A Conservation Prospectus for the Fraser River Estuary

Prioritising conservation actions for ecological resilience

MEOPAR

RAINCOAST CONSERVATION FOUNDATION

THE UNIVERSITY OF BRITISH COLUMBIA
Faculty of Forestry

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ISBN: 978-1-9993892-3-9

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Continental biological significance

The Fraser River Estuary is the largest estuary on the Pacific Coast of North America and one of Canada's most diverse and productive ecosystems. However, it is under threat from intense human activity that has occurred for over a century.

The Fraser River Estuary still supports a wealth of biodiversity in a complex food web that links fish, birds and marine mammals across the Pacific Ocean. Historically, the Fraser River had some of the largest salmon runs in the world and the estuary is vital to the migration for hundreds of millions of juvenile salmon. Juvenile Chinook, chum, and pink salmon rear in the Fraser Estuary where they feed and grow before migrating to the open ocean. Endangered Southern Resident killer whales also frequent the estuary's plume, where they rely on adult Chinook salmon populations for food.

As part of the Pacific Flyway, the estuary is a globally recognized Ramsar stopover habitat for migratory shorebirds. In this way, the Fraser Estuary connects bird species from at least three continents and boasts the highest concentrations of migratory birds in Canada – with up to 1.4 million birds utilizing the Fraser River Estuary at peak season. The estuary also provides crucial rearing grounds to over 300 species of invertebrates and over 80 species of fish and shellfish.

A biodiversity problem with no plan

While the estuary is still home to an incredible amount of biodiversity, less than 30% of intact habitat remains. Currently, 102 species in the Fraser River Estuary are at risk of extinction. The estuary faces cumulative effects from pollution, agriculture, industrial development, extensive dredging and dyking, urban sprawl and climate change. There is no broad conservation management plan for these species at risk, and no governance structures or funding mechanisms in place to implement such a plan.

A human history

The Fraser River Estuary is of great cultural and economic importance to Coast Salish Indigenous communities, who have lived in and found both spiritual and physical nourishment from its natural resources for millenia.

The estuary provides ecosystem goods including commercially and recreationally valuable salmon populations, freshwater for industry and domestic use, fertile agricultural lands, dams on some tributaries provide hydroelectric power, while ecosystem services include water filtration, nutrient cycling, flood mitigation, storm protection, and outstanding aesthetic values to the lives of its 3 million residents and the 10.3 million tourists that visit the Vancouver area annually. Being a delta estuary, the region is highly fertile and produces one quarter of British Columbia's agricultural income on less than 2% of the land base. The estuary is home to Vancouver, the largest City in British Columbia and Canada's largest port.

So what will it take to preserve the Fraser Estuary's biodiversity?

To address the cumulative threats that are facing the Fraser Estuary tools are needed to identify the most effective ways to conserve and recover remaining biodiversity. In 2017 researchers from the Martin Conservation Decisions Lab at the University of British Columbia and University of Victoria's Baum Lab were supported by MEOPAR[1] to apply a cutting edge conservation decision-making tool - Priority Threat Management (PTM). They collaborated with the Canadian government, the province of British Columbia, the Pacific Salmon Foundation and the Raincoast Conservation Foundation to identify the most cost- effective options for recovering and maintaining the region's biodiversity.

1 An independent not-for-profit, the Marine Environmental Observation Prediction and Response network (MEOPAR) funds research, trains students, mobilizes knowledge and forms partnerships in the area of marine risk and resilience.

How can we prioritize our efforts and investments?

Priority Threat Management is a conservation decision making tool that examines the cost-effectiveness of management strategies to recover and conserve species and ecosystems. Strategies to ensure the resilience of 102 species in the Fraser Estuary were developed through a structured expert elicitation process with over 65 individual experts representing the Musqueam Indian Band, Tsleil-Waututh Nation, and Tsawwassen First Nation, Governments, academia, industry and non-governmental organizations.[2]

During this process, experts assessed the benefit, cost and feasibility of different management strategies to the recovery of 102 species. These species represent 13 distinct ecological groups in the Fraser River Estuary at risk of extinction. Applying the Priority Threat Management framework as a conservation decision-making tool provides results that include estimates of the budget, capacity needed and likelihood of success of recovering species at-risk.

2 A full list of all individual participants is provided in the acknowledgments section of this document.

What strategies were assessed?

The study assessed ten individual management strategies, each with specific actions and management goals. The groups of species that benefit from each strategy are shown on the right.

Strategy 1. Public Land Management

Management Goal: Protect, restore, and connect habitats necessary to maintain persistence of identified species.

Strategy 2. Private Land Management

Management Goal: Manage, restore, and connect private land (urban and rural) necessary to maintain persistence of identified species.

Strategy 3. Green Infrastructure

Management Goal: Restore and maintain healthy hydrological cycles and implement habitat friendly flood management practices.

Strategy 4. Fisheries Regulation

Management Goal: Reduce illegal fishing and bycatch.

Strategy 5. Aquatic Habitat Restoration

Management Goal: Restore and connect aquatic habitats necessary to maintain persistence of identified species.

Combined management strategies

In addition to the individual management strategies detailed above, the study also evaluated three combinations of strategies, which have the potential to be more effective when used together. The three combinations of strategies considered were:

Strategy 6. Combining (S3) Green Infrastructure, (S7) Pollution Control, and (S10) Aquatic Habitat Restoration

Strategy 7. Combining (S6) Fisheries Regulation, (S9) Aquatic Disease Control, and (S10) Aquatic Habitat Restoration

Strategy 8. Combining all ten management strategies

Finally, in order to assess the benefits of preventing major future industrial threats, a scenario involving the implementation of a moratorium on all major future industrial development in the study region was assessed.

Strategy 9. Halting Future Major Industrial Development

Getting the best conservation bang for your buck

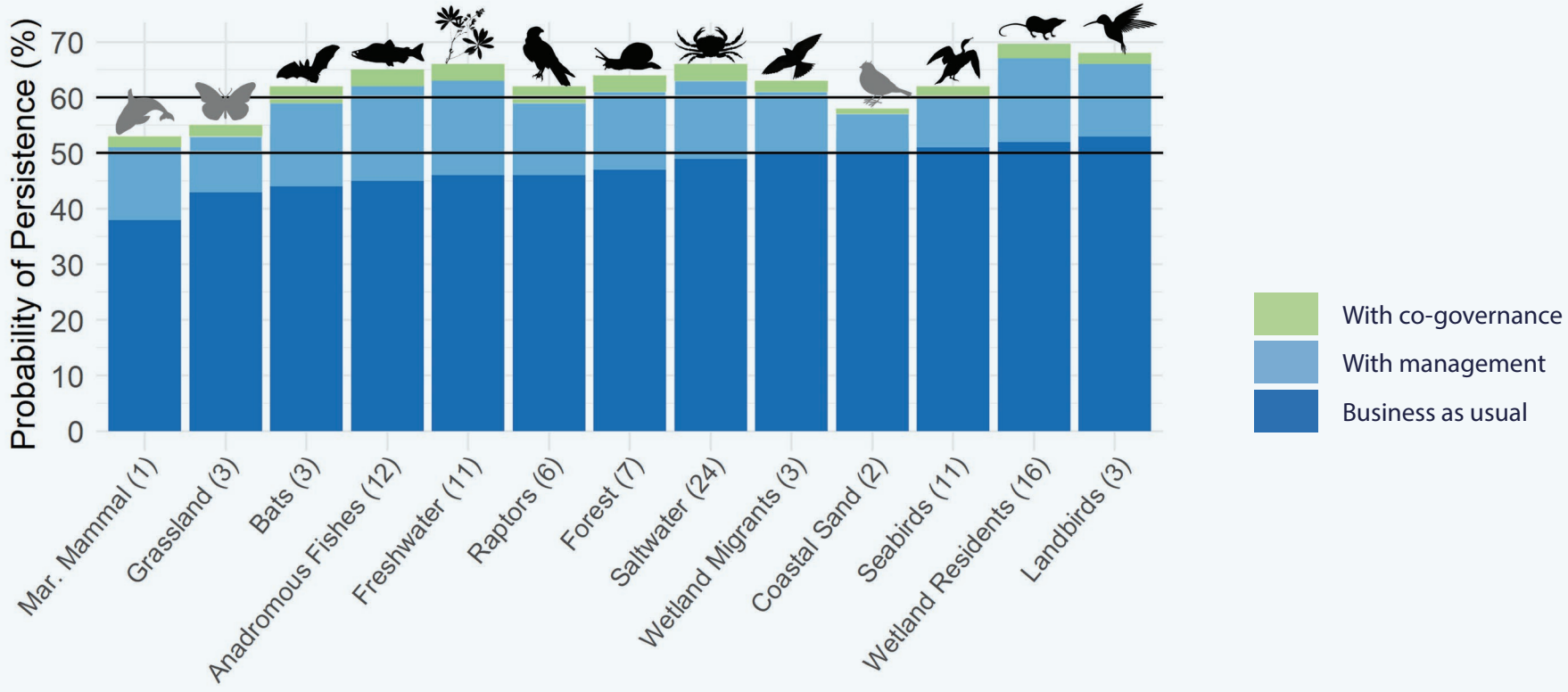
BUSINESS AS USUAL

The study found that under a 'business as usual scenario' which entails no overarching conservation plan and minimal funding, two-thirds of species within the Fraser River Estuary are predicted to have less than a 50% probability of persistence over the next 25 years (Figure 1).

STRATEGIES FOR SUCCESS

In a scenario in which the ten identified management strategies are implemented, the probability of persistence of all species over the next 25 years is over 50% (Figure 1). The estimated cost for this scenario is $381 million in Canadian dollars over 25 years or $15 million annually which is roughly $6 per person in Greater Vancouver.

FIGURE 1



Strategy 10. Governance

Governance determines who has power, who makes decisions, how others are heard, and how accountability is rendered. To ensure successful implementation of management strategies, good governance is required. At present governance across the estuary is fragmented, uncoordinated, and lacks accountability when it comes to protection of species and ecosystems.

By employing a scenario with a co-governance structure which entails First Nations and other governments collaborating to oversee the implementation of a conservation management plan, the cost-effectiveness and species persistence probabilities increased. Notably, this scenario had the highest average probability of persistence across species at 65% over the next 25 years (Figure 1).

It is clear that a co-governance model, in which First Nations and other governments work collaboratively to develop and implement a conservation management plan for the Estuary, is the most cost effective and has the highest probability of recovering species at-risk of extinction. Additionally, under co-governance the number of management strategies required to achieve species recovery is reduced thereby decreasing the investment required by up to one-third.

Conclusion

Our study reveals that it is not too late to save species from extinction in the Fraser River Estuary. But to do so, an investment of $381M over 25 years is required, which includes a co-governance structure to ensure successful implementation of priority management strategies.

What comes next?

This assessment is intended to aid decision-making across numerous organizations with respect to investment in conservation and recovery of at-risk species in the Fraser River Estuary.

Ultimately, Raincoast and the Martin Conservation Decisions Lab aim to use the results of this PTM assessment to aid in the development of an overarching conservation management plan that will put at-risk species on the path towards recovery and resilience.

Full citation

Kehoe, L. J., J. Lund, L. Chalifour, Y. Asadian, E. Balke, S. Boyd, D. Carlson, J. M. Casey, B. Connors, N. Cryer, M. C. Drever, S. Hinch, C. Levings, M. MacDuffee, H. McGregor, J. Richardson, D. C. Scott, D. Stewart, R. G. Vennesland, C. E. Wilkinson, P. Zevit, J. K. Baum, and T. G. Martin. 2020. Conservation in heavily urbanized biodiverse regions requires urgent management action and attention to governance. *Conservation Science and Practice* DOI: 10.1111/csp2.310.

Participant acknowledgement

Our participatory approach requires the input and collaboration from a broad group of professionals. We are particularly grateful to the many ecological experts who shared their expertise on species of conservation concern and strategy design, cost, feasibility, and benefits, specifically we would like to thank: Aidan Neill (Lower Fraser Fisheries Alliance), Aimee Mitchell (Athene Ecological), Amanda Rodewald (University of British Columbia), Andrea MacLeod (Vancouver Fraser Port Authority), Andrew Robinson (Environment and Climate Change Canada), Anna Mathewson (City of Surrey), Brent Gurd (BC Ministry of Forests, Lands and Natural Resources), Brian Clark (Ministry of Environment), Brian Riddell (Pacific Salmon Foundation), Carrie Holt (Fisheries and Oceans Canada), Cecilia Wong (Environment and Climate Change Canada), Charlotte Olson (Vancouver Fraser Port Authority), Christianne Wilhelmson (Georgia Strait Alliance), Cynthia Durance (Precision Identification), Dan Buffett (Ducks Unlimited Canada), Deborah Carlson (West Coast Environmental Law), Dianne Ramage (Pacific Salmon Foundation), Elsie Krebs (Environment and Climate Change Canada), Erin Stoddard (BC Ministry of Forests, Lands, and Natural Resource Operations), Gary Williams (GL Williams and Associates), Ivy Whitehorne (Environment and Climate Change Canada), Janson Wong (Lower Fraser Fisheries Alliance), Jeanne Hughes (Lower Fraser Fisheries Alliance), Jill Campbell (Musqueam Indian Band), Kathleen Moore (Environment and Climate Change Canada), Ken Ashley (British Columbia Institute of Technology), Ken Brock (Environment and Climate Change Canada), Laura Sparrow (Musqueam Indian Band), Lindsey Ogston (Tsleil-Waututh Nation), Marcin Pachcinski (Vancouver Fraser Port Authority), Marian Adair (The Nature Trust of British Columbia), Matt Pitcairn (Richmond Chamber of Commerce), Megan Lievesley (BC Conservation Foundation), Mike Brotherston (City of Delta), Oliver Brandes (University of Victoria), Peter Arcese (University of British Columbia), Peter Ross (Vancouver Aquarium), Robert Elner (Simon Fraser University), Rob Butler (Retired Environment and Climate Change Canada), Rob Knight (Ministry of Environment & Community Mapping Network), Ross Dixon (Raincoast Conservation Foundation), Sarah North (Northwest Hydraulic Consultants), Scott Hinch (University of British Columbia), Steven Stark (Tsawwassen First Nation), Thomas Doniol-Valcroze (Fisheries and Oceans Canada), Trevor Andrews (Vancouver Fraser Port Authority), ZoAnn Morten (Pacific Stream Keepers Federation).

Funder details and acknowledgement

MEOPAR, Real Estate Foundation, Bullitt Foundation, Sitka Foundation, Liber Ero, NSERC.

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