

**Marine Applications of SPEXAN/SITES/MARXAN as of December 2002.**

*This information is excerpted from a database of marine conservation planning initiatives compiled by Heather Leslie (Leslie, in prep.). Personal communications with the contacts were used to compile these data, but all errors are the responsibility of H. Leslie alone. When available, published or online sources are listed. Please send additions and corrections to Heather at [leslieh@science.oregonstate.edu](mailto:leslieh@science.oregonstate.edu). Thank you.*

<u>Location</u>	<u>Approach</u>	<u>Contact</u>	<u>Published source</u>	<u>Online source</u>
Florida Keys National Marine Sanctuary (USA)	<p>SPEXAN 3.1/SITES: This was the first marine application of the simulated annealing algorithm, which is part of the SPEXAN / SITES / MARXAN packages, all of which were written by Ian Ball in collaboration with Hugh Possingham. Using detailed maps of coral reefs and other marine habitats from the Florida Keys, we tested whether the tool could be used to create a potential network of marine reserves that included at least 20% of each habitat type. We found there were many ways, rather than one 'best' way, to select reserves to meet particular goals.</p> <p>Given the social and economic constraints inherent in all resource management situations, the multiplicity of potential reserve networks makes them a flexible and useful tool for marine management. Following our test case, resource managers and community leaders applied the tool in the field, to design a network of marine reserves in the Channel Islands National Marine Sanctuary.</p>	<p>Heather Leslie, Dept. of Zoology, Oregon State University, Corvallis, OR 97331 USA email: <a href="mailto:leslieh@science.oregonstate.edu">leslieh@science.oregonstate.edu</a></p>	<p>Leslie, H., M. Ruckelshaus, I.R. Ball, S. Andelman, and H.P. Possingham. 2003. Using siting algorithms in the design of marine reserve networks. Ecological Applications.</p>	
Channel Islands National Marine Sanctuary (USA)	<p>SITES: A working group of stakeholders used the siting tool to design a network of fully protected marine reserves for the National</p>	<p>Satie Airame, Scientific Advisor, Channel Islands National Marine Sanctuary,</p>	<p>Airame, S. J. E. Dugan, K. D. Lafferty, H. Leslie, D. A. McArdle, and R. R. Warner. 2003. Applying ecological</p>	<p><a href="http://www.cinms.nos.noaa.gov/marineres/main.html">http://www.cinms.nos.noaa.gov/marineres/main.html</a></p>

	Marine Sanctuary. Conservation targets were primarily marine habitats (or ecosystems), although species-specific data were also considered. Once approved, this network will occupy 25% of the Sanctuary's 4300 km <sup>2</sup> area.	113 Harbor Way, Suite 150, Santa Barbara, CA 93109-2315 USA email: Satie.Airame@noaa.gov	criteria to marine reserve design: A case study from the California Channel Islands. Ecological Applications.	
Northern Gulf of Mexico (USA)	SITES: This was the first non-governmental application of the tool to be published in the peer-reviewed literature. Conservation targets included both biological communities and species of interest. The identified priority areas currently are being used to help guide conservation activities by TNC and other organizations in the region.	Michael Beck, The Nature Conservancy, Center for Ocean Health, Long Marine Laboratory, 100 Shaffer Rd., UC Santa Cruz, CA 95060, USA, email: mbeck@tnc.org	Beck, M.W. and M. Odaya 2001. Ecoregional planning in marine environments: identifying priority sites for conservation in the northern Gulf of Mexico. Aquatic Conservation: Marine and Freshwater Ecosystems 11:235-242.	TNC. 2000. Identification of priority sites for conservation in the Northern Gulf of Mexico: An ecoregional plan. Draft released August 2000. Available online at <a href="http://www.conserveonline.org">http://www.conserveonline.org</a> , Accessed December 9, 2002.
British Columbia (Canada)	MARXAN: Staff at this grassroots non-governmental organization have used the siting tool to explore the possible configurations of a system of marine protected areas, including fully protected marine reserves, for the British Columbia Central Coast. Conservation targets include both marine habitats and species.	Jeff Ardron, Living Oceans Society, Box 166, Sointula, BC, V0N 3E0, CANADA email: jardron@livingoceans.org	Ardron, J., J. Lash and D. Haggarty. 2002. Modelling a network of marine protected areas for the central coast of British Columbia. Ver. 3.1. Living Oceans Society. Sointula, British Columbia, Canada. Accessed online at <a href="http://www.livingoceans.org/library.htm">http://www.livingoceans.org/library.htm</a> , December 9, 2002.	
Great Barrier Reef Marine Park (Australia)	MARXAN: This effort will evaluate the existing zoning scheme in the GBRMP to meet biodiversity conservation objectives. In particular, the fully protected reserves (or green zones), which currently occupy 5% of the Park, are expected to increase in area. Staff have assembled comprehensive information on marine ecosystems, and plan to integrate socioeconomic data as well during the course of the project. A draft plan is slated to be released in mid 2003.	Suzanne Slegers, GIS Officer Representative Areas Program, Biodiversity and World Heritage, Great Barrier Reef Marine Park Authority, PO Box 1379, Townsville, QLD Australia 4810 email: s.slegers@gbmpa.gov.au		<a href="http://www.gbmpa.gov.au/corp_site/key_issues/conservation/rep_areas/rep_areas_overview.html">http://www.gbmpa.gov.au/corp_site/key_issues/conservation/rep_areas/rep_areas_overview.html</a>
Willamette Valley-Puget	SITES: Conservation planners are using both biological community and	Zach Ferdana, GIS Analyst,	Ferdana, Z. 2002. Approaches to integrating a marine GIS into	

Trough-Georgia Basin (USA / Canada)	species-based conservation targets to draft a network of priority areas for conservation action in the Pacific Northwest (USA). It is one of the first MARXAN initiatives to involve both marine and terrestrial environments. This plan will be complemented by a 'North Coast' ecoregional planning effort, which is ramping up as of December 2002.	The Nature Conservancy of Washington, 217 Pine Street, Suite 1100, Seattle, WA 98101 USA email: zferdana@tnc.org	The Nature Conservancy's ecoregional planning process. In Marine Geography: GIS for the Oceans and Seas. J. Breman, ed. Pp. 151-158. Redlands, WA: ERSI.	
Gulf of California (Mexico)	SITES: This collaborative effort between marine scientists at Scripps Institution of Oceanography (USA) and World Wildlife Fund yielded possible marine reserve network configurations for the Gulf of California. Conservation targets included marine habitats, species, and occurrences of key ecological processes (e.g. spawning sites). Socioeconomic data (e.g. fisheries effort) were integrated into the analysis, making this the first published test of the algorithm that included both biological and economic information. The authors found that a network covering 40% of rocky reef habitat can fulfill many conservation goals while reducing social conflict.	Enric Sala, Center for Marine Biodiversity and Conservation, Scripps Institution of Oceanography, La Jolla, CA 92093, USA email: esala@ucsd.edu	Sala, E., O. Aburto-Oropeza, G. Paredes, I. Parra, J. C. Barrera, and P. K. Dayton. 2002. A general model for designing networks of marine reserves. Science 298: 1991-1993.	
Galapagos Islands (Ecuador)	MARXAN: The siting tool is being used to further the implementation of the Galapagos Marine Reserve and the associated zoning initiative, and to monitor its performance.	Rodrigo H. Bustamante, CSIRO Marine Research, PO Box 120, Cleveland, 4163, AUSTRALIA Email rodrigo.bustamante@csiro.au		Bustamante, R., K. J. Collins, and R. Bensted-Smith. 2000. Biodiversity conservation in the Galapagos Marine Reserve. Proceedings of the Symposium 'Science for Conservation In Galapagos.' April 15, 1998. Bulletin de L'Institut Royal Des Sciences Naturelles de Belgique 70, Supplement. Accessed online November 15, 2002:

				<a href="http://www.darwinfoundation.org/articles/br15049802.html">http://www.darwinfoundation.org/articles/br15049802.html</a>
Northwest Atlantic (USA/Canada)	MARXAN: WWF Canada and The Conservation Law Foundation (Boston, MA, USA) are collaborating on this initiative to designate areas of high conservation value in the Gulf of Maine/Bay of Fundy/Scotian Shelf/Georges Bank/Offshore waters. It is in the early stages.	Hussein Alidina, Sr. Manager GIS/Conservation Planning, Marine Program, WWF Canada, Suite 1202 - 5251 Duke Street, Duke Tower, Halifax, Nova Scotia B3J 1P3, CANADA email: <a href="mailto:halidina@wwfcanada.org">halidina@wwfcanada.org</a>		
South Australia	MARXAN: Marine reserve systems are configured using MARXAN to compare solutions that retain South Australia's existing marine reserves with reserve systems that are free to either ignore or incorporate them. Determining which areas are selected more than could be expected from chance alone lets us examine how efficiently South Australia's existing marine reserve's contribute to quantitative biodiversity conservation targets. Existing marine reserve that fail to contribute to efficient marine reserve systems constitute opportunity costs. This work showed that ad hoc marine reserve design is likely to be inefficient and may compromise effective conservation of marine biodiversity.	Romola Stewart, The Ecology Centre, The University of Qld, email: <a href="mailto:rstewart@zen.uq.edu.au">rstewart@zen.uq.edu.au</a>	Stewart, RR., Noyce, T., Possingham, HP. The opportunity cost of ad hoc marine reserve design decisions - an example from South Australia. Marine Ecology Progress Series 2003	R.R. Stewart and H.P. Possingham. A Framework For Systematic Marine Reserve Design In South Australia: A Case Study. Presented at the Inaugural World Congress on Aquatic Protected Areas – Cairns August 2002 <a href="http://www.ecology.uq.edu.au/links/Stewart_SystematicMR(Aug_02).pdf">http://www.ecology.uq.edu.au/links/Stewart_SystematicMR(Aug_02).pdf</a>  RR Stewart, 1* T Noyce 2 and HP Possingham1 The opportunity cost of <i>ad hoc</i> marine reserve design decisions - an example from South Australia <a href="http://www.ecology.uq.edu.au/links/Stewart_SA_OppCosts(Dec_02).pdf">http://www.ecology.uq.edu.au/links/Stewart_SA_OppCosts(Dec_02).pdf</a>