

**Docks and Piers  
Model Bylaw and  
Suggested Changes to the Marion Zoning Bylaws  
Marion Marine Resources Commission  
March 1, 2004**

(a) Introduction. The construction, use, and maintenance of docks and piers are likely to have a significant or cumulative adverse effect on issues related to storm damage prevention, shellfish, fisheries, wildlife habitat, aesthetics, erosion and sediment control, aquaculture, and recreation. Construction, maintenance and use of private docks can have adverse effects coastal natural resource areas and navigation for recreational purposes. Further, docks destroyed by storms pose a threat to nearby properties by increasing water borne debris.

Turbulence and prop dredging generated by boat traffic significantly increase turbidity levels. High turbidity levels attenuate the sunlight necessary for photosynthetic processes responsible for the primary productivity and oxygen regeneration of the water. The suspended sediments settle on shellfish beds, smothering existing shellfish and altering the quality of the sand bottom essential for spat (mollusk larvae) settlement. Resuspension of bottom sediments causes redistribution of sediments, alteration in sediment grain size distribution and causes changes in bottom topography relief, elevation and grade, including creation of depressions in the bottom. Resuspension of sediments into depressions creates deep pockets of sediment which may not be able to physically support shellfish or which can become anoxic and therefore not support shellfish. Resuspension of sediments during the period of shellfish larval settlement hinders or prevents the effective settlement of shellfish larvae. Boat traffic generated from docks will add to this disruption and will cause erosion of banks and marshes.

Construction of docks and subsequent boat activity causes resuspension of nutrient-laden sediment particles which may cause a release of sediment-bound nutrients to the water column resulting in a "bloom" of vegetation. Release of nutrients to the water column leads to eutrophication and anoxic bottom conditions. Anoxic sediments and anoxic bottom conditions create adverse impacts on benthic resources, including shellfish and fisheries.

While dock construction is typically the least environmentally destructive method of crossing a marsh, it may adversely affect the physical characteristics and functional value of a marsh. Marsh plants provide the major energy flow (detritus food chain) between the autotrophic and heterotrophic levels in a marsh-estuarine system. Many species of sport and commercial fish and shellfish are dependent upon this system. Plants adapted to high ambient light intensity, such as marsh grasses, are ill-adapted to the shaded conditions created by a dock. Shading may result in the loss of vegetative biomass (decreased plant height, population density, and leaf thickness) or alteration of species composition. Reductions in plant density result in the loss of sediment normally trapped by roots and culms. Tidal washout of sediment could result in localized depressions which, through evaporation of trapped water, concentrate salt. High sediment salt levels effectively preclude recolonization by original vegetation. Localized tidal washout may lead to further vegetative regression, erosion, and disruption of natural communities in the area.

Propeller turbulence near or in areas or submerged aquatic vegetation, such as eel grass, or salt marsh damages vegetation, thereby increasing the rate at which organic detritus is produced. If this organic detritus does not completely decompose aerobically, then anoxic bottom conditions will ensue, which

adversely impact shellfish and fisheries.

Cumulative impacts of the construction, maintenance and use of docks threaten to decrease the overall productivity of the marsh ecosystem, to reduce its ability to absorb storm wave energy, and to reduce its contribution to ground water and surface water quality.

When placed in shellfish habitat the placement length and size of the dock and the floats can interfere with the harvesting of quahogs and scallops.

Docks, depending on their length, can have an adverse impact on recreation by interfering with recreational boating activities. Not properly designed and installed, docks can interfere with intertidal lateral access for recreational fishing and fowling. Any proposal that affects navigation is likely to have a significant or cumulative adverse effect on recreation. Depending on their height, docks can create an adverse impact to the aesthetics of the area. Excessive lighting on docks can cause temporary "night blindness" in recreational boaters and have an adverse impact to the aesthetics of the night sky.

Docks and boat traffic are hazardous to swimmers. State boating regulations require that no boating occur within 75 feet of any swimming area designated by floats and 150 feet from any shoreline used as a swimming area.

(b) Regulatory framework. Marion has established a Surface Water District to regulate all uses seaward of the "low water mark" as defined by M.G.L. Ch 91, in Section 8.5 of the Zoning By-laws. Marinas and commercial piers are required to obtain a special permit pursuant to Section 8.5.3 & 8.5.4, respectively. Special permit requirements apply to "accessory piers to a single family residence" and "association piers" by reference in Section 8.5, to Sections 7.4.5 and 7.4.6, respectively. The current framework for accessory piers refers to a "no pier construction zone" designation. Marinas, commercial piers and association piers make no such reference. There is no current "no dock construction zone." Accessory piers and association piers must be placed on lots that currently meet the lot size and frontage requirements in Section 5.1. Most waterfront properties do not meet the lot size and frontage requirements of Section 5.1.

(c) Definitions. The existing definitions used in the Marion Zoning Bylaws are not consistent with the references therein or do not exist. Problems exist with the definitions of "marina," "piers," and "low water line."

The Marion Zoning By-laws describe a marina as follows :

**Marina:** A facility which provides dockage or berthing for more than five vessels and may also provide facilities for the servicing of vessels. Dockminiums, where the berths are individually owned, shall be included within the definition of a marina.

Section 8.5.4.3 regulates "Marinas as defined by M.G.L. Ch. 91". There is no definition in Chapter 91 for "marina", however the regulations adopted by the Commonwealth of Massachusetts pursuant to Chapter 91, 310 CMR 9.00, contain the following definition:

"Marina means a berthing area with docking facilities under common ownership or control with berths for ten or more vessels including commercial marinas, boat basins,

and yacht clubs, A marina may be an independent facility or be associated with a boat yard. ”

The definition of marina might be more clear if the Town deletes the reference to Chapter 91 but adopts the Chapter 91 language it its own definition section with a threshold of five vessels. The amended language would read:

**“Marina:** A berthing area with docking facilities under common ownership or control with berths for five or more vessels including commercial marinas, boat basins, and yacht clubs, A marina may be an independent facility or be associated with a boat yard.”

Accessory and association piers require a Special Permit pursuant to Section 7.4 of the Marion Zoning By-Laws. There is no current definition for “pier.” Additions to the definition section of the by-laws could be :

**Dock:** Pier

**Pier:** The entire structure of any dock, wharf, walkway, bulkhead or float, and any part thereof, including pilings, ramps, walkways, floats and/or tie-off pilings.

Section 8.5.2. of the Marion Zoning Bylaws state that:

“The district defined by these regulations shall cover all water areas within the municipal limits of the Town of Marion seaward of the low water mark as said mark is defined in Chapter 91 Regulations promulgated by the Massachusetts Department of Environmental Protection.”

The “low water mark is defined in 310 CMR 9.00 as:

“Low Water Mark means the present mean low tide line as established by the present arithmetic mean of water heights observed at low tide over a specific 19-year Metonic Cycle (the National Tidal Datum Epoch), and shall be determined using hydrographic survey data of the National Ocean Survey of the U.S. Department of Commerce.”

The National Ocean Survey data points in Marion are #8447368 Great Hill, #844385 Marion, Buzzards Bay, and #8447416, Piney Point, Wings Cove, Marion. Only #8447416, Piney Point, Wings Cove, Marion, has been updated to the National Tidal Datum Epoch (NTDE). “Mean low tide” is not a recognized datum by the NTDE. However, it can be assumed for regulatory purposes that mean low tide and mean low water are synonymous.

The NTDE is a specific 19-year period over which tide observations are taken to determine Mean Sea Level and other tidal datums such as Mean Lower Low Water and Mean High Water. The latest update defines the 19-year period as 1983-2001. A tidal datum is a vertical reference based on a specific stage of tide which serves as a baseline elevation to which sounding depths or topographic heights are referenced. The 19-year period includes an 18.6 year astronomical cycle that accounts for all significant variations in the moon and sun that cause slowly varying changes in the range of tide. The NTDE has been adopted so that tidal datum determinations throughout the United States will be based on one specific common reference period.

In Marion, mean low water during the present NTDE is equivalent to a Sea Level Datum 1929 (NGVD29) elevation of -1.46 ft. and North American Vertical Datum of 1988 (NAVD88) elevation of -2.35 ft.

Changing the appropriate language in Sections 8.5 & 3.2.1 and inserting the language below into the definition section may clear the confusion concerning the actual boundary of the Surface Water District:

**“Low Water Mark:** The present mean low water line as established by the present arithmetic mean of water heights observed at low tide over a specific 19-year Metonic Cycle (the National Tidal Datum Epoch), and shall be determined using hydrographic survey data of the National Ocean Survey of the U.S. Department of Commerce. Said line is at -1.46 ft. NVGD29 and -2.35 ft. NAVD88”

(d) No Pier Construction Zone.

The Town of Marion Marine Resources Department (MSD) has mapped the habitat of following species in the Surface Water District:

bay scallop (*Argopecten irradians*) and eelgrass (*Zostera marina*) habitat  
oyster (*Crassostrea virginica*), poor, fair, good, excellent;  
quohog (*Mercenaria merceneria*), poor, fair, good, excellent; and  
soft shell clam (*Mya arenaria*), poor, fair, good, excellent.

Data from various other sources, the Massachusetts Department of Environmental Protection (DEP), Massachusetts Division of Marine Fisheries (DMF), and Massachusetts Natural Heritage and Endangered Species Program (NHESP), were used to map the following habitat:

diamond back terrapin (*Malaclemys terrapin terrapin*);  
eelgrass (*Zostera marina*), both existing and historical; and  
razor clam (*Ensis directus*).

In order to develop an appropriate point system for to aid in the identification of important marine habitats within Marion, habitat types were ranked using the methodology in Systematic Systems Approach (Thomas H. Athey, 1974). Participants in the ranking of habitats were members of the Marion Marine Resources Commission and the Marion Shellfish Officer.

Points ranking the importance of the habitats were as follows:

NHESP diamond-back terrapin ( <i>Malaclemys terrapin terrapin</i> )	1.6 points
DEP eelgrass ( <i>Zostera marina</i> ), both existing (1996) and historical (1985)	4.0 points
DMF bay scallop ( <i>Argopecten irradians</i> )	3.1 points
MSD bay scallop ( <i>Argopecten irradians</i> ) & eelgrass habitat	3.7 points
MSD oyster ( <i>Crassostrea virginica</i> )	0.8 - 3.2 points
MSD quohog ( <i>Mercenaria merceneria</i> )	0.9 - 3.5 points
MSD soft shell clam ( <i>Mya arenaria</i> )	0.9 - 3.6 points
DMF razor clam ( <i>Ensis directus</i> )	2.7 points

Using the data from the DEP, DMF, NHESP, and MSD, the Buzzards Bay Project created compilation

of the geographic coverages of the habitats using ArcView GIS software.

The maximum score possible for a particular area is 25.5. The Marine Resources Commission reviewed the various areas of town, the “marine resources score” for that area, and discussed the recommendations of the Harbormaster and Shellfish Officer before making recommendations regarding the extent of the area proposed for mapping a no pier construction zone. In addition to shellfish resources, the Commission considered existing uses and their compatibility with piers and boat traffic.

The Marine Resources Commission identified seven areas as in need of “No Pier Construction Zones” designation. These areas and the liner feet of water front associated with each area is given below. Together, they constitute 27% of Marion’s waterfront.

<b>Area</b>	<b>Waterfront Length (ft.)</b>
Aucoot Cove	3,260
Job’s Cove	8,210
Sippican Harbor	1,650
Hammett’s Cove	17,800
Planting Island Cove	1,200
The Haven	1,400
Wing’s Cove	7,300

(e) Changes to Existing Zoning Section 7.4.5 Piers as an Accessory Use.

The zoning bylaw instructs the Planning Board to issue a Special Permit for a new pier pursuant to 7.4.5.1-5 . Each section has been reviewed, with recommendations below, by the Marine Resources Commission.:

1. The Planning Board gives due consideration to the recommendations of the Marine Resources Commission and Conservation Commission. **(Delete and replace with Design Specifications and Performance Standards in paragraph h below.)**
2. The accessory use will not have an adverse impact on coastal ecology, recreational use of adjoining waters, or the use and enjoyment of the waterfront by adjoining property owners. **(Delete and replace with Design Specifications and Performance Standards in paragraph h below.)**
3. Alternatives in the form of an association pier or public pier are not reasonably available. **(Delete)**
4. The zoning map does not designate the area as a no pier construction zone. **(Retain)**
5. The lot for which the permit is sought fully conforms with the current area and frontage requirements for the district in which it is located. **(Delete)**

(f) Changes to Existing Zoning Section 7.4.6 Association Piers.

The zoning bylaw instructs the Planning Board to issue a Special Permit for a new association piers pursuant to 7.4.6.1-7 . Each section has been reviewed, with recommendations below, by the Marine Resources Commission.:

1. Evidence is provided in the form of deed restrictions which restrict use of the pier to a defined geographical area or development. The developer shall include in the deed to the owners of individual lots within the defined area beneficial rights to such association pier. **(Retain)**
2. There are provisions assuring the maintenance of the pier facilities by the developer until taken

- over by a homeowners association. **(Retain)**
3. There are adequate provisions for assuring maintenance of the pier facilities by the homeowners association. The Planning Board's attention is called to the requirements of Section 8.5.4, which generally would be applicable to an association maintaining a pier. **(Retain)**
  4. Due consideration has been given to screening any parking areas from adjoining or nearby residences. **(Retain)**
  5. The lot meets the minimum requirements for a single family house lot in the district. **(Delete)**
  6. There is no clubhouse facility. **(Delete)**
  7. Due consideration has been given to the report and recommendations of the Marine Resources Commission and the conservation commission. **(Delete and replace with a reference to Design Specifications and Performance Standards that will be included in 7.4.5.)**

In addition to the above recommendations a reference to the Design Specifications and Performance Standards which would be included in Section 7.4.5 should be added to this section.

(g) Permitting for Changes to Existing Piers

Existing piers are considered "non-conforming structures" pursuant to Section 6.1.3 of the Marion Zoning Bylaws. Currently, regulations for their use and the special permit granting authority (ZBA) are ruled by the provisions of Section 6.1.3. To make the permitting of alterations to existing piers consistent with the permitting for new piers, the following phrase should be inserted in Sections 7.4.5 & 6:

"Notwithstanding the provisions of Section 6.1.3, any person who proposes to reconstruct, extend, alter or change a nonconforming pier shall obtain a Special Permit from the Planning Board. For the purposes of said reconstruction, extension, alteration or change of a nonconforming pier in determining if the proposed reconstruction, extension, alteration or change of a nonconforming pier is "substantially more detrimental," the Planning Board shall review the proposed reconstruction, extension, alteration or change of a nonconforming pier in light of the provisions of Section 7.4.5 in the case of an accessory pier, or Section 7.4.6 in the case of an association pier."

(h) Design Specifications and Performance Standards. The following regulations were developed by the Marine Resource Commission, Harbormaster and Shellfish Officer with the assistance of the Buzzards Bay Project to protect the public interests potentially impacted by the construction and use of residential piers.

1. Piers shall not prohibit or unreasonably impede legitimate passage along a beach, or other form of recreational intertidal lateral access, or navigation over the waters for recreational or aquacultural purposes. (The Planning Board shall give due consideration to the input of the Harbormaster and Shellfish Officer in determining if the project meets this standard.);
2. No pier shall extend more than 1/4 across a waterway;
3. No pier shall be placed within 35 feet of a marked navigational channel or one established by use. The channel location shall be shown on the plan and certified as an accurate depiction of the channel location by the Harbormaster;
4. To keep disturbance of the bottom minimal at all times during both construction and use, no vessel shall be berthed at said dock that does not have a minimum of two (2) feet of clearance between the keel, or lowest portion of the propulsion system, whichever is lower, and the bottom at the time of mean low water. In addition, there shall be a minimum of two (2) feet of

- clearance between the lowest portion of the flotation system of any float and the bottom at the time of mean low water;
5. The maximum width of a float shall be twelve feet (12');
  6. Piers shall have a maximum width of five feet (5');
  7. The pier shall be constructed to bear a minimum live load of one hundred pounds /square foot (100lbs/ft<sup>2</sup>.);
  8. No portion of the pier shall be within twenty-five feet (25') of the of an extended lot line, without a letter of permission of the affected property owner(s). Said letter of permission shall take the form of a recordable instrument;
  9. No pier shall be placed within fifty feet (50') of an existing pier;
  10. A lot upon which a pier is proposed shall have one hundred twenty-five feet (125') frontage along the mean high water (mhw) line, or shall be assigned frontage from abutting areas without piers for the purposes of this section. Said assignment of waterfront frontage shall take the form of a recordable instrument;
  11. The landward approach to a pier shall not harm vegetation on a coastal wetland, freshwater wetland, or coastal bank (A marsh, either fresh or salt, shall be crossed by a raised walkway with a decking surface with a minimum of 40% open area, and coastal banks must be preserved by use of suitable stairs.);
  12. The maximum horizontal footcandle level as measured directly below each complete lighting unit shall not exceed 0.2 foot-candle (Fc). No lighting shall shine upwards or more than ten feet (10 ft.) from the pier;
  13. All floats shall be seasonal (no earlier than March 15, no later than December 1):
  14. The off-season storage area of temporary/seasonal docks shall be designated on the plans submitted. In no case shall the storage area be in wetland areas;
  15. No pier shall be constructed within one hundred feet (100') of an existing mooring;
  16. Plans shall be prepared by a professional structural or civil engineer registered in the Commonwealth of Massachusetts;
  17. No pier shall be constructed so as to cause boat traffic within 100 feet of any swimming area designated by floats and/or 150 feet from any shoreline used as a swimming area;
  18. Boats at the dock shall not be allowed to leak oil or other pollutants into the water, nor shall oil or fuel be stored on the dock or pier; and
  19. Motors shall not be run in gear while tied to the dock in a manner to cause "prop dredging."

(Note: Items 14, 18 & 19 are likely to be included in other permit processes. However, including these items in the Zoning By-laws provides a local avenue for enforcement should the need arise.)