

## Bathymetry of Lake Pasbehegh, Winter 2018

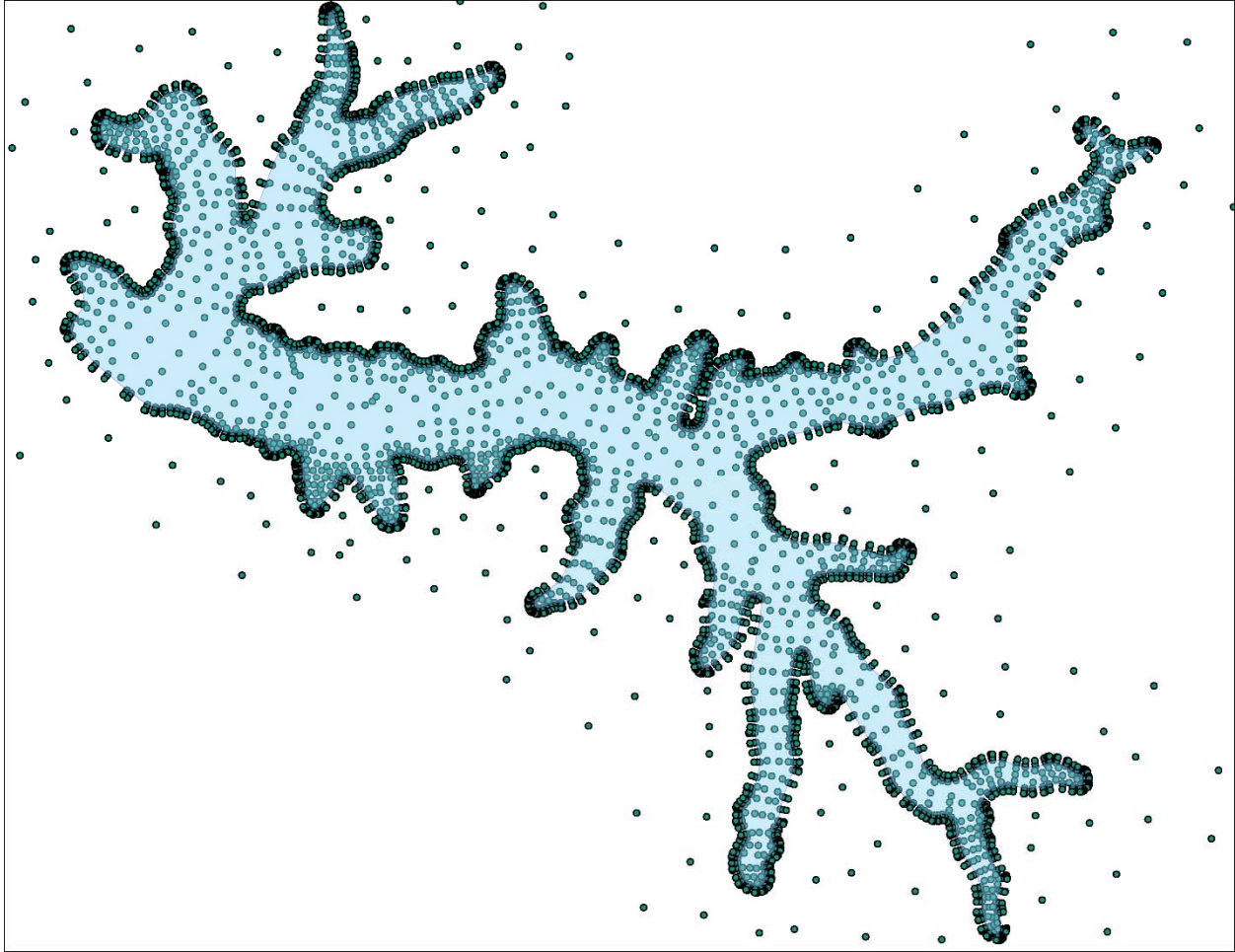
Timothy Russell

The First Colony Lake was surveyed in February and March 2018. By canoe, surveys of water depth and penetration depth through unconsolidated sediments were obtained and tied to GPS points. Owing to the wintertime absence of leaves on surrounding deciduous trees that allowed for satellite accessibility, GPS locations could be taken to within one-foot accuracy.



### Lake Pasbehegh in First Colony

The primary focus of the survey was to determine depths in the many coves along the shoreline, and most points were collected along transects in these nearshore locations. Fewer points were collected along the central axis of the lake, where water depth was fairly uniform between 7 and 8 feet, occasionally reaching 9 feet. To allow for computerized interpolation among sampling points and contour development, however, additional “placement” points were added in the main body and coves of the lake. These points were not surveyed points, but represent the average water depth of the lake between surveyed points.



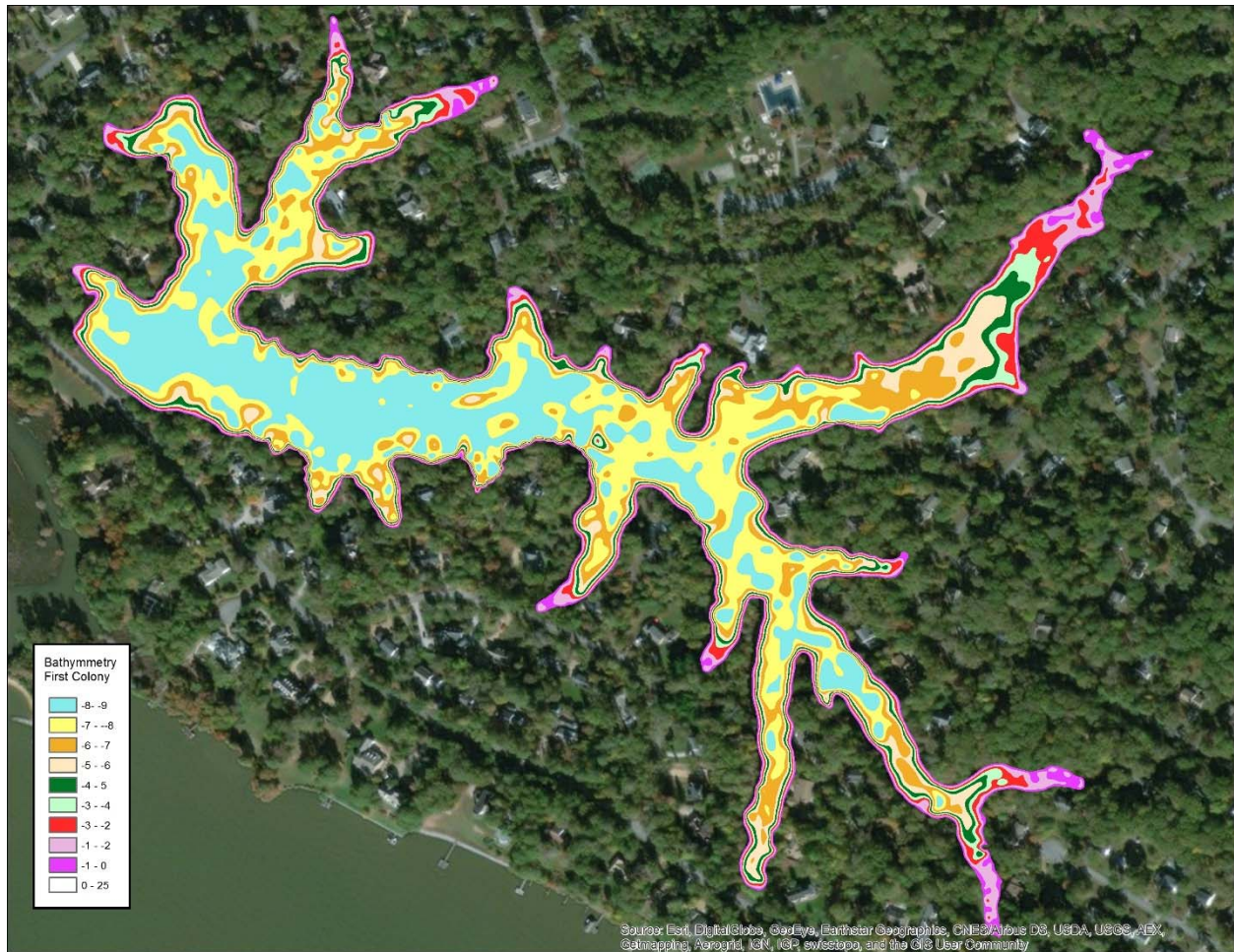
**Distribution of sampled and placement points for development of depth contours.**

The following survey summary is provided:

- Lake Surface Area: 1,409,806 ft<sup>2</sup>, or 32.3 acres
- Lake Volume: 8,501,039 ft<sup>3</sup>, or 195 acre-feet
- Average Depth: 6.0 feet

**General comments:** As expected, the cove environments are sites of most shallow water, where unconsolidated sediment accumulation is the greatest. The depth of sediment penetration was somewhat variable, however, even within coves, owing to variation in the degree of sediment consolidation. Some cove areas were filled with fine sediment probably derived from the deposition of algae in the lake, whereas other areas were filled with more coarse materials--leaves and other deciduous tree inputs from the surrounding watershed. Most notable about the lake bottom was the almost universal occurrence of downed trees—partially to fully submerged logs and limbs throughout the lake. We do not know the history of the lake but it appears the timber in the pre-lake environment was not removed prior to creation of the lake.

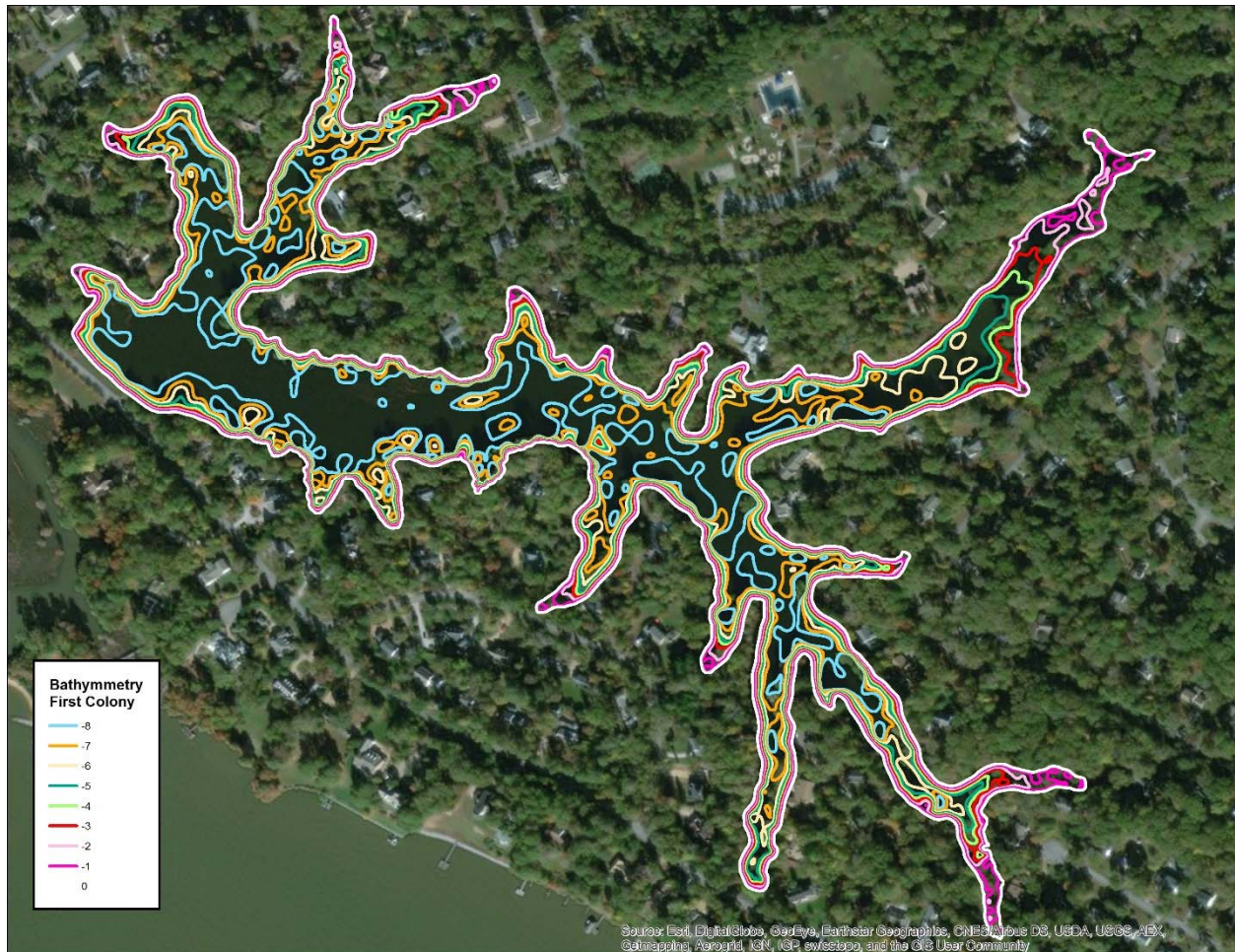
**Lake Bathymetry:** The following plot shows the color-coded range of water depths in the lake, from zero up to a maximum of just over 9 feet.



### Summary of depth measurements (in feet) in Lake Pasbeheg, winter 2018

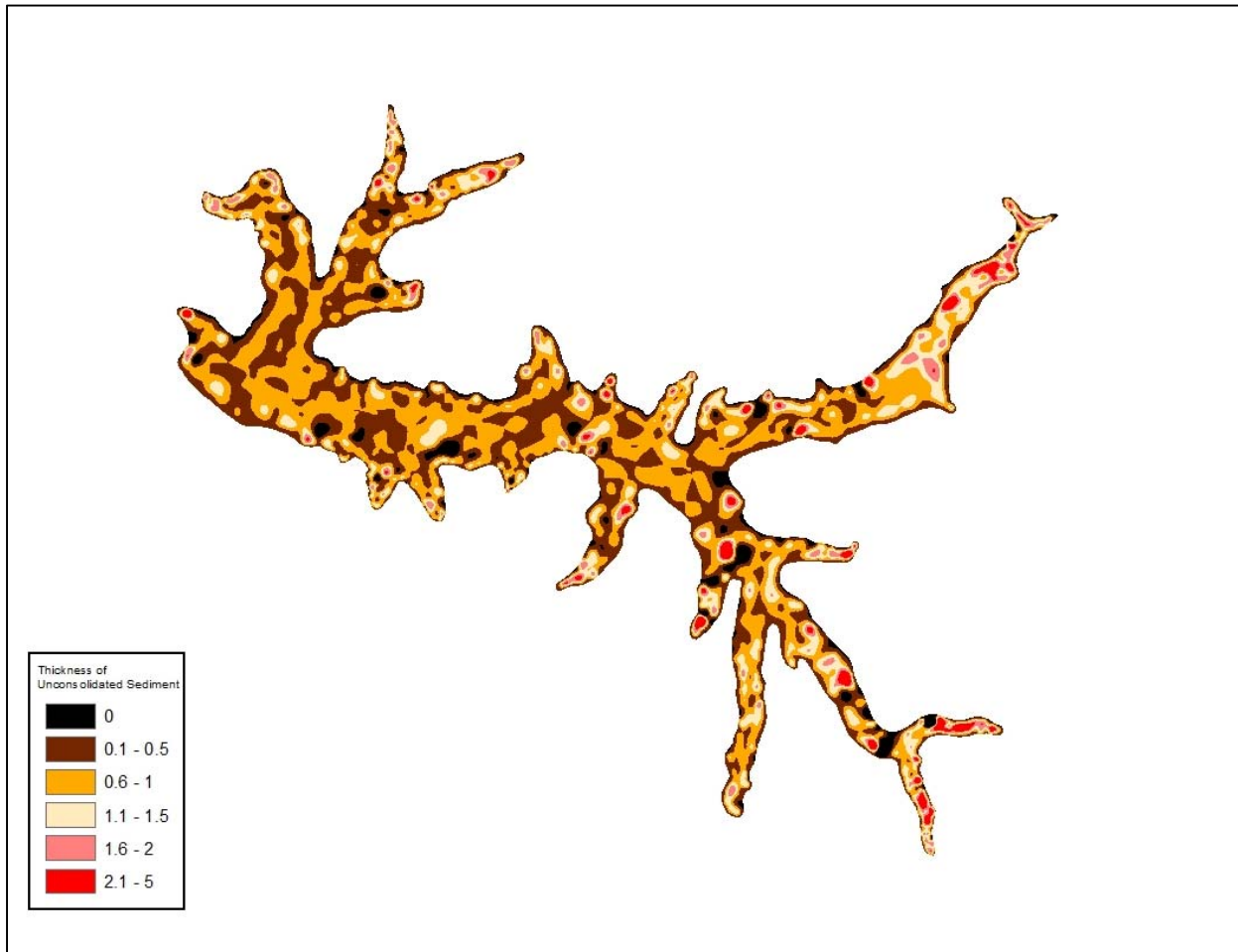
A large area of the lake is uniform and deep (7-9 feet); the more narrow, upper reaches shallow up rather quickly, but comprise a relatively small portion of the total lake area. The water depth near the lake outlet remains fairly deep (> 4 ft) almost to the spillway.

Water depth contours are shown on the next page. As noted previously, the presence of large, woody debris on the bottom of the lake led to occasional, spurious, shallow depths in some locations, but we are confident of the overall depth contours. Also, we expect some seasonal variation in depth contours, depending on weather conditions (rainy season or drought).



**1-ft depth contours in Lake Pasbehegh, winter 2018**

The depth of unconsolidated sediment (obtained by pushing stadia rod into the sediment until full resistance) was greatest in the coves, as expected. In the main portion of the lake the accumulated sediment ranged from 0-1 feet, whereas in coves the accumulated sediment was 1-2 feet or more. By taking the difference between lake depth and depth to sediment penetration, we estimated that the total accumulated sediment volume throughout the entire lake was 905,000 ft<sup>3</sup>, or 33,500 cubic yards. A majority of the lake bottom, however, has so little accumulated sediment that dredging the entire lake would not be cost-effective, and the dredging disturbance of the overall lake ecosystem would be too great. The upper reaches of some of the coves have filled in with sediment, and these areas are candidates for dredging. Unfortunately, the presence of large woody debris on the lake bottom would make such a venture very difficult to accomplish.



**Distribution (in feet) of unconsolidated sediment in Lake Pasbehegh, winter 2018.  
Note the majority of the lake bottom has less than 1 ft of accumulated sediment.**

**Summary:** Lake Pasbehegh is a shallow, 33-acre lake located in First Colony. The average depth of the lake is 6 feet, and depths range from 0 to approximately 9 feet. The majority of the lake bottom has accumulated less than 1 ft of unconsolidated sediment, with greater amounts (to 3 ft or more) in some of the upper reaches of small coves.

The bottom of Lake Pasbehegh is littered with large, woody debris that may preclude any activity such as dredging to remove accumulated sediment. The structure of fallen trees probably enhances habitat for fish, so tree removal may not be warranted. In addition to algal growth and eventual decay in the lake that adds organic matter to the bottom sediment, external inputs of deciduous leaves may contribute to the ongoing eutrophication of the lake. The presence of fence lines along shoreline property probably helps to reduce those seasonal inputs. Although some coves have filled with sediment, there is little evidence of rapid infilling throughout the majority of the lake.