts et al. (2016) and MDAT (2016) indicate that the maximum sightings of loggerhead sea turtles per unit effort in the SAP Area and adjacent waters occurs in summer and is estimated to be 6.19 species per unit of effort (SPUE).

Green Sea Turtle (*Chelonia mydas*)

The green turtle is the largest hard-shelled sea turtle, and can reach over 1 meter (3 feet) in length (NOAA 2016h). This species has an oval carapace that is variable in color and can be green, brown, yellow, gray, or black (NOAA 2016h). Unique among sea turtles, the adult green turtle is exclusively herbivorous and eats seagrass and algae (NOAA 2016h). Green turtles are found worldwide, and are known to occur in temperate waters, though they are generally found in tropical and subtropical regions (NOAA 2016h, NMFS and USFWS 1991). Green turtles in waters along the eastern U.S. Atlantic coast belong to the North Atlantic DPS, which is listed as threatened under the ESA.

Due to the global distribution and widespread nesting areas of the green turtle, estimates of the total population of this species are unavailable. Green turtles in the North Atlantic DPS nest in small numbers in the U.S. Virgin Islands, Puerto Rico, Georgia, South Carolina, and North

Carolina, and in larger numbers in Florida (USFWS 2016). The Florida green turtle nesting aggregation is a regionally significant colony, and data indicate that over 5,000 females nested in 2010 (USFWS 2016).

In the Western North Atlantic, green turtles are found in inshore and nearshore waters from Texas to Massachusetts (NOAA 2016h). This species generally feeds in shallow lagoons, inlets, reefs, shoals, and bays that have abundant algae or sea grass (NMFS and USFWS 2007b). Females nest between June and September on mainland or island sandy beaches along the southeastern U.S. coast, and are not know to nest as far north as Massachusetts (BOEM 2014). Green sea turtles are rare in southern New England, and are generally only observed during summer months due to the low water temperatures in this region (CETAP 1982). No adult green turtles have been recorded in New England (BOEM 2014). The only designated critical habitat area for green sea turtles surrounds an island off the coast of Costa Rica, and is far to the south of the project area (NOAA 2016h).

There were no confirmed sightings of green turtles in the MA and RIMA WEAs and surrounding waters during recent multi-year surveys (Kraus et al. 2016). This species was not sighted in the Vineyard Wind Lease Area during the 2016 G&G surveys for the Project (unpublished data).

Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)

The Kemps ridley turtle has a nearly circular grayish-green carapace and is the smallest sea turtle in the world, reaching only 60-70 cm in length (24-28 inches). This species feeds primarily on swimming crabs, but will also consume fish, jellyfish, and mollusks (NOAA 2016i). Kemp's ridley turtles primarily reside in the nearshore neritic zone, and rarely venture into waters deeper than 50 meters (160 feet) (NOAA 2016i, Byles and Plotkin, 1994). The Kemp's Ridley turtle is listed as endangered under the ESA.

Kemp's ridley sea turtles exhibit unique nesting behavior observed in only one other sea turtle species; during events called "arribada" female turtles arrive onshore in very large, synchronous aggregations to nest (NOAA 2016i). This species nests almost exclusively in the Western Gulf of Mexico, primarily in the states of Tamaulipas and Veracruz, Mexico (BOEM 2014). Though extremely large arribadas occurred in the 1940s (as many as 42,000 Kemps ridley turtles were observed in one day in 1947), populations plummeted between the 1940s and the 1980s, reaching a low of fewer than 250 nesting females in 1985 (NOAA 2016i). Conservation efforts led to annual increases of approximately 15% in Kemps ridley breeding populations through 2009. However, recent data indicate a decrease in the number of Kemp's ridley nests since 2010 (NOAA 2016i). The most recent estimate of the Kemp's Ridley turtle population is 7,000 to 8,000 nesting females (NMFS and USFWS, 2007a). Though this species is female biased, there are likely several thousand additional males (NMFS and USFWS, 2007a).

The Kemp's ridley sea turtle is found most commonly along the eastern coast of North America, from the Gulf of Mexico to Nova Scotia (NOAA 2016i, BOEM 2014). After nesting and breeding, this species travels to foraging grounds in shallow coastal waters along the Atlantic seaboard, where they remain for the duration of the spring and summer (BOEM 2014). Kemp's ridley turtles begin leaving northern areas in mid-September, and most have departed for warmer

southern waters by the beginning of November (Burke et al. 1989, Morreale and Standora 1989). Only juvenile Kemp's ridley turtles (2-5 years of age) have been reported in New England waters (BOEM 2014). There are no critical habitat areas designated for the Kemp's ridley sea turtle, though petitions to designate areas on the Texas coast and marine habitat in the Gulf of Mexico are currently being reviewed.

Kemp's Ridley turtles were observed rarely in the MA and RIMA WEAs and surrounding waters during recent multi-year surveys (Kraus et al. 2016). The only confirmed observations of this species were in vertical camera photographs, all six of which took place in August and September of 2012. This species was not sighted in the Vineyard Wind Lease Area during the 2016 G&G surveys for the Project (unpublished data).

Leatherback Sea Turtle (*Demochelys coriacea*)

Leatherbacks are the largest living turtles, reaching up to 2 meters (6.5 feet) in length, and are the only sea turtle that lacks a hard, bony shell (NOAA 2016j). The leatherback gets its name from its distinctive longitudinally-ridged carapace, which is composed of layers of oily connective tissue overlain on loosely interlocking dermal bones (NOAA 2016j). This species is the most wide-ranging of all sea turtles, and is found in tropical, subtropical, and cold-temperate waters (NMFS and USFWS 1992). Leatherbacks have evolved physiological and anatomical adaptations that allow them to survive in cold waters (Frair et al. 1972, Greer et al. 1973, NMFS and USFWS 1992), enabling them to range along the entire east coast of the U.S. (NMFS and USFWS 1992). Unlike most other sea turtles, which feed upon hard-shelled organisms, leatherbacks consume soft bodied prey including salps and jellyfish (NOAA 2016j). In the North Atlantic Ocean, leatherback turtles regularly occur in deep waters (100 m [>328 ft.]), but are also sighted in coastal areas of the U.S. continental shelf (NMFS and USFWS 1992). Leatherback turtles are listed as endangered under the ESA.

Leatherback turtles found along the eastern U.S. Atlantic coast belong to the Northwest Atlantic subpopulation. Nearly all leatherback nesting on continental United States shores occurs on the eastern coast of Florida (FFWCC 2017). Though the breeding population of Leatherback turtles in Florida remains small, and is likely less than 1000 individuals, the number of nests across the state of Florida has increased at a rate of approximately 10% per year since 1979 (Stewart et al. 2011). Though accurate information regarding the entire Atlantic Leatherback population is lacking (NOAA 2016j), estimates based on data from the seven nesting sites in this region range from 34,000 to 94,000 (NMFS and USFWS, 2007c; TEWG, 2007).

Leatherback sea turtles are highly migratory, exploiting convergence zones and upwelling areas in the open ocean, along continental margins, and in archipelagic waters (Morreale *et al.* 1994, Eckert 1999). Adult leatherbacks migrate extensively throughout the Atlantic basin in search of food, and may swim 6,000-12,000 km (up to ~7,400 mi) in a year (James et al. 2005). Following breeding and nesting in Florida and the tropical Caribbean, and aided by the northward flow of the Gulf Stream, leatherback turtles move northward beyond the shelf break in the spring. During summer months, leatherbacks move into fairly shallow coastal waters, apparently following their preferred jellyfish prey. In the fall, they move offshore and begin their southern migration to the winter breeding grounds (Payne et al. 1986). In southern New England, leatherback sea turtles are most commonly observed during summer and fall (Kenney

& Vigness-Raposa 2010). There are no critical habitat areas designated for the leatherback sea turtle along the U.S. Atlantic coast.

Leatherbacks were the most commonly observed species of sea turtle in the MA and RIMA WEAs and surrounding waters during recent multi-year surveys, and were observed on 151 occasions over three years (Kraus et al. 2016). This species was commonly sighted in summer and fall, infrequently observed in spring, and absent from the study area in winter. Leatherbacks were detected within the Vineyard Wind Lease Area only in summer and fall, and maximum occurrence of this species occurred in late summer. Loggerhead sightings were most highly concentrated south of Nantucket, to the west of the Vineyard Wind Lease Area. Two dead loggerhead turtles were observed during the 2016 G&G survey; however, it was determined by the on-site PSOs that the survey activities were not the cause of death. Roberts et al. (2016) and MDAT (2016) indicate that the maximum sightings of leatherback sea turtles per unit effort in the SAP Area and adjacent waters occurs in summer and is estimated to be 29.14 (SPUE).

3.1.7 Coastal and Marine Birds and Bats (585.611(b)(3-5))

Numerous species of birds are known to occur in the Massachusetts WEA, many of which are protected under the Migratory Bird Treaty Act of 1918 (MBTA) (16 U.S.C. 703–712). Three of these species are also protected under the ESA. Additionally, one species of bat has the potential to occur in waters of the Massachusetts WEA, which is also protected under the ESA. The following subsections describe these species.

In addition, the list below (Table 3.7.1-1) summarizes the species that may be found in the project area according to the IPaC (Information, Planning, and Conservation system; USFWS) report.

Table 3.1.7-1. Species Identified by the IPaC Database in the General Project Area.

Genus	Species	Common Name	Season(s)	
Sterna	*paradisaea*	Arctic Tern	At Sea:	Summer (June-Aug)
Fratercula	*arctica*	Atlantic Puffin	At Sea:	Fall (Sep-Nov), Spring (Mar-May), Winter (Dec-Feb)
Melanitta	*nigra*	Black Scoter	At Sea:	Fall (Sep-Nov), Spring (Mar-May), Winter (Dec-Feb)
Rissa	*tridactyla*	Black-legged Kittiwake	At Sea:	Fall (Sep-Nov), Spring (Mar-May), Winter (Dec-Feb)
Chroicocephalus	*philadelphia*	Bonaparte's Gull	At Sea:	Winter (Dec-Feb)
Somateria	*mollissima*	Common Eider	At Sea:	Winter (Dec-Feb)
Gavia	*immer*	Common Loon	At Sea:	Fall (Sep-Nov), Spring (Mar-May), Summer (June-Aug), Winter (Dec-Feb)
Uria	*aalge*	Common Murre	At Sea:	Spring (Mar-May), Winter (Dec-Feb)
Sterna	*hirundo*	Common Tern	At Sea:	Fall (Sep-Nov), Spring (Mar-May), Summer (June-Aug)
Calonectris	*diomedea*	Cory's Shearwater	At Sea:	Spring (Mar-May), Fall (Sep-Nov), Summer (June-Aug)
Phalacrocorax	*auritus*	Double-crested Cormorant	At Sea:	Summer (June-Aug)

Genus	Species	Common Name	Season(s)	
Alle	*alle*	Dovekie	At Sea:	Fall (Sep-Nov), Winter (Dec-Feb)
Larus	*marinus*	Great Black-backed Gull	At Sea:	Spring (Mar-May), Fall (Sep-Nov), Winter (Dec-Feb), Summer (June-Aug)
Puffinus	*gravis*	Great Shearwater	At Sea:	Fall (Sep-Nov), Summer (June- Aug)
Larus	*argentatus*	Herring Gull	At Sea:	Spring (Mar-May), Fall (Sep-Nov), Winter (Dec-Feb), Summer (June-Aug)
Podiceps	*auritus*	Horned Grebe	At Sea:	Winter (Dec-Feb)
Limosa	*haemastica*	Hudsonian Godwit	At Sea:	Migrating
Larus	*atricilla*	Laughing Gull	At Sea:	Winter (Dec-Feb)
Oceanodroma	*leucorhoa*	Leach's Storm-petrel	At Sea:	Fall (Sep-Nov)
Sterna	*antillarum*	Least Tern	At Sea:	Summer (June-Aug)
Clangula	*hyemalis*	Long-tailed Duck	At Sea:	Fall (Sep-Nov), Spring (Mar-May), Winter (Dec-Feb)
Puffinus	*puffinus*	Manx Shearwater	At Sea:	Spring (Mar-May), Fall (Sep-Nov), Summer (June-Aug)
Fulmarus	*glacialis*	Northern Fulmar	At Sea:	Fall (Sep-Nov), Winter (Dec-Feb)
Morus	*bassanus*	Northern Gannet	At Sea:	Spring (Mar-May), Fall (Sep-Nov), Summer (June-Aug), Winter (Dec-Feb)
Stercorarius	*pomarinus*	Pomarine Jaeger	At Sea:	Spring (Mar-May), Fall (Sep-Nov), Summer (June-Aug)
Alca	*torda*	Razorbill	At Sea:	Spring (Mar-May), Fall (Sep-Nov), Winter (Dec-Feb)
Phalaropus	*lobatus*	Red-necked Phalarope	At Sea:	Summer (June-Aug), Fall (Sep- Nov)
Gavia	*stellata*	Red-throated Loon	At Sea:	Fall (Sep-Nov), Spring (Mar-May), Winter (Dec-Feb)
Puffinus	*griseus*	Sooty Shearwater	At Sea:	Fall (Sep-Nov), Spring (Mar-May), Summer (June-Aug)
Melanitta	*perspicillata*	Surf Scoter	At Sea:	Fall (Sep-Nov), Spring (Mar-May), Winter (Dec-Feb)
Melanitta	*fusca*	White-winged Scoter	At Sea:	Fall (Sep-Nov), Spring (Mar-May), Summer (June-Aug)
Oceanites	*oceanicus*	Wilson's Storm-petrel	At Sea:	Fall (Sep-Nov), Spring (Mar-May), Winter (Dec-Feb)

Source: USFWS IPaC database (https://ecos.fws.gov/ipac/), July 17, 2017

Avian

Within the SAP Area, there are numerous marine and coastal bird species that may be present, including both resident and migratory species. Resident species are present throughout the year, whereas migratory species may be present only during breeding and wintering seasons, or they may only migrate through. These migrant and resident birds include various species of birds that rely on marine and coastal waters, which may occur in or around the SAP Area and adjacent waters (Table 3.1.7-2). Figure 3.1.7 depicts abundance estimates for "all avian species" as presented in the Northeast Ocean Data Portal, based on the results of a culmination of data sources modeled by the Marine-life Data and Analysis Team (MDAT).

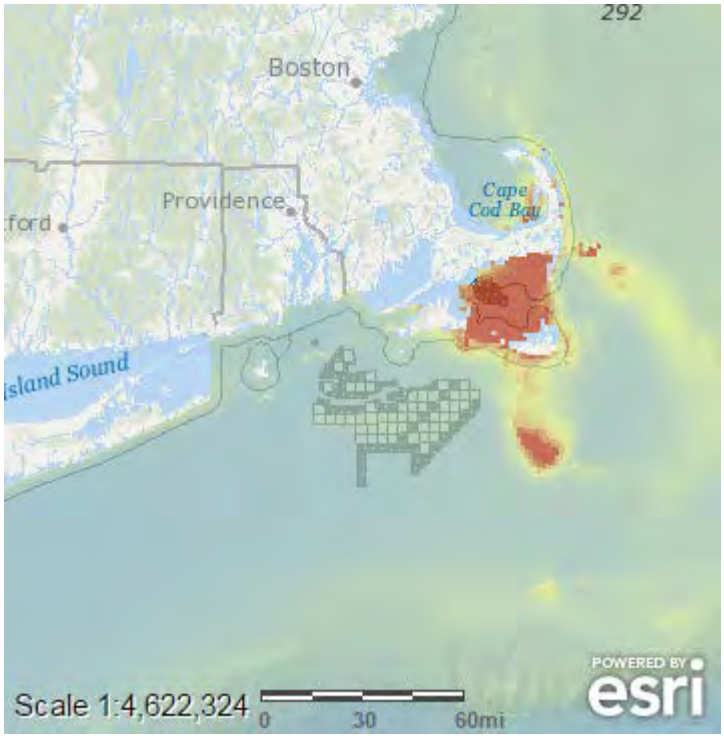


***Figure 3.1.7**. All Avian Species Abundance; warmer colors represent higher abundance; source: Northeast Ocean Data Portal, 2017*

Table 3.1.7-2. Species Known to Occur Offshore Massachusetts

Genus	Species	Common Name	Winter	Spring	Summer	Fall
			(P: present; A: absent)			
Waterfowl (mostly during migration)						
Chen	*caerulescens*	Snow Goose	P	P	A	P
Branta	*bernicla*	Brant	P	P	A	P
Branta	*canadensis*	Canada Goose	P	P	P	P
Aythya	*valisineria*	Canvasback	P	P	A	P
Aythya	*americana*	Redhead	P	P	A	P
Aythya	*marila*	Greater Scaup	P	P	A	P
Aythya	*affinis*	Lesser Scaup	P	P	A	P
Somateria	*spectabilis*	King Eider	P	A	A	A
Somateria	*mollissima*	Common Eider	P	P	P	P
Histrionicus	*histrionicus*	Harlequin Duck	P	P	A	P
Melanitta	*perspicillata*	Surf Scoter	P	P	P	P
Melanitta	*fusca*	White-winged Scoter	P	P	P	P
Melanitta	*nigra*	Black Scoter	P	P	P	P
Clangula	*hyemalis*	Long-tailed Duck	P	P	A	P
Bucephala	*albeola*	Bufflehead	P	P	A	P
Bucephala	*clangula*	Common Goldeneye	P	P	A	P
Bucephala	*islandica*	Barrow's Goldeneye	P	P	A	P

Genus	Species	Common Name	Winter	Spring	Summer	Fall
			(P: present; A: absent)			
Mergus	*serrator*	Red-breasted Merganser	P	P	P	P
Loons and Grebes						
Gavia	*immer*	Common Loon	P	P	P	P
Gavia	*stellata*	Red-throated Loon	P	P	P	P
Podiceps	*auritus*	Horned Grebe	P	P	A	P
Podiceps	*grisegena*	Red-necked Grebe	P	P	A	P
Shearwaters and Petrels						
Fulmarus	*glacialis*	Northern Fulmar	P	P	P	P
Calonectris	*diomedea*	Cory's Shearwater	A	A	P	P
Puffinus	*gravis*	Great Shearwater	A	A	P	P
Puffinus	*griseus*	Sooty Shearwater	A	P	P	P
Puffinus	*puffinus*	Manx Shearwater	A	P	P	P
Puffinus	*lherminier*	Audubon's Shearwater	A	A	P	P
Oceanites	*oceanicus*	Wilson's Storm-Petrel	A	A	P	P
Pelagodrama	*marina*	White-faced Storm-Petrel	A	A	P	A
Oceanodroma	*leucorhoa*	Leach's Storm-Petrel	A	A	P	P
Oceanodroma	*castro*	Band-rumped Storm-Petrel	A	A	P	A
Sulids						
Morus	*bassanus*	Northern Gannet	P	P	P	P
Phalacrocorax	*auritus*	Double-crested Cormorant	P	P	P	P
Phalacrocorax	*carbo*	Great Cormorant	P	P	P	P
Shorebirds						
Phalaropus	*lobatus*	Red-necked Phalarop	A	A	A	P
Phalaropus	*fulicarius*	Red Phalarope	P	P	P	P
Jaegers						
Stercorarius	*pomarinus*	Pomarine Jaeger	A	P	P	P
Stercorarius	*parasiticus*	Parasitic Jaeger	A	P	P	P
Stercorarius	*longicaudus*	Long-tailed Jaeger	A	A	P	P
Alcids						
Alle	*alle*	Dovekie	P	P	P	P
Uria	*aalge*	Common Murre	P	P	A	P
Uria	*lornvia*	Thick-billed Murre	P	A	A	P
Alca	*torda*	Razorbill	P	P	A	P
Cepphus	*grylle*	Black Guillemont	P	A	A	A
Fratercula	*artica*	Atlantic Puffin	P	P	P	P
Gulls and Terns						
Rissa	*tridactyla*	Black-legged Kittiwake	P	P	P	P
Larus	*philadelphia*	Bonaparte's Gull	P	P	P	P
Chroicocephalus	*ridibundus*	Black-headed Gull	P	P	A	P
Hydrocoloeus	*minutus*	Little Gull	P	A	P	A
Larus	*atricilla*	Laughing Gull	A	P	P	P
Larus	*delawarensis*	Ring-billed Gull	P	P	P	P
Larus	*argentatus*	Herring Gull	P	P	P	P
Larus	*glaucoides*	Iceland Gull	P	P	A	P
Larus	*fuscus*	Lesser Black-backed Gull	P	P	P	P
Larus	*hyperboreaus*	Glaucous Gull	P	P	A	A

Genus	Species	Common Name	Winter	Spring	Summer	Fall
			(P: present; A: absent)			
Larus	*marinus*	Great Black-backed Gull	P	P	P	P
Onychoprion	*anaethetus*	Bridled Tern	A	A	P	A
Sternula	*antillarum*	Least Tern	A	P	P	A
Sterna	*caspia*	Caspian Tern	A	P	P	P
Chlidonias	*niger*	Black Tern	A	P	P	P
Sterna	*dougalli*	Roseate Tern	A	P	P	P
Sterna	*hirundo*	Common Tern	A	P	P	P
Sterna	*paradisae*	Arctic Tern	A	P	P	A
Sterna	*forsteri*	Forster's Tern	P	P	P	P
Sterna	*maxima*	Royal Tern	A	A	P	A

Source: BOEM EA (2014)

For the purposes of this document only ESA listed species will be discussed in further detail. For information on other species not addressed herein, refer to BOEM (2014) and the Final Programmatic Environmental Impact Statement for Alternative Energy Development and Production and Alternate Use of Facilities on the Outer Continental Shelf (MMS 2007).

There are three species of marine and coastal birds that may be present within the SAP Area: piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), and roseate tern (*Sterna dougallii*). Table 3.1.7-3 provides a list of coastal and marine birds that are federally listed that may be found in or adjacent to the SAP Area.

Table 3.1.7-3. ESA Listed Coastal and Marine Bird Species with Potential to Occur

Common Name	Scientific Name	Federal Status[1]
Piping Plover	*Charadrius melodus*	T
Red Knot	*Calidris canutus rufa*	T
Roseate Tern	*Sterna dougallii*	E

Source: BOEM EA (2014)
[1]Federal status: Federally Endangered (E); Federally Threatened (T)

Piping plover and red knot are shorebirds that are unlikely to come into contact with SAP activities. Roseate terns may occur in the SAP Area, as they forage offshore. Section 3.1.7.1 contains detailed information about the abundance, distribution, and habitat use patterns for the piping plover, red knot, and roseate tern.

Bats

There are 9 species of bats which are known to occur in terrestrial Massachusetts and could occur offshore (Table 3.1.7-4). Little is known about how these species use the waters offshore of Massachusetts; however, recent studies have been conducted along the Atlantic coast showing that migratory tree bats utilize offshore waters during their seasonal migrations, over several degrees of latitude (Cryan 2003; Stantec 2016; NJDEP 2010; Hatch 2013). Although the migration patterns of bats are not well-documented, many bats species make extensive use of linear features in the landscape, such as ridges or rivers while commuting and migrating suggesting a preference for overland migration routes. No migratory tree bats are federally listed. The majority of bat occurring in Massachusetts are known as cave bats, which utilize caves and mines for part or all of the year. Cave bats include the

federally threatened northern long-eared bat and the federally endangered Indiana bat; these species appear to occur very infrequently offshore, as they do not migrate and have relatively small home ranges (BOEM 2007).

In an effort to understand where and when bats occur offshore (beyond 5.5 km [3 nmi] from land), an acoustic survey of bat activity on islands, offshore structures, and coastal site in the New England Gulf of Maine, mid-Atlantic coast, and Great Lakes regions occurred between 2012 to 2014 (Stantec 2016). While research vessels detected bats up to 130 km (70 nmi) from land (east of New Jersey), the study documented a statistically significant and ecologically relevant negative effect of distance from the mainland on the overall consistency, frequency and magnitude of bat activity in the three study regions. Furthermore, the results showed pronounced seasonal patterns and strong influence of weather variability on bat activity depending on region. The study suggests that because of the absence of suitable habitat, bats can only occur offshore during periods of migration and foraging; and as a result, conditions of higher risk due to offshore wind development are presumably less frequent offshore than at terrestrial sites. Therefore, it is unlikely that federally listed bats will occur in the SAP Area.

Table 3.1.7-4. Species of Bat Known to Occur in Massachusetts

Common Name	Scientific Name	Federal Status[2]	Cave-Hibernating Bats	Migratory Tree Bats
Eastern small-footed bat	*Myotis lebeii*		X	
Little brown bat	*Myotis lucifugus*		X	
Northern long-eared bat	*Myotis septentrionalis*	T	X	
Indiana bat[1]	*Myotis sodalis*	E	X	
Tri-colored bat	*Perimyotis subflavus*		X	
Big brown bat	*Eptesicus fuscus*		X	
Eastern red bat	*Lasiurus borealis*			X
Hoary bat	*Lasiurus cinereus*			X
Silver-haired bat	*Lasionycteris noctivagans*			X

Source: BOEM EA (2014); since published the Northern long-eared bat status was updated
[1]The Indiana bat is not known to occur in eastern Massachusetts
[2]Federal status: Federally Endangered (E); Federally Threatened (T)

According to BOEM (2014), Indiana bats are not known to occur in eastern Massachusetts; therefore, due to their limited home range, they will not be discussed further in this document. Section 3.1.7.2 contains detailed information about the abundance, distribution, and habitat use patterns for the northern long-eared bat.

3.1.7.1 Avian Species Profiles

Piping Plover

The piping plover (*Charadrius melodus*) is a small, migratory shorebird that breeds on beaches from Newfoundland to North Carolina (and occasionally in South Carolina) and winters along the Atlantic Coast from North Carolina south, along the Gulf Coast, and in the Caribbean (USDOI and USFWS 1996, Elliot-Smith and Haig 2004). According to the U.S. Department of the Interior (USDOI) and USFWS (2009), piping plovers that breed on the Atlantic Coast belong to the subspecies *C. melodus melodus*. The Atlantic Coast population is classified as threatened under

the ESA, whereas other piping plover populations inhabiting the Northern Great Plains and Great Lakes watershed are endangered (USDOI and USFWS 2015a). This species is also listed as threatened by the Massachusetts Natural Heritage & Endangered Species Program (MA NHESP). Since its federal listing in 1985, the Atlantic Coast population estimate has increased from 790 pairs to an estimated 1,849 pairs in 2008, and the U.S. portion of the population has almost tripled, from approximately 550 pairs to an estimated 1,596 pairs (USFWS 2009b). The most recent abundance estimates by USFWS estimate approximately 1,762 nesting pairs in 2011 (USDOI and USFWS 2012).

The Atlantic Coast Population of piping plovers nest along beaches in New Brunswick, Prince Edward Island, Nova Scotia, Quebec, southern Maine, Rhode Island, Massachusetts, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina. These birds winter primarily on the Atlantic Coast from North Carolina to Florida, although some migrate to the Bahamas and West Indies from mid-September to March (USDOI and USFWS 1996). Piping plovers inhabit coastal sandy beaches and mudflats. They use open, sandy beaches close to the primary dune of the barrier islands for breeding, preferring sparsely vegetated open sand, gravel, or cobble for a nest site. In winter the species remains confined to coastal areas, but uses a wider variety of habitats, including mudflats and dredge spoil areas, and, most commonly, sandflats (O'Brien et al. 2006). They feed on marine worms, fly larvae, beetles, insects, crustaceans, mollusks, and other small invertebrates. They forage along the wrack zone, or line, where dead or dying seaweed, marsh grass, and other debris is left on the upper beach by the high tide (USDOI and USFWS 2015a).

A key threat to the Atlantic Coast population is habitat loss resulting from shoreline development (USDOI and USFWS 1996). Piping plovers are very sensitive to human activities. Disturbances from anthropogenic activities can cause the parent birds to abandon their nests. Since the listing of this species under the ESA in 1986, the Atlantic Coast piping plover population has increased 234 percent (USDOI and USFWS 2009). Although increased abundance has reduced near-term vulnerability to extinction, piping plovers remain sparsely distributed across their Atlantic Coast breeding range, and populations are highly vulnerable to even small declines in survival rates of adults and fledged juveniles (USDOI and USFWS 2009).

Only the Atlantic Coast population has the potential to occur in the SAP Area. Piping plovers may occur in Massachusetts from late March through mid-October, which encompasses both their breeding season and their spring and fall migratory seasons (BOEM 2014). Within this period, piping plovers are unlikely to occur in the SAP Area during their breeding season, particularly from May to mid-August, as they are restricted to sandy coastal beaches (Burger et al. 2011). Plovers are more likely to traverse the SAP Area during their migratory periods, primarily April and May in springtime and August and September in the fall, as their migratory pathways do not appear to be concentrated along the coast. Although there are no definitive observations of piping plovers more than 4.8 km (3 mi) from the Atlantic Coast, this species is known to use islands more than 4.8 km (3 mi) from the coast as both breeding and wintering grounds, and have been observed in significant pre-migratory concentrations in southeastern Cape Cod and Monomoy Island in late summer (Normandeau Associates Inc., 2011).

The FWS first designated critical habitat for the wintering population of piping plovers in 142 areas along the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas on July 10, 2001 (Federal Register 2001). Critical habitat areas were subsequently revised in North Carolina in 2008 (Federal Register 2008) and in Texas in 2009 (Federal Register 2009). No critical habitat has been designated in waters offshore of Massachusetts. Although the precise route of migration is not firmly established, it is possible that these birds could fly over the SAP Area during migration.

***Rufa* Red Knot**

The *rufa* red knot (*Calidris canutus rufa*) is a medium-sized shorebird from the sandpiper family that was added to the list of threatened species under the ESA effective in January 2015. It is also a Species of Greatest Conservation Need (SGCN) in the Massachusetts Wildlife Action Plan and is proposed for listing under MESA. The red knot is one of the longest-distance migrants in the world, traveling annually in large flocks between breeding grounds in the mid- and high-arctic areas and wintering grounds in southern South America (Harrington, 2001; Morrison et al., 2001; USDOI, FWS, 2010b; Normandeau Associates, Inc., 2011). Each spring, red knots congregate in Delaware Bay during their northward migration to feed on horseshoe crab eggs (*Limulus polyphemus*) and refuel for breeding in the Artic. Protection of this species has become necessary after noted population declines in the 2000s, largely due to an increase in the harvest of horseshoe crabs for bait in the conch and eel fishing industries (Niles et al. 2009), as well as, coastal development and beach erosion/nourishment (Niles at al. 2008).

The red knot's northward migration through the contiguous U.S. occurs in April-June and the southward migration occurs in July-October. Delaware Bay is the most important spring migration stopover in the eastern U.S. because it is the final stop at which the birds can refuel in preparation for their nonstop leg to the Arctic (Harrington 2001, NatureServ 2015a, USDOI and USFWS 2010a). Approximately 90 percent of the entire population of the red knot can be present in Delaware Bay in a single day (Cornell Lab of Ornithology 2015). Red knots forage along sandy beaches, tidal mudflats, salt marshes, and peat banks (USDOI and USFWS 2010b) for a variety of small animal prey while on the ground, or while wading in shallow water within coastal environments (Harrington, 2001). Due to challenges with the species' migratory habits and differing survey methods across the red knots' range, there is not a range wide population estimate.

There are no nesting records of this species in Massachusetts. In North America, this species breeds in the high Arctic and winters well to the south of Massachusetts (Harrington, 2001) and therefore, its potential occurrence in coastal Massachusetts is restricted to migration. Red knots use coastal areas of Massachusetts as migratory stopover locations for foraging during spring and fall migrations. Historical records show that thousands of red knots utilized the Massachusetts shoreline during both spring and fall migrations (MA NHESP 2016a). Historical migratory stop-over locations in Massachusetts included beaches on outer Cape Cod and mainland beaches along West Cape Cod Bay (MA NHESP 2016a).

The red knot's migratory routes are not well characterized, however recent studies using geolocation and geospatial datasets of coastal observations have begun to reveal some migratory patterns with respect to the Atlantic OCS region (Burger et al. 2012a, 2012b; Niles et al. 2010; Normandeau Associates Inc. 2011). These studies generally suggest that red knot migratory

pathways along the Atlantic Coast are fairly widespread and diverse, but there appear to be more of a mid-Atlantic and southerly concentration of Red Knot coastal occurrences in spring; in contrast with a more northerly concentration, particularly in Massachusetts, during the fall. Hence, more Red Knot migratory passage likely takes place through the SAP Area during fall migration than during spring migration (BOEM 2014).

Roseate Tern

The roseate tern (*Sterna dougallii*) is a worldwide species that is divided into five subspecies. The Atlantic subspecies (*S. dougallii dougallii*) breeds in two discrete areas in the western hemisphere (USDOI and USFWS 1998). The northwestern Atlantic population of roseate tern, which is listed as endangered under the ESA and by MA NHESP, breeds from New York to Maine and into adjacent areas of Canada. Historically this population bred as far south as Virginia; however, the southern extent is now New York (USDOI and USFWS 2015b). Northwestern roseate terns are thought to migrate through the eastern Caribbean and along the north coast of South America, wintering mainly on the east coast of Brazil (USDOI and USFWS 2010a). Reasons for the initial listing of the roseate tern included the concentration of the population into a small number of breeding sites and, to a lesser extent, declines in population (USDOI and USFWS 1998). The most important factor in breeding colony loss was predation by herring gulls and/or great black-backed gulls.

The roseate tern is a medium-sized tern that is primarily pelagic along seacoasts, bays, and estuaries, going to land only to nest and roost (Sibley 2000). They forage offshore and roost in flocks typically near tidal inlets in late July to mid-September. Along the Atlantic Coast, they nest on sandy beaches of islands, open bare ground, and grassy areas, typically near areas with cover or shelter (NatureServ 2015b). Roseate terns forage mainly by plunge-diving and contact-dipping (in which the bird's bill briefly contacts the water). They also forage by surface-dipping over shallow sandbars, reefs, and schools of predatory fish. The roseate tern's diet consists almost exclusively

of small schooling fish, including sand lances, for which it forages by flying slowly, typically 10 to 39 feet above the water, then plunge-diving to catch fish at depths no greater than a few inches (Gochfeld et al., 1998).

The most current abundance estimate for the northwestern Atlantic population is approximately 3,200 nesting pairs (Nisbet, Gochfeld, and Burger 2014). The northwestern Atlantic breeding population currently breeds on only a handful of primarily island colonies from the maritime provinces of Canada to Long Island, NY (Gochfeld et al., 1998; USFWS, 2010). The population has become extremely concentrated and restricted in recent years, with as many as 87 percent of individuals breeding in colonies on islands off of Massachusetts and New York (Bird and Ram Islands in Buzzards Bay, MA and Great Gull Island, NY) (USFWS, 2010). The coastal region of southeastern Cape Cod, near Chatham and Monomoy Island, is the most important post-breeding staging area for roseate terns, hosting up to 7,000 individuals annually representing nearly the entire northwestern Atlantic population (Burger et al. 2011; Normandeau Associates Inc., 2011).

Only the northwestern Atlantic population of roseate tern is likely to occur in the WEA, however according to BOEM's 2014 EA, very little roseate tern activity is expected to occur in the Massachusetts WEA during both nesting and post-breeding staging periods. Modeling conducted by Kinlan et al. (2014) suggests that roseates annually concentrate north of the Massachusetts WEA near Martha's Vineyard and Nantucket, using the waters of Nantucket Sound and the Muskeget Channel. In addition, recent surveys for roseate terns in the region support these modeled predictions, including an aerial survey conducted by Veit and Perkins (2014) that shows activity almost exclusively near the Muskeget Channel from August to September. During the nesting period from mid-May to the end of July, adults typically remain

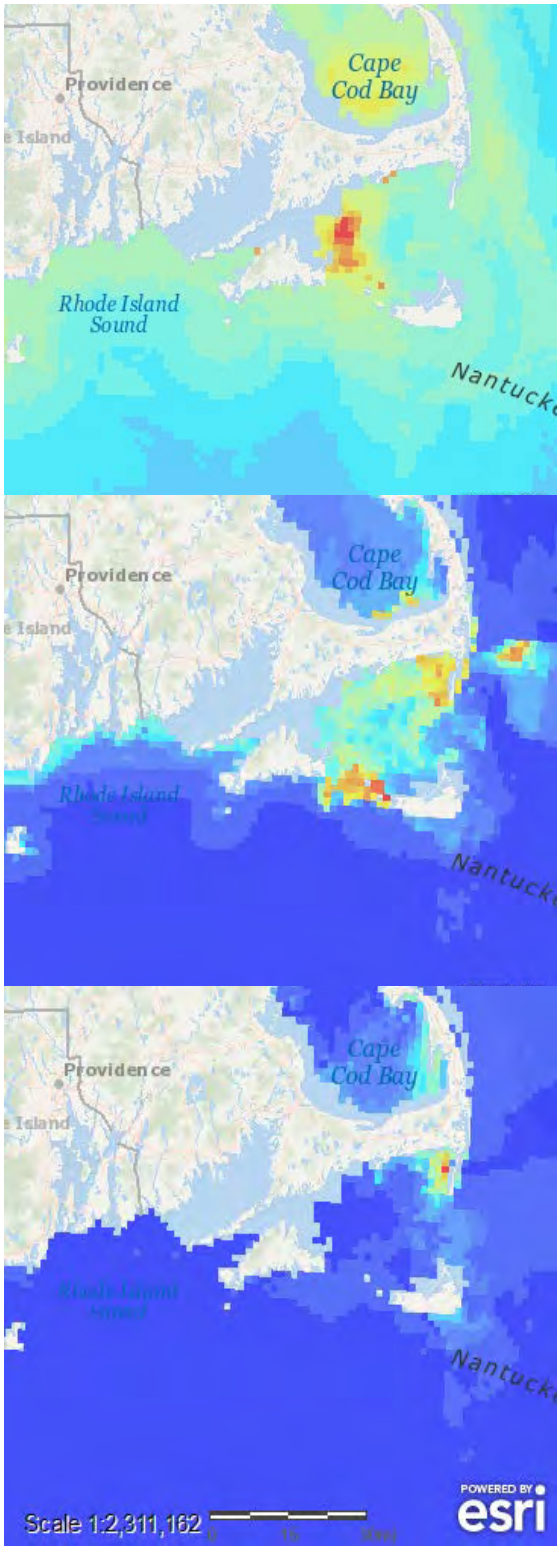


Figure 3.1.7.1*. Roseate tern abundance; spring, summer, fall (top to bottom); source: Northeast Ocean Data Portal.*

within 6.9 km (4.3 mi) of their nesting colonies. While occupying post-breeding areas most foraging activity is concentrated in shallow, nearshore waters, although some individuals may occur up to 16 km (10 mi) from the coast (Burger et al. 2011; Normandeau Associates Inc., 2011). The migration routes of roseate terns during spring and fall are not well known, but are believed to be largely pelagic (Gochfeld et al., 1998; Nisbet, 1984; USFWS, 2010); hence, roseates may traverse the SAP Area during these periods.

No critical habitat areas have been published for the roseate tern.

3.1.7.2 Bat Species Profiles

Northern Long-eared Bat

The northern long-eared (NLEB) bat is a medium-sized, cave-dwelling bat about 3 to 3.7 inches in length, with a wingspan of 9 to 10 inches, and long ears compared to other bats in its genus (USFWS 2017). Northern long-eared bats are widely distributed in the eastern United States and Canada, with the exception of the very southeastern United States and Texas. This species was listed as threatened throughout its range under the ESA in 2015 due to the rapid spread of white-nose syndrome, which was discovered in 2006 in a hibernaculum in New York State. Infected *Myotis* hibernacula in the New York and surrounding states have experienced mortality rates of over 90 percent (USFWS 2017). Northern long-eared bats are also listed as endangered by the MA NHESP.

NLEB are widespread in Massachusetts, and have been found in 11 of 14 counties. Winter hibernacula have been reported in Berkshire, Franklin, Hampden, Middlesex, and Worcester counties (MA NHESP 2015). According to data collected by the MA NHESP (2016b), NLEB maternity roosts (but no hibernacula) have been identified on Martha's Vineyard (Dukes County), Massachusetts, approximately 22.5 (14 mi) north of the WEA. Females bear and rear young from mid-May through July and forage between August and October. NLEB use approximately 0.6 km^2 (150 acres) for their home range during this period (Owen et al. 2003) and therefore would be highly unlikely to occur within the WEA, even transiently.

3.1.8 Archaeological Resources (585.611(b)(6))

Findings of the BOEM approved SAP survey (described in Appendix D) show that the seabed in the SAP Area consist of Holocene marine deposits of sand that were deposited or reformed by marine transgression and other geologic processes. Other than the occasional sand waves there was little relief in the SAP Area. The ocean bottom in the SAP Area consisted of sands.

Geologic data indicate that the SAP Area was once subaerial during the period of last glaciation and potentially could host people of the Paleoindian tradition. During the end of that period the area was inundated by the glacial melt water during marine transgression circa 10,000 years Before Present. Therefore, the archaeological sensitivity for prehistoric cultural resources within the SAP Area is temporally limited. The seabed and near subsea bed materials do not indicate any paleochannels, accumulated soils, or sediments prior to inundation.

Historically, the area was transited from the earliest periods of European exploration and settlement. Numerous ships have been lost in Martha's Vineyard and Nantucket area. None have been reported in the SAP Area. The geophysical data confirm the historic documentation. No magnetic anomalies or

side scan sonar images created from survey data had the obvious characteristics of a potential shipwreck or prehistoric site. The maximum magnetometer reading from background varied only slightly (less than ±1.3 nT) over the area. Side scan sonar data indicated that the sea bed was virtually void of any features other than one large sand wave and numerous dragger scars, remnants of fishing activities. There was one noticeable feature which is considered debris. Subbottom profiler data indicate relatively flat, laminated near subsurface materials. There were no obvious water courses or other sub seabed features that may indicate high probability areas of potential Paleoindian habitation.

No significant cultural resources were identified during this marine geophysical investigation for cultural resources and no further investigations are recommended for the SAP Area.

3.1.9 Social and Economic Resources (585.611(b)(7))

Much of the available social and economic data are summarized by county. For the purposes of this project, data from Dukes County, Barnstable County, and Nantucket County are summarized below.

Dukes County consists of 11 islands off the southeast coast of Massachusetts, including Martha's Vineyard. Barnstable County consists of the 15 municipalities on the Cape Cod Peninsula extending from the southeast coast of Massachusetts. Nantucket County comprises the Island of Nantucket. Dukes County year-round population is approximately 16,535, Barnstable County's is 214,000 and Nantucket's is 11,000. The populations in each location swells summer months with the influx of vacation-home residents and other tourists. Each County is highly dependent on summer tourism (Cape Cod Commission 2012, Martha's Vineyard Commission 2008, Nantucket Master Plan 2009).

Land uses along the coast of each County consists primarily of low density residential with a few high density developed town centers. Each County considers vehicle traffic congestion generated by the tourism season to be significant concerns. (Martha's Vineyard Commission 2010; Cape Cod Commission 2012, Nantucket Master Plan 2009.)

Coastal Industries & Employment

In 2013, ocean related businesses provided 16% of total jobs in Barnstable and Dukes County, 20% in Nantucket County and 96% of jobs were tourism and recreation related (NOAA 2017a). Dukes and Nantucket Counties are a seasonal, visitor-based economy. With the exception of some remaining commercial fishing industry employing only a very small number of people, there are no significant exports of goods or services. The driving force of the County's economic base is visitors and especially second homeowners who purchase goods and services during their stay (Martha's Vineyard Commission 2008, NOAA 2012). Barnstable County's economy is also a seasonal, visitor-based economy; however, there are more health, social service, and professional, management, administrative and waste management employment opportunities (NOAA 2012).

Commercial & Recreational Fisheries

Vessel activity (recreational angling and charter/party trips) within the MA WEA is confined primarily to the north and western portion of the area. State commercial fishing effort is considered "low" to "medium" in State waters south of Martha's Vineyard, adjacent to the location of the WEA. Species considered most important from this area are striped bass, fluke (summer flounder), black sea bass, and scup. The same areas are considered of "medium" and "high" importance to Massachusetts fisheries resources based on State survey data. Commercial otter trawl trips reported from federally

mandated vessel trip reports show the fishing effort inside the WEA is concentrated in the central and western regions. This effort is small compared to that in the regional fishing grounds located outside the WEA. Commercial scallop dredge vessel trip reports also show very little effort in the WEA. However, vessels likely cross the WEA in transit between scallop fishing grounds on George's Bank and the major scallop port of New Bedford MA (BOEM 2014)

Commercial landings data (weight and monetary value) for Massachusetts are presented below for 2011 to 2015 for all species with average annual landings valued at greater than $1,000,000 (Table 3.1.9-1). The most commercially important species are sea scallop and American lobster. Recreational landings data for Massachusetts are presented below for 2012 to 2016 for all species with annual landings greater than 45,360 kg (100,000 lbs) (Table 3.1.9-2). Striped bass is a very important sport fish in nearshore and offshore regions in both states, as are scup, bluefish, tautog, Atlantic cod, summer flounder, and tunas/mackerels (NMFS 2017).

Table 3.1.9-1. Annual Landings of Commercially Important* Fish Species for Massachusetts from 2011 to 2015. Landings Weights (lbs) and Values ($) are Presented

Species	2011		2012		2013		2014		2015		Average annual landings	
	(lbs)	$	(lbs)	$	(lbs)	$	(lbs)	$	(lbs)	$	(lbs)	$
SCALLOP, SEA	33,091,859	$330,943,531	36,725,267	$364,863,812	29,287,337	$334,205,322	21,392,034	$271,373,414	21,514,646	$264,933,400	28,402,229	$313,263,896
LOBSTER, AMERICAN	13,372,540	$53,302,490	14,485,339	$53,357,118	15,259,697	$61,661,564	15,322,892	$68,375,940	16,450,530	$78,290,126	14,978,200	$62,997,448
CLAM, ATLANTIC SURF	11,663,022	$10,014,049	18,240,911	$16,071,856	20,802,922	$17,488,715	19,416,223	$16,762,548	18,828,455	$17,094,750	17,790,307	$15,486,384
OYSTER, EASTERN	230,981	$9,066,317	309,836	$12,070,626	328,656	$13,896,080	443,705	$19,575,343	593,469	$22,741,520	381,329	$15,469,977
COD, ATLANTIC	15,012,175	$27,582,793	8,983,606	$18,558,036	4,145,441	$8,376,619	4,294,491	$7,493,636	2,913,481	$5,528,295	7,069,839	$13,507,876
GOOSEFISH	10,142,780	$13,430,685	11,582,871	$13,595,655	9,498,440	$8,869,503	10,533,109	$10,028,473	11,084,376	$10,251,355	10,568,315	$11,235,134
HADDOCK	12,151,584	$15,814,175	4,180,085	$7,565,174	3,977,813	$5,706,381	9,682,269	$10,946,352	11,479,861	$12,049,084	8,294,322	$10,416,233
HERRING, ATLANTIC	66,970,193	$8,802,476	81,781,049	$11,529,446	74,992,417	$10,749,786	77,872,559	$9,431,945	70,888,448	$8,787,347	74,500,933	$9,860,200
CLAM, OCEAN QUAHOG	12,478,860	$7,995,143			14,476,040	$10,228,720	13,421,677	$9,813,936	13,340,110	$9,063,394	13,429,172	$9,275,298
FLOUNDER, WINTER	4,477,544	$7,773,424	5,149,283	$10,137,523	5,376,720	$8,830,550	3,818,405	$7,484,783	3,198,835	$6,742,066	4,404,157	$8,193,669
POLLOCK	11,792,014	$9,000,698	11,147,701	$9,432,450	7,938,660	$7,695,602	7,070,046	$7,035,654	5,062,091	$5,206,286	8,602,102	$7,674,138
CRAB, JONAH	5,379,794	$3,648,514	7,540,394	$5,573,270	10,095,402	$9,111,026	11,858,704	$9,278,006	9,096,378	$6,894,538	8,794,134	$6,901,071
WHELK, CHANNELED	954,379	$5,943,552	1,147,719	$6,160,825	720,698	$5,589,829	612,856	$4,863,226	632,145	$4,810,947	813,559	$5,473,676
HAKE, SILVER	8,261,597	$5,012,900	7,389,004	$4,515,538	6,583,346	$3,891,955	8,422,473	$5,835,675	9,197,229	$6,522,591	7,970,730	$5,155,732
CLAM, SOFTSHELL	825,371	$4,723,456	975,344	$6,438,800	675,154	$4,625,474	414,976	$4,004,946	416,180	$4,472,995	661,405	$4,853,134
TUNA, BLUEFIN	796,085	$6,668,154	623,079	$5,523,790	363,331	$2,520,369	636,561	$3,876,602	1,098,148	$5,499,685	703,441	$4,817,720
HAKE, WHITE	5,283,622	$4,808,661	4,793,328	$5,292,573	3,720,438	$4,834,617	3,298,979	$4,481,361	2,961,075	$4,019,708	4,011,488	$4,687,384
REDFISH, ACADIAN	4,293,767	$2,636,857	7,824,895	$5,189,380	7,535,796	$4,076,794	9,504,452	$5,192,314	10,310,054	$5,890,405	7,893,793	$4,597,150
FLOUNDER,ATLANTIC,PLAICE	2,844,375	$3,983,283	2,952,340	$4,539,119	2,367,755	$3,825,412	2,233,167	$3,771,763	2,105,087	$3,939,103	2,500,545	$4,011,736
CLAM, NORTHERN QUAHOG	783,380	$3,959,558	609,893	$3,682,733	707,204	$3,838,358	687,407	$3,825,507	644,775	$4,375,877	686,532	$3,936,407
BASS, STRIPED	1,162,429	$3,183,749	1,218,485	$3,504,686	1,004,468	$3,130,000	1,138,518	$4,832,063	865,760	$3,570,775	1,077,932	$3,644,255
SKATES	13,284,301	$3,570,273	13,618,020	$3,315,643	9,518,192	$3,065,925	12,787,191	$4,521,163	11,122,162	$2,573,562	12,065,973	$3,409,313
CLAMS OR BIVALVES	293	$520	14,957,800	$10,140,896	2,018	$2,384					4,986,704	$3,381,267
CRAB, DEEPSEA RED									3,254,277	$3,231,116	3,254,277	$3,231,116
FLOUNDER, WITCH	1,721,397	$3,581,709	1,953,530	$3,671,910	1,238,139	$3,090,458	1,083,087	$2,682,576	934,365	$2,392,934	1,386,104	$3,083,917
FLOUNDER, YELLOWTAIL	3,516,492	$4,126,781	3,300,577	$4,363,975	1,674,614	$2,443,704	1,187,424	$1,505,630	1,306,170	$1,501,238	2,197,055	$2,788,266
FLOUNDER, SUMMER	1,132,192	$2,559,852	891,498	$2,341,558	859,384	$2,422,062	696,033	$2,503,920	748,433	$2,763,662	865,508	$2,518,211
SQUID, LONGFIN	1,408,248	$1,809,694	2,944,258	$3,579,450	866,984	$1,080,370	2,431,616	$2,308,681	1,884,656	$2,342,565	1,907,152	$2,224,152
SCALLOP, BAY	157,593	$1,957,430	170,979	$2,128,221	187,438	$2,477,817	154,729	$2,523,309	83,128	$1,443,888	150,773	$2,106,133
CRABS	3,596,476	$3,486,698	2,570,479	$2,570,425	1,806,603	$1,806,603	1,933,498	$1,933,498	4,259	$2,864	1,982,263	$1,960,018
SWORDFISH	740,635	$2,249,718	851,281	$2,698,922	628,111	$2,013,390	389,026	$1,326,363	627,364	$1,391,403	647,283	$1,935,959
SHARK, SPINY DOGFISH	9,071,662	$1,932,190	13,116,375	$2,887,523	6,216,751	$977,955	9,439,008	$2,027,687	7,851,049	$1,458,760	9,138,969	$1,856,823
CLAM, ATLANTIC JACKKNIFE	67,431	$447,695	126,801	$932,863	277,460	$2,347,970	173,100	$1,820,939	119,576	$1,417,831	152,874	$1,393,460
HAGFISHES					1,314,897	$1,426,918			1,260,167	$1,286,518	1,287,532	$1,356,718
MACKEREL, ATLANTIC	515,461	$136,613	4,131,405	$654,329	7,279,352	$1,222,966	10,754,742	$2,421,055	6,934,684	$1,926,478	5,923,129	$1,272,288
MUSSEL, BLUE	132,898	$546,076	408,739	$602,756	1,145,623	$1,511,654	1,126,270	$1,505,641	3,292,088	$2,042,166	1,221,124	$1,241,659

* includes species with average annual landings greater than $1,000,000

Table 3.1.9-2. Annual landings (lbs) of Recreationally Important* Marine Species for Massachusetts from 2012 to 2016

Region	Species	2012	2013	2014	2015	2016[a]	Average Annual Landings
Nearshore[b]	Striped bass	5,227,095	3,617,514	3,926,303	2,683,645	2,151,765	3,521,264
	Scup	1,799,447	1,951,067	1,754,207	1,271,100	1,435,030	1,642,170
	Bluefish	1,265,926	2,372,904	1,901,432	1,782,684	507,179	1,566,025
	Atlantic Mackerel	560,982	1,107,684	916,819	1,732,837	1,751,115	1,213,887
	Black sea bass	1,052,049	626,782	959,769	716,679	879,739	847,004
	Other tunas/ mackerels	56,993	0	60,946	33,198	792,283	188,684
	Tautog	94,699	191,786	397,047	181,119	53,121	183,554
	Pollock	144,497	164,278	44,889	77,980	339,380	154,205
	Summer flounder	171,534	63,268	193,836	141,667	111,483	136,358
	Atlantic Cod	317,669	106,345	152,361	2,327	22,634	120,267
	Herrings	43,869	24,759	122,081	20,890	362,113	114,742
	Little tunny/Atlantic bonito	6,248	5,970	50,785	279,630	221,990	112,925
Offshore[c]	Atlantic Cod	606,784	802,629	1,118,137	6,480	121,750	531,156
	Striped bass	214,798	575,901	470,880	18,079	86,314	273,194
	Atlantic Mackerel	62,785	179,017	155,792	371,880	343,885	222,672
	Pollock	526,097	328,000	42,233	72,119	82,978	210,285
	Other tunas/ mackerels	433,582	0	147,351	0	213,941	158,975
	Bluefish	32,182	189,404	66,684	54,624	275,836	123,746

* includes species with average annual landings greater than 100,000 lbs

[a]2016 data are preliminary

[b]landings from inshore areas and ocean waters ≤ 3 mi from shore

[c]landings from ocean waters > 3 mi from shore

Source: NMFS 2017

Recreation Use

All of the Counties are predominantly visited for their beaches and are considered some of the premiere summer beach destinations in the country. The sandy beaches attract beachgoers looking for relaxation, swimming, beachcombing, and sunbathing. Surfing, diving, and boat- and shore fishing are also very popular activities (ICF Incorporated 2012.)

Dukes County's 240 km (150 mi) coastline is almost entirely remote sand beach. The County has approximately 15 large public beaches, but much of Martha's Vineyard coast is private access only. There are approximately five harbors, two marinas and three yacht clubs in the County. Dukes County's only nationally protected land is on Noman's Land Island National Wildlife Refuge. (ICF Incorporated 2012.)

Much of the 885 km (550 mi) coastline in Barnstable County is sand beach that is ideal for sunbathers, walkers, snorkelers, windsurfers, and surfers (although surfing and windsurfing only occur on the south- and west-facing beaches). The County has more than 150 public beaches and several more private beaches. There are three national parks that account for 234 km^2 (58,000 acres) of protected land. (ICF Incorporated, 2012.)

The island of Nantucket is surrounded in all directions by 180 km (110 mi) of shoreline, and 130 km (80 mi) of beach, all of which are open to the public. The Nantucket Wildlife Refuge accounts for 0.1 km^2 (24 acres) of nationally-protected land and is the only national park/refuge on the island. There are two harbors, two yacht clubs, and multiple marinas. (ICF Incorporated, 2012.)

Environmental Justice

Each County has a lower percentage of minority population than Massachusetts state average. (USEPA 2017) The Wampanoag Tribe of Gay Head (Aquinnah) land trust is located in the southwest portion of Martha's Vineyard Island in the town of Gay Head (BOEM 2009). The Wampanoag Tribe of Gay Head (Aquinnah) uses Vineyard Sound and surrounding water for subsistence harvesting. (BOEM 2009).

Visual Resources

The MET/ocean buoy(s) will at most be approximately 3 m (9.8 ft.) tall; and therefore, will only be seen from approximately 6.7 km (3.6 nmi) (Appendix D). As the closest MET/ocean buoy will be over 30 km (16 nmi) from Martha's Vineyard and Nantucket it will not be seen from shore. Although there are several historic and culturally significant resources on Martha's Vineyard and Nantucket, the presence of a buoy over 30 km away will not create any visual impact. Boaters and tourist traveling offshore may be able to see the buoy; however, due to the existing conditions (presence of other buoys, boaters, ships, etc.), it is unlikely that the presence of a relatively small buoy(s) will significantly alter or diminish the visual aesthetic. Furthermore, because boats/ships are generally moving, the close-up views, and any associated impacts, would be brief (BOEM 2014).

3.1.10 Coastal and Marine Uses (585.611(b)(8))

The Atlantic OCS in the vicinity of the MA WEA supports a variety of coastal and marine uses. Aside from commercial and recreational fishing, which is described in Section 3.1.9, Social and Economic Resources, uses include shipping and marine transportation, air traffic and airports, and military activities.

The Northeast Ocean Data Portal summarizes vessel traffic data for the Northeast Atlantic waters, including the MA WEA (which includes the Vineyard Wind Project Area). Vessel traffic within the region of the MA WEA is relatively low compared to regional marine traffic hotspots. Tow-tug and passenger vessel density within the region is very low, and though tanker and cargo vessels occur at greater densities than other identified vessel types, these primarily occur along the southern and western regions of the WEA. Much of the marine traffic within the WEA is not attributed to the above vessel types, and is likely due to fishing, recreation, or other marine activities (Northeast Ocean Data Portal 2015)

In 2009, a total of 1207 transits occurred through the MA WEA. Though the number of unique vessels traveling within the MA WEA could not be determined with certainty, a total of 373 unique Maritime Mobile Service Identities (a proxy for individual vessels) transited the WEA during this time. Vessel traffic density was greatest in the southern and western portions of the WEA, and cargo ships were the most frequently observed vessel type (USCG 2016).

Approaches to Nantucket Memorial airport, and two airports on Martha's Vineyard, are located over the WEA. There are no military training routes in the airspace over the WEA and closest restricted airspace occurs around a small island that is approximately 5.2 km (2.8 nmi) south of the western end of Martha's Vineyard and approximately 12 km (6.5 nmi) north of the WEA. Similarly, there are no danger zones or restricted areas within the WEA; the closest danger zone/restricted area is the restricted air space over Nomans Land Island that is approximately 18.5 km (10 nmi) north of the WEA. Nomans Land Island is also designated as a danger zone for naval operations (33 CFR 334.70) because unexploded ordnance

is suspected to be present (NOAA Office of Coast Survey, 2017) and public access is not permitted. The WEA is within the Narragansett Bay OPAREA, and a U.S. Navy aviation warning area occurs over the majority of the area. Though vessel traffic is generally dispersed throughout the WEA, it remains low (BOEM 2014).

3.1.11 Air Quality (585.610(a)(12) and 585.659)

Air quality is characterized by comparing the ambient air concentrations of criteria pollutants to the National Ambient Air Quality Standards (NAAQS), which have been established by the EPA to be protective of human health and welfare. The Clean Air Act (CAA) establishes two types of national air quality standards: (1) primary standards, which set limits to protect public health, including the health of "sensitive" populations (e.g., asthmatics, children, and the elderly); and (2) secondary standards, which set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. The NAAQS have been established in 40 CFR Part 50 for each of the seven criteria pollutants: sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$, particulate matter with a diameter less than or equal to 10 and 2.5 µm, respectively), and lead (Pb).

Ambient air quality concentrations of criteria pollutants are determined using data collected by monitoring stations that are mainly operated by the states. These monitoring sites provide long-term assessment of pollutant levels by measuring the quantity and types of certain pollutants in the surrounding, outdoor air. When the monitored pollutant levels in an area exceed the NAAQS for any pollutant, the area is classified as “nonattainment” for that pollutant. All counties in Massachusetts and Rhode Island are presently “in attainment” (or compliant with) with the NAAQS, except for Dukes County, Massachusetts, which is presently in nonattainment with the ozone NAAQS. Nonattainment areas are classified as Extreme, Severe, Serious, Moderate, and Marginal. Dukes County is classified as Marginal.

The NAAQS for ozone are 0.12 ppm (1-hour average) and 0.075 ppm (8-hour average). Ozone is a regional air pollutant issue and the northeast part of the country has been designated as an Ozone Transport Region. Prevailing southwest to west winds carry air pollution in the form of nitrogen oxides (NO_X) and Volatile Organic Compounds (VOC) from emission sources located outside of northeastern state boundaries into the northeast, contributing to high ozone concentrations in these areas.

Air Emissions from SAP Activity

Specific to the vessel activities anticipated in the SAP areas which include the installation, maintenance, and decommissioning of the MET/buoy(s), the following data have been assembled to provide a conservative estimate (more than expected) of emissions from the vessel engines and generators that will likely be in use offshore.

Specific expected activities with air emissions include marine vessel trips and maneuvering for one MET/ocean buoy. This work is expected to entail:

- Five daily trips during installation (including allowance for standard weather issues).
- The project expects to use New Bedford or a similar port in the area for deployment and maintenance activities.
- Two types of vessels are foreseen to be used during the deployment and maintenance.

  - Vessel type A: Work boat app. 95 feet with up to 1000 HP to be used for deployment
  - Vessel type B: Smaller type support vessel with up to 450 HP to be used for deployment + inspection and maintenance
- Onsite maintenance will be planned for approximately 3 times a year and expected to be performed by vessel type B.
- Two days for decommissioning.

The table below provides an estimation of expected emissions.

Activity	Emissions (tons/year)							
	NOx	**VOC**	**CO**	**PM10**	**PM2.5**	**CO2**	**SO2**	**HAPs**
Deployment	0.389	0.010	0.060	0.012	0.011	26.6	0.000	0.001
Maintenance	0.077	0.002	0.012	0.003	0.002	5.2	0.000	0.000
Decommissioning	0.155	0.004	0.024	0.005	0.005	10.6	0.000	0.000
Total	**0.621**	**0.017**	**0.095**	**0.019**	**0.018**	**42.4**	**0.0004**	**0.0015**

An OCS air permit is not required because the project is not considered an OCS source, the project emissions are associated with mobile sources, and total emissions are well below the thresholds of 50 tons per year of NOx and VOCs, 100 tons per year of the other criteria air pollutants, and 25 tons per year of HAPs (hazardous air pollutants) or 10 tons per year of any individual HAP.

3.2 Potential Impacts

To assess the SAP activities described in Section 1.0, impacts have been classified into one of four levels – negligible, minor, moderate, or major, according the MMS Programmatic Environmental Impact State for Alternative Energy as described below (MMS 2007).

The impact levels are defined as follows:

- Negligible: No measurable impacts.
- Minor: Most impacts to the affected resource could be avoided with proper mitigation. If impacts occur, the affected resource will recover completely without any mitigation once the impacting agent is eliminated.
- Moderate: Impacts to the affected resource are unavoidable. The viability of the affected resource is not threatened although some impacts may be irreversible, OR The affected resource would recover completely if proper mitigation is applied during the life of the project or proper remedial action is taken once the impacting agent is eliminated.
- Major: Impacts to the affected resource are unavoidable. The viability of the affected resource may be threatened, AND The affected resource would not fully recover even if proper mitigation is applied during the life of the project or remedial action is taken once the impacting agent is eliminated.

The following table summarizes the potential impacts that could be incurred due to the SAP activities; this impact assessment factors in the implementation of mitigation measures proposed in Section 3.3. For the purposes of this document, only resources with negligible impacts or greater will be described in the subsections below.

Table 3.2. Summary of Impacts

Project Activity	Geologic Resources	Coastal Habitats & Terrestrial Mammals	Water Quality	Benthic Resources	Fisheries & Essential Fish Habitat	Marine Mammals & Sea Turtles	Coastal & Marine Birds & Bats	Air Quality	Archaeological Resources	Visual Resources	Navigation, Transportation & Military Activities	Commercial & Recreational Fishing	Socioeconomics
Installation													
Vessels	NA	N	NA	NA	NA	N	NA	N	NA	NA	N	NA	NA
Anchor Deployment	N	NA	NA	N	N	NA	NA	NA	NA	NA	N	NA	NA
Operation													
Service Vessels	NA	N	NA	NA	NA	N	NA	N	NA	NA	N	NA	NA
Buoy (incl. anchor & chain sweep)	N	NA	NA	N	N	N	NA	NA	NA	NA	N	NA	NA
Lighting	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	N	NA	NA
Decommissioning													
Vessels	NA	N	NA	NA	NA	N	NA	N	NA	NA	N	NA	NA
Anchor Removal	N	NA	NA	N	N	NA	NA	NA	NA	NA	N	NA	NA

N = Negligible
NA = Not applicable or less than negligible

3.2.1 Vessel Related Potential Impacts

The vessel activities necessary to install, operate, and remove a MET/ocean buoy have the potential to affect coastal habitats and terrestrial mammals, marine mammals and sea turtles, air quality, and navigation, transportation, and military operations. Potential impacts to these resources are described below.

Although other resources could experience minor side effects from vessel related activities, due to the very limited number of vessels and vessel trips associated with the SAP activities, those effects are expected to be less than negligible; and therefore, will not be described further.

Certain non-routine events associated with vessel activities, although unlikely, include collisions and spills. Vessels associated with installation, operation, and decommissioning could collide with other vessels and experience accidental capsizing or result in a diesel spill. Collisions are considered unlikely since vessel traffic is controlled by multiple routing measures, such as safety fairways, TSSs, and anchorages. These higher traffic areas were excluded from the WEAs, as described in BOEM (2014).

A diesel spill could also occur as a result of accidents or natural events. Vessels are expected to comply with USCG requirements relating to prevention and control of oil spills.

Coastal Habitats and Terrestrial Mammals

Increased minimal vessel traffic associated with SAP activities could impact coastal habitats and terrestrial mammals due to wake erosion and associated sediment disturbance. However; given the existing volume and commercial/industrial nature of existing vessel traffic in the SAP Area, only a negligible increase, if any, to wake induced erosion may occur around smaller, non-armored, waterways used by project vessels. Therefore, potential impacts are expected to be negligible, if any.

Marine Mammals and Sea Turtles

Increased minimal vessel traffic associated with SAP activities could impact marine mammals and sea turtles due to the potential disturbance from work vessels and from vessel collisions.

The potential disturbance to this resource is from the presence of the vessels traveling to and from the SAP Area. The dominant source of noise from vessels is from the propeller cavitation, and the intensity of this noise is largely related to ship size and speed. Exposure of marine mammals and sea turtles to individual construction operations vessels would be transient, and the noise intensity would vary depending upon the source and specific location. Reactions of marine mammals may include apparent indifference, cessation of vocalizations or feeding activity, and evasive behavior (e.g., turns, diving) to avoid approaching vessels (Richardson et al., 1995; Nowacek and Wells, 2001). Behavior would likely return to normal following passage of the vessel, and it is unlikely that such short-term effects would result in long-term population-level impacts for marine mammals. Furthermore, the SAP Area and adjacent waters are well-traveled waters and are host to an active fishing industry (recreational and commercial) and commercial shipping industry, and marine mammals and sea turtles are habituated to the existing conditions. While vessel traffic associated with the SAP activities may add to the existing conditions, because there will so few vessel trips associated with the SAP activities, the change is expected to be insignificant. Thus, impacts from vessel presence and noise to marine mammals and sea turtles would be negligible, if any.

Vessels associated with the SAP activities could collide with marine mammals or sea turtles during transit. However; the implementation of the vessel strike avoidance measures (Section 3.3.1) will limit the likelihood or prevent such collisions. These measures contain vessel approach protocols derived from the MMPA and identify safe navigational practices based on speed and distance limitations when encountering marine mammals. Considering the implementation of mitigation measures; the limited intermittent activities, which are spread out temporally, no significant impacts due to vessel strikes are anticipated. Thus, impacts from vessel collisions to marine mammals and sea turtles would be negligible, if any.

Air Quality

Due to the low level of additional vessel traffic that will be traversing the SAP Area at any one time over the course of the installation, operation and removal of the MET/ocean buoy(s), and due to the existing air quality in these areas, the amount of human activity that emits air pollutants in these areas, and the short duration of the emissions associated with these activities, and the mitigation measures described in Section 3.3, the potential impacts to ambient air quality are expected to be negligible, if any.

Navigation, Transportation, and Military Operations

There will be a very limited increase in vessel traffic associated with SAP activities, and only limited potential for impacts to navigation, transportation and military activities. SAP activities, in accordance with the Lease, are subject to restrictions imposed by military and NASA needs, rules, and regulations. To address the requirements of its Lease and avoid such interference, coordination between the Department of Defense (DoD) and vessel operators and contractors will be required, as needed throughout SAP activities, to ensure there are not conflicts with and/or adverse impacts to military activities in the SAP Area. Thus, potential impacts to navigation, transportation, and military operations are expected to be negligible, if any.

3.2.2 Buoy-Related Potential Impacts

The presence of a MET/ocean buoy, and its components, have the potential to affect geologic resources, benthic resources, fisheries and essential fish habitat, marine mammals and sea turtles, navigation, and transportation and military operations. Potential impacts to these resources are described below.

Although other resources could experience minor effects from the buoy(s) presence, due to the very small size of the buoy(s) and temporary existence, those effects are expected to be less than negligible; and therefore, will not be described further.

Geologic Resources

It is anticipated that deployment of the MET/ocean buoy would impact a small area of seafloor, approximately 4 m^2 (43 ft^2), due to placement of the anchor or mooring weight to secure the buoy. Thus, potential impacts to geologic resources are expected to be negligible, if any.

Benthic Resources

The primary direct impact from installation of the buoy(s) would include injury or mortality of benthic epifauna and infauna within the immediate area where the anchor is placed on the seafloor. Indirect construction impacts from suspended sediments and sediment deposition are not anticipated during installation of the buoy(s).

Operational impacts to benthic resources would consist primarily of anchor chain sweep and habitat alteration, both of which would be temporary and highly localized. With regard to anchor chain sweep, organisms with limited mobility and consequent inability to avoid the impacted area may experience injury or mortality. However, these impacts are anticipated to be temporary and highly localized; chain sweep is expected to disturb an area with a radius of 100-150m around the anchor.

Habitat alteration will be associated with the introduction of hard substrate (concrete slab anchors and chains) in an area currently consisting of unconsolidated sands. Benthic epifauna adapted to hard bottom habitats (fouling community) would be anticipated to colonize the new areas of hard substrate created by the buoy(s) anchoring system.

Indirect impacts from suspended sediments and sediment deposition are possible but expected to be extremely limited, due to the small size and temporary nature of the MET/ocean buoy and anchoring system.

The primary direct impact from removal of the buoy(s) would include injury or mortality of benthic epifauna that colonized the anchor during operation. However, following removal of the anchor, the benthic community is expected to rapidly recolonize the underlying seafloor. Indirect impacts from suspended sediments and sediment deposition are not anticipated during removal of the buoy(s).

Overall, small area of impact, compared to the large source area of similar undisturbed habitat adjacent to it, is expected to result in rapid recovery of benthic resources following removal of the MET/ocean buoy(s), as has been observed following temporary physical disturbance in similar habitats (e.g., Guerra-García et al. 2003, Schaffner 2010). Thus, potential impacts to benthic resources from SAP activities are anticipated to be negligible, if any.

Fisheries and Essential Fish Habitat

The presence of MET/ocean buoy(s) would result in some loss of habitat and cause some sediment to become suspended around the anchor chain sweep. This sediment would be dispersed and settle on the surrounding seafloor. However, due to the small footprint of disturbance relative to the overall resource, the temporary nature of the action, and availability of similar benthic habitat adjacent to the SAP Area, it is expected that the SAP activities would have negligible effects that could impact fish resources, if any.

Marine Mammals and Sea Turtles

The presence of MET/ocean buoy(s) would result in small areas of the seafloor being temporarily disturbed and occupied. This activity could conceivably impact marine mammals and sea turtles by removing a small amount of forage area that would otherwise be available to these species. However, due to the small footprint of disturbance, the temporary nature of the action, and likely availability of similar habitat adjacent to the SAP Area, it is expected that the presence of buoy(s) would have negligible effects that could impact marine mammals and sea turtles.

Navigation, Transportation and Military Operations

The presence of a MET/ocean buoy(s) has the potential to interfere with existing vessel traffic and military operations. The mitigation measures described in Section 3.3 will significantly reduce any potential impacts to navigation, transportation and military operations. Thus, potential impacts to navigation, transportation and military operations are expected to be negligible, if any.

3.3 Mitigation Measures

In accordance with the Lease and BOEM's 2014 EA, the following subsections describe the Standard Operating Conditions (SOCs) pertinent to the installation, operation, and removal of a temporary MET/ocean buoy.

For cultural resources and biologically sensitive habitats, the primary mitigation strategy is avoidance. The exact location of meteorological towers and buoys would be adjusted to avoid adverse effects to offshore cultural resources or biologically sensitive habitats, if present.

BOEM has developed several measures called Standard Operating Conditions (SOCs) to minimize or eliminate impacts on protected species. These SOCs were developed through consultation with other Federal and State agencies. The following mitigation measures are derived from BOEM's SOCs and supplemented with additional measures to ensure protection to the affected resources.

3.3.1 Vessel Strike Avoidance Measures

The measures in this section are quoted directly from the Lease and are applicable to the preparation of a SAP and a COP. These measures are not applicable to approved SAP activities, although the measures used in the activities described herein are expected to be similar.

3.3.1.1. The Lessee must ensure that all vessels conducting activity in support of plan (i.e., Site Assessment Plan [SAP] and/or COP) submittal comply with the vessel-strike avoidance measures specified in the following stipulations, except under extraordinary circumstances when complying with these requirements would put the safety of the vessel or crew at risk

3.3.1.2. The Lessee must ensure that vessel operators and crews maintain a vigilant watch for cetaceans, pinnipeds, and sea turtles and slow down or stop their vessel to avoid striking these protected species.

3.3.1.3. The Lessee must ensure that all vessel operators comply with 10 knot (<18.5 km/hr) speed restrictions in any Dynamic Management Area (DMA). In addition, the Lessee must ensure that all vessels operating from November 1 through July 31 operate at speeds of 10 knots (<18.5 km/hr) or less.

3.3.1.4. North Atlantic Right Whales:

3.3.1.4.1. The Lessee must ensure all vessels maintain a separation distance of 500 m (1,640 ft) or greater from any sighted North Atlantic right whale.

3.3.1.4.2. The Lessee must ensure that the following avoidance measures are taken if a vessel comes within 500 m (1,640 ft) of any North Atlantic right whale:

3.3.1.4.2.1. If underway, vessels must steer a course away from any sighted North Atlantic right whale at 10 knots (<18.5 km/h) or less until the 500 m (1,640 ft) minimum separation distance has been established (except as provided in Stipulation 3.3.1.4.2.2).

3.3.1.4.2.2. If a North Atlantic right whale is sighted in a vessel's path, or within 100 m (328 ft) to an underway vessel, the underway vessel must reduce speed and shift the engine to neutral. The Lessee must not engage the engines until the North Atlantic right whale has moved outside the vessel's path and beyond 100 m (328 ft).

3.3.1.4.3. If a vessel is stationary, the vessel must not engage engines until the North Atlantic right whale has moved beyond 100 m (328 ft), at which point the Lessee must comply with Stipulation 3.3.4.2.1.

3.3.1.5. Non-delphinoid Cetaceans Other than the North Atlantic Right Whale:

3.3.1.5.1. The Lessee must ensure all vessels maintain a separation distance of 100 m (328 ft) or greater from any sighted non-delphinoid cetacean.

3.3.1.5.2. The Lessee must ensure that the following avoidance measures are taken if a vessel comes within 100 m (328 ft) of any non-delphinoid cetacean:

3.3.1.5.2.1. If any non-delphinoid cetacean is sighted, the vessel underway must reduce speed and shift the engine to neutral, and must not engage the engines until the non-delphinoid cetacean has moved outside of the vessel's path and beyond 100 m (328 ft).

3.3.1.5.2.2. If a vessel is stationary, the vessel must not engage engines until the non-delphinoid cetacean has moved out of the vessel's path and beyond 100 m (328 ft).

3.3.1.6. Delphinoid Cetaceans:

3.3.1.6.1. The Lessee must ensure that all vessels maintain a separation distance of 50 m (164 ft) or greater from any sighted delphinoid cetacean.

3.3.1.6.2. The Lessee must ensure the following avoidance measures are taken if the vessel comes within 50 m (164 ft) of a sighted delphinoid cetacean:

3.3.1.6.2.1. The Lessee must ensure that any vessel underway remain parallel to a sighted delphinoid cetacean's course whenever possible, and avoid excessive speed or abrupt changes in direction. The Lessee may not adjust course and speed until the delphinoid cetacean has moved beyond 50 m (164 ft) and/or the delphinoid cetacean has moved abeam of the underway vessel.

3.3.1.6.2.2. The Lessee must ensure that any vessel underway reduce vessel speed to 10 knots (18.5 km/h) or less when pods (including mother/calf pairs) or large assemblages of delphinoid cetaceans are observed. The Lessee may not adjust course and speed until the delphinoid cetaceans have moved beyond 50 m (164 ft) and/or abeam of the underway vessel.

3.3.1.7. Sea Turtles and Pinnipeds:

3.3.1.7.1. The Lessee must ensure all vessels maintain a separation distance of 50 m (164 ft) or greater from any sighted sea turtle or pinniped.

3.3.1.8. Vessel Operator Briefing. The Lessee must ensure that all vessel operators are briefed to ensure they are familiar with the above listed stipulations.

3.3.2 Marine Trash and Debris Prevention

The measures in this section are quoted directly from the Lease.

The Lessee must ensure that vessel operators, employees, and contractors engaged in activity in support of plan (i.e., SAP and/or COP) submittal are briefed on marine trash and debris awareness and elimination, as described in the Bureau of Safety and Environmental Enforcement (BSEE) Notice to Lessee (NTL) No. 2015-G03 ("Marine Trash and Debris Awareness and Elimination") or any NTL that

supersedes this NTL, except that the Lessor will not require the Lessee, vessel operators, employees, and contractors to undergo formal training or post placards. The Lessee must ensure that these vessel operator employees and contractors are made aware of the environmental and socioeconomic impacts associated with marine trash and debris and their responsibilities for ensuring that trash and debris are not intentionally or accidentally discharged into the marine environment. The above-referenced NTL provides information the Lessee may use for this awareness training.

3.3.3 Buoy Markings and Lighting

Navigation lights for buoy(s) will be in compliance with USCG requirements. In addition, support vessels will be used only when necessary and vessel lighting will be hooded and directed downward, when possible, to reduce upward illumination and illumination of adjacent waters.

3.3.4 Buoy Notifications

Vineyard Wind will communicate the exact GPS location of the buoy(s) with the USCG, DoD, BOEM, and all other pertinent agencies. Additionally, the exact timing of the installation and removal of the buoy(s) will also be directly coordinated with USCG, DoD, BOEM, and all other pertinent agencies.

3.3.5 Air Quality Control Measures

Given the minimal air emissions associated with the SAP activities the appropriate mitigation measures are consistent with industry standard, area-wide measures for marine vessels. This includes existing fleet wide requirements for engine certifications (for 40 C.F.R Part 89, Tier 3 engines typical), emissions control equipment, and regular maintenance along with the use of ultra-low sulfur diesel fuel.

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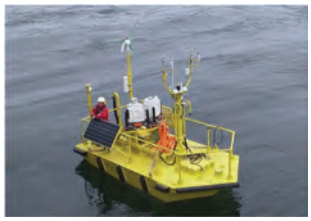
Appendix A

MET/Ocean Buoy Specifications

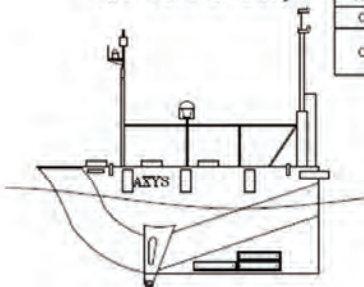
Proposed AXYS Buoy Systems

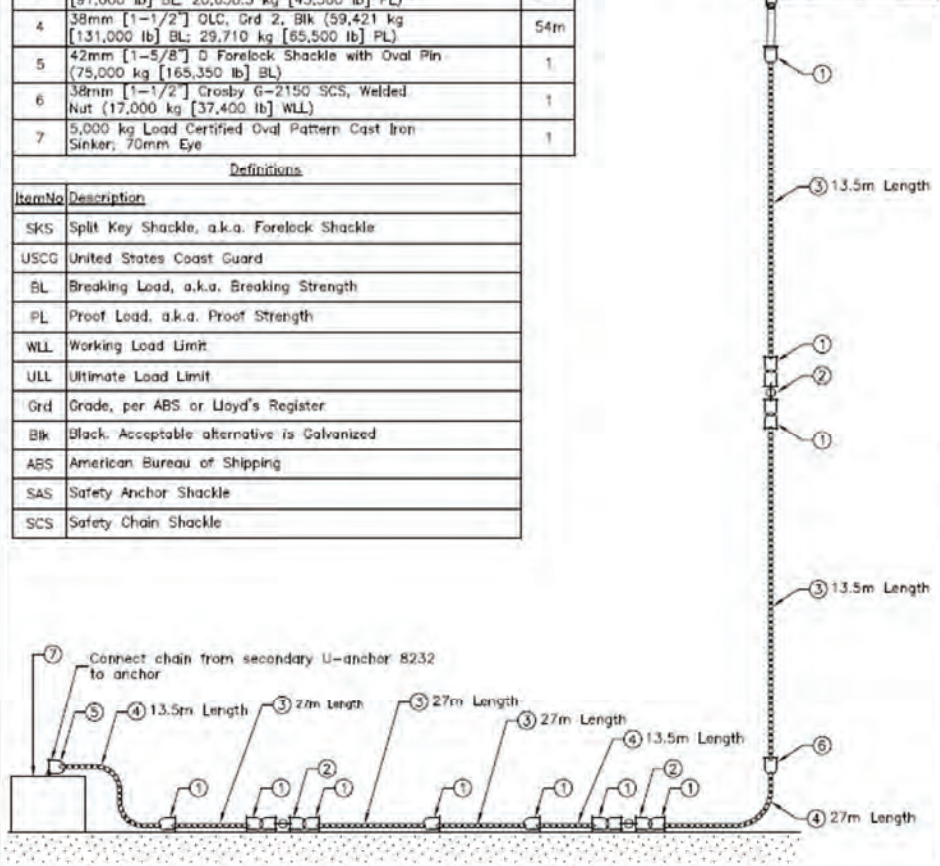
AXYS WindSentinel Floating LiDAR (also referred to as "Flidar", a commercial name by AXYS)	
	The AXYS WindSentinel is a marine buoy equipped with LiDARs specifically suited for marine conditions. Specific details of the device can be found in Appendix A. This summary table only addresses key technical data.
Overall dimension	Length: 6.30m (248 inches) Width: 3.2m (126 inches) Height to Deck Hatch: 2.85m (112 inches)
Weight	Bare Hull Weight (BHW) with no batteries, fuel or payload: *Approx. 6,800 kg (15,000 lbs) (includes 1,000 #/454kgs ballast)* BHW + 40 batteries + full payload + 240 gallons fuel *Approx. 10,000 kg (21,800 lbs)*

AXYS Technology - TRIAXYS Wave and Current Buoy	
	The AXYS TRIAXYS is a marine buoy measuring sea state conditions and sub surface currents. • Specific details of the device can be found in Appendix A. This summary table only addresses key technical data.
Overall dimension	Diameter: 1.10m (43 inches) Height: 1.10m (43 inches)
Weight	Weight (including batteries): 230 kg (510 lbs)

DEPLOYMENT DEPTH: 28.8m – 54.5m
MOORING LENGTH: 162m
MOORING SCOPE: 5.63:1 to 2.97:1
EXCURSION RADIUS: 159m – 153m

6m NOMAD Buoy





Bill of Materials

ItemNo	Description	Qty
1	38mm [1–1/2"] 3rd Class USCG SKS (28,223 kg [62,000 lb] PL)	10
2	38mm [1–1/2"] Eye&Eye Swivel, Welded Nut (20,502.4 kg [45,200 lb] WLL; 102,512 kg [226,000 lb] ULL)	3
3	32mm [1–1/4"] OLC, Grd 2, Blk (41,276.9 kg [91,000 lb] BL; 20,638.5 kg [45,500 lb] PL)	108m
4	38mm [1–1/2"] OLC, Grd 2, Blk (59,421 kg [131,000 lb] BL; 29,710 kg [65,500 lb] PL)	54m
5	42mm [1–5/8"] D Forelock Shackle with Oval Pin (75,000 kg [165,350 lb] BL)	1
6	38mm [1–1/2"] Crosby G–2150 SCS, Welded Nut (17,000 kg [37,400 lb] WLL)	1
7	5,000 kg Load Certified Oval Pattern Cast Iron Sinker; 70mm Eye	1

Definitions

ItemNo	Description
SKS	Split Key Shackle, a.k.a. Forelock Shackle
USCG	United States Coast Guard
BL	Breaking Load, a.k.a. Breaking Strength
PL	Proof Load, a.k.a. Proof Strength
WLL	Working Load Limit
ULL	Ultimate Load Limit
Grd	Grade, per ABS or Lloyd's Register
Blk	Black. Acceptable alternative is Galvanized
ABS	American Bureau of Shipping
SAS	Safety Anchor Shackle
SCS	Safety Chain Shackle

REVISIONS

REV.	DESCRIPTION	DATE D/M/Y	BY
00	Original design	11/08/16	AJM
01	Added extra swivel, welded SCS, and U mooring separation diagram as per TE, increased font	07/10/16	JRC

NOTES:
1. Reference http://goo.gl/ENikX4 for North American chain dimensions.
2. Reference http://goo.gl/jnnIS5 for European chain dimensions.
3. Reference http://goo.gl/NTiaOw for 1–1/2" US Coast Guard 3rd Class Split Key Shackle Specifications.

When printed, make sure you are using the most current revision of this document.

DESIGNER	QA	TEMPLATE #
AXYS	This drawing is controlled through Q–PULSE	QT730–03–00.dwg

DIMENSIONS IN INCHES
UNLESS OTHERWISE SPECIFIED.
LINEAR TOLERANCES ARE:
X ±0.1 X.X ±0.03
X.XX ±0.01 X.XXX ±0.003
ANGULAR TOLERANCES ARE:
X.X ±0.1 X.XX ±0.05

MATERIAL: As Specified
FINISH: –
ACAD FILE: ..\CONTROLLED DOCUMENTS\08195\0819500S.dwg

AXYS TECHNOLOGIES INC.
P.O.BOX 2219, 2045 MILLS RD.
SIDNEY, B.C., CANADA V8L 3S8
(250)655–5850 Fax:(250)655–5856

FLiDAR WindSentinel
28–55m Depth, All Chain, w/ Anchor

SCALE	DRAWN BY	DATE
NTS	AJM	11/08/16

SHEET	SIZE	DRAWING NUMBER	REV
1 of 2	A	08195	01

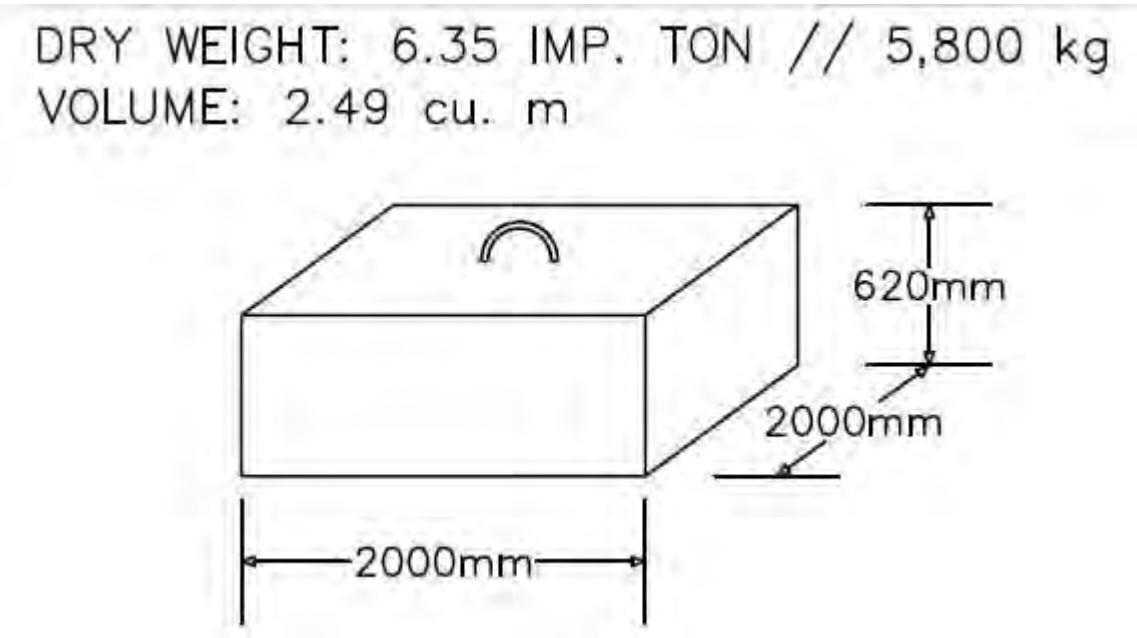
TECHNICAL NOTE

Project Name	Vineyard Wind LLC			**Date**
Revision no.	1	**Author**	CBM	2017-02-21
Document no.	-	**Checker**	RGA	2017-02-21
Title	General input to SAP			

http://www.oceanor.no/

Mooring specifications

Example of a concrete anchor.



Using a rated steel anchor is preferred and it has a smaller footprint.

FLiDAR WindSentinel Buoy

Prepared by

AXYS Technologies

Head Office
2045 Mills Road
Sidney, British Columbia
Canada

European Office
Esplanadestraat 1
8400 Oostende
Belgium

www.axystechnologies.com

Housing

Hull	5086 Aluminum (4x compartments)
Superstructure	6061 Aluminum
Mooring Bridle	316 Stainless Steel (Isolated)
Anodes	10kg Zinc (4x mooring yoke; 2x Hull)

Dimensions

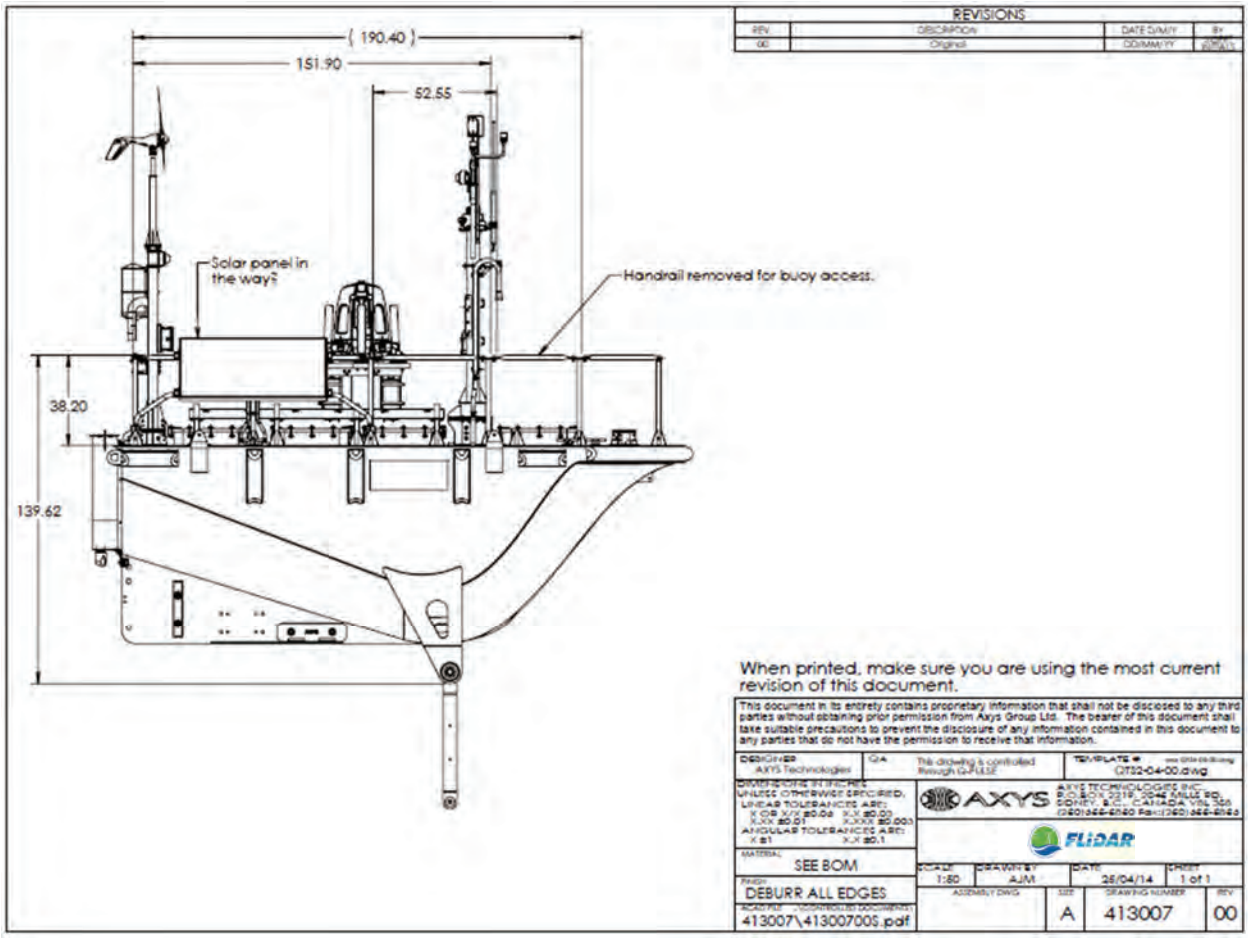


Figure 1: FLiDAR WindSentinel Dimensions – Dual ZephIR Deployment View

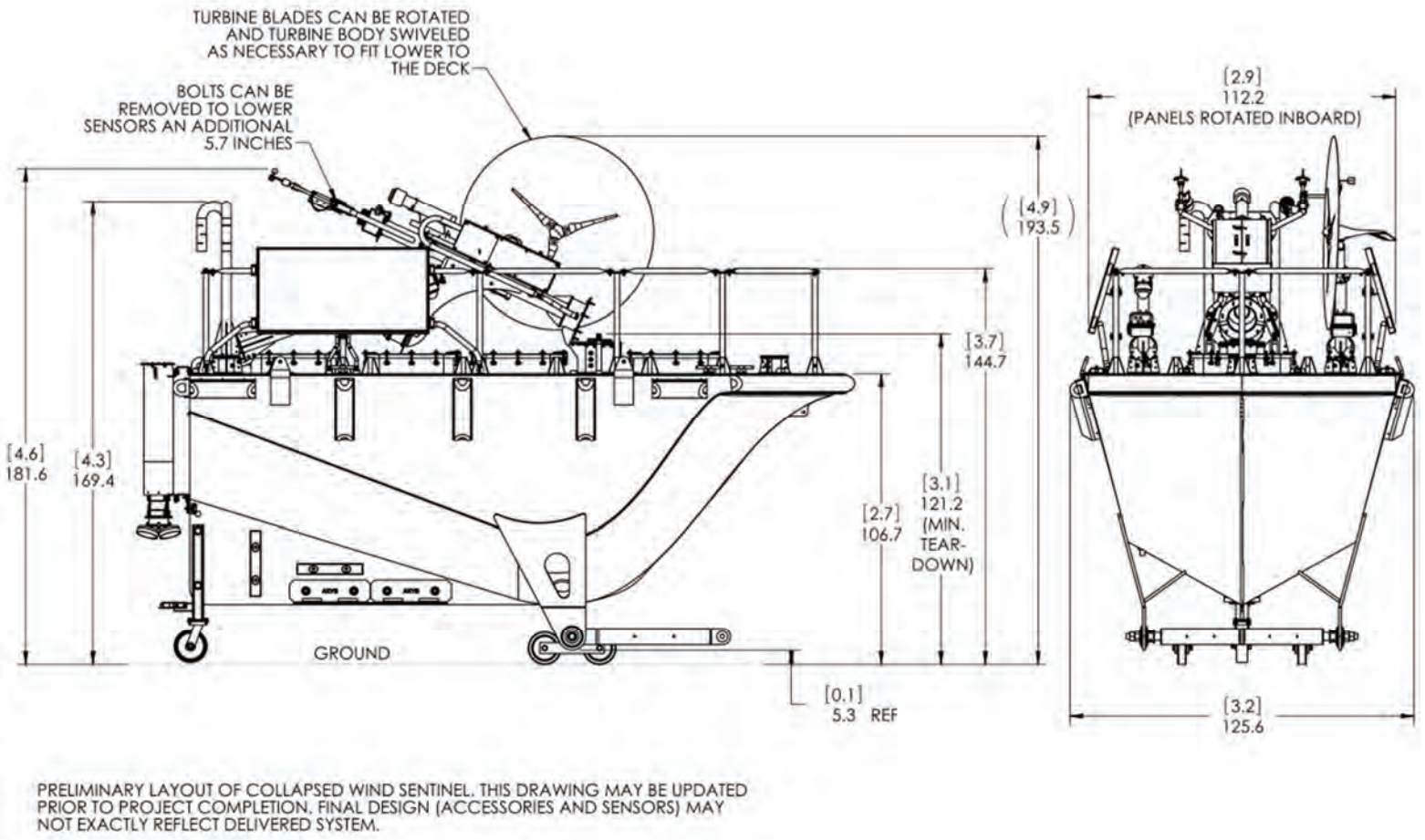


Figure 2: FLiDAR WindSentinel Dimensions – Transportation View

Table 1: Dimensions

Item	Specification
Length	6.30m (248 inches)
Width	3.2m (126 inches)
Height to Deck Hatch (from Yoke Pivot)	2.85m (112 inches)

Weight

Table 2: Weights

Item	Specification
Bare Hull Weight- BHW (with no batteries, fuel or payload)	Approximately 6818 kg (15,000 lb) (includes 1,000 #/454kgs ballast)
BHW + 40 batteries	Approximately 8090 kg (17,800 lb)
BHW + 40 batteries + full payload	Approximately 8773 kg (19,300 lb)
BHW + 40 batteries + full payload + 240 gallons fuel	Approximately 9,910 kg (21,800 lb)

Lighting

Carmanah Light Model M850 Solar LED Marine Lantern.

- Over 7 NM range (3-6 NM in all colours)
- integrated batteries and solar panels
- independent of other buoy components
- Programmable signal pattern can be set to following specifications:
  - FAA L-810 (AC 150/5345-43, EB67)
  - ICAO Type A (Annex 14, Vol. 1, 5th Ed./2009)
  - ICAO Type A (Annex 14, Vol. 1, 6th Ed./2013)
  - ICAO Type B (Annex 14, Vol. 1 5th Ed./2009)
  - ICAO Type B (Annex 14, Vol. 1, 6th Ed./2013)
  - CASA 10 cd (Part 133, Vol. 2)*
  - Transport Canada CD-810 (Std. 621)

Mooring Type, Scope and Materials

The mooring design will take the following factors into consideration:

- Water depth
- Desired length of life of the mooring
- Vessel traffic in the vicinity of the mooring
- Current speed
- Tides
- Waves
- Winds

PROCEDURE FOR A TWO DAY DEPLOYMENT AXYS 6 m FLiDAR buoy

N.B. All works will be preceded by a tool box talk involving all personnel.

A: Pre-mobilization

1. The RAMS document will be approved and agreed between all parties prior to mobilization (AXYS, TSM, and Client).
2. A pre-survey brief will be conducted in the office between the Project Manager and the survey personnel. Survey requirements will be outlined, responsibilities will be defined, next-of-kin details checked and HS&E issues discussed.
3. Weather, tide and sea state will be monitored prior to the works. Mobilization will be subject to safe, workable limits and forecasts. Client will be informed of planned mobilization as soon as the decision to mobilize has been made.

Trip One on Day One: Mooring Deployment

B: Vessel mobilization

1. The anchor weight, lower sections of riser chain (67.5m), rope (28mm dia 3 Strand PolySteel Rope – Break load 13900kg) and temporary marker float will be mobilized to the TSM Albatre in port using an onshore crane.
2. The anchor weight will be placed to the stern of the TSM Albatre.
3. The vessel crane will be used to flake the chain according to its deployment order (see Fig. 2). All riser chain components will be checked. Sacrificial tag lines will be placed at the forward end of each flake between the chain and towing bollard.

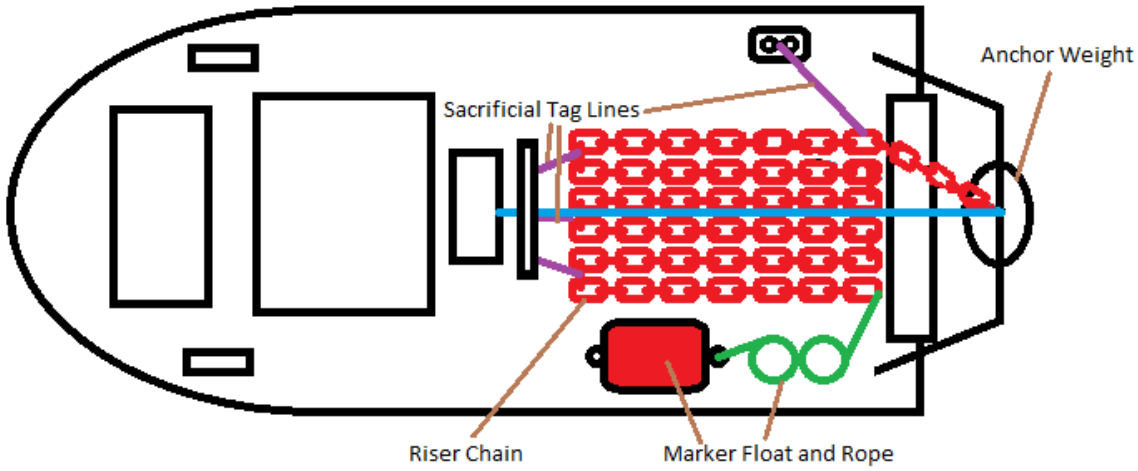


Figure 2: Deck layout of TSM Albatre after mooring has been setup. N.B. Not to scale.

4. The winch wire will be passed through the A-frame and the release hook connected.
5. The release hook will be connected to the anchor weight.
6. A tag line will be attached between a cleat on the TSM Albatre and the main winch capstan, passing through the anchor weight eye and kept taught to secure the anchor weight.

7. The shore-side crane will move the anchor weight to below the A-frame with the top of the anchor weight level with the deck. The winch wire will take the load of the anchor weight and the shore-side crane will be disconnected.
8. Another sacrificial tag line will be connected to the riser chain and a cleat at the stern of the TSM Albatre.
9. The anchor weight will be secured to prevent uncontrolled release of the release hook.

C: AXYS 6 m FLiDAR buoy mooring deployment operation (see Figure 3)

1. A pre-sail briefing will be conducted to define personnel roles and responsibilities.
2. The TSM Albatre will transit to the deployment site.
3. The rope will be attached between the free end of the riser chain and the marker float.
4. The TSM Albatre will take position away from the deployment location and deploy the rope and marker float over the stern of the vessel. Sacrificial tag lines will then be removed from the mooring prior to the chain deployment operations.
5. The TSM Albatre will begin slowly moving towards the deployment location while the chain is released over the stern. The mooring will be allowed to stream off deck over the stern of the vessel (see Fig. 3).
6. The TSM Albatre will maneuver on to position.
7. The release line for the release hook will be controlled by a member of the crew to ensure the line is slack during the deployment operations. This crew member will be positioned to the starboard side of the TSM Albatre.
8. The tag lines and securing lines will be removed from the anchor weight.
9. The safety latch of the release hook will be removed and the anchor weight will be lowered to the seabed.
10. Once on the seabed, the weight will be raised slightly for final positioning. Once on position, the release hook will be engaged and anchor weight deployed.

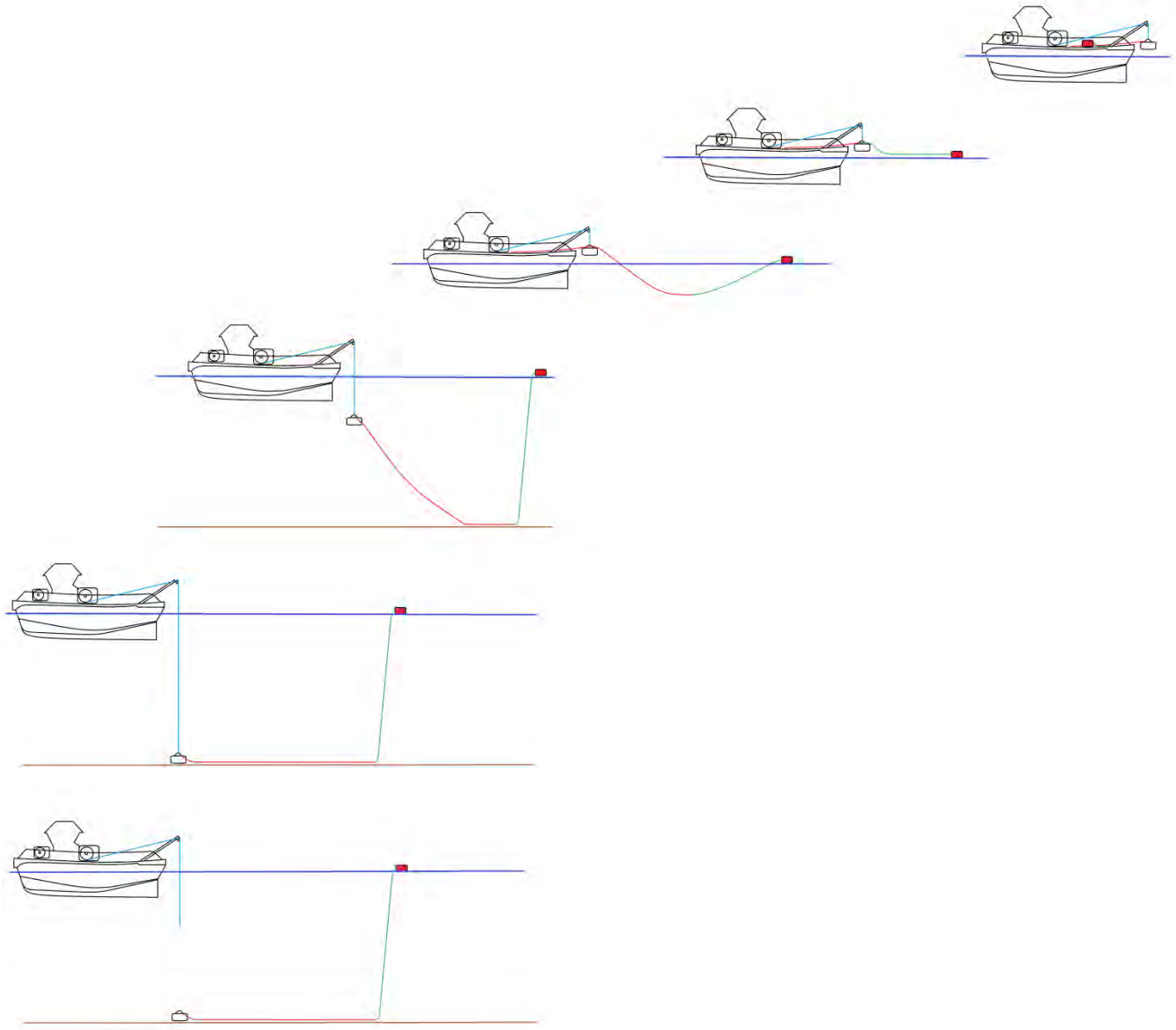


Figure 3: Diagram of riser chain deployment operation. N.B. Image is not to scale; diagram to be used as a guide to operation only. Red lines refer to chain, green lines refer to ropes, light blue lines to winch wires.

Trip Two on Day 2: AXYS 6 m FLiDAR buoy Deployment

D: Vessel mobilization

1. The upper mooring section (13.5m) will be attached to the AXYS 6 m FLiDAR buoy shackled and secured. The free end of the mooring section will be transferred to the TSM Albatre and attached to the winch wire.
2. The AXYS 6 m FLiDAR buoy will be lifted in the water behind the vessel, using an onshore crane and lifting strops attached to the lifting eyes of the AXYS 6 m FLiDAR buoy.

3. The AXYS 6 m FLiDAR buoy will be secured to the quayside in addition to the tow line if departure of the TSM Albatre is delayed for lock gates or similar.

E: AXYS 6 m FLiDAR buoy towing operations

1. The upper mooring (13.5m) section of riser chain from the AXYS 6 m FLiDAR buoy will be used as the primary tow point.
2. The tow will proceed at a maximum of 5 knots from the mobilization port to the deployment site.
3. The TSM Albatre will transit the Dieppe port locks towing the buoy close astern for ease of control.
4. Once in open water, the tow line will be extended to a suitable distance for the tow.
5. Once upon site, the winch wire will be pulled in and a sacrificial line attached to the riser chain. The winch wire will then be removed.
6. A 20m line will be attached between the lower end of the riser chain and a float.
7. The Celtic Wind/Warrior will approach the AXYS 6 m FLiDAR buoy and attach lines to maneuver the AXYS 6 m FLiDAR buoy.
8. The riser will be disconnected from the vessel and the AXYS 6 m FLiDAR buoy moved away using the Celtic Wind/Warrior for the duration of the riser chain recovery.

F: AXYS 6 m FLiDAR buoy deployment operations (see Figure 4)

1. The marker float will be recovered by the TSM Albatre and the rope attached to the main capstan winch. The rope will be wound on, and the mooring chain pulled to the surface.
2. The mooring chain will be brought on deck and secured. The rope will be removed from the riser chain.
3. The mooring buoy for the chain attached to the AXYS 6 m FLiDAR buoy will be recovered and the chain brought on deck and secured.
4. The final connection between the AXYS 6 m FLiDAR buoy and the riser chain will be made.
5. The completed mooring will then be released overboard.
6. The Celtic Wind/Warrior will remove its tow line from the buoy.
7. Post deployment checks will be made, including visual checks of the mooring behavior and buoy movement.

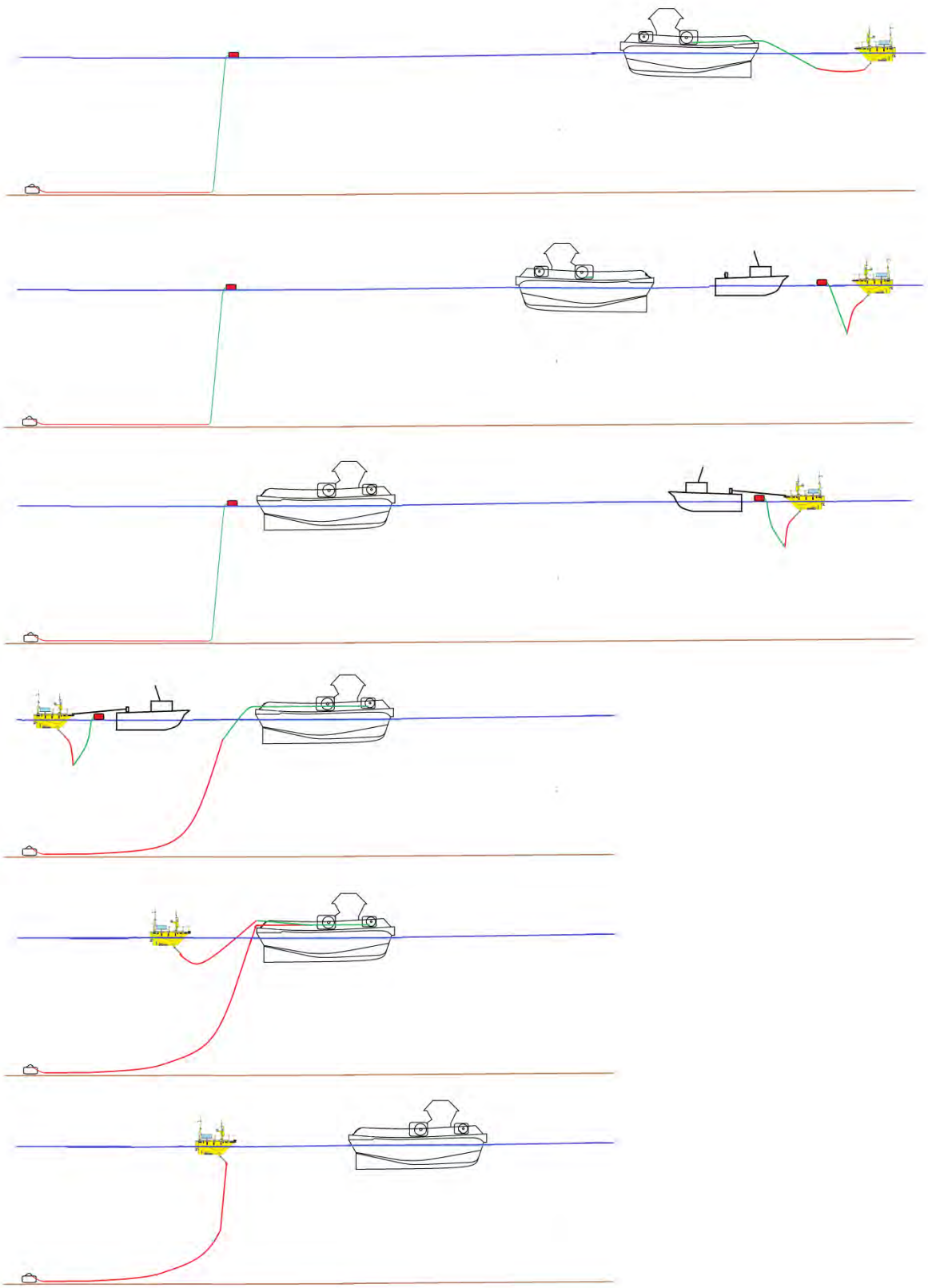


Figure 4: AXYS 6 m FLiDAR buoy deployment operations. N.B. Diagram to be used as a guide to operation only. Red lines refer to chain, green lines refer to ropes.

G: Demobilization

1. A survey de-brief will take place on return to the office between survey personnel and Project Manager. Any actions arising from the post-survey debrief will be assigned to a member of the team and deadlines given.

An operational and functionality report will be produced by survey personnel to a template agreed upon before operations begin.

NORTHSTAR
ENVIRONMENTAL & MARINE SERVICES
Est. 1990

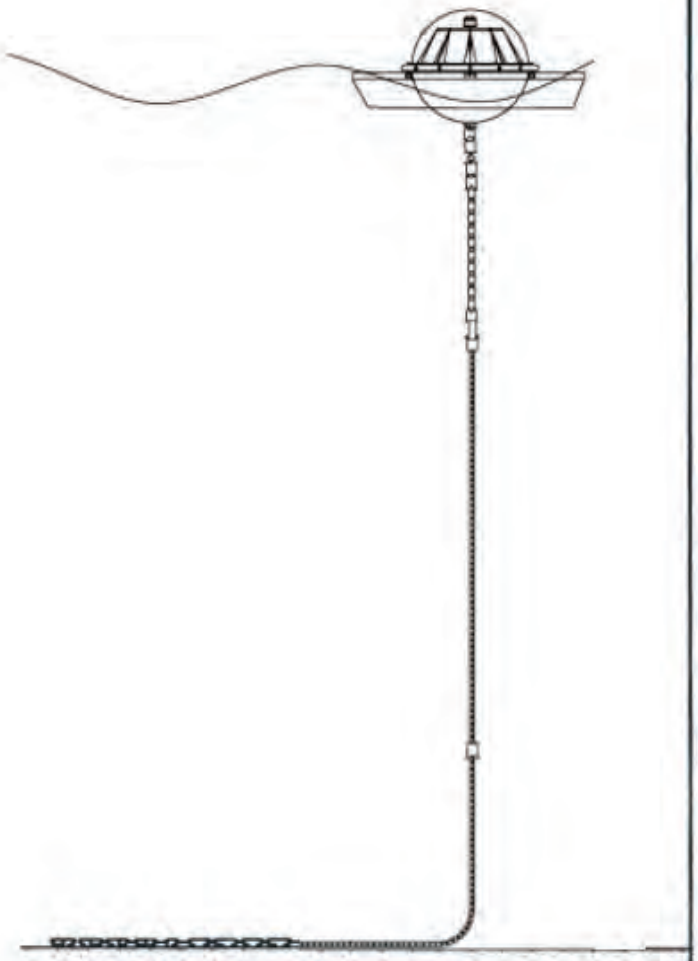
NORTHSTAR COMMANDER

The Northstar Commander is a multi-purpose offshore utility vessel (work-boat), capable of performing a wide variety of duties such as towing, salvage, marine construction, oil-spill response work, in-shore supply work and supporting a wide array of scientific and research projects.

SPECIFICATIONS

Vessel Type	R/V / Commercial Utility Vessel
Length, overall	92ft
Beam	26ft
Draft	8.5ft
Engine	Twin screw Volvo D125-E 450hp each (new 2011)
Accommodations	12 births in 3 cabins
Navigation	2x Furuno Radars, Furuno Nav Net Chart Plotter, AIS & DGPS, Raytheon Thermal Imaging Camera
Fuel Capacity	10,000 gallons
Water Capacity	2,900 gallons with additional options available for extended cruises
Other Equipment	75 ton Tow Winch
	Generators: 1x 65KW John Deere (new 2015) 1X 65KW Caterpillar (reconditioned 2010)
	3.75 ton Palfinger PK 18080MD-S25 Marine Knuckleboom Crane
	Push Knee, Towing Winch, Capstan & Windlass
	Heavy A-frame ready, 16ft A-frame available
	Deck Office Container available
	Auxiliary Hydraulics and additional Pull Master Winches available
	Full USGS safety requirements met

Design Scope: 2:1
Max. Current 1.5m/sec
Max. depth 75m



AXYS ENVIRONMENTAL SYSTEMS LTD.
P.O.BOX 2219, 2045 MILLS RD.
SIDNEY, B.C., CANADA V8L 3S1
(604)656-0881 Fax:(604)656-4511

Standard TRIAXYS Mooring Configuration 30-75m

SCALE	DATE	DRAWN BY	APPROVED BY
NTS	Dec 98	AGS	
		A	

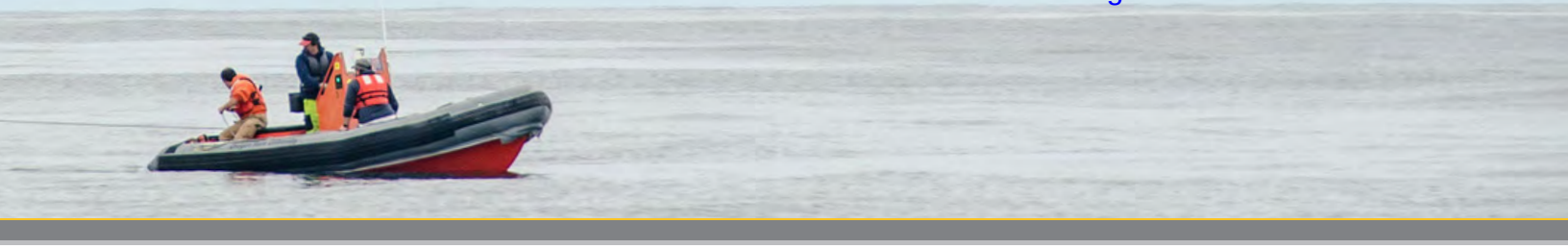
AXYS TECHNOLOGIES INC.

TRIAXYS™

The TRIAXYS™ Wave & Current Buoy is a precision instrument incorporating advanced technologies that make it an easy to use, reliable and rugged buoy for accurate measurement of directional waves and three dimensional currents.

FEATURES & BENEFITS

- Integrated current profiling
- Reliable operation in extreme weather or geographical locations
- Solar powered
- 5 year rechargeable battery life
- Supports AIS Aid to Navigation
- Supports any telemetry
- >2 years of data storage capacity
- Continuous wave sampling
- Spin and impact resistant



TRIAXYS™

Wave & Current Buoy

The TRIAXYS™ Wave & Current Buoy measures directional waves and 3D currents accurately and precisely. The buoy can withstand the rigors associated with deployment and recovery operations including, impact shock, spinning and temporary submergence.

The heart of the TRIAXYS™ Wave & Current Buoy is developed from the AXYS WatchMan500™, which integrates sensor systems and provides onboard data processing, data logging, telemetry, and diagnostic/set-up routines.

The current profiler works equally well in typical ocean surface water and in the high sediment suspensions found near the coast or in rivers. A variety of head designs ensures optimal measurement conditions, regardless of deployment surroundings. The current profiler is insensitive to biofouling and has no moving parts. It provides current speed and direction in up to 128 different layers of the water column. The system electronics integrates Doppler velocity with temperature, pressure, tilt, and compass sensors – all standard with each instrument.

The data transmitted from the buoy include wave statistics, HNE (Heave, North and East Displacements), MeanDir (Wave Direction and energy as a function of frequency), directional and non-directional wave spectra, buoy configuration, status data, position, and WatchCircle™ alarm messages.

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Specifications

- PHYSICAL DESCRIPTION
  Diameter: 1.10m outside bumper
  Weight (including batteries): 235 kg
  Obstruction Light: Amber LED. Programmable IALA ODAS flash sequence with three miles visibility.
- MATERIALS
  Hull: Stainless steel
  Dome: Impact resistant polycarbonate
  Solar Panel Assembly: Fibreglass over foam
  Clamping ring: Stainless steel
- CURRENT PROFILER
  Nortek: Aquadopp 400KHz, 600KHz, 1MHz or 2MHz
  Teledyne RD Instruments: Workhorse Monitor 600KHz
- POWER SYSTEM
  Batteries: 4 @ 12 Volt,100 Amp hr/battery
  Solar Panels: 10 @ 6 Watt
  Maximum Power Point Tracking (MPPT) Regulator
- TELEMETRY OPTIONS
  - VHF/UHF
  - IsatData Pro
  - INMARSAT M2M
  - IRIDIUM
  - HSPA Cellular (compatible with GPRS)
  - AIS Aid to Navigation

Resolution/Accuracy

	RANGE	RESOLUTION	ACCURACY
HEAVE	±20 m	0.01 m	Better than 1%
PERIOD	1.5 to 33 sec	0.1 sec	Better than 1%
DIRECTION	0 to 360°	1°	3°
CURRENTS	0-10 m/s	1 cm/s	±10 cm/s
WATER TEMP.	-5 to +50°C	0.1°C	±0.5°C

NORTHSTAR
ENVIRONMENTAL & MARINE SERVICES
Est. 1990

Northstar 4

EQUIPMENT DATA SHEET

Item	Description	Details	Remarks
1	**Vessel Type**	Richard Squires Commercial Workboat	
2	**Official No.**	560915	
3	**Construction**	Aluminum	
4	**Length, Overall**	49’ 6”	
5	**Beam**	14’ 8”	
6	**Draft**	3’ 10”	
7	**Observation platform** **Clear deck space**	14’ x 20’	
8	**Tonnage**	24 GRT	

9	**Color**	Black/White	
10	**Engine**	TMAD 102 Volvo 425 HP Diesel	
11	**Generator**	12 kW Northern Lights	
12	**Cruising Speed**	15 Knots	
13	**Fuel Capacity**	1000 gallons	
14	**Range**	600 miles	
15	**Nav Instruments**	Radar Differential GPS & Chart Plotter Receiver Depth Sounder Auto Pilot	48-mile, Furuno FCV-585 Furuno GP-1850WD Furuno LC-90 Robertson AP 35
16	**Lifting Equipment**	Aft A-frame Altn. Hoisting Boom Avail. Hydraulic Winch Hydraulic Capstan	3000-lb capacity w/ 16’ head room 1,750-lb capacity 3,000-lb 2,000-lb
17	**Safety**	6 Man Life Raft USCG Safety Equipment EPIRB, 406 MHz VHF Radio (x2) Satellite Phone Flir IR Camera	
18	**Accommodations**	Sleeps 3, w/ head, shower and galley. Heated and Air Conditioned	
19	**Other Features**	Push Knee Misc. pumps, block and hardware	

Appendix B

BOEM Approval of Vineyard Wind Survey Plan

From: Rachel Pachter
To: Matt Robertson; Stephanie Wilson; Erik Peckar
Subject: FW: BOEM Review of OffshoreMW SAP Survey Plan (OCS-A 0501)
Date: Tuesday, February 21, 2017 3:56:46 PM

Rachel Pachter

From: "MacDuffee, David" <david.macduffee@boem.gov>
Date: Thursday, September 15, 2016 at 3:35 PM
To: Erich Stephens <estephens@offshoremwllc.com>, Rachel Pachter <Rpachter@offshoremwllc.com>
Cc: James Bennett <James.Bennett@boem.gov>, Annette Moore <annette.moore@boem.gov>, Michelle Morin <michelle.morin@boem.gov>, Lucas Feinberg <lucas.feinberg@boem.gov>, Jessica Stromberg <jessica.stromberg@boem.gov>, Brian Krevor <brian.krevor@boem.gov>
Subject: BOEM Review of OffshoreMW SAP Survey Plan (OCS-A 0501)

Erich and Rachel,

This message is being sent to your attention in response to Offshore MW LLC's (the Lessee's) Site Assessment Plan (SAP) Survey Plan, which was submitted to the Bureau of Ocean Energy Management (BOEM) pursuant to commercial lease OCS-A 0501 offshore Massachusetts.

Commercial lease OCS-A 0501 went into effect on April 1, 2015. The Lessee submitted the SAP Survey Plan pursuant to stipulation 2.1.1.1 of Addendum "C" of commercial lease OCS-A 0501 on May 31, 2016, with subsequent revisions submitted on June 27, July 17, July 25, August 1, and August, 26, 2016. BOEM has completed its review of the final version of the SAP Survey Plan dated August 25, 2016, and determined that the Lessee has satisfactorily modified the Plan to address Lessor's comments in accordance with stipulation 2.1.1.1 of Addendum C of the lease.

In addition to the SAP survey plan, the Lessee submitted an HRG survey equipment field verification plan required by stipulation 4.3.6.3 of Addendum C of the lease, and an Alternative Monitoring Plan to support the Lessee's request to conduct G&G surveys at night or when visual observation is otherwise impaired, as required by stipulation 4.3.3 of Addendum C of the lease. BOEM has determined that the Lessee has satisfactorily modified the HRG survey equipment field verification plan to address Lessor's comments in accordance with stipulation 4.3.6.3 of Addendum C of the lease. Additionally, BOEM has completed its review of the Alternative Monitoring Plan and authorizes the Lessee to conduct G&G surveys at night or when visual observation is otherwise impaired in accordance with stipulation 4.3.3 of Addendum C of the lease.

In accordance with the Biological Opinion issued by the National Marine Fisheries Service, our project-specific assessment of your survey plan has determined that large whales listed under the Endangered Species Act may be present in the survey area, but are not likely to be adversely affected with implementation of the SOCs detailed in

the survey plan. Sea turtles may also be present during the survey period and the SOCs proposed must be followed to reduce the potential for adverse impacts to occur. BOEM received concurrence from NMFS on September 15, 2016, in this regard.

Please note that although BOEM has provided feedback on the reconnaissance level survey activities described in the SAP survey plan to ensure compliance with the applicable stipulations in your lease, BOEM anticipates that you will need to conduct future survey activities necessary to support the submission of a Construction and Operations Plan (COP), and those survey activities must be submitted by the lessee in COP survey plan(s) pursuant to stipulation 2.1.1.2 of Addendum C of the lease.

Finally, we look forward to receiving the HRG survey equipment field verification results and the fisheries industry liaison and fisheries representative contact information, which are required to be submitted prior to the commencement of survey activities. Please contact Luke Feinberg (luke.feinberg@boem.gov) should you have any questions.

Thanks,
Dave

David MacDuffee
Chief, Projects and Coordination Branch
U.S. Department of the Interior
Bureau of Ocean Energy Management
Office of Renewable Energy Programs
45600 Woodland Road
Sterling, Virginia 20166
Office (703) 787-1576
Fax (703) 787-1708
david.macduffee@boem.gov

Appendix C

Geophysical Survey Report for Site Assessment Plan

OCS-A 0501 MASS USA

VINEYARD WIND

Geophysical Survey Report for Site Assessment Plan

REDACTED

Appendix D

Archaeological Report for Site Assessment Plan

OCS-A 0501 MASS USA

VINEYARD WIND

Geophysical Survey Report for Site Assessment Plan

REDACTED

Appendix E

Benthic Report for Site Assessment Plan

OCS-A 0501 MASS USA

VINEYARD WIND

Geophysical Survey Report for Site Assessment Plan

REDACTED

ADDENDUM A – UPDATE TO LIDAR SYSTEM

PURPOSE

This Addendum to the Site Assessment Plan (SAP), dated November 22, 2017 and submitted November 27, 2018, provides additional information on the LiDAR system that was ultimately selected by Vineyard Wind for deployment. This system is consistent with the proposed LiDAR system discussed and assessed in the SAP. Furthermore, this system was also separately assessed by BOEM and approved as of May 1, 2017.

SELECTED SYSTEM

Vineyard Wind has selected the FUGRO Seawatch Wind LiDAR Buoy (FUGRO LiDAR), an off-the-shelf system similar, yet smaller in size than the system originally proposed. All buoy specifications and measurements are provided in Attachment A.

The FUGRO LiDAR will utilize the same gravity based mooring as proposed in the SAP, except for a smaller anchor weight, given the selected LiDAR is smaller. The FUGRO LiDAR will be equipped with the proper safety lighting, markings and signal equipment per United States Coast Guard (USCG) Private Aids to Navigation (PATON) requirements. Coordination with the USCG is completed and a PATON was approved on May 11, 2018.

Attachment A

FUGRO Seawatch Wind LiDAR Buoy Specifications

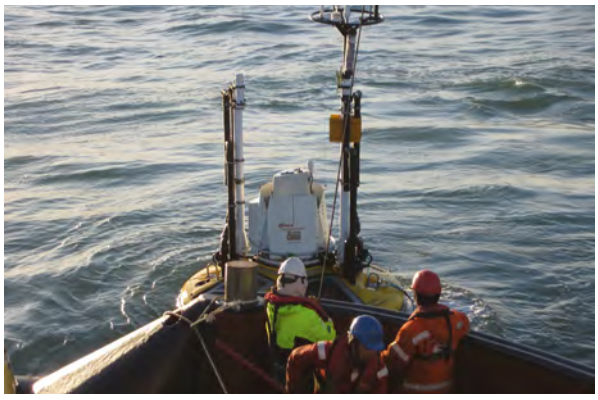
SEAWATCH Wind LiDAR Buoy

The Wind LiDAR buoy is a cost-effective and reliable solution for measuring wind profiles, waves and current profiles.

Wind Profile, Wave and Current Measurements

The SEAWATCH Wind LiDAR Buoy represents the next generation of multi-purpose buoys tailored for the renewable energy industry. The buoy accurately measures the speed and direction of wind across the diameter of wind turbine rotors, whilst sensors provide oceanographic parameters such as ocean waves and current profiles.

Accurate measurement of wind profile using SEAWATCH Wind LiDAR Buoy



Deployment of the SEAWATCH Wind LiDAR buoy

Features

- Collects data for wind resource assessments and/or for engineering design criteria
- Buoy mast wind profile measurements at 2.5 m, 4 m and 5 m
- Configurable LiDAR wind profile measurements at 10 levels from 12.5 m up to 300 m
- Configurable ocean wave measurements and sea current profiles
- Full on-board processing of all measured data
- Two-way communication link for data transfer and control
- Real-time data transfer and presentation
- Flexible configuration of sensors and data collection
- Modular hull for easy transport and local assembly
- Safe and easy handling and deployment
- Robust and reliable in all weather and temperature extremes
- Position tracker for increased safety
- The Wavescan buoy platform has a successful track record worldwide since 1985

SEAWATCH Wind LiDAR Buoy

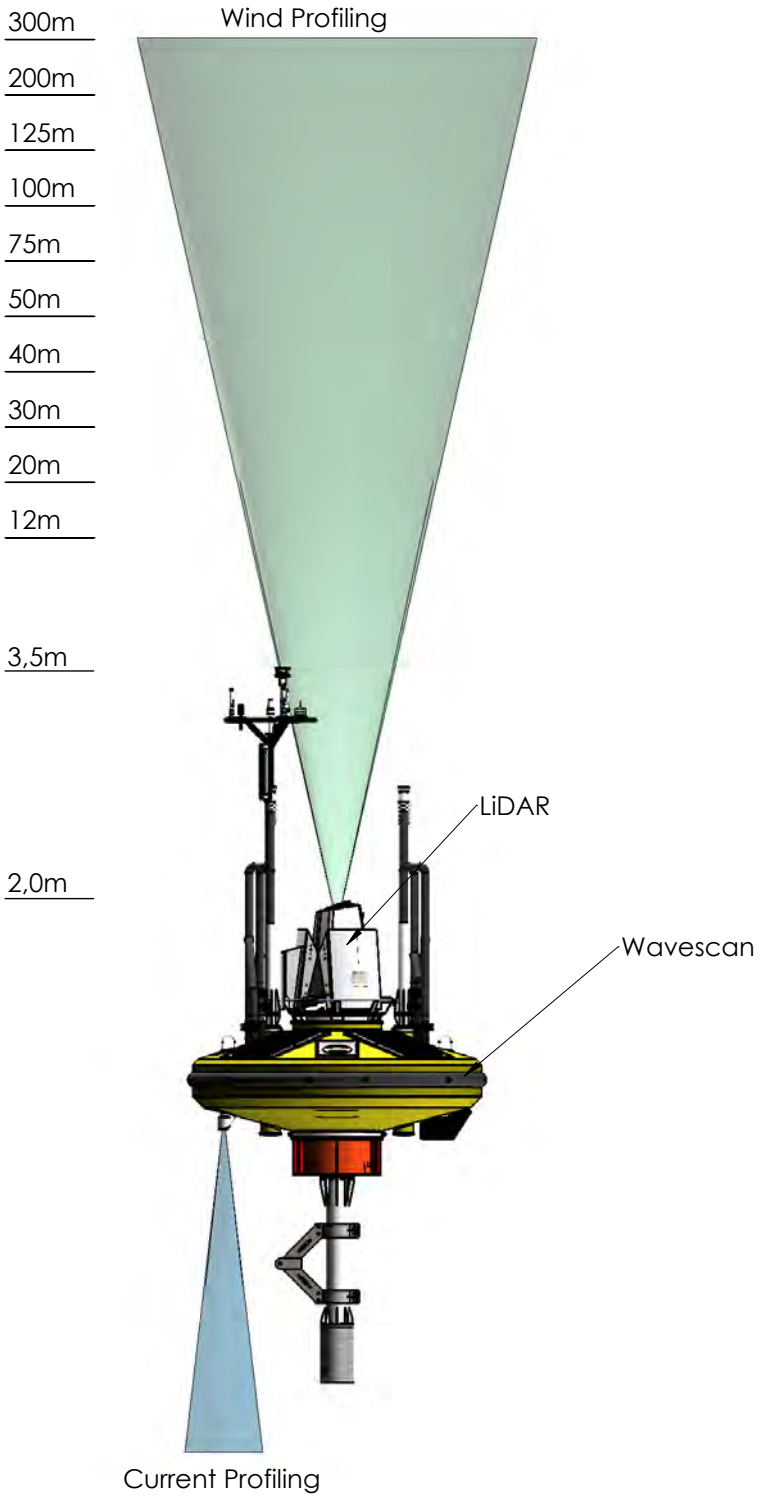
A Unique Cost-Efficient Solution

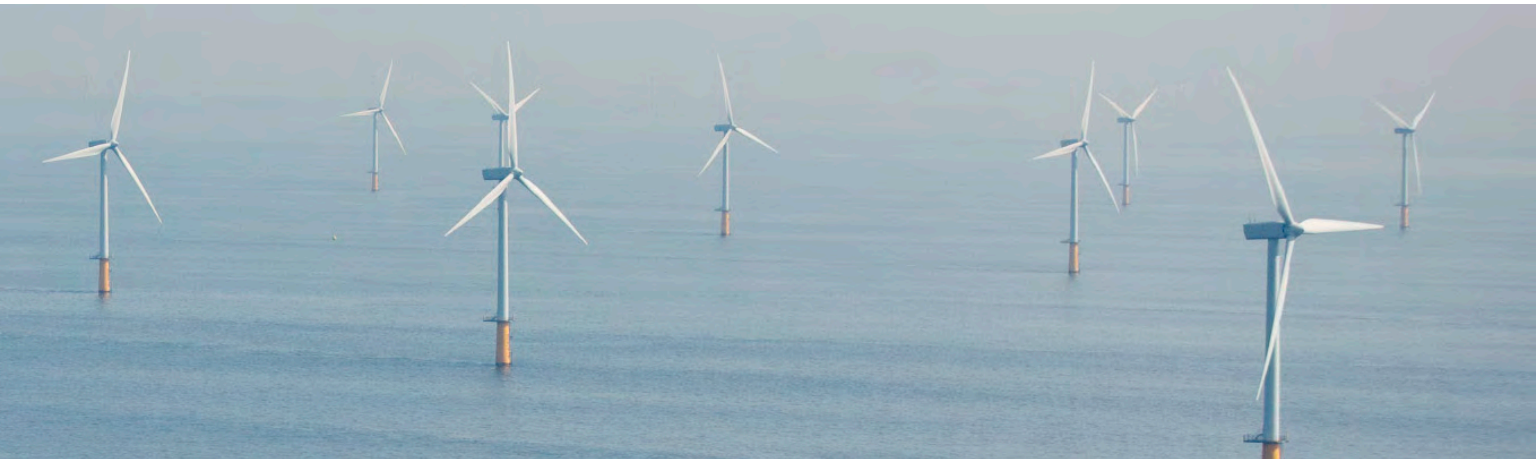
The SEAWATCH Wind LiDAR Buoy is a cost-efficient way to measure wind data at heights of conventional offshore wind turbines for wind resource assessments and engineering design criteria.

It is the first single compact buoy capable of measuring:

- Wind profiles across the blade span of the largest offshore wind turbines
- Ocean wave height and direction
- Ocean current profiles from the surface to the seabed
- Meteorological parameters
- Other oceanographic parameters as required

The smaller SEAWATCH Wind LiDAR Buoy is a proven ocean monitoring solution and is easily deployed and relocated (by towing or lifting onboard vessels) enabling data gathering across multiple locations. This is a more cost-effective alternative to existing wind profiling solutions such as fixed met masts or larger floating buoys.





Proven Platform and Technology

The SEAWATCH Wind LiDAR Buoy is built on the SEAWATCH Wavescan platform which has been deployed for a large number of satisfied clients in the most hostile oceanographic environments since 1985.

Its well proven SEAWATCH technology, includes the GENI™ controller, an intelligent power management unit and the ZephIR LiDAR.

ZephIR LiDAR

The ZephIR LiDAR was selected after years of testing and comparison of various concepts. The ZephIR 300 provides highly accurate measurements across the entire rotor diameter and beyond and can be configured to measure up to 10 different heights from 12.5 to 300 metres above the sea surface.

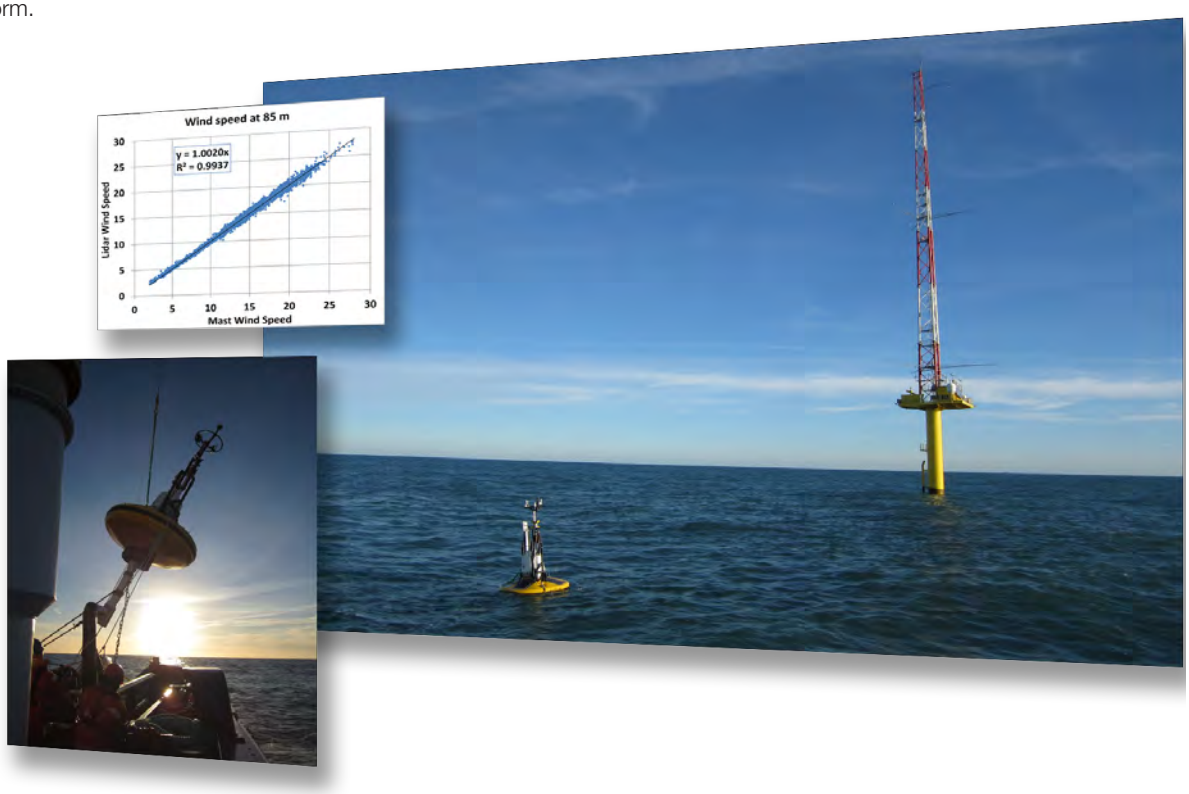
Low power consumption of the ZephIR 300 and intelligent power management are key to efficient operation when using a small low-cost platform.

Successful Collaboration

The SEAWATCH Wind LiDAR Buoy is the result of a successful joint industry R&D project, utilising offshore and wind technology expertise from Norwegian universities, research institutes and the energy company Statoil.

Offshore Testing / Validation

The SEAWATACH Wind LiDAR Buoy has been tested and validated at the Ijmuiden met mast in Dutch waters. The wind profile data measured by the SEAWATCH Wind LiDAR Buoy were compared with data from anemometers at 3 heights mounted on the met mast and a ZephIR LiDAR, measuring the wind profile above 90 m. An inter-comparison showed almost no bias and a squared correlation of more than 0.99. The validation test was performed in close cooperation with DNVGL



SEAWATCH Wind LiDAR Buoy

Technical Specifications

General

Material	Polyethylene, Aluminium, Stainless Steel
Flash light	LED based, 3-4 nautical miles range
	IALA recommended characteristic
Positioning	GPS (Inmarsat-C, Iridium, Standalone Receiver)

Buoy Dimensions

Weight (approx)[1]	1700 kg
Overall height	6.1 m
Diameter	2.8 m
Net buoyancy	2500 kg
Mast height (above water)	3.5 m

Power Supply [2, 3]

Solar panels (optional)	180 W
Lead-acid battery bank (optional)	Up to 248 Ah
Lithium battery bank	Up to 9792 Ah
Fuel cells	Up to 25926 Ah

Processing

4 GB data storage

Real-time operating system (Linux)

Large number of serial and analogue inputs

Flexible data acquisition software

Data Communication

Short range	GSM / GPRS
	UHF / VHF radio (two-way)
Long range	Inmarsat-C and Iridium (two-way)
	ARGOS (one-way)

1 - With fuel cells and methanol cartridges
2 - All values are nominal ratings
3 - The buoy consumes roughly 150 Ah per day. Exact power consumptions will be made for each case

Wind Profiler - ZephIR 300 CW LiDAR

Measurement height (configurable)	10 m – 300 m
Probe length at 10 m	0.07 m
Probe length at 100 m	7.7 m
Number of simultaneous heights measured	Up to 10
Sampling rate	50Hz
Average period (configurable)	1 second upwards
Scanning cone angle	30°
Wind speed accuracy	< 0.5%
Wind speed range	< 1 m/s to 70 m/s
Wind direction accuracy	< 0.5°

Various additional sensors are available on request, including but not limited to:

Oceanographic Sensors

Wave height and direction

Surface current velocity and direction

Water temperature

Conductivity / Salinity

Current profile

CTD profile

Meteorological Sensors

Wind speed/direction

Air pressure

Air temperature

Humidity

Precipitation

Solar radiation

Water Quality Sensors

Dissolved oxygen

Light attenuation

Chlorophyll-a

Hydrocarbon

Turbidity

Fugro GEOS Ltd, Wallingford, UK
T: +44 1491 820 500 E: uk@geos.com

Fugro GEOS, Structural Monitoring, Glasgow, UK
T: +44 141 774 8828 E: fsm@geos.com

Fugro OCEANOR AS, Sandnes, Norway
T: +47 5163 4330 E: sandnes@oceanor.com

Fugro OCEANOR AS, Trondheim, Norway
T: +47 7354 5200 E: trondheim@oceanor.com

Fugro GEOS Pte Ltd, Singapore
T: +65 6885 4100 E: singapore@geos.com

Fugro GEOS, Abu Dhabi, UAE
T: +971 2 554 5101 E: gulfmet@geos-uae.com

Fugro GEOS, Perth, Australia
T: +61 8 6477 4400 E: perth@geos.com

Fugro GEOS Sdn Bhd, KL, Malaysia
T: +60 3 2164 6210 E: malaysia@geos.com

Fugro GEOS Inc, Houston, USA
T: +1 713 346 3600 E: geosusa@fugro.com

Fugro Mexico, Campeche, Mexico
T: +52 938 381 1970 E: mexico@geos.com

Fugro Brasil, Rio de Janeiro, Brazil
T: +22-33217901 E: brazil@geos.com