APPENDIX A.

Mapping Audubon Offshore Wind Engagement Areas

We mapped three spatial features to illustrate the areas where Audubon is actively engaging in the responsible siting and operation of offshore wind energy projects. The map features include Audubon's current engagement regions, siting constraints for offshore wind projects, and average wind speeds. The map was created following the analyses presented in Lopez et al. (2022) and using publicly available spatial data (Table 1).

Table 1. Source table of input data used to create map features in Map 1.

Map feature	Input data	Description	Source
Current Audubon engagement regions	Wind Leases	Active leases managed by BOEM within U.S. Outer Continental Shelf waters	BOEM 2024
	Wind Planning Areas	Areas of interest under current investigation by BOEM	BOEM 2024
	Central Atlantic Call Area 2	BOEMs Call for a second offshore wind sale in Central Atlantic; >13 million acres off of NJ, DE, MD, VA, and NC coasts	BOEM 2024
Siting constraints	Oil/gas pipelines	61 m buffer; setback applied	MarineCadastre
	Oil/gas platforms	250 m buffer; setback applied	MarineCadastre
	Shipping Lanes	Vessel routes; constraint applied	MarineCadastre
	Conservation areas	Marine Protected Areas (MPA); constraint applied, as per 30 CFR Part 585	MarineCadastre
	Danger zones and restricted areas	Restricted area due to potential danger; constraint applied; also includes ship shock boxes and unexploded ordinances	MarineCadastre
	Submarine cables	500 m buffer; setback applied, as per NYSERDA 2018 guidance to avoid	MarineCadastre
	Shipwrecks	50 m buffer; setback applied, as per BOEM guidance	MarineCadastre
	Ocean disposal sites	Active disposal sites; constraint applied	MarineCadastre
	Bathymetric depth limit	>2600 m bathymetric depth; setback applied. Current technologies are restricted to depths <1,300 m. However, 2600 m accounts for BOEMs Central Atlantic Call Area E and F	GEBCO 2024
Wind speed	NREL	Average wind speeds at 200 m heights; wind speeds >7 m/s are considered economically viable	Draxl et al. 2015

Mapping Extent

We focused our mapping efforts within federally regulated U.S. oceans and to the outer extent of the U.S. Exclusive Economic Zone (EEZ). Federal waters begin 3 nm offshore from each coastal states' boundary, except for Texas and the Florida Gulf, which extend 9 nm. The U.S has exclusive rights over natural resources within the EEZ (MarineCadastre; von Krauland et al. 2023). We created a 50 km hexagon grid spatial data layer within the extent of federal waters within the EEZ (Figure 1). The 50 km hexagon grid was used to summarize all the map features outlined in Table 1.

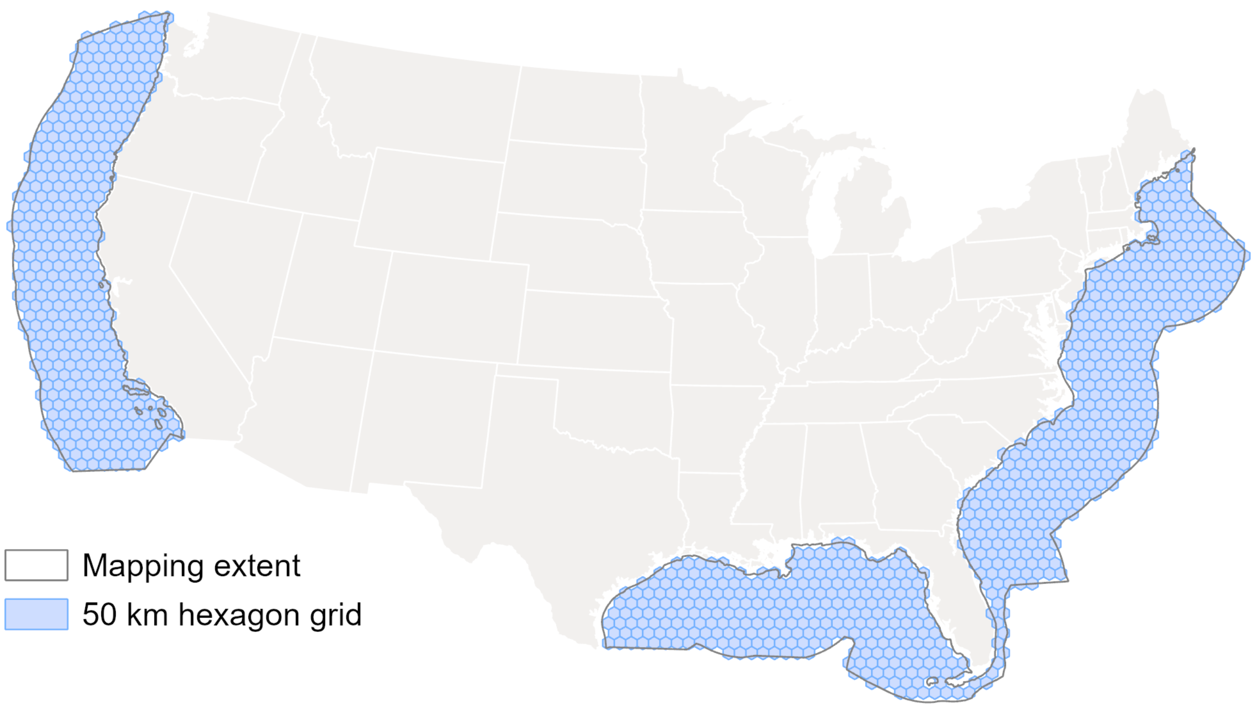

Figure 1. Offshore wind mapping extent within U.S. federal waters and the U.S. Exclusive Economic Zone (MarineCadastre) included in the analysis. The 50 km hexagon grid represents the unit of analysis in which Audubon engagement areas, area available for wind, and average wind speed were summarized for Map 1.

Current Audubon Engagement Regions

Audubon is actively engaged in and supporting the responsible siting and operation of offshore wind projects within federal waters where wind energy operations are currently underway (Table 1). This includes areas where wind energy is operational, under construction, or planned.

Wind energy operations currently underway include active wind leases, wind planning areas, and BOEMs Call for a second offshore wind sale in the Central Atlantic, announced August 21, 2024 (BOEM 2024).

To map these regions, we compiled active wind lease areas, wind planning areas (BOEM 2024), and the Central Atlantic Call Area 2 (BOEM 2024) spatial data layers (Table 1) to create a single layer representative of the areas Audubon is engaged in. Within each 50 km hexagon grid, we then summarized the area and mapped the Audubon engagement regions (Figure 2).

Figure 2. Regions where Audubon is actively engaged in the responsible siting and operation of offshore wind projects within U.S federal waters and the U.S Exclusive Economic Zone (MarineCadastre).

Siting Constraints

Although the ocean is vast, siting constraints limit the area in which offshore wind can be developed, such as existing infrastructure, competing use, and environmental considerations (Table 1). We followed the "Open Access" approach described in Lopez et al. (2022) to characterize spatial siting constraints and the area available for wind energy development.

Competing uses and environmental considerations include areas used for oil and gas, marine protected areas (MarineCadastre), and bathymetric depth limits (GEBCO 2024). Although current wind technologies are limited to oceans depths <1300 m, we set the bathymetric depth constraint to areas >2600 m to account for BOEMs Central Atlantic Call Area E and F, which extend to the 2600 m bathymetric contour (BOEM 2024).

We first applied setbacks to each spatial data layer (Table 1) and compiled them to create a single siting constraints layer (Figure 3). Within each 50 km hexagon, we summarized the siting constraints area and mapped the inverse to depict the area available for offshore wind projects.

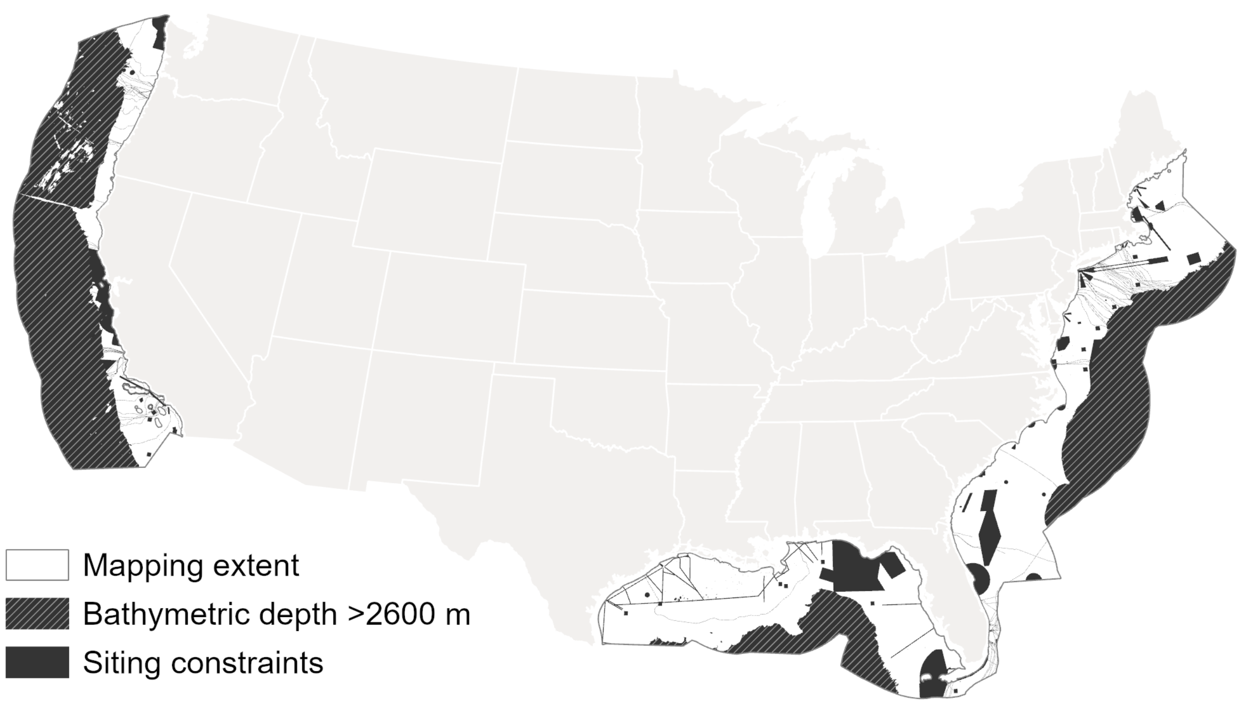

Figure 3. Siting constraints used to calculate the area available for offshore wind projects within U.S federal waters and the U.S Exclusive Economic Zone (MarineCadastre). Constraints included existing infrastructure, competing use, and environmental considerations (see Table 1 for full list).

Wind Speed

As wind speeds vary across the ocean, areas with higher average wind speeds have greater potential for wind energy production. Although technology is advancing, the current economic threshold considered viable for offshore wind energy are areas with wind speeds >7 m/s.

Wind speed spatial data is available at varying heights. As technologies are advancing, turbine tip heights are increasing, and rotor blades are becoming longer. Wind speeds at total heights, as opposed to hub height, are important to understand the potential for offshore wind (von Krauland et al. 2023).

We used the NREL Annual Average Wind Speed at 200 Meters above Surface Level data, which averages annual wind speeds for 2007-2013 (Table 1, Figure 4) (King et al 2014; Lieberman-Cribbin et al. 2014; Draxl et al. 2015, 2015). Within each 50 km hexagon, we summarized average wind speeds and mapped areas of low, moderate, and high wind speeds.

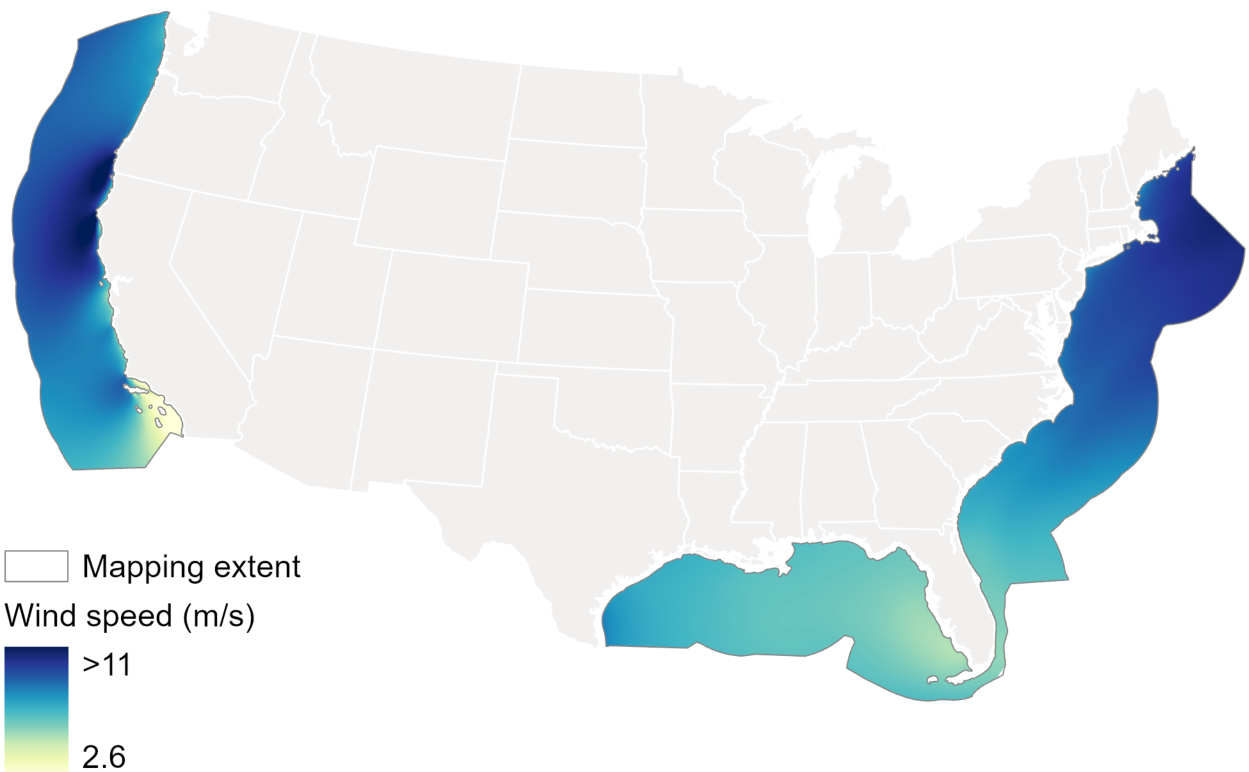

Figure 4. NREL Annual Average Wind Speed at 200 Meters above Surface Level for 2013–2017 (King et al 2014; Lieberman-Cribbin et al. 2014; Draxl et al. 2015, 2015) within U.S federal waters and the U.S Exclusive Economic Zone (MarineCadastre).

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