



## 2013 Forest Lake Water Quality Summary

The goal of this testing protocol was to monitor various water quality parameters of the lake, compare results to historical data, and identify any potential risks to the health of Forest Lake. Water samples were taken at two different locations and tested for 15 different parameters. Tests were conducted on a monthly basis from April through August. This report describes conditions at the times the samples were taken. The quality of the water was tested only to the parameters listed below. For more information, please see the full Water Quality Report.

Parameter	Change from 2012	2013 Season Average	Target Range	Status
Temperature	↓ Improvement	71.3 °F	Less Than 75 °F	● Healthy
Dissolved Oxygen	↑ Improvement	7.7 mg/L	4.0 – 12.0 mg/L	● Healthy
Total Phosphorus	↓ Improvement	76 ppb	0 – 100 ppb	● Healthy
Phosphate	↑ Decline	47 ppb	0 – 100 ppb	● Healthy
Nitrate	↑ Decline	299 ppb	0 – 1,000 ppb	● Healthy
Chlorophyll-a	↓ Improvement	2.1 ppb	0 – 7.3 ppb	● Healthy
Transparency	↓ Decline	9.8 feet	More than 6.5 feet	● Healthy
pH	↓ Improvement	8.10 S.U.	7.0 – 9.0 S.U.	● Healthy
Total Dissolved Solids	↓ Improvement	479 ppm	0 – 1,000 ppm	● Healthy
Conductivity	↓ Improvement	959 ppm	0 – 1,500 ppm	● Healthy
Alkalinity	↓ Decline	122 ppm	100 – 250 ppm	● Healthy
Sulfate	↓ Improvement	16.6 ppm	3 – 30 ppm	● Acceptable
Fluoride	↓ Improvement	0.10 ppm	0.01 – 0.30 ppm	● Healthy
Chloride	↓ Improvement	298 ppm	0 – 230 ppm	● Impaired
Trophic State Index – Transparency	↑ Decline	45		Mesotrophic
Trophic State Index – Total Phosphorus	↓ Improvement	66		Eutrophic
Trophic State Index – Chlorophyll-a	↓ Improvement	36		Oligotrophic

### Discussion:

The Temperature decreased from 2012, which increased the oxygen solubility of the lake. Therefore, the Dissolved Oxygen increased, providing more oxygen for the aquatic organisms. The Total Phosphorus decreased since last year, but the available nutrients Phosphate and Nitrate increased. Despite these increases, the Chlorophyll concentration declined, most likely due to lower temperatures (less sunlight), more rain, and aggressive plant management. Less Chlorophyll should have led to an increase of Transparency, but increased mixing from a abundant rainfall drove the water clarity downward. The water chemistry parameters all decreased from 2012, showing the rainfall flushed excess molecules from the lake. The decreases were all positive trends for the lake except Alkalinity, which is getting close to the lower limit. As the rainwater infiltrates the ground, it will pick up carbonates from the bedrock and replenish the Alkalinity.

The Trophic State Indices generalize the most useful parameters for an easy comparison to other lakes and expected values. The TSI based on Transparency increased, showing a decrease in water quality due to less clarity. However, the TSI – Chlorophyll shows that the decrease in clarity was not due to additional algae growth. Finally, the TSI – Total Phosphorus shows that this nutrients, and the lakes potential to grow plants, is improving, confirmed by the TSI – Chlorophyll.

