

12 June 2009

Mr. Stephen Ellis, Regional Superintendent  
NJDEP State Park Service  
Northern Region Office  
P.O. Box 1100  
Andover, NJ 07821

Dear Superintendent Ellis:

As we discussed on Thursday, Princeton Hydro is ready to assist the Northern Region Office (NRO) of the NJ State Park Service in the monitoring of key water quality and ecological data at Swarstwood Lake. Based on our extensive knowledge of the lake stemming from our past involvement in monitoring its water quality conditions, I feel that the following sampling program will generate the data needed to manage the lake in a proactive, ecologically balanced manner. The program outlined below consists of three elements, *in-situ* measurement of key ecological parameters, laboratory measurement of nutrients and trophic state indicators, and the quantification of weed growth.

The *in-situ* sampling will be conducted at 5 locations:

- The inlet from Little Swarstwood Lake,
- At the central deepest point in the lake,
- Within or immediately adjacent to the bathing area,
- In the cove by Greenwood Point, and
- At the southern end of the lake near its point of discharge.

At each of these sites we will measure using a multi-probe meter: DO, pH, temperature and conductivity. These parameters will be measured from surface to bottom at 1-meter increments. It should be noted that Princeton Hydro is certified by the State for the collection of *in-situ* data using such meters. We will also measure at each of these sites the Secchi depth clarity of the lake.

At the center of the lake, Princeton Hydro will collect water samples for the subsequent laboratory analysis of total phosphorus (TP), soluble reactive phosphorus (SRP), nitrate (NO<sub>3</sub>), total suspended solids (TSS) and Chlorophyll a. Samples for the analysis of these parameters will be collected at the surface of the lake and near the lake's bottom. The samples will be transported to a NJDEP certified water quality testing lab (ECM, Hillsboro, NJ) that can provide the correct level of sensitivity needed for the accurate and precise measurement of these parameters.

Finally during each event we will monitor the growth and distribution of macrophytes (weeds) at key locations throughout the lake. We can discuss the final selection of these sampling sites further, but we recommend, based on our knowledge of weed growth and our past monitoring experience, that the sampling be conducted at the following five locations:

- The inlet from Little Swarstwood Lake,
- The north cove adjacent to West Shore Drive,

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- Within or immediately adjacent to the bathing area,
- In the cove by Greenwood Point, and
- At the southern end of the lake near its point of discharge.

At each of the above sites we will establish a 150' transect that extends from the shoreline into the lake. Along each transect a 1 m<sup>2</sup> quadrat will be lowered into the water at a point of 50', 100' and 150' from the shoreline. Observational data will be recorded concerning the density and extent of plant growth occurring within each quadrat. The plants contained within the quadrat will then be harvested and the plants identified to the lowest practical taxon; typically species.

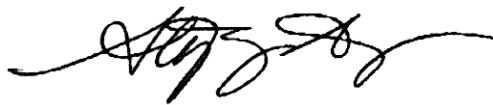
Given the nature of weed growth and water quality problems in Swartswood Lake, we recommend a frequency of sampling of once per month. The above monitoring effort should be initiated in June and continued through September for a total of four (4) events.

Upon receipt of the lab data we will prepare a very brief summary letter report of the findings of each sampling event. We anticipate 30 days to elapse between the date of sampling and the issuance of each letter report. However, if any of our observations or data are cause for concern, the NRO will be notified and the data discussed with you.

Our fee for the above outlined services is \$2,470 per event, or a total of \$9,880 should we be requested to complete all four events. Should the NRO need Princeton Hydro to attend any meetings or conduct any presentations to the public or local stakeholder groups, these services will be billed on an hourly basis in accordance with our standard government rates. Additionally, should the NRO require Princeton Hydro to prepare a comprehensive report that details the results and implications of the cumulative data generated by the four events, a separate scope of work and fee will be prepared for the development of such a report.

In closing I wish to thank the NRO for this opportunity to once again be of service relative to the management of Swarstwood Lake. Should you have any questions, please feel free to contact me via email at [ssouza@princetonhydro.com](mailto:ssouza@princetonhydro.com) or by phone at 908.237.5660.

Sincerely,



Stephen J. Souza, Ph.D.  
President, Princeton Hydro, LLC

CC: File