Ocean Wind Offshore Wind Farm

Change in Methodology for Landfall Activities and Associated Take Memorandum

Submitted to:
National Marine Fisheries Service

Prepared for:
Ocean Wind LLC

Prepared by:
HDR, Inc.

May 2023

Context

Ocean Wind LLC (Ocean Wind), a subsidiary of Orsted Wind Power North America LLC (Orsted) (Applicant) is proposing to install up to 98 wind turbine generators (WTGs) and three associated offshore substations (OSSs), each supported by a steel pipe monopile (OSSs may have jacket pile (pin pile) foundations); install and remove cofferdams at the Horizontal Directional Drilling (HDD) landfall sites; detonate unexploded ordnances (UXO); and conduct high-resolution site characterization surveys during construction and operation, all to support the construction of an offshore wind farm. The Ocean Wind Offshore Wind Farm Project (OCW01, Offshore Wind Farm, or Project) is being developed pursuant to the Bureau of Ocean Energy Management (BOEM) requirements for the Ocean Wind BOEM Lease Area Outer Continental Shelf (OCS)-A-0498 Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf.

Ocean Wind submitted a request for a rulemaking and Letter of Authorization (LOA) pursuant to Section 101(a)(5) of the Marine Mammal Protection Act (MMPA) and 50 Code of Federal Regulations (CFR) § 216 Subpart I to allow for the incidental harassment of small numbers of marine mammals resulting from the installation of WTGs and OSSs; installation and removal of cofferdams at locations of export cable route (ECR) to landfall transitions; potential detonations of UXO; and performance of high-resolution geophysical (HRG) site characterization surveys operating at less than 180 kHz. The application request was deemed complete on February 11, 2022. A Notice of Receipt of the LOA application was published in the Federal Register on March 7, 2022 (87 FR 12666). A Notice of Proposed Rule was published on October 26, 2022, in the Federal Register (87 FR 64868), and a final rule and associated LOA are expected late summer into early fall, 2023.

Recently, Ocean Wind 1 conducted a kickoff meeting with the selected contractor for the landfall project components. For feasibility, the selected contractor has requested a change from the vibratory installation and removal of sheet pile cofferdams at three ocean-side locations (one at BL England, two at Island Bay State Park) to instead using vibratory installation and removal of steel pipe pile goalposts at those locations. In total, Ocean Wind 1 is proposing to install and remove six (6) 20-inch diameter piles with a vibratory hammer for 30 minutes each, two piles per day, or a total of 3 hours of installation over three days and 3 hours of removal over three days, at each of the three locations, instead of the vibratory installation and removal of cofferdams, which were originally estimated at 18 hours of installation over two days and 18 hours of removal over two days at each location.

Ocean Wind 1 believes this change is fungible to activities already analyzed under the MMPA and ESA processes. While the total days of activity may increase from two days of installation and two days of removal to three days of installation and three days of removal, the reduction in active hammer time from 18 hours of installation and 18 hours of removal to 3 hours of installation and 3 hours of removal at each of the 3 locations means a reduction of active hammering by 30 hours at each of the three sites, or 90 hours total. Additionally, the Level B harassment zone anticipated for the vibratory installation and removal of the 20-inch diameter piles is expected to be 6,310 meters (using practical spreading with a 15 Log transmission loss and a conservative 162 dB RMS value [NAVFAC mid-Atlantic 2019 as cited in 87 FR 78072 for vibratory installation of 18-inch piles as a proxy]) for a total estimated ensonified area of 62.54 square kilometers, compared to the originally-estimated 10,000 meter sheet pile Level B harassment zone and roughly 157 square kilometer area. This change in methods at the three sites represents an 83% reduction in vibratory hammer duration and an estimated 60% reduction in total area ensonified. No impulsive sound will be generated via impact or pneumatic hammering during this activity.

At NMFS' request, updated take estimates and requests have been included in this memorandum. Original methods for calculating and requesting take as described in the OCW1 LOA application, and 2022 LOA update memorandum have been maintained, as well as original table and figure numbers. Table 6-2 remains unchanged but is included for context. Tables 6-9, 6-14, 6-19, 6-22, and 6-23 are included below with updated Level A estimated exposures and updated Level B take exposures and requests to reflect the reduction in estimated take based on the decrease in Level A and B harassment isopleth and associated area at the three landfall locations. Figures 1-1, 1-2, and 1-3 included for context, however no changes have been made.

Additionally, to avoid triggering the need for additional public comments or consultation, Ocean Wind 1 has committed to monitoring the zones associated with the vibratory installation and removal of cofferdams and implementing the mitigation measures already considered under the proposed LOA as opposed to the updated zones associated with the 20-inch steel piles if required by NMFS. No changes to the PSMMP or vibratory-piling specific monitoring plans will be required unless directed by NMFS.

Table 1-24. Distances to Weighted Level A Cumulative Sound Exposure Level Acoustic Thresholds (NMFS 2018) and Unweighted Level B root-mean-square Sound Pressure Level Acoustic Thresholds (NMFS 2012) for Marine Mammals from Vibratory Installation of Sheet Piles and 20-inch Piles.

Marine Mammal Hearing Group	Level A Threshold SEL_{cum} (dB re 1 μPa^2 s)	Maximum Distance (m) to Level A Threshold for Sheet Piles	Maximum Distance (m) to Level A Threshold for 20-inch Piles	Level B Threshold SPL_{rms} (dB re 1 µPa)	Maximum Distance (m) to Unweighted Level B Threshold for Sheet Piles	Maximum Distance (m) to Unweighted Level B Threshold for 20-inch Piles
Low-frequency cetaceans	199	86.7	8.0	120	10,000	6,310
Mid-frequency cetaceans	198	7.7	0.7	120	10,000	6,310
High-frequency cetaceans	173	128.2	11.8	120	10,000	6,310
Phocid pinnipeds in water	201	52.7	4.8	120	10,000	6,310

Notes: dB re 1 µPa = decibel referenced to 1 microPascal; µPa2 s = decibel referenced to 1 microPascal squared second; SEL_{cum} = cumulative sound exposure level; SPL_{rms} = root-mean-square sound pressure level; m= meter.

Modified from Table 1-24 of the Ocean Wind 1 ITR and LOA Application.

Table 6-2. Estimated Densities (Animals/km^2) of Marine Mammals Within a 10 km Buffer of the Affected Area of the Landfall Areas for All Months within the Planned Construction Schedule.

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Density	Oct – May Average
North Atlantic right whale [a]	0.00066	0.00054	0.00030	0.00017	0.00004	--	--	--	--	0.00003	0.00013	0.00038	--	**0.00028**
Blue whale [a]	--	--	--	--	--	--	--	--	--	--	--	--	**0.00075**	--
Fin whale [a]	0.00070	0.00021	0.00041	0.00052	0.00018	--	--	--	--	0.00017	0.00017	0.00081	--	**0.00039**
Sei whale [a]	0.00013	0.00008	0.00015	0.00019	0.00009	--	--	--	--	0.00003	0.00014	0.00029	--	**0.00014**
Minke whale	0.00013	0.00015	0.00021	0.00296	0.00234		--	--	--	0.00030	0.00004	0.00009	--	**0.00078**
Humpback whale	0.00071	0.00048	0.00072	0.00049	0.00026	--	--	--	--	0.00028	0.00067	0.00134	--	**0.00062**
Sperm whale [a]	0.00001	0.00001	0.00001	0.00002	0.00002	--	--	--	--	0.00000	0.00005	0.00003	--	**0.00002**
Atlantic white-sided dolphin	0.00047	0.00030	0.00046	0.00121	0.00067	--	--	--	--	0.00060	0.00128	0.00118	--	**0.00077**
Common bottlenose dolphin - Offshore [b]	0.03783	0.01201	0.01922	0.08214	0.20581	--	--	--	--	0.32131	0.29980	0.21115	--	**0.14866**
Common bottlenose dolphin - Coastal [b]	0.05088	0.01936	0.04322	0.21940	0.54984	--	--	--	--	0.74941	0.62651	0.33903	--	**0.32471**
Short-finned pilot whale [b]	--	--	--	--	--	--	-	--	--	--	--	--	**0.00001**	--
Long-finned pilot whale [b]	--	--	--	--	--	--	--	--	--	--	--	--	**0.00001**	--
Risso's dolphin	0.00000	0.00000	0.00000	0.00001	0.00001	--	--	--	--	0.00001	0.00004	0.00007	--	**0.00002**
Common dolphin	0.00222	0.00096	0.00171	0.00411	0.00281	--	--	--	--	0.00197	0.01140	0.00757	--	**0.00409**
Harbor porpoise	0.01230	0.01081	0.01234	0.01637	0.00324	--	--	--	--	0.00006	0.00022	0.01297	--	**0.00854**
Harbor seal	0.09066	0.06456	0.07150	0.11609	0.07464	--	--	--	--	0.11182	0.16049	0.11575	--	**0.10069**
Gray seal	0.03244	0.02310	0.02558	0.04153	0.02670	--	--	--	--	0.04001	0.05742	0.04141	--	**0.03602**

[a] Listed as Endangered under the ESA.

[b] Density adjusted by their relative abundance (short-finned pilot whale = 0.00000133395 animals/km^2; long-finned pilot whale = 0.00000181 animals/km^2) (see Section 3.1 of **Appendix A** for more information).

Note: Grey cells with **Bold** values indicate density used in Cofferdam exposure estimates.

No Modifications from Table 6-2 of the Ocean Wind 1 Density Update Memo.

Table 6-9. Estimated Level A Exposures by Month to Marine Mammal Species Resulting from Vibratory Pile Installation and Removal of Cofferdams.

Species	Jan	Feb	Mar	Apr	May	Oct	Nov	Dec	Average Exposures [a]
North Atlantic right whale [b]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Blue whale [b]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Fin whale [b]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Sei whale [b]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Minke whale	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Humpback whale	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Sperm whale [b]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Atlantic white-sided dolphin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Common bottlenose dolphins:									
Offshore	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Coastal	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Pilot whales:									
Short-finned pilot whale	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Long-finned pilot whale	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Risso's dolphin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Common dolphin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Harbor porpoise	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Seals:									
Gray seal	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**
Harbor seal	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**<0.01**

Note: **Bolded** values indicate estimates used in final take request.

[a] Average Exposure values were calculated using the October – May average density column from Table 6-2; all other monthly exposure methods remained the same.

[b] Listed as Endangered under the ESA.

Table 6-14. Estimated Level B Exposures by Month to Marine Mammal Species Resulting from Vibratory Pile Installation and Removal of Cofferdams and Goalposts.

Species	Jan	Feb	Mar	Apr	May	Oct	Nov	Dec	Average Exposures	Change from 2022 Memo
North Atlantic right whale [a]	1.60	1.31	0.74	0.42	0.10	0.07	0.31	0.92	**0.68**	-0.21
Blue whale [a]	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	**0.02**	0
Fin whale [a]	1.69	0.50	1.00	1.26	0.44	0.41	0.42	1.96	**0.96**	-0.29
Sei whale [a]	0.31	0.20	0.37	0.47	0.22	0.07	0.34	0.70	**0.33**	-0.11
Minke whale	0.32	0.37	0.52	7.21	5.69	0.72	0.09	0.21	**1.89**	-0.58
Humpback whale	1.73	1.16	1.75	1.20	0.64	0.69	1.63	3.27	**1.51**	-0.45
Sperm whale [a]	0.02	0.03	0.01	0.04	0.06	0.00	0.12	0.07	**0.04**	-0.02
Atlantic white-sided dolphin	1.14	0.73	1.12	2.95	1.62	1.47	3.11	2.88	**1.88**	-0.57
Common bottlenose dolphins:										
Offshore	92.10	29.24	46.79	199.98	501.10	782.31	729.94	514.11	**361.94**	-109.91
Coastal	123.89	47.13	105.24	534.19	1338.72	1824.63	1525.39	825.45	**790.58**	-240.06
Pilot whales:										
Short-finned pilot whale	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0**
Long-finned pilot whale	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	-0.01
Risso's dolphin	0.01	0.00	0.00	0.02	0.02	0.01	0.09	0.16	**0.04**	-0.01
Common dolphin	5.41	2.34	4.17	10.01	6.84	4.79	27.77	18.43	**9.97**	-3.02
Harbor porpoise	29.94	26.33	30.04	39.85	7.89	0.14	0.53	31.59	**20.79**	-6.31
Seals:										
Gray seal	78.98	56.24	62.29	101.12	65.02	97.40	139.80	100.83	**87.71**	-26.63
Harbor seal	220.74	157.19	174.09	282.65	181.73	272.25	390.75	281.82	**245.15**	-74.44

Note: **Bolded** values indicate estimates used in final take request.

[a] Average Exposure values were calculated using the October – May average density column from Table 6-2; all other monthly exposure methods remained the same.

[b] Listed as Endangered under the ESA.

Table 6-19. Requested Level A and Level B Takes Resulting from Vibratory Installation and Removal of Cofferdams and Goalposts and the Percentage of Each Population or Stock Taken for the Effective Period of the LOA (5-year total).

Species	Population Size	Level A Harassment Takes	Level B Harassment Takes	Max Percent Population
North Atlantic right whale [a]	368	0	1	0.27
Blue whale [a]	unknown	0	0	0.00
Fin whale [a]	6,802	0	**1**	**0.02**
Sei whale [a]	6,292	0	1	0.02
Minke whale	21,968	0	**2**	**<0.01**
Humpback whale	1,396	0	**2**	**0.14**
Sperm whale [a]	4,349	0	0	0.00
Atlantic white-sided dolphin	93,233	0	5	0.01
Atlantic spotted dolphin	39,921	0	45 [b]	0.11
Common bottlenose dolphins:				
Offshore	62,851	0	**362**	**0.58**
Coastal [f]	6,639	11 [c]	**791**	**12.08**
Pilot whales:				
Short-finned pilot whale	28,924	0	10 [d]	0.03
Long-finned pilot whale	39,215	0	10 [d]	0.03
Risso's dolphin	35,215	0	30 [d]	0.09
Common dolphin	172,974	0	**10**	**<0.01**
Harbor porpoise	95,543	0	**21**	**0.02**
Seals:				
Gray seal	27,300	28 [e]	**88**	**0.42**
Harbor seal	61,336	28 [e]	**246**	**0.45**

[a] Listed as Endangered under the ESA.

[b] No Level B exposures were estimated for Atlantic spotted dolphin, but up to 45 Level B takes are requested in the unlikely event a pod of up to 45 individuals approaches cofferdam installation or removal (based on Kenney and Vigness-Raposa, 2010).

[c] No Level A exposures were estimated for coastal bottlenose dolphin, but up to 11 Level A takes are requested in the unlikely event a pod of dolphins approaches cofferdam installation or removal (based on Toth *et al.* 2011).

[d] Level B take of these species were adjusted to account for mean group size:

- Pilot whales: Kenney and Vigness-Raposa, 2010.
- Risso's dolphins: Barkaszi and Kelly, 2019.

[e] No Level B exposures were estimated for gray and harbor seals, but up to 28 Level A takes are requested in the event that up to 2 animals per day approach cofferdam installation or removal.

[f] Coastal bottlenose dolphin take for bayside (vs. Atlantic-facing) cofferdams is likely overestimated, as this stock has been shown to prefer coastal to estuarine environments (Toth et al. 2011).

Bold and Underline indicate updates from the 2022 memo

Table 6-22. Requested Level A and Level B Takes for All Activities Conducted During Ocean Wind Construction.

Species	Population Size	Year 1			Year 2			Year 3			Year 4			Year 5		
		Level A	Level B	Max %	Level A	Level B	Max %	Level A	Level B	Max %	Level A	Level B	Max %	Level A	Level B	Max %
North Atlantic right whale [a]	368	0	3	0.82	0	7	1.90	0	2	0.54	0	1	0.27	0	1	0.27
Blue whale [a]	unknown	0	0	N/A	0	4	N/A	0	0	N/A	0	0	N/A	0	0	N/A
Fin whale [a]	6,802	0	**6**	**0.09**	4	13	0.25	0	3	0.04	0	2	0.03	0	2	0.03
Sei whale [a]	6,292	0	2	0.03	1	3	0.06	0	1	0.02	0	0	0.00	0	0	0.00
Minke whale	21,968	0	**32**	**0.15**	22	74	0.44	0	5	0.02	0	3	0.01	0	3	0.01
Humpback whale	1,396	0	**8**	**0.57**	6	21	1.93	0	3	0.21	0	2	0.14	0	2	0.14
Sperm whale [a]	4,349	0	6	0.14	0	9	0.21	0	3	0.07	0	3	0.07	0	3	0.07
Atlantic white-sided dolphin	93,233	0	12	0.01	0	100	0.11	0	11	0.01	0	5	0.01	0	5	0.01
Atlantic spotted dolphin	39,921	0	135	0.34	0	135	0.34	0	45	0.11	0	45	0.11	0	45	0.11
Common bottlenose dolphins:																
Offshore	62,851	0	**561**	**0.89**	0	1,454	2.31	0	349	0.56	0	174	0.28	0	174	0.28
Coastal [b]	6,639	11	**1,394**	**21.16**	0	934	14.07	0	934	14.07	0	465	7.00	0	465	7.00
Pilot Whales:																
Short-finned pilot whale	28,924	0	30	0.10	0	30	0.10	0	10	0.03	0	10	0.03	0	10	0.03
Long-finned pilot whale	39,215	0	30	0.08	0	30	0.08	0	10	0.03	0	10	0.03	0	10	0.03
Risso's dolphin	35,215	0	90	0.26	0	90	0.26	0	30	0.09	0	30	0.09	0	30	0.09
Common dolphin	172,974	0	**44**	**0.03**	0	1,584	0.92	0	60	0.03	0	29	0.02	0	29	0.02
Harbor porpoise	95,543	10	**90**	**0.10**	69	350	0.44	0	45	0.56	0	22	0.02	0	22	0.02
Seals:																
Gray seal	27,300	31	**173**	**0.75**	4	305	1.13	0	68	0.25	0	34	0.12	0	34	0.12
Harbor seal	61,336	35	**482**	**0.84**	13	844	1.40	0	189	0.31	0	93	0.15	0	93	0.15

[a] Listed as Endangered under the ESA.

[b] Coastal bottlenose dolphin take for bayside (vs. Atlantic-facing) cofferdams is likely overestimated, as this stock has been shown to prefer coastal to estuarine environments (Toth et al. 2011).

Bold and Underline indicate updates from the 2022 memo

Table 6-23. Summary of Level A and Level B Takes for All Activities Conducted During Ocean Wind Construction.

Species	Population Size	5 Year Total		
		Level A	Level B	Max Percent
North Atlantic right whale [a]	368	0	14	3.80
Blue whale [a]	unknown	0	4	N/A
Fin whale [a]	6,802	4	**26**	**0.44**
Sei whale [a]	6,292	1	6	0.11
Minke whale	21,968	22	**117**	**0.63**
Humpback whale	1,396	6	**36**	**3.01**
Sperm whale [a]	4,349	0	24	0.55
Atlantic white-sided dolphin	93,233	0	133	0.14
Atlantic spotted dolphin	39,921	0	405	1.01
Common bottlenose dolphins:				
Offshore	62,851	0	**2,712**	**4.31**
Coastal [b]	6,639	11	**4,192**	**63.31**
Pilot Whales:				
Short-finned pilot whale	28,924	0	90	0.31
Long-finned pilot whale	39,215	0	90	0.23
Risso's dolphin	35,215	0	270	0.77
Common dolphin	172,974	0	**1,746**	1.01
Harbor porpoise	95,543	79	**529**	0.64
Seals:				
Gray seal	27,300	35	**614**	**2.38**
Harbor seal	61,336	48	**1,701**	**2.85**

[a] Listed as Endangered under the ESA.

[b] Coastal bottlenose dolphin take for bayside (vs. Atlantic-facing) cofferdams is likely overestimated, as this stock has been shown to prefer coastal to estuarine environments (Toth et al. 2011).

Bold and Underline indicate updates from the 2022 memo

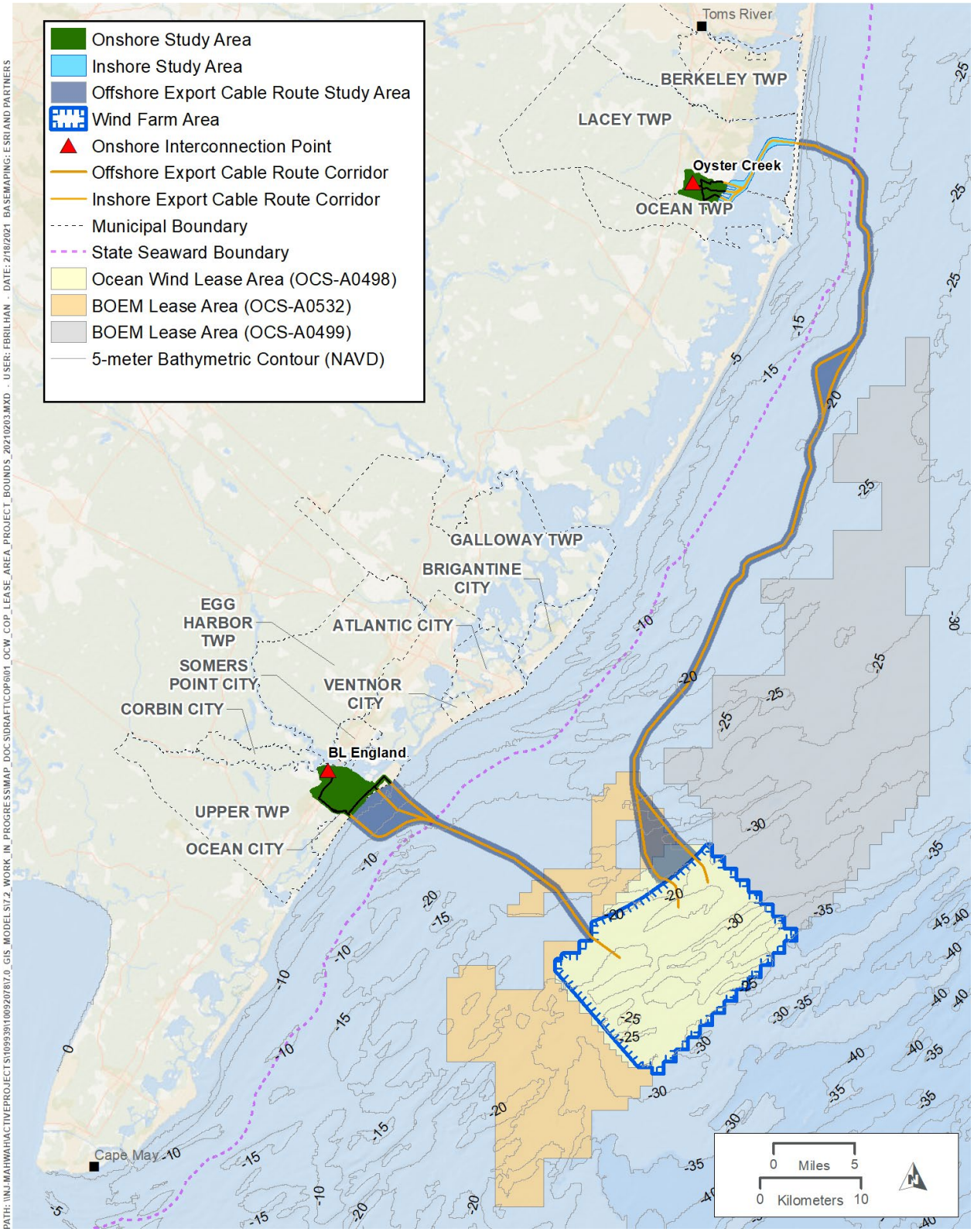

Figure 1-1. Offshore Wind Farm and Project Boundaries and Location of Potential Export Cable Routes.

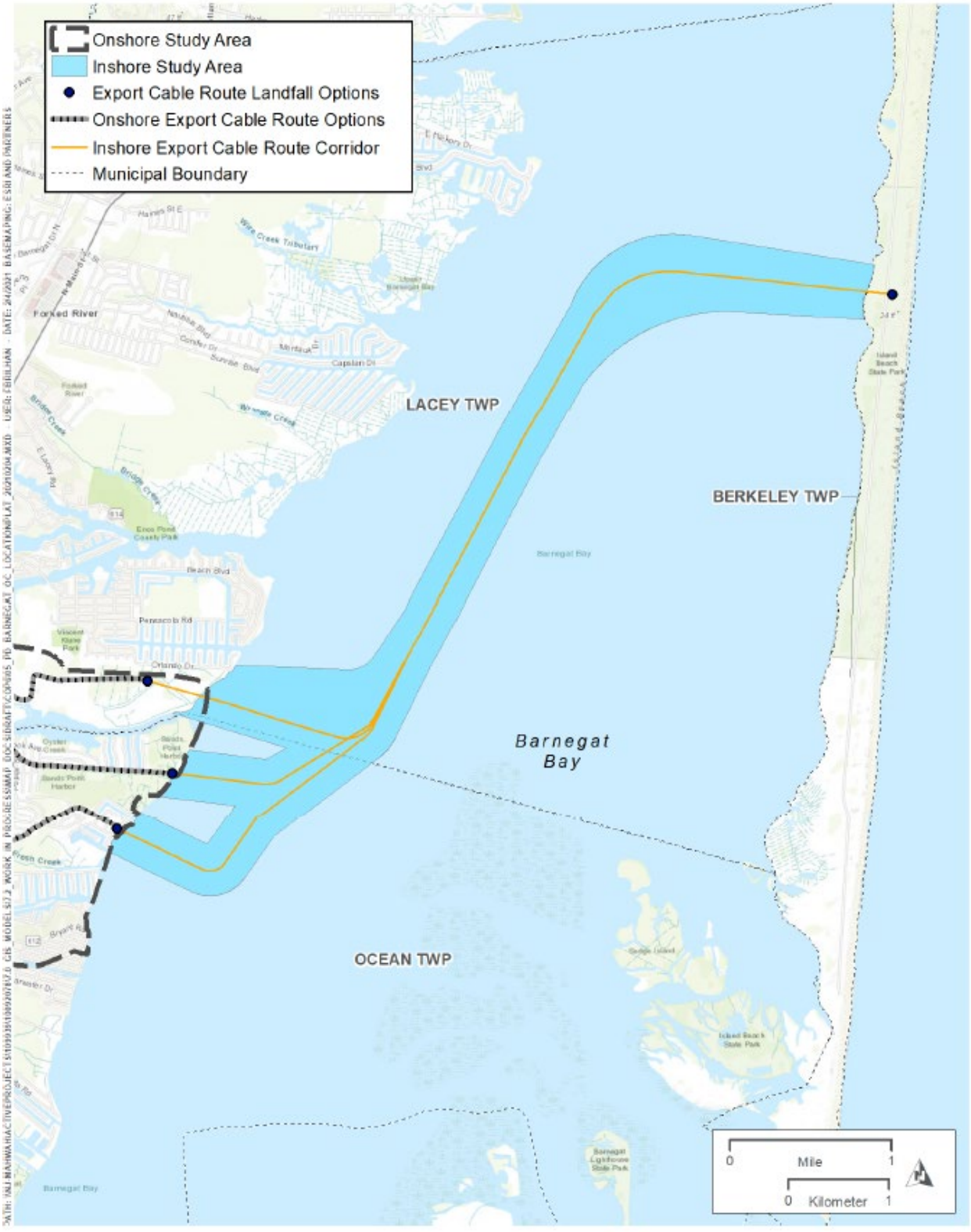

Figure 1-2. Island Beach State Park and Barnegat Bay/Oyster Creek Export Cable Route.

Figure 1-3. BL England Export Cable Route.