# Science-based Guidelines for Marine Protected Areas and MPA Networks in Canada

## An Overview

CPAWS
Canadian Parks and Wilderness Society

## Canadian seas need protection. For life and livelihoods.

Canada's oceans are suffering from the combined effects of overfishing, pollution, heavy industry and climate change. These global pressures on ocean ecosystems are especially worrisome in Canada, a country with strong maritime traditions and economies in three oceans — the Atlantic, the Pacific and the Arctic — and in the Great Lakes. As the country with one of the largest ocean territories in the world and with the longest coastline, Canada has a special responsibility to assume stewardship for ecosystem integrity and ocean health.

**If we do it right, Marine Protected Areas will protect special places in the sea** and restore and sustain healthy oceans. Canada needs to finish the network of MPAs it began in 1992.

## What are Marine Protected Areas (MPAs)?

The International Union for Conservation of Nature (IUCN) defines an MPA as:

*A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.*

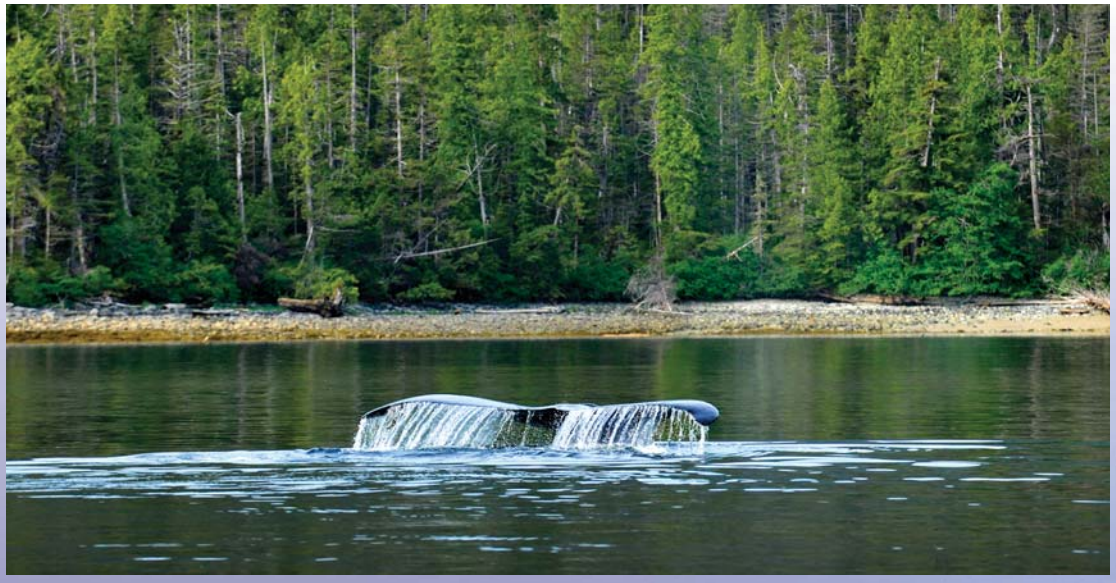
The strictness of protection can vary considerably from one MPA to another, and even among zones within an individual MPA. Zones in which all extractive activities are strictly prohibited are referred to as 'no-take reserves'.

With low impact from humans, MPAs support healthy ecosystems where biodiversity can flourish and fish stocks can replenish.

The international scientific community has demonstrated the ecological and socio-economic perspectives which should underpin the development of Canadian networks of MPAs, including how they can:

- contribute to the protection of marine species and habitats, as well as ecological processes.
- support sustainable relationships of people with oceans.

As MPA development proceeds in Canada current and future people, as well as other forms of life must be accorded just treatment.



## Networks of MPAs are essential

***To have the best odds of long-term success, MPAs need to be planned as part of a network of interconnected protected areas.***

In an effective network, MPAs are connected by the movement of organisms and nutrients. Networks are thus much more than the sum of their individual parts.

## Need for progress on MPAs

Canada protects less than one percent of its oceans. It's not nearly enough. Canada also lacks a strategic network of MPAs, despite repeated international commitments including the 2002 World Summit on Sustainable Development and the 2004 United Nations Convention on Biological Diversity.

But it's not all bad news. Canada has made considerable effort to develop a policy framework to establish a comprehensive network of MPAs.

This booklet summarizes the guidelines detailed in a larger report: *Science-based Guidelines for Marine Protected Areas and MPA Networks in Canada.*

## Science-based guidelines to reach MPA network objectives

These science-based guidelines were developed to inform the design and implementation of effective networks of MPAs throughout Canada's three oceans.[1]

The approach is based on scientific understanding of marine ecosystems, human communities and institutional arrangements, and the integration of knowledge from the biophysical and social sciences. They reflect the prominent place of Canada's Aboriginal peoples in the stewardship of our oceans.

**Canada has the opportunity and *the responsibility* to take a leadership role in marine stewardship and protection**. These guidelines are prepared with this goal in mind and to aid with its realization.

1. While Canadian MPA network policy includes the Great Lakes, these guidelines only consider marine ecosystems. Nevertheless, many of the guidelines may be applicable to the freshwater ecosystems of the Great Lakes bioregion.

## A Priority on Healthy Marine Ecosystems

These guidelines affirm that in order to achieve the full benefit of MPAs in Canada, the protection of healthy marine ecosystems must be the priority, and a number of specific requirements must be met, including:

- **no-take reserves spanning no less than 30% of each bioregion in Canadian waters;**
- **exclusion of industrial uses and developments, including exploration for and extraction of non-renewable resources, dredging, dumping, and destructive fishing practices, particularly bottom trawling;**
- **planning MPAs in effective networks and as part of comprehensive oceans management;**
- **providing interim protection from threats for candidate areas;**
- **respecting the rights and interests of Aboriginal peoples.**

# The "How to" Guide: Effective MPAs in Canada

## ECOLOGY COMES FIRST

### Selecting ocean spaces for conservation success

***Choosing the sites based on ecology:*** The design of functional networks of MPAs requires the initial identification and characterization of all sites of bioregional importance.

**Ecological Criteria to Determine Importance of Sites:**

- **Uniqueness, rarity or special character**
- **Productivity**
- **Biological diversity**
- **Degree of naturalness/human impact**
- **Sensitivity/resistance to disturbance**
- **Potential for recovery from disturbance**

## Creating functional networks on Canada's coasts

**Ecological Guidelines for Networks of MPAs:**

- *Create no-take reserves* – 30% of each bioregion should be within no-take reserves.
- *Provide adequate representation of habitat types and sites with unique, rare and special character* – At least 30% of the area of each habitat type in a bioregion should be placed in no-take reserves. For some particularly significant or particularly degraded habitat types, a larger proportion of the habitat area present may need to be protected to achieve conservation goals. All unique sites and most rare and special character sites must be protected.
- *Ensure connectivity among MPAs* – The appropriate distance between MPAs in a network depends on the scale of dispersal of the species of concern in that network. Distances should usually vary between approximately 20 km and 200 km.
- *Create large MPAs* – An average MPA size of at least 10-20 km in diameter (or in the smallest dimension) in recognition of the fact that very small MPAs may be effective in some circumstances but that in general MPA sites should be larger rather than smaller, with shapes that minimize the amount of edge.
- *Ensure replication of protected habitats and features* – Networks should contain at least two, spatially well-separated examples of each habitat type and at least three to five examples of all rare or special character sites (when their natural abundance allows it).
- *Plan for climate change* – Bioregional networks must recognize changes to natural processes and human use that will result from rapid climate change. This requires large, strictly protected areas and the designation of more, closely spaced MPAs. In addition, there is a need to include large areas that can serve as carbon sinks, such as seagrass meadows and saltmarshes.

## Social and cultural gains

**Linking Ecological and Social Ocean Networks**

***Social, cultural and economic guidelines for network design:*** While ecosystem protection needs to be prioritized in the design of MPA networks, social, cultural and economic considerations shape the performance of MPAs and are fundamental pillars for the conservation planning and implementation of MPA networks.

**Social, Cultural and Economic Guidelines:**

- **Identify culturally, historically and spiritually significant areas**
- **Identify community-based MPA initiatives and integrate local knowledge**
- **Inventory current uses and activities**
- **Identify opportunities for alternative uses / compatible activities within networks of MPAs**
- **Protect and enhance recreational sites and opportunities**
- **Protect spiritual sites and values in the marine environment**
- **Develop a displacement policy and measures**
- **Incorporate existence values into MPA decision-making**

## Achieving Canada's MPA goals

### The Broader Context of Ocean Management

***Integrating Approaches:***

MPAs are affected by what happens outside, as well as inside, their boundaries. As a result, the achievement of MPA conservation goals relies on connecting the planning and management of MPAs and MPA networks with the broader environment in which they are located.

A regional ***ecosystem-based management*** approach is key to ensuring the achievement of conservation goals, and overall improvements in ecosystem health.

***Marine spatial planning***, undertaken at a broader regional scale, will ensure that MPAs and MPA networks are planned to protect the most significant areas from a conservation perspective, while at the same time, trying to avoid those areas of high-use.

The final stage in designing the MPA network integrates ecological criteria and socio-cultural and economic considerations. This stage is greatly enabled by decision-support tools and an iterative process for involving stakeholders and constituents in the evaluation of alternative networks.

Interim protection measures should be applied as soon as a potential MPA site has been identified. This will help ensure that ecological and cultural values are secured while planning and establishment processes are initiated and completed. Given the long timeframes in Canada to complete MPAs, there is a significant risk that important ecological values could be compromised if they are not protected during the planning phase.

**Guidelines for Integrating Approaches:**

- **Implement MPA networks through marine spatial planning (MSP) embedded in ocean-wide ecosystem-based management (EBM)**
- **Plan on multiple scales and ensure that adequate consideration is given to the boundaries between bioregions in the planning of the bioregional networks**
- **Conduct a stressors/threats assessment that considers cumulative impacts**
- **Evaluate threats in relation to Limits of Acceptable Change**
- **Employ decision-support tools to integrate ecological criteria and socio-economic considerations**
- **Embed decision-support tools in processes to integrate socio-cultural and economic considerations**
- **Characterize uncertainties comprehensively and proceed without certainty**
- **Recognize limitations of economic valuation and cost-benefit analysis**
- **Adopt an adaptive management framework with explicit and achievable objectives**
- **Shift the burden of proof**
- **Link MPA planning, establishment, management and monitoring processes**
- **Provide interim protection for candidate MPAs**

## Creating policy and legislation for successful MPAs

Current governance arrangements are hindering the effective implementation of MPAs in Canada. In order to make greater progress on MPAs and MPA networks, good governance and effective management arrangements are needed.

We consider the following attributes of 'good governance' to be essential to the development of effective MPAs and MPA networks: commitment, accountability, transparency, cooperation, aboriginal partnerships, stakeholder engagement, knowledge and social learning, and public awareness and support. These attributes inform the following guidelines for MPA governance.

**Guidelines for Policy and Legislation:**

- **Develop a national MPA network action plan that includes a commitment to precise timelines and milestones**
- **Include provisions for strict protection and strong prohibitions in Canadian MPA legislation**
- **Provide adequate funding to support MPA site and network development**
- **Provide regular public reporting on progress in MPA network completion**
- **Establish an independent scientific advisory process**
- **Provide accurate, adequate and timely information to stakeholders**
- **Improve public access to fishing data in Canada**
- **Provide public access opportunities to information, meetings, and decisions**
- **Ensure effective internal and cross-departmental collaboration**
- **Establish clear terms of reference, including the scope of stakeholder involvement and influence**
- **Use professional third-party facilitation**
- **Aim to achieve realistic levels of support and acceptance by stakeholders**
- **Provide up-to-date and comprehensive, accessible data**
- **Create opportunities for constructive dialogue and shared learning**
- **Foster stewardship of the marine environment**
- **Build public awareness and support to encourage compliance**

### ABORIGINAL PARTNERSHIPS

Aboriginal peoples in Canada have a profound cultural, economic and spiritual relationship with the marine environment from time immemorial. Their traditional and ongoing connections to marine environments and resources are thus pivotal to future marine conservation management arrangements, including MPAs.

**Guidelines for Aboriginal Partnerships:**

- **Clarify how MPA creation and management interacts with existing Aboriginal rights and title**
- **Respect Aboriginal institutions**
- **Establish meaningful Aboriginal engagement**
- **Respect and build upon Aboriginal knowledge**

## Climate change and the future of Canada's oceans

A major threat to the long-term future of the oceans is climate change. Climate change is likely to exacerbate the negative effects of fishing pressure. Climate change is leading to rising sea levels and temperatures, more frequent or intense storm events and changing ocean circulation patterns.

The ultimate solution to the climate change problem is to tackle its root cause: excessive carbon emissions. However, marine ecosystem resilience to climate change impacts may be bolstered by strategic management. Thus the guidelines in this document incorporate actions that are aimed specifically at adapting to, and to a certain extent mitigating, the impacts of climate change.

## Science tells us that MPAs work

***As a group of scientists with expertise and experience in marine conservation, we are concerned that the marine management planning process in Canada currently ignores key lessons from conservation science.*** Effective progress in MPAs in Canada will depend on use the best available natural and social sciences.

Research from Australia, the USA, the UK and elsewhere has demonstrated the myriad of benefits that accrue from well-designed MPAs, and especially from no-take reserves. Such benefits include the protection of biodiversity, enhancement of ecosystem resilience and support of ecosystem services that stem from healthy marine ecosystems.

Direct economic benefits also accrue in and around MPAs through increased tourism and recreation opportunities and often fisheries enhancement. MPAs also provide key ecological benchmarks to assist in understanding environmental change, by providing sites protected from some human impacts.

## Key References


Agardy, T., Notarbartolo di Sciara, G., and Christie, P. 2011. Mind the gap: Addressing the shortcomings of marine protected areas through large scale marine spatial planning. *Marine Policy* 25, 226-232.

Ballantine, W.J. 1997. *Design principles for systems of no-take marine reserves*. Design and Monitoring of Marine Reserves Workshop, February 18-20, 1997, Fisheries Centre, University of British Columbia, Canada.

Ban, N.C., Alidina, H.M., and Ardron, J.A. 2010. Cumulative impact mapping: Advances, relevance and limitations to marine management and conservation, using Canada's Pacific waters as a case study. *Marine Policy* 34, 876-886.

Butchart, S.H.M., Walpole, M., Collen, B., van Strien, A., Scharlemann, J.P.W., Almond R.E.A., Baillie, J.E.M., et al. 2010. Global biodiversity: Indicators of recent declines. *Science* 328, 1164-1168.

Chan, K.M.A., Ban, N.C., and Naidoo, R. (In press). Integrating conservation planning with human communities, ecosystem services, and economics.

Game E.T., Mcdonald-Madden E., Puotinen M.L., and Possingham H.P. 2008. Should we protect the strong or the weak? Risk, resilience, and the selection of marine protected areas. *Conservation Biology* 22, 1619-1629.

Gardner, J. 2009. *First Nations and marine protected areas: An introduction to First Nations rights, concerns and interests related to MPAs on Canada's Pacific coast*. Report for Canadian Parks and Wilderness Society, BC Chapter.

Gleason, M., McCreary, S. Miller-Henson, M., Ugoretz, J., Fox, E., Merrifield, M., McClintock, W., Serpa, P., and Hoffman, K. 2010. Science-based and stakeholder-driven marine protected area network planning: A successful case study from north central California. *Ocean & Coastal Management* 53, 52-68.

Halpern, B.S., Walbridge, S., Selkoe, K.A., Kappel, C.V., Micheli, F., D'Agrosa, C., Bruno, J.F., Casey, K.S., Ebert, C., Fox, H.E., Fujita, R., Heinemann, D., Lenihan, H.S., Madin, E.M.P., Perry, M.T., Selig, E.R., Spalding, M., Steneck, R. and Watson, R. 2008. A global map of human impact on marine ecosystems. *Science* 319, 948-952.

Harley, C., Hughes, A., Hultgren, K., Miner, B., Sorte, C., Thornber, C., Rodriguez, L., Tomanek, L. and Williams, S. 2006. The impacts of climate change in coastal marine systems. *Ecology Letters* 9, 228-241

Harmon, D. 2004. Intangible values of protected areas: what are they? Why do they matter? *The George Wright Forum* 21, 9-22.

Jessen, S. 2011. A review of Canada's implementation of the Oceans Act since 1997 – From leader to follower? *Coastal Management* 39, 20-56.

Jones, P.J.S., Qiu W., and De Santo E.M. 2011. *Governing marine protected areas - Getting the balance right*. Technical Report, United Nations Environment Programme.

Klein, C.J., Chan, A., Kircher, L., Cundiff, A.J., Gardner, N., Hrovat, Y., Scholz, A., Kendall, B.E., and Airamé, S. 2008. Striking a balance between biodiversity conservation and socioeconomic viability in the design of marine protected areas. *Conservation Biology* 22, 691-700.

Lebel, L., Anderies, J.M., Campbell, B., Folke, C., Hatfield-Dodds, S. Hughes, T.P., and Wilson, J. 2006. Governance and the capacity to manage resilience in regional social-ecological systems. *Ecology and Society* 11, 19.

Lester, S.E., and Halpern B.S. 2008. Biological responses in marine no-take reserves versus partially protected areas. *Marine Ecology-Progress Series* 367, 49-56.

Lubchenco, J., Palumbi, S.R., Gaines, S.D., and Andelman, S. 2003. Plugging a hole in the ocean: The emerging science of marine reserves. *Ecological Applications* 13, S3–S7.

McCrea-Strub, A., Sumaila, U.R., Zeller, D., Nelson, J., Balmford, A., and Pauly, D. 2011. Understanding the cost of establishing marine protected areas. *Marine Policy* 35, 1-9.

Mulrennan, M.E. and Scott, C.H. 2001. Aboriginal rights and interests in Canada's northern seas. In C.H. Scott (Ed.), *Aboriginal Autonomy and Development in Northern Quebec and Labrador*. Vancouver: UBC Press, 78-97.

UNEP-CBD (United Nations Environment Programme -Convention on Biological Diversity). 2008. *Decision adopted by the conference of the parties to the convention of biological diversity at its ninth meeting.* UNEP/CBD/COP/DEC/IX/20. www.cbd.int/doc/decisions/cop-09/cop-09-dec-20-en.pdf

UNEP-WCMC (United Nations Environmental Programme – World Conservation Monitoring Centre). 2008. *National and regional networks of marine protected areas: A review of progress*. Cambridge: UNEP-WCMC.

Worm, B., Barbier, E.B., Beaumont, N., Duffy, J.E., Folke, C., Halpern, B.S., Jackson, J.B.C., Lotze, H.K., Micheli, F., Palumbi, S.R., Sala, E., Selkoe, K.A., Stachowicz, J.J., Watson, R. 2006. Impacts of biodiversity loss on ocean ecosystem services. *Science* 314, 787-790.

## Signatories

**Kai Chan**, Ph.D.
Associate Professor & Canada Research Chair
Institute for Resources, Environment and Sustainability,
University of British Columbia

**Isabelle Côté**, Ph.D.
Professor
Department of Biological Sciences
Simon Fraser University

**Philip Dearden**, Ph.D.
Professor and Chair
Department of Geography
University of Victoria

**Elizabeth De Santo**, Ph.D.
Assistant Professor
Marine Affairs Program
Dalhousie University

**Marie-Josée Fortin**, Ph.D.
Professor
Ecology and Evolutionary Biology
University of Toronto

**Frédéric Guichard**, Ph.D.
Associate Professor
Department of Biology
McGill University

**Wolfgang Haider**, Ph.D.
Professor
School of Resource and Environmental Management
Simon Fraser University

**Glen Jamieson**, Ph.D.
Emeritus Research Scientist
Fisheries and Oceans Canada

**Donald L. Kramer**, Ph.D.
Professor Emeritus
Department of Biology
McGill University

**Ashley McCrea-Strub**, Ph.D.
Postdoctoral Fellow
Fisheries Centre
University of British Columbia

**William A. Montevecchi**, Ph.D.
University Research Professor
Psychology, Biology and Ocean Sciences
Memorial University of Newfoundland

**Monica Mulrennan**, Ph.D.
Associate Professor
Department of Geography, Planning & Environment
Concordia University

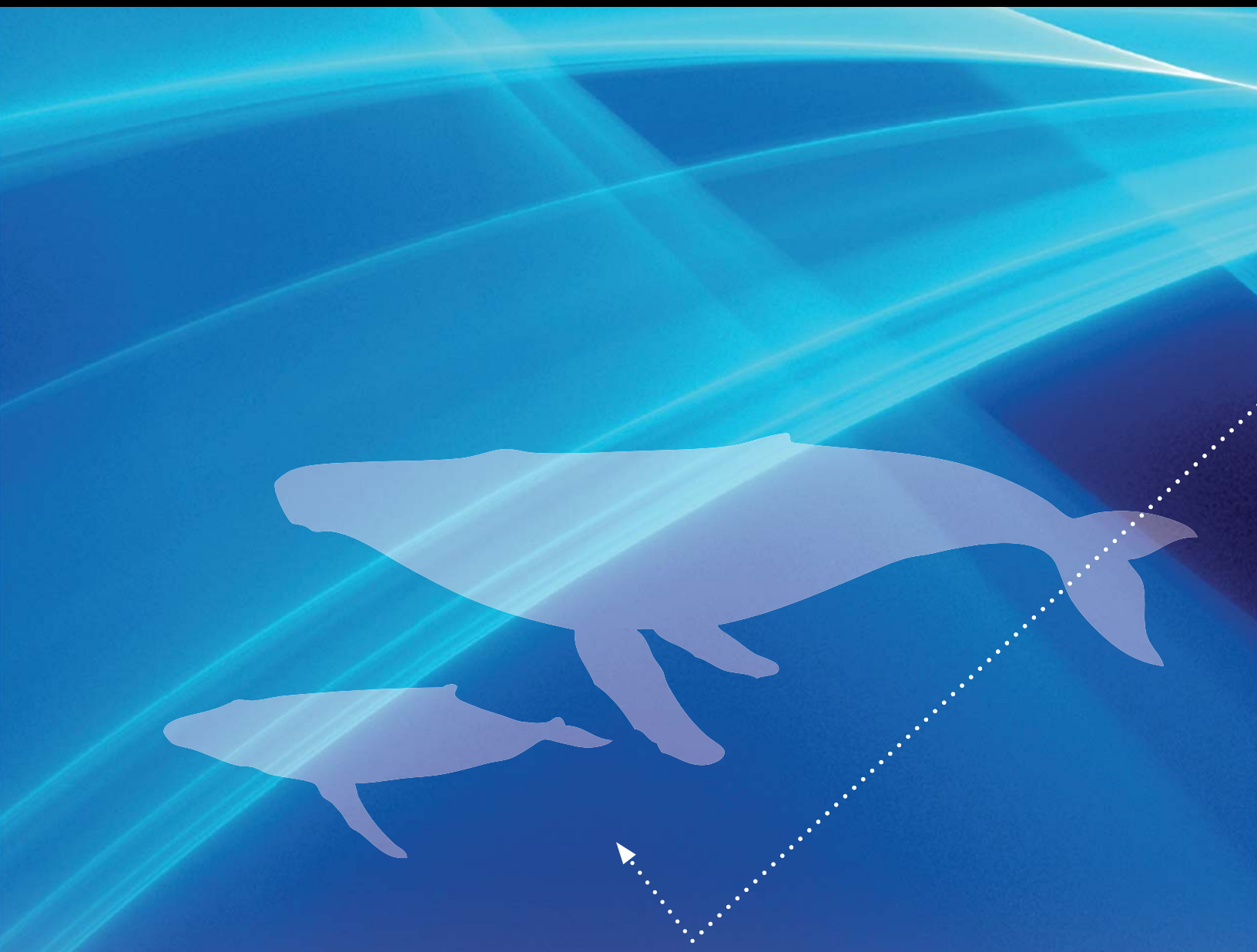
**John Roff**, Ph.D.
European Scholar, EU Erasmus Mundus Programme
Professor, Canada Research Chair (retired)
Environmental Science and Conservation
Acadia University

**Anne Salomon**, Ph.D.
Assistant Professor and Hakai Professor
School of Resource and Environmental Management
Simon Fraser University

**Canadian Parks and Wilderness Society Contributors**
Sabine Jessen, MA
Leah Honka, BSc
Alison Woodley, MA
Rodrigo Menafra, MMM

Julie Gardner, Ph.D., Dovetail Consulting

**Citation:**
Jessen, S., K. Chan, I. Côté, P. Dearden, E. De Santo, M.J. Fortin, F. Guichard, W. Haider, G. Jamieson, D.L. Kramer, A. McCrea-Strub, M. Mulrennan, W.A. Montevecchi, J. Roff, A. Salomon, J. Gardner, L. Honka, R. Menafra and A. Woodley. 2011. *Science-based Guidelines for MPAs and MPA Networks in Canada*. Vancouver: Canadian Parks and Wilderness Society. 58 pp.



CPAWS
Canadian Parks and Wilderness Society

**www.cpaws.org**

**Related documents available at:**
http://cpaws.org/publications/mpa-guidelines

Photo credits:
Jason Puddifoot, A.S. Wright, Scott Leslie, Sabine Jessen, Andrew Howe,
Olga Filatova, Bethan Martin and Isabelle Côté

Please recycle this brochure. Design: Roger Handling, Terra Firma Digital Arts