So What? Marine Mammals

Marine mammals appeal to the hearts, minds, and eyes of the public, and although scientists are just beginning to brush the surface of the world of marine mammals, it is important to consider human impacts on these animals. The marine mammal and turtle density estimate data included in the Multipurpose Marine Cadastre are the "best available" data of this type. These data can be considered for uses like avoiding physical or acoustic interactions with marine mammals (for example, ship strikes, construction interference, etc.).

Why should planners consider marine mammal density?

1. **Federal protection.** There are approximately 125 species (http://go.usa.gov/fHq) of marine mammals within U.S. waters, all protected by the Marine Mammal Protection Act (MMPA - http://go.usa.gov/fHl). There are two main designations under the MMPA: "protected" and "depleted (http://go.usa.gov/fHi)." Depleted normally includes those listed as "threatened" or "endangered" under the Endangered Species Act (ESA - http://go.usa.gov/fH3), and they therefore have additional federal protection. The "taking (http://go.usa.gov/fHO)" of marine mammals is illegal, meaning it is illegal to do anything to a marine mammal that might disrupt that mammal's natural behavior, including harassing, harming, hunting, trapping, or killing.
2. **Ocean ecosystem health.** Sustaining healthy marine mammal populations is important in maintaining balance in marine food webs and helping to keep marine ecosystems functioning as they should. Reducing populations of whales, dolphins, or seals can result in unpredictable changes to populations of other important species like fish, birds, or invertebrates. In addition, nutrient recycling (reusing nutrients for other forms of ocean production) plays a large role in all ocean ecosystems. Studies show that marine mammals could be largely responsible for nutrient recycling in areas such as the Gulf of Mexico. Read the full article (http://www.plosone.org/article/info:doi/10.1371/journal.pone.0013255).
3. **Human Interactions.** Whale watching provides many positive benefits to local economies. Studies also show economic value exists for people in simply knowing that marine mammals are present and healthy, even if they are not able to see these animals themselves. We also know that activities like ocean construction and the use of certain types of sonar produce noises at levels that could negatively impact marine mammals.

Explanation and Caveats: The marine mammal and turtle density data are outputs from models that show estimates of the average number of animals present during a given season for each 1 square kilometer (km^2) block in the area being modeled. Because marine mammals often occur in groups and are highly mobile, most of the average number of animals/km^2 values will be less than 1, which can be confusing without the behavioral context to orient the user. For example, consider a value of 0.5

animals/km^2 for bottlenose dolphins during the summer for a particular grid cell. This could mean that on average 1 animal would be expected to be present in that grid cell every other day, or 1 group of 10 animals once in a 5 day period. The models used to generate the average density numbers also use a correction factor to account for the amount of time an animal spends underwater and how difficult they are to detect when they are at the surface. These correction factors vary based on the behavior of a given species and the survey platform used for observation (i.e., shipboard or aerial observations).

The actual observations (animal sitings) data used as model inputs are not available for every km^2 block being modeled. Models produce estimates based on patterns in existing data. A benefit of this approach is a continuous output without empty blocks in the areas where no observation data were available. However, the level of confidence associated with statistically modeled output varies greatly. Consideration of the uncertainty is important when applying results to a particular question or decision.

A low estimate of marine mammal density for an area does not necessarily mean that area is not important to a species or management decisions related to it. Low density estimates, for example, may be the result of animals only visiting a spot for a short period of time in a given season to exploit a particular food source or engage in breeding or calving activity. The importance of that area for annual survival or reproduction may still be very high even if the animal spends a relatively short period of time there.

Users are strongly encouraged to consult metadata records and any available reports referenced in the metadata that explain how the outputs were generated and the types of uses they were intended for.

For questions, please contact nos.csc.mmc@noaa.gov.