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The Oregon Nearshore Research Inventory project: The importance of science and the scientific community as stakeholders in marine spatial planning

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ABSTRACT

The purpose of Oregon's Nearshore Research Inventory (NRI) project was to understand the geographic use of ocean space by the marine science community in order to include the information in Oregon's marine spatial planning (MSP) process. Spatial data and attributes about the geographic use of Oregon's ocean and coast by marine scientists were inventoried and mapped; including information about the geographic distribution of research, research timelines, and the people and institutions that conduct scientific research. The results of the NRI interviews show that the scientific community conducts research in twenty percent of the nearshore grid cells used in the Oregon's Territorial Sea amendment process. These results show that ocean space is used by the scientific community, and therefore, should be recognized as a use of ocean space in the MSP process.

As new uses, such as wave energy extraction, are proposed along coastlines and in the ocean, MSP can be used as a tool to reduce conflict and find compatible uses of ocean and coastal space. A major benefit of the scientific community's use of ocean and coastal space is that it results in data that can be used to inform ecosystem-based management decisions. Interruptions in long-term scientific research and monitoring as a result of ocean space use conflicts could limit the availability of information for use in future management decisions. While considering tradeoffs in the MSP process, decision makers need to recognize and account for the value of scientific space as a use of the ocean.

1. Introduction

Ecosystem-based management is an integrated approach that considers the entire ecosystem, including humans, by means of approaches that focus on protecting ecosystem structures, functions, and processes (Hughes et al., 2005; Leslie and McLeod, 2007; McLeod and Leslie, 2009). Marine spatial planning (MSP) is a management tool used to achieve EBM of marine resources (Douvere, 2008), and is defined as "a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives" (Ehler and Douvere, 2009, p. 18). Ideally, a MSP process will engage all ocean and coastal stakeholders (Halpern et al., 2011; Gopnik et al., 2012) to identify compatible use areas, thereby reducing conflict, while protecting and maintaining critical ecosystem services (McLeod et al., 2005; Foley et al., 2010; White et al., 2012).

During a MSP process, considering all social, ecological, and economic aspects of the ocean and coast is important when making these decisions (Pomeroy and Douvere, 2008; Halpern et al., 2011; White et al., 2012; Klain et al., 2014). A key facet of EBM is the science-based approach to making decisions, which aims to integrate multidisciplinary information from a variety of sectors (UNEP, 2011). This type of approach identifies scientific information as the building block for these management decisions (Stelzenmüller et al., 2013). Because of this, the marine and coastal scientific community, and in particular the data and interpretation they provide, plays a key role in MSP and other types of EBM activities.

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1.1. Challenges of integrating ocean and coastal science into management decisions

The National Ocean Policy (IOPFT, 2010) provides a framework for an ecosystem-based approach to managing marine resources. The role of scientists is to conduct research and interpret the resulting science (Lackey, 2013) and is perceived as apolitical (Carver, 2010). One of the roles of managers is to interpret and follow the guidelines of ecological policies while using scientific information to make tradeoffs between ecological, social, and economic considerations (Rosenberg and Sandifer, 2009). This can be challenging because the issues underlying management decisions are inherently complex (McLeod et al., 2005; Lester et al., 2013), and methods surrounding tradeoff decision-making and analysis are relatively new (Lester et al., 2013; Stelzenmüller et al., 2013).

The decision making process becomes even more challenging when managers need to make decisions when an action is new, such as marine renewable energy development (Lester et al., 2013); it is difficult to make a decision when there is a lack of understanding of the ecological consequences of the action (White et al., 2012). There is a tendency for policy issues to initiate funding for new research (Doremus, 2008), and with this comes a risk that science is engaged as a means to an end, rather as an end to itself (Krimsky, 2005). Scientific research, and specifically long-term monitoring of ocean and coastal ecological processes, provides valuable and relevant information to managers for use in trade-off analyses used to inform decisions. Without a comprehensive understanding of where, and over what time period, this research and monitoring is conducted, it is difficult to know what information is available, and where data gaps exist before managers need the information.

1.2. Scientists are ocean use stakeholders

The results of UNESCO's first international conference on marine spatial planning outline "research activities" as one of the 15 stakeholders groups (Ehler and Douvere, 2006). However, to date, the ocean and coastal monitoring community has been minimally recognized as an ocean use stakeholder in MSP processes around the world, and has not been formally recognized in MSP's in the United States. During the data gathering phase of Oregon's MSP process, a data gap in spatial information about where the ocean and coastal monitoring community uses ocean and coastal space was identified. This data gap prompted the Nearshore Research Inventory (NRI) in order to understand how and where research activities use ocean and coastal space in Oregon. The methods for this project can serve as a template for inventorying and mapping the use of the coast and ocean by marine scientists, from this point forward referred to as the coastal monitoring community.

A major motivation behind the Nearshore Research Inventory was concern that future proposed ocean uses, such as marine renewable energy development, would pose a risk to current and future research and monitoring activities. This community provides data and information that can be used by managers during decision-making processes. However, to gather this information, the ocean and coastal monitoring community uses ocean space – through buoys, research cruises, and biological and chemical sampling stations, and should be considered an ocean use stakeholder. Therefore, it is important to have a more comprehensive understanding of how and where the coastal monitoring community uses ocean and coastal space in order for the MSP process to truly engage all stakeholders.

1.3. Oregon's Territorial Sea Amendment process: a case study of integrating the ocean and coastal monitoring community as an ocean use stakeholder in the MSP process

In 2013, Oregon approved amendments to its Territorial Sea Plan (TSP: a marine spatial plan), which is the state's policy for managing activities from 0 to 3 nautical miles from the shoreline, in order to include marine renewable energy as a potential use of the ocean and coastal environment. In order to amend the plan, Oregon Department of Land Conservation and Development (DLCD), which houses the state's federally approved coastal management program, was charged with conducting a public process to spatially identify current ocean uses and resources and plan for future marine renewable energy development activities. As part of this process, DLCD engaged different stakeholders to map current and future uses of the Territorial Sea for inclusion in the TSP amendment process. Stakeholders identified in the process include the commercial and recreational fishing community, recreational use community (e.g. surfers, kayakers, and scuba-divers), and other beneficial uses (navigation channels, dredge disposal sites, telecommunication cables, pipelines and outfalls). After identifying a data gap regarding the space used by the coastal monitoring community in the Territorial Sea, DLCD initiated the Nearshore Research Inventory (NRI) project. This project, which defines the nearshore environment as the area from the shoreline up to the edge of the continental shelf, with an emphasis on the Territorial Sea, aimed to document the geographic and temporal use of ocean and coastal environments by the coastal monitoring community for use in Oregon's TSP amendment process.

The objectives of the project were to:

- Inventory current research projects within the Oregon nearshore environment;
- Identify when (over what time period), where (geographically off the Oregon coast), and what type of research is being and will be conducted;
- Create maps using tools such as Google Earth and Environmental Systems Research Institute's (ESRI®) ArcMap that identifies research locations off the coast of Oregon.
- Include the coastal monitoring community's ocean space use (e.g. scientists from federal and state agencies, non-profit organizations, educational institutions, research institutions, and privately owned companies) as a stakeholder in Oregon's MSP process;
- Provide a template for inventorying and mapping the spatial use of the coast and ocean by marine scientists for user in other MSP processes.

2.0. Methods

2.1. Data gathering

A list of individuals identified as key informants (Berg and Lune, 2012) was developed by the Coastal Permit Specialist for the Oregon Department of Land Conservation and Development. These individuals were identified based on their professional involvement with the Oregon marine research community in the beginning of the project to gain background information on the ocean and coastal monitoring community in Oregon. Key informants were contacted by email, and asked to participate in an informal discussion over the phone. Using a snowball sampling technique (Robson, 2002), the key informants identified potential contacts for principal investigators (PI) of specific research projects. Using this information, a list of individuals and agencies associated with ocean and coastal research in Oregon was developed. This list