Brief to Special Committee on Sustainable Aquaculture: Sea Lice and the Cycle of Resource Management Pathology

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My name is Craig Orr. I'm a behavioural ecologist who has studied the environmental costs of salmon farming for nearly a decade, recently as the Associate Director of Simon Fraser University's Centre for Coastal Studies, and currently as the Executive Director of Watershed Watch Salmon Society, a member of the Coastal Alliance for Aquaculture Reform (CAAR). As a member of CAAR's science and industry negotiating teams I'm also involved in working directly with Marine Harvest Canada to monitor sea lice on farmed salmon, and in research designed to reduce sea louse impacts on wild salmon.

It's probably safe to assume that you've heard much conflicting evidence on whether salmon farming, as currently practised, is sustainable, and on whether government, as currently constituted, is doing an adequate job of protecting wild fish, and thus, the interests of the public.

Tempting subjects to explore, for sure, but my main goal today is far simpler: to give this committee a glimpse of what is actually occurring on Broughton farms with respect to sea louse production. I have two things to show you: (1) estimates of louse production from all Marine Harvest farmed salmon in 2003 and 2004, and (2) weekly sea lice counts made by CAAR and Marine Harvest Canada at two Broughton farms in 2006.

Before I present these data though, I'd appreciate this committee's indulgence for a short-but-hopefully-useful "contextual detour." This detour introduces a branch of science which evaluates how well humans manage resources such as trees, wildlife, and fish. Scientists who study such things are "adaptive management" specialists, and perhaps no one is more renowned in this field than BC's own C.S. (Buzz) Holling.

Dr. Holling and several of his colleagues have now spent multiple careers examining and describing broad patterns of resource development and management. Interestingly enough, much of this research focuses on the very theme that is central to the deliberations of this committee: uncertainty.

Uncertainty, like a west coast cloud, hangs over all of our heads. But we have learned to deal with uncertainty in our daily lives. It rarely paralyzes us. We also have come to learn that ecosystems are complex in nature, and that complexity and uncertainty are often joined at the hip.

What's becoming more apparent, however, in the Broughton examples and in others, is how often uncertainty is wielded like a sharp tool by "vested interests" to maintain status quo policies and practices.

Indeed, an "uncertainty dichotomy" is described by Holling and colleagues in a rather simple principle: "While scientists use uncertainty to drive the engine of inquiry, vested interests often use uncertainty to maintain the status quo."

Academics describe resource management systems in which vested interests vigorously pursue "campaigns of pseudoscientific disinformation." They also show that social rigidity and loss of trust usually occur when government agencies claim they cannot act because evidence is "insufficient," thus shifting the "burden of proof"—that is, showing that an activity is or is not harmful—onto the public, academics, First Nations, and special committees.

The BC aquaculture debate is our very own case study in the promotion of uncertainty and inaction well past the "expiry date" of public belief and acceptance. It is also a case study in efforts to: constrain scientific inquiry and dialogue within and outside of agencies through rigid communication protocols, threats and intimidation, the control of funding and access to data, and the active promotion of pseudoscientific disinformation;

and to discredit and/or silence critics through intimidation (i.e. threats of legal action), ad homonysm (attack the person and ignore the issue), and perhaps, even through the appointment of critics to aquaculture committees.

This photo shows you one of the so-called critics of salmon farming, Alexandra Morton, engaged in what I will politely describe as a "dialogue" on sea lice with Dr. Dick Beamish of Fisheries and Oceans Canada.

Let me ask this committee: Why is it that this NGO scientist has published more on sea lice impacts than all Fisheries and Oceans and provincial fisheries scientists—combined?

Let me ask: Why has this man spent years in the Broughton, and precious time and resources, trying to show that sea lice are coming from wild salmon and sticklebacks—when farmed salmon vastly outnumber wild salmon during the critical (to wild juvenile salmon) spring period, when no egg-bearing lice have yet been found on sticklebacks, and when he was in possession of sea lice data provided by Broughton farms?

Let me also ask: Has anyone presented this committee with <u>any</u> peer-reviewed science whatsoever that proves that salmon farms are NOT the primary source of the lice we have seen on wild juvenile salmon?

Once again, it seems, it's the NGOs and academics and First Nations who are asked to do the proving. So let me get on with it by showing you a graph taken from an upcoming publication on louse production patterns from 12 active salmon farms in 2003 and 2004. These farms contained one to five million Atlantic salmon, with approximately 800,000 fewer mature salmon at the start of 2003—the partial fallow year.

In both years, louse production peaked in the late-winter, early-spring period, just prior to the emergence of newly-hatched juvenile pink salmon. Farmed salmon hosted c. 6 million-plus gravid (egg bearing) lice that produced <u>1.6 billion</u> louse eggs during two weeks in the winter of 2003-04. We also know that only half as many louse eggs were

produced from fewer salmon hosts during this period in 2003, that lice were reduced in both years through multiple uses of the louse biocide Slice, and that fewer farmed salmon and lice in 2003 coincided with a much lower abundance of lice on juvenile pink and chum salmon collected near these farms by Alexandra Morton.

Fast forward to 2006 and, while we counted lice only at two farms, we did so weekly, and recorded similar peak louse abundances in spring, and similar reductions of lice (by 94%) after the use of Slice. It is also possible to calculate that, based on an average of 500 eggs per female louse, and some 700,000 fish per farm, a single farm might produce nearly 200 million louse eggs, prior to chemical treatment.

For the sake of all British Columbians weary of the battle of the Broughton—and for the sake of wild fish—I'd like to believe this industry-NGO-First Nations' effort, and the data it generates, will enhance transparency, and our collective willingness to honestly tackle sea louse parasitism. Marine Harvest Canada deserves much credit for its positive step of making data available, as do the NGOs and First Nations who continue to shoulder a considerable burden in protecting BC's rich-but-fragile wild salmon.

But I also have to be realistic. The sadly robust pattern of resource management I have so briefly introduced suggests it may be extremely difficult to break the cycle that academics have come to call, the "pathology of regional resource management." The inevitable end point, in so many "case studies," is a further degradation in the environment—and within the agencies, themselves—as well as increasingly expensive solutions to today's unresolved problems.

The question which remains, it seems, is: Do we have the collective vision and resolve to turn things around—to break the cycle—thus avoiding the seemingly inexorable slide toward the final stages of pathology?

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