Call to Remove Expanded Polystyrene Foam from Use in Marine Dock Floats

Policy Brief by UBC Ocean Leaders and the LSDI
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Subject

Expanded polystyrene foam (EPS) pollution from marine dock floats is an urgent, unaddressed issue facing the Salish Sea. Given the ongoing ecological impacts, community costs, and other hazards associated with Expanded Polystyrene (EPS) pollution, we propose a full and immediate ban on the use of EPS in docks on British Columbia's coastline.

The Issue

EPS, commonly known by the brand name Styrofoam, is the material of choice for most dock flotation in British Columbia. However, its composition is fragile, resulting in breakage and subsequent pollution when exposed to the harsh conditions common to coastal marine waters. Broken pieces of EPS from docks are contributing to marine pollution, and local community cleanup costs are increasing. Additionally, EPS pollution in the Salish Sea is a major contributor to the larger issue of ocean plastics pollution. Large pieces of EPS are toxic to fish and marine mammals if ingested, hazardous to boats and sea traffic, and contribute to the spread of invasive species. EPS fragments of all sizes inevitably find their way to the shores of coastal communities across British Columbia's coast. It was one of these coastal communities, Lasqueti Island, whose community shoreline debris clean up initiative inspired this call to action. Failure to address the issue of EPS pollution in the Salish Sea will allow for continued worsening ocean conditions for marine life, as well as continued accumulation of costs to local communities. **Our call to action demands the immediate removal of all EPS from dock floats on British Columbia's coast**. This includes (1) and immediate replacement of existing EPS floats with alternative flotation systems, several of which are currently available and in use in BC; (2) a ban on EPS installation in new and proposed docks; and (3) the inclusion of the EPS pollution issue in the upcoming BC Coastal Marine Strategy.

Background

Expanded Polystyrene (EPS) is a thermoplastic foam material composed of 95% air. Its buoyancy and low production cost make it useful for aquatic applications such as dock and aquaculture floats. Large amounts are often lost at sea as floats degrade, making polystyrene the majority material in marine plastic debris.

Polystyrene recycling is cost-intensive and difficult; most marine polystyrene is not eligible for recycling due to water logging, colonization by encrusting organisms, and degradation.

EPS blocks readily degrade into smaller fragments. Encrusting marine organisms, including worms, bivalves, and barnacles, are a major contributor to marine polystyrene degradation. EPS helps accelerate the spread of invasive species by transporting introduced organisms to new environments. Additionally, EPS is harmful to marine life; it is often mistaken for food and, when eaten, can obstruct digestive organs and deliver toxic contaminant loads to the organisms that consume it. Physical effects on marine life include intestinal obstructions, stomach ulcers, and appetite suppression. Further, consumption breaks EPS into smaller pieces, which become much more difficult to remove from shorelines.

Shoreline clean ups around British Columbia's coasts have been ongoing for decades. The cost for volunteer shoreline cleanup can exceed $2,000 per kilometer. With over 25,000 kilometers of shoreline in British Columbia, this can quickly become a $50 million annual effort, not including compensation for labor. In 2019, the BC Ministry for the Environment and Climate Change Strategy (MECCS) reached out to Indigenous Communities and the public as part of the BC Plastics Action Plan. 84% of over 35,000 respondents reported being "Very Concerned" about plastics pollution. In 2020, BC MECCS conducted similar outreach to coastal municipal governments, Indigenous Nations, industry, citizen groups, and environmental organizations with a specific focus on marine plastic pollution. Marine polystyrene pollution was the only issue of concern that was raised by every consulted party.

The majority of fragmented EPS originates from both encapsulated and unencapsulated docks located in nearshore or foreshore waters of BC. The province is responsible for regulating the construction, placement, and use of private docks on the foreshore, in bays, and on submerged lands between the mainland to the east and Vancouver Island and Haida Gwaii to the west.[1] **The province needs to address this ongoing source of pollution by implementing regulations to remove EPS from use in docks.**

"According to the BC Ministry of Environment and Climate Change Solutions' own outreach, **84% of British Columbians are 'Very Concerned' about plastic pollution"**

Externalities and the Real Cost of Pollution

Polystyrene pollution is a classic, textbook example of an economic externality. Externalities are the differences between up-front costs (e.g., purchasing and installing a polystyrene float) and costs to society (e.g, cleanup, human health impacts, ecological impacts, and costs to other industries). The low up-front cost of polystyrene obscures a much greater cost imposed on local communities, governments, and ecosystems, and leads to inefficiency; **the total cost of polystyrene and its externalities far exceeds the marginal up-front cost increase of alternative float materials.** By neglecting to regulate polystyrene pollution in the Salish Sea, the BC Provincial Government allows the external cost of polystyrene dock floats to be offset from polystyrene manufacturers and dock owners and instead be imposed on coastal communities, provincial taxpayers, and local ecosystems.

Alternative Materials and the Dangers of Encapsulation

The BC provincial government lags its neighbors in its failure to address polystyrene pollution. Other jurisdictions have attempted to mandate encapsulation of polystyrene floats, in which polystyrene blocks are enclosed within a protective layer of plastic, wood, concrete, or other material. Encapsulation extends the lifespan of floats; however, **encapsulation breaks down and has failed to resolve EPS pollution**, especially when regulations around encapsulation material are poorly defined. Oregon State, which first mandated encapsulation in 1992, still struggles with polystyrene pollution from aquatic floats. In Washington, which mandated encapsulation in 2013, polystyrene continues to comprise a significant portion of marine debris. There are other, viable alternative float materials currently manufactured and commercially available in BC and elsewhere. The lesson is obvious: encapsulation fails to prevent the eventual release of polystyrene, especially in the high-disturbance conditions experienced by marine dock floats. We must move forward with other alternative float materials and ban EPS completely.

Conclusions

1. **We Need a Solution Now:** Polystyrene pollution is an urgent, unaddressed issue in coastal British Columbia, and dock floats are the primary source.
2. **The Community Pays the Price:** Under current regulations, the actual cost of polystyrene dock floats is externalized, with major financial and environmental burdens placed on coastal communities.
3. **Encapsulation Doesn't Work:** Mandated encapsulation has failed to solve the problem in other jurisdictions and cannot be the solution going forward.
4. **Public Awareness is Essential:** Current public awareness campaigns often focus on single-use consumer plastics which, while important, comprise only a fraction of marine plastic pollution in the Salish Sea.

Regulatory Recommendations

1. **Change Existing Regulations:** Amend the existing Provincial General Permission to Use Crown Land for a Private Moorage Dock regulation to prohibit use of EPS[1].
2. **Include EPS in the CMS:** The issue of marine polystyrene pollution must be included in the upcoming BC Coastal Marine Strategy for public and provincial consideration.
3. **Ban EPS in New Docks:** Additional regulatory steps should be taken, including a mandated ban on use of EPS in new docks and replacement of existing floats.
4. **Mandate Replacement of Existing EPS Floats:** A ban on EPS will leave thousands of docks with exposed EPS floats, polluting BC waterways for decades to come. Replacement of floats is essential to getting EPS out of BC waters.

Website

Additional Resources:

LSDI Website: bcstyropollution.org
BC MECCS: What We Heard: Plastic Action Plan Report
BC MECCS: What We Heard: Marine Debris Report
BC Marine Debris Working Group: Briefing Note
FFI: Breaking Down Ocean Polystyrene Scoping Report
BC MLWRS: Land Use: Private Moorage

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