

## Rapid Watershed Assessment

---

### Redeye (Leaf River)

(MN) HUC: 07010107



Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land-owners and local leaders set priorities and determine the best actions to achieve their goals.

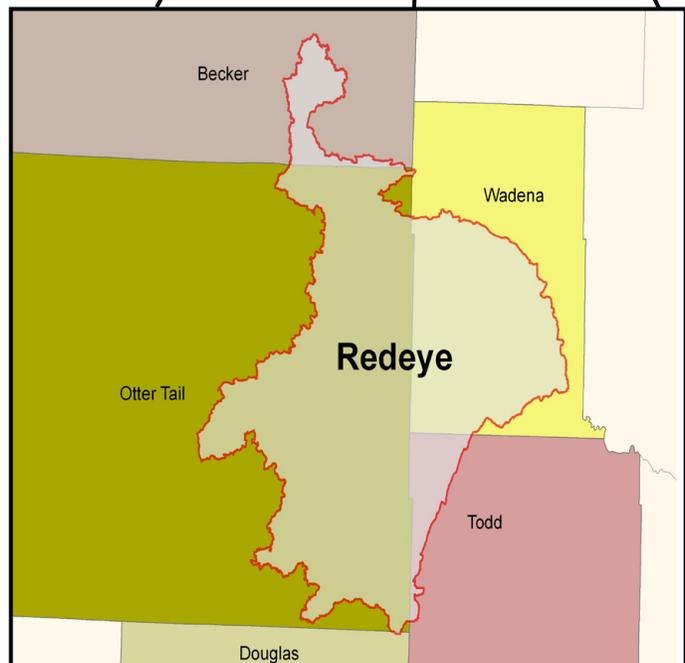
## Introduction

The Redeye 8-Digit Hydrologic Unit Code (HUC) subbasin is predominantly located within the North Central Hardwood Forest ecoregion of Minnesota, with small sections in the Northern Lakes and Forests ecoregion.

While much of the watershed is comprised of agricultural lands, it is also largely forested, with many of the conifers and hardwoods typical of the region. Approximately ninety two percent of the 574,887 acres in this HUC are privately owned. The remaining acres are federally or state owned land.

Assessment estimates indicate 1,216 Farms in the watershed. Approximately 49 percent of the operations are less than 180 acres in size, forty six percent are from 180 to 1000 acres in size, and the remaining farms are greater than 1000 acres in size.

The main resource concerns in the basin are wind and water soil erosion, woodland management, surfacewater quality, groundwater quality and quantity, surfacewater management, and wetland management. Many of the resource concerns relate directly to changing landuse and increased development in the region, resulting in fragmentation and increased sediment and pollutant loadings (mercury, excess nutrients) to surface waters.



### County Totals

| <b>County</b>       | <b>Acres in HUC</b> | <b>% HUC</b> |
|---------------------|---------------------|--------------|
| Becker              | 29,417              | 5.1%         |
| Wadena              | 163,603             | 28.5%        |
| Otter Tail          | 352,413             | 61.3%        |
| Todd                | 29,369              | 5.1%         |
| Douglas             | 85                  | 0.0%         |
| <b>Total acres:</b> | <b>574,887</b>      | <b>100%</b>  |

## Physical Description

Average elevation in the Redeye subbasin is 1,394 feet above sea level, with the highest values being in the Northwestern and Southwestern portions of the watershed, while increasingly lower values are found across the central regions approaching the east.

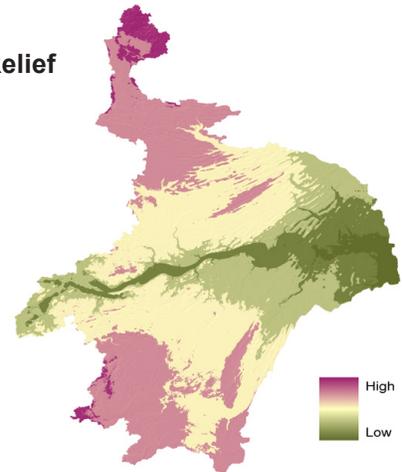
Precipitation in the watershed ranges from 25 to 29 inches annually. Evaporation estimates are between 32 to 34 inches annually (Minnesota State Climatologists Office, 1999).

Most lands within this HUC are not highly erodible, and are moderately suited to agricultural uses. Predominate land uses / land covers are Forest (25.6%), Row Crops (25.3%), Grass/Pasture/Hay (23.9%), and Wetlands (14.6%).

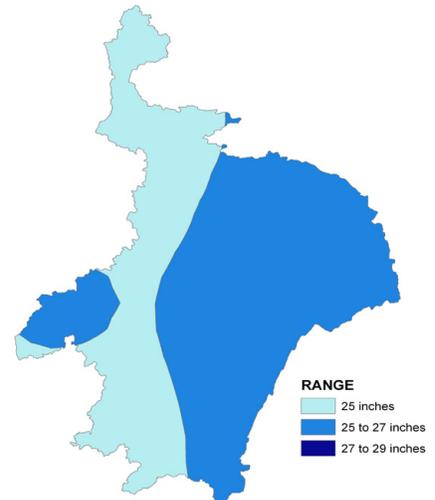
Land use within the watershed is largely agricultural, accounting for approximately 48% of the overall watershed acres.

Development pressure ranges from moderate to considerable in some areas, with occasional farms, timberland, and lakeshore being parceled out for recreation, lake or country homes.

**Relief**

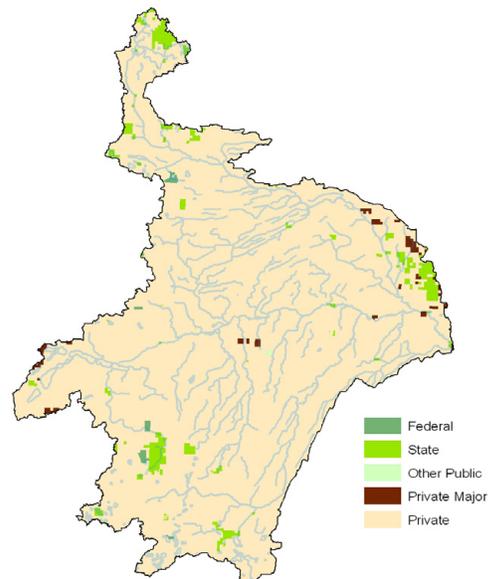


**Average Precipitation**



## Ownership

| Ownership Type*     | Acres          | % of HUC   |
|---------------------|----------------|------------|
| Conservancy         | -              | -          |
| County              | -              | -          |
| Federal             | 1,484          | 0.3        |
| State               | 16,671         | 2.9        |
| Other               | 155            | 0.0        |
| Tribal              | -              | -          |
| Private Major       | 3,700          | 0.6        |
| Private             | 552,877        | 96.2       |
| <b>Total Acres:</b> | <b>574,887</b> | <b>100</b> |

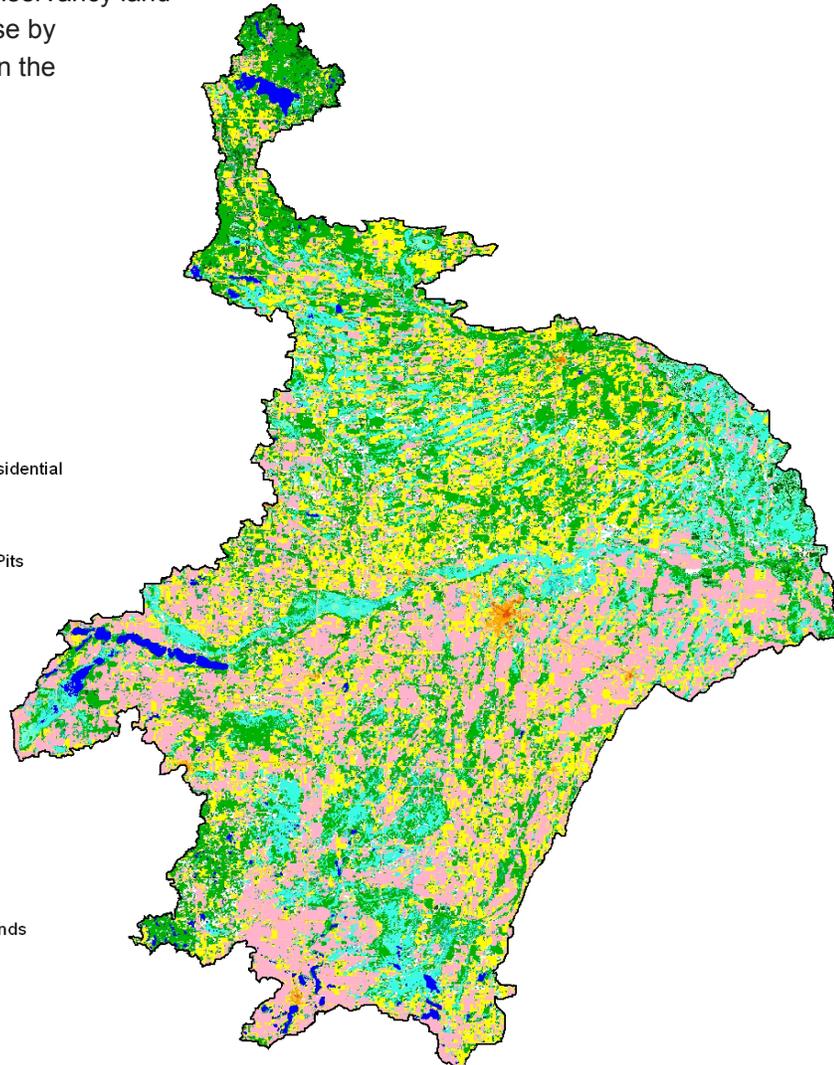
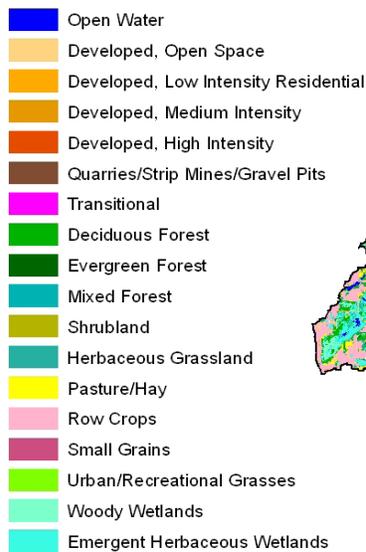


\* Ownership totals derived from 2007 MN DNR GAP Stewardship Coverage data and are the best suited estimation of land stewardship available on a statewide scale at time of publication. See the bibliography section of this document for further information.

## Ownership / Land Use

The Redeye watershed covers an area of 574,887 acres. Nearly ninety six percent of the land in the watershed is owned by private landholders (552,887 acres). The second largest ownership type is State, with approximately 16,670 acres (2.9%), followed by Private Major with 3,700 acres (0.6%), Federal with 1,484 acres (0.3%), and an additional 155 acres of miscellaneous public lands. Existing ownership data shows no Tribal, County or Conservancy land holdings in the region. Land use by ownership type is represented in the table below.

## Land Use / Land Cover <sup>1/2</sup>



## Ownership / Land Use <sup>1/3</sup>

| Landcover/Use          | Public |          | Private** |           | Tribal |          | Total Acres | Percent |
|------------------------|--------|----------|-----------|-----------|--------|----------|-------------|---------|
|                        | Acres  | % Public | Acres     | % Private | Acres  | % Tribal |             |         |
| Forest                 | 8,205  | 1.4%     | 138,684   | 24.1%     | 0      | 0.0%     | 146,889     | 25.6%   |
| Grass, etc             | 891    | 0.2%     | 136,640   | 23.8%     | 0      | 0.0%     | 137,532     | 23.9%   |
| Orchards               | 0      | 0.0%     | 0         | 0.0%      | 0      | 0.0%     | 0           | 0.0%    |
| Row Crops              | 563    | 0.1%     | 144,830   | 25.2%     | 0      | 0.0%     | 145,393     | 25.3%   |
| Shrub etc              | 916    | 0.2%     | 25,955    | 4.5%      | 0      | 0.0%     | 26,871      | 4.7%    |
| Wetlands               | 7,001  | 1.2%     | 76,745    | 13.3%     | 0      | 0.0%     | 83,746      | 14.6%   |
| Residential/Commercial | 204    | 0.0%     | 25,757    | 4.5%      | 0      | 0.0%     | 25,961      | 4.5%    |
| Open Water*            | 504    | 0.1%     | 7,977     | 1.4%      | 0      | 0.0%     | 8,481       | 1.5%    |

\* ownership undetermined

\*\* includes private-major

|                          |               |              |                |              |          |             |                |             |
|--------------------------|---------------|--------------|----------------|--------------|----------|-------------|----------------|-------------|
| <b>Watershed Totals:</b> | <b>18,286</b> | <b>3.18%</b> | <b>556,588</b> | <b>96.8%</b> | <b>0</b> | <b>0.0%</b> | <b>574,887</b> | <b>100%</b> |
|--------------------------|---------------|--------------|----------------|--------------|----------|-------------|----------------|-------------|

**Physical Description (continued)**

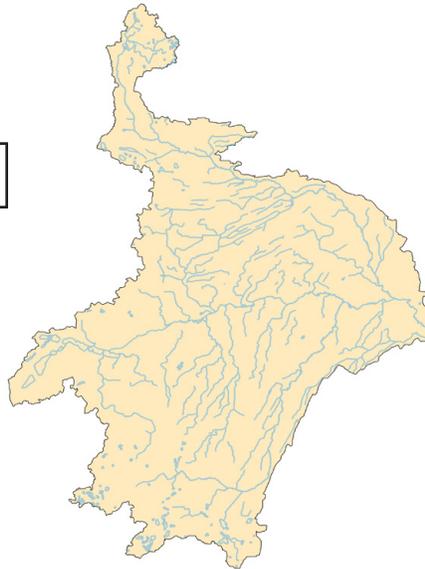
|  |  | ACRES                    | cu. ft/sec             |                 |
|--|--|--------------------------|------------------------|-----------------|
| <b>Stream Flow Data</b>  | Not available @ Publication  | <b>Total Avg.</b>        | n/a                    |                 |
|  |  | <b>May – Sept. Yield</b> | n/a                    |                 |
|  |  | <b>ACRES/MILES</b>       | <b>PERCENT</b>         |                 |
| <b>Stream Data<sup>14</sup></b><br>(*Percent of Total HUC Stream Miles)  | Total Miles – Major (100K Hydro GIS Layer)   | 815.2                    | ---                    |                 |
|  | 303d/TMDL Listed Streams (DEQ)   | 0                        | 0%                     |                 |
| <b>Riparian Land Cover/Land Use<sup>15</sup></b><br>(Based on a 100-foot buffer on both sides of all streams in the 100K Hydro GIS Layer)            | Forest   | 6,467                    | 33.0%                  |                 |
|  | Grain Crops  | 0                        | 0.0%                   |                 |
|  | Grass, etc   | 3,028                    | 15.4%                  |                 |
|  | Orchards   | 0                        | 0.0%                   |                 |
|  | Row Crops  | 1,123                    | 5.7%                   |                 |
|  | Shrub etc  | 946                      | 4.8%                   |                 |
|  | Wetlands   | 5,993                    | 30.5%                  |                 |
|  | Residential/Commercial   | 560                      | 2.9%                   |                 |
|  | Open Water   | 1,508                    | 7.7%                   |                 |
|  | Total Buffer Acres:  | 19,625                   | 100%                   |                 |
| <b>Crop and Pastureland Land Capability Class<sup>16</sup></b><br>(Croplands & Pasturelands Only)<br>(1997 NRI Estimates for Non-Federal Lands Only) | <b>1 – slight limitations</b>  | 0                        | 0%                     |                 |
|  | <b>2 – moderate limitations</b>  | 126,500                  | 48%                    |                 |
|  | <b>3 – severe limitations</b>  | 68,800                   | 26%                    |                 |
|  | <b>4 – very severe limitations</b>   | 58,400                   | 22%                    |                 |
|  | <b>5 – no erosion hazard, but other limitations</b>  | 0                        | 0%                     |                 |
|  | <b>6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest</b>                 | 8,700                    | 3%                     |                 |
|  | <b>7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat</b> | 0                        | 0%                     |                 |
|  | <b>8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply</b>                        | 0                        | 0%                     |                 |
|  | <b>Total Croplands &amp; Pasturelands</b>  | <b>262,400</b>           | <b>---</b>             |                 |
|  | <b>TYPE OF LAND</b>  | <b>ACRES</b>             | <b>% of Crop Lands</b> | <b>% of HUC</b> |
| <b>Irrigated Lands<sup>17</sup></b><br>(1997 NRI Estimates for Non-Federal Lands Only)   | Cultivated Cropland / Pastureland  | 23,700                   | 9%                     | 4.1%            |
|  | Uncultivated Cropland  | 0                        | 0%                     | 0%              |
|  | <b>Total Irrigated Lands</b>   | <b>23,700</b>            | <b>---</b>             | <b>4.1%</b>     |

## Assessment of Waters

Section 303(d) of the Clean Water Act states that water bodies with impaired use(s) must be placed on a state's impaired waters list. A water body is "Impaired" or polluted when it fails to meet one or more of the Federal Clean Water Act's water quality standards. Federal Standards exist for basic pollutants such as sediment, bacteria, nutrients, and mercury. The Clean Water Act requires the Minnesota Pollution Control Agency (MPCA) to identify and restore impaired waters.

### 2006 Minnesota 303d Listed Waters - Redeye Watershed

#### 303d Listed Streams



| Listed Stream / Reach <sup>8</sup> | Impairment | Affected Use |
|------------------------------------|------------|--------------|
| No 2006 303d Listed Streams        |            |              |

#### 303d Listed Lakes



| Listed Lake | Impairment | Affected Use        |
|-------------|------------|---------------------|
| Adley       | Mercury    | Aquatic Consumption |

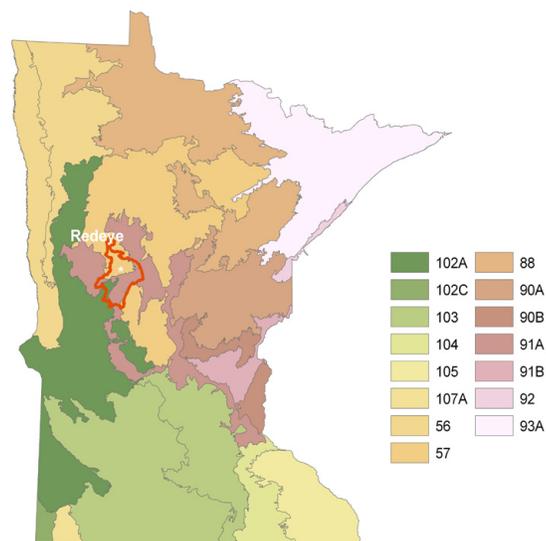
## Common Resource Areas

The Redeye Watershed encompasses three common resource areas, CRA 102A.1, 91A.1, and 57.1.<sup>19</sup>

**102A.1 Rolling Till Prairie:** Gently sloping to steep, loamy glacial till soils with scattered sandy outwash soils and silty alluvial flood plains soils. This area is part of the Prairie Pothole region of the upper Midwest. Predominantly cropped to corn and soybeans with increasing hayland and pasture and small grains in the western part. Resource concerns are water and wind erosion, nutrient management and water quality.

**91A.1 Central Minnesota Outwash:** Nearly level to gently sloping well drained sandy soils on outwash plains and stream terraces. There are also numerous poorly and very poorly drained mineral and organic soils. Irrigated crop land, pasture and hayland are the major land uses. Forestland is common in parts. Corn, soybeans, edible beans and potatoes are the primary irrigated crops. Forage crops are also extensively grown. Resource concerns are wind erosion water quality, nutrient management, improperly managed grazing.

**57.1 Northern Minnesota Till Moraine:** Rolling glacial moraine and associated outwash with short, choppy and complex slopes. Soils are generally loamy with some clayey and sandy soils included. Organic soils occur in depressions. Land use is crop-land, pasture timber and recreation. Numerous lakes occur in this region. Main crops are small grain, soybeans and forage crops. Resource concerns include improved drainage for crop production, grazing management of forest and grassland, water and wind erosion and water quality impacts.



Only the major CRA units are described above.  
 For further information, go to:  
<http://soils.usda.gov/survey/geography/cra.html>

## Geology / Soils<sup>10</sup>

The two major types of soils within the watershed are Alfisols and Entisols. The bedrock geology consists of primarily Precambrian crystalline rocks (Sims and Morey, 1972, Stark et al, 1996).

The Red Eye Watershed lies within calcareous glacial deposits associated with the Des Moines Lobe and the Wadena Lobe Associations. The bedrock hydrogeology and ground water in Red Eye Watershed consists of primarily Precambrian igneous and metamorphic rocks.

The surficial aquifers are primarily glacial outwash consisting of course-grained sands and fine-grained alluvium of calcareous and siliceous deposits and glacial till consisting of calcareous and siliceous deposits. In some areas of the watershed these glacial deposits of sand and gravel are up to 600 feet deep.

Visit the online Web Soil Survey at  
<http://websoilsurvey.nrcs.usda.gov> for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at  
<http://soildatamart.usda.gov> to download SSURGO certified soil tabular and spatial data.

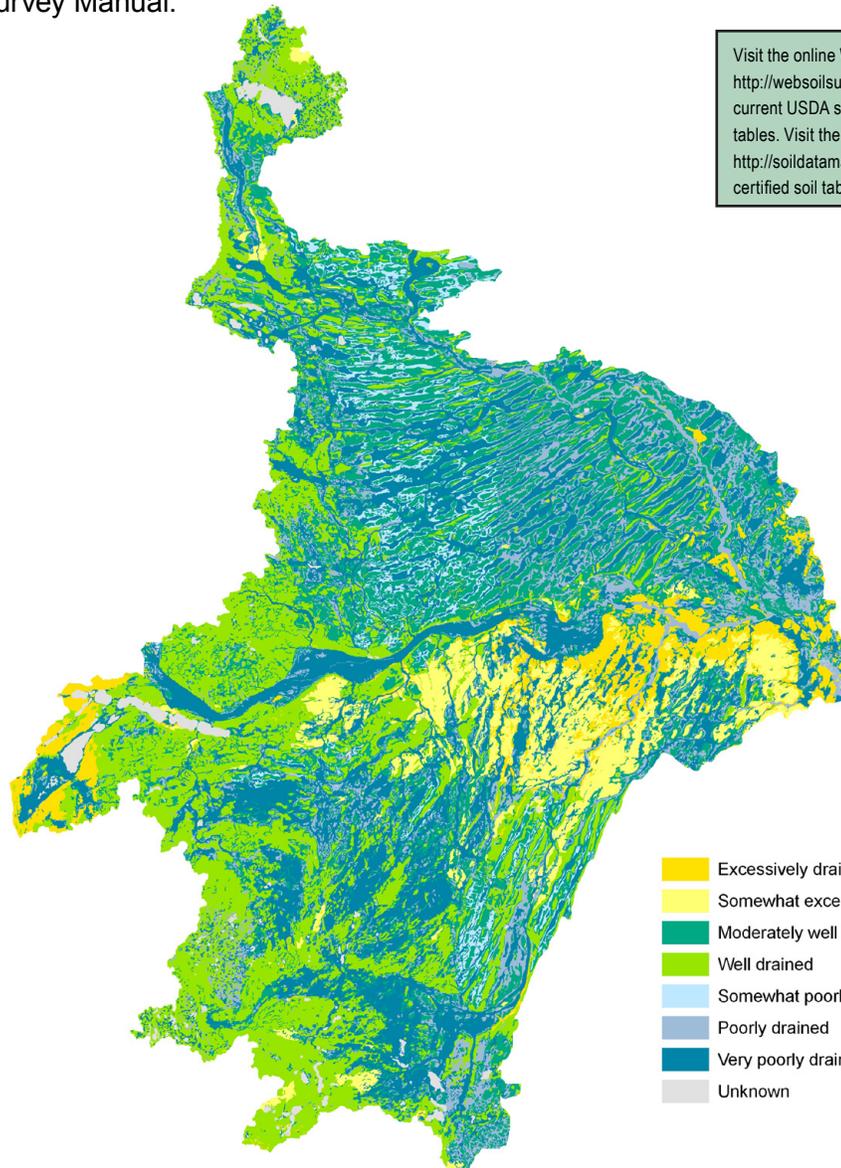
## Drainage Classification

Drainage class (natural) refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil.

Seven classes of natural soil drainage are recognized—excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the “Soil Survey Manual.”



Visit the online Web Soil Survey at
   
<http://websoilsurvey.nrcs.usda.gov> for official and
   
 current USDA soil information as viewable maps and
   
 tables. Visit the Soil Data Mart at
   
<http://soildatamart.usda.gov> to download SSURGO
   
 certified soil tabular and spatial data.



- Excessively drained
- Somewhat excessively drained
- Moderately well drained
- Well drained
- Somewhat poorly drained
- Poorly drained
- Very poorly drained
- Unknown

## Farmland Classification

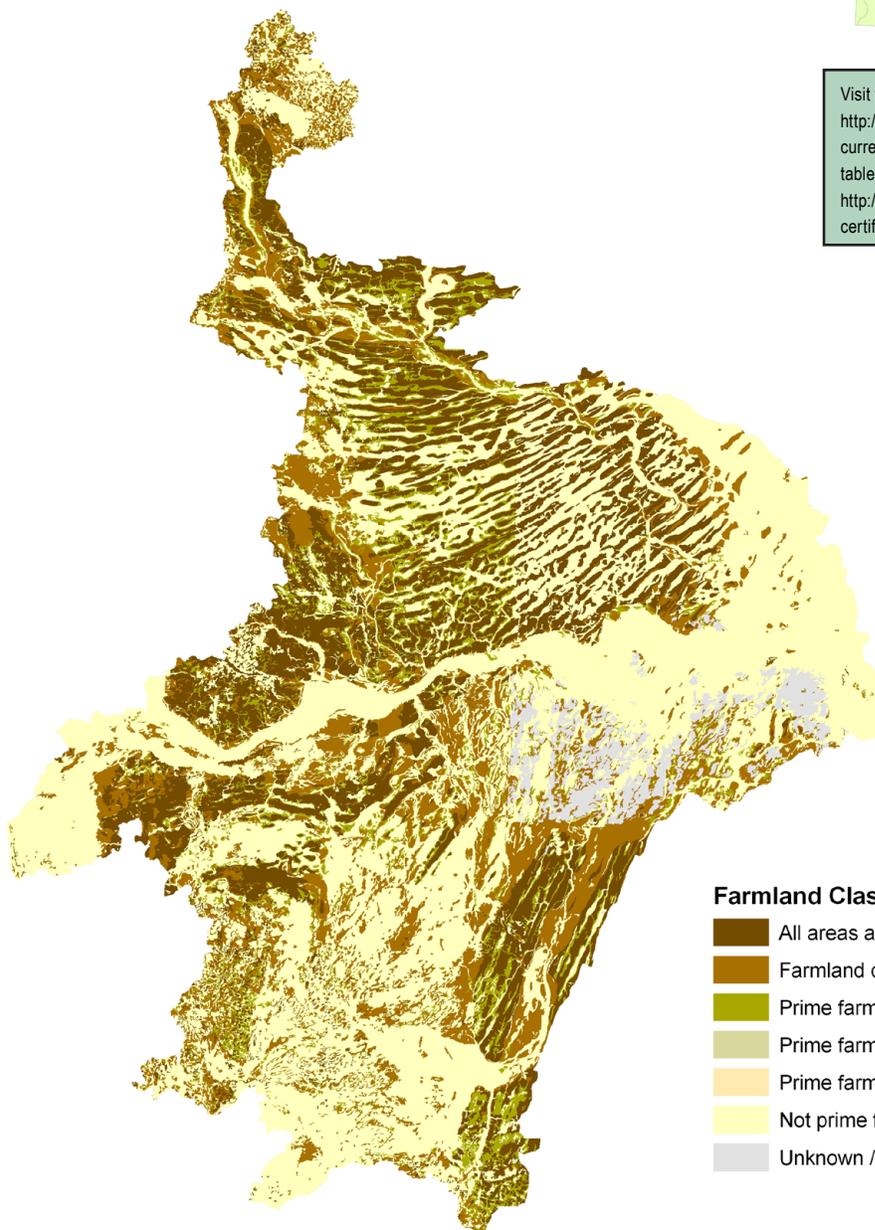
Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland.

Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops.

NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No 21, January 31, 1978.



Visit the online Web Soil Survey at
   
<http://websoilsurvey.nrcs.usda.gov> for official and
   
 current USDA soil information as viewable maps and
   
 tables. Visit the Soil Data Mart at
   
<http://soildatamart.usda.gov> to download SSURGO
   
 certified soil tabular and spatial data.



### Farmland Classification

-  All areas are prime farmland
-  Farmland of statewide importance
-  Prime farmland if drained
-  Prime farmland if drained and protected from flooding
-  Prime farmland if protected from flooding
-  Not prime farmland
-  Unknown / Open Water

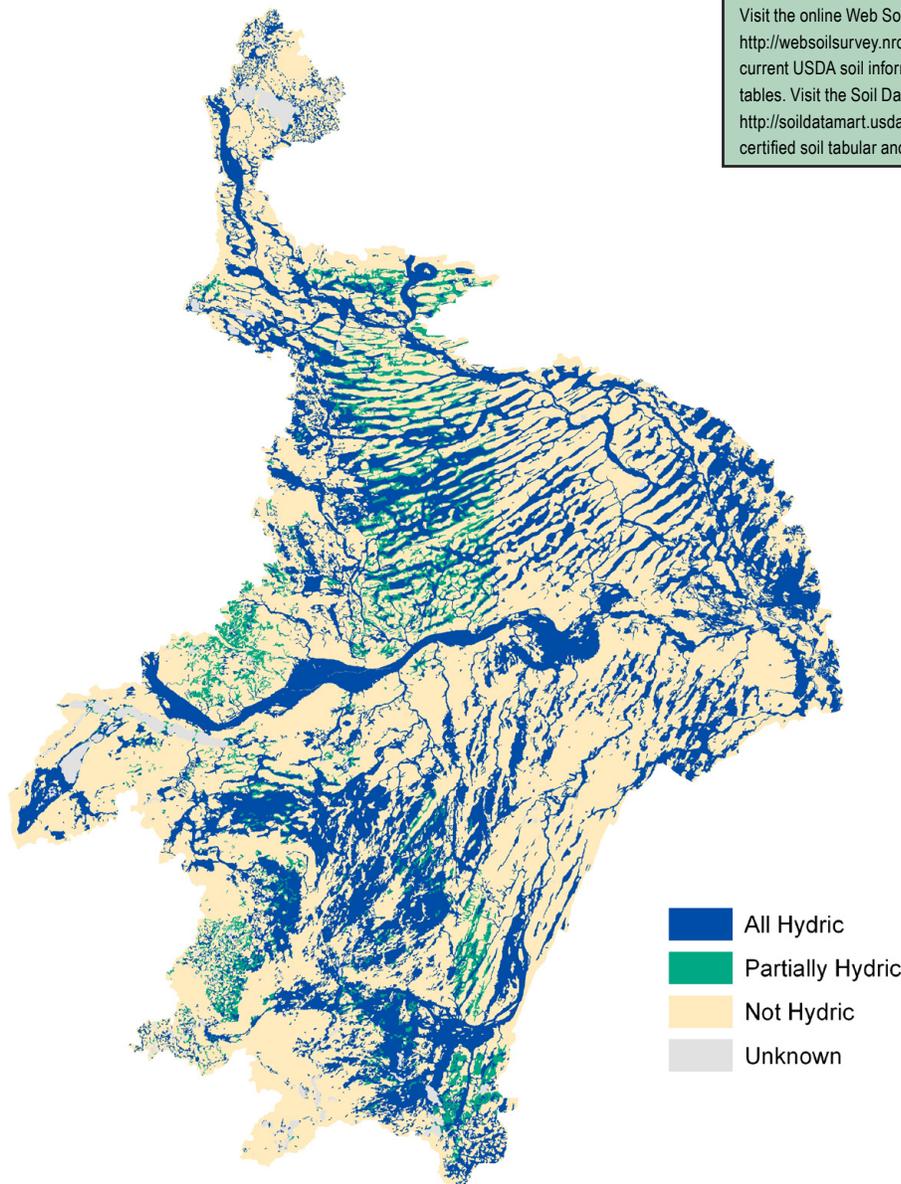
## Hydric Soils

This rating provides an indication of the proportion of the map unit that meets criteria for hydric soils. Map units that are dominantly made up of hydric soils may have small areas, or inclusions of nonhydric soils in the higher positions on the landform. Map units of dominantly non-hydric soils may therefore have inclusions of hydric soils in the lower positions on the landform.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as “soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part” (Federal Register 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.



Visit the online Web Soil Survey at <http://websoilsurvey.nrcs.usda.gov> for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at <http://soildatamart.usda.gov> to download SSURGO certified soil tabular and spatial data.



## Highly Erodible Land (HEL)

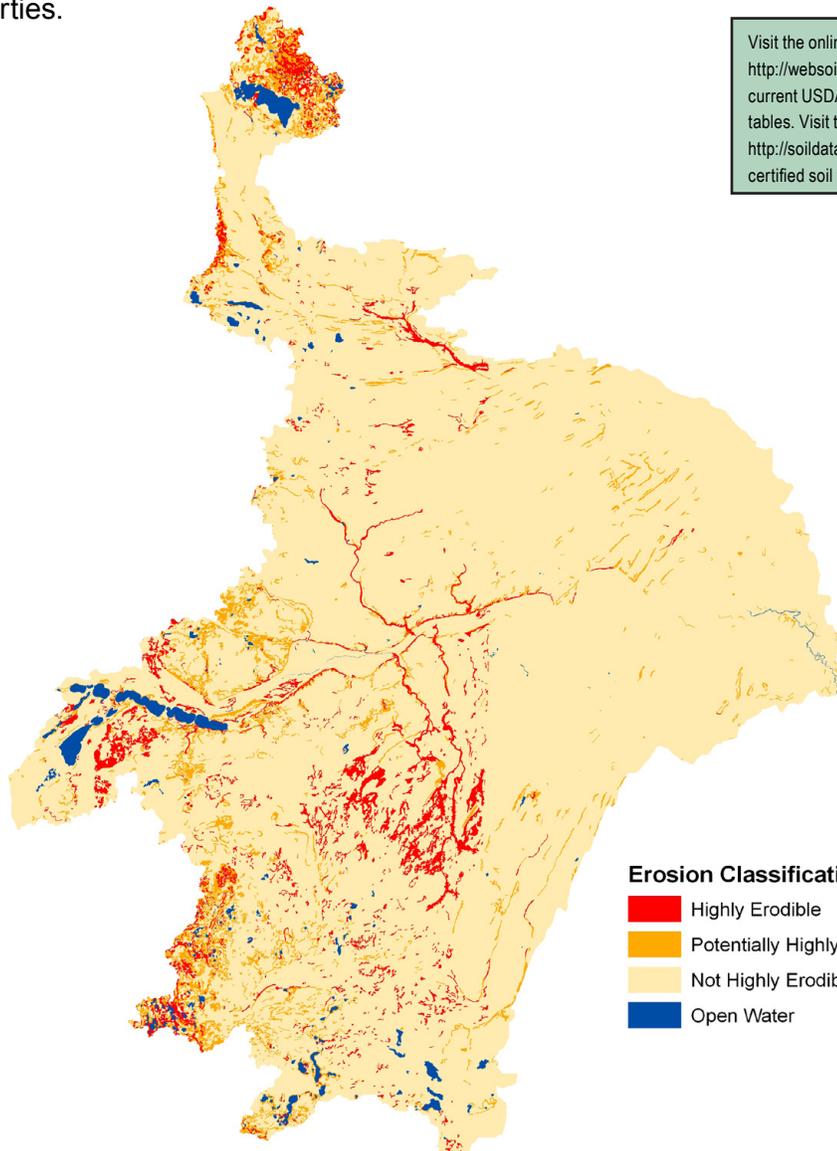
The erodibility index (EI) for a soil map unit is determined by dividing the potential erodibility for the soil map unit by the soil loss tolerance (T) value established for the soil in the FOTG as of January 1, 1990.

A soil map unit with an EI of 8 or greater is considered to be highly erodible land (HEL).

Potential erodibility is based on default values for rainfall amount and intensity, percent and length of slope, surface texture and organic matter, permeability, and plant cover. Actual erodibility and EI for any specific map unit depends on the actual values for these properties.



Visit the online Web Soil Survey at <http://websoilsurvey.nrcs.usda.gov> for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at <http://soildatamart.usda.gov> to download SSURGO certified soil tabular and spatial data.



### Erosion Classification

- Highly Erodible
- Potentially Highly Erodible
- Not Highly Erodible
- Open Water

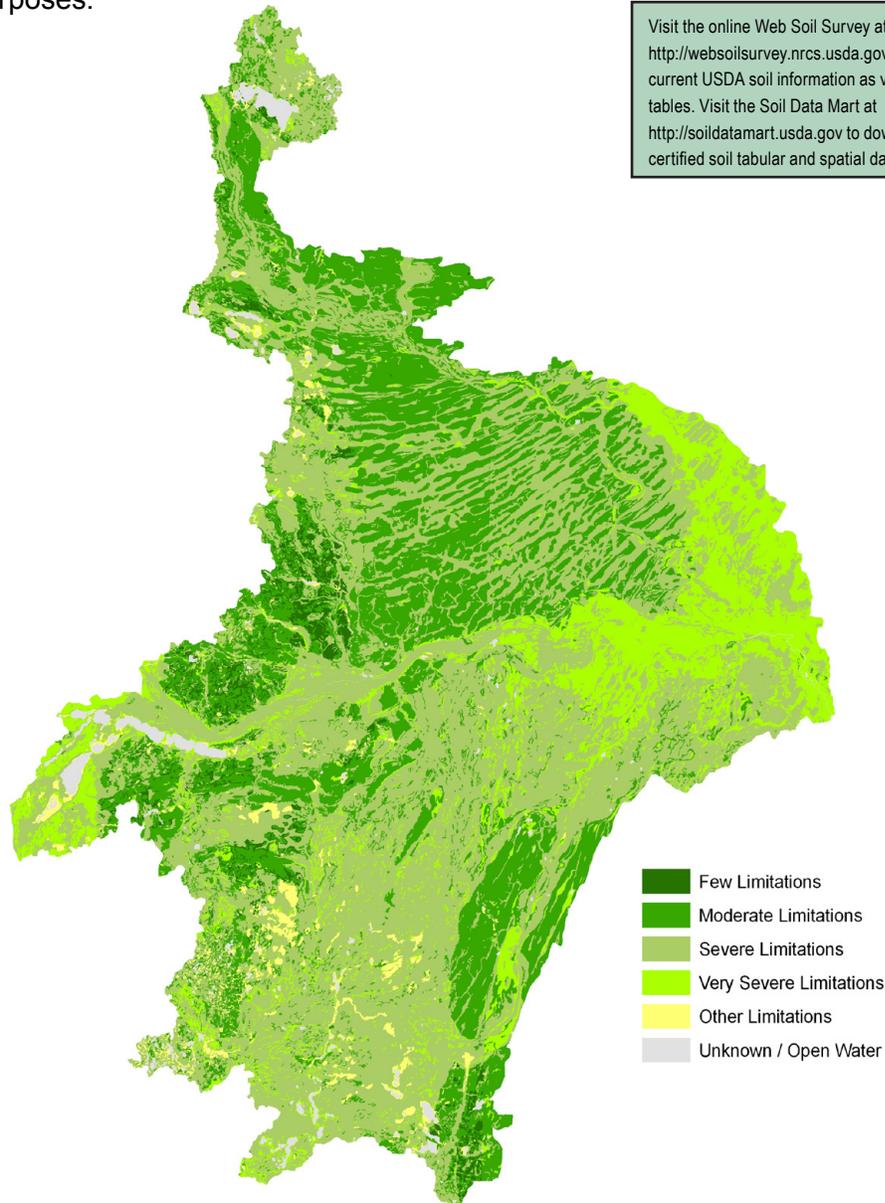
## Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management.

The criteria used in grouping the soils does not include major and generally expensive land forming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.



Visit the online Web Soil Survey at <http://websoilsurvey.nrcs.usda.gov> for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at <http://soildatamart.usda.gov> to download SSURGO certified soil tabular and spatial data.



**Performance Results System Data**

| Watershed Name: Redeye                                       |       |        |       | Watershed Number: 07010107 |        |      |        |        |        |        |
|--|-------|--------|-------|----------------------------|--------|------|--------|--------|--------|--------|
| PRS Performance Measures                                     | FY99  | FY00   | FY01  | FY02                       | FY03   | FY04 | FY05   | FY06   | FY07   | TOTAL  |
| <b>Total Conservation Systems Planned (acres)</b>            | 3,104 | 7,340  | 0     | 2,425                      | 6,957  | N/A  | 19,919 | 13,130 | 10,465 | 63,340 |
| <b>Total Conservation Systems Applied (acres)</b>            | 1,548 | 3,060  | 0     | 7,754                      | 7,754  | N/A  | 25,812 | 12,565 | 13,465 | 71,958 |
| <b>Conservation Practices</b>                                |       |        |       |                            |        |      |        |        |        |        |
| <b>Total Waste Management (313) (numbers)</b>                | 0     | 0      | 0     | 0                          | 3      | 0    | 0      | 0      | 0      | 3      |
| <b>Riparian Forest Buffers (391) (acres)</b>                 | 95    | 960    | 340   | 1,055                      | 4,013  | 153  | 1,306  | 112    | 10     | 8,044  |
| <b>Erosion Control Total Soil Saved (tons/year)</b>          | 484   | 11,364 | 3,360 | 28,469                     | 22,539 | N/A  | N/A    | N/A    | N/A    | 66,216 |
| <b>Total Nutrient Management (590) (Acres)</b>               | 0     | 668    | 805   | 1,895                      | 1,340  | 0    | 1,196  | 1,196  | 2,926  | 10,026 |
| <b>Pest Management Systems Applied (595A) (Acres)</b>        | 0     | 320    | 78    | 0                          | 0      | 0    | 109    | 270    | 1,956  | 2,733  |
| <b>Prescribed Grazing 528a (acres)</b>                       | 0     | 585    | 43    | 905                        | 1,324  | 96   | 157    | 386    | 386    | 3,882  |
| <b>Tree &amp; Shrub Establishment (612) (acres)</b>          | 413   | 2,293  | 1,898 | 3,439                      | 3,589  | 192  | 1,851  | 273    | 3      | 13,951 |
| <b>Residue Management (329A-C) (acres)</b>                   | 0     | 0      | 0     | 402                        | 1,645  | 255  | 255    | 4,341  | 558    | 7,456  |
| <b>Total Wildlife Habitat (644 - 645) (acres)</b>            | 1,791 | 10,057 | 6,991 | 4,861                      | 5,861  | 140  | 4,861  | 383    | 1,195  | 36,140 |
| <b>Total Wetlands Created, Restored, or Enhanced (acres)</b> | 30    | 180    | 18    | 603                        | 546    | 226  | 257    | 18     | 0      | 1,878  |
| <b>Acres enrolled in Farmbill Programs</b>                   |       |        |       |                            |        |      |        |        |        |        |
| <b>Conservation Reserve Program</b>                          | 358   | 2,708  | 4,594 | 6,027                      | 4,829  | N/A  | 5,790  | 1,123  | 4,568  | 29,997 |
| <b>Wetlands Reserve Program</b>                              | 0     | 0      | 170   | 0                          | 0      | N/A  | 68     | 42     | 0      | 280    |
| <b>Environmental Quality Incentives Program</b>              | 1,160 | 1,434  | 1,257 | 1,046                      | 3,266  | N/A  | 5,077  | 7,305  | 6,395  | 26,940 |
| <b>Wildlife Habitat Incentive Program</b>                    | 30    | 0      | 0     | 32                         | 32     | N/A  | 87     | 111    | 57     | 349    |
| <b>Farmland Protection Program</b>                           | 0     | 0      | 0     | 0                          | 0      | N/A  | 0      | 0      | 0      | 0      |

## RESOURCE CONCERNS

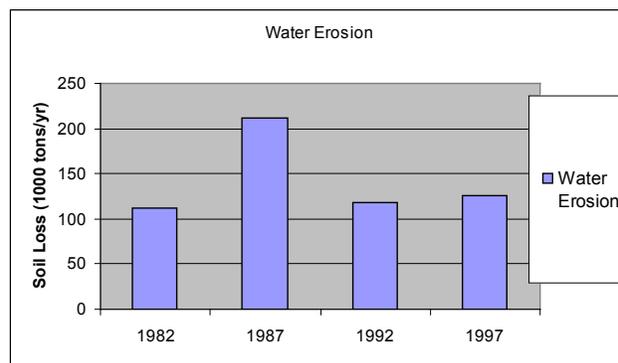
County Soil and Water Conservation Districts in the watershed have identified the following resource concerns as top priorities for conservation and cost sharing efforts:

- **Soil Quality, Excessive Erosion.** Sheet and rill as well as gully erosion and consequential soil deposition have ranked as high concerns for the counties in the watershed.
- **Woodland Management.** Management opportunities include, but are not limited to planting trees or shrubs, timber stand improvement, timber sales, enhancing wildlife habitat, prescribed burning, and controlling invasive species.
- **Surface Water Quality, Nutrients, Priority Pollutants.** Reduction of priority pollutants and sediments in surface waters is a priority issue throughout the watershed. Excessive amounts of sediments, nutrients, and bacteria degrade the water quality causing a fish community with depressed populations and limited diversity. Mercury and PCB levels are affecting Aquatic consumption, aquatic life, and aquatic recreation.
- **Ground Water Quality, Nutrients, Organics, Animal and Human Wastewater management.** Aging septic systems, feedlot runoff, nutrient runoff, tilling practices, improper closure of old manure pits, and abandoned wells all pose threats to groundwater quality throughout the region. Improved management of wastewater ensures safe water for all uses.
- **Ground Water Quantity.** Land alterations have transformed the flow, retention, and replenishment of the hydrologic cycle. Pattern tiling, ditching, wetland removal, development, stormwater drainage, excessive groundwater use, etc. have resulted in the cumulative effect of rapidly transporting a greater amount of water to major rivers and streams, and away from groundwater recharge potential.
- **Surface Water Management, Gully Control, Drainage Management.** Drained wetlands, crop production in flood prone areas, and aging dams all diminish surface water quality and productivity. Restoration of wetlands, dam repair and placing flood-prone lands in CRP/RIM all serve to lessen the impact of flooding and improve drainage.
- **Wetland Management.** Area groups recognize that development and agricultural practices have had major impacts on wetlands. Physical changes have taken place, wildlife and plant species composition have been altered greatly changing the function and value of the areas plentiful wetlands. Priority should be given to the protection and enhancement of remaining wetlands in the basin.



### NRI Erosion Estimates <sup>13</sup>

- NRI estimates for sheet and rill erosion by water on the cropland and pastureland increased by approximately 13,700 tons of soil (12.2%) between 1982 and 1997.



**THREATENED AND ENDANGERED SPECIES** 14

NRCS assists in the conservation of threatened and endangered species and avoids or prevents activities detrimental to such species. NRCS' concern for these species includes the species listed by the Secretary of the Interior (as published in the Federal Register) and species designated by state agencies. The following is a list of threatened, endangered, candidate species and species of special concern that occur in the basin.



| Scientific Name                                   | Common Name                   | Type       |
|---|-------------------------------|------------|
| <i>Ammodramus nelsoni</i>                         | Nelson's Sharp-tailed Sparrow | Zoological |
| <i>Asio flammeus</i>                              | Short-eared Owl               | Zoological |
| <i>Buteo lineatus</i>                             | Red-shouldered Hawk           | Zoological |
| <i>Cirsium hillii</i>                             | Hill's Thistle                | Botanical  |
| <i>Coturnicops noveboracensis</i>                 | Yellow Rail                   | Zoological |
| <i>Emydoidea blandingii</i>                       | Blanding's Turtle             | Zoological |
| <i>Etheostoma microperca</i>                      | Least Darter                  | Zoological |
| <i>Haliaeetus leucocephalus</i>                   | Bald Eagle                    | Zoological |
| <i>Lasmigona compressa</i>                        | Creek Heelsplitter            | Zoological |
| <i>Malaxis monophyllos</i> var. <i>brachypoda</i> | White Adder's-mouth           | Botanical  |
| <i>Notropis anogenus</i>                          | Pugnose Shiner                | Zoological |
| <i>Panax quinquefolius</i>                        | American Ginseng              | Botanical  |
| <i>Tympanuchus cupido</i>                         | Greater Prairie-chicken       | Zoological |

## Socioeconomic and Agricultural Data (Relevant)

Estimations for the Redeye subbasin indicate a current population of just over 19,120 people. Median household income throughout the district is nearly \$32,200 yearly, roughly 72% of the national average. The estimated unemployment rate is 5.1%, and approximately 12% of the residents in the watershed are below the national poverty level.

Assessment estimates indicate 1,216 Farms in the watershed. Approximately 49 percent of the operations are less than 180 acres in size, forty six percent are from 180 to 1000 acres in size, and the remaining farms are greater than 1000 acres in size. Of the 1,126 operators in the basin, 56% are full-time producers not reliant on off farm income.



| <b>(MN) HUC# 7010107</b>         |                                 | <b>Total Acres:</b> | <b>574,887</b> |
|----------------------------------|---------------------------------|---------------------|----------------|
| <b>Population Data *</b>         | Watershed Population            | 19,124              |                |
|                                  | Unemployment Rate               | 5%                  |                |
|                                  | Median Household Income         | 32,218              |                |
|                                  | % below poverty level           | 11%                 |                |
|                                  | Median Value of Home            | 81,000              |                |
| <b>Farms</b>                     | # of Farms                      | 1,216               |                |
|                                  | # of Operators                  | 1,126               | <b>Percent</b> |
|                                  | # of Full Time Operators        | 629                 | 56%            |
|                                  | # of Part Time Operators        | 497                 | 44%            |
|                                  | <b>Total Crop/Pasturelands:</b> | <b>262,400</b>      | <b>45.6%</b>   |
| <b>Farm Size</b>                 | 1 to 179 Acres                  | 103                 | 49%            |
|                                  | 180 to 499 Acres                | 77                  | 36%            |
|                                  | 500 to 999 Acres                | 20                  | 10%            |
|                                  | 1,000 Acres or more             | 10                  | 5%             |
| <b>Livestock &amp; Poultry</b>   | Cattle - Beef                   | 7,704               | 1%             |
|                                  | Cattle - Dairy                  | 9,357               | 2%             |
|                                  | Chicken                         | 3,611               | 1%             |
|                                  | Swine                           | 7,928               | 1%             |
|                                  | Turkey                          | 271,823             | 45%            |
|                                  | Other                           | 304,294             | 50%            |
|                                  | <b>Animal Count Total:</b>      | <b>604,717</b>      |                |
| <b>Total Permitted AFOs:</b>     | <b>356</b>                      |                     |                |
| <b>Chemicals (Acres Applied)</b> | Insecticides                    | 13,360              |                |
|                                  | Herbicides                      | 86,703              |                |
|                                  | Wormicides                      | 1,393               |                |
|                                  | Fruiticides                     | 4,182               |                |
|                                  | <b>Total Acres Treated</b>      | <b>105,639</b>      |                |
|                                  | <b>% State Chemical Totals</b>  | <b>0.7%</b>         |                |

\* Adjusted by percent of HUC in the county or by percent of block group area in the HUC, depending on the level of data available

## Watershed Projects, Plans and Monitoring

---

- **Biological & Toxicological Assessment**  
Minnesota Pollution Control Agency
- **Mississippi River Env. Management Program**  
US Army Corps of Engineers
- **Mississippi River Watch**  
Mississippi Headwaters Board
- **Mississippi River Defense Network**  
Legislative Commission on Minnesota Resources
- **Upper Mississippi River Basin W.Q. Plan**  
Minnesota Pollution Control Agency
- **Sunnybrook Park Native Restoration**  
Wadena County SWCD and Partners
- **Upper Mississippi River Initiative**  
National Audobon Society
- **Upper Mississippi River Basin Planning**  
Minnesota Pollution Control Agency
- **Upper Mississippi Source Water Protection Project**  
Minnesota Department of Health
- **Upper Mississippi River WS Forest Partnership**  
USDA Forest Service
- **Upper Mississippi River Watershed Fund**  
USDA Forest Service / National Fish & Wildlife Federation
- **Shell River Mussel Survey**  
Wadena Co SWCD, MN DNR, Rivers Council of MN

\* Have a watershed project you'd like to see included? Submit suggestions online @ <http://www.mn.nrcs.usda.gov/technical/rwa/>

## Conservation Districts, Organizations & Partners

---

- **Becker County SWCD**  
809 - 8th St SE, Detroit Lakes, MN 56501  
Phone (218) 846-7360
- **Douglas County SWCD**  
900 Robert St Ste 102, Alexandria, MN 56308  
Phone (320) 763-3191
- **Ottertail County SWCD, East**  
801 Jenny Ave SW Ste 2, Perham, MN 56573  
Phone (218) 346-4260
- **Ottertail Co Coalition of Lake Associations**  
PO Box 53 Ottertail, MN, 56571  
Phone (218) 736-4021
- **Todd County SWCD**  
607 9th St NE, Long Prairie, MN 56347  
Phone (320) 732-2644
- **Wadena County SWCD**  
4 Alfred St NE, Wadena, MN 56482-2303  
Phone (218) 631-3195
- **Friends of the Mississippi River**  
360 N Robert St Saint Paul, MN 55101  
Phone (651) 222-2193
- **West Central Minnesota Joint Powers Board**  
809 SE 8th St, Detroit Lakes, MN 56501  
Phone (218) 847-9392
- **Wenck - Shingle Creek WMO, W. Mississippi WMO**  
1800 Pioneer Creek Center, Maple Plain, MN 55359  
Phone (763) 479-4229
- **Trout Unlimited Twin Cities Chapter**  
PO Box 390207  
Edina, MN 55439-0207
- **MN DNR Area Fisheries Supervisor:**  
1509 1st Ave N Fergus Falls, MN 56537  
Phone (218) 739-7576

---

## Footnotes / Bibliography

---

1. Ownership Layer – Source: MN Stewardship Data: Minnesota Department of Natural Resources, Section of Wildlife, BRW, Inc, 2007. This is the complete GAP Stewardship database containing land ownership information for the entire state of Minnesota. Date of source material is variable and ranges from 1976 to 2007, although a date range of 1983 to 1985 predominates. Land interest is expressed only when some organization owns or administers more than 50% of a forty except where DNR could create sub-forty accuracy polygons.
2. National Land Cover Dataset (NLCD) - Originator: U.S. Geological Survey (USGS); Publication date: 19990631; Title: Minnesota Land Cover Data Set, Edition: 1; Geospatial data presentation form: Raster digital data; Publisher: U.S. Geological Survey, Sioux Falls, SD, USA.
3. Ownership layer classes grouped to calculate Public ownership vs. Private and Tribal ownership by Minnesota NRCS Rapid Watershed Assessment Staff. Land cover / Land use data was then extracted from the National Landcover Dataset Classification System and related to ownership class polygons.
4. U.S. Geological Survey National Hydrography Dataset (NHD) 1:100,000-scale Digital Line Graph (DLG) medium resolution hydrography data, integrated with reach-related information from the U.S. Environmental Protection Agency Reach File Version 3.0 (RF3). The Hydro 100k layer was compared to MPCA's 303(d) data to derive percentage of listed waters.
5. Land Cover / Land Use / Hydro 100k Buffer. Using the 100k Hydrology dataset, All streams within HUC were spatially buffered to a distance of 100 ft. National Landcover Dataset attributes were extracted for the spatial buffer to demonstrate the vegetation and landuse in vulnerable areas adjacent to waterways.
6. Land Capability Class. ESTIMATES FROM THE 1997 NRI DATABASE (REVISED DECEMBER 2000) REPLACE ALL PREVIOUS REPORTS AND ESTIMATES. Comparisons made using data published for the 1982, 1987, or 1992 NRI may produce erroneous results. This is because of changes in statistical estimation protocols and because all data collected prior to 1997 were simultaneously reviewed (edited) as 1997 NRI data were collected. All definitions are available in the glossary. In addition, this December 2000 revision of the 1997 NRI data updates information released in December 1999 and corrects a computer error discovered in March 2000. For more information: <http://www.nrcs.usda.gov/technical/NRI/>
7. 1997 NRI Irrigated Land Estimates. Irrigated land: Land that shows evidence of being irrigated during the year of the inventory or during two or more years out of the last four years. Water is supplied to crops by ditches, pipes, or other conduits. Water spreading is not considered irrigation; it is recorded as a conservation practice. [NRI-97] For more information: <http://www.nrcs.usda.gov/technical/NRI/>
8. 303(d) Stream data. Minnesota's Final Impaired Waters (per Section 303(d) Clean Water Act), 2006. Data obtained from Minnesota Pollution Control Agency (MPCA). The Minnesota Pollution Control Agency (MPCA) helps protect state water by monitoring quality, setting standards and controlling inputs through the development of TMDL plans. <http://www.pca.state.mn.us/water/tmdl/index.html#maps>.

## Footnotes / Bibliography (continued)

---

9. National Coordinated Common Resource Area (CRA) Geographic Database. A Common Resource Area (CRA) map delineation is defined as a geographical area where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a Common Resource Area
10. Soil Survey Geographic Database (SSURGO) Tabular and spatial data obtained from NRCS Soil Data Mart at <http://soildatamart.nrcs.gov>. Publication dates vary by county. Component and layer tables were linked to the spatial data via SDV 5.1 and ARCGIS 9.1 to derive the soil classifications presented in these examples. Highly Erodible Land Classification Data obtained from USDA/NRCS EFOTG Section II, County Soil Data. HEL classifications were appended to SSURGO spatial data via an ARCEdit session. Addendum and publication dates vary by county.
11. Lands removed from production through farm bill programs. County enrollment derived from the following: CRP Acres: [www.fsa.usda.gov/crpstorpt/07Approved/r1sumyr/mn.htm](http://www.fsa.usda.gov/crpstorpt/07Approved/r1sumyr/mn.htm) (7/30/04). CREP Acres: <http://www.bwsr.state.mn.us/easements/crep/easementssummary.html> (7/31/03). WRP Acres: NRCS (8/16/04). Data were obtained by county and adjusted by percent of HUC in the county.
12. Socioeconomic and Agricultural Census Data were taken from the U.S. Population Census, 2000 and 2002 Agricultural Census and adjusted by percent of HUC in the county or by percent of zip code area in the HUC, depending on the level of data available. Data were also taken from MPCA AFO/CAFO counts provided by county for 2005.
13. 1997 NRI Estimates for sheet and rill erosion (WEQ & USLE). The NRI estimates sheet and rill erosion together using the Universal Soil Loss Equation (USLE). The Revised Universal Soil Loss Equation (RUSLE) was not used in the 1997 NRI. RUSLE was not available for previous inventories, therefore the use of USLE was continued to preserve the trending capacity of the NRI database. Wind erosion is estimated using the Wind Erosion Equation (WEQ). For further information visit <http://www.mn.nrcs.usda.gov/technical/nri/findings/erosion.htm>
14. Federally listed endangered and threatened species counts obtained from NRCS Field Office Technical Guide, Section II, Threatened and Endangered List. <http://www.nrcs.usda.gov/Technical/efotg/>. Where listed, Essential fish habitat as established by Magnuson-Stevens Fishery Conservation and Management Act, Public Law 94-265, as amended through October 11, 1996 <http://www.nmfs.noaa.gov/sfa/magact/>
15. Watershed Projects, Plans, Monitoring. Natural Resources Conservation Service, Watershed Projects Planned and Authorized, <http://www.nrcs.usda.gov/programs/watershed/Purpose>. Additional Information on listed individual projects can be obtained from the noted parties.