Representative Systems of Protected Areas: A Short Guide for Planners

President Clinton's executive order places the US in a group with Australia, New Zealand, the Bahamas, and a small number of other nations, with each having stated its intent to create a "representative" national network of MPAs.

The word "representative" regularly appears in protected-areas planning, and designation of representative networks has long served as a goal in terrestrial land management. Building a network of protected areas representing a variety of ecosystems is intended to ensure protection for biodiversity.

But at what scale should planners implement such representativeness? And what does "representative" really mean? For guidance, MPA News consulted the literature and queried some experts.

A function of scale

In his new book *Bioregional Planning: Resource Management Beyond the New Millennium*(Harwood Academic Publishers, 2000), David Brunckhorst suggests that "representativeness" refers to the extent that existing or proposed protected areas sample known biodiversity, ecological patterns and processes, and physical features at a variety of spatial scales. "Any measure of representativeness will be a function of scale," writes Brunckhorst, director of the UNESCO Institute for Bioregional Resource Management.

Brunckhorst writes that the first step in establishing an ecologically representative protected area system is to agree on how to interpret the environment in a way that indicates what should be represented. In other words, planners must decide at what spatial scale they want to work.

In the mid-1990s, a group co-sponsored by the IUCN (World Conservation Union) proposed the creation of a worldwide representative system of MPAs. Dividing the world's marine waters into 18 large biogeographic zones -- e.g., Antarctic, Caribbean, Northwest Pacific -- the group analyzed each zone's existing MPAs and the potential need for additional protection.

As summarized in *A Global Representative System of Marine Protected Areas*(IUCN, 1995), the group noted that most of the biogeographic zones included a range of different ecosystems. "More detailed information on the range of ecosystem types present in each zone and in each MPA would be required to determine the extent to which the biodiversity of each zone is 'represented,'" the group concluded.

Challenges

For the terrestrial environment, several biogeographic systems are available and generally accepted: One of the best-known was developed in 1975 by Miklos Udvardy, who divided the terrestrial world into eight biogeographic realms, based on geographic and historic elements. The marine environment, however, is much more difficult to categorize, owing in part to its dynamic nature and other factors, including depth, types of coastline, salinity, and light.

Despite the challenges, practitioners have worked to stake out regional planning systems. Kathleen Sullivan Sealey (a biologist from the University of Miami, US) and Georgina Bustamante (a conservation coordinator for The Nature Conservancy, US) directed a team of scientists on a project to divide the marine and coastal environments of Latin America and the Caribbean into nine "biogeographic provinces" (MPA News 1:7). Each province was subdivided into marine ecoregions. The Central Caribbean ecoregion was further subdivided into 51 "coastal systems" for the purpose of identifying specific sites for marine conservation action.

How far down the spatial hierarchy should planners go? The IUCN report suggests that the approach should depend on the region or country applying it. "The biogeographic system used...in developing a representative MPA system need not be universally applicable but must suit the region or country's existing scientific heritage and information base," according to the

report.

In the Bahamas, where the national government called for the creation of a representative system of MPAs, scientists responsible for proposing the network incorporated their understanding of the archipelago's critical ecosystems. "For the Bahamas, 'representative' in the most fundamental sense means to me: coral reefs, mangroves, seagrass beds, algal plains, and marine blue holes," said Mark Hixon of Oregon State University (US). "I would further subdivide reefs into various categories based on dominant corals and other benthos, depth, proximity to other habitats, and any critical features, especially spawning aggregation sites of grouper and other species."

Representative vs. distinctive

Mark Zacharias, an analyst with the Land Use Coordination Office of British Columbia, Canada, said that the words "representative" and "distinctive" can sometimes cause confusion. If you are given a choice, he proposes, between preserving a truly representative area of abalone habitat -- similar to other abalone habitat -- or an area of distinctive (exceptional) abalone habitat, should you choose the representative habitat or the distinctive one?

"Where a number of similar areas are encountered, the most distinctive area -- as usually measured through comparisons of biophysical attributes -- is generally advanced as the candidate MPA," said Zacharias. "The phrase 'representative system of MPAs' is therefore somewhat misleading."

References:

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Three Principles for Networks

David Brunckhorst suggests that three principles -- complementarity, flexibility, and irreplaceability -- can be useful in developing representative reserve networks:

Complementarity refers to the contribution each new protected area makes to existing areas in terms of representing features not found elsewhere.

Flexibility acknowledges that within a given spatial context, different combinations of sites may be available to form a representative network.

Irreplaceability provides a way of measuring the conservation value of any site. "An irreplaceable site," Brunckhorst writes, "will appear in every analysis of alternative combinations of sites."

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