PART II - REGULATIONS FOR COASTAL WETLANDS

2.01 Land Under The Ocean

(1) Preamble

Land under the ocean is likely to be important to the protection of wildlife and wildlife habitat, marine fisheries, shellfish and shellfish habitat. Near-shore areas of land under the ocean are likely to be important to storm damage prevention, flood control and wildlife habitat.

Land under the ocean provides feeding areas, spawning and nursery grounds and shelter for many coastal organisms related to marine fisheries.

Near-shore areas of land under the ocean help reduce storm damage and flooding by diminishing and buffering the high energy effects of storms. Submerged sand bars dissipate storm wave energy. Such areas provide a source of sediment for seasonal rebuilding of coastal beaches and dunes. The bottom topography of Near-shore areas of land under the ocean is important to storm damage prevention and flood control.

Near-shore areas of land under the ocean also provide important food for birds. Waterfowl feed on vegetation and invertebrates found in estuaries and other shallow submerged land under the ocean.

Water circulation, distribution of sediment grain size, water quality, fin fish and shellfish habitat in near-shore areas of land under the ocean are factors critical to the protection of marine fin and shell fisheries.

(2) Definitions

(a) "Land Under the Ocean" means land extending from the mean low water line seaward to the boundary of Chatham's jurisdiction;

(b) "Near-shore Areas" of land under the ocean means that land extending from the mean low water line to the seaward limit of Chatham's jurisdiction.

(3) Performance Standards

(a) Improvement dredging for navigational purposes affecting land under the ocean shall be designed and carried out using the best available measures so as to minimize adverse effects caused by changes in:

(1) bottom topography which will result in increased flooding or erosion caused by an increase in the height or velocity of waves impacting the shores;

(2) sediment transport processes which will increase flood or erosion hazards by affecting the natural replenishment of beaches;

(3) water circulation which will result in an adverse change in flushing rate, temperature or turbidity levels; or

(4) marine productivity which will result from the suspension or transport of pollutants, the smothering of bottom organisms, the accumulation of pollutants by organisms or the destruction of habitat or nutrient source areas.

(b) Maintenance dredging for navigational purposes affecting land under the ocean shall be designed and carried out using the best available measures so as to minimize adverse effects caused by changes in marine productivity which will result from the suspension or transport of pollutants, increases in turbidity, the smothering of bottom organisms, the accumulation of pollutants by organisms, or the destruction of habitat or nutrient source areas.

(c) Projects not included in Section 2.01(3)(a) or 2.01(~~4~~3)(b), which affect near-shore areas of land under the ocean, shall not cause adverse ~~—~~effects by altering the bottom topography so as to increase storm ~~—~~damage or erosion of coastal beaches, coastal banks, coastal ~~—~~dunes, or salt marshes.

(d) Projects not included in 2.01(3), which affect land under the ocean, shall be located, designed and performed so as to cause no adverse effects on wildlife, marine fisheries or shell fisheries by:

(1) alterations in water circulation;

(2) destruction or diminution in the quality, quantity, vitality or productivity of eelgrass (*Zostera marina*) beds or other forms of submerged aquatic vegetation;

(3) alterations in the distribution of sediment grain size; ~~or~~

(4) changes in water quality, including, but not limited to, unnatural fluctuations in the level of dissolved oxygen, temperature or turbidity, or the addition of pollutants; or

(5) alterations of shallow submerged lands with high densities of polychaetes, mollusks or macrophytic algae.

(e) Notwithstanding 2.01(3)(a) through (d), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species.

2.02 Coastal Beaches (and Tidal Flats)

(1) Preamble

Coastal beaches, which are defined to include tidal flats, are significant to wildlife and wildlife habitat, storm damage prevention and flood control. In addition, tidal flats are likely to be important to the protection of wildlife, marine fisheries, shellfish and shellfish habitat.

Coastal beaches dissipate wave energy by their gentle slope, their permeability and their granular nature, which permit changes in beach form in response to changes in wave conditions.

Coastal beaches serve as a sediment source for dunes and subtidal areas. Steep storm waves cause beach sediment to move offshore, resulting in a gentler beach slope and greater energy dissipation. Less steep waves cause an onshore return of beach sediment, where it will be available to provide protection against future storm waves.

A coastal beach at any point serves as a sediment source for coastal areas down drift from that point. The oblique approach of waves moves beach sediment alongshore in the general direction of wave action. Thus, the coastal beach is a body of sediment which is moving along the shore.

Coastal beaches serve the purposes of storm damage prevention and flood control by dissipating wave energy, by reducing the height of storm waves, and by providing sediment to supply other coastal features, including coastal dunes, land under the ocean and other coastal beaches. Interruptions of these natural processes by manmade structures reduce the ability of the coastal beach to perform these functions.

Coastal beaches are extremely important in recycling nutrients derived from storm drift and tidal action. Vegetative debris along the drift line or wrack line is vital for resident and migratory shorebirds, which feed largely on the invertebrates which eat the vegetation. Below the drift line in the lower intertidal zone are infauna (invertebrates such as mollusks and crustacea) which are also eaten by shore birds and other animals.

The coastal berm, between the toe of a dune and the high tide line, provides nesting areas for a variety of birds, and isolated coastal beaches on small islands and barrier beaches are important as haul out areas for seals.

Tidal flats are likely to be important to the protection of marine fisheries, wildlife and wildlife habitat because they provide habitats for marine organisms, such as polychaete worms and mollusks, which in turn are food sources for fish, migratory and overwintering birds and other animals. Tidal flats are also sites where organic and inorganic materials may become entrapped and then returned to the photosynthetic zone of the water column to support algae and other primary producers of the marine food web.

Land within 100 feet of a coastal beach or tidal flat is likely to be important to the protection and maintenance of coastal beaches and tidal flats, and therefore to the protection of the wetland values which these areas contain.

When a proposed project involves the dredging, filling, removing, or altering of, or the building upon or within a coastal beach or on land within 100ft of a coastal beach or tidal flat, the presumption shall be that the coastal beach or tidal flat is significant to the interests specified above. This presumption may be overcome only upon a clear showing that the coastal beach does not play a role in storm damage prevention or flood control, or that the tidal flat does not play a role in the protection of land containing shellfish, and provided the issuing authority makes a written determination to such effect.

The following characteristics of coastal beaches are critical to the protection of marine fisheries, wildlife and wildlife habitat:

(a) distribution of sediment grain size;

(b) water circulation;

(c) water quality; and

(d) relief and elevation.

The following characteristics of coastal beaches are critical to storm damage prevention or flood control:

(a) volume (quantity of sediments) and form; and

(b) the ability to respond to wave action.

(2) Definitions

(a) "Coastal Beach" means unconsolidated sediment subject to wave, tidal or coastal storm action which forms the gently sloping shore of a body of salt water and includes tidal flats. Coastal beaches extend from the mean low water line landward to the dune line, coastal bank line or the seaward edge of existing manmade structures when these structures replace one of the above lines, whichever is closest to the ocean.

(b) "Tidal Flat" means any nearly level part of a coastal beach which usually extends from the mean low water line landward to the more steeply sloping face of the coastal beach or which may be separated from the beach by land under the ocean.

(3) Performance Standards

(a) Any activity which is allowed on a coastal beach or tidal flat or within 100 feet of a coastal beach or tidal flat shall not have an adverse effect on the coastal beach or tidal flat by:

(1) affecting the ability of waves to remove sand from the beach or tidal flat;

(2) disturbing the vegetative cover, if any, so as to destabilize the beach or tidal flat;

(3) causing any modification of the beach or tidal flat form that would increase the potential for storm or flood damage;

(4) interfering with the natural movement of the beach or tidal flat; or

(5) causing artificial removal of sand from the beach.

(b) Beach nourishment projects may be permitted.

(c) No activity, other than maintenance of an already existing structure, which will result in the building within or upon, removing, filling, or altering of any adjacent upland within 50ft of any coastal beach or tidal flat, shall be permitted, except as allowed under Part IV, section 4.01(d) or other activity as permitted under a variance from these regulations granted pursuant to Part IV, section 4.03.

(d) No project may be permitted which will have any adverse effect on specified habitat sites of rare or endangered species.

2.03 Coastal Dunes

(1) Preamble

All Coastal dunes are likely to be important to storm damage prevention and flood control. Coastal dunes on barrier beaches and the coastal dune closest to the coastal beach in any area are significant to storm damage prevention or flood control. Coastal Dunes are also important to wildlife and the protection of wildlife habitat.

Coastal dunes aid in storm damage prevention and flood control by supplying sand to coastal beaches. Coastal dunes protect inland coastal areas from storm damage and flooding by storm waves and elevated sea levels because such dunes are higher than the coastal beaches which they border. In order to protect this function, coastal dune volume must be maintained while allowing ~~its~~ dune shape to conform to natural wind and water flow patterns.

Vegetative cover contributes to the growth and stability of coastal dunes by providing conditions favorable to sand deposition.

A variety of birds, most commonly terns and gulls, nest at the base or sides of dunes. In some dune systems, other birds also nest in the interdunal area, the species being determined by the plant community structure, topography, and hydrologic regime of the area. In some dune areas, there are wet meadows or vernal pool habitats which serve as important feeding grounds for a wide variety of bird species. Dune systems also support a variety of mammals, amphibians, reptiles and invertebrates, such as diamondback terrapins, predatory animals including coyote, fox, skunk, and raccoons.

On retreating shorelines, the ability of coastal dunes bordering a coastal beach to move landward at the rate of shoreline retreat allows these dunes to maintain their form and volume.

Land within 100 feet of a coastal dune is likely to be significant to the protection and maintenance of coastal dunes, and therefore to the protection of the wetland values which these areas contain.

The following characteristics of coastal dunes are critical to storm damage prevention or flood control and the protection of wildlife habitat:

(a) the ability of the dune to erode in response to coastal beach conditions;

(b) dune volume;

(c) dune form, which must be allowed to be changed by wind and natural water flow;

(d) vegetative cover;

(e) the ability of the dune to move landward or laterally; and

(f) the ability of the dune to continue serving as bird nesting habitat.

(2) Definition

"Coastal Dune" means any hill, mound or ridge of sediment landward of a coastal beach, deposited by wind action, storm overwash or artificial means.

(3) Performance Standards

(a) Any activity, which is allowed on a coastal dune or within 100 feet of a coastal dune, shall not have an adverse effect on the coastal dune by:

(1) affecting the ability of waves to remove sand from the dune;

(2) disturbing the vegetative cover so as to destabilize the dune;

(3) causing any modification of the dune form that would increase the potential for storm or flood damage;

(4) interfering with the landward or lateral movement of the dune;

(5) causing artificial removal of sand from the dune;

(6) interfering with mapped or otherwise identified bird nesting habitat; or

(7) interfering with mapped or otherwise identified rare and endangered species habitat.

(b) The following projects may be permitted, provided they adhere to the provisions of Section 2.03(3):

(1) pedestrian walkways designed to minimize disturbance to vegetative cover;

(2) fencing and other devices designed to increase dune development;

(3) plantings compatible with the natural vegetative cover;

(4) nourishment deemed helpful to dune stabilization or development.

(c) No activity, other than the maintenance of an already existing structure, which will result in the building within or upon, removing, filling, or altering of any adjacent upland within 50ft of any coastal dune shall be permitted, except for activity which is allowed under Part IV, section 4.01(d) or other activity as permitted under a variance from these regulations granted pursuant to Part IV, section 4.03.

(d) Notwithstanding 2.03(3)(b) through (c), no project may be permitted on a dune or within 100 feet of a dune which will have any adverse effect on identified habitat of rare or endangered species.

2.04 Barrier Beaches

(1) Preamble

Barrier beaches are important to wildlife and wildlife habitat, storm damage prevention and flood control and are likely to be significant to the protection of marine fisheries, shellfish and shellfish habitat.

Barrier beaches protect landward areas because they provide a buffer to storm waves and to sea levels elevated by storms.

Barrier beaches protect from wave action such highly productive areas as salt marshes, estuaries, lagoons, salt ponds and freshwater marshes and ponds, which are in turn important to marine fisheries and the protection of wildlife habitat as described under coastal beaches and coastal dunes. The most prominent examples of barrier beaches in Chatham include Hardings Beach, North Beach, and Cockle Cove Beach.

Barrier beaches are maintained by the alongshore movement of beach sediment caused by wave action. The coastal dunes, beaches and tidal flats of a barrier beach are made up of sediment supplied by wind action, storm wave overwash and tidal inlet deposition. Barrier beaches in Massachusetts undergo a landward migration caused by the landward movement of sediment by wind, storm wave migration and tidal current processes. The continuation of these processes

maintains the volume of the land form which is necessary to carry out its storm and flood buffer functions.

Barrier beaches are significant to storm damage prevention and flood control, and the characteristics of coastal beaches, tidal flats and coastal dunes listed in Sections 2.02(1) and 2.03(1) and their ability to respond to wave action, including storm overwash sediment transport, are critical to the protection of the wetlands values of barrier beaches identified above.

(2) Definition

"Barrier Beach" means a narrow low-lying strip of land generally consisting of coastal beaches and coastal dunes extending roughly parallel to the trend of the coast and separated from the mainland by a narrow body of fresh, brackish or saline water or a marsh system. A barrier beach may be joined to the mainland at one or both ends.

(3) Performance Standards

The provisions of Section 2.02(3) and 2.03(a) through 2.03(d) shall apply to the coastal beaches and to the coastal dunes which make up a barrier beach.

2.05 Coastal Banks

(1) Preamble

Coastal banks are likely to be important to storm damage prevention and flood control. Coastal banks that supply sediment to coastal beaches, coastal dunes and barrier beaches are important to storm damage prevention and flood control. Coastal banks that, because of their height, provide a buffer to upland areas from storm waters are significant to storm damage prevention and flood control. A particular coastal bank may serve both as a sediment source and as a buffer, or it may serve only one of these roles.

Coastal Banks composed of unconsolidated sediment and exposed to wave action serve as a major source of sediment for other coastal land forms, including beaches, dunes and barrier beaches. The supply of sediment is removed from banks by wave action. This is a naturally occurring process necessary to the continued existence of coastal beaches, coastal dunes and barrier beaches which, in turn, dissipate storm wave energy, thus protecting structures and coastal wetlands landward of them from storm damage and flooding.

Coastal banks, because of their height and stability, may act as a buffer or natural wall which protects upland areas from storm damage and flooding. While erosion caused by wave action is an integral part of shoreline processes and furnishes important sediment to down drift land forms, erosion of a coastal bank by wind and

rain runoff, which plays only a minor role in beach nourishment, should not be increased unnecessarily. Disturbances to a coastal bank which reduce its natural resistance to wind and rain erosion cause cuts and gullies in the bank, increase the risk of its collapse, increase the danger to structures at the top of the bank, and decrease its value as a buffer.

Coastal banks are likely to be significant to erosion and sedimentation control, protection of fisheries, protection of shellfish habitat and protection of wildlife habitat. Vegetation tends to stabilize a coastal bank and reduce the rate of erosion due to wind and rain runoff. Vegetation on a bank and landward of a bank serves to take up excess nutrients, specifically nitrogen which in excess amounts adds to eutrophication of saltwater estuaries and embayments. Additionally, vegetation on a coastal bank offers cover for wildlife and a transitional area for food sourcing. Some banks may play a role in the propagation of wildlife by providing nesting or breeding sites for various birds, reptiles, and mammals.

Any project permitted on a coastal bank should incorporate, when appropriate, elevated walkways.

When a proposed project involves dredging, removing, filling or altering a coastal bank or upland within 100ft of a coastal bank, the presumption shall be that the area is significant to storm damage prevention, flood control, erosion and sedimentation control, the protection of fisheries, the protection of shellfish habitat and the protection of wildlife habitat. This presumption may be partially or wholly overcome, but only upon a clear showing that a coastal bank does not play a role in one or more of the aforementioned interests.

When a coastal bank is significant to storm damage prevention and flood control because it is a vertical buffer to storm waves, the stability of the bank is critical to the protection of those interests.

(2) Definition

"Coastal Bank" means the face or side of any elevated land form, other than a coastal dune, which lies at the landward edge of a coastal beach, land subject to tidal action or storm flooding, or other wetland. Any minor discontinuity of the slope notwithstanding, the top of the bank shall be the top of the face of the bank above the relevant 100-year flood plain elevation.

(The 100-year flood plain elevation shall be taken from the Flood Insurance Rate Maps, prepared by the National Flood Insurance Program for the Town of Chatham, ~~dated July 20, 1998~~effective July 16, 2014 or as most recently amended including Zones A, AO, AH, A1-A30, A99, V, and V1-V30.)

(3) Performance Standards

(a) Any activity which is allowed on a coastal bank or within 100 feet of a coastal bank shall comply with the following regulations:

(1) No new bulkhead, revetment, seawall, groin or other coastal engineering structure shall be permitted on or within 100 feet of a coastal bank, except that such a coastal engineering structure shall be permitted when required to prevent storm damage to buildings constructed prior to August 10, 1978 or constructed pursuant to a Notice of Intent (issued under MGL 131, section 40) filed prior to August 10, 1978, including reconstruction of such buildings subsequent to the effective date of these regulations, provided that the following requirements are met:

(a) a coastal engineering structure or modification thereto shall be designed and constructed so as to minimize, using best available measures, adverse effects on adjacent or nearby coastal beaches due to changes in wave action;

(b) the applicant demonstrates that no method of protecting the building other than the proposed coastal engineering structure is feasible; and

(c) the applicant provides sufficient evidence that the building was constructed pursuant to a Notice of Intent filed before August 10, 1978.

(2) Any project on a coastal bank or within 100 feet of the top of a coastal bank, other than a structure permitted under section 2.05(3)(a), shall not have an adverse effect due to wave action on the movement of sediment from the coastal bank to coastal beaches or land subject to tidal action or flooding, and shall not have an adverse effect on the stability of a coastal bank.

(3) The Permit and the Certificate of Compliance for any project within 100 feet of the top of a coastal bank permitted by the Conservation Commission under this Bylaw shall contain the specific condition: "Section 2.05 of the Wetlands Regulations promulgated under the Chatham Wetlands Protection Bylaw requires that no coastal engineering structure, such as a bulkhead, revetment, groin, or sea wall shall be permitted on or within 100 feet of a coastal bank at any time in the future to protect the project allowed by this permit."

(4) Protective planting designed to reduce erosion may be permitted.

(5) No activity, other than the maintenance of an already existing structure, which will result in the building within or upon, removing, filling, or altering any upland within 50ft of any coastal bank shall be permitted, except as allowed under Part IV, section 4.01 or other activity as permitted under the variance provision, section 4.03.

(6) No project on a coastal bank shall have an adverse impact on significant or active nesting or breeding sites for wildlife.

(7) No project on a coastal bank or within 100 feet of the top of the coastal bank shall be permitted that will have any adverse effect on identified habitat of rare or endangered species.

2.06 Salt Marshes

(1) Preamble

Salt marshes are important to the protection of wildlife and wildlife habitat, marine fisheries, shellfish and shellfish habitat, the prevention of pollution and are likely to be significant to storm damage prevention and ground water supply.

Salt marshes produce large amounts of organic matter. A significant portion of this material is exported as detritus and dissolved organics to estuarine and coastal waters, where it provides the basis for a large food web that supports many marine organisms, including fin and shell fish. Salt marshes also provide a spawning and nursery habitat for several important estuarine forage fin fish as well as important food, shelter, breeding areas, and migratory and overwintering areas for many wildlife species.

Salt marsh plants and substrate remove pollutants from surrounding waters. The network of salt marsh vegetation roots and rhizomes bind sediments together. The sediments absorb chlorinated hydrocarbons and heavy metals such as lead, copper and iron. The marsh also retains nitrogen and phosphorus compounds, which in large amounts can lead to algal blooms in coastal waters.

The underlying peat also serves as a barrier between fresh groundwater landward of the marsh and the ocean, thus helping to maintain the level of groundwater and aiding in the prevention of salt water intrusion into the drinking water supply. Salt marsh cord grass and underlying peat are resistant to erosion and dissipate wave energy, thereby providing a buffer that reduces wave damage.

Land within 100 feet of a salt marsh is likely to be significant to the protection and maintenance of salt marshes, and therefore to the protection of the wetland values these areas contain.

When a proposed project involves the dredging, filling, removing or altering of a salt marsh, or land within 100ft of a salt marsh, the presumption shall be that such area is significant to the interests specified above. This presumption may be overcome only by a clear showing that the salt marsh does not play a role in the protection of marine fisheries, prevention of pollution, protection of groundwater supply, storm damage prevention, wildlife or wildlife habitat or land containing shellfish, and provided the commission makes a written determination to such effect.

The following characteristics of salt marshes are critical to one or more of the wetland values above:

(a) the growth, composition and distribution of salt marsh vegetation;

(b) the flow and levels of tidal and fresh water; and

(c) the presence and depth of peat.

(2) Definitions

(a) "Salt Marsh" means a coastal wetland that extends landward up to the highest Spring Tide line of the year, and is characterized by a plant community consisting of, but not limited to, 40% or more of any of the following species: Salt Meadow Cord Grass (*Spartina patens*); Salt Marsh Cord Grass (*Spartina alterniflora*); Spike Grass (*Distichlis spicata*); Sea Lavender (*Limonium nashii*); Seaside Plantago (*Plantago juncoides*); Aster (*Aster subulatus*); Sea-Blite (*Suaeda maritima*); Black-grass (*Juncus gerardi*); Samphire (*Salicornia europaea*); Glasswort (*S. bigelovii*); Reed (*Phragmites communis*); Saltmarsh Bulrush (*Scirpus robustus*); or Cattails (*Typha spp*.).

(b) "Spring Tide" means the tide of the greatest amplitude during any approximately 14-day tidal cycle in a given year. A spring tide occurs at or near the time when the gravitational forces of the sun and the moon are in phase (new and full moons).

(3) Performance Standards

(a) Any activity which is allowed on a salt marsh or within 100 feet of a salt marsh shall comply with the following regulations:

(1) A proposed project in a salt marsh, on lands within 100 feet of a salt marsh, or in a body of water adjacent to a salt marsh shall not destroy any portion of the salt marsh or its substratum and shall not have an adverse effect on the productivity of the salt marsh. Alterations in growth, distribution and composition of salt marsh vegetation shall be considered in evaluating adverse effects on productivity. The landward approach to a structure sited on or near a salt marsh should minimize any adverse impact on the vegetation in the marsh. This section shall not be construed to prohibit the harvesting of salt hay.

(2) Notwithstanding the provisions of Section 2.06(3)(a), a small project within a salt marsh, such as an elevated walkway or other structure which has no adverse effects other than limited blocking of sunlight from the underlying vegetation for a portion of each day, may be permitted if such a project complies with all other applicable requirements of these regulations.

(3) Notwithstanding the provisions of Section 2.06(3)(a), a project which will restore or rehabilitate a salt marsh may be permitted; provided, however, that this section shall not be construed to allow the alteration of one salt marsh on a given site by or contingent upon the creation or restoration of a salt marsh on another.

(b) No activity, other than the maintenance of an already existing structure, which will result in the building within or upon, removing, filling, or altering of a salt marsh or of any adjacent upland within 50ft of any salt marsh shall be permitted, except for activity which is allowed under Part IV, section 4.01(d) or other activity as permitted under a variance from the regulations pursuant to Part IV, section 4.03.

(c) Notwithstanding 2.06(3)(a) through (b), no project may be permitted that will have any adverse effect on identified habitat sites of rare and endangered species.

2.07 Land Under, or Within 100 Feet of the Banks of, Salt Ponds

(1) Preamble

Land under salt ponds is important to the protection of marine fisheries, wildlife and wildlife habitat, shellfish and shellfish habitat.

Land under salt ponds provides an excellent habitat for marine fisheries. The high productivity of plants in salt ponds provides food for shellfish, crustaceans, and larval and juvenile fish. Salt ponds also provide spawning areas for shellfish and are nursery areas for crabs and fish.

Characteristics of salt ponds critical to the protection of the wetland values above are as follows:

(a) water circulation;

(b) distribution of sediment grain size;

(c) freshwater inflow;

(d) productivity of plants; and

(e) water quality.

(2) Definition

"Salt Pond" means a shallow enclosed or semi-enclosed body of saline water that may be partially or totally restricted by barrier beach formation. Salt ponds may receive freshwater from small streams emptying into their upper reaches and/or small springs in the salt pond itself.

(3) Performance Standards

(a) Any activity which is allowed on and under a salt pond or within 100 feet of the bank of a salt pond shall comply with the following regulations:

(1) Any project on land under a salt pond, on land within 100 feet of the mean high water line of a salt pond, or on land under a body of water adjacent to a salt pond shall not have an adverse effect on the marine fisheries or shellfish habitat of such a salt pond caused by:

(a) alterations of water circulation;

(b) alterations in the distribution of sediment grain size and the relief elevation of the bottom topography;

(c) modifications in the flow of fresh and/or salt water;

(d) alterations in the productivity of plants, or

(e) alterations in water quality including, but not limited to, other than normal fluctuations in the level of dissolved oxygen, nutrients, temperature or turbidity, or the addition of pollutants.

(b) Notwithstanding the provisions of Section 2.07(3), activities specifically designed and intended to maintain the depth and the opening of a salt pond to the ocean in order to maintain or enhance marine fisheries or for the specific purpose of fisheries management, may be permitted at the sole discretion of the Commission.

(c) No activity, other than the maintenance of an already existing structure, which will result in the building within or upon, removing, filling, or altering of any adjacent upland within 50ft of any salt pond shall be permitted, except for activity which is allowed under Part IV, section 4.01(d) or other activity as permitted under a variance from the regulations pursuant to Part IV, section 4.03.

2.08 Shellfish & Shellfish Habitat

(1) Preamble

Shellfish and shellfish habitat are found within certain of the areas under the jurisdiction of the Bylaw. Shellfish and aquaculture are also specifically included as wetland values in the Bylaw.

Shellfish and shellfish habitat is important to the protection of marine fisheries as well as to the protection of the interest of shellfish. Shellfish are a valuable renewable resource. The maintenance of productive shellfish beds not only assures the continuance of shellfish themselves, but also plays a direct role in supporting fish stocks by providing a major food source and supports important recreational and commercial fisheries.

The Town of Chatham enjoys the benefit of one of the richest shellfish grounds in New England. Shellfishing provides an economic base for many residents of the town and provides recreational shellfishing for many summer residents and vacationers. In recognition and support of this public value and benefit to the Town, the local Shellfish Department has an active propagation and seeding program to maintain and enhance the viability of the stock. Protecting shellfish habitat and maintaining the sustainability of shellfish and marine fisheries is vital to local public interests.

The following characteristics of land containing shellfish and shellfish habitat are critical to the protection of wetland values contained by such areas:

(a) shellfish;

(b) water quality;

(c) water circulation;

(d) the natural relief, elevation and distribution of sediment grain size of such land; and

(e) the presence of existing or emerging eelgrass beds, or where eelgrass has historically been found.

(2) Definitions

(a) "Shellfish Habitat" means land under the ocean, tidal flats, salt marshes and land under salt ponds when any such land contains shellfish or is important shellfish habitat as identified and mapped by Division of Marine Fisheries or officially designated or so identified by the Shellfish Constable.

(b) "Shellfish" means the following species: Bay scallop (*Argopecten irradians*); Blue mussel (*Mytilus edulis*); Ocean quahog (*Arctica islandica*); Oyster (*Crassostrea virginica*); Quahog (*Mercenaria mercenaria*); Razor clam (*Ensis directus*); Sea clam (*Spisula solidissima*); Sea scallop (*Placopecten magellanicus*); Soft shell clam (*Mya arenaria*); Lobster (*Homarus americanus*); Grass shrimp (*Palaemonetes sp*.); Sand Shrimp (*Crangon septemspinosa*); Blue crab (*Callinectes sapidus*); Fiddler crab (*Uca sp*.); Rock crab (*Cancer irroratus*); Horseshoe crab (L~~l~~*imulus polyphemus*).

(3) Performance Standards

(a) Except as provided in Section 2.08(4) and (5) below, any project within shellfish habitat shall not adversely affect the productivity of such land caused by:

(1) alterations of water circulation;

(2) alterations in relief elevation;

(3) the compacting of sediment by vehicular traffic;

(4) alterations in the distribution of sediment grain size;

(5) alterations in natural drainage from adjacent land;

(6) changes in water quality, including, but not limited to, unnatural fluctuations in the levels of salinity, dissolved oxygen, nutrients, temperature or turbidity or the addition of pollutants;

(7) impeding access for seeding and/or harvesting shellfish;

(8) placing of obstructions or objects in the water (other than moorings, buoys, fish weirs, or navigational aids).

(b) The moving of shellfish shall not be considered acceptable mitigation for the purpose of permitting a proposed project on such land.

(5) Notwithstanding Section 2.08(3)(a), projects approved by Division of Marine Fisheries (DMF) and in consultation with the Shellfish Constable that are specifically intended to increase the productivity of land containing shellfish may be permitted in the discretion of the Conservation Commission. Aquaculture projects approved by the appropriate local and state authorities may also be permitted in the discretion of the Conservation Commission.

2.09 Banks of or Land Under the Ocean, Ponds, Streams, Rivers, Lakes, or Creeks that Underlie an Anadromous/Catadromous Fish Run("Fish Run")

(1) Preamble

The banks of and land under the ocean, ponds, streams, rivers, lakes or creeks that underlie an anadromous/catadromous fish run are important to the protection of marine fisheries and wildlife. Land within 100 feet of such banks is likely to be significant to the protection and maintenance of these banks, and therefore to the protection of the wetlands values these areas contain.

The following characteristics of a fish run, or the land under the ocean or pond, stream, river, lake or creek that underlies a fish run are critical to the protection of those areas:

(a) the fish;

(b) accessibility of spawning areas;

(c) the volume or rate of flow of water within spawning areas and migratory routes; and

(d) spawning and nursery grounds.

(2) Definitions

(a) "Anadromous Fish" means fish that enter fresh water from the ocean to spawn, such as alewives, shad and salmon.

(b) "Catadromous Fish" means fish that enter salt water from fresh water to spawn, such as eels.

(c) "Anadromous/Catadromous Fish Run" means that area within estuaries, ponds, streams, creeks, rivers, lakes or coastal waters which is the spawning or feeding ground or passageway for anadromous or catadromous fish. Such fish runs shall include those areas which have historically served as fish runs and are either being restored or are planned to be restored at the time an Application for permit is filed.

(3) Performance Standards

(a) Any activity which is allowed on the bank of a fish run, land under a fish run, or land within 100 feet of a fish run shall comply with the following regulations:

(1) Any project on such land or bank shall not have an adverse effect on the fish run by:

(a) impeding or obstructing the migration of the fish;

(b) changing the volume or rate of flow of water within the fish run; or

(c) impairing the capacity of spawning or nursery habitats necessary to sustain the various life stages of the fish.

(2) Disposal of dredge material or filling in a fish run shall be prohibited.

(b) No activity, other than the maintenance of an already existing structure, which will result in the building within or upon, removing, filling, or altering of any adjacent upland within 50ft of any fish run shall be permitted, except for activity which is allowed under Part IV, section 4.01(d) or any other activity permitted under a variance from the regulations granted pursuant to Part IV, section 4.03.

2.10 Land Subject to Coastal Storm Flowage

(1) Preamble

Land subject to coastal storm flowage - including coastal beaches, salt marshes, banks, barrier beaches, salt ponds, dunes, land containing shellfish, land under the ocean, and banks of and land underlying fish runs - is important for the protection of public and private water supply, groundwater and groundwater quality, flood control, erosion and sedimentation control, storm damage prevention, water pollution prevention, wildlife and wildlife habitat, fisheries, and shellfish.

The wetlands values of specific resource areas, including those identified above, that lie within the area of land subject to coastal storm flowage and are otherwise addressed in the Bylaw, and the regulations promulgated thereunder are incorporated in this section by reference.

Storm Damage Prevention

Land subject to coastal storm flowage includes land that lies at the margin between upland and land subject to average (normal) coastal and wind-driven processes. When coastal conditions are not the norm - during extreme high tides and hurricanes, for example - the ability of the land to absorb flood waters and buffer more inland areas from flood and wave damage is significant.

Velocity zones (V-zones) and AO-zones of Land Subject to Coastal Storm Flowage are areas which are subject to hazardous flooding, wave impact and in some cases significant rates of erosion as a result of storm wave impact and scour. Alteration of land surfaces in A-zones can change drainage characteristics resulting in increased flood damage on adjacent properties.

The topography, soil characteristics (e.g., composition, size, density & shape of land soil material), vegetation, erodibility and permeability of the land surface within V- and AO- zones are critical characteristics which determine how effective an area is in dissipating wave energy and in protecting areas within and landward of these zones from storm damage and flooding. The more gentle and permeable a seaward-sloping land surface is, the more effective that land surface is at reducing the height and velocity of incoming storm waves. Wave energy may be expended in eroding and transporting materials comprising the land surface within the V- and AO-zones, as well as by percolation or the downward movement of the stormwater through more permeable land surfaces, thereby lessening the effects of backrush, scour and erosion.

Dredging or removal of materials within the V- and AO-zones acts to increase the landward velocity and height of storm waves, thereby allowing storm waves to break further inland and to impact upland and wetland resource areas which might not otherwise be impacted. Filling and placement of solid fill structures within V- and AO-zones may cause the refraction, diffraction and/or reflection of waves,

thereby forcing wave energy onto adjacent properties, natural resources, and public or private ways, potentially resulting in otherwise avoidable storm damage. When struck with storm waves, solid structures within V- and AO-zones also may increase localized rates of erosion and scour (Shore Protection Manual, US Army Corps of Engineers, 1984 V. 1, pg. 5-3 & 5-5).

In some cases, the placement of fill in hydraulically constricted portions of the coastal floodplain may increase flood levels in heavy rainfall events. The placement of fill in AH-zones, where ponding occurs generally as a result of overwash in coastal floodplains, may increase flood levels on the subject and adjacent properties above pre-fill flood levels.

Placing man-made structures in floodplain areas may result in direct and collateral damage to such structures - and to other structures similarly situated - during storm and heavy rain events, by wave impact and flood water inundation, and by storm-driven debris.

Prevention of Pollution

Natural or relatively undisturbed coastal floodplains can reduce erosion and sedimentation, and in a vegetated state can prevent pollutants contained in surface runoff from directly entering waterways and other wetland areas during flood events. Since the flood plain contains areas (as do other wetland resources) in which the water table is close to the surface, during a coastal storm pollutants in the flood plain, including the contents of septic systems and fuel tanks, are likely to affect public and private water supply, groundwater quality, wildlife and wildlife habitat, fisheries and shellfish.

Wildlife Habitat

Coastal floodplain areas are low-lying areas that are ecologically transitional between marine/estuarine ecosystems and upland areas. Resource areas within the 100-year floodplain are important habitats for a large variety of wildlife species. For example, salt marshes provide habitat for many crustaceans and mollusks and serve as critical nursery areas for numerous fin fish species which in turn provide food for species higher up in the food chain, e.g., herons, osprey, mink and raccoon. These resource areas also provide important over-wintering and stopover areas for many species of waterfowl.

Areas of coastal floodplains adjacent to other wetland resource areas provide important wildlife functions, such as nesting and roosting habitat, and serve as wildlife corridors connecting coastal zone resources with freshwater wetland resources. Adjacent areas within the coastal floodplain also serve as transitional zones needed to protect the coastal wetland resources' ability to provide essential habitats (Guidance Specifying Management Measures for Sources of Non-point Pollution in Coastal Waters, EPA, 1993: Castelle, et al., 1992, pgs 5 & 6).

Chatham's coastal flood plain is the town's largest single interconnected resource area, not only bordering the seacoast itself but migrating substantial distances inland along embayments, estuaries, rivers, streams, and their adjacent areas of low topography. To the extent that it remains undisturbed, the flood plain can serve as one of the town's most important wildlife habitats, especially as wildlife retreat from the continued development of upland wooded properties.

Sea Level Rise

Areas of coastal floodplains which are immediately landward of salt marshes, coastal beaches, barrier beaches, coastal dunes or coastal banks require special protection. These areas are likely to be in a state of transition as the entire complex of coastal wetland resources gradually moves landward. For thousands of years, relative sea level has been rising in Massachusetts, and it is still rising (Smith, Clayton, Mayo and Giese, 1978), resulting in gradual indundation of landward area. Historic sea level measurements indicate that relative sea level in Massachusetts is rising at approximately 1 foot per 100 years (Giese, et al, 1978).

As sea level rises, the shoreline may retreat, and areas of the coastal floodplain will successively be inundated more frequently by storm and tidal activity. Activities carried out within these 'special transitional areas' of coastal floodplains may interfere with the natural landward migration of the adjacent coastal resource areas. Maintaining these special transitional areas in their natural state is significant to the protection of the interests of other wetland resources.

(2) Definitions

(a) "Land Subject to Coastal Storm Flowage" shall mean that land subject to tidal water, flooding, or any inundation caused by coastal storms up to and including that caused by the 100year storm, the surge of record or the storm of record, whichever is greatest. Land Subject to Coastal Storm Flowage is delineated as the l00-year flood plain. (Zones, A, AO, AH, A1-A30, A99, V, and V1-V30 on the Flood Insurance Rate Maps, prepared by the National Flood Insurance Program for the Town of Chatham, dated July 20, 1998effective date of July 16, 2014 or as most recently amended) or as otherwise documented.

(3) Performance Standards

(a) Any activity which is permitted on land subject to coastal storm flowage shall not have an adverse effect on the interests protected by the Bylaw by:

(1) reducing the ability of the land to absorb and contain flood waters;

(2) reducing the ability of the land to buffer more inland areas from flooding and wave damage;

(3) displacing or diverting flood waters to other areas;

(4) causing, or creating the likelihood of, damage to other structures on land within the flood plain as debris (collateral damage);

(5) causing ground, surface or saltate pollution triggered by coastal storm flowage;

(6) reducing the ability of the resource to serve as a wildlife habitat and migration corridor through activities such as, but not limited to the removal of substantial vegetative cover and/or installation of fencing and other structures which prevent wildlife migration across property.

(b) No activity, other than the maintenance of an already existing structure, which will result in the building within or upon, removing, filling, or altering ~~of the any adjacent upland within 50ft of~~ land subject to coastal storm flowage shall be permitted, except for activity which is allowed under Part IV, section 4.01(d) or any other activity permitted under a variance from the regulations granted pursuant to Part IV, section 4.03.