

Addressing Maritime Shipping Pollution: [HB 1652/SB 5519](#) *Reducing environmental impacts associated with the operation of certain ocean-going vessels*

To improve air quality and reduce sulfur oxide and particulate matter emissions from ocean-going ships, the International Maritime Organization (IMO) limits the sulfur content of ship fuel to 0.5%.¹ The North American Emission Control Area (ECA) further limits sulfur content to 0.10%.² However, both the IMO and the U.S. allow ships to use exhaust gas cleaning systems, better known as scrubbers, to comply with air emissions regulations while continuing to use heavy fuel oil that does not meet the sulfur content emissions requirements. Heavy fuel oil contains pollutants that include carcinogens and other toxic compounds.³ Heavy fuel oil spills could cause more significant economic, environmental, and cultural damage as compared with low-sulfur fuels that meet ECA sulfur content requirements.⁴ The only advantage to using scrubbers is the lower cost of heavy fuel oil compared to emission-compliant cleaner fuels. Any cost savings for vessel owners and operators are far outweighed by the costs of the damage to the marine ecosystem.⁵

Scrubbers remove the highly acidic sulfur oxides from ship exhaust stacks. Some of the toxic non-combusted components of heavy fuel oil and combustion by-products are also removed, including heavy metals, polycyclic aromatic hydrocarbons (PAHs), nitrates, nitrites, and particulate matter.⁶ Nearly 82 percent of scrubbers are “open” and continuously discharge scrubber washwater directly into waterways; only 1 percent of scrubbers are “closed,” with the remainder being “hybrid.”⁷

The toxic contaminants in scrubber discharges threaten aquatic life and endanger human health. Heavy metals and PAHs accumulate in marine organisms in a process called bioaccumulation, and persist and increase in concentration up the food chain in a process called biomagnification.⁸

¹ International Maritime Organization. “[IMO 2020 – Cutting Sulphur Oxide Emissions.](#)”

² The American Club. (December 30, 2014). “[Circular No. 39/14 – North American ECA and New Fuel Sulfur Content Requirements.](#)” *American Club*,

³ Abdul Jameel, Abdul Gani; Alkhateeb, Abdulrahman; Telalović, Selvedin; Elbaz, Ayman M.; Roberts, William L.; Sarathy, S. Mani (2019). “[Environmental Challenges and Opportunities in Marine Engine Heavy Fuel Oil Combustion.](#)” In Murali, K.; Sriram, V.; Samad, Abdus; Saha, Nilanjan (eds.). *Proceedings of the Fourth International Conference in Ocean Engineering (ICOE2018)*. Lecture Notes in Civil Engineering. Vol. 22. Singapore: Springer. pp. 1047–1055. [doi:10.1007/978-981-13-3119-0_72](#). ISBN 978-981-13-3119-0.

⁴ ITOPF Technical Paper 13. “[Effects of Oil Pollution on the Marine Environment.](#)”

⁵ Hermansson, Lunde *et al.* (2024). “[Strong economic incentives of ship scrubbers promoting pollution.](#)” *Nat Sustain* 7, 812–822.

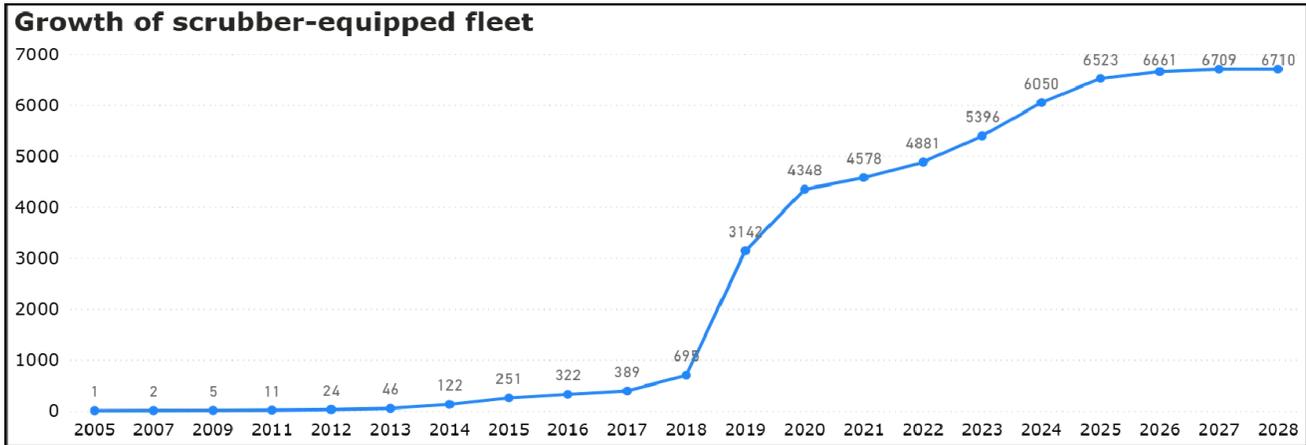
⁶ Teuchies *et al.* (2020). “[The impact of scrubber discharge on water quality in estuaries and ports.](#)”

⁷ IMO Uptake of Alternative Fuels [webpage](#).

⁸ Chouvelon *et al.*, (2019). “[Nutritional grouping of marine forage species reveals contrasted exposure of high trophic levels to essential micro-nutrients.](#)”

Endres *et al.* (2018). “[A New Perspective at the Ship-Air-Sea-Interface: The Environmental Impacts of Exhaust Gas Scrubber Discharge.](#)”

As seen in the chart below, there were no ships with scrubbers until 2005, and there were only 695 scrubbers in use world-wide in 2018. Since then, the growth of ships with scrubbers has increased 839%. As of 2025, there are 6,523 ships with scrubbers.



Data from [IMO Uptake of Alternative Fuels webpage](#)

Ships using heavy fuel oil with scrubbers produce significantly more air pollution and black carbon than ships using low-sulfur fuels.⁹ Black carbon emissions contribute to health issues such as asthma, cardiovascular disease, and cancer.¹⁰ Black carbon is also associated with adverse birth outcomes and heatwave-related mortality.¹¹

Scrubber discharge pollution threatens Washington State’s ocean economy which has the 5th largest GDP in the U.S., bringing in \$24.1 billion in revenue and providing \$7.5 billion in wages per year.¹² Ocean acidification is a growing concern for the Salish Sea as the ecosystem is naturally more acidic than other waters, primarily due to its high rates of summer upwelling. Even small changes in pH can pose a significant risk to marine life, with calcifying organisms like shellfish being the most likely to be negatively impacted. For example, Pacific oysters can survive brief dips below a pH of 7.7, but anything below that significantly impacts their chances of survival.¹³ An estimated 62,200 jobs are tied to fishing and seafood operations in Washington State.¹⁴ The shellfish industry alone is worth \$53.3 million, but the industry has been struggling because of ocean acidification that scrubber discharges exacerbate.¹⁵ A study published in Nature Communications in November of this year found that the Salish Sea is outpacing many other bodies of water as it rapidly acidifies

⁹ Comer, B. et al. (2020). [“Air emissions and water pollution discharges from ships with scrubbers.”](#)

¹⁰ U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR). (2014). [Fuel Oils / Kerosene | ToxFAQs™.](#)

¹¹ Clean Air Fund (2025). [Tackling Black Carbon: How to Unlock Fast Climate and Clean Air Benefits.](#) London: Clean Air Fund.

¹² Washington Department of Commerce. Choose Washington. [Maritime.](#) See also NOAA. (2024). [“2024 Marine Economy Report Washington State.”](#)

¹³ Lutier, M. et al. (2023) [“Pacific oysters do not compensate growth retardation following extreme acidification events.”](#)

¹⁴ NOAA Fisheries. (2023). [Fisheries Economics of the United States Reports.](#)

¹⁵ US Environmental Protection Agency (EPA). (2021). [“Marine Water Quality in the Salish Sea.”](#)

Ocean Acidification International Coordination Centre. (2018). [“The race for adaptation in an increasingly acidic Salish Sea.”](#)

due to the combination of both anthropogenic and natural sources of acidity.¹⁶

A recent study found that even extremely low concentrations of scrubber discharge can severely impact the survival, larval development, and reproductive success of copepods -- a type of zooplankton that is the primary food source for several species of forage fish, salmon, whales, and seabirds.¹⁷ In general, animals that are near the base of the food chain are more susceptible to marine contaminants because they have high surface-to-volume ratios and directly absorb pollutants from the surrounding water, while at the same time often exhibit rapid feeding rates, increasing their likelihood of ingesting pollutants. When animals that serve as the base of the marine food web, like zooplankton, decline, the entire ecosystem runs the risk of destabilizing. Fish populations shrink, top predator numbers decline, and the ecosystem itself becomes less resilient.

Preventing scrubber discharge in the Salish Sea is critical to the recovery of endangered Southern Resident killer whales and their preferred prey, Chinook salmon:

ECCC [Environment and Climate Change Canada] estimates that over 26 million tonnes of scrubber washwater was discharged into SRKW [Southern Resident killer whales] critical habitat in 2022, including 69 kg of PAHphe [Polycyclic Aromatic Hydrocarbons as phenanthrene equivalents] and over 8,000 kg of metals. Cruise ships accounted for 44% of the washwater discharge and 40% of the PAHphe and 44% of the metals in this habitat. ECCC estimates that marine vessel scrubbers contribute between 40-98% of the loading of priority contaminants within 300m of SRKW critical habitat.¹⁸

Heavy metals and PAHs can impair immune systems, growth, reproduction, and survival rates of invertebrates, fish, and marine mammals throughout the Salish Sea.¹⁹ A recent study by Lee et al. (2023) found that PAHs in critically endangered Southern Resident killer whales can even be transferred in utero through mother-fetus skeletal muscle tissues.²⁰

On March 6, 2025, the Government of Canada announced that it is proposing to “progressively prohibit vessel discharge of washwater from scrubber systems in Southern Resident killer whale critical habitat.”²¹

¹⁶ Stoll, M.M.V. et al. (2025). [“A century of change in the California Current: upwelling system amplifies acidification.”](#) And Seattle Times. (Nov. 20, 2025) [“Ocean acidification to hit Puget Sound harder, study says.”](#)

¹⁷ Picone, Marco et al. (2023). [“Impacts of exhaust gas cleaning systems \(EGCS\) discharge waters on planktonic biological indicators.”](#) *Marine Pollution Bulletin*, Volume 190, 114846, ISSN 0025-326X.

¹⁸ Environment and Climate Change Canada for the Government of Canada. (April 12, 2024). [“VESSEL POLLUTION IN PACIFIC CANADA.”](#) Commission for Environmental Cooperation. Government of Canada Response to Submission SEM 23-007. Page 29.

¹⁹ Defenders of Wildlife. (2017). [Connecting the Dots: Orcas, Salmon and Toxic Chemicals in the Salish Sea.](#)

²⁰ Lee et al. (2023). [Polycyclic aromatic hydrocarbon \(PAH\) source identification and a maternal transfer case study in threatened killer whales \(*Orcinus orca*\) of British Columbia, Canada.](#) *Nature Scientific Reports.*

²¹ Fisheries and Oceans Canada news release. (March 6, 2025). [“Government of Canada is taking action to protect the Southern Resident killer whale.”](#)

Ocean-going ships have been complying with California's cleaner fuel requirements within 24 nautical miles of California's shores for over a decade.²² Scrubber discharges are prohibited from ships at berth and at anchor in the Port of Vancouver, Canada.²³ A second phase of restrictions will prohibit scrubber discharges in all waters within the port's jurisdiction, and a third phase will fully prohibit the use of scrubber systems within the Port of Vancouver.²⁴

Other jurisdictions have taken actions to require low-sulfur fuels or limit scrubber use and discharges from maritime vessels. As of June 2023, there were 80 bans and 13 restrictions on scrubbers in 45 countries, at the port, national, and sub-national level.²⁵

The cost savings for vessel owners and operators from the use of scrubbers and heavy fuel oil as compared with the costs of emission-compliant cleaner fuels are far outweighed by the costs associated with scrubber impacts to the state's water quality; public health; aquaculture; commercial, recreational, and cultural harvests of shellfish and fish; eco-tourism; and other marine economies.

The use of scrubbers is optional (except where prohibited). Ships with scrubbers can switch to low-sulfur fuels without needing new or modified engines. Requiring ships to use low-sulfur fuels would reduce toxic discharges from ships in Washington state waters, which would be achieved with the passage of [HB 1652/SB 5519 Reducing environmental impacts associated with the operation of certain ocean-going vessels](#).

More information:

[Ship pollution: From air to ocean](#)

[Poison in the water: The call to ban scrubber discharge](#)

[On Thin Ice: Why black carbon demands urgent action](#)

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Non-profit coalition supporting this legislation:

Friends of the San Juans, Earthjustice, Washington Conservation Action, Stand.Earth, Center for Biological Diversity, Seattle Cruise Control, Washington Physicians for Social Responsibility, Western Environmental Law Center, and Puget Soundkeeper.

Paid for by Friends of the San Juans, P.O. Box 1344, Friday Harbor, WA 98250.

²² California Air Resources Board (CARB) official [website](#).

²³ Port of Vancouver. (February 2025). [PORT INFORMATION GUIDE](#). Page 189.

²⁴ Safety4Sea. (March 18, 2022). "[Port of Vancouver announces new restrictions on the discharge of scrubber wash water](#)."

²⁵ International Council on Clean Transportation. (June 23, 2023). "[Global update on scrubber bans and restrictions](#)." By Camilla Carraro.

See also NorthStandard. September 30, 2025. "[No Scrubs: Countries and Ports where Restrictions on EGCS Discharges apply](#)."