

**Door Creek Wetlands
Resource Protection Plan**



April, 2000

Dane County, Wisconsin

Door Creek Wetlands Resource Protection Plan

Steering Committee Door Creek Wetlands Resource Protection Plan

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The Door Creek Wetlands Resource Protection Plan

I. INTRODUCTION



Restoring natural resources of the Door Creek Wetlands and Lake Kegonsa

The restoration and protection of the Door Creek Wetlands is a priority in Dane County. An important element of the *Dane County Parks and Open Space* plan is promoting existing, as well as establishing new "Resource Areas," including Upper Black Earth Creek, Cherokee Marsh, the Nine Springs E-Way, Lower Mud Lake, as well as the Door Creek Wetlands. Resource Areas are generalized study areas in which project plans are prepared which identify the specific resources to be protected, establish boundaries for acquisition efforts, and provide a framework for focusing management activities. This plan amends the county *Parks and Open Space Plan* specific to the Door Creek Wetlands.

In 1998, Dane County was awarded a DNR Lake Management Planning grant to develop a *Door Creek Wetlands Resource Protection Plan*, coordinated by staff from the Dane County Regional Planning Commission. The purpose of the *Door Creek Wetlands Resource Protection Plan* is to conduct an evaluation of the Door Creek wetlands and to develop a comprehensive framework for protecting and restoring the significant natural resources associated with the Door Creek wetlands, and also Lake Kegonsa. The plan was developed under the direction of a project Steering Committee representing a cross-section of professionals, local government officials and private landowners; and

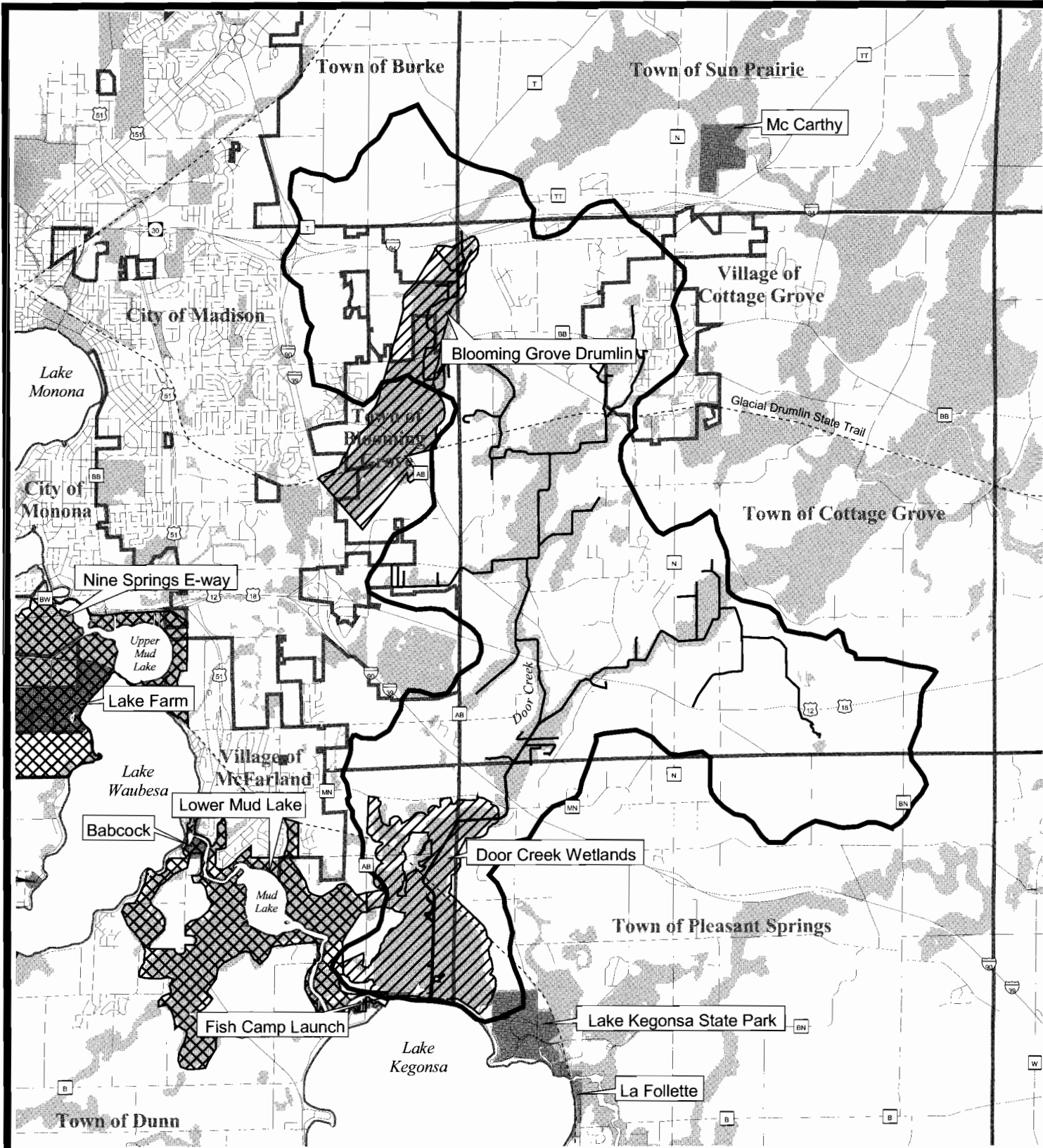
builds on previous efforts by the Friends of Lake Kegonsa (FOLKS), Dane County, the towns of Dunn and Pleasant Springs, and the Department of Natural Resources. The Steering Committee plays an important role in forming the necessary partnerships among state, county and local units of government, and also private groups and local landowners.

The principal goal for this project has been to develop a comprehensive resource protection plan and associated management strategies with special emphasis placed on restoring and enhancing wetland functions and promoting water quality improvements in Lake Kegonsa. The project ties directly to the adjacent Lower Mud Lake Resource Area, as well as other public use/natural resource opportunities that exist between Fish Camp Launch County Park and Lake Kegonsa State Park, and Lake Kegonsa.

After several public meetings, and review and analysis of existing information, the Steering Committee focused on four principal objectives:






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- 1) Establish a Door Creek Wetlands Resource Area**
 - 2) Provide Northern Pike Spawning Habitat**
 - 3) Promote Wetlands Restoration**
 - 4) Encourage Stormwater Management**
-

The following sections build upon the discussion and recommendations by the Committee members, including an evaluation of the resource, the principal concerns, management objectives and recommended actions to achieve those objectives.




Map 1: DOOR CREEK WATERSHED

Source: Dane County Parks and Open Space Plan 2000, DCRPC, 9/96.

-  DOOR CREEK WATERSHED BOUNDARY
-  PROPOSED COUNTY RESOURCE AREA
-  EXISTING COUNTY RESOURCE AREA
-  STATE AND COUNTY PARK LAND
-  OPEN SPACE CORRIDOR

9/9/99

N

0  1 1/2

Miles

(original RF scale 1:95,040)

Prepared by staff
to the DCRPC.

II. THE DOOR CREEK WETLANDS



Door Creek flows south 12.7 miles into Lake Kegonsa

The wetland resources of Door Creek are significant and well documented. Door Creek begins as a tributary stream in the southeast corner of the Town of Burke, and flows south 12.7 miles to Lake Kegonsa (Map 1). Little Door Creek begins in the south central portion of the Town of Cottage Grove and joins the mainstem just south of U.S. Hwy 12/18. Door Creek and its tributaries drain 29.5 square miles of rolling agricultural land in the drumlin-marsh area of eastern Dane County. Map 1 shows the Door Creek Wetlands in relation to other resource features in the county including county and state parks, existing and proposed resource areas, and open space corridors. Open space corridors include critical natural areas and environmental resources identified in the *Dane County Land Use and Transportation Plan*, *Water Quality Plan*, and *Parks and Open Space Plan* as needing protection from development throughout Dane County.

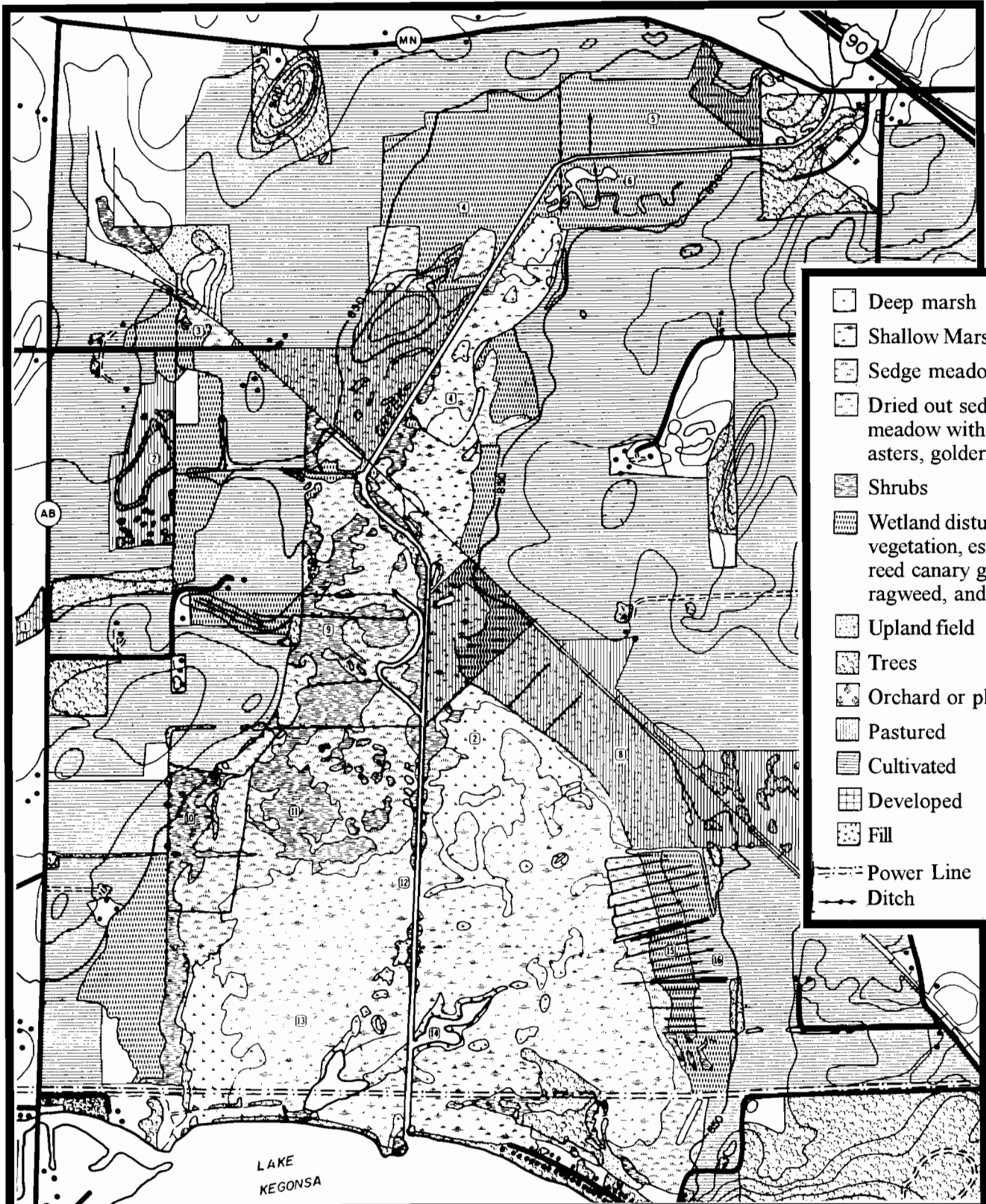
Door Creek has many water quality problems, both natural and human-influenced. The creek has a low natural baseflow and velocity and is subject to high summer temperatures. Cottage Grove's wastewater discharge to the creek was discontinued in 1982 when it hooked up to the Madison Metropolitan Sewerage District, removing a significant point source of pollution, but also reducing baseflow. Nonpoint source pollution associated with urban development and agricultural practices continues to threaten the resource.
















The land in the Door Creek watershed is almost entirely agricultural except for a few small groups of houses. Beginning around 1920, much of Door Creek was straightened and ditched to facilitate drainage and provide more agricultural land. Ditching and straightening of the stream channel, and draining of adjacent wetlands has essentially short-circuited flow through the Door Creek Wetlands. More recently, the northern and western portions of the watershed are rapidly becoming urbanized. Then and now, the sediment and nutrient loading to Lake Kegonsa is very high.

According to a detailed 1974 wetland inventory by Bedford and Zimmerman in *Wetlands of Dane County, Wisconsin*, the Door Creek wetlands rest on one of the major peat deposits of the Yahara River system, immediately north of Lake Kegonsa. The vegetation consists mainly of shallow marsh, with stands of cattail (Map 2). At the north end of the peat deposit, the surface is drier with sedge meadow and shrubs. Still farther north, the ditched watercourse of Door Creek (evident through the

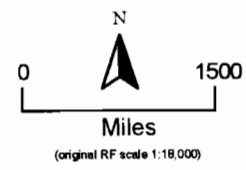


Vegetation consist mainly of sedge meadow and shallow marsh



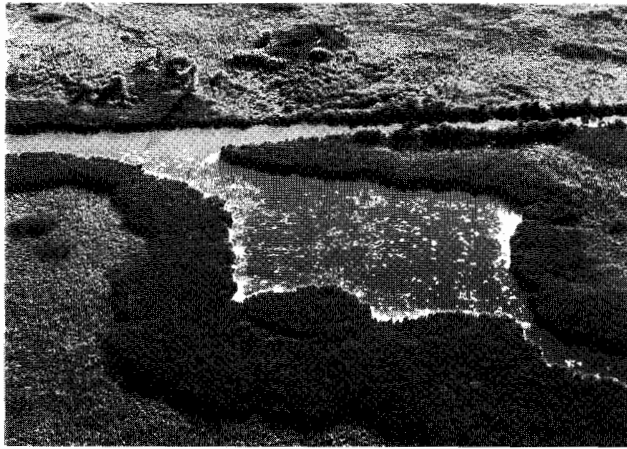
-  Deep marsh
-  Shallow Marsh
-  Sedge meadow
-  Dried out sedge meadow with abundant asters, goldenrod, etc.
-  Shrubs
-  Wetland disturbance vegetation, especially reed canary grass, giant ragweed, and nettle
-  Upland field
-  Trees
-  Orchard or planted trees
-  Pastured
-  Cultivated
-  Developed
-  Fill
-  Power Line
-  Ditch

Map 2:
DOOR CREEK MARSH



Prepared by staff
to the DCRPC.

Source: *The Wetlands of Dane County, Wisconsin*. B. Bedford, et. al. 1974



Wetlands act as large biological filters

center of the wetland) is lined with sedge meadow and disturbance vegetation. In 1993, a field review conducted by Mead & Hunt, Inc. found the vegetation had changed little from that described by Bedford and Zimmerman in 1974, save for the appearance of small patches of giant reed (*Phragmites communis*) distributed through the shallow marsh. Also, some areas which were formerly grazed have been taken out of pasture. From a drainage standpoint, the ditching of the wetland has had virtually no effect because of the extremely low gradient between the railroad tracks and the mouth, and the proximity of Lake Kegonsa which serves to maintain levels. Suggestions have been made to return flow back into the wetland and to restore some of the natural stream channels.

Wetlands are particularly important for maintaining and improving water quality. Wetlands act as large biological filters which intercept nutrients and other pollutants through deposition and uptake by plants and animals. Wetlands are also important for delaying the timing and release of phosphorus to lakes. For example, research in Lake Mendota suggests that phosphorus captured by wetlands in the spring may actually be released later in the winter where it can be tied up by lake sediments and, therefore, be less available for summer algae blooms the following year. It is primarily the spring loading of phosphorus that results in summer algal blooms. In this manner, wetlands play a critical role in the filtering and release of phosphorus that is an important factor for maintaining or improving water quality in lakes.

In addition to water quality, it is also important to note the relationship between wetlands, wildlife and fisheries management. Wildlife use of the wetland is substantial. Wetlands are important food production areas for both fish and wildlife species. By increasing the available habitat, species diversity increases which leads to healthier, more vibrant ecological communities.

Wetlands also provide important spawning areas and act as nurseries for young fish. In its channeled condition, however, Door Creek supports only a warm water fishery composed primarily of forage species. Where portions of the ditch have collapsed, however, especially in the extreme southern part, an important spawning area does exist for northern pike—a prized sport fish. In other areas of the wetland the reproductive potential is significantly limited by the ditch—especially in the spring when the floodwaters subside, the eggs and small fry become trapped behind the ditch berms. The natural reproduction of northern pike in Door Creek and Lake Kegonsa could be substantially improved by providing more access into (and escape from) the interior marsh areas through lateral connections with the ditch. Although northern pike have been observed spawning as far upstream as Hwy. N on Little Door Creek, lateral access is severely limited.



Filtering by wetlands provides improved water quality

In addition, because of a large population of rough and forage fish, the quality of fishing in Lake Kegonsa is not as high as in neighboring Lake Waubesa. A larger northern pike population would help establish a more vigorous sport fishery by preying upon less desirable fish species. In either case, both wildlife and spawning habitat would be substantially improved by restoring the stream's natural drainage pattern and diverting flow through the marsh.

Wetlands also provide important flood control benefits. Wetlands can store tremendous amounts of water (326,000 gallons per wetland acre-foot), releasing the water more slowly and helping alleviate some of the flash flooding experienced downstream. Wetlands throughout the Door Creek watershed have been substantially altered over the last century by dredging, ditching, tiling, filling, and road and utility construction. As a result, many of their functions, like flood control, have been diminished.

Wetland functions of the Door Creek wetlands were documented in a study associated with the Town of Dunn *Open Space Handbook*. Many typical wetland functions are present here, including flood control, aesthetic qualities, wildlife habitat, water quality protection and recreational opportunities. Many of the parcels in the Door Creek marsh have been owned for hunting purposes for many years, and in the survey hunting and trapping were rated



Lake Kegonsa offers recreation for county residents and visitors



Habitat and wildlife diversity is important to wetlands

very important. Other functions such as preservation of natural habitat, plant and animal diversity, and water quality protection through nutrient and sediment control are also present, but rehabilitation is needed. The wetlands also provide significant opportunity to substantially improve the northern pike spawning habitat in the area. Future potential also exists for scientific research, nature study and appreciation.

Outstanding features of the Door Creek wetlands include:

- **An extensive, relatively diverse vegetation base that supports a wide array of associated wildlife**
 - **A streamside location with marsh edges and openings that provide important spawning habitat for game and forage fishes**
 - **A lakeside location that offers aesthetic and recreational resources for residents and visitors to enjoy**
 - **Buffering and storage of agricultural and urban stormwater runoff**
 - **Environmental greenspace which offers refuge for wildlife and preserves a large segment of the Lake Kegonsa shoreline from development**
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III. DOOR CREEK WETLANDS RESOURCE MANAGEMENT OBJECTIVES

Wetland restoration, protection and enhancement activities are top priorities in Dane County, as well as throughout Wisconsin and the United States. Various federal, state and local programs have been developed to work with landowners and to offer incentives to restore "prior-converted" wetlands back to their natural state, protect existing wetlands from future harm, and to enhance the functions and values of degraded wetlands. These programs are becoming increasingly popular with landowners, which offer incentives and compensation to landowners to restore or leave the land in its natural condition, which is often marginal to begin with because it may be too wet.

Previously ditched and tiled wetlands offer important restoration opportunities since they are relatively easy to restore to their natural condition by restoring the natural hydrology, such as by plugging



Natural vegetation buffer strips protect streams and wetlands

ditches and breaking tiles. Natural vegetated buffer strips also are important for protecting wetlands from sediment and waterborne pollutants from surface runoff. Finally, wetlands can be restored through activities such as selective burning and reintroduction of native vegetation. The Door Creek wetlands could provide more of the original resource benefits that have been lost or diminished over the last century.

The Door Creek Wetlands Steering Committee met several times to evaluate information about the wetlands and formulate management objectives. Generally, the Door Creek wetlands are not realizing their full potential. They also need to be protected from upstream land use impacts.

Concerns were explicit that the plan not result in increased flooding of productive pasture or cropland without the landowner's consent, and that every effort should be made to reduce flooding. A review of the history of lake levels on Lake Kegonsa is relevant to this concern.

Under s.31.02, Wis. Stats., DNR may regulate and control the level and flow of water in all navigable waters. According to the *Findings of Fact* contained in the DNR order issued October 5, 1972, the Lake Kegonsa dam and locks were constructed in 1938, pursuant to a permit granted by the Public Service Commission on January 21, 1937 (docket #2-WP-290). From 1950-1970 summer lake levels were held higher than the normal levels of 842.6 feet, established by #2-WP-290. In 1970, the operator was instructed to maintain a summer level of 842.6 feet. During the summer of 1970, lack of rainfall resulted in lower lake levels. Riparian landowners found it difficult to bring their boats in to the piers, and experienced difficulties transporting aquatic plants to shore for disposal. On October 5, 1972, DNR issued an order establishing a minimum summer level on Lake Kegonsa at 842.6 feet, and a maximum summer lake level at 843.1 feet.

In 1979, the Dane County Park Commission and DNR discovered errors in the benchmark reference used in maintaining water levels for Lake Kegonsa. According to the findings of fact contained in the DNR order issued April 11, 1979, prior to 1975 the lake level of Lake Kegonsa was monitored by reading a staff gauge on the railroad bridge upstream from the dam on the east side of the Lake Kegonsa. After 1975, it was more convenient to read a staff gauge on a bridge on the west side of lake. The fact that the gauge on the west side refers to USGS mean sea level datum corrected to 1929, while the railroad gauge refers to USGS datum corrected to 1903, resulted in confusion and two years of lake levels managed four tenths of a foot below the intended levels. On April 11, 1979, DNR issued an order establishing a corrected minimum



Enrolling farmland in Conservation and Wetlands Reserve programs promote control of agricultural run-off

summer level on Lake Kegonsa at 843.0 feet, and a maximum summer level at 843.5 feet. While the corrected datum has caused an addition of four tenths of a foot to all the elevations referenced in the 1972 order, **the absolute (or intended) elevations remain unchanged.**

Any person may petition DNR to investigate and establish water level or flow requirements. This may be accomplished by a letter, usually in the form of a complaint. The Committee could not reach consensus on lake levels that would be better than those already established by DNR. A tenuous balance currently exists between competing user groups, with neither group benefiting except at the expense of the other. This is, and will continue to be, a very contentious issue.

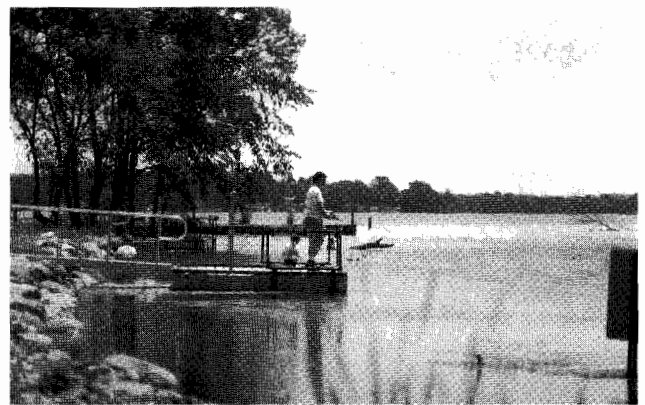
Another concern was that erosion and sediment from upstream construction and development sites can be a significant source of sediment and nutrient loading (on a per acre basis). Also, as cash cropping and the size of farm machinery has increased in recent years, more runoff and sediment is finding its way into the wetland from these sources as well. Effective construction site erosion and stormwater runoff controls should be considered, and programs also promoted to encourage control of agricultural runoff.

Landowners were also concerned that if land acquisition were included in the plan it may open up new areas for public recreation, and that activity invites abuse such as littering, increased traffic and trespassing. Although Resource Areas identified in the *Dane County Parks and Open Space Plan* often provide for limited access, the Dane County Parks Department is experienced in working with local communities and landowners in establishing passive

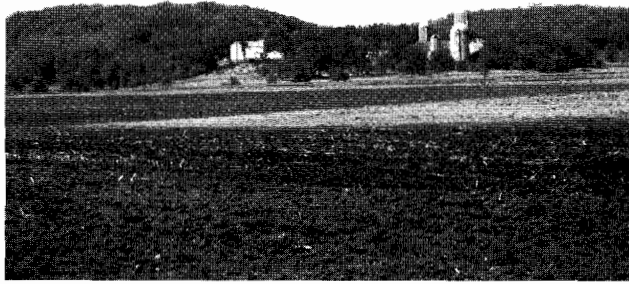
trail systems and less intrusive ways the public can appreciate and enjoy the resource, while at the same time avoiding these other kinds of problems. Access to the marsh is already quite limited by the deep muck, and it is unlikely anyone would stray very far from a footpath or trail that might be located along the edge of the marsh.

A proposed trail has been recommended in the *Parks and Open Space Plan* along the north shore of Lake Kegonsa, which would link Fish Camp Launch with Lake Kegonsa State Park—although, this is planned over the long-term, and as opportunity permits. Land could be acquired through easements or outright purchase, depending on agreements that can be reached with the property owners. DNR has also considered purchase of easements in this area to increase spawning habitat for northern pike. In this manner, county and state agencies become equal partners with landowners who share similar interest and concern for the wetlands, and that access would be controlled.

Based on ideas and concerns, the Committee focused on the following management objectives as the principal underpinnings for the *Door Creek Wetlands Resource Protection Plan*. The plan is voluntary and does not prescribe what landowners can or cannot do on their own land. Rather, the plan establishes a goal or basis for bringing in, coordinating, and focusing outside resources to help restore, protect and enhance the Door Creek Wetlands. In this manner, the state, county, and local governments, local conservation organizations, and private property owners share in promoting mutually agreed upon objectives, and becoming partners, through acquisition or other agreements, described more fully in the sections found below.



Fish Camp Launch offers recreation and resource appreciation opportunities



There are concerns with erosion and runoff from cropland

1. Establish a Door Creek Wetlands Resource Area

Realizing there are currently not enough resources to develop and implement a detailed plan for the entire watershed, efforts need to be initially targeted to the Door Creek Wetlands. This will also need to be coordinated with, and tie into other ongoing, more comprehensive state and local programs for habitat improvement, wetland restoration, land use and development, and erosion and stormwater runoff controls.

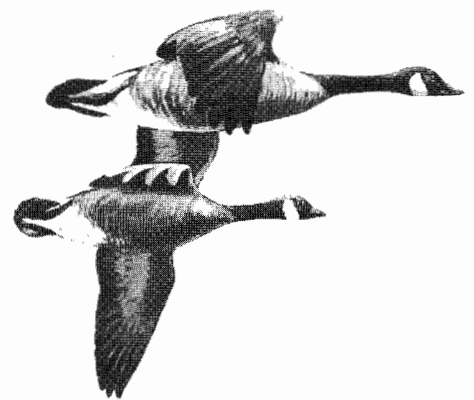
Map 3 is of the Door Creek Wetlands Resource Area (DCWRA), which has been developed to indicate public intent for focusing limited financial and technical resources where they will have the most beneficial impact. The basis for the DCWRA is outlined in the *Dane County Parks and Open Space Plan* and presented here using the official delineated DNR Wetland Inventory as the base resource of concern. This is a more detailed or refined Resource Area than the one presented in the *Parks and Open Space Plan*, which could only be approximated at time of publication since the base resource had not yet been defined.

DNR wetlands are presented here as the base resource of concern or area of focus mainly because they have protective federal, state and local regulatory status (e.g., wetland permits, zoning restrictions, etc.), they represent a critical natural resource element, and because they are relatively easy to identify in the field. Note, the DCWRA is voluntary in both design and intent, and provides no additional legal effect other than that which already exists under current law (such as local wetland and shoreland zoning). The DCWRA is used primarily to help justify and procure federal,

state and local funding, as well as target resource protection, restoration and management efforts where they will have the most beneficial impact.

The DCWRA also includes an upland buffer area of focused management emphasis and activity—approximated on Map 3 by a dashed line. Again, this boundary is voluntary and flexible, depending on the specific characteristics of the site and the desired management practices that can be negotiated with the landowner. This determination is far too site-specific and variable to be included here for each property; rather, the DCWRA establishes a general basis or framework where these agreements can be developed. For example, important concerns might be improving water quality, providing wildlife habitat and spawning areas, protecting archaeological sites, etc.—or combinations thereof. The buffer area establishes these in relation to the base resource so that restoration or protection efforts do not become overly dispersed or disconnected to be effective. A few landowners have requested their property be specifically excluded from the buffer area, which was done.

Upland buffer areas along wetlands, streams and drainageways are important natural features which provide for protection of the resource as well as opportunities for water quality protection, wildlife habitat, scenic beauty, and resource education/appreciation opportunities. Most protection and resource management activities can usually be accomplished within an upland buffer area of about 300 feet from the wetland edge (as shown on the






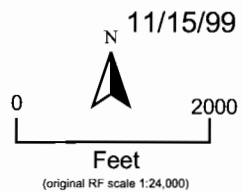
Wetlands offer protection for wildlife habitat



**Map 3:
DOOR CREEK
WETLAND RESOURCE AREA**

Source: Derived from the Wisconsin DNR Wetland Inventory, 1986.

-  DNR Wetland Boundary
-  Upland Buffer Area (APPROXIMATE)
-  LOWER MUD LAKE RESOURCE AREA



Prepared by staff
to the DCRPC.



Wider buffer zones would provide a greater diversity of habitat and wildlife

map). This management area could be expanded or contracted based on site specific evaluation and consideration of the site and any agreements that can be reached between the resource management agency/organization and the landowner. There are various combinations of management strategies and agreements that might be pursued. These are developed further in the section devoted to the development of management alternatives, page 21. Upland buffers are clearly supported in the literature and in practice as being necessary to protect wetlands, streams, and also other aquatic and special resource features (e.g., archaeological sites). A summary of policy implications (DNR, 1997) and a literature review of the functions of buffers (Castelle, et al., 1994) states that buffers should be a *minimum* of 50-100 feet under most circumstances. Minimum guidelines for buffer widths associated with Open Space Corridors is 75 feet on either side of a wetland or navigable stream (DCRPC, 1996).

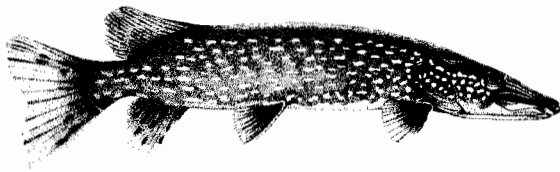
Generally, water quality benefits can be expected to increase with increasing buffer widths up to about 100 feet, beyond which a point of diminishing returns is reached. Increasing buffer width beyond 100 feet will, in most situations, be primarily beneficial for shoreland wildlife.

All other things being equal, wider buffers provide a greater diversity of wildlife by protecting more habitat from human disturbances, and by reducing the level of competition and predation. For instance, DNR wildlife managers recommend large wildlife buffers (250 feet and larger) with a connection to other suitable habitat are often needed to

provide adequate habitat for area-sensitive wildlife species, particularly songbirds and some reptiles and amphibians. A riparian buffer of 100-200 feet can provide overall benefits to shoreland dependent wildlife, riparian wildlife and many generalist species. Some buffer designers propose a multiple zone approach that allows successively more intense land uses farther away from a core undisturbed zone.

Resource agencies such as USFWS, DNR, NRCS and Dane County LCD and Parks Department are often responsible for establishing buffer widths, as do local municipal zoning and land use officials. In any case, site-specific circumstances need to be taken into account in determining appropriate buffer widths, considered on a cost-benefit scale through a process outlined in Section IV, Development of Management Alternatives.

Overall, the DCWRA indicates a principal area of focus and public intent so that resources and efforts can be coordinated in an effective manner. The total area encompasses approximately 1,600 acres, including 1,100 acres of wetlands and approximately 500 acres of adjacent uplands assuming a 300-foot buffer (which will vary). Furthermore, the Door Creek Wetlands Resource Protection Area, as contained in the *Dane County Parks and Open Space Plan*, allows Dane County to be eligible for significant federal and state acquisition and cost-sharing funding. The analysis and recommendations contained in the *Door Creek Wetlands Resource Protection Plan* helps direct Dane County Parks staff to work with local communities and state and federal agencies, to develop partnerships and focus shared financial and technical resources on mutually agreed upon resource protection, restoration and enhancement goals.



Restoring natural habitat for spawning of Northern Pike

2. Provide Northern Pike Spawning Habitat

According to DNR, there has been a significant historic decline in northern pike populations in the Yahara chain lakes, as well as the entire southern region of the state (approximately 70%), mostly due to lost wetland habitat. A newly created northern pike restoration zone for waters located south of state Hwy. 10 (near Stevens Point, WI) includes a minimum 26" minimum size, and daily bag limit of 2 fish per day. There has been a 32" minimum size limit in place on Lake Mendota for several years. The 32" minimum was so successful at improving the size, structure and abundance of the pike fishery that local fishing clubs requested that DNR raise the size limit to 40" on Mendota.

Northern pike are a popular sport fish and also keep panfish from becoming stunted due to overpopulation. Northerns have been used in some lakes to manipulate the aquatic food web in an attempt to convert algal biomass into trophy sport fish, with a corresponding increase in water clarity. This is accomplished by northerns preying on small fish, which allows more zooplankton to survive, which eat more green algae. Fewer algae means clearer water.

Stocking northern pike is a very expensive (\$3.50/fish) stop-gap solution. A much more cost-effective and long-term approach is to restore natural spawning habitat. There is significant opportunity for enhancing northern pike spawning habitat in the Door Creek Wetlands. Access to the marsh is critical, especially adjacent cattails, grasses and open water areas. This has already been done in Six Mile Creek (estimated 20,000 fingerlings hatched in the spring of 1998), with another project being undertaken at Bible Camp Marsh. In these cases, flow control structures and small channels were used, respectively, to allow spawning fish increased access to the marsh vegetation.

It is extremely expensive to stock fish, and much more cost-effective to restore natural spawning areas. With a little work, areas such as these can be turned into outstanding natural reproduction areas. In Door Creek, many of the open water and other marsh areas have been separated by the berm from the ditch cut through the center of the wetland. Once the spring flood waters subside, the eggs hatch and the northern fry can become trapped behind the berm. Suggestions have been made that small channels be created through the berm along the ditch to allow the young northerns to escape and return to the lake. However, lateral ditches can cause sediment oxidation, slumping and marsh erosion, and reduce the hydraulic detention time of the wetland. Removal of the berms along lower sections of Door Creek, on the other hand, would allow better fish access to the interior while also preventing exposure of sediments.

It is also possible (although this would need to be confirmed by more detailed engineering analyses) these channels might also reduce some of the flooding being experienced upstream by allowing more water to flow out into the marsh, thereby reducing some of the backwater. There is anecdotal evidence by landowners suggesting that the flooding may be becoming worse by the ditch filling up with sediment and weeds, fallen trees and beaver dams blocking flow. A suggestion was made to restore some of the original stream meanders through the marsh, which are quite evident from aerial photographs. This could help distribute flow through the marsh, although work such as this would need to be closely coordinated with the Dane County Farm Drainage Board and DNR.

Wetlands are constantly adjusting to variation in precipitation, lake and river stages and groundwater levels.

R.P. Novitzki

3. Promote Wetlands Restoration

According to the U.S. Fish and Wildlife Service, historic losses in wetlands have resulted in increased flooding and habitat loss. Map 4 is a map showing DNR wetlands in the watershed along with hydric soils. Hydric soils possess unique characteristics attributed to being formed under saturated soil conditions, and typically support wetland plants and animals specifically adapted to living under these saturated conditions. These soils were formed over thousands of years and maintain their hydric characteristics (such as mottled or gray coloring from the reduced iron formed under low oxygen conditions) even after they have been altered by ditching, draining or cropping. Map 4 highlights these areas, typically referred to as “farmed” or “prior-converted” wetlands, which have been historically ditched, drained or altered in some manner.

The history of these lands can be quite involved, complex and subject to legal interpretation concerning various agricultural subsidy (e.g., Swampbuster), voluntary incentive (e.g., Conservation Reserve Program) and regulatory wetland permit programs. The U.S. Army Corps of Engineers, U.S. Department of Agriculture, Natural Resources Conservation Service, Department of Natural Resources, and local Zoning and Land Conservation Departments oversee these programs and maintain detailed records on the jurisdictional, farmed or prior-converted wetland status, as well as associated buffer areas. Map 4 illustrates the significant extent of wetland conversion that has occurred throughout the watershed, and can help target these areas for restoration, protection and enhancement activities by these agencies working with private landowners.

There has been a lot of research over the years on wetlands and how they affect both flooding and water quality, in addition to other important aspects such as waterfowl and wildlife habitat. Research shows watersheds with fewer wetlands have flashier flows and water quality tends to be poorer. Wetlands are important for storing large amounts of water (about 326,000 gallons per foot of depth per acre) and also stabilizing sediment, nutrients and other pollutants, keeping them from concentrating in the lower reaches of the watershed.

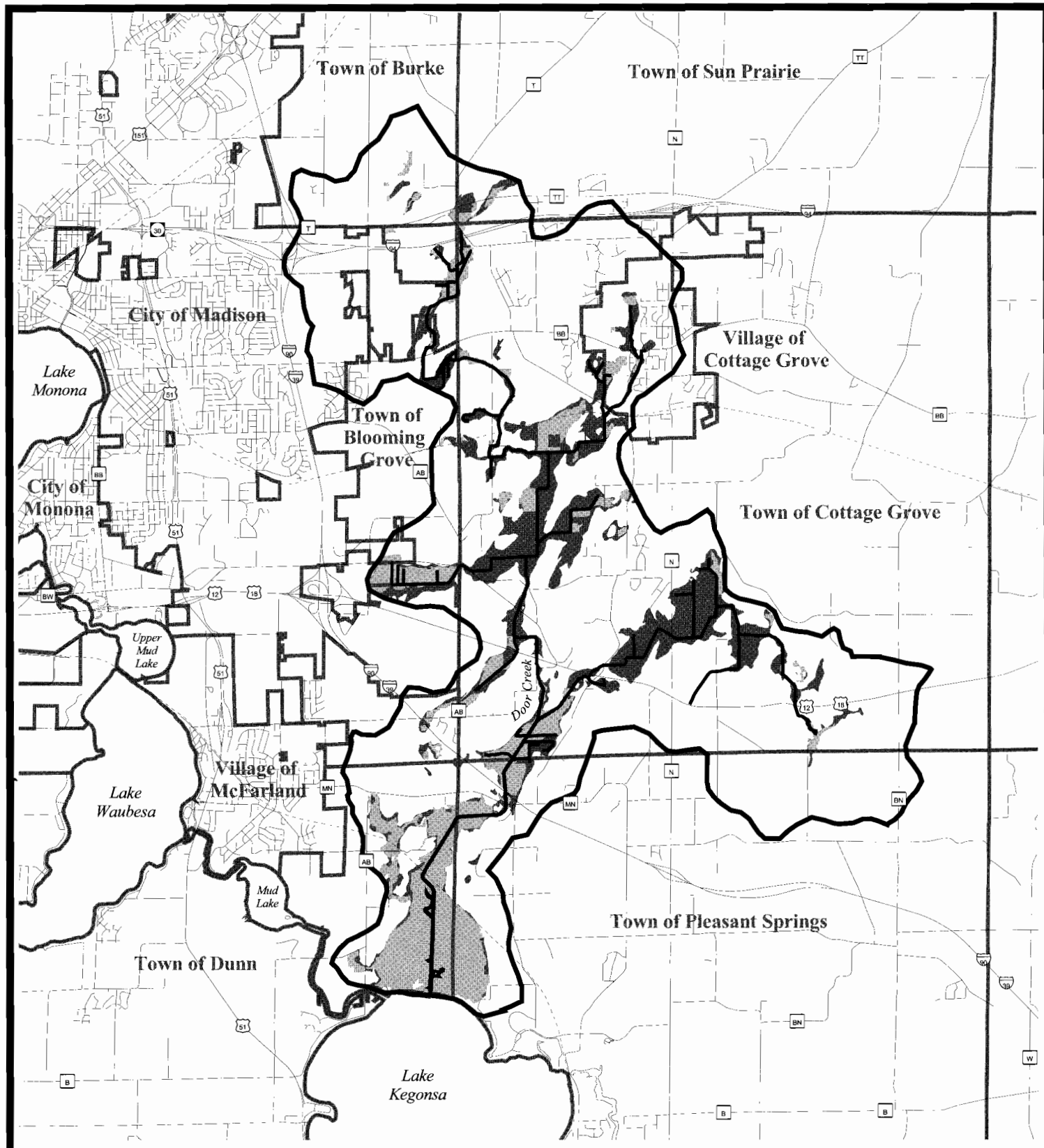


Wetlands are important for storing large amounts of water




Prior-converted and farmed wetlands offer the best opportunities to restore or enhance the wetland losses that have occurred over the last century. Wetland restoration is a priority in Dane County, as it is throughout the state and the United States. Various federal, state and local programs have been developed to work with landowners and also provide incentives. These include the “Partners for Wildlife,” the recently expanded “Conservation Reserve Enhancement Program,” as well as the Wetlands Reserve Program.”

These programs are becoming increasingly popular with landowners, and offer incentives and compensation to landowners to restore or leave their land in its natural condition—which may be marginal to begin with for farming because it may often be too wet. Previously ditched and drained wetlands are particularly important, since it is relatively easy to restore them to their natural condition by plugging the ditches and restoring the natural hydrology.¹

¹Note: It is not permissible to fill, alter or otherwise disturb drainage ditches in a drainage district without the expressed consent of the Dane County Farm Drainage Board.

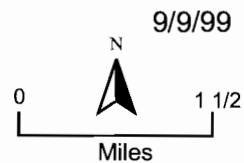


Map 4: DOOR CREEK WATERSHED

-  DNR Mapped Wetlands*
-  POTENTIALLY FARMED OR PRIOR CONVERTED WETLANDS**
-  DOOR CREEK WATERSHED BOUNDARY

* Derived from the 1986 Wisconsin DNR Mapped Wetland Inventory.

** Derived from hydric soils digitized from the NRCS Dane County Soil Survey, revised 1998, and excluding DNR mapped wetlands.



Prepared by staff
to the DCRPC.

However, in other areas, such as residential development and successful farming operations, wetland restoration may be a less feasible alternative. It is therefore very important that this be coordinated with the various wetland management agencies mentioned previously. With their assistance, restored wetlands can help provide many previously lost water quantity and quality benefits, such as reducing the rate of stormwater runoff and flooding, treating and removing pollutants, providing excellent wildlife habitat, and connecting natural resource corridors for wildlife movement.

4. Encourage Stormwater Management

In 1993, Mead and Hunt, Inc. was hired by the Friends of Lake Kegonsa to conduct a feasibility study for restoring the Door Creek wetlands. Based on a field review, they found that the wetlands are in overall good condition and that they represent a relatively diverse vegetation and associated wildlife system. Their focus was not so much restoring or enhancing the wetland (as here), but for preserving or protecting it from both existing and future development.

Both the northern and western portions of the Door Creek watershed are rapidly becoming urbanized, which is causing increased sediment and nutrient loads to the wetland, threatening its good condition, as well as water quality in Lake Kegonsa. Data indicates that Door Creek is contributing substantial amounts of nutrients to Lake Kegonsa via upstream erosion and rapid nutrient transport through the channelized reach traversing the wetland (Mead & Hunt, 1993; DNR, 1991; DNR, 1985; Town of Dunn, 1979; and Bedford and Zimmerman, 1974). Soil losses are often higher than levels considered tolerable by the NRCS. Reductions in nutrient and sediment loads would be extremely beneficial to Lake Kegonsa's water quality, as well as the associated wetland functional and wildlife values.

As part of the study, Mead and Hunt, Inc. conducted a hydrologic analysis of the watershed and source of water to the wetlands and Lake Kegonsa. Although wetlands are known to provide significant water quality and wildlife benefits, the engineers found that the wetlands are being short-circuited by the drainage ditch, and that untreated stormwater was flowing directly into the lake. In the past, best management practices (BMPs) have been developed

to help reduce the increasing *quantity* (or discharge) of stormwater flowing off urban and agricultural areas, in order to offset the increased flooding downstream. More recently, attention has been turned to also improving water *quality*, or reducing the amounts of pollutants contained in those flows.

The report went on to summarize watershed conditions in terms of erosion, sedimentation and groundwater recharge areas based on both hydrological and watershed analyses, as well as findings from a field review. The focus of the report was on source controls for various pollution sources identified in the watershed including erosion control for residential construction sites, gravel pits, agricultural lands, and a few industrial sites.

Emphasis was also placed on groundwater recharge and subsequent discharge to the Door Creek wetlands. Groundwater recharge areas in Door Creek contribute directly to the good condition of the wetland by ensuring an adequate flow of water into the wetland, especially during critical drought conditions. Without adequate groundwater recharge/discharge the wetlands could dry up during prolonged drought conditions, causing the loss of wildlife and plant species, as well as other important wetland functions and values. Overall, the emphasis of the study was on BMPs to address erosion control and protect groundwater recharge in order to preserve the good condition of the wetlands, and to also protect them from future impacts.

Since the Door Creek Wetlands are on the receiving end of development upstream, much of the effort planned here could be undone through careless development upstream. Stormwater runoff is a problem throughout Dane County and a considerable amount of resources and efforts are being directed to address this problem. The following information highlights some of the actions currently being taken, as well as those that should be promoted further in the watershed.

Existing Stormwater Management

Given the difficulty and staggering expense of treating urban stormwater once it has reached surface waters, it is imperative that local governments and private property owners do as much as possible to attack the problem at the source; such as general litter control, collection of leaf and yard waste, street cleaning and control of erosion and runoff from construction sites. In order to have a significant overall impact on urban nonpoint source pollution, it is necessary to pursue all of these approaches and management practices together—public and private, on-site and off-site.

Another area of urban stormwater management is the design and maintenance of the stormwater drainage system itself, usually managed by a municipal authority. The primary emphasis in the planning and management of the stormwater drainage systems is on preparing overall stormwater management plans, which incorporate both water quantity as well as quality considerations. Management practices applicable to stormwater management systems include stormwater detention and infiltration practices, incorporation of natural drainage systems into the storm drainage network where possible (rather than reliance on underground storm sewers), channel and shoreline stabilization and vegetation management, and protection of floodplains, wetlands and infiltration areas.

A strong note of caution is warranted, however. In communities where planners are grappling with stormwater issues. Routing stormwater to a wetland can appear to be an attractive solution that utilizes the sediment and nutrient retention functions of wetlands, while avoiding the need to dedicate developable land to stormwater treatment facilities. However, wetlands have a limited capacity to store peak flows of stormwater and retain sediments and nutrients without themselves becoming degraded. Algal blooms, duckweed blooms, monotypic stands of cattails, giant reed grass, and reed canary grass are all possible symptoms that a wetland is being overloaded with nutrients. Consideration should be given to "treatment trains" or series of pollutant removal practices prior to discharge to wetlands (such as sedimentation forebays, infiltration trenches, etc.), as well as the dispersal of residual pollutants for uptake by the wetland itself.

Given the potential for wetland degradation, plans for routing stormwater to a natural wetland, or modifying a natural wetland to increase its storage capacity and/or water quality functions should be closely scrutinized, with the presumption in favor of upland stormwater treatment. Where site conditions are favorable, constructing an artificial wetland or infiltration basin in an upland area is a preferable option for stormwater treatment, prior to its release to a natural system.

Local Stormwater Management

Both the City of Madison and Village of Cottage Grove have adopted construction site erosion and stormwater runoff control ordinances. These ordinances require the implementation of best management practices which limit erosion during construction, as well as stormwater flow control after development. For erosion control, Dane County Ordinance Chap. 14 sets generally more restrictive minimum standards applicable to all other municipalities in the county under the authority granted to the Lakes and Watershed Commission, in Wisconsin Act 324 §33.455 (2) signed by the Governor in 1990. The City of Madison has since adopted these minimum standards in its ordinance.

With regard to stormwater controls, the Dane County Lakes and Watershed Commission is currently in the process of also developing a minimum countywide stormwater management ordinance. This would establish minimum standards which would need to be incorporated into local



Construction site erosion and stormwater runoff control ordinances are being adopted to address water quality concerns

ordinances throughout the county. Regarding stormwater *quantity* controls, the City of Madison, and the Village of Cottage Grove currently require that post-development peak flows be controlled so that they are less than pre-development flows for the 10- and 100-year storms, respectively.

The City of Madison also requires management practices which provide stormwater *quality* benefits, such as wet detention basins and stormwater ponds, which remove sediment and other pollutants; although limited regarding water quality, the city's ordinance could be improved, as could Cottage Grove's ordinance.

Wisconsin Municipal Stormwater Discharge Permits

Dane county has experienced moderate to rapid growth over the last two decades. With this growth comes the addition of buildings, streets and parking lots and other impervious areas which increase stormwater runoff. Currently, federal regulations require that Phase I municipalities (population over



In the past stormwater systems were designed to remove water as quickly as possible



Today wet detention basins manage water better as a resource and also remove pollutants

100,000) obtain a municipal stormwater discharge permit to address pollution caused by stormwater runoff into nearby lakes and streams. The DNR administers the state's stormwater regulations, under Chap. NR 216 Wis. Adm. Code, which is modeled after the federal program. NR 216 requires the City of Madison to obtain a municipal stormwater discharge permit, which it received in November 1995.

More recently, DNR has taken actions to extend its permitting authority to include other municipalities that own or operate storm sewer systems in the Madison metropolitan area. In Door Creek, this includes the Towns of Burke and Blooming Grove. Agricultural lands are not affected. Once the municipality receives formal notification (February 1999) it has three to four years to prepare an application, receive approval and be issued a final permit. The permit contains a schedule for meeting the permit requirements (e.g., stormwater pollution prevention plan, monitoring, etc.) with annual reporting to update DNR on permit compliance.

Areawide Water Quality Planning

Although communities can expect urban areas to expand to accommodate anticipated future growth, residents can (and do) insist that these same municipalities require developers to address the impacts of their development on the area's ground and surface



Water quality planning addresses the impacts of development on groundwater and surface water resources

water resources. As the designated areawide planning agency for the county, the Dane County Regional Planning Commission oversees amendments to existing Urban Service Areas in order to avoid wasteful use of land, depletion of natural resources, as well as foster the efficient provision of public services and facilities.

As amendments to Urban Service Areas come before the Dane County Regional Planning Commission, staff will evaluate and usually recommend that measures be taken to address the anticipated impacts resulting from the proposed development. Environmental corridors, including wetlands, are protected from urban development. Very often, specific erosion control and stormwater management measures are included as a condition of approval of the amendment area. Project sponsors are usually willing to comply with these requirements, since they frequently enhance the amenities, economics and marketability of the development. Recommendations may also be included to maximize infiltration of rainfall in order to offset loss of groundwater recharge, depending on a site-specific evaluation of the proposal. These measures are incorporated into the design and construction of the development, and result in substantially reducing the adverse impacts of development, especially in conjunction with a community's ordinances and stormwater plans.

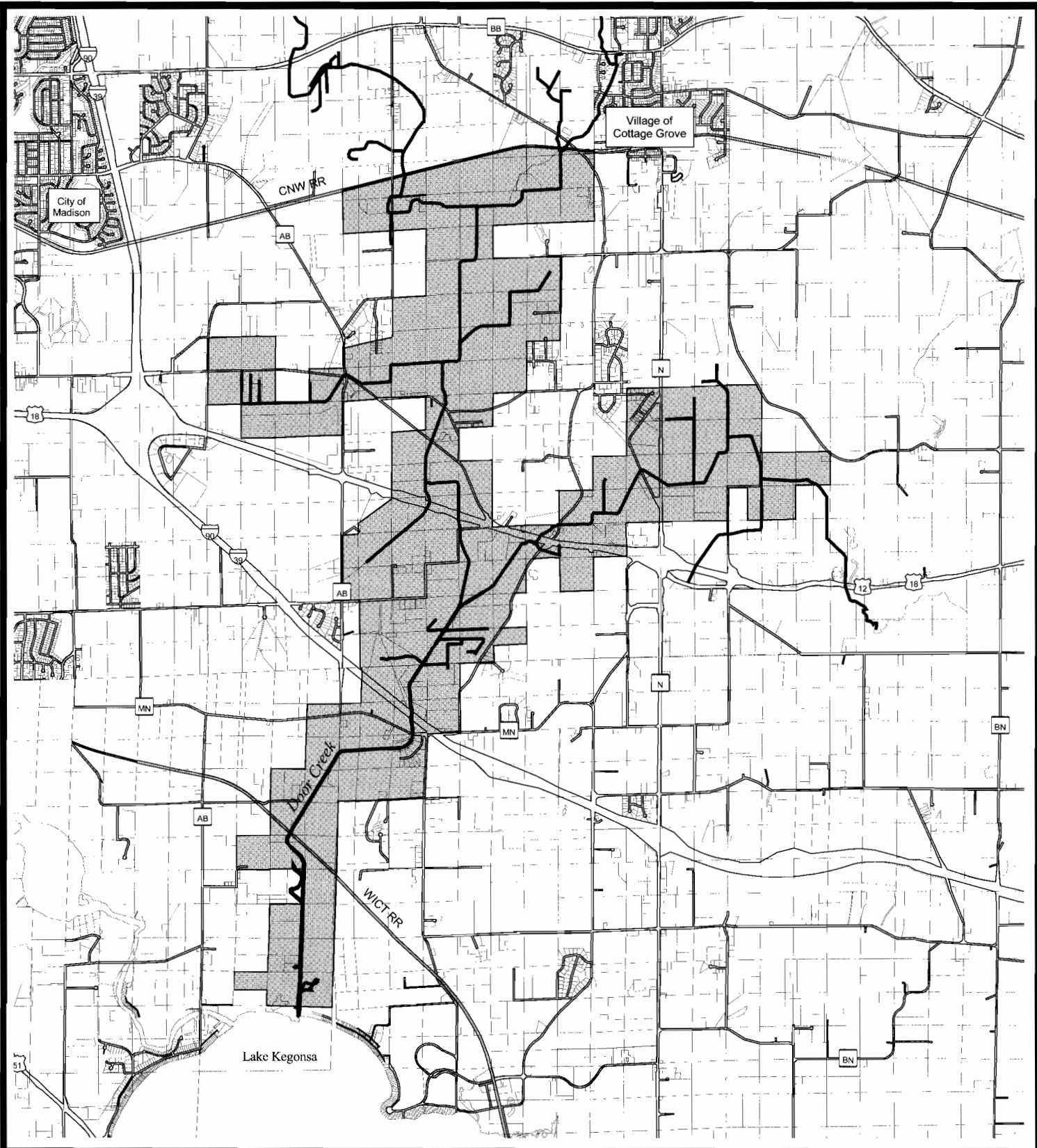
Drainage Districts

County drainage boards and the drainage districts under their jurisdiction are created primarily for the purpose of improving the drainage of agricultural land. They are not specifically empowered to abate point or

nonpoint source pollution; however, their activities may have a significant impact on water quality. The county drainage board has authority to levy assessments for the cost of planning, designing, constructing and maintaining drainage works. However, the county drainage board may raise revenue only through special assessments on the properties benefited by drainage work in the districts under its jurisdiction.

Previously, the drainage board had no authority to levy taxes or service charges or to request funds from the county, towns, cities, or villages. More recently, however, drainage boards have been given new authority over municipalities to control stormwater. Wis. Stat. §88.64 allows drainage boards to assess a municipality with territory upstream from any drain for the costs of enlarging or maintaining that drain that are attributable to increased water flow from land within the municipality. While this section of the statutes is primarily directed at insuring that the drains are capable of handling the surface water flow, there is nothing that would prohibit the drainage board from ordering additional detention ponds as a way of insuring that its existing drains can handle the flow. Also, the drainage board can order these costs be assessed against the municipality.

Wis. Chapter 48 Drainage District rules are currently being revised. The intent is to keep (bring) drainage districts into compliance with their original ditch profiles. A compliance plan must be completed for each district which includes a map, a restoration plan and a plan for control of soil erosion and runoff. The filing deadline has been extended to December 31, 2004. Dane County staff have completed maps for all 26 districts in the county, with the intent of approaching each district to see whether it wants to move ahead or be dissolved by a poll of its beneficiaries. In Door Creek, the Drainage District has been relatively inactive over the last few decades (Map 5). There has not been an assessment since about 1960. Although unlikely to be dissolved, the future of the Door Creek drainage district is currently undetermined, pending a determination by its members.

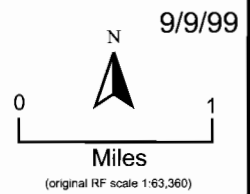


Map 5:
DOOR CREEK DRAINAGE
HISTORICAL BOUNDARY - CIRCA 1983
 (SUBJECT TO CHANGE)

Source: Dane County Land Conservation Department

 DRAINAGE NETWORK

 DRAINAGE DISTRICT



Prepared by staff
 to the DCRPC.

Agricultural Conservation Practices

Increased flooding experienced in the upland areas of the Door Creek wetlands may be less due to urban development and more a result of historic draining and loss of wetlands in some areas (resulting in less storage capacity and more runoff), combined with the ditches and laterals filling up with sediment and weeds (resulting in more water backing up into farm fields). Some of this is also the result of more intensive agricultural production and cash-cropping in the watershed. As cash cropping and the size of farm machinery has increased in recent years, more runoff and sediment may be finding its way into Door Creek and Lake Kegonsa.

A detailed technical analysis conducted as part of a 1982 watershed management study for Upper Koshkonong Creek (located immediately northeast and facing very similar land use impacts) found that the sediment delivered to the drainage system from urban areas was much less than that contributed by the agricultural areas. The greatest soil loss occurs from cropland in continuous corn, followed by crops in rotation, then pasture. The least soil loss was found to occur from woodlands. Generally, the more land in crop production, especially row crops, the greater the potential soil loss and sediment delivery in the basin.

The Koshkonong Creek study also found that sedimentation had reduced the cross-sectional area of the drains throughout the basin. As much as 3 feet of highly organic silt was found at 19 locations with estimated reductions in cross-sectional area ranging as high as 30%. Combined with the increased vegetation and debris, this has also inhibited the ability of the stream to function as a drain. Similar conditions have been noted in Door Creek, although these have not been documented to the level of scientific analysis that was conducted in Koshkonong Creek.

The most critical areas are those located within about one-quarter mile (1,300 feet) of a receiving stream or ditch. Areas of high soil loss, or erosion, do not necessarily correspond to areas of high sediment delivery to a stream or wetland. Soil loss estimates are weighted according to their distance from a receiving stream or ditch to obtain sediment delivery. For example, an area with high soil loss located far from the stream will ordinarily have a low sediment delivery, while an area close to a receiving stream will usually have a high sediment delivery rate. Furthermore, the delivery for the area between about one-

eighth mile (660 feet) and one-quarter mile is considerably lower than that occurring within one-eighth mile of a receiving stream or ditch.

The objective of upland management is to increase infiltration, reduce runoff, and minimize erosion and the potential for sedimentation. While soil loss and agricultural productivity is a concern nationally, in Dane County water quality is also a primary concern. The process for addressing these and related problems is continually evolving, each case beginning with a farm conservation plan. A conservation plan recommends protection measures or BMPs based on the natural resources a farmer has under control. Since nutrients, especially nitrogen and phosphorus, are closely associated with the sediment or the stormwater runoff which carries the sediment, erosion and stormwater control practices will help to decrease sediment and nutrient loading.

Traditional soil and water conservation practices developed to maintain agricultural productivity also help protect water resources, but additional land management practices may be needed. These land management practices serve to increase infiltration, water quality, habitat diversity and productivity. There are a variety of practices and incentive programs to choose from, based on specific application. Practices may include contour farming, conservation tillage, grassed waterways, diversions and terraces; in some instances structural measures may be required such as manure storage structures, as well as nutrient management plans used to systematically apply manure and fertilizers to cropland—all part of an overall land use system.

Buffer areas of natural vegetation are also particularly effective in trapping sediment and nutrients, as well as providing nesting cover and habitat or for wildlife. Restored wetlands no longer being actively farmed can likewise trap nutrients, sediment and release floodwaters more gradually.

The Dane County Land Conservation Department staff provides assistance to farmers in addressing these concerns. In addition, programs such as the U.S. Department of Agriculture Conservation Reserve and Wetlands Reserve Programs provide funding to retire active farmland and restore wetlands in highly sensitive areas, especially along waterways, along with other federal, state and local incentive programs for protecting farmland and restoring wildlife habitat.

IV. DEVELOPMENT OF MANAGEMENT ALTERNATIVES

Table 1

Open Space Corridor Functions and Resource Features

FUNCTION	RESOURCE FEATURES								
	Lakes, Ponds & Streams	Wetlands	Floodplains	Shoreland Buffer Strips	Steep Slopes	Woodlands	Parks	Unique Vegetation or Geology	Problem Soils
Protect Water Resources, Drainage & Hydrologic Functions	▲	▲	▲	▲		△			△
Provide Pollution Control		▲	△	▲	▲	△	△		
Protect Public Health, Safety & Property	▲	△	▲		▲				▲
Provide Outdoor Recreation & Education Opportunities	▲	△	△	△		△	▲	△	
Provide Wildlife Habitat	▲	▲	△	△		▲	△	△	
Enhance Scenic Beauty & Shape Urban Form	▲	△	▲	▲	▲	▲	▲	▲	

▲ Primary Function △ Secondary or Supplemental Function

1. Open Space Corridors

Open space has long been a significant element in Dane County Planning. The primary functions of wetlands as elements of continuous systems of open space corridors in Dane County can be classified into six general categories listed in Table 1 (DCRPC, 1996)

Wetlands are particularly fragile and important natural resources. They are especially important in protecting water resources, drainage and hydrologic functions, in that they usually represent groundwater discharge areas which maintain stream flows during dry weather conditions. Wetlands also provide temporary detention and storage of floodwaters and runoff, which reduces flood damage and maintains a hydrologic balance between ground and surface waters.

Wetlands provide an important function in pollution control including protection against erosion and sedimentation caused by incompatible or adverse development. They also provide vegetative filtering of surface runoff and stabilization of drainageways, streambanks and shorelines.

Avoiding construction and development in wetlands is an important secondary function in terms of protecting public health, safety and property, since these areas are usually subject to flooding and exhibit unstable and compressible soils. Another

secondary or supplemental function of wetlands is to provide outdoor recreation and education opportunities. These areas may also be associated with nearby archaeological sites of early Native Americans who relied on these areas for food and subsistence. While wetlands are extremely important resources for nature study, interpretation and education, these areas are fragile and generally unsuited to intensive use.

Wetlands are perhaps the most important resource feature in terms of wildlife habitat, since they represent the edge between land and water and are usually highly productive in terms of production and support of living plants and animals. Thus, wetlands are extremely important in providing food, water, nesting and breeding habitat for a wide variety of wildlife.

Finally, wetlands are important in enhancing scenic beauty and shaping urban form. They often provide logical barriers or boundaries to urban development, as well as buffers between communities and incompatible land uses. They are also commonly associated with other important open space resource features such as lakes, ponds and streams, floodplains, shoreland buffer areas, parks, woodlands, etc., contained in Table 1.

2. Functional Assessment of Wetlands

The reduction in wetland functions and their inherent values happened before the full range of benefits were realized by scientists or planners. Since the value of wetlands has been recognized, corrective action has been impeded by lack of means for assessing wetland functions. Consequently, there has been an urgent need for carefully constructed wetland evaluation methodologies that can convey to planners and the general public those wetland functions and values to ensure their future wise use, management, and protection. As a result, a plethora of wetland classification schemes have been developed and applied at all geographic scales—from very local to nationwide.

As part of the 1990 University of Wisconsin-Madison WRM workshop, a Wetland Evaluation Checklist was developed and used to evaluate the wetlands in the Yahara Monona Watershed (Appendix A). Although the project boundary stopped just short of the Door Creek Watershed, this checklist was developed with the idea that it would be applicable to other freshwater urban areas as well. The Wetland Evaluation Checklist was modified from the DNR's *Rapid Assessment Methodology for Evaluating Wetland Functional Values*. The DNR method was modified from the Federal Highway Administration method (Adamus et al., 1987), to be regionally specific to Wisconsin, and simplified to require only about 15 to 20 minutes to complete (the long version requires approximately eight hours of evaluation per wetland). While the long version provides a legally defensible evaluation, the rapid assessment methodology is better suited to be used as a less formal checklist to help guide resource evaluation and to prescribe management activities.

The Checklist was designed to evaluate functional values for a specific wetland in approximately 30 minutes. The evaluator should be someone with a basic knowledge of wetlands ecology, with some interdisciplinary training in botany, zoology, and hydrology; or teams of individuals could be formed with the necessary qualifications.

The Checklist is suggested here as a methodology which can be used to quickly assess the important functional characteristics of each site under consideration, as the initial basis for more focused or in-depth evaluation during subsequent planning stages, while also providing documentation and justification for decisions reached. In this regard, the checklist is meant to be used in an objective



Wetlands support animals and plants

manner and to document best professional judgment.

Questions may be added, modified or deleted as appropriate to a specific area of interest. The summary questions at the end of each section provide a four-level ranking system (Low, Medium, High and Exceptional) for each function. Also, the qualitative nature of the answers which precede the summary question can be effectively used to aid in developing alternative management strategies.(Figure 1).

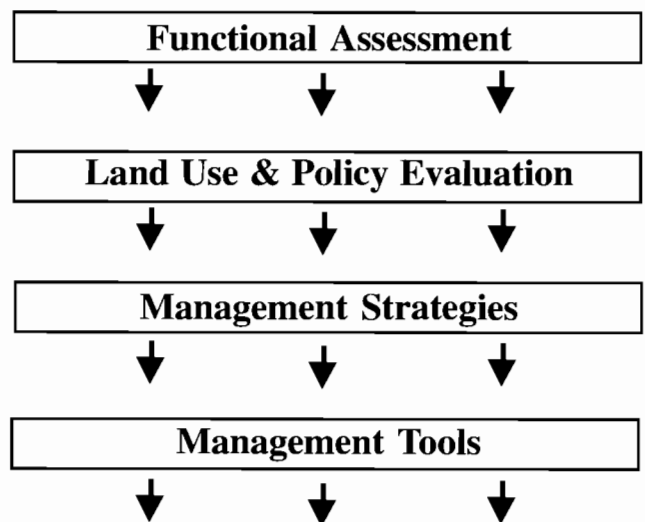


Fig. 1 Suggested process for determining specific wetland and resource management alternatives

3. Land-Use and Policy Evaluation

It is important to understand that each wetland is unique, and, depending on the physical setting of the wetland and the physical attributes, some functions may be more important than others. How highly a wetland rates in certain functions and the number of categories in which it rates highly will help determine the wetland management strategy to be taken, as well as the appropriate tools to be used. Figure 1 illustrates the process a manager could use in making specific management decisions for promoting the highest and best wetland use for a specific wetland area or parcel.



Assessing wetlands to determine management practices

The second set of factors in this approach include an evaluation of land-use and policy elements, which may be used to determine subsequent management strategies and tools. This includes an assessment of the ownership and use of both the wetland and adjacent areas, as well as an assessment of budget and policy issues that govern its management. These may be determined by considering the following types of questions:



Boating and recreation are important activities on Lake Kegonsa

- Who owns the wetland site and who owns the adjacent lands?
- What is the land use adjacent to the wetland and within the watershed? How much of it is:
 - urban? pasture?
 - residential? recreation area?
 - agricultural? parkland?
 - forested? highway/road?
- What is the existing policy concerning wetlands in general and this site in particular?
- Which government agencies or private organizations have jurisdiction or interest?
- What are the attitudes regarding wetlands on the part of both the public and the responsible policy makers?
- What budget is available for wetland management?

When the functional classification and the land-use and policy indicators have been determined, a decision can then be made as to which management strategy is most appropriate for a specific wetland area.

The role of wetlands in reducing the pollution levels of water has recently become one of the most compelling arguments for their preservation.

E. L. Hortwitz

4. Management Strategy Development

Management strategies for specific wetland areas can be regarded in four basic categories:

- 1) *No action*—A wetland may already be adequately managed for the specific function(s) it provides, or there may be so little interest, budget, or justification that further management efforts may not be useful.
- 2) *Restoration*—A wetland may have been of higher quality in the past, but may have been allowed to degrade as a result of increased urbanization and agricultural production. It may be possible to restore the wetland to its original state, by restoring desirable hydrologic conditions or by reintroducing native vegetation. The cause of degradation will usually determine the restoration strategy.
- 3) *Protection*—This strategy is suitable for a site whose present form or functions are desirable as they are, but which might be in danger from future impacts. The most common forms of protection have been through federal and state wetland laws, local zoning, acquisition, and easements—such as for upland buffers. Physical protection from over-use or pollutant run-off may be appropriate as well.

- 4) *Enhancement*—A wetland site may have the potential to become more productive, useful, or aesthetically pleasing through improvement. For example, building a path or walkway can encourage greater public awareness and appreciation, or altering the hydrology can facilitate more flood storage. Care must be exercised so that enhancement of one wetland function does not diminish another.

Any combination of these strategies may be used in managing a specific wetland area. Determining which of these management strategies is most appropriate for a specific site is the principal focus of the management decision process, which leads to specific management tools.

5. Wetland Management Tools

The tools available to implement a wetland management strategy fall into four general categories:

-
- 1) Laws and Regulations**
 - 2) Alternative Land-Use Management Tools**
 - 3) Wetland enhancement, and**
 - 4) Education**
-

The *Door Creek Wetlands Resource Protection Plan* is based on existing laws and regulations, and does not propose to change or expand those laws and regulations. The section on existing laws and regulations describes the existing legal and regulatory management tools for protecting wetlands. Protection through regulation is appropriate where public access is not needed and allows lands to remain in private ownership. Existing regulations available include wetland and shoreland zoning, subdivision regulations, official mapping, and federal, state and local permit processes.

Where public access is required for recreation, for provision of structures such as detention basins, or where access is needed for public maintenance of stream channels and structures, it is generally necessary to acquire lands through dedication or purchase. Public acquisition through dedication or purchase may also be required to protect important

wildlife habitat or resource areas vulnerable to development which are not adequately protected through zoning or other regulatory means. Conservation easements may also be used where fee-simple title is not needed.

The following section highlights some of the regulatory mechanisms for protecting open space corridors. For a more in-depth discussion see *Environmental Corridors* (DCRPC, 1996).

Existing Laws and Regulations

Federal

- Section 10 of the Rivers and harbors Act 1899 regulates all structures or work in or affecting the navigable waters of the United States, including wetlands, such as dredging and discharge of fill materials.
- Section 404 of the Clean Water Act of 1977 requires the U.S. Army Corps of Engineers to regulate the discharge of dredge and fill materials into waters of the United States.
- Section 401 of the Clean Water Act of 1977 requires water quality certification before a permit is issued for construction or operation of facilities that may discharge into navigable waters, including wetlands.
- 1996 Federal Farm Bill, administered by the U.S Dept. of Agriculture, which includes the Wetland Reserve, and Swampbuster program which provides cost-share funding for restoring wetlands drained for agricultural purposes prior to December 23, 1985, while denying USDA farm benefits for wetlands altered after that date, respectively.

State

- DNR Administrative Code NR 1.95 establishes the basis for state wetland regulations, stating that "wetlands shall be preserved, protected, and managed to maintain, enhance or restore their values in the human environment." DNR makes regulatory decisions concerning the issuance of permits for activities which affect wetlands such as sewer extensions, dredging and filling, stream course alteration, etc.

- Chapter 299, Wis. Stats. Establishes the procedures and criteria for making water quality certification determinations under the authority granted by Section 401 of the Clean Water Act. Wis. Adm. Code, NR 299 certifications apply to all federal permits in which a discharge to the waters of the state are concerned. Denial of certification is a veto of a federal permit. Certification decisions are based on standards and procedures established in state water quality standards for surface waters (NR 102) and wetlands (NR 103). These standards are also applicable to most DNR regulatory, planning, resource and financial aid determinations which may impact the quality and use of wetlands.
- Chapters 30 and 31 of the Wisconsin Statutes deal with the authority of DNR to regulate activities in and near navigable waters, and the construction and operation of dams and bridges.
- Chapter 92 of the Wisconsin Statutes requires each county to create a special Land Conservation Committee (LCC) responsible for developing and encouraging implementation of federal, state, and local programs aimed at conserving soil, water, and related natural resources. Land Conservation Department (LCD) staff work specifically with farmers, landowners and businesses to promote conservation and install Best Management Practices.
- Wisconsin State Statutes also provide shoreland (s. 59.692), wetland (s. 59.692, 61.351 and 62.231), and floodplain (s. 87.30) zoning oversight, and require the adoption of local ordinances regulating activities in the shoreland zone and 100 year floodplain, that include at least state minimum requirements. DNR rules further lay out the minimum requirements for shoreland and wetland regulations in unincorporated areas (NR 115), wetland regulations in incorporated areas (NR 117), and floodplain regulations in incorporated and unincorporated areas (NR 116).

Local

At the local level, pertinent laws begin with county jurisdiction, which includes unincorporated areas; and specific cities, villages and towns with their own regulations. In keeping with NR 115 and NR 116, Dane County has adopted a shoreland, shoreland-wetland and floodplain zoning ordinance (for the unincorporated areas only). Ordinances include a specific listing of permitted uses in the shoreland-wetland district, as well as a listing of other allowed uses requiring a conditional-use permit. The ordinance specifies that all uses not listed are prohibited unless, or until, rezoning should occur, which shall not have a significant impact on any of the wetland functions. Final approval of the zoning amendment must be made by DNR whose authority supersedes that of the County Board. It is important to note the county's ordinances are more stringent than the state's minimum requirements; they include all wetlands greater than two acres in size, compared to the minimum state standard of five-acre shoreland wetlands.²

Under to NR 117, cities and villages have also been directed to adopt wetland protection ordinances within municipal shoreland areas. To aid cities and villages in establishing and meeting shoreland-wetland zoning standards, DNR published a model ordinance. In Dane County, all of the cities and villages have adopted the more restrictive two-acre standard.

It is often advised that a municipality adopt a comprehensive land-use master plan to provide a legal basis for land use decisions. This is especially important when natural areas, such as wetlands, are protected, even partially, by local land use decisions not mandated by state or federal law.

In some instances, alternative land-use management tools may be used to provide additional flexibility and incentive for resource protection. For example, cluster zoning and planned unit development (PUD) districts have been used which involves increasing densities in some areas of the development, while the remaining areas are left in open space. Overall density is maintained while the amount of open space is maximized. Maximizing open space maintains a buffer between the impacts of development and the wetland.

In addition to zoning, communities may use subdivision regulations to protect wetland resources. Subdivision ordinances apply when a parcel of land is divided into lots for sale or development. Many communities use subdivision regulations to protect wetland resources by imposing site restrictions and design standards, as well as how much land must be set aside for open space. Subdivision regulations often include specific design standards for width and alignment of parkways and drainageways, and public easements adjacent to streams to accommodate potential flow volumes. Besides easements, the regulation may require dedication of land to the public for resource protection, open space or recreation purposes. Often plat approval is conditioned upon compliance with design standards for critical areas, or adequate protection or preservation of certain environmental features in the site development plan.

Alternative Land-Use Management Tools

Existing laws and regulations do not necessarily provide sufficient means for carrying out an effective wetland management strategy. In this regard, various alternative land-use management tools have been developed which provide additional flexibility and landowner incentive for promoting wetland resource protection, restoration and enhancement goals.

Acquisition plays one of the most important roles in wetland management. In addition, the lands surrounding the wetland may be just as important as the wetland area itself. Acquisition is a tool that may be used to assist in the management of both these areas. Typically, public acquisition and incentives are needed for environmentally sensitive areas which cannot otherwise be adequately protected by regulation. As such, there are various acquisition techniques which are available, depending on the specific circumstances surrounding the property, as well as the negotiated agreement that can be reached with the landowner.

Furthermore, various public acquisition and incentive programs have been developed which provide the necessary flexibility and landowner incentives for promoting wetland resource protection, restoration and enhancement. In this regard,

²National research suggests that, given the cumulative impact of wetland loss, especially in urbanizing areas, the current size cutoff in most zoning ordinances (either 5 or 2 acres) is too large. Cumulatively, wetlands smaller than 2 acres can perform important water quality functions, especially in watersheds with small amounts of wetlands left.

the Door Creek Wetland Resource Protection Plan establishes an extremely useful planning framework for declaring public intent and providing justification for focusing financial and technical resources into an important natural resource area, in order to realize mutually agreed upon community goals for protecting important natural resource features.

More specifically, cities, villages, towns and counties are authorized under state statutes to acquire and develop property for a variety of purposes including (among others) parks, recreation, public use and natural resource protection. Acquisition of property rights or partial rights may be accomplished in several ways, typically: (1) Purchase of fee-simple interest in a property; (2) Purchase of lesser interest in the property (e.g., easements); (3) Acquisition of development rights; (4) Dedication of lands by developers; or (5) Gifts or donations.

Fee-Simple Purchase

The simplest method of acquiring wetland and surrounding property is through fee simple purchase. Traditionally, local units of government have acquired public parkland, passive recreation and other natural resource areas through outright purchase. Fee-simple acquisition is the purchase of all rights to a specific property. Local units of government often seek financial assistance for purchase and development of parklands and natural resource areas from federal and state cost-share funding programs (e.g., State Stewardship Fund, Community Development Block Grants, DNR matching funds, etc.).

Private sector involvement in purchase of critical environmental resource recreation and open space lands has also increased in recent years. For example, land trusts are private non-profit groups directly involved in land transactions, through donation or purchase, that protect open space, recreation, and natural resource lands. In Dane County this includes the Dane County Natural Heritage Foundation and Gathering Waters, as well as other national and state environmental groups such as the Nature Conservancy. Land that falls outside the jurisdiction of state and local public agencies might thus be spared from development through land trust acquisition. Another positive

attribute is that management (removal of exotic species, habitat restoration, etc.) is often enhanced through mobilization of concerned citizens involved with these groups.

In addition, these groups may also seek a first right of refusal agreement with the owner of an environmentally valuable property, where the group is offered the first opportunity to purchase when the land is sold.

Purchase of Easements

In instances where fee-simple title is not needed, the acquisition of less-than-fee-interest in a property or easement may be more appropriate. Under an easement the owner continues to own the land but sells or donates certain rights. These may include the right to develop, the right to drain, the right to crop, etc. Common examples of easements include:

- (a) Access easements—to allow public access to private lands for hiking, fishing or other recreational purposes, or for maintenance of drainage facilities.
- (b) Conservancy easements—to preserve or restore environmentally sensitive sites without allowing public access.

Acquiring easements is also appropriate for lands bordering these sensitive areas, which serve as important buffers—protecting them from upland land uses and impacts, providing wildlife habitat, and enhancing water quality functions.

Acquisition of Development Rights

A Purchase of Development Rights (PDR) Program allows a landowner to sell his or her development rights to a parcel of land. The buyer, usually a public agency or conservation organization, pays a price which is less than the fee simple purchase price of the land, while the seller retains ownership of the land. The seller can sell the land or pass it on to other family members; however, the use of the land is restricted to agriculture or open space, usually through deed restrictions which follow the title on the land. The Town of Dunn currently administers a PDR program used to maintain and protect productive farmland from development, which may include associated wetlands.

A variant of this preservation tool is the Transfer of Development Rights (TDR) Program. A TDR program allows the transfer of future development rights or potential from properties in "sending" areas. Sending areas are designated areas where the community wishes to preserve resources and/or limit development. Productive farmlands and environmentally sensitive areas are examples of sending areas. The future development potential may be transferred to "receiving" areas designated as appropriate for new or additional development, usually areas provided with urban transportation and public services. TDR programs are being studied in Dane County, but have not yet been implemented.

Dedication of Lands by Developers

Local subdivision and Planned Unit Development (PUD) ordinances often require that a portion of subdivisions or PUD be dedicated by the developer for the purpose of park, open space, or access to navigable lakes and streams. In lieu of dedication of lands, the developer may provide a payment of fees during the land development process. In addition to providing recreation and open space areas, dedication is also a commonly used tool to preserve and protect drainage greenways on developing lands, and to help maintain buffering capacity and water quality of surface waters.

In Urban Service Areas, adopted *Environmental Corridors* provide an important basis for negotiating land dedication with subdividers and developers, especially environmentally sensitive features such as wetlands, floodplains, drainageways, etc. During the negotiation process, the *Environmental Corridors* may be used by the community to direct development away from these kinds of features. Density tradeoffs may also be suggested for enhancing or protecting a particular resource feature, while minimizing any loss in development potential for the area.

In rural areas, similar open space corridors (*Rural Resource Protection Areas*) are defined in town plans and protected through zoning or other regulations. There is less pressure for alteration or development of these lands, therefore less land is usually needed for public open space and recreation use. As a result, most of the lands in rural resource protection areas and corridors remain in private ownership. Overall, *Environmental Corridors* and *Rural Resource Protection Areas* help provide and protect needed open space, which also ties into an overall resource corridor/protection system that spans and

provides connection across jurisdictional boundaries throughout the county.

At the state level, "Mitigation Banking" has been developed as a means to facilitate regulatory off-site wetland mitigation requirements for unavoidable wetland losses associated with development, such as for road and highway construction. Although wetland mitigation is only allowed for municipal and state highway and transportation projects at this time, DNR is working on a broader mitigation program. These programs provide funding to finance restoration, replacement, acquisition, or improvement of wetland resources in other areas. The Wisconsin Department of Transportation operates a wetlands bank at Patrick Lake in cooperation with DNR, the U.S. Corps of Engineers, Fish & Wildlife Service, and Environmental Protection Agency, while the Dane County Highway and Transportation Department operates a banking site at Lodi Marsh. The potential exists for establishing a banking site in the Door Creek watershed.

Gifts or Donations

Landowners may also give land or partial rights to the land for public use to a local unit of government or public trust. Voluntary gifts or donations are a preferred method of acquiring property rights since this is the least-cost method of preserving open space. Gifts are usually granted because the landowner desires to preserve the natural qualities and value of the land, as well as receive certain tax benefits. Another type of agreement establishes a life estate condition on the property. Through this, a property could be donated (or sold) to a unit of government when the donor or direct heirs die.

Wetlands Enhancement

Wetlands enhancement means modifying a wetland to protect it from adjacent land-use impacts, restore a previous wetland function, or to improve an existing function. Enhancement tools generally include hydrologic engineering, and biotic enhancement, while non-structural tools include access modification, and adjacent land-use controls.

Hydrologic and Hydraulic Modifications

By altering the natural water-level fluctuations a few inches for relatively short periods of time, it is possible to render a wetland uninhabitable for some plant and animal communities. Because of this relationship, water level controls are probably the

most common hydrologic modification. Traditionally, this technique has been used to convert wetlands to non-wetland uses such as for agriculture. For example, if a channel is dug through a wetland the water level will flow more quickly out of the wetland, thus dropping the water table. If this channel were removed or modified to direct flow back through the wetland, water levels would likely return to near previous conditions, with an accompanying return of associated wetland plants and animals.

The water level in a wetland can be controlled in five basic ways:

- 1) Water levels may be restored by plugging a drainage ditch or subsurface tile—probably the most cost-effective alternative, where feasible.
- 2) Flow may be routed into, or re-distributed through the wetland, such as restoring original flow patterns, stream channels, or open water areas—local stormwater management is needed to control both the quantity and quality of flow.
- 3) Groundwater flow into and through a wetland may be reduced by lowering the water table through increased pumping rates—regional coordination of water use and pumping strategies is needed to help offset water table declines and reduction in groundwater discharge.³
- 4) Water entering or flowing through the wetland may be impeded by some form of barrier, like a road—a relatively permanent impact in which avoidance/mitigation is a necessary consideration.⁴
- 5) Water flowing out of the wetland may be controlled by placing a barrier or outlet control down-gradient—although potentially expensive or impractical regarding the Door Creek Wetlands, possible alternatives might include:
 - Altering DNR lake level limits to change the water levels in the wetlands associated with the Yahara Lakes system.⁵



Wetlands can be enhanced by restoring original stream patterns and flow

- Evaluate increasing the outlet capacity of the control structures and/or channel modifications to help reduce high lake stages.⁶

Biotic Enhancement

Biotic enhancement is generally associated with returning the wetland to a more natural condition. This can be done by selectively removing unwanted plant species, transplanting desired native species, and/or adding beneficial species. Biotic enhancement can also aid in the development of a particular wetland function such as restoration of wildlife habitat, flood control or sediment trapping. Biotic enhancement may include:

- 1) Scientific restoration—to attempt to restore a native community at a site to achieve a stable and enhanced ecosystem.
- 2) Functional restoration—to restore the utility of a site, such as for wildlife habitat or sediment trapping.
- 3) Aesthetic restoration—to emphasize the visual aspects and natural feeling, such as through natural landscaping.

³See *Evaluation of Alternative Management Strategies*, DCRPC 1997, conducted as part of the Dane County Regional Hydrologic Study.

⁴See *Wetland Mitigation Banking Technical Guidance*, Wisconsin Department of Transportation 1997.

⁵See *Simulation of the Effects of Operating Lakes Mendota, Monona, and Waubesa as Multipurpose Reservoirs to Maintain Dry-Weather Flow*, U.S. Geological Survey 1997, developed as part of the Dane County Regional Hydrologic Study. This report describes the development of a Yahara Lakes Reservoir Routing Model (using existing DNR lake levels limits), which could be revised to simulate the effects of new legal limits. (Note, the model currently extends only as far as Lake Waubesa. Also, establishing lake levels limits is always a highly contentious public issue.)

⁶Currently pending funding of a proposal to modify the Yahara Lakes Reservoir Routing Model to evaluate alternatives for reducing high lake stages.

Access Modification

Wetlands are often not easily accessible. Depending upon the management strategy selected, it might be desirable to provide limited access to the wetland. A footpath, trail or boardwalk are useful, sometimes simple forms of providing access for outdoor resource appreciation. In other cases it may be better to limit access by blocking entry points and posting signs.

Adjacent Land-Use Policy

Future development is a constant threat to wetlands in urbanizing areas. Development does not have to occur in the wetland to have an effect on the wetland. Simple construction site erosion control measures such as silt fences or hay bales can be used to reduce erosion and sedimentation from a construction site. Runoff can also be intercepted or impounded for a period in detention/sediment basins or wet ponds until sediment or pollutants can settle out, thereby minimize the effects of pollution and nutrient/sediment loading on a wetland. Farmers should also adopt conservation best management practices to protect wetlands from sediment, nutrients and pesticides, as well as enrolling in wetland and buffer restoration and incentive programs such as the Wetlands Reserve and Conservation Reserve Programs.

In particular:

- 1) Jurisdictions need to incorporate and enforce protective erosion control and stormwater runoff measures as a necessary consideration and condition in their formal development review and approval process.
- 2) Developers need to adopt measures (e.g., erosion and stormwater runoff controls, stormwater management plans, best management practices, etc.) to control flood flows, protect water quality and enhance groundwater recharge.
- 3) Farmers, landowners and businesses should be encourage to work closely with local Land Conservation Department staff to seek financial and technical assistance for wet land resource conservation and protective best management practices.

Education

A better understanding and appreciation of wetland functions by the general public is an important part of any wetland management program. Awareness is the first step forward in protecting, preserving and using, rather than abusing, this significant resource.

Such an education might best be achieved at the site using the wetland itself as an educational tool. Examples include self-guided nature trails, guidebooks, signposts, etc. Education can also have a significant impact on a site-specific basis where individual property owners can be provided with information on how their actions affect a certain wetland. The Wisconsin Wetlands Association is publishing a *Wetland Restoration Handbook for Landowners*.

The aim of public education is to increase public understanding and appreciation of the value and importance of wetlands, and the need to protect and enhance those values and functions.



A better understanding of the wetlands functions by the general public is important to wetland management

V. MANAGEMENT AGENCY RECOMMENDATIONS

The *Door Creek Wetlands Resource Protection Plan* is not a land use plan or zoning ordinance and does not supersede or replace existing regulations. The plan has been designed to be consistent with adopted county, city, village and town plans so that implementation actions will aid in achieving adopted land use, water quality, parks and open space goals and objectives.

The following actions present options for land acquisition, preservation easements and other mutual agreements as a means of implementing the management objectives needed to restore, protect, and enhance the Door Creek Wetlands, as well as promote water quality improvements in Lake Kegonsa:

1. Establish a Door Creek Wetlands Resource Area

- a. Dane County, DNR, local government and private resource conservation groups should develop cooperative agreements to focus shared technical, financial and volunteer resources on activities to promote the goals and management objectives described in the *Door Creek Wetlands Plan*.
- b. DNR and Dane County should work with landowners to cooperatively manage the lands within the Door Creek Wetlands Resource Area. DNR should focus on management of the wetlands, such as for spawning habitat, while the County should direct its attention to the upland areas.
- c. DNR staff should conduct a detailed wetland assessment to identify existing and potential wetland functions and values, and establish recommended guidelines for restoration, protection and enhancement activities for the resource as a whole.
- d. Protective upland buffer areas should be established which provide a variety of natural open and woodland habitat areas for wildlife, water quality protection from upland land use impacts, and to maintain the scenic character of the area. The Door Creek Wetlands Resource Area does not convey the right of public access on private land without the landowner's consent, so easements or agreements would need to be negotiated for public access to upland areas for maintenance, management or recreation.
- e. Controlled public access should be provided along the north shore of Lake Kegonsa, linking Fish Camp Launch with Lake Kegonsa State Park, which may require acquisition.
- f. Important cultural features such as archaeological sites, scenic resources, and resource interpretation/appreciation features should also be incorporated into the Door Creek Wetland Resource Area as site conditions and circumstances permit.

2. Provide Northern Pike Spawning Habitat

- a. DNR should work with Dane County, the Door Creek Drainage District, town governments, resource conservation groups and private landowners to improve northern pike spawning habitat by removing ditch berms, re-establishing original stream channels, and providing increased access into/escape from the Door Creek marsh areas (while minimizing unnecessary disturbances). Necessary assurances will need to be made to ensure increased flooding of productive agricultural crop or pastureland will not result without the landowner's consent.

3. Promote Wetland Restoration

- a. Dane County Land Conservation and Parks Departments should work cooperatively with DNR, the Door Creek Drainage District and local landowners to re-establish some of the original stream channels and re-direct flow back into the marsh areas, thereby increasing the hydraulic detention time and flow paths through the wetland.
- b. Dane County Land Conservation Department should work with the U.S. Fish and Wildlife Service, USDA Natural Resources Conservation Service, Wisconsin Department of Transportation, DNR, and local landowners to establish wetland restoration projects in prior-converted wetlands in the water shed. Consideration by these agencies should also be given to establishing a Door Creek wetlands banking site.

- c. Dane County Parks Department should work with the Dane County Natural Heritage Foundation, Friends of Lake Kegonsa, Dane County Conservation League, and other natural resource organizations and volunteer groups to organize wetlands restoration, native prairie, and wildlife habitat projects. Consideration should also be given to forming a Door Creek Watershed Association to organize and oversee community projects.

4. Encourage Erosion Control and Stormwater Management

- a. Dane County Lakes and Watershed Commission and the Land Conservation Department should continue to work with the City of Madison and Village of Cottage Grove to upgrade local erosion control and stormwater management ordinances consistent with minimum county standards.⁷
- b. The City of Madison and Village of Cottage Grove should require stormwater management practices be incorporated into development proposals that address the water quality and quantity impacts to the wetlands including, for example, stormwater infiltration and stormwater retention ponds.
- c. The City of Madison, and Village of Cottage Grove should work with the Door Creek Drainage District to share in the cost of enlarging or maintaining the drain system, and/or provide retention ponds and practices necessary to address the additional stormflow resulting from urban development.
- d. The Door Creek Drainage District should remove obstructions and sediment from the ditch in the northern portions of the wetland area to maintain drainage of agricultural land, and also work with DNR and Dane County in order to accomplish compatible and beneficial resource protection objectives. For example, additional water flow resulting from better maintained ditches might be re-directed to other areas of the wetland, such as original stream channels and flow patterns through the marsh.
- e. Dane County Land Conservation Department should continue to target farmers in the watershed to promote agricultural conservation management practices and cost-share incentive programs to improve the water quality flowing to the wetlands (such as those contained in the *Dane County Land and Water Resource Management Plan*).

5. Acquisition Recommendations

- a. Resource conservation agencies and organizations should acquire the necessary interest in property in the Door Creek Wetlands Resource Area to achieve the resource restoration, protection, and enhancement goals and objectives contained in this plan, while accommodating the needs of the landowner.
 - Preservation easements provide a range of options to preserve land while also maintaining private ownership and use. Under a preservation easement the land is deed restricted in return for compensation to the landowner to recoup the value for specific ownership rights that have been separated from the property and sold.
 - The sale or donation of easements to private land trusts are valid ways of implementing the goals and objectives of this plan, and are encouraged.
 - Fee simple purchase from willing sellers is also encouraged for lands within the Door Creek Wetlands Resource Area, particularly for any areas proposed for public access.
 - All public acquisitions, whether fee simple or easements, must follow established state laws and guidelines to assure compensation is made at fair market value. This does not preclude in-kind or negotiated agreements which may be reached by consenting parties involving changes in land use, management activities or practices.

⁷The Dane County Stormwater Management Ordinance is currently under development. Madison has adopted the county minimum erosion control standards August 1998.

VI. CONCLUSIONS

Wetlands are among the most complex and least understood of natural community types. Most wetlands also serve multiple functions. The selection and cost of specific management tools and strategies will depend on a number of factors based on an assessment of the site characteristics, an evaluation of land use, policy and financial constraints, building towards a desired management outcome, and means for achieving that outcome. Each management opportunity therefore (e.g., willingness of the landowner, availability of funding, coordinated program focus or jurisdictional/organizational interest, etc.) should be considered on a site specific basis, using the process described here as an overall framework, in cooperation/consultation with federal, state and local agencies, private conservation organizations, and affected property owners.

It is important to stress that the single most important component of a management plan is the decision process that is used to incorporate and consider the necessary information and views of the various interests, to arrive at the most cost-effective and publicly supportable management approaches. It is also very important to arrive at the optimum combination of management practices tailored to the specific site. In some cases this may be straightforward, while others may require collaboration and partnering among a diverse group of interests.

In the end, the management strategy for each part of the wetland will be as unique as the wetland itself, with the most appropriate management tool(s) determined by site specific consideration of all the natural resource elements, as well as the partnerships that may be developed among the representative community interests. The *Door Creek Wetland Resource Protection Plan* serves as the overall framework or basis for forming those relationships and taking the actions necessary to realize the plan's goal for protecting, restoring and enhancing the Door Creek Wetlands, and also promoting water quality improvements in Lake Kegonsa.

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