

MEMO

To: Sean Mahoney, CLF, Chair OETF Subcommittee 1
From: Matt Nixon, Maine Coastal Program (staff to OETF subcom #1)
Subj: Potential Approach for Data Screening and Creation of an Ocean Wind Siting Tool
Date: 20 April 2009

Following the last OETF Subcommittee #1 meeting, where Susan Elston from the University of Maine GIS project and I previewed the OWEGIS database with the subcommittee, I have a) continued to work with UMaine and others to add data, layers into the system, b) engaged in research regarding different methods for ecological valuation, c) continued to create documentation for the data, and d) met with representatives from MA CZM Office who are working on an Ocean Management Plan.

Building on the subcommittee's work in assigning preliminary "ratings" to datasets, I've put some thought into additional methods for sorting and using the data, drawing extensively from the work of the Massachusetts CZM office (for the MA Ocean Management Plan) and several other efforts. My goal was to take what I considered to be the best aspects of several approaches and to combine them to create an objective and credible review process utilizing the best scientific information and principles of adaptive management, while acknowledging the need for substantial stakeholder outreach and input. What follows is a potential approach that Maine might use in moving ahead with initial screening of areas for potential deep water ocean wind test facility sites in state waters. As you know, the proposed legislation, if passed as drafted, has a December 15, 2009 deadline for the identification of up to 5 such sites.

The following narrative and charts focus mostly on a potential evaluation method for ecological data. The approach is admittedly incomplete in that we lack a complete human use inventory of state waters and additional outreach and input are needed from the user community. This draft approach is being put forward for the purposes of an initial screening process that might yield sites that could be discussed further with the user communities. The April 23rd meeting of subcommittee #1 provides a good opportunity to get initial feedback on the proposed method and its potential use.

I. PRELIMINARY AREA SELECTION

Two basic conditions will be used to identify areas conducive to deepwater (greater than 60M), wind generation facilities.

- Bathymetry
- Wind Intensity

Criteria for each will be as follows:

- **Bathymetry:**
 - > 60 Meters – Included as a potential area for development
 - < 60 Meters – Not Included in Initial Site Selection Process

- **Wind Intensity:**
 - > Category Four Classification: 7 m/s or greater (NREL, 2009), Areas containing this classification will be included in the analysis
 - < Category Four Classification: 6.9 m/s or less (NREL, 2009), Areas containing this classification will *not* be included in the analysis.

Following discussion by Subcommittee 1, it is recommended that these locations be considered as preliminary planning areas to serve as the focus for additional screening. These areas will then be analyzed using two approaches to identify potential impacts from deep water wind power development, one focused on ecological values and one focused on human uses. State agency and University staff, with continued input from stakeholders will continue to build and refine a database¹ depicting currently-available species-specific and human use data. It is important to note that identification of potential impacts does not necessarily make an area a “no go” area, as it is almost certain that development of a deepwater wind power facility is going to have some potential impact on some use or resource value. Whether the potential impact is an actual impact and whether that actual impact is an unacceptable impact would be the subject of further evaluation.

II. MULTISPECIES ECOLOGICAL VALUATION APPROACH

Current literature contains many differentiating ways to assess ecological value. Set forth below is an example of a combination of efforts produced by both the Massachusetts Office of Coastal Zone Management and variations based on methods from the Rhode Island Special Area Management Plan establishment process and an extensive literature review. Although the number of species and human uses that might be evaluated using this method is theoretically unlimited, the period in which sites must be identified under the proposed legislation (December 15, 2009) is limited. Given that the proposed legislation provides for significant research of environmental and human impacts during the testing and demonstration of ocean energy technologies, adaptive management, and potential removal of infrastructure, it is not necessary at this point to do the same level of exhaustive study that will be required for permanent projects. Therefore it is suggested that the initial ecological analysis focus on three primary categories: Avian/Chiroptera, Marine Mammal, and shellfish².

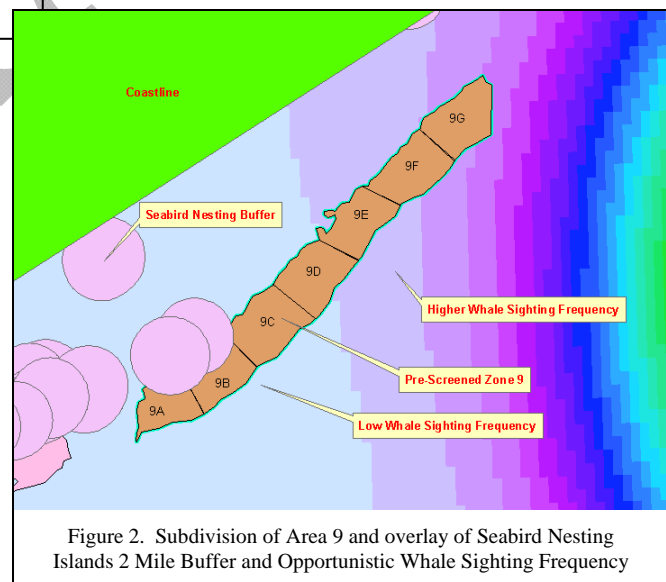
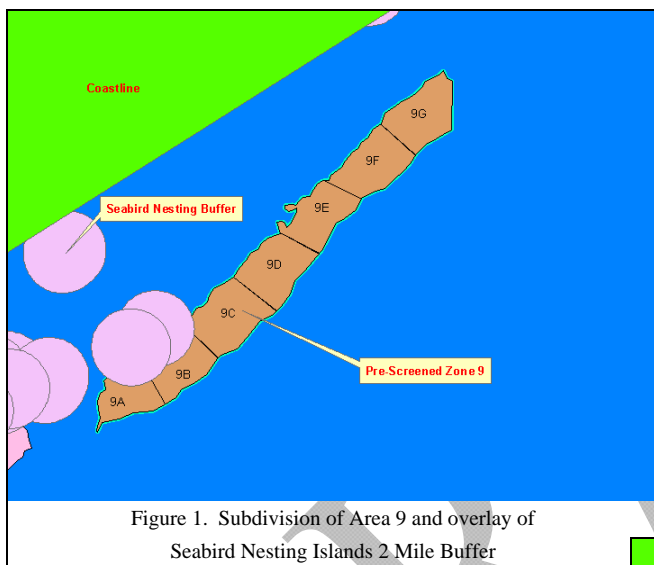
¹ UMaine and SPO share maintenance responsibilities for the database.

² This is not to say that an ecological analysis of the potential impacts on other fish won't be included, but it's something that will require outreach and input from users.

It is proposed that an area that meets the bathymetric and wind resource criteria be subdivided into three square nautical mile segments (to the most accurate extent possible because not all areas are symmetrical). Based on criteria to be discussed, each pre-screened area will be evaluated using either buffers or a presence/absence rating. For example, in the case of seabird nesting islands, a buffer can be used to depict an average foraging radius around each island. This can then be spatially projected into the OWEGIS database. Please see the following diagrams for an example of the suggested Ecological Valuation Approach.

Shown for demonstration purposes is a large location referred to here as Area 9 which is approximately sixty square nautical miles in area. Each segment is approximately 3 square nautical miles in area (Zones 9A-9G).

This illustration depicts a 2-mile buffer³ placed around the Maine Department of Inland Fisheries and Wildlife's seabird nesting island spatial data layer. Segments 9A and 9B are roughly half obscured by the seabird buffer. Adding the Department of Marine Resource's opportunistic whale sightings layer, segments 9E, 9F, and 9G indicate elevated levels of whale sightings (Figure 2).



³ Biodiversity Research Institute estimate

In order to specifically assign values to each segment, a weighted, numeric presence/absence scheme based on segment divisions can be utilized to chart, in this case, potential impacts within Zone 9. At this point in the analysis, the chart would look similar to this example:

Table 1. Zone 9 Segment Biological Potential Impact Percentage

| Zone 9 | 9A | 9B | 9C | 9D | 9E | 9F | 9G | Species Total |
|--------------------|----|----|----|----|----|----|----|---------------|
| Seabird Nesting* | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 5 |
| Whale Sightings | 0 | 0 | 0 | 2 | 4 | 4 | 4 | 14 |
| Zone Segment Total | 2 | 2 | 1 | 2 | 4 | 4 | 4 | |

**This is an example of a layer that currently exists. It is not a single species listing. Ideally, the finished product would have individual seabird species parsed by nesting islands and a list of species of concern.*

In the left-hand column, species of concern will be listed. Species with limited or no data will also be included, however these species will be subject only to review and will not have a corresponding spatial extent projection or numerical presence/absence value. Each Zone Segment will be rated using a number from one to four based on coverage percentage. For example, Zone Segment 9A had nearly 50% coverage by the seabird nesting island buffer, giving it a value of “2”, while Zone Segment 9F was not affected by any seabird buffers, giving it a value of “0”. The weighting scale would be:

- 1% – 25% Presence = “1”
- 26% - 50% Presence = “2”
- 51% - 75% Presence = “3”
- 76% - 100% Presence = “4”

To rate species’ sensitivity, a method based on the Massachusetts Ocean Partnership Ecological Valuation Index (EVI) is proposed to be used. The outcome of this index evaluation would be a Conservation Value. See below for an example of the EVI.

Table 2. Suggested Ecological Valuation Index for species sensitivity

| Species of Concern | Potential Fitness Consequences | Rarity | Proportional Importance | | Conservation Value |
|-------------------------|--------------------------------|--------|-------------------------|--------|--------------------|
| | | | Regional | Global | |
| Nesting Seabirds | | | | | |
| Black-Backed Gulls | 1 | 0 | 0 | 0 | 1 |
| Herring Gulls | 1 | 0 | 0 | 0 | 1 |
| Whale Sightings | | | | | |
| Right Whales | 1 | 1 | 1 | 1 | 4 |
| Minke Whales | 1 | 1 | 1 | 1 | 4 |

The EVI consists of three primary, subjective components. The first component, **Potential Fitness Consequences**, essentially requires an evaluation of Maine state waters in the Gulf of Maine overall and assessment of whether or not the respective species of concern are active there in a way that is critical to their population (nesting, foraging, spawning, mating, etc). If so, a value of “1” would be placed in the box, representing “yes”. The next component, **Rarity**, requires an assessment of whether or not the species is considered rare (using the state and federal endangered species lists would be useful in this activity). If a species is determined to be rare, a “1” would be entered into the corresponding box (once again representing “yes”). The next component, **Proportional Importance**, is divided into two sub-components: Regional and Global. Further assessment would reveal whether or not the species’ presence in the Gulf of Maine is of regional (GoM) importance or of Global importance. A “1” will be entered should the answer be “yes” to either. The Conservation Value is calculated by adding up all of the entries in the boxes.

The final stage of evaluation will be to overlay the species zone total with the Conservation Value based on percentage. The Zone Segment Total will be converted to a percentage. For instance, using the example above, a value of “2” would be equal to a value of .5.

- 0 = No Activity Needed – Conservation Value remains as is.
- 1 = .25
- 2 = .50
- 3 = .75
- 4 = 1

The Zone Segment Total percentage will be multiplied by the Conservation Value for each species in yet one more table. Please see the following figure.

Table 3. Final Potential Impact Total Per Zone Segment

| Pre-Screened Area 9 | Conservation Value | 9A | 9B | 9C | 9D | 9E | 9F | 9G |
|---------------------------|--------------------|------|------|------|------|------|------|------|
| Zone Segment Total | | 0.50 | 0.50 | 0.25 | 0.50 | 1.00 | 1.00 | 1.00 |
| Seabird Nesting | | | | | | | | |
| Black Backed Gulls | 1 | 0.5 | 0.5 | 0.25 | 0.5 | 1 | 1 | 1 |
| Herring Gulls | 1 | 0.5 | 0.5 | 0.25 | 0.5 | 1 | 1 | 1 |
| Whale Sighting | | | | | | | | |
| Right Whale | 4 | 2 | 2 | 1 | 2 | 4 | 4 | 4 |
| Minke Whale | 4 | 2 | 2 | 1 | 2 | 4 | 4 | 4 |
| Conflict Total | | 5 | 5 | 2.5 | 5 | 10 | 10 | 10 |

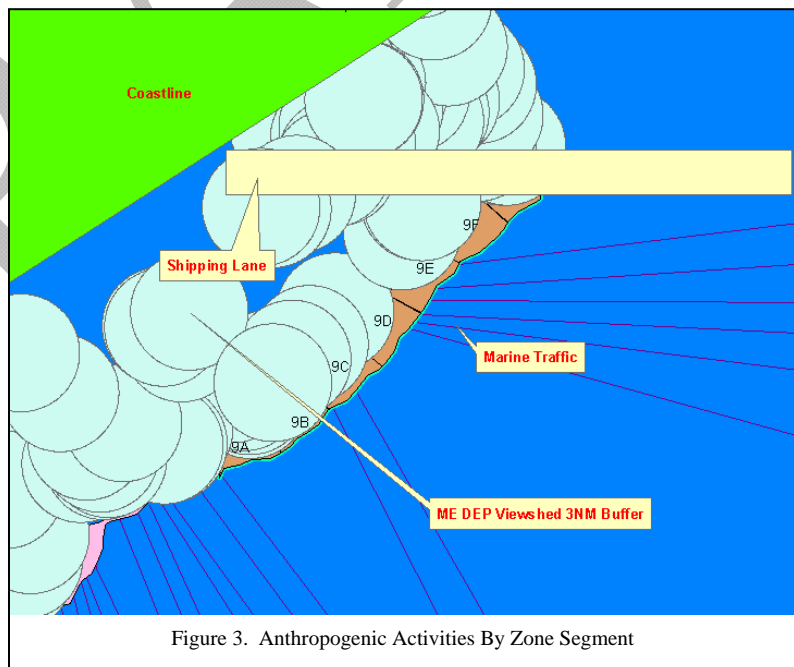
In this example, then, the Zone Segment with the lowest potential of impact on the identified biological indicators is Zone Segment 9C with the lowest total of 2.5. Using this method the potential impact on fish and wildlife only from deepwater wind power development for a Pre-Screened Zone can be calculated.

III. ANTHROPOGENIC VALUATION APPROACH

Many anthropogenic uses that may be impacted by deepwater wind power development will be assessed subjectively, although some, such as underwater obstructions, dumping sites, and major shipping lanes can be assessed fairly objectively. Anthropogenic activities and structures can be subdivided into two separate categories: attributes that can be evaluated based on presence/absence within a zone or attributes that can be evaluated subjectively.

Activities associated with presence/absence evaluation include undersea cables, shipwrecks, and marine dumping grounds. An activity involving a subjective investigation might include viewshed analysis. Regardless of the analysis type, a format similar to the EVI above can be utilized to get an idea of potential obstacles or reviews that must be taken into account. Should there be an item within a segment which simply is not compatible with a deepwater wind turbine facility, the corresponding presence/absence value will be marked in red and the segment will be deemed incompatible (unless further review proves otherwise).

The constraints depicted above show three separate spatial layers. The first is a depiction of the Department of Environmental Protection's Viewshed spatial layer⁴ with 3 Nautical Mile buffers around each (potentially triggering a visual assessment). The second is the Minerals Management Service's Marine Traffic Spatial Layer, and the third is a projection of the major shipping lanes in the Gulf of Maine. The corresponding potential impact table would look as follows:



⁴ Areas of consideration identified by the Department of Environmental Protection as being of scenic importance.

Table 4. Anthropogenic Activities Constraints Zone Total

| Category | 9A | 9B | 9C | 9D | 9E | 9F | 9G |
|---------------------------------------|----|----|----|----|----|----|----|
| Marine Traffic Route | 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| Shipping Lane | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Viewshed Conflict (3 NM) | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| Anthropogenic Activities Total | 1 | 1 | 2 | 1 | 1 | 1 | 1 |

The anthropogenic components of this constraints analysis are highly subjective. For example, all zone segments contain some sort of visual conflict, however, segments 9D and 9E contain an area large enough for three wind turbines that do not fall within the visual constraints buffer, therefore, they could be labeled as not having a visual impact⁵. Anthropogenic and biological totals can either be analyzed separately or together (by adding Anthropogenic Activities Constraints totals and Biological Conflict Totals together).

Other anthropogenic factors such as commercial fishing and recreational boating can only be effectively evaluated after significant outreach and increased involvement by interested parties in the assessment process, ideally after an initial ecological screening processes and some of the more objective anthropogenic measures (vessel routes, dumping sites) have been completed. This timing is suggested in order to allow for stakeholder input into the areas that initially seem promising (so as not to waste people's time) and should not be perceived as a last step in the process. It would be desirable to begin general discussions with stakeholder groups coincident with refinement of the biological data and to allow fishing and other sectors to have input into the development of the tool itself. In the event that information becomes available regarding fishing intensity and density or recreational boating hotspots through outreach efforts, this data can be projected spatially and evaluated. Possible methods consist of survey outreach or community meetings.

V. ADVISORY COMMITTEES

One method for conducting the objective assessments called for above could be the creation of advisory committees. For example, an advisory committee could be charged with conducting an assessment of qualitative data concerning species and habitat in areas proposed for development. A similar advisory committee could be constituted to assess anthropogenic uses. This concept is presented here with the intent of having Subcommittee One discuss further.

⁵ The undertaking of a visual assessment might be required at some sites, however, it does not mean that that a facility could not be sited there should an impact assessment be triggered.