Tidal Wetlands Guidance

Table of Contents

Tidal Wetlands Guidance

Guidance for Individuals and Property Owners

Citizen responsibilities toward tidal wetlands

Connecticut's citizens have a fundamental role in the protection of the state's tidal wetlands since they typically have more personal contact with tidal wetlands than government officials or even scientists, either by owning property containing or abutting tidal wetlands or by enjoying the benefits of tidal wetlands through recreational experiences. The most important thing that individuals and property owners can do to protect tidal wetlands is to learn about the direct and indirect contributions that they supply to the public's wellbeing, much of which is communicated in the Tidal Wetlands Primer. Once citizens understand the importance of preserving tidal wetlands, they are more likely to take a proactive interest in their protection.

Minimizing impacts to tidal wetlands

Tidal wetlands are very specialized ecosystems that are sensitive to disturbance. Hence, it is important for individuals and property owners to minimize their impact to tidal wetlands as much as possible. The following guidance provides just some practices to help preserve and promote healthy tidal wetlands in Connecticut.

Individuals

1. Only walk through high marsh areas in dry conditions, and avoid traversing the saturated low marsh areas. Tread lightly and avoid creating bare foot paths, which compact the marsh soil and impede revegetation.
2. Practice "carry-in, carry-out", which is a best practice for any natural resources setting. Depositing rubbish or similar material within tidal wetlands is also a regulated activity as defined in Connecticut General Statutes (CGS) section 22a-29.
3. Do not store or place watercraft or any structures upon areas of tidal wetlands. These are considered obstructions to their growth and lead to wetland despoliation. Placing obstructions within tidal wetlands is also a regulated activity.
4. Refrain from removing any wetland soil, which is a regulated activity, by digging out plants occurring within tidal wetlands.
5. Both you and your pets should avoid disturbing wildlife. Several endangered and threatened species and species of special concern utilize tidal wetlands for habitat, nesting, and feeding. The presence of these species also contribute to the health of tidal wetlands in different ways, so it is important to leave them undisturbed, as they can be adversely affected by human presence.
6. Consider working with your local land conservation trust or other conservancy to participate in promoting the preservation, protection, and restoration of Connecticut's tidal wetlands.
7. If you see something, say something. If you're concerned about an activity occurring within tidal wetlands, contact Land & Water Resources Division (LWRD) staff in the Department of Energy and Environmental Protection (DEEP), who can determine if the activity is authorized or requires authorization.

Property Owners

1. If you don't know already, find out if your property contains or abuts tidal wetlands by searching your address in the CTECO Map Viewer and selecting the NWI Wetlands Functions layer.
2. Know where the limits of tidal wetlands occur. The legal limit of tidal wetlands where marsh plants are capable of growing is one foot above local extreme high water, which is defined in Tidal Wetlands Regulations section 22a-30-2(h). Additional guidance on delineating the limit of tidal wetlands is available from LWRD staff.
3. Besides enjoying the scenic views and the variety of wildlife that tidal wetlands offer, think of tidal wetlands as natural property protection. Tidal wetlands provide a natural buffer to

storm and wave energy, which helps to stabilize the shoreline, inhibit erosion, and reduce flooding. Therefore, it's best to leave them undisturbed.

4. Refrain from depositing leaves or clippings from your lawn into areas of tidal wetlands. Piles of decaying leaf matter can degrade tidal wetland vegetation and lead to excess nitrification. These actions are also regulated activities.
5. While mowing or haying of high marsh grasses has been practiced for centuries and in itself is not a regulated activity, using lawn mowers, tractors and other heavy equipment can severely damage the substrate by sinking into and digging up tidal wetlands soils, which *are* regulated activities. These harmful actions can inhibit revegetation of indigenous species and promote infiltration of undesirable or invasive species that adversely affect the health of the tidal wetlands system.
6. If you currently have tidal wetlands on your property that have become degraded by invasive common reed (*Phragmites australis*), learn about controlling Phragmites and consult DEEP's Wetland Habitat and Mosquito Management Program (WHAMM).
7. Be aware of and try to prevent polluted runoff from your property from entering into tidal wetland areas. This includes things like chemicals leaking from your vehicles, washing your car in the driveway, and over-fertilizing your lawn, which gets carried by stormwater into wetland areas. This runoff can lead to eutrophication of tidal wetlands, which degrades water quality and wetland health, impacting fisheries, wildlife, and ultimately public health.
8. Establish a vegetated buffer between your upland area and an adjacent tidal wetland to further protect the wetland from polluted runoff. See the Tidal Wetlands Buffers Guidance section further down for more information.
9. Be aware that tidal wetlands are state regulated by DEEP, and many activities that could potentially disturb or degrade tidal wetlands require state authorization. Visit DEEP's Coastal Permitting page for more information.
10. Consider working with your local land conservation trust or other conservancy to participate in promoting the preservation, protection, and restoration of Connecticut's tidal wetlands.
11. If you see something, say something. If you're concerned about an activity occurring within tidal wetlands, contact LWRD staff, who can determine if the activity is authorized or requires authorization.

Guidance for Municipalities

Municipal responsibilities toward tidal wetlands

Although activities within tidal wetlands are regulated by DEEP, municipalities are responsible for ensuring that adjacent upland development does not harm these resource areas. Connecticut's Coastal Management Act contains policies and standards regarding tidal wetlands that must be applied during the municipal coastal site plan review process. Generally speaking, land use boards and commissions in coastal municipalities must ensure that development will not result in degradation of tidal wetlands, and that tidal wetlands are preserved, protected and, to the extent practicable, restored.

Minimizing impacts to tidal wetlands

The following guidance provides planning and regulatory recommendations for municipalities to minimize adverse impacts to tidal wetlands from upland development:

1. Update the municipal Plan of Conservation and Development and Municipal Coastal Program, if applicable, to better protect tidal wetlands.
   - Include an inventory of tidal wetland areas and adjacent upland for possible open space acquisition.
2. Amend existing zoning regulations to include the following:

- Provide development setbacks and vegetated buffers from the upland edge of tidal wetlands that are adequate to protect the wetlands from runoff, erosion, construction, and other negative impacts, which might result from development on adjacent upland resources.
- Reduce the maximum impervious cover allowed, wherever possible, especially adjacent to coastal waters and other sensitive coastal resources.
- Preserve or restore the structure, function, and integrity of the physical and biological components of tidal wetlands by encouraging projects that would:
  1) Maintain or restore the natural tidal flushing, circulation, and chemical characteristics of tidal wetlands and adjacent estuarine waters;
  2) Maintain or restore the natural plant and animal species that inhabit tidal wetlands; and,
  3) Avoid adverse impacts to U.S. and state listed threatened and endangered species.
- Disallow extensions of water and sewer lines into tidal wetlands. Sewers that will accommodate existing uses with limited excess capacity may be used when necessary to abate existing sources of pollution.
- Employ siting alternatives that will avoid or substantially limit negative impacts, such as:
  1) Siting inconsistent uses out of tidal wetlands on adjacent upland areas, or
  2) Siting consistent uses in such a manner as to avoid or minimize the tidal wetland area affected. When siting consistent uses, consider requiring construction techniques that will avoid or substantially limit impacts such as:
     a) The elevation of consistent uses on low impact pile foundations at a height sufficient to prevent or minimize the effects of shading on the wetland vegetation;
     b) Storage of construction materials and equipment in non-wetland areas;
     c) Provision of waterborne access to the construction site, or use of temporary elevated construction access ways;
     d) Schedule construction activities during late fall, winter or early spring months when impacts to wetland systems are generally the least harmful;
     e) Schedule construction activities so as to avoid shorebird, shellfish and finfish breeding seasons; and,
     f) Restore all disturbed marsh surfaces as nearly as possible to their natural topographic condition following construction activities, and re-establish a natural vegetation cover.
- Where applicable, as a component of permitted activities, rehabilitate and restore degraded tidal wetlands through such means as:
  1) Restoration of natural tidal range or circulation patterns;
  2) Restoration of tidal flushing and circulation to wetlands that were formerly connected to tidal waters; and,
  3) Re-establishment of marsh vegetation.
- Require on-site, upland retention of the runoff associated with the first inch of rainfall and to direct additional runoff, after appropriate treatment, away from tidal wetlands. Freshwater inputs such as those associated with stormwater runoff adversely impact the brackish and saline ecosystems that characterize most tidal wetlands in Connecticut.

See the Tidal Wetlands Buffers Guidance section below, the Connecticut Coastal Management Manual, and DEEP's fact sheet on Stormwater Management and the Water Quality Standards and Classification page for more information.

Tidal Wetlands Buffers Guidance

Vegetated buffers are an effective tool in protecting sensitive coastal and water resource areas. This guidance provides background information on the value of vegetated buffers as a tool for protecting tidal wetlands from adverse impacts associated with adjacent upland activities and development.

What is a tidal wetlands buffer?

A tidal wetlands buffer is an undisturbed area or strip of land where permanent, stable vegetation forms a barrier between the upland and an adjacent tidal wetland. The buffer can either be natural or artificially planted. If artificially planted, low-maintenance, native, noninvasive, slightly salt-tolerant vegetation should be used. Vegetated buffers are frequently used to protect inland wetlands and watercourses. Depending upon their purpose and site-specific conditions, effective vegetated buffers can range in width from a few yards to several hundred feet.

Why are vegetated buffers valuable for tidal wetlands protection?

Properly designed buffers protect tidal wetland areas from direct and indirect adverse impacts associated with adjacent upland development. An effective and established buffer provides a mosaic of interdependent functions, such as:

- Protecting tidal wetlands from adverse changes to water quality and temperature;
- Controlling erosion and trapping sediment;
- Protecting and providing wildlife habitat;
- Reducing the effects of flooding on adjacent upland property;
- Reducing the potential for direct human and/or pet disturbance of sensitive wetland areas; and,
- Maintaining the aesthetic diversity and enhancing the recreational value of coastal areas.

Establishing a tidal wetlands buffer can also decrease lawn maintenance requirements and associated costs and impacts by reducing the area of manicured landscape. This results in lowered costs for lawn care, including mowing and fertilizer and pesticide application, while improving tidal wetland protection.

Protection effectiveness of vegetated buffers

There has been abundant research assessing the value of buffers as wetland protection measures. The scientific literature to date has examined several different types of buffers (e.g., forested, grassy, shrubby) of varying widths and evaluated their effectiveness at protecting water quality in adjacent wetlands and watercourses from specific impacts associates with identified upland uses. As with most scientific research, each study has generally had a narrow focus and has examined specialized functions such as the retention of nitrogen, phosphorous, sediment or pesticides and herbicides. The majority of this research has been done with respect to freshwater wetlands and watercourses; however, in recent years, research specific to tidal wetlands has expanded. Despite the research completed to date, too many unknowns preclude determining the optimum buffer width for every instance.

The benefits of tidal wetlands buffers

Retaining an undisturbed buffer area adjacent to a tidal wetland promotes stormwater infiltration, pollutant retention, and habitat protection. It also discourages direct human disturbance and increases visual diversity. Buffers provide these benefits in very specific ways, depending upon the intent of the buffer.

Protecting water quality

When used for water quality protection, the primary role of a vegetated buffer is as a stormwater management measure. Since the land within a buffer area is not developed or significantly disturbed, it typically does not generate pollution. Such an undisturbed area acts as a filter to intercept and absorb nutrients, sediment, and other pollutants carried in stormwater runoff that flows across or through the buffer. Buffer areas also trap bacteria,

pathogens and pesticides, which then decompose or break down in place, aiding in the preservation of water quality.

A vegetated buffer also slows the flow of runoff, which both reduces erosion of the buffer area and allows silt and other suspended solids to settle out within the buffer before reaching adjacent wetlands. Additionally, any contaminants attached to the trapped sediment are retained in the buffer area. Slowing the speed of runoff allows the water to infiltrate the soil and ultimately discharge to the wetland as groundwater, rather than as overland flow, thereby reducing the volume of surface runoff. This is especially significant if the runoff is freshwater, even of potable quality. When introduced into a saline habitat, as are most tidal wetlands in Connecticut, freshwater runoff can have significant adverse impacts by diluting the natural salt content of the receiving wetland. Discharge as groundwater reduces the potential adverse impacts since it is usually below the root zone of the wetland and, thus, has less effect on the resource.

Protecting and providing wildlife habitat

Tidal wetlands buffers provide wildlife with needed areas for feeding, resting, nesting and raising young, as well as corridors through which wildlife can safely transverse otherwise developed areas. These buffers not only provide wildlife habitat directly within the buffer area but also protect adjacent wildlife habitat in the abutting resource area. Some wildlife species use the buffer area itself, while others use the tidal wetlands protected by vegetated buffers, and some species will use both areas.

Providing flood control

Naturally vegetated buffer areas adjacent to tidal wetlands serve a number of functions for flood control. On level areas abutting tidal wetlands, vegetated buffers can serve as areas where flood waters can spread out. Root systems of shrubby and forested vegetation within the buffer areas generate pores in the soil, allowing flood waters to infiltrate the soil within the buffer. Significantly more water can infiltrate soil that supports shrubby and forested vegetation than land used for lawn, buildings, patios, terraces, driveways, and other less permeable surfaces. Buffers also provide flood control by moving development back from the naturally flood-prone resource area.

Protecting wetlands from human disturbance

A vegetated buffer primarily provides a physical barrier between areas of human occupation and tidal wetlands. Human disturbance often takes the form of trampling, disposal of grass clippings and other lawn waste, intermittent filling, and other improper disposal actions. Pets can interrupt the life routines of wildlife of the wetlands and buffer area by both predation and general disturbance. The denser the vegetation in the buffer area, the less it is apt to be penetrated by humans and their pets.

Maintaining cultural ecosystem services

A healthy tidal wetland is typically fairly flat and mostly comprised of grasses. Abutting vegetated buffers can offer a visually interesting contrast in terms of vegetation type and texture. This contrast increases the aesthetic diversity of the coastal area and, because they are both interesting to look at and provide habitat for birds and other wildlife, they increase the recreational value of the area by providing improved opportunities for birding, painting/drawing, and other passive recreation. Such non-material benefits from ecosystems are called cultural ecosystem services.

Criteria for obtaining effective protection from a tidal wetlands buffer

Topography

Flat or gently sloping buffers are more effective because they are more successful at slowing the rate at which stormwater flows across them. A slower flow rate enhances the infiltration and filtering capability of the buffer. The ability to provide flat or gently sloping buffers is clearly related to individual site characteristics.

Permeability

Higher soil permeability (the rate that water can flow through soils) and greater depth to the water table will increase the rate of infiltration and attenuation within the buffer area. However, the depth to groundwater adjacent to tidal wetlands is typically quite shallow, except where the land slopes up sharply from the wetland boundary.

Vegetation type

Dense, minimally groomed, native vegetation inherently suited to the local climate (e.g., indigenous forested, shrubby, or grassland) generally provides an effective buffer that requires less maintenance than non-native or heavily groomed vegetation.

Proper width

The scientific literature to date has examined different buffer widths and evaluated their effectiveness at protecting water quality in adjacent wetlands and watercourses. The majority of this research has been done with respect to freshwater wetlands and watercourses. However, in the absence of tidal wetland specific investigations, it may be reasonable to assume that the data on freshwater systems is transferable to tidal wetlands.

The data related to the provision of buffers for wildlife functions, including feeding, nesting, resting and movement corridors vary considerably and does not clearly indicate an optimum minimum buffer width for multipurpose buffers. The following recommended buffer widths based on literature review are taken from a Yale study:

Effective buffer width (in feet)				
Aquatic Wildlife	Terrestrial Wildlife	Nutrient Retention	Sediment Control	Pesticide Retention
98 – 164	98 – 1,640	50 – 164	49 – 328	49 – 328

There is no single universal width that can provide all the desired benefits of a buffer. It can be stated, however, that the effectiveness of a buffer increases with its size. Wetland function and sensitivity to disturbance will influence the necessary level of protection. Buffers that are 100 feet or greater in width provide the best protection for water quality by moderating temperature changes and improving control of erosion, sediment and pollution and provide the widest range of wildlife values. It can be concluded that wider buffers also provide more overall benefits such as reducing human disturbance, maintaining wildlife habitat and providing improved flood protection. However, even a narrow buffer (25 to 50 feet in width) can be effective for specific purposes in certain limited situations. Thus, the optimum width of a tidal wetlands buffer depends upon a combination of on-site and adjacent conditions and desired function of the buffer.

Stormwater flow type

- *Sheet flow*: slow unrestricted flow across the ground along the length of the buffer allows the buffer area to more effectively trap sediments, attenuate pathogens and pollutants, and encourage infiltration.
- *Concentrated flow*: flows strong enough to create gullies or other eroded channels (e.g., flows directed through swales, pipes or other conveyances) reduce or essentially eliminate the effectiveness of a buffer for stormwater management.

Land uses

The land use above the buffer poses a high, medium, or low risk for pollution or other disturbance to tidal wetlands. The higher the risk posed by the upland use, the greater the need for an effective buffer. Increasing the width of a required buffer and/or increasing the density of native plantings can aid in offsetting the potential impacts from a high-risk upland use.

Limiting activities

The fewer activities allowed, the more valuable a vegetated buffer will be. Land clearing, grading, or other disturbances and establishing or maintaining impervious surfaces directly adjacent to vegetated buffers diminishes their overall effectiveness. However, in some instances, providing minimal access to the tidal wetlands edge might be appropriate as a reasonable exercise of riparian or littoral rights in order to obtain access to a dock or boating facility. For large projects, passive recreation amenities, such as walking trails, may be appropriate to provide a necessary water-dependent use, provided they are properly designed to minimize disruption of the buffer as a resource protection measure.

Implementing tidal wetlands buffers for municipalities

Zoning

Update zoning regulations to better protect sensitive tidal wetlands by establishing or increasing protective buffers between development and all tidal wetlands. Once buffers are established by regulation, they should be strictly honored. Such regulations should require:

- Vegetated buffers landward of the upland limit of tidal wetlands. In those cases where steep slopes (25% or more) abut tidal wetlands, the buffer width should be measured in from the top of the slope. The most effective buffers support dense growth of shrubs and trees. (See below for model regulation language).
- 100-foot wide vegetated buffers abutting all tidal wetlands in new subdivisions.
- Larger minimum lot sizes in areas containing or abutting tidal wetlands.
- Prohibit most uses in vegetated buffers. A reasonable exception might be to allow limited access to and, in the case of general public access, along the tidal wetland border.
- Limit clearing of vegetation adjacent to tidal wetlands and within buffer areas.
- Allowance of variances of the minimum buffer width only in those extremely limited cases where there is a strict statutory hardship as defined in the CGS section 8-6(3) and where compliance with the buffer requirement would render an otherwise buildable lot unusable.
- Establish specific standards for the removal of invasive species and perhaps allow minimal clearing to enhance views and provide access where necessary while maintaining the effectiveness of the buffer.

Municipalities may also want to consider adopting buffers to address other resource protection needs.

Approaches

There are many different ways to structure a requirement for vegetated buffers:

1. Specify a fixed minimum width. While this is simple to administer, it may not be effective enough unless the minimum width is quite wide (100' or more). A wide fixed buffer may be hard to implement in Connecticut given our established development patterns that frequently resulted in housing and other development clustered along the edges of tidal wetlands. Nevertheless, this approach is attractive due to its simplicity.
2. Require that a minimum percentage of lot depth be established as a vegetated buffer. This provides some flexibility to respond to the constraints posed deeper (perhaps more valuable lots) are being penalized by being required to provide more buffer in overall width than owners of smaller, less deep lots.
3. Use an equation that factors in specific site conditions such as slope, existing vegetation type (e.g., grassy, shrubby, forested), soil permeability and upland use(s). Often these

equations can be quite complicated, municipal staff would require specialized training to enable them to determine the minimum buffer width on a case by case basis. Implementation and enforcement can also be labor intensive and time consuming.

4. A technique utilized by some states is to grade wetlands into categories based on their existing value and functions and establish minimum buffer widths that vary based on the category of abutting wetlands. This is not a practical approach to establishing tidal wetlands buffers in Connecticut as our general statutes do not differentiate between varying qualities or values of tidal wetlands. If a wetland area meets the definition of tidal wetlands its specific condition (e.g., pristine or degraded) is not relevant to the statutory responsibility to protected the resource.

There are other approaches to establishing a tidal wetlands buffer that do not prohibit development within the buffer area, but include incentives for locating new impervious surfaces outside of the buffer. Usually these incorporate the creation of compensation areas based on the area of new impervious surface proposed within the minimum buffer area. This type of approach is attractive as it provides more flexibility than the other approaches noted above. However, establishing appropriate regulation language is a difficult task that requires careful and deliberate consideration.

The suggested model regulation language offered below is fashioned after the simplest approach of designating a fixed, effective minimum width tidal wetlands buffers. Based on the data available, a minimum width of 100 feet is recommended for a fixed width vegetated buffer.

Model regulation language

Based on the above discussion regarding the value of tidal wetlands buffers and the types of approaches to requiring them, the following model regulation language establishes a uniform 100-foot vegetated buffer adjacent to all tidal wetlands. Prior to adoption, this regulation may be tailored to the specific conditions and concerns of the municipality.

A resource protection buffer of 100 feet shall be established along the upland edge of any tidal wetland as defined by CGS section 22a-29(2). The width of the buffer shall be measured inland from the upland edge of the tidal wetlands except in the case of wetlands bordered by slopes greater than 25% in which case the buffer shall be measured inland from the top of the slope.

The following uses and activities are prohibited within the buffer:

1. *new building construction that increases the building area or footprint including minor additions to existing buildings;*
2. *detached accessory buildings such as garages and sheds;*
3. *pools, tennis courts, patios, terraces;*
4. *driveways, parking areas;*
5. *other impervious surfaces;*
6. *seawalls, bulkheads, retaining walls, landscaping walls or similar structures;*
7. *grading, excavation or filling, including the construction of new septic systems;*
8. *land clearing, except for minor clearing to allow for appropriate landscaping or the provision of acceptable access as noted below;*
9. *dumping of lawn clippings and other wastes; and*
10. *the application of fertilizers and/or pesticides except when necessary to address a public health issue as determined by the local health official and/or the State Department of Health Services or to control an infestation of invasive vegetative species if authorized by the local conservation commission.*

The following uses and activities, although not expressly prohibited, are discouraged within the buffer area:

1. *the establishment of new lawn areas;*

2. *extensive clearing or pruning. Minimal clearing to provide views may be allowed; however, to maximize the effectiveness of the buffer, pruning should only be done to the extent necessary to clear a view lane and in a manner that maintains the understory and, if forested, the canopy of the buffer area, i.e., no pruning should be conducted within three feet of the ground to protect the understory and, if wooded, no pruning should occur above 9 feet above the ground to protect the canopy.*

The following uses and activities are permitted and/or encouraged within the buffer area:

1. *preservation of existing native vegetation, including shrubs and trees;*
2. *removal of invasive species and replacement with native species;*
3. *elimination and/or minimization of mowing to encourage a variety of native species including shrubs and trees;*
4. *planting of native vegetation;*
5. *provision of passive recreational opportunities, including the provision of public access where appropriate. However, such uses should be provided at an appropriate scale so as not to significantly diminish the performance of the buffer as a measure to protect tidal wetlands from disturbance and/or degradation. For larger projects, passive recreation components within a tidal wetlands buffer could include provision of walking trails, benches, small-scale picnic areas, and associated amenities.*

This regulation does not prohibit the continued use, reconstruction or renovation of any septic disposal system, building, or other improvement in existence on the effective date of the regulation nor does it prohibit the construction of new improvements necessary for the function of water-dependent uses as defined by Connecticut General Statutes section 22a-93(16) except when those improvements can functionally be located outside of the buffer area.

Variance of this regulation is strongly discouraged. Exceptions may be made only in those instances where strict adherence would render a parcel unusable. In those cases, the minimum variance necessary to make the parcel usable should be the maximum variance considered.