# PUTTING SCIENCE AND TECHNOLOGY INTO COLLABORATIVE MPA PLANNING

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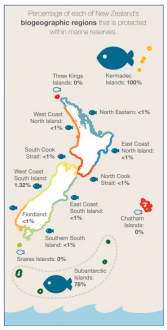
## New Zealand's Marine Protected Area (MPA) Policy

***Protect marine biodiversity by establishing a network of MPAs that is comprehensive and representative of New Zealand's marine habitats and ecosystems***




**Network Design Principles:**

- Representativity: Sites included in a MPA network should be representative of all habitats and cover centres of endemism and rare habitats or ecosystems.
- Replication: each habitat will be protected in a minimum of 2 separate MPAs. More replicates where a habitat or ecosystem is particularly vulnerable to irreversible change.
- Connectivity
- Viability: based on nature of the protection, presence of replicate MPAs, connectivity, maintenance of ecosystem processes, nature of threats, recoverability from threats, amenability for mitigation of threats. Preference for fewer, larger MPAS rather than numerous smaller MPAs

**Planning principles**

- Consistent approach to classification
- provide for special relationship between the Crown and Maori
- Processes will be undertaken in a transparent manner that informs and allows for participation and input from the public
- Minimise adverse impacts on existing users of the marine environment
- Use best available information in decision-making

***SeaSketch is designed to be easy to use by non-specialists, anytime, anywhere. All you need is an internet connection.***

## Systematic conservation planning

A systematic, ecosystem-based approach to marine conservation planning is recognised as an efficient path towards balancing the protection of marine species and ecosystems with economic, social and cultural demands. Historically, achieving sustainable, equitable and cost-effective solutions in the marine context has often been highly contentious due to the unequal access to information and a lack of involvement perceived by the public and stakeholders. Collaborative, participatory and transparent approaches to decision-making, based on best-available information and science, are increasingly proven to be the best way forward towards successful marine stewardship.

## What is SeaSketch?

SeaSketch (www.seasketch.org) is a web-based tool specifically developed for use in collaborative and participatory marine spatial planning initiatives such as New Zealand's MPA planning.

Developed by researchers and software developers at the University of California Santa Barbara, SeaSketch is currently in use in a range of planning processes around the world. SeaSketch's predecessor (MarineMap) was instrumental in the successful development of a comprehensive MPA network in California.

Since 2012 DOC has been working with the SeaSketch developers to bring SeaSketch to New Zealand for its use in collaborative and participatory MPA planning initiatives.

## The SeaSketch Toolbox

No two MPA processes are alike. SeaSketch's various functionalities are tailored to reflect the process and planning objectives that are case-specific to each MPA process and empower non-technical stakeholders to actively participate in conservation planning.

### Access to best available information

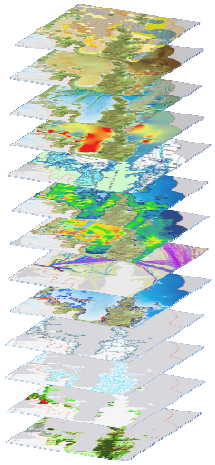
An intuitive user interface allows users to view and explore biological, physical and socio-economic data for the planning area.

**Marine environment**
- Bathymetry
- Currents
- Substrate
- Marine habitats
- Species distribution
- Areas of high ecological value
- Ecosystem services

**Uses and existing management**
- Navigational charts
- Commercial fishing
- Extraction and prospecting
- Recreational activities
- Shipping
- Heritage sites

**Cultural**
- Location of marae
- Matauranga maori

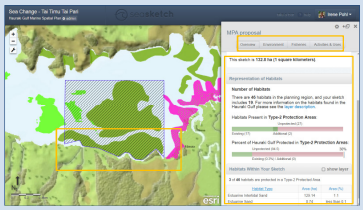
**Land use and catchment**
- Catchments
- Rivers
- Water quality
- Land cover
- Land use and conservation



### Sketching MPA designs and retrieving analytical reports

SeaSketch's analytical capability represents its core functionality as a geospatial decision-support tool. Custom-built reports, reflecting planning objectives and integrating MPA design criteria, analyze the often complex geospatial information to inform stakeholders' discussions.

As users sketch areas of interest on a map, SeaSketch will provide analytical feedback about the area within seconds. These reports can identify information such as types and percentage of habitats included in the sketch, and potential social or economic costs and benefits, e.g. *what biodiversity, social, cultural and economic values are found in the area I have drawn?* In addition, a report might provide feedback on how well the sketch might be meeting process objectives, *e.g. Does my MPA network includes examples of all habitats?*



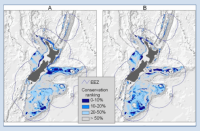
Different tabs lead the user through various parts of the report.

Tables and diagrams present the information in a user-friendly and summarized manner.

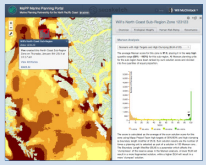
Automatic geoprocessing clips the drawn sketch to the coastline or the boundaries of existing incompatible uses (e.g. aquaculture sites).


A fast and easy to use workflow encourages iterative designs by users to meet planning objectives

Analytical reports can also report on outputs of more advanced analysis such as conservation prioritization models , *e.g. Marxan or Zonation.*



Demersal fish Zonation analysis (Leathwick *et al* 2008)



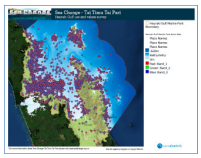
Example of reports based on Marxan runs for the western Canada Marine Spatial Planning processes (BC Marine Conservation Planning Analysis 2012).

### Collaboration - Online sharing and discussing of MPA proposals

SeaSketch can be used to engage with others face-to-face and online. Users can share their MPA designs with SeaSketch's built-in chat function. Individually or collaboratively, users can explore alternative use scenarios and ultimately modify MPA proposals towards options that reflect agreement across different interests.

### Survey tool - Collection of spatial information relevant to MPA planning

SeaSketch has the built-in capability for quick set-up and dissemination of web-based surveys that collect spatially-referenced information. Surveys targeting the general public or experts can provide valuable data and leverage local knowledge. It also provides a cost-effective way of promoting and facilitating public participation at various stages of the process.

Possible use scenarios:
- Crowdsource data from stakeholders, interest groups or the public to fill data gaps
- Public surveys on values and uses of the marine space
- Public engagement and consultation

### SeaSketch IT infrastructure and data specs

SeaSketch is a set of interlinked applications provided as a Software As A Service (SAAS) and hosted in the Amazon Web Service (AWS) cloud. SeaSketch supports map services from ArcGIS Server, OGC compliant WMS, and Tiled Map Services.

DOC has developed a secure back-end infrastructure to publish data for use in SeaSketch. Researchers, agencies or others wishing to contribute data need to provide their data in raster or vector format together with complete metadata and any information on legal constraints and limitations.

### Benefits for MPA planning

- **Accessibility and transparency:** Equal access to geo-spatial information for everyone involved in the planning process.
- **Inclusiveness:** Non-technical users are empowered to actively participate in spatial planning.
- **Collaboration:** Users collaborate during meetings or from the comfort of their homes to modify and improve designs to reflect shared interests/goals.
- **Participatory:** SeaSketch provides a variety of functionalities that facilitate participation and collaboration on multiple levels.
- **Informed engagement:** Users learn in an intuitive manner about process goals and principles. Data and background science is available on-demand.
- **Timeliness**: Real-time feedback on proposed designs enables multiple iterations of scenarios in a short time.

SeaSketch will contribute towards building trust, credibility and ultimately buy-in amongst stakeholders and the public for the created MPA network recommendations.

**Further reading**
- Merrifield M, McClintock W, Burt C, et al. *MarineMap: A web-based platform for collaborative marine protected area planning*. Elsevier Ltd; 2012. doi:10.1016/j.ocecoaman.2012.06.011.
- Gleason M, McCreary S, Miller-Henson M, et al. Science-based and stakeholder-driven marine protected area network planning: A successful case study from north central California. *Ocean Coast Manag*. 2010;53(2):52–68. doi:10.1016/j.ocecoaman.2009.12.001.

**Citations**
- British Columbia Marine Conservation Analysis. 2012. A Series of Marxan Scenarios for Pacific Canada: a report from the British Columbia Marine Conservation Analysis (BCMCA) © British Columbia Marine Conservation Analysis, 2012
- Leathwick, J., Moilanen, A., Francis, M., Elith, J., Taylor, P., Julian, K., & Duffy, C. (2008). Novel methods for the design and evaluation of marine protected areas in offshore waters. *Conservation Letters*, *1*(2), 91-102.

**Acknowledgements**

**The SeaSketch crew at the Marine Sciences Institute, University of California, Santa Barbara**

New Zealand Government

Department of Conservation
*Te Papa Atawhai*