
Lake Mendota Priority Watershed Project Summary

Introduction

The purpose of this watershed plan is to assess the nonpoint pollutants in the Lake Mendota watershed and to guide the implementation of control measures. Implementation of best management practices to control polluted runoff and education are needed to meet very specific water resource objectives designed to protect and enhance Lake Mendota and other lakes, streams, groundwater, and wetlands in the watershed.

Nonpoint source pollution, also called polluted runoff, cannot be easily traced to a single point of origin such as an effluent discharge from a wastewater treatment plant or industrial plant. Nonpoint source pollution occurs when rainwater or snowmelt flows across the land and picks up soil particles, organic wastes, fertilizers, or other pollutants and carries them to surface and/or groundwater. These soil particles and organic wastes contain phosphorus and nitrogen, the same compounds found in commercial fertilizers. Sediment, and its associated nutrients, are deposited in streams, marshes, Lake Mendota, and other small lakes in the watershed. Nonpoint source pollution in the Lake Mendota watershed has led to a general decrease in the quality of the lake and its tributaries. The decrease over time in the number of wetlands, through ditching and conversion to cropland or development, has contributed to decreased water quality and unstable base flow fluctuations.

Other sources of nonpoint pollutants in a watershed originate from streambank erosion and some gully erosion resulting in sediment deposition in the stream or lake.

The Nonpoint Source Pollution Control Plan for the Lake Mendota Priority Watershed was prepared by the Department of Natural Resources (DNR), the Department of Agriculture, Trade & Consumer Protection (DATCP), the Dane County Land Conservation Department (LCD) and the Columbia County LCD. The DNR selected the Lake Mendota watershed as a priority watershed project in October, 1993. The Lake Mendota project joins approximately 86 similar watershed projects statewide in which runoff control measures are being planned and implemented. The DNR's Nonpoint Source Water Pollution Abatement Program was created in 1978 by the state Legislature. The program provides financial and technical assistance to landowners and local governments to reduce nonpoint source pollution.

The project is administered at the state level by the DNR and DATCP. The Dane and Columbia County LCDs will administer the project at the local level with assistance from the University of Wisconsin-Extension and the U.S.D.A. Natural Resources Conservation Service. This plan is primarily used by and written for the county LCDs, DNR, DATCP, other local units of government, legislators, external program evaluators and the interested public.

General Characteristics

The Lake Mendota watershed is a 232-square-mile drainage basin located in south central Wisconsin (Map S-1). The Lake Mendota Watershed is within the Lower Rock River Basin. It includes most of the city of Madison, some of the city of Sun Prairie, all of the city of Middleton, the villages of Arlington, Dane, DeForest, Maple Bluff, Shorewood Hills, and Waunakee, and the towns of Arlington, Bristol, Burke, Dane, Leeds, Lowville, Middleton, Morrisonville, Springfield, Vienna, Westport and Windsor. About 88% (205 sq. miles) of the watershed is in Dane County, and 12% (28 sq. miles) is in Columbia County. The watershed is largely agricultural while 20% of the land area is urban, or experiencing rapid urbanization. Approximately 4% of the watershed is wetlands. Land use characteristics of the watershed are shown in Table S-1.

Table S-1. Land Uses in the Lake Mendota Watershed

	Dane Co. Acres	Columbia Co. Acres	Total Acres	Percent
Cropland	66,105	14,190	80,295	54.0
Grassland/Wildlife/Pasture	13,960	1,420	15,383	10.3
Woodland	1,800	198	1,998	1.3
Wetland ¹	5,915	412	6,327	4.2
Open Water	11,108	60	11,168	7.5
Developed ²	29,304	117	29,421	19.8
Internally Drained	2,806	1,353	4,159	2.8
	130,998	17,753	148,751	100

¹ Wetland acreage for Columbia County are included in categories called cropland, or natural and wildlife areas. Wetland acres for Dane County were estimated using digitized NRCS wetland maps combined with hydric soils maps.

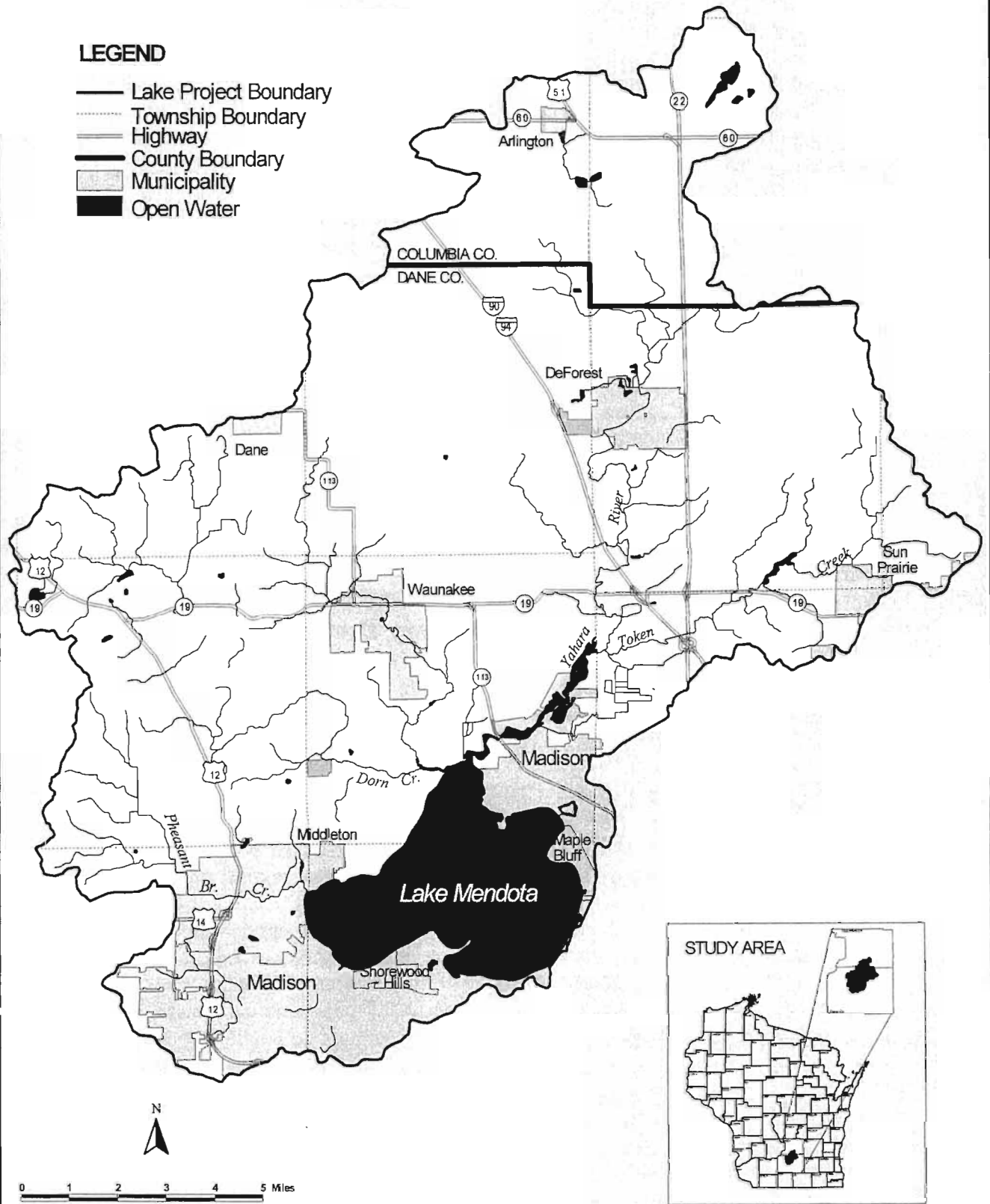
² Developed acreages include 22,088 acres for the detailed analysis of Sun Prairie, Madison, DeForest, Waunakee, Middleton, and data for Dane, Morrisonville, Windsor, and Westport, 4405 acres of roads outside detailed analysis area, and 125 acres of homesteads.

Source: Dane County LCD: Data used to run WINHUSLE computer model was used
Columbia County LCD: WDNR WISCLAND data used

Map S-1. Lake Mendota Priority Lake Project

LEGEND

- Lake Project Boundary
- Township Boundary
- == Highway
- County Boundary
- ▨ Municipality
- Open Water



Mapscale 1:185,000

Wisconsin Department of Natural Resources
 Water Division
 Bureau of Watershed Management
 September 1999

Dairy farming accounts for the large majority of income to farmers in this watershed. The average farmer manages 229 dairy animals including heifers and young stock, 358 acres of corn, and 142 acres of alfalfa. Farming in the Lake Mendota watershed is predicted to experience only moderate growth in the near future.

The rural population of the watershed has remained relatively stable over the past 20 years. However, Dane County's population is increasing at a rate significantly higher than the state average. The overall population of Dane County has risen from 290,272 in 1970 to 325,545 in 1980 and 367,085 in 1990. Projected population for the year 2020 is 488,515.

Lake Mendota, a 10,000-acre glacial lake, is intensively used for recreational purposes including fishing and water contact sports. Excessive phosphorus loading results in noxious blue-green algae blooms and excessive weed growth. Most of the lake's water quality problems are linked to current and past rural and urban runoff carrying sediment, nutrients, and possibly toxins to the lake. About 50% of the original wetlands in the watershed have been drained or filled. A reduction in nutrient and sediment loading to Lake Mendota will likely result in improvement in the three downstream lakes in the Yahara Lake Chain--Lakes Monona, Waubesa, and Kegonsa.

There are five major tributaries that drain directly into Lake Mendota: Pheasant Branch Creek, Dorn Creek, Sixmile Creek, the Yahara River, and Token Creek. Each of these tributaries is degraded from runoff pollution. Segments of the Pheasant Branch Creek, Token Creek, and the Yahara River have restoration potential if excessive sedimentation and nutrient inputs are controlled.

Sources of Nonpoint Pollution and Inventory Process

The Dane and Columbia County LCDs collected data from 1994 through 1996 on agricultural lands, barnyards, and urban areas in the watershed. The data were used to estimate the pollutant loads from these nonpoint sources. The following is a summary of the inventory results.

Barnyard Runoff Inventory

- * There were 344 barnyards that were inventoried in the watershed: 40 lots are internally drained, and 304 drain to receiving water bodies;
- * An estimated 20,000 pounds of phosphorus are generated from animals in the watershed annually. Approximately 75% of that is delivered to Lake Mendota, or 15,000 pounds annually.

Nutrient Management Inventory

- * Nutrient management plans were prepared for approximately 36% of all cropped acres in Dane County, or 30,691 acres, and 40% of all cropped acres in Columbia Counties, or about 5,500 acres.

- * According to the Farm Practices Inventory survey completed, 50% of the farmers were applying nitrogen above levels recommended by the University of Wisconsin. 70% of farmers were applying phosphorus in excess of crop removal rates.
- * Due to differences of scientific opinion, there was no determination available for phosphorus loading estimates from fields where winterspreading of manure takes place. However, some studies have put the amounts as high as 30% to 40% of the total cropland phosphorus loading coming solely from runoff of field-spread manure, whereas the remainder would come from phosphorus tied up in eroding soils.

Streambank Erosion Inventory

- * Estimation of eroding streambanks was calculated using the streambank and gully erosion model from the Natural Resources Conservation Service, using air photos, maps, and field investigations.
- * An estimated 728 tons of sediment erodes from streambanks annually, or about 8% of the watershed's total sediment load. About 4,608 pounds of phosphorus are delivered annually with the eroding soils to surface waters from streambank erosion.

Upland Sediment Inventory

- * About 146,000 acres, or 95%, of the watershed land area was inventoried in both Columbia and Dane Counties. Updated farm plans were used as the basis of the upland inventory, and for Dane County, digital orthophotography was used.
- * Almost 90,000 acres of upland (primarily cropland) drain to Lake Mendota. An estimated 35,197 tons of sediment is delivered to streams from cropland on an annual basis--2,305 tons from Columbia County and 32,892 tons from Dane County. Approximately 5,600 tons of that sediment are delivered to Lake Mendota on an annual basis or about 58% of the total load. About 35,000 pounds of phosphorus are delivered to Lake Mendota from uplands annually.

Wetlands Inventory

- * A broad inventory was conducted using maps, field investigations, and aerial photographs to document existing acreage for potential wetland restoration. Between one-third to one-half of all original wetland acres has been lost in the watershed. An estimated 4,300 acres were determined to be either prior converted wetland or another potentially restorable wetland type.

Groundwater Inventory

- * Samples were taken from 157 private wells in the watershed and tested for nitrates. Only 10% of the samples taken were less than the state Preventive Action Limit (PAL) of 2 mg/L for nitrates, the level at which human activity impacts groundwater. Another 26% of the samples were between 2 and 10

mg/L. An alarming 65% of the wells were above 10 mg/L, the Enforcement Standard (ES) Health Advisory Level. The sample results indicate overall very poor groundwater quality in the Lake Mendota watershed, and the health advisory recommends that certain individuals not drink their well water. When contamination is as widespread as it appears to be in the Lake Mendota watershed, runoff from excess manure and fertilizer is a likely source of nitrates in groundwater.

Urban Inventory

- * A complete inventory was conducted of the five largest municipalities in the watershed using maps that were digitized to various land use types (low-density residential, institutional, commercial, industrial, open space, and freeway). The municipalities were Madison, Middleton, Sun Prairie, Waunakee and DeForest. Subwatershed boundaries were drawn based on outfalls from sewer pipes. Pollutant load coefficients, based on those derived from the Source Loading and Management Model (SLAMM), were used to determine contributions of suspended solids and phosphorus for the specified land uses within those municipalities. Projected growth was estimated for the 2020 build-out areas based on maps provided by the Dane County Regional Planning Commission and each of the municipalities.
- * The number of building permits issued in recent years was used to calculate the amount of land in transition. Sediment and phosphorus loads were calculated based on the physical characteristics of the site and use of the Universal Soil Loss Equation. Future sediment loads from construction sites were based on the projected growth in the year 2020 build-out areas, and a sediment loss of 7.5 tons per acre, which assumes adoption of uniform construction site erosion control ordinances across Dane County.
- * Model results show that for existing and transitional areas, 8,626 tons of sediment are delivered to streams from these municipalities, 4,675 tons of sediment are delivered to the Pheasant Branch and Cherokee Marshes. About 3,281 tons of sediment are delivered to Lake Mendota on an annual basis, or 33% of the total load. 46,530 pounds of phosphorus are delivered to streams from these municipalities, 25,813 pounds of phosphorus are delivered to the Pheasant Branch and Cherokee Marshes, and 17,651 pounds of phosphorus are delivered to Lake Mendota on an annual basis from existing urban areas and areas undergoing construction.

Lake Modeling

- * Watershed modeling conducted at the University of Wisconsin Center for Limnology was used to estimate phosphorus loadings based on short-term and long-term monitoring data (1975-1996) conducted on the Pheasant Branch (Hwy 12) and Yahara River (Windsor) stations. Average total phosphorus loading to the lake was calculated to be 75,000 pounds per year of which approximately 66,000 pounds comes via surface water inputs from the watershed. The other

sources are dust and dry fallout, precipitation in the form of snow and rain, and groundwater. In-lake models were then used to predict how much the phosphorus loading should be reduced to improve the water quality of the lake. Improved water quality was expressed in terms of frequency of nuisance algae blooms. The monitored data that had been conducted by the Dane County LCD proved to be consistent with the modeled data.

Project Goals

The overall goal of the Lake Mendota Priority Watershed project is to protect, enhance, and restore the water quality of the streams, lakes, groundwater and wetlands in the 232-square mile drainage area.

Lake Mendota Objective

The water quality goal for Lake Mendota is to reduce the concentration of spring total phosphorus in the lake to less than 0.074 mg/L. Modeling results indicate that this concentration will result in a decrease in the concentration of blue-green algae to less than 2 mg/L during the summer months. This algal concentration generally represents the point at which algae form nuisance blooms (unsightly green water or surface scums). To achieve this goal, phosphorus input loading to the lake from its watershed must be reduced by about 50%, or 37,000 pounds annually. Given the current annual phosphorus loading, the likelihood on any given summer day of a nuisance algae bloom occurring is 50% of the time, or 1 out of every 2 days on average over a number of summers. With a 50% reduction in annual phosphorus loads to the lake, the likelihood of a nuisance algae bloom occurring is reduced to 20% of the time, which translates to no nuisance algae blooms 4 out of 5 days on average over a number of summers. In a year with high precipitation and hence high runoff into the lake, nuisance algal blooms would be more likely that summer, even with the implementation of recommended best management practices (BMPs).

Sediment Objective

To reduce overall sediment delivered to Lake Mendota from all sources by 50 percent. The following will need to be achieved:

- * Reduce sediment delivered to the lake from agricultural uplands by at least 2,242 tons, or 40% of the existing contribution from uplands--from 5,600 tons per year to no more than 3,362 tons per year. At a minimum, all landowners should reduce or maintain soil erosion on all cropland to tolerable ("T") soil loss rates, as calculated by the Universal Soil Loss Equation (USLE). All fields that are already at "T" may initiate a water management system to further reduce erosion rates.
- * Reduce streambank erosion by 50%--from about 730 tons per year to no more than 365 tons per year through the implementation of streambank protection practices such as riprap, fencing, and shaping and seeding. In addition, efforts

will be used to maintain or develop stream woodland and grassland corridors by developing buffers that provide wildlife habitat, canopy, bank stabilization, and sediment reduction.

- * Reduce sedimentation contributions from existing urban areas by 40%, from transitional areas by 80%, and from future urban areas by 80%. These reductions will be achieved by increased good housekeeping practices, such as street sweeping, and through the adoption of uniform construction site erosion control ordinances across all municipalities in Dane County.

Phosphorus Objective

To reduce overall phosphorus delivered to Lake Mendota by 50%, the following will need to be achieved:

- * Reduce the phosphorus delivered to streams and ultimately the lake in the watershed from soil erosion in agricultural uplands by at least 40%, from about 35,000 pounds per year going into Lake Mendota, to no more than 21,000 pounds per year. This can be achieved by reaching the sediment reduction objective.
- * Reduce phosphorus loading from eroding streambanks by 50%, from about 4,600 pounds per year to no more than 2,300 pounds per year.
- * Reduce phosphorus runoff from barnyards in the watershed by about 75%, from about 15,000 pounds per year to no more than 3,737 pounds per year. This can be achieved through clean water diversions and/or complete system improvement.
- * Promote nutrient management as an economically and environmentally sound practice within the watershed.
- * Reduce phosphorus from existing urban areas by 20%, from transitional areas by 60%, and from future urban areas by 50% through practices used to reduce sediment loads to the lake.

Groundwater Objective

To protect and enhance the groundwater resource in the Lake Mendota watershed, the following objectives will need to be achieved:

- * Use nutrient management plans to reduce the over-application of commercial fertilizer and manure and the application of winterspread manure on unsuitable cropland.
- * Implement BMPs as appropriate to protect and enhance groundwater quality. The highest priorities for protecting groundwater resources from runoff pollutants are where wells exceed the nitrogen standard of 10 mg/L.

- * Encourage proper abandonment of unused wells per NR 120 and NR 812, Wis. Admin Code.
- * Reduce over-application of pesticides.
- * Provide landowners with extensive informational and educational materials to promote awareness and to instill responsibility for the groundwater resource.
- * Use water conservation techniques to help decrease the flow of water out of the deeper aquifer and over-use of the upper aquifer which may be more susceptible to contamination.

Restoration Objective

To restore or enhance streams and wetlands for fish and wildlife, the following have been identified as highest priorities in the watershed:

- * The wetland complex in the Pheasant Branch Creek Resource Protection Area. This resource should be enhanced as a northern pike spawning and rearing area.
- * The unnamed tributary of Token Creek that originates in Windsor Township and enters into Token Creek in Burke Township. This tributary has the potential of being restored from a Class III to Class II cold water fishery.
- * The reach of the Yahara River from Windsor Road upstream to the Village of DeForest. This section of the Yahara River is a priority for enhancement and protection of a warm water sport fishery.
- * Goose Pond, which should be enhanced and restored as a shallow lake and wetland system.
- * Token Creek which currently has a dam which will be removed by the DNR. The objective will be to restore the wetlands around the old lake bed to ensure a water view for of the all adjacent riparian landowners, to trap sediment, and to provide habitat for nesting waterfowl and other wetland species. The numerous springs in the area should be protected to preserve the wetland complex. Native brook trout of a local genetic strain could be stocked which should thrive in the restored stream with its large amount of cold spring water. A minnow species that would originally have been found in the creek and would have been associated with the brook trout population could also be re-introduced.
- * Establish or restore wetlands in 27 other priority areas as delineated in the inventory.

Community Education and Action Objective

To foster understanding of runoff pollution problems and promote participation in resource protection within the Lake Mendota watershed, the following will need to be achieved:

- * Translate the project goals into action items by identifying target audiences and designing a program to meet those goals by working with that audience. Target audiences are: the general audience--those who must act, those who can support, and future actors and supporters. The urban transition and established urban audiences are those involved directly in planning and developing the site, those involved during implementation of the plan, and those that can support the development of the erosion control/stormwater management plans. The rural audiences are those involved directly with land management, those involved directly with livestock animals and manure management, those who work with landowners/operators and livestock operators, and those involved in conservation courses/activities.

Table S-2. Sources of Sediment to Lake Mendota and Reduction Goals

Source	Sediment Delivered to Lake Mendota	Percent of Total	Reduction Goal (tons per year and percent)	Estimated Future Sediment Delivery (tons per year)
Uplands	5,604	58%	2,242 tons 40%	3,362
Streambanks	728	8%	364 tons 50%	364
Transitional Areas	2,198	23%	1,758 80%	440
Existing Urban	1,083	11%	433 40%	650
Total	9,613	100%	4,797 50%	4,816

Table S-3. Phosphorus Delivery to Lake Mendota and Reduction Goals

Source	Phosphorus Delivered to Lake Mendota	% of Total	Reduction Goal (pounds per year and percent)	Estimated Future Load (pounds per year)
Uplands	35,030	48%	14,012 (40%)	21,018
Streambanks	4,608	6%	2,304 (50%)	2,304
Barnyards	14,986	21%	11,240 (75%)	3,747
Transitional Areas	13,911	19%	8,347 (60%)	5,564
Existing Urban	3,740	5%	748 (20%)	2,992
Total	72,275	100%	36,650 (51%)	35,625

Critical Sites

Nonpoint source pollutant load reduction in the Lake Mendota Priority Watershed project will be achieved mainly through voluntary participation. However, state statutes require that this plan contain the necessary language to ensure the reasonable likelihood of achieving water quality goals and objectives. Landowners with sites that meet the established critical site criteria are required by law to address those specific sites by reducing the runoff pollutant load to an acceptable level. Pollutant reduction can occur solely through the action of the landowner with guidance from county staff or through watershed cost-sharing participation. Each identified site will be field-verified before receiving notification as a critical site, with the findings sent to the DNR. Landowners interested in receiving cost-share assistance for installing best management practices will need to sign a cost-share agreement with either the Dane or Columbia County LCDs, depending where they reside.

Notification of landowners with critical sites will begin when Dane and Columbia County LCD staff have the ability to identify individual fields for specific management categories on the FOCS/WINHUSLE database or through the BARNY computer model for barnyard sites. Urban critical sites will be identified by Dane County or by the municipality through appropriate modeling. The highest ranked sites will be notified first until all landowners or land operators with critical sites are notified. The notification will include the following information:

- * The 36-month period in which landowners are eligible for the maximum cost-share rate of 70% of the total eligible cost, after which the cost-share rate decreases by 50 percent.
- * The potential consequences of either Wisconsin Administrative Code Chapter NR 243 for animal waste, or s. 281.20(1)(3)(5), (or current code) for sediment delivery and groundwater protection, that landowners may face if no action is taken. Some of these include a notice of discharge, requiring of a WPDES permit, or issuing a notice of intent.
- * The right to appeal the critical site designation through written request to the county Land Conservation Committee (LCC) within 60 days of receiving the notification letter. The LCC shall limit its appeal consideration to whether the critical site designation is consistent with critical site criteria established in the nonpoint source control plan.

Impact and Scope of Critical Sites

- * Of the 344 inventoried barnyards that drain to surface waters, 10 are designated as critical sites for control which will result in a minimum reduction of 25% of the barnyard phosphorus objective. At a minimum, land owners must implement clean water diversion practices, but they are eligible for cost sharing to install full systems.
- * Of the 89,000 estimated acres of cropland in the watershed that drain to Lake Mendota, 1,670 acres are designated as critical for sediment control which will achieve 25% of the pollution reduction objective for sediment.
- * In the urban areas, all transitional areas as identified in the year 2020 build-out plan that exceed 7.5 tons/acre/year in soil loss are identified as critical sites. Correction of these sites will be through enforcement of uniform construction site erosion control standards throughout Dane County.
- * Other critical sites in urban areas are identified as those that directly discharge into Lake Mendota or other surface waters and deliver pollutants to that water body according to the following formula: outfalls with a ratio of sediment (tons) to land area (acres) that is greater or equal to 0.2 and where best management practices are identified through a feasibility study. The inventory should be completed during the first three years of the implementation period.

Management Actions

The Dane County and Columbia County LCD staff will contact all landowners who are eligible to receive cost sharing during the project's 10-year implementation period. Management categories are determined based on the level of pollution control needed to achieve water quality objectives in the watershed. Specific sites or areas within the watershed project are designated as either "critical," "eligible," or "ineligible." Designation as a critical site indicates that controlling that specific source is necessary if the pollutant reduction goals for the project are to be met. Nonpoint sources which are eligible, but not critical, contribute less of the pollutant load, but are included in cost sharing eligibility to further ensure that water quality objectives are met. Landowners with eligible sites need not control every eligible source to receive cost-share assistance.

The Dane County and Columbia County LCDs will assist landowners in applying BMPs. Practices range from alterations in farm management (such as changes in manure spreading and crop rotations) to engineered structures (such as clean water diversions, or sediment basins), and are tailored to specific landowner situations. Municipalities are eligible to apply for and receive grants for nonstructural practices, such as ordinance development and enforcement, and structural practices, such as wet detention basins.

Barnyard Runoff

To maintain cost effectiveness, only those landowners with barnyard sites delivering more than 50 pounds but less than 260 pounds of phosphorus to surface water on an annual basis will be eligible for a complete barnyard runoff management system (102 yards). Barnyard runoff management is the use of structural measures such as gutters, downspouts and diversions to intercept and redirect surface runoff around the barnyard, feeding area or farmstead, and collect convey and temporarily store runoff from the barnyard, feeding area or farmstead. Landowners with barnyards delivering more than 15 pounds but less than 50 pounds of phosphorus annually will be eligible to receive barnyard runoff management systems for clean water diversion work only (120 yards). Landowners with barnyards delivering less than 15 pounds of phosphorus annually are not eligible to participate.

Table S-4. Barnyard Runoff Objective: To Reduce Pollution by 75%

Management Category	Phosphorus (lbs./year)	Number of Barnyards	P Controlled (lbs./year)
Critical	> 260	10	3,344 ¹
Eligible for full systems	> 50 but < 260	102	11,136 ²
Eligible: Clean Water Diversion only	> 15 and < 50	120	
Not Eligible	< 15	72	-

¹ This reduction represents clean water diversion work only.

² This reduction represents full system installation.

Cropland Erosion

Erosion from upland areas accounts for about 58% of the overall sediment loading to Lake Mendota. The large majority of all cropped acres are eroding at "T." Thus, priority will be placed on bringing all fields eroding at levels greater than "T" down to "T". Water management systems will be initiated on some fields that are eroding at "T" or less. These water management systems would provide extra protection during times when weather conditions reduce residue remaining after planting. Additionally, new technologies, such as the use of polyacrilamides (PAMs), may be used to complement existing conservation practices.

All fields that are eroding at levels greater than "T" and that are delivering sediment to Lake Mendota at a rate greater than 1.3 tons/acre/year will be targeted as critical sites.

Table S-5. Cropland Sediment Objective: To Reduce Sediment Loading by 40%

Management Category	USLE/Sediment Delivery (tons/acre/yr.)	Acres	Tons of Sediment Reduced
Critical	> T soil loss and > 1.3 delivered	1,670	470
Eligible	> T or > 0.2 delivered	50,630	2,788

Streambank and Gully Erosion

Because gully and streambank erosion have not been determined to be significant nonpoint sources in the Lake Mendota watershed, critical site designation will not be a component of control for these areas. However, all active gullies and all trampled streambanks will be eligible to receive cost-share assistance to abate the runoff of sediment into intermittent or continuous streams.

Project Implementation

Project implementation is scheduled to begin in June 1997 and continue for a period of 10 years. Implementation will consist of continuous educational programs for watershed residents, individual farm conservation planning, the signing of cost-share agreements, and practice installation.

Project Implementation Costs

The DNR will award grants to Dane County and Columbia County and to all eligible municipalities or other eligible grantee, such as lake districts, for the cost sharing of BMPs, staff support, and educational activities. Tables S-4 and S-5 present estimates of the financial assistance needed to implement nonpoint pollution controls in the Lake Mendota watershed, assuming a 75-percent participation rate of eligible landowners and a 100-percent participation rate on critical sites. Table S-6 shows the total estimated budget for the entire watershed management project.

An economic evaluation of the potential benefits of water quality improvements to Lake Mendota was conducted. Results show that there will be an economic benefit of \$2,604,800 annually to the watershed community from having implemented BMPs in urban and rural areas.

Table S-6. Project Costs: Lake Mendota Watershed - Rural only at 75% Participation

Activity	State Share		Local Share		Total Cost
	Dane County	Columbia County	Dane	Columbia	
Cost-Share Funds: Practices	\$4,016,681	\$366,938	1,768,256	160,388	6,312,263
Cost-Share Funds: Easements	187,500	0	0	0	187,500
Land Acquisition	281,250	0	281,250	0	562,500
Local Assistance Staff Support	1,470,892	245,340	0	0	1,716,232
Information/Education Activities (staff not incl.)	50,500	8,000	0	0	58,500
Other (travel, supplies, etc.)	187,200	20,800	0	0	208,000
Engineering Assistance	0	0	0	0	0
Sub-Total	\$6,194,023	\$641,078	\$2,049,506	\$160,388	\$9,044,995
Total	\$6,835,101		\$2,209,894		\$9,044,995

Table S-7. Project Costs - Lake Mendota Priority Watershed - Urban Only at 75% Participation

Project Element	State Share	Local Share	Total Cost
Developing Urban Areas			
Construction Site BMPs	\$0	\$1,875,000	\$1,875,000
Planned Urban Areas			
Storm Water Management Plans	25,200	10,800	36,000
Storm Water Management BMPs	0	\$3,750,000	3,750,000
Existing Urban Areas			
Feasibility Studies	78,750	33,750	112,500
Structural BMPs	1,575,000	675,000	2,250,000
Information & Education			
Urban Staffing	178,500	571,500	750,000
TOTAL	\$1,857,450	\$6,916,050	\$8,773,500

Table S-8. Total Budget - Lake Mendota Priority Watershed - 75% Participation

	State Share	Local Share	Total
Rural Total	\$6,835,101	\$2,209,892	\$9,044,995
Urban Total	\$1,857,450	\$6,916,050	\$8,773,500
Total	\$8,692,551	\$9,125,944	\$17,818,495

Project Evaluation and Monitoring

The evaluation strategy for the project involves collecting, analyzing and reporting information to track progress in four areas:

1. *Administrative:* This category includes the progress in providing technical and financial assistance to eligible landowners, and carrying out education activities identified in the plan. The Dane County and Columbia County LCDs will track progress in this area and report to the DNR and DATCP annually.
2. *Pollutant Reduction Levels:* The Dane County and Columbia County LCDs will calculate the reductions in the nonpoint source pollutant loadings resulting from changes in land use practices and report to the DNR and DATCP during the annual watershed review meeting.
3. *Water Resources:* The DNR may monitor changes in water quality, habitat, and water resource characteristics periodically during the project and at the end of the project period.
4. *LTER:* Lake Mendota will continue to be monitored on a regular basis through the University of Wisconsin, Center for Limnology, as part of the Long Term Ecological Research (LTER) Program.