Waubesa Wetlands in Scientific Context

Presentation to Capital Area Regional Planning Commission

July 10, 2014

Calvin B. DeWitt

...

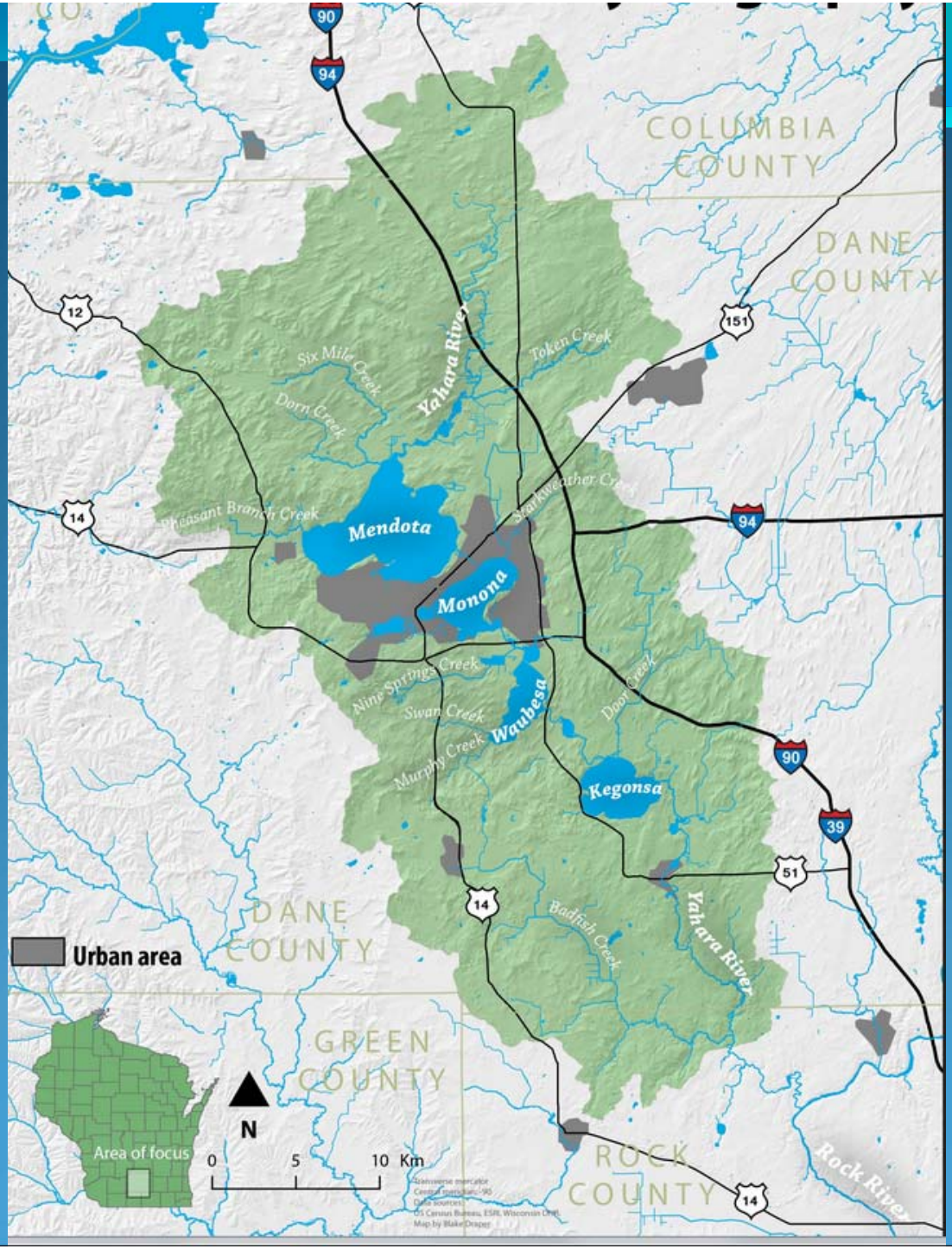
Nelson Institute
University of Wisconsin-Madison

- ***Member of the UW graduate faculties*** of:
  - Environment & Resources,
  - Water Resource Management,
  - Conservation Biology & Sustainable Development, and
  - Limnology & Marine Science.

- ***Member of professional societies***:
  - Ecological Society of America
  - Geological Society of America
  - International Society of Biometeorology
  - Society of Conservation Biology
  - Society for Integrative and Comparative Biology
  - American Society of Ichthyologists and Herpetologists
  - Society of Wetland Scientists

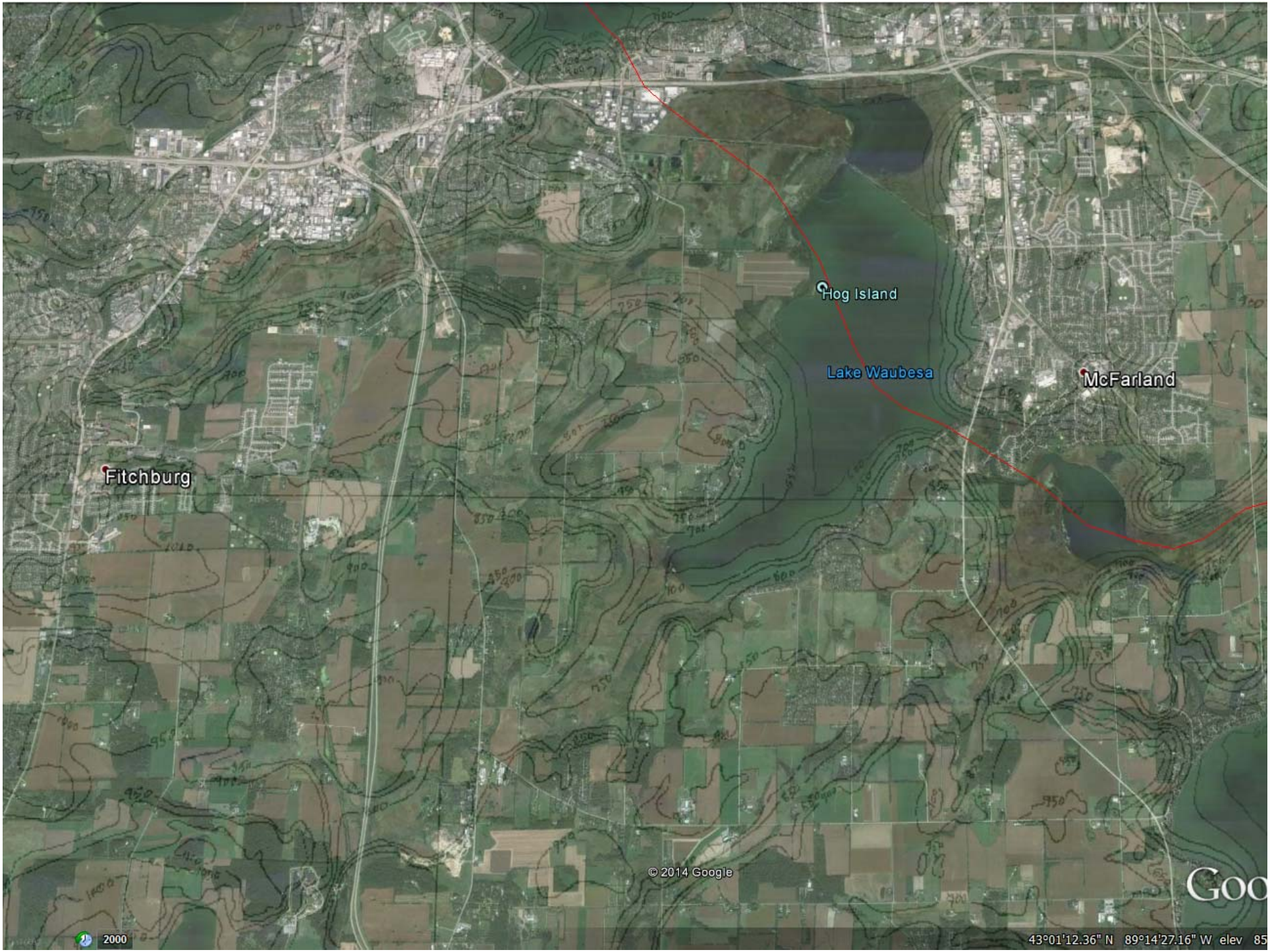
- The formation, persistence, size, and function of wetlands are controlled by hydrologic processes.
- Distribution and differences in wetland type, vegetative composition, and soil type are caused primarily by geology, topography, and climate.
- Differences also are the product of the movement of water through or within the wetland, water quality, and the degree of natural or human-induced disturbance.
- In turn, the wetland soils and vegetation alter water velocities, flow paths, and chemistry. The roles wetlands play in changing the quantity or quality of water moving through them are related to the wetland's physical setting.

---Virginia Carter, U.S.G.S.



Credit: Blake Draper.
University of Wisconsin-Madison

National Science Foundation
"Cry Me a River" brochure


Hog Island
Lake Waubesa
McFarland
Fitchburg
© 2014 Google
2000
43°01'12.36" N 89°14'27.16" W elev 85

History of Waubesa Wetlands

Are you interested in wetland restoration and stewardship?



Do you know who has been working on the conservation of Waubesa Wetlans?



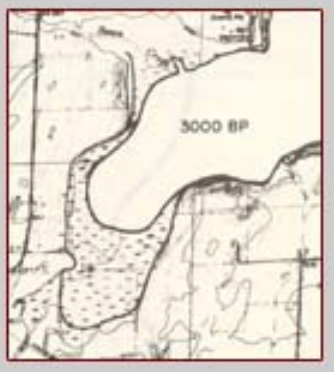
What's new on Waubesa Wetlands?

Formation of WAUBESA WETLANDS

4500BP



3000BP



1500BP



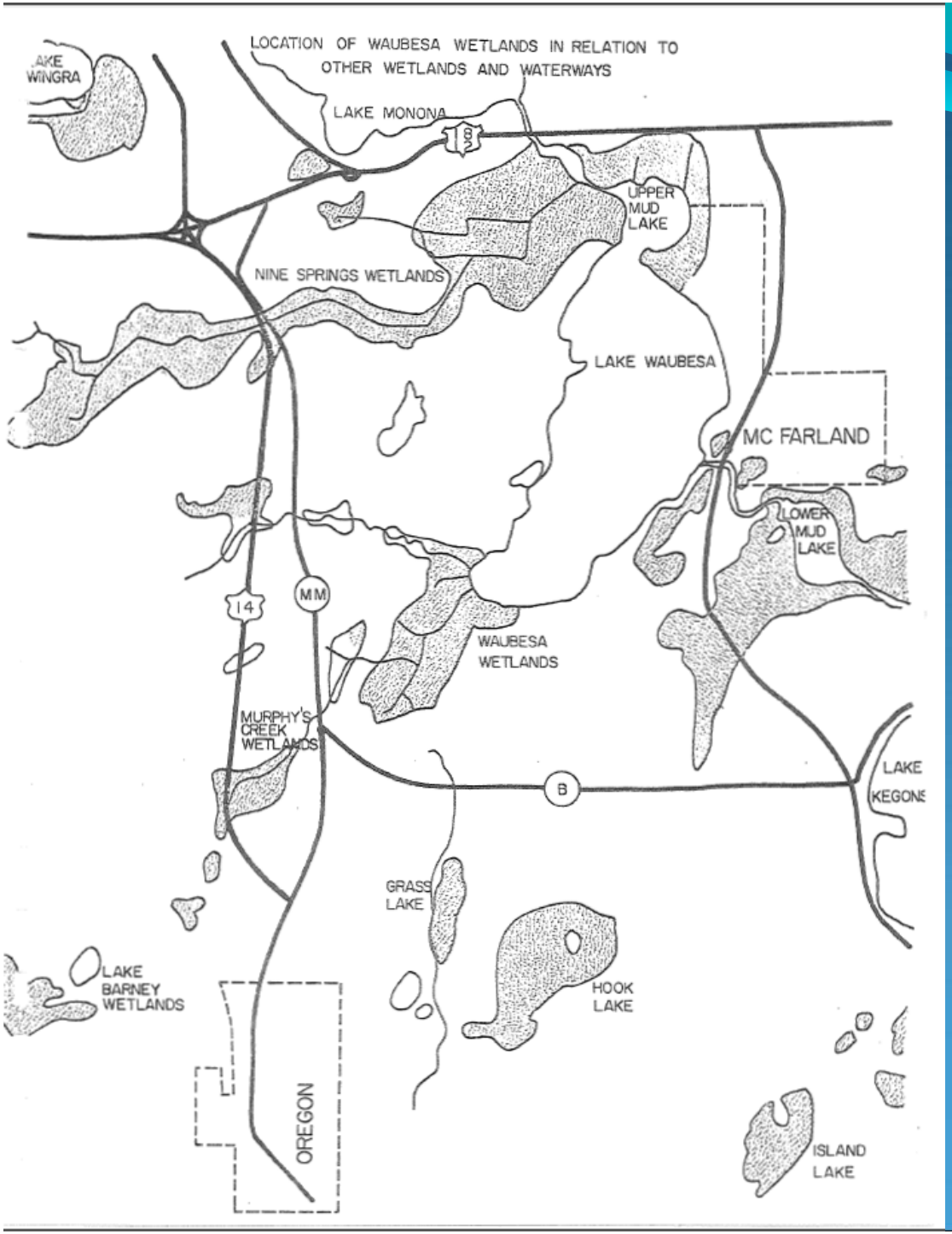
0BP



Waubesa Wetlands Ecosystem Development

- Waubesa Wetlands development as a peatland ecosystem has been described by Robert M. Friedman, with my collaboration, and collaboration with limnologist Timothy Kratz and geologist Charles Andrews. This was accomplished using a finite-difference model with virtual hexagonal cells placed in a honeycomb pattern across the wetlands and extending down to glacial till whose elevation was measured with peat rods and gravity meter analysis, with model results validated by radiocarbon dating using Box-Jenkins statistics.

- A summary of the results is given in this presentation as a map showing four stages of wetland ecosystem development. This work on Waubesa Wetlands ecosystem development has proven to be fundamental to understanding Waubesa Wetlands as a system. And this has proven to be fundamental for the five to seven graduate research projects in wetlands science conducted here every year for three decades, upon which work this presentation is based.

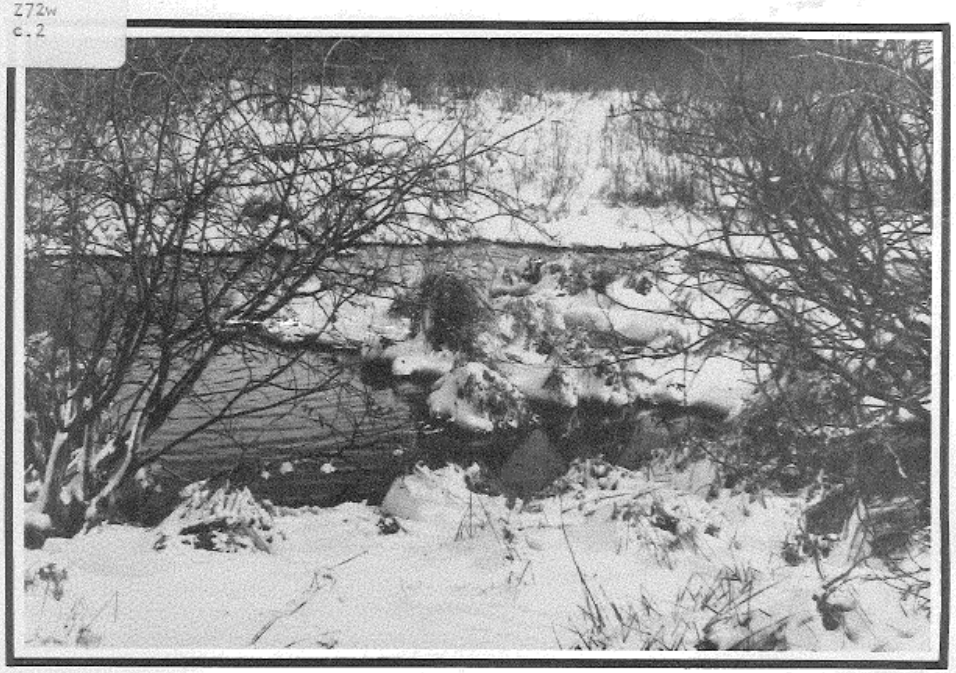

LOCATION OF WAUBESA WETLANDS IN RELATION TO
OTHER WETLANDS AND WATERWAYS
AKE
WINGRA
LAKE MONONA
UPPER
MUD
LAKE
NINE SPRINGS WETLANDS
LAKE WAUBESA
MC FARLAND
LOWER
MUD
LAKE
MM
14
WAUBESA
WETLANDS
MURPHY'S
CREEK
WETLANDS
B
LAKE
KEGONS
GRASS
LAKE
HOOK
LAKE
LAKE
BARNEY
WETLANDS
OREGON
ISLAND
LAKE







W78
Z72w
c.2

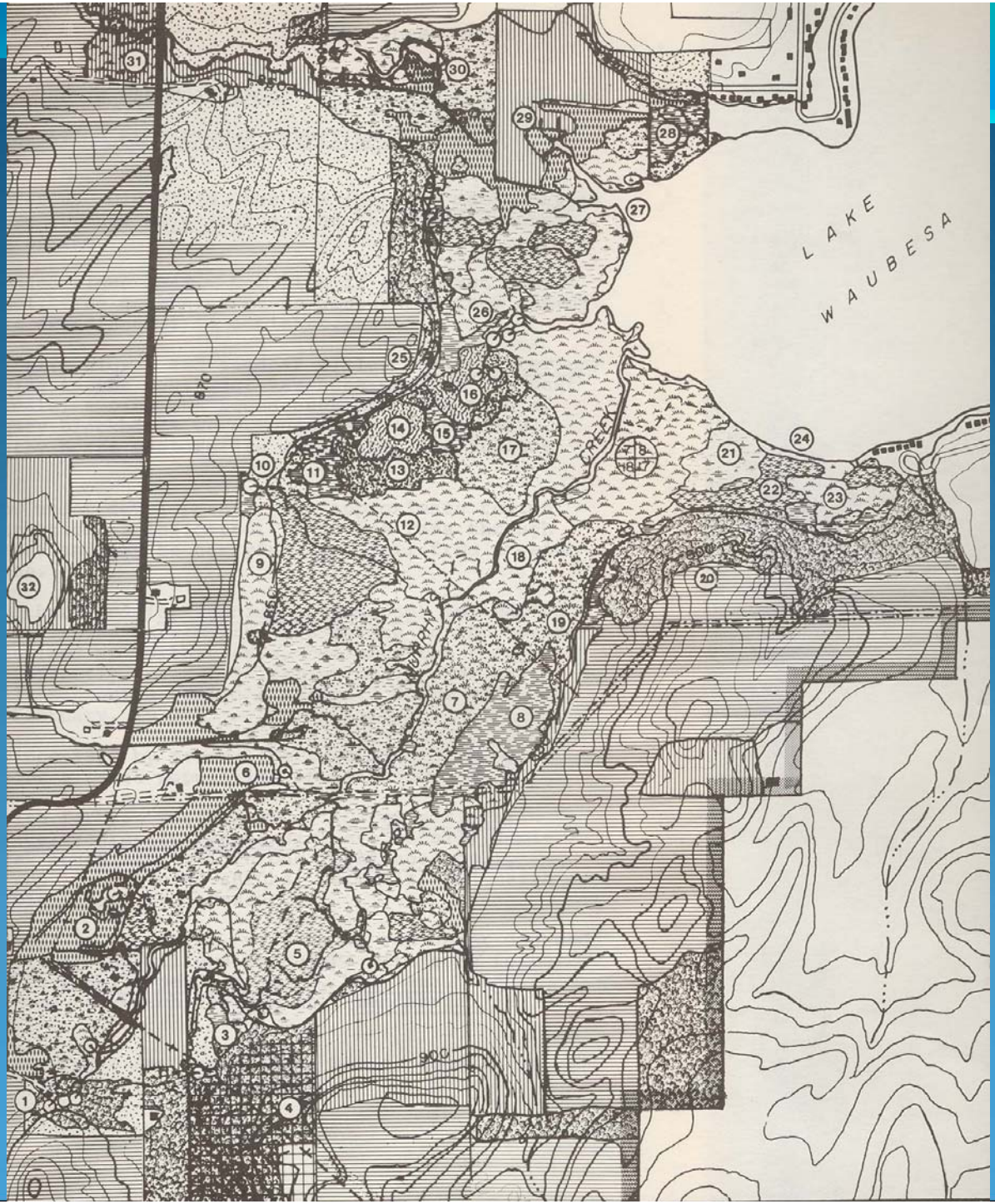


WETLANDS OF DANE COUNTY WISCONSIN

by Barbara Bedford and Jim & Libby Zimmerman

Dane County Regional Planning Commission

1974


LAKE
WAUBESA
CREEK
SPRING
870
900

Twelve Major Subsystems of Waubesa Wetlands

- Fens, including the Great Fen
- Peat Mounds, including Waubesa Mound
- Deep water marshes, particularly near the lake shore
- Shallow water marshes, with many of these distributed along the creeks.
- Shrub carrs, including Stace Shrub Carr at the wetland/upland east interface
- Floating marsh mats, including the Great Floating marsh near its south face
- Great springs, including Bogholt Deep Spring, & others in Deep Spring Creek
- Smaller springs, including Wagon Springs and Drinking Water Spring
- Many streams, including Swan Creek and Murphy's Creek whose watersheds extend outside into the upland, and internal Snail Creek, and Garos Creek
- Spring-ponds, including Blandings Pond and Garos Ponds
- The Forested Willow Swamp, at its southeast face with uplands
- Littoral waters, spanning the full the interface of Waubesa Wetlands with Lake Waubesa


WETLAND GEMS
WAUBESA WETLANDS
THREATS
ACCESS

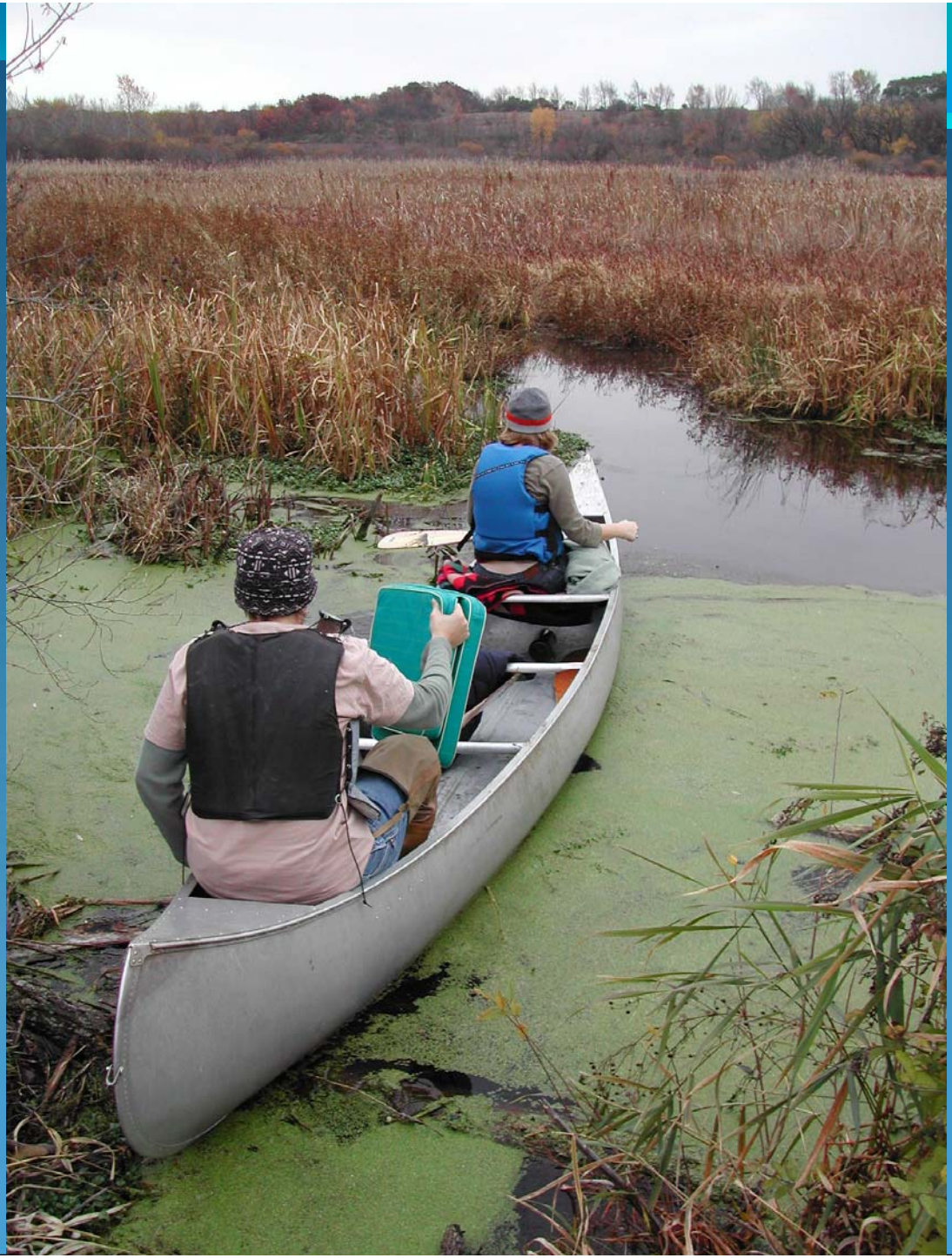
Bogholt Deep Spring…

- This spring, even when sometime overwashed with Waubesa floodwaters, continues pouring out crystal clear, cold water.
- It joins with other large springs on Deep Spring Creek and brings Its continual cleansing action for the “boot” of Lake Waubesa.
- And its Purple Bacteria often can be seen from the air, as it is here in Spring 2007 from 1000 feet altitude.

























© Photos by Steve D. Eggers

LESSER FRINGED GENTIAN

(*Gentianopsis procera* (Holm) MA)







© Photos by Steve D. Eggers

GRASS-OF-PARNASSUS

(*Parnassia glauca* Raf.)



© Steve D. Eggers











The Waubesa Fen Mound

HYDROLOGY AND CHRONOLOGY OF A PEAT MOUND IN DANE COUNTY, SOUTHERN WISCONSIN

T. K. Kratz, M. J. Winkler, and C. B. DeWitt
Institute for Environmental Studies
University of Wisconsin-Madison

Abstract

This study describes the hydrologic conditions that have caused the formation of a three hectare peat mound. This wetland is elevated two meters above the adjacent 100 hectare Waubesa Wetlands and has developed at the transition area between upland and lowland.

Results from 37 hydrologic stations located on the mound indicate the existence of an artesian source of water beneath the peat. Because of the ability of clay layers to confine an aquifer more than silt and sand layers, the stratigraphy of the mineral soil beneath the peat may dictate the amount of vertical flow of water and thus the height to which the peat can accumulate. The rate of groundwater flow and the topography of the artesian site determine whether peat will accumulate. The beginning of peat formation at the mound is dated at 7500 ±80 years before present (WIS-1265).

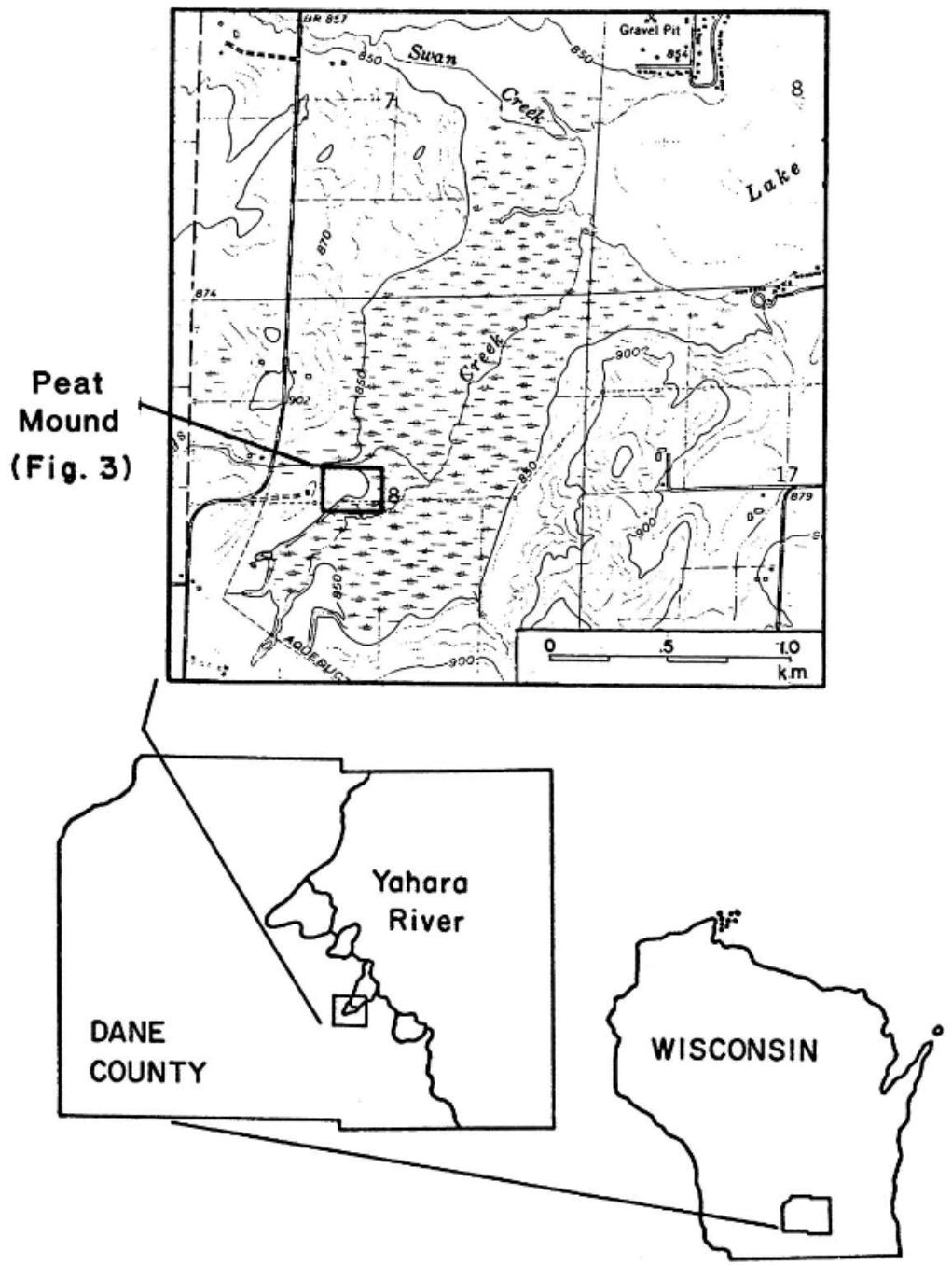
Introduction

The purpose of this study is to describe the hydrologic conditions that have caused the development of a peat mound, an elevated wetland which has formed at the transition between upland and lowland. The study site is a three hectare portion of the 100 hectare Waubesa Wetlands located in Dane County, southern Wisconsin (Figure 1). In southern Wisconsin peatlands are typically located in local depressions of the landscape where water levels are relatively high throughout the year (Bedford, *et al.* 1974). They often form in a manner similar to the way the majority of Waubesa Wetlands formed, by the accumulation of organic matter in a shallow lake bay or lake (Friedman, *et al.* 1979). The peat mound examined in this study is different from the more typical basin-filled peatlands of the region in several respects.

First, its surface is elevated two meters above the adjacent basin-filled wetland. This is remarkable because for peat to accumulate the water level must be at or near the surface of the peat throughout the year. The high water levels retard the rate of decomposition, so that rate of productivity of organic matter exceeds the rate of decomposition. The difference in elevation between the mound and the basin-filled wetland implies a dramatic change in the elevation of the water table over a relatively short distance in the peatland. The water table, and hence the surface elevation of the peat, drops nearly two meters in less than 40 meters of horizontal distance (Figure 2). This is an exceedingly steep slope for peatlands in this region. Only blanket bogs in Great Britain and Ireland exhibit steeper slopes (Moore and Bellamy 1974).

Secondly, the three-dimensional shape of the peatland is convex, not flat or concave like a typical basin-filled wetland. In this respect the mound is more similar to raised *Sphagnum* bogs that occur 800 km to the north (Heinselman 1970).

Finally, although lake sediments (gyttja) underlie the basin-filled portion of Waubesa Wetlands, no lake sediments underlie the



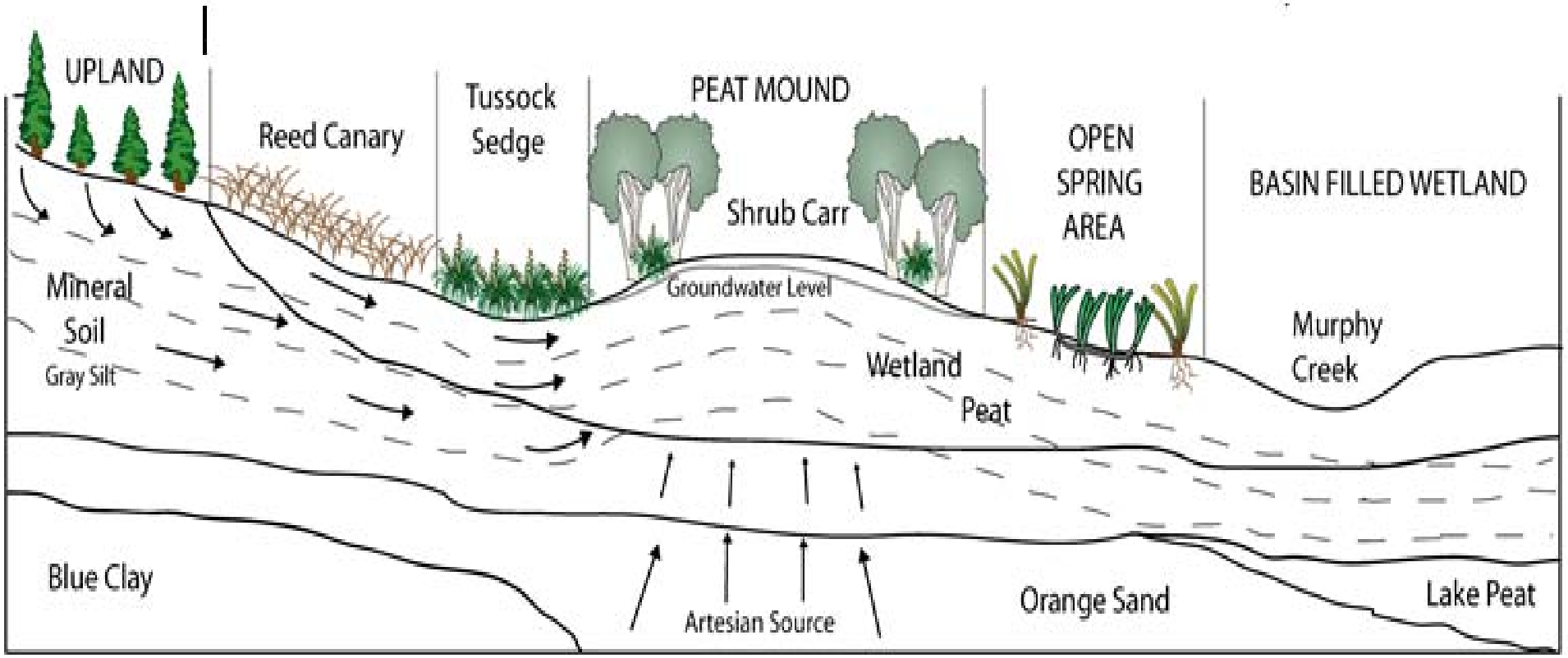


Fig. 2. Stratigraphic Cross-Section of Waubesa Wetland Complex perpendicular to the long dimension of the peat mound and the vegetation community transects

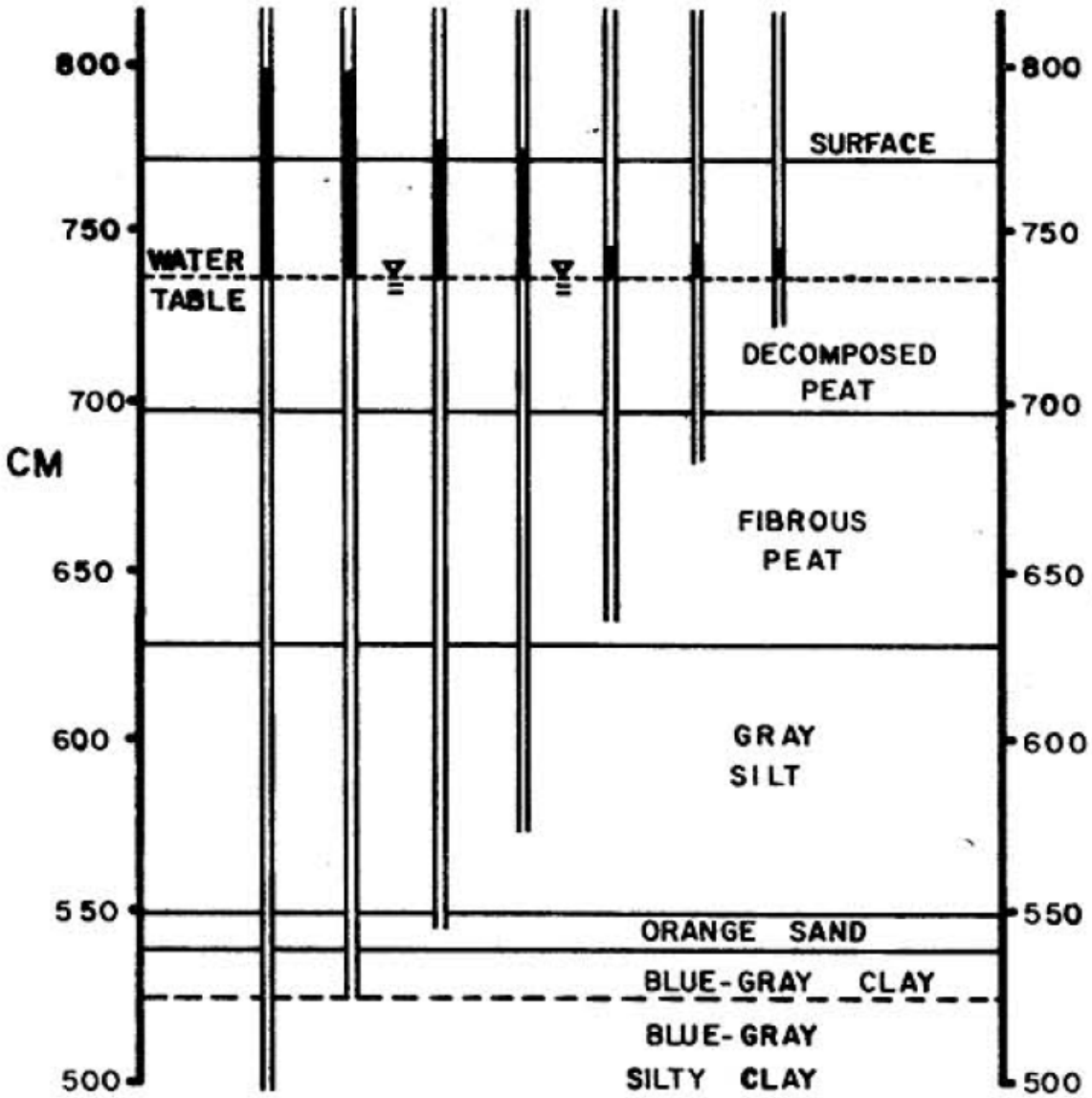
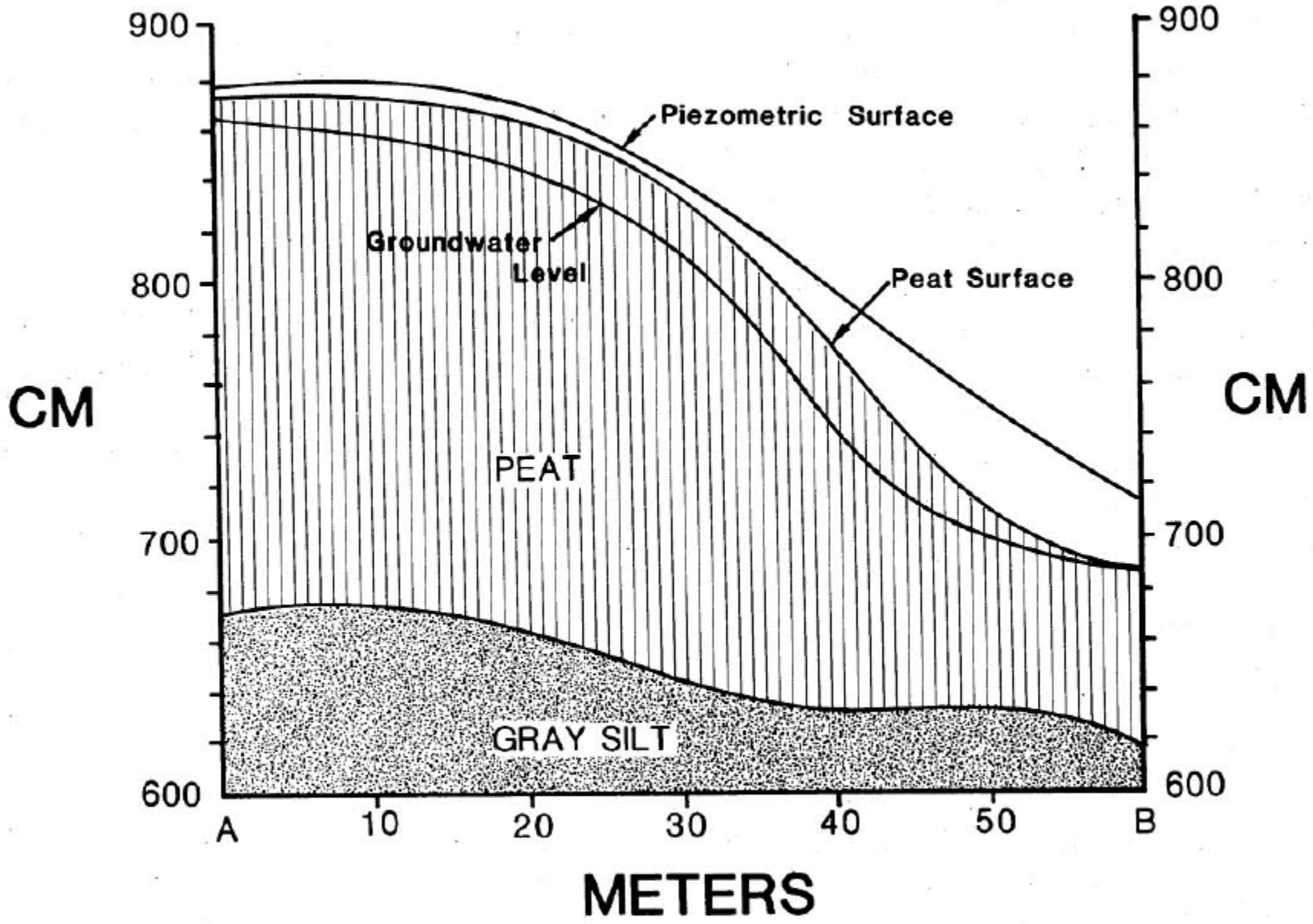


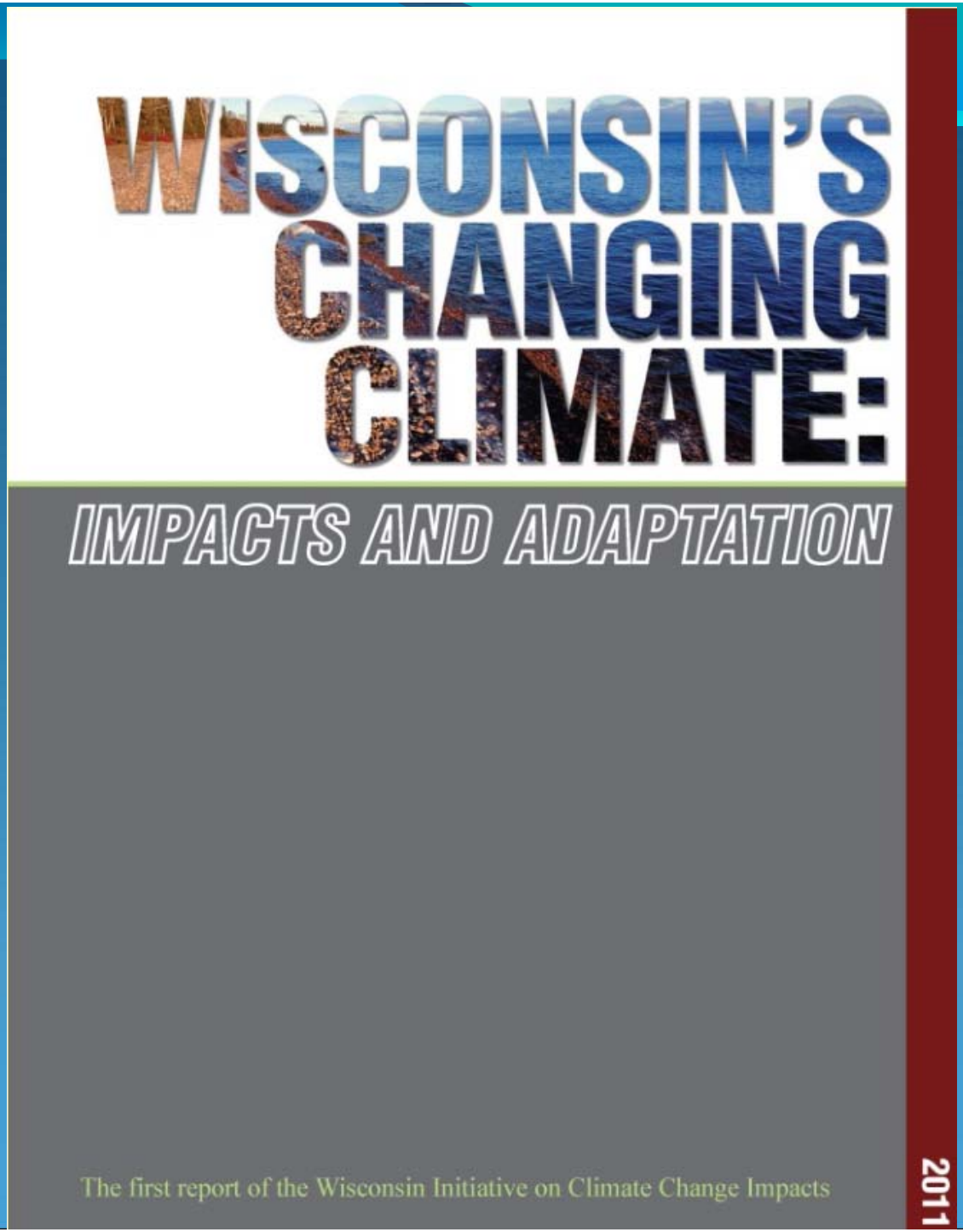
Fig. 5. Piezometric heads (dark lines) at seven levels in the stratigraphy at a midslope point. Note the three distinct levels of the piezometric heads.

Groundwater pressure below the blue clay pushes water up the piezometer tubes

--above the surface &

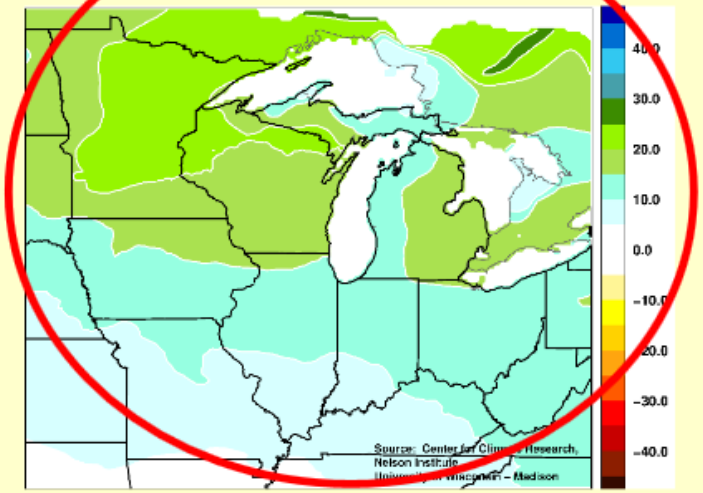
--above the water table


900
800
700
600
CM
Piezometric Surface
Groundwater Level
Peat Surface
PEAT
GRAY SILT
A
10
20
30
40
50
B
METERS

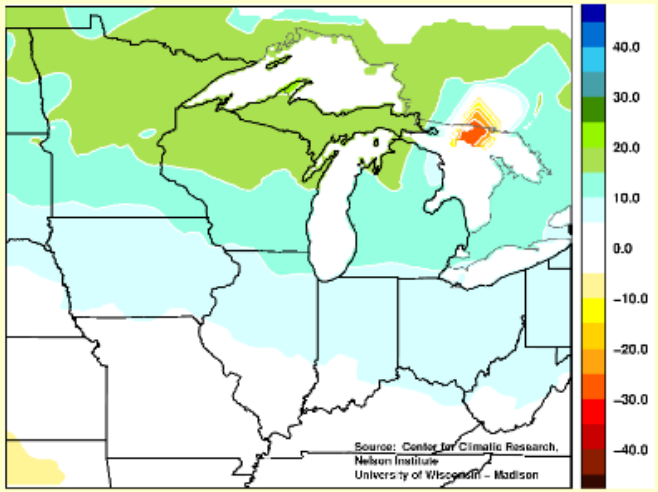

WISCONSIN'S CHANGING CLIMATE:
IMPACTS AND ADAPTATION
The first report of the Wisconsin Initiative on Climate Change Impacts
2011

Projected Change in Precipitation by Season 1980-2055 (SRES A1B)

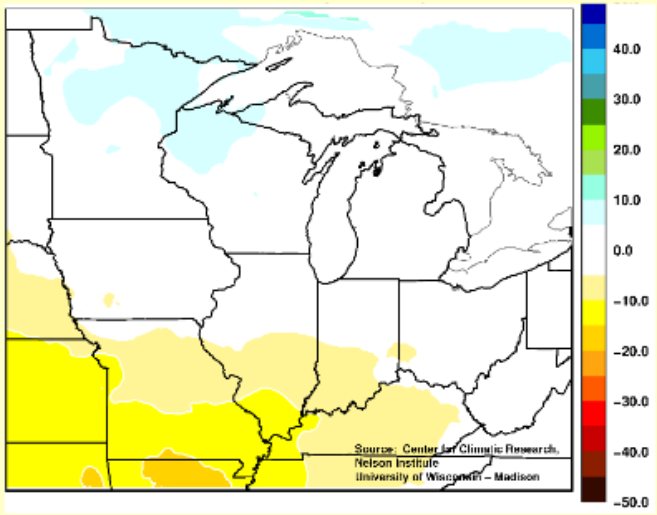
Winter +20-25%



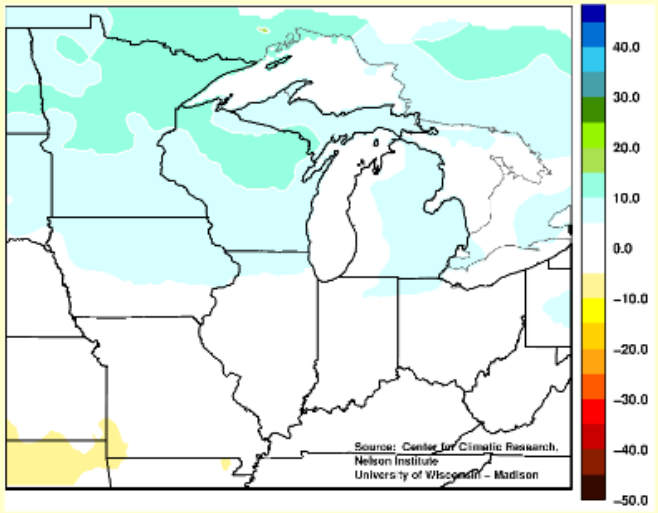
Spring +10-20%



Summer +0-5%



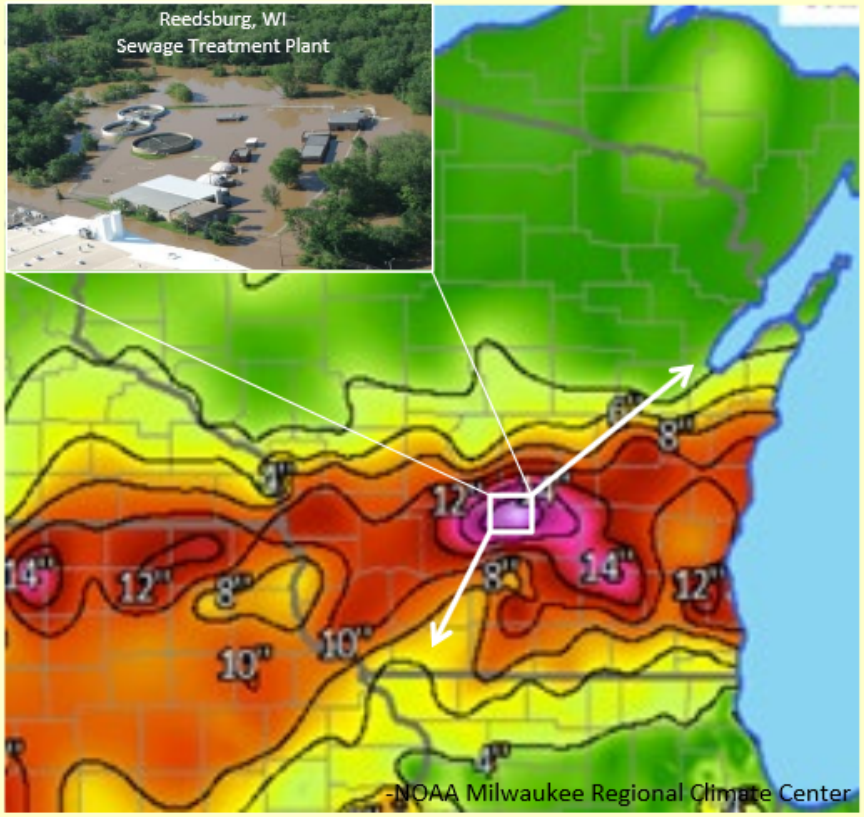
Fall +5-10%



WISCONSIN INITIATIVE ON CLIMATE CHANGE IMPACTS

Tools for Assessing Vulnerability

UW-Engineering
Extreme storm
transposition project

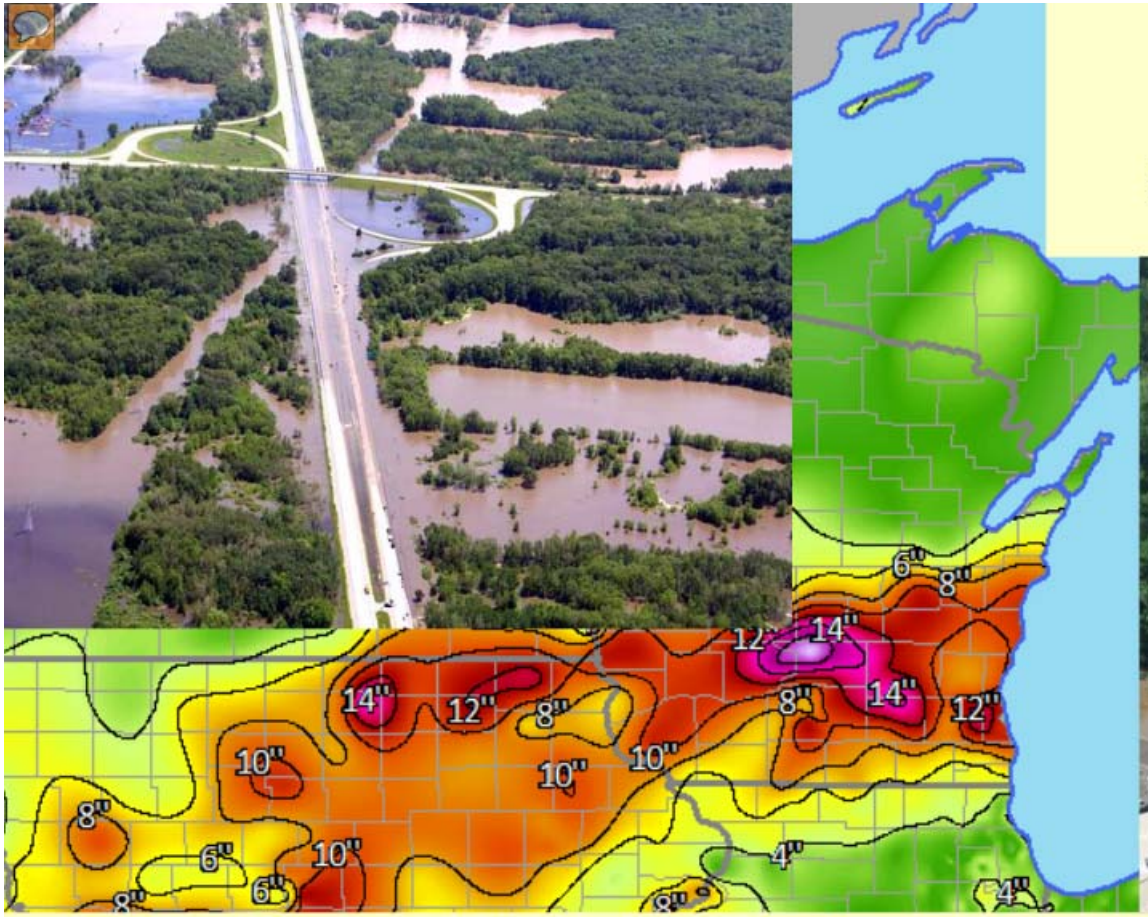


What would happen if the 2008 Baraboo rainfall was centered over your community?

NOAA CSI-SARP
NA12OAR4310098

High Water

Storms of June 1-15, 2008





38 River gauges broke records

810 Square miles of land flooded

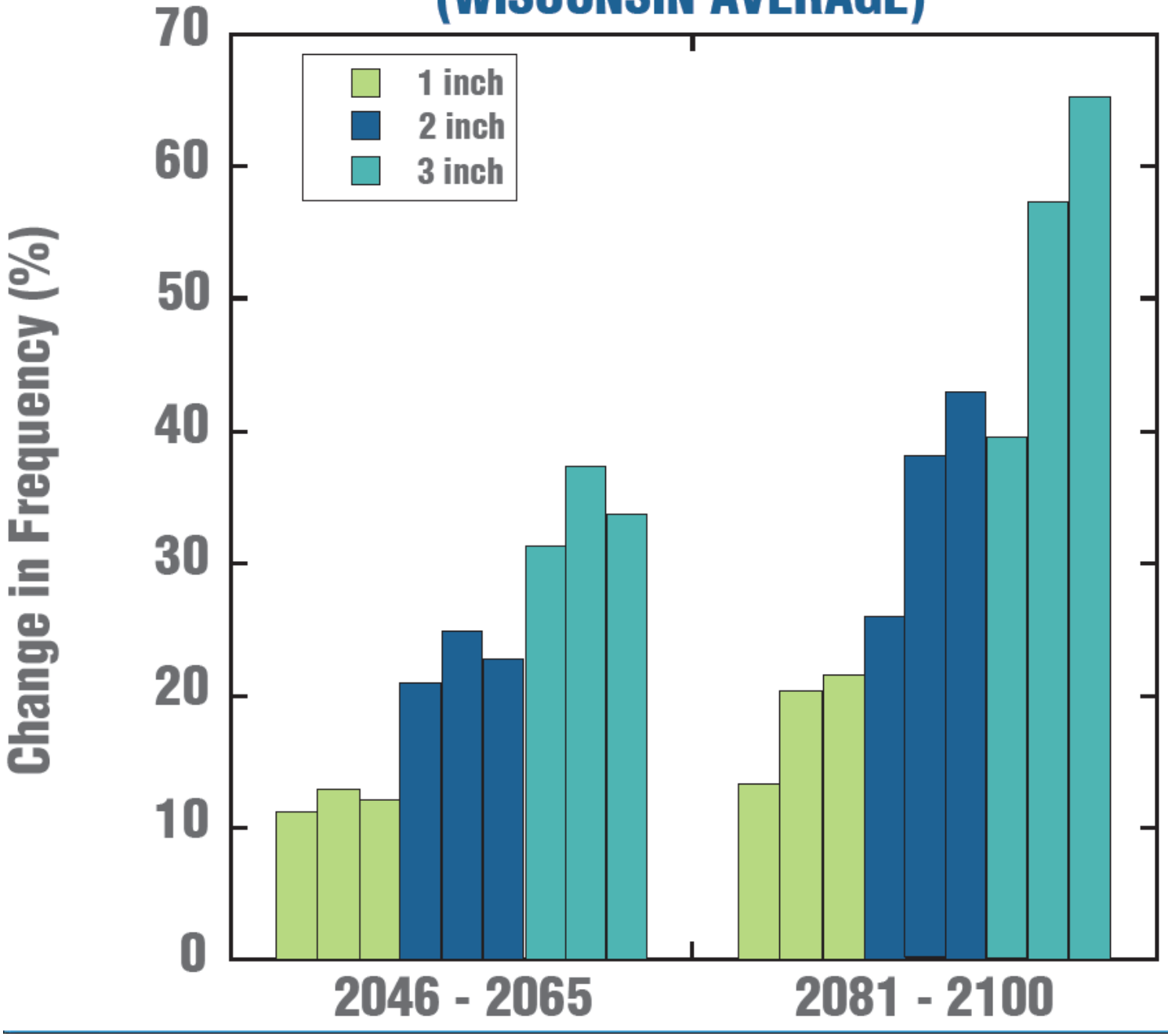
161 Communities overflowed 90 million gallons raw sewage

2,500 Drinking water wells tested - 28% contaminated

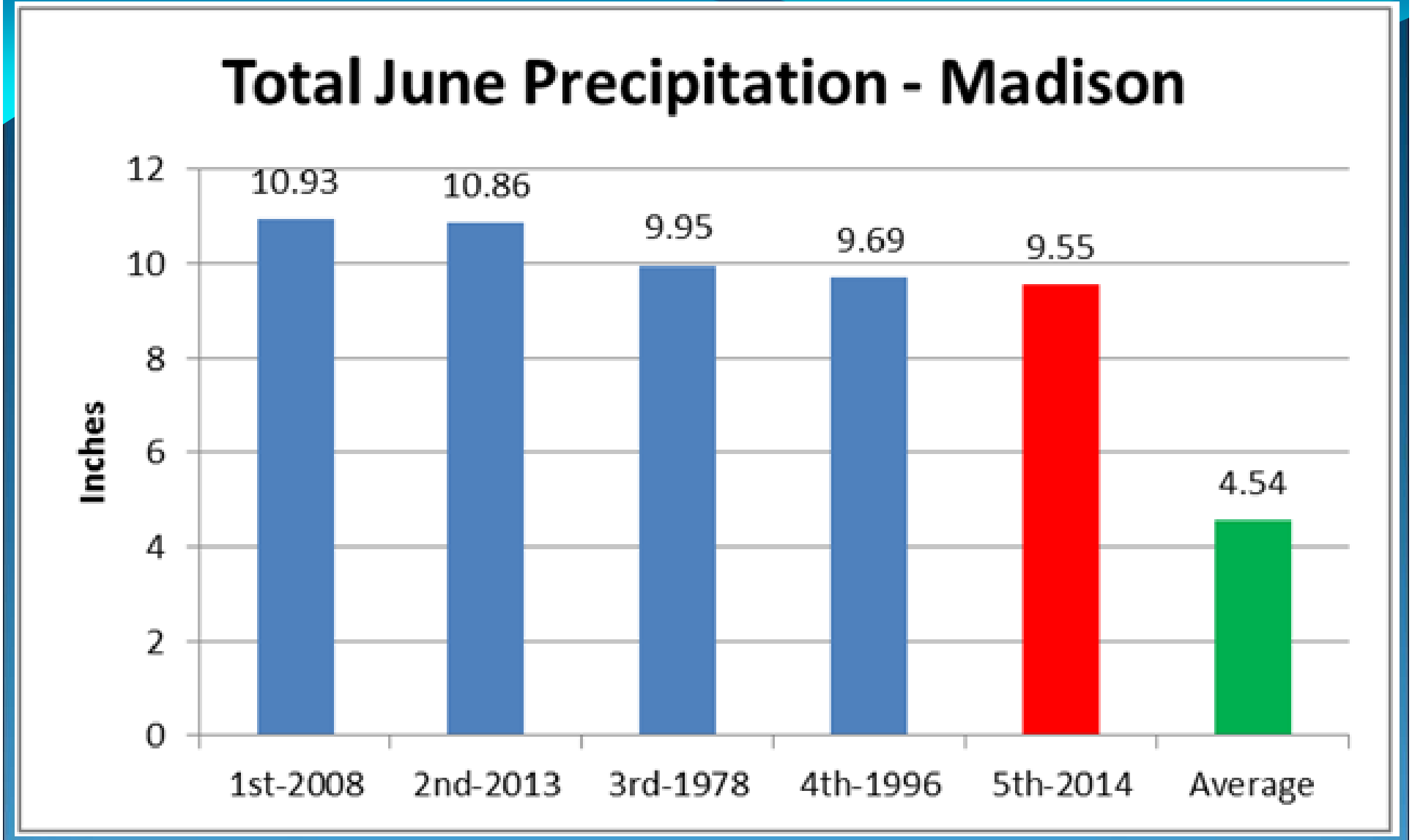
$34M in damage claims paid

Source: FEMA, WEM

CHANGE IN HEAVY PRECIPITATION DAYS (WISCONSIN AVERAGE)



Source:
WICCI 2011
Wisconsin's
Changing
Climate



Source:

National Weather Service Forecast Office, July 2, 20014 for Madison, Wisconsin


Ronne
Ice
Shelf
Siple Station
South Pole
Dome A
4000
90°W
90°E
Vostok
3500
3000
2500
2000
1000
Transantarctic Mountains
Ross
Ice
Shelf
Taylor Dome
Dome C
Law Dome
70°S









An ice core from the deep drilling through the ice sheet at Law Dome in Antarctica.



Drill head with piece of an ice core retrieved on 30 November 2002 at Dome Concordia Station during the European Project for Ice Coring in Antarctica.

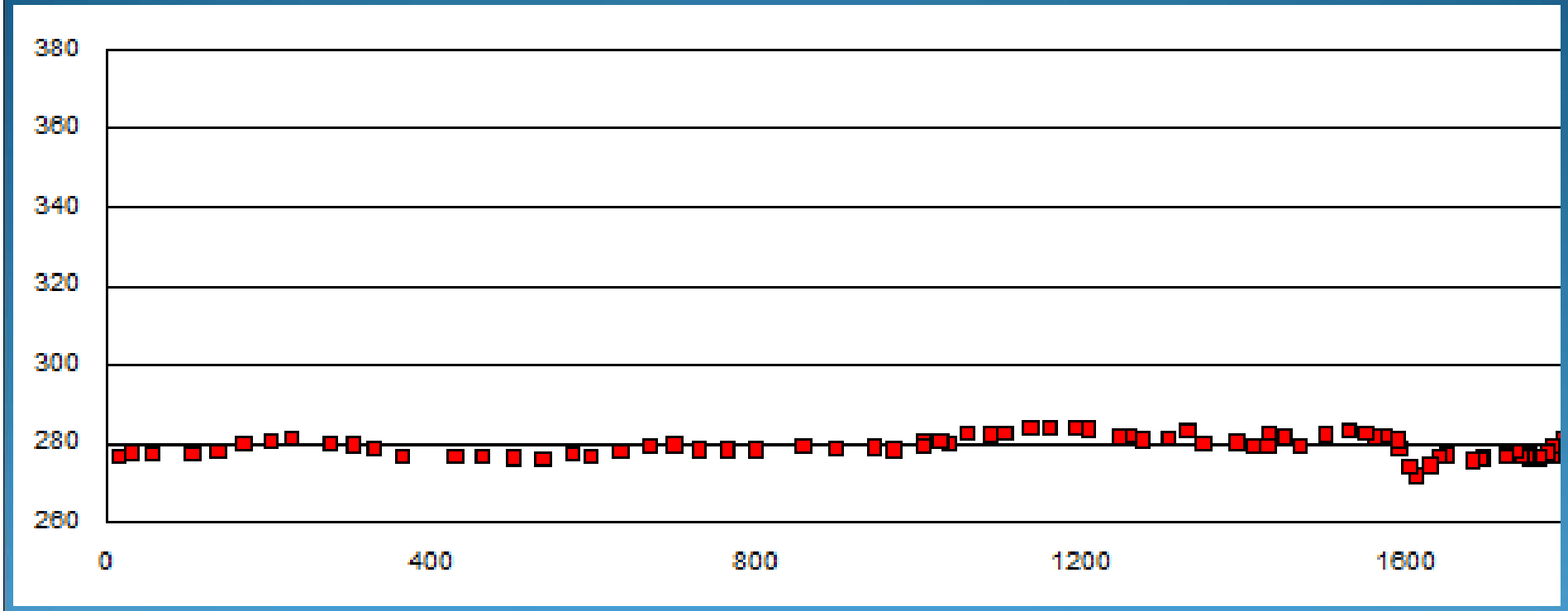
This ice is from a depth of 2873 meters and is about 491,000 years old.

The ice core contains a continuous record of greenhouse gases over the past 650,000 years

[Photo: Laurent Augustin, LGGE Grenoble]

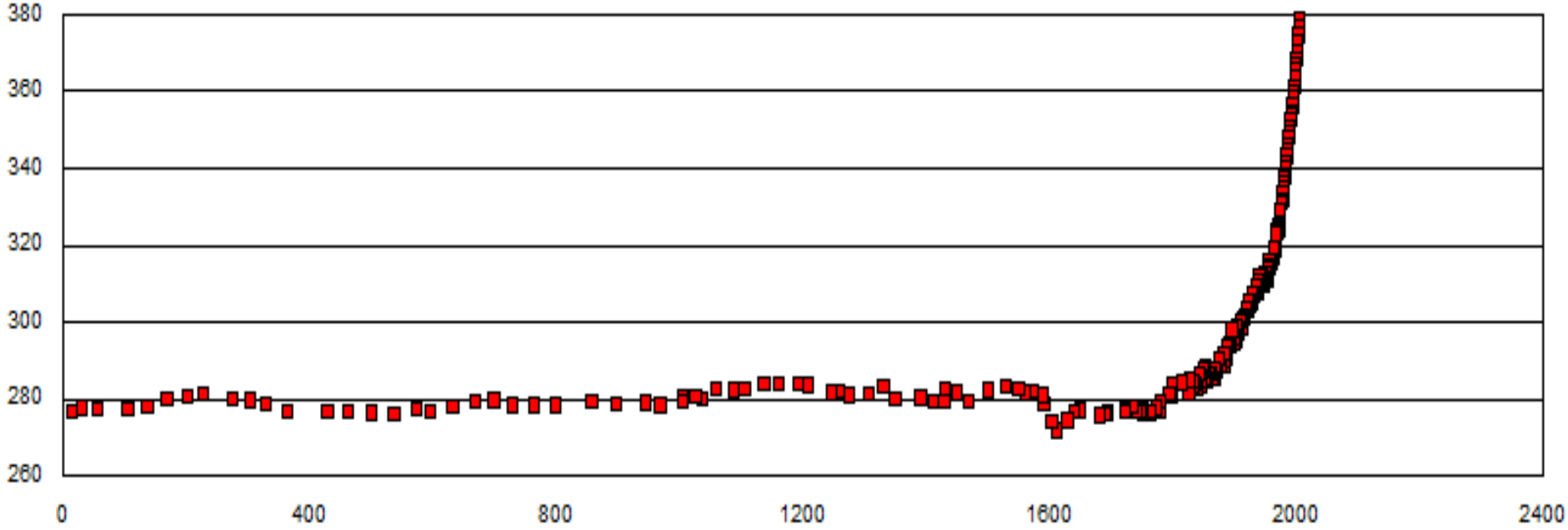
Carbon Dioxide in Antarctic Law Dome Ice Cores

from 2000 years before present to 1800 A.D.
showing regulation at 280 parts per million (pprm)



Carbon Dioxide in Antarctic Law Dome Ice Cores

from 2000 years before present to 2013 A.D.



Estimation and Extrapolation of Climatic Trends for Evaluation and Prediction of Climatic Anomalies

Robert E. Livezey

Climate Services/Office of Services/NWS/NOAA

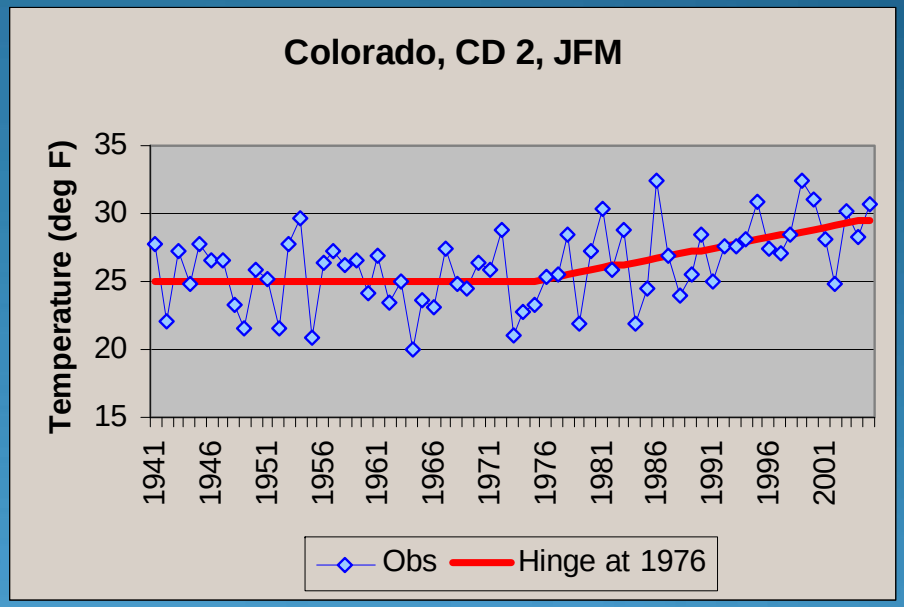
31st Climate Diagnostics and Prediction Workshop
Boulder CO, October 2006

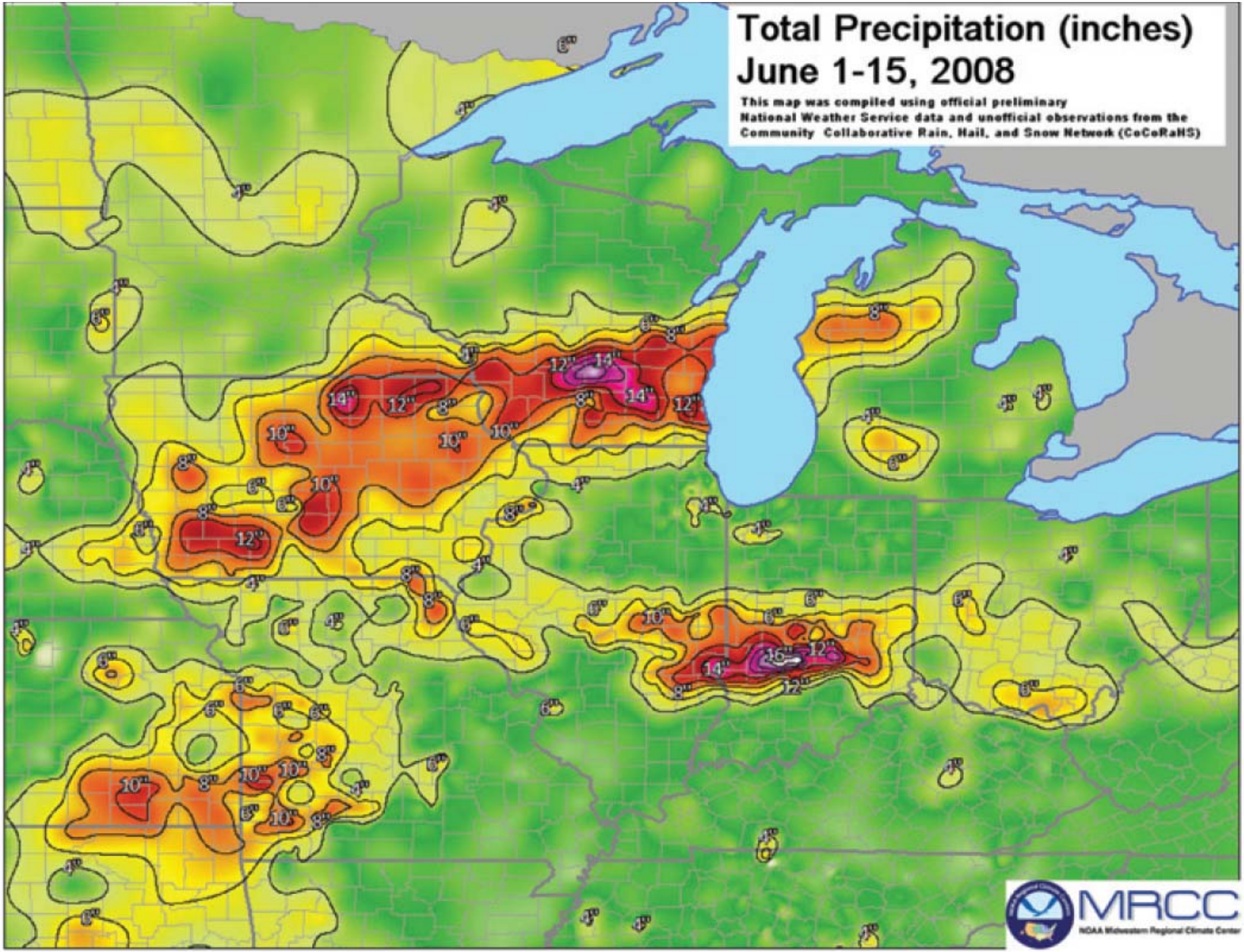
Common Methods for Estimating and Extrapolating Climate Normals

- 30-year normal, updated every 10 years, available in 3rd year, persistence constitutes the forecast.
- Optimum climate normal (OCN), average of previous 10-years (temp) and 15-years (precip), updated annually, persistence constitutes the forecast (CPC operational methodology).
- Least-squares linear trend fit, extrapolation of fitted trend constitutes the forecast.
- Intuition suggests that if the climate is changing rapidly and the change is dominantly linear, each successive method above will outperform the others. Vinnikov, *et. al.* have attempted to quantify this relative performance.

A Hinge Fit for U.S. Trends

- **Piecewise continuous with no change from 1940-1976 and linear change thereafter.**
- **An appropriate trend model with the reasonable assumption that the strong trends since the mid-1970s are related to global warming.**
- **Livezey and Tinker (unpublished) demonstrated that the sampling variability of the hinge fit is substantially smaller than a linear fit to the last three decades.**
- **Thus it will outperform the linear fit (Slide 12) if the underlying trend is dominantly linear.**




Total Precipitation (inches)
June 1-15, 2008
This map was compiled using official preliminary
National Weather Service data and unofficial observations from the
Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS)
MRCC
NOAA Midwestern Regional Climate Center

PRECIPITATION AND NUTRIENT LOADING

Data analysis of Dane County's Lake Mendota from 1980 to 2007 highlights the significance of precipitation and runoff for nutrient loading to lakes. The lowest concentration of total phosphorus in the lake was in 1988 as a result of a two-year drought. There was a reduction in the amount of polluted runoff entering the lake, and water clarity was at its best. In contrast, in 1993, total phosphorus concentrations were highest following very high-runoff spring and summer events. If Wisconsin's changing climate includes an increase in precipitation or heavy rainfall events such as those that occurred during the most recent decade (2000-2009) in Madison, these changes will lead to increased nutrient loading to lakes. This points to the need for best management practices to reduce sediment and nutrient loading.

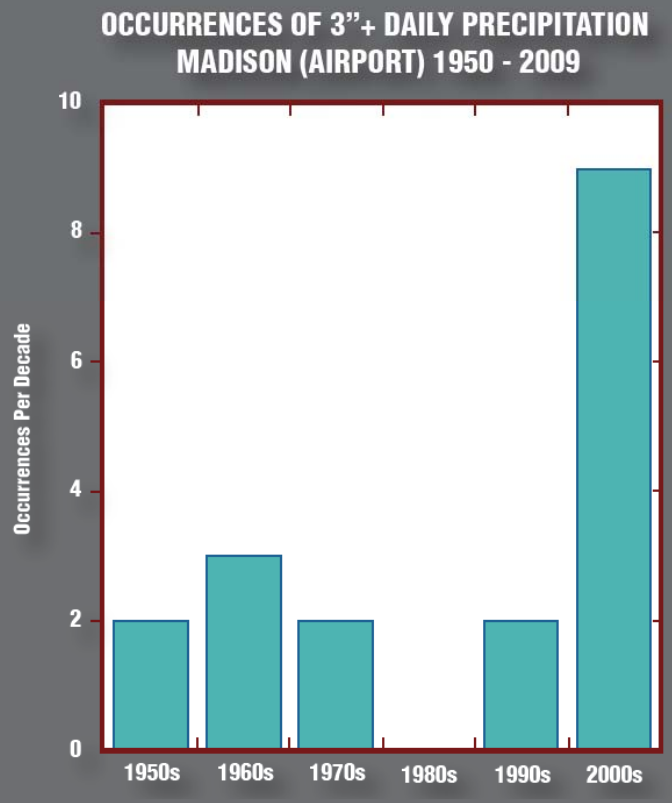


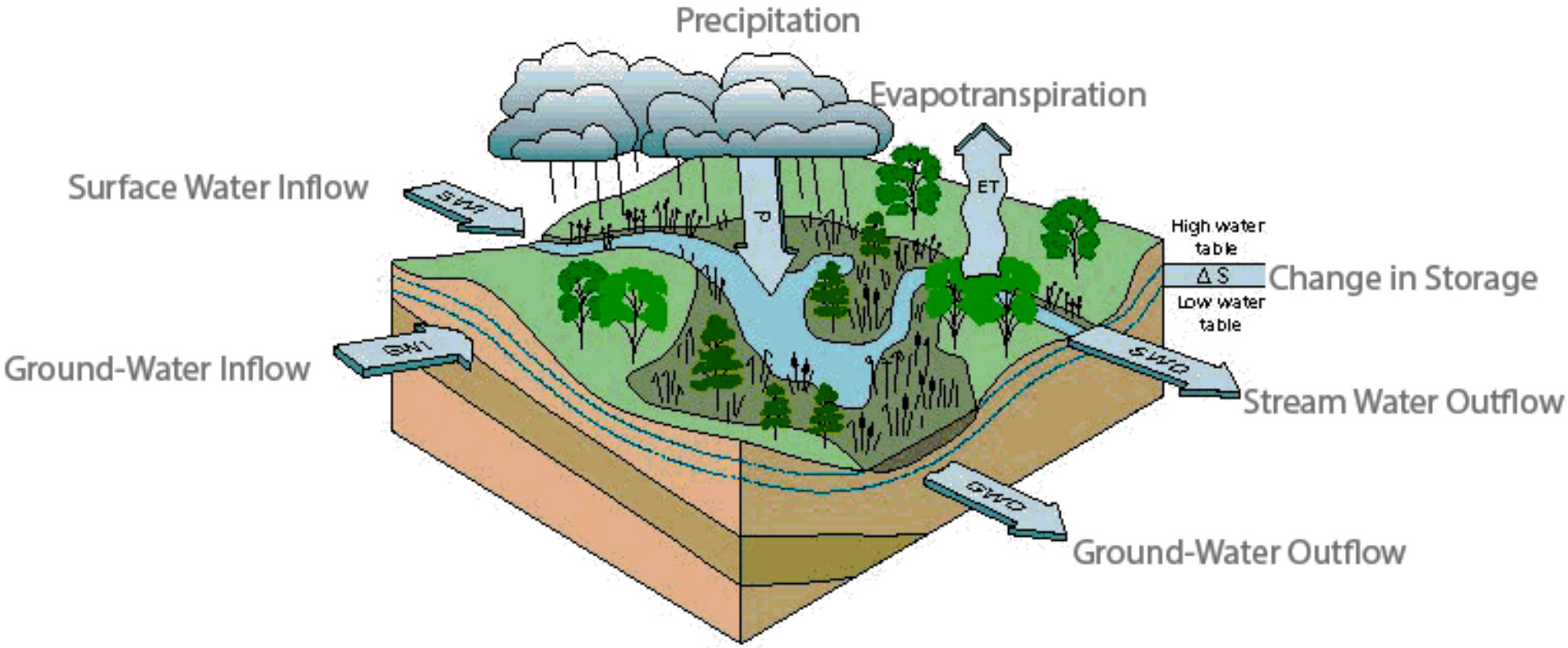
Figure 3. Precipitation trends recorded in Madison.

Source: Updated from Steve Vavrus, Nelson Institute Center for Climatic Research, University of Wisconsin-Madison.

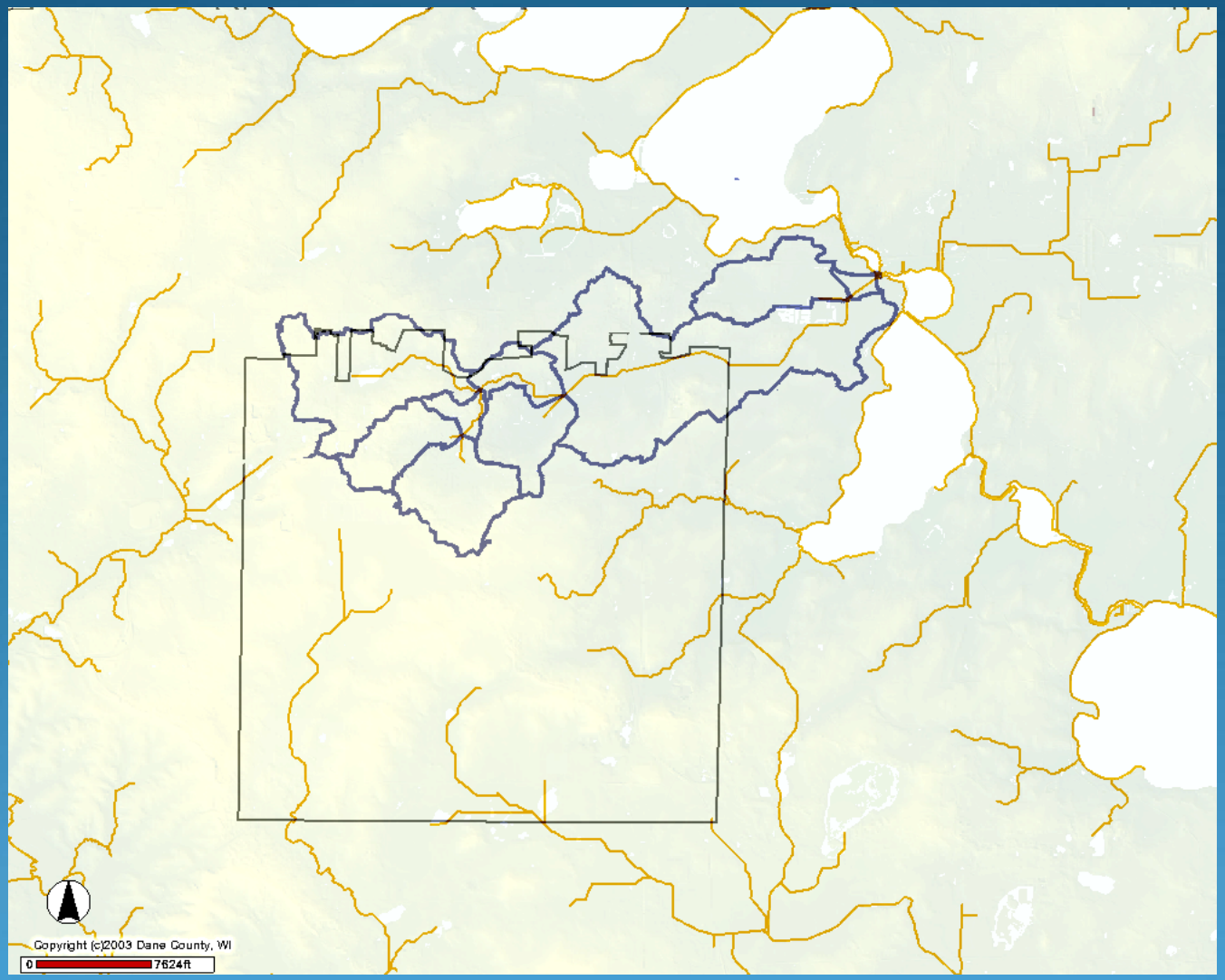
Concentrations of Total Phosphorus Lake Water:

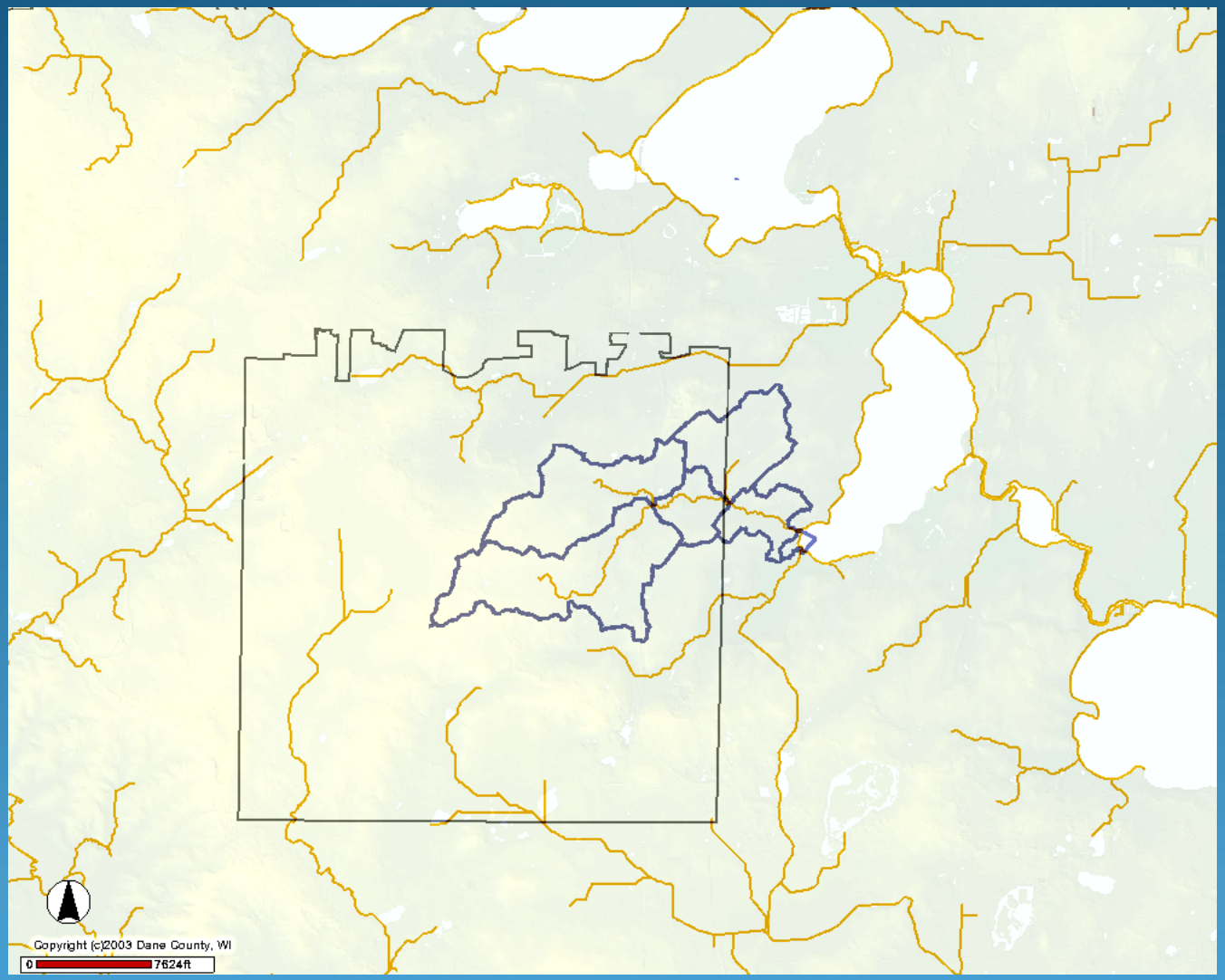
Low Precip (2-year drought) 1988: Lowest P & water clarity was at its best.

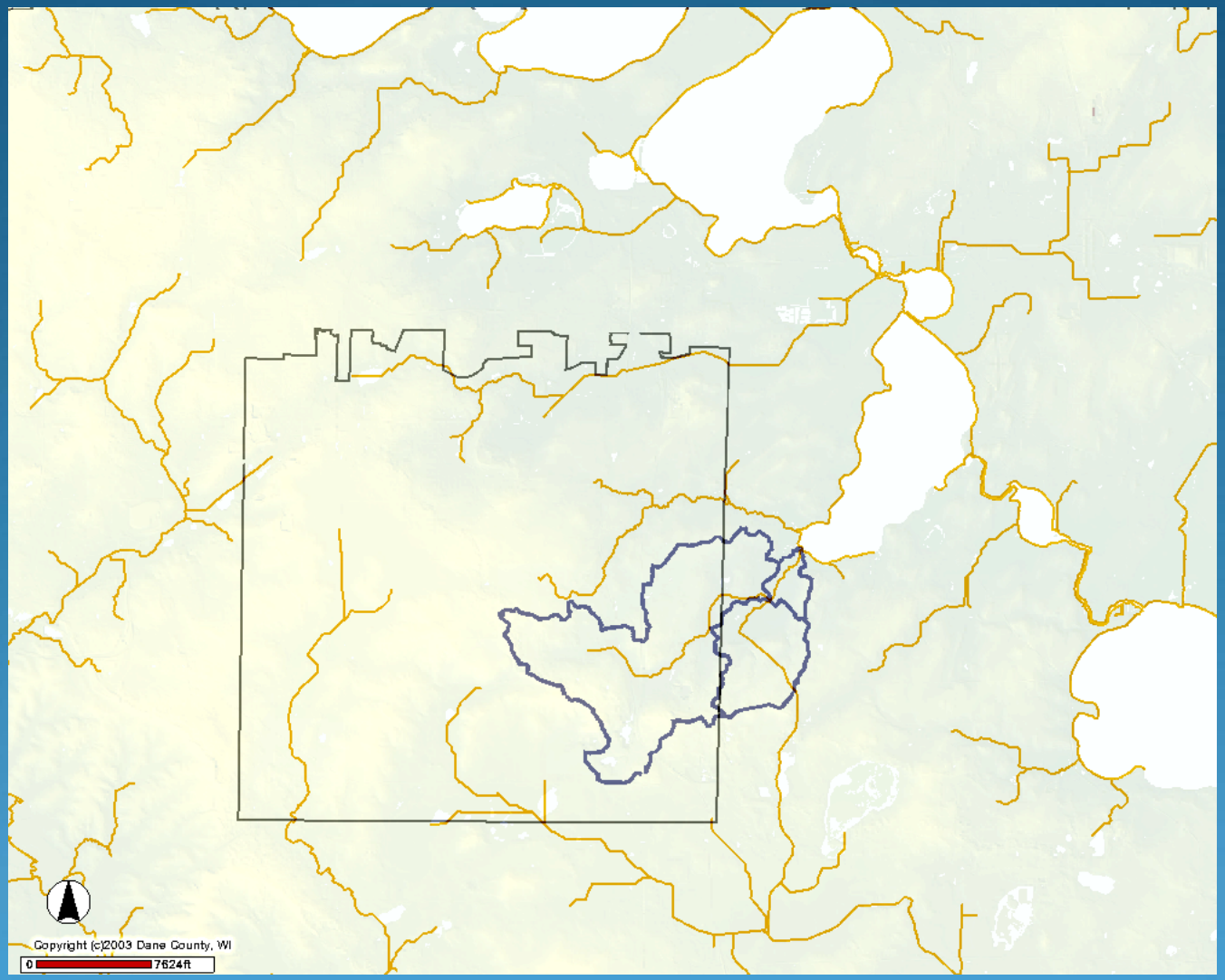
High Precip (high spring & summer run-off) 1993: increased P loading.



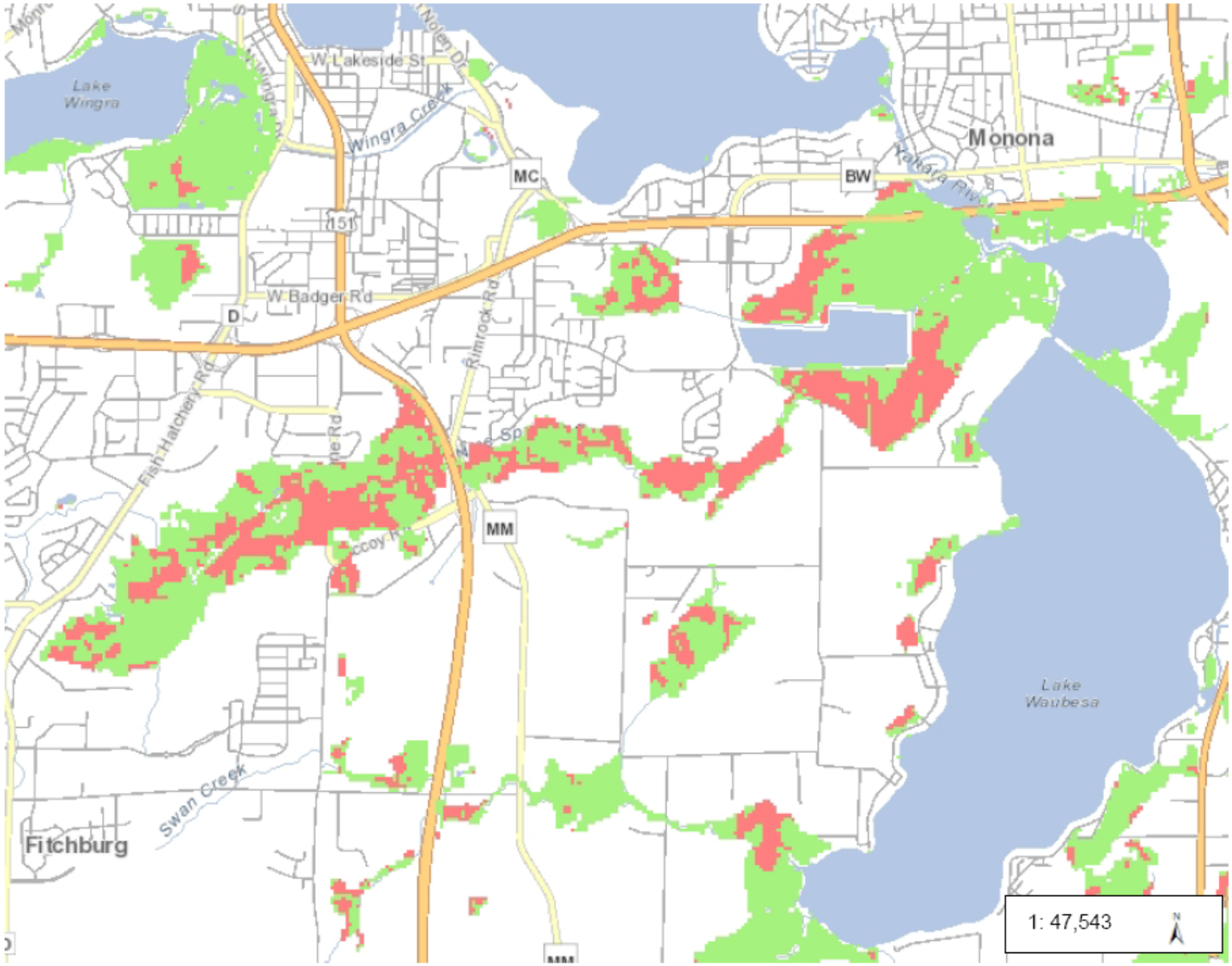
Wetland Water Budget: P + SWI + GWI = ET + GWO + delta S


Copyright (c)2003 Dane County, WI
0
7624ft


Copyright (c)2003 Dane County, WI
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7624ft


Copyright (c)2003 Dane County, WI
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7624ft

Surface Water Data Viewer Map





Legend

Reed Canary Grass

- Less than 50% RCG in the pixel
- More than 50% RCG in the pixel

Rivers and Streams

Open Water

Notes

Nine Springs Eway
Red is 50% or more Reed Canary Grass

1.5 0 0.75 1.5 Miles

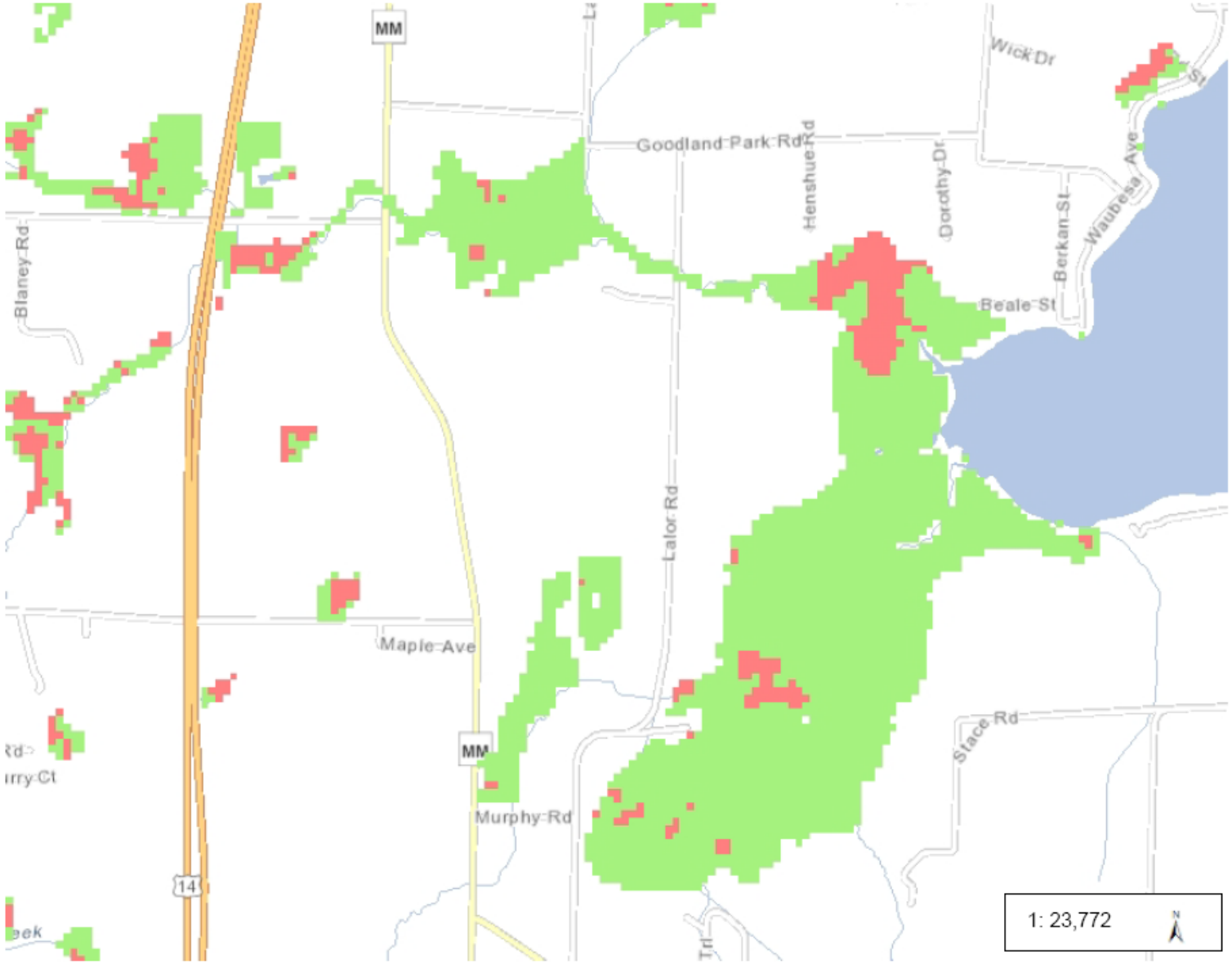
NAD_1983_HARN_Wisconsin_TM

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Surface Water Data Viewer Map





Legend

- Reed Canary Grass
  - Less than 50% RCG in the pixel
  - More than 50% RCG in the pixel
- Rivers and Streams
- Open Water

1: 23,772

0.8 0 0.38 0.8 Miles

NAD_1983_HARN_Wisconsin_TM

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Notes

Swan Creek and Waubesa Wetlands. Red is 50% or more Reed Canary Grass

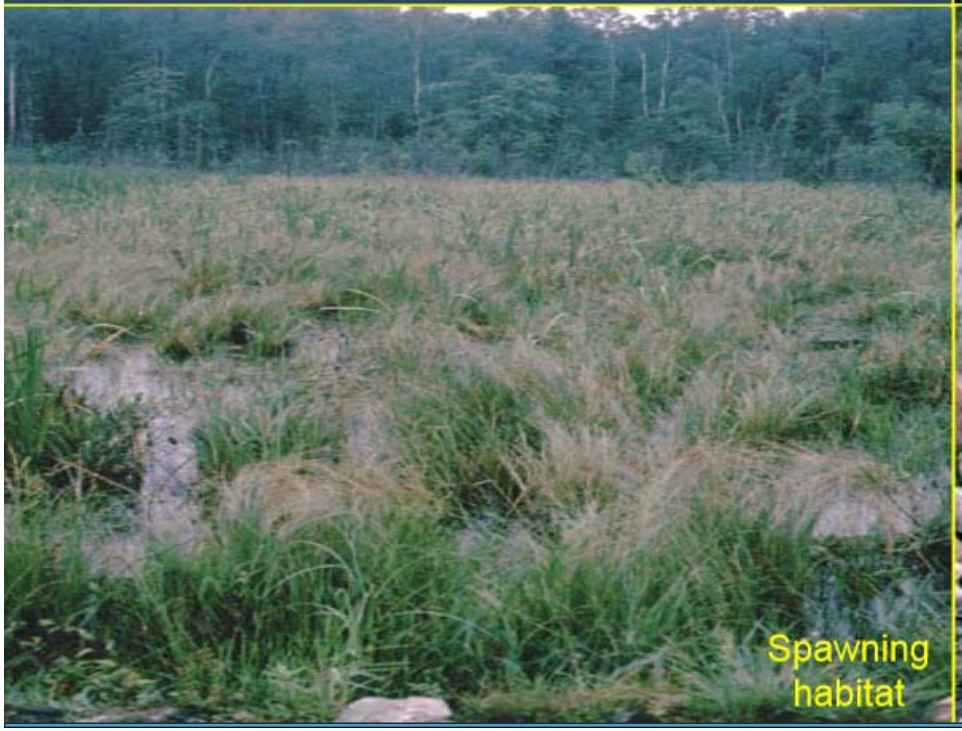
Increased Sediment and Nutrient Loads

Shifts in both temperature and precipitation will change the nutrient dynamics in wetlands. Increased precipitation could cause some wetlands and hydric soils to release phosphorus, while methane emissions may increase in others, such as the sedge meadows in southern Wisconsin. Increased summer droughts and evapotranspiration will increase decomposition and change nutrient dynamics, leading to, among other things, an increase in carbon dioxide emissions.

Pike Spawning and Nursery Habitat

Spring and early summer inundation of wetlands and adjacent shallows







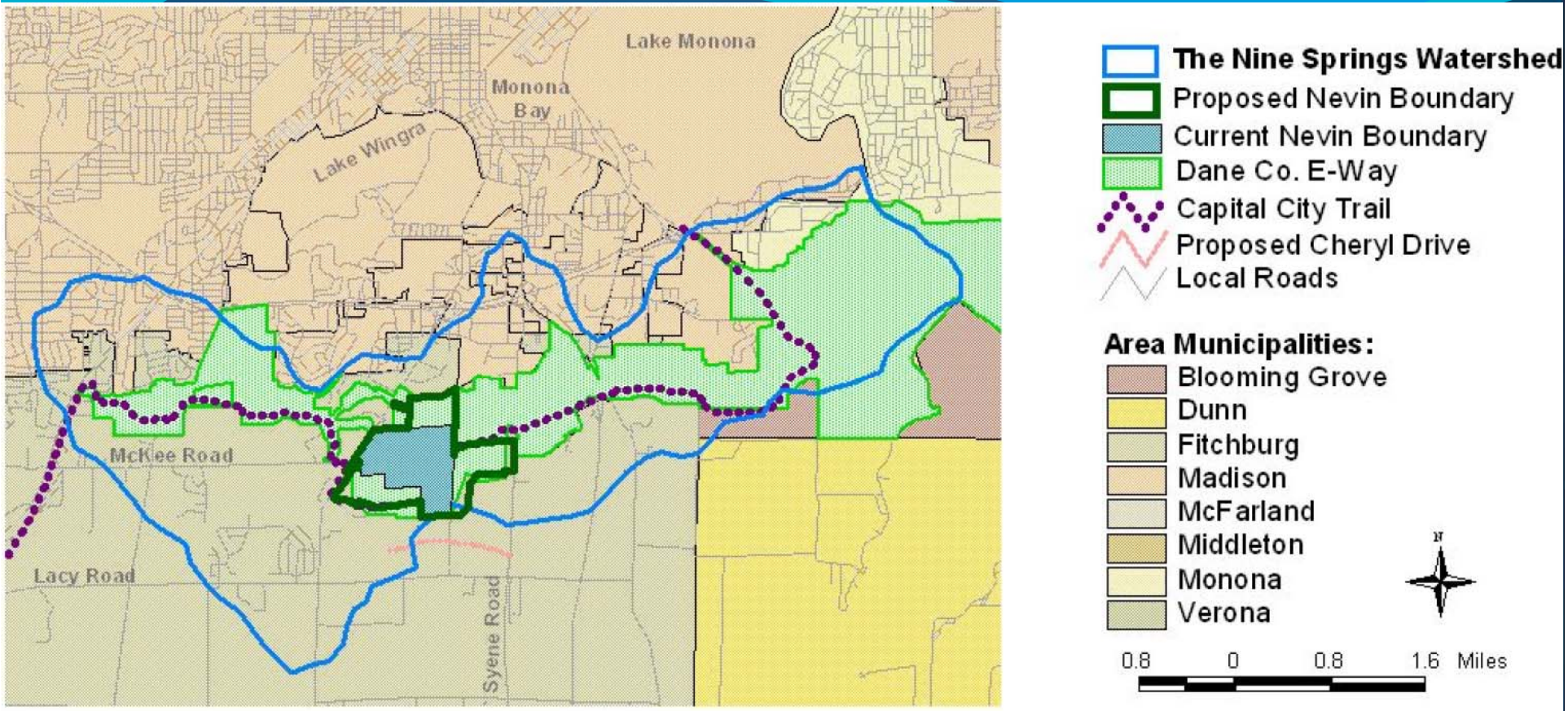
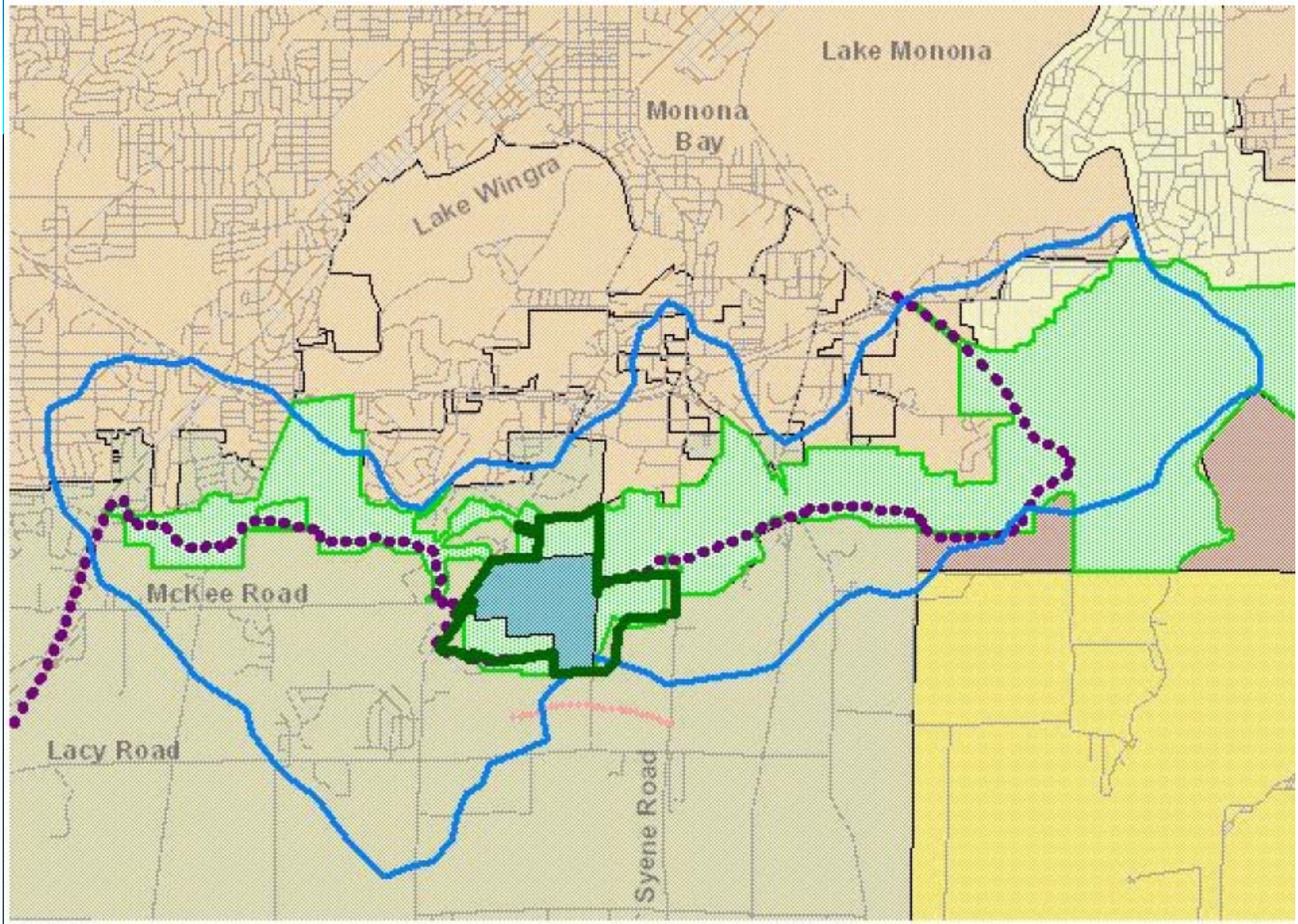


Figure 2 – Nevin's Location in the Nine Springs Watershed

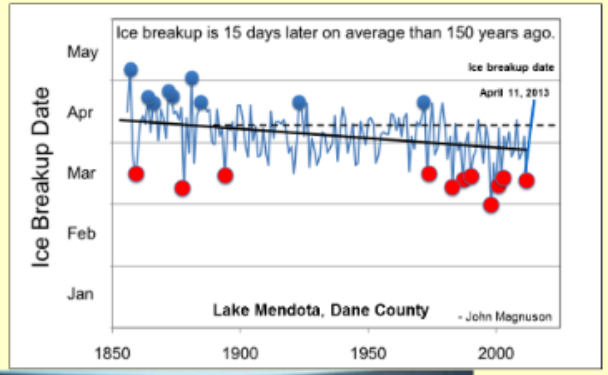

Lake Monona
Monona Bay
Lake Wingra
McKee Road
Lacy Road
Syene Road

Local Government
Climate Adaptation Planning

David S. Liebl
UW-Cooperative Extension

Melinda Habecker
Dane County UW-Extension

Wisconsin League of Municipalities
October 18, 2013







WICCI Climate Analysis
Chris Kucharik - UW Agronomy

Dan Vimont, Steve Vavrus, Michael Notaro,
David Lorenz - UW Center for Climatic Research



Pike on spawning migration up in a small freshwater ditch (Photo: Hans Hästbacka and Janne Widjeskog).



---Credit: David Solomon, Univ. of Wisconsin - Limnology

Look at the Clear-Water Area in the next slide…

- Along the edge of Waubesa Wetlands, and
- At the mouths of three streams:
  - Murphy Creek (south)
  - Deep Spring Creek (middle)
  - Swan Creek (north)



Cleansing and Flushing of Lake Waubesa

- The slide we have just seen shows one of these ecosystem services.
- It is the flow of groundwater from springs, fens, and spring mounds from the Fitchburg-Waubesa Artesian Basin.
- It is this flow coupled with groundwater and surface water flows from Nine Springs, Swan, and Murphy Creek---also part of the Fitchburg-Waubesa Artesian Basin.
- This combined flow pushes clear water north to the Yahara River outlet at McFarland.
- Without this flow the southern “boot” of Lake Waubesa would be stagnant and would eutrophy.

The next slide shows

Swan Creek

during the August 2007 Flooding

- The location here is Swan Creek Bridge on Lalor Road
- While Swan Creek was muddy during this flood event,
  - Murphy Creek remained clear
  - Badfish Creek remained clear
- Swan Creek's "ecosystem service" clearly is being compromised by upstream run-off over barren soil.



Collective Wisdom published in the Landscape

- This is the Wisdom that is published in the Land and Life of Citizens and Governments in the Landscape

Examples of this Collective Wisdom *on the Landscape*

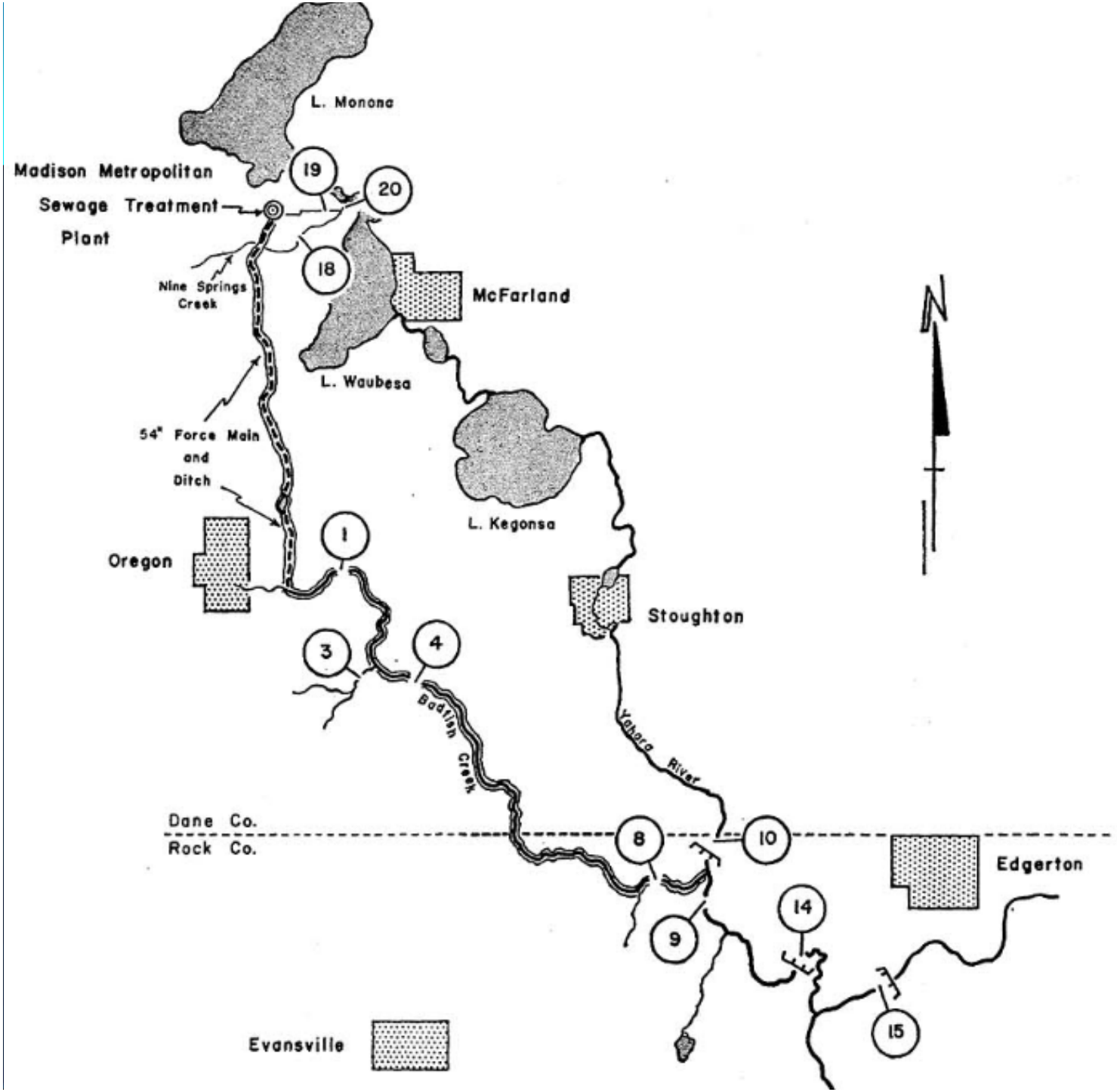
- Third Street Marsh Restoration between Wick's Farm and Lake Waubesa
- Restoration of Esox Marsh at the Bible Camp on Lake Waubesa
- Public Land Purchase for Wetland Creation and Groundwater Injection System to correct Siltation of Lake Kegonsa, Colladay Point
- Heritage Park Land Purchase for Run-Off Interception on Lake Waubesa's south shore
- Inter-Governmental Cooperation between the Town of Fitchburg and the Town of Dunn

Reciprocal Service

- This is the return of services by citizens and government back to the ecosystems that serve us.
- This is a “service with”--- a “con-” (meaning “with”) service.
- This is Reciprocal Service, Con-Service, Con-Servation.
- It means never simply taking, but also giving back to the systems that serve us at similar or greater levels.

Examples of our Con-Service: Eutrophication Remediation *in the* *Fitchburg-Waubesa Artesian System*

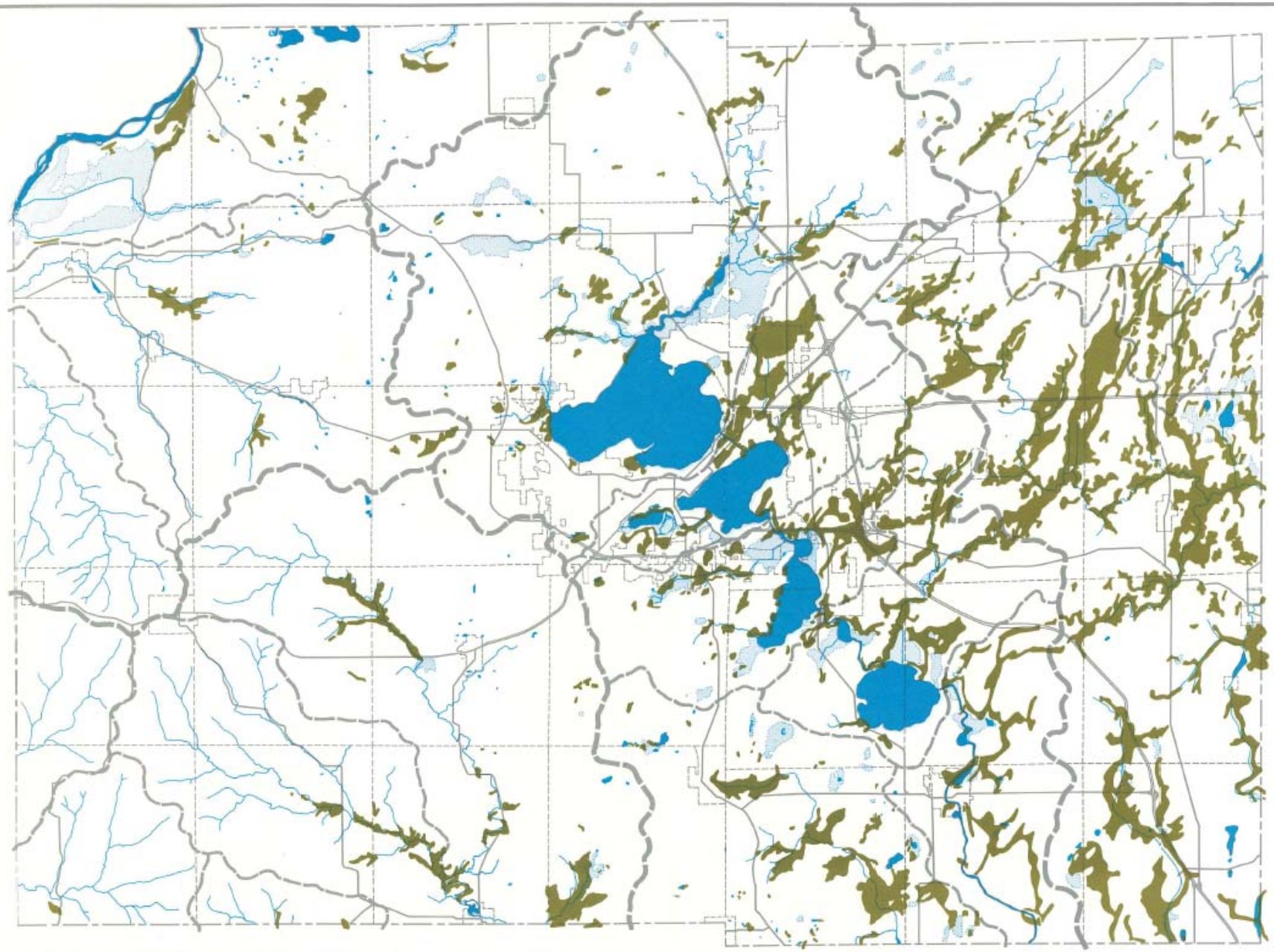
- Eutrophication of Lakes Waubesa and Kegonsa by *treated sewage diversion* via aqueduct from MMSD to Badfish Creek & the Rock River
- Construction of two in-lake Sanitary Sewers to *eliminate septic leakage* from converted cottages
- Defeat of the Libby Landfill on the western shore of Lake Waubesa, *preventing leachate* production
- Restoration of Fourth Street Marsh to intercept and process *non-point agricultural* run-off



Mackenthun et al. 1960. Trans. Wisc. Acad.

- Water is fluid and only temporarily contained—whether in our lakes, wetlands, living creatures, soils, clouds above, or ground water below. Yet it unites us and every component of the system that sustains us all.

- As we discover the services given by our lakes and wetlands, we discover why we return the services of our “Wetland Gem” ---Waubesa Wetlands--- with ours. Ours is a “con-service” —a reciprocal service between us and Waubesa Wetlands—to our mutual benefit.



DANE COUNTY WISCONSIN

WATER RESOURCES

PREPARED BY DANE COUNTY PLANNING DEPARTMENT

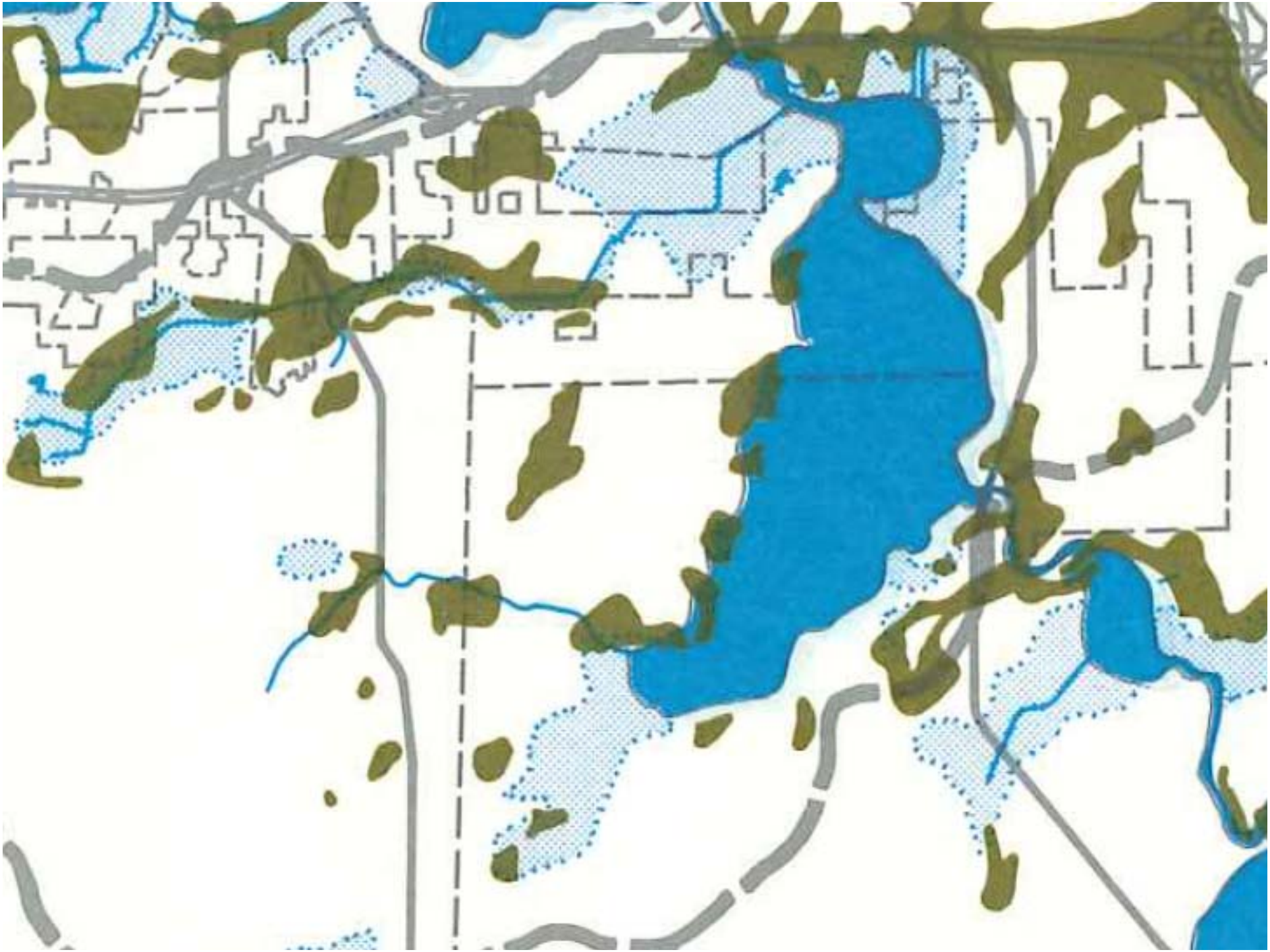
DRAINAGE BASINS
LAKES
RIVERS AND STREAMS
MARSHES
MARSH AREAS LOST SINCE 1905

TOWN, VILLAGE, CITY LIMITS
MAJOR HIGHWAYS

0 1 2 3 4 5 Miles

JANUARY 1966





Waubesa Wetlands has been assessed by significant institutions, organizations, and agencies that have conferred on Waubesa its special status with regard to its quality and significance:

- The Wisconsin Department of Natural Resouces (1974)
- The Nature Conservancy of Wisconsin (1974)
- The Wisconsin Wetlands Association (2009)
- The Dane County Regional Planning Commission's *Wetlands of Dane County* (1974)

Waubesa Wetlands (No. 114)



Photo by The Nature Conservancy

Resource links:

Wisconsin Chapter of The Nature Conservancy

Overview | Access | Ownership | Maps | Management | Recreation

Location

Dane County. T6N-R10E, Section 7, 8, 18. 538 acres.

Description

Located in an old lobe of Lake Waubesa along its southwest shore, Waubesa Wetlands is one of the highest quality and most diverse wetlands remaining in southern Wisconsin. Nine major springs and numerous smaller ones located within and around the area provide the wetland with an abundance of high quality water. The extensive wetlands and high quality of the water contribute significantly to the water quality of Lake Waubesa. Two inlet streams are also present - Murphy Creek and Swan Creek. Peat deposits - up to 95' deep in places - underlie a mix of sedge meadow, fen, and shrub-carr communities. The sedge meadow is a complex of different species that vary in abundance and structure in response to the complex hydrological system. Other parts of the site feature quaking sedge mats, calcareous fens, springs and streams with submerged aquatics, and deep spring cones lined with filamentous algae and purple-colored bacteria. The carbonate rich fens feature numerous species including grass-of-parnassus, Riddell's goldenrod, northern bog aster, lesser fringed gentian, and sage willow. Other abundant wetland species are common lake sedge, tussock sedge, American woolly-fruited sedge, common bur-reed, swamp loosestrife, American water horehound, blue-joint grass, and numerous asters. Bird life is diverse and features four rare species: least bittern (*Ixobrychus exilis*), American bittern (*Botaurus lentiginosus*), great blue heron (*Ardea herodias*), and black tern (*Chlidonias niger*). Other birds include sandhill crane, green heron, marsh and sedge wren, blue-winged teal, green-winged teal, and willow flycatcher. The state-threatened Blanding's turtle (*Emydoidea blandingii*) has also been found here. Waubesa Wetlands is owned by the DNR and The Nature Conservancy and was designated a State Natural Area in 1974.

- **State Scientific Area 114**
  designated in 1974

- One of the highest quality and most diverse wetlands in southern Wisconsin
- Nine major springs and numerous other springs, fed by groundwater
- Deep spring peat cones blanketed with mats of bright green Spirogyra & brilliant purple bacteria
- An abundance of high quality water from springs and incoming steams
- Contributes significantly to the water quality of Lake Waubesa
- Sedges meadow complexes, quaking sedge mats
- Carbonate-rich fens
- Streams with submerged aquatics
- Nesting osprey, least bittern, and black tern
- Blandings turtle, Lesser Fringed Gentian & Ladies Tresses Orchid
- Entire surface under protective ownership: DNR, TNC & Dane Co

The Nature Conservancy

Wisconsin

Wisconsin

Waubesa Wetland Preserve



These spring-fed wetlands close to Madison are a good place to see waterfowl and migrating birds.

In Madison's Backyard, a "living museum" of native plant and animal communities

WHY YOU SHOULD VISIT

This preserve is part of one of Wisconsin's most studied and valued water habitats.

The marshy terrain provides good habitat for many species of waterfowl and other migrating birds. The wetlands are fed by numerous small springs that provide a continuous flow of clear, cool water. (One of the most impressive of these is Bogholt Deep Spring, which originates in an underground cave.)

LOCATION

Just a short drive (about 4 miles) south from Madison

HOURS

Open year round, dawn to dusk

HOW TO GET THE MOST FROM YOUR VISIT

No established hiking trails exist; the best way to view the preserve is from a canoe. You can put in from the boat launch area at Goodland County Park (see Directions). The park does not offer canoe rentals.

WHY THE CONSERVANCY SELECTED THIS SITE

The Waubesa Wetlands Preserve contains high-quality, spring-fed wetlands. Close to Madison, it is used extensively for research and education.

WHAT THE CONSERVANCY HAS DONE/IS DOING HERE

Since 1974, the Conservancy has protected 232 acres.

OPEN TO THE PUBLIC

Yes

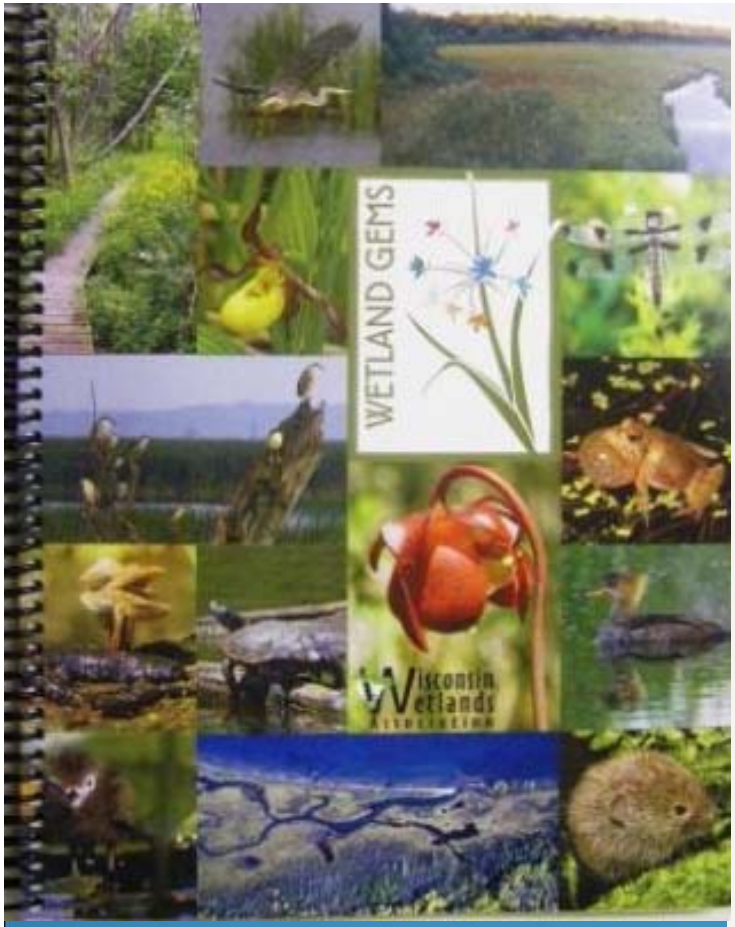
THINGS TO DO

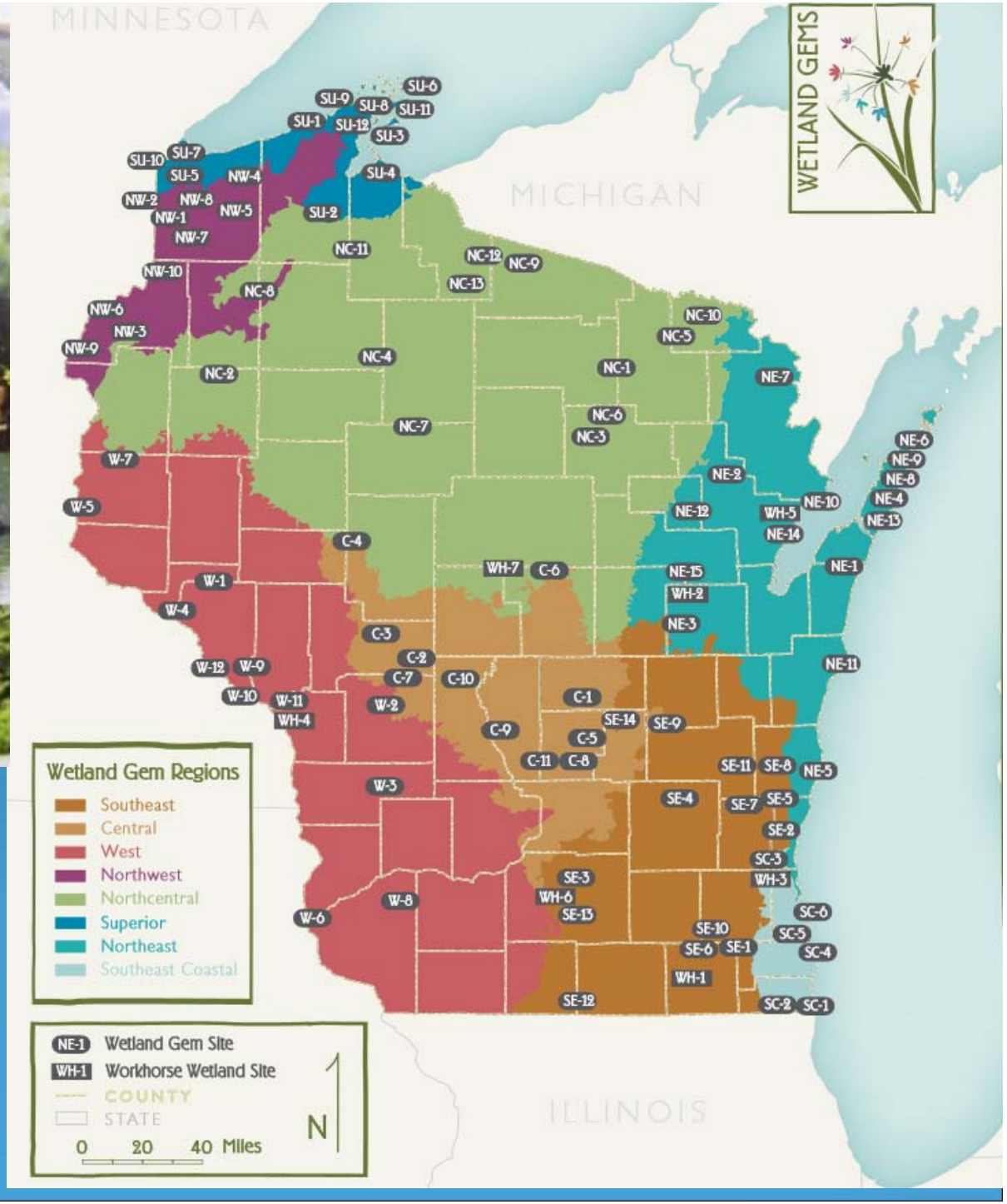
View All >

PLAN YOUR VISIT

View All >

GET DIRECTIONS


WETLAND GEMS
Wisconsin Wetlands


MINNESOTA
MICHIGAN
ILLINOIS
WETLAND GEMS
SU-6
SU-9
SU-8
SU-11
SU-1
SU-12
SU-3
SU-10
SU-7
SU-5
NW-4
SU-4
NW-2
NW-8
NW-5
SU-2
NW-1
NW-7
NC-11
NC-12
NC-9
NW-10
NC-13
NC-8
NW-6
NW-3
NC-10
NC-5
NW-9
NC-4
NC-1
NC-2
NE-7
NC-6
NC-7
NC-3
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NE-9
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NE-8
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NE-4
W-5
NE-10
NE-12
WH-5
NE-13
NE-14
C-4
NE-1
WH-7
C-6
NE-15
W-1
WH-2
W-4
NE-3
C-3
C-2
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WH-4
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W-8
SC-6
W-6
SE-13
SE-10
SC-5
SE-6
SE-1
SC-4
WH-1
SE-12
SC-2
SC-1
Wetland Gem Regions
Southeast
Central
West
Northwest
Northcentral
Superior
Northeast
Southeast Coastal
NE-1 Wetland Gem Site
WH-1 Workhorse Wetland Site
COUNTY
STATE
0 20 40 Miles
N



WISCONSIN'S WETLAND GEMS

Mink River Estuary—*Clint Farlinger*

WHAT ARE *WETLAND GEMS*?

Wetland Gems are high quality habitats that represent the wetland riches—marshes, swamps, bogs, fens and more—that historically made up nearly a quarter of Wisconsin's landscape. Critically important to Wisconsin's biodiversity, these natural treasures also provide our communities with valuable functions and services as well recreational and educational opportunities. They are landscapes that both preserve the past and inspire for the future.

Wisconsin Wetlands Association's list of 100 *Wetland Gems* includes 93 sites selected for their ecological value. These sites are distributed throughout the state and include examples of all of Wisconsin's wetland community types. We have dubbed an additional seven *Workhorse Wetland Gems,* sites that illustrate how wetlands deliver priceless services such as flood attenuation, water quality protection, and fish and wildlife habitat. Look inside for more on the purpose of this project, how sites were selected, ideas for citizen and community involvement, a visitor's guide, and a list and map of the *Wetland Gems* sites.

Visit our website for more information on this project: *www.wisconsinwetlands.org/gems.htm.*

WETLAND GEMS

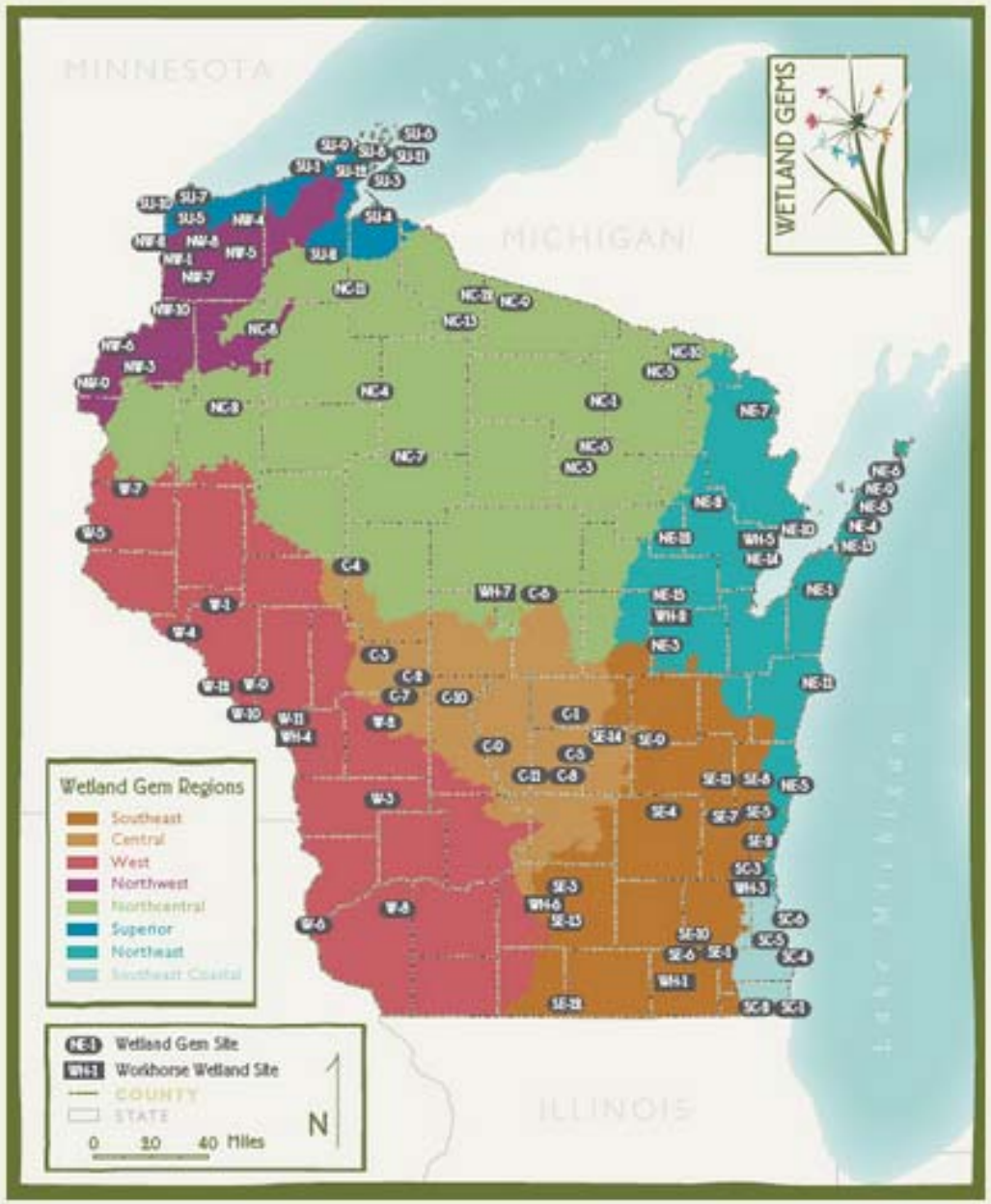
Wisconsin Wetlands Association

Southeast Coastal Region

- SC-1 Chiwaukee Prairie
- SC-2 Des Plaines River Floodplain & Marshes
- SC-3 Germantown Swamp
- SC-4 Renak-Polak Woods
- SC-5 Root River Riverine Forest
- SC-6 Warnimont Bluff Fens

Southeast Region

- SE-1 Beulah Bog
- SE-2 Cedarburg Bog
- SE-3 Cherokee Marsh
- SE-4 Horicon Marsh
- SE-5 Huiras Lake
- SE-6 Lulu Lake
- SE-7 Milwaukee River Floodplain Forest
- SE-8 Nichols Creek
- SE-9 Rush Lake
- SE-10 Scuppernong River Area
- SE-11 Spruce Lake Bog
- SE-12 Sugar River Floodplain Forest
- SE-13 Waubesa Wetlands
- SE-14 White River Marsh



SOUTHEAST - 13

WETLAND GEMS

WAUBESA WETLANDS

DANE COUNTY



Property Owners: The Nature Conservancy, WDNR
Recognitions & Designations: WI State Natural Area, WI Land Legacy Place, WI Wildlife Action Plan Reference Site

Funding for this project provided by The McKnight Foundation, which seeks to improve the quality of life for present and future generations through grantmaking, coalition-building and encouragement of strategic policy reform.

Wisconsin Wetlands Association
wisconsinwetlands.org



Cal DeWitt

WAUBESA WETLAND TYPES
Sedge meadow, fen, marsh, shrub carr

ECOLOGY & SIGNIFICANCE

This Wetland Gem, located just south of Madison along the southwest shoreline of Lake Waubesa, is one of the more diverse wetland complexes remaining in southern Wisconsin. Waubesa Wetlands comprises more than 500 acres of relatively high quality sedge meadow, fen, marsh and shrub carr habitats. The site is charactertzed by deep peat deposits and numerous springs, which provide these wetlands with a continuous source of clean, cool and mineral-rich groundwater. Two streams, Murphy's Creek and Swan Creek, meander through the site and empty into the lake. These wetlands are important to water quality in the lake and the larger Yahara River system. The proximity of this site to Madison means that it is heavily used for research, education and recreation.

FLORA & FAUNA

The majority of the site is sedge meadow habitat with species diversity that is created by varying hydrology across the site. Species include bluejoint grass, tussock sedge, sawgrass sedge, cattails and common bur-reed. A floating mat of cattails and sedges lines the lakeshore and marsh plants line the streams. Calcareous fen areas feature a diversity of plants including grass-of-parnassus, Riddell's goldenrod, northern bog aster, sage willow and the rare lesser fringed gentian. Other abundant wetland plants at the site include common lake sedge, tussock sedge, woollyfruit sedge, swamp loosestrife, American water horehound and numerous asters.

This Wetland Gem provides habitat for many species of waterfowl and other migrating birds including sandhill crane, green heron, marsh wren, sedge wren, blue-winged teal, green-winged teal, American coot, blue-gray gnatcatcher, common yellowthroat, great blue heron and willow flycatcher. Rare and unusual birds include least bittern, American bittern and black tern. This area also provides important spawning habitat for many Lake Waubesa fishes. The site could provide good spawning habitat for northern pike, but lake level drawdowns reduce the availability and accessibility of the flooded mats of grasses and sedges that pike need to lay their eggs.



Willow flycatcher — Scott Franke

THREATS

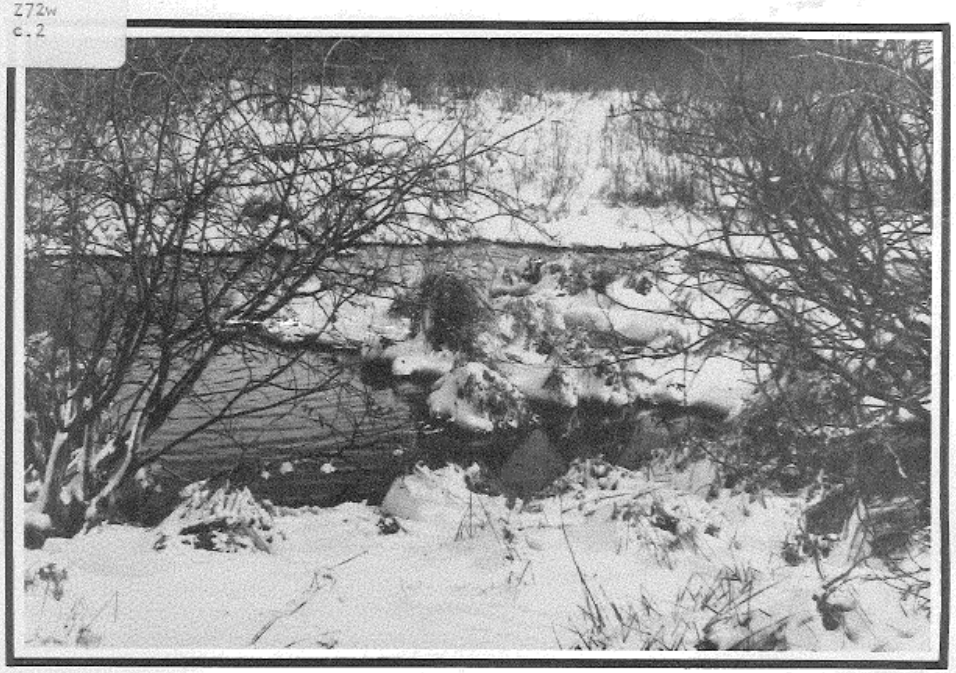
Runoff from watershed agriculture and residential development has degraded water quality and habitat at this site. Spring flow has also been diminished because of alterations to watershed hydrology. Invasive species, particularly reed canary grass, are of great concern. The lack of fire and resulting encroachment of woody vegetation is also of concern.

ACCESS

This site is best enjoyed by canoe. For details, visit the Wisconsin State Natural Areas Program website: dnr.wi.gov/org/land/er/sna.

Sources:
Wisconsin State Natural Areas Program (WDNR)
Wisconsin Land Legacy Report (WDNR)
Wisconsin's Strategy for Wildlife Species of Greatest Conservation Need (WDNR)

W78
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WETLANDS OF DANE COUNTY WISCONSIN

by Barbara Bedford and Jim & Libby Zimmerman

Dane County Regional Planning Commission

1974

Dane County Regional Planning Commission's *Wetlands of Dane County* (1974)

- Waubesa Wetlands is given a Priority I designation, one of two such designations for the Yahara Lakes Region of Dane County.
- It is described as "one of Dane County's most outstanding wetlands."
- It places all wetlands of Dane County Priority Groupings "to provide an aid for planning decisions."

- For Priority I wetlands, "Wetlands placed in this group are the best in the county, and in some cases, among the most valuable in southern Wisconsin. ...***Their value is so great, especially now that there are so few of them, that it is difficult to conceive of any circumstances which would justify either their destruction or degradation. We urge that every effort be made for their protection in perpetuity. ... 'protection in perpetuity' must mean absolute protection***."

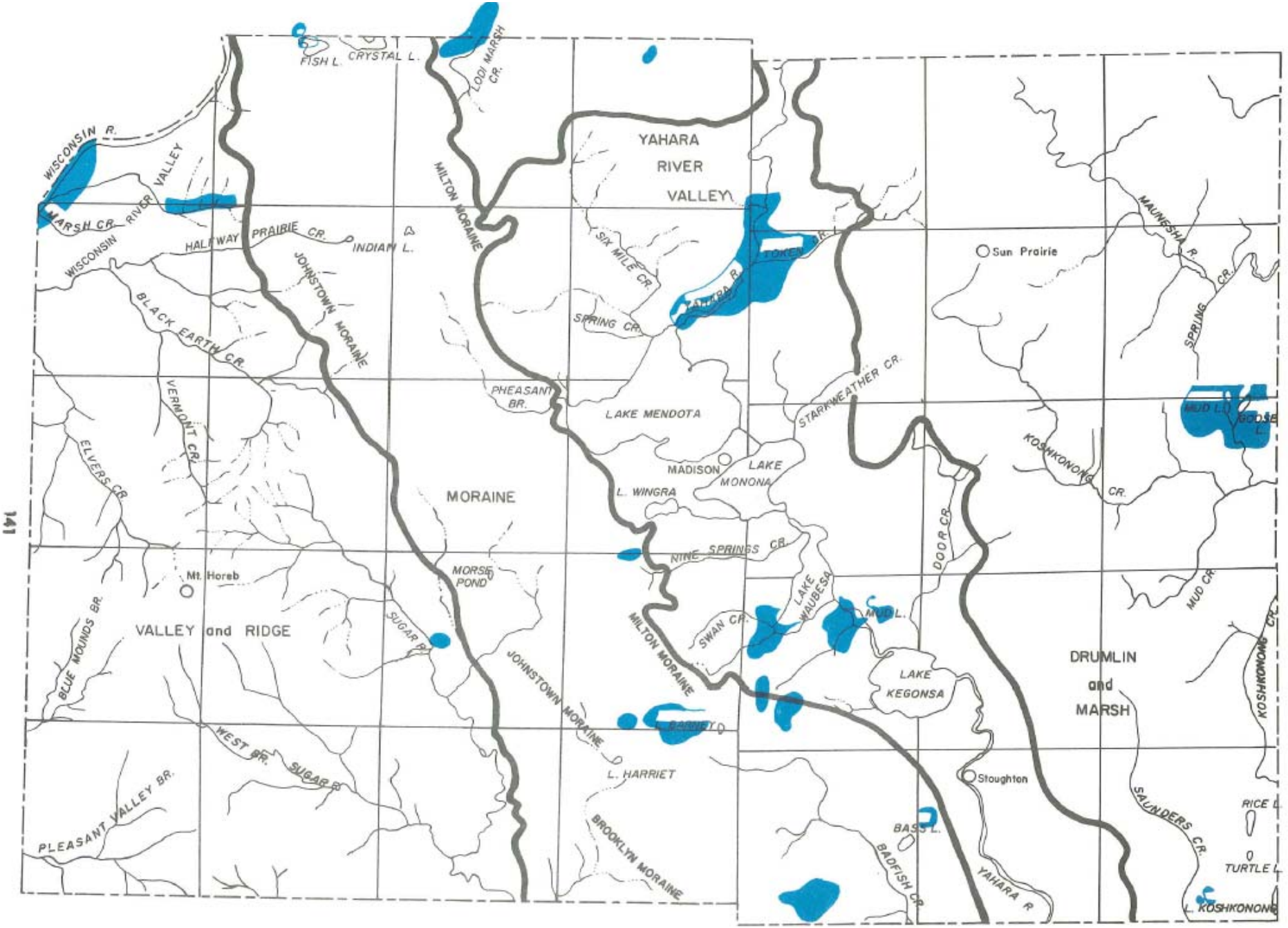


FIGURE 18a

DANE COUNTY WETLANDS PRIORITY GROUP I
SHOWING DISTRIBUTION AMONG PHYSIOGRAPHIC AREAS

Priority I Wetlands in Dane County:

- ***"Their value is so great, especially now that there are so few of them, that it is difficult to conceive of any circumstances which would justify either their destruction or degradation. We urge that every effort be made for their protection in perpetuity. … 'protection in perpetuity' must mean absolute protection."***



- ---Courtesy of Illustrated Sporting and Dramatic News

- One hundred years ago, a passenger pigeon died in a Cincinnati zoo. If she had been lonely, it was for good reason: She was the sole survivor of a species that had declined from several billion to one in half a century.
- And then on September 1, 1914, there were none.
- Martha's death was the last act in a most astonishing conservation tragedy.

"We grieve because no living man will see again the onrushing phalanx of victorious birds, sweeping a path for spring across the March skies, chasing the defeated winter from all the woods and prairies of Wisconsin."

---*Aldo Leopold, 1947*

- Water is fluid and only temporarily contained—whether in our lakes, wetlands, living creatures, soils, clouds above, or ground water below. Yet it unites us and every component of the system that sustains us all.

- As we discover the services given by our lakes and water, we discover why we return its services with ours. Ours is a "con-service" —a reciprocal service between us and the Yahara Waterscape—to our mutual benefit.

"We see a future in which everyone realizes that

our lakes are the center

of our community."

"Some ancient force in the Western psyche seems to perceive limitation as the demonic obstacle to be eliminated rather than as a discipline to evoke creativity."

--

---Thomas Berry, *The Viable Human*.

