EROSION AND SLOPE STABILITY MONITORING PLAN

for

Great Sacandaga Lake

FERC PROJECT No. 12252-NY

Prepared for:

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Hudson River-Black River Regulating District

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EXECUTIVE SUMMARY

This Erosion and Slope Stability Monitoring Plan (Plan) has been developed in accordance with Article 403, *Erosion and Slope Stability*, of the Federal Energy Regulatory Commission (FERC) License for the Great Sacandaga Lake. The Plan provides a means for the licensee to monitor erosion and slope stability and to identify, minimize and remediate erosion or sedimentation resulting from Project construction and operation. A draft version of the Plan was transmitted to the New York State Department of Conservation (NYSDEC), and Fulton, Hamilton and Saratoga Counties in November 2003 for review and comment. Agency Correspondence and pertinent review comments have been incorporated in this final version of the Plan.

Great Sacandaga Lake is a state-owned regulating reservoir operated by the Hudson River-Black River Regulating District (District). The District, which is the licensee for the Project, has been actively involved with shoreline protection at Great Sacandaga Lake since the early 1930's. Available records indicate that remedial measures have been implemented annually since that time, with the exception of about 7 years. These measures have consisted of the placement of riprap and stone protection at eroding shoreline areas. In addition, many permit holders bordering the impoundment have implemented various forms of shoreline erosion protection measures over the years. The District and these permit holders should be commended for their efforts in mitigating shoreline erosion at Great Sacandaga Lake over the years.

Procedures for monitoring erosion sites, recommended remedial measures and a system for ranking the sites for prioritizing remedial work have been developed in conjunction with District staff and regulatory agencies as part of this Plan. The findings of our 2003 shoreline inspection are provided in Section II. Recommended procedures for monitoring erosion are provided in Section III. Recommended remedial measures are discussed in Section IV. A description of the erosion site database is provided in Section V. The system used to rank the sites in terms of severity of erosion is provided in Section VI.

Erosion sites and points of interest along the shoreline have been documented as part of the 2003 shoreline inspection. This information is provided in tabular form in Appendix B and forms the initial database for the District's use in its long term monitoring efforts. The database locates the erosion sites by permit holder name, permit number and tract number. This method of site location and monitoring has been used by District staff to track shoreline erosion for many years. Therefore, it would make sense for the District to continue to use this procedure for future monitoring. Photos were taken of the sites in the database and are included in Appendix C. Most sites from the 2003 shoreline inspection were also located using Global Positioning System (GPS) equipment. This information has been provided to the District for future use in their developing electronic database for Great Sacandaga Lake.

A general procedure for scheduling erosion sites for repair has been developed for use by the District. This procedure is described in Section VII and is intended for the District's long term

planning use and may be subject to change based on several factors. These factors will likely include: site-specific conditions and access constraints for the individual erosion sites, seasonal weather conditions that could impact the timing of the work, seasonal reservoir levels that could impact site access and requests by local agencies and permit holders.

Shoreline erosion at Great Sacandaga Lake will continue to be an evolving process. Soils along the periphery of the lake are predominantly sandy in composition with the terrain varying in degrees of steepness. The steepest shoreline slopes generally occur in the inlet arm (northwest arm near Northville and Northhampton) and the outlet arm (northeast arm from Edinburg to Conklingville Dam). Historically, the most severe shoreline erosion has occurred in these areas. The shoreline of the main basin of the reservoir (southwest section near Mayfield) is generally much flatter than the inlet and outlet arms. Prior reports do not include a discussion of significant erosion along the shoreline in the main basin, although our 2003 inspection found several areas where erosion was considered noteworthy.

The predominantly sandy, cohesionless soils and steepness of the shoreline within the annual drawdown range are key elements in the erosion processes that have taken place over time at Great Sacandaga Lake. These soils are generally very susceptible to erosive forces, especially when the slopes are moderate to steep. The primary forces causing erosion at Great Sacandaga Lake appear to be wave action (both wind and boat generated) and ice scour. Prior reports have indicated that beach clearing activities by permit holders have exacerbated erosion along the shoreline. This only appears to be true in areas where the slopes are moderate to steep and bluffs have formed over time within the range of water level fluctuations. Many areas around the main basin have relatively flat slopes within the water level fluctuation range. Flatter areas that have been raked or graded to form sandy beaches are holding up quite well and are not experiencing significant erosion. Much of the stone that has been moved from these beach areas has been used to create rock jetties perpendicular to the beaches. These jetties minimize the impacts of wave action, especially waves from a cross shore direction.

Many archeological sites are located within the project lands owned and operated by the District as discussed in the 2003 Cultural Resources Management Plan (CRMP) prepared by Hartgen Archeological Associates. We did not observe any archeological sites bordering the lake during our 2003 shoreline inspection that are being impacted by erosion. The monitoring and remedial measures outlined in this Plan will ensure the continued preservation of the shoreline and its contents.

Many shoreline areas around the lake have been repaired and stabilized over the years. Sites noted in our 2003 shoreline inspection that will require monitoring and/or remedial measures have been documented in Appendix B. This includes several steep and high-banked areas (particularly along the inlet and outlet arms) that could develop stability problems if left unmonitored and erosion is allowed to continue over time. Future inspections should focus on these areas.

The lowest lake levels normally occur in February and March of each year. These conditions were not available during our September and October 2003 shoreline inspection. We recommend that the shoreline be monitored when lake levels are at or near their lowest levels, as site and weather conditions allow. Any significant shoreline erosion noted should be documented in accordance with Plan guidelines.

It is noteworthy that until 2000, Great Sacandaga Lake had been operated to target a maximum lake level of El. 768 feet (USGS), typically during the spring or early summer. During our 2003 shoreline inspection, we noted that many areas around the lake had already been stabilized for water levels up to this target elevation. Higher lake levels have occurred in the past two years with levels exceeding El. 770.5 feet in 2002 and El. 771 feet in 2003. These higher levels are the result of operation for aggressive storage as discussed in Section 3.6 of the March 2000 Offer of Settlement. Our 2003 shoreline inspection noted considerable erosion at and above these "higher" water levels including many areas that already had been stabilized with rip rap for the target operating levels prior to the Offer of Settlement.

The following revisions have been incorporated in this final Plan based on agency review comments received on the draft Plan (see Appendix D - Agency Consultation):

- The repair priority ranking system outlined in Section VI (Figure VI-2) has been revised at the recommendation of Saratoga County (NY). The revised ranking system incorporates erosion sites encroaching on adjacent privately owned facilities and highway infrastructure in the ranking system.

- The locations of Sensitive Natural Resource Areas (fish spawning areas) were provided by the NYSDEC and have been added to the reservoir map in Appendix A.

- Prior to each scheduled shoreline inspection, the District will notify county and local highway and public works departments that own and maintain roads, infrastructure or right-of-ways bordering the shoreline. This will allow these agencies the opportunity to identify areas where project induced erosion or instability is impacting or encroaching on their facilities or right-of-way.

In closing, we would like to acknowledge the District's long-standing commitment to monitoring and maintaining the shoreline of Great Sacandaga Lake. The District is currently implementing repairs at several erosion sites that were documented during our 2003 shoreline inspection.

Hudson River-Black River Regulating District
EROSION AND SLOPE STABILITY MONITORING PLAN
for
GREAT SACANDAGA LAKE

I. INTRODUCTION AND PLAN DESCRIPTION

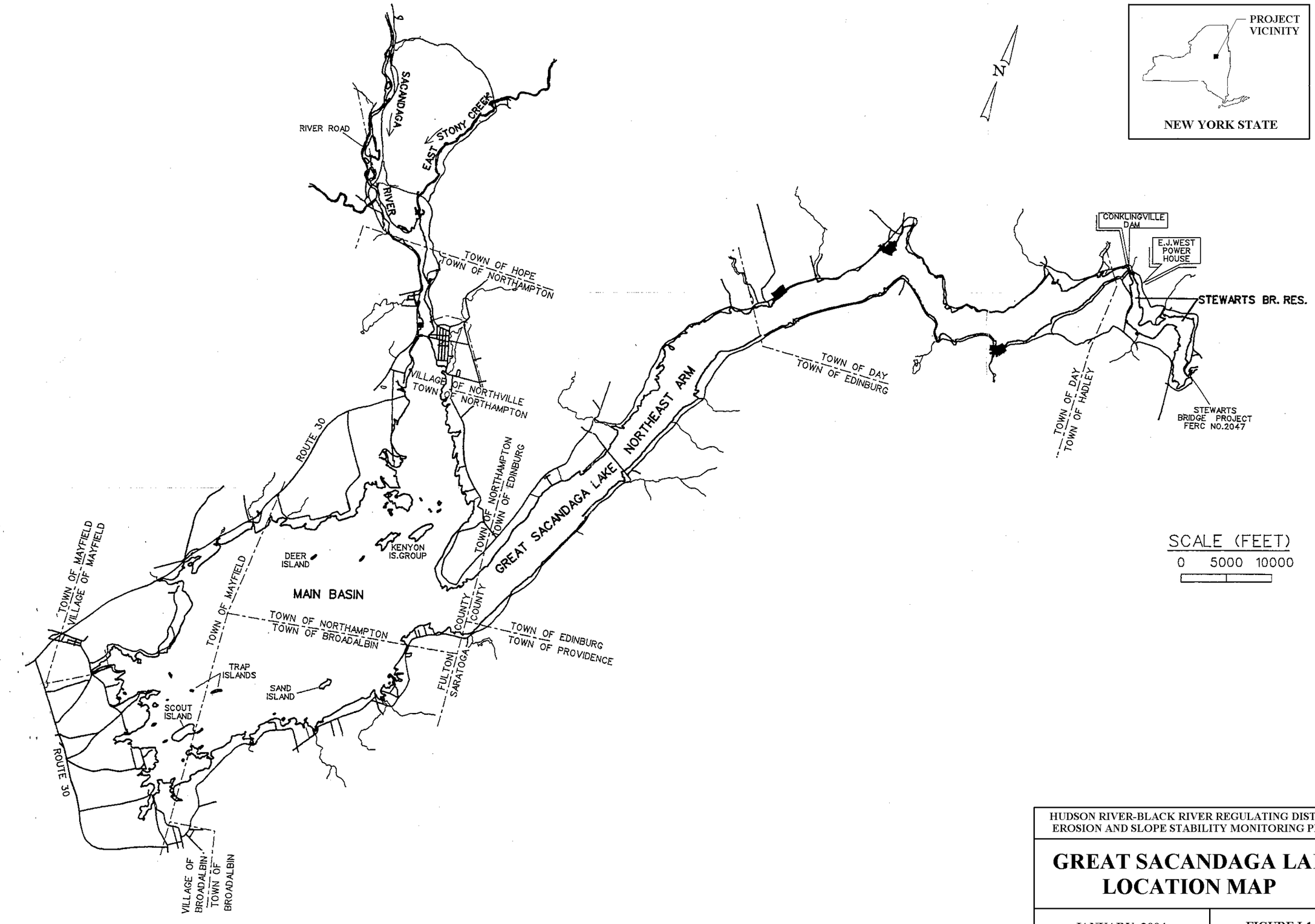
The Great Sacandaga Lake is located on the Sacandaga River in the Counties of Fulton, Hamilton and Saratoga in the eastern central section of New York State. The dam and reservoir are state-owned with operation and regulation by the Hudson River-Black River Regulating District (District). The District-owned facilities were licensed with the Federal Energy Regulatory Commission (FERC) in 2002 under Project No. 12252. The location and general layout of the Project are shown on Figure I-1.

The hydroelectric facility at Conklingville Dam is owned and operated by Reliant Energy and licensed as the E.J. West Project (FERC LP No. 2318). The hydroelectric facility is not part of the District facilities or included in the District's FERC license for Great Sacandaga Lake.

Completed in 1930 with the construction of the Conklingville Dam, the Project provides flood protection and low flow augmentation for the lower Sacandaga and Hudson Rivers. Under normal operating conditions, runoff from snowmelt fills the reservoir in the spring. During the remainder of the year, stored water is systematically released from the Project following established guide level curves. The District uses these curves to allocate the daily volume of water to be released from the lake. Releases are typically made through Reliant's hydroelectric facility. Flows in excess of the hydraulic capacity of Reliant's generating station are passed at the dam. The normal maximum lake level occurs in the spring and is approximately El. 768 feet (USGS datum). The normal minimum lake level occurs in March and is approximately El. 745 feet. This operation has resulted in an average annual water level fluctuation of about 23 feet.

As part of the September 25, 2002 FERC Order Issuing License for the Great Sacandaga Lake Project, Article 403 requires that the District develop and file for FERC approval an Erosion and Slope Stability Monitoring Plan (Plan). The intent of the Plan is to monitor erosion and slope stability and to identify, minimize and remediate erosion or sedimentation resulting from Project construction and operation.

A draft version of the Plan was transmitted to the New York State Department of Conservation (NYSDEC), and Fulton, Hamilton and Saratoga Counties for review and comment. Agency Correspondence and pertinent review comments have been incorporated in this final version of the Plan. Agency correspondence and responses by the District are provided in Appendix D.



HUDSON RIVER-BLACK RIVER REGULATING DISTRICT
EROSION AND SLOPE STABILITY MONITORING PLAN

GREAT SACANDAGA LAKE LOCATION MAP

JANUARY, 2004 | FIGURE I-1

II. 2003 SHORELINE INSPECTION

An inspection of the shoreline was performed in September and October 2003 by Gomez and Sullivan and District staff. The inspection team included Mr. David Mishalanie, P.E. and Mr. Chad Knutti of Gomez and Sullivan and Mr. Vern Duesler, III of the District. Mr. Michael Mosher, P.E. of the District accompanied the inspection team on a part-time basis. The 2003 inspection was performed by boat and encompassed the shoreline along the inlet arm, the main body of the lake and the outlet arm to Conklingville Dam. The inspection at the inlet arm started approximately 1,000 feet downstream (south) of the confluence with West Stony Creek. A map of Great Sacandaga Lake (scale: 1 in. = 5,000 ft.) is included in Appendix A for reference. Erosion sites noted during the 2003 shoreline inspection are highlighted on the map. Sensitive Natural Resource Areas (fish spawning areas) as designated by the NYSDEC have also been included on the map.

The District has maintained an active erosion monitoring and repair program since the early 1930's. Mr. Duesler, Assistant Foreman, and Mr. Jim Lewek, the District's Great Sacandaga Lake Field Office Administrator, have been directly involved in this program for more than 20 years. As such, they provided invaluable knowledge of the Project in terms of the District's capabilities in monitoring erosion sites and implementing repairs, as well as the geographic layout of the reservoir and historic changes in shoreline conditions over time.

The field inspection took place on September 22 - 26, 2003 and October 8 - 9, 2003. These dates provided ideal weather conditions for the visual inspection. The District's pontoon boat was used to access the shoreline. The inspection team stopped at shoreline sites exhibiting moderate to severe erosion as well as other points of interest to collect site-specific data for the monitoring plan. A follow-up field trip took place on October 30, 2003 to confirm data previously collected for some of the sites. Data collected during the site visit was used to develop the initial site database discussed in Section V and summarized in Appendix B. A general discussion of our observations from the 2003 shoreline inspection follows.

Soils along the periphery of the lake are predominantly sandy in composition with the terrain varying in degrees of steepness. There are some areas of exposed bedrock and fine-grained cohesive type soils in the periphery, although these areas make up a very small portion of the reservoir boundary. The steepest shoreline slopes generally occur in the inlet arm (northwest arm near Northville and Northhampton) and the outlet arm (northeast arm from Edinburg to Conklingville Dam). Historically, the most severe shoreline erosion has occurred in these areas. The shoreline of the main basin of the reservoir (southwest section near Mayfield) is generally much flatter than the inlet and outlet arms, and composed of predominantly sandy soils.

Soil type and steepness of the shoreline within the limits of the annual drawdown range are key elements in the erosion processes that have taken place over time at Great Sacandaga Lake.

Being sandy and cohesionless in nature, the majority of the soils surrounding the reservoir are very susceptible to erosion, especially when the slopes are moderate to steep. The primary forces causing erosion appear to be wave action (both wind and boat generated) and ice scour. Prior reports have indicated that beach clearing activities by permit holders have exacerbated erosion along the shoreline. This appears only to be true in areas where the slopes are moderate to steep and bluffs have formed over time within the range of water level fluctuations.

The main body (southern portion) of the reservoir has relatively flat slopes within the water level fluctuation range. Historically, this area has not experienced significant erosion, although our 2003 inspection found areas where erosion was considered noteworthy, and in some cases severe. Flatter areas that have been raked or graded to form sandy beaches are holding up quite well and are not experiencing significant erosion. In many areas, the stone that has been moved from these beach areas has been used to create rock jetties perpendicular to the beaches. These jetties act as breakers and help minimize the impacts of wave action, especially waves from a cross-shore direction.

Many archeological sites are located within the project lands owned and operated by the District as discussed in the 2003 Cultural Resources Management Plan (CRMP) prepared by Hartgen Archeological Associates. We did not observe any archeological sites bordering the lake during our 2003 shoreline inspection that are being impacted by erosion.

Until 2000, the project had been operated to target a maximum lake level of El. 768 feet, typically during the spring and early summer. Many areas around the lake that had experienced erosion over the life of the project had been stabilized for water levels up to target El. 768 feet. Since 2001, higher operating levels have resulted from operation for aggressive storage as discussed in the March 2000 Offer of Settlement for the Project. Lake levels exceeded El. 770.5 feet in 2002 and El. 771 feet in 2003. Our 2003 shoreline inspection noted considerable erosion occurring at or slightly above these recent high water levels including many areas that had already been stabilized with rip rap in prior years. The higher level erosion observed in our inspection appears to be the result of higher water levels that occurred in 2002 and 2003.

III. EROSION MONITORING PROCEDURES

The District will continue to monitor erosion sites around the reservoir. Monitoring shall include the sites in the 2003 database in Appendix B and any new sites noted that are not in the database. The District should also document erosion sites that have been repaired. For the purpose of planning and scheduling repairs, monitoring shall be performed as noted below. It is envisioned that permit holders adjoining the reservoir will continue to be a source of information regarding shoreline erosion sites. The recommended monitoring procedures are discussed below.

A. Annual Spring Inspection and Site Review

Inspect the shoreline during spring high water period after ice-out to review erosion sites, repair needs and to schedule repairs to be performed when lake levels are relatively high. This inspection allows for the observation of areas where shoreline erosion is occurring at sites that are inaccessible by land-based equipment or at sites that are ranked high on the District's repair priority list. Repairs in these areas can often only be accomplished when lake levels are high enough to allow navigation and access by the District's work boat. Data collected during this inspection should be used to update the erosion site database.

B. Annual Late Summer – Early Fall Inspection and Site Review

Inspect the shoreline when lake levels are typically below El. 762 feet. This allows for a more thorough inspection of the shoreline, particularly areas that will be scheduled for repair that year and can be accessed by land-based equipment. Data collected during this inspection should be used to update the erosion site database.

C. Information from Permit Holders

The District typically receives phone calls throughout the year from permit holders regarding erosion taking place along the shoreline. District staff will follow-up with a visit to these sites and, depending on the conditions encountered, will include them in the database if conditions warrant.

D. Monitoring When Lake Levels are Lowest

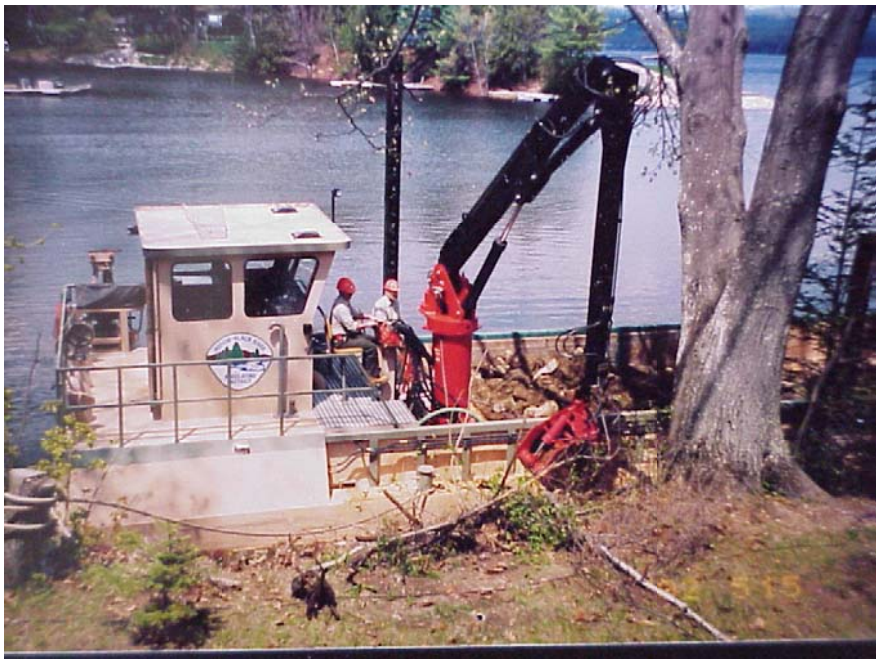
The lowest lake levels normally occur in February and March of each year. These conditions were not available during our September and October 2003 shoreline inspection. We recommend that the shoreline be monitored when lake levels are at or near their lowest levels, as site and weather conditions allow. Any significant shoreline erosion noted should be documented in accordance with Plan guidelines.

IV. REMEDIAL MEASURES

The District and many permit holders around the lake have been actively implementing shoreline protection measures over the years. The District's efforts date back to the early 1930's and consist of the placement of stone and rip rap as erosion protection along the shoreline. Measures that have been implemented by adjoining permit holders over the years have primarily included the placement of rip rap and stone protection, and the construction of retaining walls. Further discussion of the erosion protection features used by the District and the permit holders follows.

A. Protection Measures by the District

The District has been implementing erosion protection measures for the Great Sacandaga Lake shoreline since 1932. These measures have included the placement of field stone and rip rap at eroded areas along the shoreline. Repairs are currently made using rip rap (processed stone) derived from local sources. The typical stone size used is classified as "medium" by NYS Department of Transportation standards, although other sizes may be used as site constraints warrant.



HRBRRD's Work Boat used specifically for placing shoreline protection.

The District's practice is to prioritize and schedule sites to be repaired based on severity of erosion, proximity to the District's property line (referred to as the taking line) and accessibility. The taking line forms the boundary between District-owned and privately-

owned lands and is physically located by survey monuments around the entire perimeter of the lake.

Sites to be repaired are accessed either by land or by the District's work boat (see photo above). The work boat was constructed specifically for the District's use in placing rip rap at sites that are not accessible by land. Repairs in these areas can only be accomplished when lake levels are relatively high to allow navigation and access by the work boat. Sites that can be accessed by land are normally repaired in the late summer, fall and winter when lake levels are relatively low. Using these repair methods, the District is able to access nearly all of the shoreline of Great Sacandaga Lake.

The District has a procedure in place for notifying affected permit holders when work is planned at a given shoreline location. The District's field office notifies the permit holder by letter in advance that work will be performed in their permit area. At that time, the District will request the removal of permit holder-owned obstacles to the work (i.e., docks, boats, stairs, etc.). The District may also request authorization for any special access that might be required to perform the work.

B. Protection Measures by Permit Holders

Many permit holders around the lake have been actively implementing shoreline protection measures over the years. These measures have included the placement of field stone and rip rap as erosion protection, and the construction of retaining walls. Retaining walls have typically been constructed of unmortared stone, brick, and concrete. We have included pictures (below) of protection measures recently implemented by permit holders as examples.

Concrete bin wall under construction by permit holder for shoreline protection.

Rip rap placed by permit holder for shoreline protection.

Concrete bin wall constructed by permit holder for shoreline protection.

The District has a procedure in place for reviewing and approving remedial measures by permit holders. The procedure includes the submittal of a work request by the permit holder for approval by the District and review in accordance with the State Environmental Quality Review Act (SEQR). The submittal by the permit holder generally includes: a photo of the site, a description of the work, sketches of the proposed feature(s), the proposed schedule for performing the work, and any other project specific information that would assist the District in reviewing the proposed project. For the SEQR process, the District is typically the designated lead agency.

V. SITE DATABASE

Site specific data gathered during the 2003 Shoreline Inspection has been compiled in Microsoft Excel spreadsheet format included in Appendix B. The spreadsheet has been broken down into worksheets summarizing the varying degrees of erosion (severe, moderate and low) as well as any points of interest that were found to be noteworthy during our shoreline inspection. Sites falling under the "Points of Interest" category include areas that have been repaired by the District or by individual permit holders, and areas with little or no erosion potential. Data collected during the shoreline inspection for a given site typically included the following:

- Town, Village or other major geographic boundary or feature,
- Permit number, name of permit holder, and tract number from the District's property mapping,
- Predominant soil type,
- Estimated height and length of erosion area,
- The presence of undercut trees and root systems,
- Any site specific influences that may be exacerbating erosion (i.e., seepage, surface runoff, local soil type),
- Whether suitable size and quantity of stone is available at the site to make repairs,
- Whether additional stone will be required to make repairs,
- Means of access available to perform the repairs (i.e., access by land, the District's work boat, etc.),
- Photo(s) of the site showing the conditions noted,
- Preliminary ranking of the site in terms of erosion severity and priority for repair.

The following worksheets from the 2003 shoreline inspection are presented in Appendix B:

- Great Sacandaga Lake Erosion Site Database – 2003 Field Inspection
  Sites Exhibiting Severe Erosion

- Great Sacandaga Lake Erosion Site Database – 2003 Field Inspection
  Sites Exhibiting Moderate Erosion

- Great Sacandaga Lake Erosion Site Database – 2003 Field Inspection
  Sites Exhibiting Low Erosion

- Great Sacandaga Lake Erosion Site Database – 2003 Field Inspection
  Points of Interest

Key data provided on the database worksheets is summarized in Table V-1 below.

Table V-1: Key for Column Headings on Erosion Database Spreadsheets

(Database Tables Provided in Appendix B)			
Column No.	**Column Heading**	**Column Response**	**Description of Cell Contents**
1	Erosion Site Location	General Location	General Location of the Site by Known Geographic Feature
2	Permittee Name	Name	Name of Permit Holder(s) Adjacent to the Site
3	Permit No.	Number	Permit Number for Permit Holder(s) Adjacent to the Site
4	Tract No.	Number	Tract Number Adjacent to the Site
5	Site Located w/GPS	Y, N or Photo Only	If Site has been located with Global Positioning System (GPS). Y indicates the site has been delineated using GPS, Photo Only indicates the site photo has been located using GPS, and N indicates Site has not been located with GPS.
6	Photo No.	Number	Photo Number associated with Site. For Y or Photo Only, Photo will be available on GIS. Where more than one photo is listed in Column 5, the cell is linked to only one photo (photo number appears in upper left corner of photo). The other photos listed may be viewed from the photo directory.
7	Site Access Type	WB or Land or ?	Type of Site Access available to perform repairs: WB indicates the District's work boat, Land indicates access for land based equipment, ? indicates access type should be verified.
8	Repair Priority	1, 2 or 3	For each classification of erosion (Severe, Moderate, Low), the Site has been ranked from 1 to 3 with 1 being the most severe and highest priority for repair and 3 being the least severe and lowest priority for repair.
9	Date Inspected	Date	Last Inspection Date
10	Lake Level (on Date Inspected)	Feet	Lake Level at Time of Last Inspection
11	Date Repairs Performed	Date	Date most recent repairs were performed at the site. This cell will be linked to a picture if a photograph was taken after repairs were made.
12	Erosion Site Description	Description of Site	Comments and detailed description of the site. May include: predominant soil type and condition, eroded bank height, proximity to taking line or private structures, whether stone protection is available at the site to make repairs, whether additional stone protection will be required from off-site source, access type or limitations, and approximate limits of eroded areas.

VI. CLASSIFICATION AND RANKING OF EROSION SITES

For monitoring purposes, specific areas of erosion recorded during the 2003 Shoreline Inspection have been classified as having severe, moderate or low erosion activity. These sites have further been ranked numerically from 1 to 3 in order of repair priority, with 1 being the highest priority for repair and 3 being the lowest. The erosion classification system (severe, moderate and low) used by the District is presented in Figure VI-1. The repair priority ranking system is presented in Figure VI-2. Descriptions of these categories are provided below.

As noted in Section IV, some shoreline areas that will require erosion protection can only be accessed by the District's work boat during periods of relatively high lake levels. Other sites may be accessible by land and could be repaired using conventional heavy equipment. These sites should be inspected yearly once the lake level has receded. Lake levels below El. 762 feet will generally accommodate access and inspection of these sites. Areas that can be repaired by land can typically be done in the late summer or fall when lake levels are in this range or lower and recreation activities have subsided.

A. Sites Exhibiting Severe Erosion

Sites classified as Severe have extensive, active erosion. These sites typically exhibit steep banks and bluffs, with a lack of vegetation or significant undercutting of tree root systems. Severe erosion sites ranked as high priority (1) in terms of the need for repair are typically encroaching on the taking line or adjacent residential or commercial structures or highway infrastructure. Sites with severe erosion and ranked 2 or 3 in repair priority may not be currently encroaching on the taking line or adjacent structures or facilities but will likely require repair in the near future. Examples of sites with severe erosion are provided in the photos below.

Severe erosion site, highest repair priority (Severe, 1). Ranked 1 due to proximity to taking line and structures.

Severe erosion site, median repair priority (Severe, 2). Ranked 2 due to proximity to taking line and structures (moderate distance).

Severe erosion site, lowest repair priority (Severe, 3). Ranked 3 due to proximity to taking line and structures (far away).

B. Sites Exhibiting Moderate Erosion

Sites classified as Moderate have erosion that appears to be active, but somewhat less significant than sites exhibiting Severe erosion. Moderate sites may exhibit undercutting of tree root systems, and lower banks or bluffs with localized erosion. The system for prioritizing repairs is shown on Figure VI-2 (1 – high priority and 3 – low priority). Examples of sites with moderate erosion are provided in the photos below.

Moderate erosion site, highest repair priority (Moderate, 1).
Ranked 1 due to proximity to taking line and structures.

Moderate erosion site, median repair priority (Moderate, 2)
Ranked 2 due to proximity to taking line and structures
(moderate distance).

Moderate erosion site, lowest repair priority (Moderate, 3)
Ranked 3 due to distance to taking line and structures (far away).

C. Sites Exhibiting Low Erosion

Sites classified as Low generally do not exhibit significant erosion at present but have signs that erosive processes have occurred in the past. Sites documented as having low erosion activity have also been ranked using the repair priority system provided in Figure VI-2. An example of a site considered to have low erosion activity is shown in the photo below.

Site classified as having Low erosion activity. Note prior rip rap repairs with vegetation immediately above indicating erosion is not currently actively occurring at this location.

FIGURE VI-1: **Erosion Classification System**

(See Figure VI-2 for "Repair Priority Ranking System")

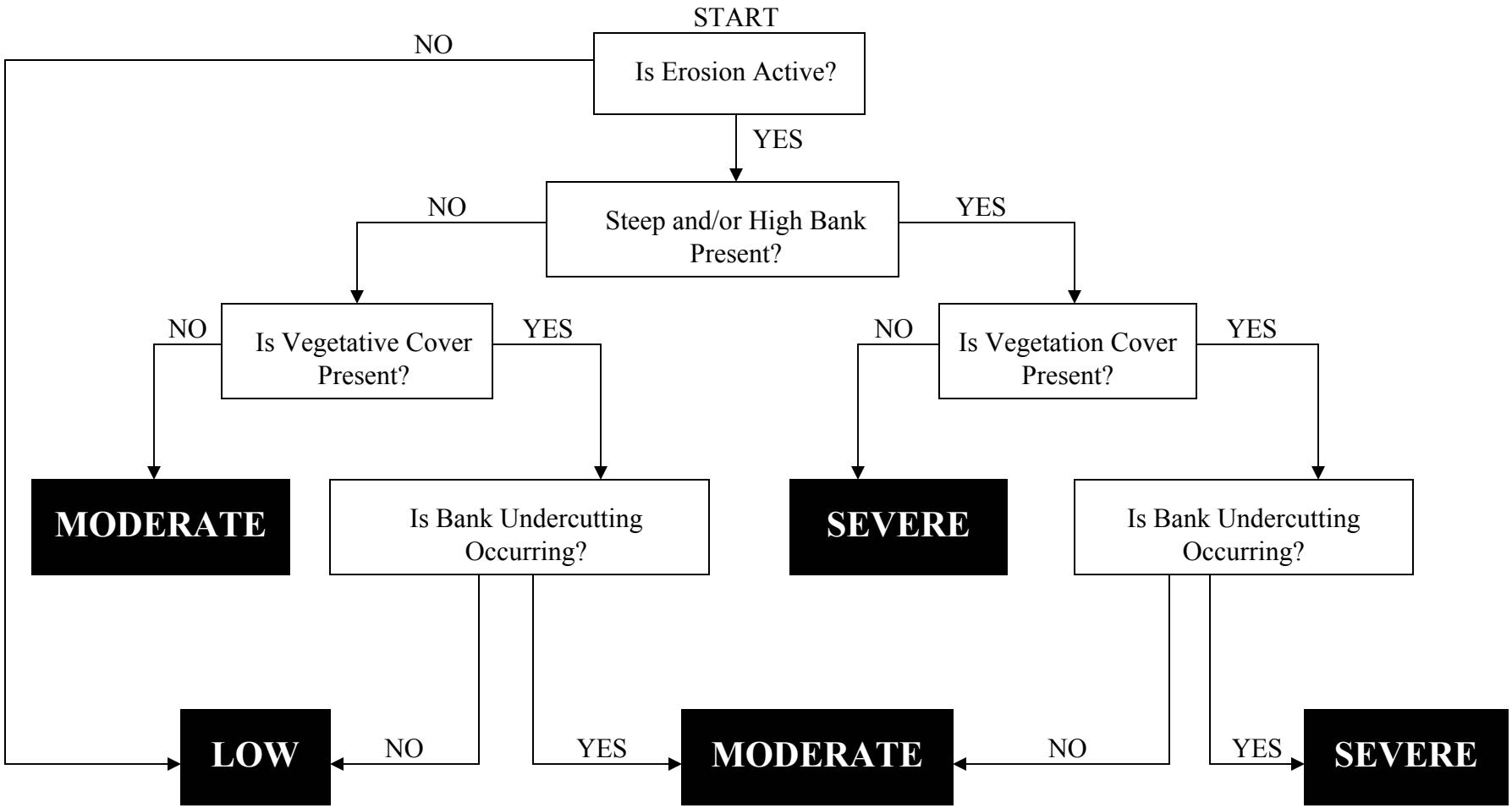
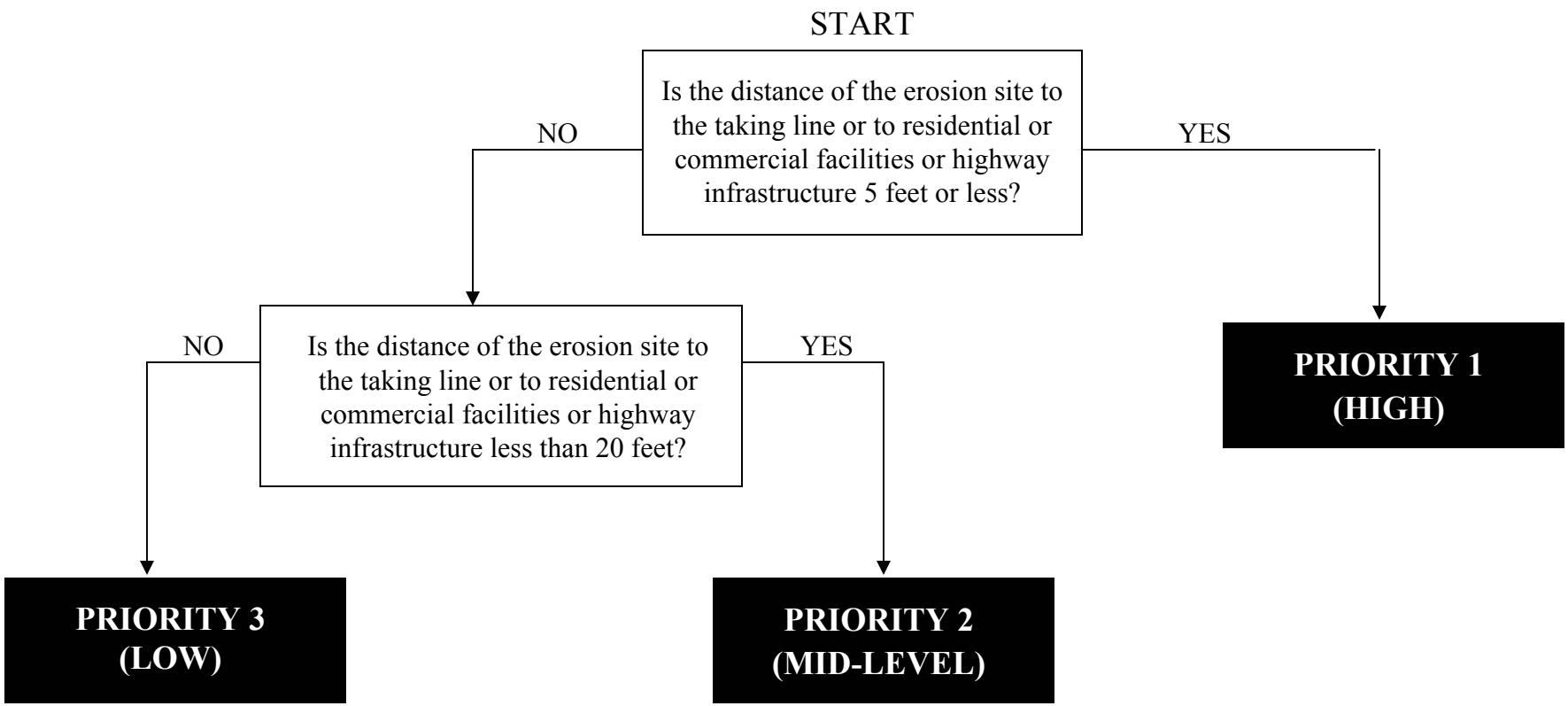


FIGURE V1-2: Repair Priority Ranking System

(See Figure VI-1 for "Erosion Classification System")



VII. CONCLUSIONS AND RECOMMENDATIONS

Procedures for monitoring erosion sites around Great Sacandaga Lake, recommended remedial measures and a system for classifying and ranking the sites for prioritizing remedial work have been developed in conjunction with District staff and regulatory agencies in accordance with FERC License Article 403.

Erosion sites and points of interest along the shoreline have been documented as part of the 2003 shoreline inspection. This information is provided in tabular form in Appendix B and forms the initial database for the District's use in its long term monitoring efforts. The database locates the erosion sites by permit holder name, permit number and tract number. This method of site location and monitoring has been used by District staff to track shoreline erosion for many years. Therefore, it would make sense for the District to continue to use this procedure for future monitoring. Photos were taken of the sites in the database and are included in Appendix C. Most sites from the 2003 shoreline inspection were also located using Global Positioning System (GPS) equipment. This information has been provided to the District for future use in their electronic database for Great Sacandaga Lake.

A general procedure for scheduling erosion sites for repair has been developed for use by the District. This scheduling procedure is intended for the District's long term planning use and may be subject to change based on several factors. These factors will likely include: site-specific conditions and access constraints for the individual sites, seasonal weather conditions that could impact the timing of the work, seasonal reservoir levels that could impact access to the site, and requests by local agencies and permit holders. In keeping with good management practices, the District may repair several erosion sites in the same area where access is considered difficult, regardless of classification or repair priority ranking. With this in mind, the general procedure for scheduling erosion site repairs follows:

1. Sites classified as having Severe erosion with a repair priority rank of 1 (high) should be scheduled for repair first.

2. Sites classified as having Moderate erosion with a repair priority rank of 1 (high) should be scheduled next.

3. Sites classified as having Severe erosion with a repair priority rank of 2 (moderate) should be scheduled for repair next.

4. Sites classified as having Moderate erosion with a repair priority rank of 2 (moderate) should be scheduled next.

5. Sites classified as having Severe and Moderate erosion with a repair priority rank of 3 (low) should be visually monitored as in conjunction with the District's shoreline inspection program. Repairs for these sites should be implemented as the District's schedule allows.

6. Sites classified as having Low erosion should be visually monitored annually in conjunction with the District's shoreline inspection program.

The erosion site database provided in Section V and Appendix B has been developed as the initial database for this Plan. Currently, many of the erosion sites listed therein are ranked as repair priority 1 (high). The District anticipates that as the repair work progresses, the quantity of priority 1 sites will decrease. The District will continue to monitor and re-evaluate site conditions and repair priority rankings as part of this Plan.

Shoreline erosion at Great Sacandaga Lake will continue to be an evolving process. Soils along the periphery of the lake are predominantly sandy in composition with the terrain varying in degrees of steepness. The steepest shoreline slopes generally occur in the inlet arm (northwest arm near Northville and Northhampton) and the outlet arm (northeast arm from Edinburg to Conklingville Dam). Historically, the most severe shoreline erosion has occurred in these areas. The shoreline of the main basin of the reservoir (southwest section near Mayfield) is generally much flatter than the inlet and outlet arms, and composed of predominantly sandy soils as well. Prior reports do not include a discussion of significant erosion along the shoreline of the main basin, although our 2003 inspection found several areas where erosion was considered noteworthy.

The predominantly sandy, cohesionless soils and steepness of the shoreline within the annual drawdown range are key elements in the erosion processes that have taken place over time at Great Sacandaga Lake. These soils are generally very susceptible to erosive forces, especially when the slopes are moderate to steep. The primary forces causing erosion at Great Sacandaga Lake appear to be wave action (both wind and boat generated) and ice scour. Prior reports have indicated that beach clearing activities by permit holders have exacerbated erosion along the shoreline. This only appears to be true in areas where the slopes are moderate to steep and bluffs have formed over time within the range of water level fluctuations. Many areas around the main basin have relatively flat slopes within the water level fluctuation range. Flatter areas that have been raked or graded to form sandy beaches are holding up quite well and are not experiencing significant erosion. Much of the stone that has been moved from these beach areas has been used to create rock jetties perpendicular to the beaches. These jetties minimize the impacts of wave action, especially waves from a cross shore direction.

Many archeological sites are located within the project lands owned and operated by the District as discussed in the 2003 Cultural Resources Management Plan (CRMP) prepared by Hartgen Archeological Associates. We did not observe any archeological sites bordering the lake during our 2003 shoreline inspection that are being impacted by erosion. The monitoring and remedial measures outlined in this Plan will ensure the continued preservation of the shoreline and its contents.

Many shoreline areas around the lake have been repaired and stabilized over the years. Sites noted in our 2003 shoreline inspection that will require monitoring and/or remedial measures have been documented in Appendix B. This includes several steep and high-banked areas (particularly along the inlet and outlet arms) that could develop stability problems if left unmonitored and erosion is allowed to continue over time. Future inspections should focus on these areas.

The lowest lake levels normally occur in February and March of each year. These conditions were not available during our September and October 2003 shoreline inspection. We recommend that the shoreline be monitored when lake levels are at or near their lowest levels, as site and weather conditions allow. Any significant shoreline erosion noted should be documented in accordance with Plan guidelines.

It is noteworthy that until 2000, Great Sacandaga Lake had been operated to target a maximum lake level of El. 768 feet (USGS), typically during the spring or early summer. During our 2003 shoreline inspection, we noted that many areas around the lake that had already been stabilized for water levels up to this target elevation. Higher lake levels have occurred in the past two years with levels exceeding El. 770.5 feet in 2002 and El. 771 feet in 2003. These higher levels are the result of operation for aggressive storage as discussed in Section 3.6 of the March 2000 Offer of Settlement. Our 2003 shoreline inspection noted considerable erosion at and above these "higher" water levels including many areas that already had been stabilized with rip rap for the target operating levels prior to the Offer of Settlement.

The following revisions have been incorporated in this final Plan based on agency review comments received on the draft Plan (see Appendix D - Agency Consultation):

- The repair priority ranking system outlined in Section VI (Figure VI-2) has been revised at the recommendation of Saratoga County (NY). The revised ranking system incorporates erosion sites encroaching on adjacent privately owned facilities and highway infrastructure in the ranking system.

- The locations of Sensitive Natural Resource Areas (fish spawning areas) were provided by the NYSDEC and have been added to the reservoir map in Appendix A.

- Prior to each scheduled shoreline inspection, the District will notify county and local highway and public works departments that own and maintain roads, infrastructure or right-of-ways bordering the shoreline. This will allow these agencies the opportunity to identify areas where project induced erosion or instability is impacting or encroaching on their facilities or right-of-way.

VIII. REFERENCES

1. *E. J. West Project, FERC No. 2318, Response to Additional Information Request No. 1, Report on Erosion Due to Water Level Fluctuations in Great Sacandaga Lake*, Kleinschmidt Associates, 1992.

2. *Upper Hudson/Sacandaga River Offer of Settlement*, Erie Boulevard Hydropower, LP, Project Nos. 2318, 2047, 2482 and 2554, March 27, 2000.

3. *Order Issuing License, Hudson River-Black River Regulating District, Project No. 12252-000*, Federal Energy Regulatory Commission, September 25, 2002.

4. *Great Sacandaga Lake Historic Properties Management Plan,* Hartgen Archeological Associates, Inc., Second Draft - September 2003.

IX. APPENDICES

Appendix A Map of Great Sacandaga Lake

Appendix B Erosion Site Database

Appendix C Photographs

Appendix D Agency Consultation

Hudson River-Black River Regulating District
EROSION AND SLOPE STABILITY MONITORING PLAN
for
GREAT SACANDAGA LAKE

APPENDIX A

MAP OF GREAT SACANDAGA LAKE

Legend

- Erosion Sites (Fall 2003)
- Sensitive Natural Resource Areas (provided by NYSDEC)

Scale 0 2,500 5,000 10,000 15,000 20,000 Feet

Hudson River-Black River Regulating District
Erosion & Slope Stability Monitoring Plan

MAP OF GREAT SACANDAGA LAKE

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January, 2004

Hudson River-Black River Regulating District

EROSION AND SLOPE STABILITY MONITORING PLAN

for

GREAT SACANDAGA LAKE

APPENDIX B

EROSION SITE DATABASE

Great Sacandaga Lake Erosion Site Database

Key for Column/Cell Headings on Erosion Database Spreadsheets

Column/Cell No.	Column/Cell Heading	Column/Cell Response	Description of Cell Contents
1	Erosion Site Location	General Location	General Location of the Site by Known Geographic Feature
2	Permittee Name	Name	Name of Permit Holder(s) Adjacent to the Site
3	Permit No.	Number	Permit Number for Permit Holder(s) Adjacent to the Site
4	Tract No.	Number	Tract Number Adjacent to the Site
5	Site Located w/GPS	Y, N or Photo Only	If Site Has Site been Located with Global Positioning System (GPS) Equipment. Y indicates site has been delineated using GPS, Photo Only indicates Photo has been located using GPS, and N indicates Site has not been located with GPS.
6	Photo No.	Number	Photo Number associated with Site. For Y or Photo Only, Photo will be available on GIS. Where more than one photo is listed in Column 5, the cell is linked to only one photo (photo number appears in upper left corner of photo). The other photos listed may be viewed from the photo directory.
7	Site Access Type	WB or Land or ?	Type of Site Access available to perform repairs: WB indicates the District's work boat, Land indicates access for land based equipment, ? indicates access type should be verified.
8	Repair Priority	1, 2 or 3	For each classification of erosion (Severe, Moderate, Low), the Site has been ranked from 1 to 3 with 1 being the most severe and highest priority for repair and 3 being the least severe and lowest priority for repair.
9	Date Inspected	Date	Last Inspection Date
10	Lake Level (on Date Inspected)	Feet	Lake Level at Time of Last Inspection
11	Date Repairs Performed	Date	Date most recent repairs were performed at the site. This cell will be linked to a picture if a photgraph was taken after repairs were made.
12	Erosion Site Description	Description of Site	Comments and detailed description of the site. May include: predominant soil type and condition, eroded bank height, proximity to take line or private structures, whether stone protection is available at the site to make repairs, whether additional stone protection will be required from off-site source, access type or limitations, and approximate limits of eroded areas.

Great Sacandaga Lake Erosion Site Database
2003 Field Inspection

Sites Exhibiting Severe Erosion

1	2	3	4	5	6	7	8	9	10	11	12
Erosion Site Location	Permittee Name	Permit No.	Tract No.	Site Located w/GPS (Y/N)	Photo No.	Site Access Type (WB or Land)	Repair Priority (1, 2, 3)	Date Inspected	Lake Level (on Date Inspected) (ft)	Date Repairs Performed	Erosion/Site Description
Mayfield	E & B Staalesen	13025	851	Y	37, 38	WB	1	9/24/03	761.3		Fine sand, soft and wet, add 2' to existing stone protection, will need stone
Mayfield	D Embree	13529	851/860	Y	37, 38	WB	1	9/24/03	761.3		
Mayfield	H & J Jasnaw	10677	851/860	Y	37, 38	WB	1	9/24/03	761.3		
Mayfield	A Lanole	12954	851/860	Y	37, 38	WB	1	9/24/03	761.3		
Mayfield	M & W Kennicutt	12474	851/860	Y	37, 38	WB	1	9/24/03	761.3		
Northampton - Above Northville Bridge	Brownell	14921	666	Photo only	60	WB	3	9/25/03	761.3		Area showing good previous repair, may need touch up along top of rip rap layer.
Mayfield	M Silvia	6234	860	Y	37, 38	WB	1	9/24/03	761.3		Fine sand, soft and wet (holds water), 4' - 6' high severe erosion, will need stone
Mayfield	W Rapant	4276	860	Y	37, 38	WB	1	9/24/03	761.3		Find sand, soft and wet (holds water), 2' - 3' high severe erosion, will need stone
Mayfield	N Burnetter	12768	860	Y	37, 38	WB	1	9/24/03	761.3		Fine sand, soft and wet (holds water), 1' - 2' high severe erosion, will need stone
Mayfield	F Rakbica	6578	860	Y	37, 38	WB	1	9/24/03	761.3		Fine sand, soft and wet (holds water), 1' - 2' high severe erosion, will need stone
Northville	W Walrath Sr	3679	502	Y	150	WB	1	10/30/03	763.6		Sandy soil, 6' - 8' high erosion, work boat access, need stone
Northville	J Mauro	12510	502	Y	150	WB	1	10/30/03	763.6		
Northville	W Walrath Jr	9852	505	Y	149	WB	1	10/30/03	763.6		Sandy soil, add to top of existing rip rap for higher water, need stone, work boat access, 7' - 8' high erosion, add to top of existing rip rap
Northville	D & J Russom	10405	507	Y	149	WB	1	10/30/03	763.6		
Northville	B Backer	11277	507	Y	149	WB	1	10/30/03	763.6		
Mayfield Bay	W. Aubrey	5878	954	Y	20, 21, 22, 23	WB/Land?	1	9/22/03	761.2		Clay bank, seepage through eroding face, wet at toe, need stone, check access type
Mayfield	G Faehner	13905	954	Y	20, 21, 22, 23	WB/Land?	1	9/22/03	761.2		
Kunkel Point	M Kunkel	1061	954	Photo only	24	Land	1	9/22/03	761.2		Sandy, severe erosion, most severe closer to point, land access, need stone
Conklingville	R Vasel	14299	96	Y	144	Land	1	10/30/03	763.6		Sandy soil, 3' - 4' high severe erosion,
Conklingville	S Nutting	12323	96	Y	144	Land	1	10/30/03	763.6		
Vandenburg Beach	R Oaksford	11022	899	Y	25, 26	WB	1	9/22/03	761.2		sandy w/ some silt, soft, wet, within 5 ft. of taking line
Vandenburg Beach	M Lourina	10708/14985	899	Y	25, 26	WB	1	9/23/03	761.2		
Mayfield	SE Price Co.	12059	1019	Y	7,8	WB	1	9/22/03	761.2		high, sandy banks, severe erosion, losing trees, taking line close but no structures nearby, work boat, need stone
Mayfield	S. Papa	9395	968	Y	12, 13, 14	Land	1	9/22/03	761.2		Significant erosion at top of rock, sandy, some natural stone, need more stone
Northhampton	M. Valachovic	3576	390	Y	64	Land?	1	9/26/03	761.3		Sandy soil, 2' - 4' high erosion, 5'-6' from taking line, will need stone, check on land access

Great Sacandaga Lake Erosion Site Database
2003 Field Inspection

Sites Exhibiting Severe Erosion

1	2	3	4	5	6	7	8	9	10	11	12
Erosion Site Location	Permittee Name	Permit No.	Tract No.	Site Located w/GPS (Y/N)	Photo No.	Site Access Type (WB or Land)	Repair Priority (1, 2, 3)	Date Inspected	Lake Level (on Date Inspected) (ft)	Date Repairs Performed	Erosion/Site Description
Vandenburgh Point	Meola	7996	898	Y	32, 33	WB	1	9/24/03	761.3		Sandy, 4' - 6' erosion height, taking line close to Meola #7996, others farther away, total length = 250'±, need stone
Vandenburgh Point	Meola	9443	898	Y	32, 33	WB	1	9/24/03	761.3		
Vandenburgh Point	Hoffman	6083	898	Y	32, 33	WB	1	9/24/03	761.3		
Northville Hampton Point	J Dean	6435S	498	Photo only	56, 57	Land/WB	1	9/25/03	761.3		Sandy soil, add 4' - 6' to top of existing rip rap, no stone available, looks access looks primarily by work boat but check land access for delivering stone. Long stretch of shoreline from Grandview Marina to State Park.
Northville/ Hampton Point	L Brown	5930	645	Photo only	56, 57	Land/WB	1	9/25/03	761.3		
Northville/ Hampton Point	G Holcomb	9585	645	Photo only	56, 57	Land/WB	1	9/25/03	761.3		
Northville/ Hampton Point	R MacMartin	7786	645	Photo only	56, 57	Land/WB	1	9/25/03	761.3		
Northville/ Hampton Point	K Dirpik	14225	645	Photo only	56, 57	Land/WB	1	9/25/03	761.3		
Northville/ Hampton Point	L Maschler	13170	645	Photo only	56, 57	Land/WB	1	9/25/03	761.3		
Northville/ Hampton Point	R Dirpik	14815	645	Photo only	56, 57	Land/WB	1	9/25/03	761.3		
Northville/ Hampton Point	I. Anderson	11195	645	Photo only	56, 57	Land/WB	1	9/25/03	761.3		
Northville/ Hampton Point	A Taylor	12823	645	Photo only	56, 57	Land/WB	1	9/25/03	761.3		
Northville/ Hampton Point	D Morales	14502S	498	Photo only	56, 57	Land/WB	1	9/25/03	761.3		
Mayfield	R. Johnson	11534	478	Photo only	56, 57	WB	2	9/25/03	761.3		
Mayfield	Miller's Grand View Marina	469-C	478	Photo only	56, 57	WB	2	9/26/03	761.3		
Mayfield	J. Todd	13989	478	Photo only	56, 57	WB	2	9/25/03	761.3		
Mayfield/ Broadalbin	K Hennessy	7782	879	Y	34, 35, 36	Land	1	9/24/03	761.3		Coarse, sandy soil, add 2' - 3' to top of existing rip rap, some stone available, land access. Long stretch from K. Hennessy to D. Fonda.
Mayfield/ Broadalbin	M Rich	8544	879	Y	34, 35, 36	Land	1	9/24/03	761.3		
Mayfield/ Broadalbin	M Franz	9255	879	Y	34, 35, 36	Land	1	9/24/03	761.3		
Mayfield/ Broadalbin	J Wyzykowski	14745	879	Y	34, 35, 36	Land	1	9/24/03	761.3		
Mayfield/ Broadalbin	R West	14746	879	Y	34, 35, 36	Land	1	9/24/03	761.3		
Mayfield/ Broadalbin	R Peters	14747	879	Y	34, 35, 36	Land	1	9/24/03	761.3		
Mayfield/ Broadalbin	D Fonda	5929	879	Y	34, 35, 36	Land	1	9/24/03	761.3		
Kennyetto Creek Bay	K. Nelson	9091	858	Y	44	WB	1	9/24/03	761.3		Sandy, some shale, 8' - 10' high erosion, steep, need stone, encroaching on taking line (about 3' away)
Northhampton - north of Hampton Pt.	Near Scandaga Golf Course	N.A.	N.A.	Photo only	59	WB	3	9/25/03	761.3		Sandy, 15' high erosion, erosion is severe, site is a long way from taking line so priority is low. Should consider repairing to mitigate for sedimentation.

Great Sacandaga Lake Erosion Site Database
2003 Field Inspection

Sites Exhibiting Severe Erosion

1	2	3	4	5	6	7	8	9	10	11	12
Erosion Site Location	Permittee Name	Permit No.	Tract No.	Site Located w/GPS (Y/N)	Photo No.	Site Access Type (WB or Land)	Repair Priority (1, 2, 3)	Date Inspected	Lake Level (on Date Inspected) (ft)	Date Repairs Performed	Erosion/Site Description
Northhampton	J. Shuttleworth	6104	374	Y	66	Land?	1	9/26/03	761.3		Sandy soil, 5'-7' erosion height, will need stone, check on land access
Providence	C. Sargalis	12877	352	Y	67	Land	1	9/26/03	761.3		Silty, fine sand, 4' - 6' erosion height, some stone available, will need more, land access available
Edinburg	D. Nikolski	479-C	330	Y	71	Land?	2	9/26/03	761.3		sandy 4' - 5' high erosion, tree roots exposed, some med.-large rock available will need more, check access
Edinburg	F. Blasé	11278	328	Y	72	WB	1	9/26/03	761.3		fine sand, 10 - 20' high erosion, taking line is close, some rock available, need more rock, work boat access
Edinburg	J. Piscitelli	14505	326	Photo only	73	Land?	1	9/26/03	761.3		8' - 10' from taking line, 3' - 5' high erosion, some stone available, more needed
Edinburg	J. & C. Friedman	14696	326	Photo only	74	WB	1	9/26/03	761.3		sandy soil, 5' - 7' high erosion, some stone available, more needed
Edinburg	L. Edwards	9702	286	Photo only	75	WB?	1	9/26/03	761.3		sandy soil, 10' - 12' high erosion, trees must be cleared, need stone, check land access
Northville	J. D'Antonio	6292	437	Photo only	81	WB?	1	9/26/03	761.3		severe erosion, very close to taking line, check on access by boat or truck
Day - North Shore	E. Shelley	5906	185A	Photo only	86	WB	2	10/8/03	762.3		Sandy, sand changes to clay deeper, some seepage through eroded bank noted, trees undermined, 2' - 10' high erosion, need stone
Day - North Shore	J B Ward	14109	185	Y	88	WB	2	10/8/03	762.3		Sand and silty sand, encroaching on North Shore Road, 4' - 8' high erosion, will need stone, work boat access, long reach to G & S Crounse (P 8177, T 185, on Moderate Sheet)
Day - North Shore	B & K Roberts	10546	183	Photo only	89	Land	2	10/8/03	762.3		Encroaching on North Shore Road, 3' - 5' high erosion, sandy, need stone, check on land access
Day - North Shore	E Bunker	2889	169	Y	90	WB	2	10/8/03	762.3		Within 25' of North Shore Road, fine sandy soil, 4' - 5' erosion undermining trees 25', need stone, access by work boat
Day - South Shore Road	K & S Decerce	12097	118	Y	93, 94	Land?	1	10/8/03	762.3		Sandy w/ gravel, up to 10' high erosion, encroaching on road, could make access road down to site, need stone - sites should be done together
Day - South Shore Road	D Rodman	10871	118	Y	93, 94	Land?	1	10/8/03	762.3		
Day - South Shore Road	A & E Laraway	10475	116	Y	95	Land (?)	1	10/8/03	762.3		Sandy soil, close to road, pavement cracking parallel to slope break, erosion to 12' high, need stone, check on land access - sites should be done together
Day - South Shore Road	J & D Laliberte	14375	118	Y	95	Land (?)	1	10/8/03	762.3		
Day - South Shore Road	Carmen Kiraly	13315	118	Y	96	Land (?)	1	10/8/03	762.3		
Edinburg - South Shore Road	D & M Wade	10531	122	Photo only	98	Land	1	10/8/03	762.3		Sandy soil, 4' - 6' high erosion, very close to road, check access - may be able to end dump from truck, will need stone
Edinburg - North Shore Road	M Clark	12525	293	Y	102	WB	1	10/8/03	762.3		Sandy, 20'± bluff height, top of bank within 20' of house, top of bluff within 12' of taking line, need stone, work boat access
Paul River Bay	J Huffman	324	147	Y	111	WB	1	10/9/03	762.2		Sandy w/ tree roots exposed, downed trees, erosion over 300' long, bank 8' - 10' plus, erosion is severe, will need stone, work boat access
Paul River Bay	R Fahey	5473	117	Y	116	Land?	2	10/9/03	762.2		Sandy soil, 6' - 8' high erosion, encroaching on North Shore Road, bedrock is close in some areas, will need stone, check on land access, these sites should be done together
Paul River Bay	A Shelbey	6411	117	Y	116	Land?	2	10/9/03	762.2		
Day - Ogden Cove	Ogden Brook Inlet	next to road	next to road	Photo only	120	WB	1	10/9/03	762.2		Site is along roadside, sandy with tree roots exposed, add to top of existing stone from inlet to point, will need stone, work boat access
Day - South Shore Road	F & A Crounse	6187	98/96	Y	118	Land	1	10/9/03	762.2		Sandy soil, eroded area is about 500' long, bank height varies 3' - 6', will need stone, land access, repair entire length
Day - South Shore Road	D & K Nickson	13879	96	Y	118	Land	1	10/9/03	762.2		

Great Sacandaga Lake Erosion Site Database
2003 Field Inspection

Sites Exhibiting Severe Erosion

1	2	3	4	5	6	7	8	9	10	11	12
Erosion Site Location	Permittee Name	Permit No.	Tract No.	Site Located w/GPS (Y/N)	Photo No.	Site Access Type (WB or Land)	Repair Priority (1, 2, 3)	Date Inspected	Lake Level (on Date Inspected) (ft)	Date Repairs Performed	Erosion/Site Description
Brooks Bay	None - Road Work by County	Road work adjacent to lake	Road work adjacent to lake	Photo only	125	N.A.	1	10/9/03	762.2		Saratoga County Highway Dept lowering road and performing slope repairs in conjunction with HRBRRD - work started fall of 2003.
Day - South Shore Road	R & R Smith	14383	84	Photo only	119	WB	2	10/9/03	762.2		Sandy with undermined trees and exposed roots, bank height 3' - 5', will need stone, work boat access, sites should be done together
Day - South Shore Road	W & S Stone	12680	84	Photo only	119	WB	2	10/9/03	762.2		
Day - Point at Ogden Cove	Sjolund	13941S	84/82	Photo only	121	WB	1	10/9/03	762.2		High, sandy bank, erosion height 10' - 15', close to house at top of bank, will need stone, work boat access
Brooks Bay	T Nyland	12251	70	Photo only	126	WB	1	10/9/03	762.2		Site adjacent to repair work done by HRBRRD is 2003, this site should be done in 2004, sandy soil, some stone available, will need stone, work boat access
South Shore Road near Dam	W Tretiak	14535	48	Y	130	WB	1	10/9/03	762.2		Sandy bank with loam and moss cover, bank height 3' - 5', encroachin on road in some areas, some stone available, will need more, work boat access, sites should be done together
South Shore Road near Dam	G Watson	14752	48	Y	130	WB	1	10/9/03	762.2		
North Shore Road	J Duffy	11996	17	Photo only	131	WB	2	10/9/03	762.2		Boney sand, undercut trees with exposed roots, trees will need to be trimmed, existing rip rap needs to be raised, will need stone, work boat access, sites should be done together
North Shore Road	R Johnson	10035	43	Photo only	131	WB	2	10/9/03	762.2		
North Shore Road	D Robinson	14910	37/41	Photo only	132	WB	2	10/9/03	762.2		Sandy bank, erosion height up to 10', some stone available, need more stone, raise rip rap to accommodate high water level, work boat access, sites should be done together
North Shore Road	S Johnson	1006	63	Photo only	132	WB	2	10/9/03	762.2		
Day - North Shore	Conklingville Community Church	7448S	73/69	Y	133	Land	2	10/9/03	762.2		Coarse, sandy soil, bank height 5' - 10', some stone available, need more stone, land access
Day - North Shore	Kathan Realty Corp	8686S	83	Y	134	Land	1	10/9/03	762.2	10/20/03	Sandy knoll, bank height at eastern-most point 10'±, length of eroded area 75'±, will need stone, land access available (Repair Photo #1 (RP001.jpg))
Day - North Shore	Kathan Camps	8686S	83	Y	135, 136	WB	1	10/9/03	762.2	10/20/03	Same are near Kathan Realty, sandy bank, erosion height 6' - 8', undercutting of trees, sandy, will need stone, L = 200'±, work boat access
Day - North Shore Road	J Sullivan	10495	105	Photo only	138, 139	WB	2	10/9/03	762.2		Boney sand, seepage through bank (water flowing from pipe in photo 140), tree roots exposed, more on Kleinschrod property, 100'± needs work, bank height 3' - 5', stone available, will need more stone, work boat access, sites should be done together
Day - North Shore Road	W & P Kleinschrod	9386	105	Photo only	140	WB	2	10/9/03	762.2		

Great Sacandaga Lake Erosion Site Database
2003 Field Inspection

Sites Exhibiting Moderate Erosion

1	2	3	4	5	6	7	8	9	10	11	12
Erosion Site Location	Permittee Name	Permit No.	Tract No.	Site Located w/GPS (Y/N)	Photo No.	Site Access Type (WB = workboat) (WB or Land)	Repair Priority (1 High, 3 Low) (1,2 3)	Date Inspected	Lake Level (on Date Inspected) (ft)	Date Repairs Performed	Description of Site Conditions Noted during Field Inspection
Edinburg (South Shore Road)	K Hottinger	12814	156	Y	146	WB	1	10/30/03	763.6		Gravelly soil, 4' - 6' high erosion, will need stone, work boat access, continuous from Hottinger to Holderbaum
Edinburg (South Shore Road)	J Lowerre	12733	156	Y	146	WB	1	10/30/03	763.6		
Edinburg (South Shore Road)	A DeBlasio	13488	156	Y	146	WB	1	10/30/03	763.6		
Edinburg (South Shore Road)	A Byrne	9580	156	Y	146	WB	1	10/30/03	763.6		
Edinburg (South Shore Road)	J Holderbaum	7552	112	Y	145	WB	1	10/30/03	763.6		
Northville (Houseman St.)	C Robinson	6509	508	N	N	WB	3	10/30/03	763.6	Oct-03	Sandy soil, add to top of existing rip rap, repair existing holes, will need stone, work boat
Brook Bridgeview Development	M Miller	12057	299	N	N	Land/WB	3	10/30/03	763.6	Oct-03	Gravelly soil, 2' high erosion, stone available, check access for land or work boat
Woods Hollow	P Dunovich	8561	851	Y	39, 40	Land	3	9/24/03	761.3		sandy-gravel, 4' - 10' erosion height, erosion is significant for several tracts but occurring far from taking line (400' ±), need stone, driveway access available
Woods Hollow	R Manginelli	10864	851	Y	39, 40	Land	3	9/24/03	761.3		
Woods Hollow	K Voorhees	13233	851	Y	39, 40	Land	3	9/24/03	761.3		
Woods Hollow	Gaugler	13773	851	Y	39, 40	Land	3	9/24/03	761.3		
Woods Hollow	D Voorhees	13232	851	Y	39, 40	Land	3	9/24/03	761.3		
Woods Hollow	Pronebski	11069	851	Y	39, 40	Land	3	9/24/03	761.3		
Woods Hollow	Pronebski	4850	851	Y	39, 40	Land	3	9/24/03	761.3		
Woods Hollow	A Luey	12341	851	Y	39, 40	Land	3	9/24/03	761.3		
Mayfield/North Hampton Line	A. Lanzi	14579	1005	Y	6	Land	1	9/22/03	761.2		Sandy soil, moderate erosion relatively close to taking line, some undercutting of tree roots, some stone available
Mayfield	M & V Farrington	14362	973	Y	9, 10	Land or WB	2	9/22/03	761.2		Sandy soil, 3' erosion height near high water level, some stone available, check on land access, sites are adjacent - do them together
Mayfield	J. Anodio	11336	973	Y	11	Land or WB	2	9/22/03	761.2		
Mayfield	M Shaad	4231	952	Y	15, 16, 17	Land	3	9/22/03	761.2		Lenses of sand and silty sand, 3' - 7' erosion height, relatively far from taking line, check land access, need stone
Mayfield	E. Holcomb	7904	911	Y	18, 19	WB	3	9/22/03	761.2		Sandy soil, moderate erosion, becomes more severe closer to point, work boat access
Northville	Sacandaga Heights	8600S	498	Y	151	WB	2	10/30/03	763.6		Sandy soil, raise 2' - 3' above existing rip rap, work boat access, need stone
Northville	J Harper	10798	634A, 628	Y	152	WB	1	10/30/03	763.6		Gravelly soil, 4' - 5' erosion height, work boat, need stone
Edinberg/ Providence	G Miller	1736	344	Y	141, 142	Land	2	10/30/03	763.6		Sandy soil, 4' - 5' erosion height, stone available, land access

Great Sacandaga Lake Erosion Site Database
2003 Field Inspection

Sites Exhibiting Moderate Erosion

1	2	3	4	5	6	7	8	9	10	11	12
Erosion Site Location	Permittee Name	Permit No.	Tract No.	Site Located w/GPS (Y/N)	Photo No.	Site Access Type (WB = workboat) (WB or Land)	Repair Priority (1 High, 3 Low) (1,2 3)	Date Inspected	Lake Level (on Date Inspected) (ft)	Date Repairs Performed	Description of Site Conditions Noted during Field Inspection
Fishhouse	R Kuhn	11982	328	Y	143	Land/WB	2	10/30/03	763.6		Gravelly sand, 4' - 5' erosion height, check on access and material needs
Broadalbin	V Regusa	10254	857	Y	42	Land	1	9/24/03	761.3		Sandy soil, 15' - 20' erosion height, bring in stone, check land access
Conklingville Overlook Beach Association	K Bayer	7642	66	Y	147, 148	WB	2	10/30/03	763.6		Gravelly soil w/stome, 4' high erosion, work boat access, will need stone
North Broadalbin	Wilcox	10928	807	Y	49, 50	Land	2	9/24/03	761.3		Sandy soil, 4' - 6' high erosion, repaired previously with small stone, will need additional stone, land access
North Broadalbin	Tomlinson	8040	807	Y	51	Land	2	9/24/03	761.3		Sandy, changes to shale, exposed tree roots, bank height 6' - 8', will need additional protection at high water level, need stone, land access available
Vandenburgh Point	J & E Bray	14594	898	Y	30	WB	2	9/24/03	761.3		8'-12' high erosion, sandy, within 30' of taking line, adjacent areas done, add to existing stone
Vandenburgh Point	Dykeman	12978	898	Y	30	WB/Land	do with Bray	9/24/03	761.3		
Kennyetto Creek Bay	Bishop	10390	858	Y	45	WB	2	9/24/03	761.3		Silty sand, very soft, seepage through bank, far from taking line, will need stone
Broadalbin	McMurray	289C	840	Y	46, 47, 48	Land	2	9/24/03	761.3		Sandy, 4' - 6' erosion height, erosion is significant but repair need is moderate relative to distance from taking line, will need stone, land access readily available
N. Broadalbin	Hulzar	12622	721	Y	52,53	Land	2	9/24/03	761.3		Sandy, 2' - 3' high erosion, stone available, land access
Providence	S. Tirpak	13664	647	Y	58	Land?	2	9/25/03	761.3		significant erosion, low priority due to location
Providence	NorthHampton Cemetery	1S	436	Y	65	Land?	2	9/26/03	761.3		sandy, 3' high erosion, some stone available
Providence	A. Jennings	13517	350	Y	68	Land	2	9/26/03	761.3		sandy soil, undercut tree roots, erosion is mod. - severe, but rated 2 due to distance to taking line, some stone available
Providence	H. Devine	133	350	Y	68	Land	2	9/26/03	761.3		
Providence	J. Winney	439C	350	Y	69	Land	2	9/26/03	761.3		boney material, some seepage through bank, 2' - 4' high erosion, some stone available, bulldozer work
Providence	K. Wachowitz	11362	350	Y	69	Land	2	9/26/03	761.3		
Providence	V. Paleschi	11849	350	Y	69	Land	2	9/26/03	761.3		
Edinburg	J. & S. Goodhue	13592	344	Y	70	Land	2	9/26/03	761.3		sandy soil, tree roots exposed, 4'-6' high erosion, some stone available, land access available
Edinburg	P. Dorgan	14256	344	Y	70	Land	2	9/26/03	761.3		
Edinburg	R. Peiham	12476	344	Y	70	Land	2	9/26/03	761.3		
Edinburg	W. Wozniak	9051	303	Y	78	WB	2	9/26/03	761.3		sandy soil, 4' - 5' high erosion, some stone available, more needed
Northville	M. Brier	627	437	Y	79	WB?	3	9/26/03	761.3		sandy soil, rip rap limits need to be raised, check on dump truck access from above, otherwise work boat
Northville	Camper Club	1833S	423	Photo only	82	WB	2	9/26/03	761.3		sandy soil, 8' - 10' high erosion, access by boat, need stone

Great Sacandaga Lake Erosion Site Database
2003 Field Inspection

Sites Exhibiting Moderate Erosion

1	2	3	4	5	6	7	8	9	10	11	12
Erosion Site Location	Permittee Name	Permit No.	Tract No.	Site Located w/GPS (Y/N)	Photo No.	Site Access Type (WB = workboat) (WB or Land)	Repair Priority (1 High, 3 Low) (1,2 3)	Date Inspected	Lake Level (on Date Inspected) (ft)	Date Repairs Performed	Description of Site Conditions Noted during Field Inspection
Northville	O. Keller	8779	391	Photo only	83	Land	2	9/26/03	761.3		sandy soil, 4' 6' high erosion, land access, touch up w/3 - 4 loads
Day - North Shore	D. Brownell	14186	187	Y	84	WB	1	10/8/03	762.3		Sandy soil, 3' - 4' erosion at high water level, will need stone
Day - North Shore	W. Conover	12049	185A	Y	85	WB	1	10/8/03	762.3		Sandy soil, 4' - 10' high bank erosion, will need stone
Day - North Shore	G & S Crounse	8177	185	Y	87	WB	1	10/8/03	762.3		Sandy soil, 4' - 6' high erosion, trees undermined, will need stone - erosion is continuous from Krounse to J B Ward (P 14109, T 185, noted on Severe Sheet)
Day - South Shore Road	N & J Johnson	433C	102	Y	91	Land	2	10/8/03	762.3		Sandy soil, variable erosion height up to 10', do both sites together, land access at Knecht parcel, will need stone
Day - South Shore Road	R & S Knecht	11408	102	Y	91	Land	2	10/8/03	762.3		
Day - South Shore Road	R. Stott	11295	118	Photo only	97	Land/WB	2	10/8/03	762.3		Sandy soil, tree roots exposed all along high water level, needs to be topped off with stone, close to road, check access - either land or work boat
Edinburg - South Shore Road	E & M Sweet	14172	154	Y	99, 100	both	1	10/8/03	762.3		Sandy soil, 10' - 15' bank, check on truck/dozer or workboat access, will need stone
Edinburg - North Shore Road	Bridgeview Beach Club	6138S	299	Y	101	both	2	10/8/03	762.3		Sandy soil, 2' - 3' high erosion at high water level, will need stone, access either way including tractor/dozer, do these sites together
Edinburg - North Shore Road	Califano	11173	299	Y	101	both	2	10/8/03	762.3		
Edinburg - North Shore Road	M Major	12226	265	Y	104	WB	3	10/8/03	762.3		Sandy soil, moss cover helps, bank 2' - 5' high, low - moderate priority, long way from takeline, will need stone
Edinburg - North Shore Road	J Hamilton	14598	247	Y	105	Land	2	10/8/03	762.3		Sandy soil, some stone available, land access (loader/backhoe), bank height 2' - 6', do these sites together
Edinburg - North Shore Road	H Donaldson	9576	247	Y	105	Land	2	10/8/03	762.3		
Edinburg - North Shore Road	G & M Berryann	11171	245	Y	106	Land/WB	1	10/8/03	762.3		Sandy soil, rank is moderate due to distance from road and takeline, erosion is severe, bank height = 15' - 20' high, will need stone, access by land or work boat, do these sites together.
Edinburg - North Shore Road	P & B Callan	13706	245	Y	106	Land/WB	1	10/8/03	762.3		
Edinburg - North Shore Road	Camelot Estates	12357S	245	Y	106	Land/WB	1	10/8/03	762.3		
Edinburg - North Shore Road	B & P Brownell	7955	237	Y	107	WB	1	10/8/03	762.3		Sandy soil, some banks 25' high, not close to takeline yet, but erosion is significant, do these sites together.
Edinburg - North Shore Road	Sandy Knolls Beach Association	7386S	231	Y	108	WB	1	10/8/03	762.3		
Edinburg - North Shore Road	M Pick	12819	231	Photo only	109	WB, check land access	1	10/8/03	762.3		steep, sandy, 25' - 30' high, need stone, check on access
Edinburg - North Shore Road	E Chamowitz	13861	231	Photo only	110	WB	1	10/8/03	762.3		add to top of already placed stone, sandy, need stone
Paul River Bay	A Brunetti	2273	153	Y	112	WB	1	10/9/03	762.2		High, sandy bank, takeline near top of bank, will need stone, erosion is continuous over about 600' of shoreline, bank height is up to 40' above shelf at current water level (El. 762.2), these sites should be done together
Paul River Bay	O Allen	9409	141	Y	112	WB	1	10/9/03	762.2		
Paul River Bay	L & M Sandberg	14585	141	Y	113	Land	1	10/9/03	762.2		Sandy soil, lots of tree roots exposed, bank height 4' - 6', will need stone, land access, these sites should be done together
Paul River Bay	M Duesler	2122	141	Y	113	Land	1	10/9/03	762.2		
Paul River Bay - North Shore Road	T & M Lane	13339	137A	Photo only	114	WB	2	10/9/03	762.2		Sandy soil, bank undercut deep below tree roots, bank height 6' - 8', will need stone

Great Sacandaga Lake Erosion Site Database
2003 Field Inspection

Sites Exhibiting Moderate Erosion

1	2	3	4	5	6	7	8	9	10	11	12
Erosion Site Location	Permittee Name	Permit No.	Tract No.	Site Located w/GPS (Y/N)	Photo No.	Site Access Type (WB = workboat) (WB or Land)	Repair Priority (1 High, 3 Low) (1,2 3)	Date Inspected	Lake Level (on Date Inspected) (ft)	Date Repairs Performed	Description of Site Conditions Noted during Field Inspection
Paul River Bay - North Shore Road	M Denkewicz & H Skeels	14620	125A	Y	115	Land	1	10/9/03	762.2		Sandy soil, tree roots exposed, bank height 6' - 8', long stretch, some stone available, will need more stone, these sites should be done together
Paul River Bay - North Shore Road	J & D Staats	14065	125A	Y	115	Land	1	10/9/03	762.2		
Day - North Shore Road	A Cresswell	14156	113	Y	117	Land (check)	1	10/9/03	762.2		Sandy soil, dress up top 3' - 5' of bank, will need stone, check on land access, these sites should be done together, also noted that erosion from above splits these lots
Day - North Shore Road	A Rosenberg	9418	113	Y	117	Land (check)	1	10/9/03	762.2		
Day - South Shore Road	J & E Schreiner	8948	80	Y	122	WB	1	10/9/03	762.2		Sandy soil, severe erosion, moderate due to location from taking line, 30' - 35' high bank, work boat access, need stone
Day - South Shore Road	None	by S. Shore Road	80	Y	123, 124	WB	1	10/9/03	762.2		Sandy point, public use area, no permit, 30' - 40' bank height, moderate for location from taking line and road, erosion is severe, work boat, need stone
Day - South Shore Road	J & J Mitchell	14699	70	Photo only	127	WB	1	10/9/03	762.2		Sandy bluff, 15' - 20' high, low priority due to location although erosion is severe, loss of tree noted, work boat access, need stone
Day - South Shore Road	W. Clark	12563	54	Y	128, 129	Land?	1	10/9/03	762.2		Fine silt and sand, wind blown, bank height varies 4' - 20', will need stone, check on land access
Day - North Shore Road	M Loew	5590	85	Y	137	WB	2	10/9/03	762.2		Coarse sand, bank height 6' - 8', erosion is severe, repair need is moderate in terms of location to taking line, will need stone, access by work boat

Great Sacandaga Lake Erosion Site Database
2003 Field Inspection Date

Sites Exhibiting Low Erosion

1	2	3	4	5	6	7	8	9	10	11	12
Erosion Site Location	Permittee Name	Permit No.	Tract No.	Site Located w/GPS	GIS Photo	Site Access Type	Repair Priority	Date Inspected	Lake Level (on Date Inspected)	Date Repairs Performed	Erosion/Site Description
				(Y/N)	(Y/N)	(WB or Land)	(1,2 3)		(ft)		
Inside Woods Hollow	Gordon	14192	857	Y	43	Land	3	9/24/03	761.3		Sandy, undercutting of trees, some repairs done previously, ranked low due to proximity to take line
Beacon Island	Mayfield Yacht Club	N.A.	N.A.	Y	27, 28 & 29	WB	1	9/24/03	761.3		Open to wind, waves on all sides. Significant erosion all sides, high, sandy bluffs, broad, flat beach area. Losing trees on bluff. Possible site for testing protection alternatives.
Palmateer Flats/ Town of Benson	N.A.	N.A.	N.A.	Y	61	WB	3	9/25/03	761.3		Sandy bank, upstream of Northville Bridge adjoining Rt. 30, rated low priority as there is currently no encroachment on private property or road, will need stone
Town of Hope	N.A.	N.A.	N.A.	Photo only	62, 63	WB	3	9/25/03	761.3		Sandy bank, furthest reach inspected upstream of Northville Bridge, rated low priority as there is currently no encroachment on private property or road, will need stone
Hunter Creek Bay	N.A.	N.A.	N.A.	Photo only	80	WB	3	9/26/03	761.3		Downstream slope of Embankment at Hunters Creek Dam. Rip rap generally in good condition, although upper 2 ft. band may need touch up.
Mayfield Northhampton Line	M. McEntee	4896	159A	Y	2, 4	Land	3	9/22/03	761.2		Photo showing area with minor erosion near the high water level only
Inside Woods Hollow	Near Partyka	NA	849	Photo only	41	WB	3	9/24/03	761.3		Long reach with some bluff erosion, low priority, long way from taking line, work boat, will need stone, long way from take line
Edinburg	Heck	7218	303	Y	77	Land	3	9/26/03	761.3		Sandy Soil, erosion of high water level, check on access

Great Sacandaga Lake Erosion Site Database
2003 Field Inspection

Points of Interest

1	2	3	4	5	6	7	8	9	10	11	12
Erosion Site Location	Permittee Name	Permit No.	Tract No.	Site Located w/GPS (Y/N)	GIS Photo (Y/N)	Site Access Type (WB or Land)	Repair Priority (1,2 3)	Date Inspected	Lake Level (on Date Inspected) (ft)	Date Repairs Performed	Erosion/Site Description
Vandenburgh Point	P. Anadio	13883	898	Y	31	None Req'd.	None	9/24/03	761.3		Permittee built concrete bin wall, blocks 4'W x 3'D x 1.5'H each
Day - South Shore Road	Unallocated	N.A.	N.A.	photo only	92	None Req'd.	None	10/8/03	762.3		Good natural protection
Fish House	Eagle Roost Assoc.	12402S	438	Y	54, 55	None Req'd.	None	9/24/03	761.3		Permittee built concrete bin wall, includes PE drain pipe
Mayfield Northhampton Line	G. Clark	14579	1047	Y	5	None Req'd.	None	9/22/03	761.2		Photo showing area of essentially no erosion, very flat beach area, protected by cobble
Edinburg - North Shore Road	J Allen Trust	14271	293	Photo only	103	None Req'd.	None	10/8/03	762.3		Permittee has been doing repairs with rip rap, considerable work done, shown in far right side of photo
Edinburg - North Shore Road	D Groat	6087	293	Photo only	103	None Req'd.	Watch	10/8/03	762.3		Permittee will be doing repairs, eroded bank on left side of photo, no work done yet
Mayfield	R & M Marshall	13925	1056	Y	1, 3	None Req'd.	None	9/22/03	761.2		Bay near HRBRRD Office - Rip Rap, Example of Permittee Repair. Good
Edinburg	Robichard .	13208	299	Y	76	None Req'd.	None	9/26/03	761.3		Work done Summer 2003 by HRBRRD. Good repair

Hudson River-Black River Regulating District

EROSION AND SLOPE STABILITY MONITORING PLAN
for
GREAT SACANDAGA LAKE

APPENDIX C

PHOTOGRAPHS

Great Sacandaga Lake

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September - October, 2003

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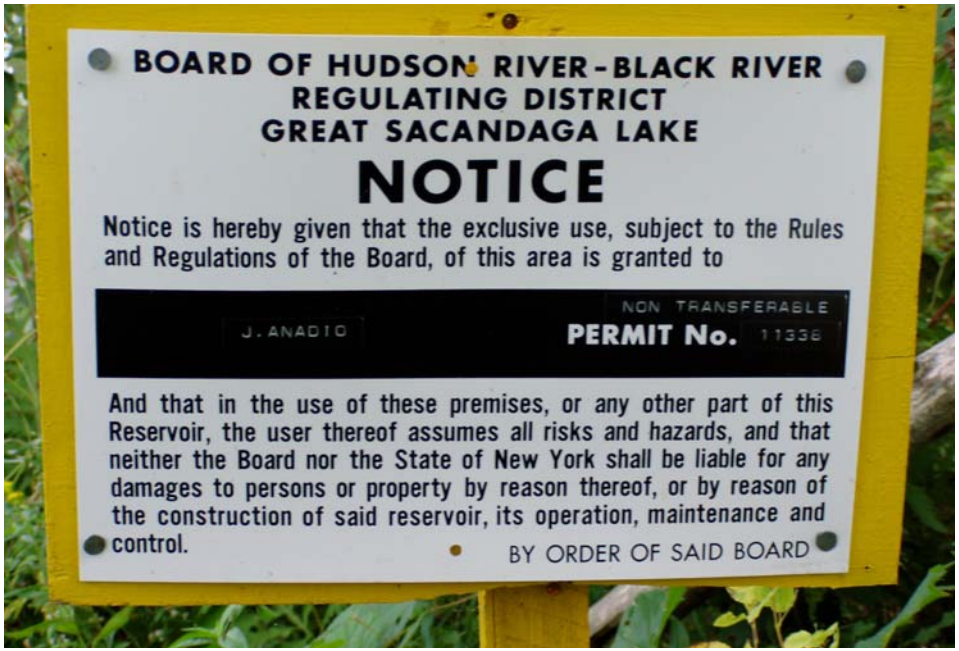

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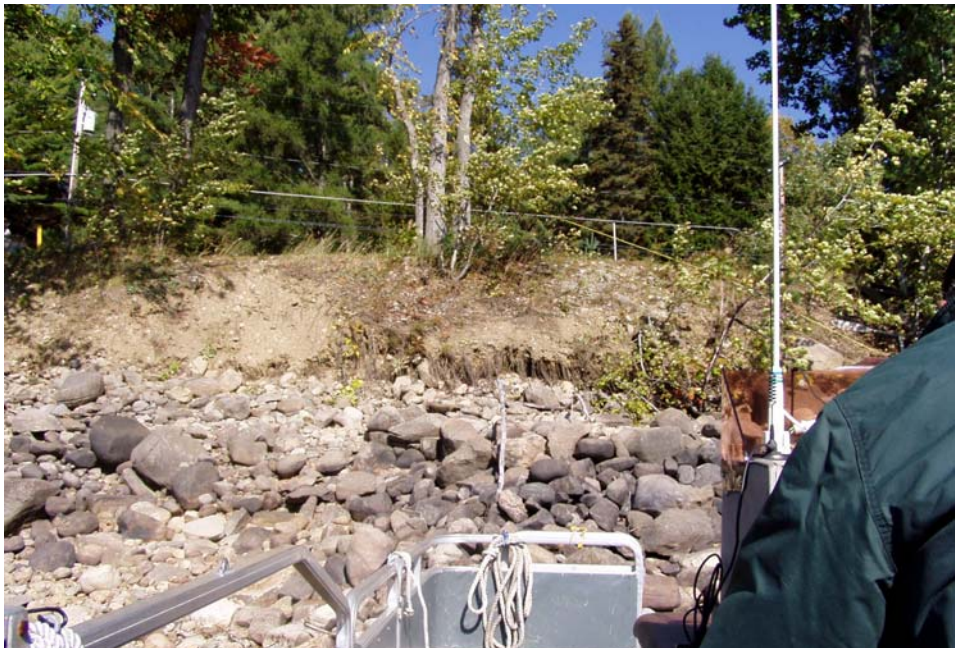

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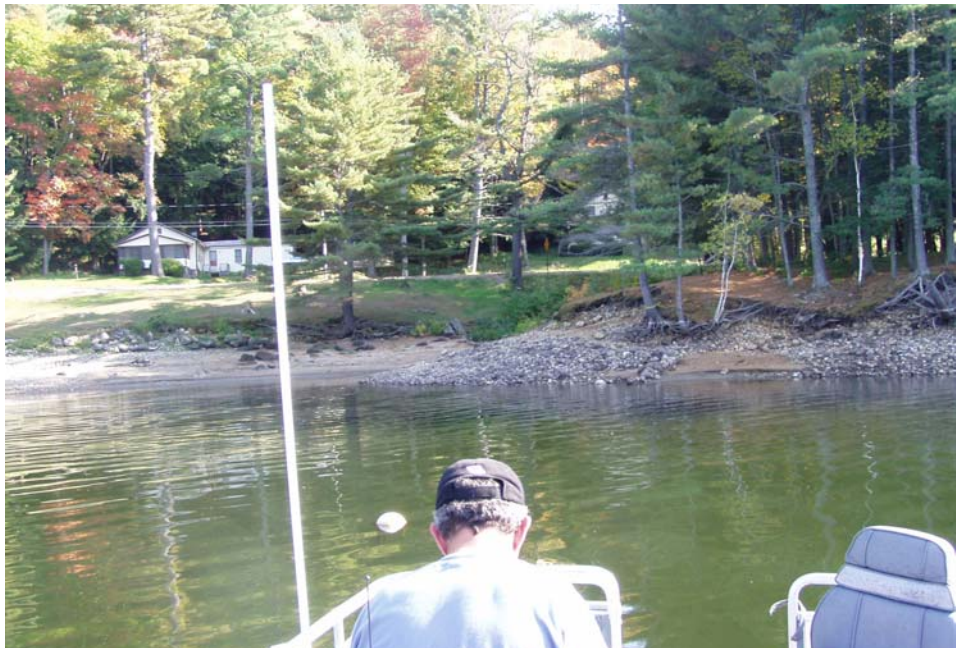

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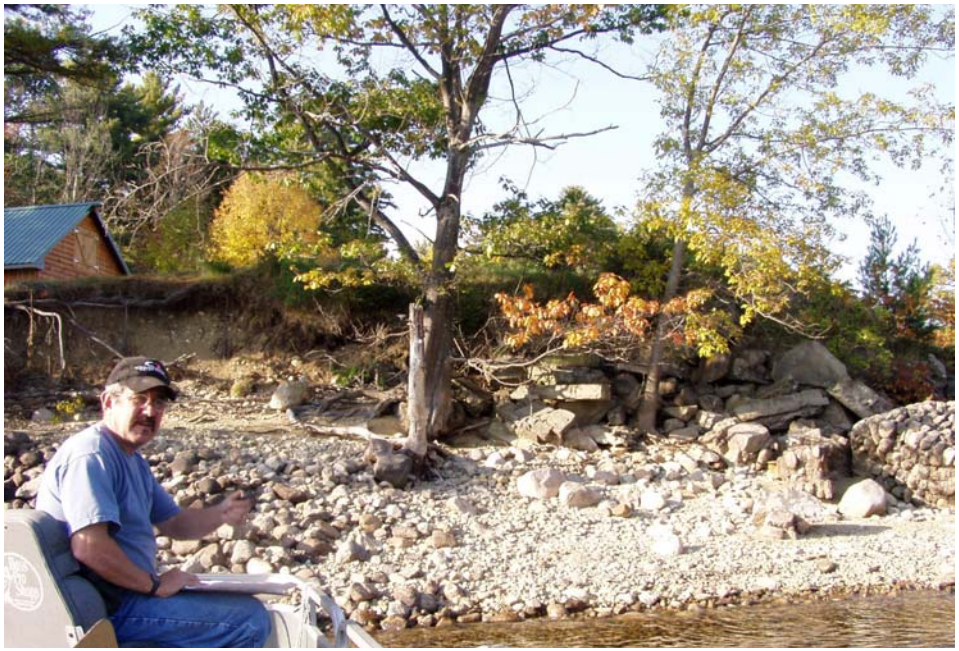

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Hudson River-Black River Regulating District

EROSION AND SLOPE STABILITY MONITORING PLAN
for
GREAT SACANDAGA LAKE

APPENDIX D

AGENCY CONSULTATION

GOMEZ AND SULLIVAN ENGINEERS, P.C.
Engineers and Environmental Scientists
288 Genesee Street
Utica, NY 13502

See Attached Service Distribution List

September 19, 2003

Re: Erosion and Slope Stability Monitoring Plan for
Great Sacandaga Lake
FERC License No. 12252 - NY

Dear Mr. Madam or Sir:

Gomez and Sullivan Engineers, P.C. has been retained by Hudson River Black River Regulating District (HRBRRD) to develop an Erosion and Slope Stability Monitoring Plan (Plan) for the Great Sacandaga Lake. This Plan will be prepared in accordance with Article 403, *Erosion and Slope Stability*, of the Federal Energy Regulatory Commission (FERC) License for the Project that was issued on September 25, 2002.

FERC License Article 403 directs the licensee to prepare the Plan after consultation with the New York State Department of Environmental Conservation and Saratoga and Fulton Counties. Since the northwest portion of the lake falls within Hamilton County, they will be included in the consultation process as well. We have attached a copy of the FERC License Order for Article 403 for your information.

The field work for development of the Plan is scheduled to take place towards the end of September and possibly early October, depending on weather conditions. We envision having a draft version of the Plan ready for your review and comment by mid-November 2003. Please note that HRBRRD is currently required to submit the final version of the Plan, incorporating any comments from the agencies, to FERC by December 31, 2003.

We will be in contact with your office when the draft version of the report is ready for distribution. In the meantime, if you have any questions or would like to discuss the project further, please call.

Yours Truly,

Dave Mishalanie, P.E.
Senior Civil Engineer
(315) 724-4860

DJM/djm
Attachment – Service List

Distribution List for Sept. 19, 2003 Letter:
Erosion and Slope Stability Monitoring Plan for Great Sacandaga Lake
FERC License No. 12252

New York State Department of Environmental Conservation
232 Hudson St., Box 220
Warrensburg, NY 12885
(518) 623-1281
Attn: Walter Haynes

Fulton County Soil & Water Conservation District
113 Hales Mills Road
Johnstown, NY 12095-9742
(518) 762-0077
Attn: Robert Ambrosino

Hamilton County Soil & Water Conservation District
PO Box 166
Lake Pleasant, NY 12108-0166
(518) 548-3991
Attn: Elizabeth Mangle

Saratoga County Soil & Water Conservation District
50 West High St., Bldg. #5
Ballston Spa, NY 12020
(518) 885-6900
Attn: John Hamilton

Hudson River Black River Regulating District
350 Northern Blvd.
Albany, NY 12204
(518) 465-3491
Attn: Michael Mosher

GOMEZ AND SULLIVAN ENGINEERS, P.C.
Engineers and Environmental Scientists
288 Genesee Street
Utica, NY 13502

See Distribution List (attached)

Re: Draft Erosion and Slope Stability Monitoring Plan
for Great Sacandaga Lake
FERC License No. 12252 - NY

November 26, 2003

Dear Madam or Sir:

Gomez and Sullivan Engineers, P.C. has been retained by the Hudson River Black River Regulating District (District) to develop an Erosion and Slope Stability Monitoring Plan (Plan) for the Great Sacandaga Lake. The attached Draft version of this Plan is being forwarded for your review in accordance with Article 403, *Erosion and Slope Stability*, of the Federal Energy Regulatory Commission (FERC) License for the Great Sacandaga Lake Project. A copy of Article 403 of the FERC License Order was transmitted to your office on September 19, 2003.

Article 403 directs the District (the licensee) to prepare and submit the Plan after consultation with the New York State Department of Environmental Conservation and Saratoga and Fulton Counties. We have also included Hamilton County in this consultation as the northwest portion of the lake falls within its boundary.

The District is currently committed to submitting the final version of the Plan, incorporating agency comments, to FERC by December 31, 2003. Therefore, we request the receipt of your review comments on the Plan by December 29, 2003 so that the schedule can be maintained. Comments on the Plan can be directed to me at the following address:

Dave Mishalanie, P.E.
Gomez and Sullivan Engineers, P.C.
288 Genesee Street
Utica, NY 13502
Ph: (315) 724-4862 Fax: (315) 724-4862

We appreciate your attention to this matter. Should you have any questions or would like to discuss the Plan further, please call me at the number above.

Yours Truly,

Dave Mishalanie, P.E.
Senior Civil Engineer

DJM/djm
Attachment

GOMEZ AND SULLIVAN ENGINEERS, P.C.
Engineers and Environmental Scientists
288 Genesee Street
Utica, NY 13502

Distribution List for November 26, 2003 Draft ESSMP Transmittal Letter:
Draft Erosion and Slope Stability Monitoring Plan for Great Sacandaga Lake
FERC License No. 12252

New York State Department of Environmental Conservation
232 Hudson St., Box 220
Warrensburg, NY 12885
(518) 623-1281
Attn: Walter Haynes

Fulton County Soil & Water Conservation District
113 Hales Mills Road
Johnstown, NY 12095-9742
(518) 762-0077
Attn: Robert Ambrosino

Hamilton County Soil & Water Conservation District
PO Box 166
Lake Pleasant, NY 12108-0166
(518) 548-3991
Attn: Elizabeth Mangle

Saratoga County Soil & Water Conservation District
50 West High St., Bldg. #5
Ballston Spa, NY 12020
(518) 885-6900
Attn: John Hamilton

Hudson River Black River Regulating District
350 Northern Blvd.
Albany, NY 12204
(518) 465-3491
Attn: Michael Mosher

Fulton County Soil & Water Conservation District
113 Hales Mills Road
Johnstown, NY 12095

Re: Comments on Draft Erosion and Slope Stability Monitoring Plan
For the Great Sacandaga Lake

Dear Mr. Mishalanie:

I have reviewed the Draft Erosion and Slope Stability Monitoring Plan that you supplied to our office. As a long time user and permit holder on the Great Sacandaga Lake, I have spent many hours on the water and its shorelines. As a soil and water conservation technician, I have assisted many landowners with erosion, drainage, septic and a variety of other related problems. I think the plan is simple to follow and has a fair inventory of the problem areas on the lake. I think the document will serve as a useful for the district as well as permit holders and landowners on the Sacandaga. There are many applications for this plan, remedial, grant application, inventory, study, reporting and others. Hopefully it will be put to good use, allowing landowners to easily apply for permits to handle remedial projects.

If our office can provide and further assistance, please contact our office.

Sincerely,

Robert J. Ambrosino

Robert J.Ambrosino
Field Manager

County of Saratoga

Board of Supervisors

40 MCMASTER STREET
BALLSTON SPA, NEW YORK 12020
Phone: (518) 885-2240
Fax: (518) 884-4771

ROBERT A. STOKES
Chairman

BARBARA J. PLUMMER
Clerk

Mr. David Mishalanie, P. E.
Gomez and Sullivan Engineers, P. C.
288 Genesee Street
Utica, New York 13502

Re: Comments on "Draft Erosion and Slope Stability Monitoring Plan for GSL";
FERC License No. 12252-NY

December 22, 2003

Dear Mr. Mishalanie:

Please provide this office with a distribution list of the various agencies which were provided copies of the *Draft Erosion and Slope Stability Monitoring Plan for Great Sacandaga Lake* for their review and comment. Saratoga County's Environmental Management Office and Supervisor Jean Raymond and Robert Monacchio, the two (2) Saratoga County representatives to the negotiated Upper Hudson/Sacandaga River settlement, did not receive copies of this document for their review and comment. If it wasn't for an incidental discussion of this document by recipient John Hamilton of the Saratoga County Soil & Water Conservation District with George Hodgson of the County's Environmental Management Office, the aforementioned parties would not have known of this document's existence and would not be in a position to provide the following comments. Mr. James Mraz, Fulton County Planning Director and Supervisor Anthony Buanno, settlement representatives for Fulton County were also not notified or provided with a copy of the proposed monitoring plan for their review and comment. Saratoga County believes that the draft erosion and slope monitoring plan should have been provided to all the parties which participated in the licensing negotiations of the Upper Hudson/Sacandaga River Settlement for their review and comment.

Saratoga County recommends that the District provide notification to all County and local highway and public works departments which own and maintain rights-of-ways, roads, and other highway structures in close proximity of Great Sacandaga Lake when the District conducts annual Spring and early Fall shoreline inspections and site reviews. These agencies should also be given the opportunity to provide input to said surveys, identifying areas of erosion and slope instability concerns which are caused by the waters of Great Sacandaga Lake which are negatively affecting any local highways, their rights-of-ways or other highway infrastructure.

Saratoga County does not agree with the District's proposed erosion classification and repair priority ranking methodologies (Figures VI-1, VI-2). These methodologies do not incorporate methods of

identifying, assessing and addressing reservoir-related erosion impacts on residential structures or local highway infrastructure. In particular, the repair priority ranking methodology relies exclusively on the proximity of the erosion site to the "taking line" to determine whether the site receives a low, mid-level or high priority. Saratoga County believes that the "priority" ranking should not be predicated upon the distance to the "taking line", but rather be based upon the severity of the lake-related erosion impact upon residential structures, roads, road rights-of-way and other highway infrastructure. Saratoga County recommends that the District also incorporate these criteria into their ranking methodology. Establishing a priority ranking to address these concerns should not be based upon the proximity of the problem to the "taking line", but should be determined by the "significance" of the erosion problem.

Sincerely,

Robert A. Stokes
Chairman, Saratoga County Board of Supervisors

cc Jean Raymond, Supervisor, Town of Edinburg
Mary Ann Johnson, Town of Day
Richard Mason, Town of Hadley
Richard Hunter, Town of Providence
Robert Monacchio, Representative, Saratoga County Upper Hudson/Sacandaga River Settlement
Joseph Ritchey, Commissioner, Saratoga County Dept. of Public Works
James Mraz, Director, Fulton County Planning Dept.

STATE OF NEW YORK

Board of Hudson River-Black River Regulating District

Sacandaga Field Office
737 Bunker Hill Rd., Mayfield, New York 12117 Phone (518) 661-5535
FAX (518) 661-5720

January 12, 2004

Robert A. Stokes
Saratoga County Board of Supervisors
40 McMaster Street
Ballston Spa, New York 12020

Re: Response to Comments on draft *Erosion and Slope Stability Plan for Great Sacandaga Lake*, FERC Project No. P-12252-NY

Dear Mr. Stokes:

The Hudson River – Black River Regulating District appreciates your taking the time to review and comment on our draft plan. The draft erosion and slope stability plan has been developed in response to a Federal Energy Regulatory Commission (FERC) license requirement. Article 403 of the District's FERC license details the minimum content of the plan and requirements for submission to the agency. Additionally, the article indicates the specific parties that shall be consulted during preparation of the plan. Specifically, the article states that "the licensee shall prepare the plan after consultation with the New York State Department of Environmental Conservation and Saratoga and Fulton Counties, New York." The Regulating District's consultant, on behalf of the District, has issued copies of the draft plan, for review and comment, to each party and in accordance with the article.

The District recognizes the importance of incorporating the comments of all parties that maintain an interest in protecting the shoreline of the Great Sacandaga Lake. The District would welcome additional comments from the individuals to which you refer in your December 22 letter if their comments are not fully incorporated through your own.

Your suggestion that the District contacts the various County and local highway and public works departments during its annual shoreline erosion survey is appropriate and will be incorporated into the plan.

The Regulating District has asked its consultant to modify the methodology used to rank and prioritize erosion sites by incorporating, as a factor in the evaluation process, the proximity of shoreline erosion to infrastructure, public roadways, and private structures and property.

Sincerely,

Robert S. Foltan, P.E.
Chief Engineer

New York State Department of Environmental Conservation

Division of Environmental Permits, Region 5

232 Hudson Street – P. O. Box 220, Warrensburg, New York 12885-0220
Phone: (518) 623-1281 · **FAX:** (518) 623-3603
Website: www.dec.state.ny.us

December 31, 2003

Mr. David Mishalanie, P.E.
Gomez and Sullivan Engineers, P.C.
288 Genesee Street
Utica, NY 13502

RE: Draft Erosion and Slope Stability Monitoring Plan
For Great Sacandaga Lake
FERC License No. 12252-NY

Dear Mr. Mishalanie,

The Department has reviewed the November 25, 2003 draft Erosion and Slope Stability Monitoring Plan ("Plan") prepared by Gomez and Sullivan Engineers, P.C. for the Hudson River - Black River Regulating District ("District"), and offer the following comments:

- The Plan should incorporate regulatory and/or policy initiatives which are designed to reduce the influence of erosional forces on the shoreline. In an effort to maintain a natural shoreline, the District should continue its efforts to minimize the destruction or removal of shoreline vegetation. Although there has been aggressive storage resulting in higher operating levels during the recreational months, efforts to achieve targeted lake levels throughout the ice-forming months to reduce the potential of ice scouring upon the banks should be discussed. Realizing the lack of the District's authority to directly regulate recreational water activities or uses, the potential approaches to establishing boating rules, such as the establishment of no or low wake zones in proximity to the shoreline, with appropriate agencies or municipalities should be considered.

- The Department has identified and designated several areas of the Great Sacandaga Lake as Sensitive Natural Resource Areas (map and narrative description attached) to demarcate known northern pike, walleye and perch spawning and rearing habitat. For the purposes of the Plan, the primary concern would be that of the loss of pike spawning and rearing habitat by the fragmentation of the terrestrial/aquatic interface through the placement of traditional hard armor structures. The sites described in Appendix B Erosion Site Database at which additional stone height is recommended may benefit from the planting of vegetation above the existing revetments instead. Of course this alternative would only apply to flatter bank areas, as areas of high banks or bluffs would not become inundated by flood waters. Northern pike are random spawners and prefer to lay their adhesive eggs in wetlands or flooded vegetation. The presence of barriers, such as tall rip rap revetments or vertical breakwalls, may impede the spawning as incoming flood waters are restricted, or thwart the emigration of larval and juvenile pike back to the lake as the water levels are dropped.

- The Plan identifies the historic and proposed methods of erosion control to be traditional "hard" systems, with no mention of alternative methods such as "light" systems (erosion control mats, rolled systems,

i.e.), "soft" systems (bioengineering) or a combination of systems. Although most areas where significant scour is present exhibit soil veneer instability and slope failure, it should not be pre-conceived that light "soft" methods cannot be effectively applied in some situations as a cost-effective and habitat-friendly alternative. The document states that the primary forces causing erosion appear to be wave action and ice scour, occurring on moderate to steep shoreline reaches. It is also stated that well graded or raked flatter areas are not experiencing significant erosion. This implies that a program of slope reduction/grading in concert with soft practices may provide acceptable results in moderate and low erosion areas, for the performance of an erosion control system is determined by its ability to withstand hydraulic regimes in the un-vegetated as well as the vegetated condition. When instability is due to overall slope failures, a solution promoting vegetation will provide improvement, however, vegetation is effective only after a certain period of time and cannot be designed to provide overall slope stability with the use of herbaceous plants. Therefore some instances require hard measures. Live cuttings can be inter-planted in rip rap to provide additional slope stability if necessary. The sites described in Appendix B Erosion Site Database at which additional stone height is recommended may benefit from such inter-planting. Root growth above and below the rip rap will improve soil strength and live vegetation will hide the rocks, presenting a more natural look which the District seeks.

The Plan does not mention the use of a filter layer beneath placed proposed rip rap structures. All other factors being the equal, failure of rip rap installations are often due to factors such as insufficient toe-down depths, not keying in the edges of the revetment, or not providing an underlying filter. A layer or layers of gravel, small stone, or geo-textile placed between the underlying soil and the rock protection is recommended. Not only would a filter prevent loss of fine particles through the voids in the overlying rock, it would enable relief from fluctuating hydrostatic pressures by allowing water to exit the bank without "blowing out" the bank when water levels drop rapidly after a prolonged period of high water. The proposed use of uniform-grade (DOT medium) rip rap, with a lack of smaller particles to fill the interstitial voids, is more likely to require a filter than a well-graded mixture. If a granular filter is used, the smaller sizes of the rip rap gradation must properly interface with the larger sizes of the filter. With geo-textiles this integration is not a problem, but a granular-bedding layer is sometimes used on top of the geo-textile to prevent damage from placing the rip rap, especially when using angular rock. One school of thought holds that use of the geo-textile creates a failure plane and actually contributes to failure of the bank, rip rap and all. This failure may be exacerbated when uniform-grade rip rap is used, as it has been found that failure of such structures occurs more suddenly than with well-graded rip rap. From a cost standpoint, it can be shown that leaving out the fabric on the slope and using more stone/grave/sand mixture (whether placed or naturally present) beneath the final armor stone may be cost effective. A discussion of proposed employment of filters where beneficial should be included. Additionally, best management practices or best engineering principles for the construction of rip rap revetments and other erosion control structures should be outlined.

Please call me at (518) 623-1285 should you have any questions. Thank you for the opportunity to provide comments.

Sincerely,

Marc S. Migliore
Deputy Regional Permit Administrator

STATE OF NEW YORK

Board of Hudson River-Black River Regulating District
350 Northern Boulevard, Albany, New York 12204 Phone (518) 465-3491
FAX (518) 432-2485

January 13, 2004

Marc S. Migliore
Deputy Regional Permit Administrator

New York State Department of Environmental Conservation
Division of environmental Permits, Region 5
232 Hudson Street – P.O. Box 220
Warrensburg, New York 12885-0220

Dear Mr. Migliore:

Thank you for your December 31, 2003 letter providing comments on the Draft Erosion and Slope Stability Plan for Great Sacandaga Lake. We appreciate your input and offer the following responses as clarification to your questions and comments. Please note that we have included your comments in italics below followed by our response.

NYSDEC Comment No. 1 — *The Plan should incorporate regulatory and/or policy initiatives which are designed to reduce the influence of erosional forces on the shoreline. In an effort to maintain a natural shoreline, the District should continue its efforts to minimize the destruction or removal of shoreline vegetation. Although there has been aggressive storage resulting in higher operating levels during the recreational months, efforts to achieve targeted lake levels throughout the ice-forming months to reduce the potential of ice scouring upon the banks should be discussed. Realizing the lack of the District's authority to directly regulate recreational water activities or uses, the potential approaches to establishing boating rules, such as the establishment of no or low wake zones in proximity to the shoreline, with appropriate agencies or municipalities should be considered.*

Response No. 1 — We acknowledge your comment in its entirety, including our limitations regarding the regulation of recreational water activities and uses. The District will continue to operate the Great Sacandaga Project within the guidelines established by the Offer of Settlement and the FERC license.

NYSDEC Comment No. 2 — *The Department has identified and designated several areas of the Great Sacandaga Lake as Sensitive Natural Resource Areas (map and narrative description attached) to demarcate known northern pike, walleye and perch spawning and rearing habitat. For the purposes of the Plan, the primary concern would be that of the loss of pike spawning and rearing habitat by the fragmentation of the terrestrial/aquatic interface through the placement of traditional hard armor structures. The sites described in Appendix B Erosion Site Database at which additional stone height is recommended may benefit from the planting of vegetation above the existing revetments instead. Of course this alternative would only apply to flatter bank areas, as areas of high banks or bluffs would not become inundated by flood waters. Northern pike are random spawners and prefer to lay their adhesive eggs in wetlands or flooded vegetation. The presence of barriers, such as tall rip rap revetments or vertical breakwalls, may impede the spawning as incoming flood waters are restricted, or thwart the emigration of larval and juvenile pike back to the lake as the water levels are dropped.*

Response No. 2

We have overlayed the locations of the Sensitive Natural Resource Areas (provided with your comment letter) with the reservoir map (Appendix A of our report) showing the locations of the erosion sites that were identified during our 2003 shoreline inspection. Our review of the data indicates that the terrain in the designated sensitive areas (pike, walleye and perch spawning habitat) is essentially flat and below the regions where any significant erosion is occurring.

There are some shoreline areas adjacent to these sensitive areas, however, where erosion has been noted, although this erosion is occurring well above the spawning habitat on moderate to steep banks. We will include the Sensitive Natural Resource Areas on our reservoir mapping in Appendix A for the final report. If any significant erosion is noted in the areas designated as sensitive during future shoreline inspections, we will contact your office to determine, what, if any, remedial actions should be implemented.

NYSDEC Comment No. 3

The Plan identifies the historic and proposed methods of erosion control to be traditional "hard" systems, with no mention of alternative methods such as "light" systems (erosion control mats, rolled systems, i.e.), "soft" systems (bioengineering) or a combination of systems. Although most areas where significant scour is present exhibit soil veneer instability and slope failure, it should not be pre-conceived that light "soft" methods cannot be effectively applied in some situations as a cost-effective and habitat-friendly alternative. The document states that the primary forces causing erosion appear to be wave action and ice scour, occurring on moderate to steep shoreline reaches. It is also stated that well graded or raked flatter areas are not experiencing significant erosion. This implies that a program of slope reduction/grading in concert with soft practices may provide acceptable results in moderate and low erosion areas, for the performance of an erosion control system is determined by its ability to withstand hydraulic regimes in the un-vegetated as well as the vegetated condition. When instability is due to overall slope failures, a solution promoting vegetation will provide improvement, however, vegetation is effective only after a certain period of time and cannot be designed to provide overall slope stability with the use of herbaceous plants. Therefore some instances require hard measures. Live cuttings can be inter-planted in rip rap to provide additional slope stability if necessary. The sites described in Appendix B Erosion Site Database at which additional stone height is recommended may benefit from such inter-planting. Root growth above and below the rip rap will improve soil strength and live vegetation will hide the rocks, presenting a more natural look which the District seeks.

Response No. 3

Soft erosion control measures were considered initially in our study but were ruled out for several reasons: (1) All erosion control and repairs by the District to date (since the 1930's) have included rip rap and stone placement. This type of repair has held up well and has typically not required significant additional repair. (2) The District can perform this type of work with their staff and equipment, and has since the early 1930's. The District recently acquired a work boat (photo shown in the erosion report) specifically designed for hauling and placing rip rap within the impoundment where access by conventional equipment is not possible or practical. (3) The District can develop and work within realistic budgets for this type of repair, which is important since the shoreline under their jurisdiction is over 125 miles long. (4) Most soft systems that could be implemented for erosion control would require considerable earthwork, including excavation, backfilling and grading to flatten the moderate to steep

slopes surrounding the reservoir. This is not a desirable option as it will require significant alteration of the shoreline configuration and could infringe on adjacent properties.

Comment No. 4

The Plan does not mention the use of a filter layer beneath placed proposed rip rap structures. All other factors being the equal, failure of rip rap installations are often due to factors such as insufficient toe-down depths, not keying in the edges of the revetment, or not providing an underlying filter. A layer or layers of gravel, small stone, or geo-textile placed between the underlying soil and the rock protection is recommended. Not only would a filter prevent loss of fine particles through the voids in the overlying rock, it would enable relief from fluctuating hydrostatic pressures by allowing water to exit the bank without "blowing out" the bank when water levels drop rapidly after a prolonged period of high water. The proposed use of uniform-grade (DOT medium) rip rap, with a lack of smaller particles to fill the interstitial voids, is more likely to require a filter than a well-graded mixture. If a granular filter is used, the smaller sizes of the rip rap gradation must properly interface with the larger sizes of the filter. With geo-textiles this integration is not a problem, but a granular-bedding layer is sometimes used on top of the geo-textile to prevent damage from placing the rip rap, especially when using angular rock. One school of thought holds that use of the geo-textile creates a failure plane and actually contributes to failure of the bank, rip rap and all. This failure may be exacerbated when uniform-grade rip rap is used, as it has been found that failure of such structures occurs more suddenly than with well-graded rip rap. From a cost standpoint, it can be shown that leaving out the fabric on the slope and using more stone/grave/sand mixture (whether placed or naturally present) beneath the final armor stone may be cost effective. A discussion of proposed employment of filters where beneficial should be included. Additionally, best management practices or best engineering principles for the construction of rip rap revetments and other erosion control structures should be outlined.

Response No. 4

We concur that filter fabric or a graded bedding layer is often desirable as part of a standard rip rap erosion control system where grading and slope modifications are implemented. However, we believe the use of filter fabric or a filter layer should be dictated by site conditions and should be considered only where conditions are conducive to a good installation. Typical filter fabric and bedding applications require site grading to provide a smooth surface for their placement prior to installing the rip rap layer. In addition, moderate to steep slopes may not be suitable for this application, as the fabric material can create a failure plane. Surface altering grading operations are not acceptable or desirable at the Great Sacandaga Lake shoreline or within the impoundment, as the goal is to retain the natural shoreline and contours to the extent possible. The use of filter fabric or bedding material on ungraded and moderate to steep slope surfaces could lead to slope failure and exacerbate erosion rather than prevent them.

As noted above, the District has many years of experience in the placement of rip rap and stone protection along the Great Sacandaga Lake shoreline and with very good success. The medium stone used by the District has historically worked well without the use of filter fabric or bedding and has been installed with little need for surface smoothing or grading. The stone used by the District is locally obtained and is generally well graded. During installation, the District crews provide sufficient coverage and layer thickness to eliminate voids in the rip rap

layer, which is the desired result and in keeping with good engineering practice. In terms of best management practices, the procedures currently used by the District further serve to minimize adverse impacts to the environment while efficiently achieving the desired result of erosion control.

We do not see the need for requiring the use of filter fabric or bedding material in conjunction with the District's current method of rip rap placement. We do envision that permit holders will continue to propose and implement shoreline erosion repairs at Great Sacandaga Lake and that some of their projects require the use of filter fabric.

Sincerely,

Michael Mosher, P.E.
Operations Engineer

Cc: Dave Mishalanie, P.E., Gomez and Sullivan Engineers, P.C.
file

Gomez and Sullivan Engineers, P.C.

Record of Phone Conversation

From: Elizabeth Mangle, Hamilton County SWCD (NY)

To: Dave Mishalanie

cc: E. Mangle, Hamilton County SWCD
M. Mosher, HRBRRD
File – GSE Project No. 1192

Date: January 7, 2004

Re: Draft Erosion and Slope Stability Monitoring Plan (ESSMP) for Great Sacandaga Lake

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Ms. Mangle returned my call to her on January 6, 2004.

I had forwarded a copy of the Draft ESSMP to her attention in November 2003 for review and comment by her office. To date, we had not received any comments from her office.

Ms. Mangle informed me that she had reviewed the draft report and did not have any comments. Therefore, we will incorporate this phone conversation record in the agency correspondence section for the final ESSMP document to be submitted to FERC.