# Laura Lake Lakeshed Assessment

The lakeshed vitals table identifies where to focus organizational and management efforts for each lake. Criteria were developed using limnological concepts to determine the effect to lake water quality.

| Lakeshed Vitals | | Rating |
|---|---|---|
| **Major Basin** | Upper Mississippi River | descriptive |
| **Major Watershed** | Leech Lake River | descriptive |
| **Minor Watershed** | 8074 | descriptive |
| **Lakeshed** | Trelipe Creek (807400) | descriptive |
| **Ecoregion** | Northern Lakes and Forest | descriptive |
| **Lake Area** | 1,255 acres | descriptive |
| **Miles of Shoreline** | 7.83 | descriptive |
| **Miles of Stream** | 0.34 | descriptive |
| **Miles of Road** | 6.3 | descriptive |
| **Lake Max Depth** | 3 - 5 ft | descriptive |
| **Lake Mean Depth** | NA | NA |
| **Water Residence Time** | NA | NA |
| **Municipalities** | None | + |
| **Sewage Management** | Individual waste treatment systems (septic systems and holding tanks) | - |
| **Public Drainage Ditches** | None | + |
| **Lake Management Plan** | None | x |
| **Lake Vegetation Survey/Plan** | None | x |
| **Forestry Practices** | None | + |
| **Development Classification** | Natural Environment | + |
| **Shoreline Development Index** | 1.6 | + |
| **Total Lakeshed to Lake Area Ratio** (total lakeshed includes lake area) | 3.3:1 | x |
| **Public Lake Accesses** | 1 | x |
| **Inlets** | 1 – Laura Brook | x |
| **Outlets** | 2 – Laura Brook, Unnamed | x |
| **Feedlots** | None | + |
| **Agriculture Zoning** | None | + |
| **Public Land : Private Land** | 4.5:1 | + |
| **Wetland Coverage** | 35% | + |
| **Lake Transparency Trend** | NA | NA |
| **Exotic Species** | None | + |

***Rating Key:***
+ *beneficial to the lake*
- *possibly detrimental to the lake*
x *warrants attention*

## Lakeshed

Understanding a lakeshed requires the understanding of basic hydrology. A watershed is the area of land that drains into a surface water body such as a stream, river, or lake and contributes to the recharge of groundwater. There are three categories of watersheds: 1) basins, 2) major watersheds, and 3) minor watersheds.

Laura Lake is found within the **Upper Mississippi River Basin**, which includes the **Leech Lake River Major Watershed** as one of its sixteen major watersheds (Figure 1). The basin covers 20,000 square miles, while the Leech Lake River Watershed covers 1,335 square miles (approximately 854,349 acres). Laura Lake falls within **minor watershed 8074**, one of the 75 minor watersheds that comprise the Leech Lake River Major Watershed (Figure 2).

Within this watershed hierarchy, lakesheds also exist. A lakeshed is defined simply as the land area that drains to a lake. While some lakes may have only one or two minor watersheds draining into them, others may be connected to a large number of minor watersheds, reflecting a larger drainage area via stream or river networks. Laura Lake falls within the **Trelipe Creek (807400) lakeshed**, covering 4,070 acres (includes lake area) (Figure 3). Even though Laura Lake receives water from minor watershed 9125, for the purpose of this assessment it is decided that only the immediate lakeshed be inventoried and assessed.

## Laura Lake Lakeshed Water Quality Protection Strategy

Each lakeshed has a different makeup of public and private lands. Looking in more detail at the makeup of these lands can give insight on where to focus protection efforts. The protected lands (easements, wetlands, public land) are the future water quality infrastructure for the lake. Developed land and agriculture have the highest phosphorus runoff coefficients, so this land should be minimized for water quality protection.

Although the majority of the land within Laura Lake's lakeshed is public, private forested uplands can be the focus of development and protection efforts in the lakeshed.

| | Private (10%) | | | | | 46% | Public (44%) | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Developed** | **Agriculture** | **Forested Uplands** | **Other** | **Wetlands** | **Open Water** | **County** | **State** | **Federal** |
| **Land Use (%)** | 2% | 0.3% | 5% | 0.3% | 2.4% | 46% | 0% | 15% | 29% |
| **Runoff Coefficient** Lbs of phosphorus/acre/ year | 0.45 - 1.5 | 0.26 - 0.9 | 0.09 | | 0.09 | | 0.09 | 0.09 | 0.09 |
| **Description** | Focused on Shoreland | Cropland | Focus of develop-ment and protection efforts | Open, pasture, grass-land, shrub-land | Protected | | | | |
| **Potential Phase 3 Discussion Items** | Shoreline restoration | Restore wetlands; CRP | Forest stewardship planning, 3rd party certification, SFIA, local woodland cooperatives | | Protected by Wetland Conservation Act | | County Tax Forfeit Lands | State Forest | National Forest |

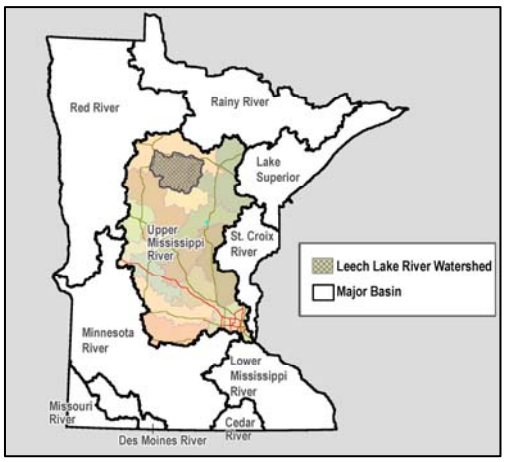



Figure 1. Upper Mississippi Basin and the Leech Lake River Watershed.

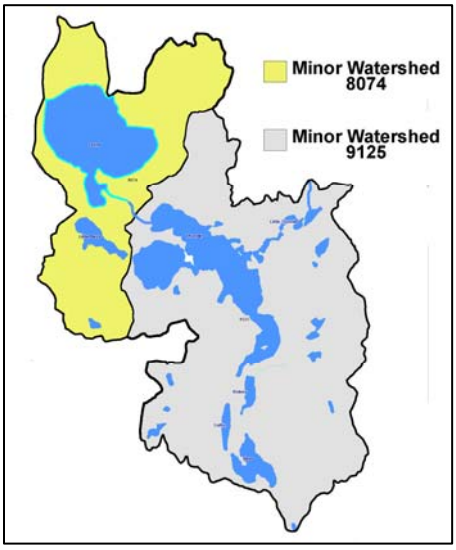



Figure 2. Minor Watersheds 8074 & 9125 contribute water to Laura Lake.

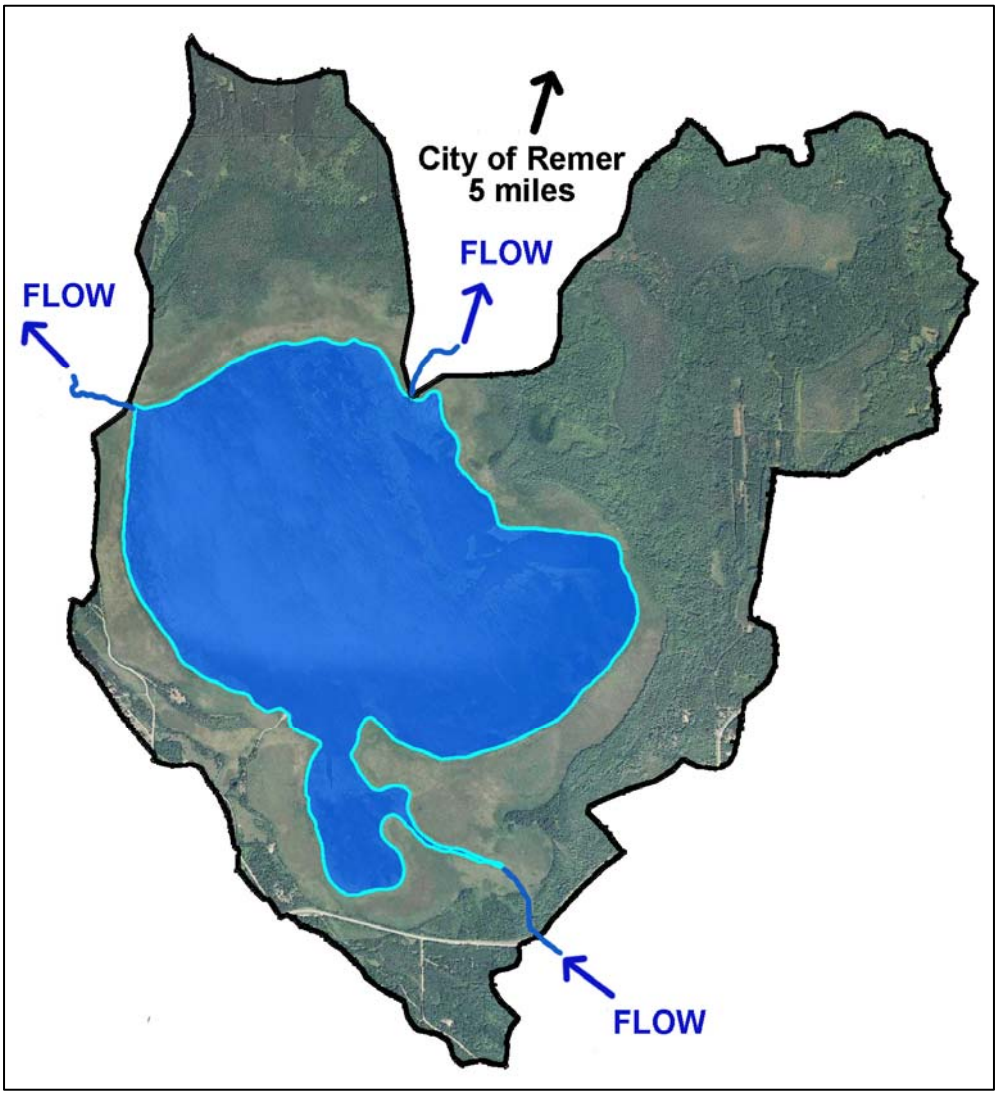



Figure 3. The Trelipe Creek (807400) Lakeshed (Aerial Imagery 2008 1M).

## Land Cover / Land Use

The activities that occur on the land within the lakeshed can greatly impact a lake. Land use planning helps ensure the use of land resources in an organized fashion so that the needs of the present and future generations can be best addressed. The basic purpose of land use planning is to ensure that each area of land will be used in a manner that provides maximum social benefits without degradation of the land resource.

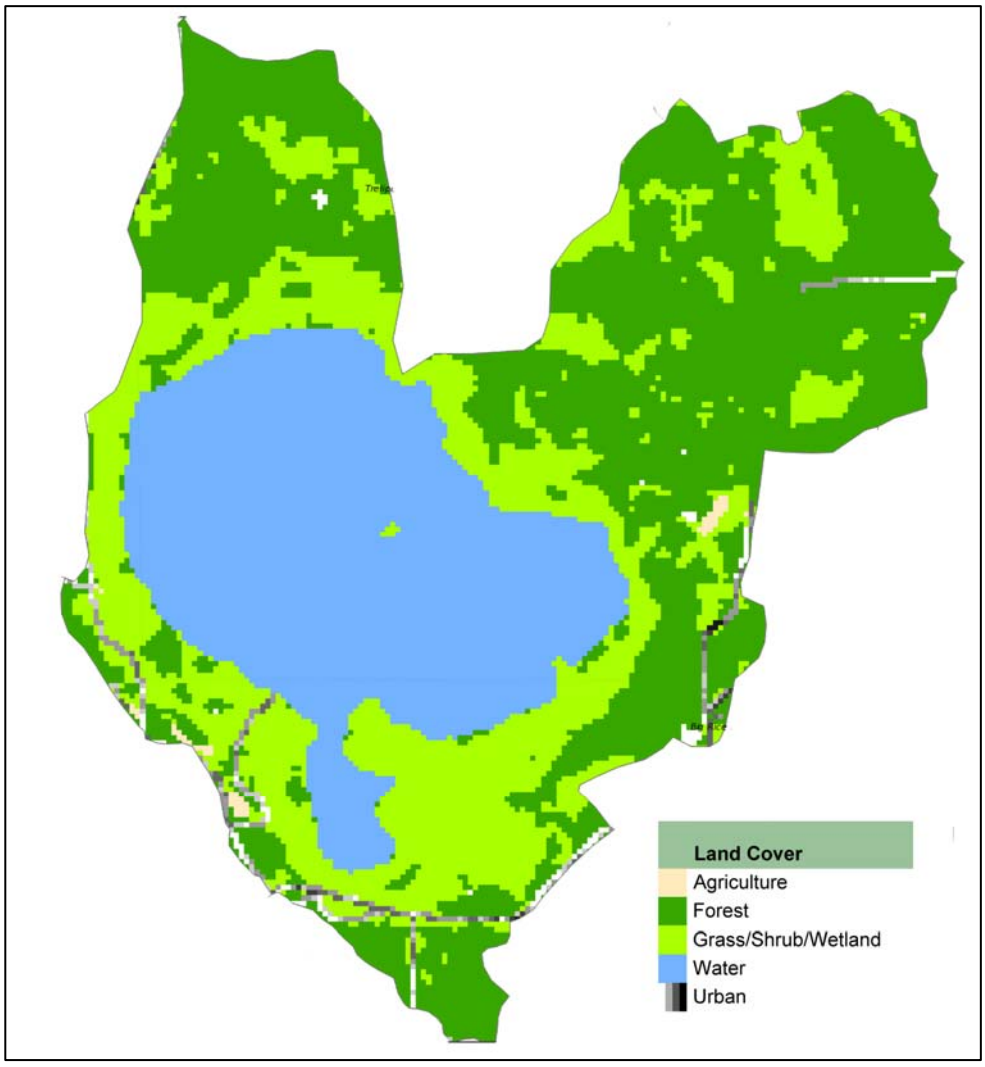



Figure 5. The Trelipe Creek (807400) lakeshed land cover (http://land.umn.edu).

Changes in land use, and ultimately land cover, impact the hydrology of a lakeshed. Land cover is also directly related to the lands ability to absorb and store water rather than cause it to flow overland (gathering nutrients and sediment as it moves) towards the lowest point, typically the lake. Impervious intensity decribes the lands inability to absorb water, the higher the % impervious intensity the more area that water cannot penetrate in to the soils. Monitoring the changes in land use can assist in future planning procedures to address the needs of future generations.

Phosphorus export, which is the main cause of lake eutrophication, depends on the type of land cover occurring in the lakeshed. Figure 5 depicts Laura Lake's lakeshed land cover.

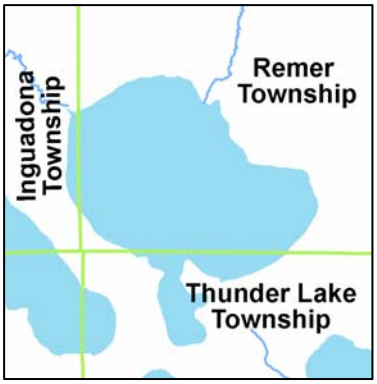
The University of Minnesota has online records of land cover statistics from years 1990 and 2000 (http://land.umn.edu). Table 1 describes Laura Lake's lakeshed land cover statistics and percent change from 1990 to 2000. Due to the many factors that influence demographics, one cannot determine with certainty the projected statistics over the next 10, 20, 30+ years, but one can see the transition within the lakeshed from agriculture, forest, and water acreages to grass/shrub/wetland and urban acreages. The largest change in percentage is the increase in grass/shrub/wetland cover (30.8%). In acreage, grass/shrub/wetland cover has also increased the most (254 acres). In addition, the impervious intensity has increased, which has implications for storm water runoff into the lake. The increase in impervious intensity is consistent with the increase in urban acreage.

Table 1. Laura Lake's lakeshed land cover statistics and % change from 1990 to 2000 (http://land.umn.edu).

| | 1990 | | 2000 | | % Change |
|---|---|---|---|---|---|
| **Land Cover** | **Acres** | **Percent** | **Acres** | **Percent** | **1990 to 2000** |
| **Agriculture** | 16 | 0.39 | 13 | 0.32 | 18.8 % Decrease |
| **Forest** | 1,925 | 47.3 | 1,702 | 41.82 | 11.6 % Decrease |
| **Grass/Shrub/Wetland** | 826 | 20.29 | 1,080 | 26.54 | 30.8 % Increase |
| **Water** | 1,223 | 30.05 | 1,193 | 29.31 | 2.5 % Decrease |
| **Urban** | 81 | 1.99 | 82 | 2.01 | 1.2 % Increase |
| **Impervious Intensity %** | | | | | |
| **0** | 4,029 | 98.97 | 4,010 | 98.5 | 0.5 % Decrease |
| **1-10** | 14 | 0.34 | 17 | 0.42 | 21.4 % Increase |
| **11-25** | 15 | 0.37 | 26 | 0.64 | 73.3 % Increase |
| **26-40** | 8 | 0.2 | 14 | 0.34 | 75 % Increase |
| **41-60** | 4 | 0.1 | 2 | 0.05 | 50 % Decrease |
| **61-80** | 0 | 0 | 1 | 0.02 | 100 % Increase |
| **81-100** | 0 | 0 | 0 | 0 | No Change |
| **Total Area** | 4,070 | | 4,070 | | |
| **Total Impervious Area (Percent Impervious Area Excludes Water Area)** | 8 | 0.28 | 12 | 0.42 | 50 % Increase |

## Demographics

Laura Lake is classified as a natural environment lake. Natural environment lakes usually have less than 150 total acres, less than 60 acres per mile of shoreline, and less than three dwellings per mile of shoreline. They may have some winter kill of fish; may have shallow, swampy shoreline; and are less than 15 feet deep.




The Minnesota Department of Administration Geographic and Demographic Analysis Division extrapolated future population in 5-year increments out to 2035. These projections are shown in Figure 6 below. Compared to Cass County as a whole, Thunder Lake and Inguadona Townships have higher extrapolated growth projections, whereas Remer Township has a lower extrapolated growth projection.

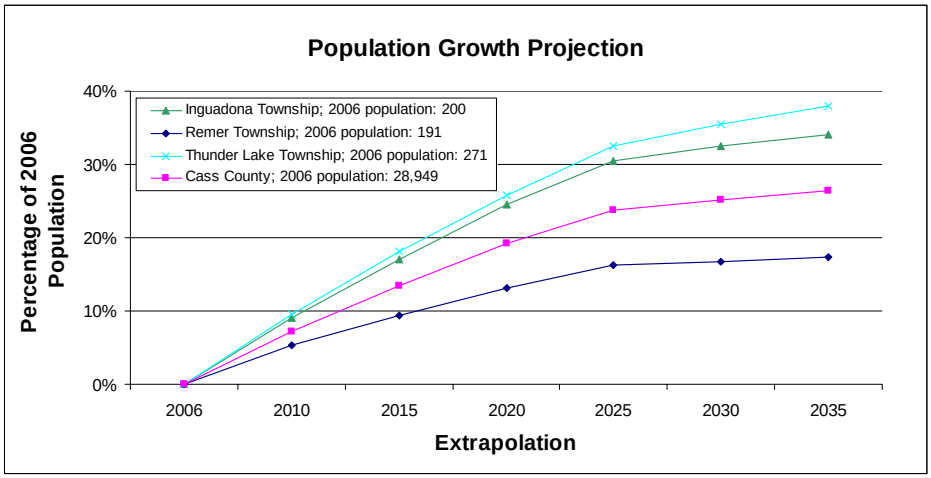



Figure 6. Population growth projection for the townships around Laura Lake and Cass County (source: http://www.demography.state.mn.us/resource.html?Id=19332).

## Status of the Fishery

No information available.