Conservation Advisory Council

To The Town of Ancram

The Conservation Advisory Council (CAC) provides information, tools, and advice for use in town planning; reviews land use proposals, and advises town government in the protection of our environment. The CAC conducts townwide natural resource inventories, reviews development proposals, and gathers and distributes information to town agencies, land use applicants, and the general public.
(Adapted from Gretchen Stevens, CAC Hillsdale)

November 19, 2010

Stream Side Vegetated Buffers

The Town of Ancram is located within the Hudson River Estuary Watershed. Hudson River tributary streams and their associated shoreline and floodplain areas provide some of the most productive wildlife habitat in the region. Stream habitats are the most threatened habitats in the Hudson Valley. The water and habitat quality of tributary streams are increasingly threatened by removal of shoreline vegetation, modification of stream channels and land-use changes in the watershed. (Strong 2008, pg.13)

The Town of Ancram Comprehensive Plan states under Detailed Strategies 2 Environment 2.4 Stream Side Buffers and Vernal Pools pg. 24;
"Adopt a minimum 25 foot stream side vegetation buffer. Streamside vegetation buffers should be natural vegetation and not lawns. If the natural streamside vegetation buffers are not already present, landowners should not be required to create them, except as part of a major subdivision."

Comprehensive Plan Draft 10 Clarifications and changes 6-11-09 states on pg. 2 paragraph 5. "Wetland, water, streamside, and vernal pool buffers are proposed at a fixed 100 feet, which is the DEC standard wetland/water/streamside buffer. This 100 foot buffer compares to the 150 foot buffer which currently exists, and the 750 foot buffer previously proposed for vernal pools. There is no longer a provision in the Plan for increasing the buffer to 150 feet based on soils, terrain or slope. In addition, the Plan recommends that streamside natural vegetation

buffers of 25 feet be maintained if they are already there, but if not already there, they do not need to be planted, except in major subdivisions."

The State Environmental Quality Review (SEQR) forms include questions related to conservation of existing surface and groundwater resources and directly relate to the importance of including protective buffers in all subdivision plans. Subdivision applicants or building permit applicants are also required by NYS to submit a Stormwater Pollution Prevention Plan (SWPPP) if they disturb more than an acre of land. Wide riparian buffers are an important means to protect water resources from pollution and erosion.

Stream buffers, also known as riparian buffers, conserve the areas adjacent to streams and rivers. Buffers differ greatly, as do the streams they border, ranging from flat floodplains to steep gorges. A healthy buffer has many different species of native trees, shrubs and herbaceous vegetation with minimal encroachment and human disturbance. Varying buffer widths correspond to different purposes in support of human needs, and the ecosystem, but in general, the wider the better. Unhealthy buffers have: plants with weak root systems, such as turf grass: invasive plant species, such as Japanese Knot Weed; grazing animals; inadequate buffer widths; hardened shorelines, and impervious surfaces, such as pavement. (NYS DEC)

Vegetated riparian buffers of sufficient width are complex ecosystems that, when adequately vegetated with native plants provide an important environmental protection to the quality of surface water, groundwater and drinking water by filtering run off and capturing Non-Point Source Pollution.

Poorly planned development along waterbodies can threaten water quality, aesthetics, wildlife habitat, municipal infrastructure and private property.

"Polluted water is the leading source of impairment to aquatic systems in the Hudson Valley." (Strong, K. 2008, pg.61)

"Buffers are not a tool to prevent development, but to direct development into less sensitive areas." (Strong, K. 2008, pg.29)

A Healthy Riparian Buffer will

- Protect, restore and maintain the chemical, physical and biological integrity of streams and their water resources.
- Improve surface and ground water quality.
- Stabilize stream banks from erosion. Removal of woody vegetation increases streambank erosion risk.
- Store floodwaters there-by decreasing damage to property.
- Recharge aquifers and our water supplies by allowing runoff to soak into the ground.
- Trap and remove the sediment in runoff.
- Trap and remove phosphorus, nitrogen, and other nutrients that cause excessive algae blooms and damage to aquatic ecosystems.
- Trap and remove other contaminants, such as pesticides, heavy metals, salt and pathogens.
- Maintain and protect valuable habitat for fish and other aquatic organisms by shading the stream and keeping water temperatures down.
- Contribute organic matter that is a source of food and energy for the aquatic ecosystem.
- Provide invaluable wildlife habitat.
- Provide scenic value and recreational opportunity.

Unfortunately, there is no "one-size fits-all" description of an ideal riparian buffer zone.

Two methods for determining riparian buffer zone width are:

1. **Standard Setting:** This method defines an area extending from the streambank edge to a set distance for all types and sizes of streams. This is the easiest method to delineate and administer. The exact width of a riparian buffer zone required for stream protection is widely disputed.
2. **Site Specific or Variable:** This method defines riparian buffer zone widths according to physical site characteristics such as slope, soil type, vegetated cover and proposed land use. Variable width buffers are better able to protect desired buffer functions. (Fisher 2000, pg.3) Studies unanimously support the conclusion that buffer efficiency at filtering out pollutants increases with width. (Hawes et al., 2005)

Standard Setting Widths

Buffers of 100-200 feet usually protect the water resource and aquatic habitat. Site conditions may require an increase in buffer width to adequately protect the resource. One approach is to widen the buffer where there are sensitive areas, including slopes greater than 15 percent, adjacent wetlands along streams, 100-year floodplains that fall outside the buffer area, and critical habitats. (Strong, K. 2008, pg.29)

Fixed width buffers are easier to enforce and administer but often fail to provide for many ecological functions. (Fisher 2000, pg.2)

Table 5-1. Benefits of Various Stream and Wetland Buffer Widths

This table provides guidelines on buffer widths based on current scientific literature. Only a site-specific biological survey can provide the exact buffer width needed to preserve species and ecosystems at a site. Note that the buffer sizes listed are not meant to be prescriptive, but are intended to help local governments better understand stream and wetland conservation. Buffer width in your municipality should be determined both by science and by what is acceptable in your community.

buffer width (in feet)	conservation benefit	source
80	nutrient and pollutant removal	Kennedy et al. 2003
100–200	buffer to protect water resources and core aquatic habitat	Semlitsch and Bodie 2003
100	temperature and microclimate regulation	Kennedy et al. 2003
100	core temporary woodland pool habitat (vernal pool)	Calhoun and Klemens 2002
160	stream detrital input and bank stabilization	Kennedy et al. 2003
330	water quality and minimal wildlife protection (includes adjacent upland)	Kennedy et al. 2003
250	stream salamander core habitat and buffer	Crawford and Semlitsch 2007
250–575	minimum corridor width needed to include 90 percent of bird species that use streamside habitat (adjacent upland)	Spackman and Hughes 1995
465–950	core riparian habitat for reptiles and amphibians (adjacent upland)	Semlitsch and Bodie 2003
535	long-term health of ecosystem (adjacent upland)	Howard 2004
750	critical terrestrial habitat for vernal pool breeding species (adjacent upland)	Calhoun and Klemens 2002

(Strong, K. 2008, pg.30)

- The Massachusetts River Protection Act requires a 200-foot resource protection area along all perennial streams in the state. Many towns in the state have local ordinances of 300-foot buffers to protect water quality and critical habitat.

Site Specific or Variable

There are many factors that influence the effectiveness of buffers. These include slope, rainfall, the rate at which water can be absorbed into the soil, type of vegetation in the buffer, the amount of impervious surfaces, how the land is used in the watershed (agriculture or residential) and other characteristics specific to the site.

Factors Influencing Buffer Effectiveness and Design

- **Slope.** As slope increases, the speed at which water flows over and through the buffer increases. The steeper the land within the buffer and or above the buffer, the wider the buffer needs to be to have time to slow the flow of water and absorb the pollutants and sediments in the runoff.
- **Soil Type.** The type of soil effects how quickly water can be absorbed. Soils that are high in clay are less permeable and may have greater runoff requiring a wider buffer. A wider buffer should also be provided in areas of erodible soils especially on steep slopes.
- **Vegetation Mix.** Structurally diverse riparian buffers are much more effective at capturing a wide range of pollutants. The most effective riparian buffers should include a mix of trees, shrubs and herbaceous plants native to the region and appropriate to the environment.
- **High Hydrogeologic Sensitivity Ratings.** These are areas that, in general, ground water could be easily and quickly impacted by surface activities, thereby requiring wider buffers. Refer to Groundwater Protection Plan for the Town of Ancram Figure 19, Areas with High Hydrogeologic Sensitivity.
- **Ground Water Recharge Areas.** Most of the ground water in Ancram is ultimately recharged (replenished) through infiltration of rainfall or snowmelt. (See Groundwater Protection Plan for the Town of Ancram figure 17, Estimated Annual Groundwater Recharge Rates)
- **Position in Watershed.** Riparian buffers in headwater streams (i.e., those adjacent to first-, second-, and third-order systems) have much greater influences on overall water quality within a watershed than those buffers occurring in downstream reaches. Downstream buffers have proportionally less impact on polluted water already in the stream (Alliance for the Chesapeake Bay 1996).
- **Buffer Length.** Continuous buffer strips adjacent to aquatic systems should be a higher priority than fragmented strips of greater width. Continuous buffers are more effective at moderating stream temperatures, reducing gaps in protection from NPSP, and providing movement corridors for wildlife.

- **Proposed Land Use.** Phosphorus and nitrogen from fertilizer and animal waste can become pollutants if more is applied to the land than the plants can use. Because excess phosphorus bonds to soil particles, 80-85 percent can be captured when sediment is filtered out of surface water runoff by passing through the buffer.

The New York State Freshwater Wetlands Act only regulates wetlands that are equal to or greater than 12.4 acres. It also regulates a 100-foot wide buffer adjacent only to these wetlands. Many local governments in New York have their own wetland and watercourse protection ordinances that regulate activities proposed in or near wetlands at the local level that are not covered under state and federal laws. The Freshwater Wetlands Act allows local governments to assume jurisdiction for regulating wetlands and strengthen the law by protecting smaller wetland and watercourse areas within their boundaries.

One tool that local officials have to help them keep waterbodies healthy is the ability to adopt land use regulations that conserve vegetated riparian buffers in areas that have not yet been developed.

In Westchester County, 30 of the county's 43 municipalities regulate freshwater wetlands at the local level.

Over the last two decades, an estimated 5000 local governments across the U.S. have adopted regulations to protect and restore wetlands and/or riparian areas/stream buffers.

Conservation Advisory Council Recommendations for the Establishment, Design and Maintenance of Riparian Buffer Zones

C.A.C. recommendations are based upon the scientific studies of riparian buffers, model buffer ordinances from many northeast communities and the desire of the residents of the Town of Ancram who firmly want to protect the environment, ground water, open spaces and the rural character of the town.

- **Intent and Purpose of Riparian Buffers**
  1. Restore and maintain the chemical, physical and biological integrity of the streams and the water resources.
  2. Prevent excessive nutrients, sediment, organic matter and other pollutants, from reaching surface waters.

3. Provide for shading of the aquatic environment to moderate temperatures, retain more dissolved oxygen, and support a healthy aquatic ecosystem.
4. Provide for the availability of natural organic matter (leaves and twigs) and large woody debris (trees and limbs) that provide food and habitat for aquatic organisms (insects, amphibians, crustaceans, and small fish), which are essential to maintain the food chain.
5. Increase stream bank stability thereby reducing stream bank erosion and sedimentation and protecting habitat for aquatic organisms.
6. Maintain base flows in streams and moisture in wetlands.
7. Control down stream flooding.
8. Conserve the natural features important to land and water resources, e.g. headwater areas, ground water recharge zones, floodways, floodplains, springs, streams, wetlands, vernal pools, woodlands, and prime wildlife habitats.

- Riparian buffers adjacent to all surface water bodies should be protected from avoidable disturbance.
- The required width for all riparian buffers should be a minimum of 100 feet. The buffer should be widened in the following cases so that development or disturbance will not adversely affect water quality, streams, wetlands, or other waterbodies.
    1. Steep slopes or erodible soils
    2. 100-year floodplain
    3. Proposed Land Use (such as parking lots, gas stations, fuel storage, mining, crop land and animal waste management)
    4. High Hydrogeologic sensitive areas
    5. Ground water recharge areas
    6. Contiguous sensitive habitat areas
- A riparian buffer for a stream system should consist of a forested strip of land extending along both sides of a stream and its adjacent wetlands, floodplains or slopes.
- The suggested method to adjust buffer width for steep slope is based on percentage of slope:
    1. 15%-17% add 10 feet
    2. 18%-20% add 30 feet
    3. 21%-23% add 50 feet
    4. 24%-25% add 60 feet

- Riparian Buffers should be extended to encompass the entire 100-year floodplain.
- NYS Stormwater Plan should be referenced.
- National Resources Conservation Service (NRCS) and Agricultural Best Practices should be referenced and encouraged.

Buffer Management and Maintenance

- The following practices and activities should be restricted within the riparian buffer zone.
    1. Clearing of existing vegetation and downed trees. Removal of invasive species is allowed.
    2. Mowing
    3. Soil disturbance by grading, stripping, or other practice
    4. Filling or dumping
    5. Manmade drainage by ditching
    6. Use, storage or application of pesticides or herbicides
    7. Housing, grazing or other maintenance of livestock
    8. Operation of motorized vehicles

- The subdivision applicant should be required to submit a plan, which evaluates the effects of any proposed uses on the riparian buffer. Their plan must include the following information.
    1. Existing vegetation
    2. Field delineated surface water bodies and or wetlands
    3. The 100-year floodplain
    4. Soil classifications
    5. Existing and Proposed Topography
    6. Proposed uses / activities
    7. Proposed buffer management techniques
    8. The manner in which the buffer will be owned and managed.
    9. A revegetation plan (if no buffer vegetation exists) that includes;
        A. Herbaceous plants as groundcover
        B. Understory Shrubs
        C. Trees that will form an overhead canopy when mature
        D. Plants native to the region and climate
        E. Plants suited to the riparian environment
- All riparian buffer areas should be maintained through a declaration of protective covenant. The covenant would be recorded in the land records and would run with the land and continue in perpetuity.

Design Guidelines for planting a riparian buffer

- Vegetation used for buffer projects should consist of a mix of trees, shrubs, and herbaceous plants that are native to the region and well adapted to the climate, soil, and hydrologic conditions of the site.
- The plant composition of an adjacent undisturbed riparian area can be a good planting guide and is often used as a starting point for the revegetation design.
- Diverse vegetation is preferable.
- Invasive exotic plant species should be removed from riparian buffers
- A mix of trees and shrubs planted along the edge of the streambank will anchor the soils and grow to shade and cool the water.

References

1. Berkshire Regional Planning Commission for The Massachusetts Department of Environmental Protection. 2003.The Massachusetts Buffer Manual, Using Vegetated Buffers to Protect Our Lakes and Rivers.
2. Fischer, R. and Fischenich, C. 2000. Design Recommendations for Riparian Corridors and Vegetated Buffer Strips. 17p.
3. Strong, K.2008. Conserving Natural Areas and Wildlife in Your Community: Smart Growth Strategies for Protecting the Biological Diversity of New York's Hudson River Valley. New York Cooperative Fish and Wildlife Research Unit, Cornell University, and New York State Department of Environmental Conservation, Hudson Tiver estuary Program. Ithaca. 101p.
4. Hawes,E. and Smith,M. 2005. Riparian Buffer Zones: Functions and Recommended Widths. Yale School of Forestry and Environmental Studies.
5. New York State Department of Environmental Conservation, Hudson River Estuary Program. (www.dec.ny.gov)
6. Connecticut River Joint Commissions, 1998. River Banks and Buffers. Introduction to Riparian Buffers.
7. Kusler, Jon Esq. 2009. Model Ordinances for Regulating Wetlands; Riparian Habitats; Stream Buffers.

Examples of Buffer Ordinances taken from

1. U.S. Environmental Protection Agency. Model Ordinances to Protect Local Resources http://www.epa.gov/nps/ordinance/mol1.htm
2. www.stormwatercenter.net , Buffer Model Ordinance
3. New Jersey Dept. of Environmental Protection, Division of Watershed Management. 2008. Riparian Zone Model Ordinance.
4. Westchester County Soil and Water Conservation District (Municipal Home Rule). 1998. Model Ordinance for Wetland Protection.