

Water Quality Strategy for Highway Operations

Steuben County

April 2007

Steuben County Water Quality Coordinating Committee

This strategy was prepared by Southern Tier Central Regional Planning & Development Board (a member of the Steuben County Water Quality Coordinating Committee) with funding from the New York State Soil and Water Conservation Committee (Water Quality Mini-Grant for development and implementation of stormwater maintenance – good housekeeping strategies for highway operations).

Water Quality Strategy for Highway Operations Steuben County

INTRODUCTION

Steuben County covers 1,409 square miles and is traversed by thousands of miles of roads. It is possible that the county has more miles of roadside drainage than miles of stream. This extensive roadway and roadside drainage system has the potential to deliver sediment and other pollutants directly into streams. In addition to the water quality impacts, roadway erosion contributes to maintenance headaches for the responsible highway department.

Roadway maintenance in Steuben County is conducted by 48 separate entities: 2 city public works departments, 32 town highway departments, 12 village public works departments, 6 county highway garages, and 2 state maintenance offices. All of these departments have similar needs for improved management practices along road corridors and at highway garages.

The Steuben County Water Quality Coordinating Committee (WQCC) has developed this strategy to promote and facilitate the use of erosion control and maintenance techniques that save money while protecting and enhancing the county's lakes and streams. It will be implemented by the highway and public works departments operating throughout the county, with technical support and assistance from the Steuben County Soil and Water Conservation District (SWCD) and other members of the Water Quality Coordinating Committee.

CURRENT MANAGEMENT PRACTICES

Municipal and county highway departments were surveyed to document current implementation practices, problem areas, funding needs, and training needs. Surveys were sent to 47 highway departments (1 county, 2 cities, 32 towns, and 12 villages) and responses received from 28 (60% return). Unfortunately, a copying error led to 11 respondents only completing 2 pages of the 4-page survey (resulting in a 36% return for the sections about problem areas, funding needs, and training needs).

The 28 highway departments responding to the survey maintain a total of 1,191 miles of paved road and 824 miles of unpaved road. The current practices documented by the survey are presented in Appendix A and summarized below:

Snow and ice control

- All of the respondents reported using salt and/or a salt/sand mixture for snow and ice control. Many use more than one type of deicing material. These include:
 - Salt – 16 departments (57%)
 - Sand – 7 departments (25%)

Salt and sand – 21 departments (75%)
Calcium chloride – 2 departments (7%)
Salt enhancers during cold weather – 1 department (4%)
swp superm 1 – 1 department (4%)
Magic – 1 department (4%)

- Total reported salt use was 46,615 tons in 2004-05.
- The average annual rate of salt use per road mile was: 13 tons/mile/year. This ranged from a low application rate of 0.06 tons of salt/mile/year (T. Rathbone) to a high of 56 tons of salt/mile/year (T. Cohocton).
- Ten highway departments reported storing salt in the open on gravel or dirt.

Road surfaces

- Of the 824 miles of unpaved road covered by the survey, dust control was applied to 742 miles (90%).
- Dust control materials used include: oil and stone, salt brine, dust oil, AEOC, and magnesium chloride.
- All but one of the highway departments with paved roads report sweeping at least some of their roads.
- Of the 1,191 miles of paved road covered by the survey, 453 miles of road are swept (38%).
- Most road sweeping is done once per year (299 miles, 17 highway departments). Seven highway departments report sweeping 2-4 times per year (131 miles); 1 department sweeps 12 times per year (10 miles); and 1 department sweeps 20 times per year (12 miles).
- Only the City of Corning monitors the amount of material removed by street sweeping. They sweep 56 miles 4 times per year, removing approximately 560 tons of material.

Road ditches and banks

- Respondents report a total of 86 miles of road ditch that are protected with rock lining.
- Respondents reported cleaning 207 miles of road ditch in 2005. Only 65 miles of ditch were seeded and/or mulched (31%). Ditch stabilization was reported by only 7 of the 22 departments that cleaned ditches:
 - Seeded and mulched – 13 miles (6%); 4 highway departments
 - Mulched (not seeded) – 12 miles (6%); 2 highway departments
 - Seeded (not mulched) – 40 miles (19%); 2 highway departments
- In response to the question, “Would you do more seeding and mulching if resources were provided?” 15 highway departments answered yes. Types of assistance desired include: funding, mulching, manpower, equipment, materials, hydroseeding, and assistance from the County Soil and Water Conservation District (SWCD). Some highway departments are apparently unaware of the assistance available from the SWCD, which provides

equipment and labor for hydroseeding, hand seeding, and mulching if the municipality covers the cost of seed and mulch materials.

- Seventeen highway departments reported undertaking 51 road ditch/roadbank stabilization and drainage projects in 2005. Of those reporting costs, the average project cost was about \$57,000 (range from \$999 to \$527,127). Reported funding sources included: FEMA (25 projects), CHIPS (11 projects), and local sources.

Culverts and streams

- Seventeen highway departments reported installing, replacing, or repairing more than 168 culverts in 2005. Of those reporting costs, the average cost per culvert/project was about \$7,500 (range from \$225 for a driveway pipe to \$78,250). Although most of the costs were paid by municipal budgets, additional funding sources included: CHIPS (19 projects) and FEMA (6 projects).
- Nine highway departments reported undertaking 15 stream projects in 2005. Numerous additional stream restoration and stabilization projects were undertaken by the SWCD. Funding sources include FEMA Public Assistance, the Steuben County Streambank Stabilization Program (administered by the SWCD), and local highway department funds.

EXISTING CONDITION OF ROAD DITCHES AND BANKS

Roadside drainage systems are designed to remove excess water from the road corridor. In the process, they frequently serve as conduits conveying sediment and other pollutants directly into streams. Water quality impacts are most pronounced when unstable slopes and exposed soils result in significant erosion of sediment from the ditches themselves and adjacent roadbanks.

In 2002, the Upper Susquehanna Coalition conducted a Road Ditch and Roadbank Inventory to create a database of the locations and severity of eroded road ditches and roadbanks. Ditch and roadbank erosion were evaluated separately and classified as: stable, fair, good, or unstable. The existing data are summarized on the following page by sub-watershed.

- Of the 8.6 miles of road ditch assessed:
 - 2% was stable,
 - 26% was fair,
 - 56% was poor, and
 - 16% was unstable.
- Of the 3.0 miles of roadbank assessed:
 - 31% was stable,
 - 37% was fair,
 - 32% was poor, and
 - less than 1% was unstable.

Watershed	Road Ditch Assessment				Roadbank Assessment			
	Stable (ft)	Fair (ft)	Poor (ft)	Unstable (ft)	Stable (ft)	Fair (ft)	Poor (ft)	Unstable (ft)
Mud Creek	0	4,158	9,260	1,208	0	649	265	0
Meads Creek	105	4,235	4,998	250	3,350	3,195	3,016	27
Post Creek	0	2,352	6,867	3,736	0	0	1,164	0
Seeley Creek	0	978	3,328	1,684	0	1,196	538	0
Bennetts Creek	0	50	465	0	450	0	65	0
Colonel Bills Creek	110	275	595	500	620	860	0	0
Canisteo River	500	0	0	0	500	0	0	0
TOTAL	715	12,048	25,513	7,378	4,920	5,900	5,048	27

It should be noted that this inventory provides a snapshot assessment of road ditch and bank conditions and may no longer be applicable to the current circumstances. In some cases, the stability will have improved due to implementation of stabilization measures or vegetative growth (particularly for the ditches assessed soon after cleaning). In other cases, subsequent high flows or other circumstances may have had a detrimental impact on the observed stability.

RECOMMENDED MANAGEMENT PRACTICES

The recommended management practices for reducing the water quality impacts of highway operations in Steuben County are summarized below. Additional resources for implementing these practices are included in the *Highway Superintendent Roads & Water Quality Handbook, Edition III*. A copy of this handbook has been provided to each municipal highway department. The updated third edition includes additional information, updated resources, and organizational changes to facilitate access to relevant material. The Handbook sections applicable to the following recommendations are indicated in parentheses.

Plan your project (Handbook section: Project Planning)

Good design saves money: Properly designed and constructed road/stream crossings and roadways will lead to long-term savings by decreasing the amount of repairs and replacements that will be required “down the road.”

- Document the problem and determine the underlying causes.
- Evaluate alternatives and prepare a conceptual plan.
- Protect stream corridors, wetlands, and other areas that provide water quality benefits.

- Limit land disturbance and reduce erosion and sediment loss.
- Limit disturbance of natural drainage features and vegetation.
- Prepare a detailed plan, final budget, implementation schedule, and maintenance plan.

Obtain any necessary permits (Handbook section: Permits)

Even if no permit is required, you may still be responsible for a water quality violation. The state water quality standard for turbidity is: “No increase that will cause a substantial visible contrast to natural conditions.”

- Maintain a record of permit applications and activities (Permit Log).
- Allow sufficient time for obtaining permits.
- The County Soil and Water Conservation District provides assistance with environmental permits.

Manage road and right-of-way drainage (Handbook section: Road Drainage)

The three most important considerations in road construction and maintenance are: drainage, drainage, and drainage. Problems caused by poor drainage include rutting, cracking, potholes, erosion, washouts, heaving, flooding, and premature failure of roadway.

Land use changes anywhere in the watershed may alter drainage onto the road.

- Use high quality road materials to promote good drainage.
- Move water off road surfaces as soon as possible.
- Promote good subsurface drainage.
- Make sure that culverts are appropriately sized (the County Soil and Water Conservation District can help with calculating the amount of runoff).
- Use appropriate culvert type, alignment, and end treatments.
- Ditches are important: pay attention to the shape, side slope, fall, lining materials, capacity, and depth.
- Direct runoff into vegetated filter areas or rock-lined turnouts.
- Manage water entering the roadway (use bank benches; look beyond the right-of-way).
- Monitor and maintain all drainage ditches and structures.

Prevent erosion (Handbook sections: Project Planning; Erosion & Sediment Control; *Roadway and Roadside Drainage* manual in Road Drainage section)

Approximately 30 tons of material can be eroded from a mile of ditches before you can see the damage! To remove and replace 30 tons of material is a lot of work.

Timely re-vegetation of road ditches and banks is the single most effective deterrent to water pollution originating from roads and road ditches. Vegetation slows the flow of water, consumes water, encourages infiltration, and anchors the soil.

- Minimize areas of disturbance.
- Avoid concentrating runoff.
- Stabilize ditches and other disturbed areas as soon as possible.
- Keep runoff velocities low.
- Inspect and maintain erosion and sediment control practices.

Stabilize roadbanks (Handbook section: Bank Stabilization; consult with the County Soil and Water Conservation District)

To determine a stable slope angle, look at stable slopes nearby that have the same soil and cover.

Roots of established vegetative cover are “Mother Nature’s rebar.”

- If the bank is stable, don’t fool with it.
- Identify the cause(s) of unstable banks (bank material, slope, hydrology, vegetation, inappropriate maintenance practices, etc.).
- Select appropriate stabilization techniques, utilizing living plants whenever possible.
- Inspect and maintain new stabilization projects.

Manage chemicals on the roadway and in the garage (Handbook sections: Dust Control; Road Salt Management; Chemical Management; *Roadway and Right-of-Way Maintenance* catalogue in Maintenance section)

- Avoid over-application of dust control and deicing chemicals.
- Do not use waste products (such as crank case drain oil from engines) for dust control.
- Store road salt in a covered area.
- Wash vehicles in cold water without any additives. This can be done outside if the site is located away from streams, wetlands, storm sewers, or drainageways. If soap, detergents, or degreasing agents are used, wash water should be treated.
- Conduct vehicle maintenance inside, in an area without floor drains.
- Vehicle fueling areas should be designed to prevent stormwater runoff and spills (paved, covered, and located away from drainageways).
- Conduct a self-audit to confirm that fuel, used oil, and other materials are stored in compliance with Petroleum Bulk Storage Regulations.

- Spills should be cleaned up immediately. Dry clean up is almost always the best option. Report spills to DEC: 1-800-457-7362.

Protect streams and wetlands (Handbook sections: Streams and Wetlands; Beaver Control)

It is not unusual for human actions to disturb the balance between a stream's energy and its sediment load, resulting in increased erosion and/or increased deposition.

The easiest, most effective way to protect a stream is to maintain a strip of plants along the bank.

- Avoid directing runoff into surface waters. Consider re-profiling road ditches to direct water away from the stream crossing and into stable vegetated buffers (see technical bulletin for "Corman" Clearwater Crossings).
- Do not encroach on the stream channel or wetland.
- Minimize encroachment onto the floodplain. Consider using floodplain culverts or a high water bypass to provide a stable overflow area during extreme flow events.
- Avoid dredging, filling, channel straightening, or relocation.
- Remove garbage from streams. Remove natural debris when necessary to protect bridges or prevent flooding. Stream cleaning should be selective to retain the natural benefits of woody debris, which slows stream velocities, breaks up flow, and provides habitat.
- When dealing with a stream problem, identify the underlying causes. Treating the symptoms may only yield short-term benefits and may even cause more problems than it solves.
- Keep in mind that streams are complex systems. Consult with the County Soil and Water Conservation District before undertaking streambank protection, sediment removal, or other stream projects.
- Evaluate alternative techniques for managing beaver problems along roadsides. Trapping is not the only solution.

Inspect and maintain the road system (Handbook sections: Maintenance; *Roadway and Roadside Drainage* manual in Road Drainage section)

Proper maintenance and rehabilitation of existing culverts can be much more economical than replacement.

Any ditch work does two undesirable things if not managed and repaired. It exposes soil to erosion. And it may change the depth or shape of the ditch to an undesirable condition.

- Mark or inventory culverts so they do not get missed during inspections.
- Inspect culverts and stream crossings every year (at least every two years) and after high flow events. (Information about what to look for and a culvert inspection form are in the *Roadway and Roadside Drainage* manual.)

- Conduct ditch maintenance during dry conditions (late summer or early fall is usually best).
- When maintaining a ditch, determine if it needs cleaning (removal of small amounts of sediment and vegetation from the bottom) or reshaping (removal of large amounts of material to widen or deepen the ditch). Be sure to do the right maintenance.
- Clean or reshape only a section of ditch at a time, leaving intact vegetation in the downhill part of the ditch to capture sediment.
- When maintaining a ditch, place erosion protection or seeding every day and before any rain. (Have the erosion material ready before starting the job.) **Do not leave exposed substrates to wash downstream.**
- Unpaved road surfaces require periodic re-shaping to re-establish the crown and cross-slope and incorporate loose stones back into the road surface.
- Sweep paved roads and parking lots to remove pollutants.
- Clean storm drain systems regularly to reduce the amount of pollutants, trash, and debris in both the storm sewer system and in receiving waters.
- Roadside vegetation management should utilize techniques that maintain stabilizing root systems, preserve climax tree species (which are structurally strong), and establish low maintenance plants (selective thinning, selective mowing, seeding, pruning).

RECOMMENDED TASKS

Train highway department staff

In order to implement the recommendations in this strategy, highway superintendents and equipment operators need periodic training in the proposed management practices. Survey respondents identified the following training needs:

- Equipment operators need training to recognize why something is a problem and what to do to correct the problems
- Drainage
- Dirt and gravel road maintenance; how to grade a dirt road properly
- Road ditch stabilization

Many highway departments send staff to the Highway School offered by the Cornell Local Roads Program each June. In addition, the Southern Tier Central Regional Leadership Conference provides local training opportunities. This is an annual one-day training program for municipal staff and officials, which includes a series of 4 workshops targeting issues of interest to highway departments. It is recommended that each conference include at least one workshop on an issue impacting water quality. In addition, the Water Quality Coordination Committee recommends that at least one full day training session be offered locally each year to provide more in-depth training. Training topics should include:

- Roadway and roadside drainage (1-day workshop offered by Cornell Local Roads Program)

- Erosion and sediment control (including bank stabilization)
- Stream management
- Dirt and gravel road maintenance
- Deicing and dust control practices
- Chemical management

Implement demonstration projects

Demonstration projects utilizing new or innovative management practices provide local examples of both the benefits and limitations of those practices. The Soil and Water Conservation District will continue to look for opportunities to demonstrate recommended practices within Steuben County. Recommended demonstration projects include:

- Use of geotextile products in road ditches.
- High-water bypass (low section of road designed to serve as a stable overflow area during high flows) – proposed location on Hamilton Road in the Town of Thurston.
- Driving surface aggregate with the particle size distribution developed by Penn State’s Center for Dirt and Gravel Road Studies (recommended for use on unpaved roads in Pennsylvania) – In addition to evaluating the effectiveness of this product, this demonstration project would involve working with local gravel companies to provide it.
- Stream stabilization techniques – proposed location in Bennetts Creek off of State Route 248 in the Town of Greenwood.

Implement drainage improvements and roadbank/road ditch stabilization

Steuben County has a history of road and shoulder damage due to failure of roadbanks and erosion of roadside ditches. Unstable sites are also significant sources of sediment pollution to waterbodies in Steuben County. Stabilizing soils and banks within road corridors is a high priority for implementation throughout the county. In the past some of these problem areas have been addressed with FEMA Public Assistance funding when flooding resulted in catastrophic failure. Many projects have also been undertaken to proactively address these problems before the next flood.

Increased implementation of drainage improvements and roadbank/road ditch stabilization requires a commitment of financial resources. Each highway department that listed priority problem areas on the survey also indicated that “inadequate funding” is an impediment to resolution. Additional impediments include time constraints, staffing, and the need for design assistance. Technical and design assistance is provided by the SWCD, which is straining to fulfill numerous requests for assistance with limited staff. It is recommended that highway department staff obtain additional training in roadway/roadside drainage and erosion/sediment control in order to reduce the demands on SWCD staff for technical assistance.

A partial list of sites requiring drainage improvements or stabilization (based on highway department surveys, roadbank/road ditch assessments, and knowledge of SWCD staff) is presented below. Some of these sites may no longer represent problems.

Implementation requires:

- Project funding
- Training of municipal highway staff
- Additional SWCD staff to provide technical and design assistance

Municipality	Location	Problem	Estimated Cost
Steuben County	CR 8 – Avoca-Wheeler Rd.	Bank/stream/road	\$25,000
	CR 101 – Borden-Elkland Rd.	Bank/stream/road	\$150,000
	CR 60 – Christian Hollow-West Union Rd.	Bank/road	\$50,000
	CR 80 – Tracy Creek Rd.	Stream/bank/road	\$150,000
	CR 46 – Windom Hill-South Dansville Rd.	Bank/road	\$75,000
	CR 128 – Canisteo-Canisteo Center Rd.	Bank/road	\$75,000
	CR 63 – Jackson Hill Rd.	345 feet unstable ditch (2002)	
	CR 30 – Swale Rd.	155 feet unstable ditch (2002)	
V. Addison	Lower South St.	Landslide below road (road sliding)	\$50,000
V. Arkport	Oak Hill Street	Storm sewer system needed	\$167,300
	Main Street	Drainage improvements needed	
T. Avoca	Olmstead Hill Rd.	Road bank	\$5,000
	Cosgriff Rd.	Road bank	\$25,000
	Waterbury Hill Rd.	Ditch stabilization	\$5,000
	VanAucker Rd.	Road bank	\$10,000
V. Avoca	Various problem areas throughout village	Replace roadside drainage with drop inlets and pipe	
T. Bath	Mills Rd.	Ditch erosion	
	Van Delinder Rd.	Ditch erosion	
	Moore Rd.	Ditch erosion	
	Cochrane Rd.	Ditch erosion	
	Telegraph Rd. (by quarry)	Road ditch erosion	
T. Bradford	Parker Rd.	Culvert outlet stabilization needed	
T. Cameron	McMaster Rd.	Culvert outlet stabilization needed	
T. Campbell	Stony Ridge Rd.	Culvert outlet stabilization needed	
	Manning Ridge Rd.	Culvert outlet stabilization needed	
T. Canisteo	Roosa Rd.	Rock riprap maintenance	

Municipality	Location	Problem	Estimated Cost
T. Caton	Birch Creek Rd.	528 feet unstable ditch (2002)	
	Kelly Hill Rd.	100 feet unstable ditch (2002)	
	Hamilton Rd.	1056 feet unstable ditch (both sides of road, 2002)	
T. Corning	Brown Hollow Rd.	Landslide into road	
	Collins Rd.	Culvert pipe stabilization needed	
T. Freemont	Hungry Hollow Rd.	Landslide below road	
T. Hartsville	Slate Creek Rd.		
	Acker Rd.		
	Fall Creek Rd.		
T. Hornby	McLaughlin Rd.	27 feet unstable bank (2002)	
	Chambers Rd.	1408 feet unstable ditch (both sides of road, 2002)	
	Chambers Rd.	2328 feet unstable ditch (2002)	
T. Howard	Parker Rd.	Ditch stabilization	\$15,000
	Buena Vista Rd.	Ditch and bank	\$20,000
T. Lindley	Scott Rd.	Culvert outlet stabilization needed	
T. Thurston	Tucker Rd.	Erosion of bank and road shoulder	
T. Tuscarora	Addison Back Rd.	Slope failure	
	Bunker Hill Rd.	Road settled for approx. 250 feet	
	Tinker Town Rd.	Slope failure and road settlement	
	Thompson Rd.	Road settlement	
T. Urbana	East Lake Road	Retaining wall	
T. Wayne	Silsbee Rd.	Road ditch erosion	
	Tainokes Rd.	Road ditch erosion	
	Fleet Rd.	1208 ft. unstable ditch (2002)	
	East Lake Road, Keuka Village	3 culverts need replacement with stabilization of headwalls	

Obtain funding for salt barns

The Steuben Department of Public Works and many municipalities have constructed salt barns for protected storage of deicing materials. Some are shared facilities used by more than one highway department. However, many departments still utilize open storage locations, where soluble salts come in contact with stormwater and can contaminate groundwater and surface waters. Funding is needed to enable these highway departments to construct enclosed storage facilities. Salt barns are needed for the following highway departments (based on highway department surveys and knowledge of SWCD staff):

- Town of Addison
- Town of Avoca
- Town of Bath

- Village of Bath
- Town of Cohocton
- Town of Dansville
- Town of Hartsville
- Town of Hornellsville
- Town of Howard
- Town of Jasper
- Village of Painted Post
- Town of Troupsburg
- Town of Wayland
- Town of Wheeler
- Town of Woodhull

Provide municipalities with seeding and mulching assistance

Timely seeding and mulching of disturbed soils is strongly recommended to reestablish protective vegetation, and thus prevent the sediment pollution and erosion damage that can result from exposed soils. The highway department survey results confirm observations that many departments do not stabilize soils after cleaning or reshaping ditches. Many of the respondents indicated that they would do more seeding and mulching if resources were provided.

The Steuben County SWCD does assist municipalities with stabilization of disturbed soils. In fact, they recently purchased a new hydroseeder to support these efforts. This assistance includes hydroseeding, loaning equipment, and providing manpower. The municipality is generally responsible for the cost of seed and materials. The SWCD is committed to continuing this assistance at the lowest possible cost to the municipalities, to the extent that the budget and staffing levels permit. There is clearly a need spread the word about this service so that it can be utilized by more municipal highway departments. This may lead to additional staffing needs for the SWCD to meet the increased demand.

Implementation requires:

- Training of municipal highway staff
- Increased awareness of the seeding/mulching assistance provided by the SWCD
- Increased resources to enable the SWCD to maintain and increase this assistance

Implement stream stabilization projects

The erosion and sediment deposition associated with unstable stream systems poses numerous threats to the county's road infrastructure. Some attempts to address these problems (by dredging, channel straightening, or other interventions) have further destabilized stream systems, contributing to even more problems. In addition, land use practices (that alter the amount and timing of runoff draining into the streams) can lead to channel adjustments that threaten infrastructure.

The SWCD has provided extensive assistance with managing streams at bridges and other locations where they impact the road. The county provides cost sharing for stream projects through the Streambank Stabilization Program, which is administered by the SWCD. Under this program, the county provides 75% funding, with the municipality or private property owner responsible for the remaining 25%. This is an extremely successful program – The requests received to-date for 2007 projects are more than double what can be accomplished with the allocated budget. In addition, many stream projects have been implemented with FEMA Public Assistance funding following declared flood disasters. The current delivery of stream restoration and stabilization projects is straining the SWCD staff resources.

A partial list of sites where roads and bridges are threatened by stream instability (based on highway department surveys and knowledge of SWCD staff) is presented below.

Municipality	Location	Problem
Steuben County	CR 27	Check dams full
	CR 70A	Check dams full
	CR 68	Check dams full
V. Arkport	Lime Kiln Creek	Bank stabilization with rock riprap needed
T. Avoca	Owens Road	River is taking shoulder off road
	Cosgriff Road	Losing shoulder
	Van Aucker Road	Losing shoulder
T. Bath	Sinclair Rd	Creek same elevation as road
	E. Union Rd.	Creek and road both in very narrow gully
	Culver Creek Rd.	Creek moving toward road
	Thomas Rd.	Creek and road both in very narrow gully
T. Canisteo	Colonel Bills Creek	Excessive gravel removal with shoal shaping
T. Hartsville	Slate Creek	Washing banks close to road
	Fall Creek	Washing banks close to road
T. Lindley	Watson Creek Rd.	Washing road bank away
T. Thurston	Tucker Rd.	Erosion of road bank
	Starr Rd.	Streambed is full of sediment above and below a culvert and doing damage to the road system every year
T. Tuscarora	Addison Back Rd.	Slope failure
T. Urbana	Glenbrook Rd.	Excessive gravel removal with shoal shaping
	Randallville Rd.	Excessive gravel removal with shoal shaping
	Cold Springs Rd.	Excessive gravel removal with shoal shaping
T. Wheeler	Hemlock Rd.	Creek erosion – 30 feet

Implementation requires:

- Continued funding (at an increased level if possible) of the Steuben County Streambank Stabilization Program
- Continuation of the 75% county funding level for Streambank Stabilization Program projects
- Project funding for large-scale restoration needs
- Training of municipal highway staff
- Additional training for SWCD staff to develop improved stream management expertise
- Additional SWCD staff to provide technical and design assistance

Reduce drainage impacts from off right-of-way land uses

Drainage alterations and land use changes outside of the road right-of-way can have detrimental impacts on the roadway drainage system. The highway department survey asked if timber harvesting or development activities have had a negative impact on the roads. Six respondents reported damage:

- Steuben County, County Route 44 (River Road) – excessive runoff from development
- Town of Bath, Velie Road – road damage due to development
- Town of Lindley, Preston Road – excessive runoff onto road from timber harvesting
- Town of Lindley, Steamtown Road – excessive runoff onto road from timber harvesting
- Town of Thurston, South Hill Road – road damage due to timber harvesting
- Town of Tuscarora, Bunker Hill Road – road damage due to development
- Town of Urbana, Randallville Road – altered runoff patterns due to timber harvesting

In order to promote more responsible land use practices that minimize the potential for drainage impacts on the roads, streams, and neighboring properties, the WQCC proposes the following:

- Conduct local stormwater management training for developers and construction personnel.
- Provide stormwater management training and technical assistance to municipalities in order to (1) support the state permit for stormwater management from construction activities, (2) promote increased local review of stormwater management plans, (3) encourage increased local oversight of drainage and sediment from construction sites, and (4) assist with development of local stormwater management regulations where desired.
- Encourage municipal adoption of stream setback requirements that prevent development within stream corridors and thus reduce the potential for disrupting stream systems.
- Encourage municipal adoption of driveway specifications that require diversion or interception of driveway drainage.
- Conduct local training on timber harvesting practices that minimize erosion, concentrated flow, and stream impacts from logging operations.
- Assist municipalities with developing strategies for reducing offsite impacts from timber harvesting (education, training, registration, etc.).

- Provide technical support and funding (where appropriate) for voluntary implementation of wetland creation/restoration and other practices that retain runoff.

Obtain funding for equipment needs

Some departments have identified equipment needs that would facilitate improved implementation of the recommendations in this strategy:

- Steuben County Soil and Water Conservation District – track mounted excavator, small equipment trailer
- Steuben County Highway Department – can always use more equipment to do this work
- Town of Avoca – loader, roller
- Town of Tuscarora – excavator, roller, heavy trucks, dozer
- Town of Urbana – access to a track hoe
- Town of Wayne – track hoe

One survey respondent indicated that a track hoe is needed for stream projects and suggested that one could be made available for use through a shared services program. There may be other opportunities for sharing equipment.

Support the Chesapeake Bay Program pollution reduction efforts

Most of Steuben County is in the Chesapeake Bay Watershed. Because water quality in the Bay is impaired, New York (along with other states in the watershed) is developing Tributary Strategy for reducing the delivery of sediment, nitrogen, and phosphorus to the Chesapeake Bay. This strategy recommends implementation of improved management practices for a variety of activities, including highway management. Documentation of “best management practices” provides “credit” in the Chesapeake Bay watershed model toward New York’s pollution reduction goals. Because of the large number of highway departments operating in the watershed, the Tributary Strategy does not currently recommend that individual departments provide documentation of highway management practices. However, it should be noted that the Chesapeake Bay is a candidate for Total Maximum Daily Load (TMDL) limits to be applied throughout the watershed in 2011. If this occurs increased implementation and documentation may be required. In particular, documentation of street sweeping activities (including the amount of material removed) could be requested.

It is recommended that highway departments in Steuben County support the efforts of the Chesapeake Bay program (while protecting their roads and local water quality) by:

- Learning about New York’s Chesapeake Bay Tributary Strategy and how it may impact Steuben County; and
- Implementing the water quality protection recommendations in this strategy.

REFERENCES

- *Highway Superintendent Road and Water Quality Handbook, Edition III*
- *Water Quality Strategy for Steuben County (May 2002)*
- *Hazardous Materials Response Plan, Annex H of Steuben County Comprehensive Emergency Management Plan.*

APPENDIX A: HIGHWAY DEPARTMENT SURVEY RESULTS

- **Current Practices – Snow and Ice Control**
- **Current Practices – Road Surfaces**
- **Current Practices – Road Ditches and Banks**
- **Current Practices – 2005 Projects**

Current Practices -- Snow and Ice Control
 Reported on Water Quality Survey for Highway Departments in Steuben County

Municipality	Road Miles paved	Road Miles unpaved	Miles Plowed paved	Miles Plowed unpaved	Deicing Material	Salt Applied 2004-05 tons	Salt Applied 2003-04 tons	Salt Use ton/mi/yr	Salt Storage
Steuben County	680	0		0	salt, sand, salt and sand	29,665			closed storage area, on pavement
T. Addison	11.02	18.88	11.02	18.88	salt and sand	350	300	11	in the open, on gravel/dirt
V. Addison	10	0	10	0	salt and sand	105	105	11	closed storage area
V. Arkport	3.5	0	4.8	0	salt	111	160	28	closed storage area, on gravel/dirt
T. Avoca	21.69	29.03	21.69	17.28	salt and sand	200	200	5	in the open, on gravel/dirt
V. Avoca	5.1	0	5.1	0	salt, sand	225	225	44	closed storage area, on pavement
T. Bath	51.46	92.74	56.07	82.99	salt, salt and sand, calcium chloride, salt enhancers	1220	930	8	in the open, on gravel/dirt
T. Cameron	4	60.92	25.5	56	salt, salt and sand	800	1000	11	closed storage area, on pavement
V. Canisteo	10.47	0	10.47	0	salt and sand	16	16	2	closed storage area, on pavement
T. Cohocton	31.08	50.7	37.08	36.7	salt, sand	4139		56	in the open, on gravel/dirt
C. Corning	64	0	64	0	salt, sand	2000	1800	30	closed storage area, on pavement
T. Corning	44	11	55.6	11	salt, sand, salt and sand	700	1000	13	closed storage area, on concrete
T. Dansville	20	50	20	40	sand, salt and sand, calcium chloride	300	350	5	in the open, on gravel/dirt
T. Hartsville	0	42	0	30	salt, sand	75	100	3	in the open, on gravel/dirt
T. Howard	25	68	25	56	salt and sand	500	600	7	in the open, on gravel/dirt
T. Lindley	18	55	18	55	salt, sand, salt and sand	250	350	4	closed storage area, on pavement
V. Painted Post	12	0	12	0	salt and sand	60	70	5	in the open, on pavement
T. Pulteney	33	20	45.6	16	salt, salt and sand	2700	2300	41	closed storage area, on pavement
T. Rathbone	0	46.22	0	44	salt and sand	3	2	0	closed storage area, on pavement, stockpiled outside

Current Practices -- Snow and Ice Control
 Reported on Water Quality Survey for Highway Departments in Steuben County

Municipality	Road Miles paved	Road Miles unpaved	Miles Plowed paved	Miles Plowed unpaved	Deicing Material	Salt Applied 2004-05 tons	Salt Applied 2003-04 tons	Salt Use ton/mi/yr	Salt Storage
V. Riverside	1	0	1	0	salt	6	8	7	none
T. Thurston	17	37	17	29	salt and sand	350	350	8	closed storage area, on pavement
T. Troupsburg	9	73.5	27	65.5	salt, salt and sand	450	500	5	closed storage area, on pavement
T. Tuscarora	11.34	39.53	21.34	39.53	salt and sand	100		2	closed storage area, on concrete
T. Urbana	27.2	34.63	27.2	30	salt and sand	300	300	5	closed storage area, on pavement
T. Wayland	50	6	50	4	salt, salt and sand, swp superm 1	350	400	7	in the open, on gravel/dirt
V. Wayland	10	0	10	0	salt, magic	440	390	42	closed storage area, on pavement
T. Wayne	13	20			salt, salt and sand	800			closed storage area, on pavement
T. Wheeler	8	69	8	66	salt and sand	400	450	6	in the open, on gravel/dirt
TOTALS	1,191	824	583	698		46,615	11,906	13 (avg)	

Current Practices -- Road Surfaces
 Reported on Water Quality Survey for Highway Departments in Steuben County

Municipality	Dust Control miles	Dust Control material	Road Sweeping miles	Road Sweeping times per year	Road Sweeping amount removed
Steuben County	0	AEPM oil, some calcium chloride	3	1	not monitored
T. Addison	2	oil and stone	1	1	not monitored
V. Addison	0		10	12	not monitored
V. Arkport	0		0		
T. Avoca	29.03	salt brine	21.69	2	not monitored
V. Avoca	0		5.1	2	minimal
T. Bath	92.74	salt brine on all unpaved roads; dust oil in front of homes	51.46	1	not monitored
T. Cameron	60.92	salt brine	4	2	not monitored
V. Canisteo	0		10.47	3 to 4	not monitored
T. Cohocton	50.7	salt brine	31.08	1	not monitored
C. Corning	0		56	4	approx. 560 tons
T. Corning	5	AEOC	44	1	not monitored
T. Dansville	50	salt brine	20	1	not monitored
T. Hartsville	42	salt brine	0		
T. Howard	68	brine	25	1	not monitored
T. Lindley	55	salt	18	1	not monitored
V. Painted Post	0		12	20	not monitored
T. Pulteney	2	dust oil	30	2	not monitored
T. Rathbone	6	oil and stone	spots	1	not monitored
V. Riverside	0		0.5	1	not monitored
T. Thurston	37	salt brine	8	1	not monitored
T. Troupsburg	73.5	salt brine	3	1	not monitored
T. Tuscarora	40	dust oil, salt brine	5	1	not monitored
T. Urbana	34.63	salt brine, some dust oil	27.2	1	not monitored
T. Wayland	4	magnesium chloride, salt brine	50	1	not monitored
V. Wayland	0		4	2	not monitored
T. Wayne	20	salt brine	4	1	not monitored
T. Wheeler	69	brine	8	1	not monitored
TOTALS	742		453		

Current Practices -- Road Ditches and Banks
 Reported on Water Quality Survey for Highway Departments in Steuben County

Municipality	Rock Lining	Ditches Cleaned	Seed & Mulch	Mulch Only	Seed Only	Seeding/Mulching Comments
	miles of ditch	miles in 2005	miles of ditch in 2005	miles of ditch in 2005	miles of ditch in 2005	
Steuben County	15	28	6	0	0	
T. Addison	2	2	0	0	0	Would like assistance with mulching
V. Addison	2	1	0	0	0	Would do more if resources were provided
V. Arkport	0.25	0				
T. Avoca	4.03	10	0	0	10	Would do more if funding were provided
V. Avoca	0	1	0	0	0	
T. Bath	12	15	0	0	0	5 miles of ditch cleaning due to 2004 flood
T. Cameron	10	10	0	0	0	Would do more if resources were provided
V. Canisteo	0	0				
T. Cohocton	0	10	0	0	0	Would like SWCD assistance
C. Corning	0	0				
T. Corning	5	2	0.02	0	0	
T. Dansville	2.5	15	0	1	0	Would do more if resources were provided
T. Hartsville	0	20	0	0	0	Would <u>not</u> do more if resources were provided
T. Howard	5	30	0	0	30	
T. Lindley	0	15	0	0	0	Would do more if help were provided
V. Painted Post	0	0.5	0	0	0	Only 1 mile of village road has ditches
T. Pulteney	10					Would like hydroseeding & financial assistance
T. Rathbone		spots	0	0	0	Would like SWCD to mulch for towns
V. Riverside	0	0				No road ditches in village
T. Thurston	1.5	5	0	0	0	Would do more if funding were provided
T. Troupsburg	1	8	0	0	0	Usually seed some. Would do more if resources were provided.
T. Tuscarora	8	10	4	0	0	Would do more if manpower, equipment, and materials were provided
T. Urbana	6	13.5	2.65	10.85	0	Would like hydroseeding assistance
T. Wayland	0	1	0	0	0	
V. Wayland	0	0				
T. Wayne		4	0	0	0	Would do more if resources were provided
T. Wheeler	2	6	0	0	0	Would like cost share assistance
TOTALS	86	207	13	12	40	

Current Practices -- 2005 Projects
 Reported on Water Quality Survey for Highway Departments in Steuben County

Municipality	Ditch/Roadbank/Drainage Projects 2005	Culvert Projects 2005	Stream Projects 2005
Steuben County	CR 92 - ditch/slopes \$75,000 CR 65 - ditch/slopes/road \$250,000 CR 61 - ditch/slopes/road \$527,127 CR 112 - ditch/slopes/road \$361,189 CR 100 - ditch/slopes/road \$195,519	CR 76 - recycling project \$42,000 CR 86 - box culvert \$50,189 CR 106 - box culvert \$78,250 CR 48 - pipe \$41,212 CR 61 - pipe \$68,823	Bennetts Creek - stream restoration Colonel Bills Creek - stream restoration Purdy Creek - stream restoration
T. Addison	Irish Hill Rd. - rock Dininny Rd. - rock Gosper Rd. - rock \$5,550 Aumick Rd. - rock Ackerson Rd. - rock Rouse Rd. - rock John Rial Rd. - rock	Irish Hill Rd. - replace pipe & headwall Dininny Rd. - add to pipe & headwall Aumick Rd - head wall Miller Rd. - headwall	
V. Addison	South St. - rock \$90,000		
V. Arkport			
T. Avoca	Michigan Hollow - bank stabilization \$7,868 Fairbrother & Van Aucker - ditch \$12,518 Owens Rd. - ditch \$1,238 Bauter Rd. - bank stabilization \$999 Wessels Hill Rd. - bank stabilization \$2,407	Wagner Hill Rd. - replacement \$867 Loucks Pond Rd. - replacement \$1,131 Michigan Hollow Rd. - replacement \$1,139 Olmstead Rd. - replacement \$1,139 Wagner Hill Rd. - replacement \$4,973	
V. Avoca		Installation of drop inlets and 160' culvert pipe to fill in ditches	
T. Bath	Whitcomb Rd. - road ditch & bank stabilization	Windfall Rd. - replacement \$17,000 Windfall Rd. - replacement \$12,000 Faucett Rd. - replacement \$12,000 Chamberlain Rd. - replacement \$14,000 Stratton Rd. - replacement \$14,000 Sinclair Rd. - replacement \$18,000 Sinclair Rd. - replacement \$12,000 Installed about 15 new driveway pipes Replaced about 40 cross/driveway pipes	Culver Cr. Rd. - streambank stabilization Tucker Rd. - replaced bridge \$100,000

Current Practices -- 2005 Projects
 Reported on Water Quality Survey for Highway Departments in Steuben County

Municipality	Ditch/Roadbank/Drainage Projects 2005	Culvert Projects 2005	Stream Projects 2005
T. Cameron	Gulf Rd. - clean & riprap ditch \$25,000 Swale Rd. - clean & riprap ditch \$14,000 Oak Hill Rd. - clean & riprap ditch \$9,000 McMaster Rd. - road bank pipe outlet rock \$8,000 McMaster Rd. - clean & riprap ditch \$8,000	Witcus Rd. - replacement \$5,000 Clinton Rd. - replacement \$3,000 Oregon Rd. - replacement \$3,000 Oak Hill Rd. - replacement \$6,000 Stone House Rd. - replacement \$5,000 Benedict Rd. - replacement \$6,000	McMaster Rd. - clean creek \$16,973
V. Canisteo			
T. Cohocton			
C. Corning			
T. Corning	Brown Hollow Rd. - road stabilization \$30,000	Charles St. \$3,000 Charles St. \$800	
T. Dansville	Reddy Hollow Rd. - widening road		Kurtz Holl. Rd. - streambank stabilization
T. Hartsville	Slate Creek Rd. Acker Rd.		
T. Howard	Spencer Hill Rd. - rock lined ditch \$20,000		
T. Lindley	Clendenning Creek Rd - stone on bank Welty Rd. - stone on bank	Davis Rd - stone inlet and outlet	Welty Rd. - channel stabilization Clendenning Cr. Rd.-channel stabilization
V. Painted Post			
T. Pulteney		Replaced or installed 20 culverts	Townline Rd. - fix wingwall and repair box culvert \$2,500
T. Rathbone	Hubbard Rd. - riprap \$2,832 Saunders Rd. - riprap Chappel Rd. - riprap \$11,295	Hubbard Rd. - 10 culverts \$19,699	
V. Riverside			
T. Thurston	Smith Rd. - bank and ditch stabilization Crane Rd. - bank and ditch stabilization Starr Rd. - bank and ditch stabilization	Starr Rd. - replace 3 pipes Hanrahan Rd. - replace 2 pipes Tucker Rd. - pipe replacement Numerous sites - headwall replacement, outlet protection, riprap	
T. Troupsburg	Prutsman Rd. - road ditch \$12,000 Spur Rd. - road ditch \$7,000	Metz Rd. - replacement \$4,370 Prutsman Rd. - replacement \$11,000 Hunter Rd. - replacement \$5,500 Townwide - replacement \$18,000	Potter Rd. - rock placement \$30,000 State Rt. 36 - clean creek \$3,000 State Rt. 36 - clean creek \$4,500

Current Practices -- 2005 Projects

Reported on Water Quality Survey for Highway Departments in Steuben County

Municipality	Ditch/Roadbank/Drainage Projects 2005	Culvert Projects 2005	Stream Projects 2005
T. Tuscarora	Le Munyan Hill Rd. - road reconstruction Bottum Hill Rd. Hamilton Rd.	Le Munyan Hill Rd. - culvert Addison Back Rd. - culvert	Tuscarora Creek - slope protection
T. Urbana	Cold Springs Rd. - stack rock bank stabilization Hutches Rd. - 600 ft. bank removal, seeded, mulched \$2,500	E. Lake Rd. - replace crossover pipe \$500 GH Taylor Mem. Dr. - replace crossover liner \$2,309 Coryell Rd. - replace crossover pipe \$1,700 Replace 8 driveway pipes \$3,300 Install 3 new driveway pipes \$1,100	
T. Wayland		Campbell Rd. - install 2 pipes \$4,000 Wearkley Rd. \$1,000 Pfaff Hollow Rd. \$1,000 Emo Rd. - 2 culverts \$1,500 Sawdust Rd. - \$1,000 Brown Rd. \$2,000	
V. Wayland			
T. Wayne		East Lake Rd. - headwall \$29,000	
T. Wheeler	Hungry Hollow Rd. - ditching Harrisburg Hollow Rd. - ditching Hemlock Rd. - ditching Fritz Hill Rd. - ditching Bauter Rd. - ditching Clark Hill Rd. - ditching Randallville Rd. - ditching Total cost \$89,000	Hungry Hollow Rd. - culvert Dinehart Rd. - culvert Stickney Rd. - 2 culverts Mutton Hollow Rd. - culvert Stryker Rd. - 2 culverts Shader Hill Rd. - 3 culverts West Creek Rd. - culvert Gardner Rd. - culvert repair Bates Rd. - culvert Carey Rd. - culvert Colegrove Hill Rd. - 2 culverts Total cost approximately \$60,000	Hungry Hollow Rd.