36 Estimating marine sanctuary public use: Preliminary results from a US National Marine Sanctuaries pilot project

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The U.S. contains over 172,481 square miles of underwater parks designated as National Marine Sanctuaries (NMS). They serve as a bridge to natural resource exploration, education, recreation, tourism, and offer many other ecosystem services for both U.S. citizens and foreign visitors alike. Visitors to these areas number in the millions each year and account for significant economic production within, and adjacent to, these areas as well. Despite the popularity and importance of these areas on the whole, a knowledge gap exists with respect to visitor use and monitoring in areas of specific aquatic orientation. Visitor use can be profoundly productive in terms of economic activity. Therefore, the National Marine Sanctuary System is critical in supporting vast production of economic activity each year. With their unique resources, National Marine Sanctuaries attract large numbers of visitors every year and may serve as primary economic drivers for surrounding communities. However, specific visitor use counting and monitoring methods are not standardized or properly applicable to specific marine sanctuary sites. A better understanding of visitor use patterns and motivations at specific marine sanctuary sites would increase the capacity for economic growth and sustainability of valuable ecosystem services in these areas. Marine sanctuaries and parks inherently have porous borders, and multiple access points may make counting as a means to arrive at visitation estimates a challenging approach. The National Marine Sanctuaries Visitor Counting Process (NMS-COUNT) offers an iterative framework to address this knowledge gap while involving key stakeholders throughout the process. In this way, communication among managers and researchers is incorporated to help develop and implement the most efficient methodology for a particular aquatic area.

NMS-COUNT engages academics, agency scientists and managers in an iterative process of four phases: 1) research and identification of visitor estimation methods applicable to a specific site, 2) expert panel to provide input on site-specific methods, use indicators (social, environmental, temporal, spatial intensity, etc.), and confidence levels, 3) development of a site-specific methodology and sampling plan, and 4) field testing and analysis (Figure 1). In each phase, methods are analyzed for confidence in producing visitor estimates that are efficient, valid, and reliable, and adapted via feedback throughout each successive iteration. Iterations between the three phases ultimately result in a scientific consensus on quantitative goals for measuring visitor use at an agreed upon level of confidence.

In Phase 1, academic researchers review the literature for a comprehensive understanding of methods in visitor sampling, estimation, and monitoring in a range of settings. From this research, potential methods and the types of data they produce are identified, as well as the advantages and disadvantages of using each method at different scales. To examine which methods and indicators of visitor use are most effective in a chosen National Marine Sanctuary, all attributes, visitor activities, and conditions (social, biophysical, regulatory, spatial, and temporal, etc.) of the Sanctuary are inventoried. Researchers then determine which methods are potentially appropriate for that particular Sanctuary, at a range of confidence levels (low to high).

Phase 2 brings together various agency managers, local stakeholders, and researchers to address a set of management objectives and associated monitoring needs. In this collaborative process, all stakeholders contribute their knowledge, perspectives, and legal mandates that guide work within a specific Sanctuary. Managers and scientists participate in a series of surveys/workshops that progress from a more broadly-based questionnaire to one with more specific questions based upon prior feedback. The expert panel discusses visitor trends and challenges specific to monitoring visitation in

their Sanctuary. The results of each iterative survey and workshop provide detailed insight into the current state of knowledge on visitation and level of confidence in the ways this information has been obtained.

In Phase 3, data from expert panel input are analyzed and gaps are identified. A methodology is designed specific to the Sanctuary based on this analysis. In Phase 4, a field study tests the methodology and performance of measures. The results of the study and all phases will be used to validate and standardize methods, and to advance development of visitation indicators and models. Understanding visitation to a marine sanctuary or park is one of the first steps to accurately estimating associated benefits and economic contributions. Furthermore, a robust process to reliably estimate general visitation may reveal useful trends within other strata of visitation or spatial hotspots which require additional monitoring. Sanctuaries may be located along shorelines or they may lack a physical boundary when located offshore. This diversity of geographic locations results in unique challenges to counting visitors, especially when data collection must be cost-effective. NMS-COUNT offers a solution to these challenges, built upon the best available science and localized input.