

portions of that area contain sufficient new sediment to leave water depths of less than two feet versus the four feet needed by various watercraft on the lake.

The need for dredging has been a focus in 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 (hereinafter site 1) and off Discovery Island (site 2). In several areas of site 1, depths below three feet were found where there had not been problems prior to Irene. We also found depths of less than 2 feet in a large section of site 2. Those areas were estimated on a map (Appendix B, page 7).
- B. In November, 2011 VTDEC conducted a follow-up to their 2010 depth survey with a focus on Round Pond. That report (Appendix C, page 8) showed a sediment increase amounting to 5.1 acre feet in just that section of the lake. The accompanying maps also show a significant increase in shallow areas around the mouth of the river, with depths of less than a half meter. This survey did not address areas south of the narrows. These results, combined with the informal one by LRA, were the basis for our initial 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 that 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 the services of 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 made water levels less than three feet in both sites. His mapping of the sites (Appendix D, page 11) is consistent with the LRA survey and that completed by VTDEC in Round Pond.
- E. Under a contract with Griggs-Lang Consulting Geologists, Inc. a formal survey was conducted April 12th at both the main lake and Round Pond sites. The resulting maps (Appendix E, page 13) 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 485 cubic yards of sediment to a width of 30 feet and a minimum depth of 4 feet.

Since much of the survey was conducted by walking around on site 1, it was possible to 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, page 15), It is also important to note that the recommended channel

path extends into areas of Round Pond most frequently used by boats going to and from the main lake.

Surprisingly, the geologist did not find any depth levels below four feet in site 2, even though they had been found and stood upon by the milfoil diver less than two weeks previously. This clear evidence of continued movement of sediment is one reason for our request to re-do the same survey in the spring of 2013 with the intent of removing additional sediment that impedes navigability in these areas of the lake.

In summary, all five surveys confirm the presence of newly deposited sediment that impedes navigability in an area of the lake where there is substantial boat traffic throughout the season. They also strongly suggest that the impact of Irene is still being felt in shifting sediment deposits and the likely incursion of new sediment from known storm damage upstream.

For these reasons, our amended proposal includes dredging the current area in site 1 in 2012, continued monitoring of the shifting, storm-related sedimentation, and conducting similar dredging in 2013 as needed.

For 2012 and consistent with the recommendations of the Griggs-Lang geological survey, LRA proposes to remove +/- 485 cubic yards of sediment from a 640 square foot area in the Black River channel leading into the Round Pond section of Lake Rescue. (See Appendix G, page 16 for an enlarged picture of the proposed dredge area.)

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. At the lowest level, the channel will be cut to a width of 24 feet with a two foot wider cut at the 3, 2 and 1 foot levels, leaving a maximum channel width of 30 feet. This is comparable to or less than the channel width beginning at the western edge of the dredge area and extending to the point where the Black River turns east.

The sediment will pass through a 6 inch hose to dewatering bags located at the state fishing access. Two geo-textile bags that will fit on the west side of the fishing access will be placed on a plastic groundsheet surrounded by hay bales to dewater the sediment and drain the water back into the lake. When dried, the sediment will be loaded onto trucks and transported to an approved non-floodplain location within five miles of the fishing access. As indicated in the bidding for transportation, site cleanup before and after using the site will be the responsibility of the selected company. Use of the fishing access site will be limited to a maximum of 14 days after the Labor Day weekend. Access to the site for boat loading and unloading as well as trailer parking will always be available during that time.

(As of this date, we have not heard back from Fish and Wildlife personnel. Our last report was that they are considering our request to use the fishing access. We have made every effort to locate another site that can be used for dewatering and have been

unsuccessful. There is simply no other suitable site within distance, at lake level, flat enough and sufficiently cleared of trees for this use. Therefore, we urgently request assistance from ANR staff in getting the necessary approval.)

As previously noted, there is solid evidence that some of the sediment left after Irene is still either in solution or shifting with weather and river current. Further, we believe that additional sediment from Irene-related damage upstream continues to enter Lake Rescue from storm-related damage upstream e.g. Money and Patch brooks, Buffalo Creek, and Pingree Field. Therefore, LRA proposes to conduct additional surveys, including a repeat of the Griggs-Land survey, early next spring, and remove such sediment as is found to impede navigation in areas above and below the narrows during 2013.

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 less than four feet deep. To do this, one to four feet of sediment will be removed within a 640 square foot area as shown on the map in appendix XX. Also we propose to maintain surveys of the area around the narrows and remove any additional barriers to navigation that arise in 2013.

6. Public benefits of the project:

Large portions of the area around the narrows separating Round Pond from the main lake were already much too shallow for boating as the result of sediment build up over the past several years. The addition of the new area of shallow water makes travel truly hazardous in this heavily traveled section of the lake. Entering the river channel is now even more difficult despite it being a popular fishing spot. Boaters who are unfamiliar with the area are at increased risk for accidents, damage to boats and general dissatisfaction with recreation experience at Lake Rescue. Therefore a major public benefit of the project is to improve and widen passage through the area. An even greater benefit will accrue to boaters from lake residences.

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

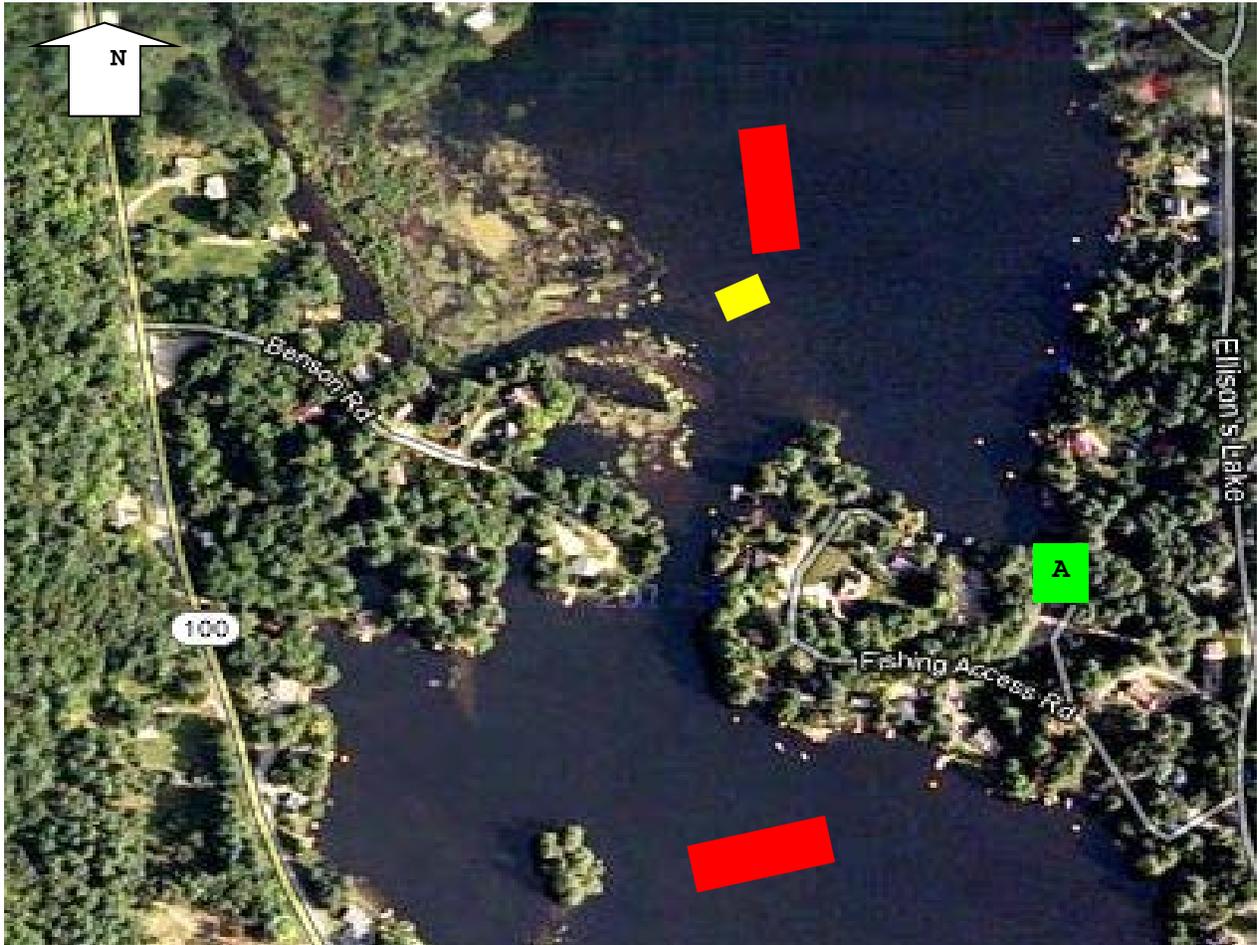
7. Planned work schedule:

Year One: Allowing for permit approval and the required notice period, we plan ten days in September 2012 for dredging and dewatering and an additional 3-5 days for material

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

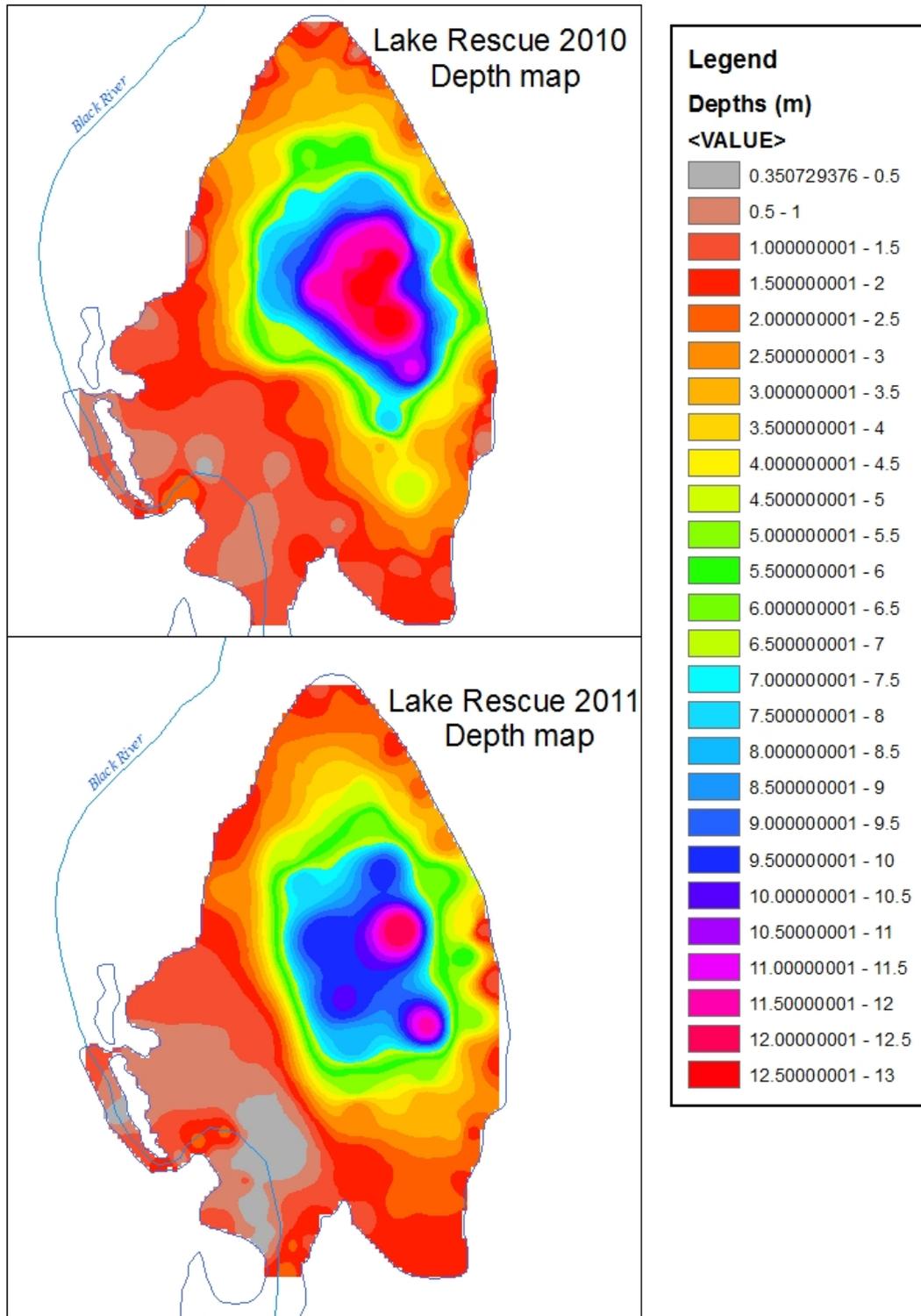
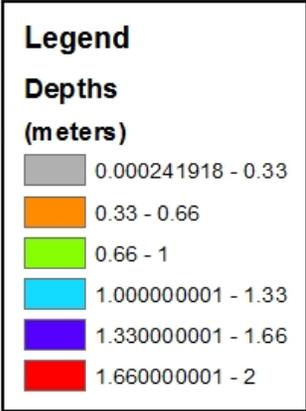
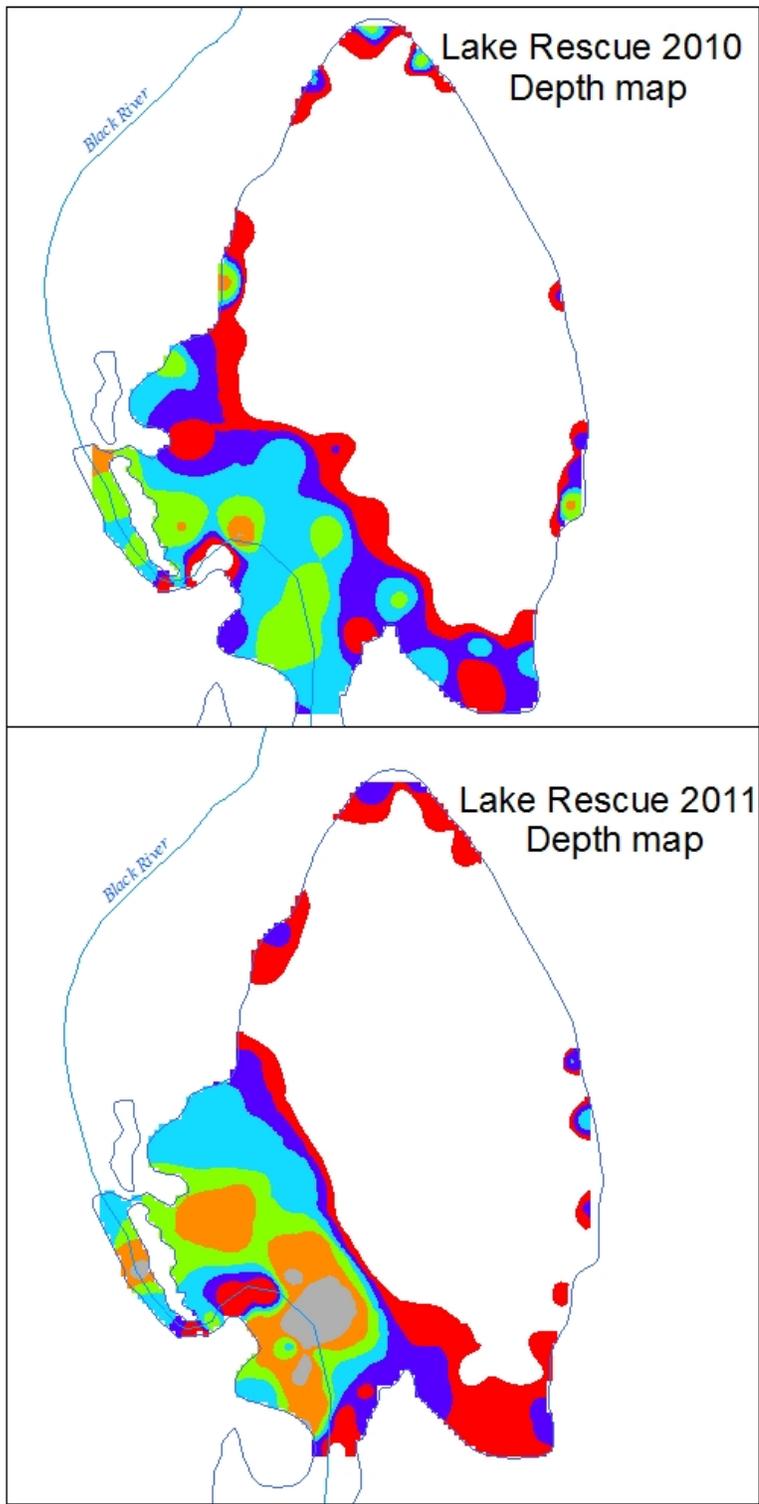


Figure 2. Lake Rescue depth maps 2010 and 2011 for two meters and shallower.



Appendix D: Under Water Survey, April 4, 2012 by Chris Sheldon
Round
Pond



Off Discovery Island



Appendix E: Existing Conditions: Round Pond (Site 1)

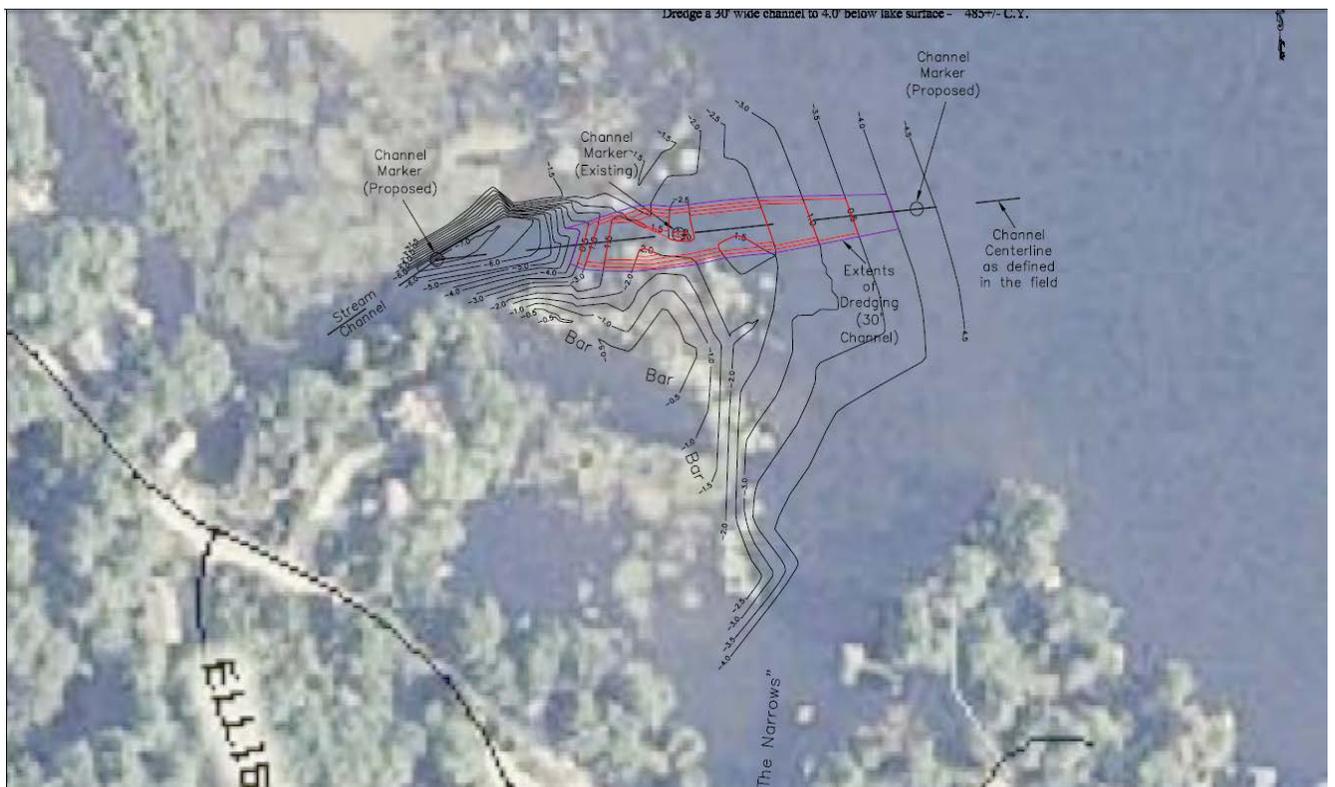


<p>LAKE RESCUE ASSOCIATION LAKE RESCUE DREDGING PROJECT Town of Ludlow, Windsor County, Vermont</p>	<p>DETAILS</p> <p>Date: 4/12/12 Base Map(s): Scale: 1"=30' Contour Interval: 0.5' Datum: MLL Project Manager: JLL Drawn by: WJS</p>	<p>LEGEND</p> <p>— Extents of Dredging — -3.5 Lake Bottom Contours</p>	<p>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</p>
	<p>EXISTING CONDITIONS MAP Survey Area North of The Narrows</p>	 <p>Griegs-Lang Consulting Geologists, Inc. 8 Brunswick Road Troy, NY 12180 Phone: (518) 270-5920 Fax: (518) 270-5922</p>	

Existing Conditions: Off Discovery Island (Site 2)



Recommendation for Material Removal from Round Pond (Site 1)



Appendix F: On-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 Black River into Round Pond

