Focus on **Saltwater Beach Odors**

from Ecology's Water Quality Program

To report beach odors:

Ecology NW Regional Office in Bellevue
425-649-7000

(Island, King, Kitsap, San Juan, Skagit, Snohomish, and Whatcom counties)

Ecology SW Regional Office in Lacey
360-407-6300

(Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston and Wahkiakum counties)

For more information about Puget Sound beach odors:

Department of Ecology
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For health-related questions about sulfide odors:

Department of Health, Environmental Health Assessments Office
360-236-3184 or
877-485-7316
www.doh.wa.gov/ehp/oehas/default.htm

The smell of seaweed and other marine life is a natural part of beach ecology. Particularly pungent smells may come from the beach when a common type of seaweed known as sea lettuce decays in an environment with low dissolved oxygen. When that happens, sulfur gases are produced, including hydrogen sulfide, which smells like rotten eggs or sewage, and dimethyl sulfide (DMS), which smells like rotting shellfish.

Beach ecology

The beach is an important habitat for a variety of marine life. Many animals live in the waters and in and on the sands of the beach. They use the beach for shelter, feeding, breeding, and egg-laying. Beaches in Puget Sound are also fertile grounds for blooms of sea lettuce. Sea lettuce, because of its rapid growth rate and thin leafy structure, can accumulate rapidly in thick piles driven by winds and ocean currents. Sea lettuce grows in shallow bays and inlets when the long hours of bright sunlight of the summer combine with a lack of wind and an influx of nutrients from a variety of sources. All types of seaweeds, including sea lettuce, are essential components of the Puget Sound ecosystem. They provide food for several species of sea birds, fish, and other marine animals, as well as shelter for several fish species.

Beach odor concerns

Noxious odors from decaying sea lettuce and other seaweeds can, in some instances, be strong enough to make people feel sick. This has sometimes been the case during the summer months at many Puget Sound beaches including Fauntleroy Cove in West Seattle, at Murden Cove on Bainbridge Island, and at Dumas Bay in Federal Way. These odors can also be produced even when there are no seaweed blooms. This happens underwater in low-oxygen marine sediments. In waters with higher oxygen, healthy live seaweeds and those that decay usually do not produce noxious odors, even if there are a lot of them.

Public health concerns

At times people living near the beach wonder if odors are coming from a source other than the beach. Because the odors of hydrogen sulfide and dimethyl sulfide (DMS) are similar to the odors of sewage, people wonder if a sewer leak might be the cause. In addition, people often want to know if there is also a risk of illness related to the odor.

Human exposure to low levels of hydrogen sulfide may, at times, cause irritation to eyes, nose or throat. Some people sensitive to such odors can detect hydrogen sulfide at very low concentrations. At higher concentrations, hydrogen sulfide can be a respiratory irritant and may lead to headaches, nausea and vomiting. Hydrogen sulfide can also aggravate asthma. Dimethyl sulfide (DMS) is a volatile byproduct of a

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compound produced by many species of algae. Cooking of certain vegetables–notably corn and cabbage–and seafood can also give off this DMS gas.

Sea lettuce accumulation in Fauntleroy Cove.

Of these two gases, hydrogen sulfide has the greatest potential health concern. While low-level concentrations in the environment generally do not result in health problems, these odors can annoy people. Unlike certain algae blooms in lakes, sea lettuce does not release toxins in the water. Public health authorities have not monitored actual hydrogen sulfide concentrations in most locations throughout Puget Sound to determine potential public health impacts.

Ecological concerns

Accumulations and blooms of sea lettuce are normal in many parts of Puget Sound and have been recorded as early as the 1930s. In recent years, some Puget Sound scientists and shoreline residents have suggested that there may be an increase in the number of places where we find mats of decomposing sea lettuce. They also suggested there is an increase in the amount of sea lettuce that is decomposing on the beach. Although the Department of Ecology has documented an increase of accumulations of sea lettuce in specific bays and inlets, no agency or group has conducted a comprehensive survey of Puget Sound to evaluate whether this is a phenomenon affecting the entire Sound.

Scientists are not sure of the cause of odors in Puget Sound. Many estuaries and bays throughout the United States and the world are experiencing increased nutrient inputs and consequently increased blooms of seaweeds and microalgae. Blooms of seaweeds often cause odor problems on beaches where they accumulate. Sea lettuce accumulations can also smother and kill important eelgrass plants that serve as critical ‘nursery’ shelter for fish and crustaceans.

The Fauntleroy community in West Seattle worked with state and local agencies in 1999 to remove sea lettuce from the beach and dispose of the material offshore. There is some evidence that these efforts temporarily reduced beach odors. But there is a lot of natural year-to-year variation in the occurrence of seaweed blooms. Also, seaweed accumulation can vary greatly from one place to another and is subject to transport by tidal currents. Therefore, there is considerable uncertainty in measuring the effectiveness of beach seaweed removal. These factors complicate decision-making to remove sea lettuce. Another complicating factor is that removal efforts may harm sensitive beach organisms such as forage fish, which spawn on Puget Sound beaches. Additionally, disposing the sea lettuce in deeper waters of Puget Sound may harm the sensitive Puget Sound ecosystem. **First and foremost, state and local officials seek to partner with local communities to reduce odors in ways that do not harm the sensitive Puget Sound ecosystem and that address the ecosystem factors that may exacerbate seaweed blooms.**

Source control

Natural conditions of Puget Sound can create dynamics that increase beach odors and deplete dissolved oxygen, worsening beach odors. Nutrients feed phytoplankton causing algae blooms, and as the tiny organisms die and sink, they decompose, using up vital oxygen in the process. If dissolved oxygen gets too low, fish and other marine animals may suffocate.

Nutrient inputs and shoreline alterations can contribute to the problem.

Ocean water naturally contains nutrients that are carried into Puget Sound by tidal action and currents. But people also contribute nutrients into Puget Sound. Nutrients enter Puget Sound from sewage treatment plant discharges, septic tanks, lawn fertilizers, pet waste and improperly discharged boat sewage. Nutrients also get into Puget Sound from the way people alter the shoreline.

While not all nutrients reach Puget Sound from human activities on the shoreline, a community may help reduce nutrients that reach the beach by working together to reduce pollution sources in the watershed. Odors may not go away completely, but the fish and other creatures that live nearby will be thankful for your efforts!

You can reduce nutrients that get into Puget Sound

- Reduce or use only small amounts of commercial fertilizers in your yard and garden.
- Do not dump yard clippings on beaches or near streams.
- Pick up and properly dispose of pet waste.
- Check your on-site sewage system to make sure it is maintained and working properly.

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