



LAKE • GEORGE
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March 11, 2011

Mr. Marc Migliore
New York State Department of Environmental Conservation
Region 5 Warrensburg Sub-Office
232 Golf Course Rd.
Warrensburg, NY 12885

Re: Echo Bay Dredging
DEC Application No. 5-5220-00346/00001

Dear Mr. Migliore:

The Lake George Waterkeeper has numerous environmental and procedural concerns regarding the Echo Bay dredging project proposed by Earth Specialty Products. These comments are submitted in my capacity as the Lake George Waterkeeper and a licensed professional engineer. We understand the purpose of the dredging project is for the improvement of navigation in this very tight, shallow bay and can sympathize with the residents' desired goal.

However, we feel the proposed actions are only a temporary solution and will negatively impact Lake George in the process. The policy of the Lake George Waterkeeper has consistently been the need to eliminate the upland sources of sediment and require stewardship improvements to reduce the conveyance of sedimentation to the lake within the tributary watershed to the dredging project. Until these issues are addressed, the watershed management practice of dredging will be a continuing maintenance project around Lake George.

Our office remains disappointed in the continued approach of the New York State Department of Environmental Conservation in regards to dredging, and we fail to see the water quality improvement measures of the project. We encourage the Department to take the same aggressive approach they have in approval of permits for dredging and apply it to stewardship and protection of the AA-Special water quality protection of Lake George. This can be accomplished through stormwater management requirements and shoreline buffering for the individual property owners who have authorized the proposed dredging actions.

We would like to note for the record that apparently not all information that was submitted was available for review, specifically the sediment core analysis and engineering information regarding dewatering and pumping rates. This information is critical for the analysis of the application and determination of potential impacts to the resources of Lake George.



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Our comments focus on the following issues:

- 1) **State Environmental Quality Review Form;**
- 2) **Lake Degradation;**
- 3) **Source of Sediments;**
- 4) **Engineering Design; and,**
- 5) **Construction Specifications.**

I. STATE ENVIRONMENTAL QUALITY REVIEW (SEQR) FORM:

It is our opinion that the Negative Declaration for the project is premature and cannot be made without additional information.

Upon our review of the application material, it cannot be determined that the project will not result in significant adverse environmental impacts. There is a lack of information regarding the dewatering rates and pumping rates necessary to determine the return water rates and the potential for erosion and scouring to the lake. There was no evidence of a determination of the presence of wetlands in the project site, even though wetland plants are present. There was no information regarding the potential resuspension of nutrients that has been evident in other dredging projects in Lake George. There was no discussion of the prevention of the spread of invasive aquatic plants by the dredging activities. There was no analysis of the potential impacts to the water supplies of the numerous residents in the bay, both inside and outside the project area. All of these potential impacts need to be evaluated.

The purpose of the project has not been identified or justified.

It is stated in the SEQR Negative Declaration that the action is standard practice common to water related recreational lake use. However, the applicant has not stated the purpose for the project. There is a question whether the removal of 6" of the lake bed is adequate for the recreational use, which has not been specifically identified. If the proposed action is for the improvement of contact recreation, it does not seem the 6" is necessary and would not provide a noticeable change. If the proposed action is for the improvement of recreational boating, 6" would not be adequate and prop scouring would continue. Additionally, if the proposed action is for the improvement for recreational boating, one alternative for residents in the bay is for the use of smaller boats with shallower drafts. It should be noted that according to local residents of the bay, the area of the bay that dredging is being proposed has historically been shallow. Boat operators and adjacent land owners would have known this fact, and should dock and operate vessels that are appropriately sized for the bay.

The Negative Declaration erroneously states the project will improve the water quality best usage for this class of water body.

Lake George is a AA-Special water body which means its primary use is for drinking water and contact recreation. Justification has not been provided how the project will improve drinking water or contact recreation with dredging. The proposed actions will result in significant turbidity which will prevent the ability to drink the water during the dredging operation and for a period as long as one month afterwards based on other dredging projects on Lake George. In addition, the resuspension and release of nutrients from the sediments will increase the already abundant algae growth in the bay, possibly further restricting the use of the lake as a drinking water source or for contact recreation. Algal blooms are indicative of excess nutrients feeding the algae. Documented algal blooms were prolific in this area during the past three summers. Algae samples taken from this area in both 2008 and 2009 were identified to include genuses of blue-green algae (cyanobacteria), among 10 other varieties of identified algae. Please refer to the photos in Appendix A.

There should be evidence of non jurisdiction by the Adirondack Park Agency.

Wetland aquatic plants, specifically *Nymphaea odorata* ssp. (white waterlily) and *Nuphar rubrodisca* (yellow pond lily), can be observed from the surface of the area included in the site of the proposed dredging (as documented on June 29, 2010). The Adirondack Park Agency should review this site for wetlands to determine if non jurisdictional. Please refer to the photos in Appendix B.

II. LAKE DEGRADATION

Project fails to address resuspension of sediment and nutrients.

All dredging activities create a level of suspended sediments and the adhesion of nutrients to sediments is well documented. Sediments will naturally contain nutrients from organic matter produced from the accumulation of phytoplankton and aquatic plant material as well as input from streams, such as the intermittent streams tributary to Echo Bay, and man's activities. From a Lake Tahoe study, the loading of nitrogen (N) and phosphorus (P) to the lake from the release of dredge area water was estimated and found to range from less than single kg levels to tens of kg levels. These loads are comparable to other inputs produced by man's activities. For instance, the resuspension of 5 kg of total nitrogen (TN) and total phosphorus (TP) by dredging is roughly equivalent to the annual TN and TP load in urban runoff from 5 acres of medium developed residential area.¹ Studies have shown silt + clay can contain higher concentrations of TP than other size particles, but there was little difference between the TN content of medium-coarse sand and fine to very fine sand with somewhat higher levels in silt + clay.² In addition, newly deposited sediments, which have not been subject to previous depletion in the lake (terrestrial-derived sediments recently transported to the lake), may potentially be more enriched in bioavailable forms of nitrogen and phosphorus.³

Recent dredging projects in the Lake George watershed document the impacts of the resuspension of sediments, specifically at the Lodges of Cresthaven (DEC Permit No. 5-5222-00268/00001) and the Herrman's property in Huddle Bay (DEC Permit No. 5-5220-00102/00007). In regard to the Cresthaven project, the two turbidity curtains installed were not adequate to contain the resuspended sediment from the removal of 400 CY, a very small dredging operation. During the second day of dredging activities, operations had to be shut down due to failure to contain turbidity, resulting in substantial visible contrast to natural conditions, and negative impacts to Lake George. Please refer to photographs in Appendix C. The turbidity levels in samples taken by the Lake George Waterkeeper 100 feet north of the exterior turbidity curtain were 10.46 NTUs, despite the use of two turbidity curtains. It should be noted the only reason two turbidity curtains were installed was due to a condition required by the Town of Lake George Planning Board. It was the opinion of the NYSDEC that only one turbidity curtain was needed, specified by the issued permit. The Herrman's project in Huddle Bay provides evidence that two turbidity curtains are not sufficient to contain turbidity and maintain natural conditions. During the dredging, the project manager felt it was necessary to install three turbidity curtains. These curtains remained in place four weeks after the dredging operations were completed. In that time, turbidity within the curtains had not settled out to normal conditions, but the curtains were removed due to oncoming winter conditions and freezing. Please refer to photographs in Appendix D. This demonstrates the significant negative environmental impacts from dredging and the difficulty to mitigate the impacts, even with two or more turbidity curtains installed.

¹ *Final Report Impacts of Marina Dredging on Lake Tahoe Water Quality*. Prepared by Tahoe Research Group, University of California-Davis. October 1996.

² *Ibid.* Page 3-17.

³ *Ibid.* Page 3-30.

Additionally, increased levels of nutrients resulting from dredging was documented by the Lake George Waterkeeper from a hydraulic dredging project sponsored by the Lake George Watershed Conference on Gull Bay in the Town of Putnam in the summer 2008. Please refer to the table documenting nutrient levels in Appendix E.

Project fails to address algae growth connected to nutrient resuspension.

The resuspension of nutrients creates a situation conducive to increased phytoplankton and algae growth. This has failed to be addressed or mitigated by any information or analysis provided in the application.

Studies have been performed in Lake Tahoe regarding the stimulated algae growth from nutrient resuspension. It was shown that algae have been sensitive to additions of very small amounts of nutrients, on the order of tenths of μl of dissolved inorganic nitrogen (DIN) and biological available phosphorus (BAP) when added in concert with the dredged sediment. The small amounts of DIN and BAP released in concert with other nutrients during dredging can potentially lead to short-term, localized areas of increased phytoplankton growth in the lake. Such increased phytoplankton growth was observed primarily in protected areas in which the dredge-impacted waters were prevented from dispersing (within turbidity curtains). Outside the turbidity curtains or in the open lake, phytoplankton and nutrients may disperse so rapidly that localized increased limiting nutrients in the lake will eventually be used to feed algae growth. The fact that dredging may possibly release other cofactors in addition to N and P (which may enhance algae growth), underscores the importance of keeping sediment disturbance and sediment resuspension to a minimum.⁴

This information was supported by observations of the Gull Bay dredging project by the Lake George Waterkeeper in the area outside of the turbidity curtain in the summer 2008. An area extending 200-300 feet outside the turbidity curtain exhibited significant algae covering the aquatic plants. The dredging site was revisited in the summer 2009 and 2010 and excessive algae growth was observed. Please refer to Appendix F for photos of the algae growth covering the aquatic plants in Gull Bay during and after the hydraulic dredging project. Algal blooms were also a problem with the previously referenced Herrman's dredging project in Huddle Bay. Abundant suspended algae and algae covering the aquatic plants as well as on the sandy substrate is prevalent in the dredged area and was documented through the summer 2010 as evident by photos in Appendix G. The algal bloom covers the exposed soils and would appear to be the beginning development of an organic layer on the bottom of the lake, the initial reason for dredging.

Dredging will expose sediment for continued nutrient release.

After sediments have been removed, deeper nutrient rich, anaerobic sediments become exposed for resuspension and release, resulting in significant algae growth. In Lake Liberty, Washington, alum was used to treat the dredged area to seal freshly exposed sediments and assist in breaking the nutrient cycle.⁵ This resuspension and release of nutrients was supported by the observations of the Lake George Waterkeeper in Gull Bay after the summer 2008 dredging and Huddle Bay in summer 2010.

The proposed project area has significant algal blooms which will only increase by the increased nutrient release.

Algal blooms have been documented for the past three summers in the location where dredging is being proposed in Echo Bay. Residents within Echo Bay contacted the Lake George Waterkeeper and became part of the Algae Awareness Project in 2008. These concerned residents requested investigation of the changes seen in this area. Lawns planted to the lake with no protective buffers on the shoreline, appearance of fertilizers and

⁴ Ibid. Page 6-11.

⁵ Funk, William H., Gibbons, H, and Bailey, G. *Preliminary Assessment of Multiphase Restoration Efforts at Liberty Lake, Washington*. Environmental Protection Agency. December 1982. Page 5.

pesticides being used on properties around the bay, and evidence of sediment entering the lake from bare soils and eroding lawns supply excess nutrients that feed algae and accumulate in the sediments. Algal blooms are indicative of excess nutrients feeding the lake. As seen in Gull Bay, resuspension of sediment and nutrients during dredging will likely further increase the extent of algal blooms in Echo Bay.

Dredging significantly alters aquatic ecosystems.

Dredging operations scour and remove existing aquatic habitats resulting in bare soil conditions. These conditions are an opportunity for significant changes in the natural balance of the local aquatic ecosystem, creating open areas ready for the establishment of invasive species or a monoculture of one single species growing prolifically. These results have been observed in Huddle Bay from the Herrman's dredging project. Prior to dredging, the aquatic ecosystem in this portion of Huddle Bay was diverse. After dredging, the bare soils became dominated by one species of aquatic plant, *Elodea Canadensis* (common waterweed) that was growing prolifically with extensive root structures evident for continued domination. Although this plant is not considered as invasive, it is unclear how the development of a monoculture of this particular species may affect the bay's fish and aquatic organism population. In addition to the abundance of *Elodea*, two invasive species were documented after dredging, *Potamogeton crispus* (Curly-leaf pondweed) and *Myriophyllum spicatum* (Eurasian watermilfoil (EWM)). EWM grows in Echo Bay with other native aquatic plants, but because of its aggressive nature, often out competes the natives for re-establishment after dredging. Dredging operations alter naturally balanced aquatic ecosystems and creates an opportunity for invasive plant proliferation. Please refer to Appendix H for photographs documenting the change in aquatic plants in Huddle Bay.

III. SOURCE OF SEDIMENTS

The proposed dredged sediment is a result of poor land use practices along the bay.

The land surrounding this portion of the bay has been filled-in for construction of single family dwellings, trees have been removed on the shoreline and in some cases the entire lot has been cleared, exposed soils on steep slopes have been noted and the release of sediment and pooling water behind silt fences that were installed for construction has been observed. Land use activities that promote erosion of sediment carrying nutrients should be mitigated in order to reduce the impacts of sediment flowing into the lake and the feeding of aquatic plants and algae. Shoreline buffering with deep rooted vegetation and appropriate duff vs. lawn would trap sediment and more effectively infiltrate and treat nutrients before they enter the lake. Without this protective buffer, the nutrient balance of the lake is affected and the ideal habitat for excessive aquatic plants and algae to grow, die and decompose is created. These conditions have been documented for the last three years in Echo Bay. Please see photos of the shoreline and land use activities in Appendix I.

Poor construction within the bay has resulted in sediment transport to the bay.

An example of sediment transport to the bay is the construction project at 3245 Baker Lane at the northeast corner of Echo Bay. This construction project received violations and significant fines from the Lake George Park Commission for continued construction and discharge of sediment to Lake George. Please see photos of land use in Appendix J.

IV. ENGINEERING DESIGN DETAILS

There is a lack of information to determine the adequacy of the size of the proposed dewatering Geo Tubes.

Typical dewatering operations for hydraulic dredging operations utilize dewater Geo Tubes with greater storage volume than the proposed 20' x 25'. For example, the dewatering tubes for the Gull Bay dredging project proposed by the same applicant used two

dewatering tubes twice the size as proposed for the current application. It should be noted that due to the extensive dewatering time for the Gull Bay project, the actual project time was nine weeks, far exceeding the two and half week estimate. This extended time required for dewatering increased the time of dredging operations, resulting in significant impacts to Lake George from increased sediments and nutrients.

The project application fails to provide an estimate for project duration.

It is necessary to minimize the length of dredging operations to reduce the negative impacts to the water quality of Lake George and to the community. The application should include information for the estimated time for the project, which should be supported by pumping rates, estimated dewatering rates, and settling time for suspended solids. Until this information is provided, the potential extent of impacts from the project cannot be determined.

The estimated return rate for the water to Lake George needs to be provided to design the return swales to Lake George.

The applicant must provide the estimated return rates for the water from the dewatering operations to properly size the swales to prevent erosion. The return 2' wide swale is proposed on 12% slopes. This swale may not be adequately sized for the amount of water and create erosion conditions. Typically, a wider swale constructed with grass in lieu of rip rap will reduce velocities and decrease the potential for erosion.

Return rates and volumes must be included to design the sediment basins for the return water to Lake George.

The application lacks information to determine if the proposed piping of return water to Lake George will meet water quality standards. From site observations of previous dredging dewatering operations, it would seem that additional sediment removal would be needed for the return water, as it should not be directly piped to the lake.

The submitted plans appear to have inaccurate information regarding existing depths.

The Lake George Waterkeeper has monitored Echo Bay as part of the Algae Awareness Project. From our observations, water depths are less than what is shown on the plans.

V. CONSTRUCTION SPECIFICATIONS AND DETAILS

The plan fails to provide details on environmental monitoring of the return water and for the turbidity curtain to ensure water quality standards.

Additional Information on the turbidity curtain specifications and design should be provided. The detail provided in the application lacks specificity and details to guarantee water quality protection.

- There are different grades and types of curtains depending on site conditions. This should be specified on the plans.
- In situations where there is significant wind or wave action, the weighted end of the curtain should not extend to the bottom of the water body. Wind/wave action on the floatation system can cause movement of the lower end of the curtain, causing it to rub against the bottom, stirring up additional sediment.⁶ The applicant should comment on this design standard and whether it should be implemented.
- What is the recommended height of the turbidity curtain and will there be flexibility with the curtain in anticipation of adverse conditions?

⁶ *Statewide Urban Design and Specifications Design Manual – Iowa.* Page 7E-24-2.

The turbidity curtain will be the most important measure of these activities to protect Lake George from the negative impacts of resuspended solids and nutrients. Therefore, the specifications of the turbidity curtain should be detailed.

The Department should require the establishment of a shoreline buffer along the areas where dredging occur.

A shoreline buffer is very beneficial for water quality protection and the mitigation of negative impacts to Lake George. Shoreline buffers can trap and remove sediments from surface runoff and uptake nutrients. The deeper roots associated with larger and more substantial vegetation will increase infiltration rates and porosity of the soils. The deeper and larger root structures also strengthen the shoreline from potential erosion. The majority of the shoreline has very minimal or no shoreline buffering, which is a factor in sediment transport and deposition to the bay, increasing stormwater runoff with reduced potential for sediment removal. Therefore, this is the perfect opportunity to require the establishment of a shoreline buffer. It has been the unfortunate policy of the Department to not "expand" the permit scope outside the project limits, where it is claimed that there is no jurisdiction to help mitigate negative impacts. This policy is short sighted and fails to help address the sources and causes of the need for such environmentally damaging projects such as dredging. The Department has the opportunity to mandate the planting of a substantial shoreline buffer, since all lakefront property owners have granted access easements for the construction activities and are part of the project site.

As evident by the magnitude of the comments provided and the lack of supporting information, there are significant negative impacts associated with this application. Most of all, it is surprising that the Department could determine there would be no adverse environmental impacts from the proposed actions. Echo Bay is already experiencing algal blooms which are resulting in a greater impact to the ecology of the lake and recreational enjoyment. The resuspension of sediment and nutrients and the exposure of buried nutrients will only increase algae growth as documented by the Lake George Waterkeeper Algae Awareness Project.

The Lake George Waterkeeper requests a hearing and an Issues Conference regarding this application. This would provide the opportunity to address the significant deficiencies, especially the environmental analysis, and adequately address the multiple significant environmental impacts associated with the proposed actions.

The Lake George Waterkeeper Program looks forward to working with the New York State Department of Environmental Conservation to defend the natural resources of Lake George and its watershed. Thank you for your consideration of these comments.

Sincerely,



Christopher Navitsky, P.E.
Lake George Waterkeeper

cc: Betsy Lowe - New York State Department of Environmental Conservation
Terry Martino, Executive Director - Adirondack Park Agency
John Banta, General Counsel - Adirondack Park Agency
Curt Stiles, Chairman - Adirondack Park Agency
W. Mark Rooks - Adirondack Park Agency
Michael White, Executive Director - Lake George Park Commission
John Connell - United States Army Corps of Engineers