

RYERSON LAKE

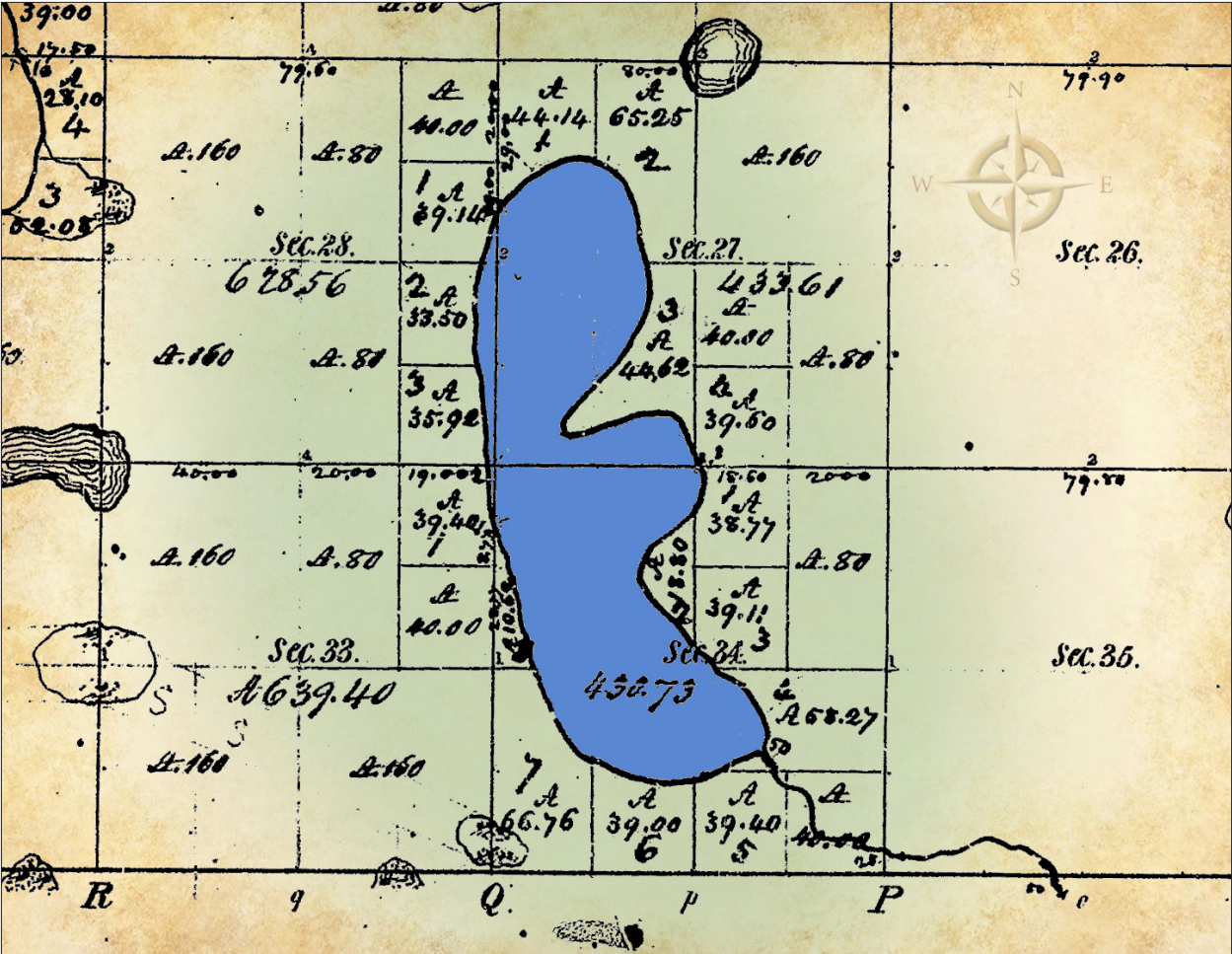
Maps and Facts

January 2017

A publication of the Ryerson Lake Improvement Board

As part of the ongoing management program on Ryerson Lake, the Ryerson Lake Improvement Board retained Progressive AE to create a series of high-resolution lake maps. This booklet contains several of the maps along with a brief explanation of various map features.

Shortly before Michigan attained statehood in 1837, a survey of the region was commissioned by the Surveyor General of the United States. An east-west base line and a north-south meridian line were established from which all additional measurements were to be based. One of the earliest maps of Ryerson Lake was created during Michigan's original land survey.



Ryerson Lake area original survey map (1837).

Lake Depth

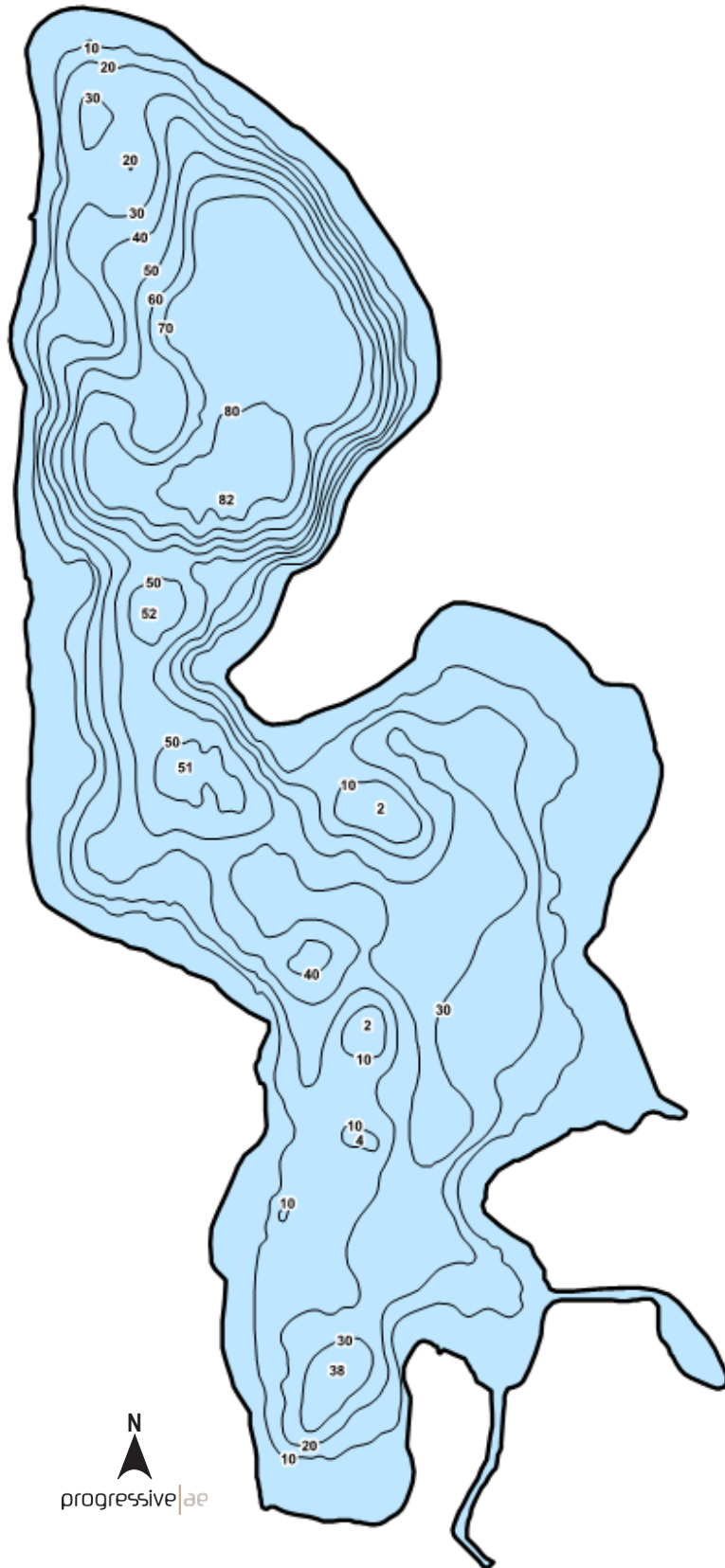
Ryerson Lake depths were first mapped by the Michigan Department of Conservation Institute of Fisheries Research in 1941. In those days, holes were drilled through the ice and weighted drop lines were used to measure depth and to collect bottom samples. This was a laborious process that took several days to complete. The early map showed a surface area of 262 acres and a maximum depth of 80 feet in Ryerson Lake.

According to the State of Michigan information database, Ryerson Lake is the 460th largest lake in the state and, in terms of area, is in the top 5% of lakes in Michigan five acres or greater.



Ryerson Lake depth contour map, 1941. Source: Michigan Department of Conservation Institute for Fisheries Research.

Lake Depth



In recent years, computer software has been developed and refined allowing hydro-acoustic soundings collected with a depth finder to be used to create highly accurate depth contour maps. This technology was used in July of 2016 to re-map the bottom of Ryerson Lake.

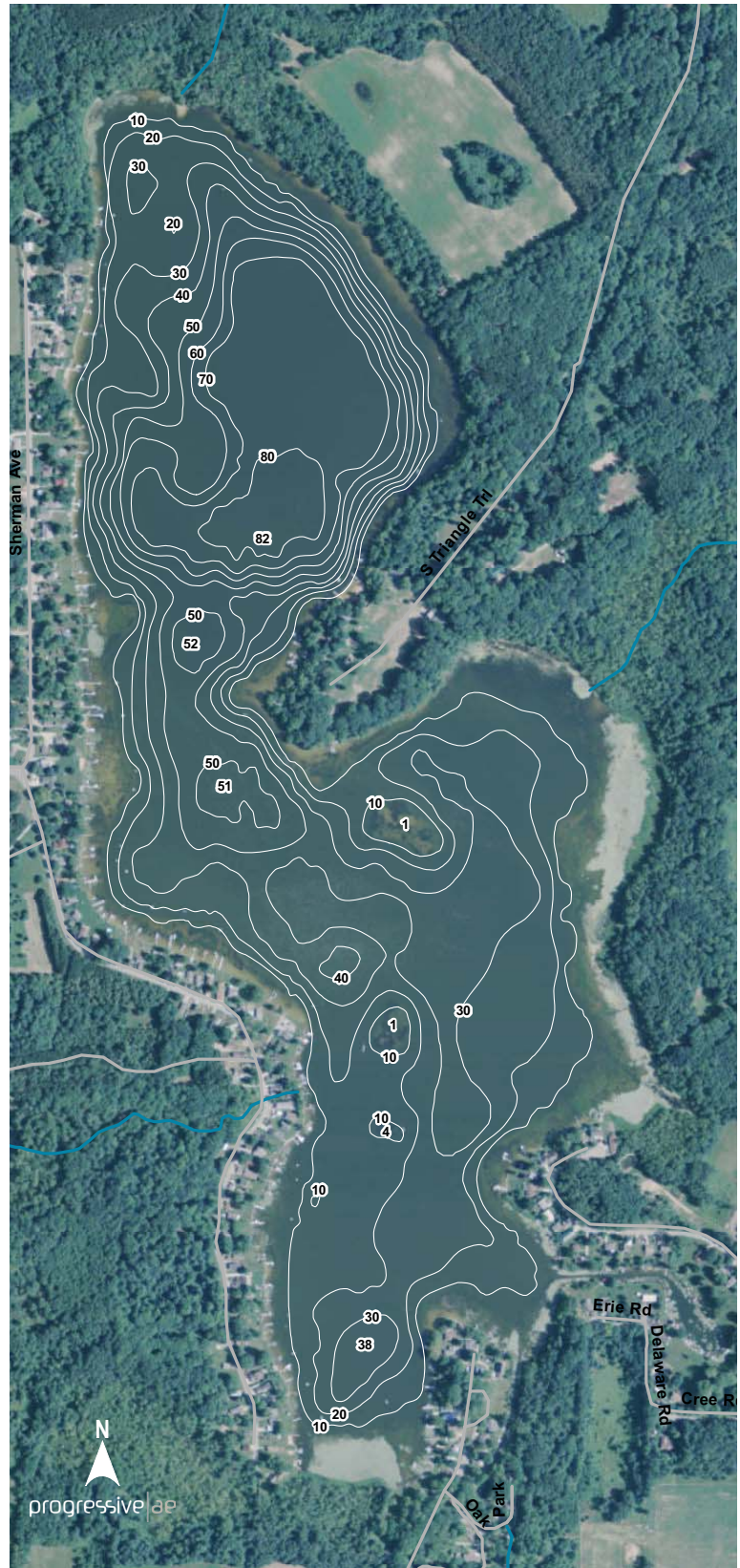
Currently, Ryerson Lake has a surface area of 255 acres and a maximum depth of 82 feet. The mean or average depth is about 27 feet, and the lake volume is 6,814 acre-feet (or 2.2 billion gallons). Ryerson Lake has a shoreline length of 4.6 miles. Interestingly, the lake depths measured in 2016 are nearly identical to the depths measured 75 years earlier in 1941.

Ryerson Lake has a shoreline length of 4.6 miles and a shoreline development factor of 2.1. Shoreline development factor is a measure of the irregularity of the shoreline. The shoreline development factor of 2.1 for Ryerson Lake indicates that the shoreline is over two times longer than if the lake were perfectly round.

Ryerson Lake depth contour map, July 2016. Lake shoreline digitized from aerial orthodigital photography (USDA FSA 2014).

Lake Depth

This map shows Ryerson Lake depth contours overlain on a recent aerial photograph (USDA FSA 2014). The three submerged islands in the south portion of the lake are visible on this map as are the shoreline drop-off areas. With the exception of Camp Echo on the east shore, residential development is evident around much of the Ryerson Lake shoreline.



Lake Depth



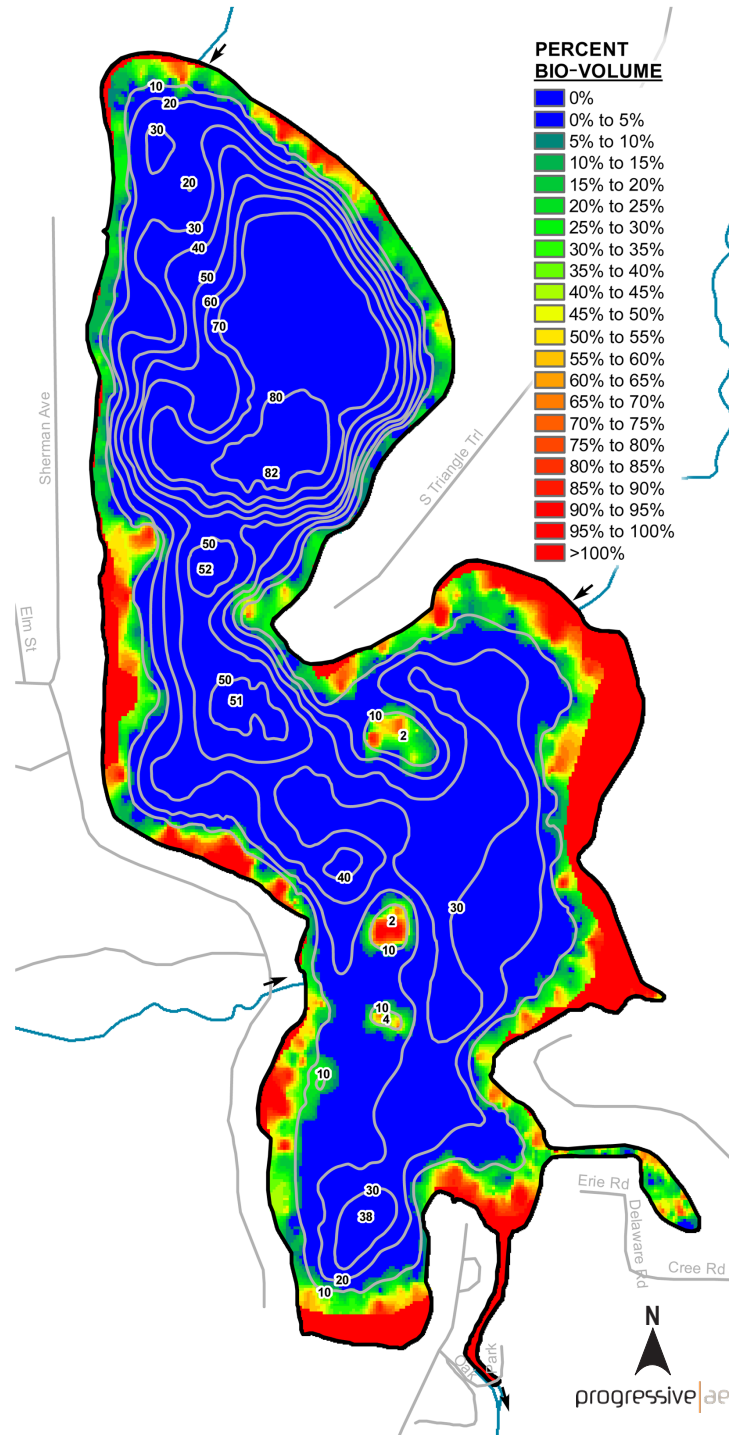
This map shows Ryerson Lake depth contours overlain on a 1985 United States Geological Survey topographic map of the area. Elevations on the topographic map are in meters. The three inlets to Ryerson lake and the outlet are clearly visible on this map. Water flowing from Ryerson Lake eventually finds its way to the Muskegon River and Lake Michigan. The topographic map indicates a lake elevation of 247.9 meters or 813 feet above sea level. There is an approximate 230-foot elevation difference between Ryerson Lake and Lake Michigan.

Plant Bio-volume

The hydro-acoustic soundings of the lake bottom also provided a measure of plant bio-volume, i.e., the height of plants in the water column. When plants grow to the surface, they occupy 100% of the water column, and those areas are shown in red on the map. When plants are not present, 0% of the water column contains plants, and those areas are shown in blue. When plants grow half-way to the surface, they occupy 50% of the water column, and are shown in yellow. In Ryerson Lake, plants were found growing to a depth of about 10 feet. At the time of the survey in July of 2016, vegetation was measured on all three of the submerged islands in the lake.

Changes in bio-volume can be expected both seasonally and year-to-year. Generally, plant growth is more sparse in the spring and, as summer progresses, plants are found over a greater portion of the lake and growing higher in the water column. Greater bio-volume would be expected after a mild winter or a warm summer, while less bio-volume would be expected after a harsh winter or cool summer. Similarly, plant bio-volume during periods of prolonged high water levels would be expected to be less than during periods of low water levels. When evaluating plant bio-volume over time, climatological and lake level fluctuations should also be considered.

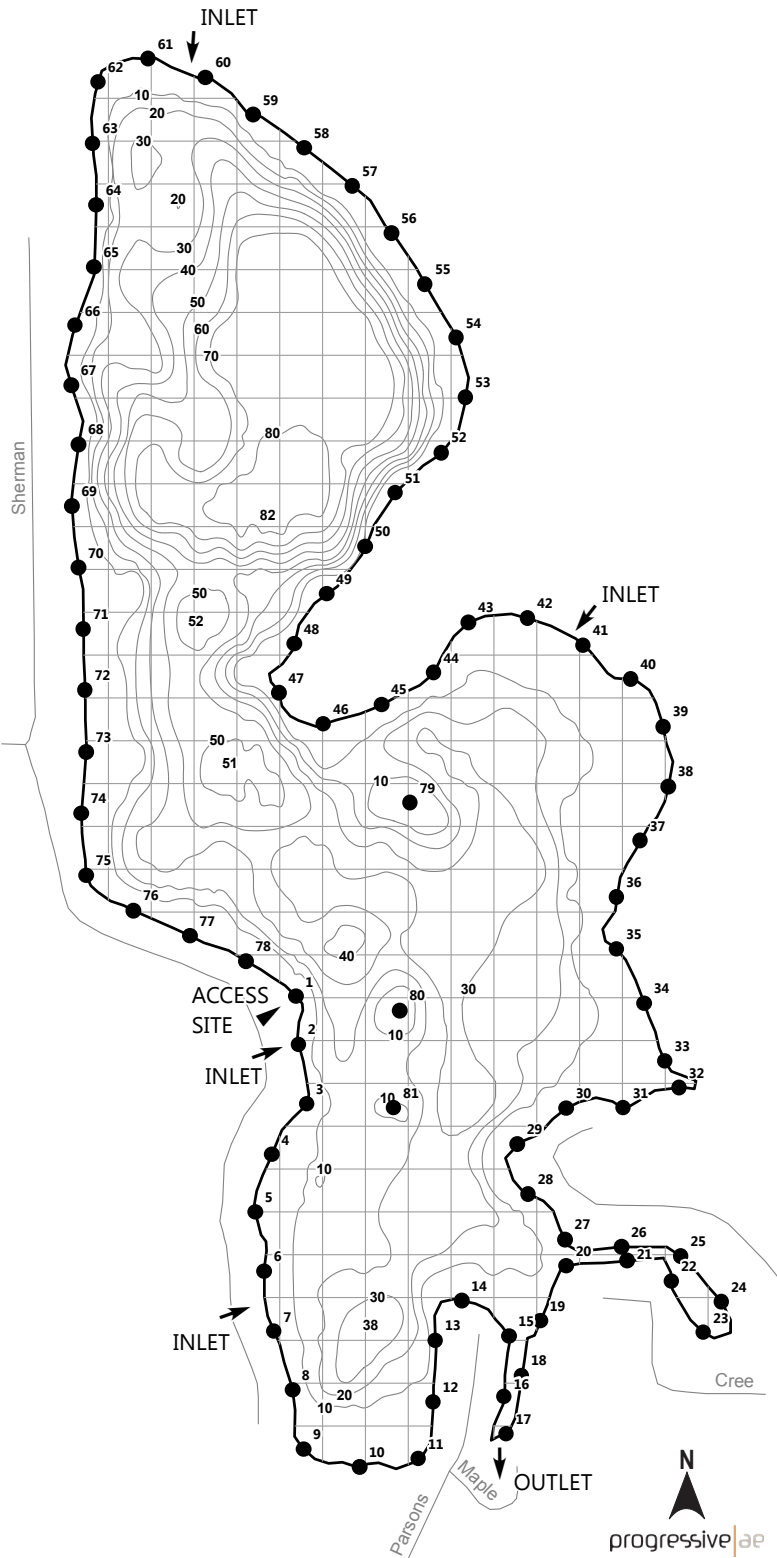
While bio-volume does not reveal which plants are in the lake, bio-volume measurements can be supplemented with plant identification surveys to evaluate plant types. Recent plant identification surveys have found as many as 15 submersed plant species in Ryerson Lake.



Ryerson Lake aquatic vegetation bio-volume map, July 2016.

Plant Survey Map

As part of the nuisance plant control program on Ryerson Lake, biologists from Progressive AE conduct GPS-guided aquatic plant surveys each year to identify the location of exotic plant species in Ryerson Lake. To facilitate the surveys, GPS reference points have been established at 300-foot intervals along the shoreline that allow precise locations of exotic plant growth areas to be mapped. Once exotic plant locations have been identified and mapped, treatment maps and GPS reference points are provided to the plant control contractor, Savin Lake Services.



Sediment Characteristics



In addition to the measurements of water depth and plant bio-volume, the hydro-acoustic soundings provide a measure of bottom hardness in Ryerson Lake. In general, near-shore areas have harder sediments while deep water areas and areas with abundant vegetation have softer bottom sediments.

Ryerson Lake sediment hardness map, July 2016.