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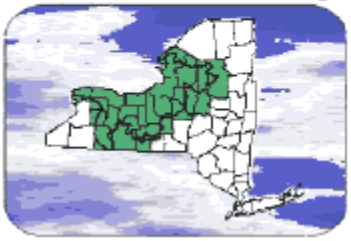

The Newsletter of the
Finger Lakes - Lake Ontario Watershed Protection Alliance
(An Affiliate of the Finger Lakes Association, Inc.)

Published by The Water Resources Board

SPRING 1999 VOL. VII, NO. 2

A Technique for Identifying Pollution Sources in a Watershed: Stressed Stream Analysis Revisited

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Introduction

Freshwater resources have historically played an instrumental role in com- munity development and economic sustainability. Over the last four decades, a concerted effort has been made to protect vital water resources of considerable value through the enactment of legislation (like the Clean Water Act) and the development of programs and initiatives (such as Phosphorous Abatement Program for the Great Lakes) to be carried out by agencies such as the Environmental Protection Agency. Although point sources of pollution are still a major water quality concern, progress has been made through enforcement of regulatory programs and technological innovations. Attention has shifted in recent years to nonpoint sources of pollution to lakes and rivers; that is, the extent to which various land-use practices in a watershed contribute pollutants that cumulatively degrade the receiving water body. A difficulty in dealing with nonpoint source pollution arises in how to economically identify sources and types of pollutants in large watersheds that cover hundreds of square miles.

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An Assessment Tool

We first wrote about an approach to identifying nonpoint sources of pollution in a lake watershed in a 1993 issue of Waterworks, a publication of the New York State Federation of Lake Associations. This approach, called stressed stream analysis, is used to identify and prioritize sub-watersheds by their relative contribution to the deterioration of the lake ecosystem and, subsequently, to locate point and nonpoint sources within priority sub-

watersheds. Once sources are identified on a sub-watershed basis, site-specific remedial actions and best management practices can be designed and implemented having optimal beneficial impact on the water body.

Since 1989, we have applied this economical and scientific technique to assess eleven watersheds in New York State in conjunction with local organizations (including county soil and water conservation districts, health departments, watershed task forces, and lake associations). The approach may be used for other watersheds where water quality deterioration is evident, but the causes of the problem are unknown or unconfirmed. Stress stream analysis fits within the comprehensive watershed management process (undertaken locally for an increasing number of New York State lakes) in the early stages of data collection and problem definition. Stress stream analysis is an excellent tool for guiding cost-effective management decisions based on quantitative information from the local setting.

What is Stressed Stream Analysis?

Stressed stream analysis is an integrative, comprehensive approach for determining the environmental health of a watershed and its constituents. Stressed stream analysis identifies individual sources of pollution in a lake watershed, and assesses their extent and severity. A watershed assessment using this technique is conducted in two phases: 1) priority ranking of sub-watersheds and 2) segment analysis.

Prioritizing Sub-watersheds

In the first phase, losses of nutrients and soils from a watershed to a lake, or loadings, are calculated by monitoring tributary discharge and concentrations. Minimally, non-event sampling should be monthly and extend for a period of at least a year, but any sampling regime must consider hydrometeorologic events. In many watersheds in western and central New York, over 80 percent of some pollutants, especially particulate fractions, are washed off the watershed during rain and meltwater events. Event sampling can be done manually, but automated, event-responsive samplers are ultimately more efficient when labor costs are considered. Mean daily loads, normalized for the area of the sub-watershed associated with the tributary, are calculated for each variable and graphed for each sub-watershed. The graphs show which, if any, sub-watersheds are delivering excessive amounts of pollutants to the lake compared to other sub-watersheds. The sub-watersheds can be prioritized based on loadings; those sub-watersheds with relatively high loadings may become candidates for Phase Two, or segment analysis.

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Targeting Sources Along a Stream

Because nutrients are easily dissolved in water, and a flowing creek transports suspended solids (like soil), pollutants can be traced back to their points of origin along a tributary through systematic stream monitoring. Segment analysis is a technique that divides the affected sub-watershed into small, distinct geographical units. Samples are taken at the beginning and end of each stream segment to determine if a source arises within that reach. If segment analysis indicates a new source is present, the cause and location of either a point or nonpoint source is determined by inventorying land uses along the segment. Segment analysis sometimes leads to an easily identified source, such as a stormwater drainage pipe extending out of a streambank. Other times the sources are less obvious, but careful inventory of the area can reveal problem(s), such as failing septic systems, runoff from a barnyard, etc.

With completion of both phases of stressed stream analysis, actual data is generated — as opposed to an estimate from a computer simulation model — that allows 1) ranking of sub-watersheds by amounts of nutrients and soils lost from the watershed to the lake and 2) identification of specific sources within those sub-watersheds. These data provide insight to answer several watershed management questions: Are nutrients being lost during hydrometerological events only or also during baseline conditions? What season of the year does maximum loss from the watershed or loading to the lake occur? Are losses high or low compared to other watersheds in New York State? Are losses from agricultural, suburban or urban settings? Best management practices and remediation strategies can be individually tailored to pollution sources on a sub-watershed basis.

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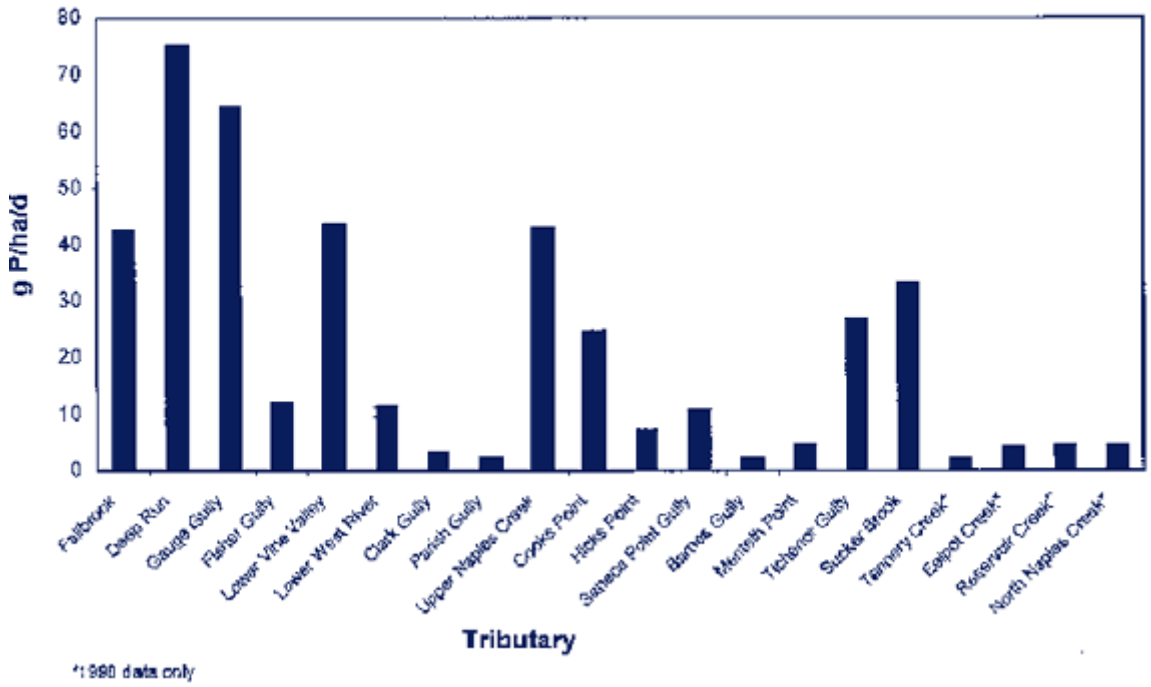
Presented here are two local applications of stress stream analysis in western and central New York assisted by scientists from the Center for Applied Aquatic Sciences and Aquaculture at the State University of New York at Brockport.

Figure 1. Phosphorus loss from Canandaigua Lake tributaries during precipitation events, 1997-1998 (n=10).



*1998 data only

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Assessing Loadings to Canandaigua Lake

Besides the obvious aesthetic value of one of the most scenic Finger Lakes, properties associated with the Canandaigua Lake are valued in excess of $600 million, and lake-related tourism sustains an estimated 4,000 jobs and annual payroll in excess of $40 million. A community-initiated action group, the Canandaigua Lake Watershed Task Force, expressed concern about impacts on the lake from various land-use practices in the watershed. Nonpoint and point source pollution from various land uses within the Canandaigua Lake watershed have potential to significantly alter the water quality of the lake and reduce its value as a resource. Identification of existing sources within the many sub-watersheds of Canandaigua Lake, followed by implementation of remedial and preventative measures,

would serve to protect the lake's high water quality. To the Task Force, where to begin and how to identify pollution sources within the 174 square-mile watershed were daunting questions.

In 1998, we began work with the Task Force on the Phase 1 process of ranking sub-watersheds by pollutant loadings through a monitoring program on 16 streams at 19 sites during both hydrometerological events and non-event periods. Though the Canandaigua Lake watershed can be divided into 34 sub-watersheds, preliminary work by the Task Force narrowed down the candidates for Phase 1 stress stream analysis to 16 sub-watersheds.

We considered measures for several potential types of pollution in this watershed. These included phosphorus (a key nutrient that stimulates algae growth in lakes); total suspended solids (as an indicator of soil loss or erosion); sodium (a measure of the loss of deicing salts); nitrate, (which also plays a role in stimulating plant and algae growth); and organic nitrogen (indicating loss of manure or human sewage inputs). We limit our discussion here, for the purpose of illustration only, to loss of phosphorus from the watershed.

By considering the total amount of phosphorus (discharge times concentration) entering the lake from the 16 streams monitored, Figure 1 shows that at least six sub-watersheds delivered the majority of this nutrient of concern into Canandaigua Lake during hydrometeorological events. The sub-watersheds monitored could be ranked from highest to lowest as candidates for Phase 2 segment analysis, and followed by remediation or implementation of best management practices tailored to their specific problem situations.

Guidelines for maximum permissible pollutant loadings (known as Total Maximum Daily Loadings, or TMDLs) are now under development by New York State Department of Environmental Conservation for priority water bodies (those on DEC's 303.d list), so there currently are no established standards to evaluate phosphorus loadings in a watershed. Comparisons to loadings for other area watersheds are useful, however (Table 1).

The mean annual phosphorus loading for Canandaigua Lake's Sucker Brook, one of the six high priority sub-watersheds for this nutrient identified in Phase 1, was 7.6 g P/ha/d (grams of phosphorus per hectare per day). Compared to other watersheds in the area, this rate of loss is high, and representative of watersheds that have sewage treatment plants discharging into creeks. Although we do not yet know the specific causes of the phosphorus loading in this sub-watershed, we know it is a concern. It is high not only for Canandaigua Lake, but also compared to creeks in other watersheds previously identified as being polluted due to known land-use practices associated with different types of point and nonpoint sources of pollution.

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Identifying Pollutant Sources to Glenmark Creek, Sodus Bay

But what are the causes of the high levels of phosphorus entering a lake from any creek identified as a high priority in Phase 1 stressed stream analysis? The next step in the analysis is to systematically sample the concentration of total phosphorus along the stream to point us toward a source.

In Wayne County, at Sodus Bay, we have performed this step. Like Canandaigua Lake, annual monitoring of nutrients and discharge allowed us to prioritize the sub-watersheds and their streams to identify the stream/sub-watershed having the greatest impact on the Bay. In this case, Glenmark Creek accounted for over 80% of the phosphorus entering the Bay.

Systematic sampling of the watershed was undertaken to determine the origin(s) of the phosphorus loss from this watershed. Several different sources were eventually identified. Figure 2 shows the sampling pattern that was developed, and how a small but important source of phosphorus was identified. In a previous sampling, a site identified as MAG1 at the base of a second-order tributary showed relatively high levels of several pollutants including phosphorus (35.6 mgP/L) as compared to the main stem of Glenmark Creek (site MAG1X, 15.8 mgP/L). By sampling systematically at various locations along thestem of this second-order creek, and above its junction with a primary-order stream, we were able to track the high phosphorus concentrations to a failed septic system from a home above Site MAG1G. Upon closer investigation, leachate was observed emanating from the ground and moving down the stream bank into the creek. Phosphorus concentrations at this location reached nearly 93 mgP/L. Once this source was targeted, the Wayne County SWCD was able to advise the homeowner on how to remedy the problem.

Determining sources of pollutants and their magnitude is prerequisite to making cost-effective land management and remedial action decisions. Stressed stream analysis uses an iterative measurement process to reduce the likelihood of costly miscalculations based on assumptions of nutrient sources and modeling. We have found this process provides hard data that enhances the ability of concerned local groups to obtain external funding for remedial or demonstration projects. In Wayne County, for example, funds were secured for a constructed wetland to remediate milkhouse wastes identified by stressed stream analysis. At Canandaigua Lake, funds were secured for a segment analysis after the priority ranking phase identified one sub-watershed (Sucker Brook) as providing a major load of phosphorus into the lake. In another county, high losses of sodium from a watershed were attributed through segment analysis to a poorly managed deicing salt pile, which has now been completely enclosed.

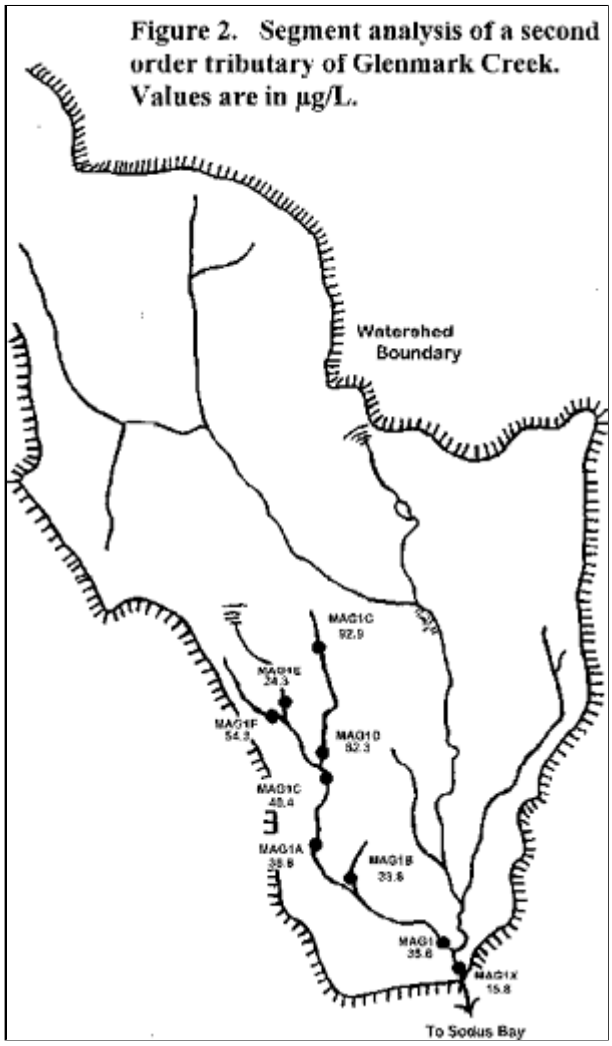

Figure 2. Segment analysis of a second order tributary of Glenmark Creek. Values are in µg/L.

By following the stressed stream analysis approach to identify and prioritize pollution problems, managers are able to make cost-effective decisions with increased confidence. Stressed stream analysis recognizes the fundamental importance of defining the problem clearly before determining the solution. It is a proactive tool that recognizes the long-term value of stewardship of natural resources.

For more information on stress stream analysis, contact Joseph C. Makarewicz at (716) 395-5747 or Theodore W. Lewis at (716) 395-5746, or Department of Biological Sciences, Center for Applied Aquatic Science and Aquaculture, SUNY Brockport, Brockport, New York 14420.

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HERKIMER COUNTY JOINS ALLIANCE

by Marion Balyszak, FL-LOWPA Program Assistant

The FL-LOWPA boundaries have ex- panded once more as Herkimer County becomes the 25th county within New York's Lake Ontario Basin to join the Finger Lakes-Lake Ontario Watershed Protection Alliance. Diverse watersheds and water resource needs characterize the forested mountains and hundreds of lakes and streams of the northern portion of the county located within the Adirondack Park, while the southern portion is predominantly agricultural, with industrial communities within the Mohawk Valley. Nonpoint source pollution sources addressed by the County's Water Quality Coordinating Committee (WQCC) direct efforts in the county and include, but are not limited to, agriculture, on-site septic systems, sedimentation, and excess nutrient loading.

Ted Teletnick, Herkimer County Soil and Water Conservation District Field Manager and newest Water Resources Board member, remarked "FL-LOWPA funding will serve to enhance local programs aimed at monitoring, assessing and reducing nonpoint source pollution threats. Protecting and improving Herkimer County's valuable resources is important. Equally important is preserving its rural agricultural lifestyle in the southern portion and the beauty of the Adirondack Park to the north, both objectives requiring diverse and balanced programs of water quality monitoring, public education and implementation, as exhibited in our proposed 1999 FL-LOWPA program."

Watershed monitoring and assessment will be aimed at establishing baseline data and determining trends in water quality throughout Herkimer County. Specifically, funding will be utilized for a new program in conjunction with the Upper Mohawk Regional Water Board and water quality coordinating committee to monitor Hinckley Lake, the City of Utica drinking water supply. This will be followed by setting up county-wide testing stations. Sharing his excitement about this effort, Teletnick stated "It has been a program Herkimer County has talked about implementing for years and we will now have the ability to make it happen!"

Herkimer County's private source drinking water testing and septic system technical assistance includes a perk testing program that will be expanded through promotional presentations and displays, workshops providing testing for drinking water supplies, and developing a database for test results. Teletnick stresses the need to promote uniform codes and enforcement. "We currently work with two townships on code and enforcement, and are trying to expand upon this base through Memoranda of Understanding. The current priority is to educate local leaders about the benefits of consistent septic system inspection and maintenance across municipalities in a watershed.

Teletnick emphasized the importance of nonpoint source pollution and potential legal liability towns face with uneven programs lacking consistency and follow-through on perk testing and soils investigations. For example, some towns currently require a certified or licensed engineer to handle perk tests while others do not. Teletnick asserts "There needs to be uniformity and consistency of code enforcement to avoid legal and environmental ramifications. Towns need to commit to such a county-wide concept and organizational awareness."

eletnick stressed the importance of holding workshops on drinking water sources and testing in conjunction with the Herkimer County WQCC. To increase awareness of water quality issues in an on-going public education program, Herkimer County will round out drinking water and septic system programs with information on issues such as nonpoint source pollution, stormwater management, and hazardous household chemicals.

Herkimer County's FL-LOWPA program also recognizes the agricultural nature of the county's southern portion. Agricultural and non-agircultural nonpoint source pollution controls and installation of Best Management Practices (BMPs) to reduce erosion, recycle wastes and manage nutrients are supported through FL-LOWPA. FL-LOWPA funds will augment the development of BMPs not supported through the Environmental Quality Incentives Program (EQIP) or other funding sources.

Herkimer County demonstrates an urgency for nutrient management planning. Although the county has done some work using EQIP funding, it is not yet known how new Concentrated Animal Feedlot Operations (CAFO) regulations will affect local operations. Teletnick is trying to anticipate who will be available to do nutrient management plans when the regulations take effect. Although consultants are available now, they may not meet revised Natural Resource Conservation Service standards and specifications for training nor satisfy a requirement for a team approach to waste management planning. Herkimer County SWCD is moving ahead with training for its technician to provide nutrient management planning services, including plan review.

When asked about the benefits of joining the Alliance, Teletnick was quick to indicate he is already seeing heightened interest from the Herkimer County WQCC. "We will finally have some funding to implement things we have been wanting to do. This has stimulated interest from WQCC members as well as other groups and organizations who now want to be more involved with the WQCC." He added, "The District can bolster programs and meet WQCC objectives."

For more information on nonpoint source pollution control programs in Herkimer County, contact Ted Teletnick at (315) 866-2651.

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Land Use Planning for Sustainable Watersheds

Summarized by Betsy Landre, FL-LOWPA Program Coordinator

What is a Sustainable Watershed?

Frances Gotcsik, Executive Director of Friends of the Genesee Valley Greenway, opened the land use discussion by posing questions to broaden our thinking about the meaning of the term sustainable watershed. Gotscik asserts, "While water quality is important, clean water is not enough. A lot more has to happen for a watershed to have the long-term viability and quality of life that sustainability implies." She expanded our

Editor's note:

Every year FL-LOWPA sponsors a public conference to facilitate dialogue on ways to ensure healthy local and regional watersheds for the future. The 1998 conference featured a panel on the connection between land use policy and watershed sustainability in the Genesee River watershed. This panel generated much discussion and a fair level of

thinking through a series of questions about our watersheds:

- Is the air clean?
- Are people proud to live or work there, or enthusiastic about visiting?
- Is it a place that welcomes and supports all socio-economic levels?
- Do communities understand, respect, and celebrate their heritage?
- What gives communities their identity? What makes them unique?
- Do the communities strive to preserve what they value – viewsheds, natural areas, landscapes, buildings, etc.?
- Is new development encouraged to partner with the landscape?
- Do decision-makers know and have working relationships with their watershed relatives from a variety of disciplines?
- Are watershed impacts given consideration in those places where the main waterbody is far away, and does not serve as a visual reminder that it needs attention? Gotscik's questions are a helpful reminder that managing a sustainable watershed requires a holistic approach to integrate economic, social, institutional and environmental interests. Land use planning is a practice where these interests (at times disparate, or compatible — but always interrelated) can be considered together to make decisions that enhance watershed stewardship. Two case studies from the Genesee River watershed illustrate local leadership in the development of land use plans to sustain watersheds and communities.

excitement which carried over into local venues after the event. It appears the topic struck a chord (if not a nerve). In the interest of keeping the dialogue going and documenting the session for our many readers who were not at the conference, the main ideas from the October 28, 1998 panel titled "Land Use Planning for Sustainable Watersheds" are summarized here.

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Whole Community Planning in the Upper Genesee River Watershed

Kevin Masterson, Director of the Building and Zoning Department for the Town and Village of Livonia, presented an example of "whole community" planning in the Upper Genesee River watershed. The Town and Village of Livonia (combined population approximately 9,000) in Livingston County joined together in the late 1990's to develop a shared comprehensive master plan. Masterson explains the cooperative planning effort allowed the Town and Village to maximize efficiency by combining services to protect resources valued by both communities.

The timing of the comprehensive master plan for Livonia was critical. The Town of Livonia is fast growing, with 50 % of the housing starts in Livingston County over the past decade. The master plan stressed the existence of shared resources valued by both Village and Town residents. These include two relatively pristine Finger Lakes, Hemlock and Canadice, as well as wetlands, open spaces, rural character, and recreational and historic resources. It was realized that the best way to safeguard these resources for the future would be through a cooperative, intermunicipal – or "whole community" — approach. By working together, the Village and Town could also more effectively reduce impacts to neighboring communities downstream.

As a result of the cooperative planning process, the Town and Village abolished their separate land use ordinances and boards in favor of a single zoning ordinance, Joint Planning Board and Joint Board of Appeals. The joint zoning ordinance covers permitted uses, subdivisions, erosion and stormwater control standards, cluster development and incentive zoning standards, site plan review, parking, sign standards, and landscaping. The

comprehensive master plan identifies Conservation Areas where more stringent protection is desired. Minimum lot sizes are increased for these areas, and site plan reviews are required for new activities.

To oversee the land use ordinance and policies, a single administrative department responsible to both Town and Village legislative boards was created. By combining financial resources, the Town and Village can afford to professionally staff this department on a full-time basis. The result is the Town and Village each save money while more effectively implementing land use policy and protecting resources valued by citizens.

How does a whole community planning process get started? Masterson explains some key steps:

1. Ask what resources citizens value and want protected, and identify those in a comprehensive master plan. In the Livonia case, a citizen survey was used.
2. Consolidate planning issues. The community becomes defined by resources and shared goals, rather than political boundaries.
3. Strive for intermunicipal cooperation, to the extent of joint codification.
4. Consolidate specific services. Once political subdivisions have tested their ability to cooperate and address issues jointly, consolidating services makes cost-effective, programmatic sense. Planning and zoning issues lend themselves well to consolidation.

Masterson cautions that whole community planning requires a belief among local decision-makers that working cooperatively for expanded, mutual benefits is more important than maintaining full autonomy. He explains, “Too often political divisions between municipalities obstruct the formulation of whole community plans. Local officials fail to realize they are members of the same community.”

How can obstacles to redefining your “whole community” be overcome? Masterson urges citizens to become active on and/or convince town boards to take a serious look at whole community planning. Legislators need to be shown the benefits of combining financial resources and services. It also helps to have someone in the community with vision and an ability to bring people together around new ideas. In Livonia, public education and involvement were emphasized throughout the planning process.

Urban Sprawl and a Vision for Smart Growth in the Lower Genesee River Watershed

Rochester, New York Mayor Bill Johnson is committed to speaking about the costs of urban sprawl and the need for a regional approach to land use planning and development. He

speaks frequently on the subject at forums in Rochester, its surrounding suburbs and adjacent rural areas. Johnson states, “Even though Upstate New York has 70,000 fewer residents today than in 1993, the urbanized areas of Rochester, Buffalo, and Syracuse are spreading out in a discontinuous or scattershot manner” called urban sprawl. He maintains that much is at stake under this development scenario. There are social, economic and environmental costs to urban sprawl that are impossible to isolate from one another. Consider these:

- Conversion of prime agricultural land in a discontinuous, leapfrog pattern where parcels that are difficult to develop are skipped over in favor of more easily developed farmland.
- Increased need for and cost of infrastructure, as public facilities like water, sewer, and streets are extended to accommodate the leapfrog pattern of development (and this increases the tax burden).
- Homes, schools, churches, shopping areas, libraries and other public buildings are distanced from each other, even though they might have functions and land use characteristics that would benefit by being on the same or contiguous sites.
- All trips to these places are now made by car, often retracing one’s path. Johnson states Monroe County alone has nearly 300 more miles of roads than a decade ago, and Monroe County residents drive over 2 million more miles per day than just a decade ago. It takes more time to get places, and more time in the car means less time with families and more polluting automobile exhaust.
- More pavement means more impervious surfaces. Runoff from impervious surfaces is now the largest uncontrolled source of water pollution in the nation (according to the EPA).
- As more of the ground within a watershed is covered with concrete, asphalt, and sprawling buildings, flooding is increased, streambeds are altered, aquatic habitat is affected, and groundwater recharge is reduced. The watershed’s capacity to absorb and filter is diminished.

Johnson alleges the costs of sprawl to the region are extravagant, as urbanized land area in Upstate New York has increased 80 percent over the past 20 years, *in the absence of real population growth.* “It just costs more, on a per-unit basis, to serve the same number of people who are now more widely dispersed. This is money that could be better spent protecting the environment and creating a sustainable future for ourselves and our children.”

Johnson is one of New York State’s vocal supporters of Smart Growth strategies designed to create environmentally, fiscally, and socially sustainable development. He explains Smart Growth strategies are regional strategies, but that regionalism is a concept local politicians have yet to embrace.

Environmental issues, by their nature, must be examined in a “framework as broad as the region” that takes into account the relationship of one problem to another. Johnson explains, “The problems of water quality are the problems of recreational opportunity are the problems of economic development are the problems of real property values.”

Smart Growth coordinates land use with transportation and looks to improve pedestrian access; reuse existing buildings and infrastructure; encourage clustered development and architectural design that is compatible with the natural landscape; and protect and enhance waterways, open space, and other features of community value.

According to Johnson, sustainable development requires a vision of a place in which people want to live. It also requires hard data, and a willingness to explore options and form new alliances. “If planning boards, the media, and citizens are presented with data showing that

the extentof impervious surfaces in a local watershed is causing harm to water quality, you can bet there will be pressure to plan land use differently." He also points to an Ohio study showing that residential properties near open space and wetlands sell for considerably more than identical properties in standard subdivisions. Johnson stresses the importance of communicating data in ways meaningful to the public and decision-makers.

In 1998 a "stewardship council", representative of the population of the Rochester region, released a draft comprehensive master plan for the City of Rochester. Although the City has statutory authority to affect change only within its municipal boundaries, the draft plan advocates intergovernmental cooperation to create sustainable policies for regional land use, economic development, and environmental stewardship. These sectors are inextricably linked, to one another within a community, and between communities within a region, a point reiterated by each speaker on the panel.

Johnson is optimistic about the role water resources can play in sustainable development, as local communities increasingly recognize the uniqueness of the region's waterways – the Finger Lakes, Lake Ontario, the Genesee River, and Erie Canal. He explains, "We're beginning to realize that our shared water assets can give us an economic boost and, perhaps, provide a common interest capable of knitting our communities together with a regional identity."

Water resources help define the quality of life in the Finger Lakes - Lake Ontario region. Alliances can form around water resources, as has FL-LOWPA. Major pieces of the work to be done to ensure sustainable watersheds include: 1) Getting all community members to recognize the relationships between environment, economy, and quality of life; 2) Defining consensus visions for sustainable communities and watersheds; 3) Working together, across disciplines and political boundaries, to plan knowledgeably, creatively, and sensibly to make vision reality.

For more information on the whole community planning approach and Livonia's Joint Comprehensive Master Plan, contact Kevin Masterson, Town of Livonia Building and Zoning Department, 35 Commercial Street, P.O. Box 43, Livonia, NY 14487 (716) 346-2098.

For more information on Smart Growth or the comprehensive master plan for Rochester, NY, contact Mayor William A. Johnson, Jr. at City of Rochester, 30 Church Street, Rochester, NY 14614.

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Workshop on Available Controls for Eurasian Watermilfoil and Purple Loosestrife

Contributed by James Skaley, PhD

A workshop on control of invasive aquatic plants will be held on **June 24, 1999** at the Varna Community Center in Ithaca, New York. The purpose of the workshop is to cover the range of controls, which are permitted in New York State and provide the latest information on bio-control measures currently being researched for both Eurasian watermilfoil and purple loosestrife.

Topics include herbicide use and the permit process; use of grass carp in ponds; SONAR use

in New York State; effectiveness of mechanical harvesting; and bio-control measures for Eurasian watermilfoil and purple loosestrife. A panel of resource persons will address questions from workshop participants. Participants are invited to bring information on what lake associations are doing to control nuisance species, and to share experiences, observations and concerns. A hands-on aquatic plant identification workshop for species common to New York State lakes will end the day. Information on the native plant communities and the role invasive species can play in lake ecology and limiting recreational uses will be included.

Who should attend this workshop? Lakeshore homeowners, representatives from lake and watershed associations, and technical and professional persons interested in managing aquatic plants in lake environments are encouraged to attend.

The program includes **Tom Beschle**, Permit Officer from Region 6, DEC, who will provide information on herbicides currently approved in New York and will take participants through the permitting process. **Jim Balyszak**, Yates County Soil & Water Conservation District, will discuss his experiences working with grass carp and restrictions on their use. S**cott Kishbaugh**, NYSDEC Division of Water, will provide the latest information on SONAR (floridone), which has been used in a few New York lakes with varying results. A presentation on mechanical harvesting, including costs and effectiveness will be featured. **Bob Johnson**, Cornell University, will provide the latest information on the potential for bio-control of Eurasian watermilfoil, discussing promising experimental results from Dryden Lake and data from Cayuga Lake that suggests a link between the European aquatic moth larva (Acentria ephemerella) and return to a native plant community. Johnson will also discuss introductions of a weevil (Euhrychiopsis lecontei) for milfoil control, and provide comparative information on the moth and weevil as long-term bio-control tools. **Dr. Bernd Blossey** will talk about the Cornell Bio-Control Program for Exotic Weeds and, in particular, efforts to control purple loosestrife in New York and elsewhere.

The Varna Community Center is located on Route 366 approximately 1.5 miles east of the Cornell University main campus. Lunch will be provided as part of the registration fee of $12.50. For details and registration information contact Steuben County Soil & Water Conservation District at 607-776-7398 ext. 202.

This workshop is funded by New York State through a grant from the FL-LOWPA Special Projects Fund to Steuben County SWCD. Co-sponsors include NYS Department of Environmental Conservation Division of Water and NYS College of Agriculture and Life Sciences at Cornell University.

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Cayuga Lake Watershed Network Identifies Leading Watershed Issues

by Mary Catt, Cayuga Lake Watershed Network

Water quality, public health and preservation of open spaces are rated the three most important Cayuga Lake watershed issues, according to a Cayuga Lake Watershed Network survey of 294 people in 1998.

Those who participated through written surveys or telephone interviews were asked to rate the importance of various watershed issues. The leading issues were water quality (with 80 percent of respondents rating this issue very important); public health, including concerns such as septic system operation (75 percent); preservation of open spaces (52 percent); and land use and development (50 percent). Rated as very important by less than half the respondents were invasive plants or animals such as zebra mussels (42 percent); economic development (40 percent), tourism (39 percent), lake access (31 percent), lake water levels (26 percent), activities using all-terrain vehicles or personal watercraft (19 percent) and activities such as biking and hiking (17 percent).

When asked who should be most responsible for watershed issues, the top two answers were local government (64 percent), and "everybody" in the watershed (60 percent). Other responses included state government (36 percent), farmers (28 percent), federal government (27 percent), agricultural organizations (27 percent), business owners (24 percent), lake users (23 percent), lakeshore owners (23 percent) and industry (23 percent).

Respondents said that the Network, a 600-member group of citizens in the Cayuga Lake watershed formed in 1998, can play a role in watershed issues by helping to coordinate; communicate; network; educate; raise awareness; foster community decisions and identify ways of addressing watershed issues.

Network Vice-Chair Janet Hawkes, who oversaw the survey, said, "Our organization was heartened to confirm that the people who live, work and play in the watershed are knowledgeable about its issues and truly concerned." She added, "The Network provides a framework for people to participate in the watershed's future," Hawkes added. "The findings of the survey reinforce the Network's mission — to educate, communicate and lead — and will help guide us as we go forward."

Survey respondents represented many stakeholder groups identified by the Network, including county, state and federal departments and agencies, municipalities, regional agencies and non-governmental groups, property owners and realtors, recreation, tourism and environmental groups, utilities and service districts, businesses and industries; farmers and agribusiness and educational institutions, seasonal and year-round residents.

The project was led by Doreen Greenstein, Ph.D., Senior Extension Associate, Department of Agricultural and Biological Engineering, Cornell University. It was funded through an organizational development grant from the Finger Lakes-Lake Ontario Watershed Protection Alliance Special Projects Fund and a donation of administration and supervision from the Cayuga Nature Center.

A project report was published by the Network. For more information contact the Network's coordinator, Tee-Ann Hunter, at (315) 364-9504 or Janet Hawkes at (607) 255-8122 or (607) 387-3726.

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Fostering Collaborative Watershed Projects: The Special Projects Fund

FL-LOWPA member counties sub- mitted fourteen proposals for more than $250,000 in the

most recent round of the Special Projects Fund (SPF). Five proposals were awarded funding in January 1999 in amounts ranging from $3,750 to $18,250. Projects funded include:

New York State Onsite Wastewater Treatment Training Center - $10,000
Sponsored by Madison County Planning Department, in partnership with Madison County Health Department and SUNY Morrisville. In Madison County, 60 percent of the housing units rely on septic systems. The Madison County Department of Health has identified the need for increased education and training in septic system technologies, operation and maintenance. An Onsite Wastewater Treatment Training Center has been established at SUNY Morrisville (in conjunction with the National Environmental Training Center for Small Communities) to provide training to contractors, system design engineers, pumpers, local government officials and homeowners in New York State. The SPF grant will be used to develop interpretive signs for demonstration systems installed at the Center.

Honeoye Lake Tributary Monitoring Program - $11,000
Sponsored by Ontario County Planning Department, in partnership with Ontario County SWCD, Honeoye Lake Watershed Task Force, and Honeoye Valley Association. The tributary monitoring program builds upon a watershed assessment effort for Honeoye Lake. The SPF grant will provide funding to set up and implement the first year of a tributary monitoring program to 1) measure sedimentation and associated contaminants from tributaries and 2) prioritize the tributaries based on their relative contributions.

Workshop to Evaluate Available Controls of Invasive Nuisance Aquatic Plants - $3,750
Sponsored by Steuben County SWCD, in partnership with Cornell University, and NYSDEC. A public workshop will be held June 24, 1999 in Ithaca, New York to discuss various methods for controlling invasive aquatic plants like Eurasian watermilfoil and water chestnut. As the body of information grows about whatmanagement tools work well under different scenarios, this workshop is intended to offer up-to-date, comparative information to help guide lake managers, lake associations, and other stakeholders in making informed management decisions. See page 8 for more information.

Keuka Lake Looking Ahead Watershed Management Plan Public Education Initiative - $7,000
Sponsored by Yates County SWCD, in partnership with Steuben County SWCD, Cornell Cooperative Extension of Yates County, and Keuka Lake Foundation. The SPF grant will help fund the printing and dissemination of a quality color document based on the findings of the recently completed Keuka Lake Looking Ahead Watershed Management Plan. The document will include a management vision, goals and objectives, a list of cooperators and funding sources, major findings on the limnological status of the lake and watershed, pollution sources and impacts, management recommendations, and an implementation strategy. This document is intended to enhance public understanding of the management plan and support for its implementation.

Lake Ontario Embayment Education Initiative - $18,250
Sponsored by Wayne County SWCD, in partnership with the SWCDs of Niagara, Orleans, and Jefferson Counties, Cayuga County WQMA, and Oswego and Monroe County Planning Departments. The project will produce an educational document that addresses the unique ecology and management needs of river outlet areas and embayments along the Lake Ontario shoreline. Twelve Mile Creek Embayment; Oak Orchard and Johnson Creeks; Irondequoit, Sodus, East, Port, Blind Sodus, Fair Haven, and Chaumont Bays; North and South Sandy Ponds; and Henderson Harbor will be highlighted.

The Special Projects Review Committee is comprised of three Water Resources Board

members representing a cross-section of agencies in the three FL-LOWPA regions (eastern, central and western). The review committee is appointed to rank proposals and a submit recommendation to the Executive Committee. The committee for this round included **Angela Ellis** (Livingston County), **Lloyd Wetherbee** (Schuyler County) and **Ian Drew** (Hamilton County). Special thanks to these individuals for their diligence and responsible approach to the task!

The **Special Projects** Fund is a competitive grant program. The objective of the fund is to provide incentive, through seed money, for FL-LOWPA counties to develop and implement innovative, cooperative watershed-based nonpoint source pollution control programs with broad benefit. Short-term projects with duration of one year or less and a local in-kind effort are emphasized. For administrative purposes, the sponsor of the project must be a member of FL-LOWPA's Water Resources Board, but cooperators from other organizations are encouraged. The Request for Proposals for the next (FY1999) round of the Special Projects Fund is pending the outcome of the FY1999-00 New York State Budget.

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ETCETERA…ETCETERA…ETCETERA…

The sixth edition of Keeping New York's Waters Pure, a guide to financial and technical assistance programs for rural community water and sewer infrastructure development and water quality management, was recently released. Published by the NYS Legislative Commission on Rural Resources, copies can be obtained from the office of Senator Patricia McGee (Chair) at (518) 455-2544.

FL-LOWPA Chair Mark Watts (Chemung County) was honored with the 1999 Willard N. Croney Distinguished Service Award by the New York Conservation District Employees' Association. Mark has worked for 15 years for Chemung County Soil and Water Conservation District. In addition to his substantial efforts to work with state and local groups to conserve natural resources, Mark has served as Chair of the Water Resources Board of FL-LOWPA since 1998 and served as Secretary from 1996 - 1997. All who know Mark admire his unselfish style of leadership and positive approach to problem solving. His contributions to the field are significant. Congratulations, Mark!

What's a FL-LOWPA?

FL-LOWPA has put together a PowerPoint presentation on its nonpoint source pollution control and watershed management programs in the New York Lake Ontario basin. The presentation illustrates FL-LOWPA's unique structure as an alliance of 25 counties working together to meet local water quality needs while exchanging information and addressing shared problems. FL-LOWPA will accommodate requests for presentations to local, regional and state organizations as FL-LOWPA personnel are available. Please call the Water Resources Board at (315) 536-7488 or e-mail us at wrb@eznet.net to inquire. Special thanks to Linda Cossaboon and Karen Tillotson (Chemung County SWCD) for assistance in the development of the presentation.

Newsflash!

FL-LOWPA's 9th Annual Sustainable Watersheds Conference will emphasize watershed management in the eastern Oswego River Basin. Progress in watershed management since the 1994 conference for Skaneateles, Otisco, and Owasco Lakes will be reviewed and new

issues identified. The extensive Black River watershed will also be featured. An ad hoc planning group of stakeholders from the region has convened to advise FL-LOWPA on the conference program. The event will be held in October near Syracuse, New York. More news ahead!

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Seneca Lake Watershed Residential Environmental Risk Survey Completed

The Seneca Lake Watershed Envi- ronmental Risk Survey and Assess- ment Project was completed in 1998 to provide Seneca lakefront property owners with a tool to evaluate their homes for potential pollution risks. The project was completed by Seneca Lake Area Partners in Five Counties (SLAP-5), a coalition of public and private entities working on a comprehensive watershed management plan for Seneca Lake. Prior to this project, no comprehensive information had been collected within the Seneca Lake watershed that identified human health and environmental risks associated with nonpoint source pollution around the home. Data collected through a homeowner survey gave SLAP-5 a better understanding of the potential impacts of shoreline properties on water quality in Seneca Lake.

The project was designed to maximize its educational value for shoreline property owners. The project utilized the Home*A*Syst environmental risk assessment guide published by the Northeast Regional Agricultural Engineering Service (NRAES) of Cooperative Extension. This guide contains a self-assessment tool for human health and environmental risks at home related to physical characteristics of the property, stormwater, drinking water well management, hazardous household products, septic systems and household wastewater treatment, lead, yard and garden care, liquid fuels, heating and cooling systems, and indoor air quality. Project organizers tailored the assessment by adding a section on observation of zebra mussels. Home*A*Syst books, which explain these potential risks, were distributed to lakefront property owners who participated in the survey. A public workshop was held to share results. By using the Home*A*Syst guide, SLAP-5 took advantage of a well-tested measurement tool and educational materials (and avoided reinventing the wheel).

Four interns, hired and trained specifically for the survey, efficiently staffed the labor-intensive project. The interns personally visited lakeshore properties and completed 971 individual assessments in the summer of 1998.

The results of the survey are useful in a variety of ways. First, homeowner education needs can be identified.

Second, the data give SLAP-5 a better understanding of the potential human health and environmental sensitivities of shoreline properties. This information can help tailor management strategies for maximum benefit. For example, the types and ages of septic systems and wells were assessed. The distances from leachfields to wells and the lakeshore were noted, as were locations of fuel storage tanks. Lawn care behaviors, including the use of fertilizers and pesticides and composting, were measured. The assessments were broken out by subwatershed, so management strategies can be geographically targeted to the shoreline areas of greatest need.

The project managers recognized the likelihood of some degree of bias in the data, whereby respondents tend to under-report behaviors they think may be viewed negatively. Project managers also stressed the importance of training for the interns - both in the subject matter and survey techniques - to ensure data quality.

SLAP-5 intends to assess all potential land-based sources of pollution to Seneca Lake as part of its watershed planning process. The Residential Environmental Risk Survey was a practical way to collect information on private shoreline properties in five counties around the lake. The project was funded by FL-LOWPA's Special Projects Fund, Seneca Lake Pure Waters Association, and a mini-grant from the NYS Soil and Water Conservation Committee. For more information on the project, contact Barb Demjanec, SLAP-5 Technical Coordinator, c/o CCE Yates County, 110 Court Street, Penn Yan, NY 14527.

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The Information Exchange is published by the Water Resources Board (WRB), a group of representatives from 25 counties in upstate New York which comprise the Finger Lakes - Lake Ontario Watershed Protection Alliance (FL-LOWPA) funded by New York State.The primary purpose of FL-LOWPA is to foster coordinated watershed management activities and exchange information related to the condition of surface water bodies in New York's Lake Ontario Basin.

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