

## 9. Wetland, Shoreline & Riparian Corridor Management

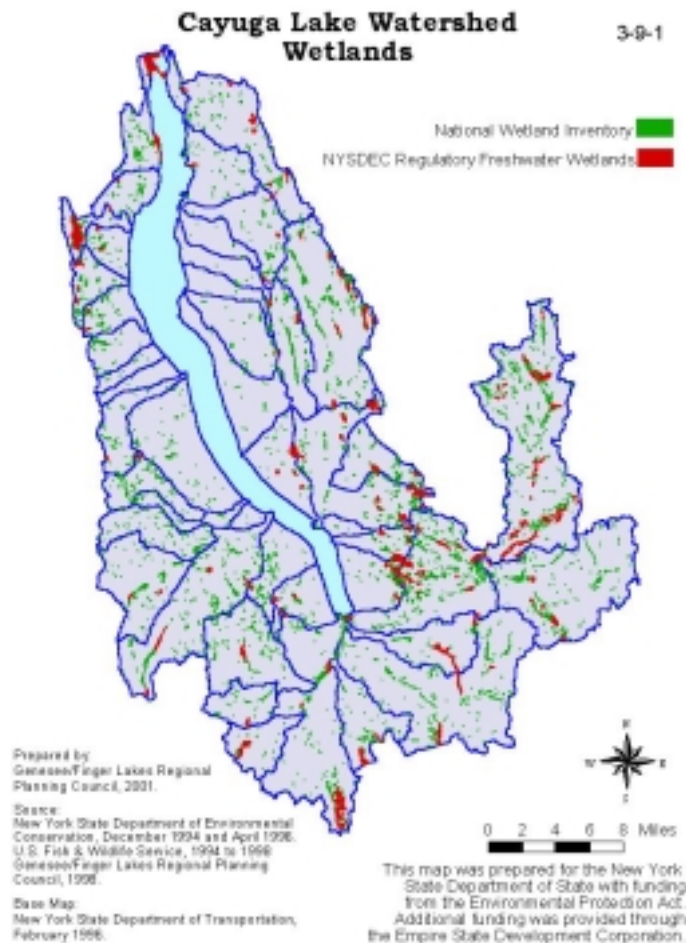
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|--|--|---|--|---|--|-------------------------------|------------------------------|
| <a href="#">Agricultural Practices</a> (A) | <a href="#">Development</a> (D)                            | <a href="#">On-site Wastewater Systems</a> (O)                    | <a href="#">Stormwater Runoff</a> (SR) | <a href="#">Wastewater Treatment</a> (WW)           |  |                               |                              |
| <a href="#">Drinking Water</a> (DW)        | <a href="#">Tourism and Other Economic Development</a> (T) | <a href="#">Water Quality Standards</a> (WQS)                     |  |   |  |                               |                              |
| <a href="#">Water Quality</a> (WQ)         | <a href="#">Exotic species</a> (ES)                        | <a href="#">Fertilizers and Pesticides</a> (F)                    | <a href="#">Heavy metals</a> (H)       | <a href="#">Phosphorus and Nutrient Loading</a> (N) | <a href="#">Organic compounds</a> (OC) | <a href="#">Pathogens</a> (P) | <a href="#">Sediment</a> (S) |
| <a href="#">Comprehensive Planning</a> (C) | <a href="#">Education</a> (E)                              | <a href="#">Economic Revitalization &amp; Sustainability</a> (ER) | <a href="#">Infrastructure</a> (I)     |   |  |                               |                              |

## Introduction

Wetlands and riparian (stream-side) corridors provide an important transition from the terrestrial to the aquatic environment. These areas represent a unique habitat for the community of plants and animals. Wetlands and healthy, vegetated streambanks, or riparian zones, improve water quality by filtering out contaminants from groundwater, removing sediment and sediment-attached phosphorus by filtration, transforming nitrate to nitrogen gas, acting as a sink by storing nutrients for an extended period of time, providing a source of energy for aquatic life and retarding floodwaters. Because of the critical role played by riparian and wetland areas the RPP focuses on their protection and restoration.

## *Wetlands*

The Cayuga Lake Watershed contains approximately 6,575 acres of New York State Department of Conservation regulated wetlands (NYSDEC, 2000) and approximately 16,402 acres of federally designated wetlands (National Wetlands Inventory, 2000). NYSDEC freshwater wetlands are lands and waters of the State that cover an area of 12.4 acres (5 ha) or more unless they have unusual importance. Wetlands form in a range of environmental conditions and include familiar areas such as marshes, swamps, and bogs. They are formally defined in Federal law as areas "that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions"



As Map 3-9-1 Cayuga Lake Watershed Wetlands indicates, the state designated wetlands are, in general, evenly distributed from the north to the south within the watershed with slightly more located toward the south end. In the east west direction, the wetlands are clustered along the edges of the watershed away from the lake. In the northwestern edge of the watershed, in the upper reaches of the Red Creek watershed, there is a large

wetland area. At the very north end of the lake is the Montezuma National Wildlife Refuge, a wildlife refuge covering approximately 6820 acres.

Smaller wetlands are scattered throughout the upper watershed area. These smaller wetland areas tend to be clustered more in the outer edges of the watershed but are more evenly distributed in the east west direction than the larger wetlands. Other than those associated with the very large streams and at the southern and northern ends of the lake, very few wetlands are found adjacent to the lake's shoreline.

A number of wetland types are found throughout the watershed. The Fish and Wildlife service has mapped wetland cover types throughout the United States and documented these wetlands on the National Wetland Inventory (see Map 3-9-1) maps (labeled by cover-type codes). Based on these maps, the wetlands found within the Cayuga Lake Watershed include Palustrine Forested, Broad-leaved Deciduous, Seasonally Flooded/Saturated Areas (PFOIE), Palustrine Shrub-scrub, Broad-leaved Deciduous, Semi-Permanently Flooded Areas (PSSIF), and Open Water Excavated Wetlands (POWZh). The degree to which wetlands provide society with ecological, social, and economic functions is influenced by these wetland characteristics.

#### *Riparian Corridors*

Riparian zones are the lands bordering surface waters; under natural conditions these zones represent a transition from aquatic to terrestrial ecosystems. Riparian zones vary in width. For the *RPP* the riparian zone is defined as 150 ft. from the centerline of each major stream. Table 3-9-1 indicates the percentage of each land use within this buffer area for the major subwatersheds. The amount of developed area varies from about 40% to 80%, indicating significant development along most of the tributaries.

See also: Cayuga Lake Watershed Roadbank & Streambank Inventory (*Cayuga Lake Preliminary Watershed Characterization*) and Map 2-3 Land Use in the Riparian Corridor

#### Functional Assessment - Streamside Vegetation and Wetland Functions

While the physical, biological, and chemical characteristics of wetlands largely determines how they function, the impact wetlands have on water quality depends on their position within the watershed. Because of the steep nature of the Cayuga watershed, wetlands tend to be located in the headwaters of streams, serving more as baseflow stream augmentation than flood reduction. The few wetlands in the lower portion of the landscape provide flooding attenuation. Each wetland cover type will provide a different set of functions to the watershed and downstream water quality. As a general rule the amount of nutrients that can be trapped by a wetland is directly proportional to the amount of flow going through.

| Table 3-9-1. Percent (%) land-use within 150 ft. riparian corridor |      |          |               |      |        |         |                      |      |        |          |         |       |
|--|------|----------|---------------|------|--------|---------|----------------------|------|--------|----------|---------|-------|
|  | Ind  | Junkyard | Institutional | Res  | Ag Res | Ag Open | Developed Categories | Rec  | Forest | Wet-land | Unknown | Undev |
| Great Gully  | 0    | 0.13     | 0             | 1    | 2      | 78      | <b>81.13</b>         | 0    | 19     | 0        | 0       | 19    |
| Yawger Cr.   | 0.02 | 0        | 0             | 3    | 0      | 74      | <b>77.02</b>         | 0    | 23     | 0        | 0.02    | 23.02 |
| Sheldrake  | 0    | 0        | 0             | 3    | 1      | 70      | <b>74</b>            | 0    | 25     | 0        | 0       | 25    |
| Hicks Gully  | 2    | 0        | 0             | 4    | 0      | 68      | <b>74</b>            | 0    | 27     | 0        | 0       | 27    |
| Paines Cr.   | 0.35 | 0        | 0             | 3    | 0.38   | 70      | <b>73.73</b>         | 0    | 26     | 0        | 0       | 26    |
| Ledyard  | 0.05 | 0        | 0             | 2    | 1      | 68      | <b>71.05</b>         | 0    | 29     | 0        | 0       | 29    |
| 68   | 1    | 0        | 0             | 4    | 1      | 64      | <b>70</b>            | 0    | 30     | 0        | 0.04    | 30.04 |
| Direct Drainage  | 2    | 0        | 0             | 6    | 1      | 61      | <b>70</b>            | 0    | 31     | 0.01     | 0.01    | 31.02 |
| Mack Creek   | 0.04 | 0        | 0             | 1    | 0      | 63      | <b>64.04</b>         | 0    | 36     | 0        | 0       | 36    |
| Trumansburg  | 0.32 | 0        | 0             | 5    | 1      | 57      | <b>63.32</b>         | 0.46 | 37     | 0        | 0       | 37.46 |
| Salmon Cr.   | 0.39 | 0.03     | 0             | 3    | 1      | 58      | <b>62.42</b>         | 0    | 38     | 0        | 0       | 38    |
| Canoga Creek   | 0    | 0        | 0             | 16   | 0.32   | 46      | <b>62.32</b>         | 0.47 | 24     | 9        | 4       | 37.47 |
| Renwick  | 11   | 0        | 0.08          | 27   | 0.4    | 23      | <b>61.48</b>         | 1    | 38     | 0        | 0       | 39    |
| Taughannok   | 0.06 | 0        | 0             | 3    | 1      | 50      | <b>54.06</b>         | 0.3  | 46     | 0        | 0.07    | 46.37 |
| Glenwood   | 0.31 | 0.42     | 0             | 9    | 1      | 41      | <b>51.73</b>         | 0    | 48     | 0        | 0       | 48    |
| Willow Cr.   | 0    | 0        | 0             | 0.03 | 1      | 48      | <b>49.03</b>         | 0    | 51     | 0        | 0.21    | 51.21 |
| Fall Creek   | 0.61 | 0        | 0.54          | 7    | 0.23   | 39      | <b>47.38</b>         | 0.53 | 51     | 0        | 0       | 51.53 |
| Gulf Creek   | 0    | 0.39     | 0             | 9    | 0      | 37      | <b>46.39</b>         | 0    | 54     | 0        | 0       | 54    |
| Inlet  | 2    | 0        | 0.24          | 8    | 0.07   | 28      | <b>38.31</b>         | 0.06 | 63     | 0        | 0       | 63.06 |

| <b>Table 3-9-2. Percent total wetlands areas to total subwatershed area</b> |                        |   |          |          |          |
|---|------------------------|---|----------|----------|----------|
| <b>Subwatershed</b>   | <b>Total area (ha)</b> | <b>Percent total wetland area per class</b> |          |          |          |
|   |                        | <b>1</b>                                    | <b>2</b> | <b>3</b> | <b>4</b> |
| Canoga  | 2387.9                 | 6.7   | na       | na       | na       |
| Direct Drainage   | 22388.8                | na  | na       | na       | na       |
| Fall  | 33507.4                | 0.4   | 1.5      | 0.1      | 0.09     |
| Glenwood  | 2487.7                 | na  | 0.8      | 0.03     | na       |
| Great Gully   | 3861.9                 | na  | 0.2      | 0.4      | na       |
| Gulf  | 1598.2                 | 2.7   | 0.9      | na       | 1.7      |
| Hicks   | 1812                   | na  | 0.5      | 1.7      | na       |
| Inlet   | 41229                  | 1   | 0.3      | 0.03     | na       |
| Interlaken  | 6727.2                 | na  | na       | na       | na       |
| Ledyard   | 5224.8                 | na  | na       | 0.04     | na       |
| Mack  | 1922.9                 | na  | na       | na       | na       |
| Paines  | 3851.8                 | na  | na       | 0.2      | na       |
| Renwick   | 2946.3                 | 1.2   | 1        | na       | na       |
| Salmon  | 23860.6                | na  | 0.8      | 1        | na       |
| Sheldrake   | 2620.9                 | na  | 0.3      | na       | na       |
| Taughannok  | 17539.2                | na  | 0.3      | 0.09     | 0.07     |
| Trumansburg   | 3749.8                 | na  | 0.3      | na       | na       |
| Willow  | 2893                   | na  | 0.2      | na       | na       |
| Yawger  | 6313.2                 | na  | 1        | 0.3      | na       |

| <b>Table 3-9-3. Percent (%) developed area land use within 150 ft. riparian corridor</b> |                   |                     |                    |
|--|-------------------|---------------------|--------------------|
|  | <b>Developed</b>  | <b>ENCROACHMENT</b> | <b>Undeveloped</b> |
|  | <b>Categories</b> | <b>RANK</b>         | <b>Categories</b>  |
| <b>Great Gully</b>   | 81.1              | <b>H</b>            | 19.0               |
| <b>Yawger Cr.</b>  | 77.0              | <b>H</b>            | 23.0               |
| <b>Sheldrake</b>   | 74.0              | <b>H</b>            | 25.0               |
| <b>Hicks Gully</b>   | 74.0              | <b>H</b>            | 27.0               |
| <b>Paines Cr.</b>  | 73.7              | <b>H</b>            | 26.0               |
| <b>Ledyard</b>   | 71.1              | <b>H</b>            | 29.0               |
| <b>68</b>  | 70.0              | <b>H</b>            | 30.0               |
| <b>Direct Drainage</b>   | 70.0              | <b>H</b>            | 31.0               |
| <b>Mack Creek</b>  | 64.0              | <b>M</b>            | 36.0               |
| <b>Trumansburg</b>   | 63.3              | <b>M</b>            | 37.5               |
| <b>Salmon Cr.</b>  | 62.4              | <b>M</b>            | 38.0               |
| <b>Canoga Creek</b>  | 62.3              | <b>M</b>            | 37.5               |
| <b>Fall Creek</b>  | 61.8              | <b>M</b>            | 37.4               |
| <b>Renwick</b>   | 61.5              | <b>M</b>            | 39.0               |
| <b>Taughannok</b>  | 54.1              | <b>M</b>            | 46.4               |
| <b>Glenwood</b>  | 51.7              | <b>L</b>            | 48.0               |
| <b>Willow Cr.</b>  | 49.0              | <b>L</b>            | 51.2               |
| <b>Gulf Creek</b>  | 46.4              | <b>L</b>            | 54.0               |
| <b>Inlet</b>   | 38.3              | <b>L</b>            | 63.1               |

## Restoration Priorities

### *Setting Watershed-wide Priorities For Restoring and Creating Wetland Areas*

As a means of setting restoration priorities, each major subwatershed was analyzed for the area of NYSDEC wetland by class. Table 3-9-2 indicates the percentage of each class by subwatershed (Class 1 indicates wetlands with the greatest ecological significance and the most restrictive standard for disturbance). The subwatersheds with the highest percentage of NYSDEC wetlands are: Canoga (6.7%), Gulf (5.2%), Hicks (2.3%), Renwick (2.2%) and Fall Creek (2.1%). These subwatersheds would be candidates for wetland restoration and protection. The other subwatersheds contain less than 2% NYSDEC wetlands and would be candidates for restoration and wetland creation.

### *Setting Watershed-wide Priorities For Restoring Riparian Zones*

The role riparian zones play in protecting water quality is determined by characteristics including vegetation, slope, soils and land use. The percentage of land use class within the riparian zone is the best measure of condition within these areas. Table 3-9-3 ranks each major subwatershed in order of percentage-developed land within the 150-foot buffer zone. Subwatersheds with over 70% development are assigned to a "high" category, from 70% to 54%, to a "medium", and below 53% to "low". Watersheds with the highest percent of developed area should be given the highest priority for riparian zone restoration.

In addition to the RPP project, there is a coordinated project to develop and implement a methodology to quantify the restoration potential of wetland and riparian corridors in this watershed. Two subwatersheds, Taughannock Creek and Yawger Creek, have been used to develop and test the approach.

## Goals

- Preserve existing wetlands and restore degraded wetlands with the watershed
- Restore degraded streams to a natural condition for the purposes of reducing streambank erosion and restoring aquatic habitat.
- Develop and maintain streamside vegetation corridors; for the purposes of reducing streambank erosion, trapping sediments and nutrients, and providing shading and cool water during the summer.
- Construct and/or restore wetlands for natural water treatment and moderation of flood flows.
- Protect a full range of wetlands and riparian functions by preventing development activity in hydrologically sensitive areas.

## Existing Measures

State and Federal Regulations: NYSDEC freshwater wetlands are lands and waters of the State that are subject to state wetland regulations (Article 24 and Title 23 of Article 71 of

the Environmental Conservation Law (see <http://www.dec.state.ny.us/website/dcs/freshwet/freshwet01.html>) because they extend over an area of at least 12.4 acres (5 ha), or have some unusual local importance. These wetlands, and areas within 100 feet of their boundaries, are subject to regulation by the NYSDEC. The Map 3-9-1 shows the approximate location of the wetland boundaries at a scale of 1"=24,000.

At the federal level, the Army Corps of Engineers (ACOE) regulates the filling of "waters of the United States." This includes streams, lakes, impoundments, intermittent drainage ways, and associated wetlands. Authority is granted to the ACOE by Section 404 of the Clean Water Act (see <http://www.epa.gov/owow/wetlands/facts/fact10.html>). The Federal wetlands regulations do not stipulate a buffer zone.

Preservation of Wetlands - Several programs administered by government agencies control development activities that could affect wetlands by providing financial assistance to those who wish to protect these areas.

Wetland and Riparian Zone Education – Cornell Cooperative Extension along with a number of counties within the watershed carry out very active educational programs aimed at the protection of wetlands and riparian zones. One example is the booklet "Finger Lakes Landscape: Landscaping for Erosion Control" that focuses methods for protection and restoration of riparian areas.

### Recommendations

Develop a wetland and riparian corridor management strategy for incorporation into the overall Cayuga Lake Watershed Restoration & Protection Plan. Strategies, which include both regulatory and non-regulatory approaches, can be implemented by local agencies and incorporated into educational initiatives.

The following table recommends establishing guidelines for the riparian zone. It must be wide enough to filter sediment from surface runoff and needs to be protected from encroachment. Adoption of a comprehensive and integrated set of environmental restrictions to govern the development process can be critical to maintaining the integrity of stream corridors and wetlands. Figure 3-9-1 illustrates a recommended riparian zone system that could be established along streambanks (USDA, 1991). Urban stream buffers vary from 20 to 200 feet in width on each side of the stream according to a national survey of 36 local buffer programs, with a median of 100 feet (30.5 meters).

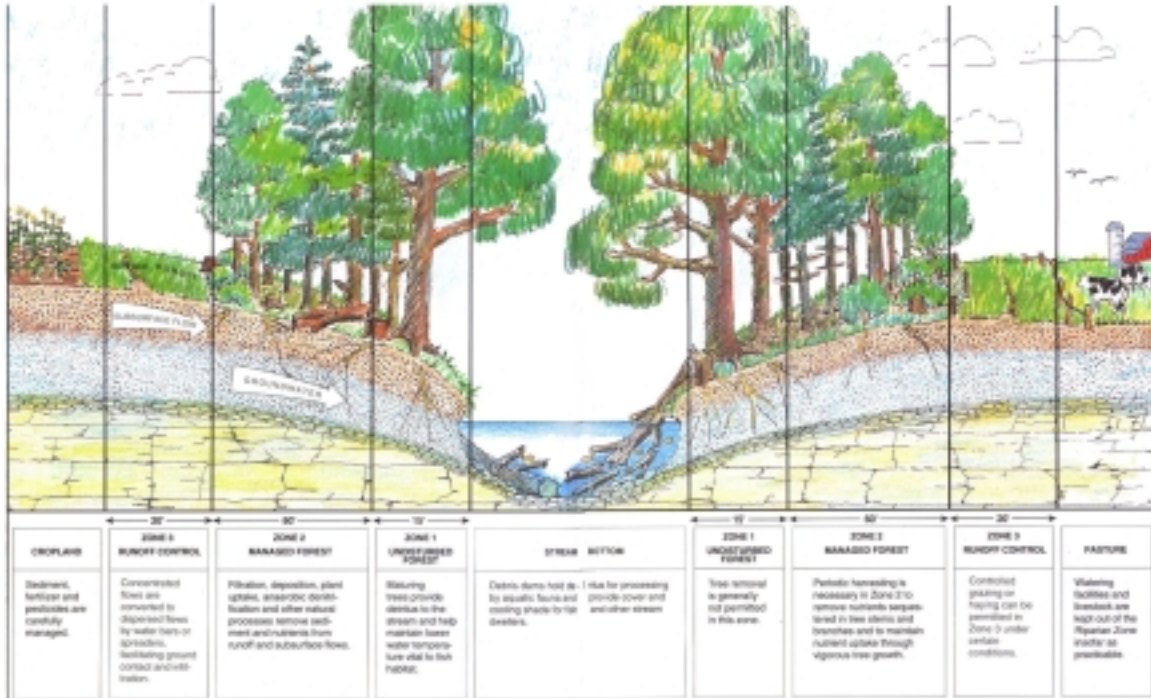


Figure 3-9-1

| No.<br>9 | Wetland, Shoreline & Riparian Corridor Management Recommendations   | Related Issue(s)                             | Potential Responsible Org(s) | Measures/ Targets   | Approx Cost |
|----------|---|--|------------------------------|---|-------------|
| A        | <b>Wetland protection and restoration</b>   |  |                              |   |             |
| A1       | All municipalities that have land use control ordinances should require review of disturbances within 100 ft of all natural wetlands and all municipalities should prohibit discharge of stormwater to wetlands without prior treatment (for example, using vegetated filter strips). The following municipalities have some protection of wetlands within their local law (also see Appendix T): City of Ithaca (zoning), Town of Danby (subdivision), Town of Homer (zoning), Town of Ithaca (zoning), Town of Lansing (zoning and subdivision), Town of Romulus, Town of Seneca Falls (zoning), and Town of Spencer (subdivision). | A, D, SR, WQ, F, H, N, OC, P, S, C, E, I     | M, LO                        | First 5 years - all municipalities with wetlands adjacent to riparian corridors<br><br>Second 5 years - 20% of all other municipalities with highest population and household units | -           |
| A2       | Inventory all wetlands in watershed to establish priorities. Restore degraded wetlands (based on watershed-wide analysis of potential benefit to water quality, habitat, and hydrology).  | A, D, SR, WQ, F, H, N, OC, P, S, C, E, I, ES | NYSDEC, USEPA, SWCD, NRCS    | 20 acres/year at \$5,000/acre   | \$50,000    |
| A4       | Incorporate wetlands as an important component of regional stormwater management  | A, D, SR, WQ, F, H, N, OC, P, S, C, E, I     | NYSDOT,                      | <i>see Stormwater Management &amp; Erosion Control</i>  | -           |
| B        | <b>Riparian zone management</b>   |  |                              |   |             |
| B1       | Restoration - restore very severe streambank segments (see Appendix S) based on Cayuga Lake Watershed Streambank Inventory (2000) (see <i>Cayuga Lake Preliminary Watershed Characterization</i> ) using Watershed Stream Restoration Method (see Appendix S). Concentration is on segments of Big  | A, D, SR, DW, WQ, F, H, N,                   | SWCD, C, M, NYSDDEC,         | 3 miles/year for 10 years   | \$50/foot   |

|    |   |  |                 |                         |          |
|----|---|--|-----------------|-------------------------|----------|
|    | Salmon Creek, Cayuga Inlet, and Fall Creek.   | OC, P, S                                 | City of Ithaca, |                         |          |
| B2 | All municipalities that do not presently deal sufficiently with riparian corridors within local law should adopt ordinances defining riparian zone as "critical environmental area" requiring review of disturbances. Minimum size of the riparian corridor is 100 ft, with wider areas around more sensitive or valuable resources. At minimum no new development should be allowed on uninhabitable land subject to flood. Resource-related goal is to retain 60-70% of riparian corridor in native vegetation.<br><br>List of municipalities that deal with riparian corridors within local law (see Appendix S) | A, D, SR, WQ, F, H, N, OC, P, S, C, E, I | M, LO           | 20% within 5 years      | -        |
| B3 | All municipalities that do not presently deal sufficiently with flood plain development within local law should adopt ordinances prohibiting development in 100- year floodplain.<br><br>List of municipalities that deal with flood plain development within local law (see Appendix S)  | A, D, SR, WQ, F, H, N, OC, P, S, C, E, I | M, LO           | 1 municipality per year | -        |
| B4 | Limit stream crossings by utilities or roadways to 2 per km of stream channel. Develop guidelines for the location of stream crossings and siting.  | A, D, SR, WQ, F, H, N, OC, P, S, C, E, I | NYSDOT          | 1/year                  | \$25,000 |