U.S. Department of Homeland Security

United States Coast Guard

Commander
Fifth Coast Guard District

431 Crawford St.
Portsmouth, Va. 23704-5004
Staff Symbol: (dpw)
Phone: (757) 398-6230
Fax: (757) 398-6303

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Office of Renewable Energy Programs

Bureau of Ocean Energy Management
Office of Offshore Alternative Energy Programs
381 Elden Street, Mail Stop 4090
Herndon, VA 20170

Dear Sir or Madam:

The Coast Guard has completed review of the National Renewable Energy Laboratory (NREL) "Assessment of Offshore Wind Energy Development Zones for the BOEM Maryland Wind Energy Area" draft report and I have concerns with the current configuration. I have a few alternatives for your consideration for proposed leasing sites.

The stated intent in Maryland was to delineate two equal development zones. Although maritime impacts were acknowledged during the development phase, the configuration does not account for the high rate of navigation conflicts in the current WEA design. The Coast Guard has identified more than half of the proposed southern zone with a high probability of being removed when marine navigation is addressed. Based on additional evaluation of the tug and barge AIS information, navigational concerns can be mitigated, while leaving an area suitable for two utility scale projects.

The Coast Guard Atlantic Coast Port Access Route Study gathered comments and other information regarding the alongshore routes of tugs and barges (and other smaller vessels). Routing to accommodate all WEAs (NJ, DE and MD), as proposed, would result in pushing alongshore traffic (≈10-15NM) out to more exposed offshore waters (30+NM). Many vessels cannot transit safely at that distance, particularly smaller units and during foul weather conditions. The alternative for the tugs and barges would be to transit to the west of the WEAs, which would introduce hazardous conditions by crossing with inbound and outbound traffic at the entrance to Delaware Bay. The increased understanding of the alongshore routes and the impacts that would result from displacing traffic from existing routes has further solidified the concerns that the Maryland WEA, as currently proposed, will result in unacceptable increases in risk to navigational safety.

The Coast Guard developed alternative routing scenarios with the goal of balancing competing interests. Enclosed is an explanation of the alternative routing scenarios and corresponding change to the WEA that I propose. This alternative would address a majority of the navigational concerns, while still supporting two utility scale projects (350MW+). This exceeds the 200MW project size currently supported by the State of Maryland Offshore Renewable Energy Credits (ORECs).

The Coast Guard is committed to working with the BOEM to develop workable solutions, and stands ready to assist the BOEM in evaluating additional areas that may be suitable for development that have not yet been explored in the Maryland waters. If additional information or discussion is necessary, please contact me at (757) 398-6640, or Commander Lonnie Harrison at (757) 398-6672 or lonnie.p.harrison@uscg.mil.

Sincerely,

U.S. Coast Guard

Enclosure: Analysis of Alternatives for the Maryland Proposed Lease Area

Copy: COMDT (CG-5PW)
CG LANTAREA (LANT-54)
COGARD Sector Hampton Roads

Development of Alternative Routing Scenarios to Balance the Viability of the Maryland WEA with the Need for a Safe Alongshore Transit Route for Tugs and Barges

Background: From the initial discussions in the development of the Maryland Wind Energy Area (WEA) there has been awareness of conflicts with navigational routes entering and exiting the Traffic Separation Scheme (TSS) and transiting alongshore. Additional research and processing of AIS data have further solidified the concerns with respect to these conflicts and it seems apparent that the WEA as currently proposed would pose unacceptable navigational safety risks. Concerns for deep draft vessels are primarily time and distance due to rerouting, but the proximity to the TSS also poses increased risk. For tug and barges there are additional concerns related to increased sea states further offshore and with being forced into routes travelled by larger, faster vessels.

Discussion: Moving forward with leasing an area that would not be acceptable for development is not in the interest of the "Smart from the Start Initiative" nor in the interest of successfully promoting wind energy development. The Coast Guard has looked at alternative routing scenarios with the goal of balancing competing interests and developing a more realistic proposal. The following discussion will look at developing criteria for the viability of the wind energy area to support utility scale projects and the risk factors affecting tug and barge traffic.

What is a viable area for development?

The DOE National Renewable Energy Laboratory (NREL) was requested to assist BOEM to provide technical input to help inform delineation of leasing zones within four BOEM WEAs including Maryland. As briefed at the fifth Maryland State Task Force held on 29 JAN 2013, NREL uses 350 MW as minimum project size when delineating zones for leasing.[1] Maryland's max potential is 1,600 MW, however, NREL noted will likely be less to accommodate larger spacing due to buffering.

In Fisherman's Energy's comments to the Virginia Proposed Sale Notice they stated "The single 122,799-acre lot proposed for auction in the PSN is simply too large. At a development rate of 100 MW per OCS block, a lease of this size could support approximately 2,000 MW of generating capacity, at least five utility-scale projects of 300 – 400 MW each." and "Designation of a single lot with approximately 2,000 MW of generating potential serves no purpose when 300 to 400 MW constitutes an efficient, utility-scale project.[2]

The State of Maryland recommended two zones for leasing to ensure competition for Offshore Renewable Energy Credits. Note that the credits are only for 200MW.

Following this logic, the MD WEA could be reduced by as much as 50% and remain viable for two utility scale projects of 350-400 MW.

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1 http://boem.gov/uploadedFiles/BOEM/Renewable_Energy_Program/State_Activities/NREL%20Zone%20Delineation.pdf

2 Document ID: BOEM-2012-0033-0011

What is an acceptable alongshore route for tug and barge traffic?

Vessels utilize the most efficient route (determined by time and distance) that can be transited in a safe manner. For an alongshore tug and barge route this generally results in routes close to shore (10-15 miles) where they receive protection from the lee provided by land. Transiting further offshore subjects vessels to a larger sea state which would force vessels to slow down and may result in unsafe conditions. When looking at the Delaware Bay region there is also a concern with forcing alongshore traffic to the west of the DE and MD WEAs which would result in crossing traffic in a high traffic area at the entrance to Delaware Bay. So an acceptable route is considered to be a route that would be amenable to tug and barge traffic to transit offshore of the WEAs in a safe manner.

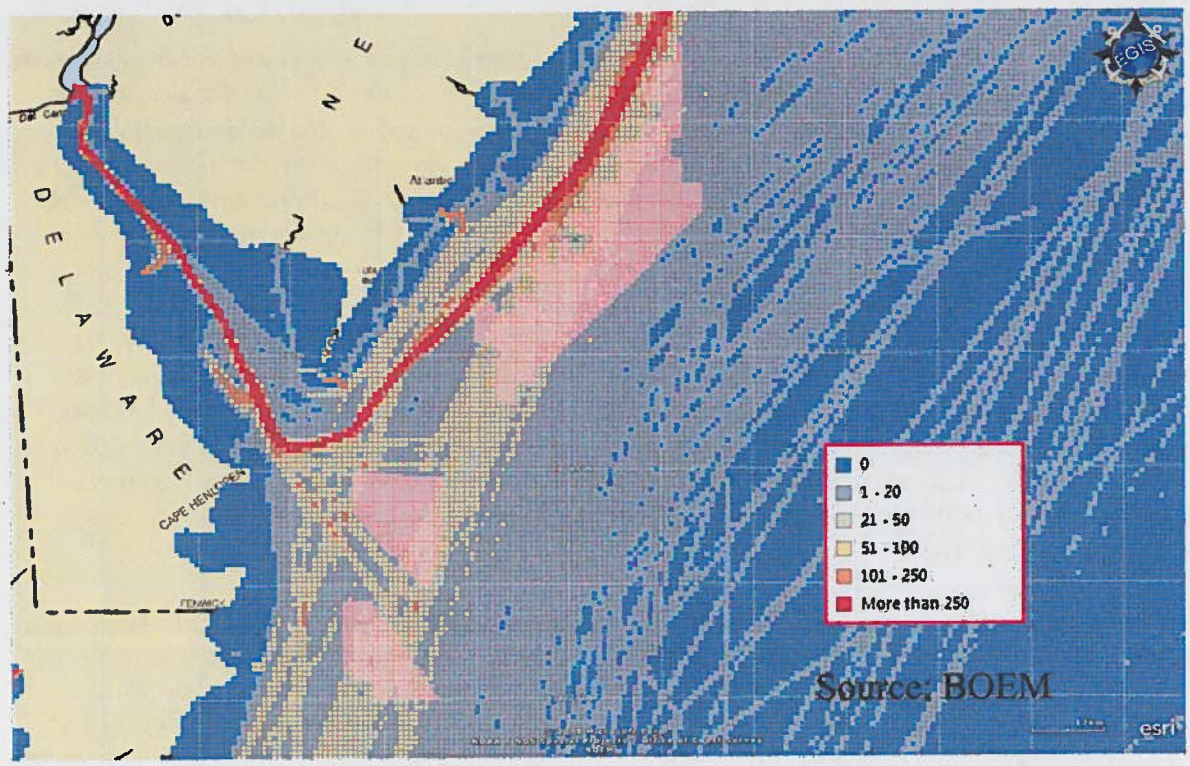


Figure 1: 2010 Density Plot of Tug and Barge Routes through NJ, DE and MD WEAs

If the Density Plot in Figure 1 were to be applied to the MD WEA to account for the alongshore route, the remaining area would result in the equivalent of approximately 3 lease blocks as shown in Figure 2. This would not be sufficient to support two utility scale projects.

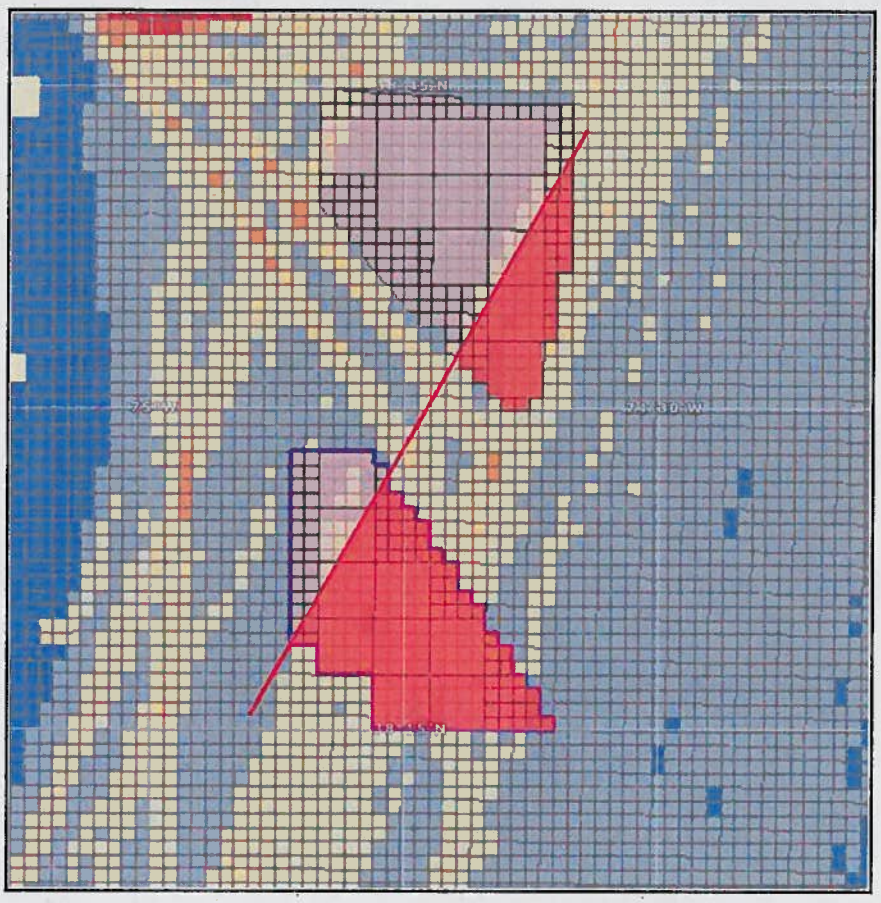


Figure 2: Representation of DE and MD WEAs if existing Tug and Barge were preserved

When looking at alternative routing scenarios we attempted to account for all three of the WEAs (MD, DE, NJ). to ensure a more direct route.

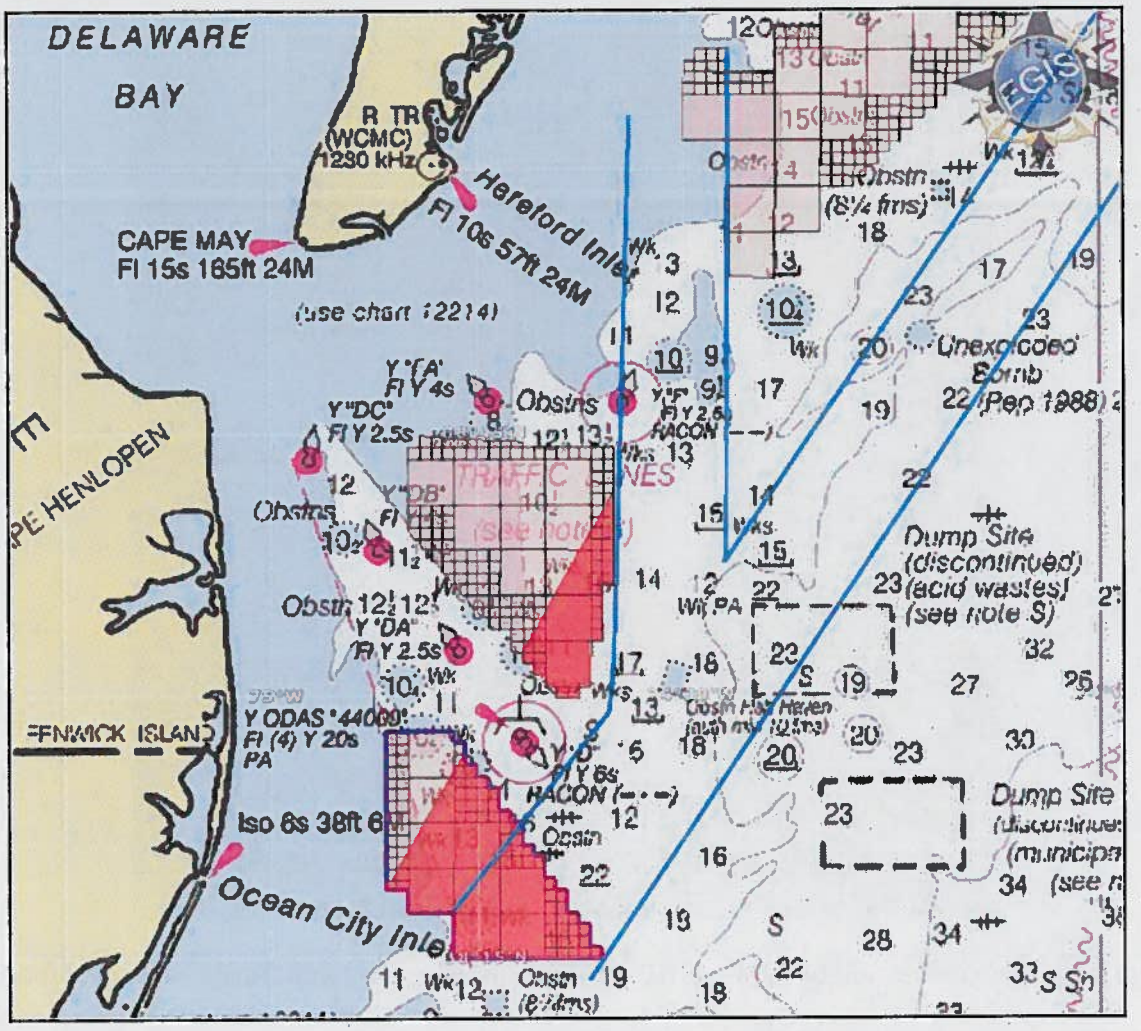


Figure 3: Alternative routing scenario #1

Alternative 1 consisted of determining a direct North/South route between the eastern edge of the Delaware WEA and providing for a sufficient width to the east. This would result in eliminating almost 2 lease blocks on the western side of the New Jersey WEA. The route continues south until it clears the Delaware WEA such that vessels would then cross the TSS at an approximate right angle.

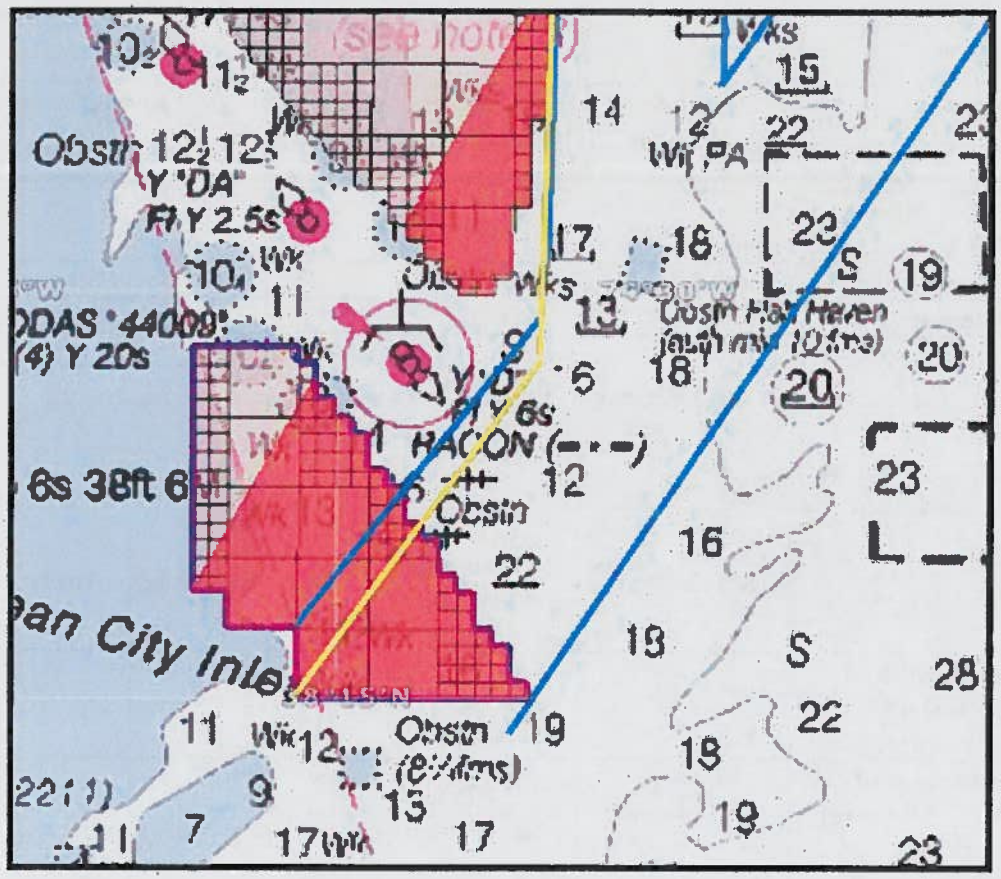


Figure 4: Alternative routing scenario #2

Alternative 2 in yellow, consisted of the same direct North/South route used in Alternative 1, but extends slightly further south prior to crossing the TSS at an approximate right angle. This is as far south the route could be located and still enable vessels to cross at an approximate right angle.

Both of these alternatives were analyzed to determine how much "conflict" would be removed by modifying the WEA. Conflict was determined by calculating the number of transits through each wind energy area.

Area	Number of Transits	Area sq. miles	Reduction in Area %	Reduction in transits %
Entire Maryland WEA	2,841	125	–	–
Alternative 1	1,206	76	39	58
Alternative 2	1,414	88	30	50

***Table 1.** Results for all vessels*

Area	Number of Transits	Area sq. miles	Reduction in Area %	Reduction in transits %
Entire Maryland WEA	491	125	–	–
Alternative 1	304	76	39	38
Alternative 2	359	88	30	27

Table 2. Results for Tugs and towing vessels (Vessel Types 31, 32, and 52

	Status Quo	Preserve Existing Alongshore Route	Alternative 1	Alternative 2
Maximum # of potential utility scale projects	3-4	1	2	2
Reduction of conflict- All vessel types	No reduction	>95% (estimated)	58%	50
Reduction of conflict with Tug and Barges	No reduction	>90% (estimated)	38	27
Likelihood tug and barges will be forced inshore* (approx. displacement Offshore)	Highly Likely (13NM)	Not likely (not displaced)	Possibly (4 NM)	More likely (6 NM)
Likelihood additional area would need to be removed at a later stage	Highly Likely	Not likely	Possibly	More Likely
* Rating is based on the further the route is forced offshore, the less likely vessels will be able to utilize the offshore route				

Table 3. Comparison of Alternatives

Conclusions:

1. Leaving the WEA as currently proposed (Status Quo) would most likely result in a significant amount of the area being removed later in the process and the full impact would likely be to only one of two zones.
2. Preserving the existing tug and barge route would not meet the objective to have a minimum of two zones for leasing.
3. Both Alternatives 1 and 2 would meet the objective of having two zones for leasing and give a good return on reducing conflict when evaluating all vessel types. However, when evaluating tugs and towing vessels the reduction of conflict is not as significant, due primarily to center of the actual tug and barge alongshore route being located west of the alternative routes. This translates to a more significant displacement of tug and towing vessels.
4. Alternative 2 would displace the route further offshore. This will result in a lower probability of vessels being able to transit offshore and the undesired effect of crossing traffic at the entrance to Delaware Bay. This also places the WEA further at risk to having additional area removed later in the process.
5. The effective reduction in the WEA for Alternatives 1 and 2 may actually only be much smaller than discussed due to the southeast portion of the WEA having 30-40 meter depths that exceed current technology.

Recommendation: Move forward with Alternative 1 by recommending the BOEM consider removing the corresponding area in the southeast portion of the WEA. Alternative 1 provides the best alternative to reduce the navigational safety risk and reduce the likelihood of additional area being removed later in the process, while providing enough area to lease two zones for utility scale projects. The course of action would also lend some credibility to the BOEM process in the eyes of mariners.

Transits in the Maryland Wind Energy Area (WEA)

Methods

All Vessels

The 2009 AIS data from the Marine Cadastre was used for this analysis. For the analysis, the data was projected into the UTM Zone 18N NAD 1983 projection.

First, track lines were created by connecting the AIS messages by MMSI in date and time order.

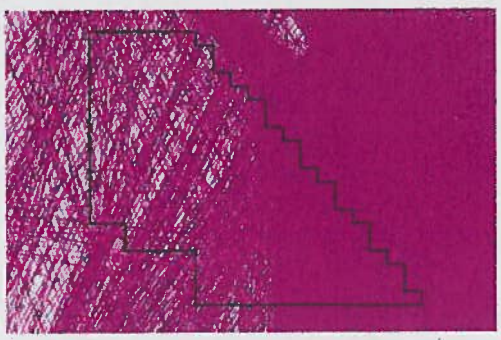
(a) (b) 

***Figure 1.** (a) 2009 AIS Broadcast messages and (b) track lines created by connecting the AIS messages in the vicinity of the Maryland WEA*

Next, the track lines were clipped to the Maryland WEA, as shown in **Figure 2**, below.

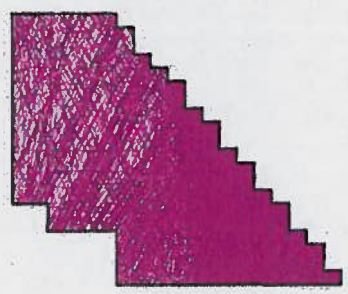


***Figure 2.** 2009 track lines clipped to the Maryland WEA*

The track lines are multipart features. Each track line represents the movement of each MMSI over the entire year. The track line was converted to single part features to determine the number of transits. An example of this is shown in **Figure 3**, below.

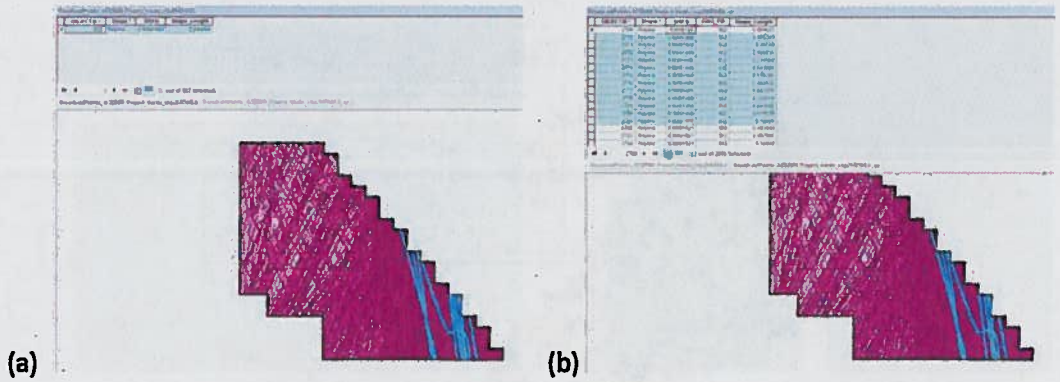


Figure 3. *Example of (a) track line from a single MMSI and (b) the twelve corresponding transits*

This process was repeated for the two proposed alternatives for the Maryland WEA, shown below in **Figure 4.** The area, in square miles and square nautical miles for each alternative area is shown below in **Table 1.** The polygon was projected to UTM NAD 1983.

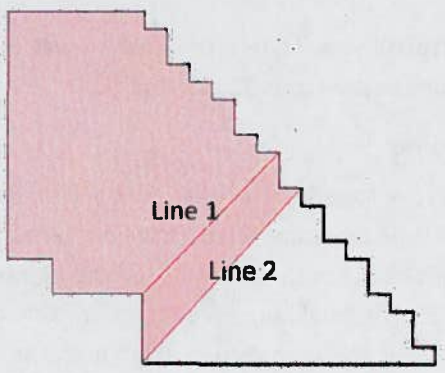


Figure 4. *WEA analysis areas*

Area	Area (Sq. Miles)	Area (Sq. Nautical Miles)
Entire Maryland WEA	124.541112	94.043448
Northwest portion of Maryland WEA split at Line 1	75.580958	57.072671
Northwest portion of Maryland WEA split at Line 2	88.232289	66.625941

Table 1. *Area of WEA and alternatives*

For this analysis, a transit is defined as any time a line enters and exits the Maryland WEA. By counting this way, a vessel that is transiting near the edge of the WEA may enter and exit the WEA several times, each time being counted separately. **Figure 5** shows an example of an MMSI that had ten transits through the WEA in 2009.

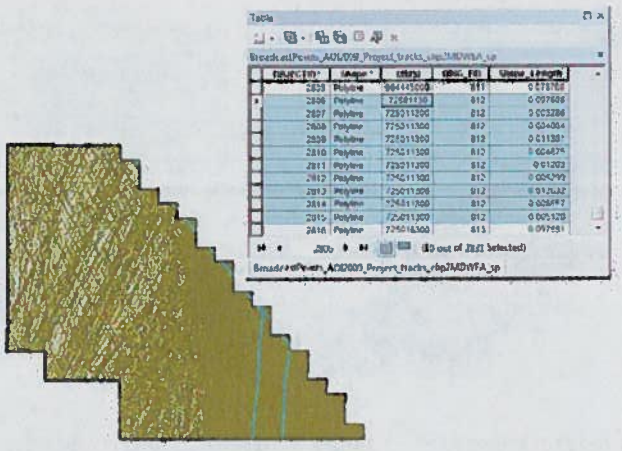


***Figure 5.** Example of a vessel transit near the edge of the Maryland WEA.*

Tug and Towing Vessels

After the analysis was completed for all vessel types, the analysis was repeated for just tug and towing vessels. In the AIS data, this includes vessel types 31, 32, and 52.

Vessels coming from the TSS

The number of unique MMSIs, a proxy for unique vessels, that transit through the outbound lane of the traffic separation scheme and the WEA was quantified through a series of intersections. The track lines were intersected with the two ends of the outbound lane and then intersected with the wind energy area, shown in red below (**Figure 6**). The total number of track lines that intersected with all three indicates the unique number of MMSIs that transited through both the outbound lane of the Delaware Bay Southeastern Approach traffic separation scheme.

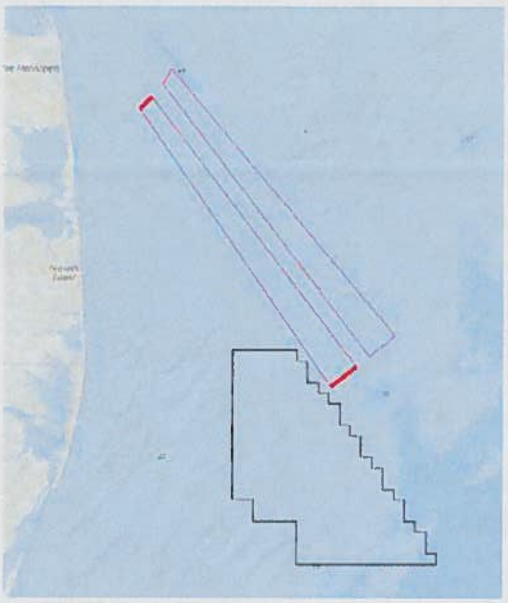


Figure 6. *The outline of the Delaware Bay Southeastern Approach traffic separation scheme in relationship to the Maryland WEA. The two ends (in red) were used for the intersections.*

Results

All Vessels

The number of unique MMSIs and unique transits for 2009 for all vessel types are summarized below in **Table 2** for the entire WEA and the two alternative areas.

Area	Number of MMSIs	Number of Transits
Entire Maryland WEA	823	2,841
Northwest portion of Maryland WEA split at Line 1	497	1,206
Northwest portion of Maryland WEA split at Line 2	541	1,414

Table 2. *Results for all vessels*

Figure 7, below, shows the distribution of the track lines from all vessel types in the area of the wind energy area. The track lines indicate that the vessels follow the traffic separation scheme to the north east of the Maryland WEA.

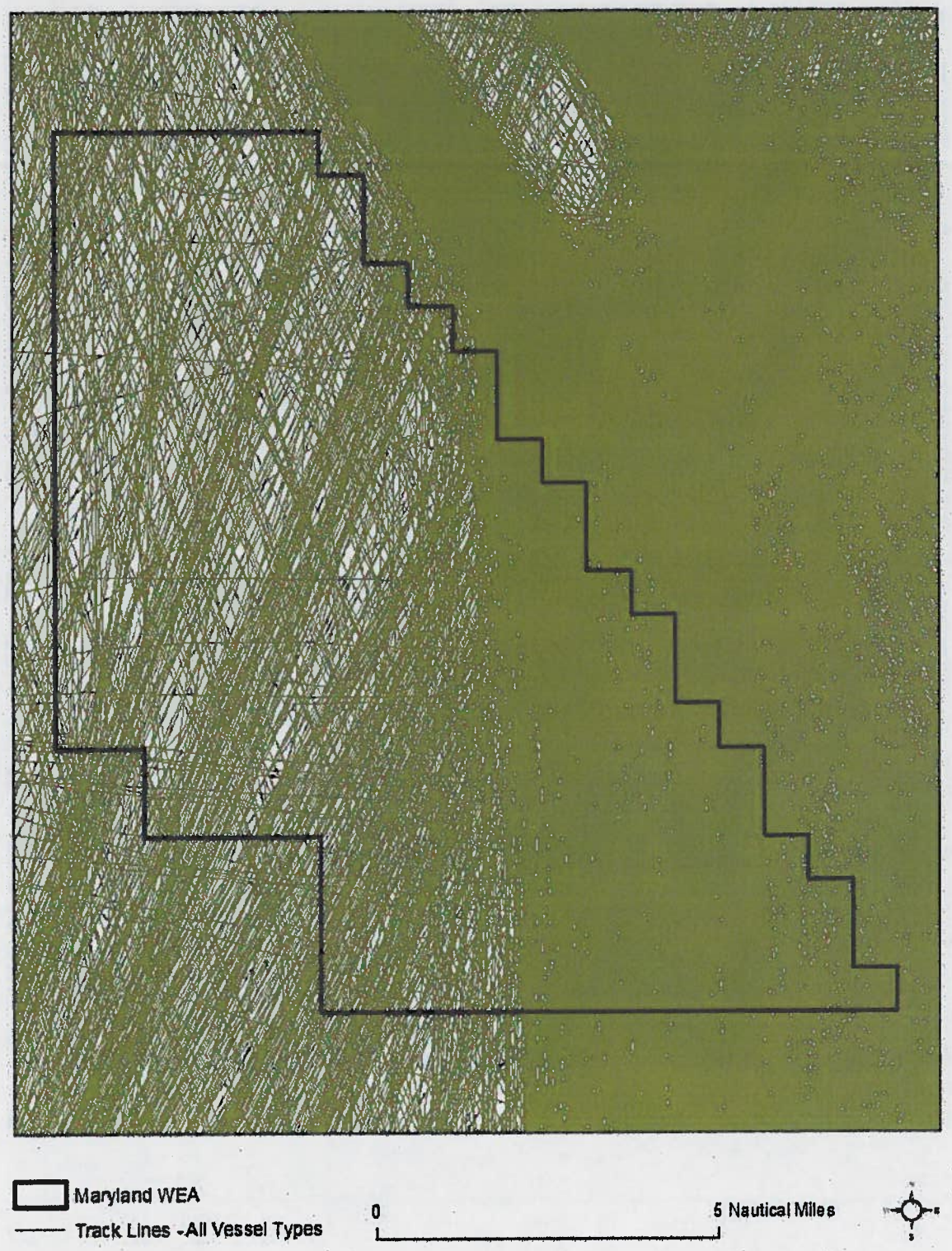


Figure 7. *Track lines from all vessel types*

Tug and Towing Vessels

The number of unique MMSIs and unique transits for 2009 for tug and towing vessels are summarized below in **Table 3** for the entire WEA and the two alternative areas.

Area	Number of MMSIs	Number of Transits
Entire Maryland WEA	124	491
Northwest portion of Maryland WEA split at Line 1	115	304
Northwest portion of Maryland WEA split at Line 2	117	359

Table 3. *Results for Tugs and towing vessels (Vessel Types 31, 32, and 52)*

Figure 8, below, shows the distribution of the track lines from all vessel types in the area of the wind energy area. Many of these vessels transit across the wind energy area and do not use the traffic separation scheme.

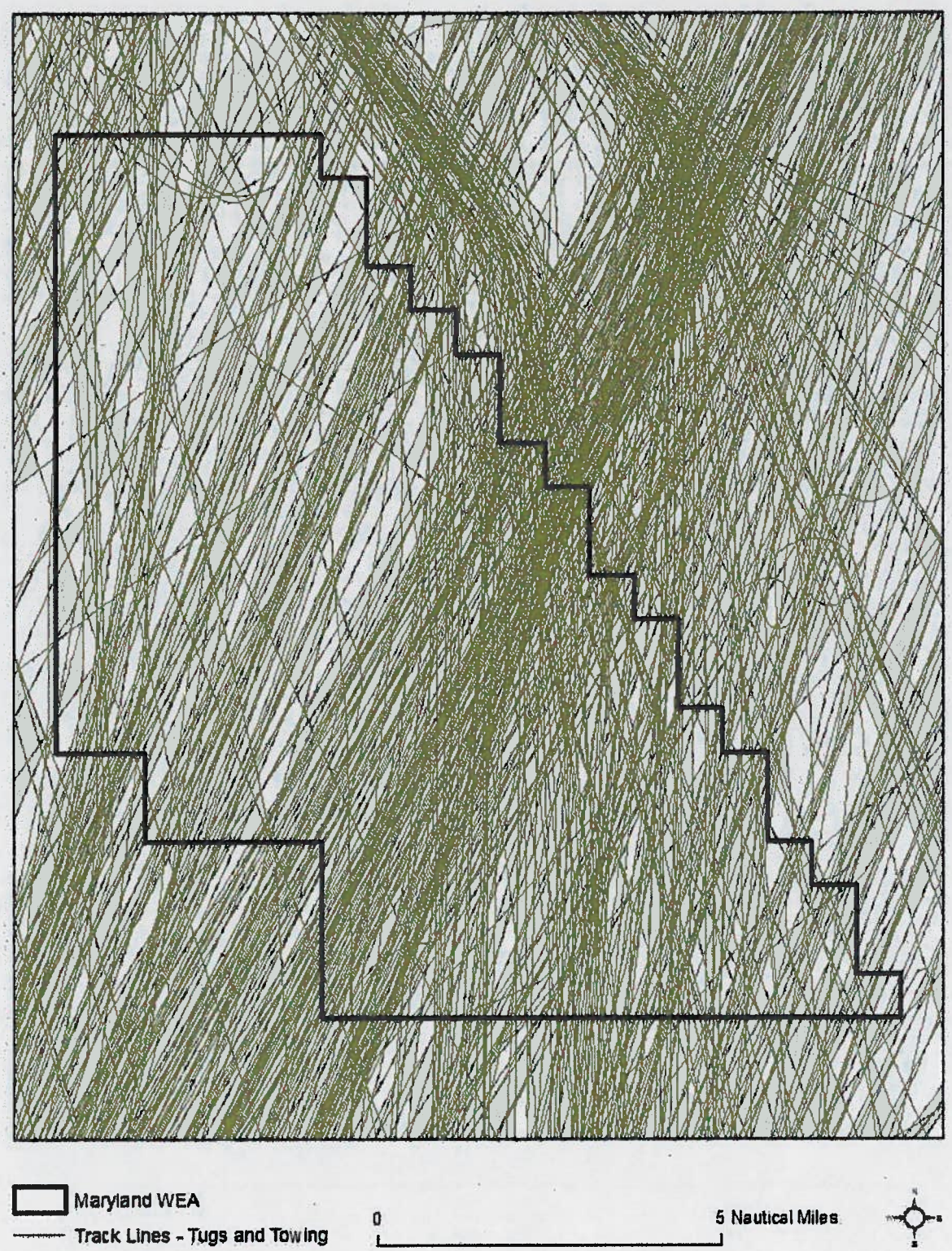


Figure 8. *Track lines from tug and towing vessels*

Vessels coming from the TSS

In 2009, there were 429 unique MMSIs that transited through the outbound Delaware Bay Southeastern traffic lane and the Maryland WEA. This number indicates that these vessels transited through both areas at some point during the year 2009. This does not indicate total number of transits, only unique MMSIs. Some vessels may have transited through these areas multiple times throughout the year.