LAKE CLASSIFICATION SHORT REPORT
FAWN LAKE, ADAMS COUNTY, WI

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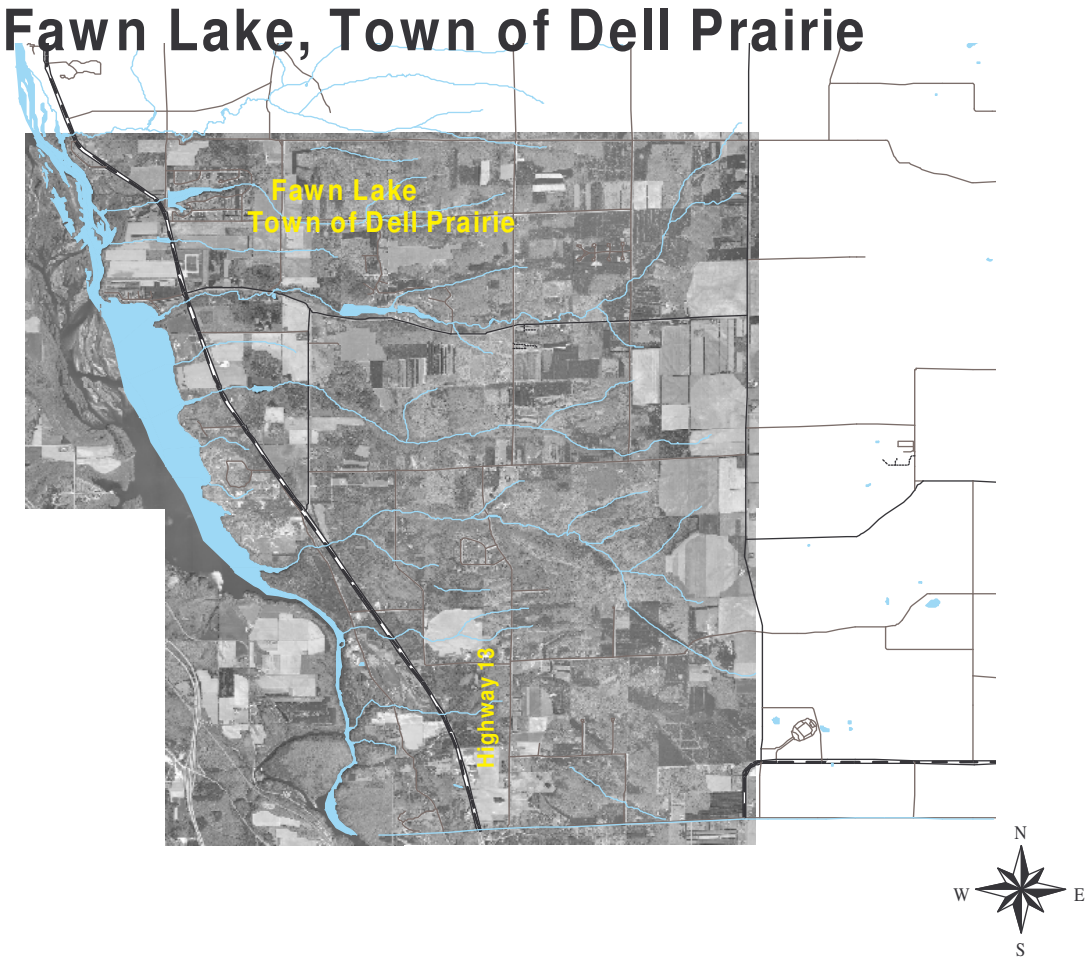
Introduction

Information about Fawn Lake: Fawn Lake is located in the Town of Dell Prairie, Adams County, WI, in the south central part of Wisconsin. Fawn Lake is a mildly eutrophic impoundment with good water quality and fair water clarity. It has 29 surface acres, with a maximum depth of 13 feet and an average depth of 5 feet. Water level is controlled by a dam owned and maintained by Adams County. There is a public boat ramp on the northeast end of the lake. A public fishing dock is located near the boat ramp.



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Land Use

Both the surface and ground watersheds of Fawn Lake are fairly small. Studies have shown that lakes are the product of their watersheds, with the water quality of a lake affected by the land use, especially in the amount and content of stormwater runoff from the surface. Runoff volume is affected by the amount of impervious surface, the soil type and the slope of the area. Natural landscapes tend to have low stormwater runoff.

	Surface		Ground		Total	
Fawn Lake	**Acres**	**% of Total**	**Acres**	**% of Total**	**Acres**	**% of Total**
Agriculture--Non Irrigated	208.93	16.77%	17.38	13.48%	226.31	16.46%
Residential	440.05	35.31%	3.15	2.45%	443.2	32.23%
Water	25.02	2.01%	1.39	1.08%	26.41	1.92%
Woodland	572.05	45.91%	106.98	82.99%	679.03	49.39%
total	1246.05	100.00%	128.9	100.00%	1374.95	100.00%

Woodland is the largest land use category in both Fawn Lake watersheds. Since forest floors are often full of leaves, needles and other duff, runoff from forested lands is usually more filtered than that from agricultural or residential lands.

Residential land use is the second most common land use category in Fawn Lake watersheds, especially around the lake itself, where residential land use is concentrated. This land use category, in some instances, may also contribute a significant amount of nutrients to the water from stormwater runoff, mowed lawns, and impervious surfaces.

Nearly 17% of the surface watershed for Fawn Lake is non-irrigated agriculture; such agriculture is over 13% of the ground watershed. This category is the third largest land use category. Traditionally, agriculture may contribute significantly to the amount of nutrients in water.

There are several wetlands around the Fawn Lake shore. Most of these are cattail marshes. Wetlands play an important role in water quality by trapping many pollutants in runoff waters and by serving as buffers to catch and control what would otherwise be uncontrolled water and pollutants. Wetlands also play an essential role in the aquatic food chain, thus affecting fishery, and also serve as spaces for wildlife habitat, wildlife reproduction & nesting, and wildlife food.

The photo below shows one of the wetlands along Fawn Lake's shore. It is essential to preserve these wetlands for the continued health of Fawn Lake waters.

Cattail Marsh along Fawn Lake shores

Like many lakes in Wisconsin, Fawn Lake is a phosphorus-limited lake. This means that of the pollutants that end up in the lake, the one in the shortest supply and most affects the overall quality of the lake water is phosphorus. Studies have shown that lakes are products of their watersheds. Land use types play a major role in determining the amount of phosphorus being loaded into the lake.

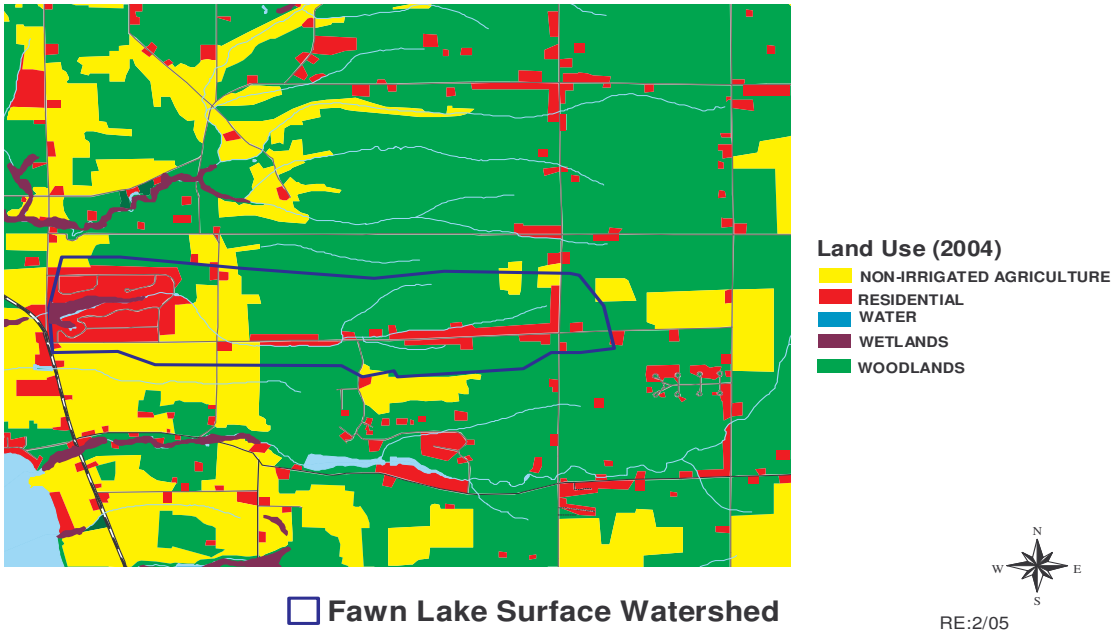
Some aspects of phosphorus loading can't be modified by human behavior—they are simply part of the natural landscape. However, phosphorus loading from agriculture, residential, recreational and septic use of the land can be decreased or increased.

MOST LIKELY CURRENT PHOSPHORUS LOADING		
BY LAND USE	%	Current
Agriculture--Non Irrigated	50.3%	74.8
Residential	2.7%	4.4
Other Water	0.5%	0.5
Woodland	31.0%	46.2
Groundshed	3.9%	6.6
Lake Surface	1.8%	2.2
Septic	9.8%	14.52
total in pounds/year	100.0%	149.22

Simply reducing the phosphorus loading by 10% from areas known to be impacted by human activities would reduce the amount of phosphorus by 10.032 pounds per year. This initially may not sound like much. However, when it is considered that one pound of phosphorus may produce up to 500 pounds of phosphorus, those 10.032 pounds of phosphorus become up to 5016 pounds **fewer** of algae per year. !

Land Use	Current	-10%	-25%	-50%
Agriculture--Non Irrigated	74.8	67.32	56.10	37.40
Residential	4.4	3.96	3.30	2.20
Other Water	0.5	0.50	0.50	0.50
Woodland	46.2	46.20	46.20	46.20
Groundshed	6.6	5.94	4.95	3.30
Lake Surface	2.2	2.20	2.20	2.20
Septic	14.52	13.07	10.89	7.26
total	149.22	139.188	124.14	99.06

Fawn Lake Surface Watershed Land Use



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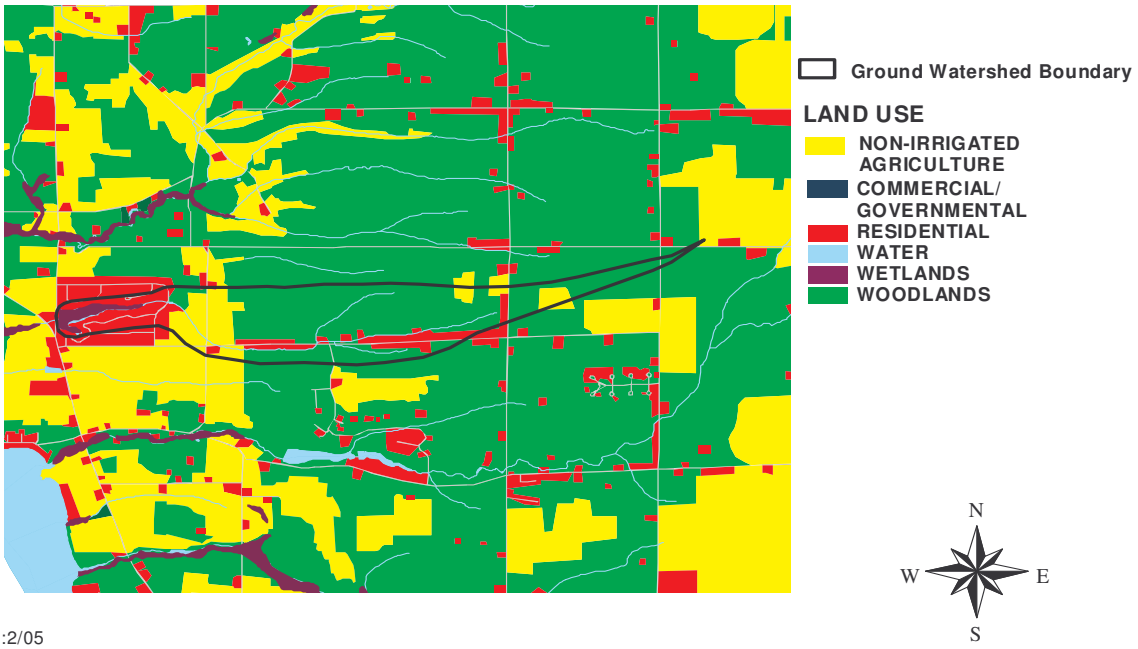
Ground Watershed Land Use--Fawn Lake



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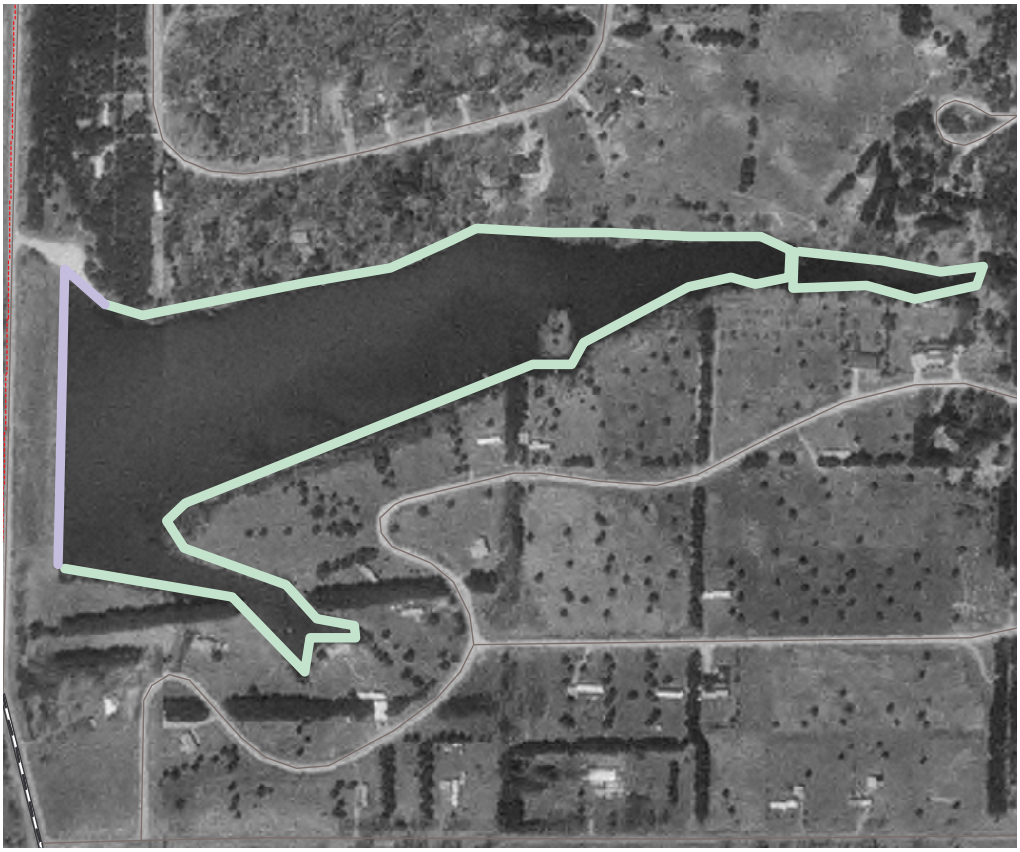
Shorelands

Most of Fawn Lake's shore is cattail marsh (a type of wetland). 76.92% of Fawn Lake's shoreline is vegetated; the remaining is rock riprap along the dam area. Most of the houses are set more than 70' back from the shore, even in those places where there is mowed lawn. The shore by the dam is covered with rock riprap to prevent erosion. Some emergent vegetation (mostly cattails) has grown in front of the rocks. As one enters the boat ramp, to the left is a willow thicket at the shore.

Fawn Lake Shoreline



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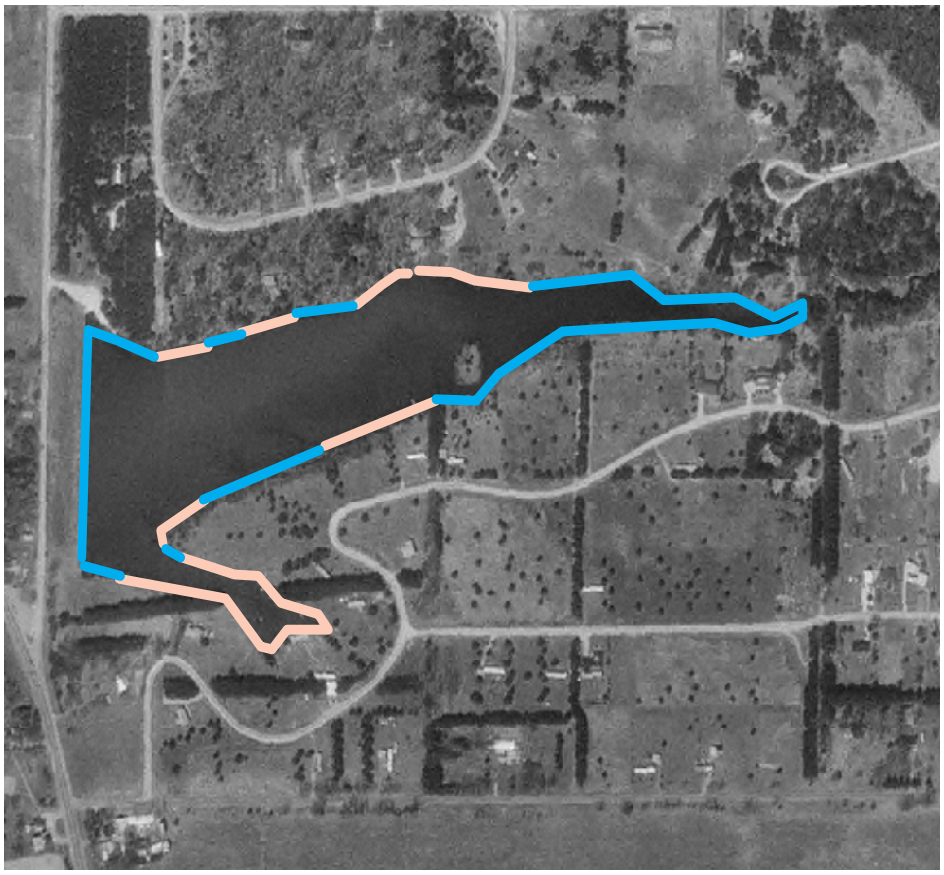
Hard Structure/Rock
Vegetated Shore

N
W E
S

A 2004 shore survey showed that while about 2/3 of the shore had an "adequate buffer". An "adequate buffer" is a native vegetation strip at least 35 feet landward from the shore. Most of the "inadequate" buffer areas were those with mowed lawns and/or insufficient native vegetation at the shoreline to cover 35 feet landward from the water line.

Shore Buffers on Fawn Lake



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Adequate Buffer

Inadequate Buffer

N
W
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Shoreland buffers are an important part of lake protection and restoration. These buffers are simply a wide border of native plants, grasses, shrubs and trees that filter and trap soil & similar sediments, fertilizer, grass clippings, stormwater runoff and other potential pollutants, keeping them out of the lake. A 1990 study by the Wisconsin Department of Natural Resources of Wisconsin shorelines revealed that a buffer of native vegetation traps 5 to 18 times more volume of potential pollutants than does a developed, traditional lawn or hard-armored shore. The filtering process and bank stabilization that buffers provide help improve a lake's water quality, including water clarity.

Example of Adequate Buffer

Example of Inadequate Buffer

Vegetated shoreland buffers help stabilize shoreline banks, thus reducing bank erosion. The plant roots give structure to the bank and also increase water infiltration and decrease runoff. A vegetated shore is especially important when shores are soft, as are most of the Fawn Lake shores.

Water Quality Information

One of the measures Wisconsin uses to give a general estimate of a lake's water quality is the **trophic state index.** This index looks at a lake's water clarity, its amount of total phosphorus (the element most related to aquatic plant and algal growth), and its chlorophyll-a level (chlorophyll-a is a pigment used by algae for photosynthesis).

Depending on the trophic index score, lakes are then classified as **Oligotrophic** (good)**, Mesotrophic** (fair), or **Eutrophic** (poor)**:**

- **Good:** Oligotrophic lakes have clear, deep water with few algal blooms. Larger game fish are often found in such lakes.
- **Fair:** Mesotrophic lakes have more aquatic plant and algae production, with occasional algal blooms and a good fishery. The water is usually not as clear as that of oligotrophic lakes.
- **Poor:** Eutrophic lakes are very productive, with lots of aquatic plants and algae. Algal blooms are often frequent in these lakes. They may have a diverse fishery, but rough fish (such as carp) are also common. Water is often cloudy or murky. Small shallow lakes are more likely to be eutrophic.

Fawn Lake's overall TSI is 56

Score	TSI Level Description
30-40	**Oligotrophic:** clear, deep water; possible oxygen depletion in lower depths; few aquatic plants or algal blooms; low in nutrients; large game fish usual fishery
40-50	**Mesotrophic:** moderately clear water; mixed fishery, esp. panfish; moderate aquatic plant growth and occasional algal blooms; may have low oxygen levels near bottom in summer
50-60	**Mildly Eutrophic:** decreased water clarity; anoxic near bottom; may have heavy algal bloom and plant growth; high in nutrients; shallow eutrophic lakes may have winterkill of fish; rough fish common
60-70	**Eutrophic:** dominated by blue-green algae; algae scums common; prolific aquatic plant growth; high nutrient levels; rough fish common; susceptible to oxygen depletion and winter fishkill
70-80	**Hypereutrophic:** heavy algal blooms through most of summer; dense aquatic plant growth; poor water clarity; high nutrient levels

Water clarity readings are usually taken by using a Secchi disk (shown at right). **Average summer Secchi disk clarity in Fawn Lake in 2004-2006 was 5.05 feet**. This places Fawn's water clarity in the "fair" category. Water clarity can be reduced by turbidity (suspended materials such as algae and silt) and dissolved organic chemicals that color or cloud the water.

Increased phosphorus levels in a lake will feed algal blooms and also may cause excess plant growth. **The 2004-2006 summer average phosphorus concentration in Fawn Lake was 34.67 micrograms/liter.** This is above the 30 micrograms/liter average for impoundments in Wisconsin to avoid frequent algal blooms, but still scores in the "fair" category for phosphorus levels.

The third measure used in trophic state classification is the amount of chlorophyll-a contained in the lake. The amount of chlorophyll-a found in a lake is an indication about the amount of algae in the lake. **The 2004-2006 summer average chlorophyll-a concentration in Fawn Lake was 16.4 micrograms/liter.** This level of chlorophyll-a gives Fawn Lake a "poor" ranking for chlorophyll-a. It is this reading that suggests that Fawn Lake is on the cusp between a mesotrophic and eutrophic lake.

In-Lake Habitat

Aquatic Plants

A diverse aquatic plant community plays a vital role in improving water quality, providing valuable habitat resources for fish and wildlife, resisting invasions of non-native species and checking excessive growth of the most tolerant species.

An updated aquatic plant survey was performed in 2006. The 0-1.5ft depth zone supported the most abundant aquatic plant growth. The Fawn Lake aquatic plant community is characterized by medium quality and medium species diversity. The most common plants were those tolerant of disturbance. *Elodea canadensis* (waterweed), *Lemna minor* (small duckweed), and *Typha latifolia* (broad-leaf cattail) were the most common aquatic species.

Comparing the results of the 2002 aquatic plant survey to the 2006 results, it appears that some progress is being made. In 2002, the most common plants found were *Ceratophyllum demersum* (coontail), *Myriophyllum spicatum* (Eurasian watermilfoil), and *Potamogeton crispus* (curly-leaf pondweed). Two of these three are exotic invasives.

By 2005, after treatment by the Fawn Lake District addressed to the Eurasian Watermilfoil, the two invasives were much less visible. Eurasian Watermilfoil declined from 14% frequency of occurrence in 2002 to 5% in 2006. Curly-leaf Pondweed went from 22% in 2002 down to 2% in 2006.

Curly-Leaf Pondweed

Purple Loosestrife

Eurasian Watermilfoil

Important to maintaining this progress and continuing to a more diverse aquatic plant community is an integrated aquatic plant management plan that controls the invasive plants in the lake. The Fawn Lake District has been working with the WDNR and the Adams County Land & Water Conservation Department to incorporate this integrated approach into its lake management plan.

More detailed information can be found in the aquatic plant report of the 2006 survey, available on request from the WDNR or Adams County Land & Water Conservation Department.

Elodea canadenis **Waterweed**

Emergent Plants-Fawn Lake 2006

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Emergent Plants Found 2006

Floating Plants--Fawn Lake 2006

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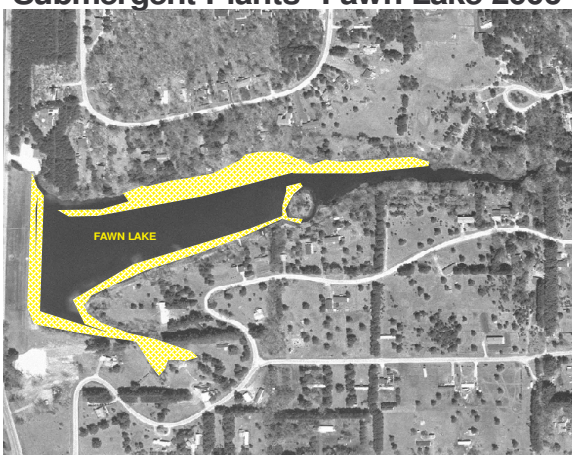
Floating Plants Found 2006

Submergent Plants--Fawn Lake 2006



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Submergent Plants Found 2006

Curly-Leaf Pondweed in Fawn Lake 2006

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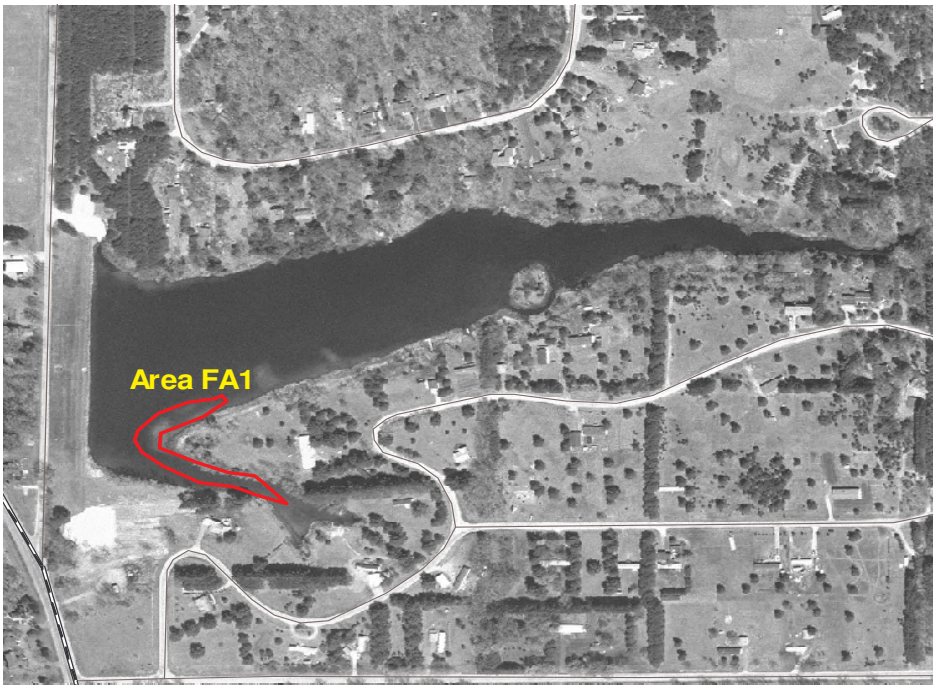
Curly-Leaf Pondweed Found 2006

Critical Habitat

Critical Habitat Area on Fawn Lake



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Wisconsin Rule 107.05(3)(i)(I) defines a "critical habitat areas" as: "areas of aquatic vegetation identified by the department as offering critical or unique fish & wildlife habitat or offering water quality or erosion control benefits to the body of water. Thus, these sites are essential to support the wildlife and fish communities. They also provide mechanisms for protecting water quality within the lake, often containing high-quality plant beds. Finally, critical habitat areas often can provide the peace, serenity and beauty that draw many people to lakes in the first place.

One area on Fawn Lake was determined to be appropriate for critical habitat designation. FL1 extends along approximately 500 feet of the southwestern shoreline of Fawn Lake, up to the ordinary high water mark.

North Part of FL1

The Critical Habitat Report for Fawn Lake has more specific information on these sites. Copies are available from the Adams County Land & Water Conservation Department.

Fishery/Wildlife/Endangered Resources

In 1982, after an inventory of the lake, the WDNR determined that Fawn Lake was best managed for largemouth bass and bluegills. The most recent fishery inventory indicated that bluegill were abundant, with largemouth bass and pumpkinseed common. Also present were yellow perch, yellow bullhead and black crappie.

Muskrat are also known to use Fawn Lake shores for cover, reproduction and feeding. Seen during the field survey were various types of waterfowl, songbirds, and turkey. Frogs and salamanders are known, using the lake shores for shelter/cover, nesting and feeding. Turtles and snakes also use this area for cover or shelter in this area, as well as nested and fed in this area. In 2006, a pair of Egyptian geese made a summer home at Fawn Lake.

Egyptian Goose at Fawn Lake 2006

Endangered resources known in the Fawn Lake watersheds are Blanding's turtle and the western slender glass lizard.

Blanding's Turtle

Western Slender Glass Lizard

Recommendations

Lake Management Plan

- The lake plan needs to be regularly evaluated on the following aspects concerning the management of the lake: aquatic species management; control/management of invasive species; wildlife and fishery management; nutrient budgeting; shoreland protection; critical habitat protection; water quality protection.
- The plan needs to be sure to include a strategy for protecting the designated critical habitat area.

Watershed Recommendations

- Since computer modeling results suggest that input of nutrients, especially phosphorus, are a factor that needs to be explored for Fawn Lake, it is recommended that both the surface and ground watersheds be inventoried, documenting any of the following: runoff from any livestock operations that may be entering the surface water; soil erosion sites; agricultural producers not complying with nutrient management plans and/or irrigation water management plans.
- If such sites are documented, the Fawn Lake District should encourage landowners and Adams County Land & Water Conservation Department to design and implement practices to address the issues.
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Water Quality Recommendations

- All lake residents should practice best management on their lake properties, including keeping septic systems maintained in proper condition and pumped every three years, eliminating the use of lawn fertilizers, cleaning up pet wastes and not composting near the water.
- Reducing the amount of impervious surface around the lake and management of stormwater runoff will also help maintain water quality.
- Residents should become involved in the Citizen Lake Water Monitoring Program, which includes monitoring for water quality and invasives, as well as the Clean Boats, Clean Waters program.
- Lake residents should protect the natural shoreline around Fawn Lake and restore any areas currently not having natural vegetation.

Aquatic Plant Recommendations

- All lake users should protect the aquatic plant community in Fawn Lake by assisting in developing and implementing an integrated aquatic plant management plan that uses multiple methods of control.
- The Fawn Lake Association should maintain exotic species signs at the boat landings and contact DNR if the signs are missing or damaged.
- The Fawn Lake Association should continue monitoring and control of Eurasian Watermilfoil maintain the most effective methods and modify if necessary. Residents may need to hand-pull scattered plants.
- Lake residents should get involved in the county-sponsored Citizen Aquatic Invasive Species Monitoring Program. This will allow not only noting changes in the Eurasian Watermilfoil pattern, but also look for Curly-Leaf Pondweed and Purple Loosestrife. Noting the presence and density of these plants early is the best way to take preventive action to keep them from becoming a bigger problem.

Critical Habitat Recommendations

- Maintain current habitat for fish and wildlife.
- Leave fallen trees along shoreline & in water.
- Seasonal protection of spawning habitat.
- Maintain the wildlife corridor.
- Maintain sedge meadow/deep marshes areas.
- Protection emergent vegetation.
- Seasonal control of exotics.
- No bank grading or grading of adjacent land.
- Maintain aquatic vegetation in undisturbed condition for wildlife habitat, fish use and water quality protection.