Application Number:_____
(Office use Only)

STATE OF VERMONT
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
103 South Main Street, Building 10 North, Waterbury, VT 05671-0408
**29 V.S.A. Chapter 11: Management of Lakes and Ponds**

1. Name of Lake or Pond: **Lake Rescue** Municipality: **Ludlow, Vermont 05149**
2. Name of Applicant: **Lake Rescue Association, Inc.**

   Mailing Address: **PO Box 372, Ludlow, Vermont 05149**
3. Persons to contact regarding this application:

| | |
|---|---|
| Name: **Charles Robinson** | Name: **Christina Salerno** |
| Daytime Telephone: **802-989-7079** | Daytime Telephone:<br>**VT: 802 228 4306**<br>**FL: 239 472 3124**<br>**Cell:203 733 8259** |
| Mailing Address:<br>**70 Maple Street, #307**<br>**Middlebury, VT 05753** | Mailing Address:<br>**VT: 7 Norman Drive**<br>**Ludlow, VT 05149**<br>**FL: 537 Lake Murex Circle**<br>**Sanibel, FL 33957** |
| Email: **crobinson@askdrcharlie.com** | Email: **chrssal@aol.com** |

**4. Project description:**

Lake Rescue is located in Ludlow, Vermont on Route 100 North. (See map, Appendix A, page 6) . Please note that this proposal is an amendment to the application originally submitted in January, 2012 and includes important information obtained since that time.

The proposed project location is in the area north of the narrows in Lake Rescue, especially where the Black River enters what is referred to as Round Pond and southward toward the passage into the main lake This area is near the State of Vermont's Fishing Access used by the majority of boaters visiting the lake.

Significant changes in water depth occurred in in this area as a result of tropical storm Irene on August 28, 2011. This reduced navigability with measured depths of two feet and under in several places. After a site tour with the Agency of Natural Resources (ANR) staff, the Lake Rescue Association, Inc. (LRA) was invited to submit an application to dredge.

With the Town of Ludlow as co-applicant, LRA therefore applied to remove sufficient sediment to restore navigability, specifically clearing the river channel that extends into

areas of Round Pond and the upper part of the passageway used by watercraft moving from Round Pond where the fishing access is located into the main lake. This area, labeled site 1, is shown in appendices A, B, E-1, E-3 and G.

Another area, located off Discovery Island on the main lake and labeled Site 2, was also originally identified as a possible hazard to navigation (Appendix B and D-2). Results of subsequent surveys have not consistently shown depth levels of less than four feet. Therefore, we are not considering it a hazardous location at this time. We will, however, continue to monitor it since it appears to be an example of the ongoing impact of tropical storm Irene on depth levels in the lake.

The need for dredging to restore navigability has been the focus of five different surveys conducted since Irene:

A. After ANR and LRA board members experienced grounding in a pontoon boat last fall, LRA members did several informal surveys using a boat depth finder in Round Pond and off Discovery Island. In several areas of site 1, depths below two feet were found where there had not been problems prior to Irene. However, lacking GPS capability, locations had to be estimated as shown on the map in Appendix B.

B. In November, 2011 VTDEC conducted a follow-up to their 2010 depth survey with a focus on Round Pond. (The survey did not address areas south of the narrows.) The report (Appendix C) showed a sediment increase amounting to 5.1 acre-feet in just that section of the lake. A loss of more than 6,300 cubic meters of water in an area this small is notable. The accompanying maps also show a significant increase in shallow areas around the mouth of the river and south toward the narrows, with depths of less than a half meter in some places. This is especially noticeable by overlapping the 2010 and post-Irene maps on page 10. These results, combined with the informal one by LRA, were the basis for our preliminary application for dredging to restore navigability submitted in January, 2012.

C. During the winter, Dr. Andrea Lini from the University of Vermont continued core sampling in two locations, one each in both Round Pond and the main lake. While we do not have his final report, he found an increase in sediment in the Round Pond sample as compared with an earlier sampling. In the main lake, there was also measurable new sediment. Significantly, however, at a much deeper level, he found much of the sediment still in solution. This suggests that several months after Irene, new sediment was still moving within the lake.

D. In early April, LRA engaged our milfoil diver for an underwater survey of the two sites. He was selected because of his intimate knowledge of the shallower areas of the lake based on eight years of dives looking for milfoil. He found significant areas where new sediment had reduced water depths to less than three feet at both sites. His mapping of the site 1 (Appendix D-1) is consistent with the LRA survey and that completed by VTDEC in Round Pond. He also found reduced depth levels at site 2 (Appendix D-2).

E. Under a contract with Griggs-Lang Consulting Geologists, Inc. a formal survey was conducted April 12th at both sites. The resulting maps (Appendix E-1, E-2, E-3 and Appendix G) clearly show the extent of the problem in the channel leading from the river and extending into Round Pond. To restore navigability in that area, the report recommends removing approximately 1,200 cubic yards of sediment to achieve a minimum depth of 4 feet and a width of 100 feet on the east end of the channel. Analysis of these data indicate widening the channel on the east would substantially ease entry to the river channel, widen the heavily used passage to the narrows and make it possible for the river to return to its angled entry to the main lake versus the currently required 90 degree turn.

Since much of this survey was conducted by actually walking around on site 1, it was possible to more completely test the firmness of the sediment. In areas where sediment has built up over time, it is firm and easy to walk on. However, in the recently deposited areas on the edges of the channel and in the channel at some points, it is soft and unstable (see pictures in Appendix F). The vast majority of the proposed dredging is not only where depths are as low as half a foot, but also where the sediment is unstable. It is also important to emphasize that the recommended channel path extends into areas of Round Pond most frequently used by boats going to and from the main lake.

The geologist did not find any depth levels less than four feet in site 2, even though they had been found – and walked on – by the milfoil diver less than two weeks previously. These inconsistencies led to the decision not to dredge at site 2 but to continue monitoring.

In summary, all five surveys confirm the presence of substantial amounts of newly deposited sediment that impedes safe navigation in site 1 where there is significant boat traffic throughout the season. Data from these surveys are also consistent in identifying new shallow areas in both the channel extension into Round Pond and southward toward the narrows.

For these reasons, our amended proposal is to remove 1,200 +/- cubic yards of material beginning from the northern line of the original river channel with an expanding southern edge of the channel as it moves to the east. While this does not remove all of the new sediment left by Irene, it does return depths of at least four feet and sufficient width to restore navigability. See Appendix G for an enlarged map of the proposed dredge site.

As recommended by Griggs-Lang, LRA will place channel markers in four locations to clearly delineate boundaries of the new channel.

A Rotomite 6000 dredger with 6 foot auger and a 2500 GPM discharge volume will be used. The work area will be surrounded by a geo-textile curtain. The lowest level of the channel will be cut to a maximum depth of 4 feet. This is comparable to or less than the depth of the existing channel between the dredge area and the point where the Black River turns sharply east as it enters the lake. Along the northern and southern edges of

the channel, cuts will be narrowed by one foot at the 3, 2 and 1 foot levels. These step cuts are expected to soften into slopes on both sides of the channel to form the trapezoidal shape requested by ANR.

The sediment will pass through a 6 inch hose to dewatering bags located at the state fishing access. To dewater the pumped material, geo-textile bags will be placed on the west side of the fishing access. Each bag will be on plastic groundsheets surrounded by hay bales. Placement will allow drainage of the water back into the lake. When dried, the sediment will be loaded onto trucks and transported to an approved non-floodplain location within ten miles of the fishing access. The trucking company will assure site preparation and cleanup after dredging. Use of the fishing access site will be limited to the minimum number of days possible beginning after Labor Day weekend. Access to the site for boat loading and unloading as well as trailer parking will always be available during that time.

We understand that the above conditions are acceptable to the Vermont Fish and Wildlife Department and that they will issue the necessary permit after approval of this application.

As previously noted, there is solid evidence that some of the sediment deposited in the lake by Irene is still either in solution or shifting with weather and river current. Further, we believe that additional sediment continues to enter Lake Rescue from storm-related damage upstream e.g. Money and Patch brooks, Buffalo Creek, and Pingree Field. Therefore, LRA will continue to monitor areas above and below the narrows to assure continued navigability and will report problems to ANR.

**5. Purpose of the project:**

The purpose of this project is to restore navigability in an area of Lake Rescue that contains the channel where the Black River enters the lake to a point where there is substantial boat traffic between Round Pond and the main lake that is currently less than four feet deep. To do this, one to four feet of sediment totaling 1,200 +/- cubic yards will be removed to widen and deepen the channel as shown on the map in Appendix G.

Removal of this sediment will make it possible for the Black River to return to its pre-Irene angled entry to the main lake versus the currently required 90 degree turn; removing this loose sediment now will prevent additional sediment from moving down and blocking the main channel to the lake.

**6. Public benefits of the project:**

Tropical storm Irene deposited large amounts of new sediment above the narrows making navigation in this part of the lake hazardous. Entering the river channel is very difficult and allows almost no margin for error. In addition, boaters moving from the fishing access to the narrows must also attempt a more restricted passage to the main

lake. In particular, those unfamiliar with the area face increased risk for accidents, damage to boats and general dissatisfaction with the recreational experience at Lake Rescue. Therefore, a major public benefit of the project is to restore safe passage ways through the area for both visiting and local boaters.

The assessed valuation of property in the Lake District is just under $134,000,000. In 2011, owners paid $2,344,000 in property taxes. In addition, residents, renters and visitors using the State Fishing Access contribute a large, albeit unknown, amount to the state and local economies by purchasing licenses, goods and local services. Restoring navigability is therefore an important component in the Town of Ludlow's attraction as a four-season recreational area.

**7. Planned work schedule:**

Allowing for permit approval and the required notice period, we plan to dredge in September, 2012 and will work to complete the process in as few days as possible, understanding that dewatering time is impacted by weather.

**8. Site location and address;**

Round Pond section of Lake Rescue, Ludlow, Vermont

**9. Names and mailing addresses of property owners:**

Because the dredging itself does not abut any properties, we were advised that this information was not needed. However, a list of property owners closest to the dredging site can be provided on request.

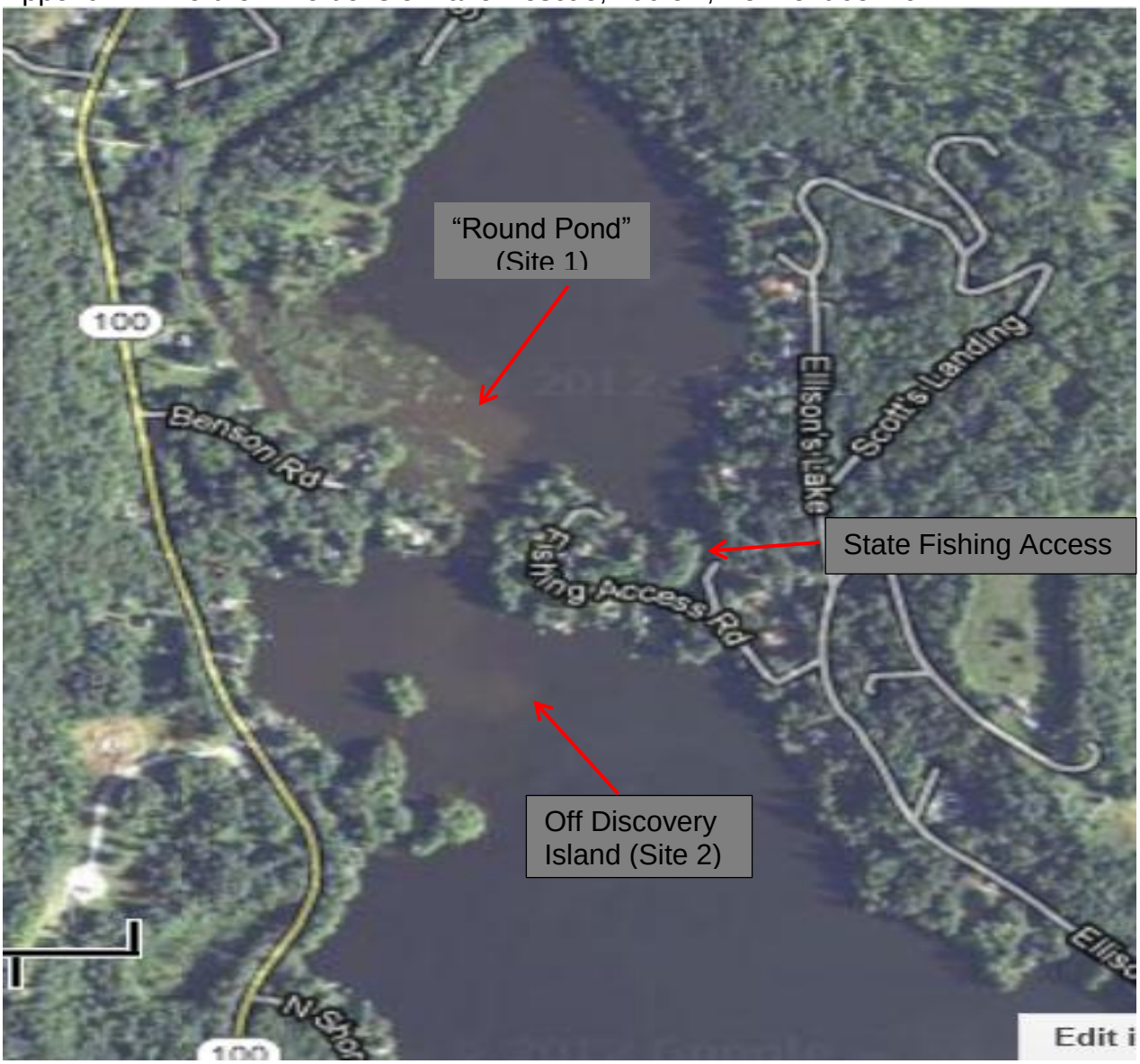
**10. Application fee enclosed** N/A **Estimated cost of project: $70,000 – $100,000**

**11. Certification:** We hereby certify that the information in this application and its enclosures are true and accurate. We grant the Department permission to enter upon the land to verify information in the application [29 V.S.A 404(b)]

Applicant Signatures

| | | | |
|---|---|---|---|
| _____ | _____ | _____ | _____ |
| MR Batesole, President | Date | Frank Heald, | Date |
| Lake Rescue Association, Inc. | | Town Manager | |

Appendix A: Northern Portions of Lake Rescue, Ludlow, Vermont 05149



Appendix B: GOOGLE MAP SHOWING PROPOSED AREAS OF DREDGING AND DEWATERING.


The green box shows the proposed dewatering site at the state fishing access.

The yellow box shows the approximate location where the pontoon boat hung up on new sediment during the October, 2011 tour with ANR staff. Previous to Irene, such boats could enter the river.

The solid red boxes show the approximate locations of two new sandbar areas.

## Appendix C: Lake Rescue bathymetry comparison 2010 to 2011

Heather Pembrook
January 11, 2012

**Background:** In 2010, the VTDEC conducted a full lake bathymetry survey on Lake Rescue in Plymouth, Vermont. On August 28th, 2011 Tropical storm Irene hit Vermont delivering sediment loads to most rivers, streams, lakes and ponds. At the request of the Lake Rescue Lake Association, the VTDEC conducted a follow-up survey limited to the northern portion of Lake Rescue in the late fall of 2011. The northern section of Lake Rescue is referred to as Round Pond and the survey included the area through the "narrows". It did not include any areas south of this section, although the lake association has observed large sediment deposits in the bays just south of the narrows.

**Results:** In order to determine the extent of change between 2010 and 2011, the VTDEC compared the volume of Round Pond pre-Irene and post-Irene. The table below summarizes the results.

| **Round Pond*** | **Volume** | |
|---|---|---|
| | **Cubic meters ($m^3$)** | **Acre-feet** |
| Pre-Irene (November 2010) | 651,341.7 | 528.0 |
| Post-Irene (November 2011) | 644,994.4 | 522.9 |
| **Difference from 2010 to 2011** | **6,347.3** | **5.1** |

*This is limited to the northern section of Lake Rescue, through the narrows.

After tropical storm Irene, Round pond held less water than it did before the storm. A total of 6,347.3 cubic meters of water was displaced with sediment. This may be easier to imagine as 5.1 acre feet, meaning five acres of sediment, one foot deep.

In order to estimate where the greatest change took place, the data was interpolated in GIS. This interpolation resulted in depth isopleths. It is important to note that these interpolations will give a general idea where the changes took place. They are not a roadmap for exact locations of sediment build-up. A full underwater mapping project would yield such results and the VTDEC does not have this capacity.

Figure 1 displays Round Pond before and after the storm for all depths. The shallow areas nearest to inlet have enlarged as shown in gray. The deepest part of the lake displayed some changes as well, but should be interpreted with caution. There were fewer data points in this area than in the shallower areas, and the apparent change may be an artifact of the smaller data set on which to base the interpolation.

Figure 2 display just those areas that were two meters deep or shallower. In this view, there is greater precision in the areas that may pose a challenge to navigation. This map has increments of approximately 0.33 meters (~ 1 foot). The two shallowest categories, gray and orange, have increased in area from 2010 to 2011.

Figure 1. Lake Rescue depth maps 2010 and 2011 for all depths

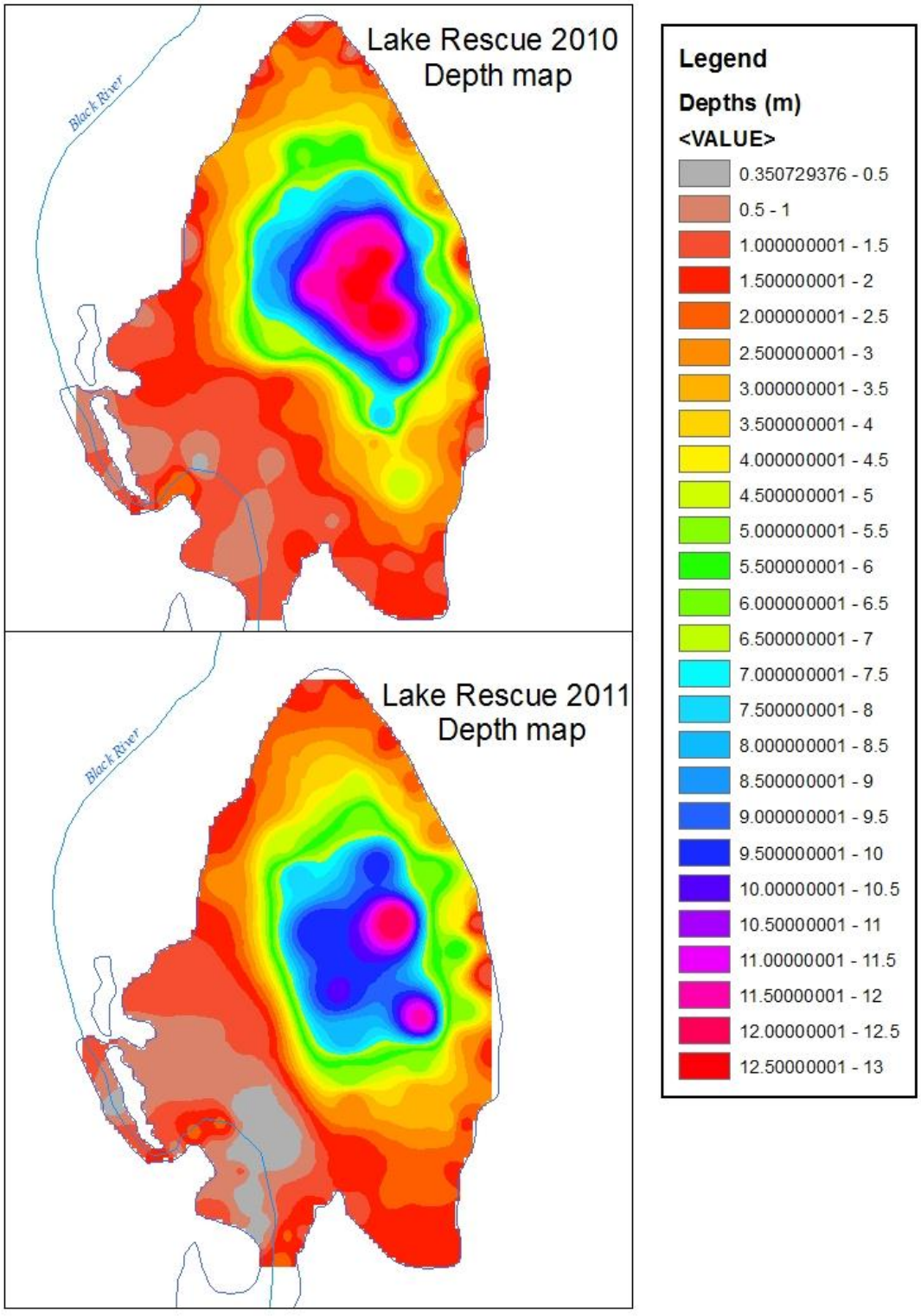
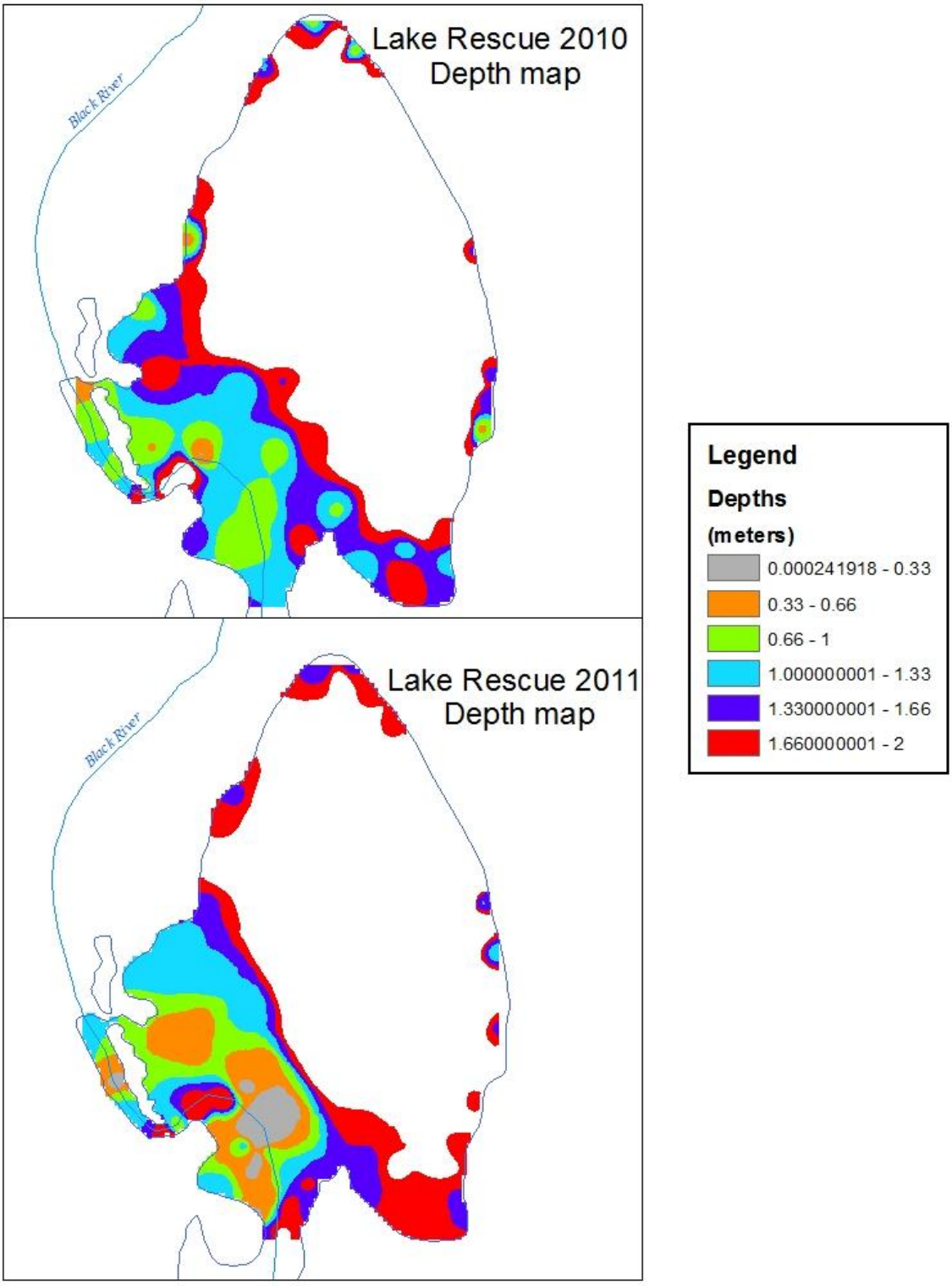
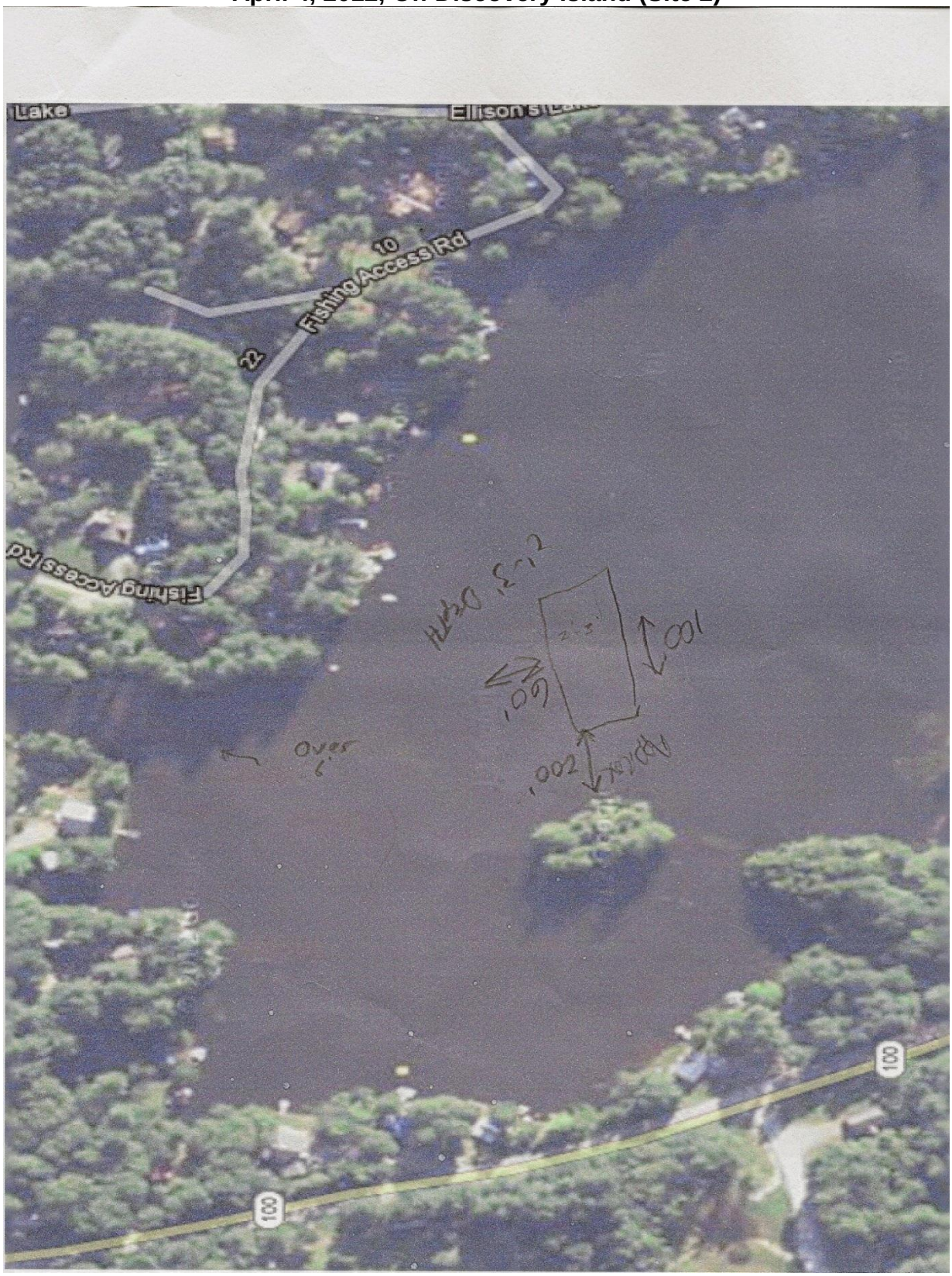


Figure 2. Lake Rescue depth maps 2010 and 2011 for two meters and shallower.

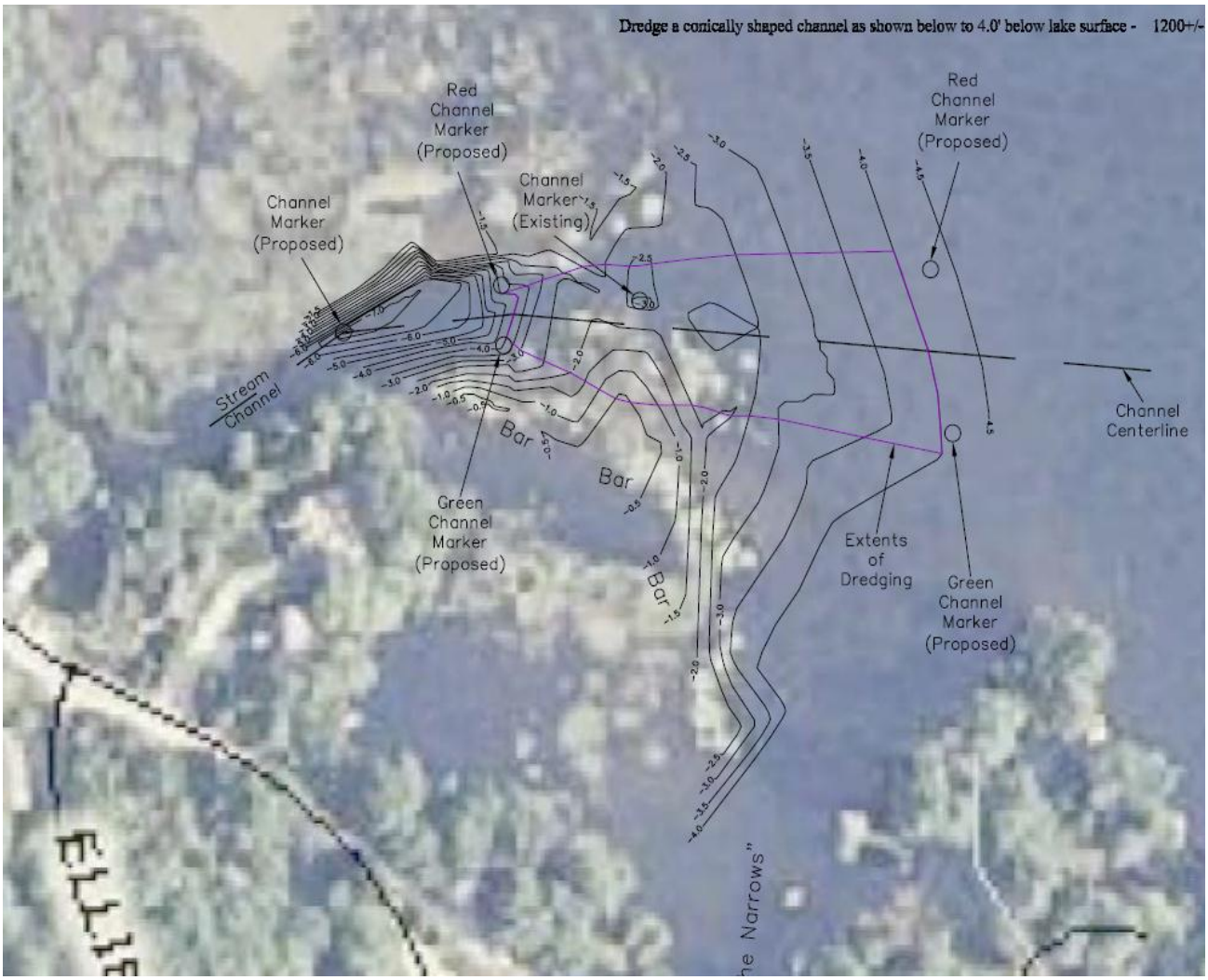


**Appendix D-1: Existing Conditions from Under Water Survey by Chris Sheldon**
**April 4, 2012, Round Pond (Site 1)**

**Appendix D-2: Existing Conditions from Under Water Survey by Chris Sheldon**
**April 4, 2012, Off Discovery Island (Site 2)**



Appendix E-1: Existing Conditions April 12, 2012: Round Pond (Site 1)
William (Bill) Sheldon, Geologist
Griggs-Lang Consulting Geologists, Inc.



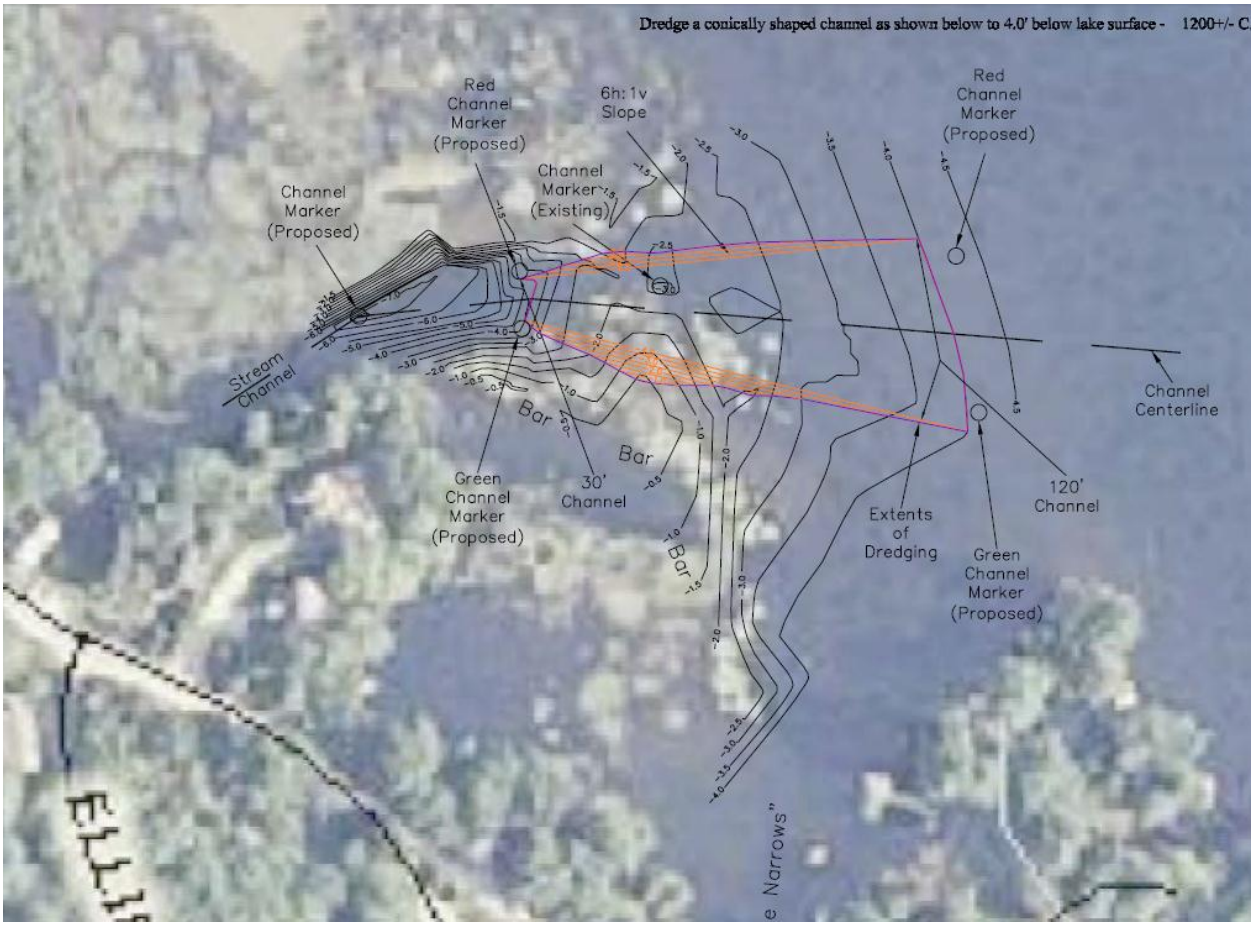

Notes:

1) Depth to lake bottom contours based on Lake Levels as observed on 4/12/12.

2) Lake was 5-6 inches down average level on date of survey

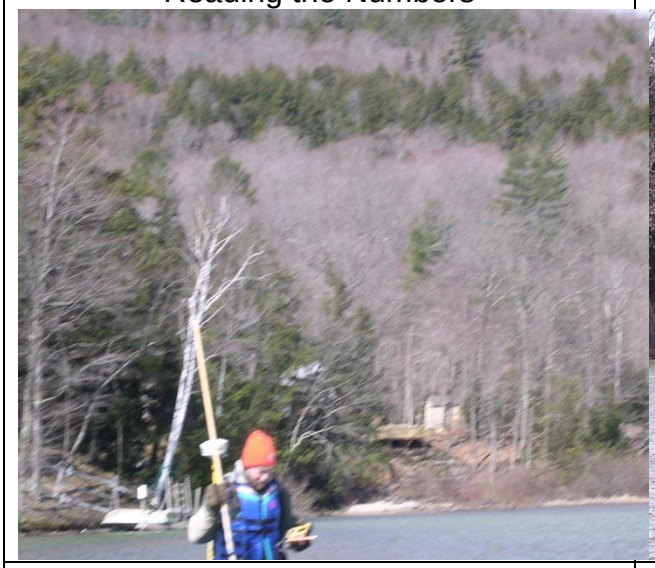
Appendix E-2: Existing Conditions April 12, 2012: Off Discovery Island (Site 2)
William (Bill) Sheldon, Geologist
Griggs-Lang Consulting Geologists, Inc.

Appendix E-3: Recommendation for Material Removal from Round Pond (Site 1)
William (Bill) Sheldon, Geologist
Griggs-Lang Consulting Geologists, Inc.




(For enlargement, see Appendix G, page 17.)

Appendix F: On-Site Survey Work, April 12, 2012
William (Bill) Sheldon, Geologist
Griggs-Lang Consulting Geologists, Inc.

| Reading the Numbers | Depth = Minus One |
| --- | --- |
|  |  |
| Standing in the Channel | Wind Stronger than Motor. Goodby, Bill |
|  |  |

Appendix G: Enlargement of Proposed Dredging Area of Channel
from the Black River into Round Pond (Site 1)
William (Bill) Sheldon, Geologist
Griggs-Lang Consulting Geologists, Inc.