Thomas Field February 4, 2010 at 2:23 PM

To: Bill & Jean Noel Cc: PLenz@dep.nyc.gov, Jim Polk

Re: DEP

Gentlemen,

I have printed a hard copy to send to Paul Lenz. Do any of you have the street address and zip code I should use? In the mean time, attached is Word Document of the text Paul can use in reviewing the plan.

Tom

Thomas C. Field, Ph.D.
Fernwood-Limne, Inc.
1236 Route 9
Gansevoort, NY 12831
518-793-1282
tcfield11@verizon.net

On Feb 4, 2010, at 11:41 AM, noel1@aol.com wrote:

> Tom
>
> I really get annoyed when someone points out that I missed something! Didn't Jim warn you that I was perfect and that is was impossible that I left out NYC DEP regarding the water management plan as I was focusing on the dam.
>
> > **Paul Lenz**
> > **Section Chief, Natural Resources Management**
> > **NYCDEP - Kingston, NY office**
> > **Office: 845.340.7862**
> > **Blackberry: 718.744.8704**
> > **Fax: 845.340.1296** PLenz@dep.nyc.gov
>
> So now I pass the buck back to you and request that you sent Paul a complete with pictures and drawings etc. of the draft plan to bring them up to speed.
>
> **Paul apparently Tom had an idea which admittedly may have some merit to it. Do you want to be included on the association emailing list? Alternatively, everything is posted on our website www.sevenhillslake.com.**
>
> **Also Paul stop the weather from interfering so we can schedule our meeting, I am available whenever you are.**
>
> **Bill**
>
> -----Original Message-----
> From: Thomas Field <tcfield11@verizon.net>
> To: Bill Noel <noel1@aol.com>
> Cc: James Polk <canstruct@comcast.net>
> Sent: Thu, Feb 4, 2010 11:19 am
> Subject: DEP
>
> Bill,
>
> I don't think I answered your question about contact with DEP. Since they are members of the Association, and will have a significant role in the permitting process, it would be beneficial to include them in the loop as soon as possible. If there is someone specifically representing DEP in the Association, perhaps we should send them a copy of the current draft for review and comment. If there is not a specific DEP representative, you could ask who a good contact person would be when you are talking with them about the dam. Since you have asked as many Association people as possible to review the plan, it would not be good to leave DEP out, unless they indicate that they prefer to review the weed control activities through the normal regulatory channels.
>
> Tom

Thomas Field February 9, 2010 at 8:26 AM
To: Lenz, Paul Cc: Bill & Jean Noel, Jim Polk
Re: DEP

Paul,
When the Association attempted to address their water lily problem with a herbicide proposal, the proposed use of an additional pesticide triggered a need by DEC to do an "enhanced" review, and the first part of the process is the production of an Aquatic Plant Management Plan that provides a justification and co-ordinated approach to solving the vegetation problems. This is the plan. The format for the plan was taken from the DEC website, and is at the end of the document I have attached to this email. I added an initial element to their outline, describing the environmental setting that I believe is necessary to understanding the problem, and with one exception in the order of discussion, I have followed their outline. If I can be of more help explaining the document, or if you would like to discuss it, please let me know.
Tom

Thomas C. Field, Ph.D.
Fernwood-Limne, Inc.
1236 Route 9
Gansevoort, NY 12831
518-793-1282
tcfield11@verizon.net

On Feb 9, 2010, at 8:03 AM, Lenz, Paul wrote:

> Thanks Tom and Bill, I have a copy of the plan - I have to admit I'm not sure of the nature of it. Is this something the Association asked you to prepare to address aquatic species, control weeds, etc.? It has nothing to do with the DEC "Dam" annual report correct? Thank you both for including DEP in the review-once I hear back from you we'll pursue as needed.
>
> **Paul Lenz** | **Section Chief** | **NYC Environmental Protection**
> **(O) 845 340 7862** | **plenz@dep.nyc.gov**
>
> **From:** Thomas Field [mailto:tcfield11@verizon.net]
> **Sent:** Friday, February 05, 2010 2:15 PM
> **To:** Lenz, Paul
> **Subject:** Re: DEP
>
> Thanks, Paul. The latest iteration of the report should arrive by FedEx on Monday.
>
> Thomas C. Field, Ph.D.
> Fernwood-Limne, Inc.
> 1236 Route 9
> Gansevoort, NY 12831
> 518-793-1282
> tcfield11@verizon.net
>
> On Feb 5, 2010, at 8:16 AM, Lenz, Paul wrote:
>
> Good morning.
>
> NYCDEP
> Attn: Paul Lenz
> 71 Smith Ave.
> Kingston, NY 12401
>
> I'm still trying to set up a site visit and hope to have it confirmed next week.
>
> **Paul Lenz** | **Section Chief** | **NYC Environmental Protection**
> **(O) 845 340 7862** | **plenz@dep.nyc.gov**

From: Bill Noel [mailto:noel1@aol.com]
Sent: Thursday, February 04, 2010 4:00 PM
To: Thomas Field
Cc: Lenz, Paul; canstruct@comcast.net
Subject: Re: DEP

Paul

Please give us mailing address

Bill

On Feb 4, 2010, at 2:23 PM, Thomas Field <tcfield11@verizon.net> wrote:

<Aquatic Plant Management Plan text1.1.doc>

Gentlemen,

I have printed a hard copy to send to Paul Lenz. Do any of you have the street address and zip code I should use? In the mean time, attached is Word Document of the text Paul can use in reviewing the plan.

Tom

Thomas C. Field, Ph.D.
Fernwood-Limne, Inc.
1236 Route 9
Gansevoort, NY 12831
518-793-1282
tcfield11@verizon.net

On Feb 4, 2010, at 11:41 AM, noel1@aol.com wrote:

Tom

I really get annoyed when someone points out that I missed something! Didn't Jim warn you that I was perfect and that is was impossible that I left out NYC DEP regarding the water management plan as I was focusing on the dam.

Paul Lenz
Section Chief, Natural Resources Management
NYCDEP - Kingston, NY office
Office: 845.340.7862
Blackberry: 718.744.8704
Fax: 845.340.1296 PLenz@dep.nyc.gov

So now I pass the buck back to you and request that you sent Paul a complete with pictures and drawings etc. of the draft plan to bring them up to speed.

Paul apparently Tom had an idea which admittedly may have some merit to it. Do you want to be included on the association emailing list? Alternatively, everything is posted on our website www.sevenhillslake.com.

Also Paul stop the weather from interfering so we can schedule our meeting, I am available whenever you are.

Bill

-----Original Message-----
From: Thomas Field <tcfield11@verizon.net>
To: Bill Noel <noel1@aol.com>
Cc: James Polk <canstruct@comcast.net>
Sent: Thu, Feb 4, 2010 11:19 am
Subject: DEP

Bill,

I don't think I answered your question about contact with DEP. Since they are members of the Association, and will have a significant role in the permitting process, it would be beneficial to include them in the loop as soon as possible. If there is someone specifically representing DEP in the Association, perhaps we should send them a copy of the current draft for review and comment. If there is not a specific DEP representative, you could ask who a good contact person would be when you are talking with them about the dam. Since you have asked as many Association people as possible to review the plan, it would not be good to leave DEP out, unless they indicate that they prefer to review the weed control activities through the normal regulatory channels.

Tom

Thomas C. Field, Ph.D.
Fernwood-Limne, Inc.
1236 Route 9
Gansevoort, NY 12831
518-793-1282
tcfield11@verizon.net

=

=

Elements of Aquatic Plant Mana...nt Plan.pdf

References

Baker, J.P., H. Olem, C.S. Creager, M.D. Marcus, and B.R. Parkhurst. 1993. Fish and Fisheries Management in Lakes and Reservoirs. EPA 841-R-93-002. Terrene Inst. U.S. Environ. Prot. Agency, Washington, DC.
Conesus Lake Association, 2002. The Conesus Lake dockside/near shore lake weed and algae treatment guide. Lakeville, NY.

Cooke, G.D., et al. 1993. Restoration and Management of Lakes and Reservoirs. Lewis Publishers, Boca Raton, FL.

Cooke, G. D. and R. H. Kennedy. 1989. Water quality management for reservoirs and tailwaters. Report I. In-lake reservoir water quality management techniques. Tech. Rep. E-89-I. U.S. Army Corps Eng., Vicksburg, MS.

Creed, R. 1998. A biogeographic perspective on Eurasian watermilfoil declines: Additional evidence for the role of herbivorous insects in promoting declines? J. Aquat. Plant Manage. 36: 16-22.

Crowe, G.E. and C.B. Hellquist. 2000. Aquatic and wetland plants of northeastern North America: a revised and enlarged edition of Norman C. Fassett's A manual of aquatic plants. University of Wisconsin press.

Darrin Freshwater Institute. 1991. Hand harvesting Eurasian watermilfoil in Lake George. DFWI Rep. 91-7. Rensselaer Polytechnic Institute, Troy, NY.

Eichler, L.W. et al. 1995. Recolonization of the littoral zone by macrophytes following the removal of benthic barrier material. J Aquat Plant Manage. 33: 51-54

Engel, S. 1984. Evaluating stationary blankets and removable screens for macrophyte control in lakes. J. Aquat. Plant Manage. 22:43-48.

Holdren, C., W. Jones, and J. Taggart. 2001. Managing Lakes and Reservoirs. N. Am. Lake Manage. Soc. and Terrene Inst., in coop. With Off. Water Assess. Watershed Prot. Div. U.S. Environ. Prot. Agency, Madison, WI.

Johnson, R. 2002. Personal communications. Ithaca, NY.

Lord, P.H., R. L. Johnson and K.Wagner. 2005. Effective aquatic plant monitoring: data and issues from Waneta Lake. Presentation at the Northeast Aquatic Plant Management Society annual meeting, Saratoga Springs, NY

McComas, S. 1993. Lake Smarts: The First Lake Management Handbook. Terrene Inst., U.S. Environ. Prot. Agency, Washington D.C.

Newroth, P. and R. Soar. 1986. Eurasian watermilfoil management using newly developed technologies. Lake Reserv. Manage. 2: 252-57

NYSDEC, 2002. New York State Water Quality 2002. Albany, NY.

Perkins, M.A., H.L. Boston, and E.F. Curren. 1980. The use of fiberglass screens for control of Eurasian watermilfoil. J. Aquat. Plant Manage. 18:13-19

Sheldon, S. and L. O'Bryan. 1996. The life history of the weevil, *Euhrychiopsis lecontei,* a potential biological control agent of Eurasian watermilfoil. Entomolog. News 107: 16-22.

Solarz, S. and R. Newman. 1996. Oviposition specificity and behavior of the watermilfoil specialist *Euhrychiopsis lecontei*. Oecologia 106: 337-44.

Westerdahl, H.E. and K.D. Getsinger, eds. 1998. Aquatic plant identification and herbicide use guide. Vol. 2. Aquatic plants and susceptibility to herbicides. Waterways Experiment Station. U.S. Army Corps Eng., Vicksburg, MS.

Definitions

Emergent plants grow primarily above the water surface, although the plant may be rooted in the water. Cattails, purple loosestrife, and phragmites are examples of emergent plants

Exotic species- not native to a lake, and usually not native to a larger geographic region (the Adirondacks, New York, North America….), at the time of European settlement. Usually refers to plants or animals accidentally or purposefully introduced to an area outside of its historic range. Also referred to as non-native, alien, or introduced species.

Floating plants may or may not be rooted underwater, but the majority of the plant is associated with a floating leaf. Water lilies, watershield, duckweed, and watermeal are examples of floating plants

Invasive Species- plants or animals that rapidly reproduce and displace native species. Also referred to as noxious species.

Macrophytes- large plants (macro meaning large, and phyte meaning plant)- most of the aquatic plants found in New York State can be referred to as macrophytes

Meristems- the growing tips of aquatic plants- these are preyed on by herbivorous insects, and are often the most conspicuous part of an underwater plant

Monoculture- a single, homogeneous culture without diversity, such as a plant bed comprised solely of a single aquatic plant

Native Species- native or indigenous to a region at the time of European settlement

Naturalized- introduced from another region and persisting without cultivation; for example, aquatic plants or animals that might not be truly native but were long ago introduced and have adapted to a lake environment

Nuisance Species- plants or animals interferes with human activities. Also referred to as weeds.

Submergent plants grow primarily underwater, although small floating leaves or fruiting structures may sit on or above the lake surface. Water milfoil, pondweeds, coontail, and bladderwort are examples of submergent plants.

Veligers- a larval stage of a mollusk, such as a zebra mussel

Appendix A: Elements of an Aquatic Plant Management Plan

- <u>Problem Statement</u>
  - **Map(s) Indicating Areas of Plant Growth**
  - **Identification of Aquatic Plants on the Map, Including Invasive/Target Species** (indicate how target species identification was verified- professional? Applicator? Part of monitoring program?….)
  - **History of Invasive Weed Growth**- include year of introduction if known, indicate if invasive weed populations are increasing, stable, or decreasing
  - **Uses Impaired**- identify only major uses affected by weeds and whether these are designated lake uses, including impact of target plants/ exotics on native plants and lake ecology (aquatic life impacts)
  - **Known Occurrences of Rare/Endangered Species of Concern?**- list (reference NYS Protected Plant list as needed)

- <u>Management History</u>
  - **Description of Previous Management Efforts** (one paragraph per control strategy used).
  - **Evaluation of Successes and Failures**- did previous management successfully control problem?
  - **Lessons Learned**- did it work?, use of specific control methods, whether limitations existing on the use of particular techniques at this lake
  - **Does Overall Lake Management Plan Exist?** (does it address plant control?)
  - **Context of Aquatic Plant Management versus other lake management objectives** (is aquatic plant control compatible with other lake management objectives, such as swimming, potable water intake, irrigation water, etc.?)
  - **Description of Public Involvement in Management Efforts**- Lake Association? Local Government? Adoption of Prior Management Plans?

- <u>Management Objectives</u>
  - **Extent of Preferred Management**- summarize in one paragraph
    - Partial vs. whole lake management
    - Seasonal (short-term) vs. year-round
    - Immediate vs. long-term or persistent
    - Selective control vs. removing all plants in targeted area
  - **Expected Use Benefits**- one paragraph summary
  - **Critical Areas to Protect** (re: fisheries, wetlands, water intake)

- <u>Management Alternatives-</u> include information on "practical" use of these alternatives at this lake (what factors affect choice of preferred management alternatives- including bathymetry, flushing rate, outflow/groundwater seepage)- In other words, identify why each management alternative is (or is not) appropriate
  - **Local Control**- hand harvesting, benthic mats, herbicides- one paragraph for all methods

- **Lakewide Control**
    - Physical/Mechanical control- drawdown, mechanical harvesting, shading- one paragraph for all methods
    - Biological control- grass carp, herbivorous insects- one paragraph for all methods
    - Chemical control- herbicides- one paragraph for all methods
- **No Action Alternative-** one paragraph summary
- **Preferred Alternative(s)**- one paragraph summary
- **Integrated Management**- one paragraph summary of whether integrated approach (multiple techniques) is appropriate

- Pre-, During- and Post Treatment Actions Planned
    - **Monitoring**-
        - **Aquatic plant**- describe on-going and future monitoring to support aquatic plant management plan
            - Method (rake toss? point intercept? transects?)
            - Frequency of monitoring? (monthly, annually,…?)
            - Conducted by? (professional or volunteer)?
            - Results reported by maps? Data tables? Presence/absence?
        - **Water Quality**- describe on-going and future monitoring to support aquatic plant management plan
            - Water clarity and/or chlorophyll to evaluate shift from macrophyte-dominated to algae-dominated?
            - Dissolved oxygen measurements to evaluate potential for fish kills during and after treatment?
            - Frequency of monitoring?
            - Professional or volunteer?
    - **Early Response**- describe planned activities- one paragraph each:
        - Hand pulling or benthic mats as individual plants or small beds of reinfested target species
            - Frequency/schedule?
            - Prompted by?
                - Identifications through monitoring program?
                - Reports from lake residents?
        - Educational program re: exotics and vectors of transport
    - **Source Management**- describe planned activities- one paragraph
        - Signage/pamphlets at local launches
        - Boat/prop inspections
        - Strategies for reducing sediment/fertilizer load to lake (list and brief description of proposed strategies)- if not, indicate why this would not be efficient use of resources/effort (not contributing to invasive plant problem, etc)- will the lake resident try to identify sources of pollutants to the lake and start to address this loading
    - **Evaluation of Efficacy (Did it work?)**- brief (one paragraph summary)- timeframes; will this information will be reported to the DEC?
        - Did it control the target plants?
        - Will fisheries impacts be evaluated and how?
        - User surveys planned? (did people think it was successful)

Thomas Field February 10, 2010 at 10:11 AM

To: Paul Lenz Cc: Jim Polk, Bill & Jean Noel

Fwd: DEP

Paul,
One more thought I want to add to yesterday's email. DEP will have an opportunity to review and comment on the Aquatic Plant Management Plan as it passes through regulatory review, but as members of the Association, we would like your thoughts before the plan is submitted for review. If the Association is proposing something DEP cannot live with, it is unlikely to be permitted by DEC, and we would rather modify the plan before it is submitted rather than later.
Thanks,
Tom

Thomas C. Field, Ph.D.
Fernwood-Limne, Inc.
1236 Route 9
Gansevoort, NY 12831
518-793-1282
tcfield11@verizon.net

Begin forwarded message:

> **From:** Thomas Field <tcfield11@verizon.net>
> **Date:** February 9, 2010 8:25:43 AM EST
> **To:** "Lenz, Paul" <PLenz@dep.nyc.gov>
> **Cc:** Bill Noel <noel1@aol.com>, James Polk <canstruct@comcast.net>
> **Subject:** **Re: DEP**
>
> Paul,
> When the Association attempted to address their water lily problem with a herbicide proposal, the proposed use of an additional pesticide triggered a need by DEC to do an "enhanced" review, and the first part of the process is the production of an Aquatic Plant Management Plan that provides a justification and co-ordinated approach to solving the vegetation problems. This is the plan. The format for the plan was taken from the DEC website, and is at the end of the document I have attached to this email. I added an initial element to their outline, describing the environmental setting that I believe is necessary to understanding the problem, and with one exception in the order of discussion, I have followed their outline. If I can be of more help explaining the document, or if you would like to discuss it, please let me know.
> Tom
>
> Thomas C. Field, Ph.D.
> Fernwood-Limne, Inc.
> 1236 Route 9
> Gansevoort, NY 12831
> 518-793-1282
> tcfield11@verizon.net
>
> On Feb 9, 2010, at 8:03 AM, Lenz, Paul wrote:
>
>> Thanks Tom and Bill, I have a copy of the plan - I have to admit I'm not sure of the nature of it. Is this something the Association asked you to prepare to address aquatic species, control weeds, etc.? It has nothing to do with the DEC "Dam" annual report correct? Thank you both for including DEP in the review-once I hear back from you we'll pursue as needed.
>>
>> ____
>> **Paul Lenz | Section Chief | NYC Environmental Protection**
>> **(O) 845 340 7862 | plenz@dep.nyc.gov**
>>
>> ---
>>
>> **From:** Thomas Field [mailto:tcfield11@verizon.net]
>> **Sent:** Friday, February 05, 2010 2:15 PM
>> **To:** Lenz, Paul
>> **Subject:** Re: DEP
>>
>> Thanks, Paul. The latest iteration of the report should arrive by FedEx on Monday.
>>
>> Thomas C. Field, Ph.D.
>> Fernwood-Limne, Inc.
>> 1236 Route 9
>> Gansevoort, NY 12831
>> 518-793-1282
>> tcfield11@verizon.net

On Feb 5, 2010, at 8:16 AM, Lenz, Paul wrote:

Good morning.

NYCDEP
Attn: Paul Lenz
71 Smith Ave.
Kingston, NY 12401

I'm still trying to set up a site visit and hope to have it confirmed next week.

____

Paul Lenz | Section Chief | NYC Environmental Protection
(O) 845 340 7862 | plenz@dep.nyc.gov

From: Bill Noel [mailto:noel1@aol.com]
Sent: Thursday, February 04, 2010 4:00 PM
To: Thomas Field
Cc: Lenz, Paul; canstruct@comcast.net
Subject: Re: DEP

Paul

Please give us mailing address

Bill

On Feb 4, 2010, at 2:23 PM, Thomas Field <tcfield11@verizon.net> wrote:

<Aquatic Plant Management Plan text1.1.doc>

Gentlemen,

I have printed a hard copy to send to Paul Lenz. Do any of you have the street address and zip code I should use? In the mean time, attached is Word Document of the text Paul can use in reviewing the plan.

Tom

Thomas C. Field, Ph.D.
Fernwood-Limne, Inc.
1236 Route 9
Gansevoort, NY 12831
518-793-1282
tcfield11@verizon.net

On Feb 4, 2010, at 11:41 AM, noel1@aol.com wrote:

Tom

I really get annoyed when someone points out that I missed something! Didn't Jim warn you that I was perfect and that is was impossible that I left out NYC DEP regarding the water management plan as I was focusing on the dam.

Tom

I really get annoyed when someone points out that I missed something! Didn't Jim warn you that I was perfect and that is was impossible that I left out NYC DEP regarding the water management plan as I was focusing on the dam.

Paul Lenz
Section Chief, Natural Resources Management
NYCDEP - Kingston, NY office
Office: 845.340.7862
Blackberry: 718.744.8704
Fax: 845.340.1296 PLenz@dep.nyc.gov

So now I pass the buck back to you and request that you sent Paul a complete with pictures and drawings etc. of the draft plan to bring them up to speed.

Paul apparently Tom had an idea which admittedly may have some merit to it. Do you want to be included on the association emailing list? Alternatively, everything is posted on our website www.sevenhillslake.com.

Also Paul stop the weather from interfering so we can schedule our meeting, I am available whenever you are.

Bill

-----Original Message-----
From: Thomas Field <tcfield11@verizon.net>
To: Bill Noel <noel1@aol.com>
Cc: James Polk <canstruct@comcast.net>
Sent: Thu, Feb 4, 2010 11:19 am
Subject: DEP

Bill,

I don't think I answered your question about contact with DEP. Since they are members of the Association, and will have a significant role in the permitting process, it would be beneficial to include them in the loop as soon as possible. If there is someone specifically representing DEP in the Association, perhaps we should send them a copy of the current draft for review and comment. If there is not a specific DEP representative, you could ask who a good contact person would be when you are talking with them about the dam. Since you have asked as many Association people as possible to review the plan, it would not be good to leave DEP out, unless they indicate that they prefer to review the weed control activities through the normal regulatory channels.

Tom

Thomas C. Field, Ph.D.
Fernwood-Limne, Inc.
1236 Route 9
Gansevoort, NY 12831
518-793-1282
tcfield11@verizon.net

NYS DEC
AQUATIC PLANT MANAGEMENT PLAN
SEVEN HILLS LAKE

FOR

Seven Hills Lake Property Owners Association
P.O. Box 1087
Kent Lakes, New York 10512

BY

Thomas C. Field, Ph.D.
Fernwood-Limne, Inc.
1236 Route 9
Gansevoort, New York 12831

February 2010

TABLE OF CONTENTS

Thomas Field 2/12/10 2:41 PM
Deleted: 6

GEOGRAPHIC SETTING

Seven Hills Lake was constructed in the 1950's for the purpose of providing recreational boating, fishing, and swimming to the residents of planned subdivisions adjacent to its shoreline. The lake is located in north-central Putnam County, New York, in the town of Kent. Both the lake and its watershed are elongated features with a north-south axis of orientation corresponding with the orientation of the Taconic Highland ridges that form the valley of the watershed. The lake is located entirely in Putnam County, but the watershed, which is over four miles in total length, extends northward into Dutchess County for a distance of approximately two miles (MAP 1), nearly to Interstate 84. The highest point of the watershed atop Big Buck Mountain is 1170 feet above mean sea level and located in the southeastern corner of the watershed. The hills defining the northern edge of valley are nearly as high, reaching an elevation of 1056 feet. The hills forming the western slope of the valley are somewhat lower, reaching a maximum height of 957 feet. The lake itself has an elevation of 637 feet according to USGS topographic maps.

Most of the uplands along the western slope of the watershed are undeveloped and covered by mature deciduous woodlands (PHOTOS 1 and 2). Portions of the uplands of the eastern slope are also dominated by deciduous woodlands particularly in the middle section of the valley above the road between Meads Corners and Farmers Mills. Below Farmers Mills Road, the eastern slope of the valley is occupied by the Seven Hills Lake residential subdivision along the lower slope, and by another residential subdivision along the ridge top. At the head of the valley in Dutchess County more residential subdivisions lie along the valley floor and on the lower slopes of the eastern valley wall. These subdivisions were also been built after 1956 according to the USGS topographic maps. In the northeast corner of the watershed where State Route 52 cuts through the upper slopes of the eastern slope of the valley, residential use of the uplands has existed for a longer period. The density of residential development in the southern watershed in 2007 can be seen in PHOTO 1, and the density of residential development in the northern watershed in 2004 is seen in PHOTO 2 (State Route 52 enters the north-center of the photo and exits the east-center of the photo). Other current land uses in the watershed include small-scale mineral extraction and small-scale agriculture.

MAP 1: Watershed of Seven Hills Lake showing orientation to roadways and county border (dashed pink).

Lake and Watershed Physical Characteristics

Seven Hills Lake is a manmade body of water formed by impounding Leetown Brook with a concrete weir (PHOTO 3). The precise date of the dam construction is unknown, and information from the two 7.5' topographic maps that include portions of the lake suggests a date circa1980, which is incorrect. The lake is not found on the 1956 USGS Oscawana 7.5' map updated by aerial photographs taken in 1979, but is found on the 1981 USGS Lake Carmel 7.5' map as an update based upon aerial photos taken in 1980. However, the Seven Hills Lake Property Owners Association was established in 1957 with a provision for the fees to be paid by property owners for the maintenance of the lake. This information suggests a much earlier date of construction. Furthermore, a 1957 plat for the Seven Hills Lake Subdivision date also depicts the lake and the planning board approved the plat in 1960, suggesting a construction date about that time.

The former landscape of the lake is depicted as level wetland on the 1956 USGS Oscawana 7.5' map and the 1944 USGS Lake Carmel 7.5' map. The watershed was sparsely settled prior to 1956, and the few buildings depicted on earlier USGS topographic maps show roads and buildings primarily along the slopes and ridges of the valley. USGS topographic map revisions in the early 1980's indicate considerable residential development upstream of the lake between 1955 and 1980, mainly along Leetown Brook near the head of the watershed in Dutchess County. Additional residential development has occurred since 1980 as is evident in PHOTOS 1 and 2.

Photo 3: Concrete weir portion of the earthen dam forming Seven Hills Lake (June 2002)

The lake has an elongated surface of 55.3 acres with a generally north-south orientation. It drains to the south into Boyd Corners Reservoir and the New York

City Delaware-Catskill water supply system. Seven Hills Lake has a maximum depth of 11 feet. Its watershed is a moderately confined valley with steep and moderately steep slopes encompasses approximately 3600 acres underlain by biotite granitic gneiss, which appears as occasional outcroppings in the uplands. The watershed is divided into two sub-drainages, the larger Leetown Brook (approximately 2800 acres) and the smaller White Pond drainage (approximately 800 acres). Beside these two major surface water inflows, a small permanent stream flows from the east shore at approximately mid-point of the lake, and an intermittent stream discharges from the west shore at its southern end where the lake is at maximum width. Surface water runoff appears to supply most of the water to the lake and groundwater appears to provide a minor component to the water supply based upon the minimal thermal stratification that is sustainable even when the lake is completely choked with macrophyte growth.

The soils within the valley exhibit a broad range of drainage characteristics, dominated by excessively drained medium-moderately course glacial tills of the Charlton-Chatfield series in the uplands and poorly drained organic/alluvial soils of the Carlisle-Palms-Fluvaquents series in the lowlands (ostensibly including the lake bottom) and along Leetown Brook upstream of the lake (USDA SCS, 1994).

A bathymetric map of Seven Hills Lake was produced in 1985 as part of a limnological investigation of three lakes in Putnam County (Carpenter Environmental Associates, 1986). Additional depth data were collected in 1999 to substantiate the accuracy of the earlier map, and to determine the extent to which sedimentation had occurred. The principal differences in the two maps are: 1) contours representing the original stream channel extend much further north than indicated on the 1986 map, and 2) the area within the 11 foot contour appeared to be somewhat less in 1999 than in 1985. The maximum depth of the lake has remained the same since 1985, but lake residents at the northern end of the lake have observed an accumulation of sediment and decreasing lake depth from shore to shore in the years since the maps were constructed. A major source of the sedimentation at the northern end of the lake ostensibly originates in storm-water runoff from Farmers Mills Road.

The 1999 bathymetric map is presented as MAP 2. Area and volume measurements were calculated from the 1999 bathymetric map, and are found in TABLE 1. The average depth of the lake based on this map is 6.7 feet.

Seven Hills Lake has a high average flushing rate and short hydraulic retention time because of its relatively large watershed. Using an average annual runoff of 25 inches, the lake flushes over 20 times per year and has an average hydraulic retention time of 18 days. Although the average exchange rate is high, variations from the mean can also be large and significantly influence the character of water quality.

MAP 2: Bathymetric Map of Seven Hills Lake (Not to Scale).

TABLE 1: Area and Volume Estimates for Seven Hills Lake

DEPTH ft	AREA acres	VOLUME acre-ft
0	55.3	
		205.6
4	47.6	
		82.7
6	35.4	
		55.2
8	20.5	
		23.5
10	4.8	
		2.1
11	0.3	
	Total	369
Mean Depth ft.		
6.7		

BIOLOGICAL COMMUNITIES

Wetlands

State regulated wetlands are located adjacent to the northwest end of Seven Hills Lake (MAP 3). In addition, a “linear wetland” is located along the northeast shore of the lake in the Wetland Check Zone on MAP 3. Another wetland is located downstream of the lake, before the outlet flows into Boyd Corners Reservoir.

MAP 3: DEC Regulated Wetlands and Significant Natural Communities

Fish Community

Seven Hills Lake supports a warmwater fishery and contains no habitat suitable for coolwater and coldwater species. No fisheries survey of the lake is known to exist, but White Pond, upstream of Seven Hills Lake, held a diverse fish community containing white perch (*Morone Americana*), largemouth bass (*Micropterus salmoides)*, black crappie (*Pomoxis nigromaculatus)*, common sunfish (*Lepomis gibbosus)*, red-breasted sunfish (*Lepomis auritus)*, spotted sunfish (*Enneacanthus gloriosus)*, chain pickerel (*Esox americana)*, and golden shiners (*Notemigonus chrysoleucas)* in 1936 (NYS DOC, 1937). Brown bullhead (*Ictalurus nebulosus)*, and smallmouth bass (*Micropterus dolomieu*) were also thought to be present at the time although neither species was captured in the survey; both species were collected downstream of the present lake, in Boyd Corners Reservoir at the same time, however. Any of these species are likely to be residents of Seven Hills Lake and none are protected in New York State. With the exception of triploid grass carp, all fish populations in Seven Hills Lake are maintained by natural recruitment without stocking augmentation.

Unusual Plant and Animal Species

A letter from the NYS Natural Heritage Program (APPENDIX 1) indicates that there are no known occurrences of rare or state-listed species of plants and animals in Seven Hills Lake, and listed species that might potentially be in the lake have not been observed during plant surveys. No quillworts, lobelias, bladderworts, or unusual pondweeds, naiads, milfoils, or duckweeds were observed even before the introduction of hybrid grass carp. Listed fish species that might be found in habitats similar to Seven Hills Lake in this part of the state, such as mud sunfish (*Acantharchus pomotis*) and ironcolor shiner (*Notropis chalybaeus*) have not been found east of the Hudson River (Smith, C.L., 1985). Listed birds that might make use of the lake such as osprey (*Pandion haliaetus*) and red shouldered hawk (*Buteo lineatus*) are undoubtedly present from time to time, but aquatic weed reduction should increase feeding opportunities for these birds by decreasing cover and improving fish-hunting opportunities, and should not otherwise be deleterious to these species.

PROBLEM STATEMENT

Based on USGS maps and soil surveys, the land now occupied by Seven Hills Lake was likely wooded/brushy swampland. After the dam was built, a submerged aquatic vegetative community formed, and by 1985, all but the deepest part of the lake was covered with a prolific mixture of long-leaf pondweed (*Potomogeton nodosus*), a species more common to streams than lakes, and large-leaf pondweed (*Potomogeton amplifolius*), a plant that likes soft sediments such as would have formed after the flooding of Palms and Fluvaquents soil types. A few patches of yellow water-lily (*Nuphar* sp.)were observed at the northern end of the lake, and along the eastern and western shorelines of the lake. Muskgrass (*Chara* sp.) and Naiads (*Najas* sp.) were found at the southern end of the lake, and Arrow Arum (*Peltandra virginica*), Pickerelweed (*Pontederia cordata)*, and Arrowhead (*Sagittaria latifolia*) were present in the wetlands at the northern end of the lake (Carpenter Environmental Associates, 1986). The origins of these initial components of the aquatic macrophyte community are unknown, but potential sources exist in several wetlands and ponds upstream of the lake.

Thomas Field 2/12/10 1:45 PM
Deleted: a

The lake was judged to be moderately eutrophic in 1985 based upon nutrient levels, supersaturated summer dissolved oxygen values, decreasing summer light penetration measurements, high density of aquatic macrophytes, and the presence of summer algae blooms. The use of a mechanical weed harvester to control aquatic macrophytes began in 1985.

Two exotic invasive macrophytes, Eurasian water milfoil (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potomogeton crispus*), had dominated the aquatic macrophyte community by the mid-1990's. The dates of their introductions are unknown, but the plants had impaired the use of the lake for boating and fishing before 1996 when they were first identified. Mechanical weed harvesting could no longer control the macrophyte growth and algae blooms became more frequent. A survey was conducted to evaluate alternatives for aquatic weed control in 1999. Eurasian milfoil, bushy waterweed (*Najas flexalis*), curly-leaf pondweed, an unidentified pondweed (probably *Potomogeton nodosus*), muskgrass (*Chara* sp.), filamentous algae (*Rhyzoclonium* sp.), white water crowfoot (*Ranunculus longirostris*), large-leaf pondweed, and yellow water lily were observed by gross visual observation during a survey in June 1999 (Field, 1999). Benthic vegetation was extensive throughout the pond at all depths; Eurasian water milfoil was the most dominant species. Six different species assemblages were identified and the locations of these are found in MAP 4. Each assemblage is defined by the three or four most common plant species, listed in declining abundance for each assemblage description. With the exception of the two smallest assemblages (along the southern shore of the lake), all assemblages were high density in the sense that fishing lures could not be retrieved without fouling. The density of plants along the southern end of the lake was rated as moderate, although the bathing beach was relatively free of plants. A relatively low-density mixture of waterweed and muskgrass also inhabited a small, rocky area along the southeast shore of the lake. Over 95% (52 acres) of the lake was covered by dense growths of rooted aquatic macrophytes. Small colonies of lilies were found in the northern end of the lake and sporadically along the western shore, but lilies were not abundant or dominant in any portion of the lake, and were not sufficiently abundant to be a component of any species assemblage. Similar aquatic macrophyte maps showing a fluctuating community composition resulted from surveys in June 2002 (Field, 2002), June 2005 (Field, 2005), and June 2009 (MAPS 4-7).

The most diverse aquatic macrophyte community was observed in 2005 (MAP 6). Eurasian milfoil and curly-leaf pondweed dominated the areal coverage and biomass composition of aquatic macrophytes as they have in all the surveys, but the northern end of the lake had three native species of pondweed (*Potomogeton amplifolius, Potomogeton nodosus, Potomogeton pusillus*), American waterweed (*Eleodea canadensis*), and eelgrass (*Valisneria americana*). These species have not persisted and were not observed in 2009 (MAP 7). The pondweed referenced in MAP 7 is entirely the curly-leaf species, and the milfoil is entirely the Eurasian species. Photographs of the species assemblages in MAP 7 are found in PHOTOS 4-7. In 2009, coontail (*Ceratophyllum demersum*), a native species, was surveyed for the first time at the northern end of the lake.

MAP 4: Aquatic Macrophyte Map June 1999

MAP 5: Aquatic Macrophyte Map June 2002

MAP 6: Aquatic Macrophyte Map June 2005

MAP 7: Aquatic Macrophyte Map June 2009

PHOTO 4: 95+% Dense Pondweed, <5% Milfoil Assemblage (June 2009)

PHOTO 5: Dense Milfoil Assemblage (June 2009)

PHOTO 6: 70% Milfoil, 30% Pondweed, Moderate Water Lilies Assemblage (June 2009)

PHOTO 7: Dense Milfoil, Dense Water Lily Assemblage (June 2009)

Although the composition of the aquatic macrophyte community has changed from survey to survey since aquatic weed problems were first described in 1985, at least one species of macrophyte has been sufficiently abundant to inhibit the use of the lake for fishing, boating, and swimming each summer since then. The earliest descriptions are of high densities of long-leaf and large-leaf pondweeds, which had been replaced by Eurasian milfoil and curly-leaf pondweed by the mid-1990's, with milfoil creating the preponderance of biomass. By 2005, curly-leaf pondweed had begun to replace much of the Eurasian milfoil, and by 2009, the predominant macrophyte was curly-leaf pondweed (PHOTO 4), and Eurasian milfoil dominated the coverage of a much smaller proportion of the lake (PHOTO 5).

Since the late 1990's blooms of filamentous algae have also impaired the use of the lake during portions of some summers (PHOTO 8).

PHOTO 8: Algae Bloom, Seven Hills Lake (June 2002)

The coverage of water lilies has also increased dramatically during the last decade, and colonies of these plants now inhibit use of, and access to the lake, particularly at the northern end. In 1985, lily colonies were described as patches along the northern, eastern, and western shores, and this description remained accurate at the time of the next survey in 1999. By June 2009, water lilies occupied approximately seven acres of the surface of the northern end of the lake (PHOTO 6 and 7)(MAP 7), and were common along other portions of the shoreline.

An emerging problem associated with the expansion of water lilies has been the accumulation of unconsolidated sediments and loss of depth at the northern end of the lake. The most northern end of the lake is configured as a narrow channel just below Farmers Mills Road. Here, the velocity of flow is much faster than elsewhere in the lake, and sediment deposition has not been remarkable. Below the narrow section, however, the lake widens, and this part of the lake is usually occupied by dense macrophyte growth, usually milfoil, but increasingly milfoil and water lilies. This dense growth creates a curtain that reduces turbulence and accelerates the deposition of unconsolidated sediments, decreasing water depth. Water lilies rhizomes that come to inhabit the new sediment also accelerate the rate at which water depth is decreasing.

AQUATIC PLANT MANAGEMENT HISTORY

Mechanical Weed Harvesting

Mechanical weed harvesting has been used to control aquatic macrophytes since

1985. The technique was successful in controlling vegetation in the deeper portions of the lake, but could not reach some shallow areas near docks and swimming areas where lake residents would like to have more control. Initially, mechanical weed harvesting was the primary tool for weed control and used throughout the lake. After the introduction of Eurasian milfoil and curly-leaf pondweed, weed harvesting became incapable of controlling the problem.

Drawdown

Winter drawdown of the lake was initiated in 1998 to attempt to control aquatic macrophytes in shallow areas of the lake. In 1998, the lake was drawn down four feet to five-and-a-half feet for a period of at least four to six weeks from January to March. This technique was used until 2001 when it was discontinued due to concerns over frost and ice damage to the concrete face of the dam.

Triploid Grass Carp

Triploid grass carp were first used in 2000 when 575 fish were released in May. A moderate stocking density of ten fish per acre was used to reduce the biomass of aquatic macrophytes. Aquatic macrophytes appeared to decline, and in 2005, a simplistic population model was created as a guide to maintaining an acceptable population number. Based upon the model, 235 triploid grass carp were stocked in 2006, and another stocking of the same size is scheduled for 2010.

Herbicide Treatments

Sonar was applied in 1996 to treat the invasive exotic macrophytes. The treatment was repeated in 1997 and then discontinued in search of less expensive and more effective control measures. After other measures failed to adequately control the weed problem, herbicide treatments were restarted in 2007 when the northern shoreline, eastern shorelines, and center of the lake (16 acres) were treated with Aquathol K. In 2008, 18 acres at the northern end and along the eastern shoreline of the lake were again treated with Aquathol K to remove Eurasian milfoil and curly-leaf pondweed. Permitting restrictions have limited treatment to 50% or less of the lake, and for these two years treatment coverage was 29% and 32% respectively. An algae bloom covering half the lake was treated with Captain in 2007.

Treatment Evaluation

The on-going aquatic macrophyte weed problem in Seven Hills Lake has only been controlled by use of a combination of techniques since the arrival of Eurasian water milfoil and curly-leaf pondweed. The early efforts to control the exotic invasive species with Sonar were expensive and inadequate, probably because the herbicide was quickly diluted and a toxic dosage could not be maintained for an adequate exposure period. Mechanical weed harvesting continued during these treatment years, but the magnitude of the job exceeded the capacity of the weed harvester, and the harvester was not effective in some shallow waters invaded by the new exotic macrophytes.

The next approach to controlling macrophytes used a combination of triploid grass carp and winter drawdown. The combination of these techniques successfully reduced the overall density of aquatic macrophytes, but the fish did not remove vegetation from some parts of the lake where control was highly desirable, and mechanical weed harvesting was still necessary to enable boating and fishing. Grass carp ostensibly reduced the magnitude of the weeds that needed control by other methods, but did not solve the problem. Drawdown also improved conditions for recreational use in the shallow waters of the lake, but did not entirely eliminate the need for mechanical weed harvesting either. Drawdown was discontinued when frost damage to the weir was observed, and concern for the integrity of the infrastructure exceeded any benefit that might be had in weed control.

The use of Aquathol K in conjunction with weed harvesting and the partial control exerted by the grass carp has provided the most effective control of the weed problem to date. Pesticide permits have restricted the area of treatment to no more than 50% of the lake in any given treatment, and this coverage has been adequate to date. The grass carp appear to reduce the amount of control necessary by other methods, chemical spraying is used for treating areas of the densest plant growth and shallow areas where mechanical weed harvesting is ineffective, and the weed harvester is used in the deeper parts of the lake and where repeat treatment during a specific year is necessary.

Thomas Field 2/12/10 1:50 PM
Deleted: ast p

Algae blooms have created periodic summertime problems since at least the mid-1980's, but only one of these has been treated chemically, in 2007. Captain was applied to 27 acres of the lake and effectively treated the problem. Blooms have not been predictable in either species composition or frequency, however, and depending upon the species composition of future bloom, stronger treatment with copper sulfate might be necessary to achieve a satisfactory result.

Lake Management Plan

The Seven Hills Lake Maintenance Committee was formed in October 1998 with the purpose of developing a comprehensive long-term management plan for the lake. Although the Association has not formally adopted a plan for the lake, the Committee continues to address the on-going maintenance needs of the lake for the Association. Responsibilities regularly undertaken or supervised by the Committee include dam maintenance, weed and algae control, beach maintenance, and erosion control on Association property. A water-quality monitoring program was initiated in 1999, and application for the stocking of triploid grass carp was initiated the same year, in part funded by a grant from the Putnam County Lake Management Program.

During the past three years, Putnam County grants (via NYC DEP watershed protection programs) have upgraded several septic systems near the lake, the only systems suspected of providing nutrient inputs to the lake based on tests of septic systems located within 200 feet of the lake. Almost all the homes adjacent to the east shore of the lake are well set back from the lakeshore on the opposite side of Seven Hills Lake Drive, and the west shore of the lake is completely undeveloped. Unlike many recreational lakes, Seven Hills Lake has few septic systems near its shoreline.

The results of water-quality monitoring surveys (APPENDIX 2) have indicated that the primary surface water supplies to the lake consistently contain elevated concentrations of chlorides characteristic of road runoff, and periodically contain high concentrations of nutrients and bacteria that reflect variations in the frequency and durations of storm events and the associated quality of road runoff. The Associations has no control over these surface water flows.

In 2007 a movable fence was erected across the swimming beach to deter geese, and this barrier has been successful in removing the birds from the beach area. Use of the lake by geese in general has declined since the installation of the fence.

The focus of the Maintenance Committee's work continues to be on aquatic weed control, which has been a chronic problem since 1985, and beyond the capability a their mechanical weed harvester since the establishment of the exotic invasive macrophytes in the 1990's. The lake was constructed as a recreational lake with the intention that it would be used for boating, swimming, and fishing. Control of the overabundance of aquatic macrophytes and algae blooms is consistent with these lake management objectives. The lake is not used as a source of potable water or for irrigation. The potential impacts of pesticides on downstream waters are diminished by limiting the area of treatment and concentration of chemicals used in any given treatment.

MANAGEMENT OBJECTIVES

The Association prefers to use an integrated approach for controlling nuisance aquatic vegetation in Seven Hills Lake. This approach include 1) maintaining a small population of triploid grass carp to reduce the need for weed harvesting and chemical controls, 2) mechanical weed harvesting to control macrophytes in along the shoreline, where recreational use is heaviest, and where repeat control may be necessary, 3) the use of Aquathol K or an acceptable alternative herbicide to treat portions of the lake between mid-May and the end of August to eliminate the densest biomass of curly-leaf pondweed and Eurasian water milfoil that cannot been controlled by weed harvesting, and 4) the use of Captain or copper sulfate to treat heavy blooms of filamentous and unicellular algae that occur from time to time.

The need to treat aquatic macrophytes is likely to continue for the foreseeable future due to the invasive nature of the macrophytes being controlled and the fertility of surface waters feeding the lake. In addition to biological and chemical control for macrophytes and algae, the Association would like to remove unconsolidated sediments from the northern end of the lake using Hydro-Raking. This would return the northern end of the lake to the depth contours found on the 1999 bathymetric map. The process would clear selective areas at the north end of the lake so that these could be used for boating and fishing as they have in the past. In the process of removing sediments, water lilies would also be removed from the selected areas in the center of the lake, but not along the shoreline. This approach would cause minimal disturbance to shoreline landscapes and cost far less than dredging.

These management techniques are necessary to enable the use of the lake for boating, swimming, and fishing, and the Association is also aware of the need to protect fisheries and classified wetlands. The Association will not manage plant growth in the classified wetland portions of the lake, and the partial treatment proposed elsewhere will leave much aquatic macrophyte growth in untreated portions of the lake to perform ordinary ecological functions. Partial treatments also lessen the risk of oxygen depletions that might cause fish kills. Fish kills have not occurred following herbicide treatments in the past, and the lake is normally well oxygenated during the summer, usually being supersaturated near the surface. Partial removal of the exotic invasive macrophytes ostensibly improves fish habitat in general by creating more habitat diversity than exists in the dense stands of vegetation being treated.

MANAGEMENT ALTERNATIVES

Local Controls

The approach to managing aquatic vegetation in Seven Hills Lake has been shaped by physical factors (organic nature of lake-bottom soils, shallow lake depth, high flushing rate, periodically enriched water inflows), and the invasive nature of the exotics that presently dominate the macrophyte community. The shallow nature of the lake allows aquatic macrophytes to cover virtually the entire lake and the rich organic nature of the soils that constitute the lake bottom are capable of supporting a luxuriant growth of either native or exotic macrophyte species. These conditions insure that aquatic weed grow will be a persistent problem requiring control to enable use of the lake for swimming, boating, and fishing in most years. In the absence of control use of the lake for swimming, boating and fishing will be practically eliminated.

The high flushing rate of the system and associated variations in weather pattern during the summer appear to play an important role in determining the density of the macrophyte community and the severity of algae blooms. The system's high flushing rate, every 18 days on average, assures that the lake water quality will reflect the nature of recent surface-water runoff events, but different weather patterns can produce wide variation in the water quality characteristic of runoff, as is reflected in the water-quality monitoring data (APPENDIX 2). Droughty summers, at one extreme, produce storm events that are characteristically infrequent or of insufficient volume to generate regular runoff. Under these conditions, nutrients collect on terrestrial surfaces from various dry depositions, and when a storm of sufficient size does produces runoff, it carries the accumulated depositions into the lake as a nutrient-rich slug that can stimulate macrophyte growth and trigger algae blooms. If another storm event does not flush the nutrient-rich slug from the lake quickly, it may influence aquatic weed growth for several weeks before another event of somewhat different water quality dilutes or replaces it. At the other extreme, e.g. the summer of 2009, rainfall is frequent and substantial throughout the summer. Under these conditions, terrestrial surfaces are continuously washed, dry deposition does not accumulate, and runoff reflects more average conditions throughout the summer. Aquatic macrophytes receive less nutrient stimulation, and algae blooms are less frequent due to lower nutrient levels and a higher flushing rate.

These conditions produce aquatic weed problems that vary in composition from year to year, but predictably impact the entire lake rather than create localized problems. The Association has achieved control by extensive use of the mechanical weed harvester and partial treatments of herbicides, along with some help from grass carp. The magnitude of the problem is large and beyond the scope of benthic mats or hand harvesting, which are impractical for the Association plan. Individual homeowners in areas to shallow for mechanical weed harvesting or when control is not available in a timely may use local hand harvesting to improve conditions at private beaches, and glyophosate to create narrow channels from the shorline to the open lake. Benthic mats might provide suitable control in these situations as well.

Lake-wide Control

The Association has used two physical/mechanical lake-wide controls (mechanical weed harvesting and drawdown) in the past, but these have been discontinued for different reasons. Mechanical weed harvesting was the primary method of control from 1985 until the mid-1990's, but since the arrival of invasive exotic macrophytes, the magnitude of the task has exceeded the ability of the equipment to perform lake-wide duty; mechanical weed harvesting is still used for partial control of the weed problem. Drawdown was used for two years and did decrease the severity of weed growth, but was discontinued due to the damage occurring to the weir face from repeated freezing and thawing. Shading has never been considered as a potential control measure due to the large size and high flushing rate of the lake that would make this method both ineffective and excessively expensive.

Triploid grass carp were stocked in 2000 and 2005, and survivors of both stockings still reside in the lake. Another stocking of 235 yearling fish is planned for 2010. Grass carp are unlikely to be a satisfactory tool alone to control aquatic macrophytes because of the difficulty of keeping the size of the fish population adjusted to the size of the macrophyte community given the variability of the latter from year to year. Grass carp survival and growth appear to be good based upon gross visual observation, but their contribution to the success of control efforts is difficult to quantify. Another potential biological control, milfoil weevils (*Euhrychiopsis lecontei*) has not been considered because of generally undependable results reported from other lakes, and the high population of pan-fish, thought to be predators of the weevils, in Seven Hills Lake. Furthermore, milfoil weevils do not feed on curly-leaf pondweed.

The Association does not consider lake-wide use of herbicides appropriate at this time. The use of non-selective contact herbicides on a whole-lake basis would likely eliminate almost the entire vegetated littoral habitat, cause fish kills within the lake, greatly decrease habitat diversity, and impact aquatic vegetation downstream of the lake. The use of low-level formulations of systemic herbicides such as fluridone to control Eurasian milfoil is unlikely to be successful because of the long contact time required for successful control, and the high flushing rate of the lake that makes regulation of the proper dosage difficult and expensive.

Thomas Field 2/12/10 2:23 PM
Deleted: which would

The preferred management alternative for Seven Hills Lake remains the integrated approach using mechanical weed harvesting, herbicide application, and triploid grass carp to attack the persistent annual problem. The primary tools in this alternative are expected to be the use of the mechanical harvester and Aquathol K or other acceptable herbicide for partial control of the invasive exotics. Because new herbicides appear on the market fairly frequently and new techniques for applying both new and old pestices more effectively are being developed, the Association anticipates that more acceptable herbicide treatment regimes may appear in the future, and the Association intends to evaluate new treatment approaches for suitability at Seven Hills Lake as they become aware of them. The use of weed harvesting and herbicides is expected to vary from year to year depending upon the severity and mixture of weed growth. A problem dominated by curly-leaf pondweed might be most easily controlled by mechanical weed harvesting, while an extensive coverage dominated by milfoil might require more chemical treatment to bring the growth within the capability of the weed harvester. Grass carp will be kept at a relatively low population level and are not intended to have a primary control function. Algae blooms have been a periodic, but unpredictable occurrence in the lake since at least the mid-1980's. Captain

Thomas Field 2/12/10 2:36 PM
Deleted: these two techniques

or copper sulfate will be used to treat algae blooms as appropriate.

Thomas Field 2/12/10 2:27 PM
Deleted: needed

PLANNED PRE-, DURING- AND POST TREATMENT ACTIONS

Monitoring

The aquatic macrophyte problem in Seven Hills Lake is persistent and chronic. The state of problem is assessed each spring (May-June) by visual observation from an airboat provided by the pesticide applicator. The selection of areas to be treated is based upon macrophyte density and intensity of recreational use. The chairman of the Lake Maintenance Committee and an employee of the pesticide application firm make the determination of the treatment area(s), which are mapped for treatment later in the summer. A rake toss may be used to determine community composition, but the areas chosen for treatment have been, and are expected to remain, dense monocultures or dense mixtures composed solely the two exotic invasive target species.

Water Quality

Water-quality monitoring has involved periodic (1999, 2002, 2005, 2009) summer profiles of water temperature, dissolved oxygen (APPENDIX 3), and measurement of nutrients taken during the fall at various points within the lake and from the major tributaries (APPENDIX 2). Water-quality measurements have not been made in conjunction with herbicide treatments, but the routine data show that the lake is generally well oxygenated and usually supersaturated with dissolved oxygen at the surface during the summer. Since the treatments have been, and are expected to remain, partial treatments, the risk of fish kills is perceived to be low, and no fish kills, or evidence of stressed fish have been associated with herbicide treatments to date. In general, dissolved oxygen is expected to remain adequate for fish through the normal wind-driven circulation water within the lake, even in treated areas, and the limitations on treatment coverage should leave substantial parts of the lake as a well-oxygenated for fish.

Early Response

The aquatic macrophyte problems in Seven Hills Lake are persistent, lake-wide, annual occurrences that are not expected to be eliminated by the proposed treatments. The Association does not perform early response activities as such prior to the lake-wide assessment in May or June. Individual property owners may initiate early responses such as hand harvesting or the installation of benthic mats if weed growth reaches problem proportions on their beaches prior to weed control by the Association.

Source Management

The Association has a number of on-going means of keeping their members aware of practices that would potentially introduce new pests to the lake. The Lake Maintenance Committee at regular Association meetings presents the topics where they are discussed by the membership in general, and information concerning potential invasive species, boat inspections, eutrophication processes, the activities and problems of other lake associations, use of lawn fertilizers, the availability of funds for septic system improvements, and the availability of invasive plant awareness signs have been featured in the Association newsletter and posted on the Association website (http://sevenhillslake.com/index.html). The lake has no public beach or boat launch so the presentation of materials for public consumption is unnecessary, and the dissemination of pertinent information through meetings, newsletter, and the website should be effective in delivering important information to the people using the lake. The Association has also attempted to identify sources of nutrient enrichment originating from the properties of its membership, and assisted in seeking funds for the improvement of septic systems thought to be contributing to nutrient flows to the lake.

Evaluation of Efficacy

The proposed use of mechanical weed harvesting, herbicides, and grass carp to control the weed problems in Seven Hills Lake will be a continuation of the methods that have adequately reduced the extent of the weed growth in the past and improved the opportunity to use the lake for recreational swimming, boating, and fishing. The Association anticipates that this efficacy will continue in the future. The impact of the herbicide treatments on fisheries has not been specifically evaluated, and the Association has no plans make such evaluations in the future. Past treatments have resulted in no evidence that fish are imperiled by the treatments, and the increase in habitat diversity that results from the treatments is thought to be generally beneficial to the fish community. Likewise, the use of surveys to evaluate the success of the program is not planned, but the results of the weed control program will be an on-going topic of discussion at Association meetings, and evaluations of the efforts will continue to be reported in the newsletter and on the Association website.

REFERENCES CITED

Carpenter Environmental Associates, Inc., 1986. Excerpts from Evaluations of Three Lakes in Putnam County. Prepared for Putnam County Environmental Management Council, Carmel, NY. 20p.

Field, Thomas C., 1999. Survey of Seven Hills Lake for the Seven Hills Lake

Property Owners Assoc., Fernwood-Limne, Inc., Gansevoort, NY. 13p.

Field, Thomas C., 2002. Survey of Seven Hills Lake for the Seven Hills Lake Property Owners Assoc., Fernwood-Limne, Inc., Gansevoort, NY. 10p.

Field, Thomas C., 2005. Survey of Seven Hills Lake for the Seven Hills Lake Property Owners Assoc., Fernwood-Limne, Inc., Gansevoort, NY. 16p.

NYS DOC, 1937. A biological Survey of the Lower Hudson Watershed. Supplement to the Twenty-sixth Annual Report, 1936. NYS DOC, Albany, NY. 373p + maps.

Randall, Allan D., 1996. Mean Annual Runoff, Precipitation, and Evapotranspiration in the Glaciated Northeastern United States, 1951-80. USGS Updated 2004. http://ny.water.usgs.gov/pubs/of/of96395/OF96-395.html

Smith, C.L., 1985. The Inland Fishes of New York State. NYS DEC, Albany, NY. 522p.

USDA SCS, 1994. Soil Survey of Putnam and Westchester Counties, New York. 205p + maps.

Thomas Field
To: Bill & Jean Noel, Jim Polk, Glenn Sullivan
Fwd: plant manaagement plan seven hills lake

February 26, 2010 at 8:59 AM

TF

Gentlemen:

Bill has forwarded to me DEP's comments on the draft Aquatic Plant Management Plan for Seven Hills Lake. I will incorporate responses to their comments and try to get the applications submitted next week. In summary, my additions will be as follow.

> - Streams mentioned on pg. 3 should be identified by the Waters Index Number and associated classifications and standards for all relevant reaches as listed in the NYCRR. I will add this information

> - The bathymetric map listed cannot be viewed. It would be helpful to see the extent of shallow water area susceptible to macrophyte growth. Increasing deep-water habitat (dredging) could help address excessive macrophyte growth. The person offering this comment must have been reviewing a draft of the text that did not include the map. There is no deep-water habitat and the entire lake bottom is susceptible to macrophyte growth. Dredging is not an realistic option from a number of perspectives.

> - PP. 6; It should be noted that walleye are also present in White Pond and it should be confirmed whether yellow perch are also in White Pond. There are records of them from White Pond. There are also more recent surveys than the 1937 referenced work. I will try to obtain the most recent survey data for White Pond from DEC Fisheries.

> - It is recommended that they further evaluate internal phosphorus loading resulting from an anoxic hypolimnion during summer months. If an anoxic zone is small, the phosphorus release might be corrected with aeration. The lake has no hypolimnion and no anoxic zone. I will add the available temperature and dissolved oxygen profiles as an appendix.

> - Pg 11: Since a combination of techniques would work: winter drawdown, grass carp stocking and mechanical harvesting in areas not adequately addressed by the other techniques. It is recommended that ways to address frost damage to the exposed weir should be examined. I will add some more discussion to the drawdown section, explaining that the near-shore vegetation that was predominately milfoil during the 1990's is now pondweed that is not very susceptible to drawdown, and the density of pondweeds may increase as a result of drawdown. In addition, drawdown will also affect the linear wetland and change the composition of that community in unknowable ways. Perhaps Bill could explore with Paul Lenz any potential way of controlling frost damage. I do not know anything about this topic. Since DEP owns a portion of the dam, they would be involved in anything done along these lines, and would also be affected by any damage that might occur.

> - Pg. 17: It is recommended that they also measure WQ nutrients in spring to capture snow melt/run-off contributions. DO should be measured early AM to catch diurnal sag. Jim and I have discussed collecting early spring data several times, and it might be useful to DEP in addressing impacts from road runoff in the future. The diurnal sag in DO is a non-issue since there is no significant plant community at that time of year and the lake will usually have such a high flushing rate during snow melt that water exchange will mask any potential sag. Should I add spring WQ data collection to the plan?

> - Pg. 18; "the use of surveys to evaluate the success of the program is not planned". Monitoring is necessary to evaluate treatment options and should be required in the management plan. I will expand my discussion of this topic to better explain that it is the pre-treatment survey the spring following treatment that is used to evaluate the success of the program. I do not believe that a post treatment survey will provide any useful information. Perhaps I am incorrect. Glenn, do you have any comment, or suggestion for a post-treatment survey?

> - Finally, I have attached the most recent text of the plan for Glenn's benefit. It shows the additions (in red) I made following his comments. I believe both Bill and Jim have already seen this. If anyone has any last comments or ideas, please let me know.

Thomas C. Field, Ph.D.
Fernwood-Limne, Inc.
1236 Route 9
Gansevoort, NY 12831
518-793-1282
tcfield11@verizon.net

Thomas Field
To: Bill & Jean Noel, Jim Polk, Glenn Sullivan
Fwd: plant manaagement plan seven hills lake

February 26, 2010 at 8:59 AM

TF

Gentlemen:

Bill has forwarded to me DEP's comments on the draft Aquatic Plant Management Plan for Seven Hills Lake. I will incorporate responses to their comments and try to get the applications submitted next week. In summary, my additions will be as follow.

- Streams mentioned on pg. 3 should be identified by the Waters Index Number and associated classifications and standards for all relevant reaches as listed in the NYCRR. I will add this information

- The bathymetric map listed cannot be viewed. It would be helpful to see the extent of shallow water area susceptible to macrophyte growth. Increasing deep-water habitat (dredging) could help address excessive macrophyte growth. The person offering this comment must have been reviewing a draft of the text that did not include the map. There is no deep-water habitat and the entire lake bottom is susceptible to macrophyte growth. Dredging is not an realistic option from a number of perspectives.

- PP. 6; It should be noted that walleye are also present in White Pond and it should be confirmed whether yellow perch are also in White Pond. There are records of them from White Pond. There are also more recent surveys than the 1937 referenced work. I will try to obtain the most recent survey data for White Pond from DEC Fisheries.

- It is recommended that they further evaluate internal phosphorus loading resulting from an anoxic hypolimnion during summer months. If an anoxic zone is small, the phosphorus release might be corrected with aeration. The lake has no hypolimnion and no anoxic zone. I will add the available temperature and dissolved oxygen profiles as an appendix.

- Pg 11: Since a combination of techniques would work: winter drawdown, grass carp stocking and mechanical harvesting in areas not adequately addressed by the other techniques. It is recommended that ways to address frost damage to the exposed weir should be examined. I will add some more discussion to the drawdown section, explaining that the near-shore vegetation that was predominately milfoil during the 1990's is now pondweed that is not very susceptible to drawdown, and the density of pondweeds may increase as a result of drawdown. In addition, drawdown will also affect the linear wetland and change the composition of that community in unknowable ways. Perhaps Bill could explore with Paul Lenz any potential way of controlling frost damage. I do not know anything about this topic. Since DEP owns a portion of the dam, they would be involved in anything done along these lines, and would also be affected by any damage that might occur.

- Pg. 17: It is recommended that they also measure WQ nutrients in spring to capture snow melt/run-off contributions. DO should be measured early AM to catch diurnal sag. Jim and I have discussed collecting early spring data several times, and it might be useful to DEP in addressing impacts from road runoff in the future. The diurnal sag in DO is a non-issue since there is no significant plant community at that time of year and the lake will usually have such a high flushing rate during snow melt that water exchange will mask any potential sag. Should I add spring WQ data collection to the plan?

- Pg. 18; "the use of surveys to evaluate the success of the program is not planned". Monitoring is necessary to evaluate treatment options and should be required in the management plan. I will expand my discussion of this topic to better explain that it is the pre-treatment survey the spring following treatment that is used to evaluate the success of the program. I do not believe that a post treatment survey will provide any useful information. Perhaps I am incorrect. Glenn, do you have any comment, or suggestion for a post-treatment survey?

- Finally, I have attached the most recent text of the plan for Glenn's benefit. It shows the additions (in red) I made following his comments. I believe both Bill and Jim have already seen this. If anyone has any last comments or ideas, please let me know.

Thomas C. Field, Ph.D.
Fernwood-Limne, Inc.
1236 Route 9
Gansevoort, NY 12831
518-793-1282
tcfield11@verizon.net

Begin forwarded message:

From: noel1@aol.com
Date: February 25, 2010 4:55:20 PM EST
To: tcfield11@verizon.net, canstruct@comcast.net
Subject: **Fwd: plant manaagement plan seven hills lake**

Tom

Remember you asked!

Bill

-----Original Message-----
From: Lenz, Paul <PLenz@dep.nyc.gov>
To: noel1@aol.com <noel1@aol.com>
Sent: Thu, Feb 25, 2010 4:41 pm
Subject: RE: plant manaagement plan seven hills lake

Hi Bill, below are some comments from our staff, hope these help and thanks for the opportunity!

- Streams mentioned on pg. 3 should be identified by the Waters Index Number and associated classifications and standards for all relevant reaches as listed in the NYCRR.

- The bathymetric map listed cannot be viewed. It would be helpful to see the extent of shallow water area susceptible to macrophyte growth. Increasing deep-water habitat (dredging) could help address excessive macrophyte growth.

- PP. 6; It should be noted that walleye are also present in White Pond and it should be confirmed whether yellow perch are also in White Pond. There are records of them from White Pond. There are also more recent surveys than the 1937 referenced work.

- It is recommended that they further evaluate internal phosphorus loading resulting from an anoxic hypolimnion during summer months. If an anoxic zone is small, the phosphorus release might be corrected with aeration.

- Pg 11: Since a combination of techniques would work: winter drawdown, grass carp stocking and mechanical harvesting in areas not adequately addressed by the other techniques. It is recommended that ways to address frost damage to the exposed weir should be examined.

- Pg. 17: It is recommended that they also measure WQ nutrients in spring to capture snow melt/run-off contributions. DO should be measured early AM to catch diurnal sag.

- Pg. 18; "the use of surveys to evaluate the success of the program is not planned". Monitoring is necessary to evaluate treatment options and should be required in the management plan.

Paul Lenz
Section Chief, Natural Resources Management
NYCDEP
845.340.7862

From: noel1@aol.com [noel1@aol.com]
Sent: Thursday, February 25, 2010 1:38 PM
To: Lenz, Paul
Subject: plant manaagement plan seven hills lake

Paul

Canyou send me the comments/suggestions please

Bill

Aquatic Plant
Manageme…text1.2.doc

APL

AQUA PRO-TECH LABORATORIES

CERTIFICATIONS

NJ DEP #07010/NY DOH #11634

CT #PH-0233

ANALYTICAL RESULTS SUMMARY

Client	**Allied Biological Inc** 580 Rockport Rd. Hackettstown, NJ 07840	**APL Order ID Number**	**10110681**
		Date Sampled	11/15/2010 12:00
		Date Received	11/18/2010 9:51
Contact	Chris Doyle	**Matrix**	Soil
Project		**Site**	Seven Hills Lake
Report Date	12/09/2010 9:03	**Customer Service Rep.**	

Sample Number/ Parameter	Method	Analysis Time	Analyst	Result	Units
10110681-001 Site A					
Antimony	SW 846 6010B	12/01/2010 11:40	MARKA	<0.48	mg/kg
Arsenic	SW 846 6010B	12/01/2010 11:40	MARKA	0.53	mg/kg
Beryllium	SW 846 6010B	12/01/2010 11:40	MARKA	<0.024	mg/kg
Cadmium	SW 846 6010B	12/01/2010 11:40	MARKA	0.15	mg/kg
Chromium	SW 846 6010B	12/01/2010 11:40	MARKA	5.66	mg/Kg
Copper	SW 846 6010B	12/01/2010 11:40	MARKA	16.8	mg/kg
Lead	SW 846 6010B	12/01/2010 11:40	MARKA	13.5	mg/kg
Mercury	SW 846 7471A	11/29/2010 11:24	ASTOICA	0.042	mg/kg
Nickel	SW 846 6010B	12/01/2010 11:40	MARKA	6.03	mg/kg
PCBs	SW 846 8082		BOB	SA	
Percent Solids	Gravimetric	11/19/2010 11:51	MARKA	84.1	%
Pesticides	SW 846 8081A		BOB	SA	
Selenium	SW 846 6010B	12/01/2010 11:40	MARKA	<0.6	mg/kg
Silver	SW 846 6010B	12/01/2010 11:40	MARKA	<0.72	mg/Kg
Thallium	SW 846 6010B	12/01/2010 11:40	MARKA	<0.48	mg/kg
Volatile Organics	SW 846 8260B		OLGA	SA	
Zinc	SW 846 6010B	12/01/2010 11:40	MARKA	49.5	mg/kg

SA: See attached report

Brian Wood

Laboratory Director

QA

APL
AQUA PRO-TECH LABORATORIES

CERTIFICATIONS
NJ DEP #07010/NY DOH #11634
CT #PH-0233

ANALYTICAL RESULTS SUMMARY

Client	**Allied Biological Inc** 580 Rockport Rd. Hackettstown, NJ 07840	**APL Order ID Number** **Date Sampled** **Date Received**	**10110681** 11/15/2010 13:30 11/18/2010 9:51
Contact	Chris Doyle	**Matrix**	Soil
Project		**Site**	Seven Hills Lake
Report Date	12/09/2010 9:03	**Customer Service Rep.**	

Sample Number/ Parameter		Method	Analysis Time	Analyst	Result	Units
10110681-002	Site B					
Antimony		SW 846 6010B	12/01/2010 11:43	MARKA	<0.56	mg/kg
Arsenic		SW 846 6010B	12/01/2010 11:43	MARKA	0.51	mg/kg
Beryllium		SW 846 6010B	12/01/2010 11:43	MARKA	<0.03	mg/kg
Cadmium		SW 846 6010B	12/01/2010 11:43	MARKA	<0.06	mg/kg
Chromium		SW 846 6010B	12/01/2010 11:43	MARKA	8.16	mg/Kg
Copper		SW 846 6010B	12/01/2010 11:43	MARKA	9.70	mg/kg
Lead		SW 846 6010B	12/01/2010 11:43	MARKA	14.1	mg/kg
Mercury		SW 846 7471A	11/29/2010 11:24	ASTOICA	0.055	mg/kg
Nickel		SW 846 6010B	12/01/2010 11:43	MARKA	7.5	mg/kg
PCBs		SW 846 8082		BOB	SA	
Percent Solids		Gravimetric	11/19/2010 11:51	MARKA	84.5	%
Pesticides		SW 846 8081A		BOB	SA	
Selenium		SW 846 6010B	12/01/2010 11:43	MARKA	<0.7	mg/kg
Silver		SW 846 6010B	12/01/2010 11:43	MARKA	<0.84	mg/Kg
Thallium		SW 846 6010B	12/01/2010 11:43	MARKA	<0.56	mg/kg
Volatile Organics		SW 846 8260B		OLGA	SA	
Zinc		SW 846 6010B	12/01/2010 11:43	MARKA	54.7	mg/kg

SA: See attached report

Brian Wood

Brian Wood
Laboratory Director

QA

1275 BLOOMFIELD AVENUE, BLDG. 6, FAIRFIELD, NJ 07004 TEL 973 227 0422 FAX 973 227 2813

AQUA PRO-TECH LABORATORIES
Fairfield, NJ

PCB ANALYTICAL REPORT
Method 8082 S

Client:	Allied Biological	**Lab Sample ID:**	10110681-1
Project:	Seven Hills	**GC Run ID:**	3B3673
Sample ID:	Site A	**Extraction Date:**	12/1/10
Date Sampled:	11/15/10	**Sample Wt /Vol:**	15 g
Matrix: (soil/water):	Soil	**Final Volume (ml):**	10
% Moisture:	16%		
Concentration Units:	µg/kg		

Compound	Result	MDL	PQL	Qualifier	Date Analyzed	Dilution Factor
Aroclor 1016	ND	8.42	78.5	U	12/2/10	1
Aroclor 1221	ND	10.6	78.5	U	12/2/10	1
Aroclor 1232	ND	12.5	78.5	U	12/2/10	1
Aroclor 1242	ND	5.77	78.5	U	12/2/10	1
Aroclor 1248	ND	3.98	78.5	U	12/2/10	1
Aroclor 1254	ND	8.88	78.5	U	12/2/10	1
Aroclor 1260	ND	8.52	78.5	U	12/2/10	1

Qualifiers:

U - compound not detected at the specified detection limit
J - below PQL
D - concentration taken from diluted analysis
E - compound concentration exceeds calibration

AQUA PRO-TECH LABORATORIES
Fairfield, NJ

PCB ANALYTICAL REPORT
Method 8082 S

Client:	Allied Biological	**Lab Sample ID:**	10110681-2
Project:	Seven Hills	**GC Run ID:**	3B3674
Sample ID:	Site B	**Extraction Date:**	12/1/10
Date Sampled:	11/15/10	**Sample Wt /Vol:**	15 g
Matrix: (soil/water):	Soil	**Final Volume (ml):**	10
% Moisture:	16%		
Concentration Units:	µg/kg		

Compound	Result	MDL	PQL	Qualifier	Date Analyzed	Dilution Factor
Aroclor 1016	ND	8.38	78.1	U	12/2/10	1
Aroclor 1221	ND	10.6	78.1	U	12/2/10	1
Aroclor 1232	ND	12.4	78.1	U	12/2/10	1
Aroclor 1242	ND	5.74	78.1	U	12/2/10	1
Aroclor 1248	ND	3.96	78.1	U	12/2/10	1
Aroclor 1254	ND	8.84	78.1	U	12/2/10	1
Aroclor 1260	ND	8.48	78.1	U	12/2/10	1

Qualifiers:

U - compound not detected at the specified detection limit
J - below PQL
D - concentration taken from diluted analysis
E - compound concentration exceeds calibration

AQUA PRO-TECH LABORATORIES
Fairfield, NJ

PESTICIDE ANALYTICAL REPORT
Method 8081 S

Client:	Allied Biological	**Lab Sample ID:**	10110681-1
Project:	Seven Hills	**GC Run ID:**	2T3329
Sample ID:	Site A	**Extraction Date:**	12/1/10
Date Sampled:	11/15/10	**Sample Wt /Vol:**	15 g
Matrix: (soil/water)	Soil	**Final Volume (ml):**	10
% Moisture:	16%		
Concentration Units:	μg/kg		

Compound	Result	MDL	PQL	Qualifier	Date Analyzed	Dilution Factor
alpha-BHC	ND	0.947	7.85	U	12/3/10	1
beta-BHC	ND	0.922	7.85	U	12/3/10	1
gamma-BHC (Lindane)	ND	0.733	7.85	U	12/3/10	1
delta-BHC	ND	0.711	7.85	U	12/3/10	1
Aldrin	ND	0.789	7.85	U	12/3/10	1
Heptachlor	ND	1.09	7.85	U	12/3/10	1
Heptachlor Epoxide	ND	1.19	7.85	U	12/3/10	1
Endosulfan I	ND	1.32	7.85	U	12/3/10	1
Endosulfan II	ND	0.888	7.85	U	12/3/10	1
4,4'-DDE	ND	0.837	7.85	U	12/3/10	1
4,4'-DDD	ND	0.53	7.85	U	12/3/10	1
4,4'-DDT	ND	0.91	7.85	U	12/3/10	1
Dieldrin	ND	0.956	7.85	U	12/3/10	1
Endrin	ND	0.919	7.85	U	12/3/10	1
Endrin Aldehyde	ND	1.97	7.85	U	12/3/10	1
Endrin Ketone	ND	0.853	7.85	U	12/3/10	1
Endosulfan Sulfate	ND	0.841	7.85	U	12/3/10	1
Methoxychlor	ND	1.07	7.85	U	12/3/10	1
Chlordane	ND	1.82	7.85	U	12/3/10	1
Toxaphene	ND	12.9	78.5	U	12/3/10	1

Qualifiers:

U - compound not detected at the specified quantitation limit
J - below PQL
D - concentration taken from diluted analysis
E - compound concentration exceeds calibration

AQUA PRO-TECH LABORATORIES
Fairfield, NJ

PESTICIDE ANALYTICAL REPORT
Method 8081 S

Client:	Allied Biological	**Lab Sample ID:**	10110681-2
Project:	Seven Hills	**GC Run ID:**	2T3330
Sample ID:	Site B	**Extraction Date:**	12/1/10
Date Sampled:	11/15/10	**Sample Wt /Vol:**	15 g
Matrix: (soil/water)	Soil	**Final Volume (ml):**	10
% Moisture:	16%		
Concentration Units:	µg/kg		

Compound	Result	MDL	PQL	Qualifier	Date Analyzed	Dilution Factor
alpha-BHC	ND	0.942	7.81	U	12/3/10	1
beta-BHC	ND	0.918	7.81	U	12/3/10	1
gamma-BHC (Lindane)	ND	0.73	7.81	U	12/3/10	1
delta-BHC	ND	0.707	7.81	U	12/3/10	1
Aldrin	ND	0.785	7.81	U	12/3/10	1
Heptachlor	ND	1.08	7.81	U	12/3/10	1
Heptachlor Epoxide	ND	1.19	7.81	U	12/3/10	1
Endosulfan I	ND	1.31	7.81	U	12/3/10	1
Endosulfan II	ND	0.884	7.81	U	12/3/10	1
4,4'-DDE	ND	0.833	7.81	U	12/3/10	1
4,4'-DDD	ND	0.528	7.81	U	12/3/10	1
4,4'-DDT	ND	0.906	7.81	U	12/3/10	1
Dieldrin	ND	0.951	7.81	U	12/3/10	1
Endrin	ND	0.914	7.81	U	12/3/10	1
Endrin Aldehyde	ND	1.96	7.81	U	12/3/10	1
Endrin Ketone	ND	0.849	7.81	U	12/3/10	1
Endosulfan Sulfate	ND	0.837	7.81	U	12/3/10	1
Methoxychlor	ND	1.06	7.81	U	12/3/10	1
Chlordane	ND	1.82	7.81	U	12/3/10	1
Toxaphene	ND	12.9	78.1	U	12/3/10	1

Qualifiers:

U - compound not detected at the specified quantitation limit
J - below PQL
D - concentration taken from diluted analysis
E - compound concentration exceeds calibration

Aqua Pro-Tech Laboratories
EPA Method 8260 Analytical Report

Client: Allied Biological, Inc.
Project: Seven Hills Lake
Matrix: Soil

Client Sample: Site A

Sample Weight 5.0 Grams
Level: Low
% Moisture: 15.9%

Lab Sample ID: 10110681-001
Lab File ID: 4V8877.D
Date Collected: 15-Nov-10

Date Analyzed: 26-Nov-10
Dilution Factor: 1

CAS No.	Compound	Conc ug/kg	Q	MDL	PQL
75-71-8	Dichlorodifluoromethane		U	1.32	5.95
74-87-3	Chloromethane		U	0.773	5.95
107-02-8	Acrolein		U	4.85	23.8
75-01-4	Vinyl Chloride		U	1.12	5.95
74-83-9	Bromomethane		U	2.03	5.95
75-00-3	Chloroethane		U	2.71	5.95
75-69-4	Trichlorofluoromethane		U	1.39	5.95
67-64-1	Acetone		U	3.41	11.9
75-35-4	1,1-Dichloroethene		U	1.61	5.95
75-65-0	tert-Butyl Alcohol		U	11.6	59.5
75-09-2	Methylene Chloride		U	0.975	5.95
75-15-0	Carbon Disulfide		U	0.820	5.95
107-13-1	Acrylonitrile		U	1.55	5.95
1634-04-4	Methyl tert-Butyl Ether		U	1.03	5.95
156-60-5	trans-1,2-Dichloroethene		U	0.797	5.95
75-34-3	1,1-Dichloroethane		U	0.999	5.95
108-05-4	Vinyl Acetate		U	1.47	5.95
78-93-3	2-Butanone		U	2.44	11.9
594-20-7	2,2-Dichloropropane		U	0.618	5.95
156-59-2	cis-1,2-Dichloroethene		U	0.618	5.95
67-66-3	Chloroform		U	0.927	5.95
74-97-5	Bromochloromethane		U	1.12	5.95
71-55-6	1,1,1-Trichloroethane		U	1.36	5.95
563-58-6	1,1-Dichloropropene		U	1.28	5.95
56-23-5	Carbon Tetrachloride		U	1.03	5.95
107-06-2	1,2-Dichloroethane		U	0.678	5.95
71-43-2	Benzene		U	0.654	5.95
79-01-6	Trichloroethene		U	0.975	5.95
78-87-5	1,2-Dichloropropane		U	0.939	5.95
75-27-4	Bromodichloromethane		U	0.916	5.95
74-95-3	Dibromomethane		U	1.01	5.95
110-75-8	2-Chloroethylvinyl ether		U	1.17	11.9
108-10-1	4-Methyl-2-Pentanone		U	0.892	11.9
10061-01-5	cis-1,3-Dichloropropene		U	0.226	5.95
108-88-3	Toluene		U	0.428	5.95
10061-02-6	trans-1,3-Dichloropropene		U	0.523	5.95
79-00-5	1,1,2-Trichloroethane		U	0.809	5.95
591-78-6	2-Hexanone		U	1.31	11.9
142-28-9	1,3-Dichloropropane		U	0.749	5.95

Qualifiers : U=Undetected, J=Estimated, B=Also Detected in Blank,
E=Exceeded Calibration - Dilution Required, D=Result of Dilution

Aqua Pro-Tech Laboratories
EPA Method 8260 Analytical Report

Client: Allied Biological, Inc.
Project: Seven Hills Lake
Matrix: Soil

Client Sample: Site A

Sample Weight: 5.0 Grams
Level: Low
% Moisture: 15.9%

Lab Sample ID: 10110681-001
Lab File ID: 4V8877.D
Date Collected: 15-Nov-10

Date Analyzed: 26-Nov-10
Dilution Factor: 1

CAS No.	Compound	Conc ug/kg	Q	MDL	PQL
127-18-4	Tetrachloroethene		U	0.797	5.95
124-48-1	Dibromochloromethane		U	0.809	5.95
106-93-4	1,2-Dibromoethane		U	0.452	5.95
108-90-7	Chlorobenzene		U	0.511	5.95
630-20-6	1,1,1,2-Tetrachloroethane		U	0.749	5.95
100-41-4	Ethylbenzene		U	0.476	5.95
1330-20-7	m+p-Xylenes		U	1.14	11.9
95-47-6	o-Xylene		U	0.939	5.95
100-42-5	Styrene		U	0.749	5.95
75-25-2	Bromoform		U	2.13	5.95
79-34-5	1,1,2,2-Tetrachloroethane		U	1.69	5.95
96-18-4	1,2,3-Trichloropropane		U	3.29	5.95
108-86-1	Bromobenzene		U	1.02	5.95
95-49-8	2-Chlorotoluene		U	0.547	5.95
106-43-4	4-Chlorotoluene		U	0.392	5.95
541-73-1	1,3-Dichlorobenzene		U	0.987	5.95
106-46-7	1,4-Dichlorobenzene		U	1.01	5.95
95-50-1	1,2-Dichlorobenzene		U	0.856	5.95
96-12-8	1,2-Dibromo-3-chloropropane		U	5.36	11.9
120-82-1	1,2,4-Trichlorobenzene		U	1.17	5.95
87-68-3	Hexachlorobutadiene		U	2.72	5.95
91-20-3	Naphthalene		U	1.09	5.95
87-61-6	1,2,3-Trichlorobenzene		U	2.14	5.95

Qualifiers : U=Undetected, J=Estimated, B=Also Detected in Blank,
E=Exceeded Calibration - Dilution Required, D=Result of Dilution

Aqua Pro-Tech Laboratories
EPA Method 8260 Analytical Report
Tentatively Identified Compounds

Client: Allied Biological, Inc.
Project: Seven Hills Lake
Matrix: Soil

Client Sample: Site A

Sample Weight 5.0 Grams
Level: Low
% Moisture: 15.9%

Lab Sample ID: 10110681-001
Lab File ID: 4V8877.D
Date Collected: 15-Nov-10

Date Analyzed: 26-Nov-10
Dilution Factor: 1

CAS No.	Compound	Est. Conc.	Q	RT

Number of TICs found: 0
Total Est. Concentration: 0 ug/kg

Qualifiers : J=Estimated Concentration, N=Used When Reporting a Specific Tentatively Identified Compound

Aqua Pro-Tech Laboratories
EPA Method 8260 Analytical Report

Client: Allied Biological, Inc.
Project: Seven Hills Lake
Matrix: Soil

Client Sample: Site B

Sample Weight 5.0 Grams
Level: Low
% Moisture: 15.5%

Lab Sample ID: 10110681-002
Lab File ID: 4V8878.D
Date Collected: 15-Nov-10

Date Analyzed: 26-Nov-10
Dilution Factor: 1

CAS No.	Compound	Conc ug/kg	Q	MDL	PQL
75-71-8	Dichlorodifluoromethane		U	1.31	5.92
74-87-3	Chloromethane		U	0.769	5.92
107-02-8	Acrolein		U	4.83	23.7
75-01-4	Vinyl Chloride		U	1.11	5.92
74-83-9	Bromomethane		U	2.02	5.92
75-00-3	Chloroethane		U	2.70	5.92
75-69-4	Trichlorofluoromethane		U	1.38	5.92
67-64-1	Acetone		U	3.40	11.8
75-35-4	1,1-Dichloroethene		U	1.60	5.92
75-65-0	tert-Butyl Alcohol		U	11.5	59.2
75-09-2	Methylene Chloride		U	0.970	5.92
75-15-0	Carbon Disulfide		U	0.817	5.92
107-13-1	Acrylonitrile		U	1.54	5.92
1634-04-4	Methyl tert-Butyl Ether		U	1.03	5.92
156-60-5	trans-1,2-Dichloroethene		U	0.793	5.92
75-34-3	1,1-Dichloroethane		U	0.994	5.92
108-05-4	Vinyl Acetate		U	1.47	5.92
78-93-3	2-Butanone		U	2.43	11.8
594-20-7	2,2-Dichloropropane		U	0.615	5.92
156-59-2	cis-1,2-Dichloroethene		U	0.615	5.92
67-66-3	Chloroform		U	0.923	5.92
74-97-5	Bromochloromethane		U	1.11	5.92
71-55-6	1,1,1-Trichloroethane		U	1.35	5.92
563-58-6	1,1-Dichloropropene		U	1.28	5.92
56-23-5	Carbon Tetrachloride		U	1.03	5.92
107-06-2	1,2-Dichloroethane		U	0.675	5.92
71-43-2	Benzene		U	0.651	5.92
79-01-6	Trichloroethene		U	0.970	5.92
78-87-5	1,2-Dichloropropane		U	0.935	5.92
75-27-4	Bromodichloromethane		U	0.911	5.92
74-95-3	Dibromomethane		U	1.01	5.92
110-75-8	2-Chloroethylvinyl ether		U	1.16	11.8
108-10-1	4-Methyl-2-Pentanone		U	0.888	11.8
10061-01-5	cis-1,3-Dichloropropene		U	0.225	5.92
108-88-3	Toluene		U	0.426	5.92
10061-02-6	trans-1,3-Dichloropropene		U	0.521	5.92
79-00-5	1,1,2-Trichloroethane		U	0.805	5.92
591-78-6	2-Hexanone		U	1.30	11.8
142-28-9	1,3-Dichloropropane		U	0.746	5.92

Qualifiers : U=Undetected, J=Estimated, B=Also Detected in Blank,
E=Exceeded Calibration - Dilution Required, D=Result of Dilution

Aqua Pro-Tech Laboratories
EPA Method 8260 Analytical Report

Client: Allied Biological, Inc.
Project: Seven Hills Lake
Matrix: Soil

Client Sample: Site B

Sample Weight 5.0 Grams
Level: Low
% Moisture: 15.5%

Lab Sample ID: 10110681-002
Lab File ID: 4V8878.D
Date Collected: 15-Nov-10

Date Analyzed: 26-Nov-10
Dilution Factor: 1

CAS No.	Compound	Conc ug/kg	Q	MDL	PQL
127-18-4	Tetrachloroethene		U	0.793	5.92
124-48-1	Dibromochloromethane		U	0.805	5.92
106-93-4	1,2-Dibromoethane		U	0.450	5.92
108-90-7	Chlorobenzene		U	0.509	5.92
630-20-6	1,1,1,2-Tetrachloroethane		U	0.746	5.92
100-41-4	Ethylbenzene		U	0.473	5.92
1330-20-7	m+p-Xylenes		U	1.14	11.8
95-47-6	o-Xylene		U	0.935	5.92
100-42-5	Styrene		U	0.746	5.92
75-25-2	Bromoform		U	2.12	5.92
79-34-5	1,1,2,2-Tetrachloroethane		U	1.68	5.92
96-18-4	1,2,3-Trichloropropane		U	3.28	5.92
108-86-1	Bromobenzene		U	1.02	5.92
95-49-8	2-Chlorotoluene		U	0.544	5.92
106-43-4	4-Chlorotoluene		U	0.391	5.92
541-73-1	1,3-Dichlorobenzene		U	0.982	5.92
106-46-7	1,4-Dichlorobenzene		U	1.01	5.92
95-50-1	1,2-Dichlorobenzene		U	0.852	5.92
96-12-8	1,2-Dibromo-3-chloropropane		U	5.34	11.8
120-82-1	1,2,4-Trichlorobenzene		U	1.16	5.92
87-68-3	Hexachlorobutadiene		U	2.71	5.92
91-20-3	Naphthalene		U	1.09	5.92
87-61-6	1,2,3-Trichlorobenzene		U	2.13	5.92

Qualifiers : U=Undetected, J=Estimated, B=Also Detected in Blank,
E=Exceeded Calibration - Dilution Required, D=Result of Dilution

Aqua Pro-Tech Laboratories
EPA Method 8260 Analytical Report
Tentatively Identified Compounds

Client: Allied Biological, Inc.
Project: Seven Hills Lake
Matrix: Soil

Client Sample: Site B

Sample Weight 5.0 Grams
Level: Low
% Moisture: 15.5%

Lab Sample ID: 10110681-002
Lab File ID: 4V8878.D
Date Collected: 15-Nov-10

Date Analyzed: 26-Nov-10
Dilution Factor: 1

CAS No.	Compound	Est. Conc.	Q	RT

Number of TICs found: 0
Total Est. Concentration: 0 ug/kg

Qualifiers : J=Estimated Concentration, N=Used When Reporting a Specific Tentatively Identified Compound

November 1, 2010

SEVEN HILLS LAKE ASSOCIATION
William Noel
66 LaCrosse Road
Kent Lakes, New York 10512

HYDRO-RAKING FEASIBILITY PROPOSAL
SEVEN HILLS LAKE
PUTNAM COUNTY, NEW YORK

ALLIED BIOLOGICAL is submitting this proposal to conduct a Hydro-Raking Feasibility Study for Seven Hills Lake located in Kent Lakes, NY. The Study will include delineation and mapping of sediments within the area of the lake (north end) that is to be hydro-raked. Optional services for analysis of sediments and full lake bathymetry are included as well.

SEDIMENT SURVEY

The depth and distribution of accumulated sediments within the targeted north end of the lake will be approximated through probing with a 1¼" diameter sediment probe at approximately 25 designated points. A map indicating water depths within the target area and the volume of sediments will be produced using GPS/GIS technology. The map will include representation of water depth, contours, numerical sediment depths, and sediment depth transect profiles within the north end of the lake.

The sediment accumulation survey measures the depth of loose sediment which sits atop the original lake bottom. A bathymetric map displays the bottom contours of a lake and is a valuable tool for all assessment and management activities. The survey will be scheduled between November and December 2010 based on weather, and should take 1 day of fieldwork. The final map can be completed within 60 days of the field work. Chemical analysis of sediments will reveal if any toxic or hazardous materials are present which may influence the disposal of dredged materials.

FULL LAKE BATHYMETRY

The addition of a full lake bathymetric survey during the sediment accumulation survey makes both procedures considerably more cost efficient. Allied Biological will provide a Lake Mapping Technician or Lake Biologist with a suitable boat and a custom lake mapping system to complete field data collection for the entire 55 acre lake. The mapping system is comprised of an Eagle Cuda fathometer linked to a Trimble Differential Global Positioning System. This system collects 1 datapoint per 2 seconds of operation, which are used to create an intricately detailed bathymetric map. Once field data is collected, it will be transmitted to a mapping program for processing with proprietary, state-of-the-art mapping software. A variety of outputs are available, including 11□x 17□printed maps, wall maps and pdf versions. Map resolution normally depends on water depth, but intervals of 1/10 of a foot can be displayed.

Corp Office: 580 Rockport Road Hackettstown, NJ 07840 908-850-0303 Fax 908-850-4994
NY Office: 984 County Highway 35 Maryland, NY 12116 607-286-7257 Fax 607-286-7332

Allied Biological

COMPENSATION

The fee for conducting the Sediment Accumulation Study for Seven Hills Lake is based on the area to be surveyed.

SEDIMENT SURVEY (north end of lake)	$1,795.00
FULL LAKE BATHYMETRY (in addition to Survey)	$1,950.00

The cost for physical and/or chemical analysis of core samples is not included with the above fees. Analysis of physical sediment composition should be conducted to determine disposal options. The percentage of sand, silt, clay and organic matter can be determined (2 samples are recommended).

Parameter	Cost per sample	# Samples
Volatile Organics	$ 132.00	_____
Target Analyte Metals Screen	$ 228.00	_____
Pesticides / PCB's	$ 172.00	_____
Copper only	$ 55.00	_____
Physical Sediment Analysis	$145.00	_____ (2 samples recommended)

ACCEPTANCE

This proposal shall remain in effect for 60 days. Acceptance of this Proposal can be made by indicating acceptance of recommended services and returning one signed copy.

ALLIED BIOLOGICAL INC.

Glenn P. Sullivan, CLM
President

Accepted this _____ day of _________________, 2010

SEVEN HILLS LAKE

By ____

Title ____

Allied Biological
580 Rockport Road • Hackettstown, NJ 07840 • 908-850-0303 • www.alliedbiological.com

Lake Survey Report

Seven Hills Lake Association

Contact

Contact: James Polk

Phone: C 845-228-2611

Fax:

Email: canstruct@comcast.net

Survey Information

Date: 7/7/2010

Time: 12:30:00 PM

Biologist: Wayne Horn

Survey Method: 17' boat

Findings

Alkalinity: 90 DO (ppm): 10 Secchi (Visibility in ft.): 6 pH: 8.5 Temperature(oF): 83.4

Aquatic Vegetation Species

Curlyleaf Pondweed *Potamogeton crispus*

Eurasian Watermilfoil *Myriophyllum spicatum*

Waterlilies *Nymphaea spp.*

Algae Species

Filamentous Algae

(To view pictures of the plants surveyed, go to ***www.alliedbiological.com*** and click on the Plant Identification link at the bottom of the page.)

Comments

Moderate to heavy Eurasian Watermilfoil growing along shoreline and out 10-20' from edge. Large patch, approx. 3-4 acres, at northern end of lake. Floating filamentous algae attached to topped out milfoil. Trace amount of Curlyleaf Pondweed scattered along shoreline and mixed in with milfoil. Benthic filamentous algae at inlet end of lake in depths less than 1'. Scattered waterlilies along shoreline.

Treatments Conducted

Aquathol-K applied in 8 acres for control of Eurasian Watermilfoil. Treatment notices were posted.

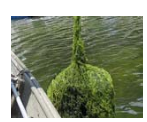
Plant Density Key

None

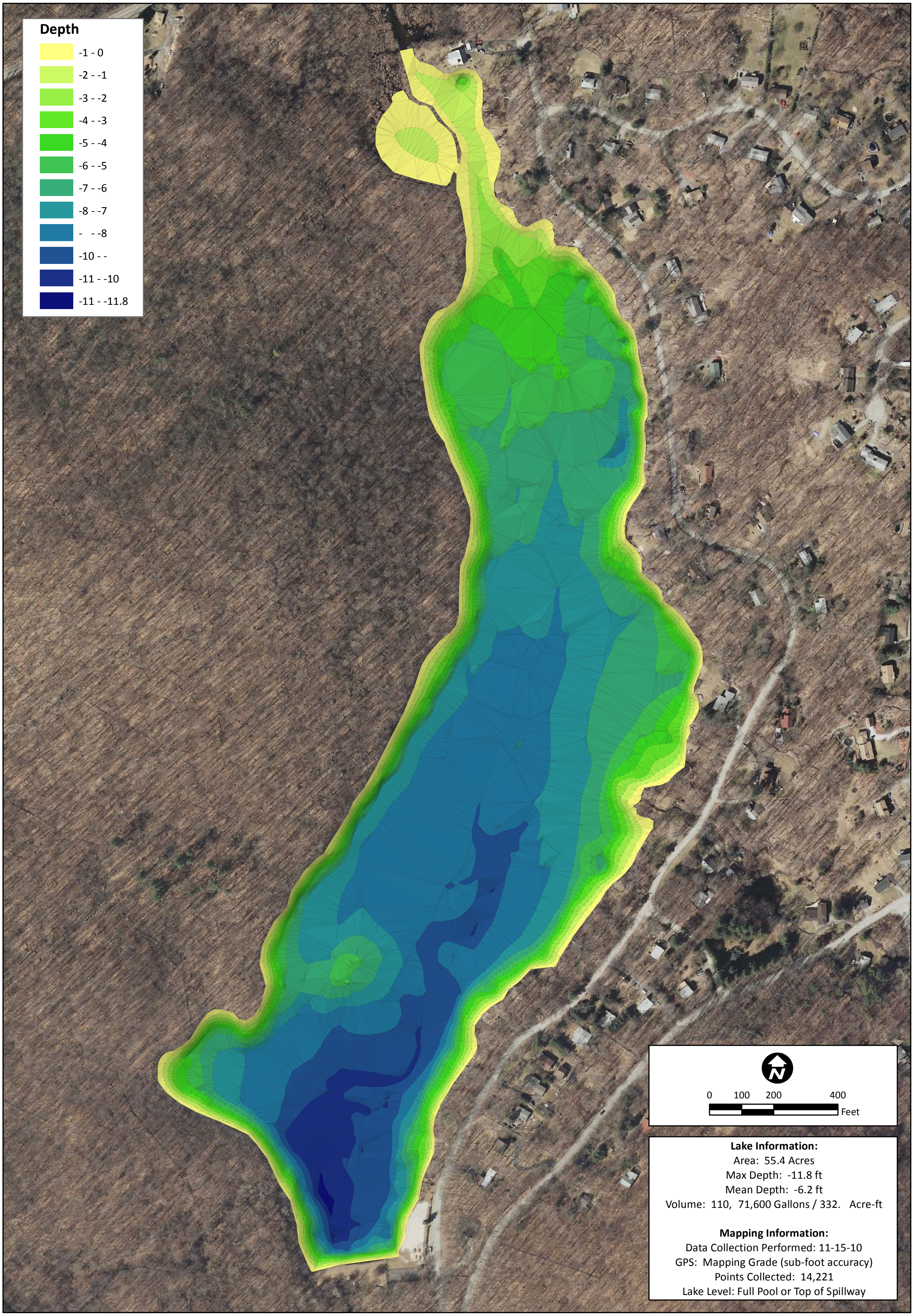
Trace

Sparse

Moderate



Dense

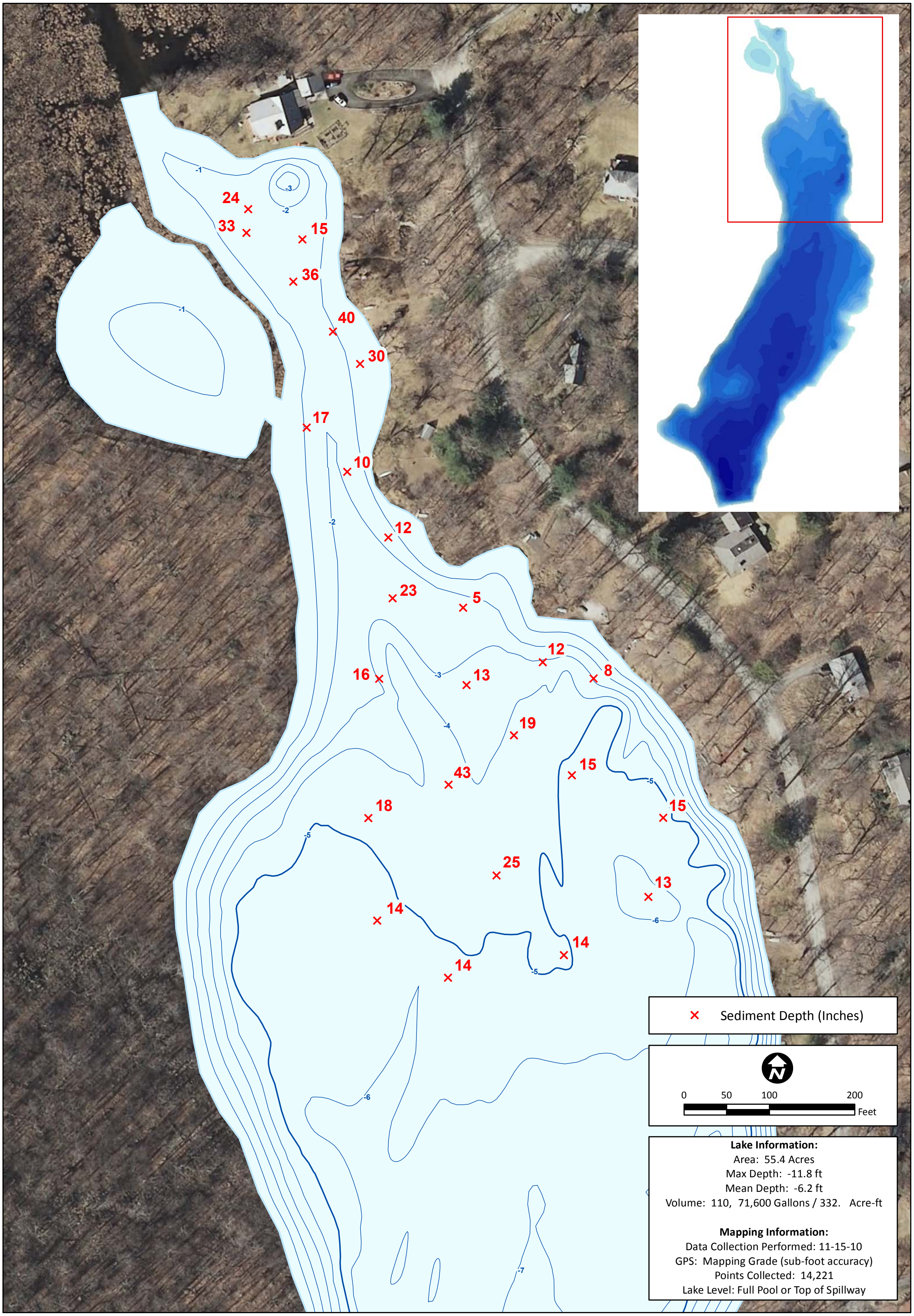


www.alliedbiological.com

Seven Hills Lake

Putnam County, New York

www.TheMappingNetwork.com



www.alliedbiological.com

Seven Hills Lake

Putnam County, New York

www.TheMappingNetwork.com