

APPENDIX VI

Analysis of Navigational Conflicts with the North Carolina Wind Energy Areas

Prepared for:

UNITED STATES COAST GUARD ATLANTIC AREA

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A. Overview

The Bureau of Ocean Energy Management (BOEM) Renewable Energy State Task Force for North Carolina held its first meeting in January 2011. The U.S. Coast Guard (USCG) Fifth District has been involved in the Task Force from its inception. The Coast Guard's initial Red-Yellow-Green (R-Y-G) determination for the Kitty Hawk Call Area determined the majority of the area to be red, (i.e., unsuitable based on existing vessel traffic) with only small areas along the Western edge and Northeast corner determined to be yellow or green. BOEM made a decision to move forward with a Call for Information and Nominations (Call) for the entire proposed area noting the Coast Guard concerns, as well as National Park Service (NPS) concerns with view shed from NPS lands.

As BOEM approached the Area Identification process, BOEM and Coast Guard staffs attempted to work with industry representatives to identify areas within the Kitty Hawk Call Area that would minimize impacts to navigational safety, while still providing sufficient area for wind development. These efforts fell short of identifying areas that were not objected to by the maritime community with the majority of the maritime community opposed to any development in areas initially determined to be "Red" by the Coast Guard.

The modeling and analysis tool (developed by Pacific Northwest National Lab (PNNL)) was expected to be completed in November of 2013 and was supposed to have the ability to determine the change in risk from the various siting scenarios. However, the modeling and analysis tool was not delivered as expected. In lieu of the ability to analytically determine the change in risk and the intention of BOEM to move forward in the Area Identification process, this evaluation was developed to inform any recommendations the Coast Guard may want to make to BOEM at this stage in the process.

B. North Carolina Wind Energy Area (WEA) Timeline¹

- The first task force meeting was held on January 19, 2011 in Wilmington with the federal, state, local and tribal governments. The goal of the task force was to facilitate intergovernmental communications regarding OCS renewable energy activities. North Carolina presented a study by the University of North Carolina (UNC) to examine the feasibility of wind development.
- The second North Carolina task force meeting was held on May 11, 2011 in Raleigh to discuss potential WEAs and task force member concerns. Many task force members presented their concerns and recommendations for planning areas. The Coast Guard presentation highlighted the conflicts with the traditional shipping routes throughout most of the potential areas.
- A third North Carolina task force meeting was held on October 6, 2011 at the University of North Carolina Wilmington. The purpose of this meeting was to discuss remaining conflicts, including vessel traffic, and discuss next steps of the leasing process for each of the potential areas. The task force decided to move forward with a Call for Information and Nominations for areas 1, 2, and 3; and a Request for Information for areas 4 and 5.
- A fourth North Carolina task force meeting was held on August 2, 2012 in Nags Head. BOEM kicked off the meeting by announcing that they have decided to move forward with a Call for

¹ Documentation from each of the Task Force meetings are posted on the BOEM State Activities website: <http://www.boem.gov/Renewable-Energy-Program/State-Activities/North-Carolina.aspx>

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Information and Nominations for areas 1, 2 and 5. Note: This differed from the course of action recommended by the task force at the previous meeting. They acknowledged that conflicts had not been addressed with shipping or view shed from NPS.

- The North Carolina Call for Information and Nominations was published in the Federal Register on December 13, 2012 under Docket ID: BOEM-2012-0088. In the Call, areas 1, 2, and 5 were renamed Wilmington West, Wilmington East, and Kitty Hawk, respectively.
- On January 7 and 9, 2013, BOEM held public information sessions to provide an overview of BOEM's recently published Call for Information and Nominations and Notice of Intent to solicit public comment and to discuss the next steps in the environmental, planning, and leasing processes in North Carolina.
- BOEM published a notice in the Federal Register reopening the comment period for the North Carolina Call for Information on February 5, 2013 and also announced the Notice of Intent to Prepare an Environmental Assessment (EA) for Commercial Wind Leasing and Site Assessment Activities on the OCS Offshore North Carolina.
- The comment period for the North Carolina Call for Information and Nominations closed on March 7, 2013. BOEM received five expressions of interest from five developers and thirty-seven public comments. Most of the public comments were in favor of WEA development and a few were related to conflicts with existing uses and navigational safety concerns.
- On June 19, 2013 Coast Guard and BOEM staffs met to attempt to identify smaller areas within the Kitty Hawk and Wilmington East areas that may allow for wind development without significant impacts to navigational safety. Through additional analysis of vessel traffic data and discussion with the marine industry, BOEM and the USCG worked collaboratively to develop five alternatives for consideration for the NC WEAs.
- On September 25, 2013, the USCG Fifth District Commander sent a letter and questionnaire to stakeholders asking for their views on the North Carolina options for both Kitty Hawk and Wilmington Call Areas. A summary of the responses from industry are included as Enclosure (1).
- BOEM met with the NPS regarding the North Carolina Call Area view shed on February 10, 2014. The NPS would like to push the minimum distance of the wind farms to possibly to the theoretical line of sight from the Bodie Lighthouse, which is approximately 38 nautical miles.

C. Initial Determination of Suitability

1. Determining Shipping Routes Based on Automatic Identification System (AIS) Data.

AIS data is the primary source of vessel transit data available to determine traditional routes used by commercial vessel traffic. When the “Smart from the Start” Initiative was first launched in January 2011, the AIS products available were very limited due to the extremely long processing times and lack of resources to complete the analyses. As development of the proposed WEAs for North Carolina progressed, the ability to process AIS data and create Geographic Information System (GIS) products had greatly improved.

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Figure 1 is one of the earlier plots showing density at the aliquot level for all vessels over a one year period using 2010 AIS data. These density plots are a good initial look at the conflicts with the proposed wind energy areas.

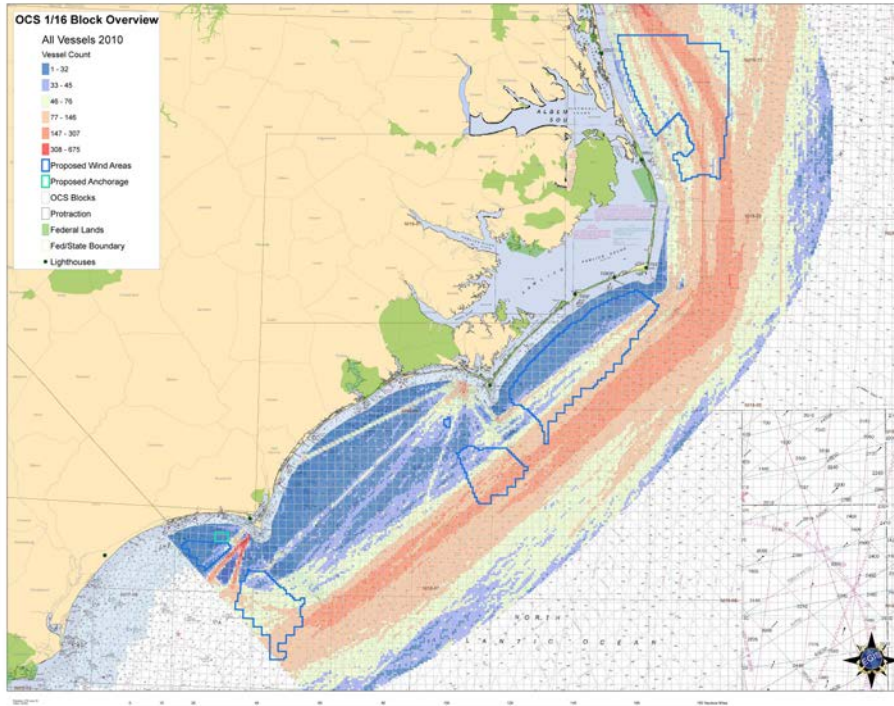


Figure 1: Heat Map of the Initial North Carolina Proposed Wind Areas

“Heat map” is a term used for a depiction of line density or point density where the “hotter” color reflects a higher density.

2. Application of the R-Y-G Methodology.

The initial R-Y-G determination completed by the Coast Guard Fifth District was based on the evaluation of AIS heat maps of all vessels in 2010 to identify existing vessel traffic patterns in or near the areas proposed in the study conducted by North Carolina.

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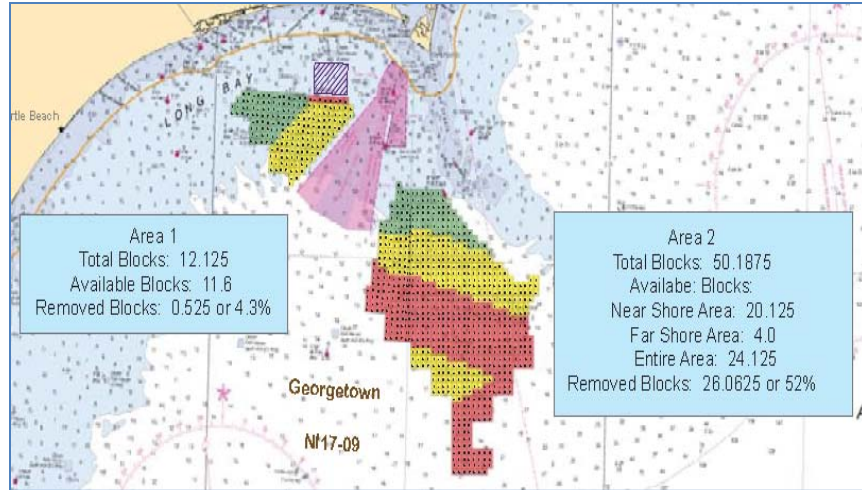


Figure 2: R-Y-G Analysis of the North Carolina Call Areas 1 and 2

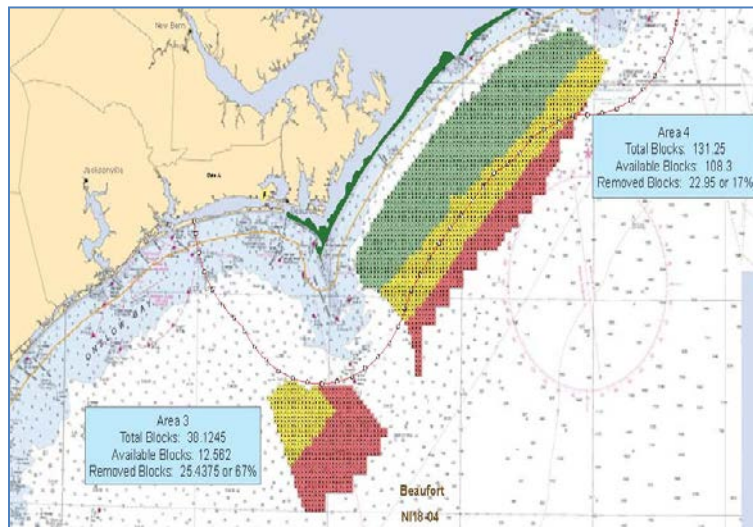


Figure 3: R-Y-G Analysis of the North Carolina Call Areas 3 and 4

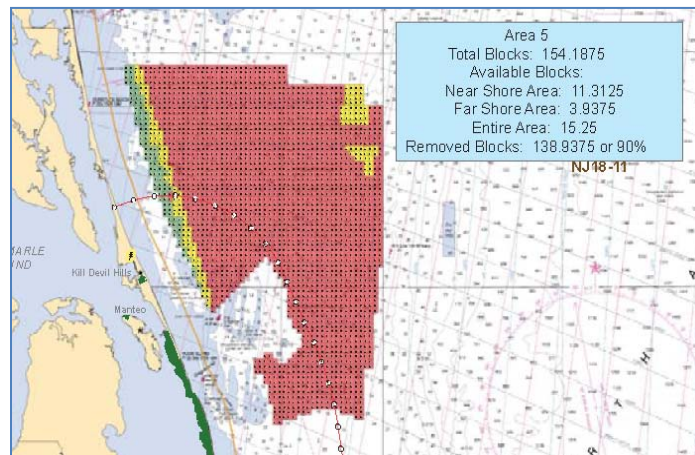


Figure 4: R-Y-G Analysis of the North Carolina Call Area 5

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D. Description of North Carolina Call Areas

1. Kitty Hawk Call Area. The Call Area Kitty Hawk offshore North Carolina contains approximately 138 whole Outer Continental Shelf (OCS) blocks and 36 partial blocks. The boundary begins six miles from the shore and extends roughly 34 nautical miles (nm) seaward at its longest point. It extends from North to South approximately 45 nm. The entire area is approximately 1372 nm².

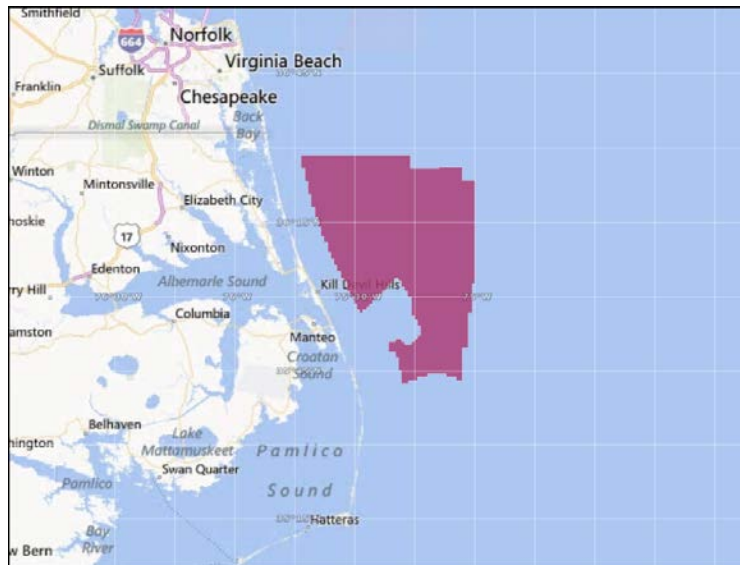


Figure 5: Call Area Kitty Hawk

An analysis of the number and types of vessel transits through the Kitty Hawk Call Area was conducted using one year of AIS data from 2009. The analysis found that there were 7,180 unique transits by 1,553 individual vessels. The majority of the transits were conducted by Cargo vessels accounting for 64% of the total, followed by Tugs and Towing at 13%, and Tankers at 5%. The remaining 19% of transits were by vessels of other categories or unknown.

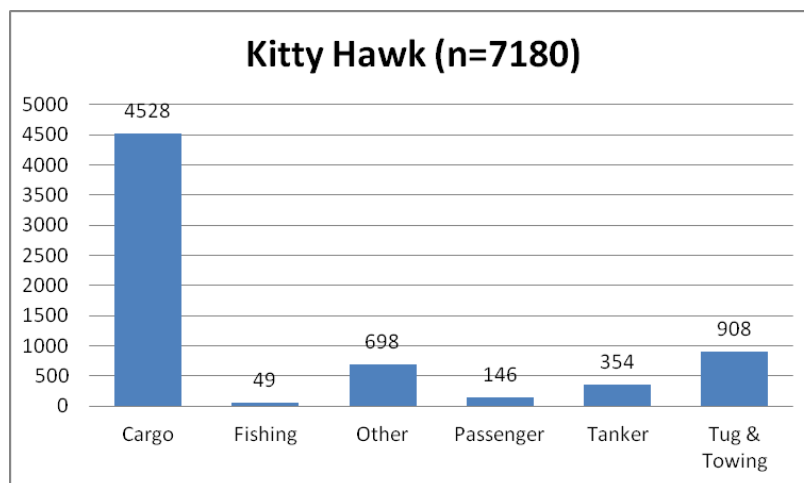


Figure 6: Vessel Transits through Call Area Kitty Hawk by Vessel Type

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In addition to quantifying the transits, visualizations of the AIS data were completed to determine if routes varied by vessel type, draft, or direction of travel. The hypothesis was that the multiple routes shown in the all vessel density plot would prove to vary based on vessel type, draft, and direction. It was known that towing vessels transited closer to shore and assumed that the smaller, shallow draft vessels would do the same to avoid higher sea states and take advantage of the lee (protection from prevailing winds) provided by land. When looking at the density plots of all vessels, there was a common misconception that the two highest density routes through the middle of the Kitty Hawk Call Area were a Northbound and a Southbound route.

The January 2009 data was used to plot tracklines of Northbound and Southbound vessels (shown below). Although the numbers of transits appear to differ, direction (Northbound or Southbound) did not vary for the routes through the Kitty Hawk Call Area.

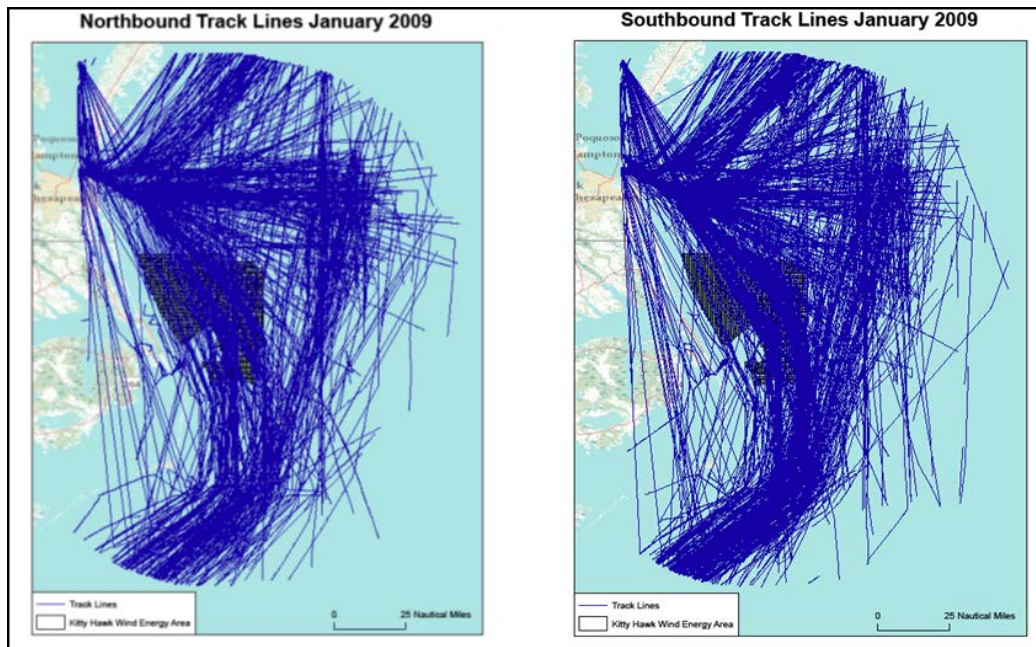


Figure 7: Comparison of January 2009 Tracklines for Northbound and Southbound Vessels

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The separation of vessel traffic was determined to be a result of a series of U. S. Navy structures located in the area resulting in vessels avoiding the towers by 4 nm on average.



Figure 8: Navy Air Combat Maneuvering Range Towers Located in the Kitty Hawk Call Area

When looking at “vessel type,” there was a clear distinction between Tugs and Towing and Deep Draft vessels. The Tugs and Towing vessels clearly favored inshore routes along the coast. Below is a density plot comparison of the routes for Tugs and Towing and Cargo vessel types using 2010 AIS data.² Although not shown, other Deep Draft vessel types followed similar routes to Cargo vessels.

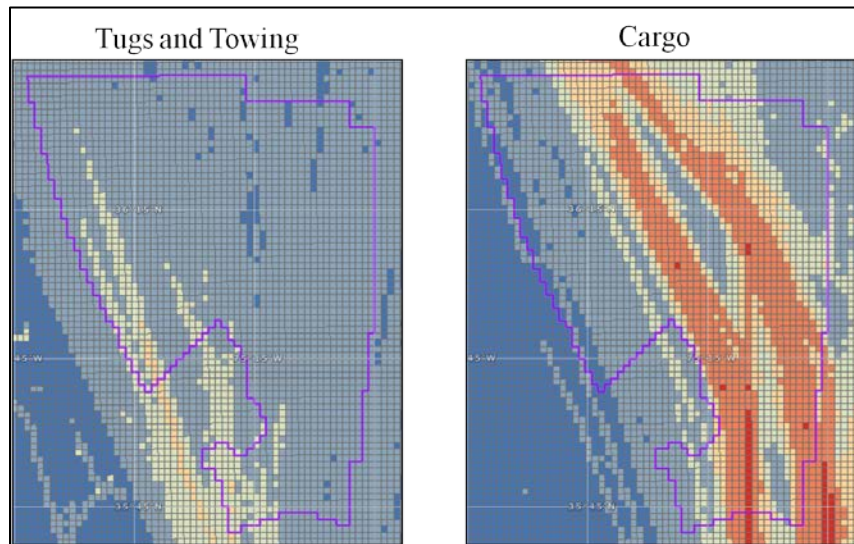


Figure 9: Comparison of Tugs and Towing Routes with Cargo Vessel Routes

² Cargo vessels make up the majority of Deep Draft vessels and therefore are a good surrogate for determining routes.

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To explore routes based on draft, trackline plots were created for the month of January 2009 for vessels less than 20 feet, 20-29 feet, and 30-39 feet. Based on this small sample size, there does appear to be some correlation between draft and the distance offshore vessels transit with shallower draft vessels favoring near shore routes.

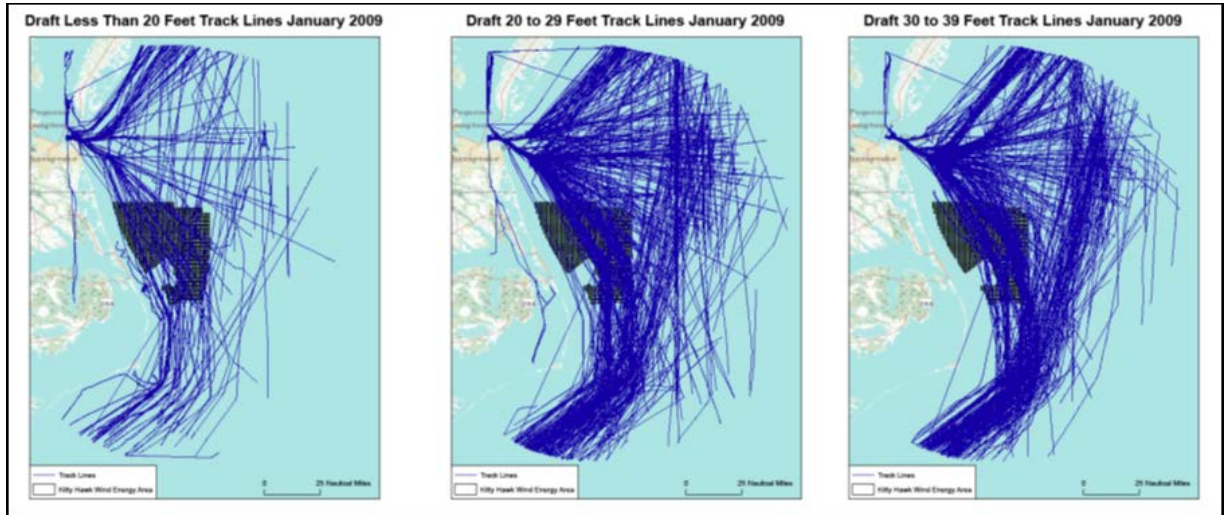


Figure 10: Comparison of January 2009 Tracklines for Vessels of Varying Drafts

2. Wilmington-East Call Area. Call Area Wilmington-East offshore NC contains approximately 51 whole OCS blocks and 15 partial blocks. The boundary begins 13 miles from the shore and extends roughly 28 nm seaward. It extends from east to west approximately 21 nm. The entire area is approximately 432 nm².

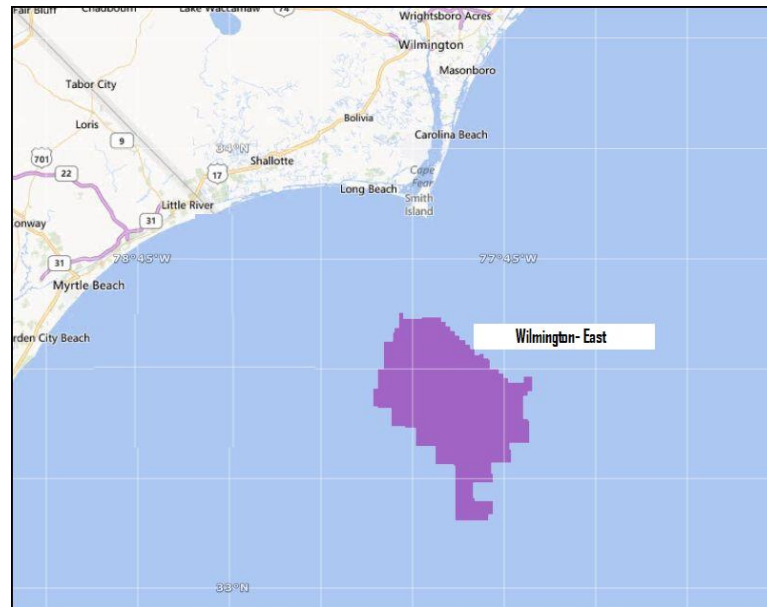


Figure 11: Call Area Wilmington East

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An analysis of the number and types of vessel transits through the Wilmington-East Call Area was conducted using one year of AIS data from 2009. The analysis found that there were 4,119 unique transits by 1,008 individual vessels. The majority of the transits were conducted by cargo vessels accounting for 64% of the total, followed by tankers at 11%, Tugs and Towing at 10%, and. The remaining 14% of transits were by vessels of other categories or unknown.

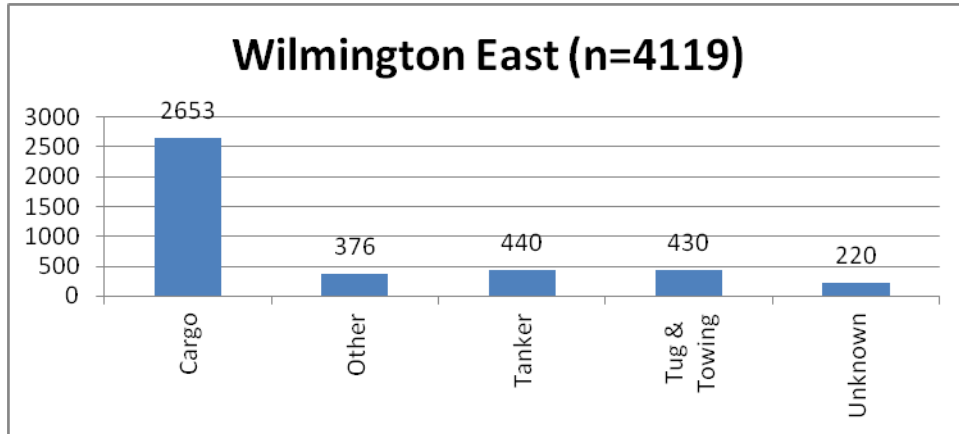


Figure 12: Vessel Transits through Call Area Wilmington East by Vessel Type

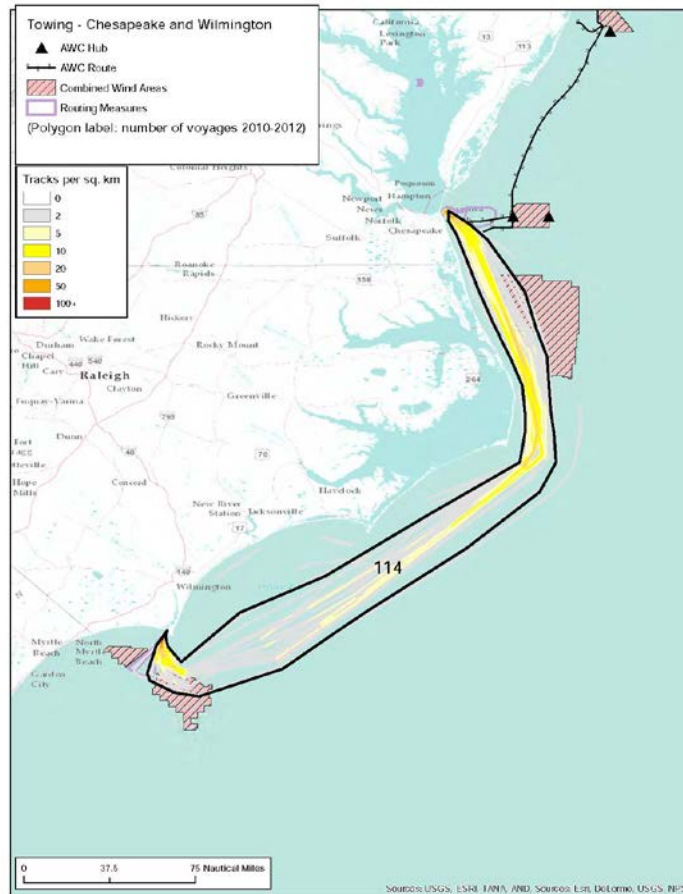


Figure 13: Towing Vessel Transits From Chesapeake to Wilmington

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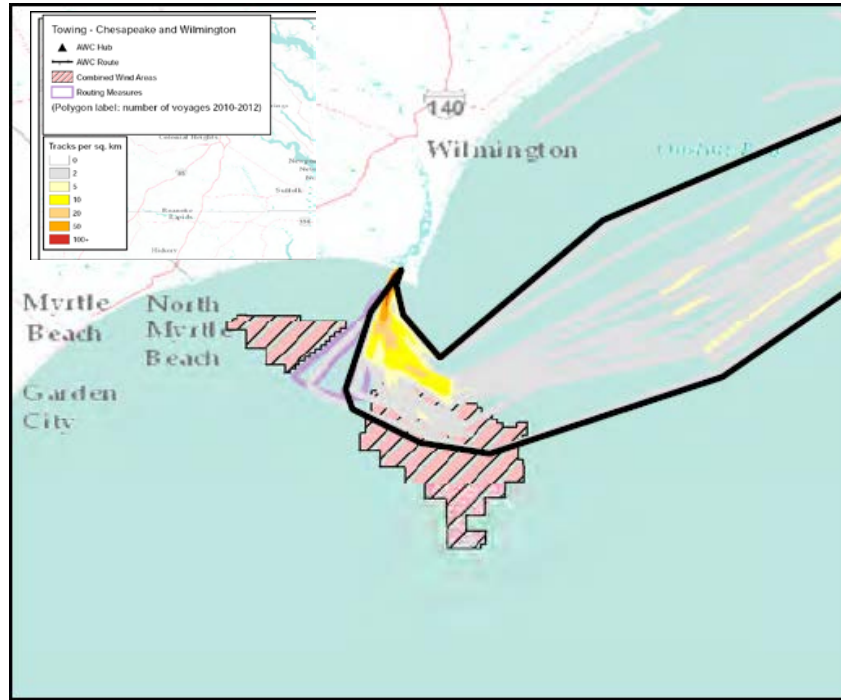


Figure 14: Towing Vessel Transits From Chesapeake to Wilmington

3. Wilmington-West Call Area. Call Area Wilmington-West offshore North Carolina contains approximately six whole OCS blocks and nine partial blocks. The boundary begins seven miles from the shore and extends roughly 11 nm seaward. It extends from east to west approximately 15 nm. The entire area is approximately 103 nm².

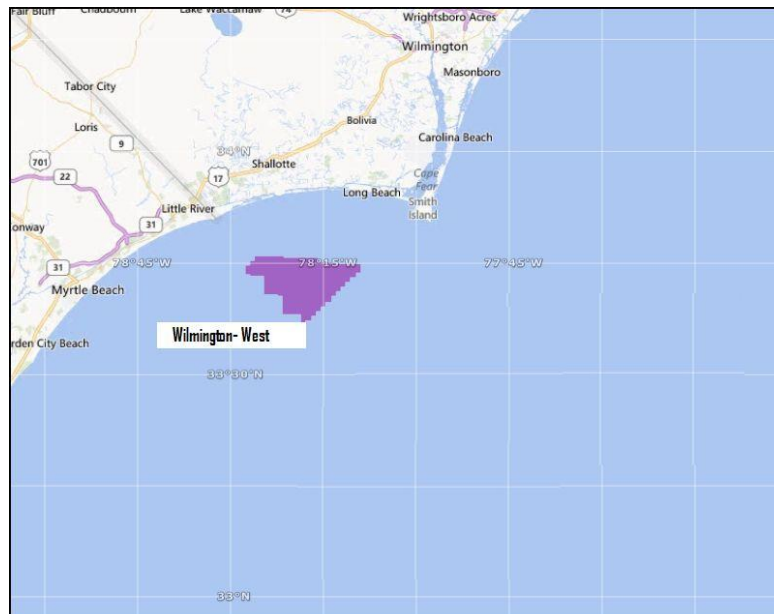


Figure 15: Call Area Wilmington West

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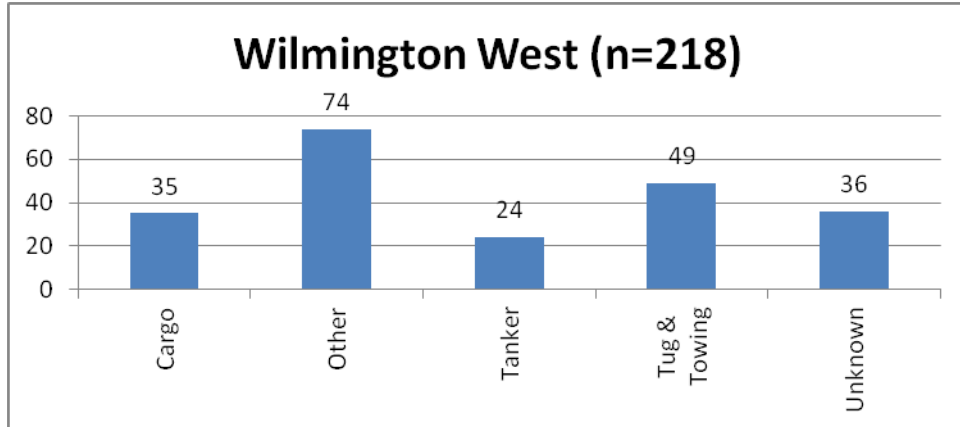


Figure 16: Vessel Transits through Call Area Wilmington West by Vessel Type

An analysis of the number and types of vessel transits through the Wilmington-West Call Area was conducted using one year of AIS data from 2009. The analysis found that there were 218 unique transits by 87 individual vessels. The Other and Unknown categories of vessels accounted for 50% of the total, followed by Tugs and Towing at 22%, Cargo at 16% and Tankers at 11%.

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E. Development of Options for the Kitty Hawk Area Identification Process

Recognizing that vessel traffic had not been addressed in the Kitty Hawk Call Area, BOEM established a Maritime Working Group to explore potential areas that could be developed within the Call Area that would not result in unacceptable impacts to navigation. All options were either in or adjacent to established routes and would impact navigational safety. This effort had trouble gaining traction and was ultimately unsuccessful in identifying suitable areas.

The BOEM and USCG then collaboratively developed a series of five options, all subsets of the original Call area. The options were derived using references, such as distance from shore (12 nm and 15 nm), and also the edges of established routes. There are two clear deep draft routes; one going to the West of the Navy structures and one to the East. These routes will be referred to as Deep Draft West (DDW) and Deep Draft East (DDE) to simplify the descriptions of the options.

By providing concrete alternatives for the maritime industry to contemplate, the hope was that it would stimulate comments that would assist in defining a suitable area. The five options were disseminated with a questionnaire to the maritime industry by the USCG Fifth District Commander. An example of the questionnaire and the summary of the responses are included as Enclosure (1). The majority of responses objected to the development of any areas initially determined to be “Red” by the Coast Guard.

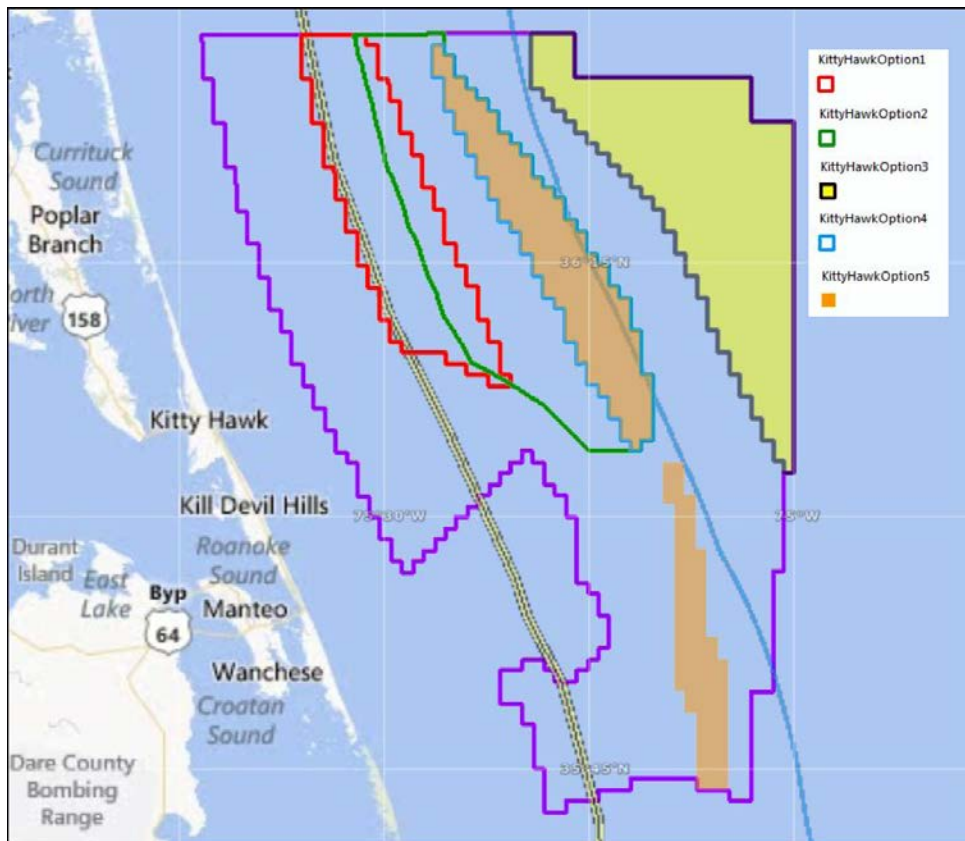


Figure 17: The Five Kitty Hawk Options

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F. Kitty Hawk Analysis of Alternatives

1. Kitty Hawk Option 1 - Near Shore Option.

The Western edge of Option 1, shown in Blue, begins at the Northern extent of the Call Area and parallels the shoreline following the 12 nm line for approximately 20 nm. The Eastern edge of the area goes out to the Western edge of DDW, approximately 17 nm offshore. The entire area encompasses approximately 100 square nm.

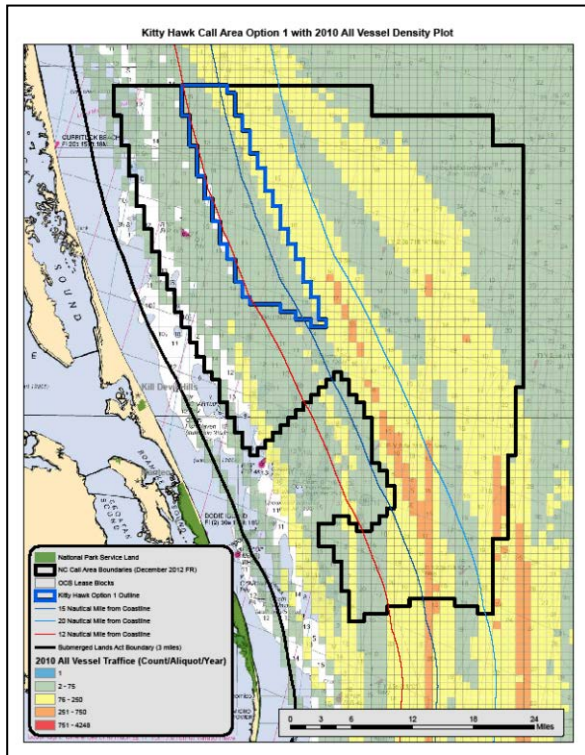


Figure 28: Kitty Hawk Option 1 with 2010 All Vessel Density Plot

An analysis of 2010 AIS data showed there were a total of 850 vessel transits through the Option 1 area. A breakdown of vessel transits by vessel type is shown to the right.

Option 1 attempted to maintain both of the existing deep draft routes, but would eliminate a near shore tug/tow route that transits at a distance of 12 nm to 15 nm from shore. This option would compress near shore traffic into a much smaller area with obstructions to both sides limiting the available sea room in the event of an emergency or during meeting, crossing and overtaking situations with other vessels. In addition, it would force some traffic further offshore into deep draft routes and subject them to higher sea states than they would have experienced otherwise. Once a vessel chose to go inshore or offshore, they would be committed to that route for the length of the area (20 + nm). The American Waterways Operators (AWO) stipulated the need for a coastwise shipping route that extends out at least 15 nm from shore.³

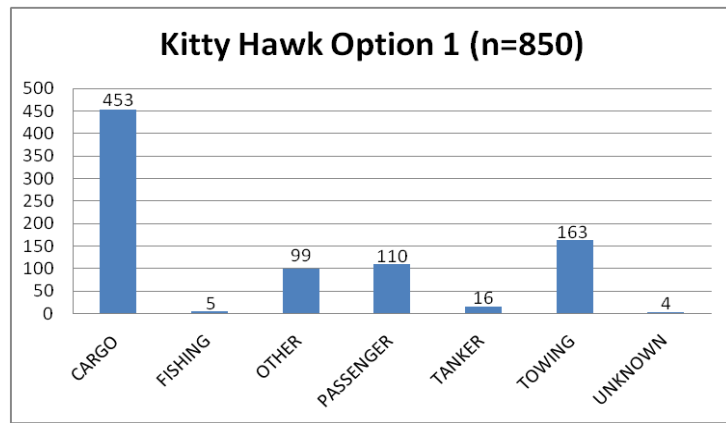


Figure 39: Breakdown of Vessel Transits Through Kitty Hawk Option 1 by Vessel Type

³ AWO letter to BOEM dated 31 MAY 2013 and AWO letter to USCG dated 31 OCT 2013.

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2. Kitty Hawk Option 2 - Mid Shore Option.

The Western edge of Option 2, shown in Green, begins at the Northern extent of the Call Area and parallels the shoreline following the 15 nm line for approximately 25 nm. The area extends Eastward to the Eastern edge of DDW and is approximately 8 nm wide on average. The entire area encompasses approximately 200 square nm.

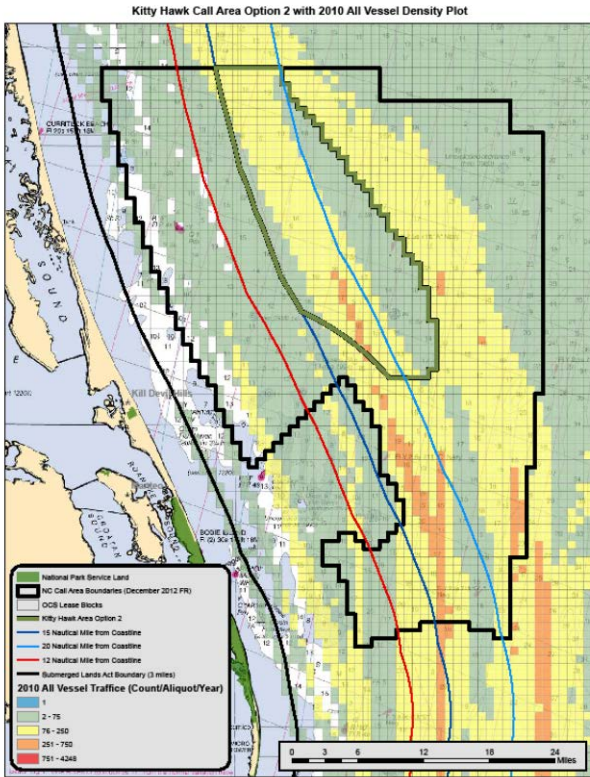


Figure 40: Kitty Hawk Option 2 with 2010 All Vessel Density Plot

With the Western edge along the 15 nm line, it accounts for the alongshore routes used by towing vessels, but eliminates the Western deep draft route. This option would displace a significant amount of deep draft traffic to the East. By providing an additional three miles to the width of the inshore route, sea room is much less of an issue in the event of an emergency or during meeting, crossing, and overtaking situations with other vessels. Option 2 also reinforces the natural segregation of smaller, slower vessels and large deep draft vessels moving at higher speeds.

An analysis of 2010 AIS data showed there were a total of 1931 vessel transits through the Option 2 area. A breakdown of vessel transits by vessel type is shown to the right.

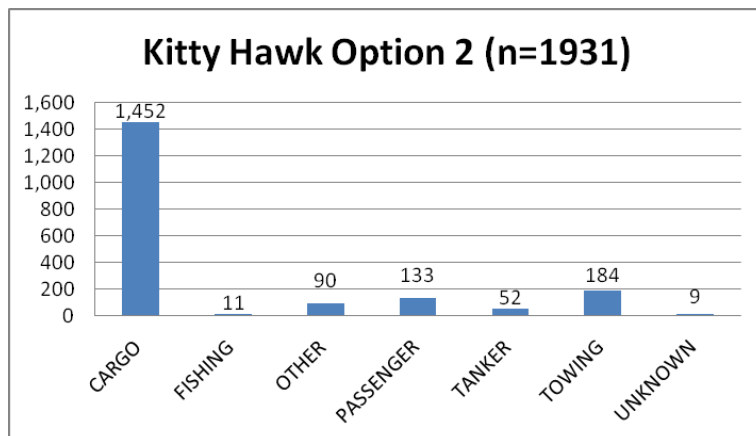


Figure 25: Breakdown of Vessel Transits Through Kitty Hawk Option 2 By Vessel Type

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3. Kitty Hawk Option 3 - Far Shore Option.

Option 3, shown in Light Blue, is the Northeast corner of the Call Area with the Western edge along the Eastern edge of DDE. The entire area encompasses approximately 170 square nm.

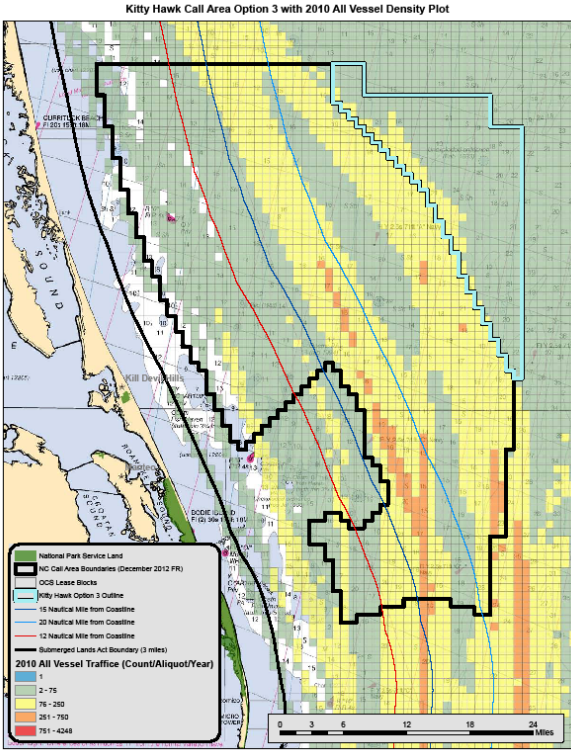


Figure 22: Kitty Hawk Option 3 with 2010 All Vessel Density Plot

Option 3 attempted to avoid all of the high density routes through the Call Area, although a significant number of vessels still transit through the area⁴ in a more spread out manner. Although they were opposed to any development within the Kitty Hawk area, a few of the industry comments stated that Option 3 was the least objectionable.

An analysis of 2010 AIS data showed there were a total of 1671 vessel transits through the Option 3 area. A breakdown of vessel transits by vessel type is shown to the right.

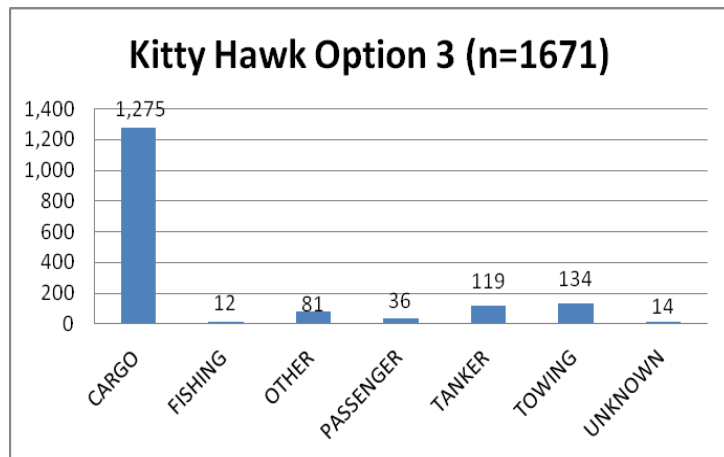


Figure 23: Breakdown of Vessel Transits Through Kitty Hawk Option 3 By Vessel Type

⁴ Option 3 had 1,671 transits in 2010, which is 23% of the total transits through the Kitty Hawk Call Area.

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4. Kitty Hawk Option 4 - Island Option.

The Western edge of Option 4, shown in Purple, begins at the Northern extent of the Call Area and parallels the shoreline following the 20 nm line for approximately 27 nm. The area extends Eastward to the Western edge of DDE and is approximately three nm wide on average. The entire area encompasses approximately 75 square nm.

Option 4 included an area of relatively lower density as a result of shipping avoiding a Navy structure located in the Northern half of the Call Area. This option would likely result in two-way deep draft traffic on both sides of this area. Due to the presence of a wind farm, vessels would be expected to provide additional separation distance when transiting along the wind farm, which would force the DDW route further West and closer to the tug/barge and shallow draft vessels routes. There would also be a convergence of routes at both ends of the wind farm, which could increase risk of collision due to potential obstructed views and radar interference as vessels clear the wind farm; however, AIS would mitigate the risk to some extent when all vessels are so equipped.

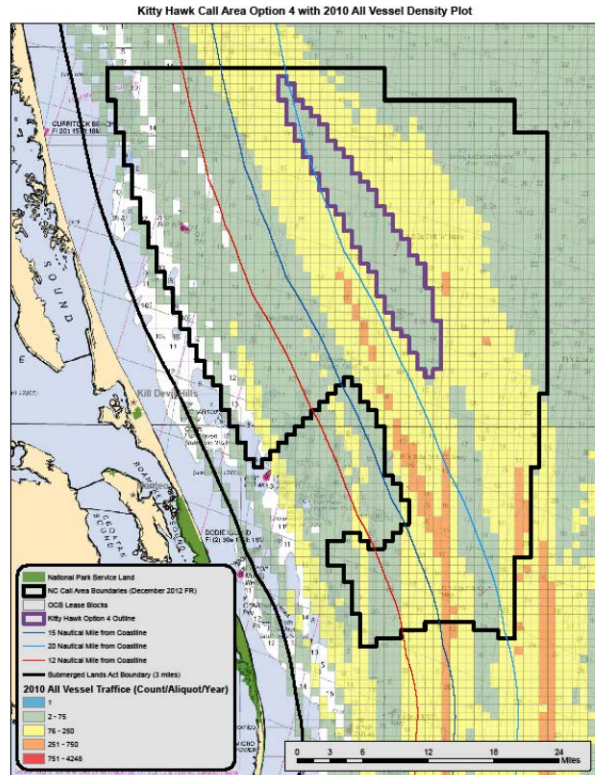


Figure 24: Kitty Hawk Option 4 with 2010 All Vessel Density Plot

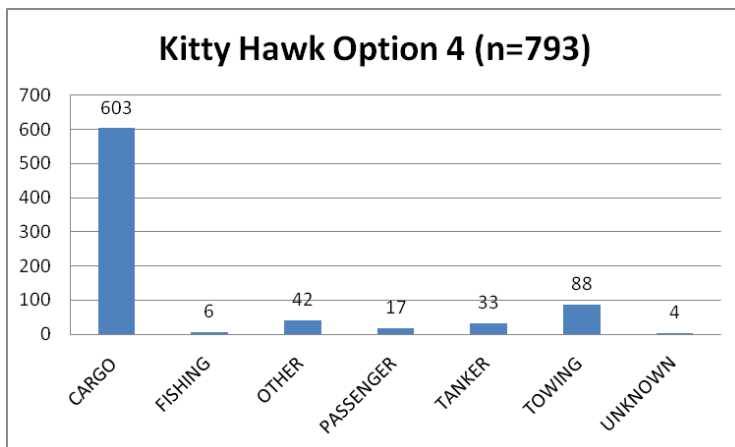


Figure 25: Breakdown of Vessel Transits Through Kitty Hawk Option 4 By Vessel Type

An analysis of 2010 AIS data showed there were a total of 793 vessel transits through the Option 4 area. A breakdown of vessel transits by vessel type is shown to the left.

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5. Kitty Hawk Option 5 - Extended Island Option.

Option 5 is an extension of Option 4 by adding a second area of lower density traffic where vessels are avoiding a Navy structure in the southern portion of the Call Area. The added area is roughly 20 nm long and 2 nm wide on average. The combined areas encompass approximately 115 square nm.

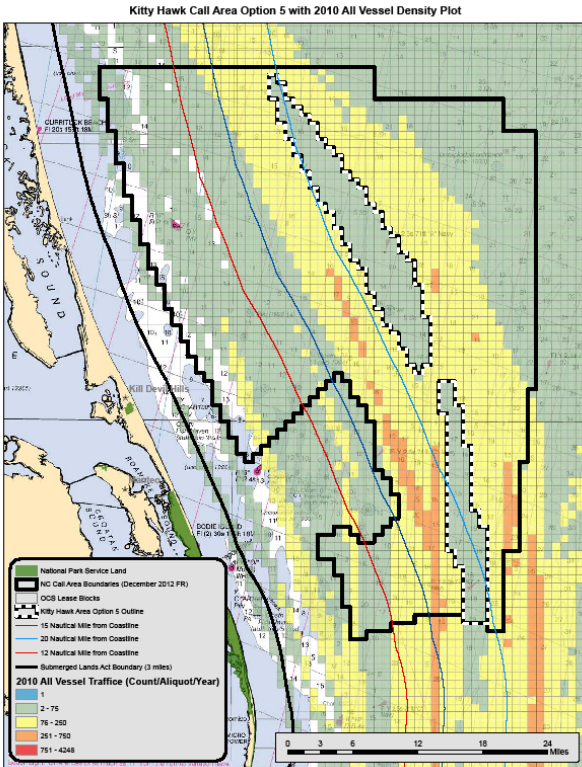


Figure 26: Kitty Hawk Option 5 with 2010 All Vessel Density Plot

Option 5 would result in similar traffic patterns as Option 4, with two way traffic transiting along both sides of the areas. There is currently traffic that transits between the two areas that would be expected to continue and further complicate vessel interactions due to obstructed views and radar interference. With the length of the combined areas being almost 50 nm the “exposure” to the risk posed by the fixed obstructions (wind farm) is significantly increased.

An analysis of 2010 AIS data showed there were a total of 1,484 vessel transits through the Option 5 area. A breakdown of vessel transits by vessel type is shown to the right.

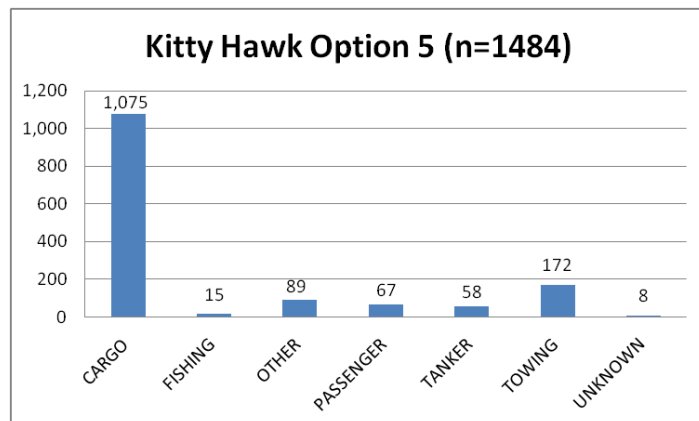
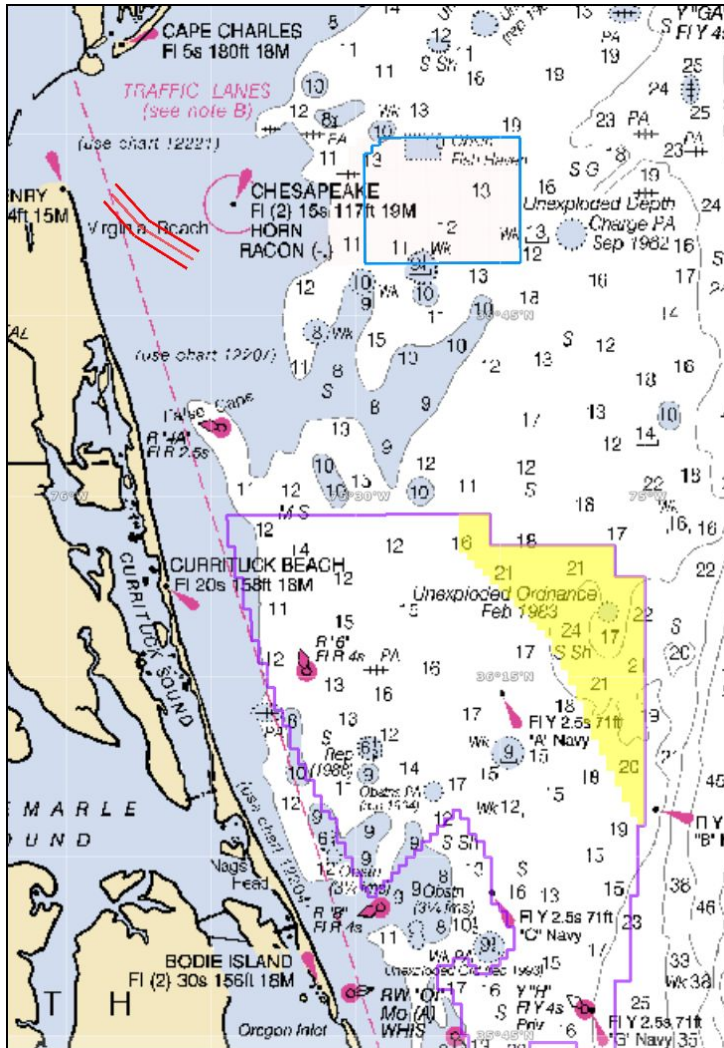


Figure 27: Breakdown of Vessel Transits Through Kitty Hawk Option 5 By Vessel Type

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6. Consideration of Future Trends in Shipping.

In a 2012 U.S. Army Corps of Engineers (USACE) report on the Panama Canal, the container vessel fleet on the East Coast is projected to double both in the number and size of vessels.⁵ As the numbers of vessels increase, the density along these routes will also increase. Larger vessels will require additional sea room to maneuver. Routes that may be suitable in size for shipping today may not be suitable in the future. Routes bounded on both sides with obstructions will be even less desirable from a navigational safety standpoint.



Larger vessels with increased draft will require additional under keel clearance particularly during heavy sea states. Larger vessels will likely shift routes further offshore with deeper water and fewer obstructions. As routes shift to deeper water, the area in Option 3 may become the preferred route for the approaches to Chesapeake Bay despite relatively lower densities of existing vessel traffic.⁶

Figure 68: Approaches to Chesapeake Bay Entrance Showing Kitty Hawk Option 3 in Yellow With a Nautical Chart Background

⁵ Derived from Table 3, pg. 19 of “U.S. Port and Inland Waterways Modernization Preparing for *Post-Panamax* Vessels,” USACE, Institute for Water Resources, 20 June 2012.

⁶ Comments to this effect were submitted by both Wayne Huebschman and Bill Broadley.

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G. Comparison of Kitty Hawk Options

Option 1 provides an attractive area for wind development, but the impacts to vessels requiring routes closer to shore would be unacceptable. The compression of the route would not provide the necessary flexibility for tug/barge units to adjust their routes based on varying sea states and weather conditions. Vessels that may prefer a near shore route, but cannot navigate safely in the remaining area, will be forced further offshore and into the routes used by deep draft vessels.

Option 2 provides an additional 3 nm of width to the near shore route; it has the benefit of greater segregation between inshore and offshore routes; and, this option simplifies the interactions of vessel meeting, crossing, and overtaking situations by reducing the number of routes. Option 2 also provides the largest area for offshore wind that should support multiple phases of development well into the future.

Option 3 was the “least objectionable” for many of the maritime interests that commented on the five options, based primarily on the lower traffic densities. As vessels get larger, the area contained in Option 3 will be more important as a route for deeper draft vessels. Option 3 may force these deeper draft vessels and other vessels wishing to keep all obstructions inshore of their route to transit much further offshore than current routes. Although developers responding to the Call for Information and Nominations expressed an interest in this area, the viability compared to other Options is likely far less due to depth of water and distance from shore.

Options 4 and 5 capitalize on areas of lower density, created as a result of vessels avoiding the Navy structures located between the Eastern and Western deep draft routes. Both of these options will likely push routes further East and West to provide additional separation from the wind farms, thus compressing the Western deep draft route. Deep draft vessels who choose to continue using the Western route will have fixed structures to one side, and slower moving tug/barge units and shoals on the other. Vessel interactions at the ends of the wind farms and also between the two farms would be more complicated due to obstructed views and radar interference as the routes converge or cross. The length of the combined areas almost doubles the distance that vessel routes are exposed to fixed obstruction hazards over other options. A summary of the pros and cons of the five options are listed in Table 1.

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	Pros	Cons
Option 1	<ul style="list-style-type: none"> • Preserves deep draft routes • Viable for wind development due to: <ul style="list-style-type: none"> ➤ Proximity to shore, ➤ Shallower water ➤ Sufficient size 	<ul style="list-style-type: none"> • Large impacts to tug/barge and smaller vessels: <ul style="list-style-type: none"> ➤ Severely constricts the inshore route ➤ Displaces some vessels further offshore with higher sea states ➤ Results in mixing of vessel traffic
Option 2	<ul style="list-style-type: none"> • Allows room for existing inshore routes • Further segregates inshore and offshore routes • Accounts for future trends in shipping by preserving the deepest water approaches to Chesapeake Bay • Largest area for wind development within parameters for existing technology 	<ul style="list-style-type: none"> • Completely eliminates the Western deep draft route with largest displacement of traffic further offshore (primarily an economic impact)
Option 3	<ul style="list-style-type: none"> • Lower traffic densities • Preserves existing routes 	<ul style="list-style-type: none"> • Eliminates deepest water approach to Chesapeake Bay (important as vessels get larger) • Largest displacement of routes offshore if keeping seaward of all obstructions is desired • Less attractive for wind development: <ul style="list-style-type: none"> ➤ Water depths exceed current technology for wind development ➤ Furthest distance to shore
Option 4	<ul style="list-style-type: none"> • Utilizes areas of lower density • Preserves (but impacts) existing routes 	<ul style="list-style-type: none"> • Results in more complicated vessel interactions: <ul style="list-style-type: none"> ➤ Mixing of traffic ➤ Western deep draft route further restricted with obstructions on both sides • Less total area than other areas • Less room for growth of wind development (unless you move towards shore, which would be the same as Option 2)
Option 5	<ul style="list-style-type: none"> • Adds additional area for wind development over Option 4 	<ul style="list-style-type: none"> • The same vessel interaction concerns of Option 4, further complicated by having two areas with vessels transiting in between • Greater distance of exposure to fixed obstructions along the vessel routes • Non-continuous area for development

Table 1: Comparison of Kitty Hawk Options

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H. Recommendations

There are many competing interests when it comes to the siting of renewable energy projects. The primary focus of this analysis was to evaluate impacts to navigation. Impacts to navigation fall into two categories: 1) navigational safety impacts; and, 2) economic impacts. There are numerous factors that can affect navigational safety including but not limited to density of traffic, sea room, mixing of vessel types, introduction of fixed hazards, impacts to visibility, impacts to navigational equipment, sea states and complexity of ship interactions. Economic impacts are primarily due to an increase in time and/or distance. Although economic impacts are important to consider, the priority of this analysis was to minimize navigational safety impacts while identifying suitable areas for wind energy development.

Of the options evaluated, Options 2 and 3 appear to have the lowest impacts to navigational safety based on current navigational patterns. Either option taken independently may be suitable for additional study. Option 3 will result in the least displacement of vessel traffic from existing routes, but may be the least suitable for wind energy development due to increased depths and distance from shore. Option 2 has the advantages of simplifying traffic patterns while providing the most suitable routes for larger vessels in the future and also provides the largest area for development of wind energy within current parameters.

Since BOEM intends to move forward with area identification without seeking additional public comment,⁷ Option 2 is recommended as the best balance of navigational safety with wind energy development. It is also recommended Option 2 be modified to shift the area 1 nm further to the east to provide for additional sea room for the inshore route, with minimal additional displacement of vessel routes.

⁷ Email correspondence between Will Waskes (BOEM) and George Detweiler (CG-NAV-3) dated 07JAN14.

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Enclosure (1): Maritime Industry Stakeholder Questionnaire and Consolidated North Carolina Stakeholder Responses to USCG Fifth District Commander Questionnaire

U.S. Department of
Homeland Security
United States
Coast Guard



Commander
United States Coast Guard
Fifth Coast Guard District

431 Crawford Street, Rm. 100
Portsmouth, VA 23704-5004
Staff Symbol: dpw
Phone: (757) 398-6230
Fax: (757) 398-6349

25 September 2013

Allied Transportation Co.
PO Box 717
Norfolk, Va 23501

NORTH CAROLINA OFFSHORE WIND ENERGY AREA QUESTIONNAIRE

The Coast Guard is a cooperating agency with Bureau of Ocean Energy Management (BOEM) in the offshore renewable energy initiatives process under the provisions of National Environmental Policy Act, and is responsible for ensuring the safety of navigation under the Ports and Waterways Safety Act of 1972.

The Coast Guard, through the BOEM North Carolina Renewable Energy State Task Force, advises BOEM of navigational concerns related to its wind energy call areas. In the Coast Guard's initial evaluation of BOEM's proposed wind energy areas offshore North Carolina, I expressed concern with the potential impacts to navigation safety in the proposed areas to BOEM based upon the existing vessel traffic data available (Federal Register, Vol. 77, No. 240). At that time, no other alternatives were readily apparent. These wind energy call areas may be viewed online at http://www.boem.gov/uploadedFiles/BOEM/Renewable_Energy_Program/State_Activities/NC_Call_Area_Names.pdf.

Through additional analysis of vessel traffic data and discussion with the marine industry, and in the interest of developing wind energy areas that minimize navigation risk, BOEM and the Coast Guard have worked collaboratively to identify six additional alternatives for consideration. These alternatives may be viewed online at: <http://www.uscg.mil/lantarea/ACPARS/NC-options.asp>.

In order to ensure all waterway users' navigational concerns are considered in the evaluation of these alternatives, I ask that you review each option and provide responses to the enclosed questions. Responses may be sent via email to ACPARS@uscg.mil, or mailed to Commander (dpw), Fifth Coast Guard District, 439 Crawford St, Rm. 100, Portsmouth, VA 23704-5004, Attn: Mr. John Walters. In your response, please clearly denote the specific option and question number. Responses received by October 31 will be shared with BOEM and incorporated into the Coast Guard's Atlantic Coast Port Access Route Study.

Sincerely,

A handwritten signature in blue ink, appearing to read "S. H. Ratti".

STEVEN H. RATTI
Rear Admiral, U.S. Coast Guard
Commander, Fifth Coast Guard District

Enclosure: North Carolina Offshore Wind Energy Area Questionnaire

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1. World Shipping Council, Douglas Schneider, Vice President

“The World Shipping Council (WSC) is a non-profit trade association that represents over twenty-nine liner shipping companies that carry approximately 90 percent of U.S. international containerized trade. Our member lines operate ships that regularly transit along the coast of North Carolina and pass through the proposed wind energy areas carrying U.S. import and export cargo. We appreciate your invitation to comment on the North Carolina Offshore Wind Energy Questionnaire. In addition to our comments below on the questionnaire’s options, we also wish to draw your attention to our January 28, 2013 comments (see attachment) to the Bureau of Ocean Energy Management (BOEM) on the proposed wind energy lease areas off North Carolina.

Comments on Kitty Hawk Options

The questionnaire invites comments on whether the placement of fixed wind turbines in five sub-sections of the Kitty Hawk wind energy area would pose any navigational safety or economic impacts. We note that the Coast Guard conducted a “Red-Yellow-Green” (R-Y-G) navigational safety risk assessment of the Kitty Hawk Area that considered, among other things, the number and types of vessels passing through a given block during a given period of time. That assessment then applied risk management criteria to classify blocks within proposed wind energy areas based on the safety risks they posed. The Coast Guard’s own R-Y-G analysis of the Kitty Hawk area (shown below) concluded that virtually all of this area should be deemed “red” and excluded from consideration because wind farm development in these areas would pose “very high” to “high” risk. We concur with the Coast Guard’s R-Y-G analysis of the Kitty Hawk Area and do not find any of the five options proposed for the Kitty Hawk area to be compatible with safe and efficient commercial navigation. Each of the five options would introduce fixed wind farms into areas of already moderate to high vessel traffic, which would force traffic in a given area to move into other traffic zones thus increasing the navigational safety risks there. We therefore continue to urge BOEM and the Coast Guard to exclude from further consideration any full or partial blocks that the Coast Guard deemed “red” in that analysis. We note that the Coast Guard’s R-Y-G analysis classified some sections of the Kitty Hawk Area as yellow or green. We recommend that BOEM and the Coast Guard consider only these yellow or green areas for future wind farm development.

Comments on Wilmington East Option

The questionnaire invites comments on whether the placement of wind farms in the revised Wilmington East area would pose navigational safety or economic impacts. We note that a significant portion of the revised Wilmington East area (comprising approximately the bottom half of the revised area) was deemed “red” in the Coast Guard’s R-Y-G assessment of 3 Wilmington East. As already mentioned, the Coast Guard’s classification of an area as “red” means that wind farm development in that area could posed high to very high navigational safety risk. We therefore recommend that BOEM and the Coast Guard consider only the yellow and green areas within the revised Wilmington East area for future wind farm development. Thank you for your consideration of these comments.”

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2. American Waterways Operators, John Harms, Manager, Atlantic Region

“The American Waterways Operators is the national trade association for the U.S. tugboat, towboat, and barge industry. Our industry’s 4,000 tugboats and towboats and more than 27,000 barges safely and efficiently move more than 800 million tons of cargo each year in the domestic commerce of the United States. These vessels transport more than 60 percent of U.S. export grain, energy sources such as coal and petroleum, and other bulk commodities that are the building blocks of the U.S. economy. We appreciate the opportunity to respond to your September 25 letter presenting proposed alternatives for North Carolina Offshore Wind Energy Areas (WEAs). AWO members are proud to be part of an industry that is the safest, most fuel efficient, and has the smallest carbon footprint of any transportation mode. AWO members also have a deep commitment to safety, having adopted in 1994 the Responsible Carrier Program, a code of safe marine practices and environmental stewardship that is a condition of AWO membership. Our commitment to environmental stewardship includes support of developing alternative energy resources. However, it is critical that such projects not produce navigational hazards that put vessels and their crews at risk, or obstruct the movement of goods on which the nation’s economy depends.

With this same philosophy, we have evaluated and considered the North Carolina Offshore WEAs, and we do not find any of the five options proposed for a Kitty Hawk Call Area to be compatible with safe and efficient commercial navigation. To different extents, each of the five options would introduce new navigational hazards and impede waterborne commerce. This position is supported by Coast Guard’s own “R-Y-G” determination for the Kitty Hawk WEA (copy enclosed), which found that constructing alternative energy projects on any of the five proposed options would pose a “high” risk to mariners. Each option for the Kitty Hawk WEA negatively impacts towing vessel safety by eliminating the safest near-shore or off-shore vessel route, or by disrupting established deep draft vessel routes that will displace towing vessels from their safest routes. AWO is particularly concerned about the impacts these options would have on established routes for traditional tugboats and barges operating close to shore. Traditional tugboats pulling barges on a hawser must operate close to shore where seas are calmer and it is easier to reach a port of refuge when severe weather develops unexpectedly. AWO’s letter to BOEM dated May 31, 2013 (copy enclosed) discusses the need for a coastwise shipping route in this area that extends from the shore out to at least fifteen miles. This corridor width accounts for the presence of shoals and other navigations hazards, while allowing safe passing distance for tugboats towing barges headed in opposite directions. Several of the proposed options will also threaten the safety of mariners operating newer articulated tug and barge units (ATBs) that operate farther from shore. While these ATB units are capable of operating farther from shore in rougher waters, their relatively slow speed means that they generally avoid deep draft shipping lanes for safety reasons. In addition, many of these vessels approaching from the south are bound for ports in New York or New England, so their natural route is eastward of the traffic lanes into and out of the Port of Norfolk. Altering deep draft vessel routes in this area will cause vessel congestion that displaces towing vessels from their safest route and pushes them either farther offshore or into deep draft vessel routes. The options presented for the Kitty Hawk WEA would force ATBs to significantly alter course, enter into deep draft traffic lanes, or proceed so far offshore that sea conditions are significantly rougher due to the continental shelf and the Gulf Stream. AWO appreciates the Coast Guard’s efforts to incorporate stakeholder input into the citing of offshore WEAs. Unfortunately, AWO is unable to endorse any of the proposed options

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for the Kitty Hawk WEA due to their impacts on the safety of tugboat and barge operations. The region being considered for inclusion in the Kitty Hawk WEA poses unique safety concerns due to its location off the coast of Cape Hatteras and its proximity to the Port of Norfolk, a significant maritime destination for towing vessels and deep draft vessels alike. Given these unique safety concerns, AWO recommends that the Coast Guard convene a panel of maritime and navigation experts who can develop and recommend alternative options for the safe citing of the Kitty Hawk WEA. AWO believes that this kind of constructive and expert input is especially important given the absence of a completed Atlantic Coast Port Access Route Study. The towing industry appreciates the Coast Guard's efforts to safeguard the lives of mariners and preserve existing vessel routes. We believe the right next step in this effort is to convene a roundtable of industry stakeholders to propose safe alternatives for WEAs for the region. Thank you for the opportunity to comment. AWO would be pleased to answer any questions or provide further information that is needed."

3. Virginia Port Authority, Heather Wood, Vice President, Government Affairs

"Thank you for the opportunity to comment on the North Carolina Offshore Wind Energy Area (WEA) Questionnaire and the five alternatives for the Kitty Hawk WEA developed by the Coast Guard and the Bureau of Ocean Energy Management (BOEM). As stated in our letter dated January 30, 2012, we support the development of off-shore wind energy along the Atlantic Coast and the USCG's on-going evaluation of the existing shipping routes with regard to competing uses. In addition, we appreciate the BOEM's and the Coast Guard's continued efforts to include the maritime industry in the WEA evaluation process. In response to the questionnaire and the five alternatives, the Virginia Port Authority (VPA) respectfully offers the following for consideration. The Port of Virginia is presently the third largest East Coast container port handling approximate 2.1 million TEU's in 2012. Combined total tonnage through the Port of Virginia (Hampton Roads) exceeds 54 million annually, making the Port a critical asset to our nation's supply chain. Within the Commonwealth of Virginia alone, the direct impact of the Port's operations are estimated at over \$1.9 billion in revenue, \$566 million in employee compensation, and over 10,000 jobs. We believe that the development of offshore wind areas off the East Coast will provide a much needed source of alternative power and result in additional economic benefits to the Commonwealth and the Nation. However, development of the WEA area proposed for the Kitty Hawk, NC region must not come at the expense of navigational safety or the efficient transport of goods along the East Coast. After evaluating the proposed alternatives and discussing the options with port stakeholders, we do not believe any of the five options proposed for the Kitty Hawk WEA are compatible with safe and efficient commercial navigation. This opinion is supported by the Coast Guard's R-Y-G determination in the Atlantic Coast Port Access Route Study (ACPARS). Accordingly, we respectfully encourage BOEM to follow to the ACPARS determination and consider removing the Kitty Hawk area as a potential lease option. We appreciate the Coast Guard's and BOEM's efforts in this matter. We are confident the Coast Guard's research and outreach efforts will provide for a well informed decision. Should you have any questions or if we can provide further comments, please contact me at (757) 683-2152 or at hwood@portofvirginia.com. Thank you for the opportunity to comment."

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4. Virginia Maritime Association, David White, Vice President

“The Virginia Maritime Association (VMA) is the trade association representing over 400 businesses directly and indirectly engaged in the flow of waterborne commerce through the ports of Virginia. Virginia's ports are a critical link in our nation's supply chain, supporting domestic and international commerce. An economic impact study published by the College of William and Mary revealed the Port of Virginia produced or facilitated total Virginia economic activity of \$13.5 Billion in employee compensation to 345,000 Virginia employees (9% of Virginia resident employment) and in excess of \$41.1 Billion in total revenues. As the "Voice of the Port", representing these interests, we write in response to your letter dated September 25 presenting several proposed alternatives for North Carolina Offshore Wind Energy Areas (WEA). The VMA has demonstrated our support for the development of offshore wind projects and worked cooperatively with responsible government agencies to establish a Virginia Offshore WEA that will be compatible with the current and future needs of commercial navigation. With the same philosophy, we have evaluated and considered the NC Offshore WEA's and we do not find any of the five options proposed for a Kitty Hawk Call Area to be compatible with safe and efficient commercial navigation. To different extents, each of the five options would introduce new navigational hazards and impede waterborne commerce. This position is supported by Coast Guard's own "R-Y-G" determination for the Kitty Hawk WEA (copy enclosed). If a portion of the proposed Kitty Hawk Call Area must be allocated for offshore wind development, some subset of "Kitty Hawk Option 3: Far-Shore Option" consistent with Coast Guard's "R-Y-G" determination would be the least objectionable. It would pose the least risk from a safety perspective and interfere least with current and future shipping routes. We find options 1 and 2 wholly unacceptable because of their impacts to existing tug/tow and deep draft shipping routes. Options 4 and 5 are also unacceptable because they would present new hazards in the center of existing shipping routes and fail to account for the future removal of the Navy structures creating the current areas of avoidance; thereby eliminating those areas of avoidance. The VMA appreciates the efforts of the Coast Guard in this matter. We are confident the Coast Guard's research and outreach efforts will allow for a well informed decision. Please call us if there are any questions or additional information we can provide.”

5. Chamber of Shipping of America, Kathy Metcalf, Director, Maritime Affairs

“The Chamber of Shipping of America (CSA) appreciates the opportunity to comment on the North Carolina Offshore Wind Energy Area Questionnaire and in particular the 5 options under consideration for the Kitty Hawk call area. CSA represents 35 U.S. based companies that own, operate or charter oceangoing tankers, container ships, tug/barge units and other merchant vessels engaged in both the domestic and international trades. The Chamber also represents other entities that maintain a commercial interest in the operation of such oceangoing vessels. CSA members operate vessels on voyages to/from US ports including vessels running coastwise and to/from ports on the Atlantic Coast of the United States and will be impacted by decisions taken with respect to siting of offshore wind energy areas. CSA has been engaged from the outset with discussions relating to the National Ocean Policy and issues surrounding marine spatial planning. Further, we appreciate the fact that shipping is but one of the many users of our marine resources and discussions among these many users and the US government agencies with jurisdiction over marine resources are critical to minimize, if not eliminate potential spatial

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conflicts. We support the development of offshore wind projects as part of our national energy policy but only within the context of assuring that the current levels of navigational safety are maintained.

With these fundamental concepts in mind, we have evaluated and generally agree with the R-Y-G analyses approach as utilized in the first phase recommendations in the ACPARS interim report. In addition we have reviewed the North Carolina Offshore Wind Energy Area Questionnaire developed by your office. We offer the following points and recommendations which we respectfully request you consider as this process moves forward. These points are based on graphical depictions for Options 1 through 5 in the questionnaire as compared to a slide in the presentation made at the 2 August 2012 BOEM North Carolina Renewable Energy Task Force Meeting (Slide 14 entitled “R-Y-G Determination for North Carolina Area 5”) which reproduces the R-Y-G analysis found in the ACPARS Interim Report at Appendix VII, Figure 27.

- CSA cannot support any of the five options proposed for the Kitty Hawk Call area as none are compatible with the fundamental need for safe and efficient marine navigation as evidenced by the fact that each of the 5 proposed options includes areas assessed as “red” in the ACPARS Interim Report.
- In our view, each of the 5 options proposed would introduce new navigational safety issues based on traffic density patterns in the subject area.
- CSA could support an option that incorporates the green and yellow areas as contained in the ACPARS Interim Report at Appendix VII, Figure 27 and would recommend that this “option 6” be included in future discussions.
- Of the five options proposed, Option 3 (Far Shore Option) would be the least objectionable as it would result in the least dislocation of vessels from current routes though the area; however, as noted above, the red areas should be removed from this option to align with the recommendations in the ACPARS Interim Report.
- Options 1 and 2 are unacceptable in that they represent the most significant and severe impacts to current vessel routes in the area due to the dislocation of tug/barge routes (Option 1) and deep sea shipping southbound routes (Option 2),
- Options 4 and 5 are equally unacceptable because of the impacts to deep sea shipping routes in that they could introduce new hazards in the center of existing routes not unlike a situation where obstructions were allowed to be placed in the separation zones of existing traffic separation schemes.

CSA appreciates the opportunity to provide comments to the USCG on these very significant issues and supports the continuation of the informed data based approach the USCG is using to resolve these issues in a manner that fully accounts for the need for safe navigation in this and other areas under consideration for offshore wind energy development. Please contact us if you have any questions or require any additional information on the points made above.”

6. Maryland Port Administration, Shawn Kiernan

“The Maryland Port Administration (MPA) has reviewed the North Carolina Wind Energy Area (WEA) Kitty Hawk Call Area Options referenced in a letter dated September 25, 2013. We respectfully provide the following comments. The MPA does not directly influence decisions made by shipping lines as to routing and operations, however siting of structures which may incur additional transit time for ships or result in unsafe navigation conditions are of concern to

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MPA. The MPA continues to encourage the safe and adequate separation between existing shipping routes and future installed commercial wind turbines. In review of each of the proposed Kitty Hawk WEA area options (near-shore, mid-shore, far-shore, island and extended island), we have identified the continued potential for impacts to existing inbound and outbound navigation routes of commercial shipping from the Chesapeake Bay. While the MPA recognizes that the questionnaire is specific to the review of the Kitty Hawk options, we nevertheless recommend that the total, cumulative effect of all offshore turbine installation on existing commercial navigation, in and around the other lease areas, continue to be considered as part of any future assessments. Thank you for considering our comments. The MPA appreciate our continued coordination with the US Coast Guard to safely site offshore wind energy operations along the East Coast.”

7. Express Marine Inc., Wayne Huebschman

“My name is Wayne Huebschman. I am the Port Captain for Express Marine Inc. I have held a License as a Merchant Marine Officer (tugboat operator & 500T Master) since 1978. The majority of my seetime has been coastal towing and pushing in the Northeast. I have been following the wind energy proposals from the beginning. The thing that troubled me the most was the way things were being handled before the ACPARS slowed things down a bit. Before then many states were making plans without looking at the navigation/commerce issue with the respect it deserves. The proposal from Maryland was a prime example of a complete disaster, due to placement issues. Another issue is the lack of understanding as to how commerce moves up and down the coast and why vessels do what they do. As I said, the ACPARS has slowed the process down a bit and is asking questions concerning these very issues. Now I am seeing a little more unity and groups are forming to look at the East Coast of the U.S. as regions rather than individual states, MARCO etc. The potential to reroute commerce is very real and very troubling for quite a few different reasons. For example just look what will have to change by rerouting a vessel 12 miles out of its regular route. Let’s say it’s a smaller tugboat that is twin screw towing a barge with a length overall of 1800 + feet long, and burns a total of 190 gallons an hour and is moving along at 10 knots. If you consider transit both ways we are talking about 24nm added to the trip. To cover that it will take the tug 2.4 more hours to make the trip. That means he will burn 456 gallons additional fuel for the trip and will emit exhaust gases for 2 hours and 24 minutes longer. Keep in mind this is only one transit and a unit of this configuration could make many trips in a year’s time. This is only one vessel and one that is in the minimal part of the problem. If you start looking at large container ships that make regular runs, all the numbers will be exponentially larger and much more of a problem. Now we can add fishing vessels, military vessels etc. Tugs and tows are getting bigger all the time with ATB’S (articulated tug/barge units) that act as one unit and are much less weather sensitive, being able to move in more direct routes for fuel and emissions savings.

Also a problem for vessels at sea is the biggest unknown factor, weather. Smaller vessels are much more susceptible to it than larger ones. With easterly weather it is better to stay farther to the east than normal to avoid shallow water and bottom configuration for a smoother ride. In westerly weather, it is better to stay closer to the west to lessen the fetch of wind. All of these considerations depend on where you are on the coast and the configuration of the coastline. The best trip offers many options for making it as good as possible with all the right choices and planning. Traditionally we have not had to worry about much in the way of stationary

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obstructions, however now it will become another factor as to how vessels move along their routes, and ultimately remove some very important options for trip changes that can only be done “on the fly” due to changing conditions. We also need to realize that whatever routes we are talking about there has to be enough room for it to be a “two way street.”

It looks as though the wind farms are being considered in the areas where vessel traffic is at a minimum and that’s good, however we must realize that vessels will not be moving right along the edges of these areas for many different reasons. Most Masters require a CPA (closest point of approach) of at least 2 miles and in times of limited visibility, and in proximity of other vessels, that will increase considerably. So even though we consider these areas to be acceptable to put wind generators, in reality an area considered to be right on the edge of navigation may not be so after all. This is evident by the size of the area of separation caused by the navy offshore structures, a relatively small obstruction compared to an area full of wind turbines. The larger the area of obstructions, the more area is needed to avoid it. Short sea shipping is becoming ever more important as time goes forward. The major roads today are operating at the maximum right now and will not stand much more commerce before they will be jammed every day. I can only see marine commerce increasing in the future with the new larger Panama Canal and Marad’s highway program increasing in scope. Having said that, I am not by any means opposed to wind energy and realize it will be in our future, but we must look at this closely when considering where to put our windfarms.

Looking over the 5 options for the Kitty Hawk area here are my thoughts:

- Kitty Hawk option 1 – Ok, but I would like to see more room for the inshore route.
- Kitty Hawk option 2 – My first choice - it still leaves room inshore, gives the most area for wind turbines, incorporates the Navy Platforms and isn’t too far offshore. My thinking is that as time goes on, larger units will be coming online and would use the offshore area proposed in option 3 to leave all shallow water and obstructions to the West. By increasing the amount of deep draft vessels to the East of everything I don’t think that will affect navigational safety any more or less than the other options, once the paradigm shift is established.
- Kitty Hawk option 3 – I think this option, although clear of present traffic, would be right in the area that modern commerce would most likely chose to leave all the obstructions to the West anyway.
- Kitty Hawk option 4 – To me is too small and puts commerce in a position to choose to go around the outside anyway.
- Kitty Hawk option 5 – More of the same as option 4 but spread out over a much longer area. I would rather see a wind farm concentrated in one area as much as possible as opposed to spread out.

As far as answering the questions posed in the questionnaire, the first is, if the alternatives pose any navigational safety impacts. I feel the answer is the same for whatever option you look at. Anytime you put stationary objects in proximity with moving ones you have decreased the safety of both. Mariners will look at what’s in front of them and act accordingly taking into account all the relative factors at the time, and limitations of their equipment. There is no one answer to a question that pertains to so many different aspects of a real time decision. The second question refers to economic impact. Again, the answer is the same for all options. Yes, there is going to be economic and environmental impact on all of the options. The relevance of an answer to my one

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particular situation falls so short of the question that the answer may be misleading to the rest of the industry as a whole. The chance of an economic impact being so large and unknown to me is a very real possibility. The last problem we face is the fact that most of the people who can give relative answers in their particular field have jobs and can't devote the time needed to accurately answer questions and take time to try and figure out what, where and when to do so."

8. The Vane Brothers Company, Captain Bill Meekins, Port Captain

"I am responding to the Questionnaire for Offshore Wind Energy. It is in my professional opinion after spending many years transiting the areas of discussion Towing petroleum barges safely, that the best option would be #3 Far Offshore this would preserve the near shore transit for Tugs and Barges, and keep the deep draft routes intact. The other options I feel could cause navigation issues if an emergency would arise. For instance, Tug towing a barge and loses the Tow with a strong west wind. If the Barge is not recovered in time the Barge would be blown into the wind farm and would cause damage to the wind farm and the barge. As where if everything would be further Offshore as in option #3 this would not be an issue."

9. Vane Line Bunkering Inc, Capt. Mason Keeter, General Manager Port of Hampton Roads

"In response to the questionnaire regarding the North Carolina Offshore Wind Energy Area; Option# 3 in my opinion is the best of the 5 presented if one had to pick one. The option 3 area is less invasive and will allow towing vessels to use establish routes as well as some of the establish routes for deep draft vessels. Option #3 allows the towing vessels the option of running closer to shore to make use of the lee of the land and to escape the effects of the Gulf Stream when headed south or a little further off shore especially during periods of heavy weather; where the swells are a little more predictable and more spaced. Most importantly it allows more room to maneuver in the event of unforeseen problems. The coastal waters of the outer banks of North Carolina are unpredictable due to the close proximity to the Gulf Stream. The Gulf Stream is ever shifting and the weather is ever changing and so towing vessels and deep draft vessels not having to luxury of plotting the best course to protect the crews, equipment and environment in order to avoid a windmill farm is ludicrous. I have in depth reviewed all of the options that were presented and found Option #3 is the safer option for both towing and deep draft vessels."

10. Captain Rodolph Mouchotte, Fleet Navigation Center, CMA Ships, CMA-CGM Group

Kitty Hawk Option 1: Near-Shore Option

1. Does the alternative pose any navigational safety impacts? If so, please list and describe all impacts (quantify if possible). For CMA CGM no impact according ship's size and draft.
2. Does the alternative pose any economic impacts? If so, please list and describe all impacts (quantify if possible). For CMA CGM no impact, no change with actual passage planning.

Kitty Hawk Option 2: Mid-Shore Option

1. Does the alternative pose any navigational safety impacts? If so, please list and describe all impacts (quantify if possible). For CMA CGM poor impact result of East deep draft route suppression.
2. Does the alternative pose any economic impacts? If so, please list and describe all impacts (quantify if possible). For CMA CGM no impact, no change with actual passage planning.

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3. This option would displace some deep draft traffic into the deep draft vessel traffic route east of the Navy structures, thereby increasing the number of transits through this route. Would the increase in the number of transits significantly affect navigational safety? For CMA CGM impact resulting of East deep draft route suppression will be poor.

Kitty Hawk Option 3: Far-Shore Option

1. Does the alternative pose any navigational safety impacts? If so, please list and describe all impacts (quantify if possible). For CMA CGM no impact, no change with actual passage planning.
2. Does the alternative pose any economic impacts? If so, please list and describe all impacts (quantify if possible). For CMA CGM no impact, no change with actual passage planning.
3. Although fewer vessels transit this area currently, is it important to preserve this area for potential future large vessel use instead of some of the existing, more direct routes? For CMA CGM no impact, no change with actual passage planning.

Kitty Hawk Option 4: Island Option

1. Does the alternative pose any navigational safety impacts? If so, please list and describe all impacts (quantify if possible). For CMA CGM no impact, no change with actual passage planning.
2. Does the alternative pose any economic impacts? If so, please list and describe all impacts (quantify if possible). For CMA CGM no impact, no change with actual passage planning.

Kitty Hawk Option 5: Extended Island Option

1. Does the alternative pose any navigational safety impacts? If so, please list and describe all impacts (quantify if possible). For CMA CGM no impact according ship's size and draft.
2. Does the alternative pose any economic impacts? If so, please list and describe all impacts (quantify if possible). For CMA CGM no impact, no change with actual passage planning.
3. Is an opening/corridor between the Northern and Southern extents of this option area needed or preferred? If so, how much distance is needed for this opening/corridor? For CMA CGM no need.

Wilmington-East Option

1. Does the alternative pose any navigational safety impacts? If so, please list and describe all impacts (quantify if possible). For CMA CGM no impact according ship's size and draft.
2. Does the alternative pose any economic impacts? If so, please list and describe all impacts (quantify if possible). For CMA CGM no impact according ship's size and draft.

11. Self Representing, Bill Broadly

“I agree with Wayne and his excellent letter. I also like the approach of using AIS traffic density to determine areas available to wind energy development. Options 1 and 2 are both OK provided they allow for an inside 1 mile wide “Two Way Route” similar to my proposal along the NJ coast. Option 3 with the offshore area will not be good. MY concern is that as ships get bigger with the new Panama Canal class of vessels that will be approaching the Chesapeake Bay Entrance from the South, they will most likely be wanting to approach using this area which is to the East in deeper and less obstructed waters which is through this area. Not only that but this area may be too deep for wind turbine development with present technology. Option 4 may be OK if allows for enough blocks to be viable for wind farm development. Option 5 has possibilities, however, it will make a long area. It is workable but with some routing measures

APPENDIX VI

established. If there is going to be a wind turbine area using any of these proposals, I would suggest establishing appropriate routine measures in this areas. The reason for this is to channel marine traffic around the wind turbines obstructions. If possible, if I could have the Lat, Long, coordinates of the final proposal, then I could plot with some suggestions as to appropriate routing measures, etc. Also, I can write this up as a more formal letter if you desire.”

12. Stephen Walker, Sallaum Lines USA

“In response to referenced questionnaire, please be advised that Sallaum Lines USA has reviewed the information provided and determined that there are no issues identified for which the company could provide comments which could benefit the studies. Although we cannot contribute in this matter, we appreciate any opportunity to assist in the future.”