Turning Down the Volume on Growing Ocean Noise

Summary: Growing ocean noise poses a threat to marine wildlife off the coast of British Columbia. **Measurable steps, such as introducing vessel speed limits, quantitatively assessing harmful noise levels to marine life, and preserving "quiet zones" on the BC coast, can be taken to manage ocean noise** before this issue causes serious damage to our cetacean and fish populations.

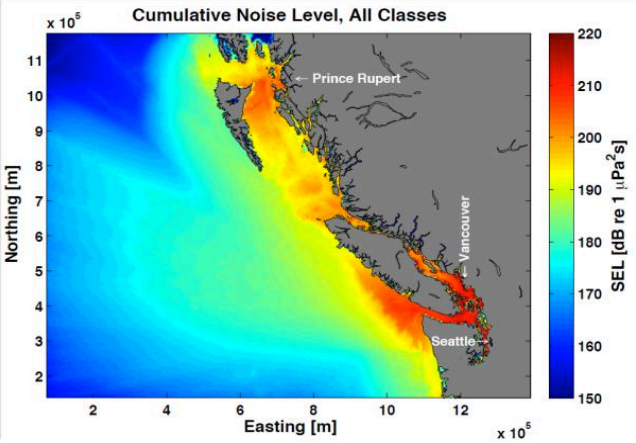

Figure 1: Cumulative noise level map of the BC coast, circa 2008. Areas in red exceed the EU's "good conservation status" limits on marine noise, yet no such quantitative standards for it exist in Canada.
Study: Erbe et al (2012). Mapping cumulative noise from shipping to inform marine spatial planning. J Acoust Soc Am **132**, EL423.

Noise pollution off the coast of British Columbia has reached critical levels in the last few years. This increase is primarily due to the high tanker traffic the coast experiences as the major western port for Canada. While the ocean is thought to be a quiet place, in reality many marine animals rely on sound to live, and are impacted by growing anthropogenic noise. Species change their behavior, avoid once-suitable habitat, and may even develop hearing loss or die.

With plans to expand tanker traffic as the LNG sector of British Columbia develops, and no quantitative guidelines for managing ocean noise, we need to address the issue of noise pollution due to increased vessel traffic immediately.

BALEEN WHALES

Because they rely on sound to communicate, whales are especially vulnerable to noise pollution. It has been revealed that vessel traffic off Cape Cod can "bleach" whale communications[1], disrupting their social networks and encouraging them to spend more time alone.

ORCAS

The southern resident killer whale population travels around the northeastern Pacific coast, hanging around the Juan de Fuca Strait, the southern Strait of Georgia, and Puget Sound- areas that experience high levels of noise pollution. This can lead to marked changes in behavior[2].

FISH

While the effects of marine noise pollution on fish are not well studied, studies point to intermittent noise- such as that made by travelling vessels- contributing to stress in coastal marine fish such as the giant kelpfish in California[3]. BC fish species may also be affected.

1. Hatch, L., Clark, C., Merrick, R., Van Parijs, S., Ponirakis, D., Schwehr, K., Thompson, M. and Wiley, D. (2008) Environ. Manage, 42(5): 735-752.
2. Miller P. J., Kvadsheim P. H., Lam F-PA, Wensveen P. J., Antunes R., et al. (2012) Aquat. Mamm. **38**: 362-401.
3. Nichols, T. A., Anderson, T. W., Sirovic, A. (2015) PLoS ONE 10(9): e0139157.

What affects the severity of human-made noise vs. animals?

- The more vessels pass through a given area, the more marine life is affected by the noise they emit.
- Vessel speed is the most influential factor on an individual vessel's impact on certain marine animals[4].
- Intermittent noise, such as that produced by vessels passing through an area, has a more disruptive effect on fish than chronic noise, such as that made by a generator[3].

The situation now

British Columbia is the western gateway of Canada, facilitating the country's trade with Asia and the west coast of the U.S. Port throughput in Vancouver is expected to increase in the coming years[5], and liquid natural gas, or LNG, projects will contribute to increasing tanker traffic along the entire BC coast, including in the Strait of Georgia.

Unlike the EU, Canada currently lacks quantitative guidelines to assess marine noise levels against their impact on marine life[6], despite recognizing noise pollution as a threat to the southern resident orca population off the coast of Vancouver and other acoustically sensitive marine animals.

Fortunately, there are relatively quiet spots north of the Strait of Georgia and Vancouver Island that may act as "quiet zones": these could be set apart as marine protected areas (MPAs) once their importance to noise-sensitive species is assessed.

Recommendations

1. Implement speed limits for vessels in the waters off the coast of British Columbia.
-> Backed by the latest science that shows that vessel speed plays a role in noise impact on animals

2. Encourage the adoption of EU-like guidelines for identifying zones with harmful marine noise level in BC and Canada.
-> Quantitative guidelines allow for noise pollution to be considered explicitly as part of a conservation strategy for a species or environment that may depend on low noise conditions for success.

3. Direct vessel innovation efforts into quieting technologies.
-> Recent investments in military and merchant ship building in Vancouver and Halifax offer the opportunity to develop ship-quieting technology and make it a new standard in ship-building.

4. Support the creation of MPAs that protect "quiet zones" on the BC coast
-> Can also revise MPA policy to include noise limits in their criteria and policies.

4. Houghton, J., Holt, M. M., Giles, D. A., Hanson, M. B., Emmons, C. K., Hogan, J. T., Branch, T. A., VanBlaricom, G. R. (2015). PLoS ONE 10(12): e0140119
5. Living Oceans Society (2011). Sointula, BC: Living Oceans Society.
6. Erbe et al (2012). J Acoust Soc Am **132**, EL423.
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