

**Lake Status**

**Overall Strategy:** Routine Watershed Management

**Water Quality Rating:** A: Secchi – 11.6 ft;

TP (2007) – 19 µg/L

**Impairment:** *Aquatic consumption* due to mercury in fish tissue.

**Water Quality Trend:** Secchi – Improving;

TP – No Trend

**Shoreland Classification:** Recreational Development

**Subwatershed Land Cover:** 17% developed, 16% forests and woodlands, 10% grassland/shrubland/sparse vegetation, 16% lakes and open water wetlands, 31% planted or cultivated, 11% wetlands.



**BASIC FACTS**

<b>DNR ID</b>	82004900
<b>Section</b>	35
<b>Township</b>	31
<b>Range</b>	20
<b>Lake Area</b>	455 acres
<b>Subwatershed Area</b>	3410 acres
<b>Outlet Elevation</b>	862 ft.
<b>Low Water Level</b>	852.11 ('65)
<b>High Water Level</b>	866.37 ('81)
<b>Ordinary High Water</b>	863.90
<b>100-Yr. Flood Elev</b>	864.7(FEMA)
<b>Greatest Depth</b>	64 ft.

**Control Structures:**  
7 ft. control weir at outlet owned by CMSCWD

**Fish Species:**  
Bluegill, Black Crappie, Hybrid Sunfish, Largemouth Bass, Northern Pike, Pumpkinseed Sunfish, Walleye, White Sucker, Yellow Bullhead, Yellow Perch (2003)

**Aquatic Nuisance Species:**  
Purple Loosestrife (1999)  
Curlyleaf Pond Weed

**CMSCWD References:**  
WCD Water Monitoring Report ('07 & '08)  
DNR Lake Finder  
DNR Lake Information Report  
MN Statewide Mercury TMDL ('07)  
A Paleolimnological Investigation of Trophic Change in Lakes of the CMWD ('01)

**Resource Goals**

**Short Term Goals – Year 2015**

- Maintain a water quality rating of A.
- Achieve a five-year mean summer phosphorus concentration at or below 20 µg/L ± 4%.
- Maintain a mean summer secchi depth no less than 10 ft.
- Encourage an active Lake Association for teaming on lake management and education.

**Long Range Goals - Year 2020**

- Maintain a water quality rating of A.
- Achieve a five-year mean summer phosphorus concentration at or below 20 µg/L ± 4%.
- Maintain a mean summer secchi depth no less than 10 ft.
- Conduct watershed management in consideration of the area’s statewide importance to the Blanding’s turtle.

**DNR Fisheries Lake Management Plan (2008)**

- Long Range Goal: Improve northern pike and walleye populations.
- Operational Plan:
  - Population assessment in 2009; re-survey in 2012.
  - Review all DOW and APM permit applications.
  - Stock walleye fingerlings at 1.5 lbs/littoral acre annually.
  - Monitor changes in the northern pike population through spring trap netting.
- Mid Range Objective: Develop walleye population with gill net CPUE > 3.0.
- Potential Plan:
  - Creel and recreational use survey.
  - Install a fishing pier.
  - Encourage restoration of natural shoreline.

## Implementation

### Operational Priorities

Routine Watershed Management

### Education

Routine Watershed Education Program

### Regulatory

Activities impacting Big Carnelian Lake will be regulated by the watershed district through its *Rules of the District*. Regulatory efforts will be coordinated with May Township, Washington County and the Minnesota DNR, where applicable.

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## Projects

### Current:

- Routine Watershed Water Quality Monitoring
- Routine Watershed Best Management Practices (BMP) Program
- Ongoing Monitoring of BMPs
- Permitting Program

### Future/Potential:

- None at this time.



\* See 2010 Watershed Management Plan Section V, Lake Management Plans for additional information on District lake management

## Overall Assessment: Big Carnelian Lake

Big Carnelian Lake is an exceptionally clean lake with a well-developed shoreline and excellent recreational opportunity. The shoreline is experiencing ongoing redevelopment pressure as small seasonal cabins are converted to year-around residences. Residents highly value the opportunities the lake provides them to interact with nature in addition to the recreational opportunities. The water quality of Big Carnelian is much better than that of many others in the watershed. Lake levels have been generally stable since the 1985 completion of the District outlet to the St. Croix River, but does rise and fall moderately with fluctuations in annual precipitation. Citizens are primarily concerned with protecting lake water quality which is most influenced by runoff non-point source pollution and discharges from Carnelian Creek. Big Carnelian is listed on the EPA's 303(d) list of impaired waters due to the mercury content in fish.

In 2007 the MPCA completed a statewide Total Maximum Daily Load (TMDL) study and implementation plan to address the state's mercury impairments.

Based on findings from the 1998 Aerial Lakeshore Analysis this lake became a focused watershed for protection from degradation in the District's 2000 Management Plan. Proper management of the shoreland and community education has been a District priority over the past decade. The District implemented shoreline BMPs, initiated a permitting program including review and comment to County and local governments on shoreland ordinance variance requests and educated landowners on the environmental damage associated with suburban style lawns. Shoreline BMPs included expanded vegetative buffers, installation of berms, raingardens or other retention devices, and a public access BMP demonstration site. One major BMP was installed at the lake inlet in partnership with May Township to treat road runoff.

In 2001, the Carnelian Marine Watershed District completed a paleolimnological investigation of trophic changes in four lakes in the watershed: Big Carnelian Lake, Big Marine Lake, East Boot Lake, and Loon Lake. The purpose of the investigation was to establish the baseline trophic conditions existing in the lake prior to European settlement in the mid-1800s. The diatom-inferred total phosphorus (TP) values for Big Carnelian Lake for presettlement were around 16 µg/L. Changes in diatom-inferred TP coincided with peaks in agricultural activity and, therefore, peaks in nutrient inputs to the lake. Inferred TP increases from greater than 20 µg/L before 1900 to a peak concentration of 26 µg/L around 1930 and drops by the 1950s, coinciding with the regional peak in farming activity around 1930 and improvements in farming practices between 1930 and the 1950s. TP increased somewhat again in the 1970s. The median pre-settlement TP for a larger group of lakes with similar TP reconstructions was 16-32 µg/L. Big Carnelian Lake has good water quality today, consistent with estimated presettlement water quality, but may have been slightly less eutrophic in the distant past.

Water quality is currently trending upwards according to the 2008 WCD Water Monitoring Report. The lake has achieved a water quality rating of 'A' and a mean summer secchi depth of no less than 10 feet. Big Carnelian Lake no longer needs a focused watershed management strategy. Routine watershed management will continue to be implemented.