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Lake Maspenock Survey and Management Analysis

I. Survey Summary

Date: 9/15/2015
Start/End location: Public boat launch, West Main Street, Hopkinton, MA
Arrival/Departure: 9:30AM-2:30PM
Dive locations: 9

The AB Aquatics, Inc. team arrived on site shortly after 9:00 AM. Following a debriefing the survey boat was launched and data recording commenced. The goal for the day was to evaluate Lake Maspenock's infestations of various invasive and nuisance species, gather sufficient data to support an evaluation, and familiarize the team with all factors unique to the lake and its aquatic vegetation. Meeting these objectives has allowed the creation of this report, which will review the observations from the survey and make suggestions on a management strategy.

Initial observations showed many areas of Lake Maspenock to be heavily infested with fanwort, milfoil, and large leaf pondweed. The overall dominant species was large leaf pondweed. In most areas either milfoil or fanwort was mixed amongst the pondweed. In a few specific areas the milfoil and fanwort presence was greater than that of the pondweed. Overall, the dense and abundant presence of all three species was alarming. AB Aquatics, Inc. uses a 0 through 4 density scale while in the field to quickly assign a value to a specific area of infestation. At most dive sites visited during the survey infestations were rated at a level 4. A level 4 density is characterized as extremely thick and un-navigable for a diver or swimmer and when plants are close to the water's surface, un-navigable by boat. The observed effect this had on areas was loss of recreational value, reduction in aquatic plant diversity, reduction in water flow, and increased biomass.

II. Findings and Recommendations

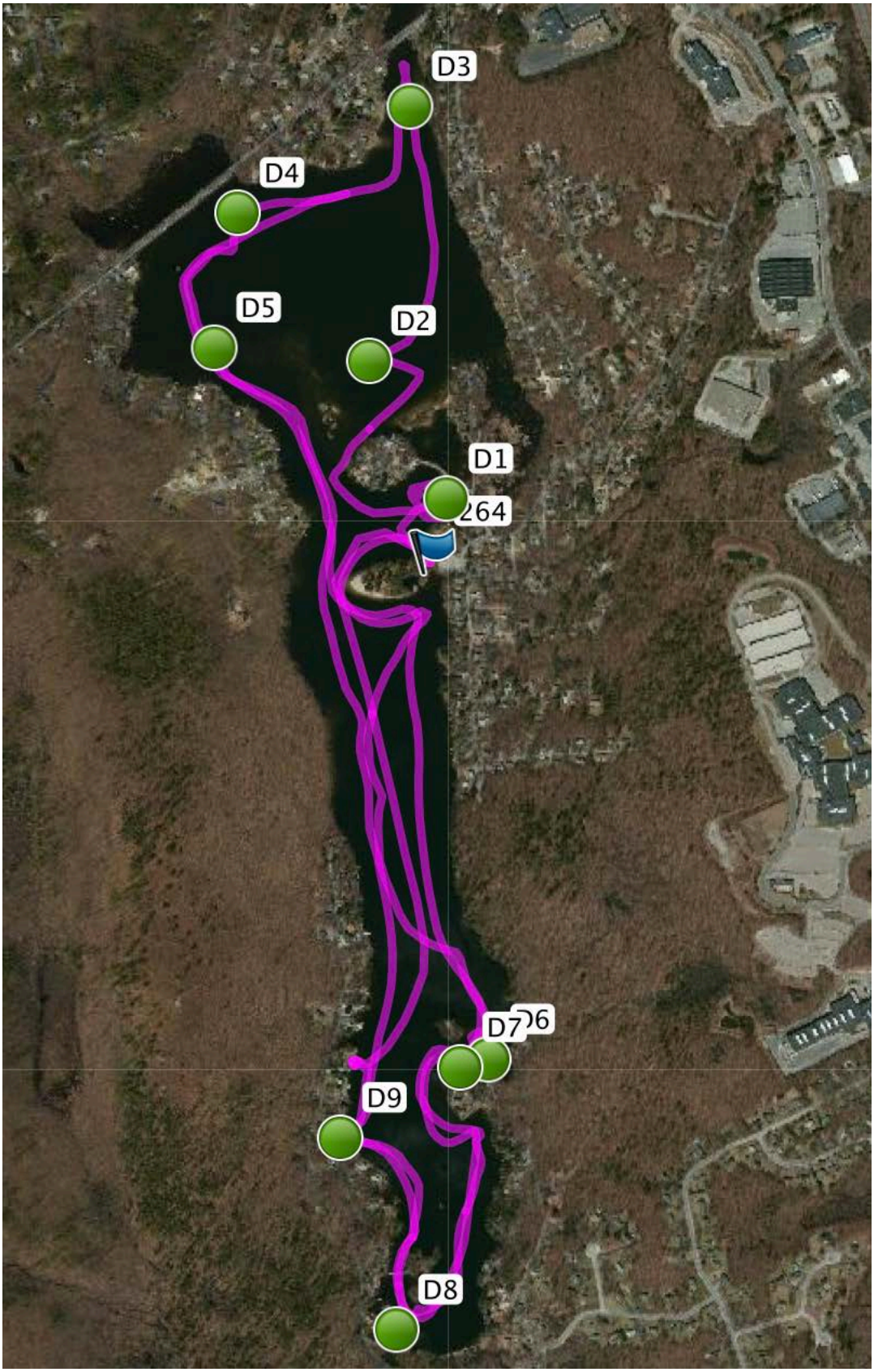
Within the first phase of the survey, where a full tour around the lake was provided prior to any diving, it became clear that any effective management project would not be feasible with only the Diver Assisted Suction Harvesting (DASH) control method unless unprecedented funding is available. This is because of the shear volume of plants that cover so many acres of the lake. The total amount of area infested with the undesired aquatic plants is too large for the labor-intensive DASH control method to be cost effective. Initial aquatic herbicide application would be the only way to reduce the

density level of the plants to a point where DASH could be implemented across the whole lake.

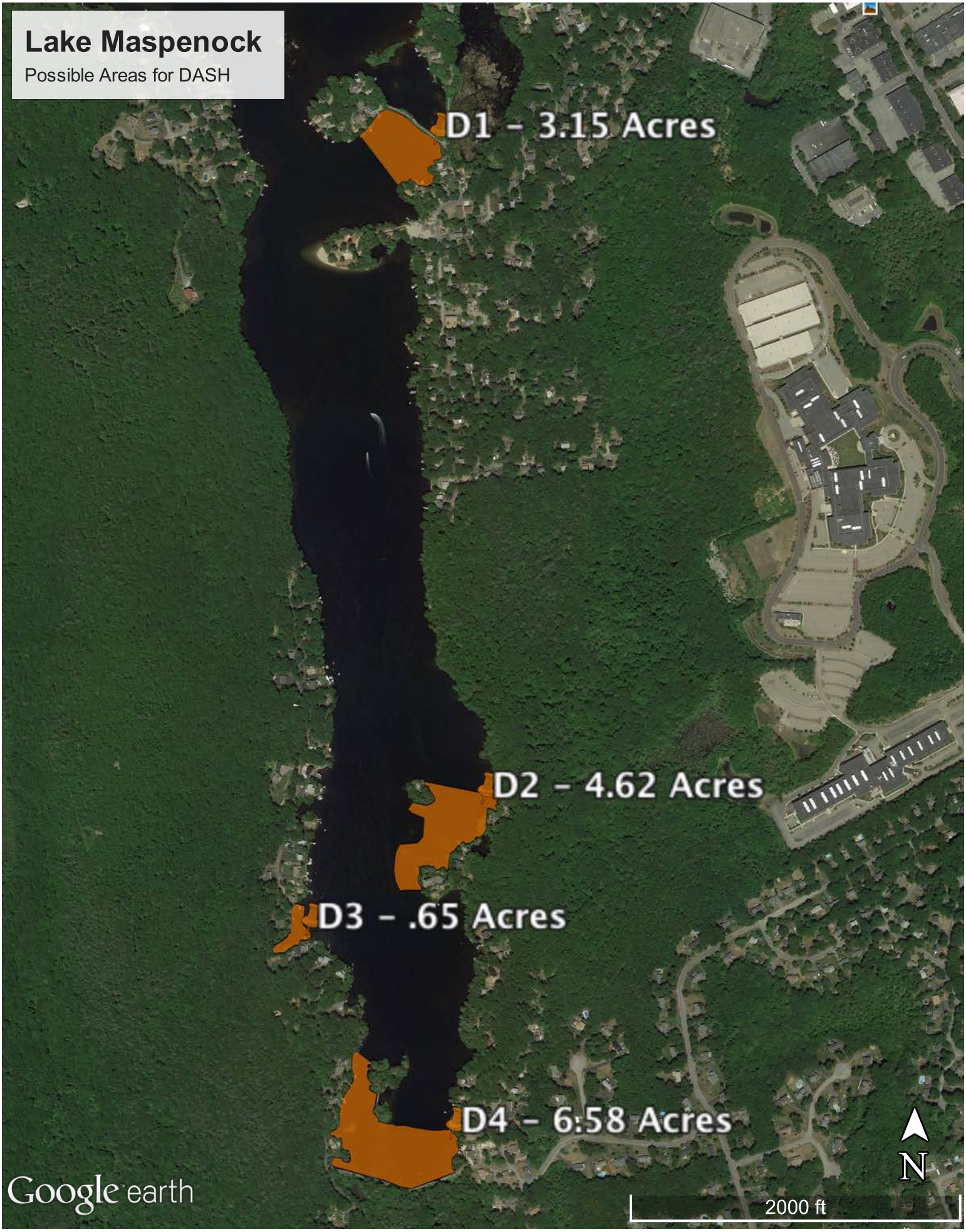
If Lake Maspenock is to not only halt this infestation but reclaim it's many areas overrun by these aquatic plants it will need to enter into a comprehensive and aggressive, annual management plan. In the experience of this company and the industry as a whole the only feasible way to do this is with both Diver Assisted Suction Harvesting (DASH) and herbicide application. Some areas of the lake can start to be controlled with DASH immediately while others are too dense and vast to be managed with DASH until aquatic herbicides are used to reduce the density to a manageable level. Once these vast high-density areas are treated with herbicide, DASH will be needed to maintain the area to ensure progress is not lost and the density continues to be reduced.

A recommended management plan would be an aggressive first phase lasting 3 years in which population reduction is the main focus. It would be important in these first three years to allocate enough resources to dramatically reduce density. Phase two would be two to three years where the focus would switch from drastic density reduction to covering areas completely and thoroughly to bring the infestation to its most minimal point possible. Third phase would require continual maintenance to preserve previous mitigation. This rough outline would be the best path forward for Lake Maspenock with its heavy infestation. Nonetheless aquatic plant management is a field that has to attempt to predict factors that are unpredictable. It could take one of these phases more or less time than predicted.

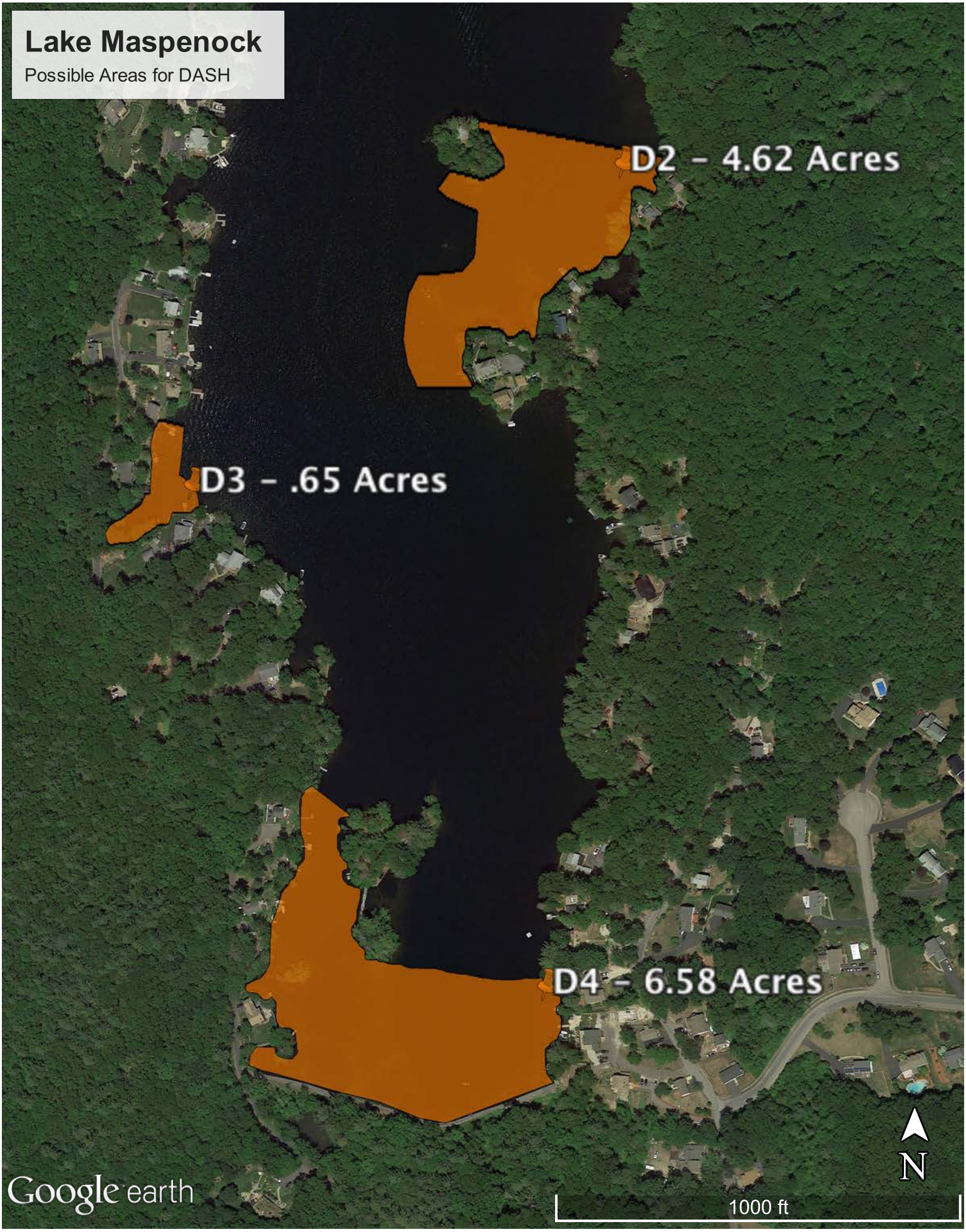
The map below shows the course taken around the lake and the nine different dive sites that are indicted with the green dots.


D3
D4
D5
D2
D1
264
D7
D9
D8

Diving in each area allowed the bottom type to be identified. In nearly all cases the bottom type was soft silt. Bottom type is a major consideration in crafting time and budget estimates for DASH work. When a plant's roots system is rooted in soft sediment it can be worked out of the bottom by hand much easier than a hard pack clay or gravel which takes considerably longer to remove. Diving also allowed for identification of root depth, plant condition, and general observation. The following map shows areas that would be manageable to start harvesting immediately. The largest and most extensive area where DASH wouldn't be cost effective is the entirety of the north end of Lake Maspenock. Below is a map indicating the 4 areas of infestation that would be candidates for DASH treatment without a previous application of aquatic herbicide. The total area of the 4 sites is 15 acres.


Lake Maspenock
Possible Areas for DASH
D1 - 3.15 Acres
D2 - 4.62 Acres
D3 - .65 Acres
D4 - 6.58 Acres
N
2000 ft
Google earth


Lake Maspenock
Possible Areas for DASH
D1 - 3.15 Acres
N
700 ft
Google earth


Lake Maspenock
Possible Areas for DASH
D2 – 4.62 Acres
D3 – .65 Acres
D4 – 6.58 Acres
N
1000 ft
Google earth

III. Cost estimates

With many factors inherently variable in the weed management industry estimates are difficult to produce with high accuracy. The table below is a rough outline of a first year of DASH control so that concerned parties can start to understand the costs involved with such an effort. As with any estimate price will change when more details are finalized such as quantity and duration. Because variability exists in the precise densities across all areas, changing plant type, differing root type, etc. AB Aquatics always encourages a group taking on a management project of this scale to choose an initial area to perform DASH. Once the subject area is harvested tangible cost and time projections can be relied upon. Area "D1" would be the recommended area for any initial DASH work. The below estimate is based on harvesting .75 - 1 Acre every 4-dive days for one crew. The shear volume of plants is the most taxing factor on efficiency.

In this table the "D1 – 3.15 Acres" column was created to highlight the costs of the potential initial area.

Mapped Areas Reference Map A	D1 - 3.15 Acres	D1-4 - 15 Acres	Total Lake ~150 Acres
1 Diver and 1 unit + crew $1223.00	13 -17 days $15,899 - $20,791	60 – 80 days $73,380 - $97,840	600 days $733,800
2 Divers and 2 units + crew $2120.00	6.5 - 8.5 days $13,780 - $18,020	30 -40 days $63,600 - $84,800	300 days $636,000

*Our data indicates that if the 15 Acres were harvested it would likely be over 125,000 plants removed.

IV. General Information

Diver Assisted Suction Harvesting (DASH) is effective and environmentally friendly. In our company's home state of NH, both aquatic herbicide and DASH are used in combination to mitigate invasive weed species successfully. Both the NH Department of Environmental Services and our clients agree that this combination approach, when needed, is most effective. In some cases, water bodies don't need a preliminary application of aquatic herbicide because their infestation is small. Unfortunately, by the time many water bodies are given the proper care infestations have grown to a point where aquatic herbicide is needed. We do have numerous clients under our management that were able to use just DASH as a control method. There are also numerous customers that needed aquatic herbicide initially and now only need the use of DASH.

There are a variety of reasons to use DASH. As a control method it is versatile and effective. When the diver removes each root system by hand it is a definitive removal.

Lakes with large infestations choose DASH after aquatic herbicide application to prevent the long-term repeated use of herbicides. Another benefit of removing the plant completely from the water, as with DASH, is there is no decomposition of a very large amount of biomass that would occur with other control methods. In later management stages DASH is critical because we can deploy a team and unit quickly to various small patches that might need to be addressed. Other control methods can take longer to implement and rapid response is difficult. A final benefit when using DASH is accurate monitoring. Divers under the water are the only accurate way to ensure the evaluation of where a water body stands in its management.

An example of successful management with DASH:

Big Island Pond in Hampstead, NH reached out to us in 2013 to help combat their invasive weed infestation. Originally lake residents assumed we would need just 20 days of DASH work but by the end of that year we had harvested for over 40 days. Through that winter we worked hard with Big Island Pond (BIP) to develop a comprehensive management plan that would reduce their infestation to maintenance levels as quickly as possible. In 2014 we carried out 85 days of harvesting and this year (2015) we carried out 95 days or harvesting. As a result of the DASH work in the last two years our final days on BIP this year were yielding a daily harvest of less than 40 plants in most cases. Residents were highly satisfied considering just one year prior we removed roughly 40,000 plants from the lake. For 2016 we will likely budget for 65 days and hope to dive for just 50. We are highly confident that after 2016 harvesting future years will require only the amount of time it takes to properly re-cover past infested areas and remove sporadic instances of plants.

In closing, it was a pleasure to visit Lake Maspenock personally and compile this information for those involved who I hope I've now assisted. It should be universally accepted that a management plan for this lake is drastically needed. In the course of your discovery and decision-making please let me know if I can assist further. This is likely only a portion of the information that will be needed if DASH service is desired and I am available to provide further information or answer questions at anytime. If you wish, please view this as a start of a dialogue that can evolve as decisions are made.

Best,

Bob

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