Prioritization of Management and Restoration Alternatives for Cazenovia Lake Cazenovia, New York

Prepared For:

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In 1992, Coastal Environmental Services conducted a detailed diagnostic feasibility study of Cazenovia Lake. Information and data were collected over an approximate one year time frame on the lake's physical, biological and water chemistry characteristics. Emphasis was placed on identifying those factors that were, or in the future could, impact the water quality and overall "ecological health" of the lake. This involved not only examining in-lake factors, but included the in-depth study of the lake's watershed. The findings of that study were used to prepare a Management and Restoration Plan. The Plan was designed to provide management solutions for the lake's existing problems, particularly those that were adversely affecting the quality or the recreational enjoyment of the lake. The Plan also provided guidance to the Cazenovia Lake Association (CLA) regarding measures or actions that should be implemented over time to protect the lake from further, future impact.

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Some of the lake's specific problems noted in the 1992 study were as follows:

1. Excessive weed growth, especially in the lake's north end,

2. Sediment in-filling and the accumulation of silts and organic sediments in the shallow coves and embayments in the lake's north end,

3. Depletion of dissolved oxygen in the deeper waters of the lake (hypolimnion) following the onset of summer stratification, and

4. The internal regeneration and recycling of sedimentary phosphorus in the lake's hypolimnion triggered by the depleted dissolved oxygen conditions (anoxia) that occurred in the deep waters of the lake during the summer.

The study identified, through a combination of modeling and field sampling activities, that the causes for many of the lake's problems were:

1. The influx of nutrients, via groundwater, from the leachate of septic systems. This included systems well removed from the lake's shoreline or immediate watershed. It also included contributions from systems that were considered, from a public health perspective, to be properly operating systems. It was determined that septic related nutrients were stimulating localized algae blooms and patches of weed growth.

2. The influx of nutrients, sediments and contaminants (heavy metals, petroleum hydrocarbons, and organic matter) via stormwater runoff from the surrounding watershed. This included runoff originating from roadways, parking lots, and lawns. Runoff was determined to be a particularly significant cause of the sediment in filling that had been evidenced around the lake, the negative effects of which were most noticeable at the mouth of major storm sewer outfalls.

3. The contribution of nutrients from organic sediment deposits occurring in both shallow and deep waters. This source of nutrients was determined to be stimulating both weed and algae growth. Along the shoreline, especially at the mouth of many of the storm sewer outfalls, some of these sediment deposits had built up because of runoff and erosion problems in the adjacent watershed areas. These deposits proved to be ideal areas for the development of weed beds, which overtime had become increasingly dense. The subsequent growth and die-off of weeds was determined to further exacerbate and contribute to the accumulation of the very organic, nutrient rich sediments. In the north end of the lake, the sediments were found to be naturally organic, owing to their alluvial

origin. Weeds flourish in this section of the lake, both because of the nutrient rich sediments and prevailing shallow water depths. It was determined that boat traffic, and even intense storm events, can disrupt these deposits and facilitate the release of nutrients into the water column. This in turn has the potential to stimulates algae blooms.

These findings led to the development of a Management and Restoration Plan that focused on the control of nutrient loading through the combined implementation of septic management, improved control and treatment of stormwater runoff, erosion control, and homeowner "grass roots" nutrient control techniques. To improve the recreational utilization of the lake, it was recommended that the weed harvesting program be both expanded and intensified.

Over the past six years, the CLA has worked diligently to implement many of the recommendations set forth in the management plan. The efforts of the CLA has led to a septic management ordinance for the lake front section of the watershed, some drainage improvements (most notably at the intersection of Routes 20 and 92), and cooperation from the County to better control erosion problems resulting from the clean out of roadside swales. In addition, the CLA intensified weed harvesting to gain better control of weed growth in the lake. Finally, the CLA has heightened public awareness and has implemented public education efforts for the purpose of reducing nutrient loading, promoting septic management, and reducing impacts to the lake.

Based on the review of the past data and discussions with the CLA, it was concluded that the CLA's objective to both protect and improve the quality of Cazenovia Lake requires an intensification of effort in respect to the control of nutrient, sediment and contaminant loading to the lake. Focus must be placed on reducing inputs from septics and road runoff. To accomplish this, the CLA should do the following:

TASK 1: Stormwater Management:

The influx of sediments, nutrients and other pollutants from roadway runoff can be controlled and significantly reduced through the implementation of various stormwater management projects. In some cases, this can be as simple as removing existing catch basins and replacing them with water quality inlets, or by changing the design of existing swales to minimize scour and erosion and facilitate the removal of sediments and particulate pollutants. In other cases however, it may require the construction of a new stormwater management structure. Identifying potential project sites can usually be accomplished simply by making

observations during storm events and noting erosion areas or outfalls that appear to be contributing excessive amounts of sediments to the lake. Coupled with the pollutant loading and hydrologic data that were developed in the 1992 study, this should provide ample justification for the need to upgrade, improve or construct stormwater management structures. These same data should also provide the CLA with the basic information needed to prioritize and establish the order in which stormwater management projects should be conducted.

However, to actually size and determine the type of drainage improvement that should be implemented, it will be necessary to conduct some additional analyses and calculations. We highly recommend that this be accomplished by conducting a hydrologic analysis of each drainage system slated for improvement using TR-55 and other appropriate hydrologic modeling tools (e.g. BASINOPT). Sizing should be based on management of the one-year, NYSDEC water quality storm. In theory, systems designed to manage the runoff from storms of this magnitude are efficient in the removal of pollutants. In addition, when sized for the one-year storm, the resulting structures are usually not excessively large, thereby making them somewhat easier to site and construct. However, because of their small size, these structures will not be effective in flood control.

With the pollutant load and hydrologic data it will be possible to design a conceptual stormwater management system for each problem drainage area, develop cost estimates for the required improvements, and create the background data that could later be used to calculate pollutant load reductions. These data will also be instrumental in determining maintenance and clean-out requirements for the new or retrofitted structures.

Monies can now be obtained through the State Environmental Bond Act and the NYS Non-Point Source Pollution Implementation Grants program for the control of road runoff related, non-point source pollutant loading to the lake. The CLA will need the Village or County to act as co-sponsor any such projects. The data developed in this task will provide the information needed to support the grant request and establish the level of funding required. The Federally funded 319 program may also be another funding source for the stormwater management improvements discussed above.

TASK 2 Septic Management:

The CLA has already made significant progress in respect to the management of septic related nutrient loading to the lake. This has been accomplished through the passage of the septic management ordinance and through public education efforts aimed at the lake community. However, the CLA recognizes that the existing ordinance has its limitations; basically because it pertains only to those dwellings in close proximity to the lake. There exists

the need, as was supported by the data developed in the 1992 study, to expand septic management into the remainder of the watershed.

In addition, there has been an extension of centralized sewer service along the west shore of the lake. Although this helps reduce septic related nutrient inputs to the lake, it can potentially create new, equally severe problems. Typically, sewering of a watershed leads to an intensification of development pressure. This can result in serious secondary impacts, most notably increased stormwater runoff and an increase in non-point source (NPS) pollutant loading. It is in the best interests of the CLA to have a means of addressing the immediate impacts associated with septic related nutrient loading to the lake while simultaneously being able to minimize the long-term future impacts likely to occur as a result of additional watershed development.

Based on our past experience in providing guidance to lake communities on septic management, it is recommended that the CLA develop a Septic Management Plan for the Cazenovia Lake watershed. Basically, the plan would consist of two separate by inter-related elements; watershed-wide septic management and guidance for the future servicing of the watershed by a centralized wastewater treatment (sewer) system.

The data needed to address both elements is derived from a Sensitive Lands Analysis. Basically, this involves the combined use of soil, slope, depth to groundwater, hydrologic features (streams and wetlands), existing development intensity and existing/future zoning information to establish areas within the watershed that are most likely to experience problems with the use of septic systems for the on-site treatment of waste water. This includes areas that are currently developed as well as sections of the water shed that could be developed in the future. Most of this data can be obtained through the Madison County Department of Planning's GIS database. It may be possible to overlay these data on tax maps. Once compiled, the data are analyzed using GIS to identify, on a lot specific basis, septic suitability/sensitivity problem or target areas.

The resulting database provides a very objective means of establishing where and why septic management must be practiced. In this respect, these data can be used to support the need for the implementation of septic management initiatives for "problem areas" located throughout the watershed. They can also be used to identify those sections of the watershed, including those not in the immediate proximity of the lake, where the use of septic systems will result in the export of nutrients to the lake. As such, these data can be used to provide the technical justification needed to expand the Septic Management Ordinance to outlying sections of the watershed.

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It is also feasible to expect that it will be possible to use these data in a pro-active manner to limit development intensity, or to request that special development provisions be taken when development of highly sensitive (i.e. lands having multiple constraints) sections of the watershed is proposed.

Sewer lines have, or are presently being, extended to service communities located along the west shore of the lake. This may trigger the demand for the servicing of additional areas. The data developed through the Sensitive Lands Analysis could be used to identify those sections of the watershed, that under existing development conditions, would most greatly benefit from a centralized sewer system. The data developed in the Sensitive Lands Analysis can be used to prioritize such areas for sewering. This could encompass not only those sections of the watershed that currently have the greatest number of recorded septic failures, but also those areas where the septic related nutrient load is exceptionally high. These data thus provide an objective means of targeting areas for centralized wastewater management.

Although the extension of sewer lines can benefit the lake by reducing the septic related nutrient load, it can simultaneously lead to serious secondary impacts to the lake. As mentioned above, it could be prudent to extend services to those sections of the lake where existing septic problems exist or where the land has recognized limitations in the treatment of wastewater. The data developed through the Sensitive Lands Analysis could also be used to "flag" sections of the watershed that are sensitive to development, and have a low development capacity. Intensified land use normally occurs following the sewering of a watershed. Once the infrastructure is in place, it becomes fiscally desirable to maximize the return on this capitol investment. This translates to maximizing the number of connections and the number of serviced units. In addition, a centralized sewer system negates the need for maintaining large lot sizes. Since there is no longer a dependance on land-based treatment of wastewater, houses can be built on smaller parcels of land. As a result, land use intensifies and non-point source pollutant loading increases. This can be especially true in steep slope areas, areas having erosion prone soils, or areas located in close proximity to the lake, its tributaries or major wetlands. The data compiled in the Sensitive Lands Analysis can be used to protect sensitive lands from over development or to justify the need for the implementation of special construction practices, setback requirements, or mitigation measures.

As with the stormwater initiative, monies could probably be obtained through the State Environmental Bond Act for this project.

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TASK 3 Macrophyte Control

To date, the weed harvesting program has been very successful in reducing weed densities throughout the lake and in improving its overall recreational utilization. To further maximize the effectiveness of the program, the CLA is considering the inclusion of additional mechanisms to manage the lake's weeds. Specifically, in addition to harvesting there is interest in the selective use of herbicides and in the use of biological controls, namely the milfoil weevil.

Weed growth is essential for the health and ecological well being of a lake ecosystem. Weeds provide valuable fishery habitat, decrease the effects of shore line erosion by serving as a wave break, and help channel nutrients away from the algae. Obviously, when they begin to grow too dense, weeds can impede recreational use, reduce or alter water circulation, exacerbate sedimentation, and even negatively effect the fishery assemblage of a lake.

It is possible to manage weed growth in the lake using a combination of techniques. Care must be taken when using chemicals to control weeds in a lake as trophically sensitive as Cazenovia. The die-off of weeds that occurs after wide-spread chemical treatment can result in marked increases in nutrient loading, depletion of dissolved oxygen concentrations, and disruption of the lake's ecological balance. As such, if chemicals are used to control weed growth, they should used only after careful analysis and only be used to control growth in selected sections of the lake.

The biological control of milfoil, one of the weeds that occurs in nuisance densities in the lake, is worthy of consideration. The milfoil weevil have proven to be a very effective means of minimizing Eurasian milfoil infestations. However, in order for them to be effective and exert a controlling effect, it is necessary to create conditions that maximize their concentration in the given target area.

It should be noted that permits must be obtained from the NYSDEC prior to the introduction of weevils or the use of any chemicals, regardless of the amount.

It is recommended that the CLA conduct A Weed Management Alternative Control Study before initiating chemical control or introducing the weevils. The study would have three basic components:

1. Identification of how to maximize the effectiveness of the ongoing weed harvesting operation.

2. Assessment of whether chemical treatment is an ecologically sensible and cost-effective control alternative for the lake. If so, the study would determine which chemicals should be used in the lake, what areas are best suited for chemical control, and how best to integrate chemical control strategies with the weed harvesting program.

3. Implementation of a scientifically based *in-situ* test study of the effectiveness of the weevils. This would involve the placement of test structures (20' diameter enclosures) in the lake and introducing different concentrations of weevils to each of test enclosures. A control (non-treated) enclosure would also be established and used to measure the effectiveness of the weevils. A study of this nature would have numerous benefits. First, it would determine whether the weevils were effective. Second, it would identify the minimum density at which the weevils would have to be introduced to exert a controlling effect. Third, it would generate the data that may be needed for NYSDEC regulatory approvals associated with the introduction of these organisms into the lake.

Overall, conducting such a study would give the CLA the information that they need to make wise management decisions in respect to the physical, chemical and biological control of weeds in Cazenovia Lake.

TASK 4 Fishery Survey:

There is interest in stocking the lake with walleye for the purpose of improving the lake's recreational fishery. These fish could also exert the predatory pressure needed to reduce the number of stunted panfish that occur in the lake. The questions that have arisen pertain to whether the lake is in fact a good walleye lake, whether spawning habitat is present in the lake, and whether the fish that have been introduced in the lake in the past have in fact survived. The fishery surveys conducted as part of the 1992 study used sampling gear and sampling techniques that were purposely biased for the evaluation of the littoral zone (shallow water) fishery. To provide the data needed to address the CLA's questions it would be necessary to conduct a fishery survey specifically designed to capture walleye. This would be best accomplished using gill nets set in relatively deep waters, but adjacent to and parallel to the shoreline. The catch in these nets could be used to evaluate walleye numbers, the availability of prey and the feeding habitats of the captured walleye. The study would also involve surveying the lake's shoreline to identify areas having habitat conducive for walleye spawning. The data derived from this study would address the issues raised by the CLA concerning walleye stocking. If it is determined that stocking walleye is appropriate, recommendations would be provided to the CLA in the report relative to stocking densities, habitat enhancements, and other related factors that would help maximize the success of any stocking effort.

TASK 5 Public Education:

Based on the success of past efforts, the CLA recognizes that an educated lake community is beneficial to the long-term success of its management and restoration efforts. Not only does public education help raise awareness of the lake's problems and what must be done to protect the lake from future impacts, it also helps create the public backing needed for the passage of ordinances, the implementation of stormwater and watershed management projects, and the generation of funds and contributions needed to support the efforts of the CLA. It is this highly recommended that the CLA re-institute a public education program. Based on discussions with the CLA, it is suggested that this program initially focus on issues of significance relevance to the lake users, for instance weed control or septic management, but later be expanded into pro-active measures, including those that can be conducted by the individual homeowner to improve the lake. There are numerous formats that can be used to convey information to the public. A newsletter appears to be the most appropriate format. It should be short, concise, and graphically appealing. The newsletter could be distributed by mail as well as distributed by local businesses or at the library and Village Hall.

In conjunction with the publication of the newsletter, it would also be beneficial for the CLA to schedule an open forum meeting. The purpose of this meeting would be to stimulate questions and discussion amongst the lake users, Village government, and the lake residents. At the meeting, information could be disseminated and the public informed as to what the CLA is doing to manage the lake.

It is also recommended that the CLA consider planning a Save The Lake Day. This would be an ideal opportunity to educate the public about the lake and the efforts of the CLA while involving a diverse assemblage of interest groups ranging from local government, State and County natural resource agencies (e.g. Soil and Water Conservation District, NYSDEC Fish and Game, County Planing Department, etc.), sporting groups and fishing clubs, and local business interests. We have found that such events creates an ideal situation to distribute educational materials in a relaxed environment. We have found that such events can be conducted at little if any cost, and are very successful in raising public interest and involvement.

TASK 6 Hydrologic Analysis of the Effect of the Canal on the Lake's Water Balance:

There has been increased discussion pertaining to the effect of the Canal on the hydrology of the lake. Specifically, concerns have been voiced pertaining to the loss of water from the lake to the canal during non-storm event conditions and the influx of pollutants and nutrients to the lake from the canal during storm events. It would be possible to model the hydrodynamics of the Canal and collect *in-situ* flow data to identify what is actually occurring in

respect to water exchange between the two waterbodies. The modeling could be conducted using HEC2RAS, a backwater analytical model, in combination with a basic flow routing model such as TR-55. To properly run HEC2RAS, it is necessary to have cross-sectional data of the canal, and it is unclear at this point whether such data are available. Flow measurements using automated monitoring equipment along with staff gage observations should also provide the data needed to evaluate the hydrodynamics of the system. It will be necessary to collect these data over a prolonged time frame (9 to 12 months) and over an array of flow conditions in order to generate data needed to yield scientifically legitimate conclusions about the interactions between the canal and the lake.

TASK 7 Review and Analysis of the CSLAP Data:

The CLA has been involved in the past in the NYSDEC's CSLAP water monitoring program. Although data have been collected, there is the need to analyze this information in respect to the baseline conditions established in the 1992 study. Doing so will enable the CLA to objectively determine whether the quality of the lake has improved, deteriorated or remained relatively constant over the past 6+ years. It would be advisable to particularly assess changes in the lake's transparency, deep water dissolved oxygen concentrations, chlorophyll a concentrations and nutrient concentrations as these data are particularly insightful in regard to establishing the lake's trophic state and the effects of the eutrophication process on water quality. It thus highly recommended that the CLA acquire and conduct a thorough review of these data, with the results of the review used to evaluate and/or support the need for future management direction or restoration activities.

:RECOMMENDATIONS:

At the CLA meeting held on 4 May 1998, there was a lengthy discussion of immediate and long-term of management needs facing Cazenovia Lake. Based on the available information and review of the points of concerns discussed at the May meeting, the above tasks have been prioritized for implementation. Specifically, the CLA should immediately initiate Tasks 1 (Stormwater Management), 2 (Septic Management), Task 3 (Weed Control) and 5 (Public Education). Completion of Tasks 1,2 and 3 will provide the much needed solutions to existing and future lake water quality problems. Completion of Task 5 will aid the CLA in generating the public support, and instilling in the lake community, the public awareness needed to properly manage and restore the lake.

Although the completion of Task 7 is not necessarily a priority project it could possibly yield information that the CLA could use to make future management decisions. It is thus recommended that this project be initiated in the late fall of 1998 and be completed prior to the

beginning of the 1999 management season.

It is highly likely, with cooperation from the County and/or Village, that the funds needed to conduct the stormwater retrofits or to construct new stormwater management structures (task 1) could be secured from public funding sources. Likewise, it may be possible to obtain public funding for completion of Task 2 (Septic Management), and even some money to further public education efforts (Task 5). The ability to use public funds to aid in the completion of these tasks increased their feasibility of implementation.

Although the fishery study (Task 4) and the Hydrological Study (Task 6) will address some significant concerns raised by the CLA, postponing their implementation until Tasks 1, 2, 3, and 5 have been completed does not impact the short-term management of the lake or compromise lake water quality. It is also unlikely that either of these projects could qualify for public funding. In addition, it would be best to conduct the fishery study such that sampling is conducted in the spring, summer and early fall. The window of opportunity for conducting such a sampling effort has passed. Rather than split the fishery sampling effort between two years, it is recommended that the CLA consider implementation of this project in 1999. This is also true for the hydrologic study, as it would be best to conduct all the sampling during the same water year, with sampling starting in the spring and continuing through the late fall.

For Task 1, the CLA should start immediately with the basic pollutant loading and hydrologic calculations needed to size and design stormwater management measures. This should begin first with a reconnaissance of the watershed to identify management needs or concerns. The observations and information gathered from such a reconnaissance would be used to determine what type of BMP (Best Management Practice) should be implemented at each site. This could range from simple retrofits of the existing catch basins to more complicated projects involving the construction of stormwater treatment wetlands, sandfilters or sediment traps. The updated pollutant loading data would be used to examine the cost-benefits of various projects and to prioritize projects sites for implementation. The hydrologic calculations are needed for the sizing of any structures that will be used to manage runoff. The sizing data are in turn also used to help develop cost estimates. In combination, these data provide the specific information needed to prepare State grant applications.

For Task 2, it is essential, if the CLA seriously wishes to expand the septic management zone, that The Sensitive Lands Analysis be implemented as soon as possible. An inquiry should be made of the County to determine what type of GIS data are available and whether the CLA will be able to obtain these data for use in the Sensitive Lands Analysis. It would also appear, given some of the on-going sewer projects, that action should be taken immediately to prevent the down-zoning of the watershed.

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In respect to Task 3, it is probably too late in the growing season to implement the weevil experiment. However, it would be possible to immediately assess the feasibility and appropriateness of chemical control strategies. If herbicides are a viable management option, it will be necessary to determine how they can be used along with harvesting as part of an integrated weed control program. It should be noted that permits are required for the application of herbicides. Given the permit process in the State of New York, even if it is determined that herbicides are a feasible management measure, it may not be possible to obtain permits in time to conduct an application in the summer of 1998.

For Task 5, it is recommended that the CLA start immediately to draft a newsletter that identifies the role of the CLA, reviews past accomplishments, and discusses proposed future projects. This newsletter should also include a general overview of lake water quality issues and the introduces the reader to some of the actions that can be taken on a grass roots level to improve the quality of the lake. Later issues can delve, in detail, into specific topics.

In summary, the CLA should focus their attention and efforts on the management of NPS pollutant inputs contributed via stormwater runoff. This will involve the retrofit, upgrade or construction of new stormwater management structures, with projects being prioritized on the basis of pollutant loading, engineering feasibility and cost. Septic inputs continue to be a problem in the long-term maintenance of the lake's water quality and trophic state. This is best addressed at this time through aggressive septic management. This includes management of systems removed from the immediate shoreline zone of the lake. Before alternative weed control strategies are implemented, it is best if these techniques be assessed for their feasibility of implementation at Cazenovia Lake. This is particularly true of chemicals. If used indiscriminately, herbicides can have deleterious effects on the long-term quality of the lake. Finally, public education should be continually promoted both as a means of generating support for the efforts of the CLA and for encouraging lake users and property owners to be pro-active in the management and protection of Cazenovia Lake.

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BUDGET:

In order to implement any of the above tasks it will be necessary for the CLA to develop a budget. The following provides the CLA with the projected cost of implementing each of the tasks.

Task 1 Stormwater Management:

The initial sub-tasks that needs to be conducted are the identification, sizing, and prioritization of key stormwater management projects throughout the watershed. As mentioned

previously, to do so will involve conducting both pollutant loading and hydrologic modeling. Also part of Task 1 is the development of construction cost estimates that can be used as a basis for funding requests or for the development of grant applications. The budget for the completion of **Task 1 is $15,600.**

Task 2 Septic Management:

Completion of Task 2 primarily involves the preparation of the Sensitive Lands Management Plan. The basic assumption made in developing the budget for this task is that the Madison County GIS data can be accessed and obtained at no charge. Once the data are assembled and mapped, it will be necessary to prepare a report that details the findings in respect to:

1. Support of the expansion of the existing septic management ordinance to encompass the entire watershed.

2. Identification of sections of the watershed that should be prioritized for central sewering, and recommendations regarding cost-effective sewering options.

3. Identification of sections of the watershed that once sewered, because of a combination of natural resource attributes and/or prevailing development patterns, would be environmentally sensitive to down-zoning and an intensification of development. For these areas, information would be provided that the CLA could use to demonstrate why large lot zoning should be preserved, and the types of environmental safe guards that must be taken to minimize impact to the lake as a result of the intensified development of these portions of the watershed.

Assuming that the County GIS data are available and accessible for use, the cost to complete **Task 2 is $15,900.**

Task 3 Macrophyte Control:

Completion of Task 3 involves evaluating and providing the CLA with recommendations concerning alternative weed control strategies. As discussed above in the Recommendation Section of this report, the window of opportunity for conducting the weevil experiment has passed for 1998. However, it is still possible to evaluate the general suitability of this biological control technique as well as to make recommendations concerning the use of herbicides for aquatic weed control. The cost to complete **Task 3 is $4,200.**

Task 4 Fishery Survey:

Collection of the fishery data, identification of the existing walleye habitat, and preparation of a report that discusses the findings and provides recommendations for future stocking and habitat enhancement are all part of this task. The fishery data should be conducted over three sampling events, each two days in duration. The cost to complete **Task 4 is $11,520.**

Task 5 Public Education:

As part of this task, four (4) newsletters will be developed for the CLA dealing with the following topics:

1. An overview of the CLA and the need to implement various management and restoration strategies for the protection and enhancement of Cazenovia Lake. This would be an introductory type of newsletter, dealing in a "broad brush" manner, with the factors important to the lake.

2. A newsletter on septic management

3. A newsletter on stormwater management and non-point source pollution control, emphasizing grass roots actions that can be taken by the community to protect the lake.

4. A newsletter dealing with weeds, focusing on the types of control techniques best suited for Cazenovia Lake.

This task would also include recommendations pertaining to the organization of a Save The Lake Day. The cost to complete **Task 5 is $4,950.**

Task 6 Hydrologic Analysis of the Effect of the Canal on the Lake's Water Balance:

Of all the Tasks, this is the most complicated to conduct, and although it will yield valuable information, the data and conclusions drawn from the data will have the most limited scope of all the tasks relative to the future management of the lake. The project entails conducting a 12 month study, the collection of both automated and manually recorded flow data, interpretation of the data using hydrologic models, and preparation of a report. The cost to complete **Task 6 is $26,680.**

TASK 7 Review and Analysis of the CSLAP Data:

Acquisition and analysis of the CSLAP data, and the preparation of a report that examines water quality trends and compares the NYSDEC data to the results of the 1992 study can be conducted for a cost of **$3,600.**

To summarize, the cost per task is as follows:

Task 1 Stormwater Management	**$15,600**
Task 2 Septic Management	**$15,900**
Task 3 Macrophyte Control	**$4,200**
Task 4 Fishery Survey	**$11,520**
Task 5 Newsletters	**$4,950**
Task 6 Hydrologic Analysis	**$26,680**
Task 7 CSLAP Review and Report	**$3,600**

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