



**June 25, 2019**

**Subject: Lake Seneca Bathymetric Survey**

The purpose of our survey was to determine the existing depths throughout the entire lake and amount of sediment in the upper end of the lake. The investigation was performed on June 13 & 14, 2019. Our investigation consisted of utilizing a pontoon boat outfitted with GPS position equipment and a sonar depth measurement unit to map the existing lake bottom. We also used a graduated rod to probe down to the hard bottom to measure the thickness of sediment in the upper end of the lake.

The data collected was used to produce the attached color coded maps of the entire lake. The lake surface was broken up into 3 sections. Section 1 consisted of the area at the northeastern end of the lake. Section 2 consisted of the central part of the lake and Section 3 included the southeastern portion of the lake from the beach area to the dam. Existing water depth throughout the lake is indicated by the color coding on the overall map and the black numbers. Also included are more detailed maps of each of the 3 sections. Section 1 has existing depths ranging from 0.5 feet to 5.5 feet with an average depth of approximately 3.2 feet. Section 2 has existing depths ranging from 4.5 feet to 9.3 feet with an average depth of approximately 6.0 feet. Section 3 has depths ranging from 7.5 feet to 13.2 feet with an average depth of approximately 10.3 feet.

Approximately 150 probes were taken in Section 1 in the upper end of the lake to measure the sediment thickness. The sediment thickness ranges from 0 feet to 5.5 feet with an average thickness of 1.7 feet. This data is represented with (2) different maps. The first map shows the existing bottom surface with the sediment thickness overlaid in blue numbers. The second map is a color coded contour map of the bottom of the sediment (in other words, what the bottom would be if all the sediment was removed).

The surface area of Section 1 is approximately 63.7 acres. With an average sediment thickness of 1.7 feet, this yields an estimated sediment volume of 174,700 cubic yards. The worst area is in the eastern end of Section 1 where the existing depth is 3 feet or less. This area is approximately 25.8 acres with an average sediment thickness of 1.85 feet. This area yields approximately 77,000 cubic yards of sediment.

Generally speaking, the results of this survey indicate that roughly 10% of the lake is too shallow to safely navigate with a boat (less than 3' deep). With the steady flow of sediment coming into the lake this problem will get progressively worse. The solution will involve major dredging and removal of at least 50,000 cubic yards of sediment and a plan to control erosion upstream from the lake to reduce the volume of sediment entering the lake.

We appreciate the opportunity to perform this investigation for you. Please do not hesitate to call if you have questions.

Thank you,

Mark Zielinski

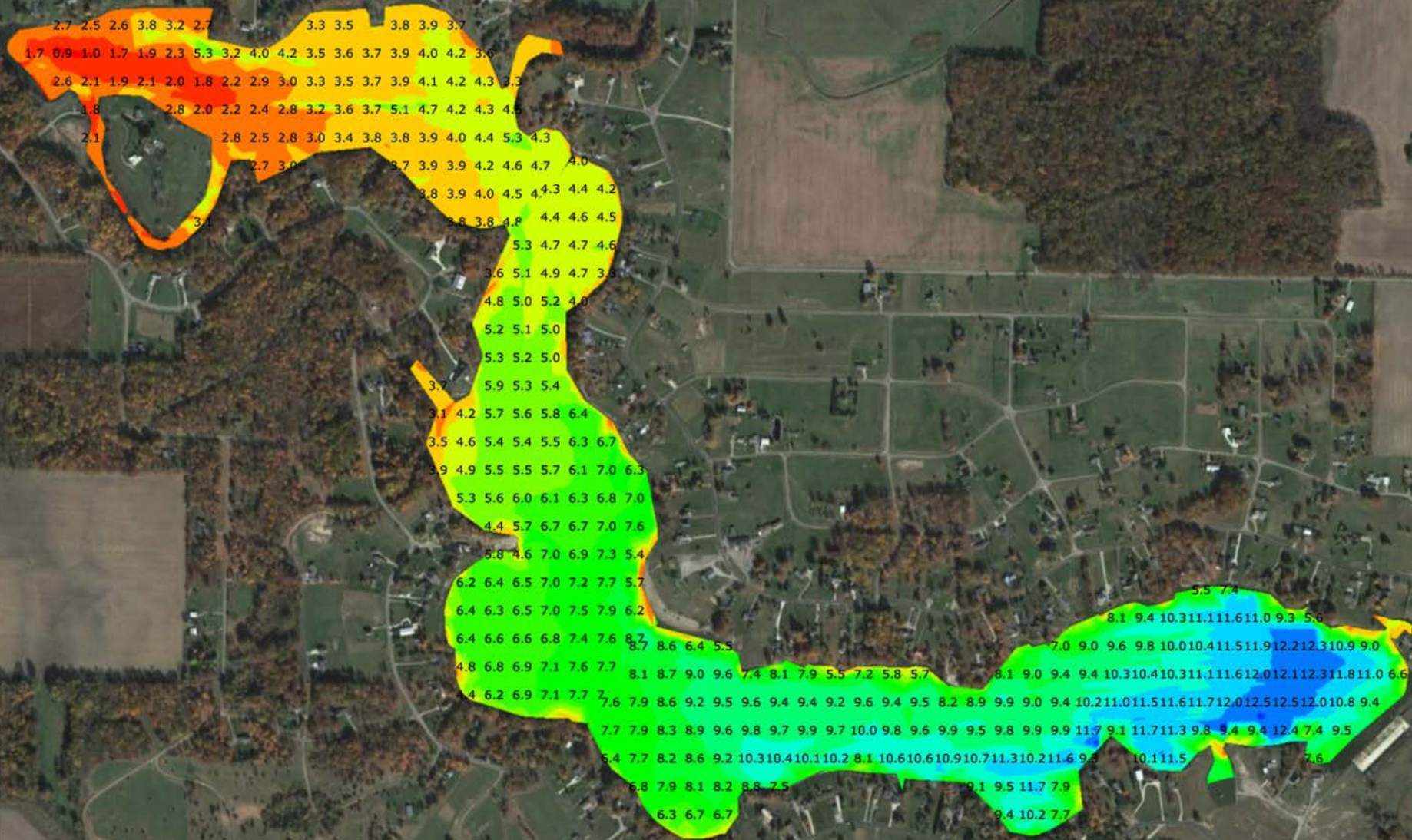
Estimator

Heartland Dredging

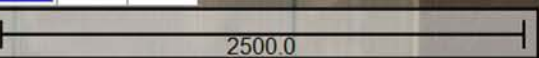
3961 Perry Boulevard, Whitestown, IN 46075

(317) 769-2781 Direct Line

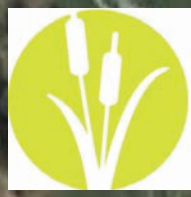
(317) 714-1132 Cell Phone



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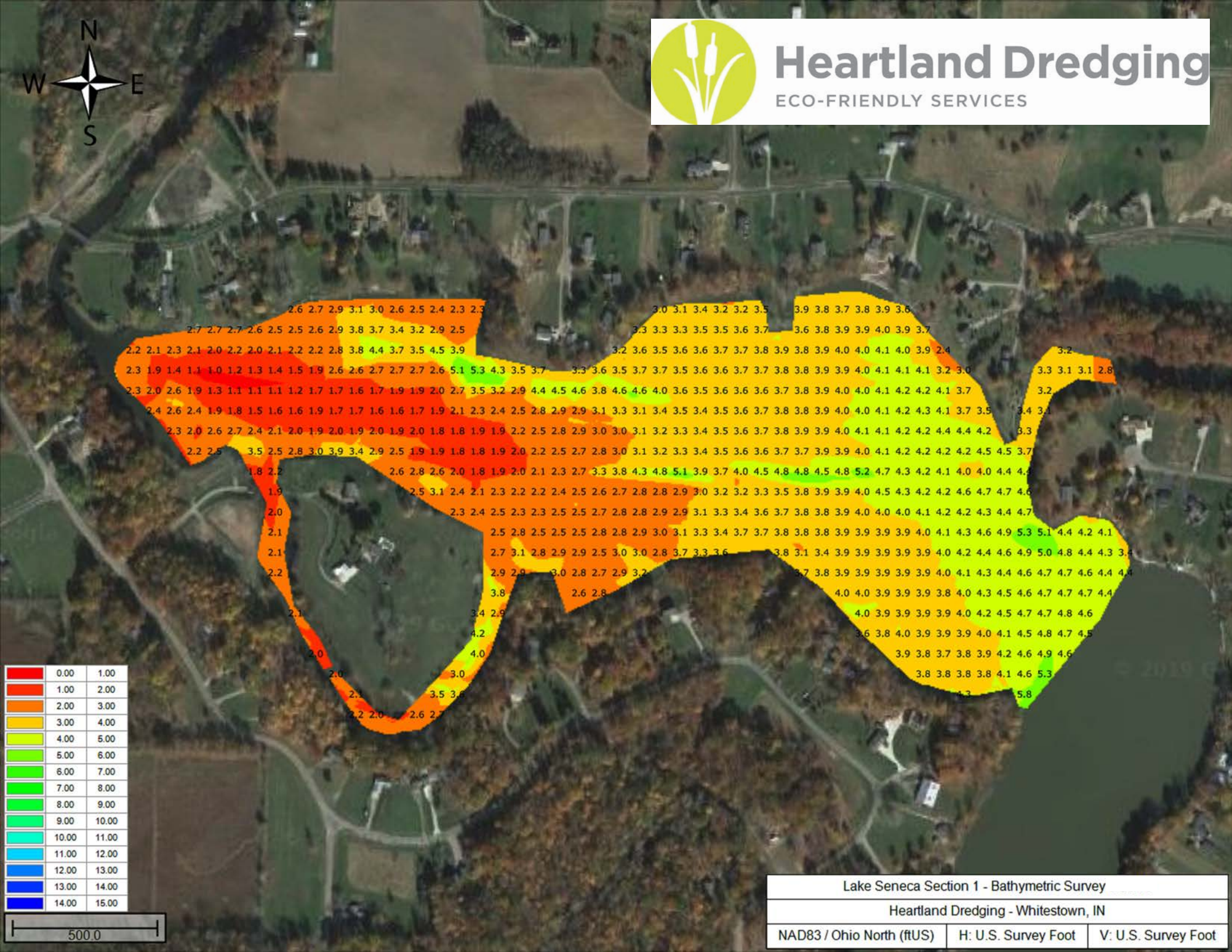


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| Lake Seneca - Bathymetric Survey    |                     |                     |
| Heartland Dredging - Whitestown, IN |                     |                     |
| NAD83 / Ohio North (ftUS)           | H: U.S. Survey Foot | V: U.S. Survey Foot |



# Heartland Dredging

ECO-FRIENDLY SERVICES



|                |       |       |
|----------------|-------|-------|
| Red            | 0.00  | 1.00  |
| Orange         | 1.00  | 2.00  |
| Yellow-Orange  | 2.00  | 3.00  |
| Yellow         | 3.00  | 4.00  |
| Light Green    | 4.00  | 5.00  |
| Green          | 5.00  | 6.00  |
| Light Blue     | 6.00  | 7.00  |
| Blue           | 7.00  | 8.00  |
| Dark Blue      | 8.00  | 9.00  |
| Very Dark Blue | 9.00  | 10.00 |
| Black          | 10.00 | 11.00 |
| Black          | 11.00 | 12.00 |
| Black          | 12.00 | 13.00 |
| Black          | 13.00 | 14.00 |
| Black          | 14.00 | 15.00 |

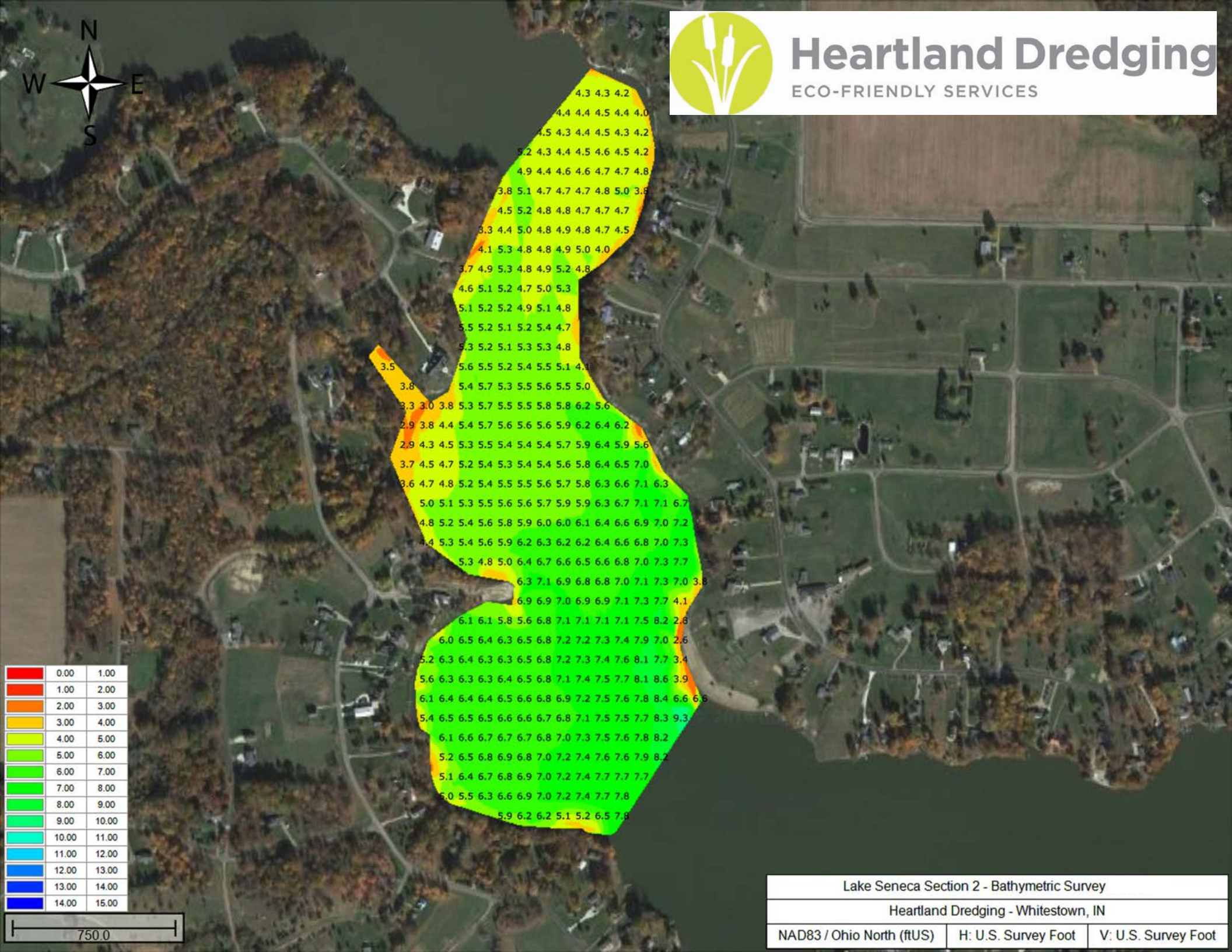


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| Lake Seneca Section 1 - Bathymetric Survey |                     |                     |
| Heartland Dredging - Whitestown, IN        |                     |                     |
| NAD83 / Ohio North (ftUS)                  | H: U.S. Survey Foot | V: U.S. Survey Foot |

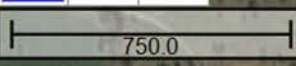


# Heartland Dredging

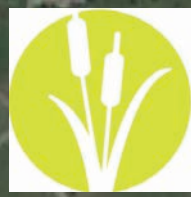
ECO-FRIENDLY SERVICES



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| Lake Seneca Section 2 - Bathymetric Survey |                     |                     |
| Heartland Dredging - Whitestown, IN        |                     |                     |
| NAD83 / Ohio North (ftUS)                  | H: U.S. Survey Foot | V: U.S. Survey Foot |

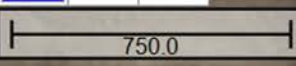


# Heartland Dredging

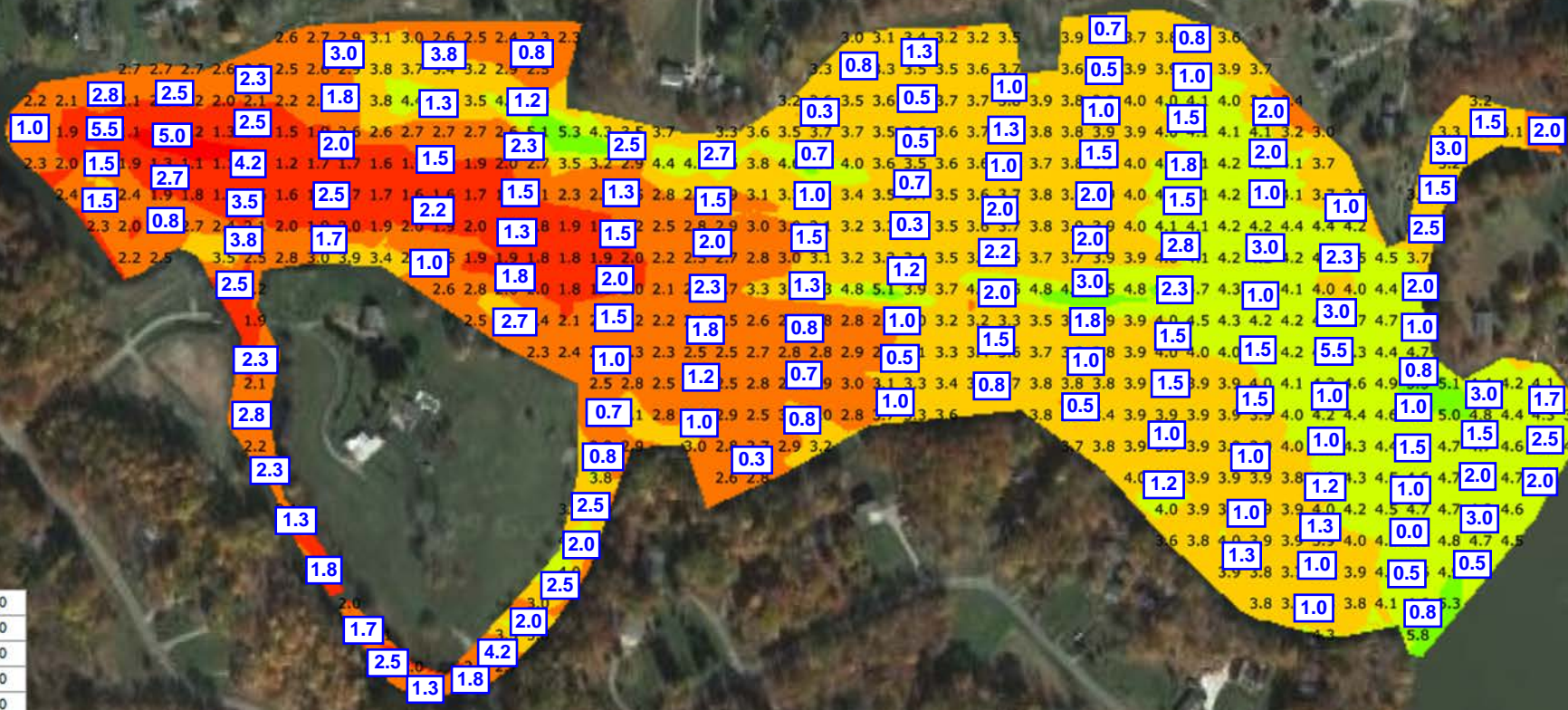
ECO-FRIENDLY SERVICES



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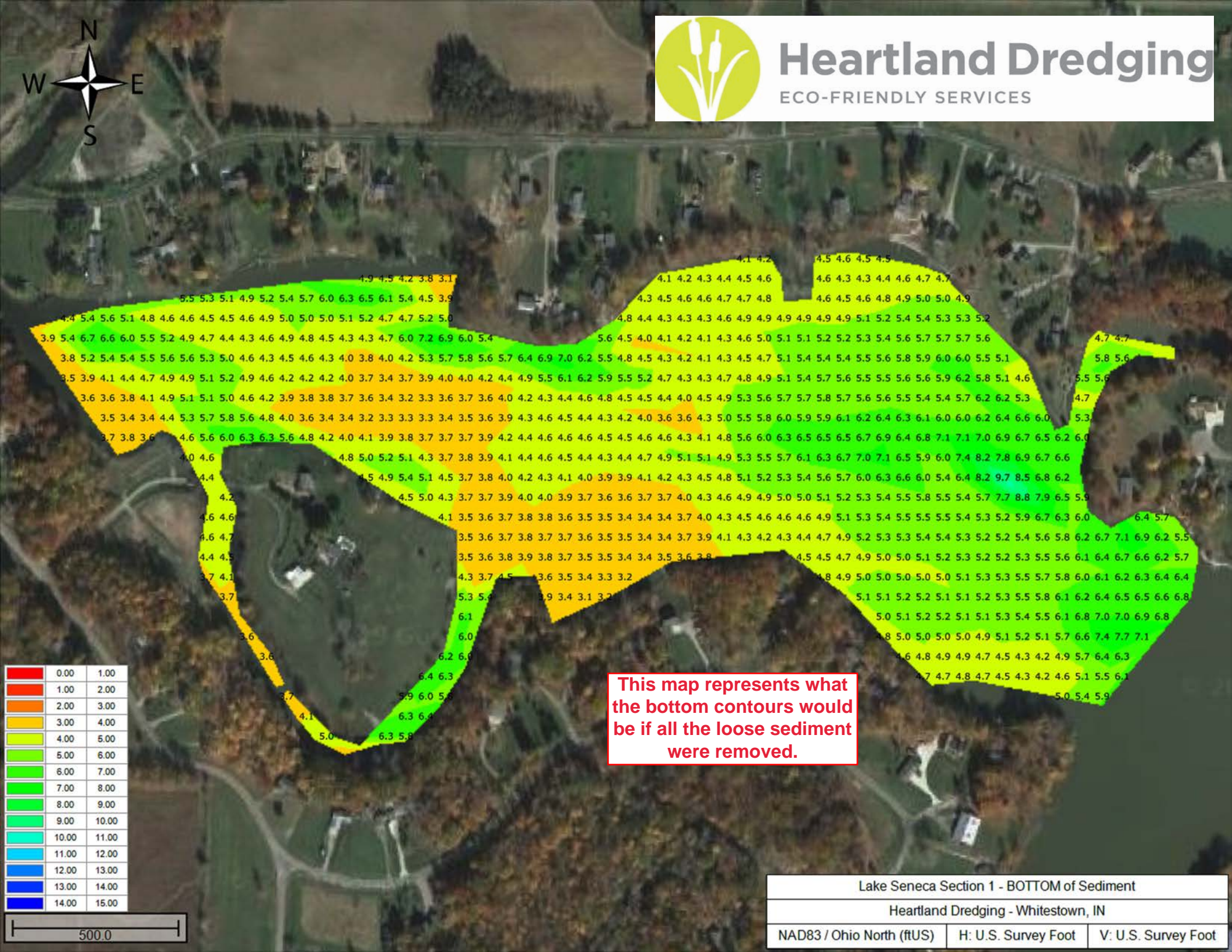
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| Lake Seneca Section 3 - Bathymetric Survey |                     |                     |
| Heartland Dredging - Whitestown, IN        |                     |                     |
| NAD83 / Ohio North (ftUS)                  | H: U.S. Survey Foot | V: U.S. Survey Foot |



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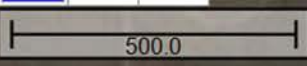
**NUMBERS IN BLUE REPRESENT  
SEDIMENT THICKNESS**

|  |                     |                     |
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| Lake Seneca Section 1 - Bathymetric Survey |                     |                     |
| Heartland Dredging - Whitestown, IN        |                     |                     |
| NAD83 / Ohio North (ftUS)                  | H: U.S. Survey Foot | V: U.S. Survey Foot |



|                |       |       |
|----------------|-------|-------|
| Red            | 0.00  | 1.00  |
| Orange-Red     | 1.00  | 2.00  |
| Orange         | 2.00  | 3.00  |
| Yellow-Orange  | 3.00  | 4.00  |
| Yellow         | 4.00  | 5.00  |
| Light Green    | 5.00  | 6.00  |
| Green          | 6.00  | 7.00  |
| Light Blue     | 7.00  | 8.00  |
| Blue           | 8.00  | 9.00  |
| Light Cyan     | 9.00  | 10.00 |
| Cyan           | 10.00 | 11.00 |
| Light Blue     | 11.00 | 12.00 |
| Blue           | 12.00 | 13.00 |
| Dark Blue      | 13.00 | 14.00 |
| Very Dark Blue | 14.00 | 15.00 |

**This map represents what the bottom contours would be if all the loose sediment were removed.**



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|--|---------------------|---------------------|
| Lake Seneca Section 1 - BOTTOM of Sediment |                     |                     |
| Heartland Dredging - Whitestown, IN        |                     |                     |
| NAD83 / Ohio North (ftUS)                  | H: U.S. Survey Foot | V: U.S. Survey Foot |