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Healthy Forests in the Finger Lakes and Lake Ontario Region

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Introduction

Forests dominate our rural, suburban, and even our urban landscapes. People value forests for the diverse benefits they provide. These benefits range from the immediate pleasure of cutting your own firewood for exercise or providing habitat to enhance wildlife viewing. They also extend to the less obvious advantages of helping to maintain clear, clean water and a vibrant segment of the economy through the forest industry. Most benefits are mutually compatible. Indeed, many people benefit from water, air, and wildlife provided by forests without being aware of the presence of the forests themselves. A driving objective for managing both healthy forests and a healthy water supply is to ensure that the ecological and economic benefits of forests are sustained. How then can land managers and community leaders work with forestry stakeholders to retain these valued qualities? Good forest management is a key for ensuring sustainability of New York's forests. Our goal here is to describe state and regional forests, the stakeholders and their issues, and suggest some possible solutions. Although we won't provide a thorough discussion, we hope to spark awareness and dialogue.

Inside . . . .

Regional Forests in a Statewide Context

New York's landscape hasn't always looked as it does. Although a predominantly forested landscape when Europeans colonized the state, New York forests were subsequently almost totally cleared for agricultural production. Through the middle 1800's, agriculture dominated New York, with almost three-quarters of the landscape associated with farms. Even many farm woodlots, while not tilled, were included in farm production through livestock grazing and firewood harvesting. Beginning in the 1880's, the number of acres in farms began to decline, a pattern that has persisted for decades. As farms were abandoned or taken from production, much land began to revert to forest land. Now statewide, New York has over 18 million acres of forest land, almost two-thirds of the state (Figure 1).

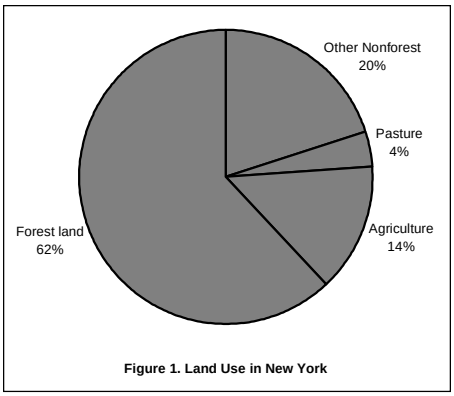

Figure 1. Land Use in New York

Painting New York as a forested state is only part of the picture. Most people don't realize that 85% of New York's forests are privately owned by families. Industry and state (public) ownership only account for

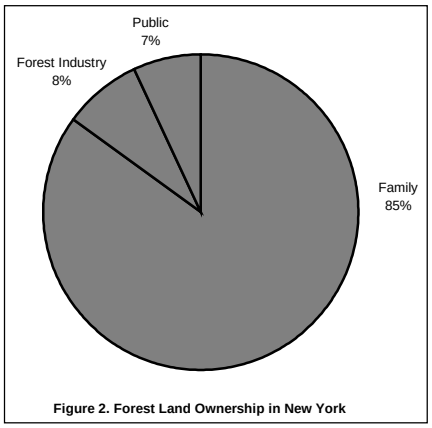

Figure 2. Forest Land Ownership in New York

15% (Figure 2). Thus, the nearly 500,000 family forest landowners are important as stewards of an economically and ecologically vital landscape element. Further, the forests that began as early successional habitats for birds such as chestnut-sides, warblers and bobolinks 70 to 90 years ago, are now increasingly mature. These forests now can provide habitat for species that require larger expanses of more mature forest, such as oven birds and wood thrush. Additionally, approximately 50% of New York forests are classified as "sawtimber," stands having an average tree size with a potential for commercial value (Figure 3). Obviously, just because a tree can be sold doesn't mean now is the appropriate time.

Knowing that forests are a dominant landscape feature statewide, it's worth assessing their role in the regional context of the Finger Lakes and Lake Ontario watersheds. Consideration of four issues concerning this region's forests will illuminate some useful points: their economic contribution; what's involved in good forest man-

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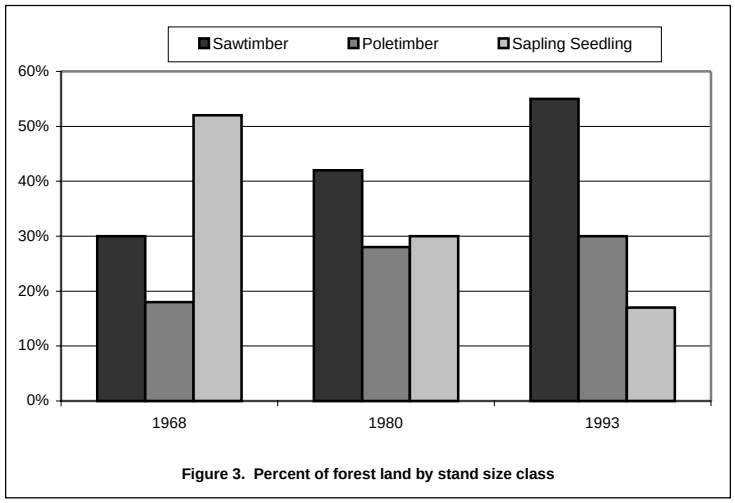

Figure 3. Percent of forest land by stand size class

agement; who are the forestry stakeholders and their issues; and solutions to help ensure the harmony between healthy managed forests and high water quality.

Forests as a Key Landscape Feature

Although New York is a forested state, to what extent are the landscapes of the Finger Lakes and Lake Ontario watersheds forested? The 25 counties of the FLLOWPA region comprise approximately 41% of the state and the region is renowned for countless and beautiful farms and agrarian vistas. Interestingly, of this 12 million acres of land, 57% is forested, just over 7 million acres of forest land! (Table 1) We know that forests provide more than economic benefits, but those benefits are most easily quantified to characterize a region and the importance of its forests. In this region, almost 40% of the forest land is sawtimber, or has commercial potential. The region supports 449 forest industry establishments that employ over 16,000 people with annual payrolls (in 1998) of over $450 million. Although more difficult to value, consider also the value of the clear, clean water provided by well-managed forests. Certainly forests are ecologically and economically important to the region.

What is Forest Management?

Many different images come to mind when you think of forest management. Often people think of timber harvesting, but this is only one aspect of forest management. Forest management is a process to manipulate a forest to achieve some desired and explicit end goal. The manipulation can be active through planting or cutting, or passive by letting nature takes its course.

A foundation of good forest management is to realize the importance of matching the management activity with a landowner's forest resource goals. This same rule applies whether the land is owned publicly or privately. Thus, the first step of forest management is for landowners to explicitly state what they hope to achieve and receive from their forested property. For private landowners, the management goals will typically reflect what people like about their property and why they own it. Examples of forest management include tree planting, timber stand improvement, trail creation, wildlife habitat enhancement, forest thinning, tree girdling, riparian protection, sap collection and others. The important aspect is to match management activity with management objective. It must be recognized that forests are dynamic, and doing nothing will result in changes through time. Therefore, deliberate inactivity is a reasonable part of forest management if the objective is to achieve some later successional stage.

Forestry Stakeholders — Issues and Solutions

In the broadest thinking, every citizen of New York is a stakeholder of forestry. Everyone benefits from the aesthetic qualities of forested hillsides, clean water from streams that originated in woodlands, and from viewing wildlife that use young or old forests as habitat. However, it is more practical to identify specific groups that we need to work with and we can generally group most New York citizens into one of three key stakeholder groups. Thinking back to our original question of how to sustain healthy forests, let's focus our attention here on issues of these stakeholders. These are neither comprehensive lists of issues nor are all issues relevant or of equal importance to all stakeholders. Once recognizing some of the stakeholder issues, we can address the actions to take locally and statewide to resolve the pressing issues.

Private forest landowners

Private forest landowners are many and varied. Statewide, approximately half own less than 10 acres of forest land, and as such have different needs and concerns than forest owners with 50 or 500 acre parcels. The issues confronting landowners though, irrespective of property size, often come down to: (1) tax rates on lands that benefit both owners and local communities; (2) education to make informed decisions; (3) costs to implement non-commercial management activities; (4) landowner liability; and (5) finding a qualified professional to assist with management. These are issues because they either reduce the ability of a landowner to bear the cost of ownership or they reduce the owner's satisfaction in being a forest landowner. Either way, if barriers result in parcelization or changes in land use, the consequence can be reduced water quality or the capacity of the land to provide high water quality.

At least four strategies provide solutions to some or all of these issues. One strategy that we are familiar with through our role in Cornell Cooperative Extension is the power of educational programs to increase awareness of opportunities and the potential for changed behavior. We rely on numerous venues with various partners, from fact sheets and publications to web pages and satellite videoconferencing. Another strategy is tax incentives. Although availability of this option is determined at the government level, landowners benefit by knowing when and how to make use of this incentive. Cost-share incentives are another government program that are designed to encourage practices that benefit society and also initiate and enhance a stewardship attitude among landowners that results in additional management practices. Finally conservation easements through various organizations and agencies provide a tool to help landowners ensure the stability of their property and/or receive assistance in the cost of ownership.

Loggers, professional foresters, forest industry

It's easy to lump this group together since they have many common interests. However, they perhaps should be considered as separate stakeholder groups since

they are often on different sides of the fence depending on the issue. However, they quite commonly share a role in working with landowners to ensure the availability of forest products. Issues they often confront include: (1) professional credentials; (2) public acceptance; (3) market share; (4) supply and demand; (5) client stability, and of course, (6) the bottom line, profit. These are issues because they increase the costs of doing business or they impede the delivery of quality service. The forest industry is not unique in that it seeks ways to reduce operating costs. However the industry has, to its credit, generally recognized a social license to work with landowners as stewards of the forest resources we all cherish.

A number of strategies are available for resolving these issues. Education is one used throughout the forest industry. From the "Trained Logger Certification (TLC)" program, to continuing education of professional foresters, to business management short courses, the forest industry is engaged in efforts to improve business, production, and safety capacity. Other strategies include: public awareness and outreach; looking for and developing innovative markets and marketing skills; certification, licensing and registration, maintaining and enhancing customer satisfaction; support for local, state, and federal efforts to provide a favorable business climate; and seeking a production efficiency and fiscal prudence. These strategies are not unique to the forest industry and seek to refine the way service providers respond to client concerns and needs.

Citizens, local communities, and local government

Citizens and local communities are understandably interested in the way forests are managed, and how management influ-

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Table 1. Summary of forestry statistics of counties within the Finger Lakes and Lake Ontario Watershed

County	All classes (thousands of acres)	Forest Land (%)	Forest Land (thousands of acres)	Saw Timber (thousands of acres)	Productive Forest Land (Very Good plus Good) (thousands of acres)	Forest Industry Mid-March Employees (1998)	Forest Industry Total Annual Pay ($1,000)	Forest Industry Establishments	Estimated Maple Syrup Value/ County ($)
Allegany	659.4	67%	441.4	175.6	31.6	119	2,163	11	$215,736
Cayuga and Seneca	651.6	34%	221.1	123	53.1	146	1,695	12	$20,813
Chemung	261.2	68%	177.3	68	26.2	503	12,107	9	$7,068
Cortland	319.8	53%	168.1	84.8	5.2	354	7,237	13	$70,944
Genesee	316.2	39%	123.1	32.1	24.5	303	7,186	9	$16,806
Hamilton	1101.2	98%	1079.1	192.4	29.2	60	na	9	$8,995
Herkimer	903.6	76%	686	185.7	42.6	665	4,594	21	$28,619
Jefferson	814.3	49%	401.6	123	64.2	1,325	50,696	21	$86,982
Lewis	816.4	76%	617.1	333.7	103.1	690	30,720	33	$708,349
Livingston	404.6	38%	155.4	46.1	12.9	155	3,223	10	$0
Madison	419.8	47%	199.1	84.1	45.3	161	2,701	11	$50,434
Monroe	421.9	26%	108.9	38.3	3.4	2,128	47,991	70	$0
Niagara	334.7	28%	92.1	42.5	18.3	1,196	36,929	29	$0
Oneida	776.2	59%	455.5	248.1	67	1,925	45,671	44	$39,916
Onondaga	499.4	48%	241.7	99.7	36.3	2,084	52,174	47	$318,052
Ontario	412.4	34%	142.1	76.4	0	696	19,242	17	$49,709
Orleans	250.5	27%	68.7	27.6	28.6	20	na	3	$13,491
Oswego	610.1	70%	428.2	247.8	106	1,427	56,165	22	$55,696
Schuyler	210.4	59%	124.8	59.4	16.2	175	na	6	$5,338
Steuben	891.3	54%	481.8	247.3	79.7	827	1,508	13	$59,430
Tompkins	304.7	56%	169.3	80.1	39.2	80	na	10	$17,675
Wayne	386.7	41%	160.1	74.1	38.1	1,060	26,666	14	$4,771
Wyoming	379.5	42%	161.1	61.5	40.9	250	3,708	14	$501,582
Yates	216.5	51%	111.4	38.4	5.2	10	na	1	$11,272
Total	12362.4		7015	2789.7	936.8	16559	412,376	449	$2,291,678

Legend

Column A: County
Column B: Total land area in county
Column C: Percent of land in commercial or reserved forest land
Column D: Acres of land in commercial or reserved forest land
Column E: Acres of sawtimber (e.g. mature or near mature forest and potentially harvestable)
Column F- H: Acres of land classified as fair to very productive for forestry (greater than 50 cu. ft/ac/yr or approximately 2.5 cords/ac/yr)
Column I: Number of mid March employees in a report dated 1998
Column J: Annual payroll of forest industry including lumber, furniture, fixtures, and paper
Column K: Number of forest industry establishments including lumber, furniture, fixtures, and paper
Column L: Estimated value per county based on NYS Ag and Markets average price and production

Sources

Alerich, C.L. and D. A. Drake. 1995. Forest Statistics for New York: 1980 and 1993. USDA Forest Service Resources Bulletin NE-132

Canham, H. O. and K. S. King. 1998. Just the Facts: An Overview of New York's Wood-Based Economy and Forest Resource. Empire States Forest Products Assocation and NY Center for Forestry Research and Development

ences water quality. Several other issues related to forest management are of concern including: (1) scenic vistas, (2) business retention, (3) highway safety and maintenance, (4) biodiversity, and (5) open space. While these stakeholders may neither own forest land nor be a participant in the industry, they sometimes work through their local governments to influence the way private forest lands are managed. Occasionally the symptoms of other land management practices (e.g., land clearing for development) are associated with forest management and reduced water quality or the proposed solutions are not appropriately matched to the actual concern. This mistaken association drains energy and can be divisive to a community.

Citizens and local communities are vested in the management of their local forests as this influences their quality of life. If inclined to try to influence local forest management practices, several strategies will help. First, work with the forest industry and local forest landowners rather than creating an adversarial situation. Let all involved spend time building a trusting relationship that initially seeks for all to understand the positions of others. Don't assume that a problem exists without data to support such a position. Seek the facts of the situation and attempt to separate those facts from value judgments and personal attitudes. Second, focus on the issue of concern and retain your perspective on the common values you share with others. Seek win-win situations where all parties are vested rather than pursuing confrontational and legislated actions. Remember from Table 1 that the forest industry is often an important economic component of a community and forestry can be compatible with the overwhelming majority of citizen and community objectives. Several specific strategies to address citizen and community issues include: education, tax incentives, business retention and expansion, land-use planning, conservation easements, land purchase, "Right to Practice" legislation, and zoning. Finally, the easy and quick solution may not be the best solution.

Summary

Forests dominate the state and the watershed of the Finger Lakes and Lake Ontario. Forest management, depending on how it is conducted, can impact water quality and watershed protection in both positive and negative ways. The first step in forest management is increased awareness of the importance of this resource and the need to manage it properly. Hundreds of thousands of people representing dozens of stakeholder groups are vested in the long-term sustainability of forests, forest management, and water quality. Stakeholders bring their own experiences and issues to the discussions of forestry and several strategies are useful in addressing each issue. A strategy common to all stakeholders and most issues is the use of focused educational programs targeting specific audiences that seek to increase awareness and affect changes in behavior towards current technologies and management practices.

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"Hundreds of thousands of people representing dozens of stakeholder groups are vested in the long-term sustainability of forests, forest management, and water quality."

A New Look at the NYS DEC Priority Waterbodies List

By Jeff Myers, Bureau of Watershed Assessment, Division of Water, NYS Department of Environmental Conservation

Background

To fulfill requirements of the Federal Clean Water Act, the New York State Department of Environmental Conservation (DEC) provides periodic assessments of the quality of the water resources in the state. These assessments reflect monitoring data and water quality information drawn from a number of programs and sources, both within and outside the DEC. This information has been compiled by the DEC Division of Water into an inventory (database) of waterbodies in New York State that characterizes known and/or suspected water quality problems and issues, and tracks progress towards their resolution. This inventory of water quality information is more generally known as the Division's *Priority Waterbodies List* (PWL).

By identifying specific water quality problems and issues, the Priority Waterbodies List has been used to help guide Division of Water program management decisions since the early 1980s. The PWL provides the Division with:

Baseline Water Quality Assessments

Periodic assessments evaluate whether the waters of the state support their designated uses (e.g., drinking water supply, fish/shellfish consumption, aquatic life, etc.). Such assessments are both general (cumulative statewide evaluation of all waters) and specific (evaluation of individual waterbodies) in nature.

A Focus for DEC Division of Water Program Activities

Because of limited resources, the Division of Water targets its programs and efforts to where it is believed the greatest impact can be realized. These programs include treatment facility compliance, ambient monitoring, grant funding for water quality restoration projects, etc. The PWL identifies the problems and issues upon which the Division's resources should focus.

Consistent Information for Ranking Priorities

The PWL evaluation of water quality is used in the development of priority ranking systems for various programs. Two examples include scoring Clean Air/Clean Water Bond Act project proposals and completing the state's Unified Watershed Assessment.

A Record of Water Quality History and Status

The PWL provides information for specific waterbodies so that the Division can easily respond to questions from both inside and outside the DEC concerning what is known about the water quality of individual rivers, lakes, and watersheds.

A Measure of Progress

The PWL provides a mechanism to track the progress of Division programs and efforts toward improving the water resources of the state.

Identifying Areas for Coordinated Efforts

PWL information also allows DEC program managers and other agency and public water quality partners to identify specific priority watersheds where coordinated efforts can more effectively address water quality problems.

Assessing the Severity of Impairment

The assessments of New York State water resources in the PWL are holistic in that they reflect the ability of waterbodies to support specific *best uses* (see Figure 1). Each waterbody (whether it be a stream, river, lake, etc.) in the state is classified by DEC according to its best use. The PWL maintains information regarding how well specific individual waterbodies support these best uses and, where they do not, the degree of *use impairment*.

Figure 1. "Best Uses" of New York's Water Resources

- Water Supply
- Shellfishing
- Public Bathing
- Fish Consumption
- Fish/Aquatic Life
- Recreation
- Aesthetics

Information in the PWL database is generated from a variety of available sources including statewide ambient monitoring data; monitoring of toxic substances in fish and wildlife; fisheries surveys; water quality complaints; beach closure reports; shellfish area closures; and other sources. After the available water quality information is compiled, it is evaluated to determine:

- whether an impairment to a specific use is occurring
- the severity of the impairment
- the level of documentation supporting the impairment information

The severity of impairment to a specific use is evaluated and categorized along a spectrum. Use impairment categories in order of most impaired to least impaired are *precluded*, *impaired*, *stressed* and *threatened*. These impairment categories are outlined below.

Precluded uses occur where frequent/persistent water quality or quantity conditions and/or associated habitat degradation prevents all aspects of the particular waterbody use. For example, the local health agency prohibits swimming at a public beach because of poor water quality, or a fish consumption advisory recommends eating no fish from a lake due to PCB contamination.

Impaired uses occur where occasional water quality or quantity conditions and/or habitat characteristics periodically prevent the use of the waterbody. For example, the local health agency may close a beach for a period of time after a storm event due to high coliform bacteria levels from combined sewer overflows and stormwater runoff; however the beach is later reopened. In other cases of impaired uses, frequent or persistent conditions discourage use of the waterbody. For example, although swimming may be allowed in a lake, algal blooms and dense rooted aquatic vegetation may deter swimming. A waterbody may also be classified as impaired where some aspects of its best use are limited or restricted, e.g., where a fish consumption advisory recommends eating no more than one meal per month of fish taken from a waterbody. Finally, a waterbody is considered impaired where its use requires additional/advanced

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measures or treatment. Examples of this situation include the need to provide additional filtering of a water supply due to high turbidity, or for aquatic vegetation control (via mechanical harvesting or application of herbicides) to allow for swimming and boating on a lake.

Stressed waterbody uses are not significantly limited or restricted, but water quality or quantity conditions and/or associated habitat degradation may periodically discourage the use of the waterbody. For example, high turbidity that occurs after rainstorms does not preclude, but may temporarily deter, swimming in a lake; or ambient water column analyses may indicate occasional standard violations but effect on the fish/aquatic life is not evident.

Threatened waters refer to waterbodies where conditions currently support uses and the ecosystem exhibits no obvious signs of stress, however existing or changing land use patterns may result in future use restrictions or ecosystem disruption. While a case can be made for any waterbody as being threatened, here the use of the term is limited to situations where a very tangible and specific condition poses a threat to water quality. The threatened classification would apply where monitoring data reveals a declining trend in water quality which, if continued, would result in use impairment. A waterbody may also be listed as threatened if uses are not restricted and no documented problems exist, but the waterbody is a highly valued resource deemed worthy of special protection and consideration. Such *Special Protection Waters* are often associated with public drinking water supplies and will be identified by DEC Division of Water staff during the PWL update process.

In addition to the level of severity, the PWL further characterizes use impairments based on how much is known about these impairments. Under this schema, impairments may be classified as *known*, *suspected* or *possible*, depending upon available documentation (see Figure 2).

Improving the PWL

Since its inception in 1983, the PWL – then known as the Priority Water Problems (PWP) List – has served as DEC's tool to manage the flow of water quality information generated by the Division as well as outside sources. However, its effectiveness at providing an appraisal of water quality has been limited by inconsistent and subjective water quality information and inadequate review and verification of that information. A recent review of the PWL by the Division concludes that, while the PWL generally provides an adequate framework for managing statewide and site-specific water quality information, the quality of PWL information needs improvement. Improvements planned for the system involve the following:

- *Impairment, Severity, Cause/Source* and *Documentation Information* that is specifically defined and consistently applied;
- *Tracking the Status and Resolution of Water Quality Problems* along a spectrum that includes verification of a problem, documentation of its causes and sources, development of corrective strategies, and the implementation of such strategies.

Figure 2. Best Use Impairments are Classified based on Available Documentation of Water Quality Problems.

Known - *Water quality monitoring data has been compiled and/or studies conclude that the use of the waterbody is restricted to the degree indicated by the listed severity.*

Suspected - *Anecdotal evidence, public perception and/or specific citizen complaints suggest that the use of the waterbody may be restricted. However, water quality data/studies that establish an impairment have not been completed or there is conflicting information.*

Possible - *Land use or other activities in the watershed are such that the use of the waterbody could be affected. However, there is currently very little, if any, documentation of an actual water quality problem.*

- *Extensive Narrative Discussion* of the details of the water quality problem, causes/sources, history and monitoring/documentation related to listed waterbodies, including references for source(s) of information;
- *Regular Review and Update of the PWL Segments* in all drainage basins over a five-year cycle where two or three basins are updated each year. This update includes a thorough review of all segment information, integrating the PWL update with the results from the Rotating Intensive Basin Studies (RIBS), DEC's statewide ambient water quality monitoring program;
- *Comprehensive and Inclusive Update Process* that solicits and incorporates water quality information from all Division of Water and other relevant DEC programs, as well as other state, federal, and local agencies, and citizen/volunteer groups.

The Waterbody Inventory: An Expanded Database for New York State Waters

Recent efforts to update PWL information have been accompanied by considerable discussion concerning which segments should be on the PWL and which segments – due to a lack of a significant problem or limited problem documentation – should be excluded from the list. At the same time, the Division of Water recognizes a growing need to monitor and report on "good" water quality resources that support all their best uses, in addition to those with problems. The Division has decided to expand the inventory database of waterbodies to include water quality information for **all** waters in the state (not just those waterbodies with problems). This database is still in the development stage, and is called the *Waterbody Inventory*.

For program management decisions, the Division must also be able to cull from this expanded comprehensive list a smaller number of *priority* segments to be the focus of Division resources. In other words, there is a need for both a comprehensive Waterbody Inventory of available water quality information for all waters in the state, and also for subsets of this inventory based on problem documentation, the severity of use impairment and the potential resolvability of the problem. The Priority Waterbodies List will then be one subset of the comprehensive Waterbody Inventory, and will continue to provide focus for remedial and resource protection activities by the Division and its various local watershed partners.

To enhance its use as a management tool, water resources listed in the larger

comprehensive Waterbody Inventory will be segregated into one of four Water Quality Assessment Categories. The first two categories use definitions borrowed form the PWL and, taken together, will comprise the PWL. These categories include:

Water Quality Problem Segments These are waterbodies with documented (verified) use impairments with a severity of *precluded*, *impaired* or *stressed.* This category includes both *High/Medium Resolvability* segments, where the Division considers the expenditure of additional resources to improve water quality to be worthwhile given public interest and/or the expectation that a measurable improvement can be achieved; and *Low Resolvability* segments, with persistent/intractable problems on which the Division is not likely to spend any significant resources (e.g., atmospheric deposition).

Threatened Segments include waterbodies where uses are not restricted and where no water quality problems currently exist, but where specific land use or other changes in the surrounding watershed are known or strongly suspected of threatening water quality. Also included in this category are waterbodies designated by the Division as highly valued *Special Protection Waters* worthy of special protection and consideration.

A third Waterbody Inventory category is **Segments Needing Verification.** These are waterbodies that are thought to have use impairment, but for which there is not sufficient documentation of a problem. These segments will be designated to be verified by the Division (during the *Comprehensive Assessment Strategy* rotating basin schedule) or by other watershed partners.

The last category includes **Segments Considered to Have No Impairment**, such as:

1) segments monitored and documented as being *Not Impaired*, and
2) segments that have not been assessed.

Segments listed in these latter two categories are entered into the comprehensive Waterbody Inventory, but are not considered to be on the Priority Waterbodies List. For these waters, additional monitoring and assessment activities to document use impairments, causes and sources, and water quality status are more appropriate than remedial/corrective or resource protection efforts.

Updating the Watershed Inventory and PWL

The new process by which the Watershed Inventory/Priority Waterbodies List (WI/PWL) is being updated has influenced recent modifications to the data. In the past, DEC conducted periodic updates of the PWL (usually every 2 or 3 years) for the entire state. However, due to the many waterbodies in the state, numerous segments on the list, and multiple sources of water quality information, it was difficult to review, verify and objectively evaluate all the available water quality information. To address this shortcoming, the approach to updating the list was changed. Rather than focus on the entire state at one time, the review and update process targets two or three major drainage basins each year. This cycle allows for a more focused review each year, while providing coverage of the entire state over five years (see Table 1).

The WI/PWL review and update process includes a significant public participation component. An established network of County Water Quality Coordinating Committees around the state facilitates this component. The process also incorporates input from other avenues of citizen participation such as the Water Management Advisory Committee (WMAC), the Statewide NonPoint Source Committee, citizen advisory committees (CAC) for Remedial Action Plans (RAPs) and Lake Management Plans (LaMPs), and other state and local groups with a water quality focus, such as the Finger Lakes - Lake Ontario Watershed Protection Alliance. This emphasis on public involvement is reflected in the update process milestones outlined by DEC:

- Identify *Watershed Partners*, including County Water Quality Coordinating Committees and other agency and public groups that would be appropriate to include in the review.
- Conduct regional WI/PWL Workshops to inform Partners about the process and the information to be incorporated into the update.
- Solicit water quality information, from within and outside DEC, to be evaluated and compiled into the WI/PWL Basin Update.
- Prepare and distribute (by DEC) Draft WI/PWL information for the targeted basin, with review and comment on the draft by Partners.
- Respond to comments on the Draft and publish the Final WI/PWL Basin Update.

Updated regularly to reflect ongoing monitoring efforts, the WI/PWL represents the Division's most complete repository of water quality information. As such, it provides the basis for generating the state's periodic water quality assessment reports (including the 305(b) Report to USEPA), identifying areas where additional monitoring is needed, and targeting restoration and pollution prevention efforts and resources. In short, the better the information contained in the WI/PWL, the more effective New York State's water quality programs will be.

For more information on the Watershed Inventory or Priority Waterbodies List, contact Jeff Myers at Bureau of Watershed Assessment, Division of Water, NYS Department of Environmental Conservation at Room 392, 50 Wolf Road, Albany, NY 12233-3502, tel: (518) 457-7130, e-mail: Jamyers@gwdec.state.ny.us❑

Table 1: Priority Waterbodies List (PWL) Basin Update Schedule

YEAR	BASINS
1998	Black River*, Chemung River, St. Lawrence River
1999	Susquehanna River, Lower Hudson River**
2000	Lake Champlain, Atlantic Ocean-Long Island Sound
2001	Genesee River*, Delaware River
2002	Niagara River-Lake Erie*, Mohawk River
2003	Allegheny River, Oswego-Seneca-Oneida Rivers**, Upper Hudson
2004	Black River*, Chemung River, Lower Hudson River**
2005	Susquehanna River, Lake Champlain, Atlantic-Long Island Sound
2006	Genesee River*, Delaware River, St. Lawrence River
2007-11	Repeat the 2002-2006 Basin Cycle (and repeat again every 5 years)

** The Lake Ontario Minor Tributaries Watershed has been divided among the Niagara River-Lake Erie, Genesee River, Oswego-Seneca-Oneida Rivers, and Black River Basins.*

*** The Ramapo River and Housatonic River Basins are included in the Lower Hudson River Report.*

The Fishhook Water Flea: A New Exotic Zooplankter to New York

by Joseph C. Makarewicz, Ph.D.,
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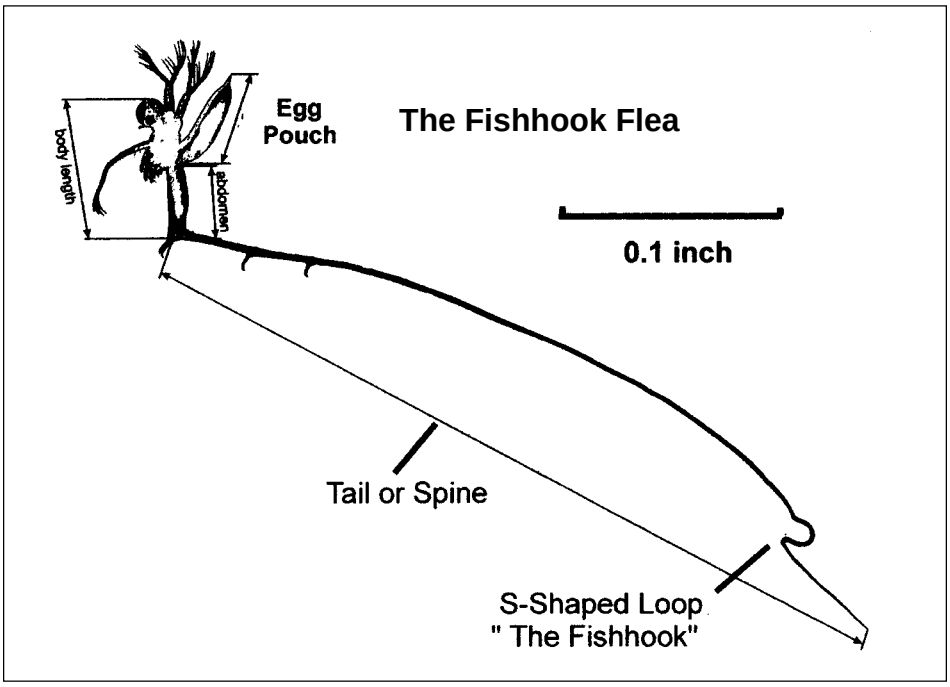

Lake Ontario and the Finger Lakes have some new inhabitants. Nestling side by side, 50 to 80 of them could fit within one square inch of space. At less than 1/2 inch in length with their tails, their small size belie the potential that these fishhook water fleas hold for altering how our lakes function. During the summer of 1998, Lake Ontario fishermen kept reporting a slime or jelly-like substance on their fishing lines. At first, we believed it might be the spiny water flea, another alien organism first observed in Lake Ontario in 1989. However, closer examination revealed that the organism possessed an S-shaped loop or "fishhook" on its tail. It was the "fishhook water flea". These crustaceans possess a long, spiny S-shaped tail several times the length of their small bodies, which hook together into masses to form the jelly-like substance found on fishermen's lines. Like the spiny water flea and zebra mussels, fishhook fleas are native to the Black, Azov and Aral Seas of Russia. Fishhook fleas likely hitched a ride in ballast water from a ship coming into the United States from that region and found a new home when water from that ship was released into Lake Ontario, even though both U.S. and Canadian laws prohibit the discharge of ballast waters into the Great Lakes.

Technically, the fishhook flea is called ***Cercopagis pengoi***. It is difficult to pinpoint the exact day of introduction to Lake Ontario. We do know it was absent from samples taken in early June, July, and August of 1998, 4 miles north of Hamlin Beach State Park in New York. By early September, abundance reached approximately 320 individuals/cubic yard of water. The following year, abundance reached 1500 individuals per cubic yard in Lake Ontario. The fishhook water flea is generally found in the upper warm layers of lakes in July and August and reproduces almost exclusively by cloning. Theoretically, a single female can seed an entire lake and are known to carry as many as 17 eggs in Lake Ontario. However, during inhospitable periods such as the winter, the female produces a sexual "resting egg" which allows the fishhook flea to withstand adverse conditions. The establishment of the fishhook flea in 1998 in Lake Ontario coincided with the lowest levels in twenty years of the alewife, a fish a biologist would expect would eat, reduce and control the fishhook flea.

Introduction of exotic species, like the fishhook flea, to new habitats is one of the most significant mechanisms by which humans are altering the planet. In the Great Lakes, exotics have impacted ecosystem structure and function in ways we are just beginning to understand. For example, the zebra mussel and the closely related quagga mussel have clogged water intake structures from drinking water plants, blocked outboard motor water pumps, littered beaches with their shells and have altered aquatic food webs in Lake Erie from a pelagic community to a benthic/pelagic system more comparable to the nearshore marine environment. In general, little is known about the fishhook flea in North America. At present, we do not even know what eats it or what it eats. Young fish may not be able to eat the flea because of the spiny tail. Concerns about the fishhook flea center on the fleas' competition with young and small fish, since they all eat the same tiny aquatic organisms. Besides having an impact on food availability to young and small fish, addition of an extra step to the food web may result in biomagnification of toxic chemicals and increased levels of pesticides in trout and salmon of sport fishing interest. The multi-billion dollar sport fishing industry for trout and salmon on the Great Lakes may be affected.

Expansion of the current North American range from Lake Ontario and establishment in other Great Lakes is likely. By late August of 1998, the fishhook flea was observed in the St. Lawrence River near Alexandria Bay - 40 miles down river from Lake Ontario. The potential of this species to invade and migrate quickly to new areas is great. Working with Web Pearsall of the NYS DEC during the summer of 1999, we confirmed the presence of fishhook fleas in several of the Finger Lakes (See Table 1). Its tolerance of brackish waters also suggests it may invade marine estuaries in

North America. Mechanisms of dispersal include water from bait buckets and small-boat bilge waste originating from infected lakes. Even waterfowl are implicated. If a duck's feet are dangling in waters laden with fishhook fleas and the duck moves to an uninfected lake, the fishhook flea may go with it. The ability to produce clones quickly and in great numbers, the ability to generate "resting eggs" and the possession of a "sticky" S-shaped spine promote rapid population growth, viability during unfavorable periods, and rapid dispersal of the fishhook flea. Unless fish predation eliminates them, which has not happened in Lake Ontario, the fishhook flea will become part of the growing number of alien organisms in our lakes and streams.

Joseph C. Makarewiz is a Distinguished Professor of Biological Sciences at the State University of New York at Brockport, Brockport, New York. A team of scientists from SUNY Brockport, Cornell University, and the University of Windsor in Canada have been funded by the Great Lakes National Program Office, the New York Sea Grant Institute and the Niagara County Fisheries Development Board to study the biology, ecology, invasion route and impact of the fishhook flea. For further information, contact Dr. Makarewicz at the Center for Applied Aquatic Science and Aquaculture, Department of Biological Sciences, SUNY Brockport, Brockport, NY 14420, tel. (716) 395-5747.❑

Table 1:
Presence of the fishhook flea in the Finger Lakes of New York State during the summer of 1999.

Lake	Date	Individuals/ cubic m
Seneca Lake	18 August	31.5
Cayuga Lake	25 August	11.6
Otisco Lake	24 August	29
Canandaigua Lake	17 August	Present
Skaneateles Lake	16 August	0.00
Owasco Lake	25 August	2.1
Conesus Lake	Entire Summer	0.0

Special Projects Fund Awards Announced

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. Four projects received FY1999 Special Projects Fund grants totaling $48,148. Projects funded include:

Finger Lakes-Lake Ontario Watershed: A Water Resources Journey Through Interactive Learning - $15,000

Sponsored by the Onondaga County Health Department, in partnership with The Living School Book Project at Syracuse University School of Education, School Districts, and FL-LOWPA.

Based on a similar project for Onondaga Lake, this project will produce a multimedia, interactive learning resource (compact disk) for school students and the general public. The resource will provide students with an overview of the major watersheds and characterize, with a water quality focus, selected waterbodies and watercourses within the Finger Lakes-Lake Ontario Basin. The project will increase public awareness as to the importance of water quality and demonstrate how FL-LOWPA counties working together enhance water quality protection. Developing this resource will provide students of virtually all age groups the opportunity to learn the values of stewardship, the roles of water quality professionals, and provide an important community service.

Development of Municipal Participation in a Watershed Management Plan for the Oatka Creek Watershed - $11,077

Sponsored by the Genesee County Soil & Water Conservation District in partnership with the Monroe County Water Quality Coordinating Committee, Wyoming County Soil and Water Conservation District, and Oatka Creek Watershed Committee.

Data gathering for the Oatka Creek Watershed is underway and work will begin to draft a State of the Watershed report that will serve as a springboard for a full watershed management plan. A major objective of the project is participation of all municipalities within the watershed to insure that the final plan addresses all local concerns and will be implemented by the municipalities. Funding will be used to hire an intern to work throughout the Oatka Creek Watershed to enlist municipal participation and develop consensus on actions needed to protect and enhance the resource and to begin work on a watershed management plan.

Field Fluorometer Water Quality Testing Program - $14,604

Sponsored by the Jefferson County Soil and Water Conservation District in partnership with NYS DEC Region 6 and Jefferson County Water Quality Coordinating Committee.

Project funding will provide for the purchase of a field fluorometer for use in the Water Quality Coordinating Committee's ongoing water quality programs and nonpoint source pollution investigations, as well as for water quality activities by concerned agencies and environmental groups of Jefferson County. Primary uses will include inspection and monitoring of private and small commercial wastewater treatment systems in the county, both in areas where groundwater is impacted because of shallow clay-like soils and where surface waters are affected because of dense lake/river front development. The fluorometer would also be available to trained personnel working on water quality issues in the region.

Water Chestnut Management on Oneida Lake: A Comprehensive Multi-County Approach - $7,467

Sponsored by the Oswego County Planning Department in partnership with the Oswego County Soil and Water Conservation District, New York State DEC, Central New York Regional Planning and Development Board, Oneida Lake Watershed Initiative, Oneida Lake Association, and Cornell University-Biological Field Station.

(continued on page10)

The invasive, exotic aquatic plant known as the water chestnut (*Trapa natans*) has entered the shallow waters of Oneida Lake (western end). The water chestnut out competes other submersed aquatic vegetation that waterfowl enjoy, endangering feeding and wintering grounds for many ducks. Water chestnut creates large mats, restricting (if not eliminating) boating, preventing fishing, shielding light from native plants, and altering the natural ecosystem. The goal of this project is to document the extent of water chestnut in Oneida Lake waters, and to pursue public education and eradication measures. This project will provide a management example for other water bodies suffering from this invasive plant.

The Special Projects Fund Review Committee is comprised of three Water Resources Board members representing a cross-section of agencies in the three FL-LOWPA regions (eastern, central, western). The review committee is appointed to rank proposals and submit recommendations to the Executive Committee. The committee for this round included: **Fred Sinclair** (Allegany County), **Robert Pierce** (Ontario County) and **Elizabeth Mangle** (Hamilton County). Special thanks to these individuals for their efforts!❑

MEETINGS AND EVENTS

♦ New York State Wetlands Forum 2000 Spring Meeting

"Streams, Nationwide Permits, Wetland Mapping and Other Contentious Issues: Can Consensus Be Found in the New Century?"
March 30-31, 2000
LOCATION: Holiday Inn, Binghamton, New York
More information contact: (518) 783-1322

♦ "Caring for Creeks 2000" Watershed Education Symposium

Sponsored by Rochester Area Community Foundation
***DAY 1**: Friday, April 28, 2000 • 9:00 am-3:00 pm*
LOCATION: Genesee Country Village, Mumford, New York

Presentations on five important area creeks: Oatka, Irondequoit, Northrup, Black and Allens Creeks (with a special presentation on Allens Creek given by students of the Harley School). Keynote presentation by the Canandaigua Lake Watershed Task Force. Discussion, Exhibits, Lunch. Fee approximately $11.00.

Earth Day Water Education Activities

***DAY 2**: Saturday, April 29, 2000 • 9:00 am-3:00 pm*
LOCATION: Many Sites Throughout the Greater Rochester Area

Hands-on, family-oriented water education activities held throughout the area! These activities include interpretive hikes along each of the five featured creeks; freshwater lab and Lake Ontario simulator at Rochester Museum and Science Center; streambank erosion project at Powder Mills Park; "Your Home, Your Water, and You" program at Cornell Cooperative Extension; Watershed "Mystery Tour"; Long Pond Wetlands Tour; Monroe Community College Water Watch Training; and more! Events FREE
More information on Caring for Creeks 2000 contact Evan Lowenstein at RACF (716) 271-4271 ext. 4305 or email elowenstein@racf.org

♦ Federation of Lake Associations Annual Conference

May 5-7, 2000
LOCATION: White Eagle Conference Center, Hamilton, New York
More information contact: 800-796-3652.

♦ Great Lakes Great Rivers 2000: A Vision for Tomorrow

May 22-25, 2000
LOCATION: Cornwall, Ontario

Hosted by the St. Lawrence River Institute of Environmental Sciences in collaboration with the University of Ottawa and the Mohawk Council of Akwesasne. The conference will feature workshops, plenary speakers, and sessions on over 35 topics related to understanding, restoring, and protecting the Great Lakes-St. Lawrence River Ecosystem. Registration costs vary.
More information contact: Christina Collard (613) 936-6620 or ccollard@riverinstitute.com or on the internet at www.iaglr.org/conference.

♦ Northeast Training Workshop: Stream Restoration & Natural Channel Design

May 23-25, 2000
LOCATION: Lake Morey Resort, Fairlee Vermont

Workshop to promote and build capabilities of local governments, states and federal agencies, not-for-profits and others in the Northeast to protect and restore rivers, streams and associated wetlands with special emphasis upon natural channel design for problem prevention and problem solving.
More information visit: http://www.aswm.org/upcoming.htm

♦ Rivers 2000 Week

June 3-11, 2000

Go out and get involved in river and stream cleanups, canoeing, river walks, or other activities to show your appreciation of rivers!❑

Farm Stewards in Tompkins County

For the second year in a row, a family farm in Tompkins County won the New York State Environmental Stewardship Award. The 100-year old **Carey Farm in Groton, NY** received the 1999 award, given by the *American Agriculturalist*, NYS Department of Agriculture and Markets, and Empire State Potato Club. **Craig Schutt**, District Manager of Tompkins County SWCD and FL-LOWPA representative nominated **Daniel and Ann Carey** and family for the award. The Carey's operate a 620-acre dairy operation with 180 milking cows, 200 acres of corn and 200 acres of haylage. The farm is located within the Owasco Lake watershed, which serves as a drinking water supply for the city of Auburn. Conservation practices on the farm are documented back to 1946 when Dan's grandfather signed a cooperative agreement with Tompkins County SWCD. The Carey's are recognized for their innovation, use of new technologies, and cost-cutting strategies. Conservation practices used on the farm include intensive rotational grazing, manure storage, milkhouse waste treatment, and developing a nutrient management plan. According to Schutt, the rotational grazing system resulted in permanent vegetation cover on 100 plus acres classified as highly erodible, saving three to eight tons of soil per acre per year. For the Carey's, recent farm conservation practices have resulted in a healthier herd and help ensure the viability of the land for their four children in the fifth generation of this family farm.❑

The Carey's of Groton in Tompkins County are 1999 Environmental Stewards.

Welcome...

The Water Resources Board welcomes new and returning officers to the 2000-2001 Executive Committee. **Jeff Parker** (Steuben County) began his two-year term as Chair in January. **Jim Malyj** (Seneca County) and **Karen Noyes** (Oswego County) return for a second term as Vice-Chair and Secretary, respectively. **Russ Nemecek** (Onondaga County) joins the committee as Treasurer. The WRB welcomes the leadership and expertise of this team. Sincere gratitude for his dedication and service is expressed to **Mark Watts** (Chemung County) who completed his 1998-1999 term as Chair.

For more information on WRB members and activities, check www.fllowpa.org❑

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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.

~ ~ ~ ~ ~ ~ ~

WRB Chairperson *Jeff Parker*
WRB Program Coordinator/TIE Editor *Betsy Landre*
WRB Program Assistant *Marion Balyszak*
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Submissions are encouraged. Address all queries to:
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