Truro Conservation Commission
Regulations - Chapter 2
Coastal Management Plan - Sand and Drift Fence Guidelines

2.01Performance Standards: "Coastal banks play an important role in storm damage prevention and flood control. The characteristics which make them important to these two interests are:

> An ability to erode in response to wave action, which allows coastal banks to supply sediment to coastal beaches, coastal dunes, barrier beaches and land under the ocean.
>
> A natural resistance to erosion caused by wind and rain runoff, which allows coastal banks to act as a vertical buffer to storm waters and waves."

This policy is adopted in an effort to meet these standards; nothing in this plan shall be construed to permit any dune-related activity that would hinder the coastal bank behind the dune "to erode in response to wave action" because without bank erosion, there would be no beaches. Dunes and coastal banks represent at least three interests of the act: flood control, storm damage protection and wildlife habitat, and may relate to other interests in certain situations.

2.02 Rule: No fencing shall be erected or maintained, nor shall any vegetation be planted in a coastal resource area within the Town of Truro without the prior approval of the Truro Conservation Commission. Planting of native vegetation, installation of Sand (rolls of lightweight fencing) and Drift (Serpentine) fencing may be permitted as set forth below. Layered sand fencing may be permitted on both ocean and bay sides of Truro. Drift (serpentine) fencing may only be erected on the bay side. Layered Drift fencing shall only be permitted under special circumstances and in limited areas, and shall be sought by application for a waiver. Hardened fencing, seawalls, revetments or bulkheads shall not be allowed, except as specifically provided in 310C.M.R. 10.30 (3), which states that coastal engineering structures cannot be permitted when a coastal bank "is significant to storm damage prevention or flood control because it supplies sediment to coastal beaches, coastal dunes and barrier beaches". Maintenance or repair of existing bulkheads and revetments shall only be by prior approval of the Truro Conservation Commission. Engineering structures shall not be permitted as defined in 310 C.M.R 10.23:

> Coastal engineering structure means, but is not limited to, any breakwater, bulkhead, groin, jetty, revetment, seawall, weir, riprap or any other structure that is designed to alter wave, tidal or sediment transport processes in order to protect inland or upland structures from the effects of such processes.

A fencing solution may not be appropriate for every property. Initially, the applicant should determine the appropriate type and extent of installation for their situation. Factors to consider may include the amount of vegetation, existence of a dune currently, angle of repose, recent cutting or evidence of past bank erosion. The Conservation Commission may request an outside consultant to review this assessment at the applicant's expense according to the Wetlands Regulations.

2.03 Rationale:

Coastlines are dynamic environments where sediment is seasonally, annually and inter-annually moved by waves, tidal currents, and winds, leading to erosion and deposition as part of the natural system. The coastal processes are constantly adjusting in an attempt to reach equilibrium, or a smooth profile between the beach and the ocean. A well-established, vegetated primary fore-dune provides storm damage protection and some flood control. Dunes and beaches dissipate storm energy, thereby minimizing the impacts to landward areas.[1] Dunes also provide unique wildlife habitat for some endangered or threatened species.

Local, state and federal regulatory agencies strongly encourage the use of non-structural measures to reduce the impacts of storm damage and flooding.[2] Structural measures often create adverse effects on subject property as well as adjacent and nearby beaches by increasing erosion through wave reflection and by eliminating important sediment sources.[2] The optimum landward dune location is often above the seasonal average storm tide elevation.[1] Over time this elevation changes and naturally settles in a more landward position.

When storm activity erodes coastal dunes, the material eroded remains part of the overall coastal system, and provides nourishment for downdrift beaches and nearshore sand bars. Once fair weather beach processes resume following a storm, the sand from sand bars migrates seasonally back to the beach, and then wind-blown sand from the beach naturally rebuilds the dunes.[1] The dune rebuilding process can take several years, and in certain cases it may be desirable to rebuild a storm-eroded dune more quickly.[1]

Any fencing activity should be viewed as a temporary measure to initially trap higher volumes of sand than American beachgrass could alone. Once the beachgrass is established, it has been proven to trap sand at a rate comparable to multiple sand fences.[1] Holding a dune unnaturally seaward of the storm tide elevation at any given time creates problems for abutting properties and ultimately can negatively affect the distribution of sediment along an entire

coastline alongshore, as well as on and off shore where bars provide important storm protection.

2.04 Definitions:

a) Sand Fencing: Also sold as "snow fencing", in 50 foot long rolls, 4 feet high. The rolls can be chain sawed in half to produce 100 feet of 2 foot high fencing. Constructed of lightweight wooden slats, factory wired together with spaces between the slats approximately equal to slat width (approx. 1.5 inches) Fencing may be installed in three 10'wide rows parallel to the shoreline, or in zig-zag pattern. 2 foot high fencing can be installed by driving the individual slats into the sand with a rubber mallet. 4 foot high fences may be supported by wooden posts, attached with screws or plastic ties.

b) Drift Fencing (also called "Serpentine" Fencing): Timber posts dug at least five feet into the sand, connected by 6 to 10 foot spans of fencing comprised of 2x4 spans and 2x3 slats. Space between slats is a minimum of 3". Fence posts are installed alternating 2' on either side of a center line so that a "zig zag" or "serpentine" structure results.

c) Hardened fencing: Any Sand or Drift fencing backed by landscape fabric, bracing spans of wood, or packed with beach debris, straw, or any other material intended to or actually providing greater blockage of sand and water than would be caused by the fencing alone.

2.05 Options for Property Owners:

a) No Installation: A property owner may choose to not install any fencing. Some properties along the bay side do not have fencing, and have grown dunes back following erosion events. Gently sloping, wider seaward-facing dunes are less prone than steep slopes to storm wave loss of sand. Through experimentation it was shown that planted dunes on Cape Cod create lower and wider dunes than fence-built dunes. [1] The lower, wider dunes that form without fencing result in less sediment loss during typical storm events.

b) Sand fencing: Sand fencing is commonly used along the Eastern United States to encourage deposition of wind-blown sand to help re-build a dune. The effectiveness of this method in any given area depends upon availability of adequate amounts of wind-blown sand. The degree of success a fencing system will have in any given location varies along the coast line, therefore each site should be examined individually, and in conjunction with

neighboring properties. The rolled sand fencing interferes less with natural processes.

c) Drift fencing: The fencing approach is intended to encourage deposition, and thereby slow erosion, it is not intended to hold a dune in place. Installation of a fence of this nature must not be confused with a engineering structure as defined in the wetlands regulations 310CMR.

2.06 Procedure:

a) Notice of Intent (NOI) - A Notice of Intent is required for initial installation of any Sand or Drift fencing. Should new or additional timber supports be required for repair or maintenance of an existing fence a NOI is required. Where, due to erosion, the timber piles or posts must be moved or relocated, a NOI is required.

b) Maintenance Permit: Where an existing fence is damaged by storm or erosion, repair may be accomplished by application for a Maintenance Permit except where placement of new or additional timber supporting posts, or relocation of the fence is required.

c) Amended Order of Conditions - A request for an Amended Order may be filed in the event that damage occurs to a fence with a previously issued Order of Conditions which has not been closed by issuance of a Certificate of Compliance, and may include repair, including relocation of all or part of an existing fencing system.

2.07 Construction specifications and Protocol for Sand Fencing.

Sand fencing offers a less invasive approach to dune restoration than the more substantial serpentine fence. This, when combined with a nourishment and replanting plan, will provide the coastal property owner an effective option for protecting an eroded bank or dune. The expense of sand fencing is considerably less than installing a drift fence, and its lighter construction may be less damaging to the beach during installation.

a) Placement: Dune restoration by means of sand fencing should take place as far landward as possible. A second or third, optional, fence may be installed up the unvegetated fore dune slope providing additional sand accumulation.

b) Materials: Sand fences should be made of wood slats, connected by wire and having a 50-50 ratio of open space to slats. (24” rather than 48” height will

likely last longer due to less wind resistance while collecting a similar volume of sand.) The rolls should be attached to the posts with staples, with additional tie-wraps as desired. 4" x 4" rounded posts should be used if the area may be inundated with waves. Otherwise a lighter post may be used.

c) Identification: All posts shall be branded marked with the assessor's map and parcel # for the property where the fence is to be installed. Each fence shall be constructed so that the identifying information is on the landward side of the fence.

d) Construction: Posts should be set at or within several feet seaward of the toe of the dune scarp, 8' apart. Posts should be buried a minimum of 5' in the sand, and more if the fence is in a high-energy area. Each section of fencing between posts should have two removed or "missing" pickets, so as to create an opening in the fencing to accommodate birds and animals.

2.08. Construction Specifications and Protocol for Drift Fencing

a) Placement. Drift fencing should be placed well above the mean high tide line and as close as practicable to the coastal bank or dune. Plans submitted should delineate all resource areas and the location of all pilings.

b) Materials.

1. Timber pilings used to anchor sections of fencing shall preferably be 6-8" in diameter, and shall not be longer than 8'.

2. Slats shall be no more than 2"x3" and front braces and fence spans shall be no larger than 2x4 lumber, fence sections shall be 6' to 10' long, having a 50-50 ratio of open space to slats. Each fence span shall contain at least one "missing" slat, leaving a gap of at least 7.5" in the fencing (to permit movement of birds and other animals).

c) Construction:

1. All wooden materials to be used in any fencing shall be branded with the assessor's map and parcel # for the property where the fence is to be installed. Each fence shall be constructed so that the identifying information is on the landward side of the fence.

2. Fence sections shall be assembled off site and brought to the beach location where the fence is to be erected;

3. All pilings shall be individually dug with small excavator, at least five feet deep; fence sections shall be bolted to pilings with slats on the water

side; fence sections may be secured on the landward end by installation of a bracing member across the landward side. Fence sections shall not be trenched in to the beach.

2.09 Deposition and Mitigation

Every fencing project shall include beach nourishment. Every Notice of Intent and application for maintenance permit shall specify the amount of sand to be deposited at the site, and shall identify the source from which the nourishment material will be obtained. The nourishment material must be clean sand free of debris or waste, and should be of a compatible grain size to the native beach material at the site. (Note: if sand which is of smaller grain size than the native material is used, the lighter sand will wash away sooner.)

The amount of nourishment material required for each project shall be determined on a case-by-case basis, and will depend upon the topography of the site and the adjacent areas. In general, it is recommended that the applicant fill the area between the fence and the dune or bank to at least one-half the fence height, or a minimum of two feet above existing grade, whichever is greater. In addition, where the distance between the fence and the mean high water mark is fifteen feet or more, then the applicant is required to deposit sufficient material to mirror the existing beach profile.

2.10 Vegetation:

1. Every fencing project shall include planting of American Beach grass between November 1 and April 1 following completion of the installation or repair of the fencing. Culms should be planted at no greater than 12 inch intervals, center staggered in alternate rows. To encourage the greatest rate of dune stabilization it is recommended to put two or three culms per hole. It is recommended to plant in the greatest density in the landward section, and decrease the spacing of plants in the seaward direction. Slow-release fertilizer may be applied in spring, at a rate of 100 pounds per acre of 10-10-10, unless the area is in a particularly sensitive environment that could be negatively affected by fertilizer. The best results have been found with two applications, one in late spring within 30 days of planting, but before April 1, and another application in late summer or early fall. For further information, see: Coastal Dune Protection and Restoration, Marine Extension Bulletin, Woods Hole Sea Grant and Cape Cod Cooperative Extension, December 2008, and Beach Nourishment, MassDEP's Guide to Best Management Practices for Projects in Massachusetts, March 2007.

2.11 Monitoring and Maintenance:

Every fencing project shall include submission of photographs taken within one month of completion of construction and nourishment. Photographs taken between May 1 and June 1, shall be submitted annually thereafter in printed or digital format. The measurement of lateral width of the dune terrace from the toe of the coastal bank (when one is present) to the front edge where the foredune meets the beach, and the height of the foredune from the beach elevation to the top of the dune should also be submitted. When appropriate this measurement should be taken at multiple locations along a given property, should the width of the dune vary by more than 5' in depth. Photograph submission shall be required for the duration of the Order of Conditions.

2.12 General Regulations applicable to all projects.

a) All projects shall specify dates for commencement and completion. All projects may only begin after Columbus Day and must be completed prior to Memorial Day, provided however that the project area is clear of nesting shorebirds as confirmed by the conservation agent or her designee.

b) All construction equipment, including dump trucks with sand for deposition shall only access the site from the beach, and only travel along the beach above the mean high tide line. Applicants shall use best efforts to avoid disturbance of existing vegetation.

c) Any substantial beach restoration requiring the hauling of materials from town landings across public and private beaches will be conducted exclusively from Columbus Day to Memorial Day. Substantial projects are those requiring over two days to haul materials.

d) Beach construction and restoration work shall not be performed on weekends or holidays, nor before 8:00 a.m. or after 5:00 p.m on weekdays.

e) Properties between the public access point for the project and the project locus shall be considered abutters and shall be notified of any substantial beach restoration projects in the same manner and at the same time as other abutters.

f) Construction debris shall be removed at the end of each day and the access route shall be left backbladed to a normal grade.

g) Application for Construction or Maintenance of a Sand or Drift fence shall constitute agreement by the property owner to reimburse the Town for the cost of clearing away any debris generated from the property owner's fence.

h) Where fencing becomes ineffective due to storm damage, erosion or other cause, it must either be promptly repaired or removed at the property owner's expense.

i) Where fencing does not exist on an adjacent property, the fencing erected for the applicant shall be no closer than 25 feet to the abutter's property line; where fencing exists on adjacent properties, new fencing shall be aligned with existing fencing.

j) Owners of lots which have less than 100 feet of beach frontage may be approved for fencing construction and/or restoration projects which do not comply with these general regulations, by special permit from the Commission.

k) It is the responsibility of the project proponent to obtain consent to traverse private property as may be required by property owners.

2.13 Fees for installation and maintenance (intentionally left open for later regulatory action)

2.14 Penalties for non-compliance - When an instance of non-compliance is first discovered by the Commission or brought to the Commission's attention, the Commission shall first give written notice to the property owner with a request that the property be brought into compliance within two weeks. If compliance is not obtained, the agent shall issue a $50.00 citation and require compliance within two weeks. If compliance is not obtained, penalties shall be assessed at the rate of $50.00 for each day, or part thereof, that the violation continues. Each violation shall be treated as a separate offense.