



Hydrographic Survey

**Holiday Lake
Holiday Lakes, Ohio
October 14, 2025**



PARAGON
INTEGRATED SERVICES GROUP
ENVIRONMENTAL SERVICES

Projection: SPCS (NAD83) (1905408.909, 520782.589 us-ft)

41° 05' 45.2080" N, 82° 43' 44.0737" W

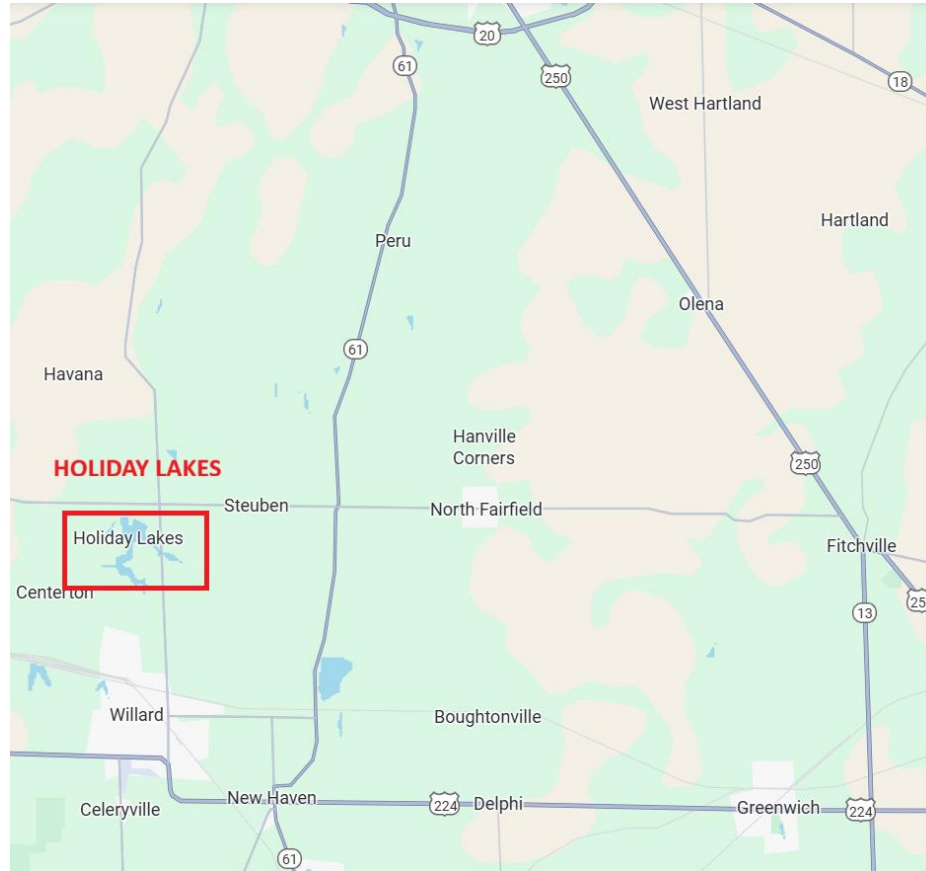


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1 Overview of Lake

Paragon ISG Environmental performed a hydrographic survey on September 29-30, 2025 at Holiday Lake located in Holiday Lakes, Ohio. The purpose of the survey was to assess the overall bathymetry, depth, and condition of the lake bed. Holiday Lake serves as a recreational lake for the Holiday Lakes community and is approximately 220 acres. Paragon conducted the survey using two remotely operated survey boats that are both equipped with a single-beam, dual-frequency echosounder. One frequency (200kHz) allows for the detection of the depth to the lake bed (also called Top of Mudline) and the other frequency (30-50kHz) penetrates the softer sediments to detect hard bottom, the impermeable retention layer of sediment that underlays bodies of water. The Max Depth measured during the survey was approximately 27 feet. Average depths and volumes are displayed in the included data table.

*In this report the lake will be divided into three zones (North, Central, and South) to facilitate viewing the displayed images.

**ADDENDUM: Please note another section was added to the end of this report that includes images of the elevation difference between the two layers, TOP OF MUDLINE HARD BOTTOM. A heat map of the elevation difference is shown with labels (in feet) and areas with the largest difference between the two layers have been highlighted.

2 Holiday Lake Zone Designation

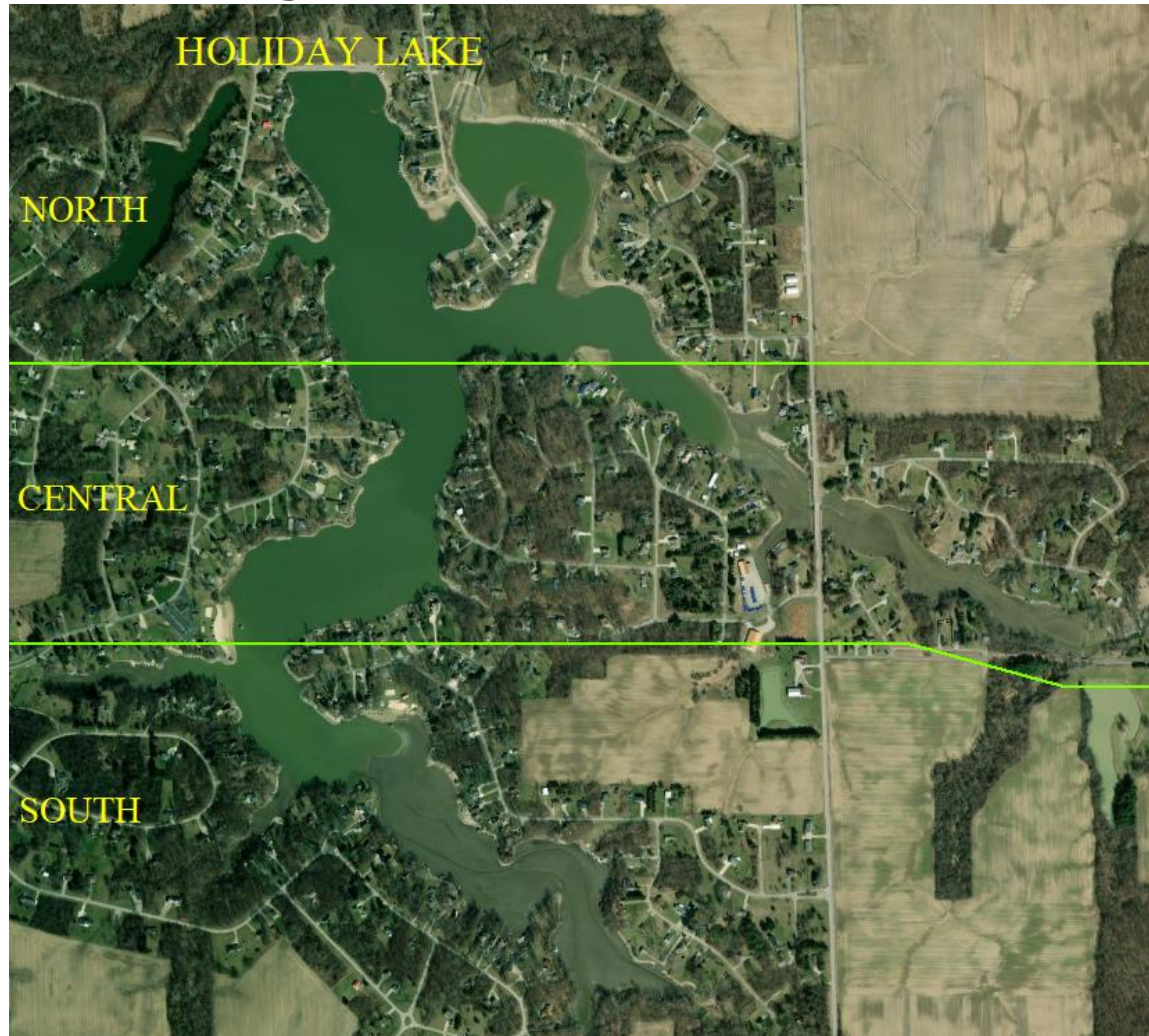


FIGURE 2: LAKE ZONE DESIGNATION (NORTH, CENTRAL AND SOUTH)

3 Entire Lake Images

3.1 Top of Mudline/Lake Bed Elevation Grid (ft)

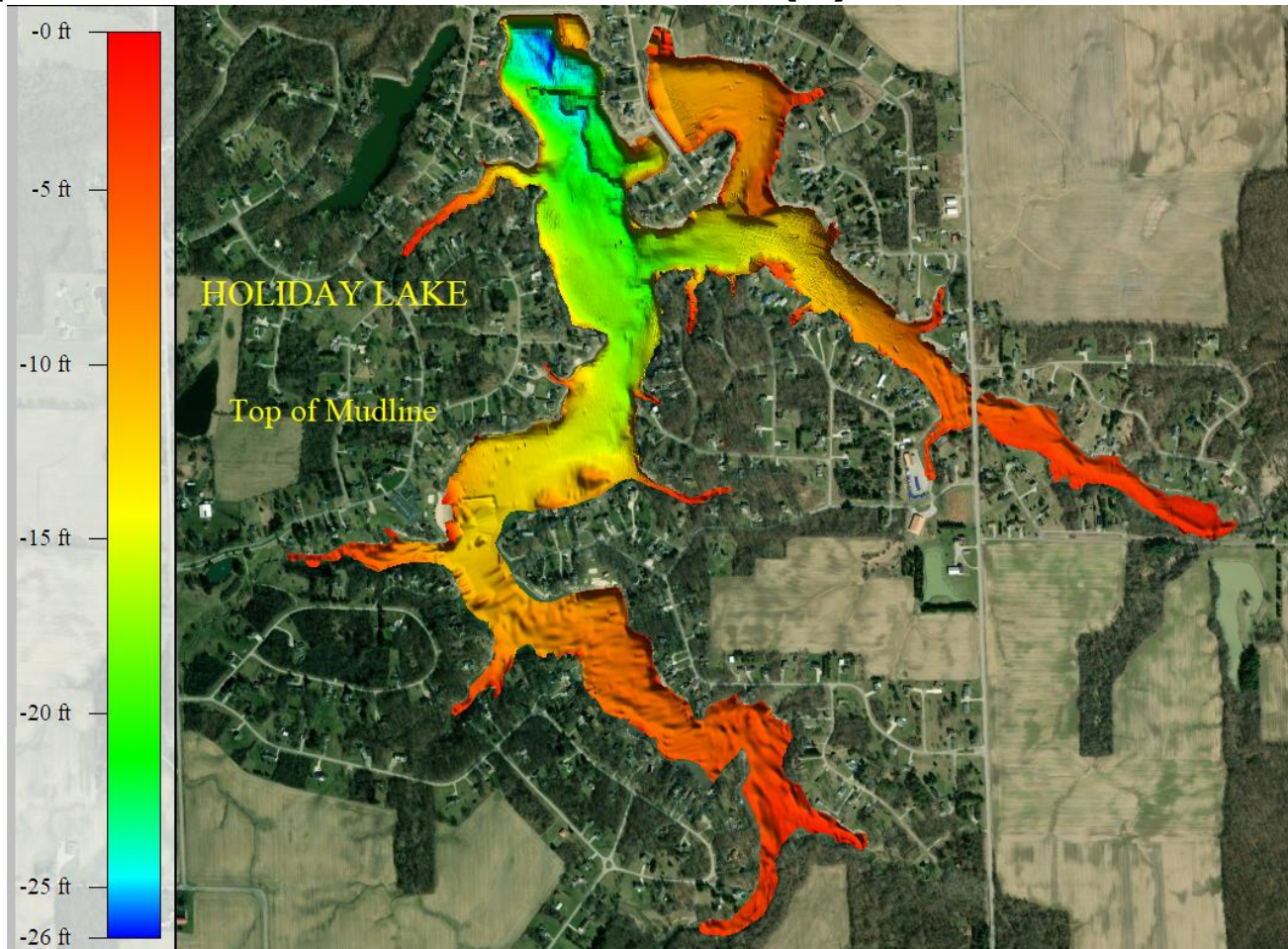


FIGURE 3: TOP OF MUDLINE ELEVATION GRID (FT)

3.2 Top of Mudline Elevation Grid with Depths (-ft)

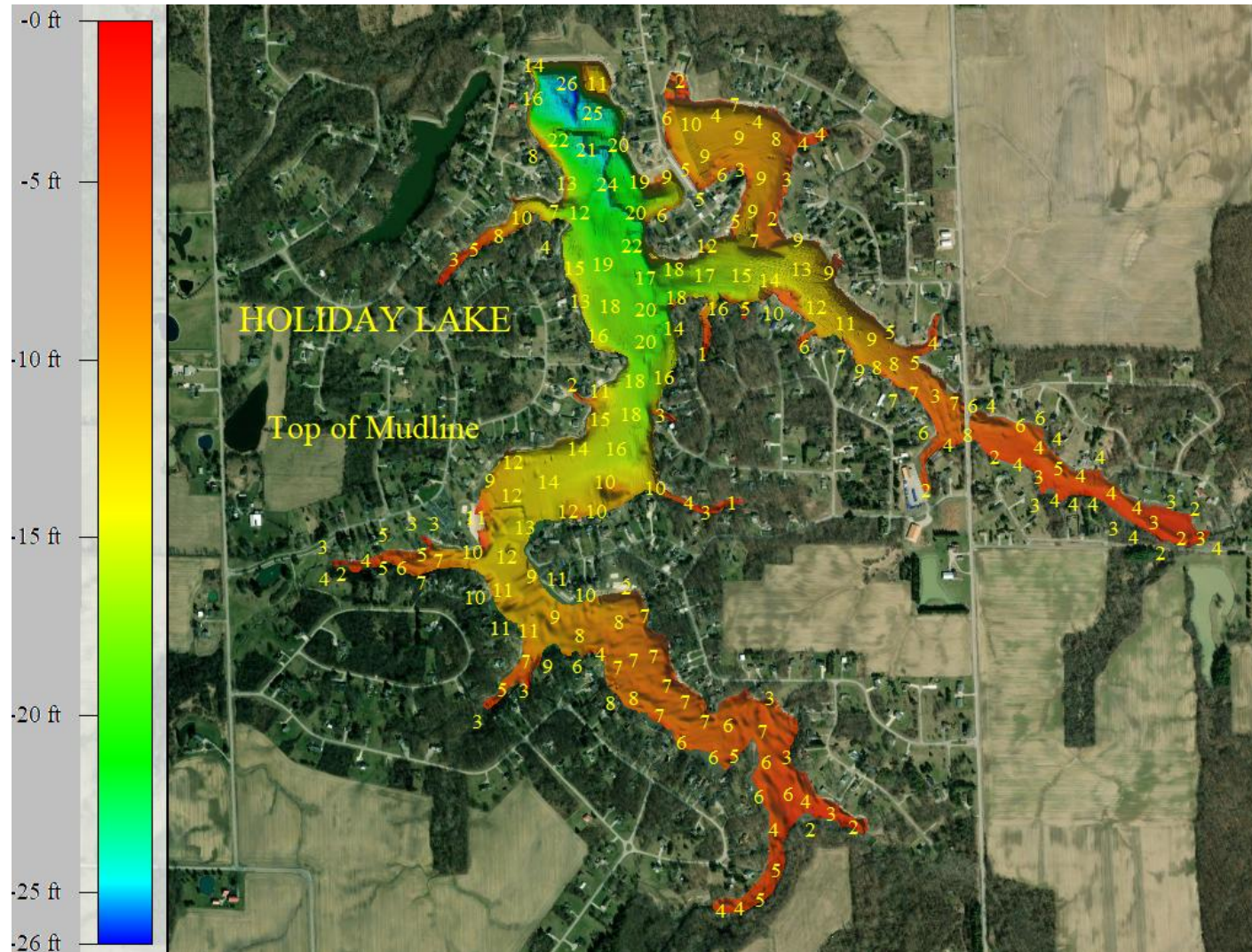


FIGURE 4: TOP OF MUDLINE ELEVATION GRID WITH DEPTHS (-FT)

3.3 Top of Mudline/Lake Bed Depths (-ft)

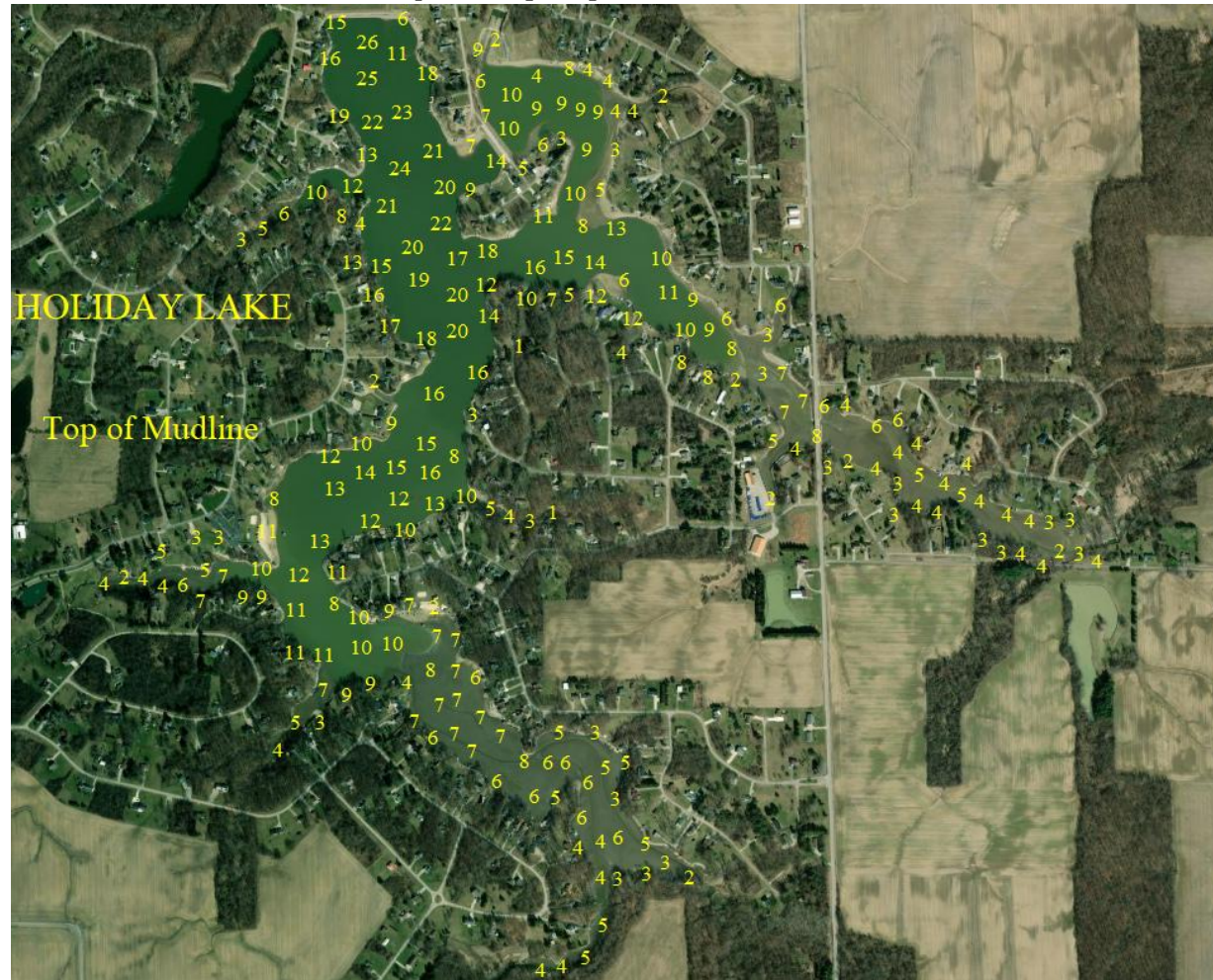


FIGURE 5: TOP OF MUDLINE DEPTHS (-FT)

3.4 Top of Mudline/Lake Bed Real World Elevation Grid (ft)

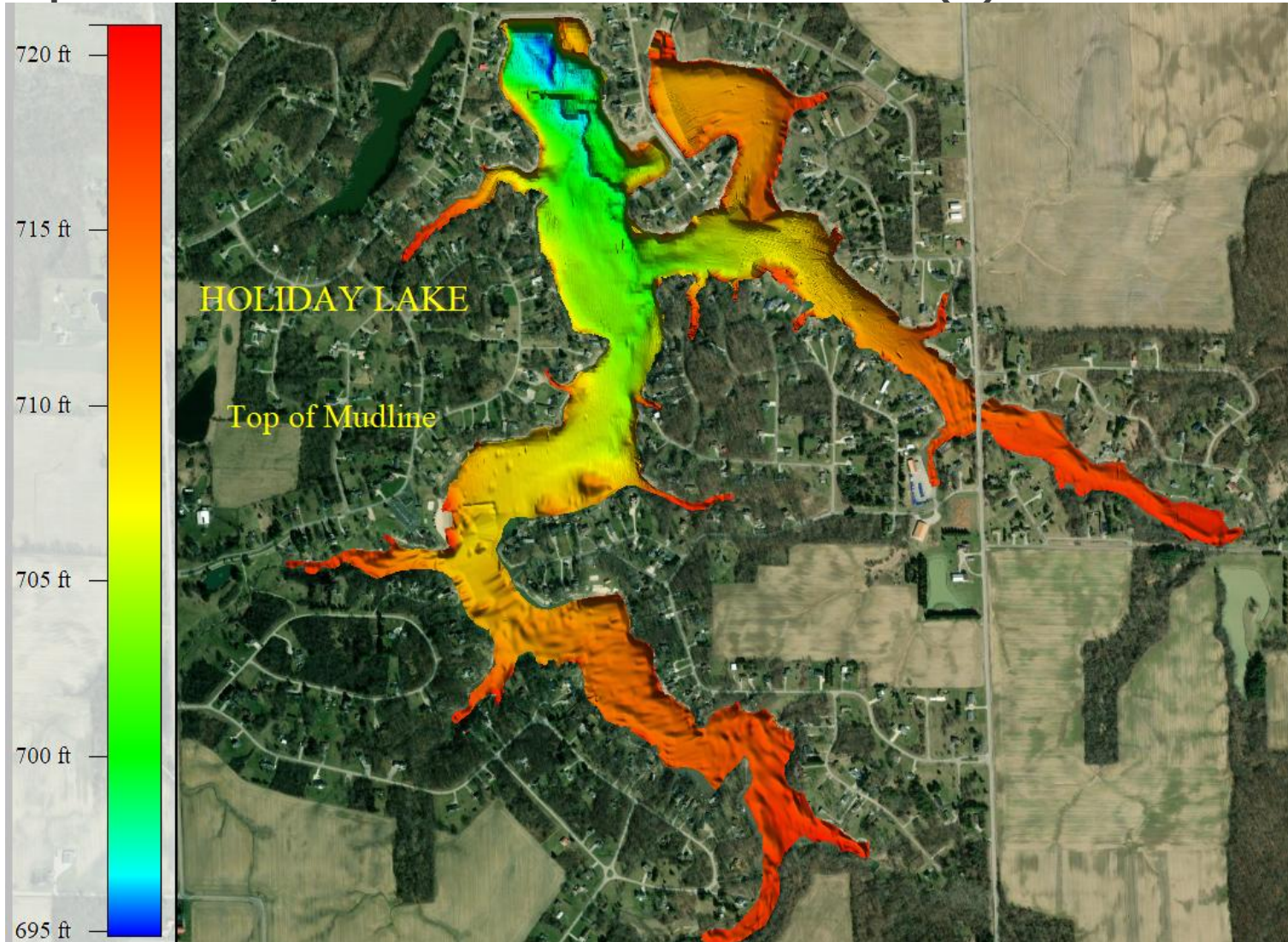


FIGURE 6: TOP OF MUDLINE REAL WORLD ELEVATION GRID (FT)

3.5 Top of Mudline Real World Elevation Grid Plus Labels (ft)

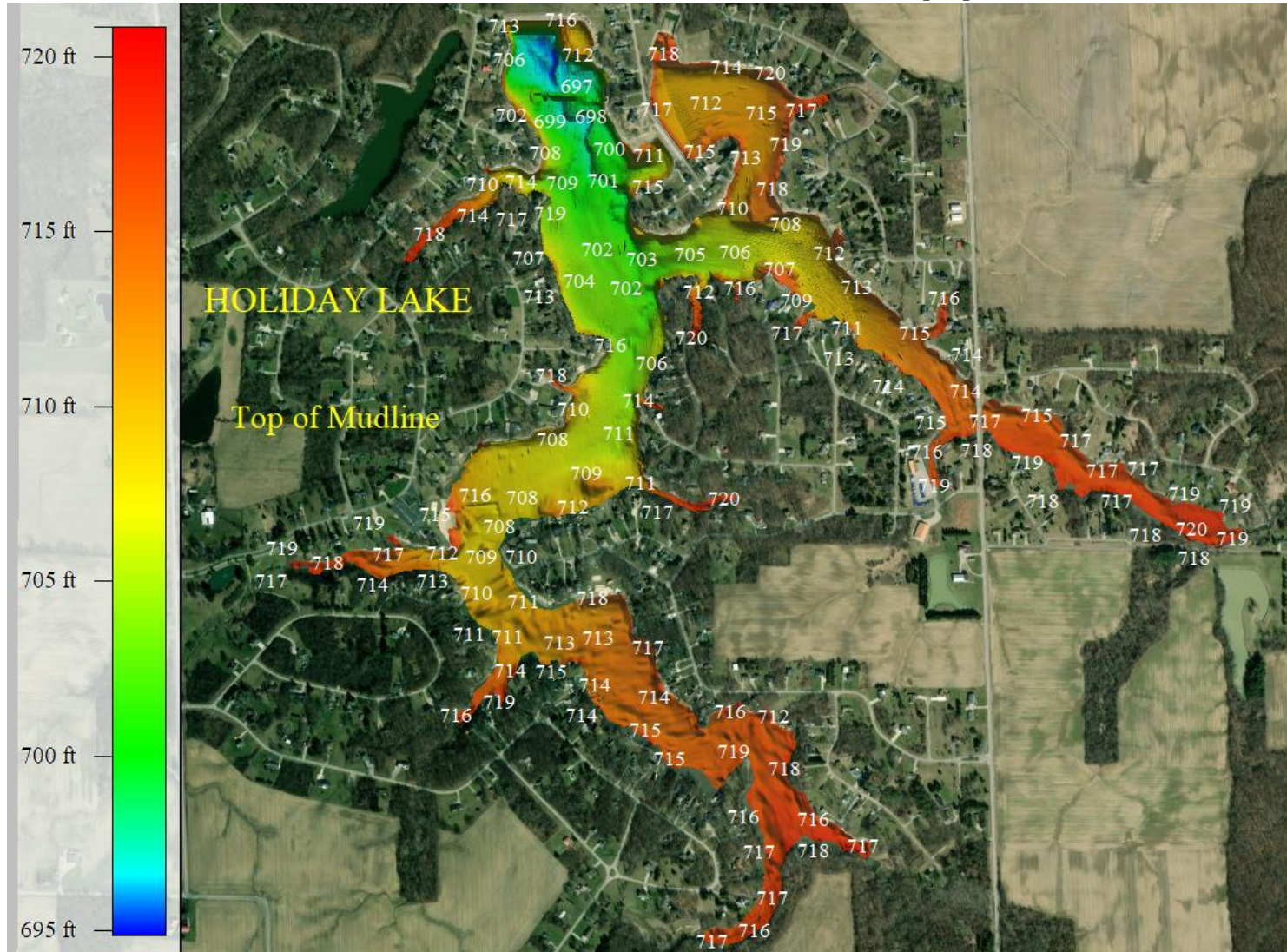


FIGURE 7: TOP OF MUDLINE REAL WORLD ELEVATION GRID WITH LABELS (FT)

3.6 TOP OF MUDLINE CONTOURS (1 FT CONTOURS)

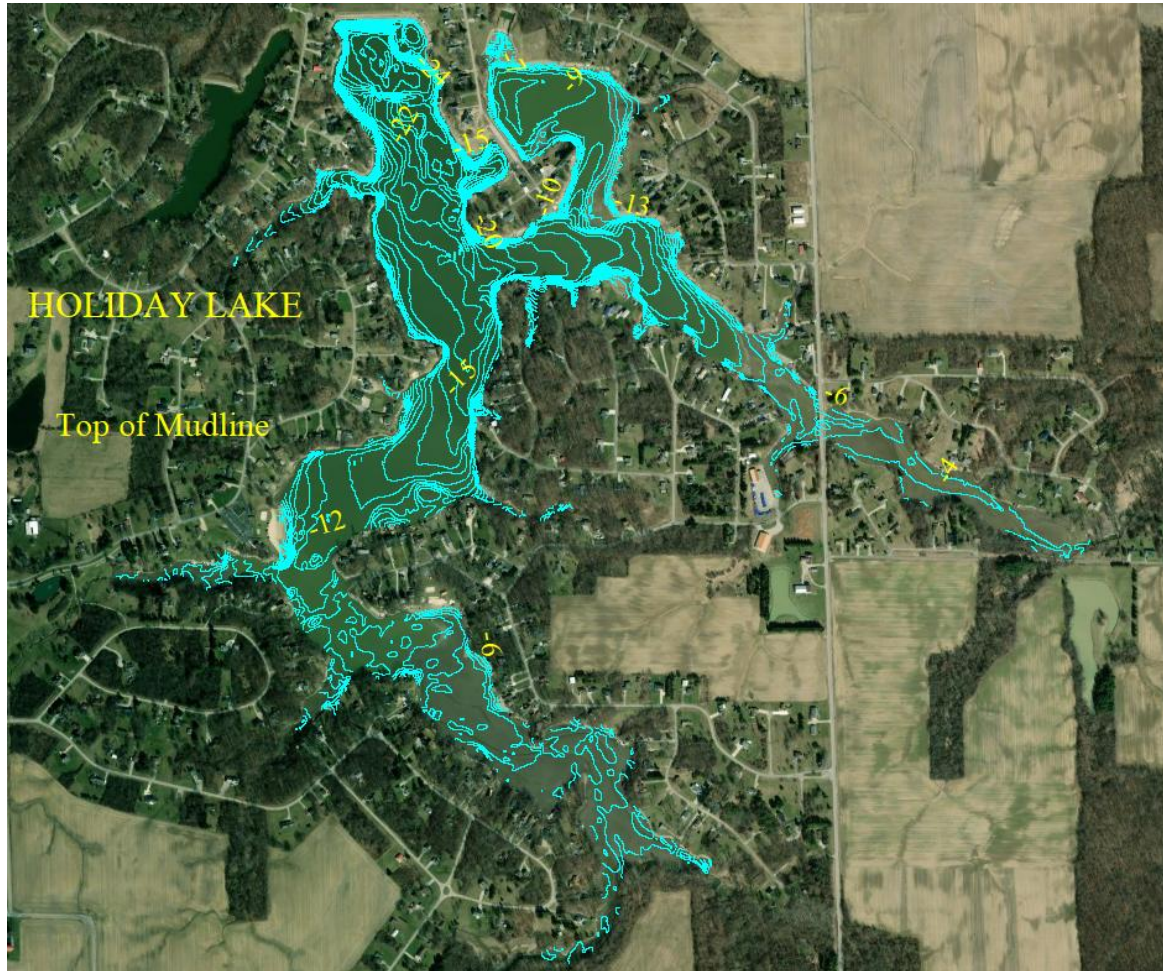


FIGURE 8: TOP OF MUDLINE CONTOURS (1 FT INTERVALS)

3.7 HARD BOTTOM ELEVATION GRID (FT)

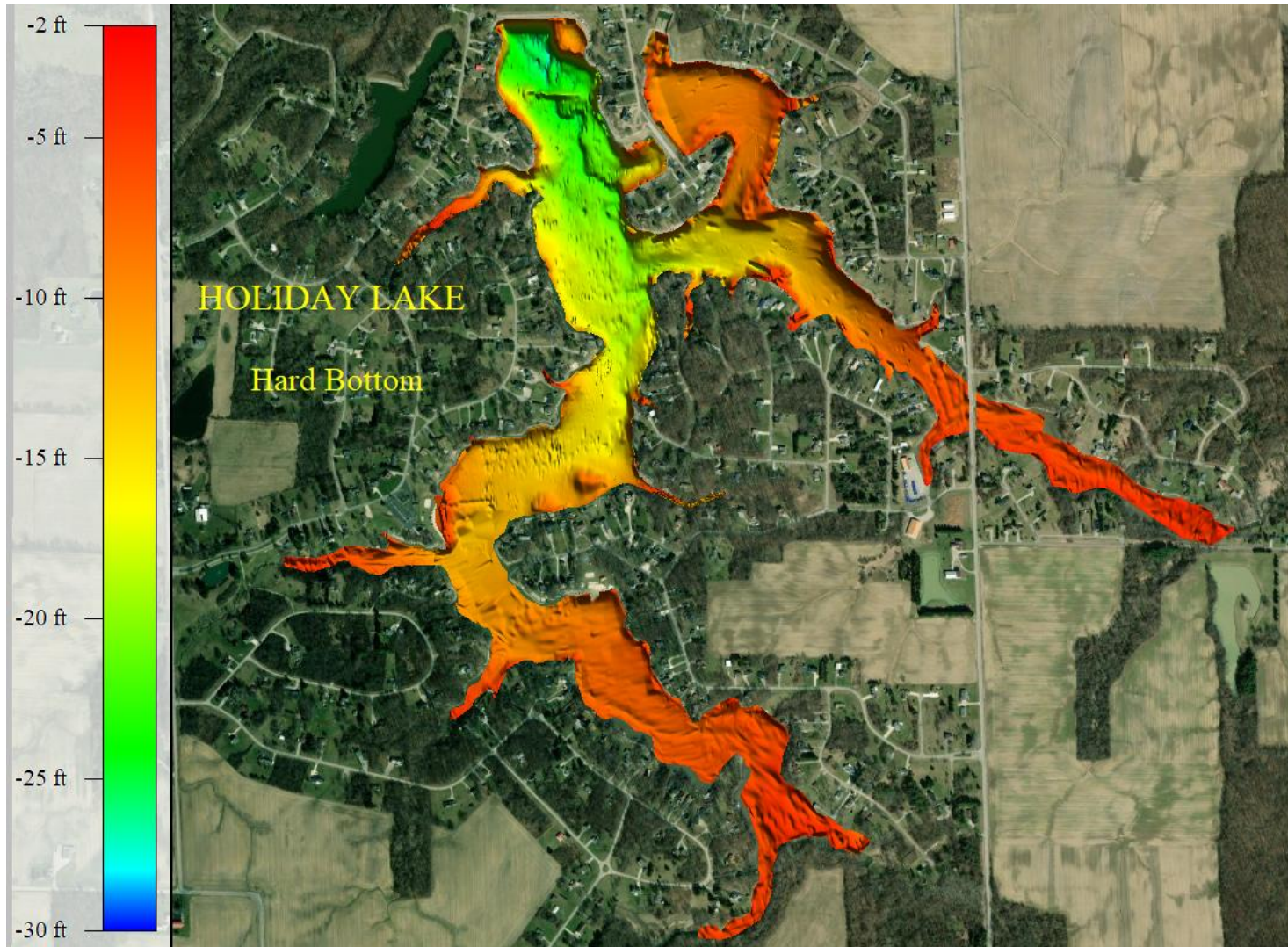


FIGURE 9: HARD BOTTOM ELEVATION GRID (FT)

3.8 HARD BOTTOM ELEVATION GRID WITH DEPTHS (-FT)

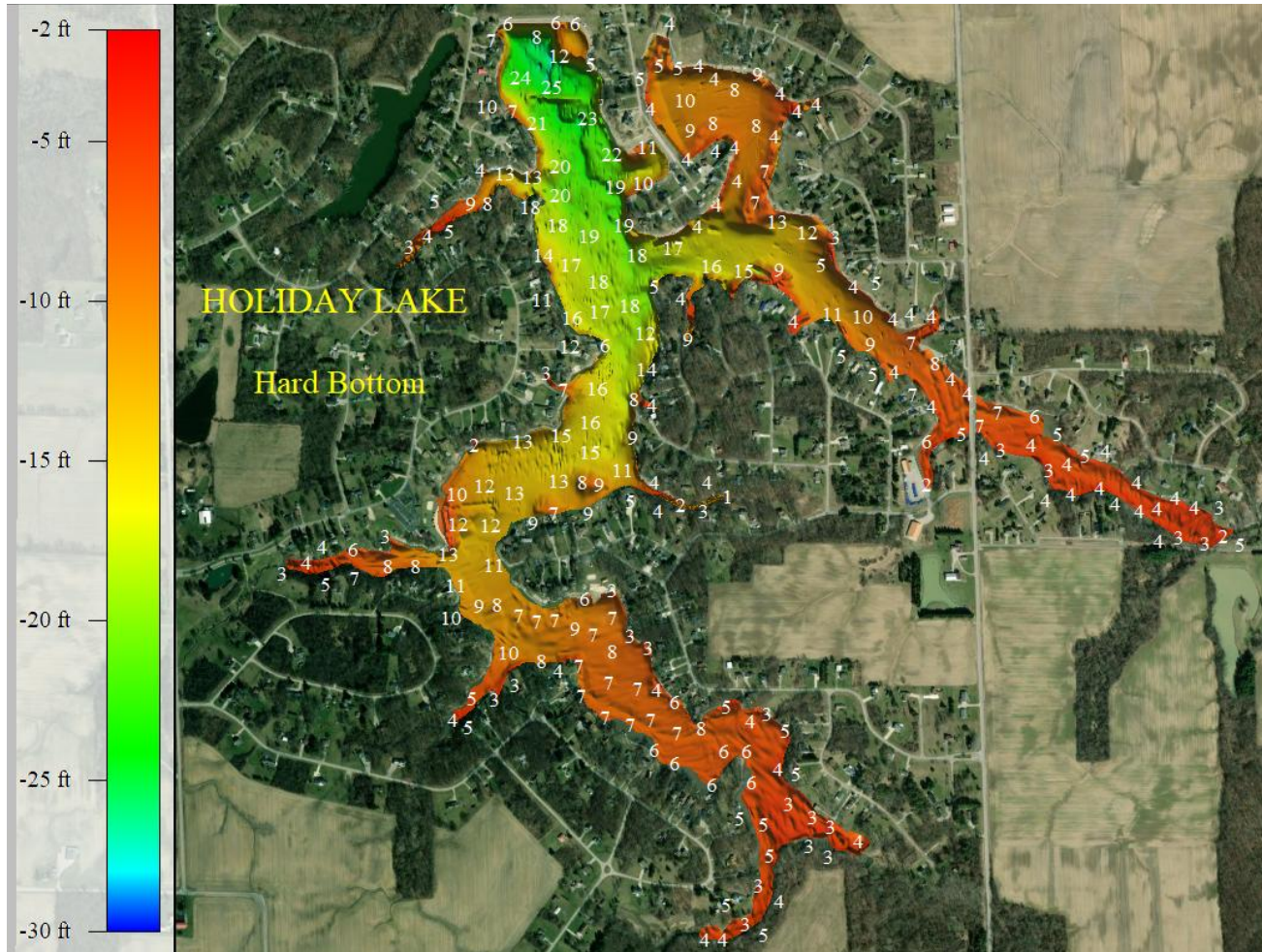


FIGURE 10: HARD BOTTOM ELEVATION GRID WITH DEPTHS (-FT)

4 NORTH ZONE IMAGES

4.1 Top of Mudline Elevation Grid (ft)

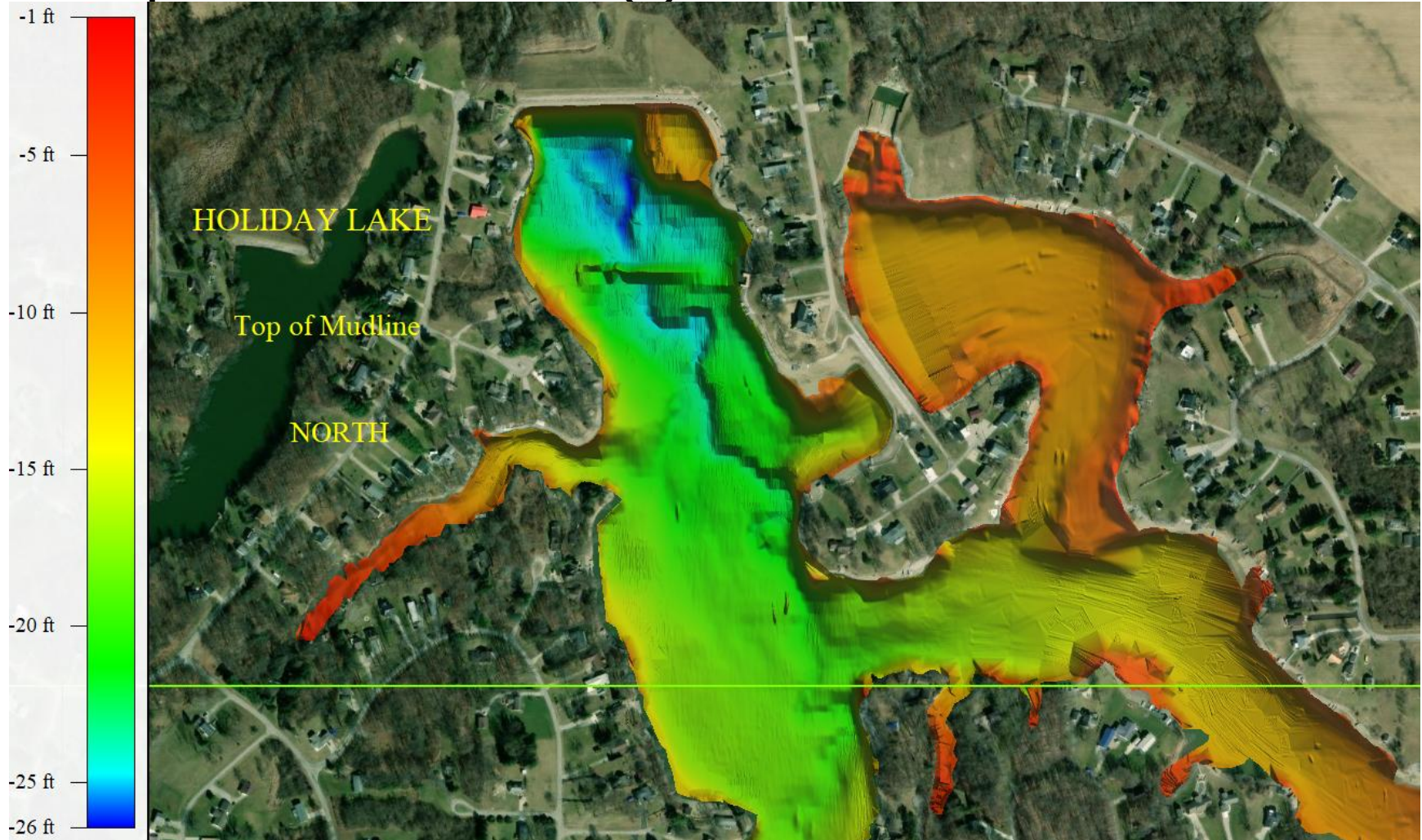


FIGURE 11: NORTH ZONE TOP OF MUDLINE ELEVATION GRID (FT)

4.2 Top of Mudline Elevation Grid with Depths (-ft)

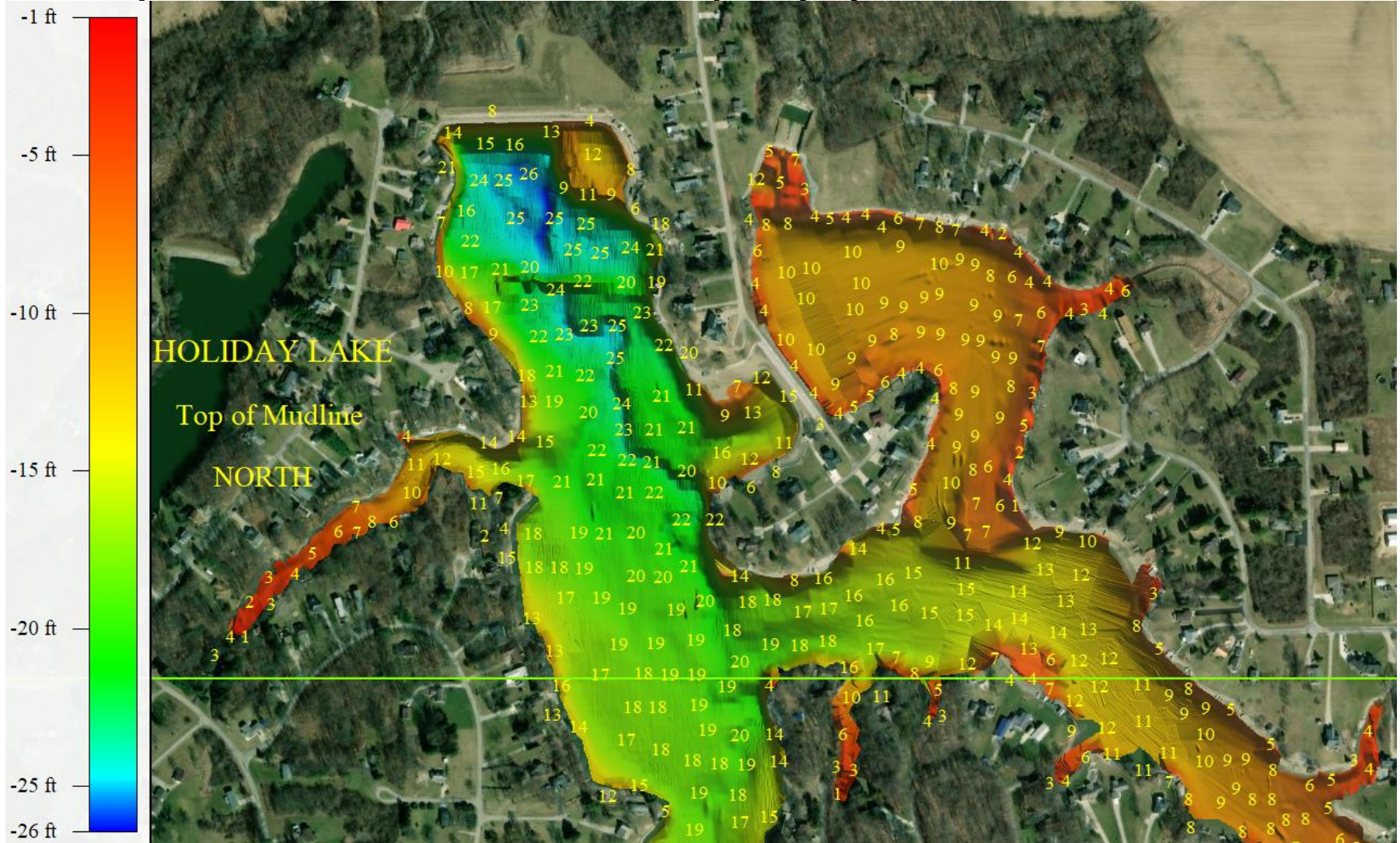


FIGURE 12: NORTH ZONE TOP OF MUDLINE ELEVATION GRID WITH DEPTHS (-FT)

4.3 TOP OF MUDLINE DEPTHS (-FT)



FIGURE 13: NORTH ZONE TOP OF MUDLINE DEPTHS (-FT)

4.4 Top of Mudline Real World Elevations Grid (ft)

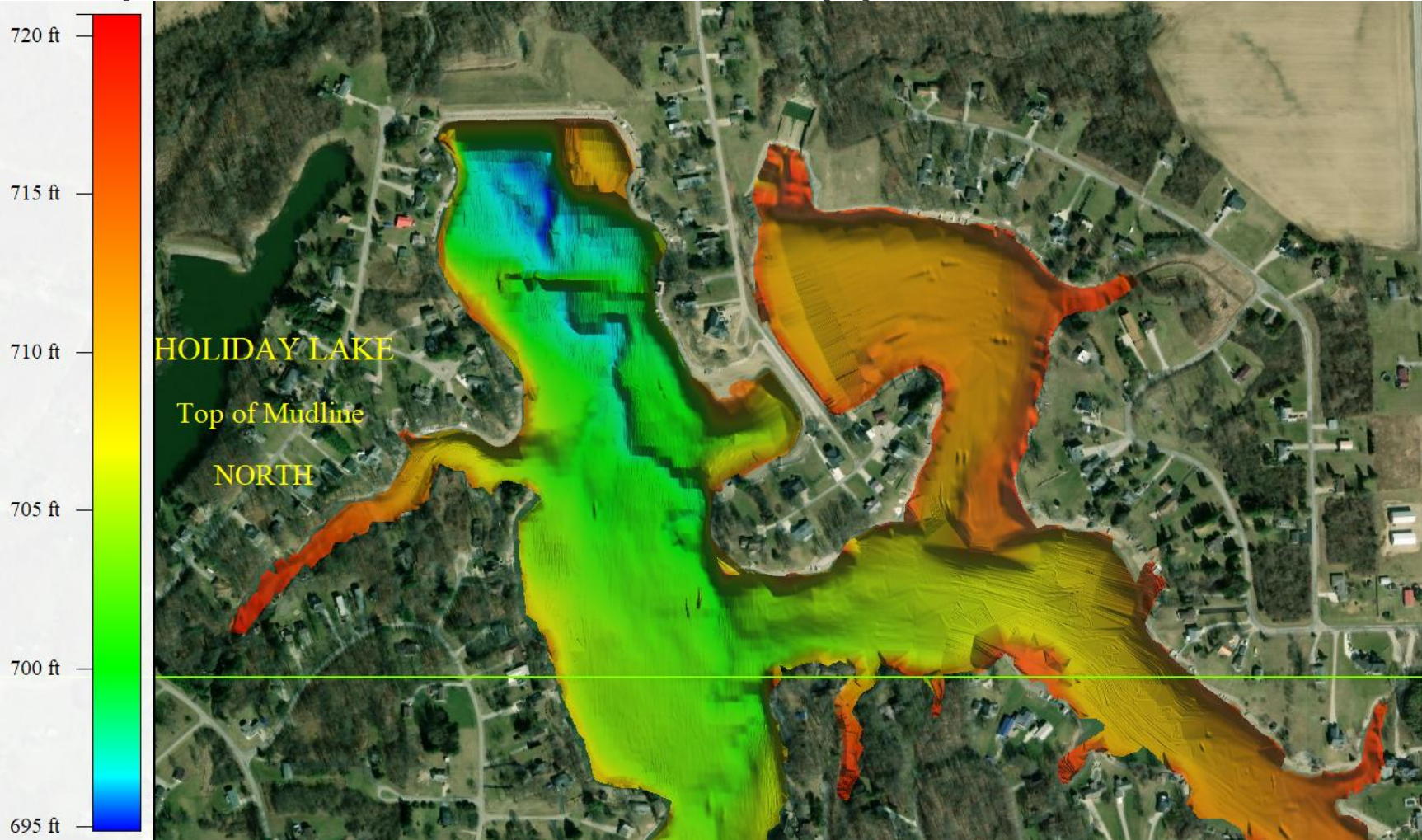


FIGURE 14: NORTH ZONE TOP OF MUDLINE REAL WORLD ELEVATIONS GRID (FT)

4.5 Top of Mudline Real World Elevation Grid with Labels (ft)

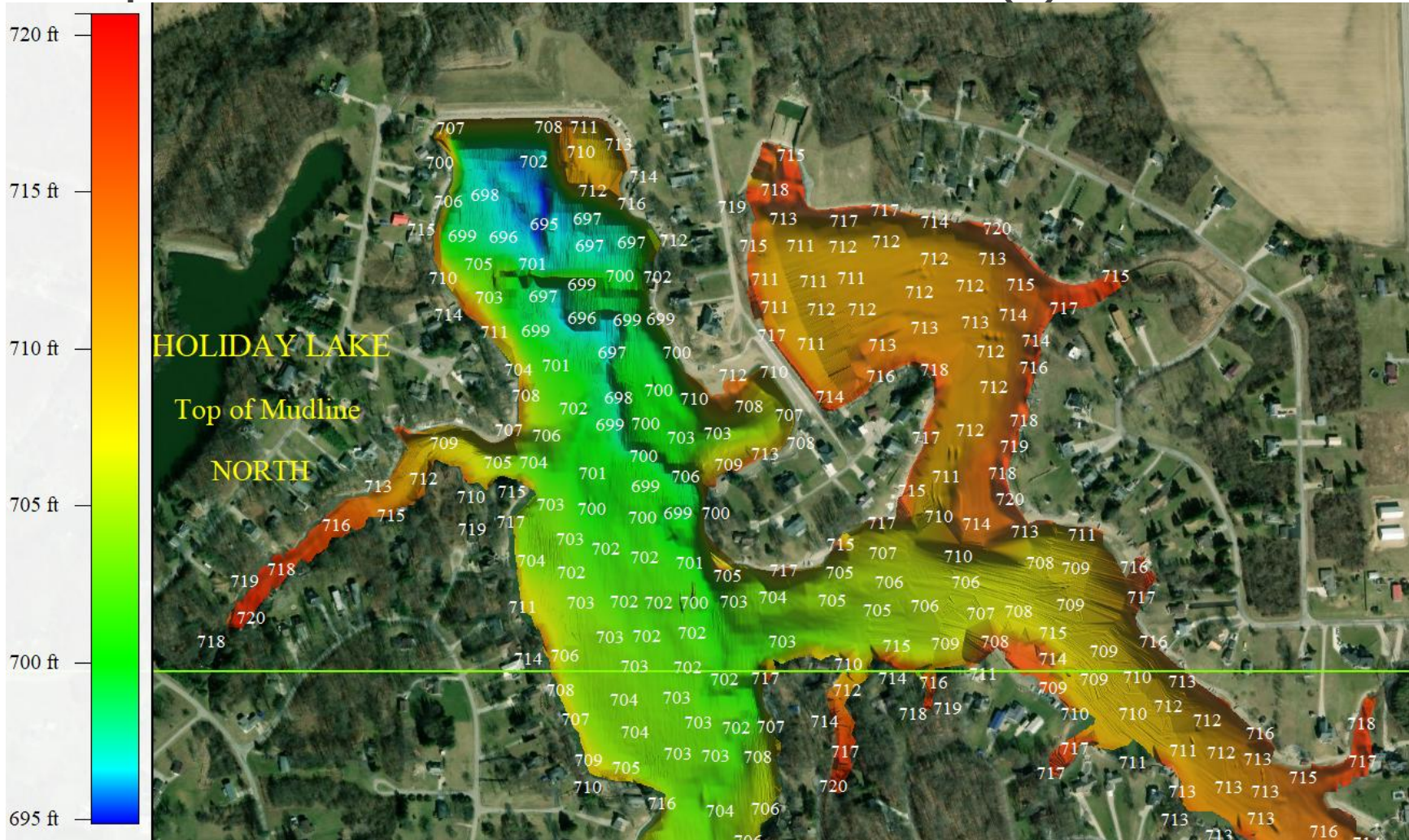


FIGURE 15: NORTH ZONE TOP OF MUDLINE REAL WORLD ELEVATION GRID WITH LABELS (FT)

4.6 Top of Mudline Contours (1 ft Intervals)

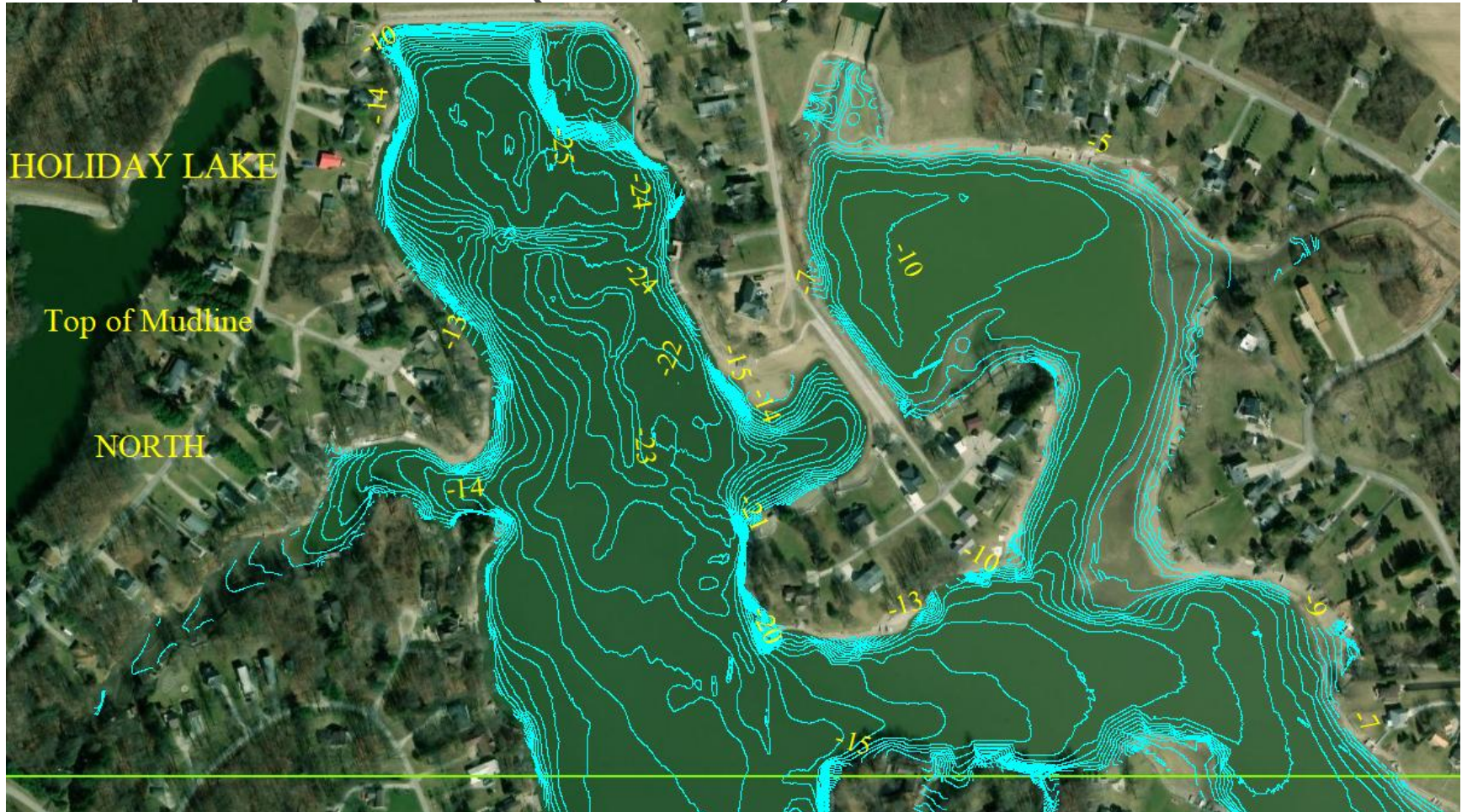


FIGURE 16: NORTH ZONE TOP OF MUDLINE CONTOURS (1 FT INTERVALS)

4.7 Hard Bottom Elevation Grid (ft)

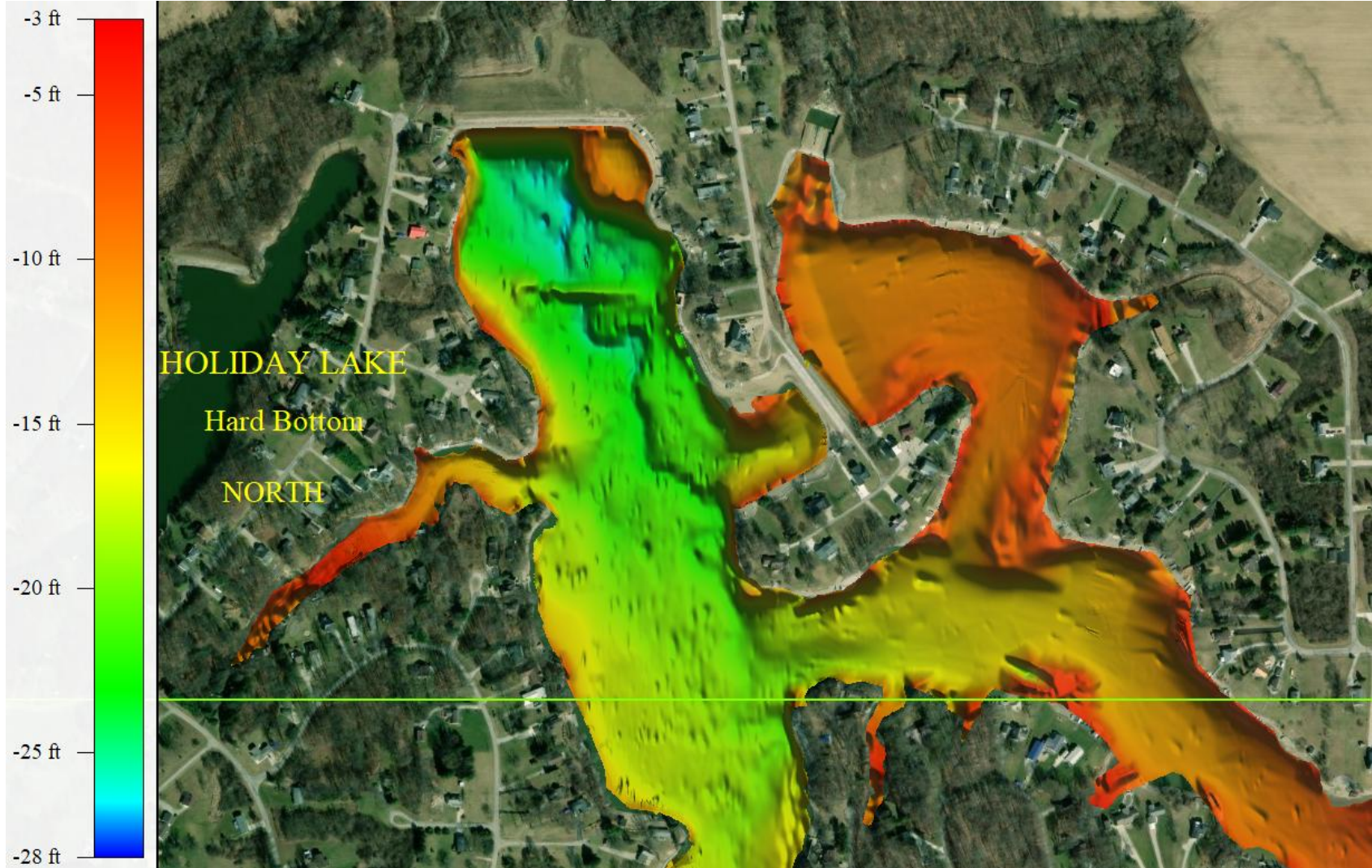


Figure 17: North Zone Hard Bottom Elevation Grid (ft)

4.8 Hard Bottom Elevation Grid with Depths (-ft)

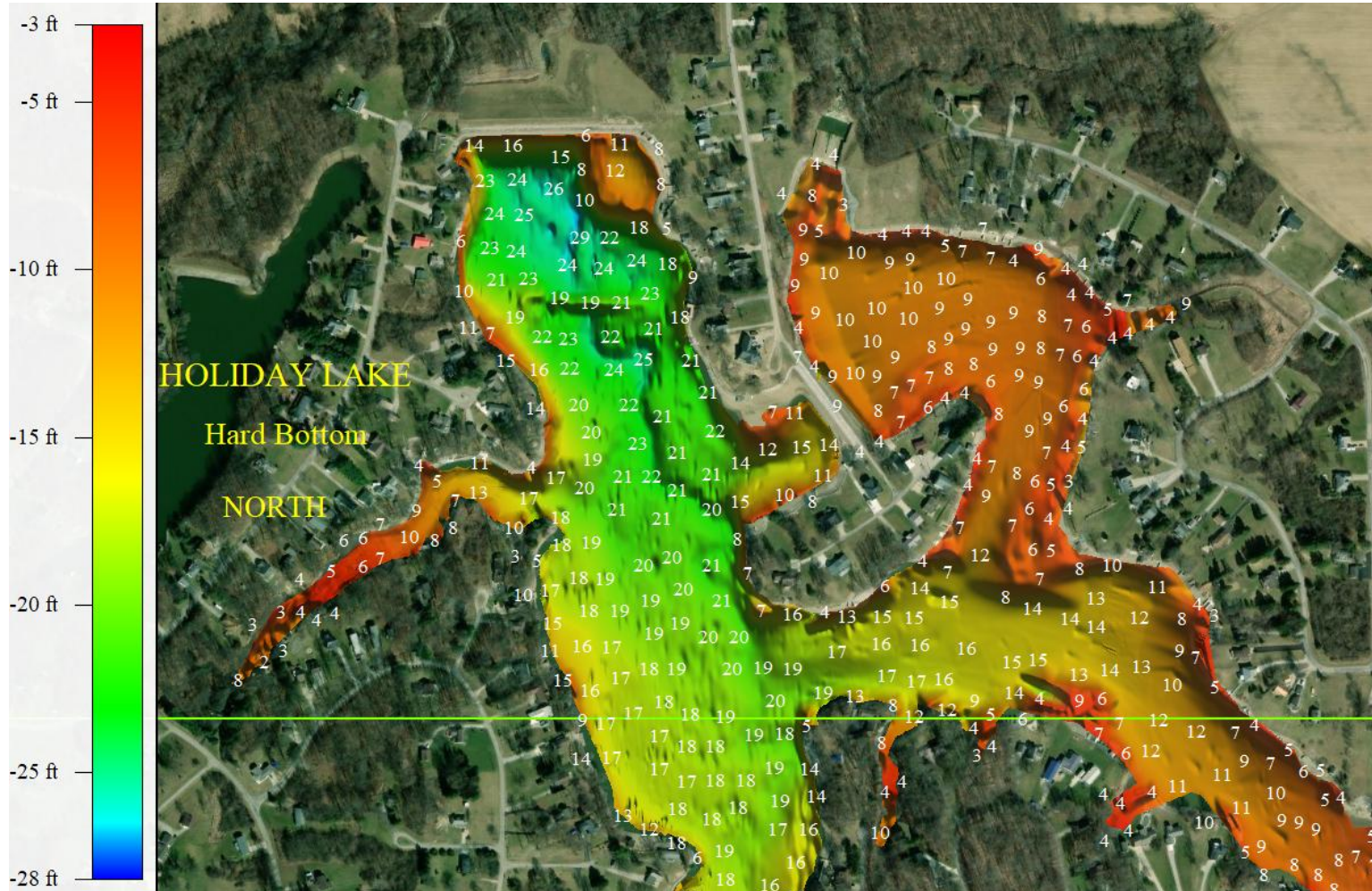


FIGURE 18: NORTH ZONE HARD BOTTOM ELEVATION GRID WITH DEPTHS (-FT)

4.9 Hard Bottom Contours (1 ft Intervals)

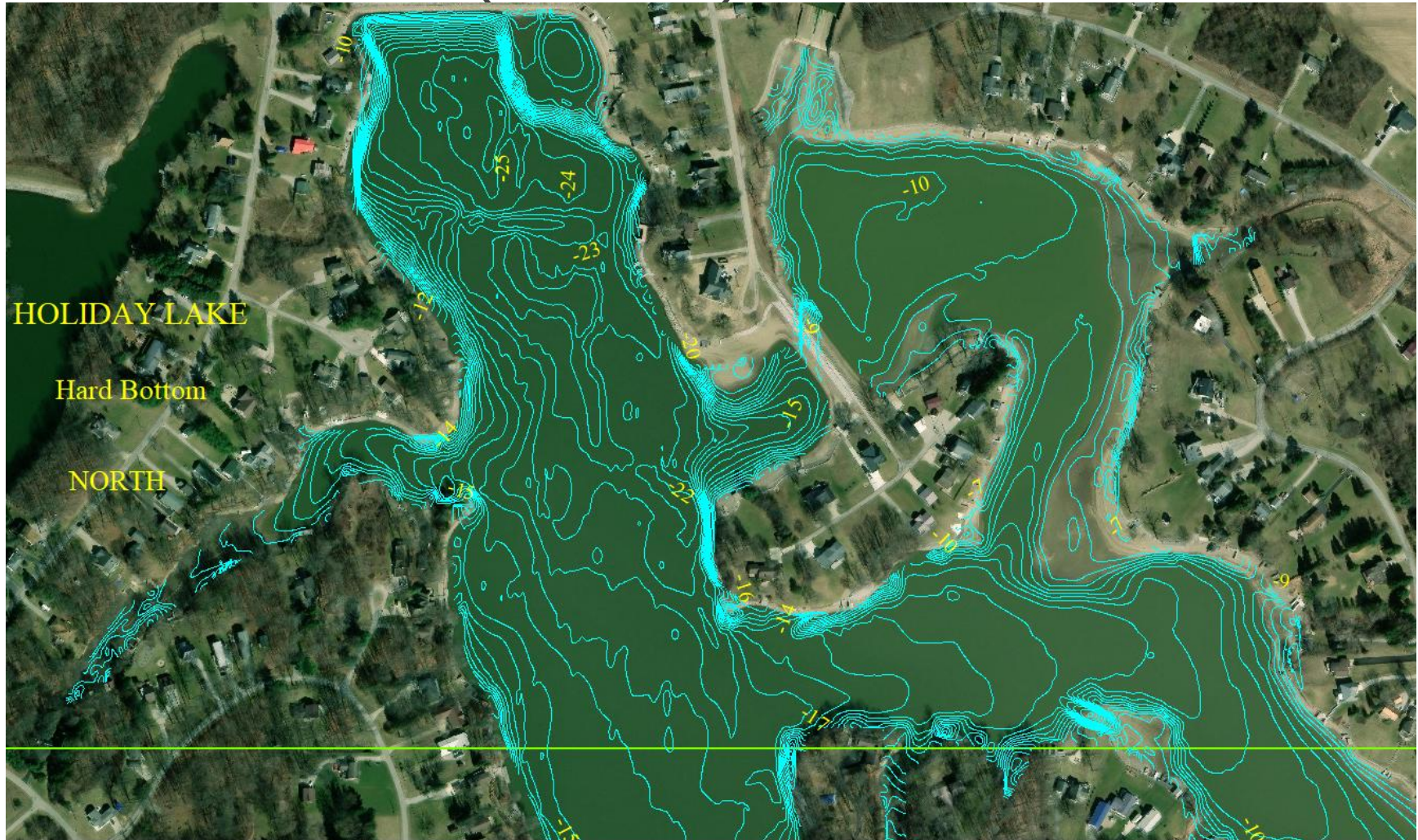


FIGURE 19: NORTH ZONE HARD BOTTOM CONTOURS (1 FT INTERVALS)

5 Central Zone Images

5.1 Top of Mudline Elevation Grid (ft)

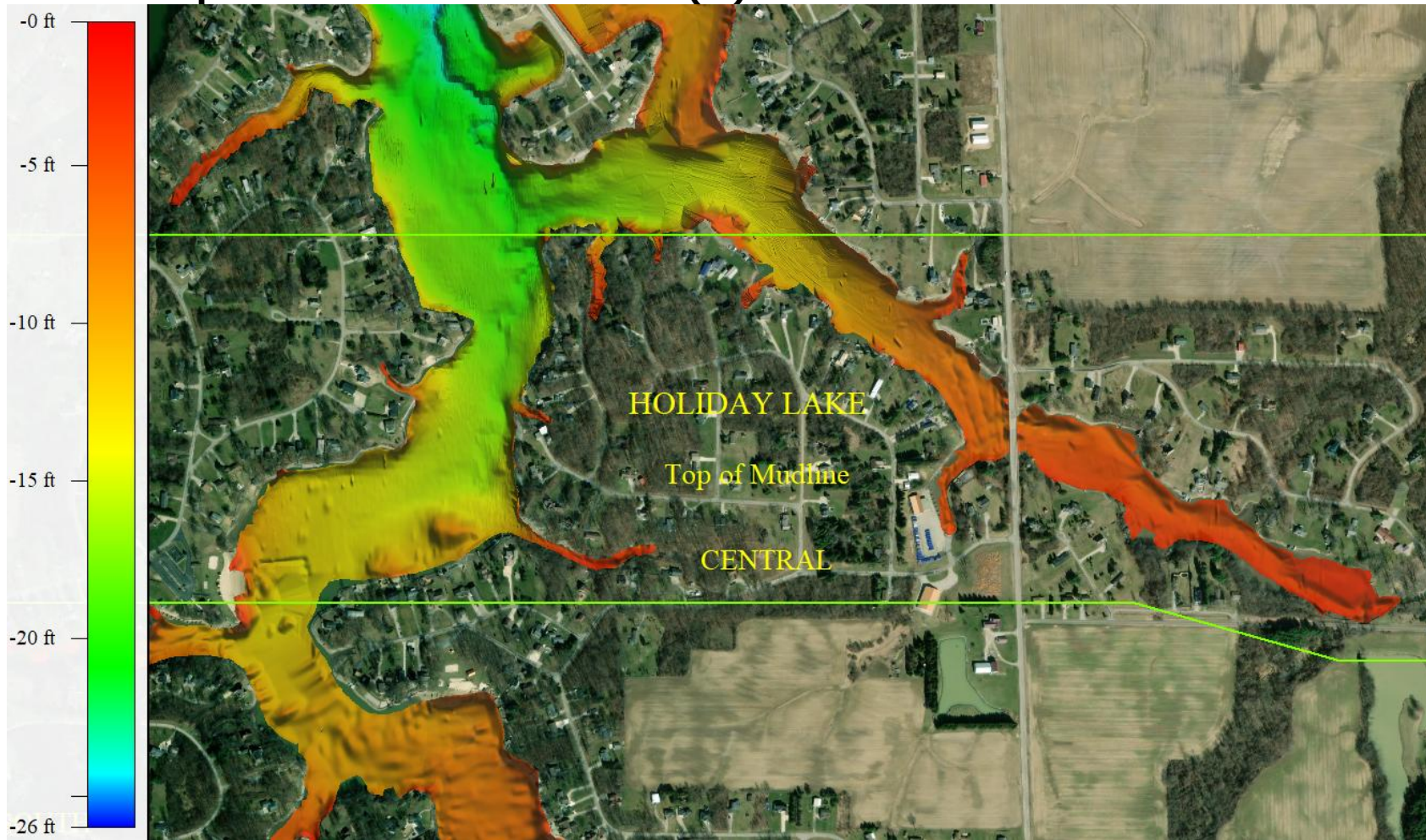


FIGURE 20: CENTRAL ZONE TOP OF MUDLINE ELEVATION GRID (FT)

5.2 Top of Mudline Elevation Grid with Depths (-ft)

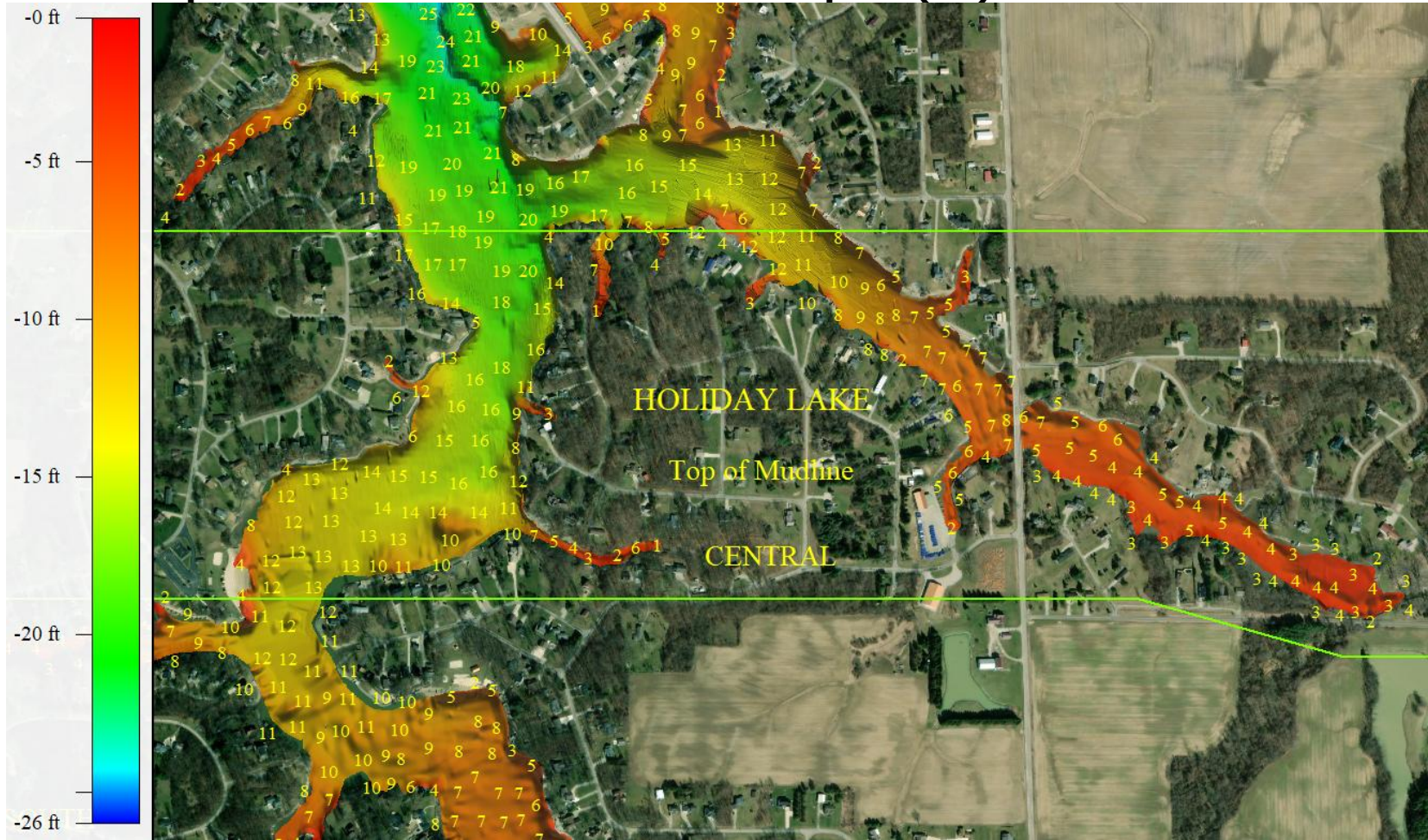


FIGURE 21: CENTRAL ZONE TOP OF MUDLINE GRID WITH DEPTHS (-FT)

5.3 Top of Mudline Depths (-ft)

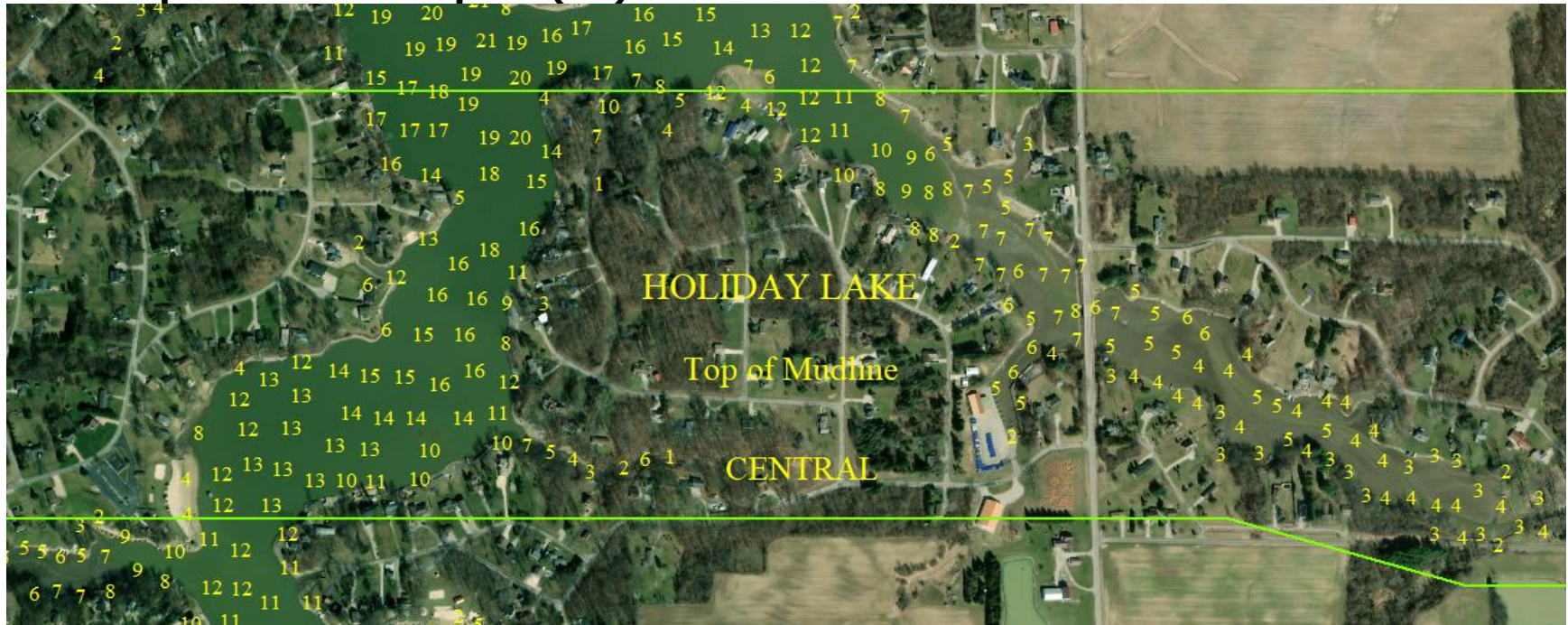


FIGURE 22: CENTRAL ZONE TOP OF MUDLINE DEPTHS (-FT)

5.4 Top of Mudline Real World Elevation Grid (ft)

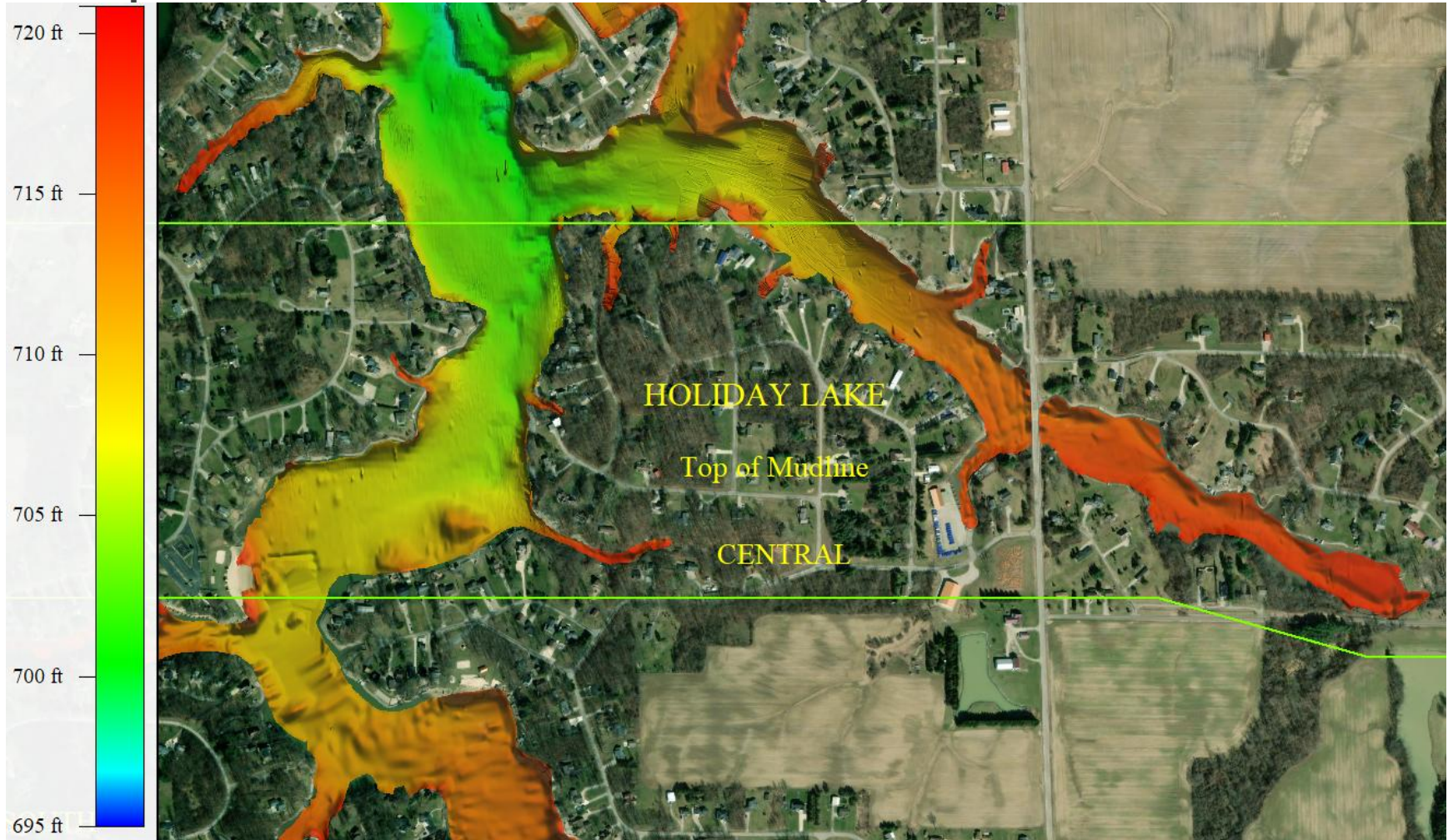


FIGURE 23: CENTRAL ZONE TOP OF MUDLINE REAL WORLD ELEVATION GRID (FT)

5.5 Top of Mudline Real World Elevation Grid with Labels (ft)

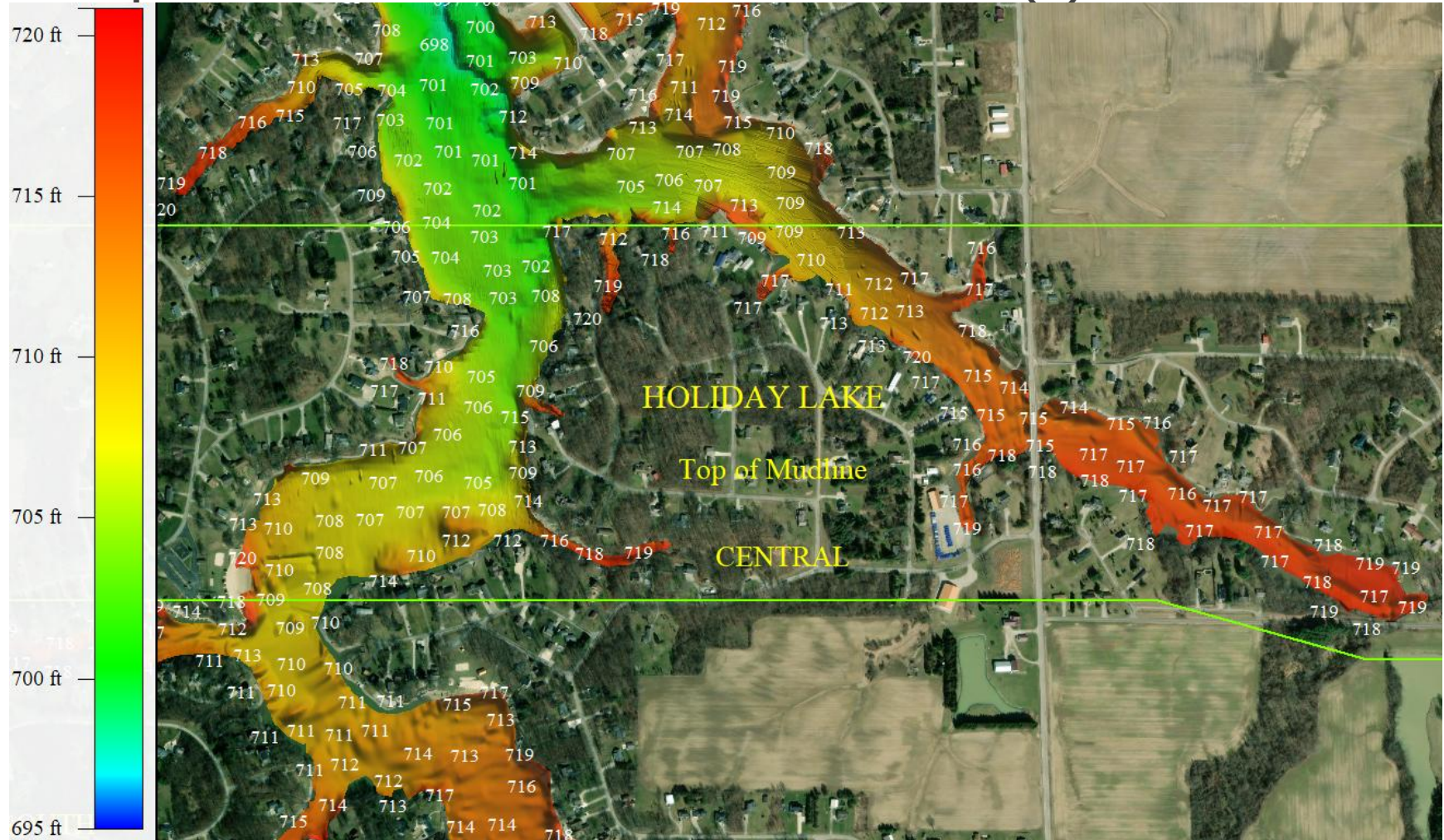


FIGURE 24: CENTRAL ZONE REAL WORLD ELEVATION GRID WITH LABELS (FT)

5.6 Top of Mudline Contours (1 ft Intervals)



FIGURE 25: CENTRAL ZONE TOP OF MUDLINE CONTOURS (1 FT INTERVALS)

5.7 Hard Bottom Elevation Grid (ft)

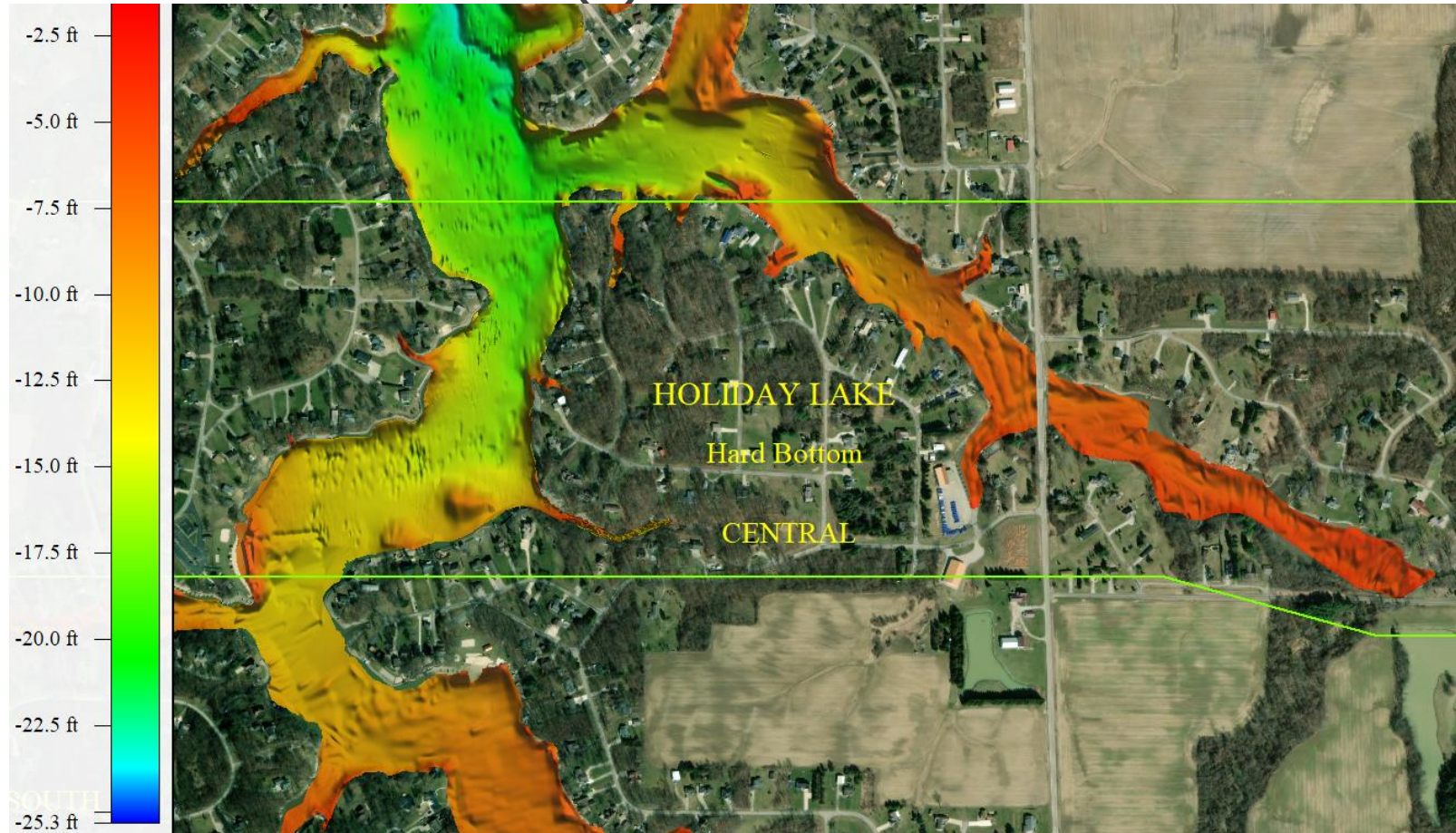


FIGURE 26: CENTRAL ZONE HARD BOTTOM ELEVATION GRID (FT)

5.8 Hard Bottom Elevation Grid with Depths (-ft)

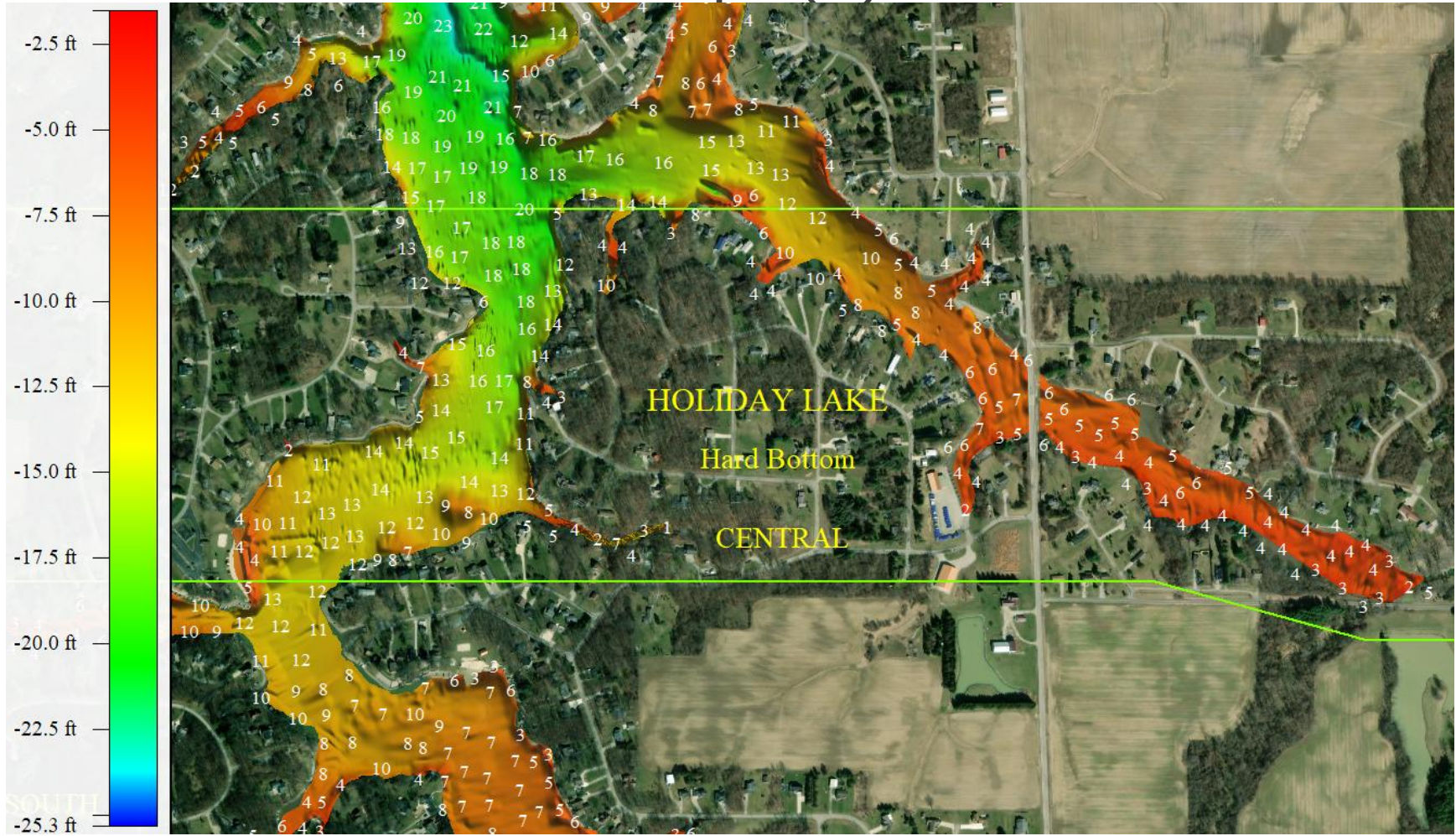


FIGURE 27: CENTRAL ZONE HARD BOTTOM ELEVATION GRID WITH DEPTHS (-FT)

5.9 HARD BOTTOM CONTOURS (1 FT INTERVALS)



FIGURE 28: CENTRAL ZONE HARD BOTTOM CONTOURS (1 FT INTERVALS)

6 South Zone Images

6.1 Top of Mudline Elevation Grid (ft)

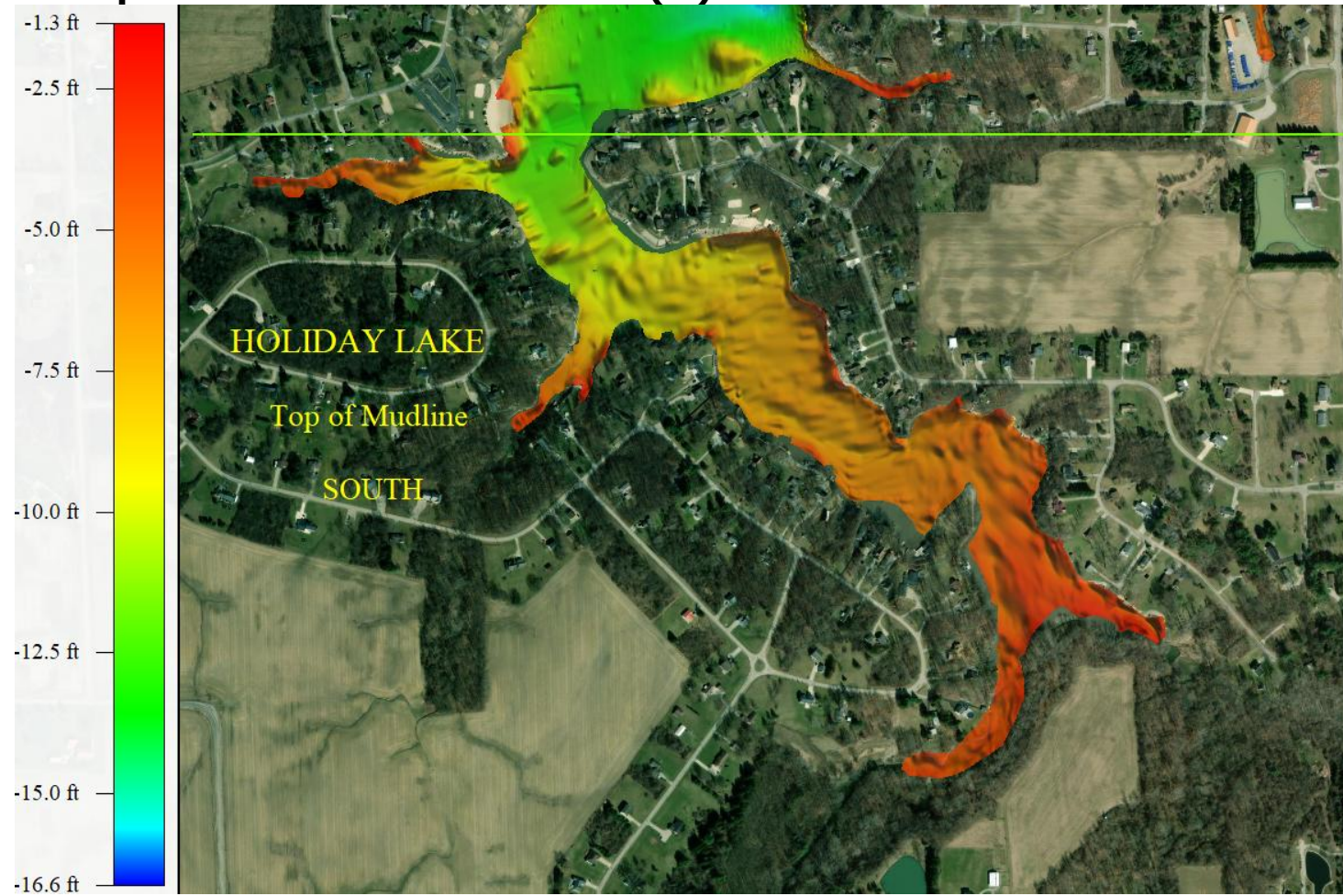


FIGURE 29: SOUTH ZONE TOP OF MUDLINE ELEVATION GRID (FT)

6.2 Top of Mudline Elevation Grid with Depths (-ft)

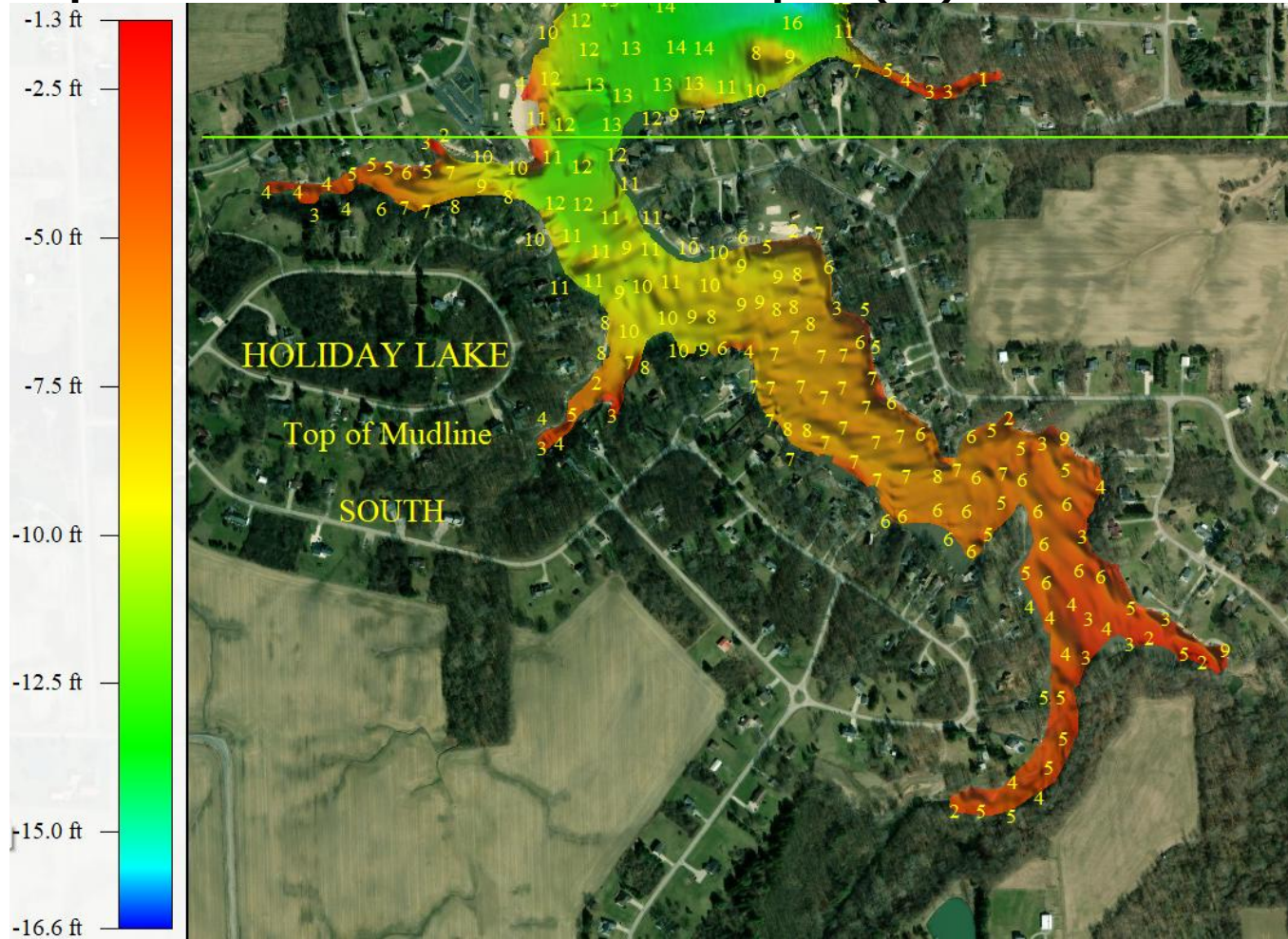


FIGURE 30: SOUTH ZONE TOP OF MUDLINE ELEVATION GRID WITH DEPTHS (-FT)

6.3 Top of Mudline Depths (-ft)



FIGURE 31: SOUTH ZONE TOP OF MUDLINE DEPTHS (-FT)

6.4 Top of Mudline Real World Elevation Grid (ft)

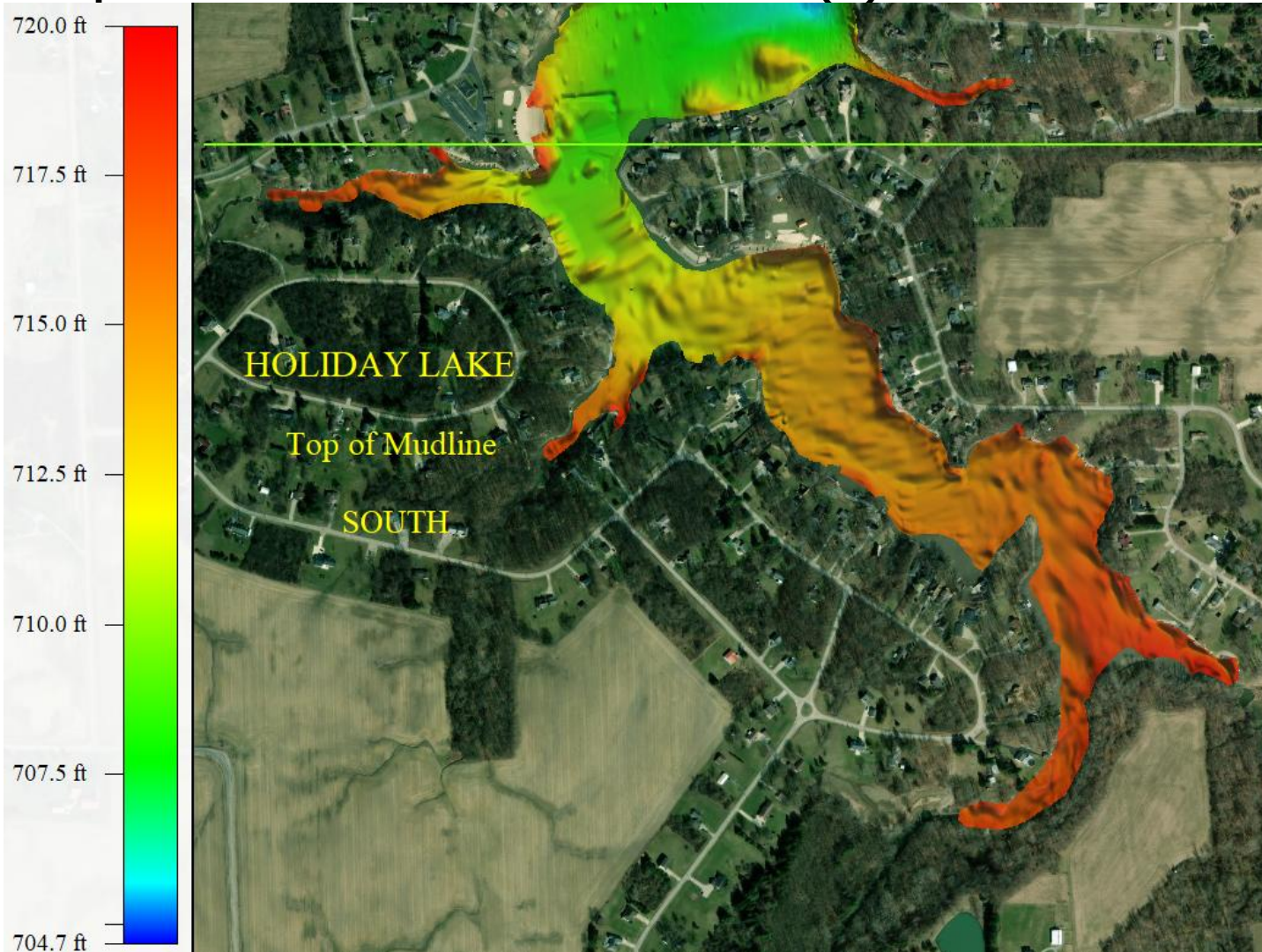


FIGURE 32: SOUTH ZONE TOP OF MUDLINE REAL WORLD ELEVATION GRID (FT)

6.5 Top of Mudline Real World Elevation Grid with Labels (ft)

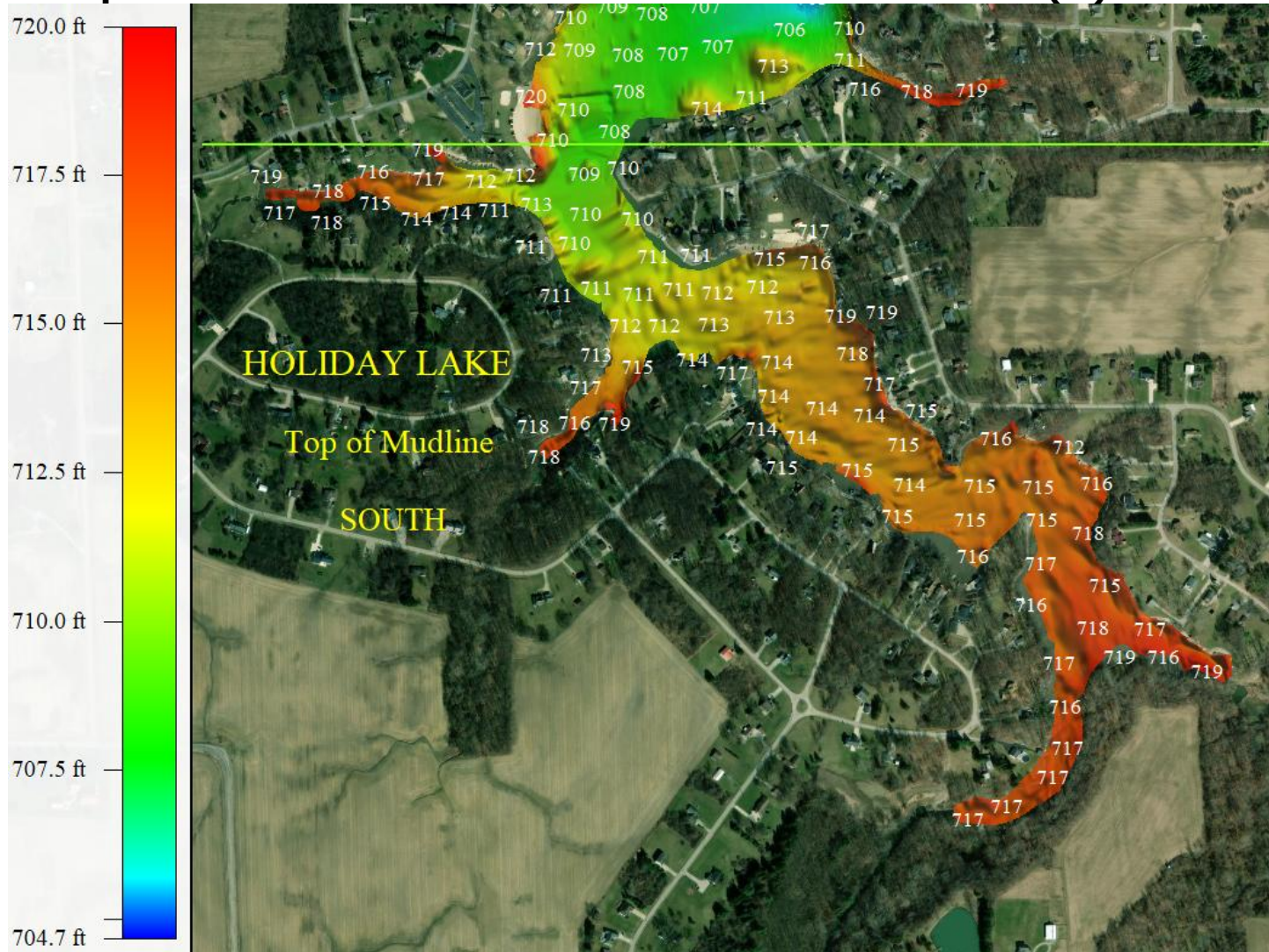


FIGURE 33: SOUTH ZONE TOP OF MUDLINE REAL WORLD ELEVATION GRID WITH LABELS (FT)

6.6 Top of Mudline Contours (1 ft Intervals)



FIGURE 34: SOUTH ZONE TOP OF MUDLINE CONTOURS (1 FT INTERVALS)

6.7 Hard Bottom Elevation Grid (ft)

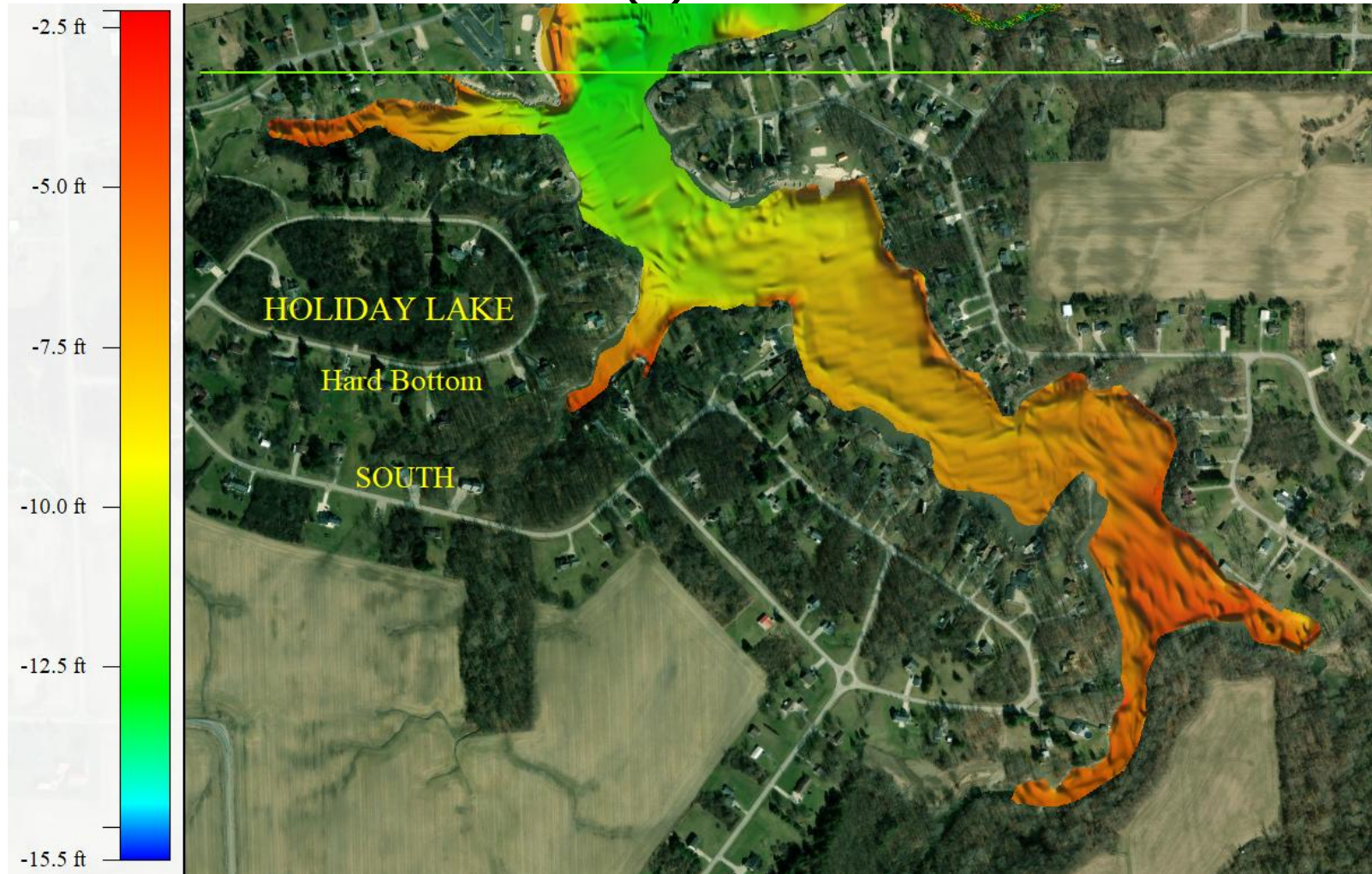


FIGURE 35: SOUTH ZONE HARD BOTTOM ELEVATION GRID (FT)

6.8 Hard Bottom Elevation Grid with Depths (-ft)

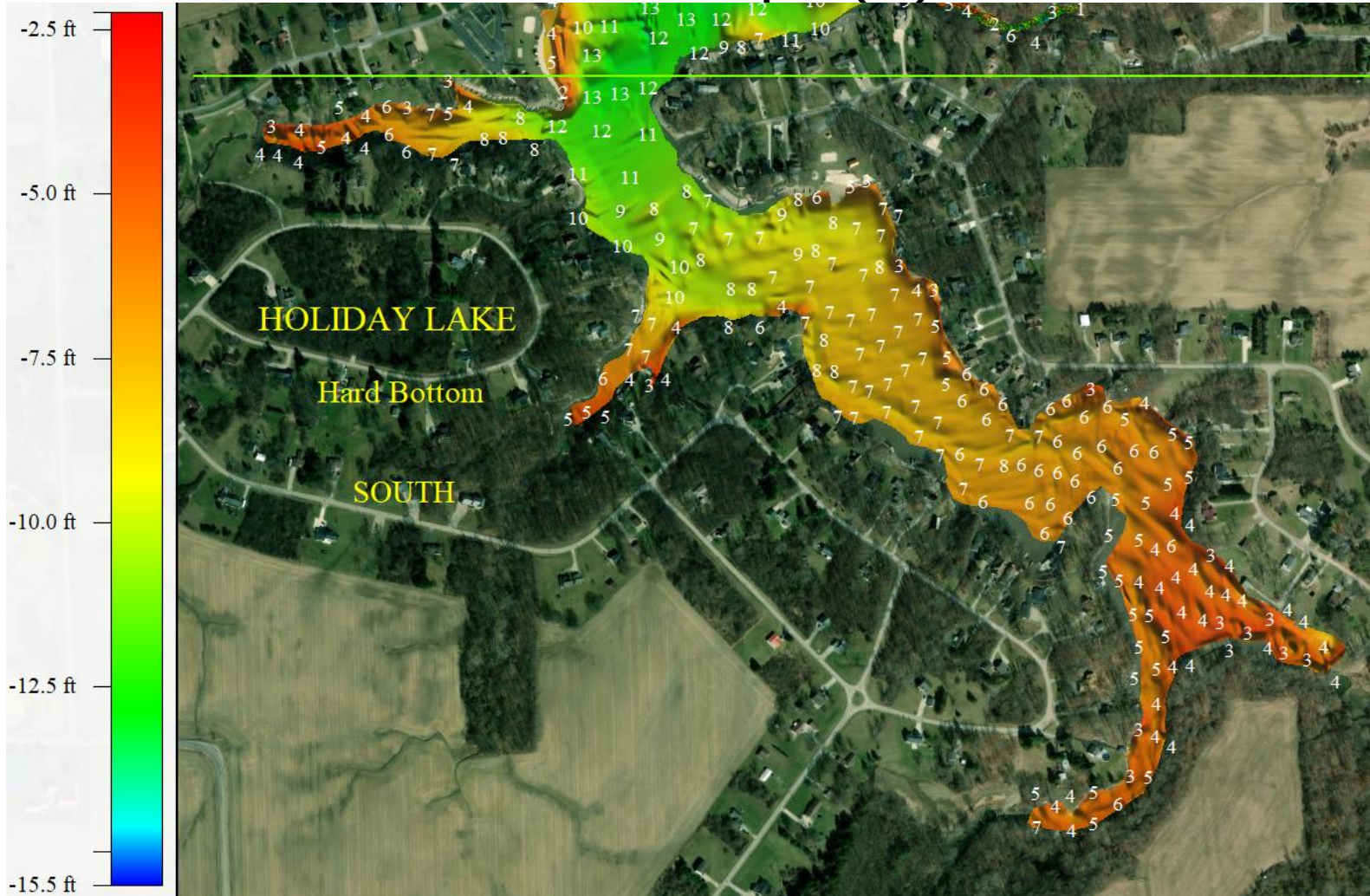


FIGURE 36: SOUTH ZONE HARD BOTTOM ELEVATION GRID WITH DEPTHS (-FT)

6.9 Hard Bottom Contours (1 ft Intervals)



FIGURE 37: SOUTH ZONE HARD BOTTOM CONTOURS (1 FT INTERVALS)

7 Area, Depth and Volume Data Table

Holiday Lake								
Area (sq ft)	Area (Acres)	Average Depth Top of Mudline (ft)	Average Depth Hard Bottom (ft)	Water Volume to Top of Mudline (acre-feet)	Water Volume to Hard Bottom (acre-feet)	Water Volume Top of Mudline (gallons)	Water Volume Hard Bottom (gallons)	Volume of Material Between Top of Mudline and Hard Bottom (cubic yards)
~9,583,200	~220	-10.6	-11.3	2,170	2,351	707,023,266	766,148,579	238,044

FIGURE 38: DATA TABLE

8 Survey Area (Acreage) and Survey Point Cloud

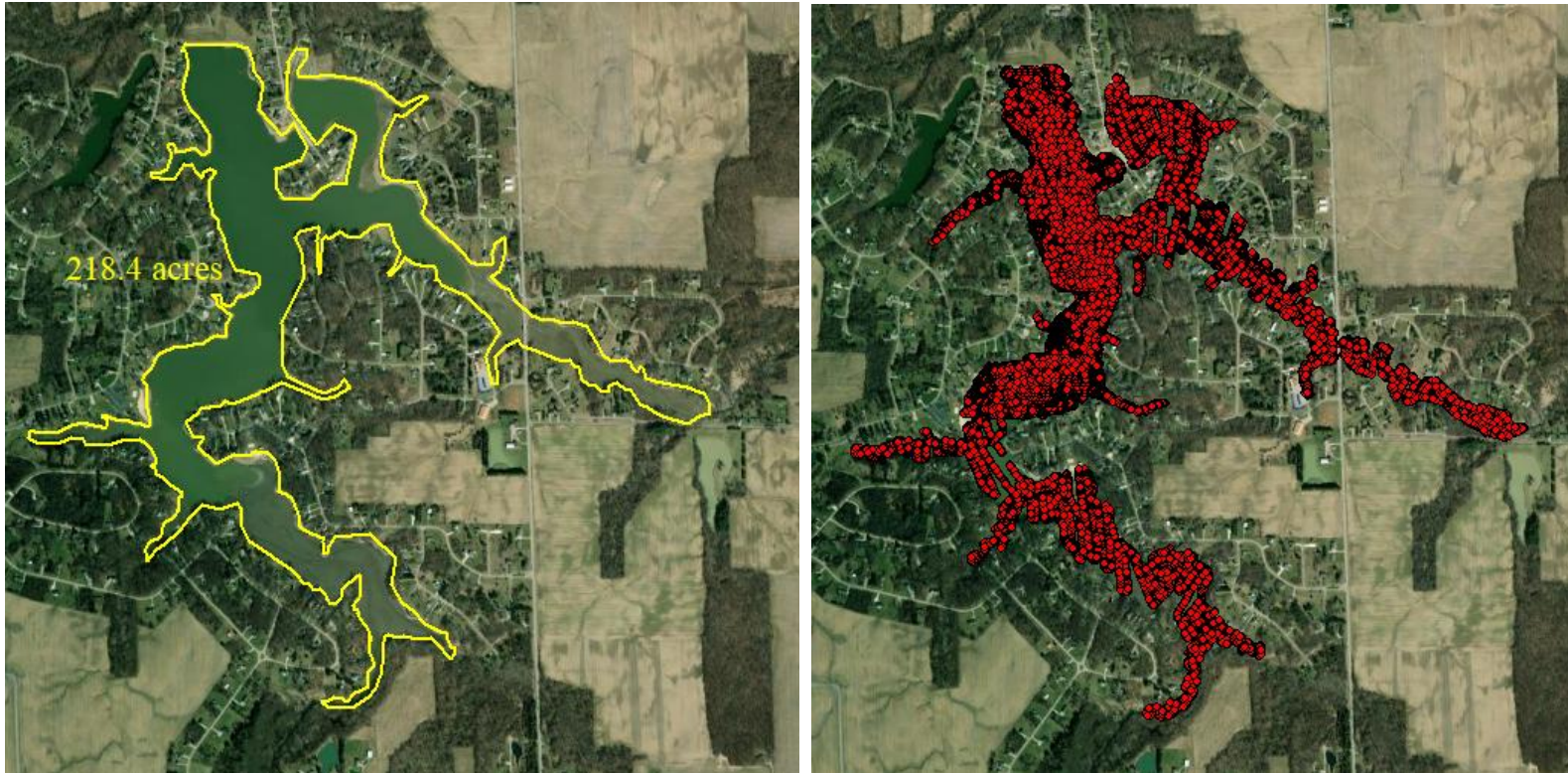


FIGURE 39: LAKE ACREAGE AND SURVEY POINT CLOUD

9 Difference in Elevation Between Top of Mudline and Hard Bottom Layers
9.1 Entire Lake Elevation Difference (in feet)

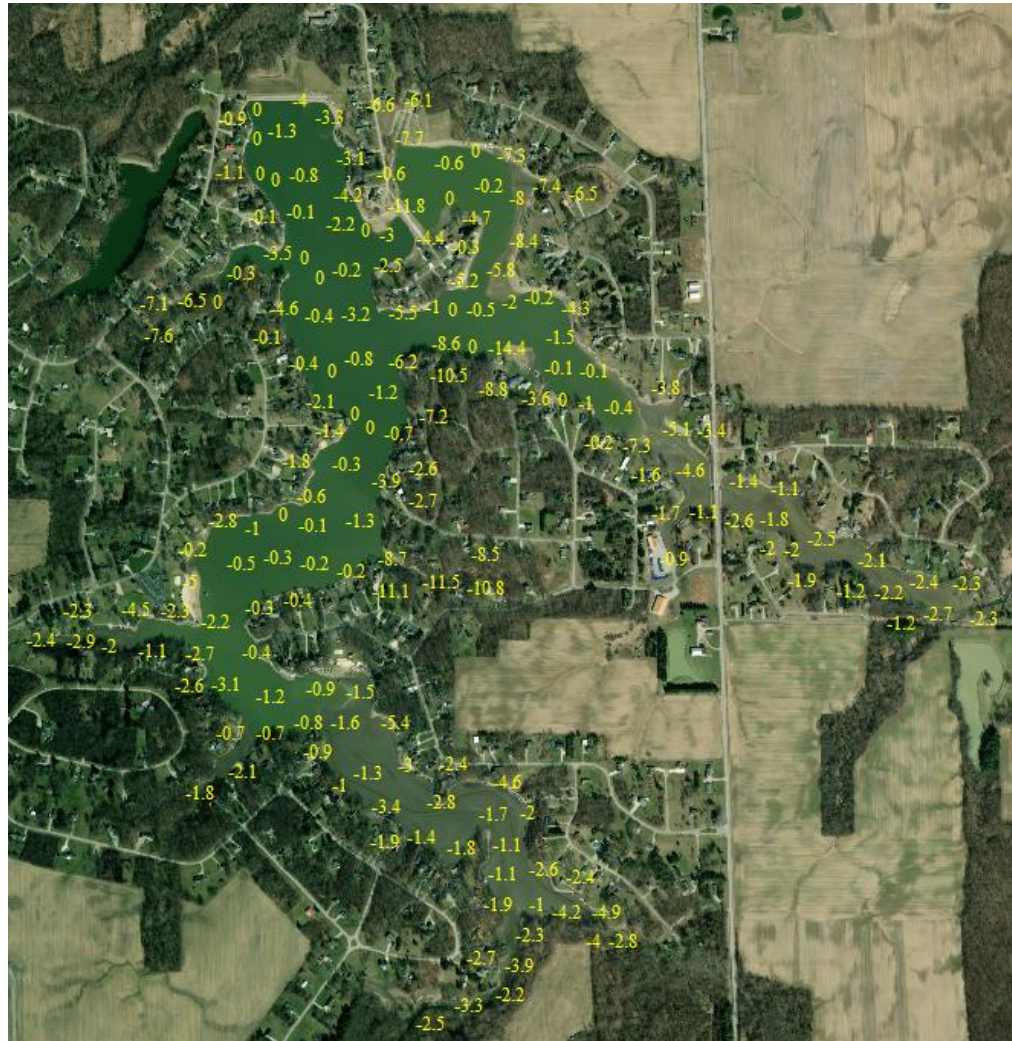


FIGURE 40: ELEVATION DIFFERENCE BETWEEN TOP OF MUDLINE AND HARD BOTTOM (IN FEET)

9.2 Elevation Difference Heat Map Grid

***NOTE:** Areas in BLUE indicate the greatest difference between the two layers (Top of Mudline and Hard Bottom) and areas in RED indicate the least difference between the two layers.

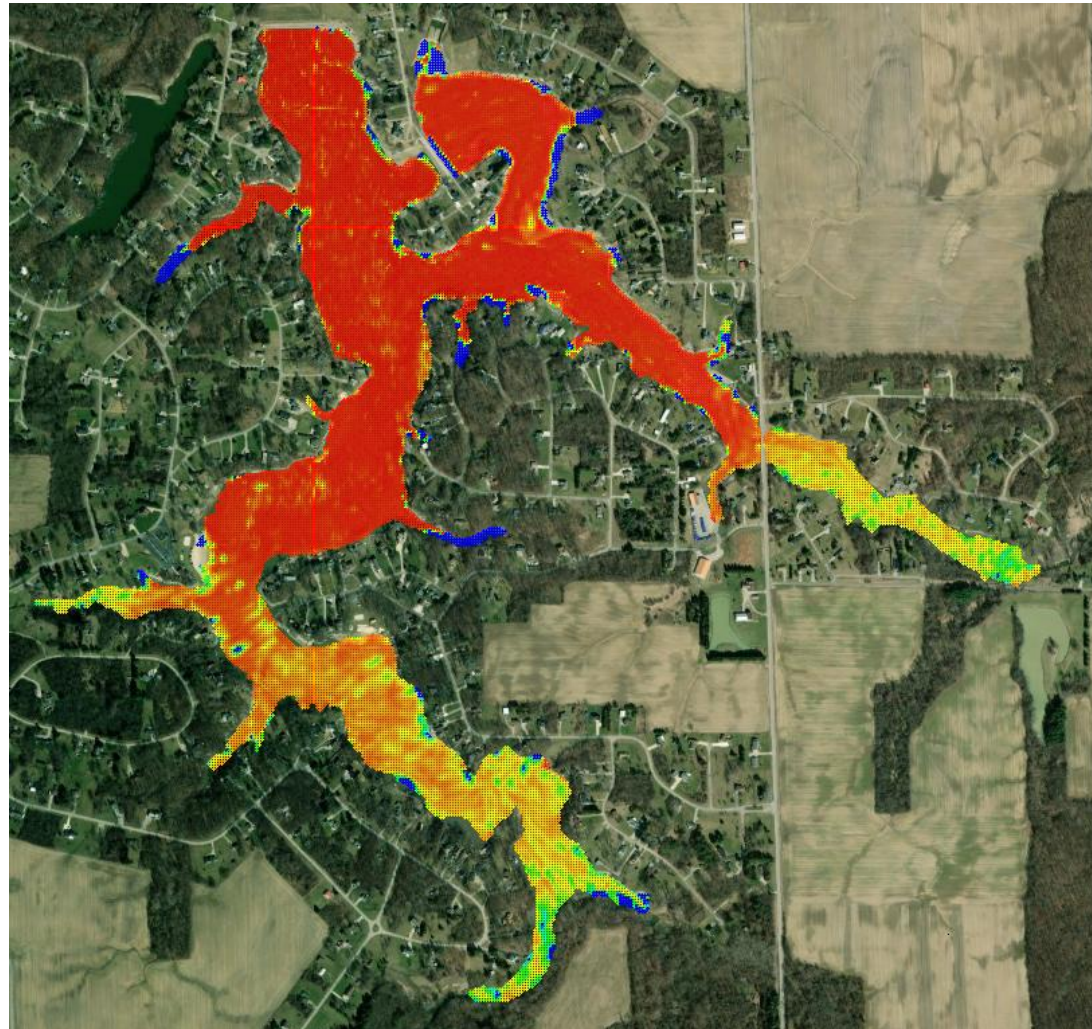


Figure 41: Elevation Difference Heat Map Grid

9.3 Heat Map Grid with Circles Displaying Potential Areas of Concern

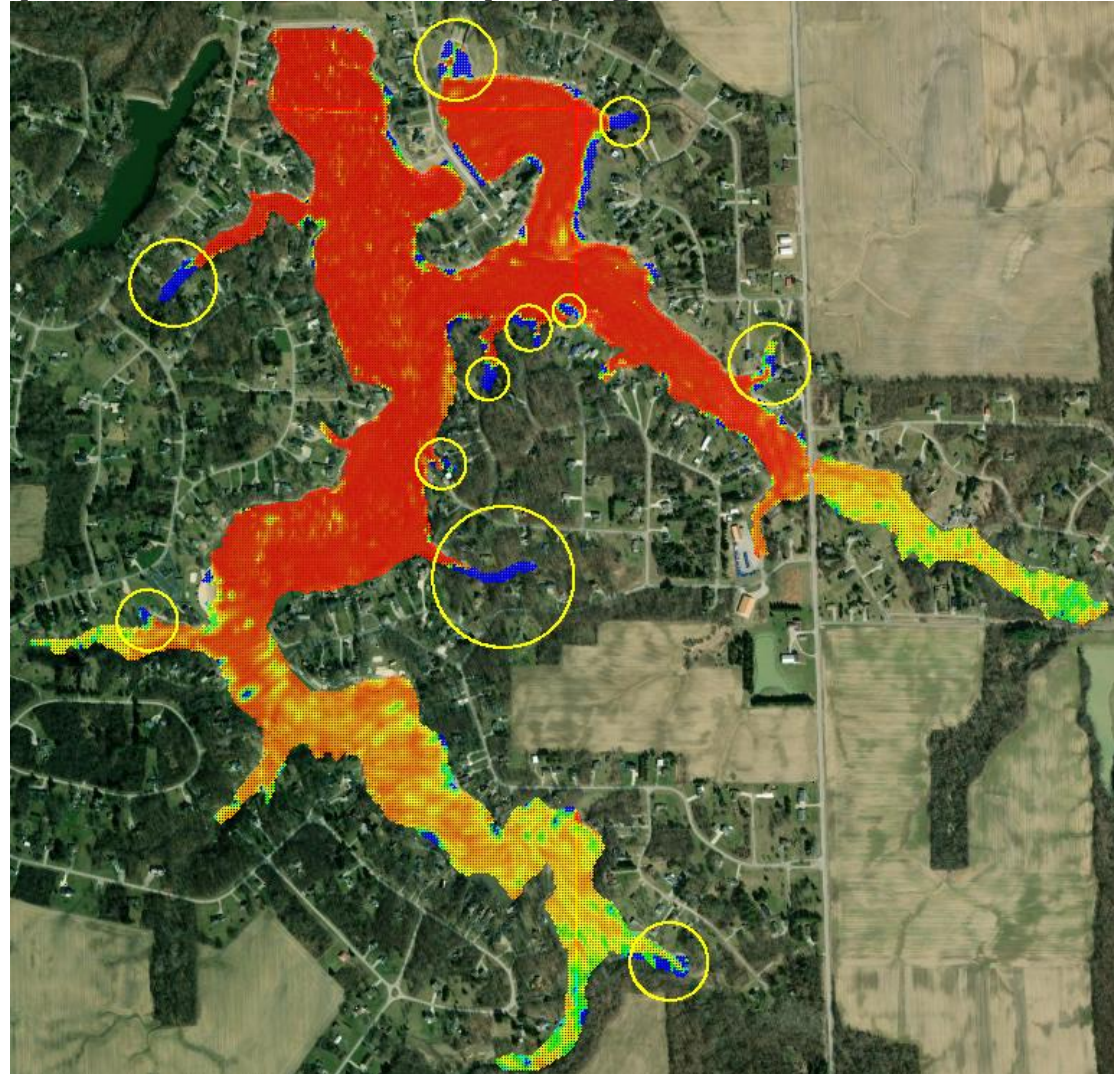


FIGURE 42: HEAT MAP GRID WITH CIRCLES DISPLAYING AREAS OF CONCERN

9.4 Elevation Heat Map Grid with Labels (in feet)

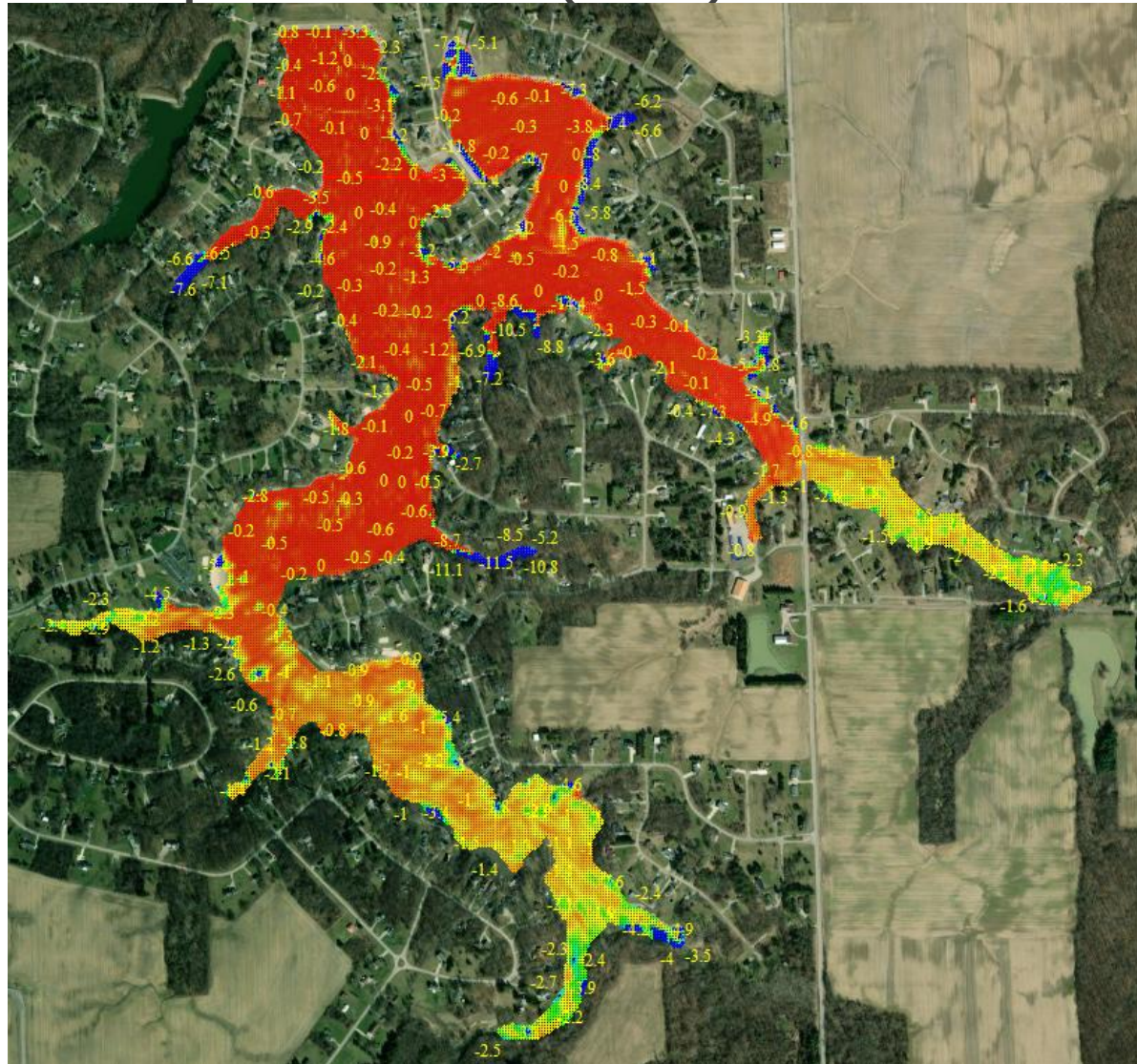


FIGURE 43: ELEVATION GRID WITH LABELS (IN FEET)

9.5 North Zone Heat Map with Labels (ft) and Circled Areas



FIGURE 44: NORTH ZONE WITH HEAT MAP AND LABELS (IN FEET) AND CIRCLED AREAS

9.6 Central Zone Heat Map with Labels (ft) and Circled Areas

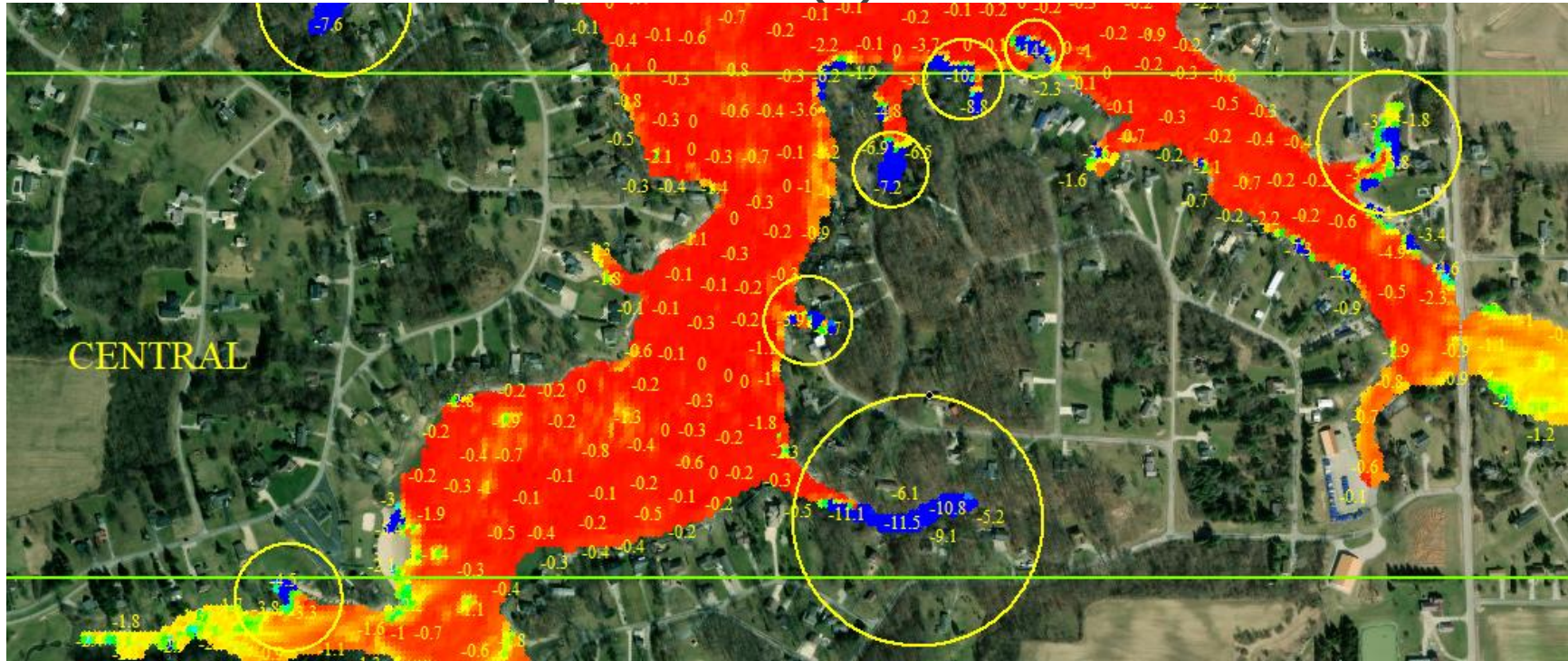


FIGURE 45: CENTRAL ZONE HEAT MAP WITH LABELS (FT) AND CIRCLED AREAS

9.7 South Zone Heat Map with Labels (ft) and Circled Areas

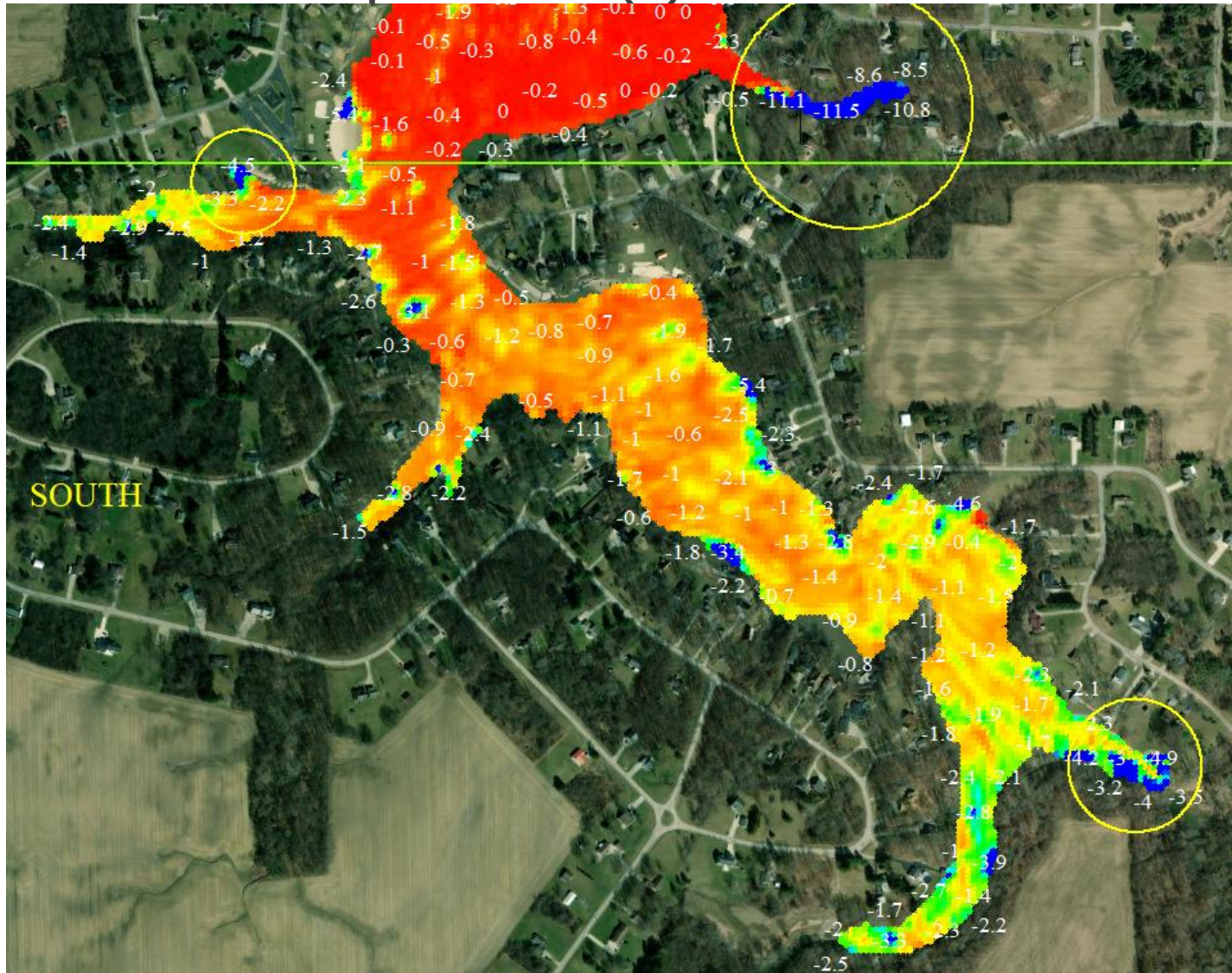


FIGURE 46: SOUTH ZONE HEAT MAP WITH LABELS (FT) AND CIRCLED AREAS