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Vignette 20: Fraser River Estuary in Need of Urgent Intensive Care

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20 | FRASER RIVER ESTUARY IN NEED OF URGENT INTENSIVE CARE

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If the Fraser River Estuary were a hospital patient, she would be rushed to the intensive care unit. She would need urgent attention from many different specialists. But if we provide her the care she needs in a timely way, she can heal, and one day thrive. She could once again be bursting with life, bountiful runs of salmon, pods of orcas, and millions of migratory birds.

The Fraser River is the lifeline of the Salish Sea, influencing its stratification, circulation, and primary productivity. Historically, the Fraser River was home to the largest salmon runs in the world. These days, an impressive number of fish still frequent this rich ecosystem. Millions of juvenile salmon spend weeks to months in the estuary before embarking on their ocean migration. Above the water, 1.4 million migratory shorebirds stopover in the estuary at peak season. However, everything is not well in the Fraser. Annual salmon returns and bird numbers have been declining for decades and are now at record lows.

Our research finds that within the mighty Fraser River estuary, 102 species are at risk of extinction. Over the past 150 years, multiple and cumulative pressures, including urbanization, agricultural and industrial development, pollution, overexploitation, disease, and climate change, have severely impacted these species. However, we also discovered it's not too late to save them.

The Fraser River estuary isn't just crucial to wildlife, humans rely on this estuary too. Coast Salish First Nations have lived in and found both spiritual and physical nourishment from the Fraser's natural resources for millennia. Today, this resilient and diverse estuary is host to the busiest port in Canada, home to half of British Columbia's rapidly expanding urban population (Vancouver and surrounds), and is particularly vulnerable to sea level rise and continued industrial development.

Audrey Siegl member of Musqueam First Nation, one of over 30 nations who live in and rely on the Fraser River Estuary Photo: Michael Snyder.

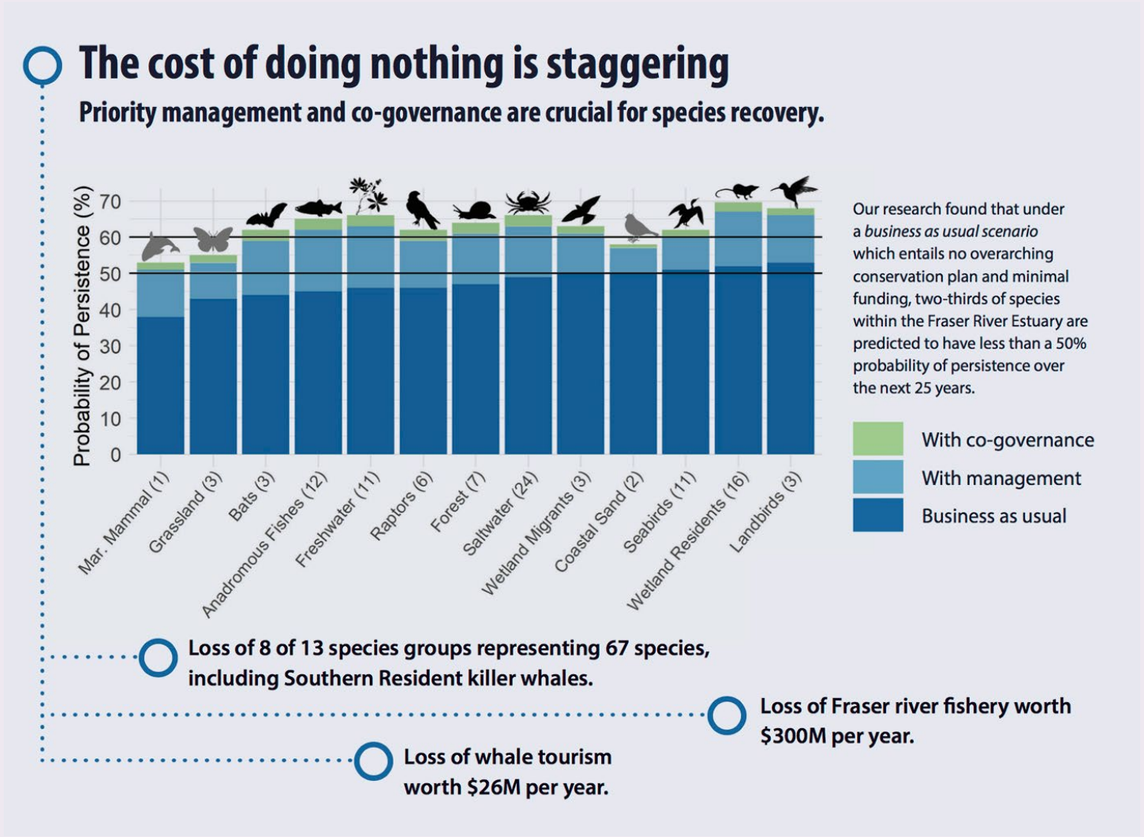
The need for a costed prospectus to deliver long-term ecological resilience to this highly contested region has never been more urgent. Our research delivered exactly that. For the 102 species at risk of extinction in the Fraser River estuary, a suite of conservation strategies, spanning aquatic habitat restoration to better farmland management, is needed to save them from extinction.

Southern Resident killer whale in the Fraser River Estuary Photo: Tom Middleton.

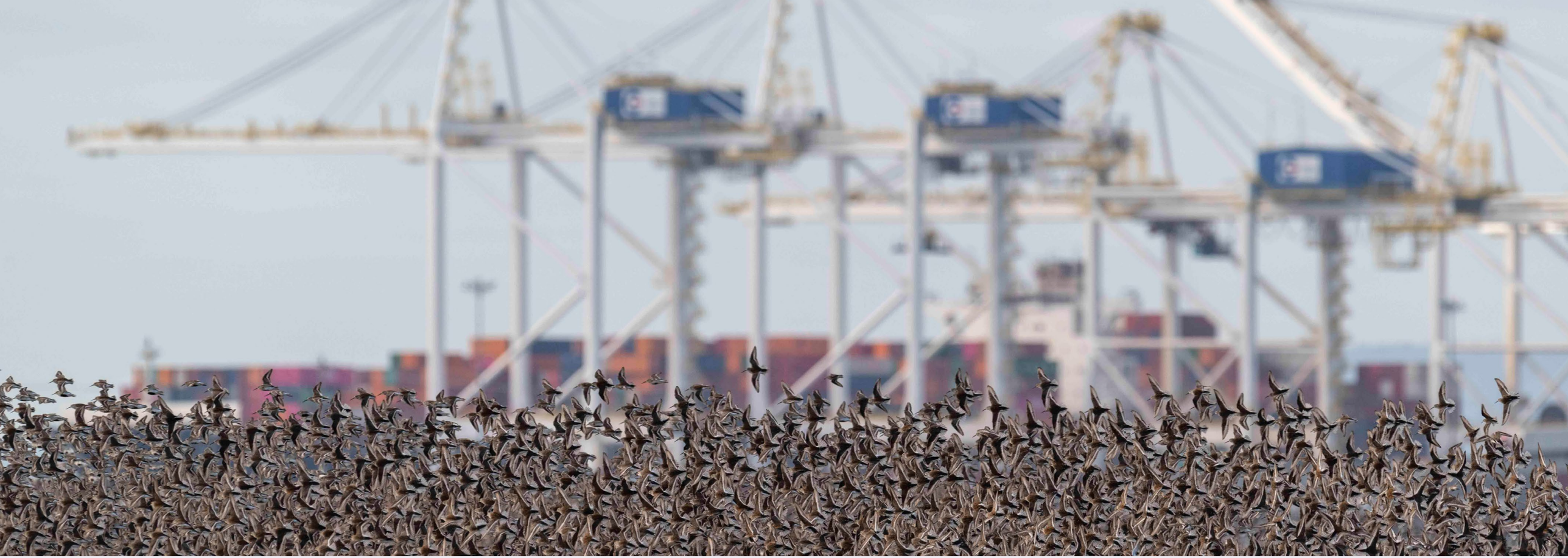
The comprehensive action plan that we developed is estimated to cost $381 million over 25 years, or $15 million a year to implement. This might sound like a lot, but it is only $6 per Vancouverite each year, the cost of one measly beer a year. It's a drop in the ocean compared to the $26 million per year that whale tourism earns in the Salish Sea and the $300 million per year that fisheries in the estuary were estimated to be worth in the 90s. If we all raised a toast to the Fraser, we could save it.

On the other hand, if we don't take strong action to conserve the Fraser River estuary, two-thirds of the species at risk in this region are predicted to have a less than 50% chance of survival. Many of the region's most iconic species could disappear, including the southern resident killer whale, salmon, sturgeon and a raft of internationally recognized migratory birds.

While often overlooked, governance is a key factor influencing the feasibility of conservation management, particularly in regions of high competing interests. Despite this, surprisingly little is known about whether the conservation benefits of building and supporting environmental governance



Probability of persistence for each of 13 species groups under increasing levels of investment over 25 years. Baseline (dark blue) represents species persistence probabilities under no additional management; management (light blue) represents implementing all management strategies; co-governance (green) represents the implementation of an overarching co-governance strategy. Under full management and co-governance, 10 of 13 species groups (black species silhouettes, representing 96 of 102 species) reach a 60% probability of persistence. Species groups are ordered from lowest to highest probability of persistence under baseline scenario. Source: Kehoe et al. (2021).



The Fraser River Estuary is a critical stopover site for western sandpipers. Photo: Jason Puddifoot.

outweigh the costs, especially since effective governance is likely to determine the success or failure of conservation interventions.
Our action plan tested the cost-effectiveness of a co-governance model that sees First Nation, local, provincial, and federal governments working together to implement these cost-effective strategies and ensure their success. We found that co-governance was critical to successful conservation outcomes, as it increased the feasibility and cost-effectiveness of all our conservation actions.

On top of conservation outcomes, we found a wealth of additional benefits of co-governance. These benefits include: better cohesion between partners, stricter adherence to regulations, long-term collaboration on projects, the security of ongoing funding, participatory decision making, a better balance between healthy ecosystems and development opportunities, savings in time and resources, and more public engagement. Our technique is the first to explicitly quantify the cost-effectiveness of co-governance in terms of species conservation and provides a blueprint for future work on assessing the potential for co-governance in imperiled regions.

Co-governance allows for coordinated action to better conserve species under threat—but what about stopping those threats at their source? Multiple large-scale industrial threats face our study region, including (but not limited to): the Trans Mountain Pipeline, a new terminal at Roberts Bank (an ecologically sensitive area), and a new bridge that would allow for more shipping traffic into the estuary.

Alongside prioritizing the most cost-effective management strategies for this imperiled region, we included an assessment of halting future major industrial development. We found that the continuation of industrial development would jeopardize the future of many iconic species such as the southern resident killer whale, anadromous fishes, including salmon and sturgeon, and saltwater species, including the migratory western sandpiper. The gravity of these future threats is underscored with our finding that the benefits from halting future major industrial development are estimated to be greater than nine out of the ten management strategies we assessed. Our research emphasizes that along with restoration action we must prevent further developments that could undermine restoration success.

Our research shows that conservation action combined with environmental governance is a pathway for a brighter future in highly contested regions, such as estuaries, and that the return on investment likely offsets the cost of management. In a world of rapid urban sprawl and ongoing biodiversity declines, our methodology identifies the most cost-effective strategies to conserve nature in areas important to both humans and wildlife. We have the tools to conserve the many wonders of the natural world, but we must employ them while there is still time to act.

Vignette adapted from Kehoe et al. (2021)