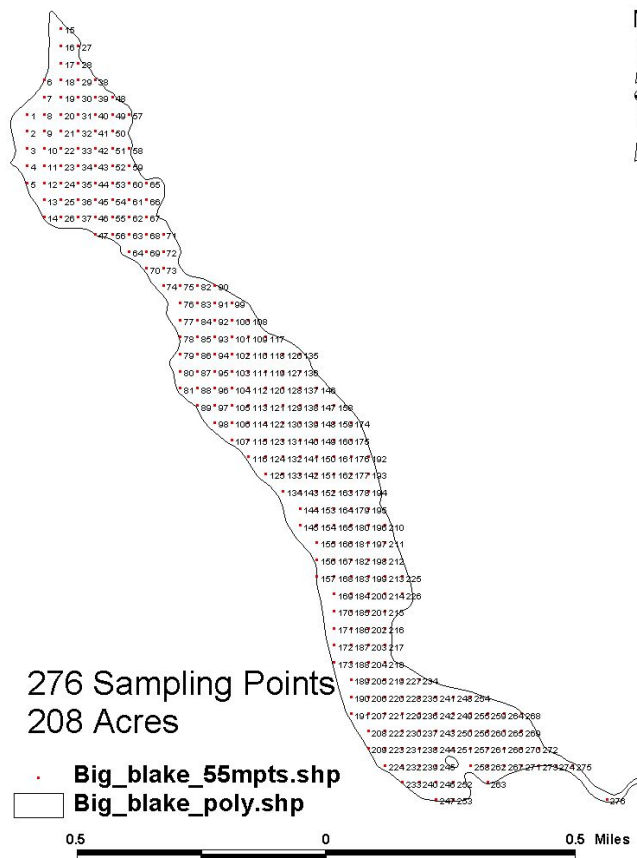




## Polk County Land & Water Resources Department

### Big Blake Lake Aquatic Macrophyte Monitoring

Two aquatic macrophyte surveys have been carried out on Blake Lake in spring and late summer since 2006 and intensively since 2007, to assess the success of harvesting within the lake. 276 sampling points were established in the lake. A point intercept method was used to establish sampling points. A grid of points was generated in ArcView (a GIS program) and downloaded to a GPS unit. Points were then sampled in field.



The Jessen and Lound rake method was used to sample the macrophytes. This method involves using a rake with a handle and making a figure eight in an area that is approximately 1 m<sup>2</sup>. The rake is then inverted and brought to the surface to assess the sample.

Each species on the rake head was identified, and the approximate density of each species was determined on a scale of 1 to 3. This can be used to determine species composition or dominance of a species at a site or certain water depth. The results were then evaluated using three different indices or metrics. The Floristic Quality and Simpson's Diversity Index were calculated as well as the Frequency of Occurrence for each species.

#### Macrophyte collection sites on Blake Lake

The Frequency of Occurrence (FO) is defined as the number of sites along all transects that the species occurred divided by the total number of sites in the lake with vegetation. FO is expressed as a percent. The FO shows that *Potamogeton crispus* (curly-leaf pondweed) was present at 96.54% of the sites shallow enough to support vegetation, while in 2011 the FO was 66.91%, an almost 30% reduction. The rake density of curly-leaf pondweed went from an average of 2 in 2007 to 1.19 in 2011.

Simpson's Diversity Index (D) measures the probability that two individuals randomly selected from a sample will belong to the same species. To measure how diverse the plant community is, Simpson's index is calculated. This value can range from 0 to 1.0. The greater the value, the more diverse the plant community is in a particular lake. In late summer 2007 the Simpson's Diversity Index was calculated to be 0.63, in 2011 it was calculated to be 0.77. This suggests that the native plant community is starting to recover as CLP density and coverage is reduced.

The Floristic Quality Index (FQI) has also been determined to assess the quality of the macrophyte community in Blake Lake. The Floristic Quality Index is designed to evaluate the closeness of the flora in an area to that of an undisturbed condition. It can be used to identify natural areas, compare the quality of different sites or locations within a single lake, monitor long-term floristic trends, and monitor habitat restoration efforts. In 2007 the summer FQI was determined to be 22.94; in 2011 it was determined to be 24.49. This again suggests that the native macrophyte community is beginning to recover in Big Blake Lake.

A thorough examination will be done of all the data collected over the last five years and a report will be given to the Big Blake Lake P & R district. This early data comparison certainly suggests that harvesting efforts have helped reduce the curly-leaf pondweed density and that the native plant community has begun to recover.