

- (5) Performance standards for work or activities proposed in the buffer zone to a Fish Run are specified in DWR 22.0.
- (6) The Commission may impose such additional requirements as are necessary to protect the wetland values protected under the Bylaw.

22.0. BUFFER ZONE

a) Preamble. The 100-foot buffer zone to Resource Areas specified in the Bylaw and in DWR 2 (1-5) provides critical protection for Resource Areas. Most human activities likely to come under the review of the Commission take place in the buffer zone.

Adverse effects to Resource Area buffers are likely to have an adverse effect and cumulative adverse effect on the wetland values.

A buffer zone in a naturally vegetated condition can act like wetlands in removing nitrogen and phosphorus from entering receiving waters by serving as sinks, filters and transformers of suspended and dissolved nutrients. A buffer can remove 50-100% of sediments via filtration through natural organic litter. Absorption of ground water via mature trees can take up 14 times more water than an equivalent area of grass. Bank and stream channel stability is dependent on the anchoring ability of root systems and slowing of runoff velocity and flow diffusion provided by the buffer. Vegetation in the buffer can act to moderate water column temperatures and levels of dissolved oxygen.

The higher the water temperature, the more deleterious the effects of release of nutrients (phosphorus and nitrogen) from sediments. As nutrient concentrations in water increase, the likelihood of algal blooms and eutrophication increases, resulting in lower oxygen levels. The buffer provides corridors and connector and dispersal routes for wildlife, as well as habitat for breeding, nesting, development, feeding, basking, cover, hibernation, aestivation, and migratory activities.

Buffers reduce the adverse effects of adjacent land uses on wetlands. Buffers reduce wetland impacts by moderating impacts of stormwater runoff including stabilizing soil to prevent erosion; filtering suspended solids, nutrients, and harmful or toxic substances; and moderating water level fluctuations. Buffers help to prevent water pollution and protect public or private water supplies. They reduce the adverse impacts of human disturbance on wetland habitat including blocking noise and glare; reducing sedimentation and nutrient input; reducing direct human disturbance from dumped debris, cut vegetation, and trampling; and providing visual separation. They also provide essential habitat for wetland-associated species for use in feeding; roosting; breeding and rearing of young; and cover for safety, mobility and thermal protection.

Wetlands with important functions and values or wetlands which are sensitive to disturbance will require greater buffers to reduce the risk of disturbance. Wetland functions, values, and sensitivity are attributes that will influence the necessary level of protection for wetlands. Where wetland systems are rare or irreplaceable (e.g., high

quality estuarine wetlands, mature swamps, and bogs) larger buffer widths will ensure a lower risk of disturbance.

Uplands immediately adjacent to wetlands vary in their ability to reduce adverse effects of development, most importantly in relationship to slope and vegetative cover. Buffers with dense vegetative cover on slopes less than 15% are most effective for protection of water quality. Dense shrub or forested vegetation with steep slopes provide the greatest protection from direct human disturbance. Appropriate vegetation for wildlife habitat depends on wildlife species present in the wetland and buffer. Effectiveness is also influenced by ownership of the buffer.

Land uses associated with significant construction and post-construction impacts need greater buffers. Construction impacts include erosion and sedimentation, debris disposal, vegetation removal and noise. Post-construction impacts are variable depending on the land use, but residential land use, in particular, can have significant impacts. Residential land use is associated with yard maintenance debris, domestic animal predation, removal of vegetation and trampling, nitrogen and phosphorus loading, and excessive herbicide and pesticide application. Buffers in a natural condition are aesthetically and economically valuable. Buffers provide recreational opportunities for hunting, fishing, walking, photography and other recreational activities.

Buffer effectiveness increases as buffer width increases. As buffer width increases, the effectiveness of removing sediments, nutrients, bacteria, and other pollutants from surface water runoff increases. However, for incrementally greater sediment removal efficiency (e.g., from 90 to 95%), disproportionately larger buffer width increases are required.

As buffer width increases, direct human impacts, such as dumped debris, cut or burned vegetation, fill areas, and trampled vegetation, will decrease. As buffer width increases, the numbers and types of wetland-dependent and wetland-related wildlife that can depend on the wetland and buffer for essential life needs increases.

Appropriate buffer widths vary according to the desired buffer function(s). Temperature moderation, for example, will require smaller buffer widths than some wildlife habitat or water quality functions. Buffer widths for wildlife may be generalized, but specific habitat needs of wildlife species depend on individual habitat requirements.

Buffers of less than 100 feet in width are generally ineffective in protecting wetlands and water bodies. A buffer is necessary to protect a wetland from direct human disturbance in the form of human encroachment (including, but not limited to, foot traffic, trampling, debris, noise). The appropriate width to prevent direct human disturbance depends on the type of vegetation, the slope, and the adjacent land use. Some wetlands are more sensitive to direct disturbance than others. In some cases, buffers greater than 100 feet may be necessary to protect wetland values.

To retain wetland-dependent wildlife in important wildlife areas, buffers need to retain

plant structure for the maximum distance allowed by the Bylaw. This is especially true where open water exists or where the wetland is used extensively by migratory or overwintering birds or rare species. The buffer width needed would depend upon disturbance from adjacent land use and resources involved. Priority species may need even larger buffers to prevent their loss due to disturbance or isolation of subpopulations.

Notwithstanding the critical importance of the buffer zone for protection of Resource Area values, there may be some minor or temporary work or activities which may have no adverse effect or cumulative adverse effect upon the wetland values. Such work or activities may be allowable within the outer portion of the buffer zone, provided the Commission finds that there is no adverse effect or cumulative adverse effect upon the wetland values.

b) Wetland Values and Presumptions of Significance. The buffer zone is significant to the wetland values of the Resource Area which it borders. In addition, where rare species or vernal pools occur in the buffer zone, the buffer zone itself is significant for protection of rare species, rare species habitat, vernal pool organisms, and vernal pool habitat, respectively.

Where a project involves removing, building upon, degrading, or otherwise altering a Resource Area buffer adjacent to a Resource Area specified in DWR 2.00 (1-5), the Commission shall presume that such area is significant to, or will have a cumulative effect upon, the following wetland values: protection of public or private water supply; protection of groundwater; flood control; erosion and sedimentation control; storm damage prevention, including coastal storm flowage; prevention of water pollution; protection of fisheries, protection of wildlife and wildlife habitat; protection of rare species habitat, including rare plant and animal species; protection of recreation; and protection of aesthetics. This presumption may be overcome upon a clear showing that said land does not play a role in protecting one or more wetland values given above.

If the Resource Area buffer is not present (i.e., has already been altered and/or encroached upon), the Commission shall presume that there already exists a significant adverse effect or cumulative adverse effect upon the wetland values of the Resource Area. This presumption may be overcome upon a clear showing that there is no significant or cumulative effect the protection of said wetland values.

c) Definition. The buffer zone is the area within a minimum distance of 100 horizontal feet of any Resource Area specified in DWR 2.0 (1-5), excluding the buffer zone itself, Land Subject to Coastal Storm Flowage, and the Riverfront Area. The buffer width shall be measured horizontally in a landward direction from the Resource Area boundary as surveyed in the field.

d) Performance Standards.

- (1) The intent of the Conservation Commission is to move all structures and activities as far away as possible from any Resource Area, in order to protect the wetland values of Resource Areas.
- (2) Except as otherwise specified, Resource Area buffers shall be retained and maintained in a naturally vegetated condition. Where buffer disturbance has occurred during construction, revegetation with native vegetation may be required.
- (3) The Commission may require that already-altered buffer zone be restored in order to protect or improve Resource Area values. Restoration means planting native vegetation, grading, correcting site drainage, removing debris, or other measures which will improve, restore and protect the wetland values of the Resource Area.
- (4) Notwithstanding the above provisions, no project may be permitted which will have any adverse effect on specified habitat of rare vertebrate or invertebrate and rare plant species, as identified by procedures established under 310 CMR 10.37 for Coastal Resource Areas or 310 CMR 10.59 for Inland Resource Areas.
- (5) The Commission may impose such additional requirements as are necessary to protect the wetland values protected under the Bylaw.

23.0. PROJECT-SPECIFIC PERFORMANCE STANDARDS

The following performance standards shall be applied to projects that are proposed in one or more of the Resource Areas as defined herein. The Conservation Commission has frequently reviewed certain activities and as a result has developed standards that the Commission feels are sufficient in most cases to protect the wetland values of each affected Resource Area. In addition to the following specific performance standards, the Conservation Commission may require a Conservation Restriction on land associated with new projects in any Resource Area defined herein, if the Commission deems it necessary to protect the wetland values of the Resource Area.

23.1. Septic Systems

a) Subsurface Disposal of Sanitary Sewage (Title 5). The State Environmental Code (310 CMR 15.00 et seq.), administered locally by the Town of Duxbury Board of Health, is a minimal public health regulation that may be supplemented at the local level. This code was developed to protect public health against bacteria-caused disease; it was not designed to protect public health from viral contamination nor was it designed to protect