

## Dynamic Management Areas

*Note: This white paper was developed within NOAA Fisheries as supporting documentation to provide explanation into the development of the operational measures in the proposed ship strike strategy. The paper should be considered a working document to be used as a tool for policy analysis and to further understand the origin of proposed measures. Comments on the document are welcomed, and may be sent to [alerial.jensen@noaa.gov](mailto:alerial.jensen@noaa.gov).*

The purpose of dynamic management area (DMA) management is to provide a means to regulate vessels in areas where right whales are detected and no specific measure(s) are in place or in force. There are five circumstances that may warrant a dynamic approach to vessel management:

1. Right whales occur outside the geographic area where other measures apply;<sup>1</sup>
2. Right whales occur in an area outside the time period when other measures are applicable;
3. No permanent measure is appropriate for a geographic area and time frame of the measure;
4. Right whales occur when a routing measure alone does not provide adequate protection; and
5. Right whales occur in very high vessel density areas, for example inside port areas, rivers, or in the Cape Cod Canal.

DMA might include temporary re-routing, vessel speed restrictions, or giving the mariner the option to either proceed at a reduced speed, route around the DMA, or delay entry into the DMA (e.g. rivers). Mariners might also be required to do such things as check their steering and ensure that their engines are ready for maneuvering.

The DMA measure has many benefits. It avoids the imposition of permanent, large scale, seasonal management measures in areas or at times where the occurrence of right whales is unpredictable. This allows the permanent seasonal measures to be more narrowly tied to the areas and times of peak right whale occurrence, and limited to where and when there is sound and sufficient data. By narrowing the areas and times for the application of the permanent measures, DMAs also minimize the regulatory and economic burden on industry, while providing for protection of the whales. An additional benefit is that DMAs provide for a

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<sup>1</sup> Note that designations and restrictions imposed in a seasonal management area (SMA) preclude the need to manage such an area using the dynamic management area mechanism, when the SMA is in force.

predictable and orderly procedure to follow for protecting those right whales that occur unpredictably in specific areas. This procedure will hopefully assist the agency, industry, and others to avoid the possible substantial expenditure of resources in an attempt to protect these whales via wide-scale restrictions. Finally, this measure attempts to address the concerns of affected members of the public. The shipping industry has repeatedly requested that any measure be tied as closely as possible to the actual need for whale protection. DMAs would be tied directly to the presence of whales. The fishing industry and the environmental non-governmental organizations have been advocating for measures to protect right whales from ship strikes; this measure directly responds to this request. The areas where DMAs may be particularly appropriate include the Gulf of Maine, Block Island Sound, the approaches to New York and New Jersey, but should also include any areas within the range of right whales (e.g. East Coast rivers used infrequently by right whales).

Much is known about the general distribution of right whales, especially with respect to their seasonal occurrence in the Southeast U.S. calving areas; the feeding areas of Cape Cod Bay, the Great South Channel and the Bay of Fundy; and their use of the mid-Atlantic migratory corridor. In these areas it is possible to establish permanent, seasonally regulated areas. Such an approach provides the shipping industry with known, predictable areas in which restrictions apply. It provides maximum protection for the whales, while also providing the industry with predictability to make necessary adjustments. However, right whales are biological entities and their occurrence and distribution is linked to oceanographic and biological factors (e.g., prey distribution). Therefore, when considering predictable seasonal restrictions, from time to time right whales may arrive earlier at, or leave later than expected from, known nursery/feeding areas, or they may not remain within the confines of the regulated area.

In other areas, although right whales may aggregate in large numbers or there is high vessel traffic thus warranting vessel operating restrictions, the exact time and place of right whale aggregations is not sufficiently predictable to adopt permanent measures. While it is known where many of these aggregations have occurred in the past, and sometimes why these aggregations occur (for example a "bloom" of their primary food source the copepod *Calanus finmarchicus*), it is not possible to pinpoint with certainty the annual occurrence in place and time. In such areas, establishing regular, seasonal measures can be problematic. These areas include: the Gulf of Maine including Stellwagen Bank; the Boston Approach Traffic Separation Scheme (TSS) in the Great South Channel; Block Island Sound; and the southern approaches to the ports of New York, New Jersey. Other examples of such occurrences include: occasional courtship aggregations near the Southeast U.S. critical habitat and sightings of resident mother/calf (new born) pairs-north and east of the designated critical habitat in the Southeast U.S. (e.g., the approaches to the ports of Savannah, Georgia and Charleston, South Carolina).

The TSS in the Great South Channel provides an example of the complexities of regulating shipping to protect right whales within the relatively large area, the Great South Channel critical habitat. In most years, the right whales' primary food, *Calanus finmarchicus*,

blooms to the east of the TSS. Thus, vessels transiting this area and using the TSS are automatically routed away from aggregations of right whales.<sup>2</sup> However, in some years the bloom of *Calanus finmarchicus* occurs both within and to the west of the TSS (2003, 2004). This poses a dilemma for resource managers that can be addressed through the use of DMAs -- rather than through a permanent, seasonal measure, that could, for example, be in effect when no whales are present. Thus, DMAs provide flexibility that is linked to whale occurrence that also allows, to the maximum extent possible, “business as usual” for the industry.

Several publicly exciting occurrences of right whales that have required intensive multi-agency efforts and resources have been focused on individual "wayward" right whales that have shown up quite unexpectedly in the Cape Cod Canal, the Delaware River, Portland harbor, and St. Johns River, Florida. Navigable waterways have been shut down, waterborne commerce halted, and escort boats assigned to keep watch over these "explorers" until they leave these high vessel traffic density areas.

Several factors must be taken into consideration in establishing a DMA mechanism. Most importantly, it is necessary to determine the “trigger” threshold that will result in the establishment of a DMA (for example, the number and behavior of whales present). It will also be necessary to establish the means to determine the total area the DMA will cover, length of time it will remain in effect, and the applicable restrictions. Further, it will be necessary to identify the means of gathering the scientific evidence that whales are present and establish the means to notify mariners in a timely fashion.

Trigger mechanism: The “trigger” threshold or mechanism is the density or relative density of whales that would result in the temporary imposition of measures. Parameters of the trigger threshold are being described here for discussion purposes and to provide a framework; the actual and specific triggers need to be identified with further analysis.

The primary factor in determining the trigger mechanism is the residency of right whales in an area. A DMA should be imposed if right whales have temporarily taken up residence in an area of vessel traffic. A “resident” whale is one that is actively feeding or is in a courtship group, as opposed to a whale, or whales, that are transiting through an area. Right whales are known to aggregate and remain in an area when they are feeding and forming courtship groups. A travelling whale will not necessarily remain in a specific area, whereas a feeding whale is likely to remain in an area where resources/factors (e.g., prey abundance) important to the whale occurs.

Other indices, if available, may also be useful to take into account in determining whether to establish a DMA. For instance, observation of a dense patch (es) of right whales'

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<sup>2</sup> One of the recommended measures for the Great South Channel is the designation of the area east of the Boston TSS as an Area to Be Avoided.

primary food is a good indication that right whales are resident in an area. Research is underway to develop models that weigh oceanographic factors to predict where right whales are likely to occur. Another example is specific observations that right whales are surface feeding. Successive observations (e.g., two or more sightings on consecutive surveys) of right whales in an area obviously indicate residence. Another important aggregation that is necessary to protect are those of a resident mother /calf pair.

Aggregations of feeding right whales or courtship groups occur in the northeast United States and have been seen as far south as New Jersey, Block Island Sound and throughout the Gulf of Maine, including the Great South Channel. Courtship aggregations are occasionally seen in the southeast United States. Resident mother/calf pairs typically first occur in the southeast United States but also have occurred north and east of the southeastern designated critical habitat, including off the approaches to the ports of Savannah, GA and Charleston, SC. During the northerly migration, mother/calf pairs occur along the mid-Atlantic. Eventually, these pairs will be sighted off the Northeast U.S. and Canada.

In determining the trigger mechanism for the imposition of vessel operating restrictions, the starting point can be the criteria which NMFS established for dynamic area management fishery closures to prevent entanglements when feeding or foraging whales are detected in the Northeast United States (Clapham and Pace, 2001). The conclusions of this study are based primarily on the occurrence of right whales in the Cape Cod Bay and Gulf of Maine areas. The criterion used for fishery closures is when three or more right whales are observed resident in an area of a particular size such that the right whale density in this area is 0.04 right whales per nm<sup>2</sup>. This equals four right whales observed in a 10x10 square nm.

In general, the trigger mechanism for fisheries restrictions may also be considered for application in the context of DMAs to reduce the risk of ship strikes. There are, however, three special circumstances where it is necessary to refine further the trigger mechanism. First, two or more animals seen actively feeding on a patch of food in a designated shipping lane may serve as a triggering mechanism to impose a DMA. Actively feeding right whales are believed to be highly vulnerable to ship strikes, because they are likely focused on the feeding activity and possibly less aware of oncoming ships. Designated shipping lanes carry more shipping traffic and therefore the probability of whale-ship interaction is higher in those lanes than it is in other areas.

Second, the sighting of a non-migrating mother/calf pair within 15 nautical miles of a shipping lane, at a time and in a place where no other operating restrictions apply, may trigger imposition of a DMA. Mother/calf pairs are the most vulnerable (they are restricted in their abilities to maneuver, and calves have relatively brief dive times thus spending a substantial amount of time at the surface). Further, mature breeding females are the most critical to survival of the species.

Third, a single right whale sighted in the immediate vicinity of a port entrance or a port area, or in or near the entrances to Cape Cod Canal or in a river, may be used as criterion to trigger DMA restrictions. It should be noted that other federal authorities might also be applicable in such a situation. For instance, the Army Corps of Engineers and the Coast Guard have used their authorities to prevent hazards to navigation to protect whales in shipping channels.

Defining the buffer zone or geographic extent of a DMA. To account for the movement of the whales, a buffer zone of up to 15 nautical miles may be established from the location of an individual sighting area when triggering a DMA. The outer boundaries of the DMA may then be defined by lines of latitude and longitude, or in a particular radius around a position, designed to encompass both the actual sighting area and the buffer zone. The first step in establishing a DMA boundary is to determine the size of the individual sighting area by identifying a circle around each individual sighting with a radius equal of three nautical miles (nm) per animal. This radius will be adjusted to account for the number of animals seen in the sighting, so that the density of 0.04 animals per nm<sup>2</sup> is maintained. Since this is a nonlinear relationship (the area is circular), to maintain this density, the radius of the circle for a sighting of a single animal would be 2.77 nm, for 2 whales in the sighting the radius would be 3.99 nm, for 3 whales the radius would be 4.89 nm, and so on. If any circle or group of contiguous circles includes three or more animals, or if one of the three special circumstances exists, the actual (individual) sighting area would be a candidate for dynamic management. To protect the animals within the identified area, it would be necessary to expand the original individual sighting area to provide a buffer zone to allow for the relatively short-term movement of the whales. Of course, in establishing the actual size and area of the DMA, it would also be necessary to consider navigational safety.

Proposed vessel operating restrictions in a DMA: The measures imposed need to be determined. In imposing any measure within a DMA, safety of navigation must be ensured. The responsible agency would impose one or more measures that might include: 1) establishing a temporary area to be avoided; 2) imposing a speed restriction for vessels unable to avoid the area; or 3) providing the option to the mariner of proceeding at designated slow speed through the area in lieu of avoiding the area. Mariners could also be required to check their steering and engines and to post look-out(s) (not necessarily additional persons) familiar with spotting whale

Implementation, notification of mariners and enforcement: Detailed regulations addressing the establishment of a DMA, as well as agency guidance, instructions and procedures would have to be developed. The regulations would address many details such as the geographic coordinates of the DMAs, seasonal occurrence, the range of possible requirements that might be imposed on vessels, notification procedures, navigational safety, any log keeping requirements, and other similar matters.

Dynamic management of shipping can be accomplished relatively quickly in comparison to dynamic management of fisheries since there is no need to retrieve and reset gear, i.e., ships

are only passing through an area and can respond quickly, whereas fishermen are deploying fixed gear. Commercial shipping traffic is comparatively flexible. Even if a DMA is imposed, the vessel can still transit from one point to another. Thus, the degree of disruption of regular activities would arguably be much less in the case of commercial vessels than it is for fishermen.

Imposition of a DMA would be accomplished by rule making. Actual notice of the final rule could be transmitted to vessels through existing, and highly efficient (i.e., rapid and inexpensive) communication systems. Examples of such existing systems include: Broadcast Notice to Mariners, NAVTEX, Local Notice to Mariners, NOAA weather radio and the MSR system. Coast Guard instructions on Limited Access Areas provide a good template for means of notification (see Coast Guard Marine Safety Manual, Vol. 6, Chapter I, section J, Limited Access Areas).

While some enforcement of DMA actions could be accomplished through overflights, other enforcement measures could take place in port rather than at sea. Regular Coast Guard port state control boardings could, for example, include examination of ships logs and random checks of these logs by either Coast Guard or NOAA enforcement officers. Deep draft mariners are already required to log course and speed changes. Consideration should be given to imposing log-keeping requirements on all vessels that pass through right whale management areas on their way to port.

Education of mariners would be an important component of enforcement efforts. Port authorities, ships' agents, national and international industry associations, and pilots associations should be partners in this education. Coast Pilots, British Admiralty publications, and Port Guides to Entry could include information on the need for mariners to be alert to emergency dynamic management areas.

### **Literature Cited**

Clapham, P.J., and R.M. Pace. III. 2001. Defining Triggers for Temporary Area Closures to Protect Right Whales from Entanglements: Issues and Options. NMFS, NEFSC Reference Document 01-06. 28 p.