

Managing Seaweed Accumulations on Recreational Beaches

Guidance from the Massachusetts Office of Coastal Zone Management, May 2013



Seaweed is an important part of the Massachusetts coastal and ocean ecosystem, providing food and habitat for a variety of species. Even when seaweed washes ashore, it continues to serve important purposes—providing a place where sand collects to help build beaches and dunes, nutrients for coastal systems, and areas where birds and other animals forage and find shelter. Accumulations of seaweed on beaches, however, can cause management challenges, particularly in warmer weather when the material decays and causes odor problems. This guidance was developed by the Massachusetts Office of Coastal Zone Management (CZM) to

help local beach managers effectively address seaweed accumulations on recreational beaches while protecting coastal resources.

Seaweed in Massachusetts

Massachusetts is home to a wide variety of seaweed, which includes algae such as kelp and sea lettuce, and also flowering, vascular plants such as eelgrass. Well over 100 species of macroalgae (larger types of algae) and two species of marine grasses are native to Massachusetts. In addition, at least 17 non-native species of algae—species not indigenous to the area that have been



Seaweed varieties in a tide pool.

introduced by humans—are present in the region. See CZM’s *Non-Native Seaweed in Massachusetts* fact sheet for more information.

Seaweed provides important habitat and a critical source of food for marine animals, serving as forests under the sea. Plant debris deposited on the shoreline also provides important nutrients and organic matter for the ecosystem. On most shorelines, the wrack line (the area where items from the sea are deposited on the shore between high and low tides) is primarily made up of different seaweed species, seeds, and terrestrial plant debris. The organic matter in the wrack provides food and habitat for small crustaceans and a number of other species, which then provide food for fish, crabs, and nesting and migrating birds, some of which are threatened or endangered. Plants may also use shifting wrack deposits to help distribute seeds and fragments so that the population can reproduce and expand. In addition, the wrack line catches sand that helps build beaches and dunes, which is important for storm damage protection and flood control in coastal areas.

Each seaweed species has an individual cycle of growth and abundance. Some are annuals, occurring only for a season or few seasons, and some are perennials that can persist for several years. Natural fluctuations in the abundance of

seaweeds, combined with strong currents during storms and other wind/weather events can result in a large amount of seaweed material being washed up on the beach. These accumulations, referred to as seaweed blooms, may become a nuisance during periods of warm weather when the seaweed begins to decay and produce odors and/or attract flies and their larvae. Excessive seaweed accumulations may also reduce beach access for recreational activities.

Recommended Management Measures

Because seaweed is a natural and important part of the coastal ecosystem, it should be left in place whenever possible. When seaweed management is deemed necessary, however, local conditions and management considerations must be fully understood and addressed before selecting appropriate techniques. Because there is no one-size-fits-all approach for all beaches, CZM recommends developing a seaweed management strategy or policy, ideally as part of a comprehensive beach management plan for all public beaches (see the *Town of Scituate, Public Swim Beach Seaweed Removal Policy* and *Town of Hull, North Nantasket Beach Management Plan* in Additional Resources on page 6 as examples). Ideally, this management strategy should be in place before the recreational beach season begins. In addition, before any action is taken to remove or alter the wrack on the shoreline, all applicable permits and permissions

A variety of seaweed species washed up on a beach.



PHOTO: ADRIENNE PAPPAL



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should be obtained. Seaweed removal techniques that meet all regulatory requirements can be specified and permitted as part of a beach management plan, allowing seaweed removal to proceed when necessary.



Seaweed washed ashore during low tide; an accumulation of seaweed on the beach (inset).

SEAWEED MANAGEMENT PERMITS

PERMITS TYPICALLY REQUIRED

- Order of Conditions (from the local conservation commission)

ADDITIONAL PERMITS/PERMISSIONS THAT MAY BE NEEDED

- Massachusetts Endangered Species Act Permit
Mass Wildlife's Natural Heritage and Endangered Species Program
(508) 389-6345 | www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_home.htm
- U.S. Army Corps of Engineers (USACE) Permit
USACE Regulatory Program
978-318-8335 | www.nae.usace.army.mil/Missions/Regulatory.aspx
- 401 Water Quality Certification (WQC)
Massachusetts Department of Environmental Protection (MassDEP)
MassDEP, Wetlands Program
(617) 292-5893 | www.mass.gov/eea/agencies/massdep/water/watersheds/wetlands-protection.html

When removing seaweed accumulations from a beach, the lowest impact techniques available should be used, such as hand removal or hand raking. Whether hand raking, rake-type machines, or other heavy machinery is used, the following general guidelines should be followed:

- Removal activities should be conducted on an “as needed” basis due to the variable rates of seaweed washed ashore.
- Effort should be made to remove as little sediment (sand, gravel, and cobble) from the beach as possible to minimize impacts and leave important substrate in place.
- All machinery should remain on the beach at least 10 feet seaward of dunes and vegetation to protect the stability and ecology of the area.
- Removal should be focused on the areas of significant accumulations of nuisance seaweed, leaving a sufficient wrack line on the beach to provide a seed source, nutrient source, and foraging habitat for shorebirds and to help build the beach and dunes.
- Mechanical rakes should be set to only skim the surface of the beach to avoid scraping or moving beach sediments.
- Bucket loaders should not be used to collect seaweed but can be used to transport seaweed collected by hand or by rake-type machines.
- Mechanical beach cleaning equipment, such as Cherrington machines, should only be used in high use areas and the frequency of their use should be kept to a minimum. This equipment should not be used in rare species habitat to ensure that enough foraging material remains for shorebirds and other species.
- Inorganic debris and materials considered hazardous to public health or safety should be

removed by hand as soon as possible.

- In threatened or endangered species habitat and significant migratory shorebird staging areas, seaweed removal should be prohibited from April 1 to September 30.
- Management practices should be reviewed on an annual basis with the Conservation Commission and other local officials involved in the management activities (e.g., Department of Public Works, Beach Committee).
- On beaches where federal or state-listed birds (e.g., Piping Plovers and Least Terns) are nesting and raising young, areas of suitable nesting habitat on the upper beach and foredunes should be delineated with symbolic fencing (twine or rope strung between posts with warning signs). Mechanical raking and beach-cleaning equipment should remain outside of all fenced areas. To avoid violations of state and federal endangered species laws, after May 15 no mechanical raking or beach-cleaning should occur unless a qualified shorebird monitor is present to determine that no unfledged chicks are at risk.

Although seaweed is a natural material, once it is removed from a beach, disposal can pose some challenges. Disposal strategies will vary depending on space available for storage and drying of seaweed, the amount of material to be disposed of, the resources available for disposal, and ecological impacts. It is highly recommended that, as part of a beach management plan, criteria are developed for determining whether disposal of seaweed is warranted and strategies are established for the disposal of varying quantities of material. All options should be carefully evaluated and those that most successfully address seaweed issues while avoiding impacts should be selected. See the “Seaweed Disposal Options Used by Massachusetts Coastal Communities” text box on page 5 for a list of some disposal options available.

Whichever disposal strategies are used, these general guidelines should be followed:

- A consultation with the Massachusetts Department of Environmental Protection's Solid Waste Program is recommended before any disposal or management actions are taken in upland areas or town transfer sites (see Additional Resources on page 6).
- Prior to disposal, seaweed should be shaken or sorted to remove as much sand, sediment, and live organisms as possible.
- Wrack material should not be deposited on any dune area where it can smother live plants, leading to dune erosion and destabilization.
- Wrack material should be sorted to remove any trash or debris if it is to be stored or stockpiled anywhere on a barrier beach or coastal beach system.
- Seaweed contaminated with trash or other inorganic debris should never be deposited into the ocean.

In addition to removal and disposal, these options may be used to manage seaweed accumulations:

- Removal of fresh seaweed material on a regular basis for use in compost may help to control the amount of seaweed that accumulates over time. However, as with any removal technique,

care must be taken to ensure that sufficient material remains in the wrack to protect marine ecological functions.

- Excess nutrients enhance seaweed growth and can contribute to seaweed blooms. If seaweed blooms are a recurring problem, an investigation into the source of excessive nutrient inputs should be considered, especially in an enclosed embayment.

For More Information

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SEAWEED DISPOSAL OPTIONS USED BY MASSACHUSETTS COASTAL COMMUNITIES

- No disposal—seaweed remains in place or is moved off to one side of the beach or to a non-recreational use area.
- Seaweed is allowed to dry in a designated storage area (good options include empty parking lots or fields). Since seaweed is composed primarily of water, this reduces the amount of material to be disposed of. Once dried, seaweed may be:
 - o Returned to the beach wrack to help sand build up.
 - o Composted—either on site, at a transfer station, or by individuals.
 - o Brought to a landfill.
- For minor accumulations, other options include on-site burial or return to the sea when wind/tide conditions are favorable (seaweed may or may not be dried on site first).

Additional Resources

Massachusetts Office of Coastal Zone Management: *Guidelines for Barrier Beach Management in Massachusetts*. www.mass.gov/czm/hazards/pdf/barrier_beach_guidelines.pdf.

Massachusetts Office of Coastal Zone Management: *Non-Native Seaweed in Massachusetts*. www.mass.gov/czm/non-native-seaweed-fact-sheet.pdf.

U.S. Fish and Wildlife Service, Northeast Region: *Guidelines for Managing Recreational Activities in Piping Plover Breeding Habitat on the U.S. Atlantic Coast to Avoid Take Under Section 9 of the Endangered Species Act*. www.fws.gov/northeast/pipingplover/pdf/recguide.pdf.

Massachusetts Department of Environmental Protection: *Recommended Conditions for Barrier Beaches*, In: *Guidelines for Barrier Beach Management in Massachusetts*, p. 215-220. www.mass.gov/czm/hazards/pdf/barrier_beach_guidelines.pdf.

Massachusetts Department of Environmental Protection Solid Waste Program
(617) 292-5500
www.mass.gov/eea/agencies/massdep/recycle

Massachusetts Division of Fisheries and Wildlife: *Guidelines for Managing Recreational Uses of Beaches to Protect Piping Plovers, Terns, and Their Habitats in Massachusetts*, In: *Guidelines for Barrier Beach Management in Massachusetts*, p. 195-210. www.mass.gov/czm/hazards/pdf/barrier_beach_guidelines.pdf.

Town of Hull, North Nantasket Beach Management Plan, February 2012. www.town.hull.ma.us/Public_Documents/hullma_conservation/BMP_2-21-12_adopted_by_Smen.pdf.

Town of Scituate, Public Swim Beach Seaweed Removal Policy, July 2012. www.town.scituate.ma.us/documents/Seaweed-Removal-Policy2012.pdf.

www.mass.gov/czm/invasives

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