

Appendix I
Interim Recommendation Project Description

1999 Project Descriptions not available in digital format.

Year 2000 Project Descriptions

Project 1

A_ProjectTitle:

Biomonitoring of Four Major Tributaries of Northern Cayuga Lake: Yawger Creek, Great Gully, Paine's Creek and Salmon Creek

B_Principal_Investigator: Niamh O' Leary, Ph.D.; A. Thomas Vawter, Ph.D.

B_Affiliation: Wells College

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B_MiddleName:

B_LastName: O' Leary

B_StreetAddress: Wells College

B_City: Aurora

B_State: NY

B_Zip: 13026

B_Email: noleary@wells.edu

B_AreaCode: 315

B_Exchange: 364

B_PhoneNumber: 3279

C_ProjectCategory: Research

C_ProjectCategory_other:

D1_addresses_impairment: yes

Impairment:

Impairment of water supply by a variety of pollutants from agricultural and urban run-off, as well as streambank erosion. Likely pollutants include sediments, pathogens, pesticides and nutrients.

D2_solution: yes

D3_watershed_wide: yes

D4_human_use: yes

D5_lake_ecology: yes

D6_watershed_ecology: yes

E_description:

This project will establish a means by which routine biomonitoring of four major tributaries (Yawger Creek, Great Gully, Paine's Creek and Salmon Creek) of northern Cayuga Lake can be achieved. Under the guidance of Wells College faculty, students enrolled in environmental studies courses and engaged in independent research at Wells College will monitor the tributaries for two groups of organisms--macroinvertebrates and coliforms. The species distribution

within macroinvertebrate communities is an indicator of overall water quality; coliforms are indicators of specific pathogens in the water. The aim of this project is to accumulate an appreciable volume of reliable baseline data on the water quality in these tributaries, and to establish a means by which changes in the quality of the water can be detected. The data will be made accessible to others in the watershed via a web page. Data collection will begin in the fall of 2000 for an initial period of 2 years. Consistent, long-term monitoring, as is proposed here, is required to determine the degree of impairment of waterbodies accurately, and to allow a means by which their impairment or degradation can be tracked. Ultimately this project will be expanded to include or coordinate with efforts in other subwatersheds of Cayuga Lake.

F_impact_on_management:

Development and implementation of an effective Cayuga Lake Watershed Management Plan requires accurate knowledge of the water quality status of the lake and its tributaries. This project would provide a consistent, reliable, and long-term source of water quality data for tributaries in the northern region of the Cayuga Lake Watershed, a region that has not received as much attention as the southern end due to the latter's higher population density and relative wealth of educational and research institutions with the resources and the personnel to conduct monitoring.

G1_impact_on_watershed:

This project will serve as a model for combining the educational needs of an environmental studies program with the data needs of the surrounding watershed and, as such, could be relatively easily emulated by other educational institutions or, in modified form, by volunteer service organizations. Once it is established, the pilot project at Wells could serve as a coordinating "umbrella" for these other, similar projects.

G2_solution:

The Cayuga Lake Watershed Draft Preliminary Watershed Characterization identifies the need for baseline water quality and loading characterization of subwatersheds. The use of macroinvertebrates and coliforms as indicators of water quality in streams is well established. Standard methods allow calculation of water quality indices that allow comparisons among streams within the watershed and elsewhere.

G3_evaluation:

The success of this project will be evidenced by the accumulation of high quality data on the coliform flora and macroinvertebrate communities of the chosen tributaries and the insertion of these data in an accessible database for use by the Intermunicipal Organization and other interested parties.

G4_operation_maintenance:

Long-term maintenance of this program during the academic year will be integrated into the regular activities of Wells College faculty and students. The project will, however, require summer stipends for faculty and students and funds for the purchase of some expendable biomonitoring supplies. The current proposal is for a 2-year pilot program.

G5_identified_impairment:

The diversity of pollutants that have led to the placement of Cayuga Lake and its tributaries on the DEC 1996 Priority Waterbodies List would be adequately monitored in this project using the proposed indicators. In addition, the Cayuga Lake Watershed Draft Preliminary Watershed Characterization Report identifies Yawger Creek, Great Gully, Paine's

Creek and Salmon Creek as likely to be impaired to a greater or lesser extent by pollutants in run-off and erosion. Several data gaps do exist, however, for the chosen tributaries, and these gaps would be addressed by the study proposed here.

G6_human_use:

Yes. According to the Cayuga Lake Watershed Draft Preliminary Watershed Characterization Report, the recreational use and potential drinking water use of the tributaries in question are likely to be affected by pollutants in run-off and erosion. Thus accurate quantification of the extent of these problems via biomonitoring is warranted.

G7_lake_watershed_ecology:

The biomonitoring proposed here will help us identify potential ecological problems in the subwatershed studied. Only problems identified through monitoring can be addressed by remediation

G8_benefit_degrade:

The project will be of benefit to the general quality of the lake and its watershed as it will provide a means by which best management plans for water quality can be evaluated. There will be no negative effects on water quality.

G9_use_consideration:

According to the NYS DEC 1996 Priorities Waterbodies List, the uses of Cayuga Lake and its tributaries are restricted by the pollutants and pathogens, which would be effectively monitored in this study. Data collected in this project would lead to effective targeting of remediation practices to broaden actual use of the waterbodies.

G10_expenditure_limits:

The 2-year proposed duration of the pilot project will require \$28,000 for summer stipends, and \$10,000 for supplies.

G11_funding_considerations:

Wells College will cover most of the costs of the project by paying the salaries of the principal investigators for the 9 months of the academic year and by providing laboratory space, equipment, computer facilities and other elements of infrastructure

G12 number of criteria met: 11

H1_real_cost:

NYS DOS (Clean Water/Clean Air Bond Act): We will be requesting \$38,000 for a 2-year biomonitoring pilot program.

Wells College Environmental Studies Program: Additional salaries, supplies and overhead for biomonitoring September to May for 2 years.

H2_cost_specifics:

Summer stipends for students and principal investigators: \$28,000

Supplies: \$10,000

Total: \$38,000

H3_continued_funding: yes

Project 2

A_ProjectTitle: Water Remediation

B_Principal_Investigator:

Doug Field, Village Trustee; Melinda Kostreva, Clerk/Treas; John Reid, Engineer, R&D Engineering

B_Affiliation: Village of Union Springs

B_FirstName: Edward

B_MiddleName: C.

B_LastName: Trufant

B_StreetAddress: 26 Chapel Street

B_City: Union Springs

B_State: NY

B_Zip: 13160

B_Email: n/a

B_AreaCode: 315

B_Exchange: 889

B_PhoneNumber: 7341

C_ProjectCategory: Implementation

C_ProjectCategory_other:

D1_addresses_impairment: yes

Impairment:

There are trace levels of Volatile Organic Compounds, Cis-1,2-Dichloroethene and Trichloroethene in the public drinking water supply.

D2_solution: yes

D3_watershed_wide: no

D4_human_use: yes

D5_lake_ecology: yes

D6_watershed_ecology: yes

E_description:

The Village of Union Springs has undertaken a Water Remediation Project to eliminate the presence of Volatile Organic Contaminants in the public water supply. Levels of the VOCs Cis-1,2-Dichloroethene and Trichloroethene are

above New York State Department of Health regulations and pose a health concern for all Village and 280 Town of Springport residents. Our engineers have proposed to correct this problem by installing a tower air stripper unit.

The design of the project has been initiated so that when approval is received and funding obtained, the project can commence immediately under the following schedule:

- Finalize design and permits - 1 to 30 days following approval
- Project construction - 30 to 150 days following approval
- Project closeout - 150 to 200 days following approval

F_impact_on_management:

The project will correct urgent problems with the Village water system that threaten the public health and continued economic vitality of the regions. A safe drinking water supply is essential in providing a healthy, liveable neighborhood for residence and activities.

Additionally, the VOCs detected in the groundwater will travel to tributaries and finally into the lake. They will not remain contained and thereby have a watershed-wide effect.

G1_impact_on_watershed:

Provide a safe municipal water supply and address a groundwater contamination problem.

G2_solution: Yes, installation of a Tower Air Stripper Unit.

G3_evaluation: Yes, ongoing State and County mandated water sample analysis.

G4_operation_maintenance:

The Village of Unions Springs has operated a public water supply system since the 1930s. The funding is an expected part of the municipal budget and financed completely through user fees.

G5_identified_impairment: Yes, cleans a contaminated municipal water supply.

G6_human_use: Yes, drinking water.

G7_lake_watershed_ecology: Yes, extent of VOCs moving offsite unknown.

G8_benefit_degrade: Yes, eliminates VOCs from groundwater reducing the amount traveling to tributaries and the lake.

G9_use_consideration: Yes, drinking water.

G10_expenditure_limits: Total Project Cost = \$177,000.00

G11_funding_considerations:

Denied HUD CCI funding. Submitted funding request of \$100,000. to New York State Department of State Quality Communities Demonstration Program.

G12_funding_criteria_met: Nine.

H1_real_cost:

The project's component tasks and costs are as follows:

- | | |
|---------------------------------|-----------|
| 1. Vertical air stripper | 35,000.00 |
| 2. Booster pump | 7,000.00 |
| 3. Stripper enclosure (bldg.) | 30,000.00 |
| 4. Piping modifications | 20,000.00 |
| 5. Electrical & instrumentation | 15,000.00 |
| 6. Site Work | 10,000.00 |

7. Engineering, Legal,
Administrative & Contingency 60,000.00

TOTAL COST 177,000.00

H2_cost_specifics: \$6,000.00 projected maintenance and operation costs

H3_continued_funding: no

Project 3

A_ProjectTitle: Cayuga Lake Road: Hydrologic Modification

B_Principal_Investigator: Phil Griswold

B_Affiliation: Seneca County Soil and Water Conservation District

B_FirstName: Phil

B_MiddleName:

B_LastName: Griswold

B_StreetAddress: 12 North Park Street

B_City: Seneca Falls

B_State: NY

B_Zip: 13148

B_Email: PG@NYSENECSFA.FSC.USDA.GOV

B_AreaCode: 315

B_Exchange: 568-4568

B_PhoneNumber: 4366

C_ProjectCategory: Implementation

C_ProjectCategory_other:

D1_addresses_impairment: no

Impairment:

This project will potentially address the impairments listed in the 1996 PWL List. Those being: Water Supply, Bathing, Fishing Fish Propagation, Aesthetics and boating.

D2_solution: yes

D3_watershed_wide: yes

D4_human_use: yes

D5_lake_ecology: yes

D6_watershed_ecology: yes

E_description:

An area along Cayuga Lake Road in the Town of Romulus exhibits a severe erosion problem. Installation of rock rip/rap and drop structures are the recommended corrective measures for this site. If funded, this project could begin within 30 days.

F_impact_on_management:

When completed, this project will correct a severe erosion problem in the above mentioned area as well as reduce the amount of sediment entering Cayuga Lake.

G1_impact_on_watershed:

This project will reduce sedimentation in Cayuga Lake. This project will also be a demonstration project targeting Highway Superintendents and local legislators in the benefits of proper road bank management.

G2_solution:

Yes. Installation of rock rip-rap and drop structures is a widely accepted best management practice. All construction will be to USDA Natural Resources Conservation Service specifications.

G3_evaluation:

This project will not be evaluated from a scientific standpoint. The project will result in tangible benefits however. Stabilization of the road bank will result in reduced maintenance costs to the Town of Romulus.

G4_operation_maintenance:

Long term maintenance cost will be minimal. These costs will be the responsibility of the Town of Romulus Highway Department.

G5_identified_impairment:

Yes. Cayuga Lakes use impairments are listed as Water Supply, bathing, fishing, fish propagation, aesthetics and boating. Two types of pollution listed are nutrients and sediment. This project will potentially reduce the inputs of these pollutants to Cayuga Lake.

G6_human_use:

Yes. Reduction of sediment and nutrient inputs to the lake could potentially improve the condition of the lake within the affected area. This would potentially reduce the above mentioned use impairments.

G7_lake_watershed_ecology:

Yes. The reduction of erosion and the resulting nutrient and sediment loading to the lake can potentially improve the ecology of the watershed and the lake.

G8_benefit_degrade:

The project will potentially benefit the quality of both the watershed and the lake by reducing nutrient and sediment loading to the lake.

G9_use_consideration:

The project will potentially improve all the listed use impairments listed in the 1996 Priority Waterbodies List.

G10_expenditure_limits:

The total project cost will be \$10,000. The Town of Romulus and the Seneca County SWCD will provide approximately \$5,000 in in-kind services.

G11_funding_considerations:

Funding for this project has been requested from two sources:

The Great Lakes Basin Program and the 1999 Water Quality Coordinating Committee Mini Grants Level III program.

G11_funding_considerations:

H1_real_cost:

\$5,000 Materials to be purchased

\$4,850 Personnel and equipment costs (in-kind)

\$150 Educational materials

total \$10,000

Funding for this project will again be requested from the Great Lakes Basin Program.

H2_cost_specifics: No maintenance and operation costs are anticipated.

H3_continued_funding: no

Project 4

A_ProjectTitle: ITHACA/CAYUGA HEIGHTS/LANSING AREA WASTEWATER COLLECTION AND TREATMENT SYSTEM IMPROVEMENTS

B_Principal_Investigator: Lawrence P. Fabbri, P.E., L.S.,

B_Affiliation: Assistant Superintendent DPW, City of Ithaca Water & Sewer Division

B_FirstName: Lawrence

B_MiddleName: Peter

B_LastName: Fabbri

B_StreetAddress: 510 First Street

B_City: Ithaca

B_State: NY

B_Zip: 14850

B_Email: larryf@ci.ithaca.ny.us

B_AreaCode: 607

B_Exchange: 272

B_PhoneNumber: 1717

C_ProjectCategory: Implementation

C_ProjectCategory_other: Approximately, \$4.2million local funds have been spent to date.

D1_addresses_impairment: yes

Impairment:

Nutrients south end of lake summer exceedance of 20 ug/l average. failing septic systems, raw sewage overflows, and lack of total secondary treatment in the Six Mile Creek, Cascadilla Creek, Fall Creek, and Salmon Creek Watersheds emptying into Cayuga Lake representing approximately 50% of flow into Cayuga Lake.

D2_solution: yes

D3_watershed_wide: yes

D4_human_use: yes

D5_lake_ecology: yes

D6_watershed_ecology: yes

E_description:

See last year's description.

This joint municipal project involving six municipalities on the southern end of Cayuga Lake, bordering tributaries that contribute over 50% of the flow into Cayuga Lake, addresses water quality impacts related to phosphorus discharges directly into the lake at the two wastewater plant discharges. The total regional plan will abate health concerns and water quality impacts related to failing on-site systems on the lake and within tributary areas of Six Mile Creek, Cascadilla Creek, Fall Creek, and Salmon Creek. Likewise, all known existing sewer system raw sewage overflows that occur within the wastewater collection systems or at plant bypasses to the Flood Channel, Six Mile Creek, Cascadilla Creek, Fall Creek, Salmon Creek, and Cayuga Lake will be mitigated. This project provides municipal wastewater treatment service to currently unsewered areas in the Town of Lansing, Village of Lansing, and Town of Dryden while providing a solution to all groundwater contamination problems! of on-site systems and treatment deficiencies of existing larger scale in-ground or package plants. The area has prepared and submitted a Unified Engineering plan accepted by DEC as sufficient for Bond Act applications. The area has spent \$4.2million local money on improvements thus far. The projects will be implemented in 2000-2002 if adequate grants are received to move forward expeditiously.

F_impact_on_management:

This project is just part of a more inclusive City of Ithaca and neighbors effort to eliminate point and non-point source pollution in the same watersheds. These collective improvements will compliment the balance of the watershed protection efforts directed to soil and stream bank stabilization, farm management practices, etc. The state of sewage treatment systems will be dramatically improved at the south end of Lake Cayuga. These collective improvements will effect the greatest integrated environmental package of improvements ever to support urbanization and protect the water quality of waters discharging to Cayuga Lake.

G1_impact_on_watershed:

The tertiary phosphorus removal systems will implement best available filter technology that could prove to be applicable at any other treatment facility discharging to Cayuga Lake or its tributaries. The current permitted loading of phosphorus of 100+ pounds per day is expected to be reduced to no more than 50 pounds per day even with the expanded treatment capacity at the Ithaca wastewater palnt to 13MGD and expanded service area in Lansing and Dryden.

G2_solution:

The phosphorus removal systems are up and down flow filter systems some with continuous backwashing and high rate settling filters all currently being evaluated for the most cost-effective solution to meet target phosphorus removals. The sewer collection upgrades and extensions are proven technology with much data comiled through engineering facility plans and infiltration inflow studies.

G3_evaluation:

Yes! Phosphorus discharges at the two plants are currently monitored so before and after data will be available. The City is cooperating with multiple agencies in gathering nutrient information before and after these improvements and Cornell Lake Source Cooling to evaluate impacts on the southern Lake basin. The recorded bypassing of secondary treatment at the Cayuga heights Plant will be eliminated. The overflow of raw sewage to tributaries will be eliminated. Discharges of package plants will be eliminated. Failing septic systems will be eliminated. All these improvements are absolute and verifiable.

G4_operation_maintenance:

Operating and maintenance costs added to the improvements will be funded through user rates without the need for additional outside funding beyond help with the first cost capital expenses. The City has had successful user charge systems in place since 1906. Cayuga Heights has had similar systems successfully in place since building their plant in 1954. The surrounding Town and Villages involved all have viable financial plans associated with sewer districts to sustain O&M funding.

G5_identified_impairment:

Yes!PWL#0705-0040 Water clarity in the southern Cayuga Lake is reduced due to inflows of sediment from the watershed and from algal particulates generated within the lake basin. Uses of this water segment are considered impaired due to the high turbidity. Swimming at Stewart Park has been precluded for more than 20 years, and the NYSDEC notes that macrophyte growth is suppressed, thus limiting fish habitat. Recent USGS estimates of the sedimentation rate in the southern Cayuga Lake document the accelerated deposition of solids over the past several decades. The state guidance value for total P (summer average 20 micrograms per liter) is exceeded in this water segment.

G6_human_use:

Reliability of wastewater collection and treatment at the plants will increase, reducing potential for overflows, periods of diminished treatment, and dramatically reducing point source phosphorus contributions to the lake in critical dry flow periods. The projects will enhance human uses of the Lake and its tributaries by eliminating bacteriological concerns, protecting the Class AA recreational and drinking water supply portion of the Lake, and lowering the nutrient levels contributing to algae growth and resulting decaying odors.

G7_lake_watershed_ecology:

The southern basin of the Lake will support a wider range of fish sizes. Southern Cayuga Lake is classified as Class A, with designated best use for water supply following treatment. This region of Cayuga Lake is heavily used for boating and other water contact recreation. The Allen H. Treman State Marine Park is located in the water segment affected by the proposed project. Cayuga Lake supports two distinct fish communities: a littoral zone warm water community and a cold water community dominated by lake trout, rainbow trout, brown trout, and landlocked salmon. Rainbow trout and salmon travel through shallow southern Cayuga Lake on their annual spawning migrations to the southern tributaries.

G8_benefit_degrade:

The benefits are numerous and great to the Lake and watersheds contributing 50% of the flow to Cayuga Lake as elaborated above. The phosphorus removal technologies will greatly help to reduce point source nutrients contributed to the Lake. Elimination of raw sewage overflows, incomplete treatment, and package plant point discharges will reduce loads of pathogens, nitrates, and phosphorus to local surface waters and groundwater. There is no conceivable degradation as construction disturbances will be totally mitigated through a Stormwater Management Plan.

G9_use_consideration:

See 7 above. With the dramatic decrease of pathogens, nitrogen, and phosphorus contributions to the lake in a manner than can be sustained and regulated, the complementary efforts going on in the watersheds to reduce non-point source pollution will improve the fishery, boating, drinking, and swimming opportunities along the southern part of the lake and its shore line.

G10_expenditure_limits:

The project costs projected in our 1999 submission was \$19,510,000 with \$8,061,000 being funded locally. We had been successful in receiving \$7.4 million in Bond Act Funds in September 1998. This was actually increased to a total of \$7,513,920 in the latest grant awards to the Finger Lakes in April 2000. Our \$4 million dollar project given the highest

rating in the 1999 rankings by the technical group and I/O, a Score of 317, HAS NOT BEEN FUNDED TO DATE. This was submitted as part of a larger regional package for Bond Act Funding in August 1999. A revised total budget of \$26million includes more enhanced treatment and some more financial assistance for sewer and I/I work. This request through the I/O would increase of previous request to the I/O from \$4 million to \$7 million. We have some indication this is the highest rated project in the Fingerlakes but that Albany would like to wait until this next cycle to award additional funds. Local funding in the end even if we were to receive additional funds from the Bond Act would approach \$11.5 million. We have spent \$4.2 million of this already. The Watershed inclusion of this project in your management plan and priorities is essential to its funding and more all inclusive results and success.

G11_funding_considerations:

See 10 above. The local communities have a \$26 million+ improvement program outlined for wastewater improvements. The current total request through the I/O for additional Bond Act funds is \$7 million, including the \$4 million not acted upon from the I/O top 1999 priority for interim recommendation to the Department of State. The \$7 million will further help Lansing with sewer construction, Cayuga heights and the Ithaca Plant owned by the City and Town of Ithaca, and Town of Dryden and with overflow and I/I problems in the interceptor conveyance system. No other outside funding other than low interest EFC revolving fund loans is available. The support of this project and inclusion in the Cayuga Lake Watershed Management Plan is essential to its successful funding for major improvements to one of the few urban areas discharging to a Finger Lake. Grant funds have been lacking for major wastewater improvements identified over twenty-five years ago to adequately serve the Ithaca region.

G11_funding_considerations: All criteria are met in multiple ways.

H1_real_cost:

\$26million +, State Bond Act \$14.5 million (\$7.5 received to date)
local funding \$11.5 million (\$4.2+ spent to date)

H2_cost_specifics:

The Cayuga Heights Plant and the Ithaca Plant owned by the City and Town of Ithaca and Town of Dryden have combined operational budgets of \$2.7million per year. The increased cost of treatment will be adsorbed in the user charges that Cayuga Heights has had a system for since 1954 and the City has had a system for since 1906.

The sewer collection system is funded annually for the six municipalities at over \$2 million per year. The costs to the part of the system with replacement interceptors will actually be less. The costs where sewers will replace septic systems and package plants will be covered in sewer district costs.

H3_continued_funding: no

Project 5

A_ProjectTitle: Ag Nutrient Management in Seneca County

B_Principal_Investigator: Phil Griswold, Neil LeRoux

B_Affiliation: Seneca County SWCD, USDA Natural Resources Conservation Service

B_FirstName: Phil

B_MiddleName:

B_LastName: Griswold

B_StreetAddress: 12 N. Park St.

B_City: Seneca Falls

B_State: NY

B_Zip: 13148

B_Email: PG@nysenecafa.fsc.usda.gov

B_AreaCode: 315-568-4315-568-4315

B_Exchange: 568

B_PhoneNumber: 4366

C_ProjectCategory: Implementation

C_ProjectCategory_other:

D1_addresses_impairment: yes

Impairment:

This project will address the impairments listed in the 1996 PWL list. Those being: Water Supply, Bathing, Fishing, Fish Propagation, Aesthetics, and Boating

D2_solution: yes

D3_watershed_wide: yes

D4_human_use: yes

D5_lake_ecology: yes

D6_watershed_ecology: yes

E_description:

41 Livestock Farms have been identified in the portion of the Cayuga Lake Watershed that lies within the boundaries of Seneca County. These farm operations contain approximately 5000 animal units and utilize 15,447 acres of farm land. Many of these operations are located within a close proximity to the various tributaries or to Cayuga Lake itself. 29 of these farms were identified as Dairy Farms. The goal of this project is to provide funding to create Comprehensive Nutrient Management Plans to these farms as well as provided funding as needed to construct Best Management Practices, mainly manure storage facilities.

F_impact_on_management:

This project would reduce nutrient and possibly pathogen loading to many of the tributaries of Cayuga Lake.

G1_impact_on_watershed:

Reduced Nutrient, Sediment and possibly pathogen loading reaching the Cayuga Lake.

G2_solution:

Yes. The implementation of Comprehensive Nutrient Management Plans, and construction manure storage and other manure management facilities are proven best management practices.

G3_evaluation:

This project can possibly be evaluated using long term water quality monitoring.

G4_operation_maintenance:

Long term operation and maintenance will be the responsibility of the individual farmer.

G5_identified_impairment:

Yes. The potential reduction of Nutrient and sediment loading that this project can potentially accomplish, may address the impairments listed in the PWL. A common complaint, aquatic vegetation can be reduced.

G6_human_use:

Yes. The potential reduction in Nutrient and Sediment loading can enhance all potential human uses of the lake. A reduction in Aquatic vegetation and algal growth will enhance human uses of the lake.

G7_lake_watershed_ecology:

Yes. The potential reduction in Nutrient and Sediment loading can address potential watershed and lake ecology.

G8_benefit_degrade:

This project will benefit the general quality of the lake and its tributaries. It will reduce use impairments listed in the PWL.

G9_use_consideration:

This project will potentially improve all of the listed use impairments listed in the PWL.

G10_expenditure_limits:

The total cost to accomplish all of the goals of this project is \$885,000.00

G11_funding_considerations:

Funding for portions of this project has been requested from 2 sources in the past:

- AG Non-Point Source Program (Ag and Markets)
- EQUIP

G11_funding_considerations:

H1_real_cost:

\$885,000 Comprehensive Nutrient Management plans for 41 Livestock operations and construction of manure management facilities in 20 of 29 dairy operations.

Funding Sources would be:

- EQUIP
- AG Nonpoint Program (Ag and Markets)

H2_cost_specifics:

Operation and Maintenance costs will be the responsibility of individual farmer/recipients.

H3_continued_funding: no

Project 6

A_ProjectTitle: Proposed Water System Improvements Village of Interlaken

B_Principal_Investigator: Resource Associates Cortland, N. Y. 13045

B_Affiliation:

B_FirstName: Barbara

B_MiddleName: B.

B_LastName: Stewart

B_StreetAddress: PO 130 3683 Clinton St.

B_City: Interlaken

B_State: NY

B_Zip: 14847

B_Email: bbs2@cornell.edu

B_AreaCode: 607

B_Exchange: 532

B_PhoneNumber: 4917

C_ProjectCategory: Implementation

C_ProjectCategory_other:

D1_addresses_impairment: yes

Impairment:

our off shore wells have gone dry twice in 2 years, forcing us to use water from cayuga lake.

D2_solution: yes

D3_watershed_wide: no

D4_human_use: yes

D5_lake_ecology: yes

D6_watershed_ecology: yes

E_description:

there are 3 parts: emergency artificial recharge, placement of a permanent mechanism to allow us to remove water from cayuga lake in case of a water emergency.

booster station improvements: install a new water storage tank, this would allow us to pump at the night rate. as our energy rates are very high this would be a significant help in keeping our usage rates current at least with no increase. modifications to the booster pumps would help provide additional water flow to the system in case of fire needs.

and part 3 concerns the current water tank, at this time we are not going to take direct action. we are considering a replacement tank sometime in the future.

F_impact_on_management:

with some of the modifications in place, it would be our hope that we would not have to use the lake water, cayuga. which we feel is a direct impact. an indirect positive would be the reduced use of high cost electricity.

G1_impact_on_watershed: reduced use of lake water

G2_solution: if we have a drought, our lake shore well would go dry again.

G3_evaluation: na

G4_operation_maintenance:
hopefully with grant monies that will allow for improvements, we will be able to better manage these areas.

G5_identified_impairment: no

G6_human_use: no

G7_lake_watershed_ecology:
the additional tank would allow a much more efficient use of water from our well that is fed by an aquifer. hopefully we would not need the emergency recharge system.

G8_benefit_degrade: benefits the quality of the lake/aquafer by more efficient use of the natural resource.

G9_use_consideration:

G10_expenditure_limits:

G11_funding_considerations:

G11_funding_considerations:

H1_real_cost:

part1:emergency artifical recharge \$38,461
part 2: booster station improvements \$145,000
part 3: if we need tank in the future \$326, 167

H2_cost_specifics: non available at this time

H3_continued_funding: no

Project 7

A. Project Title: **HIGH RESOLUTION-MULTISPECTRAL REMOTE-SENSING CHLOROPHYL- α QUANTITATION**

B. Principal Investigator(s), Affiliation(s), Contact Information: (Provide name of primary contact person, address, phone no., and e-mail address)

Jose Lozano, City of Ithaca Environmental Laboratories
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(607) 273- 8381, Fax (607) 273-8433
e-mail: JLL13@cornell.edu

C. Project Category: Implementation, **Planning**, Education, **Research**, Other (specify):
Planning and Research

D. Please respond to the following questions. (Each may be expanded in Section E – Project Description):

1. Does the project address an identified impairment to the watershed? Yes or No (indicate one)
If so, what is that impairment? Yes, Nutrients load

2. Does the problem identified have an existing solution? Yes or No (indicate one): Yes, BMPs implementation at the most critical locations
3. Can the project be implemented on a watershed-wide basis (either now or in the future)?
Yes or No (indicate one): Yes, Once implemented it will be an economical and easily implemented measurement of the overall water quality of the lake
4. Does the project address human uses of the watershed? Yes or No (indicate one): Yes, Recreational, Fisheries, Drinking Water.
5. Does the project address lake ecology? Yes or No (indicate one): Yes, It provides a measurement of the trophic state of the lake
6. Does the project address watershed ecology? Yes or No (indicate one): Yes, it allows to locate and identify the worst areas in which nutrients are being discharged into the lake.

E. Project Description. (In 150 words or less, describe what the project is; why, where, how and when it will be done; and project readiness):

The concentration of chlorophyll- α is one of the best indicators of the trophic state of waterbodies. The large scale resolution studies, using remote sensing quantitation, have proven this to be the case. The application of this methodology at a small-scale resolution is proposed here.

Silt and nutrients loading in Cayuga Lake have been identified as the most probable cause for impairment in Cayuga Lake. The simultaneous upgrading of the two major wastewater treatment plants and several stream bank stabilization projects in Cayuga Lake, offer a unique opportunity to study the improvement in the water quality and ecology at Cayuga Lake, using “conventional” water-quality parameters and remote-sensing quantitation of chlorophyll- α at a meter scale resolution.

Project Objectives: Establish baseline water quality conditions in the Lake and tributaries for:

- i) Chlorophyll- α by multiprobe sensing and laboratory analysis calibration
- ii) Phosphorous (P), Ammonia (NH₃), Total Dissolved Solids (TDS), Dissolved Oxygen (DO), and Temperature (T), GPS location, and Depth

F. Briefly describe the overall impact of the project in terms of watershed management.

The measurements of chlorophyll alpha will be useful in several ways, (i) it will allow the characterization of the main areas in the lake receiving the largest nutrient loads, (ii) it will allow the targeting of these most important areas for priority remediation, and (iii) it will provide a quantitative measurement of how well best management practices, and which ones, are performing.

G. Describe the project in relation to the Evaluation Criteria (summarized numerically below – refer to Evaluation Criteria section for more detail).

1. What is the overall positive long-term impact on the watershed and/or lake?

Provides a quantitative measurement of the overall water quality of the lake. Not a localized evaluation, but a lake wide, practical way to measure the entire lake's overall health.

2. Does the problem to be addressed have an existing solution?

Yes, the implementation of BMP's for both point and non-point pollution sources

3. Does the project have a means of being evaluated? What means will you use?

The project has a specific outcome, the distribution and concentration of Chlorophyll alpha in the Lake. This will be calibrated by direct laboratory assays by independent laboratories, as well as the peer-review of the technical Watershed Group based at the Cornell Center for the Environment.

4. Operation and maintenance consideration.

Annual calibration assays will be conducted, after the two year sampling seasons.

5. Does the project address an identified impairment?

Yes, Nutrients loading into Cayuga Lake and the data gaps that exist in the precise localization of these sources.

6. Does the project address potential human use of the lake and the watershed?

Yes, Drinking water, recreation, and fisheries

7. Does the project address potential lake and watershed ecology?

Yes, It provides a measurement of the trophic state of the lake

8. Does the project potentially benefit/degrade the general quality of the lake, or the watershed feeding the lake?

It will benefit the lake's ecology by improving the identification of priority areas in the lake. It would also (i) allow the characterization of the main areas in the lake receiving the largest nutrient loads, (ii) allow the targeting of these most important areas for priority remediation, and (iii) it will provide a quantitative measurement of how well best management practices, and which ones, are performing.

9. Capital expenditure limit.

Estimated In-Kind Contribution: Staff cost per year (includes the use of two certified environmental laboratories): \$14,212.00 per year + Sampling and Analysis Total Cost: \$4,112.25 per year + Equipment & supplies

\$15,000.00 (HydroLab multiprobe \$12,000.00, Geographic Positioning System \$5,000.00) that gives a TOTAL LOCAL MATCHING FUNDS: \$35,324.25

The Ithaca Area Waste Water Treatment Facility has funded \$10,000.00 for the purchase of a vessel. Funding from a 2001 RFP to the Finger Lakes –Lake Ontario Watershed Protection Alliance, FL-LOWPA, will be used for the purchase of sampling equipment. This proposal has been endorsed by the Tompkins County Water Resources Council.

(FY 2000-01 Project Budget: Itemized Expenses: Samplers \$3,000.00, + Boat \$20,000.00, + Supplies \$8,000.00 to give a TOTAL COST: \$44,000.00)

10. Actual use consideration.

Planning agencies as well as Conservation offices and researchers will derive useful information from the measurements. This is a long-term lake wide, practical assessment tool to measure Cayuga Lake water quality.

11. Funding considerations.

This proposal will seek funding from the NSF, USDA, NYS-DOS or NASA.

H. Budget

- Provide real cost of the project and identify funding source(s).

A tentative estimate of the project's budget is indicated next.

Budget Request: bimonthly sub-meter resolution, multispectral-resolution remote sensing fly-over info sets over Cayuga Lake (\$150,000.00??), four sets of multiprobe chlorophyl- α sensors (\$32,000.00), laboratory analysis of chlorophyl- α field reference samples (15,000.00), Overhead expenses (15%). Total = 297,000+15%

- Provide cost specifics of maintenance and operation.

These will be derived from the third and subsequent years of operation, taking in consideration three annual measurements (sub-meter resolution, multispectral-resolution remote sensing fly-over info sets over Cayuga Lake (50,000??) and field calibration measurements of Chlorophyll Alpha (\$5,000)

- Will the project require continued funding? Yes or No (indicate one)

Yes, remote sensing and field calibration (\$55,000/year)

Project 8

A. Project Title: SIX MILE CREEK RIPARIAN BUFFER RESTORATION PROGRAM

G. Principal Investigator(s), Affiliation(s), Contact Information: (Provide name of primary contact person, address, phone no., and e-mail address)

APPLICANT MUNICIPALITY: Caroline, City of Ithaca, & Town of Ithaca

CONTACT PERSON: Jose Lozano

Environmental Laboratories, City of Ithaca

525 Third St., Ithaca NY 14850

PHONE: (607) 273-6381 FAX: (607) 2738433

e-mail: jll13@cornell.edu

H. Project Category: Implementation, Planning, Education, Research, Other (specify):
All these categories will be addressed in this project

I. Please respond to the following questions. (Each may be expanded in Section E – Project Description):

7. Does the project address an identified impairment to the watershed? Yes or No (indicate one)
If so, what is that impairment?
Siltation, Habitat degradation, Fisheries, Drinking Water
8. Does the problem identified have an existing solution? Yes or No (indicate one)
Yes, Stream Riparian Buffers Restoration
9. Can the project be implemented on a watershed-wide basis (either now or in the future)?
Yes or No (indicate one) Yes, the project is a multi jurisdictional cooperation
10. Does the project address human uses of the watershed? Yes or No (indicate one)
Yes, Drinking Water and recreational uses
11. Does the project address lake ecology? Yes or No (indicate one)
Yes, it aims at decreasing the silt load at the south end of the lake
12. Does the project address watershed ecology? Yes or No (indicate one)
Yes, Improving fish habitat at a Class A Trout Stream and reducing the silt load at the south end of the Lake

J. Project Description. (In 150 words or less, describe what the project is; why, where, how and when it will be done; and project readiness)

This is an implementation and management program of riparian buffers, designed to decrease silt and nutrients loading to improve water quality and habitat in the Six Mile Creek Watershed. One of the most important impairments of Six Mile Creek is the high silt loading, the associated habitat degradation and the lack of an effective riparian buffer zone management program.

Six Mile Creek, the source of drinking water for the City of Ithaca and a Class A trout stream, is part of the Cayuga Lake Watershed, a priority waterbody located in the Seneca-Oneida Watershed (Category 1 NYS-Unified Watershed Assessment). The Six Mile Creek Management Program has been endorsed by the Cayuga Lake Inter-municipal Organization, the Tompkins County Water Resources Council, the Town of Caroline, and the City of Ithaca.

If this riparian corridor restoration and management program is funded, a critical component of the intermunicipal stakeholders partnership effort will be accomplished and the benefits of riparian buffers would be realized at Six Mile Creek, beyond the basic streambank stabilization already funded by the NYS Clean Air - Clean Water Bond Act.

In partnership with the Center for the Environment, Cornell University we are setting a testing node for end-users (planners, elected officials, watershed stakeholders) of a user-friendly comprehensive water resources modeling program. It will have the ability to answer 'what if' questions pertaining the land use, as well as water resource designated uses, quality, and quantity.

The Six Mile Creek Stakeholders group will be the pilot study for the presentation and simulation of “what-if” scenarios of the effect of riparian buffers have on water quality and stream health.

Twelve sites at Six Mile Creek have been documented in terms of macroinvertebrates, fish, chlorophyll α , water quality parameters, and land cover – usage. The effect of the riparian buffer restoration program will be followed and used to educate the end-users about the benefits of a healthy riparian corridor.

K. Briefly describe the overall impact of the project in terms of watershed management.

Improving fish habitat at a Class A Trout Stream and reducing the silt load at the south end of the Lake this proposal also organizes a multi jurisdictional, multi disciplinary partnership. This partnership includes citizens groups, municipal and federal government, and state and federal agencies. The experience gained during the implementation of this proposal would be easily applied to other areas in the watershed.

The cooperation between the DEC and the Six Mile Creek partnership has now been expanded to work on the Cayuga Lake Inlet restoration project. In a joint effort, these two teams will develop the stream restoration projects simultaneously at the Inlet and at Six Mile Creek.

- L.** Describe the project in relation to the Evaluation Criteria (summarized numerically below – refer to Evaluation Criteria section for more detail).
- 12.** What is the overall positive long-term impact on the watershed and/or lake?
Siltation reduction, habitat improvement (Fish, forest, and wildlife), drinking water quality protection.
- 13.** Does the problem to be addressed have an existing solution?
Yes, the implementation of a steambank restoration program (already funded by 175,000 for Six Mile Creek, ~200,000 for the Inlet), and the restoration of riparian buffer corridors.
- 14.** Does the project have a means of being evaluated? What means will you use?
Yes, Monitoring for water quality and bioassessment is an integral part of the program.
Not only before and after, but also upstream and downstream of the target areas.
- 15.** Operation and maintenance consideration.
The schedule for maintenance is indicated below:
- 16.** Does the project address an identified impairment?

Time Since Installation	Inspection Interval
2 Months	2 weeks (4 total)
6 Months	1 month (5 total)
2 Years	6 months (3 total)

Yes, Silt and nutrient load at the south end of Cayuga Lake

- 17.** Does the project address potential human use of the lake and the watershed?
Six Mile Creek is the drinking water source for the City Ithaca; Fisheries, recreational uses will also benefit from the implementation of the riparian buffer restoration program.
- 18.** Does the project address potential lake and watershed ecology?
Yes. The silt and nutrient load is a priority impairment in Cayuga Lake watershed.
- 19.** Does the project potentially benefit/degrade the general quality of the lake, or the watershed feeding the lake?
Yes, the benefits are direct, by addressing one of the main impairments in the watershed, the reduction of silt load and fisheries habitat improvement is expected to have an immediate beneficial impact on the watershed.
- 20.** Capital expenditure limit.
The total cost of the project as follows:
- | | |
|------------------------------------|---------------------|
| <u>Total Project Costs:</u> | <u>\$487,300.00</u> |
| <u>Local Match:</u> | <u>\$232,200.00</u> |
| <u>State Assistance Requested:</u> | <u>\$100,000.00</u> |
- 21.** Actual use consideration.
The present proposal -Six Mile Creek Stream Corridor Restoration Program- is part of a wider management plan for this watershed. Already funded by the NYS Clean Air - Clean Water Bond Act, the streambank stabilization of Six Mile Creek is already underway.

This stream is also part of a Source Water Assessment Program currently under consideration for funding. This SWAP proposal was prepared in partnership with Dr. Pete Loucks's team at CfE, Cornell University. In this SWAP proposal, all the Cayuga Lake Watershed would be evaluated.

The implementation of Six Mile Creek Watershed Management plan has the highest priority in the Tompkins County Water Quality Strategy Plan. The Six Mile Creek Management Plan has also been endorsed by the Cayuga Lake Watershed Inter-municipal Organization.

Six Mile Creek is a tributary to Cayuga Lake. Both are in the 303(d) priority waterbodies list. The Six Mile Stream Corridor Restoration Program is helping to restore the recreational use of Cayuga Lake, also contributing to protect and improve fisheries by decreasing silt loading

22. Funding considerations.

This proposal is seeking funding from the US Forest Service (487,300).

The local match has been secured already. It was provided by the City of Ithaca Planning Department (\$200,000). The difference is accounted for in staff and other in-kind contributions

H. Budget

- Provide real cost of the project and identify funding source(s).

The total cost of the project as follows:

<u>Total Project Costs:</u>	<u>\$487,300.00</u>
<u>Local Match:</u>	<u>\$232,200.00</u>
<u>State Assistance Requested:</u>	<u>\$100,000.00</u>

This proposal is seeking funding from the US Forest Service (487,300).

The local match has been secured already. It was provided by the City of Ithaca Planning Department (\$200,000). The difference is accounted for in staff and other in-kind contributions

- Provide cost specifics of maintenance and operation.

The maintenance costs are considered here as an independent source of funding. The members of the Six Mile Creek partnership, by incorporating the maintenance of riparian buffers into their annual work programs and local ordinances will create the continuity required by the successful upkeep of riparian buffer corridors.

- Will the project require continued funding? Yes or No (indicate one)

After the three year project duration, the funding, although required for maintenance, will come for an independent source. Please see previous paragraph.

Project 9

A. Project Title:

The Trophic State of Cayuga Lake
As affected by a Reduction of Phosphorous and Silt Loading

M. Principal Investigator(s), Affiliation(s), Contact Information: (Provide name of primary contact person, address, phone no., and e-mail address)

Jose Lozano, City of Ithaca Environmental Laboratories
525 Third St., Ithaca NY 14850
(607) 273- 8381, Fax (607) 273-8433
e-mail: JLL13@cornell.edu

N. Project Category: Implementation, **Planning, Education, **Research**, Other (specify)**

Planning and Research

O. Please respond to the following questions. (Each may be expanded in Section E – Project Description):

13. Does the project address an identified impairment to the watershed? Yes or No (indicate one)
If so, what is that impairment? Yes, Silt and Phosphorus load to Cayuga Lake
14. Does the problem identified have an existing solution? Yes or No (indicate one) Yes, the upgrading of the largest waste water treatment plants and streambank stabilization.
15. Can the project be implemented on a watershed-wide basis (either now or in the future)?

Yes or No (indicate one) Yes, the implementation in a lake-wide basis of this type of project will benefit the watershed, of particular interest are septic systems performance and sources of sediment

16. Does the project address human uses of the watershed? Yes or No (indicate one) Yes, it addresses the protection of drinking water.
17. Does the project address lake ecology? Yes or No (indicate one) Yes. The assessment of the trophic state of Cayuga Lake provides the means to plan an effective management plan for Cayuga Lake.
18. Does the project address watershed ecology? Yes or No (indicate one) Yes. The trophic state is one of the best indicators of the ecological status of Cayuga

P. Project Description. (In 150 words or less, describe what the project is; why, where, how and when it will be done; and project readiness)

The simultaneous upgrading of the wastewater treatment plants and the stream bank stabilization projects provides a unique opportunity to study the effect of the reduction of phosphorous and silt loading on the trophic state of the South end of Cayuga Lake

The objectives of the project are

1. – Establish the Phosphorous baseline of Cayuga Lake, upon nutrient and silt loadings reduction on Cayuga Lake before and after the wastewater treatment plants upgrade and streambank stabilization projects. The objective of this study is to characterize the Phosphorus baseline after a reduction in nutrients and silt loading to Cayuga Lake.

2. - Bacteriological assessment (Total and Fecal Coliforms)

In order to evaluate if there are improvements of the water quality, in terms of bacteriological density on the lake by farm run-off and storm over-flows, the density of Total and Fecal coliforms in the lake will be determined in bi-monthly samplings.

Q. Briefly describe the overall impact of the project in terms of watershed management.

The results of this proposal will establish the general health status of Cayuga Lake and allow for the planning of remediation strategies. It will also provide data to formulate successful grant proposals for the actual implementation of the Cayuga Lake Management Plan. The data derived for this project will be of great value in accomplishing a quantitative way to assess the performance of implemented best management practices. It will also provide the information required to evaluate the placement of Cayuga Lake in the waterbodies lists that determine funding priorities, i.e., The Unified Watershed Assessment and Restoration Priorities of New York State. It can also have an impact on the placement of Cayuga Lake in the 303(d) List.

R. Describe the project in relation to the Evaluation Criteria (summarized numerically below – refer to Evaluation Criteria section for more detail).

23. What is the overall positive long-term impact on the watershed and/or lake?

Provides a quantitative assessment tool for watershed management and determination of funding priorities when requesting State or Federal funds for the implementation of the Cayuga Lake Management plan.

24. Does the problem to be addressed have an existing solution?

Yes, the lack of up to date information will help to plan a better management plan

25. Does the project have a means of being evaluated? What means will you use?

Yes, the direct product of the work will be the peer-reviewed assessment of the trophic state of Cayuga Lake.

26. Operation and maintenance consideration.
The sampling and analysis of data is the main cost. The Operation/Maintenance costs are only a minimal part. They are restricted to equipment maintenance and operation.
27. Does the project address an identified impairment?
The need for up-to-date information, and the need of a monitoring program have been established in the preliminary assessment. The data gaps identified in the preliminary characterization report are addressed by this proposal.
28. Does the project address potential human use of the lake and the watershed?
Yes, it has a direct effect the water quality of the like by providing a quantitative measurement.
29. Does the project address potential lake and watershed ecology?
Yes, by gauging the trophic state of the lake, we gain a valuable planning tool.
30. Does the project potentially benefit/degrade the general quality of the lake, or the watershed feeding the lake?
The potential benefits are substantial. See section F, above.
31. Capital expenditure limit.

BUDGET

STAFF: SUBTOTAL per year: \$10,306.00

SAMPLING & ANALYSIS: SUBTOTAL \$4,112.25 per year

SUBTOTAL Equipment and Supplies Total: \$49,000.00 (First year)

TOTAL: First Year \$63,418.25 per year

LOCAL MATCHING FUNDS:

STAFF SUBTOTAL: \$10,306.00 per year

SAMPLING AND ANALYSIS SUBTOTAL COST: \$4,112.25 per year

EQUIPMENT AND SUPPLIES TOTAL: \$15,000.00 (First year)

TOTAL LOCAL MATCHING FUNDS: \$29,418.25

TOTAL COST : \$34,000.00

32. Actual use consideration.
The information derived from this study will be available to all Cayuga Lake stakeholders. Planning departments and local government officials will have access to information useful in decision making.
33. Funding considerations.
The present proposal is funded by the monitoring program undertaken by the Town and City of Ithaca, as well as Dryden through the Special Joint Sub-committee, SJS, at the Ithaca Waste Water Facility. The total matching funds, \$39,418.00, has been allocated to the purchase of a sampling vessel, and monitoring equipment. The staff in the project has given the backing required for this project by the SJS endorsement of a monitoring program for Cayuga Lake. This proposal is seeking the endorsement of the IO to be able to seek funding from the NYS Department of State.

H. Budget

- Provide real cost of the project and identify funding source(s).
The total cost of this project is \$63,000.00 during the first year, \$34,000.00 will be the amount requested, for the first year, by the present request for endorsement.
The cost of the project in each of the two more years of the duration of the project is \$20,000.

- Provide cost specifics of maintenance and operation.

The project will require funding during three years. Each year \$10,000.00 will be allocated to maintenance and operation.

- Will the project require continued funding? Yes or No (indicate one)

Yes, we are requesting funding for three years. The start-up costs are quite high, in relation to the operation/maintenance costs of the second and subsequent years. It can be said that it makes good financial sense to run the monitoring program for at least three years.

Project 10

A. Project Title:

Defining a Source Water Assessment Program (SWAP) for the Cayuga Lake Watershed and the Hydrological, Ecological and Environmental Conditions of Watersheds Undergoing Socio-Economic Changes Affecting Land and Water Use.

S. Principal Investigator(s), Affiliation(s), Contact Information: (Provide name of primary contact person, address, phone no., and e-mail address)

- Daniel P. Loucks, Professor, Civil and Environmental Engineering, Cornell University
- Mark B. Bain, Associate Professor, Natural Resources, Cornell University
- Rolf J. Pendall, Assistant Professor, City & Regional Planning, Cornell University
- Tammo S. Steenhuis, Professor, Agriculture and Biological Engineering, Cornell University
- Jose Lozano, Director, Environmental Laboratories, City of Ithaca

Contact: J Lozano JLL13@cornell.edu 525 Third St., Ithaca NY 14850, Phone (607) 273-8381, FAX (607) 273-8433.

T. Project Category: Implementation, **Planning, Education, Research**, Other (specify)
Planning, Education, and Research

U. Please respond to the following questions. (Each may be expanded in Section E – Project Description):

19. Does the project address an identified impairment to the watershed? Yes or No (indicate one)
If so, what is that impairment? Yes, the lack of a drinking water source assessment
20. Does the problem identified have an existing solution? Yes or No (indicate one)
Yes, the development of the objectives of this proposal will provide an assessment of the drinking water sources in Cayuga Lake.
21. Can the project be implemented on a watershed-wide basis (either now or in the future)?
Yes or No (indicate one)
Yes, the coverage of the present SWAP program includes all the Cayuga Lake watershed.
22. Does the project address human uses of the watershed? Yes or No (indicate one)
Yes. Drinking Water
23. Does the project address lake ecology? Yes or No (indicate one)
Yes. The ecological good health of the Lake will be the best SWAP.
24. Does the project address watershed ecology? Yes or No (indicate one)

Yes, this proposal also has a community-participation-based objective: to develop a suite of improved computational tools that will allow stakeholder groups to work effectively with professionals in specifying management strategies for watershed development and water quality protection.

- V.** Project Description. (In 150 words or less, describe what the project is; why, where, how and when it will be done; and project readiness)

The objective of this proposal is to conduct a detailed diagnostic study of Land Use, Hydrology, Limnology and Bioassessment of Cayuga Lake and the streams tributaries of Cayuga Lake in order to establish a Source Water Assessment Program. Emphasis is placed on Phosphorus and Sediments loading in Cayuga Lake for TMDL development, since the New York State Department of Environmental Conservation (NYS DEC) has placed Cayuga Lake on the Water Bodies Priority List indicating the need to study Phosphorus and Sediments Loadings. Data will be compiled from existing sources (EPA,USGS, Tompkins County, City of Ithaca, Bolton Point, Lake Source Cooling Project) and/or collected for one year. Other water quality parameters (pH, T, TDS, DO) are also included. Cayuga Lake is one of the Finger Lakes, located in the Great Lakes Basin. Cayuga Lake and the Finger Lakes are classified by the NYS DEC as priority watersheds. The impaired uses identified for Cayuga Lake are swimming, and because of the heavy siltation, fisheries are also impacted.

- W.** Briefly describe the overall impact of the project in terms of watershed management.

This proposal is primarily driven by the research objective: to better understand and predict the socioeconomic processes taking place in urbanizing watersheds and the water quality and ecological impacts resulting from these processes. The proposal also has a community-participation-based objective: to develop a suite of improved computational tools that will allow stakeholder groups to work effectively with professionals in specifying management strategies for watershed development and water quality protection. If such strategies are to help protect water quality, open space, and other valued environmental attributes, these tools must be able to simulate the multiple interdependent impacts of alternative watershed land use and water management policies and practices.

Through such understanding and tools our objective is to fill the major data and technology gaps that currently limit the usefulness of a watershed management approach for establishing and implementing Source Water Assessment Programs (SWAPs) and Total Maximum Daily pollutant Load (TMDL) requirements.

- X.** Describe the project in relation to the Evaluation Criteria (summarized numerically below – refer to Evaluation Criteria section for more detail).

- 34.** What is the overall positive long-term impact on the watershed and/or lake?

Changes in a watershed's land use and cover will impact that watershed's hydrology. Both land use and hydrology will impact the watershed's water quality and ecology. Section 303(d) of the Clean Water Act requires states to identify pollution-impaired water bodies and develop plans to reduce pollutant loads

Development of TMDLs requires a broad understanding of point and nonpoint pollutant sources, the processes that influence their magnitude, timing, attenuation, transformation and transport to water bodies, and how they affect aquatic and riparian (flood plain) biota.

- 35.** Does the problem to be addressed have an existing solution?

Yes. The processes to develop SWAP or TMDLs programs tend to be highly site-specific. In their efforts to comply with the Clean Water Act, local environmental planning agencies and/or watershed authorities are challenged by frequent lack of data, information and modeling tools. This proposal addresses these data gaps.

- 36.** Does the project have a means of being evaluated? What means will you use?

All the questions formulated in this proposal will require the development, calibration, verification and then application of predictive models. Having these models will allow us together with the stakeholders in the three watersheds to analyze and simulate relationships among

- alternative land use or urbanization patterns including sprawl, farming and forestry practices,
- total amounts of point and nonpoint source pollutants generated and their fate and transport through the watershed.

- the socio-economic, environmental and ecological impacts of the time series of pollutant loadings resulting from alternative land and water management policies and practices.

37. Operation and maintenance consideration.
Not applicable

38. Does the project address an identified impairment?
Drinking water, and information data gaps

39. Does the project address potential human use of the lake and the watershed?
Yes, Land use, stormwater runoff, and planning

40. Does the project address potential lake and watershed ecology?

Yes, given that the main objective of this proposal is the detailed diagnostic study of Land Use, Hydrology, Limnology and Bioassessment of Cayuga Lake and the streams tributaries in order to establish a Source Water Assessment Program.

41. Does the project potentially benefit/degrade the general quality of the lake, or the watershed feeding the lake?
Yes. Emphasis is placed on Phosphorus and Sediments loading in Cayuga Lake for TMDL development.

42. Capital expenditure limit.
Approximately \$700,000 for the proposed three year duration of the project.

43. Actual use consideration.
We intend to address the research questions outlined above in the combined Cascadilla-Fall-Six Mile Watersheds flowing into Cayuga Lake in south central New York. These contain areas that have been urbanized since at least the 1800s; suburban areas developed in the 1950s to 1990s; and still-rural areas that represent important visual, ecological, and hydrologic resources for their watersheds. These rural areas are experiencing residential development, and employment decentralization also seems likely in the coming several decades. Recent developments have led to an increase in rural households with relatively high incomes and high values on open space. The new residents are both concerned and ready to do something about open space preservation. They have formed land trusts, voted for municipal open-space purchases, and advocated local zoning changes and growth management programs.

44. Funding considerations.
This proposal will seek funding from the federal SWAP program, the US EPA, and the NYS – DOS.

H. Budget

- Provide real cost of the project and identify funding source(s).
Approximately \$700,000 for the proposed three year duration of the project. This proposal will seek funding from the federal SWAP program, the US EPA, and the NYS – DOS.
- Provide cost specifics of maintenance and operation.
Not applicable.
- Will the project require continued funding? Yes or No (indicate one)

The total cost of the project, during the proposed three years, is approximately \$700,000.00

Project 11

A. Project Title: Stream Restoration at the Barrile Site in the Town of Caroline

B. Mr. Donald Barber
Town of Caroline Supervisor
108 Landon Road
Ithaca, NY 14850
(607) 539-3395

C. Implementation of Best Management Practices on the Six Mile Creek to address sedimentation, drinking water, and nutrient and pathogen concerns.

D. 1.) Yes (1996 Priority Waterbodies List: water supply, fish propagation; Tompkins County Water Quality Strategy Plan: sedimentation and nutrients)
2.) No
3.) Yes
4.) Yes
5.) Yes
6.) Yes

E. Project Description

The project is located along the main corridor of Six Mile Creek, a major tributary of Cayuga lake. The project site is located in the Town of Caroline in Hamlet of Slaterville Springs, starting at the Crispell farm extending to the State Road 79 bridge. The area of concern totals approximately 3,000 feet in length. Previous work at the site includes gravel removal and straightening of the stream corridor, which increased the speed and velocity of the stream, causing 80-100 feet of streambank erosion on each of six properties (one farm and five homes).

Due to this erosion, septic systems at this site are currently located within 50 feet of the streambank. Further encroachment of the stream could have extreme negative impacts on other local sources of drinking water (private wells) and pathogen loading in the Six Mile and Cayuga Lake watersheds.

Restoration of this area would reinstate the natural curvature of the streams by installing rock weirs, rock veins, and rootwads in and along the streambank and streambed (using large stones); and securing streambanks using bioremediation and buffer strips installation. To ensure the longevity of this work, project construction will also lower the slope of and stabilize the streambanks and streambeds.

The project will begin pending award of financial resources.

F. Overall Impact on Watershed Management

This project has the potential to dramatically impact watershed management in the Six Mile Creek and Cayuga Lake watersheds in terms of improving overall water quality including sources of drinking water. This would be accomplished by:

- reducing sedimentation by stabilizing streambanks and streambeds and installing buffers strips,
- implementing best management practices (bioremediation and buffer strips),
- reducing potential nutrient and pathogen pollution of public and private drinking water sources, and
- creating terrestrial and aquatic habitat by remediation and via the stream restoration techniques employed.

Additionally, this restoration will reduce nutrient, pathogens, and sedimentation in the Six Mile Creek watershed and the Cayuga Lake watershed, identified in the Cayuga Lake Watershed Primary Characterization as pollutants of concern.

G. Project Description for Evaluation Criteria

1.) This project: will lead to increased water quality in Six Mile Creek and Cayuga Lake watersheds; provides a model project for homeowner and farmers that could be transferred to similar conditions around Tompkins County and the Cayuga Lake watershed; offers a more environmentally friendly approach to stream restoration problems that integrates the principles of stream mechanics; and considers contiguous properties affected by these conditions rather than just individual properties.

2.) Although work has been conducted previously at this site on several occasions, that work was not successful because it looked at short-term, site specific approach to creek management. The proposed solution of stream restoration (modeled after the Dave Rosgen techniques) takes a more natural and long-term approach to stream management and has been successfully employed in other areas of the country and New York State, including Greene County. Steuben and Chemung Counties are also beginning to use this approach. All work will be conducted to the specifications of the USDA National Resource Conservation Service.

3.) Measuring progress at this site could include evaluating the amount of sedimentation in the settling ponds upstream of the Six Mile Creek drinking water reservoir and at the gauging station at German Cross Road (the gauging station provides historical data for sedimentation and nutrients); the amount of erosion at the area of concern (feet of property lost); and the creation of wildlife habitat and aquatic and terrestrial species (macroinvertebrates, fish, birds, ungulates, etc.)

4.) The site will require periodic monitoring and maintenance for the first 2-3 years after project construction. Once the necessary maintenance and structural corrections have been made at the site and vegetation has been established, the project is considered final and permanent and will require little to no maintenance thereafter. Any unanticipated costs incurred after the repositioning and establishment of vegetation will be the responsibility of the Town of Caroline.

5.) This project addresses many identified impairments including:

- **1996 Priority Waterbodies List** (water supply, fish propagation)
- **Cayuga Lake Watershed Preliminary Characterization** (sedimentation, nutrients and pathogen loading)
- **Tompkins County Water Quality Strategy Plan** (sedimentation, nutrients)
- **Town of Caroline Watershed Committee** (flood mitigation, private property loss, sedimentation, water quality)

6.) This project could dramatically impact drinking water sources for the Town of Caroline; the City of Ithaca, both of which depend on Six Mile Creek for drinking water. To some extent, this project would improve drinking water sources (Cayuga Lake) for other watershed residents as well. Additionally, this project could address recreation impairments at the southern end of Cayuga Lake due to sedimentation (primarily drinking, swimming, fishing, aesthetics, tourism).

7.) This project directly affects the ecology of the Six Mile Creek watershed ecology by enhancing existing aquatic and terrestrial habitat using rock weirs, cross weirs, and rootwads which cause water to pool as well as bioremediation and buffer strips. This is critical for Six Mile Creek as it is a DEC-identified trout stream.

This project also indirectly addresses the ecology of the Cayuga Lake watershed, particularly the ecology of the southern end of the Cayuga Lake, by reducing sedimentation and enhancing aquatic habitat.

8.) This project benefits both the Six Mile Creek watershed and the Cayuga Lake watershed by reducing sedimentation and preventing conveying problems downstream, implementing Best Management Practices, providing a model for construction and habitat creation that can be used elsewhere in these watersheds, taking a more natural and environmentally-friendly approach to stream restoration, considering several contiguous properties rather than taking a property-by-property approach, and protecting drinking water resources from nutrient and pathogen loading.

9.) This project addresses the actual use impairments identified by the 1996 Priority Waterbodies List, the Cayuga Lake Watershed Preliminary Characterization, the Tompkins County Water Quality Strategy Plan, and the Caroline Watershed Committee including drinking water supply, swimming, fishing, and aesthetics.

10.) The approximate cost of the total project would be \$250,000.00, including all in kind services donated for the project and long-term maintenance and monitoring of the construction at the project site.

11.) Additional sources of funding for the project might include: State Bond Act, Tompkins County Flood Hazard Mitigation, the State Environmental Protection Fund, Great Lakes Commission, and Clean Water Act Section 319 Funds.

12.) The proposed action addresses all of the stated criteria to some degree, including all environmental considerations.

H. Budget

- The total costs for the project are approximately \$250,000 to \$300,000. Additional sources of funding for the project might include: State Bond Act, Tompkins County Flood Hazard Mitigation, the State Environmental Protection Fund, Great Lakes Commission, and Clean Water Act Section 319 Funds.
- Long-term operation and maintenance of the project include some repositioning of rock weirs and plant material in the first two years following completion of project construction. Once vegetation is established at the site, monitoring and maintenance of the site will be minimal.
- Once project construction is completed and vegetation is established, no additional funding should be required for the project.

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