INLAND WETLAND AND WATERCOURSE REVIEW AREAS

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INTRODUCTION

Inland Wetland Agencies (IWA) have traditionally regulated activities within mapped inland wetlands that are defined by soils, vegetation, or presence of water bodies. The 1995 revisions to the Inland Wetland and Watercourse Act specifically enabled the IWA to also regulate upland activities that would likely impact wetlands or watercourses. The recent Connecticut Supreme Court decision in the case of Queach Corporation vs. Branford Inland Wetlands Commission reaffirmed this authority. This clarification in the authority to regulate upland areas generates interest in how to evaluate the functions and values of upland areas with respect to the wetland or watercourse and how to assess the impact of proposed activities.

Evaluation of upland areas should include: hydrologic functions including protecting stream banks from erosion, providing flood water conveyance, providing groundwater recharge and storage; water quality functions including providing shade to moderate water temperature, trapping sediment, renovating surface water runoff and isolating pollution sources; ecological functions including providing sources of woody detritus for streams, terrestrial habitat, wildlife corridors, nesting sites, and protection of rare or endangered species; and cultural values including aesthetics, recreation and educational opportunities. Evaluating the scientific functions and values of wetlands and their adjacent upland areas often requires review of the watersheds natural resources and technical assistance.

The assessment and regulation of upland areas beyond the boundaries of wetlands and waterbodies is not a new role for IWA. Many IWAs have had regulated upland areas, popularly known as buffers, adjacent to wetlands for many years, often specifying a fixed width regulated area parallel to wetland boundaries. The designation and use of upland review areas has been suggested to IWAs in the Connecticut Department of Environmental Protection "Guidelines For Upland Review Area Regulations" recommends use of a 100-foot wide review area. The preparation of a town wide wetland inventory of watershed plan would help identify areas of special interest or concern and inform all parties where and under what circumstances upland review areas are applied.

BUFFER ZONE HIERARCHY

It is not uncommon for the riparian areas to be thought of as having two or more sub-areas based upon their primary function. The first 25± feet of upland adjacent to a wetland or watercourse are usually the most important. This inner portion of the zone includes stream banks that may be subject to periodic inundation and may convey and or store floodwaters. Bank vegetation provides root mass that stabilizes banks and the canopy reduces rainfall energy. It is the interface between aquatic and terrestrial habitat and its vegetation that provides shade to moderate water temperature fluctuations.

Vegetative zones up to 50± feet wide are important as a source of coarse woody debris and particulate material that serves as a source of organic energy for the base of the food chain. The first 50 feet adjacent to a wetland is also important for the treatment of surface water runoff which moves as sheet flow through vegetated areas that filter, absorb, infiltrate and attenuate of non-point source pollutants.

The use of increasingly wide buffer zones has diminishing benefits to wetlands and watercourses. Zones in excess of 100 feet have been reported in the literature primarily for protection of wetland dependent mobil wildlife rather than for direct water resources protection. This raises the logical issue of to what extent should an IWA regulate a non-wetland habitat for species such as amphibians that use a combination of aquatic and upland terrestrial habitats.

The Metropolitan Washington Council of Governments has published a three-part procedure for estimating buffer widths. This model for water quality (sediment) protection considers the slope of the land, vegetation density, adjacent land uses and sediment type with resulting buffer widths ranging from 50 feet for low gradient sandy soils to 200 feet for steep silty soils. It is noted that vegetative buffers are not effective in trapping clay sediment particles, which can travel hundreds of feet (MWCOG, 1995).

Buffer zones in urban areas are primarily for the protection of stream banks, renovation of runoff, providing shade and woody detritus, and aesthetics. The literature suggests that these functions are often accomplished in relatively narrow zones of 25 to 75 feet in width. In suburban areas, dominant land uses are often single-family residential lots with on-site sewage disposal systems and water supply wells. The Connecticut Public Health Code requires sewage disposal systems to be 50 feet from an "open watercourse," which could include wetlands with exposed surface water, and to be 100 feet from water supply reservoirs. The US Environmental Protection Agency recommends a 50-100 foot separation distance between sewage disposal systems and surface water.

Evaluation of Upland Areas

The author recommends a five-step process to help guide the review, regulation, and management of the upland areas in a structured manner. The five steps are to evaluate existing natural resources associated with the wetland and/or watercourse; evaluate upland site conditions such as soils, slope and vegetation; set clearly defined conservation goals and objectives consistent with the Inland Wetland and Watercourse Act; assess the scope of the proposed activities and their potential impacts; and evaluate potential mitigation measures that avoid, minimize or compensate for potential adverse impacts.

The first step in establishing an equitable regulated area is to inventory and assess the wetland and watercourse resources, including their local and watershed wide values. Typical metrics include type of wetland (marsh, swamp, bog, open water, etc.), water quality classification, water supply usage, fauna and flora, presence of rare or endangered species, floodwater storage or conveyances, recreational use, etc. There are numerous models that can be used to organize the data. The author recommends that communities with upland review areas develop guidelines for how to identify areas or activities of special concern. There are numerous wetland evaluation models available to help inventory and assess wetlands functions and values including the CTDEP Bulletin #9, the US Army Corps of Engineers Descriptive Approach and the HGM methodology. However, there are few established methods for evaluation of adjacent upland areas. Resource evaluations are most valuable when comparative data is available for other local wetlands/watercourses, allowing one to compare wetland values to reference sites. The above task should be performed in coordination with, the staff of those towns that seek to regulate broad areas. Ideally, watershed management plans should be prepared at the inter-municipal level to coordinate basin activities that affect wetlands, flooding, water supply, waste disposal, open space, greenways etc. Individual applicants for activities in upland areas may not even own or abut the down gradient wetlands and often lack permission to enter and inspect private property or reference sites.

The second step is to assess the upland site of the proposed activity and the area leading to wetlands or watercourses. Specific geophysical issues that affect the performance of upland areas include soil types, soil erodibility, slopes, vegetation, depth to groundwater, watershed area, runoff rates and drainage patterns. For example, steep slopes and low permeability soils influence soil erosion and sediment transport, while dense natural vegetation and irregular micro-topography help to reduce sediment travel distances. Similarly, highly pervious soils minimize natural surface runoff and erosion, but result in a large increase in runoff if they are paved over.

The performance of upland areas for water quality protection varies with site conditions. Upland areas with steep slopes (over ten percent) have rapid flow velocities that tend to channelize overland flow, reducing opportunities for water infiltration, nutrient uptake or absorption of pollutants. Wider areas or less intense land uses are recommended for highly erodible soils with a high silt or clay content, or where there is thin vegetation.

At the conclusion of Steps 1 and 2, one can assess whether the adjacent upland review area contributes to the wetland or watercourse functions, leading to setting goals and objectives for balancing land use and resource conservation. Logical questions include whether the wetland has high value functions, is it rare, is it part of a continuous corridor, does it have true riparian characteristics or is it a perched groundwater site on a hillside? Does the upland review area support or supplement the wetland or watercourse? Is the wetland or watercourse dependent upon the adjacent upland area and to what extent? These questions can be difficult to address and incorporate into the application process unless one has a basic understanding of the overall watershed.

Low impact activities within the upland area would include selective vegetation removal, passive recreation, water supply wells, narrow crossings such as roads, utilities, agriculture, pathways and water dependent activities. Activities with potentially large impacts include clear cutting vegetation, extensive earthwork, buildings, hazardous materials, excessive use of lawn products, parking lots and wastewater disposal systems. Some potential impacts can be limited by sensitive site design and erosion controls.

Temporal impact factors include the duration of the activity and the season in which it occurs. Short duration activities with temporary impacts may be more tolerable than long-term activities of a lower intensity. Similarly, in-water activities during the spawning, breeding, or migratory periods may be of greater significance than the same activities during the off-season.

Mitigation efforts begin with good site design to avoid unnecessary negative impacts. A simple example is to cross wetlands or watercourses at their lowest value area, often at their narrowest point. There is a need to emphasize low impact design to reduce the dependency on buffer zones. Low impact techniques include minimizing impervious cover, building vertically with a smaller footprint, use of narrower roads, avoiding non-functional curbs, use of grass swales instead of enclosed pipes, and use of storm water infiltration systems. It is desirable to avoid direct discharges of stormwater runoff from impervious areas into watercourses. Pollution prevention, through the use of substitute materials, safe storage and proper disposal, is an important measure to reduce pollutants. Phased construction to minimize the disturbed area and rapid soil stabilization are important, plus best management measures for soil erosion prevention, sediment control, and runoff treatment.

There is extensive literature on the performance of buffer zones in relation to specific functions. However, much of the data is limited to regional geographic areas or vague, poorly defined land uses. As a result, summaries of the literature tend to be generalized and provide a wide range for buffer widths. It is apparent that published widths and performance vary depend on their intended function and site conditions. A recent publication by the U.S. Army Corps of Engineers for example, recommends 5 to 30 meters for water quality protection, 10 to 20 meters for stream bank stabilization, 3 to 10 meters for input of woody detritus, 20 to 150 meters for flood attenuation, and 30 to 500 meters for habitat (Fischer, 2000). The non-profit Center for Watershed Protection summary of buffer widths in 36 communities and found a median width of 100 feet.

As noted by the US Army Corps of Engineers, there is insufficient information in the literature to rigorously relate buffer widths to upland land use and riparian functions. The process thus requires professional judgment.

EMERGING ISSUES

The use of effective mitigation measures is an important factor to consider in reviewing potential project impacts. For instance, research on water quality and sediment impacts generally neglect the use of best management practices which could include erosion silt fence, sediment basins, hydro seed, grit chambers, and others. Best management practices for storm water runoff are being emphasized by the new NPDES Phase II regulations and by the DEP Office of Long Island Sound.

The 1995 revisions to the General Statutes included vernal pools as a regulated area and allow IWA to review their impact areas. Vernal pools are a seasonal landscape feature whose unique properties, fauna and flora are most visible during a short period in the spring. Consequently, there are seasonal limitations that may impede comprehensive site assessments, IWA staff inspections and the public review process. There has been some discussion, but no resolution, concerning mandatory timing of site assessments.

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