



State of Rhode Island and Providence Plantations
COASTAL RESOURCES MANAGEMENT COUNCIL
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September 14, 2010

Coastal Resources Management Council
Chairman Michael M. Tikoian
Stedman Government Center- Suite 3
4808 Tower Hill Road
Wakefield, RI 02879-1900

Dear Chairman Tikoian:

Below please find a detailed summary of technical changes to the Ocean Special Area Management Plan. **Please note that this memo supersedes the memo submitted to the Council on August 24th, 2010. This memo does not respond to written comments received on or after September 9th, 2010.** Technical changes proposed in this memo include (1) changes in response to feedback and updated data received from URI Ocean SAMP researchers who reviewed these chapters; (2) changes requested by federal agencies to better reflect federal mandates; (3) changes to allow for consistency between Ocean SAMP chapters; and (4) proofreading changes.

Chapter 2, Ecology

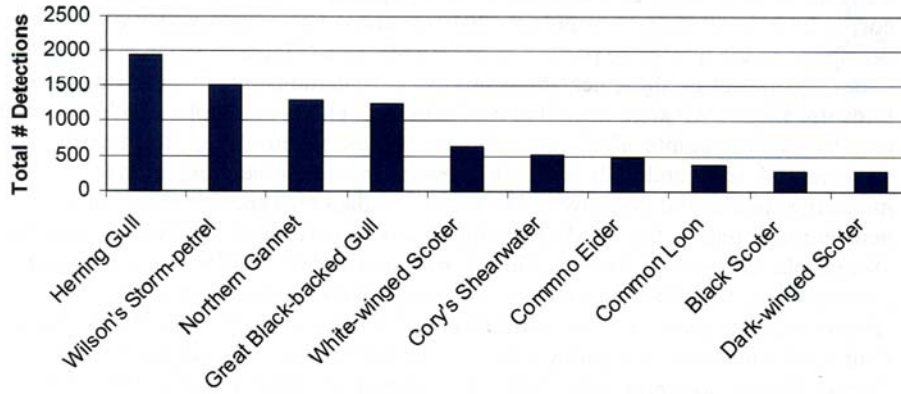
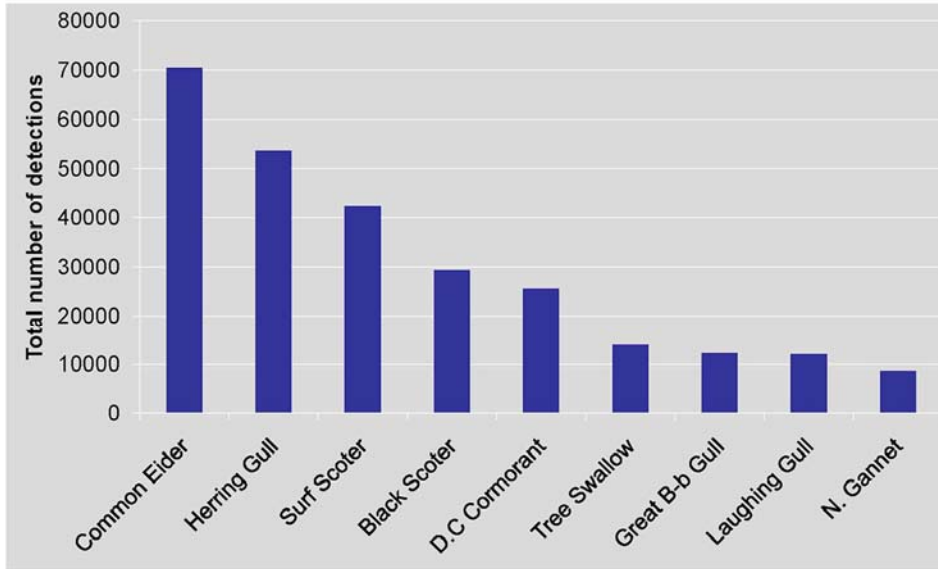
Items 1-14 are in response to comments and feedback received from the URI Ocean SAMP avian research team led by Dr. Peter Paton.

1. At the request of the URI Ocean SAMP avian research team, all references to earlier research report versions (specifically Winiarski et al. 2009 and Paton et al. 2010 presentation) was replaced with reference to Paton et al. 2010, the appendix to the Ocean SAMP and most recent and complete version regarding avian research. This change does

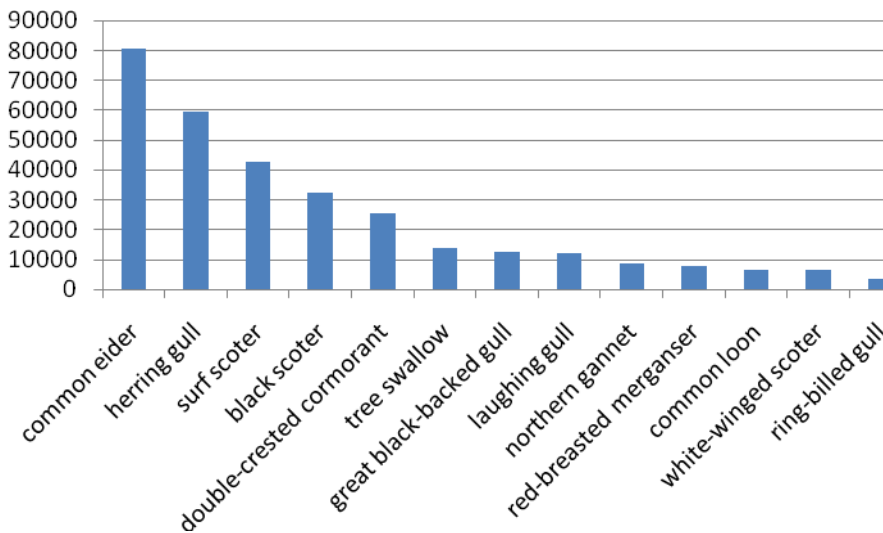
not in any way change the meaning, context, or potential interpretation of the Ecology Chapter text as presented.

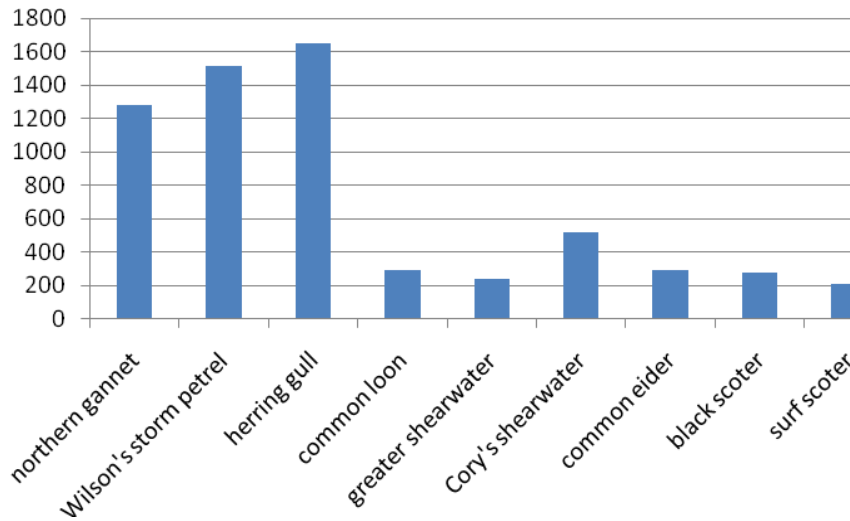
2. **PAGE 103, 250.6., #6**, revised as follows: “Figure 2.38 shows the seasonality of waterbird use in the Ocean SAMP area, according to bird type, and providing greater definition than could be shown in Figure 2.36, which is useful in showing, at the same scale, seasonality of bird use in the Ocean SAMP area. Gull use of the area is year round, while ~~sea ducks~~loons appear to use the Ocean SAMP area as overwintering grounds. Pelagic birds, such as shearwaters, and storm petrels appear later in the season, probably usinginhabit the Ocean SAMP area as a feeding ground only during the summer. In general, bird life is most diverse and abundant during fall and spring migration, and during winter (Paton et al., 2010).”
3. **Figure 2.37**. Caption revised as follows: “Use-Potential use of the Ocean SAMP area by diving ducks, ~~showing they mainly utilize shallow water, nearshore habitats~~which suggests they forage in waters less than 20 meters deep. Since benthic community composition is not know, this map shows ~~only most used water depth~~potential, not preferred, foraging sites.”
4. **PAGE 106, 250.6., #7**. Revised as follows: “Paton et al. (2010), based on both land-based and ~~boatship~~-based survey counts, have identified the most common bird species using Ocean SAMP waters (Figure 2.39). Common eider are the most abundant user of nearshore waters, followed by the herring gull and surf scoter. Offshore waters are utilized most heavily by ~~herring gulls~~northern gannets, followed by Wilson’s storm-petrels, ~~northern gannets~~, and ~~black-backed~~herring gulls. Gulls appear to be one of the major users of Ocean SAMP waters, both inshore and offshore, and throughout the seasons.”
5. **Figure 2.39**: Figure updated with more recent data, as suggested/provided by URI Ocean SAMP avian researchers. Caption revised as follows: “Most abundant waterbirds found nearshore (top panel) and offshore (bottom panel) in the Ocean SAMP area, based on land-based (Jan 2009–Jan 2010) and ~~boatship~~-based (Mar 2009–Jan 2010) survey counts (from Paton et al. 2010).” Figure revised as follows:

OLD FIGURE 2.39 (DELETED):



NEW FIGURE 2.39 (INSERTED):





6. **PAGE 100, 250.6, #2.** Revised as follows: “A variety of water birds utilize the water and air space of the Ocean SAMP region. Waterfowl utilizing Ocean SAMP waters include nearshore species such as geese and ducks, as well as more oceanic species such as shearwaters. Passerines (e.g., songbirds) tend to utilize Ocean SAMP air space during migrations, with Block Island serving as resting, staging or feeding site. Passerines also utilize Block Island for nesting and breeding purposes. Bird life throughout the Ocean SAMP area is dynamic, with substantial changes between seasons and years. During summer in some years (e.g., 2009), tens of thousands of pelagic seabirds migrate into the area for several months to feed, while in other years (e.g., 2010) seabirds inhabit more offshore area and are not observed in the Ocean SAMP area. In general, avifauna in the Ocean SAMP area is most abundant during fall and spring migration periods, and during winter. Water depth is an important factor in the spatial distribution of these birds. Gannets and loons for instance, which feed mainly on fish, frequent waters up 45 m in depth, while seaducks primarily forage in Ocean SAMP waters less than 20 m deep.”

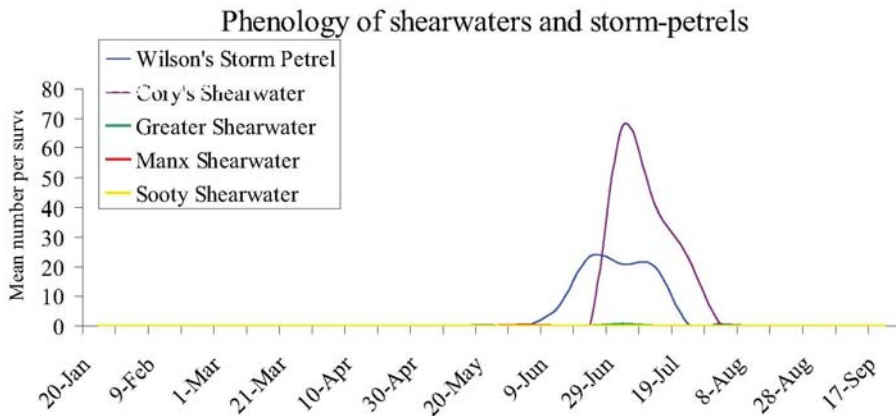
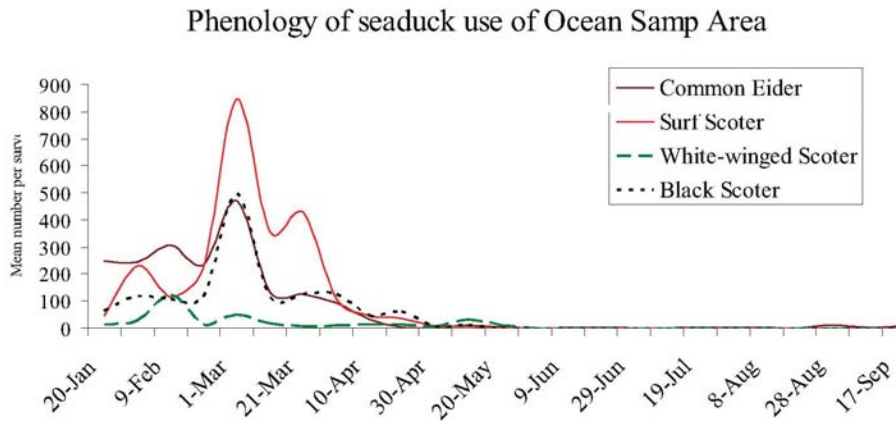
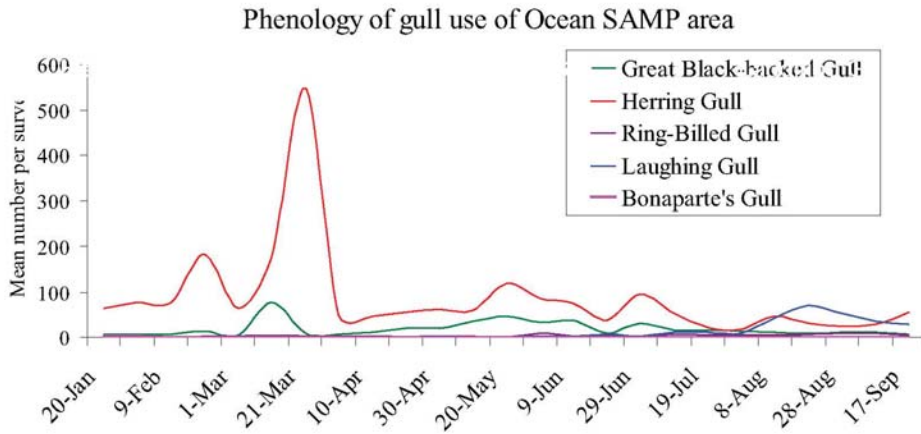
7. **PAGE 100, 250.6, #1.** Revised as follows: “Birds are an element of the Ocean SAMP area ecology; they are attracted to the area because of temperate climate—many of these birds nest in the Arctic or Antarctic—and for feeding purposes, utilizing the seasonal abundance of fish and invertebrates as an important resource. The impact of avifauna on the overall ecology of the Ocean SAMP area is not well studied and so how bird use shapes benthic invertebrate ecology in shallow waters is not well known and is an area of further possible research.”

8. **Table 2.12:** updated to more accurately reflect Seasonal Use with new data as provided by the URI Ocean SAMP avian research team, as follows:

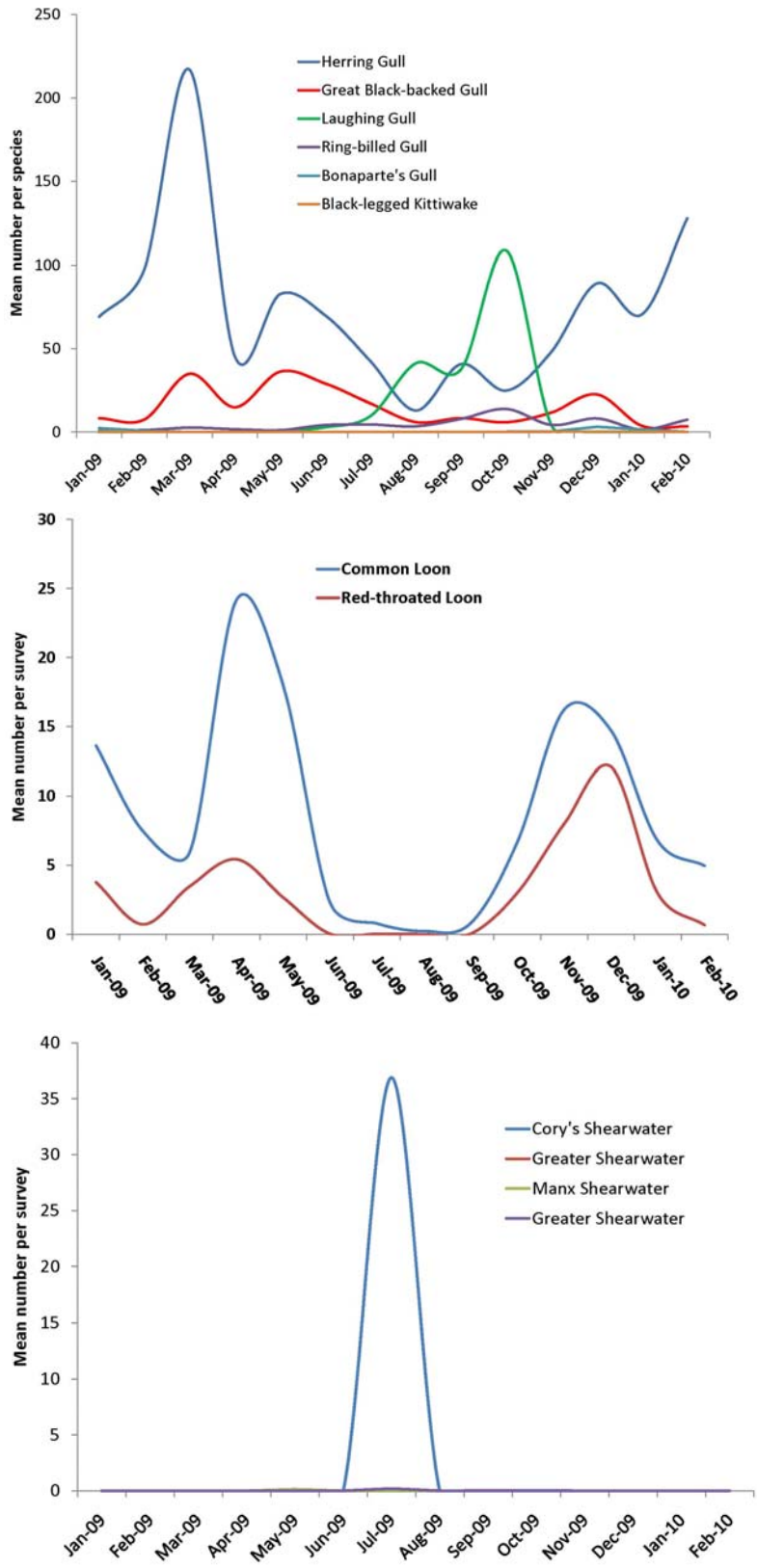
Common Name	Scientific Name	Seasonal Use
Cormorant, Double-crested	Phalacrocorax auritus	Mar–Nov
Eider, Common	<i>Somateria mollissima dresseri</i>	NovOct–Apr
Gannet, Northern	<i>Morus bassanus</i>	Sep–Jun
Gull, Bonaparte’s	<i>Chroicocephalus philadelphia</i>	
Gull, Great Black-backed	<i>Larus marinus</i>	Mar–Jul All Year
Gull, Herring	<i>Larus argentatus</i>	All Year
Gull, Laughing	<i>Leucophaeus atricilla</i>	AugMay–SepNov
Gull, Ring-billed	<i>Larus delawarensis</i>	All Year
Loon, Common	<i>Gavia immer</i>	NovOct–Jun
Loon, Red-throated	<i>Gavia stellata</i>	NovOct–May
Scoter, Black	<i>Melanitta nigra americana</i>	DecSep–AprMay
Scoter, Surf	<i>Melanitta perspicillata</i>	DecSep–AprMay
Scoter, White-winged	<i>Melanitta deglandi</i>	JanSep–AprMay
Shearwater, Cory’s	<i>Calonectris diomedea</i>	Jun–Aug
Shearwater, Greater	<i>Puffinus gravis</i>	Jun–Sep
Shearwater, Manx	<i>Puffinus puffinus</i>	May–Aug
Shearwater, Sooty	<i>Puffinus griseus</i>	May–Sep
Storm-Petrel, Wilson’s	<i>Oceanites oceanicus</i>	Jun–Jul
Tern, Black	<i>Chlidonias niger</i>	
Tern, Common	<i>Sterna hirundo</i>	Apr–Sep
Tern, Forster’s	<i>Sterna forsteri</i>	
Tern, Least	<i>Sternula antillarum</i>	May–Aug
Tern, Roseate	<i>Sterna dougallii</i>	Jul–Aug

9. **PAGE 102, 250.6, #5.** Revised as follows: “Paton et al. (2010) have found [that water depth is an important factor in the spatial distribution of birds in the Ocean SAMP area.](#) ~~Based on a review of the literature, that~~ most sea ducks typically forage in water of 5 to 20 m depth (Figure 2.37) where bivalves and other forage is available. Sea ducks will therefore be largely found in nearshore habitats where water depth allows efficient feeding. [Gannets and loons are piscivorous specialists and tend to occur in areas where water depths 30–45 m deep, and <35 m deep, respectively \(Paton et al., 2010\).](#) [Razorbills were consistently found in shallower waters closer to the mainland, common murre primarily in the central regions of the Ocean SAMP area, and dovebies offshore over deeper depths out to the Continental Shelf \(Paton et al., 2010\).](#) While bathymetry is known for the Ocean SAMP area, benthic community composition is not and therefore preferred/critical waterbird forage areas cannot be readily identified. ~~Paton et al. (2010) also noted a trend of decreasing avian diversity with distance from land, further reinforcing the importance of nearshore habitat for these avian species.”~~
10. **Figure 2.38.** Caption revised as follows: “Figure 2.38. ~~Seasonal use of the Ocean SAMP area by gulls, sea ducks, shearwaters and storm-petrels (from Winiarski et al. 2009).~~ Seasonal use of the Ocean SAMP area by gulls, ~~sea ducks, loons and~~ shearwaters ~~and storm-petrels~~ (from [Winiarski Paton et al. 20092010](#)).” Figure itself revised as follows:

OLD FIGURE 2.38 (DELETED):



NEW FIGURE 2.38 (INSERTED)



11. **PAGE 107, 250.6., #8.** Revised as follows: “Various species of tern are found throughout the Ocean SAMP area during summer months (Paton et al. 2009; Paton et al. 2010), ~~and utilize marine waters for foraging purposes with more birds in the area during the post-breeding season. For endangered roseate terns, N~~nearly all occurrence observations of tern species ~~however, i~~were over the waters north of Block Island, increasing with nearness to the Rhode Island coastline. ~~Terns~~ Roseate terns do not appear to significantly utilize more open, deeper water areas of Block Island Sound, Rhode Island Sound or the Offshore Ocean SAMP area, although they have been detected roosting on Block Island (Paton et al., 2010). Impact of ~~their tern~~ feeding on fish ecology of the Ocean SAMP area is not known.”

12. **PAGE 107, 250.6., #9.** Revised as follows:

“Paton et al. (2010) report the following patterns of avian use of Ocean SAMP area waters, ~~based on aerial survey results,~~ for the period of late November 2009 through late February 2010:

“a. Both common and red-throated loons are abundant species during winter months in the Ocean SAMP area, and population estimates suggest this area provides critical wintering habitat for a significant number of loons. Loons were found to be scattered throughout the area, though thinly throughout most of the central portion of Rhode Island Sound. Densest concentrations occurred along the Rhode Island south shore shoreline, around Block Island shoreline, and in the area west of Block Island bordering Montauk Point and the opening to Long Island Sound. ~~Shallower waters appear to be preferred, most likely for foraging purposes~~ Waters less than 35 m deep appear to be preferred, though some loons were documented in deeper offshore waters in Rhode Island Sound.

“b. Scoters and common eider were among the most abundant birds observed using nearshore habitats during with months. They tended to ~~showed~~ concentrations around the west side of Block Island, along the Rhode Island south shore shoreline, and around the Sakonnet shoreline bordering Rhode Island Sound. Few were found over the open waters of Block Island Sound, Rhode Island Sound or the Offshore Ocean SAMP area. Scoter appeared to be most abundant during the November through January time span; eider appeared to use the area throughout the surveyed time span. ~~Shallower waters appear to be preferred, most likely for foraging purposes.~~ While research suggests that seaduck primary foraging depth is less than 20 m of water depth, Paton et al. (2010) found seaducks to consistently forage in waters up to 25 m deep in the Ocean SAMP area.

“c. Alcids (razorbills, dovekies, murre, puffins, guillemots), winter migrants to the Ocean SAMP area, were found scattered throughout the area, though densest concentrations occurred in deeper waters south of Block Island and throughout the central portions of Rhode Island Sound and south onto the Offshore Ocean SAMP area. ~~Use of Ocean SAMP waters by these types of avifauna appears to be reduced towards late February, and largely for rafting purposes.~~ These species exhibited spatial segregation in the Ocean SAMP study area, with razorbills specializing in northern,

shallow water sections closer to land, while common murrelets tended to use the central portions of the Ocean SAMP area. Dovekies were offshore specialists that reached peak densities in southern Ocean SAMP areas, out to the Continental Shelf.

“d. Northern gannets ~~were~~ are a common spring and fall migrant in the Ocean SAMP area. This piscivorous specialist tends to occur in areas where depths exceed 30 m in depth, and were observed scattered throughout the area, though ~~thinly throughout the central and eastern portions of Rhode Island Sound and the inner portions of Block Island Sound.~~ Occurrence in waters north of a line from Montauk Point to Martha’s Vineyard was mainly during November/December, with occurrence of this species during January/February largely limited to deeper waters at the southern extent of Block Island and Rhode Island Sound, and over the Offshore Ocean SAMP area ~~their densities peaked approximately 3 miles offshore of Block Island and/or the Rhode Island mainland during fall and winter.~~”

13. At the suggestion of the URI Ocean SAMP avian research team, a new paragraph (250.6., #11) was added as follows: “During land-based surveys, Paton et al. (2010) detected 7 species of raptors and 27 other species of landbirds. However, with the exception of tree swallows, which are diurnal migrants along the coast, very few songbirds or other types of landbirds were detected. During ship-based line transect diurnal surveys, only 8 species of landbirds were detected in Rhode Island’s offshore waters (Paton et al. 2010). This is not surprising as most landbirds, particularly songbirds, are nocturnal migrants, and are only effectively monitored by radar. Mizrahi et al. (2010), using a radar unit on Block Island throughout 2009, were not able to separate out landbirds from other species during radar investigations. Based on this radar study, peak flight altitudes of targets ranged between 200-400 m above sea level, with more birds passing over Block Island in the fall than spring. Peak migration appeared to take place from sunset to 5 hours after sunset.”
14. New reference added as per correction #14 above: “Mizrahi, D., Fogg, R., Mararian, T., Elia, V., and La Puma, D. 2010. Radar monitoring of bird and bat movement patterns on Block Island and its coastal waters. Draft interim report. Rhode Island Ocean Special Area Management Plan. University of Rhode Island, Narragansett, RI.”

Items 15-27 in response to comments and feedback received from the URI Ocean SAMP circulation research team led by Dr. Codiga and Dr. Ullman.

15. **PAGE 22, 220.1., #3.** At the suggestion of URI Ocean SAMP researchers Codiga and Ullman the following section was amended as follows: “Winds have not been shown to play a major role in driving the long-term circulation patterns observed in Rhode Island Sound or Block Island Sound, though on a seasonal and shorter time frame basis wind can be a significant factor. Summer south westerly winds (e.g., sea breeze), while only half as strong as winter winds, drives upwelling along the coast which appears to help drive the flow of Long Island Sound water towards the shelf and offshore (O’Donnell and Houk in prep). Codiga and Ullman (2010) and Ullman and Codiga (2010) have found that during winter months a weak, non-wind driven upwelling pattern is observed in Rhode Island Sound and in the Offshore

[Ocean SAMP area.](#) Westerly summer winds also tend to increase the exchange of water between Block Island Sound and Rhode Island Sound, while winter winds, predominantly from the northwest, promote increased water column mixing rather than increased horizontal exchange (Gay et al. 2004). This mixing may help bring nutrients into the water column for uptake by phytoplankton, perhaps contributing to spring blooms when they occur. [Codiga and Aurin \(2007\) further support the above through direct observations, finding that the volume of water exchanged between Long Island Sound and Block Island Sound was weakest during winter months.](#)”

16. New reference added: [“Ullman, D.S. and Codiga, D.L. 2010. Characterizing the physical oceanography of coastal waters off Rhode Island: Part 2: New observations of water properties, currents and waves. Final Report for Rhode Island Ocean Special Area Management Plan. Coastal Resources Management Council, Wakefield, RI.”](#)
17. **PAGE 27, 230., #6.** At the suggestion of URI Ocean SAMP researchers Codiga and Ullman the following section was amended as follows: “While there have been studies of the physical oceanographic characteristics of the Ocean SAMP area, many of them are geographically limited in their scope and do not portray a picture of how the area functions as a connected, dynamic system. A practical way to proceed at a systems-level scale is through modeling. The physical oceanography of the Ocean SAMP area however is complicated due to complex topography, which makes modeling attempts more challenging. Furthermore, a major challenge will be linking biological/ecological functions to physio-chemical processes to gain an ecosystem-based view of the region as a functional whole. Dr. Changshen Chen (University of Massachusetts Dartmouth; fvcom.smast.umassd.edu/research_projects/NECOFS/index.html) and collaborators have developed the U.S. Northeast Coastal Ocean Forecast System (NECOFS), which contains detailed geometry for Rhode Island Sound and Block Island Sound. Future application of this model to the Ocean SAMP area would assist in better understanding circulation dynamics, and the ecology because biological components can be incorporated into the model to develop an ecosystem-level understanding. ~~Codiga and Ullman (2010) report on many of the physical oceanographic aspects of the Ocean SAMP area that would be of importance to the NECOFS model application.~~ [Many detailed aspects of physical oceanography in the Ocean SAMP area based on Finite Volume Coastal Ocean Model \(FVCOM\) hydrodynamic simulations, which underlie NECOFS, have been described by Codiga and Ullman \(2010\).](#)”

18. **PAGE 28, 230.1., #1 and #2.** At the suggestion of URI Ocean SAMP researchers Codiga and Ullman, the following sections were amended as follows:

“Wave analysis performed by Spaulding (2007) found that nearly 53% of the waves in the Ocean SAMP area come from three dominant directions: 22% from the south, 19% from the south southwest, and 12% from the south southeast, with average annual wave heights for each direction: 1.09 m (SSE), 1.15 m (S) and 1.29 m (SSW). Asher et al. (2009) are in

agreement that the greatest frequency of waves, regardless of size, come from a southerly direction, with a mean wave height of 1.2 m and an extreme height of 8.4 m. Spaulding (2007) estimated probable wave height extremes for 10 year: 6.5–7.0 m; 25 year: 7.5–7.75 m; 50 year: 8.2–8.35 m; 100 year: 8.8–9.0 m frequencies. Asher et al. (2009) also estimated 9.0 m extreme wave height at a 100 year frequency, but noted that the probability of such a wave was not applicable to all Ocean SAMP areas. They found that geography influenced wave height, with waves from the south and the southeast having the greatest potential for larger size, with 10+ m extreme waves possible. [Ullman and Codiga \(2010\) found average wave heights to range from 0.5 m to 2.5 m, with waves of less than 0.5 m occurring for less than a day during winter and up to several days during summer.](#) Asher et al. (2009) found that the moraine stretching between Block Island and Montauk provided a wave damping action, with a net result that extreme wave heights would be 2–3 m less to the west of Block Island (versus to the south or southeast). This may be important ecologically as it tends to create an environment less influenced by disturbance events.”

“Average wave heights in the Ocean SAMP area tend to be 1–3 m, and overall, would be expected to have little impact on bottom waters, though surface waters would tend to stay well mixed. Larger waves, generated by winds associated with storms, will have a greater potential to impact the water column, particularly water column stratification. [Ullman and Codiga \(2010\) found waves larger than 2.5 m in height to be associated with strong wind events, generally lasting 3 to 8 days, and being slightly more common during winter.](#) First (1972) found that statistically modeled wave induced bottom velocity should be strong enough, given 97 km hr⁻¹ (60 mph) winds, to impact bottom sediments at a depth of about 60 m (e.g., Cox Ledge). From their modeling efforts, First (1972) further determined that wave induced bottom impact in water depths of 60 m should occur 1.5–4.9% of the time between September and November. This suggests that high intensity winds have the potential to mobilize sediment at the surface of the seafloor throughout much of the Ocean SAMP area, reworking sediments and sorting them as described previously (see Section 210). The impact of wave disturbance on the benthic environment of the Ocean SAMP area is not well known.”

19. **PAGE 33, 230.3.1., #6.** At the request of URI Ocean SAMP researchers Codiga and Ullman, the following reference was added to show original source of data; Citation below added to References section of the chapter as well:

“O’Donnell and Houk (in prep) [and Kaputa and Olsen \(2000\)](#) note a strong seasonal signal in temperature at both surface and bottom at a station located northwest of Block Island, and about ¾ of the distance to The Race. Figure 2.11 shows the seasonal peak in water temperature consistently occurs in later summer/early fall (Aug/Sep), with the seasonal low occurring in late winter/early spring (Feb/Mar). During those years where surface and bottom temperatures are nearly identical (e.g., 1996), the water column is most likely well mixed. Conversely, in those years where surface and bottom temperatures are considerably divergent (e.g., 1998), the water column appears not to be well mixed and water column stratification is likely.”

[“Kaputa, N.P. and Olsen, C.B. 2000. Summer hypoxia monitoring survey ‘91–‘98 data review. Long Island Sound Water Quality Monitoring Program. Connecticut Dept. of Environmental Protection, Hartford, CT.”](#)

20. **PAGE 39, 230.3.2., #5.** At the suggestions of URI Ocean SAMP researchers Codiga and Ullman, the following amendment was made; Citation below added to References section as well:

~~“During times of low freshwater discharge into Long Island Sound, O’Donnell and Houk (in prep) observed high salinity water intruding into Block Island Sound from the Offshore Ocean SAMP area region at mid depth in the water column (not shown in Figure 2-14). Intrusions of high salinity water from the shelf such as noted by O’Donnell and Houk, have not been reported previously and are little understood with regard to the frequency of occurrence, and how they relate to other physical forcing factors such as winds and tides. Ullman and Codiga (2010) have observed intrusion of high salinity water at about 30 m depth in the water column, finding the characteristics of this water to be consistent with those reported by Linder and Gawarkiewicz (1998) for water found on the inside of the Continental Shelf, about 100 km offshore. The impact of mid-depth, high salinity intrusion events on the ecology of the area has not been studied, but suggests that a strong connection between waters of the Offshore SAMP area Block Island Sound may result during times of low flow from Long Island Sound.”~~

[“Linder, C.A., and Gawarkiewicz, G. 1998. A climatology of the shelfbreak front in the Middle Atlantic Bight. *Journal of Geophysical Research* 103: 18405–18423.”](#)

21. **PAGE 40, 230.4., #2.** At the suggestion of URI Ocean SAMP researchers Codiga and Ullman the following amendment was made: “Circulation patterns in Rhode Island and Block Island Sound are influenced by temperature and salinity differences in the water column, tidal ebb and flood, and wind shear. Buoyancy driven circulation—circulation that occurs based on the relationship between water temperature and salinity, which together define the density of water, and the differences in water density both vertically and laterally—makes an important contribution to the mean circulation on seasonal and longer timescales (Codiga and Ullman 2010). Tidal ebb and flood is considered to play an important role in creating turbulence and in mixing the water column, while wind-driven currents play a significant role on timescales of a day to several days, particularly during winter in association with storms, but also in summer due to the diurnal sea breeze. For instance, westerly winds during summer increase the exchange of water between Block Island Sound and Rhode Island Sound in the area between Block Island and the Rhode Island coastline. Winter winds on the other hand, which are predominantly from the northwest and stronger than summer winds, promote water column mixing rather than increased water exchange (Gay et al. 2004). [This is further supported by the direct observations of Codiga and Aurin \(2007\) who found the volume exchange of water between Long Island Sound and Block Island Sound to be weakest during winter months.](#)”

22. **Figure 2.15 legend:** amended as per suggestion of Codiga and Ullman comments as follows:
“Figure 2.15. Differences in [tidal](#) circulation velocities between Rhode Island Sound (RIS) and Block Island Sound (BIS), showing Block Island Sound to be more vigorous and dynamic than Rhode Island Sound. Velocity is greatest over shallow areas and at constricted areas. Note different scales; this does not allow direct comparison between the two diagrams. [VS=Vineyard Sound; NS=Nantucket Shoals]”

23. **PAGE 42, 230.4., #5.** Text amended to correct an incorrect citation and Figure 2.16 legend text amended to correct an incorrect statement as follows:

“Based upon findings presented previously, and upon results of their own modeling and research, Codiga ~~and Ullman~~ ([20102009](#)) have developed a schematic that shows circulation transport pathways in Rhode Island Sound and Block Island Sound (Figure 2.16). They find minor interaction between Rhode Island Sound and Narragansett Bay, Buzzards Bay and Vineyard Sound both at surface and at depth. Deep flow from Point Judith, moving westward along the Rhode Island shore and into Block Island Sound is moderate, as are return flows at surface from Block Island Sound into Rhode Island Sound around the north side of Block Island. Moderate flow at the surface (into Block Island Sound) and strong flow at the bottom (into Long Island Sound) is seen through The Race. Moderate flows are seen at depth coming off the Offshore Ocean SAMP area into both Rhode Island Sound and Block Island Sound, with strongest cross-shelf deep flow occurring into Rhode Island Sound along its eastern portion; Codiga ~~and Ullman~~ ([20102009](#)) concede that there is limited information for this section of Rhode Island Sound, and that further study is needed. Strong surface flows are observed moving water out of both sounds, generally in a southwestward direction parallel to the south shore of Long Island. Surface water transport out of both sounds and south following the coast of Long Island is a major pathway for water in the Ocean SAMP area to move into the Mid-Atlantic Bight ecosystem. “

“Figure 2.16. [Modeled Schematic of hypothesized](#) water flow, ~~temperature, salinity and density (σ_t)~~ at surface and at depth in the Ocean SAMP area (from Codiga ~~and Ullman~~ [20102009](#)).”

24. **PAGE 42/43, 230.4., #6.** Text amended to correct a statement error and Figure 2.17 legend text amended to correct an incorrect statement as follows:

“While Figure 2.16 shows overall patterns of circulation, Figure 2.17 shows [modeled a summary schematic diagram of](#) surface and bottom flows on a seasonal basis, [based upon best interpretation of observations and model output](#). Fall and winter show dominant offshore flow out of Rhode Island Sound, with a reversal during spring and summer months; this reversal could promote inshore transport of larval forms produced during winter/spring spawning events. Block Island Sound shows continuous interchange with all adjacent waterbodies, though the interchange is most vigorous in spring and summer when Long Island Sound influence is the greatest. Interaction between Block Island Sound and Rhode Island Sound in year round, but most intense in spring and summer when freshwater input from Long Island Sound intensifies overall circulation in the Ocean SAMP area.”

“Figure 2.17. ~~Hypothesized annual water flow volumes at both surface and at depth~~Schematic summary, based on observations and model outputs, of currents and hydrography in the Ocean SAMP area; size of arrow indicates magnitude of the flow (from Codiga and Ullman 2010). Histogram inserts show detail of temperature, salinity and density at various sites.”

25. **PAGE 44, 230.4.1., #2.** Text amended to correct a wrong citation and improve the text; citation corrected in references section as follows:

“Upon leaving The Race, shallow flow tends southwestward towards the opening to Block Island Sound between Montauk Point and Block Island, with a peak flow of 10–25 cm s⁻¹ (Figures 2.15 and 2.16; Ullman and Codiga 2004). This flow is deflected westward along the south shore of Long Island by the Coriolis force, where it moves southward to mingle with southern waters of the Mid-Atlantic Bight ecosystem. This flow is seasonally stratified; strongly so during late spring and early summer due to estuarine flow driven by freshwater input to Long Island Sound. During the spring freshet (e.g., snow melt plus spring rains) this flow is significant, and is referred to as a “jet” which can be detected 5 km south of Montauk Point (Ullman and Codiga 2004). Codiga (~~in prep 2009~~) hypothesized reports an annual mean volume flow out of Block Island Sound at surface of 24,000 m³ sec⁻¹ onto the Offshore Ocean SAMP area, with a bottom water return from the Shelf into Block Island Sound of 10,000 m³ sec⁻¹.”

“Codiga, D.L. ~~in prep 2009~~. Circulation in Block Island Sound, Rhode Island Sound, and Adjacent Waters, with Emphasis on Subsurface Flows. In: *Sound Connections: The Science of Rhode Island & Block Island Sounds. Proceedings of the 7th Annual Ronald C. Baird Sea Grant Science Symposium*. Rhode Island Sea Grant, Narragansett, RI. October 2008. http://seagrantadm.gso.uri.edu/Baird_08/Abstracts/codiga.pdf”

26. **PAGE 45, 230.4.1., #3.** New references added as per suggestion of URI Ocean SAMP researcher Dan Codiga; citations added to reference section as follows:

“A sharply delineated boundary, or sharp gradient (e.g., a front), is observed south of Block Island where lower salinity estuarine waters meet saltier continental shelf waters (Edwards et al. 2004; Ullman and Cornillon 2001). The front may represent the outer boundary of estuarine influence from Long Island Sound on the Offshore Ocean SAMP area (Ullman and Codiga 2004; Ullman and Cornillon 2001). The front is readily noted by a temperature discontinuity, and is seasonal in its nature. Figure 2.17 shows the seasonality of the front; offshore in winter then moving north and intensifying in spring with a strong presence off Block Island during summer months. During summer, the front is strongly set and is often observed to extend from the region northeast of Block Island southwestward, 15–20 km southeast of Montauk Point (Figure 2.19; Edwards et al. 2004; [Kirincich and Hebert 2005](#); [Codiga 2005](#)). The influence of this front on the ecology of the sounds is not well known. However, fronts are areas of high biological activity due to nutrient mixing across water masses, which stimulates increased primary production (Mann and Lazier 2006); increased

primary production often leads to increased secondary production (Munk et al. 1995). Commercial and recreational fishermen actively seek out the location of the front to help locate specific species and/or areas of greater fish abundance, suggesting the front either acts as an area of food concentration, or as an area of thermal refuge, or both. Roff and Evans (2002) note that distinct, special oceanographic processes that occur at local scales (e.g., a front) create distinctive habitat that is attractive to fish. Worm et al. (2005) correlated sea surface temperature gradients to increased tuna and billfish diversity. Further description of the ecological importance of oceanic fronts can be found in Mann and Lazier (1996).”

[“Codiga, D.L. 2005. Interplay of wind forcing and buoyant discharge off Montauk Point: seasonal changes to velocity structure and a coastal front. *Journal of Physical Oceanography* 35: 1068–1085.”](#)

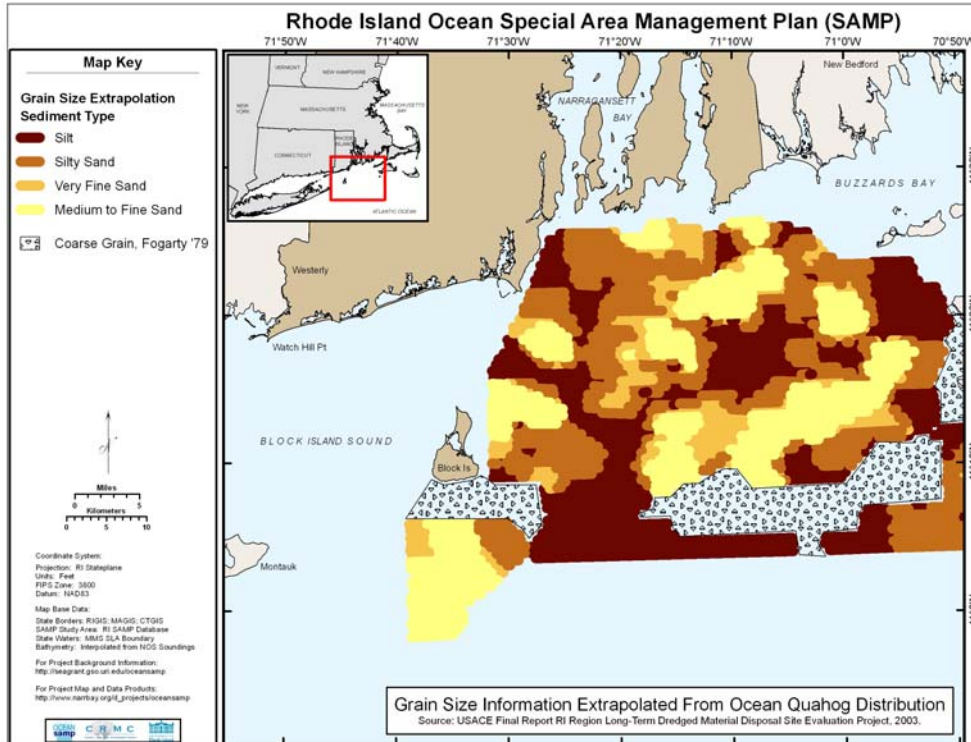
[“Kirincich, A. and Hebert, D. 2005. The structure of the coastal density front at the outflow of Long Island Sound in spring 2002. *Continental Shelf Research* 25: 1097–1114.”](#)

27. **PAGE 47, 230.4.2., #6.** Text amended as per suggestion of URI Ocean SAMP researcher Dan Codiga as follows: “Kincaid et al. (2003) also found a distinct, significant flow during summer time in the eastern portion of Rhode Island Sound that moved to the west, and then southwest, following the coast of Rhode Island (Figure 2.20). Riley (1952) noted a similar westward flow into Block Island Sound between Point Judith and Block Island, as have Codiga and Ullman (2010). During winter months this flow continued, but at a much diminished rate. Kincaid et al. (2003) suggest that a seasonal cyclonic gyre exists in Rhode Island Sound, and that this gyre has significant influence upon dynamic exchange with Narragansett Bay. ~~However, Codiga and Ullman (2010) point out that reports of a gyre in Rhode Island Sound are consistent with reports of flow around the periphery of the sound, but that there is no evidence that the flow is closed to form a distinct gyre as originally noted by Cook (1966). This is an area where further research is needed to improve understanding of circulation in Rhode Island Sound.~~ While a cyclonic gyre the size of Rhode Island Sound is consistent with flow counterclockwise around its periphery, the analysis of model output by Codiga and Ullman (2010), and of current observations in Ullman and Codiga (2010), have both demonstrated that along the southern edge of Rhode Island Sound the flow is westward, which contradicts the idea that flow closes in a distinct gyre as originally suggested by Cook (1966).”

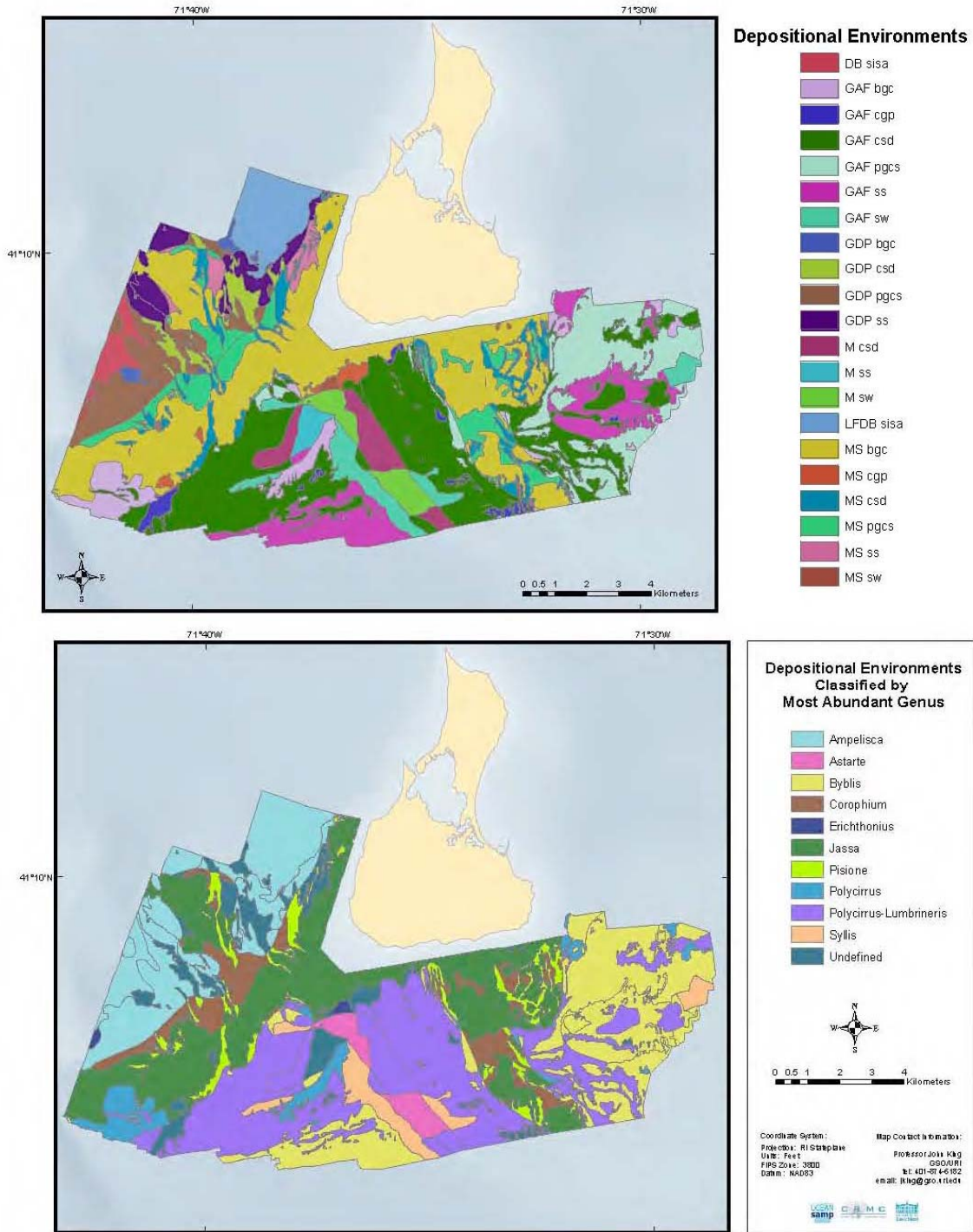
28. **Figure 2.25:** amended in response to in response to feedback received from the URI Ocean SAMP benthic habitat research team led by Dr. John King and summarized in LaFrance et al. (2010). Legend amended as follows: “Figure 2.25. ~~Grain size distribution in Rhode Island Sound as extrapolated from ocean quahog distribution (Fogarty 1979). Benthic geological environments (top) and genus defined benthic geological environments (bottom) in a select portion of Block Island Sound (LaFrance et al. 2010). Top panel key: DB=Depositional Basin; GAF=Alluvial Fan; GDP=Glacial Delta Plain; M=Moraine; MS=Moraine Shelf; LFDB=Lake~~

[Floor/Depositional Basin; sisa=silty sand; bgc=boulder gravel concentrations; cgp=cobble gravel pavement; csd=coarse sand with small dunes; pgcs=pebble gravel coarse sand; ss=sheet sand; sw=sand waves.](#)” Figure replaced with two (2) new images provided by URI researchers LaFrance et al. (2010) as follows:

OLD FIGURE 2.25 (DELETED):



NEW FIGURE 2.25 (INSERTED):



29. **Page 71, 250.2., #7:** rewritten to reflect new Figure 2.25, in response to feedback received from the URI Ocean SAMP benthic habitat research team led by Dr. John King and summarized in LaFrance et al. (2010), as follows: “Figure 2.25 shows ~~bottom sediment distribution interpreted from ocean quahog distribution data in Rhode Island Sound, and benthic habitat can sometimes be inferred based on preferences of species found in the~~

~~area for specific sediment types~~ benthic geological environments, and genus-defined benthic geological environments, as interpreted from side scan imagery, sub-bottom profile imagery, sediment samples, and underwater video surveys reported by LaFrance et al. (2010). Zajac (in prep) developed a first order compilation of benthic species–sediment type relationships (Table 2.7) based on the published literature. There appears to be basic agreement in distribution of some types, for example *Byblis* (bottom panel) in coarse sand and gravel areas (top panel), while for others, *Ampelisca* for example, the agreement is less clear, and this could be related to Figure 2.25 as a first approximation of benthic species distribution in Rhode Island Sound. Without groundtruthing however, such an exercise should be considered only guidance for further research, and no implications should be assumed. Given the broad distribution of silt, silty sand, and fine sand in Rhode Island Sound, it is not surprising that amplexiscid amphipods, which appear to prefer these sediment types, are the most broadly distributed benthic invertebrate. Further mapping such as that conducted by LaFrance et al. (2010) will help to better define the benthic environment of the Ocean SAMP area, and may allow for comparison to past surveys that may have accurately identified the geographic location of sample sites. The survey results of LaFrance et al. (2010) are in general agreement with past survey findings that tube-dwelling amphipods are the most abundant benthic organism. LaFrance et al. (2010) suggest that the large mats created by tube-dwelling amphipods are valuable benthic habitat that provides a positive influence on the benthic ecosystem.

30. **Page 74, 250.2., #8:** amended in response to feedback received from the URI Ocean SAMP benthic habitat research team led by Dr. John King and summarized in LaFrance et al. (2010), and URI Ocean SAMP fish habitat research team led by Dr. John King and Jeremy Collie and summarized in Malek et al. (2010). Malek et al. (2010) also inserted into Literature Cited. See as follows:

“Habitat diversity promotes species diversity—the more complexity a habitat contains the greater the number of species the habitat can generally support (Eriksson et al. 2006). A potential proxy for habitat complexity in marine benthic ecosystems could be surface roughness. The presumption is that the rougher the bottom, the greater the vertical complexity, which could be equated with the promotion of increased species diversity. King and Collie (2010) have developed a first-order interpretation of bottom roughness from sidescan sonar images for the Ocean SAMP area (Figure 2.26). Until further interpretation accompanied by groundtruthing occurs, increased surface roughness, as shown in Figure 2.26, should be considered only as providing the potential for habitat that promotes increased species diversity and/or abundance. ~~Furthermore, species correlations to “roughness patterns” cannot be assigned. While only a first, rough approximation, areas of high surface roughness appear to generally correspond to glacial moraines; these areas are often hot spots for commercial and recreational fishing activity, which while not necessarily suggesting increased diversity, does suggest highly productive areas of the Ocean SAMP area seafloor, and that the moraines are important fish habitat. Initial findings by LaFrance et al. (2010) suggest that the relationship between surface roughness and habitat diversity appears to vary according to the scale at which surveys are conducted and~~

the accompanying statistical routines used to interpret the relationship. ~~Further research would be needed to elucidate why these areas attract fish—is it food, shelter, current flow, or otherwise?~~ They find that a relationship does exist between surface roughness and habitat diversity, though it is clear that further research needs to be conducted, at appropriate scales, to elucidate how this relationship relates to species abundances and uses of the various benthic habitats in the broader Ocean SAMP area. Malek et al. (2010) also found a trend towards greater habitat complexity, but only for Block Island Sound, based on acoustically derived surface roughness interpretation, but again suggesting that more research is needed to further verify and build upon these findings.”

“Malek, A., Collie, J., LaFrance, M., and King, J. 2010. Fisheries ecology and benthic habitat in Rhode Island and Block Island Sounds. Technical Report #14 of the Ocean Special Area Management Plan. Rhode Island Coastal Resources Management Council, Wakefield, RI.”

31. **Page 77, 250.2.1., #4:** amended in response to feedback received from the URI Ocean SAMP benthic habitat research team led by Dr. John King and summarized in LaFrance et al. (2010). Added (f) as follows: “(f) LaFrance et al. (2010) found that in samples from both Block Island Sound and Rhode Island Sound that small surface burrowing polychaetes of the genus *Lumbrineris* were the most broadly distributed, followed by small surface burrowing amphipods of the genus *Unciola* and large deep burrowing polychaetes of the genus *Glycera*. With regards to abundance, LaFrance et al. (2010) found the tube-swelling amphipod genus *Ampelisca* to be the most abundant, followed by *Leptocheirus*, also a tube-dwelling amphipod.”
32. **Page 80, 250.3., #4:** amended in response to feedback received from the URI Ocean SAMP fisheries research team led by Dr. Jeremy Collie and summarized in Bohaboy et al. (2010); reference inserted into Literature Cited as well. See as follows:

“Circulation and salinity play a role in fish species distribution and abundance. For instance, Merriman and Sclar (1952) noted a correlation between salinity in Block Island Sound and years of heavy spawning for at least certain species of fish. In one year of their survey the salinity in Block Island Sound was 2‰ higher than in other years, which corresponded to being a year during which a heavy spawn was noted. Similar heavy spawning was not seen in other years when salinities tended to be lower. Merriman and Sclar (1952) found that precipitation and runoff were both lower during the year of high salinity/heavy spawning. Three years later they noted an increase in the catch of weakfish (a species with high reproductive success during the high salinity event), again suggesting correlation between these events. Merriman and Sclar (1952) noted however, that there were not enough data to make correlations with a large degree of certainty, though they did suggest causality. Bohaboy et al. (2010) find that season is a strong determinant of both fish diversity and fish abundance in the Ocean SAMP area, with fall having greater numbers of fish present than during spring.”

[“Bohaboy, E., Malek, A., and Collie, J. 2010. Baseline characterization: data sources, methods and results. Appendix A to Chapter 5: Commercial and Recreational Fisheries. Ocean SAMP. Rhode Island Coastal Resources Management Council, Wakefield, RI.”](#)

33. **Page 55, 250.1., #1:** amended in response to feedback received from the URI Ocean SAMP ecology research team led by Dr. Scott Nixon and summarized in Nixon et al. (2010); reference added to Literature Cited as well. See as follows:

“There appear to be correlations between phytoplankton species composition in Narragansett Bay and Rhode Island Sound, though more work is needed to prove and clarify that correlation, as well as to research trends for species shifts over time. [Recent findings of Nixon et al. \(2010\) suggest that surface waters of Rhode Island Sound contain more phytoplankton than those of Block Island Sound, though in summer when the water column is stratified this relationship appears not to hold; this pattern does not hold for primary production \(see 250.1.1\).](#) Primary production is seasonal in the Ocean SAMP area, and production values are generally similar to though slightly lower than those of adjacent areas, [which agrees with findings of Nixon et al. \(2010\).](#) As is noted for Narragansett Bay, Rhode Island Sound appears to be experiencing a less consistent winter–spring phytoplankton bloom, though again more research is needed to verify and clarify this observation, and define its importance to the overall ecology of the area. [Nixon et al. \(2010\) have found evidence for a fall bloom in Ocean SAMP waters, a bloom which was not seen to occur in Narragansett Bay.](#) Zooplankton species composition was found to be seasonal, and heavily influenced by change in salinity and/or temperature in the water column; distinct species changes were noted in warm vs. cool years, dry vs. wet years. Influx of the ctenophore *M. leidyi* had significant impact on the zooplankton community of Narragansett Bay, though similar study has not been conducted in Rhode Island Sound so it is unclear if similar interaction is occurring. Differences between Rhode Island Sound and Block Island Sound regarding zooplankton control of phytoplankton stocks was suggested, but has not been studied in a comparative sense, nor is it known if ctenophore outbreaks have influenced zooplankton–phytoplankton interactions in Rhode Island or Block Island Sound. Very preliminary comparison (Deevey 1952a,b; Kane 2007) suggests zooplankton dominant species have not changed over the past 50 to 60 years, nor has the seasonality of at least some dominant species. Rigorous analysis however, needs to be undertaken before this can be stated with any degree of surety.”

[“Nixon, S., Granger, S., Oviatt, C., Fields, L., and Mercer, J. 2010. Spatial and temporal variability of surface chlorophyll, primary production, and benthic metabolism in Rhode Island and Block Island Sounds. Technical Report #9 for the Ocean Special Area Management Plan. Rhode Island Coastal Resources Management Council, Wakefield, RI.”](#)

34. **Page 57, 250.1.1., #5:** amended in response to feedback received from the URI Ocean SAMP ecology research team led by Dr. Scott Nixon and summarized in Nixon et al. (2010) as follows: “Hyde (in prep), using ocean color remote sensing data, estimated phytoplankton average annual biomass and productivity for the past 10 years for the Rhode Island Sound

and Block Island Sound area as 1.07 mg m^{-3} . Primary production estimates for the Ocean SAMP area ranged from 143 to $204 \text{ g C m}^{-2} \text{ d}^{-1}$ and were comparable to, though slightly lower than, primary production measurements for nearby regions (Table 2.3). Sampling at four stations in Rhode Island Sound found chlorophyll *a* concentrations of 6 to $9 \text{ } \mu\text{g l}^{-1}$ (U.S. Army Corps 2002), which is comparable to those noted by Staker and Bruno (1977) for Block Island Sound. They are also consistent with oceanic systems and slightly lower than an average estimate of phytoplankton production on continental shelves (Mann 2000), and are consistent with Hydes' assessment. [Nixon et al. \(2010\) found that chlorophyll concentrations above \$4.5 \text{ } \mu\text{g l}^{-1}\$ were unusual but more common in Rhode Island Sound than in Block Island Sound, with most common concentrations ranging between 0.5 and \$1.0 \text{ } \mu\text{g l}^{-1}\$. For Rhode Island Sound, Nixon et al. \(2010\) found production over the span of October 2009 to April 2010 to be between \$86 \text{ and } 91 \text{ gC m}^{-2} \text{ d}^{-1}\$, and \$87 \text{ gC m}^{-2} \text{ d}^{-1}\$ for Block Island Sound.](#) Figure 2.22 shows annual phytoplankton growth (via chlorophyll *a*) in the Ocean SAMP area over a decadal span of time. While there is year-to-year variability, a general trend of increased production closer to shore is apparent. Nearshore waters will be shallower, better mixed, closer to nutrient sources, and warmer than offshore waters, all factors which promote increased productivity. No trend over time is visibly apparent from this time series data set, though statistical analyses are lacking to make any further judgment."

35. **Page 82, 250.3., #12:** amended in response to feedback from URI Ocean SAMP fisheries research team led by Dr. Jeremy Collie and summarized in Bohaboy et al. (2010), as follows: "Brown (in prep) characterizes the major demersal (e.g., living near but not necessarily on the bottom) and pelagic fish and invertebrates as residents or migrants of the Ocean SAMP area (Figure 2.27). The majority of the pelagic species are seasonal users of the area, with most of those arriving during spring and leaving during the fall. Relatively few major species are resident in the Ocean SAMP area. This suggests that the overall fish community of the Ocean SAMP area largely follows a seasonal cycle of abundance. [These findings are corroborated by recent research by Bohaboy et al. \(2010\) in the Ocean SAMP area.](#) Water temperature and food availability are no doubt major elements in shaping fish abundance patterns, both of which also exhibit strong seasonality. In general terms, early spring sees the start of a major influx of migratory species to the area, reaching a maxima in later summer then declining throughout the fall season. This pattern is similar to those noted for zooplankton and ichthyoplankton communities."

36. **Section 270.1, Policy 1:** technical revisions to make language consistent with Chapter 11, Policies of the Ocean SAMP, as approved by the CRMC Ocean SAMP Subcommittee on 22 July 2010, as follows: "The Council recognizes that the ~~primary guiding policy for the Ocean SAMP is to protect and where possible restore and enhance natural resources and ensure that~~ [preservation and restoration of ecological systems shall be the primary guiding principle upon which environmental alteration of coastal resources will be measured.](#) Impacts from future activities ~~are~~ [shall be](#) avoided and, if they are unavoidable, ~~are~~ minimized and mitigated ~~so they are acceptable to the scientific community and the people of Rhode Island.~~"

37. **Section 270.1, Policy 3:** technical revisions to make language consistent with Chapter 11, Policies of the Ocean SAMP, as approved by the CRMC Ocean SAMP Subcommittee on 22 July 2010, as follows: “The Council recognizes that while all fish habitat is important, spawning and nursery areas are especially critical in providing shelter for these species during the most vulnerable stages of their life cycles. The Council will ensure that impacts ~~from to~~ these essential fish sensitive habitats are avoided and, if they are unavoidable, are minimized and mitigated, ~~especially for habitats that are used by recognized Threatened and Endangered finfish per the Endangered Species Act (16 U.S.C. 1531 et. seq.).~~ In addition, the Council will give consideration to habitat used by as well as finfish listed as “Species of Concern” as defined by the NMFS Office of Protected Resources.”
38. **Section 270.1, Policy 4:** technical revisions to make language consistent with Chapter 11, Policies of the Ocean SAMP, as approved by the CRMC Ocean SAMP Subcommittee on 22 July 2010, as follows: “Because the Ocean SAMP is located at the convergence of two eco-regions and therefore more susceptible to change, the Council will ~~employ the precautionary principle to carefully managing manage~~ this area, especially as it relates to the projected effects of global climate change on this rich ecosystem.”
39. **Section 270.2, Regulatory Standard 1:** technical revisions to make language consistent with Chapter 11, Policies of the Ocean SAMP, as approved by the CRMC Ocean SAMP Subcommittee on 22 July 2010, as follows: “The Council designates the Ocean SAMP sea duck foraging habitat ~~(Chapter 8, Figure 39)~~ in water depths less than or equal to 20 meters [65.6 feet] as depicted in Figure 11.7 in Chapter 11, The Policies of the Ocean SAMP, as Areas Designated for Preservation due to their ecological value and the significant role these foraging habitats play ~~on for these to~~ avian species, and existing evidence suggesting the potential for permanent habitat loss as a result of offshore wind energy development. For further information on Areas Designated for Preservation, see Chapter 11, The Policies of the Ocean SAMP. Current research indicates that there may be a permanent loss of foraging habitat for these species thus the Council shall prohibit any Large Scale Offshore Development, mining and extraction of minerals, or other development that has been found to be in conflict with the intent and purpose of an Area Designated for Preservation.”
40. **Section 270.2, Regulatory Standard 2:** technical revisions to make language consistent with Chapter 11, Policies of the Ocean SAMP, as approved by the CRMC Ocean SAMP Subcommittee on 22 July 2010, as follows: “Glacial moraines are important habitat areas for fish because of their relative structural permanence and structural complexity. The Council also recognizes that because glacial moraines contain valuable fish habitats they are also important to commercial and recreational fishermen. Accordingly, Due to there high habitat value, the Council shall designate glacial moraines as identified in figures 11.3 and 11.4 in Chapter 11, The Policies of the Ocean SAMP, as Areas of Particular Concern. For further information on Areas of Particular Concern, see Chapter 11, The Policies of the Ocean SAMP. Applicants for Offshore Development shall avoid Areas of Particular Concern within the Ocean SAMP area. Avoidance shall be the primary goal for these areas. Any Large scale, Small scale, or Other Offshore Development, as required, that cannot avoid these Areas of

~~Particular Concern shall be required to minimize to the greatest extent possible any impact, and as necessary, mitigate any significant impact to these resources. The applicant shall be required to demonstrate why these areas cannot be avoided or why no other alternatives are available.”~~

41. **Section 270.2, Regulatory Standard 4:** technical revisions to refer to appropriate sections of Ocean SAMP document, as follows: “Biological resource assessments shall be conducted according to the procedures outlined in Section ~~860-1160.5~~ of ~~the Renewable Energy Chapter~~ Chapter 11, The Policies of the Ocean SAMP, and detailed in the Site Assessment Plan and the Construction and Operation Plan sections.”

42. **Section 270.2, Regulatory Standard 5:** technical revisions to make language consistent with Chapter 11, Policies of the Ocean SAMP, as approved by the CRMC Ocean SAMP Subcommittee on 22 July 2010, as follows: “The Council ~~and in coordination with the~~ Joint Agency Working Group, as described in Chapter 11, The Policies of the Ocean SAMP, shall determine requirements for establish monitoring protocols prior to, during and post-construction ~~to evaluate the consequences of decisions and adapt management to the monitoring results~~. Specific biological monitoring requirements shall be determined on a project by project basis and may include but are not limited to the monitoring of:

- i. Coastal processes and physical oceanography
- ii. Underwater noise
- iii. Benthic ecology
- iv. Avian species
- v. Marine mammals
- vi. Sea turtles
- vii. Fish and fish habitat

~~The applicant shall provide the Council will a monitoring report scheduled by the Council.”~~

43. **References:** The following changes have been made to correct references/citations related to abstracts and presentations given at the 7th Annual Ronald C. Baird Sea Grant Science Symposium. The following changes do not change the content or intent of any text within the chapter; they only provide a full reference/citation to data sources that were not available in earlier drafts. In all cases the references/citations following have been changed from “*author name*. In Prep.” to “*author name 2009*” in the text portion of the chapter and to “*author name*. 2009. *title*. In: *Sound Connections: The Science of Rhode Island & Block Island Sounds. Proceedings of the 7th Annual Ronald C. Baird Sea Grant Science Symposium*. Rhode Island Sea Grant, Narragansett, RI. October 2008.

http://seagrantadm.gso.uri.edu/Baird_08/default.htm in Section 280. Literature Cited. Changes made as follows:

- a.) References re: Boothroyd changed/corrected on:
 - Page 13 (Sec 210, #3)
 - Page 17 (Sec 210, #5)
 - Page 117 (Sec 280. Literature Cited)

- b.) References re: Ullman changed/corrected on:
Page 45 (Sec 230.4.1, #3; Figure 2.19 legend)
Page 130 (Sec 280. Literature Cited)
- c.) References re: O'Donnell and Houk changed/corrected on:
Page 21 (Sec 230.1, #2)
Page 22 (Sec 230.1, #3)
Page 33 (Sec 230.3.1, #6)
Page 38 (Sec 230.3.3, #4)
Page 34 (Sec 230.3.1, #6; Figure 2.11 legend)
Page 39 (Sec 230.3.3, #4; Figure 2.13 legend)
Page 39 (Sec 230.3.3, #4; Figure 2.14 legend)
Page 125 (Sec 280. Literature Cited)
- d.) References re: Hyde changed/corrected on:
Page 46 (Sec 230.4.2, #2)
Page 58 (Sec 250.1.1, #5)
Page 58 (Sec 250.1.1, #5; Table 2.3 legend)
Page 59 (Sec 250.1.2, #2)
Page 60 (Sec 250.1.2, #2; Figure 2.22 legend)
Page 65 (Sec 250.1.5, #4)
Page 122 (Sec 280. Literature Cited)
- e.) References re: Pfeiffer-Herbert changed/corrected on:
Page 65 (Sec 250.1.5, #5)
Page 66 (Sec 250.1.5, #5; Figure 2.23 legend)
Page 68 (Sec 250.1.5, #8)
Page 126 (Sec 280. Literature Cited)
- f.) References re: Zajac changed/corrected on:
Page 71 (Sec 250.2, #7)
Page 72 (Sec 250.2, #7; Table 2.7 legend)
Page 77 (Sec 250.2.1, #4)
Page 79 (Sec 250.2.1.2, #2)
Page 131 (Sec 280. Literature Cited)
- g.) References re: Collie changed/corrected on:
Page 85 (Sec 250.3, #13; Figure 2.28 legend)
Page 85 (Sec 250.3, #13; Figure 2.29 legend)
Page 86 (Sec 250.3, #13; Figure 2.30 legend)
Page 87 (Sec 250.3, #14; Figure 2.31 legend)
Page 119 (Sec 280. Literature Cited)

- h.) References re: Brown changed/corrected on:
Page 82 (Sec 250.3, #10)
Page 82 (Sec 250.3, #10; Table 2.8 legend)
Page 82 (Sec 250.3, #10; Table 2.9 legend)
Page 82 (Sec 250.3, #12)
Page 83 (Sec 250.3, #12; Figure 2.27 legend)
Page 118 (Sec 280. Literature Cited)

Chapter 3, Global Climate Change:

1. **Sections 310-340:** As part of the proofreading process, figure captions were shortened to a simple title with explanatory statements moved to the text or a footnote (as appropriate) as follows:

- a.) Figure 3.1 caption: **“Figure 3.1.** Annual mean temperature at the official weather service stations for Providence, R.I., from 1905 to 2006 (Source: Pilson 2008).~~The annual mean temperature from 1905 to 2006 is 10.41°C (18.74°F), with an increase of 0.094°C (0.17°F) per decade. From 1961 to 2006 the increase per decade was 0.31°C (0.56°). It should be noted that the temperature recording station was moved several times in the early 1900s within the Providence city limits, until it was located to the T.F. Green Airport in Warwick in 1953 where it has remained since.”~~ Text integrated into 310.1 #2: “Annual average temperature has increased similarly in the Northeastern U.S. and Rhode Island. Since 1900, the annual average temperature in the Northeastern U.S. has risen 0.83°C (1.5°F), with the majority of warming occurring in the past few decades (Frumhoff et al. 2007). Winter temperatures have risen even faster with a total increase of 2.22°C (4°F) between 1970 and 2000 (Frumhoff et al. 2007). In Rhode Island, National Weather Service data in Providence shows that the annual mean temperature has increased 10.41°C (18.74°F) from 1905 to 2006. The average temperature has risen 0.094°C (1.7°F) per decade from 1905 to 2006, and 0.311.14°C (2.50.56°F) between 1961 and 2005 (Figure 3.1) (Pilson 2008). It should be noted that the temperature recording station was moved several times in the early 1900s within the Providence city limits, until it was located to the T.F. Green Airport in Warwick in 1953 where it has remained since. Although lower temperatures might be expected outside of an urban area and near water, the trend line beginning around 1960 suggests a more rapid increase than that for the entire time series (1905–2006).”
- b.) Figure 3.3 caption: **“Figure 3.2.** Observed sea level in Newport, R.I., from 1930 to 2008. ~~Sea level data (collected by the National Oceanic and Atmospheric Administration from the Newport, R.I., tide gauge) are measured relative to the National Geodetic Vertical Datum of 1929 (NGVD 29) for mean sea level (MSL). NGVD 29 is a vertical control point historically used for measuring elevations, including the absolute change in sea level (incorporating both global and local dynamics) at the site. The rate of sea level rise is 25.8 cm (10.16 in) per 100 years.~~ (Figure courtesy of J. Boothroyd, the University of

Rhode Island). ~~These data are available on line and continuously updated at: http://co-ops.nos.noaa.gov/sltrends/sltrends_station.shtml?stnid=8452660%20Newport,%20RI (NOAA/NOS 2008a).~~ New footnote #2: “2. Sea level data (collected by the National Oceanic and Atmospheric Administration from the Newport, R.I., tide gauge) are measured relative to the National Geodetic Vertical Datum of 1929 (NGVD 29) for mean sea level (MSL). NGVD 29 is a vertical control point historically used for measuring elevations, including the absolute change in sea level (incorporating both global and local dynamics) at the site. These data are available on line and continuously updated at: http://co-ops.nos.noaa.gov/sltrends/sltrends_station.shtml?stnid=8452660%20Newport,%20RI (NOAA/NOS 2008a).”

- c.) Figure 3.4 caption: “Figure 3.3. Total annual precipitation (rain and snow) at the weather stations in Providence, R.I., from 1905 to 2006. ~~The rate of increase (slope of the simple linear regression) is 3.05 mm (0.12 in) per year.~~ (Source: Pilson 2008).” Text integrated into 310.5 #2: “Between 1905 and 2006 there has been a 32 percent increase in precipitation (rain and snow) in Rhode Island when all years, even extremely dry and wet years, are included (Figure 3.4) (Pilson 2008). The rate of increase (slope of the simple linear regression) is 3.05 mm (0.12 in) per year (Pilson 2008). This estimate is comparable to the New England Regional Assessment data if extremely dry and wet years are excluded (Pilson 2008). The increase in precipitation, as well as warmer winter temperatures, is related to the observed increase in cloudiness, which results in a decreasing amount of sunlight reaching Rhode Island (Nixon et al. 2009).”
- d.) Figure 3.6 caption: “Figure 3.4. Observed global CO₂ emissions from fossil fuel burning and cement production compared with IPCC emissions scenarios (Le Quéré et al. 2009). ~~The shaded area covers all scenarios used to project climate change by the IPCC. Actual emissions began following the high emissions scenario in 2006 A1FI is high emissions scenario; B1 is low emissions scenario. (Source: Allison et al. 2009).~~” New footnote #4: “The shaded area covers all scenarios used to project climate change by the IPCC. Actual emissions began following the high emissions scenario in 2006 A1FI is high emissions scenario; B1 is low emissions scenario. (Source: Allison et al. 2009).”
- e.) Figure 3.7 caption: “Figure 3.5. Mean values of projected surface warming (compared to the 1980–1999 base period) for several scenarios of the Special Report on Emissions Scenarios (Source: IPCC 2007). ~~for the Special Report on Emissions Scenarios (SRES) scenarios A2 (red – higher emissions), A1B (green – intermediate emissions) and B1 (blue – lower emissions). Projections when emissions are kept constant from 2000 levels are shown (orange). Lines show the multi-model means, shading denotes the ±1 standard deviation range (Source: IPCC 2007).~~” New footnote #5: “Scenarios A2 (red – higher emissions), A1B (green – intermediate emissions) and B1 (blue – lower emissions) are from the Special Report on Emissions Scenarios (SRES). Projections when emissions are kept constant from 2000 levels are shown (orange). Lines show the multi-model means, shading denotes the ±1 standard deviation range (Source: IPCC 2007).”

- f.) Figure 3.8 caption: “Figure 3.6. Projections of future global sea level rise to 2300 ([Source: Allison et al. 2009](#)). ~~Historical data from Church and White (2006). Future projections are from Schubert et al. (2006) (represented as ‘WGBU’), Rahmstorf (2007), and Vellinga et al. (2008) (represented as ‘Delta Committee’), (Source: Allison et al. 2009).~~” New footnote #6: [“Historical data from Church and White \(2006\). Future projections are from Schubert et al. \(2006\) \(represented as ‘WGBU’\), Rahmstorf \(2007\), and Vellinga et al. \(2008\) \(represented as ‘Delta Committee’\), \(Source: Allison et al. 2009\).”](#)
- g.) Figure 3.9 caption: “Figure 3.7. Projected dynamic sea level rise (10 year running mean) at coastal cities worldwide under the intermediate emissions scenario ([Source: Yin et al. 2009](#)). ~~These projections account for the amount of sea level rise caused by changes in large scale ocean currents alone and not other factors such as thermal expansion and ice sheet melting. (Source: Yin et al. 2009).~~” New footnote #7: [“These projections account for the amount of sea level rise caused by changes in large scale ocean currents alone and not other factors such as thermal expansion and ice sheet melting \(Yin et al. 2009\).”](#)
- h.) Figure 3.10 caption: “Figure 3.8. Observed and IPCC 2001 estimated global sea level rise. This figure illustrates the range of IPCC scenarios as of 2001 projections([Figure from Rhamstorf et al. 2007](#)). ~~Observations illustrate that sea level is rising at a rate slightly above the highest IPCC scenario (A1FI) from 2001 (Figure from Rhamstorf et al. 2007)”~~ Text integrated into 320.3 #5: “The Northeast Climate Impacts Assessment in 2006 projected increases in sea level of 6 cm to 33 cm (2.5 in to 13 in) by mid-century (under either emissions scenario), and 10 cm to 53 cm (4 in to 21 in) under the lower-emissions scenario and 20 cm to 84 cm (8 in to 33 in) under the higher-emissions scenario by late-century (Figure 3.10) (NECIA 2006). [Observations illustrate that sea level is rising at a rate slightly above the highest IPCC scenario \(A1FI\) from 2001 \(Rhamstorf et al. 2007\).](#) The assessment report indicates that these projections do not incorporate the recently observed high rates of continental ice melt, and should be considered to be at the lower range of possible future sea level rise.”
- i.) Figure 3.11 caption: “Figure 3.9. Observed and model-based winter precipitation as a percentage of change in the U.S. Northeast ([Source: NECIA 2006](#)). ~~The black line depicts average historical precipitation patterns from 1900–2000. The red line represents the predicted change in precipitation under the higher emissions scenario. The blue line represents precipitation changes under the low emissions scenario. The largest increase in precipitation is expected after 2050, particularly in the high emissions scenario. (Source: NECIA 2006).~~” New footnote #8: [“The black line depicts average historical precipitation patterns from 1900–2000. The red line represents the predicted change in precipitation under the higher emissions scenario. The blue line represents precipitation changes under the low emissions scenario. The largest increase in precipitation is expected after 2050, particularly in the high emissions scenario. \(Source: NECIA 2006\).”](#)

2. **Section 350.1, #2:** Revised policy to make language consistent with language in Chapter 11, Policies of the Ocean SAMP, as approved by the CRMC Ocean SAMP Subcommittee on 22 July 2010, as follows:

“The Council shall incorporate climate change planning and adaptation into policy and standards in all areas of its jurisdiction of the Ocean SAMP and its associated land-based infrastructure to proactively plan for and adapt to climate change impacts ~~of such as~~ increased storminess and temperature change, in addition to accelerated sea level rise. For example, when evaluating Ocean SAMP area projects and uses, the Council will carefully consider how climate change could affect their future feasibility, safety, and effectiveness. When evaluating new or intensified existing uses within the Ocean SAMP area, the Council will consider predicted impacts of climate change especially on sensitive habitats, most notably spawning and nursery grounds, of particular importance to targeted species of finfish, shellfish, and crustaceans.”

3. **Section 350.1, #3:** Revised policy to make language consistent with language in Chapter 11, Policies of the Ocean SAMP, as approved by the CRMC Ocean SAMP Subcommittee on 22 July 2010, as follows:

“The Council will convene a panel of scientists biannually to advise on findings of current climate science for the region and the implications for Rhode Island’s coastal and offshore regions, as well as the possible management ramifications. The horizon for evaluation and planning needs to include both the short term (10 years) and longer term (50 years). The Science Advisory Panel for Climate Change will provide the Council with expertise on the most current global climate change related science, monitoring, policy, and development design standards relevant to activities within its jurisdiction of the Ocean SAMP and its associated land-based infrastructure to proactively plan for and adapt to climate change impacts ~~of such as~~ increased storminess, temperature change, and acidification in addition to accelerated sea level rise.”

4. **Section 350.1, #5:** Revised policy to make language consistent with language in Chapter 11, Policies of the Ocean SAMP, as approved by the CRMC Ocean SAMP Subcommittee on 22 July 2010, as follows:

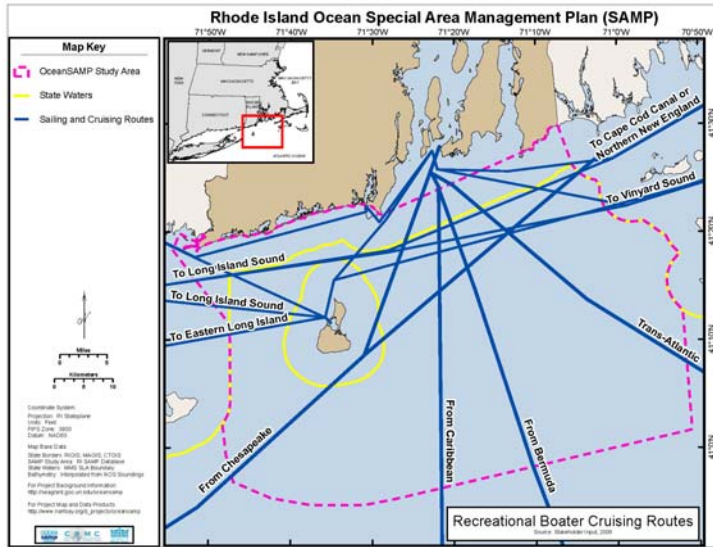
“The Council ~~endorses supports~~ the application of enhanced building standards in the design phase of rebuilding coastal infrastructure associated with the Ocean SAMP area, including port facilities, docks, and bridges that ships must pass under.”

5. **Section 350.1, #6:**

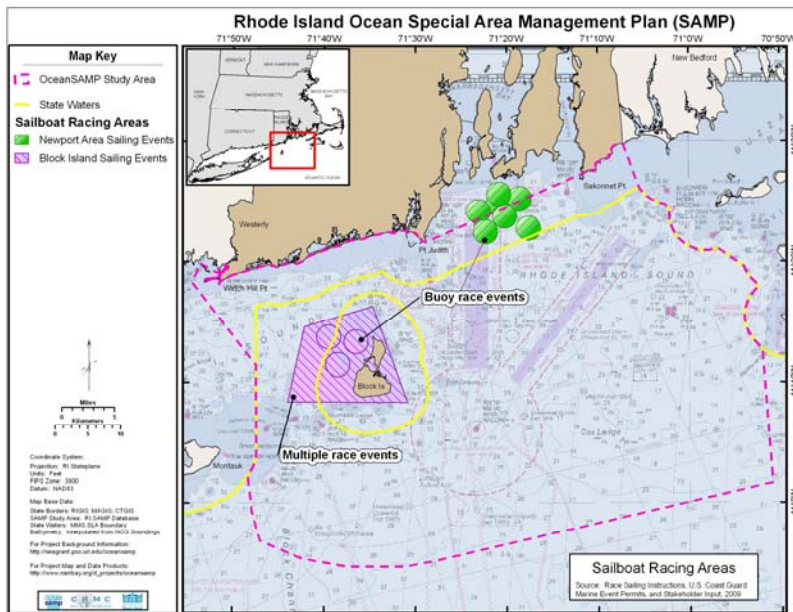
- a.) Revised first sentence of policy to make language consistent with language in Chapter 11, Policies of the Ocean SAMP, as approved by the CRMC Ocean SAMP Subcommittee on 22 July 2010, as follows:

“The Council ~~endorses supports~~ the development of design standards for marine platforms that account for climate change projections on wind speed, storm intensity and frequency, and wave conditions, and will work with the Minerals Management Service U.S. Bureau of Ocean Energy Management, Regulation and Enforcement, Department of Interior,

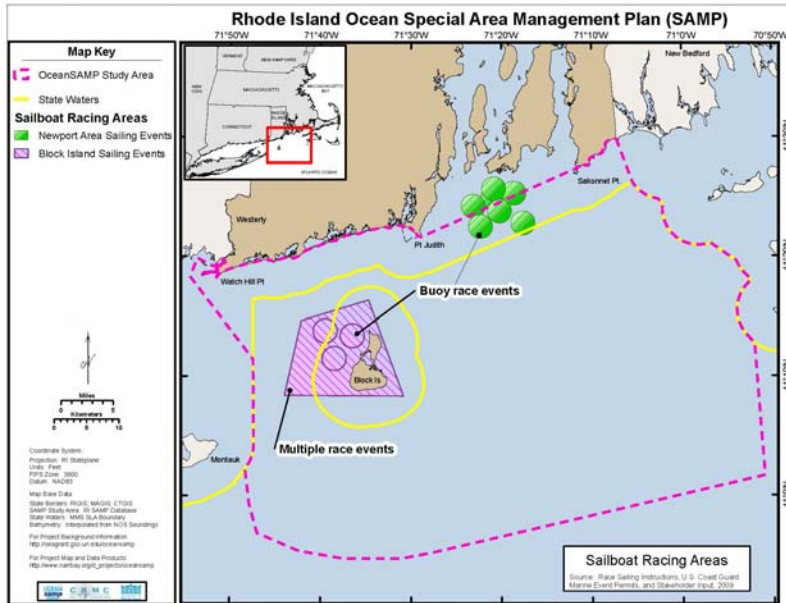
NEW FIGURE 6.1:



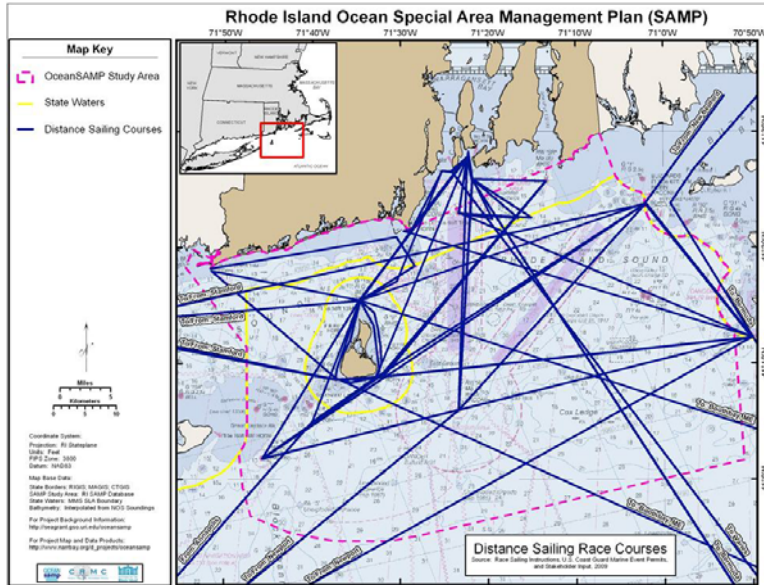
OLD FIGURE 6.2:



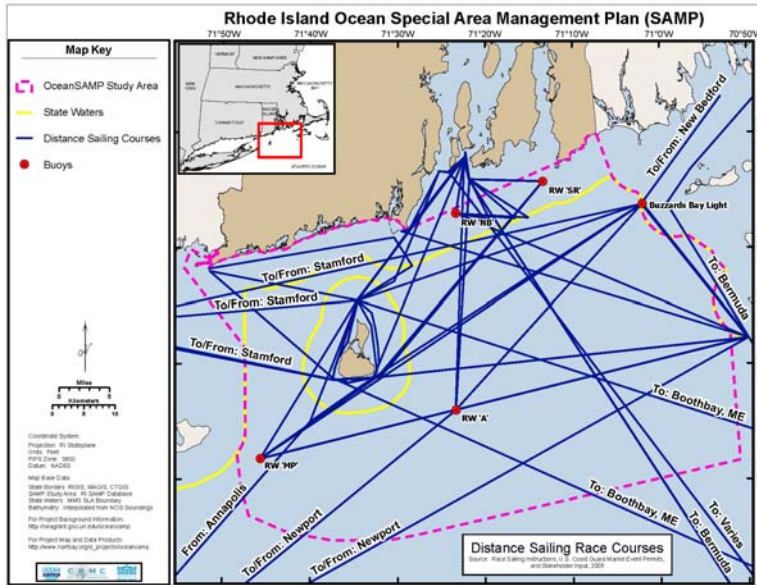
NEW FIGURE 6.2:



OLD FIGURE 6.3:

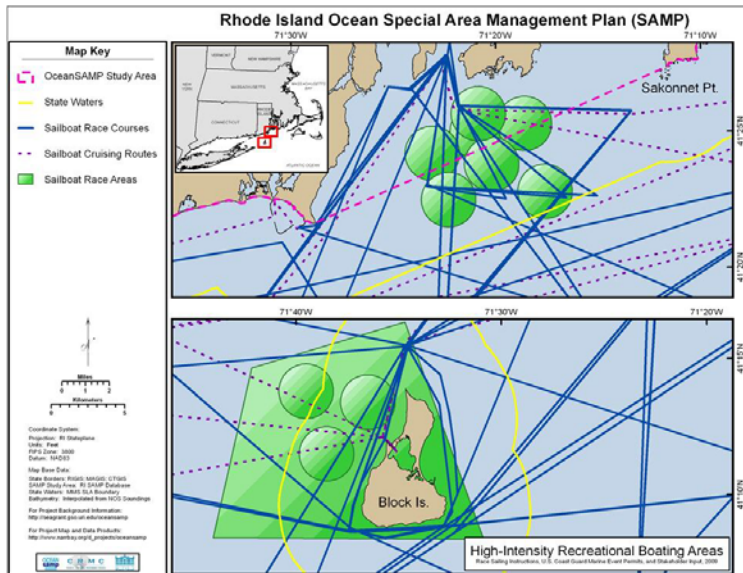


NEW FIGURE 6.3:

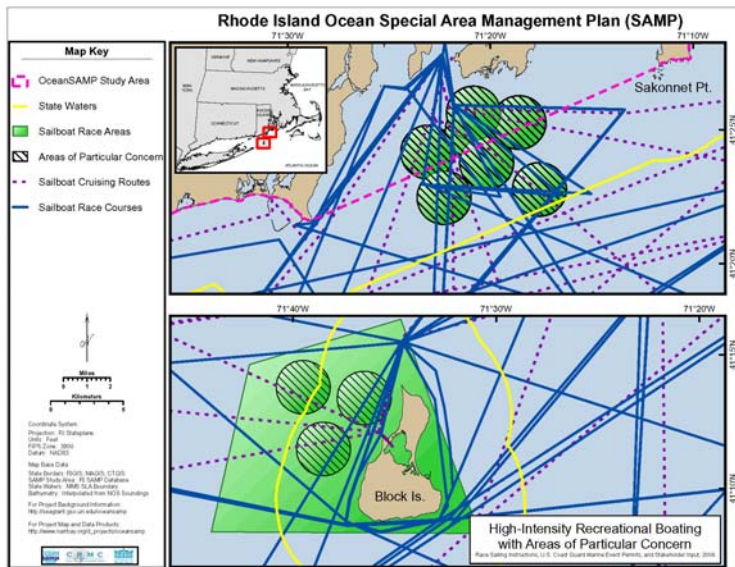


3. **Section 620.3 Offshore Sailboat Racing, Figure 6.4:** Revised figure, High-intensity Recreational Boating Areas, to be consistent with language and figures in Chapter 11, The Policies of the Ocean SAMP, as approved by the CRMC Ocean SAMP Subcommittee on 22 July 2010, as follows:

OLD FIGURE 6.4:



NEW FIGURE 6.4:



4. **Section 620.3:** Revised 620.3 #8 and included new #9 to make language consistent with Chapter 11, The Policies of the Ocean SAMP, as approved by the CRMC Ocean SAMP Subcommittee on 22 July 2010, as follows:

“8. As Figures 6.2 and 6.3 illustrate, sailboat racing within the Ocean SAMP area is widespread, but is also concentrated in two different areas: south of Brenton Point and around Block Island. The waters south of Brenton Point are used for the majority of buoy racing that takes place within the Ocean SAMP area. Many races also start or end in these waters, or just north of them inside Narragansett Bay. It is also important to note that this area is where America’s Cup races took place for over 50 years, from 1930 to 1983. Block Island is also a popular destination or waypoint for many of the races that take place within the Ocean SAMP area. In addition to Block Island Race Week, eight other races listed above use Block Island as either a destination or a waypoint. In many cases, Block Island is integral to the challenge of a race in that sailors make strategic decisions about whether to pass to the north or south of the island, or how close to pass near it, in order to gain advantage over competitors. See Figure 6.4, High-Intensity Recreational -Boating Areas and Areas of Particular Concern.”

“9. Figure 6.4 identifies the racing circles south of Brenton Point and west of Block Island as Recreational Boating Areas of Particular Concern. These areas, which are used for buoy racing as well as other uses, are characterized by an especially high concentration of boating activity and as such have been designed as Areas of Particular Concern. See section 660 for further information.”

5. **Section 660 Recreation and Tourism Policies and Standards:**

All policies and standards revised to be consistent with the Recreation Policies and Standards that are included in Chapter 11, The Policies of the Ocean SAMP, which was approved by the CRMC Ocean SAMP Subcommittee on 22 July 2010. See specific changes below.

6. **Section 660.1:** Section title changed from “Policies” to “General Policies”

7. **Section 660.1, Policy #2:** Revised as follows: “2. When evaluating proposed ~~future projects~~Offshore Developments, the Council will carefully consider the potential impacts of such activities on marine recreation and tourism uses. Where it is determined that there is a significant impact, the Council may ~~suitably~~ modify or deny activities that significantly detract from these uses. “

8. **Section 660.1, Policy #4:** Revised as follows, which includes integrating text from Policy #5: “4. The Council recognizes that the waters south of Brenton Point (~~see Figure 6.4) are and within the 3-nautical mile boundary surrounding Block Island are heavily-used~~ ~~higher-intensity~~ recreational ~~use~~-areas ~~than adjacent waters~~ and are commonly used for organized sailboat races and other marine events. The Council encourages and supports the ongoing coordination of race and marine event organizers with the U.S. Coast Guard, the U.S. Navy, and the commercial shipping community to facilitate safe recreational boating in and adjacent to these areas, which include charted shipping lanes and Navy restricted areas (see Chapter 7, Marine Transportation, Navigation, and Infrastructure). The Council shall consider these ~~high intensity~~heavily-used recreational ~~uses~~-areas when evaluating ~~proposed future projects~~Offshore Developments in this area. Where it is determined that there is a significant impact, the Council may ~~suitably~~ modify or deny activities that significantly detract from these uses. The Council also recognizes that much of this organized recreational activity is concentrated within the circular sailboat racing areas as depicted in Figure 6.4, and accordingly has designated these areas as Areas of Particular Concern. See Chapter 11, The Policies of the Ocean SAMP, for requirements associated with Areas of Particular Concern.”

9. **Section 660.1, Policy #5:** Deleted as such and integrated with Policy #4 above:

~~5. The Council recognizes that the waters within the 3-nautical mile boundary surrounding Block Island (see Figure 6.4) are higher intensity recreational use areas than adjacent waters and are commonly used for organized sailboat races and other marine events. The Council shall consider these high intensity recreational uses when evaluating proposed projects in this area. Where it is determined that there is a significant impact, the Council may suitably modify or deny activities that significantly detract from these uses.~~

10. **Section 660.1, Policy #6:** Moved to regulatory standards section, renumbered as Regulatory Standard #1, and revised as follows:

“1. Offshore dive sites within the Ocean SAMP area, as shown in Figure 6.6, are designated Areas of Particular Concern. The Council recognizes that offshore dive sites, most of which

are shipwrecks ~~(see Figure 6.6)~~, are valuable recreational and cultural ocean ~~features~~. ~~The Council shall consider these ocean features assets and are important to sustaining Rhode Island's recreation and tourism economy. See Chapter 11, The Policies of the Ocean SAMP, for requirements associated with Areas of Particular Concern. when evaluating proposed projects in these areas. Where it is determined that there is a significant impact, the Council may suitably modify or deny activities that significantly detract from these uses. See Chapter 12, New Policies, Procedures, Zoning, and Regulations."~~

11. **Section 660.1, Policy #7:** Revised as follows:

"7. The Council recognizes that offshore wildlife viewing activities are reliant on the presence and visibility of marine and avian species which rely on benthic habitat, the availability of food, and other environmental factors. The Council shall consider these environmental factors when evaluating proposed projects-Offshore Developments in these areas. Where it is determined that there is a significant impact, the Council may suitably modify or deny activities that significantly detract from these uses. See Chapter 2, Ecology."

12. **Section 660.1, Policy #8:** Renumbered as General Policy #5 and revised as follows:

"5. The Council shall work together with the U.S. Coast Guard, the U.S. Navy, the U.S. Army Corps of Engineers, NOAA, fishermen's organizations, marine pilots, recreational boating organizations, and other marine safety organizations to promote safe navigation, fishing, and recreational boating activity around and through offshore structures and developments and along cable routes during both the construction, ~~and~~ operation and decommissioning phases of such projects. The Council will promote and support the education of recreational all mariners boaters regarding safe boating navigation around offshore structures and developments and along cable routes."

13. **Section 660.1, Policy #9:** renumbered as General Policy #6 and revised as follows:

"6. Preliminary consultations with the U.S. Coast Guard, the U.S. Minerals Management Service Bureau of Ocean Energy Management, Regulation and Enforcement, and the U.S. Army Corps of Engineers have indicated that no boating vessel access restrictions are planned for the waters around and through offshore structures and developments, or along cable routes, except for those necessary for navigational safety. Commercial and recreational fishing and recreational boating access around and through offshore structures and developments and along cable routes is a critical means of mitigating the potential adverse impacts of offshore structures on commercial and recreational fisheries and recreational boating. The Council endorses this approach and will shall work to ensure that the waters surrounding offshore structures, developments, and cable routes remain open to commercial and recreational fishing, marine transportation, and recreational boaters boating, except for navigational safety restrictions. The Council requests that federal agencies notify the Council immediately of any federal action that may affect vessel access around and through offshore structures and along cable routes. The Council also requests ongoing review of any federal agency decisions regarding vessel access around and through offshore structures and developments and along cable routes."

14. **Section 660.1, Policy #10:** Renumbered as Regulatory Standard #3 and revised as follows:
 “~~3. The Council will shall~~ consult with the U.S. Coast Guard, the U.S. Navy, marine pilots, the Fishermen’s Advisory Board as defined in section 1160.1.6, fishermen’s organizations, and recreational boating organizations ~~marine recreation and tourism organizations and stakeholders, such as the Rhode Island Marine Trades Association, the Rhode Island State Yachting Committee, and the Rhode Island Party and Charter Boat Association,~~ when scheduling offshore marine construction or dredging activities. Where it is determined that there is a significant conflict with ~~scheduled recreational events or~~ season-limited commercial or recreational ~~uses~~ fisheries activities, recreational boating activities or scheduled ~~recreational~~ events, or, other navigation uses, the Council ~~may suitably~~ shall modify or deny activities to minimize conflict with ~~recreational~~ these uses.”
15. **Section 660.1, Policy #11:** Renumbered as Regulatory Standard #4 and revised as follows:
 “~~4. The Council will provide~~ shall require the assent holder to provide for communication with commercial and recreational fishermen, mariners, and recreational boaters ~~marine recreation and tourism users~~ regarding offshore marine construction or dredging activities. Communication ~~will shall~~ be facilitated through a project website and ~~will shall~~ complement standard U.S. Coast Guard procedures such as Notices to Mariners for notifying ~~boaters~~ mariners of obstructions to navigation.”
16. **Section 660.2:** Section title changed from “Standards” to “Regulatory Standards”
17. **Section 660.2 Standards #1 and #2:** deleted in response to comments from the NOAA Office of Ocean and Coastal Resource Management regarding mentioning federal statutes:
~~1. The potential impacts of a proposed project on recreation and tourism may be evaluated in accordance with the National Environmental Policy Act, 42 U.S.C. § 4321 et. seq. (NEPA). Depending on the project and the lead agency, NEPA review may include assessment of visual resources associated with recreational resources, assessment of boating intensity in the project area, or other requirements (e.g. Minerals Management Service 2009a, Federal Energy Regulatory Commission 2008). See the MMS Renewable Energy Framework for further information on NEPA requirements for renewable energy projects in federal waters (Minerals Management Service 2009b).~~
~~2. Visual impacts of proposed offshore projects may also be evaluated in accordance with Section 106 of the National Historic Preservation Act, 16 U.S.C. § 470 et. seq. For further information see Chapter 4, Cultural and Historic Resources, and Section 330 of the R.I. Coastal Resources Management Program.~~
18. **Section 660.2 Standard #3:** Renumbered as Regulatory Standard #7 and revised as follows:
 “~~7. Prior to project development, the~~ The Council ~~recommends~~ shall require where appropriate that project developers perform systematic observations of recreational boating intensity at the project area at least three times: pre-construction; during construction; and post-construction. Observations may be made while conducting other field work or aerial surveys and may include either visual surveys or analysis of aerial

photography or video photography. The Council ~~recommends~~ shall require where appropriate that observations capture both weekdays and weekends and reflect high-activity periods including the July 4th holiday weekend and the week in June when Block Island Race Week takes place. The quantitative results of such observations, including raw boat counts and average number of vessels per day, will be provided to the Council.”

19. **Section 660.2:** Added Regulatory Standards #5 and #6, which are copied from chapter 11, The Policies of the Ocean SAMP, and were originally developed within the Renewable Energy and Other Offshore Development Chapter:

“5. Where possible, Offshore Developments should be designed in a configuration to minimize adverse impacts on other user groups, which include but are not limited to: recreational boaters and fishermen, commercial fishermen, commercial ship operators, or other vessel operators in the project area. Configurations which may minimize adverse impacts on vessel traffic include, but are not limited to, the incorporation of a traffic lane through a development to facilitate safe and direct navigation through, rather than around, an Offshore Development.”

“6. Any assent holder of an approved Offshore Development shall work with the Council when designing the proposed facility to incorporate where possible mooring mechanisms to allow safe public use of the areas surrounding the installed turbine or other structure.”

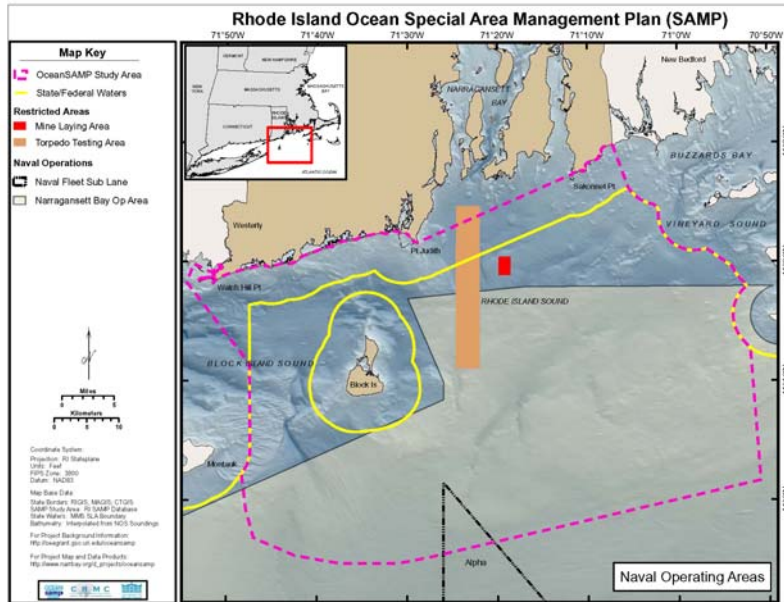
Chapter 7: Marine Transportation, Navigation, and Infrastructure:

1. **Entire Chapter:** This chapter has been proofread and formatted for consistency with other Ocean SAMP chapters.
2. **Section 720.7, 730.5, and Figure 7.2, Navy Submarine Lanes:** Updated section 720.7, “Navy Restricted Areas,” section 730.5, “Naval Vessels,” and Figure 7.2, “Navy Operating Areas,” per the request of the U.S. Navy to remove map images and specific geographic information in reference to submarine transit lanes, as follows:

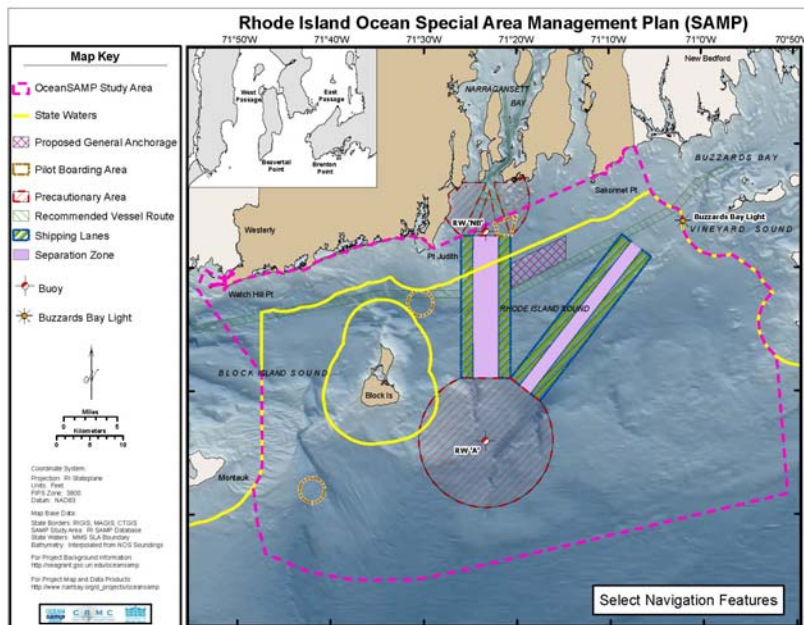
Section 720.7: “2. In addition to these charted areas, the Navy has designated Submarine Transit Lanes for submerged submarine transit. One of these lanes overlaps with the southern border of the Ocean SAMP area ~~(see Figure 7.2)~~. For further discussion of submarine activity and other Naval activities within the Ocean SAMP area, please refer to Section 730.”

Section 730.5: “9. Submarine traffic originates primarily from New London, Conn. Submarines travel on the surface from New London through the southwest corner of the Ocean SAMP area to reach deepwater Naval Fleet Operations Submarine Lanes. ~~The Figure 7.2 shows a triangular part of the submarine lane to the southeast of Block Island, which is the~~ only part of the SAMP area where submarines might be submerged is in a submarine lane which intersects the southern boundary of the Ocean SAMP area, as ~~they~~ submarines generally wait until they reach the 100-fathom depth far offshore (Vincent, pers. comm.).”

OLD FIGURE 7.2:



NEW FIGURE 7.2:



- Section 720.4, Passenger Ferries:** Updated section 720.4, Passenger Ferries, to reflect the fact that NOAA Chart 13218 now publishes the route of the BI Ferry to alert mariners to this traffic, as follows; also updated references accordingly:

“1. Ferries operating within the Ocean SAMP area travel relatively consistent routes that do not necessarily align with charted shipping lanes or recommended vessel routes. At the time of this writing, ~~none of the~~ only Ocean SAMP area ferry routes are-that is noted on

NOAA nautical charts, ~~though the U.S. Coast Guard is in the process of charting~~ is the Block Island Ferry route between Point Judith and Block Island's Old Harbor, though it should be noted that this ferry route may still vary from its charted route; see NOAA Chart 13218 (NOAA Office of Coast Survey 2009) for further information. ~~(Cowan, pers. comm.)~~. See Section 730 for further discussion of ferries and Figure 7.8 for a map of approximate routes for ferries currently operating within the Ocean SAMP area."

4. **Section 770 Marine Transportation, Navigation and Infrastructure Policies and Standards:** All policies and standards revised to be consistent with the Marine Transportation Policies and Standards that are included in Chapter 11, The Policies of the Ocean SAMP, which was approved by the CRMC Ocean SAMP Subcommittee on 22 July 2010. See detailed changes below.
5. **Section 770.1:** Section title changed from "Policies" to "General Policies"
6. **Section 770.1 Policy #1** renumbered as Regulatory Standard #7 and edited as follows:

"7. Applications for projects proposed to be sited in state waters pursuant to the Ocean SAMP shall not have a significant impact on marine transportation, navigation, and existing infrastructure. Where the Council, in consultation with the U.S. Coast Guard, the U.S. Navy, NOAA, Minerals Management Service (MMS), the U.S. Bureau of Ocean Energy Management, Regulation and Enforcement, the U.S. Army Corps of Engineers, USACE, marine pilots, the R.I. Port Safety and Security Forums, or other entities, as applicable, determines that such an impact on marine transportation, navigation, and existing infrastructure is unacceptable, the Council shall require that the applicant modify the proposal or the Council shall deny the proposal. For the purposes of Chapter 7 and policies 770.1.1 to 770.2.~~4~~7, impacts will be evaluated according to the same criteria used by the U.S. Coast Guard, as follows; these criteria shall not be construed to apply to any other Ocean SAMP chapters or policies:

 - a. Negligible: No measurable impacts.
 - b. Minor: Adverse impacts to the affected activity could be avoided with proper mitigation; or impacts would not disrupt the normal or routine functions of the affected activity or community; or once the impacting agent is eliminated, the affected activity would return to a condition with no measurable effects from the proposed action without any mitigation.
 - c. Moderate: Impacts to the affected activity are unavoidable; and proper mitigation would reduce impacts substantially during the life of the proposed action; or the affected activity would have to adjust somewhat to account for disruptions due to impacts of the proposed action; or once the impacting agent is eliminated, the affected activity would return to a condition with no measurable effects from the proposed action if proper remedial action is taken.
 - d. Major: Impacts to the affected activity are unavoidable; proper mitigation would reduce impacts somewhat during the life of the proposed action; the affected activity would experience unavoidable disruptions to a degree beyond what is

normally acceptable; and once the impacting agent is eliminated, the affected activity may retain measurable effects of the proposed action indefinitely, even if remedial action is taken.”

7. **Section 770.1 Policy #2:** renumbered as Policy #1 and revised as follows:

~~“1. Projects or proposals that significantly impact marine transportation are prohibited.~~ The Council recognizes the importance of designated navigation areas, which include shipping lanes, precautionary areas, recommended vessel routes, pilot boarding areas, anchorages, ~~and Navy restricted areas~~military testing areas, and submarine transit lanes to marine transportation and navigation activities in the Ocean SAMP area. The Council also recognizes that these and other waters within the Ocean SAMP area are heavily used by numerous existing users who have adapted to each other with regard to their uses of ocean space. Any changes in the spatial use patterns of any one of these users will result in potential impacts to the other users. The Council will carefully consider the potential impacts of such changes on the marine transportation network. ~~Where it is determined that there is a significant adverse impact, the Council may modify or deny activities that significantly detract from these transportation areas and activities.~~ Changes to existing designated navigational areas proposed by the Coast Guard, NOAA, the R.I. Port Safety and Security Forums, or other entities could similarly impact existing uses. The Council requests that they be notified by any of these parties if any such changes are to be made to the transportation network so that they may work with those entities to achieve a proper balance among existing uses.”

8. **Section 770.1 Policy #3** renumbered as Regulatory Standard #2 and revised as follows:

~~“2. The Council will shall~~ consult with ~~marine transportation organizations, vessel operators, and federal entities such as~~ the U.S. Coast Guard, the U.S. Navy, ~~the Northeast Marine marine Pilots Association, and nearby port operators~~the Fishermen’s Advisory Board as defined in section 1160.1.6, fishermen’s organizations, and recreational boating organizations when scheduling offshore marine construction or dredging activities. ~~It is the Council’s policy to promote harmonious interaction between uses of offshore waters. The Council will not allow activities that cause a significant disruption to occur.~~ Where it is determined that there is a significant conflict with season-limited commercial or recreational fisheries activities, recreational boating activities or scheduled events, or ~~marine transportation and~~ navigation uses, the Council ~~may shall~~ modify or deny activities to minimize conflict with these uses.”

9. **Section 770.1 Policy #4** renumbered as Policy #2 and revised as follows:

~~“2. The Council recognizes the economic, historic, and cultural value of marine transportation and navigation uses of the Ocean SAMP area to the state of Rhode Island. The Council’s goal is to promote uses of the Ocean SAMP area that do not significantly interfere with marine transportation and safe navigation within designated~~ navigation areas. ~~Designated areas are defined as, which include~~ shipping lanes, precautionary areas, recommended vessel routes, pilot boarding areas, anchorages, ~~and Navy restricted areas~~military testing areas, and submarine transit lanes ~~as delineated on NOAA nautical~~

~~charts.~~ See section 770.2 for discussion of navigation areas which have been designated as Areas of Particular Concern.”

10. **Section 770.1 Policy #5** renumbered as Policy #3 and revised as follows:

“3. The Council will encourage and support uses of the Ocean SAMP area that enhance marine transportation and safe navigation within designated navigation areas. ~~Designated areas are defined in Section 770.1.4, which include shipping lanes, precautionary areas, recommended vessel routes, pilot boarding areas, anchorages, Navy restricted areas, and submarine transit lanes.~~”

11. **Section 770.1 Policy #6** renumbered as Policy #4 and revised as follows:

“4. The Council shall work together with the U.S. Coast Guard, the U.S. Navy, the U.S. Army Corps of Engineers, NOAA, fishermen’s organizations, marine pilots, recreational boating organizations, ~~marine pilots,~~ and other marine safety organizations to promote safe navigation around and through offshore structures and developments, and along cable routes, during ~~both~~ the construction, ~~and~~ operation, and decommissioning phases of such projects. The Council will promote and support the education of ~~recreational boaters~~ all mariners regarding safe ~~boating navigation~~ around offshore structures and developments and along cable routes.”

12. **Section 770.1 Policy #7** renumbered as Policy #5 and revised as follows:

“5. Preliminary ~~e~~Consultations with the U.S. Coast Guard, ~~MMS~~ the U.S. Bureau of Ocean Energy Management, Regulation and Enforcement, and the U.S. Army Corps of Engineers have indicated that no ~~boating vessel~~ access restrictions are planned for the waters around and through offshore structures and developments, ~~or along and~~ cable routes, except for those necessary for navigational safety. Commercial and recreational fishing and recreational boating access around and through offshore structures and developments and along cable routes is a critical means of mitigating the potential adverse impacts of offshore structures on commercial and recreational fisheries and recreational boating. The Council endorses this approach and ~~will~~ shall work to ensure that the waters surrounding offshore structures, developments, and cable routes remain open to commercial and recreational fishing, marine transportation, and recreational boating, except for navigational safety restrictions. The Council requests that federal agencies notify the Council immediately of any federal action that may affect vessel access around and through offshore structures and developments and along cable routes. The Council also requests ongoing review of any federal agency decisions regarding vessel access around and through offshore structures and developments and along cable routes.”

13. **Section 770.1 Policy #8** renumbered as Regulatory Standard #3 and revised as follows:

“3. The Council ~~will~~ shall require the assent holder to provide for communication with commercial and recreational fishermen, mariners, and recreational boaters ~~marine transportation and navigation user groups~~ regarding offshore marine construction or dredging activities. Communication ~~will~~ shall be facilitated through a project website and

~~will shall~~ complement standard U.S. Coast Guard procedures such as Notices to Mariners for notifying ~~vessel operators~~mariners of obstructions to navigation.”

14. **Section 770.2 Standard #1** deleted in response to comments from the NOAA Office of Ocean and Coastal Resource Management regarding mentioning federal statutes:
 - ~~1. The potential impacts of a proposed project on marine transportation and navigation may be evaluated in accordance with the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 et. seq. Depending on the project and the lead federal agency, NEPA review may include a waterway suitability assessment describing vessel use and the impacts a proposed project may have on navigational safety and security, an assessment of boating intensity in the project area, or other requirements (e.g. MMS 2009a;). See the MMS Renewable Energy Framework for further information on NEPA requirements for renewable energy projects in federal waters (MMS 2009b).~~
15. **Section 770.2:** Included new Regulatory Standard #1, which is copied from Chapter 11, The Policies of the Ocean SAMP:

“1. Navigation, military, and infrastructure areas including: designated shipping lanes, precautionary areas, recommended vessel routes, ferry routes, dredge disposal sites, military testing areas, unexploded ordnance, pilot boarding areas, and anchorages, as shown in Figures 7.1, 7.2, 7.8, and 7.9 have been designed as Areas of Particular Concern. The Council recognizes the importance of these areas to marine transportation, navigation and other activities in the Ocean SAMP area. See Chapter 11, The Policies of the Ocean SAMP, for requirements associated with Areas of Particular Concern.”
16. **Section 770.2:** Included new Regulatory Standards #4, 5, and 6, which are copied from Chapter 11, The Policies of the Ocean SAMP and were originally developed within Chapter 8, Renewable Energy and Other Offshore Development:

“4. Where possible, Offshore Developments should be designed in a configuration to minimize adverse impacts on other user groups, which include but are not limited to: recreational boaters and fishermen, commercial fishermen, commercial ship operators, or other vessel operators in the project area. Configurations which may minimize adverse impacts on vessel traffic include, but are not limited to, the incorporation of a traffic lane through a development to facilitate safe and direct navigation through, rather than around, an Offshore Development.”

“5. Any assent holder of an approved Offshore Development shall work with the Council when designing the proposed facility to incorporate where possible mooring mechanisms to allow safe public use of the areas surrounding the installed turbine or other structure.”

“6. The facility shall be designed in a manner that minimizes adverse impacts to navigation. As part of its application package, the project applicant shall submit a navigation risk assessment under the U.S. Coast Guard’s Navigation and Vessel

Chapter 8, Renewable Energy and Other Offshore Development

1. We propose modifying Section 800: Introduction paragraph 1 (pg. 8) to make the language consistent with how this particular Ocean SAMP objective is stated in the Chapter 1, Introduction as follows:

"One of the objectives of the Ocean SAMP is to encourage marine-based economic development that ~~meets~~considers the aspirations of local communities, and is consistent with and complementary to the state's overall economic development, social, and environmental needs and goals."

2. We propose the following grammatical correction to Section 810.2 Renewable Energy Statutes, Initiatives and Standards in Rhode Island, paragraph #7 (pg. 19) based on feedback from the Ocean SAMP avian research team. The correction is as follows:

"In 2006, Rhode Island then adopted the System Reliability and Least-Cost Procurement Act requiring the Rhode Island Public Utilities Commission to establish standards and guidelines related to energy diversification (system reliability procurement) and energy efficiency and conservation (least-cost procurement). System reliability procurement refers to increasing the diversity in Rhode Island's energy portfolio, by diversifying the energy supply to include sources such as renewable energy. Least-cost procurement refers to using energy efficiency and energy conservation measures that are prudent and reliable when such measures are lower cost than the acquisition of additional supply. Moreover, under this legislation, each electrical distribution ~~companies~~company must submit plans for how the company plans to reach the standards and guidelines outlined by the Rhode Island Public Utilities Commission. This plan (which must be updated every three years) must include measurable goals and targets for multiple criteria including efficiency and renewable energy."

3. We propose the following grammatical correction to Section 820 Utility-Scale Offshore Wind Energy, paragraph #2 (pg. 33) based on feedback from the Ocean SAMP avian research team. The correction is as follows:

"Generating wind power offshore has a number of distinct advantages that has made this form of renewable energy generation attractive to state's along the eastern Atlantic coast. First, offshore wind turbines can generate power close to coastal load centers where demand for energy is high, electrical rates are high, but space for new power facilities is often limited."

4. **Section 820.4:** We recommend modifying the following sentence in Section 820.4 Stages of Development, paragraph #3 (pg. 45) based on feedback received from the Ocean SAMP avian research team. The modification shown below is meant to clarify the sentence:

“During the pre-construction stage, project permitting on the federal, state and local levels is completed, involving substantial reviews and assessments of environmental impacts and compliance with applicable environmental legislation. Table 8.8 summarizes applicable state actions relevant to offshore wind energy construction. The review process of an offshore wind energy project located in state waters is led by the U.S. Army Corps of Engineers, as opposed to projects located in federal waters, whose review process is led by the U.S. Department of the Interior Bureau of Ocean Energy Management, Regulation and Enforcement (formerly Minerals Management Service; see Chapter 10, Existing Statutes, Regulations, and Policies for a description of federal versus state waters). The National Environmental Policy Act (NEPA) mandates that an environmental analysis be prepared prior to the issuance of federal action (e.g. permits or approvals) for offshore wind farms. Based on the project, the environmental review may consist of an Environmental Assessment or a more extensive review in the form of an Environmental Impact Statement. The review process includes: an analysis of alternatives, an assessment of all environmental, social, and existing use impacts (i.e. ecological, navigational, economic, community-related, etc.), a review for regulatory consistency with other applicable federal laws and the implementation of mitigation measures. Concurrent with the preparation of the final Environmental Impact Statement or other NEPA documentation, a consistency review (under the Coastal Zone Management Act) and subsequent Consistency Determination (CD) is completed relative to each affected State’s federally approved coastal zone management program. Each CD includes a review of each State plan, analyzes the potential impacts of the proposed lease sale in relation to program requirements, and makes an assessment of consistency with the enforceable policies of each State’s plan (MMS 2009b). Moreover, the installation of a submarine cable through state waters and through and state upland areas at which point all applicable state permits and approvals would be required. It should be noted that even if a project is sited in federal waters, the installation of a transmission cable within state waters or upland areas will trigger all applicable state permitting requirements. See Chapter 10, Existing Statutes, Regulations, and Policies for more information on state and federal reviews and regulations relevant to offshore wind energy development.”

5. We propose the following revision to Table 8.8 *Potential State Actions Required to Construct an Offshore Wind Energy Facility in the Ocean SAMP area* (pg. 47) based on comments received by the Ocean SAMP avian research team. The change shown below would correct an error in the table where the Rhode Island Historical Preservation and Heritage Commission (RIHPHC) was incorrectly listed as the Rhode Island Natural History Survey.

Permitting Agency	Applicable Permit or Approval	Statutory/Regulatory Authorities Establishing Scope of Jurisdiction	Projects Applicable to this Permit/Approval
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Rhode Island Coastal Resources Management Council (CRMC)	State Assent	R.I. Gen. Laws § 46-23 et seq.	Facilities located in state waters Transmission Cables sited in state waters
	Lease/ License of Offshore Land	CRMC Enabling Legislation, R.I. Gen. Laws § 46-23-6(4)(iii) (authorizing CRMC to “[g]rant licenses, permits and easements for the use of coastal resources... and impose fees for the private use of these resources.”)	
	Coastal Wetlands Permit and Freshwater Wetlands Permit	CRMC Coastal Resources Management Program, CRIR 04-000-010 (2009); Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast CRIC 04-000-017 (2009).	
	Permit for Marine Dredging and Associated Activities	R.I. Gen. Laws § 46-6; 1 Marine Infrastructure Maintenance Act of 1996 and the Marine Waterways and Boating Facilities Act of 2001	
CRMC	Coastal Consistency Determination	Coastal Zone Management Act 16 U.S.C. § 1451 (as amended through Pub. L. No. 109-58, the Energy Policy Act of 2005) CRMC Enabling Legislation, R.I. Gen. Laws §§46-23-1 et seq.; CRMC Coastal Resources Management Program CRIR 04-000-010 (2009)	Facilities located in federal waters
Rhode Island Department of Environmental Management (RIDEM)	Freshwater Wetlands Permit (not in the vicinity of coast)	RI Freshwater Wetlands Act, R.I. Gen. Laws §§2-1-18 through 2-1-24; Administration and Enforcement of the Freshwater Wetlands Act, CRIR 12-190-025 (2009)	Onshore connection of Transmission Cable
	401 Water Quality Certification and/or State Water Quality Certification	Clean Water Act § 401(a)(1), 33 U.S.C. § 1342(a)(1); 40 C.F.R. § 121.1(g); RI Water Pollution Act, R.I. Gen. Laws §§ 46-12-1 et seq.; Water Quality Regulations, CRIR 12-190-001 (2009)	Facilities located in state waters Transmission Cables sited in state waters
	Rhode Island Pollutant Discharge Elimination System Permit	R.I. Gen. Laws §§ 46-12,42-17.1 & 42-35, as amended	Facilities located in state waters
Rhode Island Energy Facilities Siting Board	Energy Facility License	Energy Facility Siting Act, R.I. Gen. Law § 42-98.	Facilities located in state waters
Rhode Island Historical Preservation and Heritage Commission (RIHPHC)	Consultation Under the National Historic Preservation Act, Section 106; Consultation and	National Historic Preservation Act, 16 U.S.C. 470; Abandoned Shipwreck Act, 43 U.S.C. 2101 et seq.	Facilities located in state waters Transmission

Rhode Island Natural History Survey (SHPO)	Determination Under the Abandoned Shipwreck Act		Cables sited in state waters
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6. **Section 820.6:** We recommend the following revision to Section 820.6 Federal and State Incentives, paragraph #8 (pg. 56) based on feedback received from the Ocean SAMP avian research team to include a qualifier that baseline data generated as part of the Ocean SAMP should not take the place of finer-scale baseline data collected for a specific project site. The proposed change is as follows:

“The Ocean SAMP process may also be classified as a type of incentive as it may inform and potentially expedite the permitting and review process for proposed projects in areas determined suitable for future offshore renewable energy development. The research conducted as part of the Ocean SAMP provides baseline data on the physical, biological, ecological resources, as well as describes human uses and activities that occur in the Ocean SAMP area which may be informative in siting or reviewing proposed projects in state and federal waters. ~~This baseline data will also be important when~~ While proposed projects will still be required to collect site specific baseline data, data collected for the Ocean SAMP will provide a useful comparison in monitoring the potential effects of any future offshore renewable energy development. Furthermore, the renewable energy policies and standards outlined in the Ocean SAMP will clarify the considerations of the CRMC when evaluating future projects, as well as identify the design and monitoring protocols that will be expected of any future developers. Once approved by the National Oceanic and Atmospheric Administration as part of Rhode Island’s coastal zone management program, the Ocean SAMP policies will also inform the consistency review determination of future offshore renewable energy development in federal waters within the Ocean SAMP boundary, as the CZMA requires federally approved projects be consistent with state coastal management program policies. For more information on consistency determination, see Section 820.4, Chapter 1, Introduction, as well as Chapter 10, Existing Statues, Regulations, and Policies).”

7. We recommend the following addition to 830.2 Siting Analysis- Technology Development Index, paragraph #3 (pg. 60) based on feedback received from the Ocean SAMP avian research team. This addition is a grammatical revision.

“To develop a TDI value for all areas within the Ocean SAMP boundary, Spaulding et al. (2010b) calculated PPP and TCI values using a 100 meter by 100 meter grid. First, the wind speed data, shown in Figure 8.22, was converted to wind power per unit area. While the mean wind speed increases gradually with distance offshore, from 7 to 9.6 m/sec (15.7 to 21.5 mph) (a 37% increase), wind power increases by a factor of 2.6. This is due to the relationship between wind speed and potential power. The power output of a wind turbine increases by the cube of wind speed, so even a small increase in wind speed can substantially increase the amount of potential power production. The TCI value was calculated using a number of assumptions: the use of jacket foundations at all sites, cost estimates based on Roark (2008) and water depth measurements of the site (see Figure

8.23); and cable distance estimates calculated based on the closest straight-line distance to shore. Because the effort (and cost) of installing lattice jacket structures (especially pile-driving activities) is known to be sensitive to composition of the seabed sediments within the upper 30 to 50 m (98.4 to 164.0 feet) of the sediment column, Spaulding et al. (2010b) adjusted TCI values for the impacts of seabed geology. The seabed geology in the Ocean SAMP area is dominated by glacial end moraine and lake floor sediments which were deposited in several incidents of glacial advancements and retreats (see Chapter 2, Ecology of the SAMP Region for more information). A map of construction effort (see Figure 8.24) was developed by glacial geological experts familiar with the Ocean SAMP waters, ranking areas on a scale of 1 to 5 (pers. comm. Boothroyd and King as cited in Spaulding et al. 2010b) (for more information on the geology of the Ocean SAMP area see Chapter 2, Ecology of the SAMP Region). A low ranking indicates deposits amenable to pile driving operations, while the highest values reflect areas with shallow depth to bedrock, which would require drilling and grouting techniques to install the piles. Intermediate values (level 3) are indicative of complex end moraine sediment deposits, consisting of a mix of lake floor sediments and sand, gravel, and boulders of varying size. Figure 8.24 is an initial estimate of construction effort and will be refined as additional sub-bottom mapping and geotechnical studies of the Ocean SAMP area are completed.”

8. We propose the following number correction (pg.85):

| 840.32. Electricity Rates

9. We propose the following grammatical correction to Section 840.3 Electricity Rates, paragraph #1 (pg.85):

| “Under Rhode Island’s Long-Term Contracting Standard for Renewable Energy, energy distributors (i.e. National Grid) ~~is~~ are required to sign 10- to 15-year contracts to buy a minimum of 90 MW of its electricity load from renewable developers and up to 150 megawatts from utility-scale offshore wind energy facilities developed off the coast of Rhode Island (see Section 810.2).¹ These long-term contracts, referred to as Power Purchase Agreements, outline how much, and at what price, energy from a renewable energy producer will be purchased by a utility company. Power purchase agreements provide assurances to developers that the power produced by a project will be purchased at a stated price, which may in turn aid a developer in obtaining financing for a project. In addition, power purchase agreements define the purchase price of the renewable energy over many years, allowing utility companies to identify energy costs well in advance. The cost of conventional fuel sources, such as natural gas, varies with the market and result in greater volatility in energy prices. Depending on the prices agreed upon in the power purchase agreement, the effect of offshore renewable energy development in the Ocean SAMP area may result in higher or lower electricity rates for Rhode Island residents.”

¹ R.I. Gen. Law §39-26.1

10. We propose the following number correction (pg.87):

840.43. Potential Revenue Sharing

11. We recommend the following grammatical correction to Section 840.4 Potential Revenue Sharing, paragraph #1 (pg.87):

“In addition to the economic impacts associated with an offshore wind ~~facilities~~ facility’s construction and operation activities, Rhode Island may also receive a portion of any federal leasing or operating fees charged for use of public submerged lands.”

12. We propose the following number correction (pg.88):

840.5-4. Non-Market Value

13. We propose the following correction to Section 850.4.1 Habitat Displacement or Modification, paragraph #3 (pg. 122) based on comments received from the Ocean SAMP avian research team. This proposed change would correct the common name of the Black Scoter. The proposed change is as follows:

"At the Horns Rev Demonstration Project, Red-throated and Arctic Loons (*Gavia stellata* and *Gavia arctica*), Northern Gannets (*Sula bassana*), ~~Common Black~~ Scoters (*Melanitta nigra*), Common Murre and Razorbills (*Uria aalge* and *Alca torda*) decreased their use of the wind farm area after the installation of the wind turbines, including also zones of 2 and 4 km (1.2 and 2.5 miles) around the wind farm (DONG Energy and Vattenfall 2006). The reason for this avoidance was unknown, though the researchers suggest that perhaps disturbance effects from the turbines or from increased human activity associated with maintenance of the facility may be possible reasons. However, changes in the distribution of food resources in the study area may have also played a role. In contrast, Herring Gulls (*Larus argentatus*) showed a decreased avoidance of the wind farm area, while Great Black-backed Gulls (*Larus marinus*), Little Gulls (*Larus minutus*) and Arctic and Common Terns (*Sterna paradisaea/hirundo*) showed a general shift from preconstruction avoidance to post construction preference of the wind farm area. Gulls and terns recorded within the facility were mainly observed at the edges of the wind farm and far less in the central parts of the facility. The presence of the turbines and the associated vessel activity in the area were suggested as possible reasons for increased use of the project areas by the gulls (DONG Energy and Vattenfall 2006)."

14. **Section 850.2:** We suggest adding a sentence to the end of Section 850.2 Coastal Processes and Physical Oceanography, paragraph 2 (pg. 93) based on comments from NOAA National Marine Fisheries Service recommending we clarify that the potential localized effects around wind turbines will vary depending on site-specific conditions. The proposed change is shown below:

“The potential effect of offshore renewable energy structures in the water column on currents and tides have been examined using modeling techniques. Modeling of the proposed Cape Wind project found that the turbines would be spaced far enough apart to prevent any wake effect between piles; any effects would be localized around each pile (MMS 2009a). The analysis of Cape Wind demonstrated that the flow around the monopiles (which range in diameter from 3.6-5.5 m [11.8-18.0 feet] wide) would return to 99% of its original flow rate within a distance of 4 pile diameters (approximately 14.4-22 m [47.2-72.2 feet]) from the support structure (ASA 2005). Both of these studies, however, are representative of monopile wind turbine subsurface structure and may not be directly applicable to jacket-style foundations. The potential localized effects of lattice jacket structures on the hydrodynamics are likely to be even less compared to that found with monopiles as pile diameters for lattice jackets are much smaller (1.5 m [4.9 feet]) than monopiles (4-5 m [13-16.5 feet] diameter). Furthermore, the spacing between the turbines using lattice jacket support structures will be much greater than the 4 pile diameters. However, the effects of currents may be site-specific, as there could be localized currents or other conditions that could affect or be affected by the presence of wind turbines; site specific modeling may be necessary to determine impacts.”

15. **Section 850.3.1:** We propose modifying and adding the following sentences to Section 850.3.1 Benthic Habitat Disturbance, Paragraph 7 (pg. 98). These proposed changes are in response to comments from NOAA National Marine Fisheries Service requesting the chapter mention that scars along the bottom could impact migration for benthic animals and the extent of impacts may depend on the amount of time it may take for the natural bathymetry to recover. The proposed changes are shown below:

“In ~~most~~ many cases, the seabed is expected to return to its pre-disturbance state after cable installation. The extent of the impacts from cable laying may depend on the amount of time it takes for the natural bathymetry to recover. Post-construction monitoring may be used to track the recovery of a project site. On rock or other hard substrates where the seabed may not recover easily, backfilling may be required, or else permanent scarring of the seabed may result. Scars along the bottom may impact migration for benthic animals. Species found in rock habitats tend to be sessile (permanently attached to a substrate), either encrusting or otherwise attached to the rock, and are therefore more susceptible to disturbance (BERR 2008). Clay, sand, and gravel habitats are typically less affected. Undersea cables can also cause damage to benthic habitat if allowed to “sweep” along the bottom while being placed in the correct location (Johnson et al. 2008). Initial re-colonization of the site by benthic invertebrates takes place rapidly, sometimes within a couple of months (BERR 2008). In deeper waters, where disturbance of the seabed occurs with less frequency, recovery to a stable benthic community can take longer than in shallow waters, sometimes years. Generally, the effect on the benthic ecology will not be significant if the cabling is done in areas where the habitat is homogenous. However, if the cabling activity takes place in areas of habitat that are rare or particularly subject to disturbance, the effects could be greater (BERR 2008). The most serious threats are to submerged aquatic vegetation, which serves as an important habitat for a wide variety of marine

species. Shellfish beds and hard-bottom habitats are also especially at risk (Johnson et al. 2008). Shellfish in particular are usually not highly mobile, and cannot relocate during the cable-laying process. Biogenic reefs made up of mussels or other shellfish may become destabilized if plowing for cable-laying damages the reefs (BERR 2008).”

16. **Section 850.4:** We propose the addition to Section 850.4 Birds, paragraph 1 (pg. 107) after receiving feedback from the Ocean SAMP avian research team that this section should mention that the timing of project development, as well as the cumulative impacts of other offshore development in the area will have a role in determining the degree of impact experienced by avian species. The addition is as follows:

“Offshore renewable energy may have a variety of potential effects on avian species in the Ocean SAMP area. Some effects may be negative, resulting in adverse impacts, other effects may be neutral, producing no discernible impacts, while others may be positive, resulting in enhancements. The purpose of this section is to provide an overview of all the potential effects of offshore renewable energy development on birds, including the potential for habitat displacement or modification; disturbances associated with construction activities and/or vessel traffic; avoidance behavior or changes in flight patterns; risk of collision with installed structures; the risk of exposure to pollutants accidentally discharged during construction, operation or decommissioning. Potential affects to birds in the Ocean SAMP area will vary based on the species, as well as on the particular site, and size of the project. [The timing of construction or decommissioning of an offshore renewable energy facility, along with the cumulative impacts of other offshore developments will also have an effect on the degree of impact.](#)”

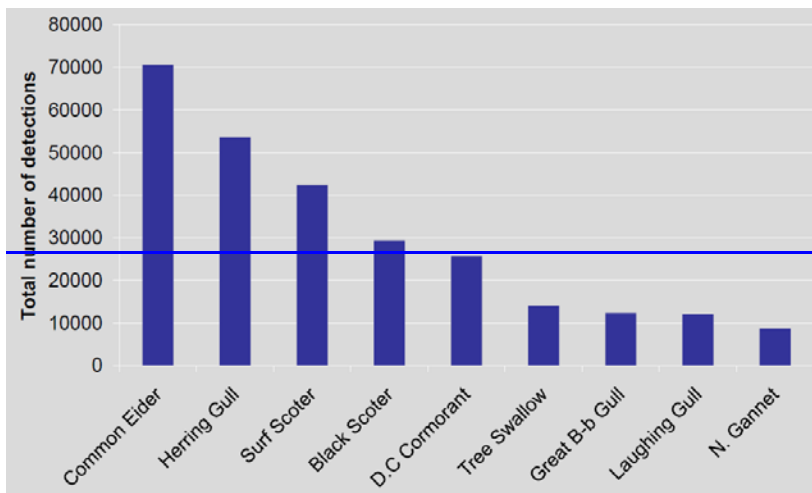
17. **Section 850.4:** We propose the following revision to Section 850.4 Birds, paragraph 3 (pg. 107) in order to make this section of the chapter consistent with the Ocean SAMP avian technical report. The revision is as follows:

“Research conducted by Paton et al. (2010) for the Ocean SAMP has collected baseline data on species occurrence and distribution in the Ocean SAMP area through land-based, ship-based and aerial surveys, as well as through radar surveys from 2009 to 2010, although the exact time period of surveys varied by survey technique. The goal of this research is to assess current spatial and temporal patterns of avian abundance and movement ecology within the Ocean SAMP boundary. Preliminary analysis of the surveys conducted in nearshore habitats during land-based point counts from January 2009 to [January-February](#) 2010 recorded 121 species and over ~~440,000~~[460,000](#) detections in the nearshore portion of the Ocean SAMP area (Figure 8.38; Paton et al. 2010). Observations during these nearshore surveys have demonstrated that a wide range of birds use the Ocean SAMP area, including seaducks (e.g. eiders and scoters), other seabirds (e.g. loons, cormorants, alcids and gannets), pelagic seabirds (e.g. storm petrel and shearwaters), terns and gulls, shorebirds, passerines and other land birds (e.g. migrating species and swallows). The most abundant bird species observed in nearshore habitats in the Ocean SAMP area during land-based surveys were Common Eider (*Somateria mollissima*), Herring Gull (*Larus argentatus*), Surf

Scoter (*Melanitta perspicillata*), Black Scoter (*Melanitta nigra*), Double crested Cormorant (*Phalacrocorax auritus*), Tree Swallow (*Tachycineta bicolor*), Great Black-backed Gull (*Larus marinus*), Laughing Gull (*Leucophaeus atricilla*), and the Northern Gannet (*Morus bassanus*) (see) (Paton et al. 2010). Farther offshore, more pelagic species were detected during boat-based surveys conducted from June 2009 to March 2010. During boat-based surveys, which sampled eight 4 by 5 nm grids, 55 species were detected from 10,422 detections (see Figure 8.39). In offshore areas, Herring Gulls, Wilson’s Storm-Petrels (*Oceanites oceanicus*), Northern Gannets, Great Black-backed Gulls, White-winged Scoters (*Melanitta fusca*) were among the most commonly detected species.”

18. **Figures 8.38 and 8.39:** We recommend updating the following figures based on feedback received from the Ocean SAMP avian research team. Updating figures 8.38 and 8.39 (pg. 108) will make the chapter’s description consistent with both Chapter 2, Ecology of the SAMP Region and the technical report produced by Paton et al. (2010). The proposed change is as follows:

OLD FIGURES 8.38 and 8.39 (DELETED):



~~Figure 8.38. Most Abundant Species Observed in Nearshore Habitats of the Ocean SAMP Study Area Based on Land-based Point Counts from January 2009 to January 2010 (Paton et al. 2010). (Note: Total detections= 440,000)~~

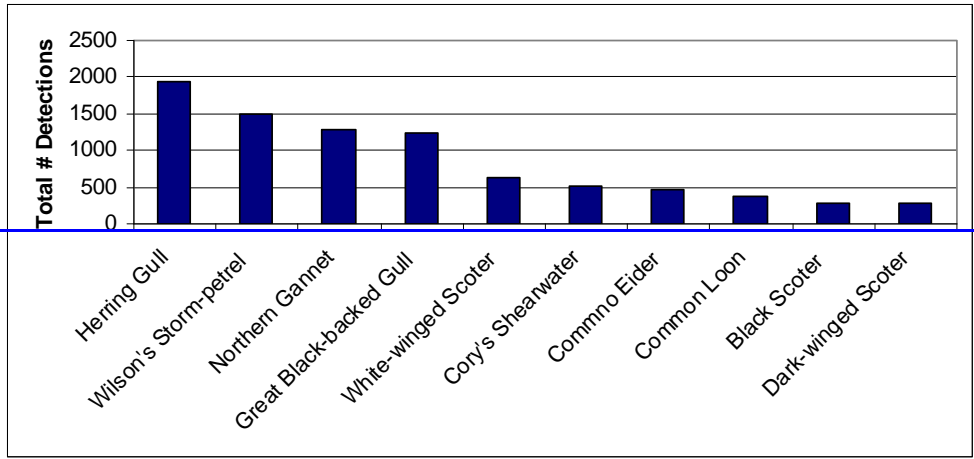


Figure 8.39. Most Abundant Species Observed in Offshore Habitats Based on Boat-Based Point Counts in the Ocean SAMP Study Area from June 2009 to March 2010 (Paton et al. 2010).

NEW FIGURES 8.38 and 8.39 (INSERTED):

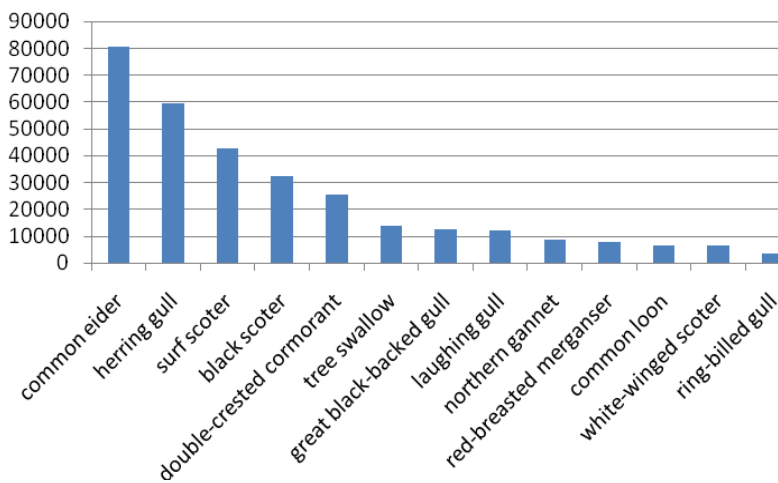


Figure 8.38. Most Abundant Species Observed in Nearshore Habitats of the Ocean SAMP Study Area Based on Land-based Point Counts from January 2009 to January 2010 (Paton et al. 2010). (Note: Total Detections = 465,039).

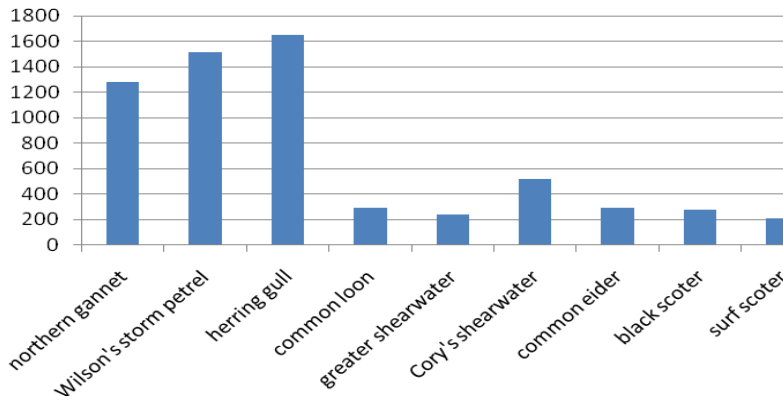


Figure 8.39. Most Abundant Species Observed in Offshore Habitats Based on [Ship-Based](#) Point Counts in the Ocean SAMP Study Area from [Mar 2009–Jan 2010](#) [June 2009 to March 2010](#) (Paton et al. 2010).

19. **Section 850.4:** We recommend the following revision to Section 850.4 Birds, paragraph #4 (pg. 108) based on feedback received from the Ocean SAMP avian research team to emphasize the variability in abundance and distribution of birds from year to year, as well as the importance of long-term baseline data collection prior to construction and operation. The proposed change is as follows:

“Species distribution and abundance varied both spatially and seasonally in the Ocean SAMP area. Most birds that use the Ocean SAMP area are migratory, so that their occurrence is highly seasonal. [Paton et al. \(2010\) have found high inter-annual variability in the abundance and distribution of avian species in the Ocean SAMP area, suggesting that the collection of long-term baseline data prior to construction and operation of an offshore renewable energy facility will be important in examining any potential effects to avian species. Following the completion of their work, Paton et al. \(2010\) will describe the seasonal and spatial distribution of different species based on their findings.](#) For further discussion of the findings of Paton et al. (2010) see Chapter 2, Ecology of the SAMP Region.”

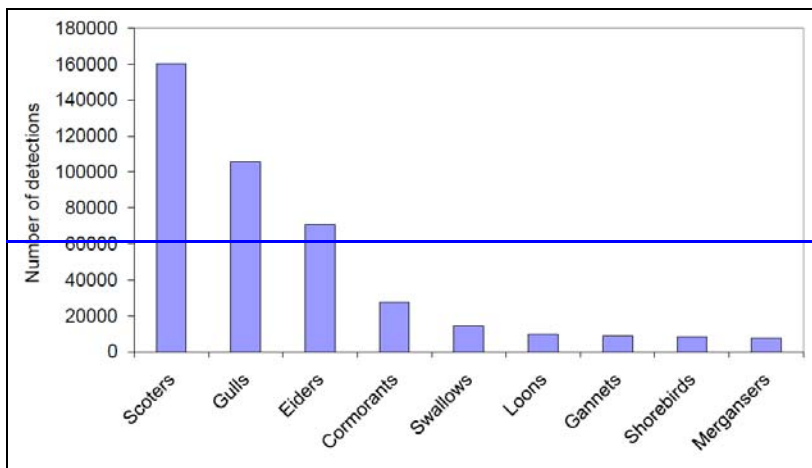
20. **Section 850.4:** We suggest the following revision to Section 850.4 Birds, paragraph #5 (pg. 109) based on feedback received from the Ocean SAMP avian research team. The proposed change below is suggested to make this section of the chapter more consistent with the findings in the Ocean SAMP technical report produced by Paton et al. (2010). The revision is as follows:

“In addition to recording occurrence and abundance in the Ocean SAMP area, Paton et al. (2010) have also identified potential foraging habitat for avian species. Based on a literature review performed by Paton et al. (2010) nearshore habitats, with water depths of less than 20 m [66 ft], are believed to be the primary foraging habitat for seabirds (see Table 8.14). Figure 8.40 illustrates the areas within the Ocean SAMP boundary with water depths less than 20 m (66 feet) and therefore [is thought to represent](#)~~represents~~ the primary foraging

habitat for the thousands of seaducks that winter in the Ocean SAMP waters. Preferred sea duck foraging areas are strongly correlated with environmental variables such as water depth, bottom substrate, bivalve community, and bivalve density (Vaitkus and Bubinas 2001). Currently, bathymetric data (water depth, bottom substrate) of the Ocean SAMP area is well known, but relatively little is known about bivalve community and bivalve density, especially further offshore. Foraging depths of seaducks differ among species and are a function of preferred diet, but average depths tend to be less than 20 meters (66 feet) for most species. Common eiders forage in water less than 10 m (33 feet) during the winter when diving over rocky substrate and kelp beds (Goudie et al. 2000; Guillemette et al. 1993). Preferred diet of common eider changes with season and foraging location, but mainly consists of mollusks and crustaceans (Goudie et al. 2000; Palmer 1949; Cottam 1939). Maximum diving depths of scoters are about 25 m (82 feet), although most birds probably forage in water less than 20 meters (66 feet) deep, particularly during the winter months (Vaitkus and Bubinas 2001; Bordage and Savard 1995). Scoter diet in marine environments predominantly consists of mollusks (Bordage & Savard 1995; Durinck et al. 1993; Madsen 1954; Cottam 1939). [Paton et al. \(2010\) did detect seaducks in waters up to 25 meters \(82 feet\) deep during aerial surveys, although it was unclear from the aerial surveys if the seaducks were foraging or engaging in other behaviors such as roosting. Paton et al. \(2010\) suggest more detailed research be conducted to better understand the depths used for foraging by scoters or eiders in the Ocean SAMP area. ~~Much of the study area is relatively deep \(>25 meters \[82 feet\]\), thus most of the Ocean SAMP area is probably not preferred suitable foraging habitat for seaducks, although seaducks can roost in deeper waters.~~](#)

21. **Figure 8.41:** We recommend updating the following figure based on feedback received from the Ocean SAMP avian research team. Updating figure 8.41 (pg. 112) will make the chapter’s description consistent with the technical report produced by Paton et al. (2010). The proposed change is as follows:

OLD FIGURE 8.41 (DELETED):



~~Figure 8.41 Total Number of Detections for the Most Abundant Guilds Observed in Nearshore Habitats During Land-Based Point Counts, January 2009-January 2010 (Paton et al. 2010). (Note: Total Number of detections >440,000; Total Number of Species Recorded= 121)~~

NEW FIGURE 8.41 (INSERTED):

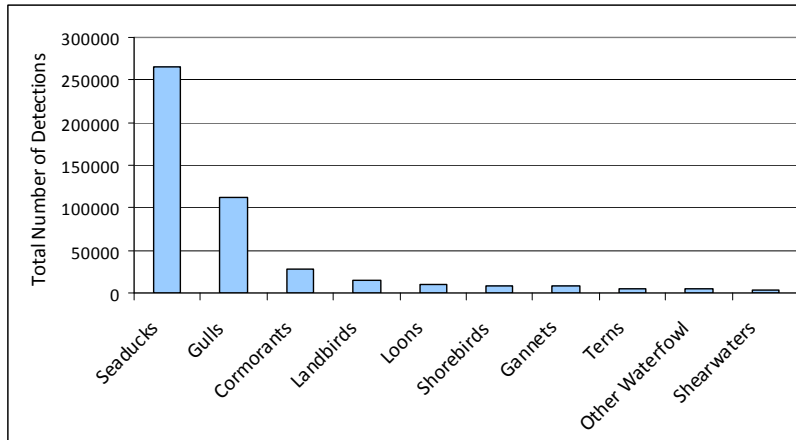


Figure 8.41. Total Number of Detections for the Most Abundant Guilds Observed in Nearshore Habitats During Land-Based Point Counts, [Jan 2009-Feb 2010 \(Paton et al. 2010\)](#). (Note: Total Number of detections = 465,039; Total Number of Species Recorded= 121)

22. **Section 850.4:** We recommend the following revision to Section 850.4 Birds, paragraph #8 (pg. 112) based on feedback received from the Ocean SAMP avian research team. This proposed change more accurately described the findings in the technical report produced by Paton et al. (2010). The proposed change is as follows:

“In addition to foraging activity, migrating Roseate Terns may also pass through the Ocean SAMP area on their way to and from their nesting colonies (Harris 2009). Recent studies of post-breeding staging by Roseate Terns documented 20 sites on Cape Cod where Roseate Terns congregate in the fall before migrating south. Many uniquely color-banded birds from Great Gull Island in NY at the western edge of the Ocean SAMP area were located on Cape Cod (Harris 2009), thus it is probable that many terns are migrating through the Ocean SAMP area in July and August, but their migratory routes, the diurnal variation of this migration, and flight elevations are uncertain. Paton et al. (2010) conducted surveys specifically to record Roseate Tern use of the Ocean SAMP area during summer (July, August), and detected relatively few birds [during systematic ship and land-based surveys \(total detections equaled 29 and 125 observations respectively\)](#). [Alternatively, observations at Great Salt Pond on Block Island during July and August of 2009 recorded relatively high numbers of individuals, with up to 100 observations per day. It is believed that these birds are likely individuals that breed in New York or Connecticut and are transiting through the Ocean SAMP area; however more research is needed on post-breeding movement of Roseate Terns.](#) ~~While the current evidence suggests that few Roseate Terns use Ocean SAMP waters for foraging habitat, of the sightings recorded the majority were located in~~

~~nearshore sites, presumably where water depths are shallow enough to allow access to prey~~ (Paton et al. 2010).”

23. **Section 850.4.1:** We propose the following revision to Section 850.4.1 Habitat Displacement or Modification, paragraph #2 (pg. 122) based on feedback from our Ocean SAMP avian research team to clarify the findings of DONG and Vattenfall (2006).

“Changes in species distribution have been observed at a number of offshore wind energy facilities in Europe. One reported example of habitat displacement was found to occur at the Nysted Offshore Wind Energy Facility in Denmark. Long-tailed ducks (*Clangula hyemalis*) at this site showed statistically significant reductions in density within and 2 km (1.2 miles) around the wind farm post-construction. Prior to construction the same area had shown higher than average densities, suggesting that the facility had resulted in the displacement of this species from formerly favored feeding areas. However, the observed number of long-tailed ducks was relatively low and therefore of no significance to the overall population, the sample size was small (DONG Energy and Vattenfall 2006).”

24. **Section 850.5:** We suggest deleting the last sentence in Section 850.5 Marine Mammal, paragraph 3 (pg. 127). The deletion of this sentence was suggested by NOAA National Marine Fisheries Service because it makes a broad conclusion regarding impacts to whales which is not supported by any analysis. The proposed change is shown below:

“Marine mammal species in the Ocean SAMP area are either whales (cetaceans), a scientific order which includes dolphins and porpoises, or seals (pinnipeds). Marine mammals are highly mobile animals, and for most of the species, especially the migratory baleen whales, the Ocean SAMP area is used temporarily as a stopover point during their seasonal movements north or south between important feeding and breeding grounds. The Ocean SAMP area overlaps with the Right Whale Seasonal Management Area, although the typical migratory routes for right whales and other baleen whales lie further offshore and outside of the Ocean SAMP area (Kenney and Vigness-Raposa 2009; see Chapter 7, Marine Transportation, Navigation and Infrastructure). Right whales and other baleen whales have the potential to occur in the SAMP area in any season, but would be most likely during the spring, when they are migrating northward and secondarily in the fall during the southbound migration. In most years, the whales would be expected to transit through the Ocean SAMP area or pass by just offshore of the area. ~~Therefore, any future offshore renewable energy projects within the Ocean SAMP area are unlikely to impede the movement of animals between important feeding and breeding grounds.~~”

25. **Section 850.5:** We suggest adding the following information to Section 850.5 Marine Mammals paragraph 5 (pg. 132). This revision is in response to a comment from NOAA National Marine Fisheries Service recommending the addition of a sentence noting that both the Marine Mammal Protection Act (MMPA) protections and the Endangered Species Act (ESA) prohibit the taking of certain species. Also the commenter suggested including

the ESA definition of take and that any wind farm will require consultation under the ESA and MMPA. The proposed changes are shown below:

“The degree to which offshore renewable energy facilities may affect marine mammals depends in large part on the specific siting of a project, as well as the use of appropriate mitigation strategies to minimize any adverse effects (MMS 2007a). All potential adverse impacts and enhancements posed by any future project within the Ocean SAMP area to marine mammals will undergo rigorous review under the National Environmental Policy Act (NEPA) to comply with the standards under the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). Under the MMPA all marine mammals are protected, and acts that result in the taking (a take is defined as “harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal”) of marine mammals in U.S. waters is prohibited without authorization from the National Marine Fisheries Service (NMFS). Further protection is granted under the ESA by the NMFS for marine mammals that are listed as threatened or endangered. The ESA prohibits any person, including private entities, from "taking" a "listed" species. "Take" is broadly defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or to attempt to engage in any such conduct." As a result, any proposed ~~project's~~ project will require consultation under the ESA and MMPA to examine all potential effects on ~~the welfare of~~ marine mammals ~~are scrutinized~~ prior to development in order to ensure that potential adverse impacts are minimized. For more information on the MMPA and the ESA see Chapter 10, Existing Statutes, Regulations, and Policies.”

26. **Section 850.5:** We suggest adding the following word to Section 850.5 Marine Mammals, paragraph 6 (pg. 132). This change was suggested by NOAA National Marine Fisheries Service as the risks to marine mammals from any project are likely to vary based on the exact project design and location. The proposed change is shown below:

“The principle impacts identified in the PEIS include potential effects of increased underwater noise, impacts to water quality, vessel strikes and displacement (MMS 2007a). Of these potential impacts, increased underwater noise may poses the greatest risk to marine mammals, especially to baleen whales (e.g. humpback whales and the North Atlantic right whale), who are in theory most sensitive to the low frequency sounds produced during construction activities (see below for further discussion).”

27. **Section 850.5.1:** We suggest adding the following phrase to Section 850.5.1 Noise paragraph 3 (pg. 133). Listing the maintenance of an exclusion zone was suggested by NOAA National Marine Fisheries Service. The proposed change is shown below:

“Underwater noise may be generated during all stages of an offshore renewable energy facility, including during pre-construction, construction, operation and decommissioning. The strength and duration of the noise varies depending on the activity (see Table 8.17). For example, some construction activities, such as pile driving, result in short periods of intense noise generation, compared with long-term, low level noise associated with operational

activities. While the intensity and duration of the noise produced by pile driving activities and operational wind turbines vary, both produce low frequency noise, and therefore potentially pose a risk in particular to large whales, such as the North Atlantic right whale, humpback whales, and fin whales, as these species are thought to be most sensitive in this frequency range (Southall et al. 2007; see Figure 8.45). In order to minimize the risk of causing hearing impairment or injury to any marine mammal during activities of high noise, monitoring the project area for the presence of marine mammals [and maintenance of an exclusion zone](#) has been required (MMS 2009a; JNCC 2009). Furthermore, scheduling construction activities to avoid periods when marine mammals may be more common in the project area is one precautionary measure to minimize any potential adverse impacts (OSPAR 2006). Information on the potential long-term impacts of displaced individuals, or on the potential effects under water noise may cause to resident marine mammal populations, is not currently available (MMS 2007a, OSPAR 2008).”

28. **Table 8.17:** The following additions are suggested for Table 8.17. *Above and Below Water Noise Sources Associated with Offshore Renewable Energy Development* (pg. 134). The clarification of what the noise source described as ‘Construction’ referred to and the recognition that pile-driving noise will vary greatly depending on the size of the pile and type of hammer used were suggestions provided in the comments received from NOAA National Marine Fisheries Service. The proposed changes are shown below:

Above Water Noise					
Noise Source	Duration	Frequency Range	Frequency of Peak Level (Hz)	Peak Sound Intensity Level (dB re-20 µPa)	Reference Distance (m)
Ship/barge/boat ^{a,b,d}	Intermittent to continuous, up to several hours or days	Broadband, 20–50,000 Hz	250–2,000	68–98	Near source
Helicopter	Intermittent, short duration	Broadband with tones	10–1,000	88	Near source
Pile driving ^{a,d}	50-100 millisecond pulses/beat, 30–60 beats/min, 1–2 hours/pile	Broadband	200	110	15 m (49.2 feet)
Construction Equipment ^d	Intermittent to continuous	Broadband	Broadband	68–99	15 m (49.2 feet)
Underwater Noise Sources					
Noise Source	Duration	Frequency Range	Frequency of Peak Level (Hz)	Peak Sound Intensity Level (dB re-1 µPa)	Reference Distance (m)
Ship/barge/boat ^{a,b,c,f}	Intermittent to continuous, up to several hours or days	Broadband, 20–50,000 Hz	250–2,000	150-180 rms	1m (3.3 feet)
**Pile driving ^{a,d,f}	50-100 millisecond pulses/beat, 30–60 beats/min, 1–2 h/pile	Broadband 20- above 20,000 Hz	100-500	228 peak, 243-257 peak to peak	1m (3.3 feet)

this is an estimate and that the zones may be larger or smaller depending on the actual size of the pile and method of installation.”

⁵⁵Based on an attenuation rate = 17log(range from source) for a sound source at 200 Hz. See Miller et al. 2010 for more information.

31. **Section 850.5.1:** We recommend revising the language used in Section 850.5.1. Noise, paragraph 10 (pg. 139). As suggested by NOAA National Marine Fisheries Service, this revised language more clearly describes the area monitored by marine mammal observers. The proposed changes are shown below:

“Pile driving may create noise that may adversely affect marine mammal feeding or social interactions, or alter or interrupt vocal activity (MMS 2007; Thomsen et al. 2006). However, these impacts will vary within, as well as between, species. Any marine mammal that remains within the project area at the start of pile driving activities are subject to the increased risk of hearing impairment that may occur within close range (Madsen et al 2006; Thomsen et al. 2006). Placing marine mammal observers onboard construction vessels and halting construction activity once a marine mammal has been spotted within a project area a designated exclusion zone are precautionary measures that can be taken to reduce this potential risk (MMS 2007a). In addition, acoustic isolation of the ramming pile may reduce the noise level of pile driving activities. Acoustic deterrent devices and ramp-up pile-driving procedures may also help to protect individuals from impairment or injury by encouraging them to leave the construction site (Thomsen et al. 2006; Tougaard et al. 2003; Tougaard et al. 2005).”

32. **Section 850.5.1:** We recommend the inclusion of the following footnote to accompany 850.5.1. Noise, paragraph 11 (pg. 139), as well as the addition of the appropriate source to the Works Cited section This addition is in response to a comment received from NOAA National Marine Fisheries Service requesting the inclusion of information on the source level of the pile driving noise and the noise levels at 20km that are discussed in the text of the chapter. The proposed footnote is shown below:

“⁵⁶ Measurements made at Horns Rev during pile driving activities recorded high sound levels of about 190 dB re 1 μ Pa at several hundred meters away from the sound source. A best fit attenuation of 18 dB per 10 times increase in distance was used to estimate a source level of 235 dB re 1 μ Pa at 1 meter distance and 150 dB re 1 μ Pa at a distance of more than 20 km. See Tougaard et al. 2006 for more information.”

New reference:

Tougaard, J., Tougaard, S., Jensen, R.C., Jensen, T., Teilmann, J., Adelung, D., Liebsch, N. and Muller, G. 2006. *Harbour seals at Horns Reef before, during and after construction of Horns Rev Offshore Wind Farm*. Final report to Vattenfall A/S. October 2006.

33. **Section 850.5.1:** We recommend the addition of the following footnote to accompany 850.5.1. Noise, paragraph 15 (pg.141). This footnote is in direct response to a comment received from NOAA National Marine Fisheries Service requesting more explanation of the findings of Miller et al. (2010) regarding ambient noise levels in the Ocean SAMP area. The proposed footnote is shown below:

⁶⁰ Miller et al. (2010) created an ambient noise budget for an area southwest of Block Island using a Passive Aquatic Listener device for the 1/3-octave band centered at 500 Hz. The main contributors to the noise budget at this location were shipping with 97 dB re 1 μ Pa and wind related noise was 97 dB re 1 μ Pa. Rain was next with 92 dB re 1 μ Pa and lastly, biological noise with 87 dB re 1 μ Pa.”

34. **Section 850.5.2:** We suggest revising one citation used in Section 850.5.2. Vessel Strikes, paragraph 2 (pg. 142), and listed in the Works Cited. This change is suggested as a result of a comment received from NOAA National Marine Fisheries Service stating that a more accurate citation was the NOAA National Marine Fisheries Service ship strike rule. The proposed change is shown below:

“Of all whale species within the Ocean SAMP area, the population-level impacts of a vessel strike would be most severe to the North Atlantic right whale (MMS 2007a). Ship strikes more commonly result in whale fatalities when a ship is travelling at speeds of 14 knots [16 mph] or more. In fact, the number of ship strikes recorded decreases significantly for vessels travelling less than 10 knots [11.5mph] (Jensen and Silber 2004), which suggests that reducing ship speeds to this level may reduce the risk of vessel strikes even further (~~MMS 2009a~~ [NOAA National Marine Fisheries 2008](#)). As a result of this finding, the PEIS suggests vessels reduce ship speed and maintain a safe operating distance when a marine mammal is observed (MMS 2007a; MMS 2009a). In addition, by locating offshore renewable energy installations away from migratory routes, the risk of vessel strikes is further minimized (MMS 2007a). It should also be noted that there is already a vessel speed restriction in place during parts of the Ocean SAMP area during certain times of the year to minimize the risk of right whale ship strikes; this speed restriction is part of the Right Whale Seasonal Management Area and is enforced by NMFS (NOAA National Marine Fisheries Service n.d.). See Chapter 7, Marine Transportation, Navigation, and Infrastructure for further discussion.”

New citation:

[NOAA National Marine Fisheries. 2008. Endangered Fish and Wildlife; Final Rule To Implement Speed Restrictions to Reduce the Threat of Ship Collisions With North Atlantic Right Whales. *Federal Register* 73\(198\): 60173-60191. Friday, October 10, 2008.](#)

35. **Section 850.6:** We suggest deleting the following reference from Section 850.6 Sea Turtles paragraph 2 (pg. 145). NOAA National Marine Fisheries Service suggested not referring to the NOAA Biological Opinion for the Cape Wind project when describing the occurrence of

sea turtles in the Ocean SAMP area, rather only using primary sources such as Kenney and Vigness-Raposa (2009). The proposed change is shown below:

“According to ~~the NOAA Biological Opinion for the Cape Wind FEIS (MMS 2009a)~~ and to Kenney and Vigness-Raposa (2009), the sea turtles that may be found in the Ocean SAMP area include the following:”

36. **Section 850.6:** We suggest the following change to Section 850.6 Sea Turtles paragraph 3 (pg.145). These revisions are in response to a comment received from NOAA National Marine Fisheries Service suggesting that this paragraph clarify that the foraging depths of 16-49 feet were for sea turtles in Long Island waters. The commenter also suggested that any reference to NOAA’s Biological Opinion as part of the Cape Wind EIS be cited as a NOAA reference and not MMS 2009a:

“Sea turtles may use the Ocean SAMP area for foraging. They are capable of diving to great depths, although ~~most tracking studies of turtles in the Northeast have~~ a study of sea turtles off Long Island found them primarily foraging in waters between 16 and 49 feet (4.9 and 14.9 meters) in depth. Leatherback turtles, likely the most abundant sea turtles in the Ocean SAMP area, have been shown to dive to great depths and may spend considerable time on the bottom , sometimes holding their breath for as long as several hours. Some sea turtles, particularly green sea turtles, feed on submerged aquatic vegetation (~~MMS 2009a~~NOAA National Marine Fisheries 2009). While the placement of wind turbines will be at depths greater than where this foraging takes place, if cables are placed through areas of submerged aquatic vegetation, this could have an effect on sea turtles. Similarly, many sea turtles may feed on benthic invertebrates such as sponges, bivalves, or crustaceans, all of which are likely be found in the Ocean SAMP area (NOAA National Marine Fisheries 2009~~MMS 2009a~~). Sea turtles may be affected by any loss of these food species during the cable-laying process; again, turtles are unlikely to forage at the depths where the turbine bases are likely to be located. Leatherback turtles are known to consume Lion’s mane jellyfish (*Cyanea capillata*) as a mainstay of their diet; these jellyfish are plentiful in the Ocean SAMP area during the summer and fall (Lazell 1980).”

37. **Section 850.6:** We suggest adding a sentence to Section 850.6 Sea Turtles paragraph 4 (pg. 146). This is to address comments received from NOAA National Marine Fisheries Service to clarify that sea turtles may be found more commonly in the Ocean SAMP area than the data would suggest. The proposed change is shown below:

“Additionally, any of these turtle species may migrate through the Ocean SAMP area as part of their northward or southward migration in spring and fall, respectively (~~MMS 2009a~~ NOAA National Marine Fisheries 2009). While sightings of most of these species are infrequent, sea turtles, particularly juveniles, are not routinely detected during surveys, meaning they may be more common in the Ocean SAMP area than survey data would suggest.”

38. **Section 850.6.1:** We suggest deleting one sentence from Section 850.6.1 Sea Turtles – Noise, paragraph 2 (pg. 146) and adding another sentence. These changes address comments received from NOAA National Marine Fisheries Service in the review process. The deleted sentence may not accurately characterize sea turtle foraging habits, and the additional sentence is to clarify the potential effects of noise will vary depending on the project and site-specific conditions.

“The Cape Wind FEIS (MMS 2009a) predicts that no injury during the pile driving process is likely to occur to sea turtles, even if the turtle were as close as 30 m (98.4 feet) from the source. The noise generated by pile driving is likely to cause avoidance behavior in sea turtles, which may move to other areas. ~~However, only leatherback turtles are likely to be foraging in the area of the construction activity, as the other species seek out prey available at shallower depths, and their preferred prey items are located throughout the Ocean SAMP area.~~ Sea turtles migrating through the area may also be affected, as they may avoid the construction area. These effects are expected to be short-term and minor (MMS 2009a). The noise created during construction, and thus the effects of noise on sea turtles, may vary depending on the size of the piles and the characteristics of the particular site.”

39. **Section 850.6.1:** We suggest deleting one sentence from Section 850.6.1 Sea Turtles – Noise, paragraph 3 (pg. 146), and adding an additional sentence. This suggestion is based on comments from NOAA National Marine Fisheries Service which reflect the fact that the effect of seismic surveys cannot be known without knowing the details of the seismic surveying.

“Any seismic surveys used in the siting process have the potential to affect individual sea turtles by exposing them to levels of sound high enough to cause disturbance if a turtle is within a certain distance of the sound source (1.5 km [0.9 miles]), ~~although not high enough to cause injury. These effects will be minimal and short-term (MMS 2009a).~~ While the Cape Wind EIS predicted only minimal effects to sea turtles from seismic surveys (MMS 2009a), the effects to sea turtles from seismic surveys in the Ocean SAMP area will depend on the type of survey device used, the water depths, and other factors.”

40. We propose the following correction to the Section 870 Literature Cited. This change was suggested by the Ocean SAMP avian research group to accurately cite the technical report submitted. The change proposed is as follows:

~~Paton, P.W.C., McWilliams, S. R., Winiarski, K., and Trocki, C. L. 2010. *Spatial Distribution and Abundance and Flight Ecology of Birds in Nearshore and Offshore Waters of Rhode Island*. Technical Report.~~

Paton, P.W.C., Winiarski, K.J, Trocki, C. L, and McWilliams, S. R. 2010. *Spatial Distribution, Abundance and Flight Ecology of Birds in Nearshore and Offshore Waters of Rhode Island*. Technical Report. 304pp.

41. **Section 860.1:** We propose modifying Section 860.1 General Policies, Policy #4 (pg. 177) based on comments received from NOAA’s Office of Coastal Resource Management as follows:

“Offshore Developments ~~proposed to be sited in State waters~~ shall not have a significant adverse impact on the natural resources or existing human uses described in the Ocean SAMP. Offshore Developments ~~proposed to be sited in State waters~~ are bound by all the applicable provisions listed in Chapter 11, The Policies of the Ocean SAMP. Where the Council determines that impacts on the natural resources or human uses of the SAMP area through the pre-construction, construction, operation, or decommissioning phases of a project constitute significant adverse impacts, the Council shall require that the applicant modify the proposal to avoid and/or mitigate the impacts or the Council shall deny the proposal.”

42. If the Council approves the above-mentioned change to Chapter 8 Renewable Energy and Other Offshore Development, Section 860.1 General Policies, #4, this same policy will need to be revised in Chapter 11, The Policies of the Ocean SAMP, Section 1150.7, as follows:

“Offshore Developments ~~proposed to be sited in State waters~~ shall not have a significant adverse impact on the natural resources or existing human uses described in the Ocean SAMP. Offshore Developments ~~proposed to be sited in State waters~~ are bound by all the applicable provisions listed in Chapter 11, The Policies of the Ocean SAMP. Where the Council determines that impacts on the natural resources or human uses of the SAMP area through the pre-construction, construction, operation, or decommissioning phases of a project constitute significant adverse impacts, the Council shall require that the applicant modify the proposal to avoid and/or mitigate the impacts or the Council shall deny the proposal.”

43. **Section 860.2.8:** We propose removing the following phrase from Section 860.2.8 Standards for Construction Activities, Standard #4 (pg. 222) based on comments received from NOAA’s Office of Coastal Resource Management as follows:

“All construction activities ~~occurring within state waters~~ shall comply with the policies and standards outlined in the Rhode Island Coastal Resources Management Program (aka the ‘Red Book’), as well as the regulations of other relevant state and federal agencies.”

44. If the Council approves the above-mentioned change to Chapter 8, Renewable Energy and Other Offshore Development, Section 860.2.8 Standards for Construction Activities, Standard #4, this same policy will need to be revised in Chapter 11, The Policies of the Ocean SAMP, Section 1160.8, as follows:

“All construction activities ~~occurring within state waters~~ shall comply with the policies and standards outlined in the Rhode Island Coastal Resources Management Program (aka the ‘Red Book’), as well as the regulations of other relevant state and federal agencies.”

45. The following changes are suggested in order to make the policies and regulatory standards of this chapter fully consistent with language used in Chapter 11, The Policies of the Ocean SAMP, as approved by the CRMC Ocean SAMP Subcommittee on July 22nd, 2010:

Section 860.2.1 Overall Regulatory Standards, Standard #1 (pg. 179):

“All Offshore Developments regardless of size, including energy projects, which are proposed for or located within the Ocean SAMP area, are subject to the policies and standards outlined in Section 860. For the purposes of the Ocean SAMP, Offshore Developments are defined as:

- a. Large-scale projects, such as:
 - i. offshore wind facilities (5 or more turbines within ~~up to~~ 2 km of each other, or 18 MW power generation);
 - ii. wave generation devices (2 or more devices, or 18 MW power generation);
 - iii. instream tidal or ocean current devices (2 or more devices, or 18 MW power generation); and
 - iv. offshore LNG platforms (1 or more); and
 - v. Artificial reefs (1/2 acre footprint and at least 4 feet high), except for projects of a public nature whose primary purpose is habitat enhancement.
- b. Small-scale projects, defined as any projects that are smaller than the above thresholds;
- c. Underwater cables;
- d. Mining and extraction of minerals, including sand and gravel;
- e. Aquaculture projects of any size, as defined in RICRMP Section 300.11; or
- f. Other development (as defined in the RICRMP) which is located in tidal waters from the mouth of Narragansett Bay seaward, between 500 feet offshore and the 3-nautical mile, state water boundary.”

Section 860.2.1 Overall Regulatory Standards, Standards #5 (pg. 181):

“Any assent holder of an approved Offshore Development shall:

- i. Design the project and conduct all activities in a manner that ensures safety and shall not cause undue harm or damage to natural resources, including their physical, chemical, and biological components to the extent practicable; and take measures to prevent unauthorized discharge of pollutants including marine trash and debris into the offshore environment.
- ii. Submit requests, applications, plans, notices, modifications, and supplemental information to the Council as required;
- iii. Follow up, in writing, any oral request or notification made by the Council, within 3 business days;
- iv. Comply with the terms, conditions, and provisions of all reports and notices submitted to the Council, and of all plans, revisions, and other Council approvals, as provided in Sections 860.2.5;
- v. Make all applicable payments on time;

- vi. Conduct all activities authorized by the permit in a manner consistent with the provisions of this document, the Rhode Island Coastal Resources Management Program, and all relevant federal and state statutes, regulations and policies;
- vii. Compile, retain, and make available to the Council within the time specified by the Council any information related to the site assessment, design, and operations of a project; and
- viii. Respond to requests from the Council in a ~~timely manner~~ timeframe specified by the Council."

46. The following proposed change is recommended for 860.2.4 Other Areas, Standard #1 (pg. 196) to correct an error identified by URI Ocean SAMP researcher Chris Damon. This correction is recommended to accurately describe the grid size used in the analysis of commercial marine traffic, as shown in Figure 8.55:

"Large-scale projects or other development which is found to be a hazard to commercial navigation shall avoid areas of high intensity commercial marine traffic. Avoidance shall be the primary goal of these areas. Areas of High Intensity Commercial Marine Traffic are defined as having 50 or more vessel counts within a ~~100 by 100 meter~~ 1 km by 1 km grid, as shown in Figure 8.55."

47. If the above-mentioned change is approved by the Council, this same language must also be changed in Chapter 11, Policies of the Ocean SAMP, section 1160.4, as follows:

"Large-scale projects or other development which is found to be a hazard to commercial navigation shall avoid areas of high intensity commercial marine traffic. Avoidance shall be the primary goal of these areas. Areas of High Intensity Commercial Marine Traffic are defined as having 50 or more vessel counts within a 1 km by 1 km ~~100 by 100 meter~~ grid, as shown in Figure 8.55."

48. The following addition is proposed for Table 8.26 *Resources, Conditions and Activities that shall be described in the Construction and Operations Plan* (pg. 209). This addition is recommended to make the regulatory standards of this chapter and Chapter 2, Ecology of the SAMP Region (270.2 Standard #3) consistent. The proposed change is shown below:

Type of Information:	Including:
(1) Hazard information and sea level rise.	Meteorology, oceanography, sediment transport, geology, and shallow geological or manmade hazards. Provide an analysis of historic and project (medium and high) rates of sea level rise and shall at minimum assess the risks for each alternative on public safety and environmental impacts resulting from the project (see Section 350.2 for more information).
(2) Water quality <u>and circulation</u>	Turbidity and total suspended solids from construction. <u>Modeling of circulation and stratification to ensure that water flow patterns and velocities are not altered in ways</u>

	that would lead to major ecosystem change.
(3) Biological resources.	Benthic communities, marine mammals, sea turtles, coastal and marine birds, fish and shellfish not targeted by commercial or recreational fishing, plankton, seagrasses, and plant life.
(4) Threatened or endangered species.	As defined by the ESA (16 U.S.C. 1531 et. seq.)
(5) Sensitive biological resources or habitats.	Essential fish habitat, refuges, preserves, Areas of Particular Concern, sanctuaries, rookeries, hard bottom habitat, barrier islands, beaches, dunes, and wetlands.
(6) Fisheries Resources and Uses	Commercially and recreationally targeted species, recreational and commercial fishing (including fishing seasons, location, and type), commercial and recreational fishing activities, effort, landings, and landings value.
(6) Archaeological resources.	As required by the NHPA (16 U.S.C. 470 et. seq.), as amended.
(7) Social and economic resources.	As determined by the Council in coordination with the Joint Agency Working Group.
(8) Coastal and marine uses.	Military activities, vessel traffic, and energy and non-energy mineral exploration or development.

49. If the Council approves the above-mentioned change to Table 8.26 in Chapter 8, the same language will need to be revised in Chapter 11, The Policies of the Ocean SAMP, Table 11.6, as follows:

Type of Information:	Including:
(1) Hazard information and sea level rise.	Meteorology, oceanography, sediment transport, geology, and shallow geological or manmade hazards. Provide an analysis of historic and project (medium and high) rates of sea level rise and shall at minimum assess the risks for each alternative on public safety and environmental impacts resulting from the project (see Section 350.2 for more information).
(2) Water quality and circulation.	Turbidity and total suspended solids from construction. Modeling of circulation and stratification to ensure that water flow patterns and velocities are not altered in ways that would lead to major ecosystem change.
(3) Biological resources.	Benthic communities, marine mammals, sea turtles, coastal and marine birds, fish and shellfish not targeted by commercial or recreational fishing, plankton, seagrasses, and plant life.
(4) Threatened or endangered species.	As defined by the ESA (16 U.S.C. 1531 et. seq.)
(5) Sensitive biological resources or habitats.	Essential fish habitat, refuges, preserves, Areas of Particular Concern, sanctuaries, rookeries, hard bottom habitat, barrier islands, beaches, dunes, and wetlands.
(6) Fisheries resources and uses	Commercially and recreationally targeted species, recreational and commercial fishing (including fishing seasons, location, and type), commercial and recreational fishing activities, effort, landings, and landings value.
(6) Archaeological resources.	As required by the NHPA (16 U.S.C. 470 et. seq.), as

	amended.
(7) Social and economic resources.	As determined by the Council in coordination with the Joint Agency Working Group.
(8) Coastal and marine uses.	Military activities, vessel traffic, and energy and non-energy mineral exploration or development.

Chapter 10: Existing Statutes, Regulations, and Policies

1. Change “Minerals Management Service” or “MMS” to “Bureau of Ocean Energy Management, Regulation, and Enforcement” or “BOEMRE”, with the exception of within references or quotations, throughout the entire chapter.
2. Section 1010.1, State and Federal Jurisdiction: Amend #4 to clarify relevant UNCLOS provisions in response to comments received from the Conservation Law Foundation as follows:

“4. The third zone, the EEZ, overlaps with the contiguous zone and extends from twelve (12) nautical miles seaward to two-hundred (200) nautical miles. In the EEZ the United States has extensive rights over natural resources. With the current movement to site new energy facilities offshore, it is important to note that international law recognizes coastal nations' "sovereign rights" for the "economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds" and "jurisdiction" with regard to "the establishment and use of...installations and structures" and marine scientific research—[and the protection and preservation of the marine environment](#)—(UNCLOS, Article 56).”

Chapter 11: Policies of the Ocean SAMP:

1. We propose the following word changes to Section 1150.6 Marine Transportation, Navigation and Infrastructure, Policies #1 (pg. 13), #2 (pg. 13), #3 (pg. 14) to make consistent with the language throughout the Ocean SAMP document. The proposed changes are as follows:

“The Council recognizes the importance of designated navigation areas, which include shipping lanes, precautionary areas, recommended vessel routes, pilot boarding areas, anchorages, ~~Navy restricted~~ [military testing](#) areas, and submarine transit lanes to marine transportation and navigation activities in the Ocean SAMP area. The Council also recognizes that these and other waters within the Ocean SAMP area are heavily used by numerous existing users who have adapted to each other with regard to their uses of ocean space. Any changes in the spatial use patterns of any one of these users will result in potential impacts to the other users. The Council will carefully consider the potential impacts of such changes on the marine transportation network. Changes to existing designated navigational areas proposed by the U.S. Coast Guard, NOAA, the R.I. Port Safety

and Security Forums, or other entities could similarly impact existing uses. The Council requests that they be notified by any of these parties if any such changes are to be made to the transportation network so that they may work with those entities to achieve a proper balance among existing uses. “

“The Council recognizes the economic, historic, and cultural value of marine transportation and navigation uses of the Ocean SAMP area to the state of Rhode Island. The Council’s goal is to promote uses of the Ocean SAMP area that do not significantly interfere with marine transportation and safe navigation within designated navigation areas, which include shipping lanes, precautionary areas, recommended vessel routes, pilot boarding areas, anchorages, ~~Navy restricted~~[military testing](#) areas, and submarine transit lanes. See section 1160.2 for discussion of navigation areas which have been designated as Areas of Particular Concern.”

“The Council will encourage and support uses of the Ocean SAMP area that enhance marine transportation and safe navigation within designated navigation areas, which include shipping lanes, precautionary areas, recommended vessel routes, pilot boarding areas, anchorages, ~~Navy restricted~~[military testing](#) areas, and submarine transit lanes.”

Thank you for your consideration.

Sincerely,

A handwritten signature in cursive script that reads "Grover J Fugate". The signature is written in black ink and is positioned above the printed name.

Grover Fugate