



WWF

FACTSHEET

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Marine

Cumulative Impact Mapping



C. CHAD GRAHAM / WWF-CANADA

Introduction

“In some way or other, almost all of British Columbia’s waters are being affected by people”

– Natalie Ban
Lead Author
University of Victoria

The marine waters of British Columbia span over half a million square kilometres (an area twice the size of the United Kingdom) but not a single patch of this ocean is untouched by human activity. This is the conclusion of a cumulative impact study, co-authored by a WWF-Canada scientist and published in the peer-reviewed journal *Marine Policy* in 2010.

The entire continental shelf of Canada’s Pacific marine waters is affected by multiple human activities. The study shows commercial fishing, marine traffic, and downstream pollution from land-based activities all have an impact on these coastal waters. Lead author Natalie Ban, a University of Victoria environmental studies professor, notes that even in the less populated areas of B.C.’s coast, there are still a surprising number of human impacts on the marine environment. Co-author Hussein Alidina, WWF’s Senior Marine Science Officer, says the study’s methodology advances how we can quantify the threats of overexploitation and climate change to our ocean.

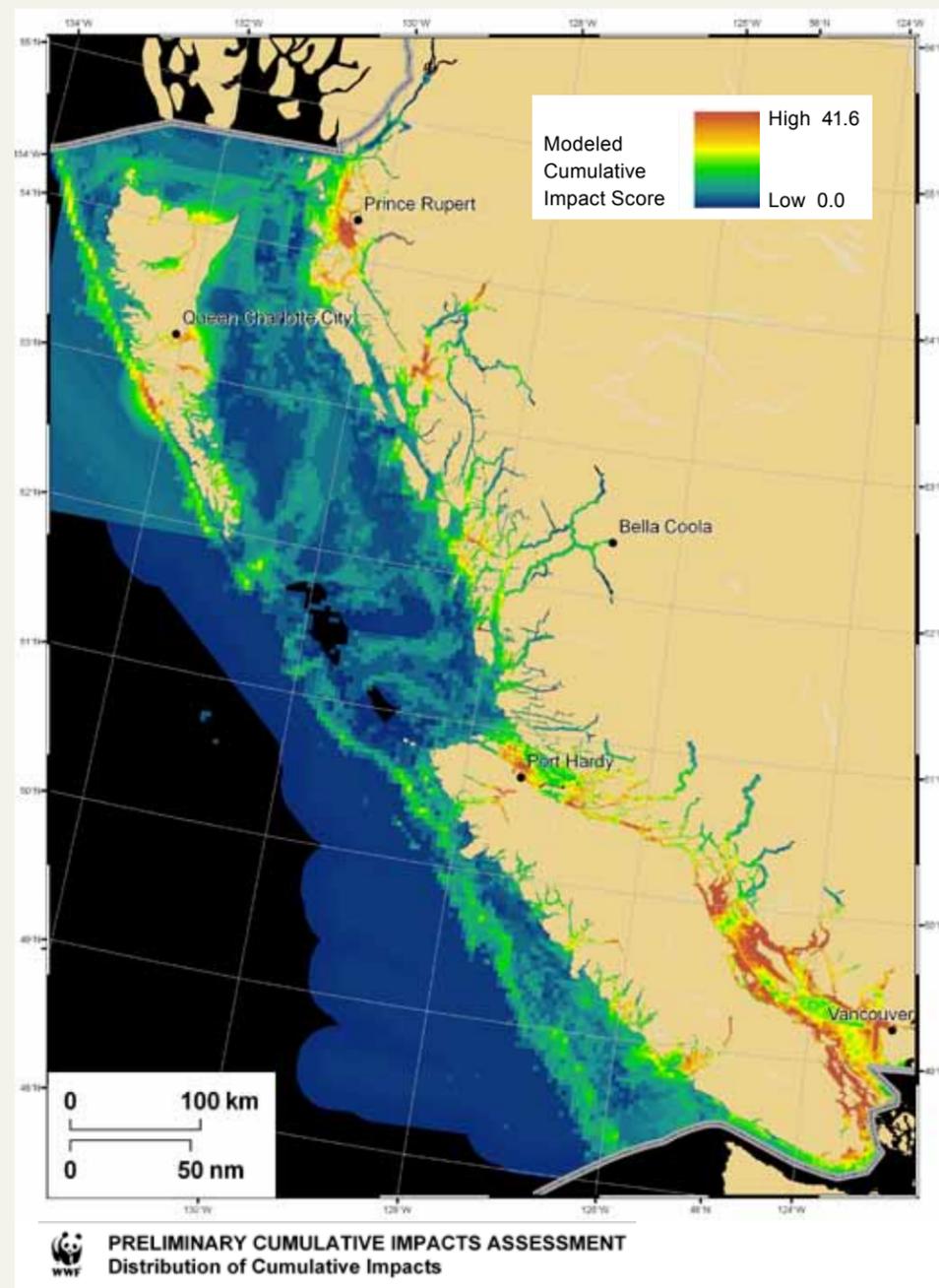
Looking at the big picture

This study highlights the importance of taking the big picture into consideration for marine resource management and planning. The cumulative mapping work demonstrated by the study provides important information for ecosystem-based management (EBM) use. Ban says that

before this type of work in Canada and internationally “there wasn’t really much of a consideration for how much effect the combination of all of these human activities actually has on the habitats and species that we care about.”

“Traditionally we’ve managed resources in a very single minded way but as populations are increasing, and as we extract more and more resources, we’re not just dealing with one pressure anymore.”

Cathryn Clarke Murray,
WWF Marine Science Officer
WWF-Canada



What EBM looks like on the ground

Fishing and conservation agencies increasingly recognize the importance of considering how stressors add up, one on top of another, and of managing ecosystems as a whole rather than their separate parts. The Great Barrier Reef Marine Park Authority in Australia was one of the early adopters of marine EBM. Faced with pressures from overfishing, terrestrial runoff and climate change, it was clear by the late '90s that management of the Great Barrier Reef was failing to protect the world's largest coral reef system from degradation. As a result, the park's governance was overhauled in 2004 to implement management that encompassed the marine park in its entirety.

Here in B.C., the shift from sector-by-sector management of marine resources to a more holistic approach is also underway. Starting in 2004, Fisheries and Oceans Canada began to research an integrated management approach to the Pacific North Coast Integrated Management Area (PNCIMA) – spanning the waters from Vancouver Island to the Alaska border.

Since then the federal government has withdrawn from the initiative but the Province and Coastal First Nations have continued to carry the vision forward under the Marine Planning Partnership for the Pacific North Coast (MaPP) – with active participation from NGOs, commercial fisheries, tourism and other ocean sectors.



C. J.D. TAYLOR / WWF-CANADA

How do impacts of human marine activity add up in Pacific Canada?

The impacts of 38 different human activities on Canada's Pacific Ocean region are mapped in the study. Commercial fishing activities account for more than half (57 per cent) of the cumulative impacts and marine transportation for 17 per cent. Land-based activities account for nearly 20 per cent of marine impacts in B.C.; specifically, the water quality impacts of land-based mining operations greatly affect the ocean, as does agricultural runoff. The study shows the Strait of Georgia as the most highly stressed ecoregion. Counter intuitively, it reveals that marine

conservation areas are particularly affected by multiple activities. This suggests conservation measures are ineffective or conservation areas are being affected by activity taking place outside their borders.

In a worst case scenario, an ecosystem under pressure from multiple stressors may pass a threshold or tipping point that would compromise how it functions. Cumulative mapping studies like this help to identify which areas are shouldering the burden of multiple activities in a way that a sector-by-sector approach to management does not.

Considering the Future

The line that connects the dots between cumulative effects and ecosystem based management is short. Documenting cumulative effects reveals what's happening in the marine environment; employing an ecosystem-based management approach helps manage some of those effects on the marine environment. The ultimate goal for ecosystem-based management is to ensure a sustainable system for people and for species, allowing for both sustainable use by humans and conservation of biodiversity.

B.C. waters run along 27-thousand kilometres of coastline and host 600 known types of seaweed, 70 species of sea stars, five species of salmon in thousands of salmon-bearing streams, and 409 species of fish. Looking ahead, these waters will only

get more crowded. Already, there are nearly half a million vessel movements recorded in B.C. waters and over the next 15 years, container traffic is expected to increase by 300 per cent.

Understanding the ways in which our oceans are being affected is one step toward envisioning their future health. WWF is continuing work on cumulative impacts with a new study soon to be released on the impacts of fishing on seafloor habitats. WWF is also collaborating with a network of researchers and scientists on the current state of practice in Canada and extending these results to examine long term climate change and cumulative impacts on the marine environment.



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¹ Natalie C Ban, Hussein M Alidina, Jeff A. Ardron (2010) Cumulative impact mapping: Advances, relevance and limitations to marine management and conservation, using Canada's Pacific waters as a case study, 876-886. *Marine Policy* 34 (5).

² Per Olsson, Carl Folke, and Terry P. Hughes Navigating the transition to ecosystem-based management of the Great Barrier Reef, Australia, PNAS 2008 105 (28) 9489-9494

³ Fargo, J., MacDougall, L., Pearsall, I. 2007. Appendix G: Groundfish. In Ecosystem Overview: Pacific North Coast Integrated Management Area (PNCIMA). Edited by Lucas, B.G., Verrin, S., and Brown, R. Can. Tech. Rep. Fish. Aquat. Sci. 2667: vi + 28 p

⁴ D.J. BC Ministry of the Environment, Technical Analysis Requirements for British Columbia to Consider Support for Heavy Oil Pipelines, (Government of BC: Victoria) 2012

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Why we are here

We are creating solutions to the most serious conservation challenges facing our planet, helping people and nature thrive.

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