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Incorporating stakeholder input into marine research priorities for the Aleutian Islands

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ABSTRACT

Resource management agencies are required to consider stakeholder input in the selection of preferred alternatives for proposed actions. Not only do stakeholders contribute unique perspectives on the impact of alternative actions and the desirability of various policy objectives, including stakeholders in the decision process adds to the perceived legitimacy of those decisions. However, gathering stakeholder input and incorporating it into decisions can be difficult. We solicited public input on research needed to improve marine resource management decision-making for the Aleutian Islands region. Stakeholders and an expert panel were asked to use the analytical hierarchy process to rank those research needs. Spearman rank correlation tests were used to search for statistically significant differences in the rank orderings between stakeholders and the expert panel. A high level of association was found between rankings by an expert panel and those by stakeholders. Moreover, the rank orderings were robust to the inclusion or exclusion of interest-group subsets of the stakeholders and expert panel. The expert panel and stakeholders assigned highest priority to new research designed to increase basic knowledge of the Aleutian Islands marine ecosystem. Agreement between stakeholder and expert panel rankings was closest for the most and least important research needs; most substantial differences in the rankings involved research needs identified as moderately important. These results suggest that an expert panel may provide input comparable to that which could be obtained from engaging in a more extensive stakeholder process. Furthermore, these results suggest that the analytical hierarchy process can serve as a useful mechanism for organizing stakeholder input for environmental planning and resource management.

1. Introduction

Stakeholder engagement is a key component for sustainable management of the oceans and for implementing ocean policies, such as ecosystem-based management and coastal marine spatial planning (Costanza et al., 1998; Pomeroy and Douvere, 2008; CEQ, 2010; Halpern et al., 2012). In the United States, essential steps in environmental planning and resource management include gathering, weighing, responding to, and incorporating stakeholder input as required by, inter alia, the National Environmental Policy Act (NEPA), the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and the Endangered Species Act (ESA). However, processing and incorporating stakeholder input can be challenging because of its large volume and the self-selection of contributors.

As defined in this study, stakeholders include those who have an interest in the science, use, and management of marine resources in Alaska (Pomeroy and Rivera-Guieb, 2006; Mackinson et al., 2011). This definition includes residents of the Aleutian Islands, state and federal resource managers, members of non-governmental organizations, representatives of commercial enterprises, academic researchers, and other interested members of the public. While U.S. environmental acts such as NEPA include procedures that invite stakeholder participation (Bronstein et al., 2005), the influence of stakeholder input on decisions can be unclear to observers and participants alike. For example, in response to requests for public input regarding proposed actions, resource managers typically receive comments that express conflicting opinions about likely environmental, economic, and social impacts. Those comments may include multiple copies of form letters forwarded by members of interest groups, letters submitted on behalf of large numbers of

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signatories, and unique letters sent by individuals. State and federal agencies rely on a variety of methods to solicit, tabulate, categorize, and respond to the comments they receive. While agencies are required to consider public comment, it is often unclear to the public if, and how, such input actually affects subsequent decisions. For example, a large volume of comments from one interest group could overly influence processes or decisions related to particular actions. Value judgments expressed by stakeholders may be particularly difficult for agencies to respond to and incorporate in their decisions (Steelman, 1999).

Established by the MSA, the Regional Fishery Management Council (Council) process is designed to include stakeholder participation in fisheries management. Members of stakeholder groups attend Council meetings and provide written and/or oral testimony on agenda items. Although the meetings are open to all members of the public, those more likely to attend may possess preferences toward more extreme policies (a greater vested interest), reside in nearby locations (Turner and Weninger, 2005; Brzezinski et al., 2010), or represent organized groups with the financial resources to support member travel or professional lobbying. Council voting members and their Advisory Panels and Scientific and Statistical Committees listen to testimony from stakeholders, and are, in some cases required to summarize that testimony. Nevertheless, it is not clear whether stakeholder input receives due consideration or affects decision-making. Nor is it evident whether disproportionate weights are given to input from particular stakeholders.

Group decision-making techniques provide structured and transparent processes that incorporate expertise and value judgments from multiple participants. A common group decision-making approach involves problem identification, followed by an unstructured pooling of solutions and the final selection of a decision based on consensus or majority vote (Van de Ven and Delbecq, 1974). However, that type of approach does not work well for complex multi-objective decisions common to natural resource management, nor does it satisfy the public notification and review requirements of NEPA or the Administrative Procedures Act. Moreover, when multiple management agencies have overlapping responsibilities for a particular resource they may have conflicting economic, social, and natural resource conservation priorities or objectives, and may receive incongruent input from non-overlapping sets of stakeholders.

The analytical hierarchy process (AHP) is a group decision-making technique developed to solve discrete multiple criteria problems (Saaty and Kearns, 1985; Saaty, 2001). The AHP structures a problem into a hierarchy and evaluates group preferences through ranking or numerical rating to identify priorities among choices. The AHP can assist in the avoidance of "group-think", where the drive to reach an agreement leads individuals to disregard their own reservations and to go along with the majority to achieve consensus. The AHP has been applied to planning, conflict resolution, and prioritization of alternative actions in economics, engineering, medicine, and military science (Vaidya and Kumar, 2006). It has also been applied to natural resource management decisions (Schmoldt et al., 2001).

Because natural resource managers often have to make decisions despite incomplete information, there is a need for analytic methods that can incorporate quantitative (i.e., best available science) and qualitative (e.g., professional judgment) information. Case studies in marine resource research and management show that the AHP can demonstrate instances when multiple stakeholder groups agree on priorities and other instances when they express discord. For example, in the Kenai River Chinook salmon sport fishery, stakeholders disagreed sharply about allocation issues but agreed on the desirability of adopting measures to enhance conservation and management and favored increased funding for enforcement of regulations (Merritt and Criddle, 1993). Leung et al. (1998) surveyed members of the Western Pacific Fishery Management Council to evaluate alternatives for limiting entry of longliners in the Hawaiian pelagic fishery and found consistency in management choices across four Council bodies: the Council itself, its Scientific and Statistical Committee, its Advisory Panel, and its fishery management plan teams. In assessing stakeholder preferences with respect to wetland management in Sri Lanka, Wattage and Mardle (2005) found that, although stakeholders expressed different views regarding specific objectives, there was consensus for conservation over development of wetlands. In contrast, Innes and Pascoe (2010) evaluated the importance of environmental impacts of fishing to stakeholder groups across Europe and found that while most stakeholders preferred adoption of measures to reduce habitat damage, commercial fishers preferred adoption of measures to reduce commercial fishing discards.

We selected the AHP for this study because of its ability to organize information and to prioritize input while highlighting differences. The Aleutian Islands region provides an excellent opportunity to test the robustness of the AHP as a tool for environmental decision-making because there are overlapping and often conflicting demands for use or non-use of resources in this region and there is a need for tools to help stakeholders to agree on priorities for research and management efforts. In order to coordinate research relevant to the Aleutian Islands region, it is necessary to identify, synthesize, and prioritize research needs.

1.1. The Aleutian Islands

The Aleutian Islands archipelago forms an arc between Alaska and Russia and separates the Bering Sea from the North Pacific Ocean (Fig. 1). The Aleutian Islands region is a biologically diverse and productive ecosystem that supports valuable fisheries and hosts high concentrations of seabirds and marine mammals. However, despite management actions intended to preserve resource abundance, local populations of several species of marine mammals, fish, and shellfish have declined (Schumacher and Kruse, 2005; NPFMC, 2007). In particular, concern over the decline and subsequent slow recovery of the western distinct population segment of Steller sea lions has prompted the closure of some fisheries (NMFS, 2010).

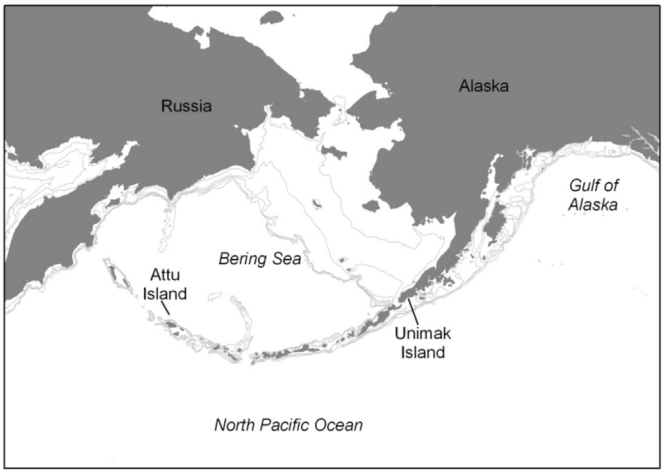

Fig. 1. The Aleutian Islands Regional Marine Research Plan boundary extends from Unimak Island to Attu Island. Contour lines represent 50 m isobaths up to a maximum 400 m. Source: ArcGIS Version 9.3.1.