Case Study: Identification of priority sites for conservation in the northern Gulf of Mexico; using peer review to improve credibility and quality of methods and outcomes[1]

Summarized by Shirley Keel from: Beck, M. W., M. Odaya, J. J. Bachant, J. Bergan, B. Keller, R. Martin, R. Mathews, C. Porter, G. Ramseur. 2000. *Identification of priority sites for conservation in the northern Gulf of Mexico: an ecoregional plan.* The Nature Conservancy, Arlington, VA.

Purpose and region of analysis

The purpose of the northern Gulf of Mexico ecoregional assessment was to identify sites that represent the biological diversity of the near shore waters of this region. The northern Gulf of Mexico Ecoregion extends from Anclote Keys, Florida, to the southern extent of the Laguna Madre de Tamaulipas, Mexico, and may be broadly divided into western, central and eastern sub-regions.

The methods developed for site prioritization and the prioritization itself were subject to peer review. The methodology was published in a peer reviewed journal. The prioritization of sites resulting from this methodology was reviewed and improved by local biodiversity experts. Together these reviews added credibility to and support for the process and outcomes.

Criteria /Methods

During the priority site selection phase of the ecoregional planning process, expert interviews and an experts' workshop were conducted to review portfolios generated by a reserve selection algorithm SITES v1.0. The northern Gulf of Mexico ecoregional plan (Beck et al. 2000) was published in October 2000. Using the eastern subregion—northwest Florida as an example, Beck and Odaya (2001) illustrated the process of ecoregional planning in marine environments in a peer-reviewed journal *Aquatic conservation: marine and freshwater ecosystems*.

Products / Outcomes

The basic steps in ecoregional planning—identification of conservation targets (species and habitats), collection of data on their ecology and distribution, determination of conservation goals for the amount of targets that must be protected, and identification of a set of sites that meet these goals for all targets—were adhered to the ecoregional plan of the northern Gulf of Mexico. The concept of setting conservation goals and identifying priority sites across

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a large geographic region was considered novel by many workshop participants at the time in 2000.

Given the constraints in quality and quantity of available biodiversity information, using the computer program SITES to assemble portfolios of conservation areas has obvious benefits over the subjective way of drawing circles around selected areas by workshop participants. The software SITES and similar programs were designed with clear underlying assumptions to perform mathematical analyses which provide a heuristic framework for initiating discussions and explaining the scale, scope, and potential outcome of an ecoregional plan.

Results of sites v1.0: mathematical algorithm to determine strawman priority sites

Western Gulf-- Laguna Madre de Tamaulipas to Brazos River

Algorithm= Simulated Annealing

Results=

Laguna Madre de Tamaulipas
Lower Laguna Madre
Baffin Bay
Upper Laguna Madre
Corpus Christi Bay
Matagorda Bay

Central Gulf-- Galveston Bay to Mobile Bay

Algorithm= Simulated Annealing

Results=

Mobile Bay	
West Mississippi Sound	
Chandeleur Sound	
& one of either	*with one of either*
Atchafalaya/Vermillion Bay	Grand &White Lake
Terrebonne/Timbalier Bays	Galveston Bay

Eastern Gulf-- Perdido Bay to Anclote Keys

Algorithm= Simulated Annealing

Results=

Apalachee Bay (south)	Apalachee Bay (south)	Apalachee Bay (south)
Apalachicola Bay	Apalachicola Bay	Apalachicola Bay
Choctawhatchee Bay	Apalachee Bay (north)	Pensacola Bay

In personal interviews and at the workshop, experts evaluated the assumptions, data, and results of the analysis. Most of the results from mathematical analyses were ecologically sensible. There were, however, cases when the results of mathematical analyses did not give a full picture of the distribution of diversity and its threats in the northern Gulf of Mexico. More priority sites were selected by experts than by the computer program to reflect variability in communities within habitat types across the ecoregion. The addition of extra sites generally was a reflection of the fact that the mathematical analyses were based on insufficient data particularly because the classification of marine habitats was too coarse. An

underlying assumption for the data used in the mathematical analyses was that there were no differences in the assemblages of plants and animals found within any given habitat type (e.g. each patch of seagrass was assumed to have similar community composition throughout the subregion).

The final set of priority sites was assembled after combining the results of the mathematical analyses with the comments by the scientists and managers. Some changes were made in the site boundary lines. The priority sites are generally whole bays and estuaries. The high priority sites contain the most important occurrences of the conservation targets in the northern Gulf of Mexico. In general the 20% conservation goal of current targets' distribution was met for almost all targets except for those with little available spatial data. Most experts, however, were concerned that a 20% goal based on current distributions was insufficient given the amount of the habitat lost in the Gulf of Mexico.

Tools

1) A mathematical reserve selection program, SITES v1.0: providing a preliminary set of priority sites that could be used to stimulate debate and enhance the data-gathering process.
2) Expert consultations: interviews and a workshop with local scientists and managers.
3) Peer-reviewed journal publication to increase visibility and credibility.

Lessons learned (strengths and weaknesses)

Strengths
1) Experts' review of portfolio sites in the form of interviews and a workshop with more than 25 scientists and managers from around the region is time-saving, transparent, and encouraging buy-ins from stakeholders for the implementation of the ecoregional plan or conservation actions.

2) Publishing the results of ecoregional assessment in a peer-reviewed journal increases the credibility of the work and helps to reach a wider audience to get familiar with TNC science-based conservation work.

Weaknesses
The time-lag between submission (in this case 12 July 2000) and publication of an article (in this case July/August issue of 2001) to a peer-reviewed journal is often between six months to one year. Publication should be reserved for action that is not time-sensitive.

Suggestions for Others

The process of using a computer program SITES as well as interviews and a workshop with scientists and managers to assemble a set of priority sites prove to be complementary and effective. This combined method should be transferable to many planning exercises and should work better than getting participants to draw lines around priority areas on blank maps. Overall there was substantial congruence between the results of the mathematical

analyses and the input of the scientists and managers. Scientists and managers tended to add additional sites to those that were suggested by the mathematical analyses. It is potentially problematic that these additions could reflect personal biases in the selection of priority sites. However the additional sites should be acceptable as long as there is a broad consensus among the scientists and the participants did not simply suggest that their local study sites should be given priority.

References

Michael W. Beck and Mami Odaya. 2001. Ecoregional planning in marine environments: identifying priority sites for conservcation in the northern Gulf of Mexico *Aquatic Conserv: Mar. Freshw. Ecosyst*. **11**: 235-242