

# ☞ 05hr\_SSC-DNRRRR\_Misc\_pt06o



☞ Exhibits/comments submitted by Tilton. RE: DNR study regarding Lower St. Croix ordinary high water mark.

(FORM UPDATED: 08/11/2010)

## WISCONSIN STATE LEGISLATURE ... PUBLIC HEARING - COMMITTEE RECORDS

### 2005-06

(session year)

### Senate Select

(Assembly, Senate or Joint)

### Committee on ... DNR (SSC-DNRRR)

### COMMITTEE NOTICES ...

- Committee Reports ... **CR**
- Executive Sessions ... **ES**
- Public Hearings ... **PH**

### INFORMATION COLLECTED BY COMMITTEE FOR AND AGAINST PROPOSAL

- Appointments ... **Appt** (w/Record of Comm. Proceedings)
- Clearinghouse Rules ... **CRule** (w/Record of Comm. Proceedings)
- Hearing Records ... bills and resolutions (w/Record of Comm. Proceedings)
  - (**ab** = Assembly Bill)                      (**ar** = Assembly Resolution)                      (**ajr** = Assembly Joint Resolution)
  - (**sb** = Senate Bill)                              (**sr** = Senate Resolution)                              (**sjr** = Senate Joint Resolution)
- Miscellaneous ... **Misc**

Book 2  
Part  
1 of 2

Jennifer Esser

Clerk, Senate Select Committee on DNR Regulatory Reform

FEBRUARY HEARING MATERIALS

**LIST OF EXHIBITS TO TILTON COMMENTS RE WI DNR 'STUDY'  
REGARDING LOWER ST. CROIX ORDINARY HIGH WATER MARK**

- EXHIBIT A** DNR "Study" materials and additional selected materials with numbering added
- EXHIBIT B** Aerial Photos of Tilton shoreline
- EXHIBIT C** Photos of Tilton shoreline taken during October 2005 site surveys and investigations done by Dr. David Biesboer and Graham Environmental Services, Inc, including photos taken with stakes showing DNR's proposed OHWM of 681.5
- EXHIBIT D** Reduced version of 10/28/04 Tilton Tree Survey, with names and dimensions of trees removed. Only trees 4" or larger were surveyed. See Exhibit L for full Tilton Tree Survey, including names and dimensions of trees
- EXHIBIT E** Graham Environmental Services, Inc., Lower St. Croix Ordinary High Water Mark Evaluation Report, including photos of Tilton site and Lake Mallalieu-Union Pacific RR site OHWM indicators and location of DNR's proposed OHWM of 681.5
- EXHIBIT F** Report of Professor David D. Biesboer, Ph.D., University of Minnesota Professor of Biology, dated 10/26/05, regarding OHWM indicators on Tilton property and re DNR 'study' methodology in general
- EXHIBIT G** BARR Engineering Report, dated 10/29/04, regarding Tilton OHWM and other matters
- EXHIBIT H** William L. Tilton letter to DNR % Robert Baczynski, dated 8/8/05, containing commentary relevant to DNR's OHWM 'study'
- EXHIBIT I** Miscellaneous notes by W. Tilton upon initial partial review of DNR OHWM 'study' materials. These notes were compiled 9/15 and 10/3/05 and contain commentary re DNR staff's use of criteria not contained in the Diana decision nor in Chapter 40, re DNR staff's lack of scientific method, re ignorance of or misuse of Chapter 40 and Diana criteria, etc. These notes are incomplete and are provided simply as further illustration of the many omissions and inadequacies contained in the DNR 'study' materials.

**EXHIBIT J**

(a) Memo to River House File from WLTilton dated 11/11/04 regarding site visit to Tilton property by DNR, including detail re refusal of E. Post to look at OHWM indicators on the Tilton property and her inability to articulate what were the OHWM indicators relevant to the Tilton property; (b) Email of WI DNR to St. Croix Co. Zoning, including comment of Eunice Post dated 12-15-04 stating Tilton OHWM is 682 and would be further determined per DNR's ongoing 'study;' (c) Public Statement distributed by Eunice Post, WI DNR, on or about 1/13/05, inviting suggestions of additional sites for DNR 'study.' This is part of Exhibit 1 at pages 1050-1051; compare to August 2005 statement in final DNR 'study' report that there was not time for DNR staff to investigate additional sites as part of their OHWM study - *i.e.*, as DNR's dishonest explanation why DNR staff failed to make any on-site study of the Tilton shoreline, despite Tilton's requests since 1999 that they do so; despite E. Post's site visit in November 2004; and despite Tilton's October 2004, February 2005 and August 2005 specific requests that an OHWM investigation and determination be made specifically at and for the Tilton property."

**EXHIBIT K**

Miscellaneous Experts' Curriculum Vitae

**EXHIBIT L**

Tilton "Tree Survey" dated 10/19/04 containing location of all trees on Tilton property 4" or thicker at breast height, with notation of tree dimensions and type. This is the full-sized and detailed version of the reduced survey contained in Exhibit D.

B

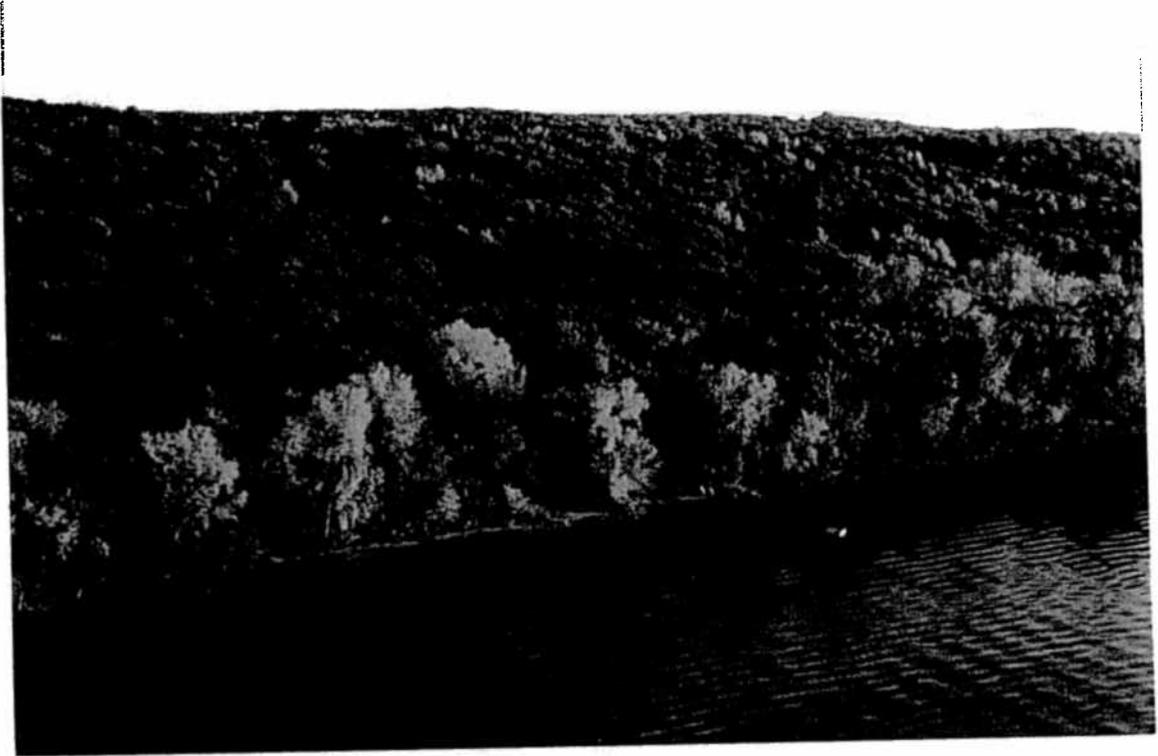


Photo of northern portion of Tilton shoreline; arrow at approximate northern edge of property line. Photo from October, mid-90s. Water level estimated at 676-677'. Edge of tree line at 678-679'.



Arrows show approximate north and south boundaries of Tilton St. Croix shoreline. Photo taken approximately mid 90s, October. Water level estimated to be 676-677'. Edge of tree line at 678-679'.



Arrows show approximate north and south boundaries of Tilton St Croix property. .  
Photo taken October mid 90s, approx. Water level estimated to be 676-677'.  
Edge of tree line at 678-679'.

©



Photos taken October 25, 2005. Views of 65" thick tree on Tilton shore line looking northward (above) and looking southward (below). Stakes with pink flags set at 681.5'. According to the 681.5 DNR-proposed OHWM, this 65' thick tree is not "terrestrial." Presumably the DNR considers this and the many other trees waterward of 681.5 to be the last gasp of aquatic vegetation.





Photo taken October 25, 2005. Water level 677.02. Views of Tilton shoreland looking northward and following stakes (with pink ribbons) set at 681.5', the DNR-proposed OHWM. This DNR proposal inherently declares that the trees, moss and other vegetation to the left (waterward) of the stakes (including more than three dozen trees between 4" and 65" thick) should not be considered "terrestrial vegetation" as that term is used by the Wisconsin Supreme Court in the Diana case and elsewhere.





Photo taken October 25, 2005. Water level 677.02. View of the Tilton shoreline looking northward along a line of stakes (with pink ribbons) set at 681.5. All trees, moss and other vegetation to the left (waterward) of these stakes would be non terrestrial (or aquatic) according to the DNR's proposed OHWM of 681.5'.





Southern portion of Tilton shoreline. Photo taken October 25, 2005. Water level 677.02'.



This 65" tree on the Tilton shoreline is below the 681.5 level proposed by the DNR to be the OHWM for this property (and for the entirety of the St. Croix shoreline). To the DNR investigators, the existence of this tree is less important to a determination of the OHWM than are stains on barge dolphins or on concrete ten miles away.



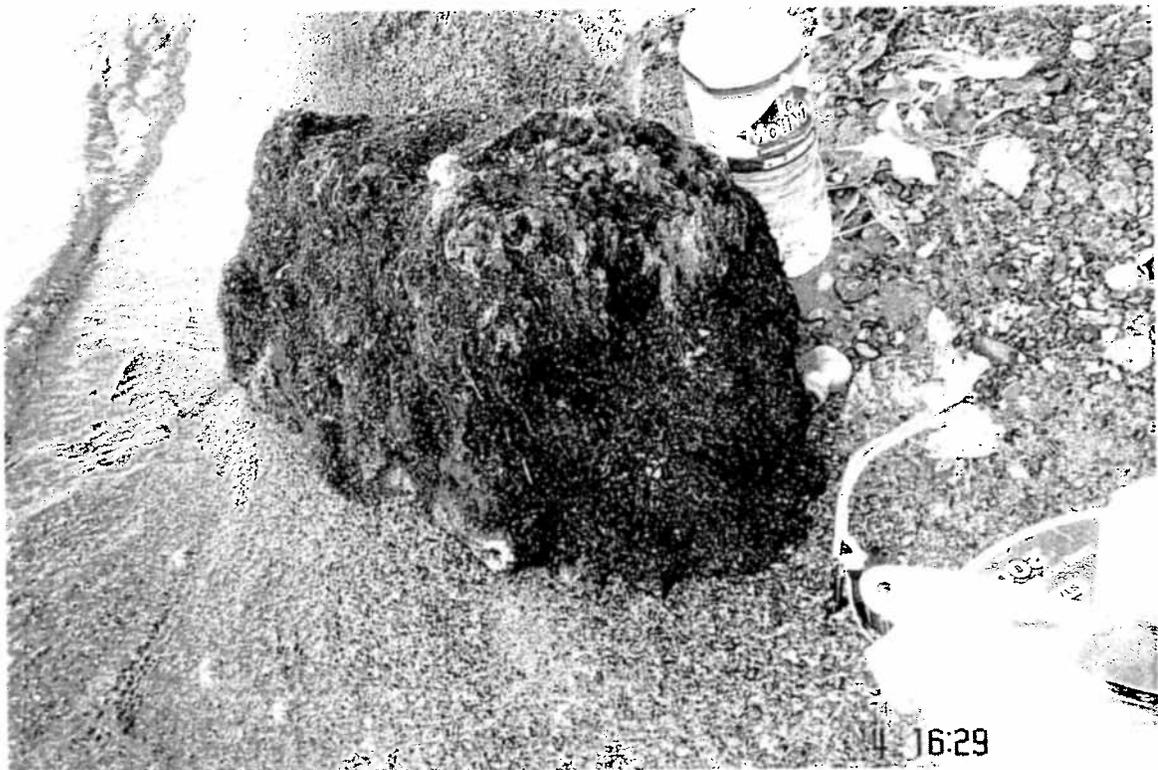
Photo taken October 4, 2005 showing a south-looking view of the mid-portion of the Tilton shoreline. Water level at 677.2'.



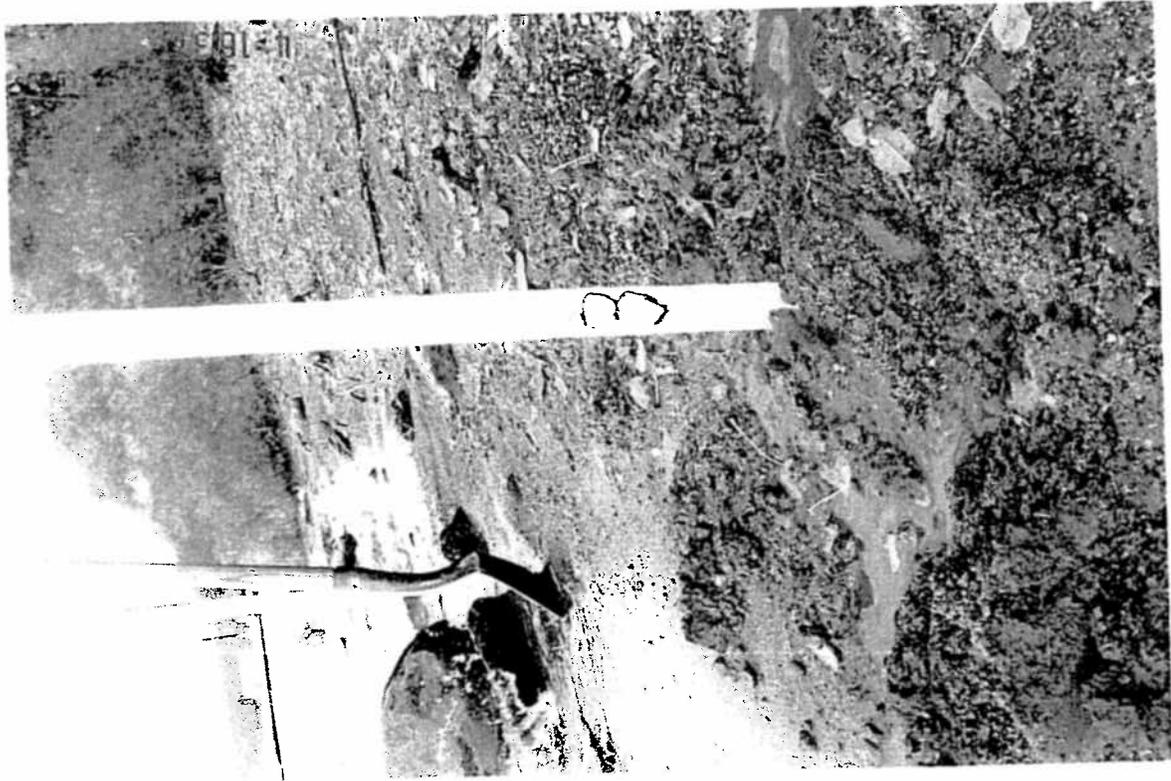
Photo taken October 4, 2005 showing south-looking view of southern portion of Tilton shoreline. Water level 677.2. Stake at right is set at moss collection site #2. Mosses identified as terrestrial *platydicta* genus were found to a level of 677.0 (just below the October 4, 2005 water level).



October 4, 2005 north-looking view of Tilton shore. Water level at 677.2. Stake at left marks moss collection site #2. Professor Biesboer (blue shirt) in process of soil investigation. Multiple soil pits failed to display any gleying or mottling or other evidence of being anaerobic.



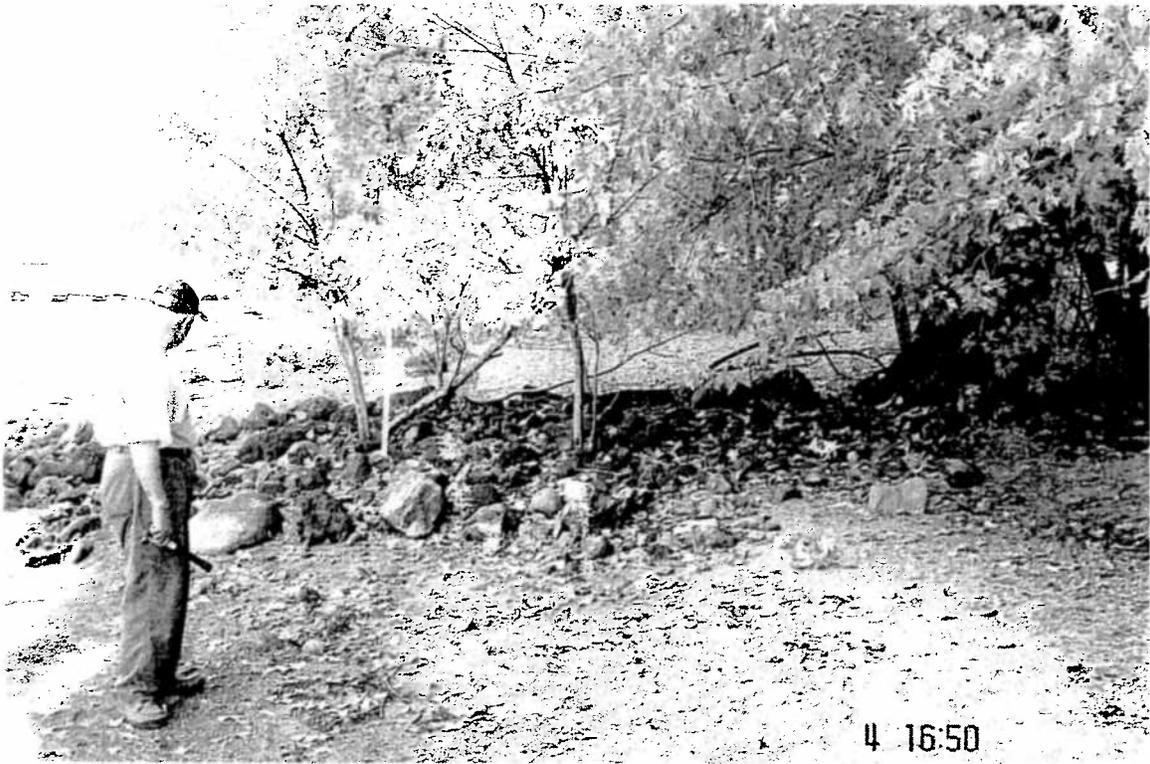
Moss covered rock at Tilton shoreline (water level at 677.2') near stake for moss collection site #2. Photo taken Oct. 4, 2005..



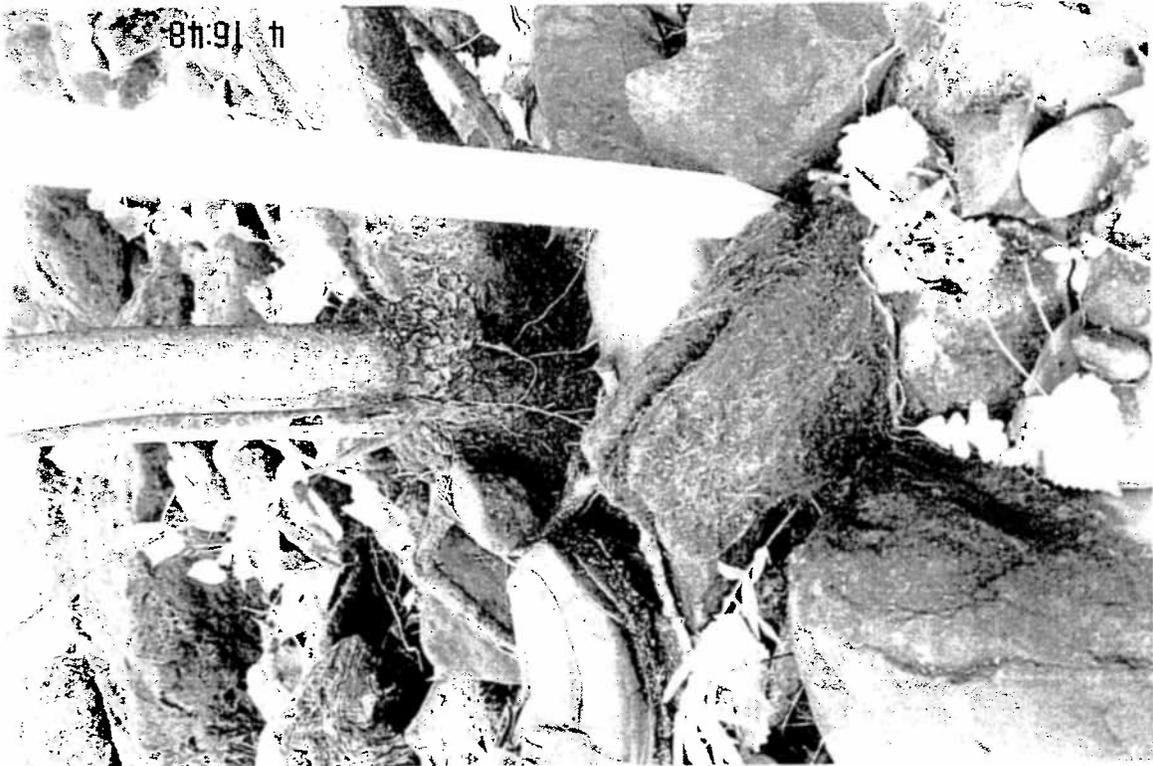
Collection site #3, Tilton shoreline. Photo taken October 4, 2005.  
Water level 677.2



Moss collection at site #2, Tilton shoreline. Photo taken  
October 4, 2005. Water level 677.2



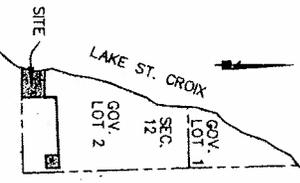
October 4, 2005. Tilton shore, moss collection site #4. Frances Ogden at left.  
Water level 677.2





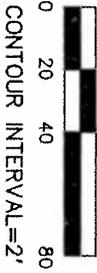
Photos of northern approx. 100' of Tilton St Croix shoreline. Photo taken August 1999. Tree line 678-679'. Line of smaller vegetation below the tree line but above bare sand estimated to be at 677-678'. Bottom of terrestrial moss lines estimated at 677'.

(D)



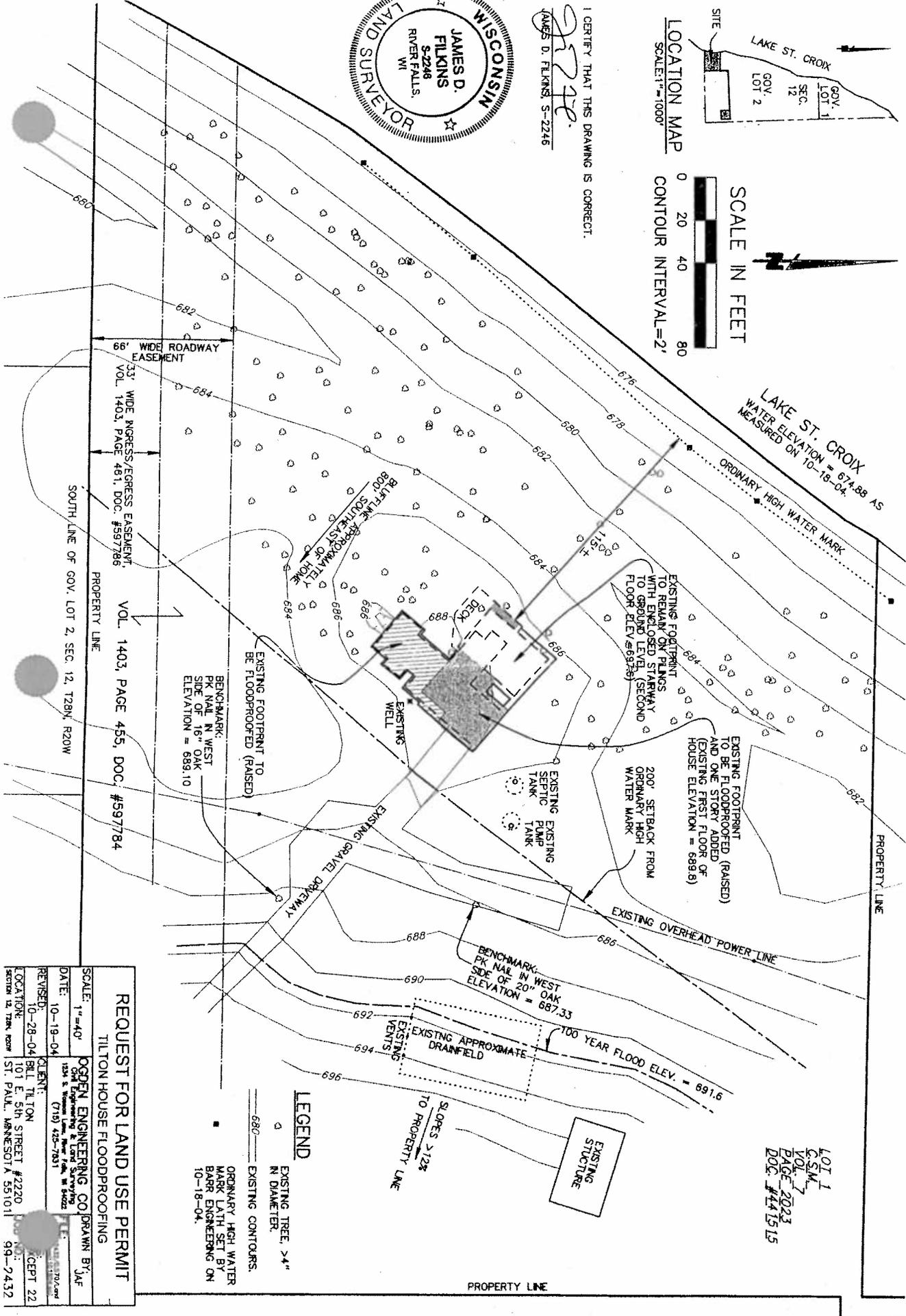
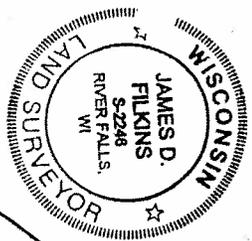
LOCATION MAP  
SCALE: 1" = 1000'

SCALE IN FEET



I CERTIFY THAT THIS DRAWING IS CORRECT.

JAMES D. FLIKINS, S-2246



LAKE ST. CROIX  
WATER ELEVATION = 674.88 AS  
MEASURED ON 10-18-04

ORDINARY HIGH WATER MARK

EXISTING FOOTPRINT  
TO REMAIN ON PLANS  
WITH ENCLOSED STAIRWAY  
TO GROUND LEVEL (SECOND  
FLOOR ELEV. = 692.5)

EXISTING FOOTPRINT  
TO BE FLOODPROOFED (RAISED)  
AND ONE STORY ADDED  
(EXISTING FIRST FLOOR OF  
HOUSE ELEVATION = 689.8)

200' SETBACK FROM  
ORDINARY HIGH  
WATER MARK

EXISTING OVERHEAD POWER LINE

BENCHMARK  
PK NAIL IN WEST  
SIDE OF 20" OAK  
ELEVATION = 687.33

100 YEAR FLOOD ELEV. = 691.6

EXISTING APPROXIMATE  
DRAINFIELD

SLOPES > 12%  
TO PROPERTY LINE

EXISTING  
STRUCTURE

**LEGEND**

- ▲ EXISTING TREE, >4" N DIAMETER.
- EXISTING CONTOURS.
- ORDINARY HIGH WATER MARK LATH SET BY BARR ENGINEERING ON 10-18-04.

LOT 1  
C.S.M.  
VOL. 7  
PAGE 2023  
DOC #141515

**REQUEST FOR LAND USE PERMIT**  
TILTON HOUSE FLOODPROOFING

SCALE: 1" = 40'

DATE: 10-19-04

REVISOR: 10-28-04

CLIENT: BELL TILTON

LOCATION: 101 E. 5th STREET #2220 ST. PAUL, MINNESOTA 55101

PREPARED BY: JDF

DESIGNED BY: JDF

DATE: 10-19-04

REVISOR: 10-28-04

CLIENT: BELL TILTON

LOCATION: 101 E. 5th STREET #2220 ST. PAUL, MINNESOTA 55101

ACCEPT 22

99-2432



# Lower St. Croix River Ordinary High Water Mark Evaluation Report

Prepared for: Mr. William Tilton

**Hudson, Minnesota**



The east shoreline of the St. Croix River, looking north on the Tilton property.

**November 10, 2005**

GES Project No. 2005.142





Graham Environmental Services, Inc.  
P.O. Box 189 Ellsworth, Wisconsin 54011

# Lower St. Croix River Ordinary High Water Mark Evaluation Report

Prepared for: Mr. William Tilton

Hudson, Wisconsin

November 10, 2005

## Background & Methodologies

At the request of Mr. William Tilton, Graham Environmental Services, Inc. (GES) has conducted a review of the Wisconsin Department of Natural Resources (DNR) proposed Ordinary High Water Mark (OHWM) of 681.5 feet elevation (1912 datum) for the entire Lower St. Croix River, between Stillwater, Minnesota and Prescott Wisconsin. GES understands Mr. Tilton owns St. Croix shoreline property at 278 Westgrove Road, Troy Township, St. Croix County (**Figure 1**) which would be affected by the OHWM determination, and therefore is interested in the accuracy and validity of the DNR's determination.

At Mr. Tilton's request, GES made its own investigation and determination of the OHWM at two sites: (1) Mr. Tilton's property and (2) the Lake Mallalieu Dam/Union Pacific Rail Road Property Site.

On October 25, 2005, Mr. Scott Krych and Mr. Kelly Bopray of GES conducted on-site investigations of these two separate locations with the surveying assistance of Mr. Frank Ogden. Additional site photographs were taken on November 8, 2005. Mr. Bopray has a BS and MS in soil science and is a licensed Professional Soil Scientist with 19 years of experience evaluating wetlands and soils. Mr. Krych has a BS in Biology and is a registered Professional Wetland Scientist with 19 years of experience in evaluating wetlands and conducting ecological field surveys. Mr. Bopray's and Mr. Krych's CV's are attached in Appendix A.

In Wisconsin, the definition of OHWM has been set by the State Supreme Court in Diana Shooting Club v. Husting (1914), 146 Wis. 261,272 (Diana):

By ordinary high-water mark is meant the point on the bank or shore up to which the presence and action of the water is so continuous as to leave a distinct mark either by erosion, destruction of terrestrial vegetation, or other easily recognized characteristic.

Additionally, Wisconsin's Waterway and Wetland Handbook Chapter 40, (Chapter 40) provides guidance and procedures for determining the OHWM on a lake or stream in accordance with the Diana decision.

According to material provided to GES via Mr. Tilton and the WI DNR website, it appears that the WI DNR has made a preliminary determination that the OHWM for Lower St. Croix is at an elevation of 681.5 feet (1912 datum). The DNR's findings were published and are available on its web site in a document titled "Lower St. Croix National Wild and Scenic River Ordinary High Water Mark".

To test the validity/applicability/accuracy of this proposed OHWM of 681.5, GES had the 681.5 contour staked on the Tilton property as well as on the Lake Mallalieu/Union Pacific Railroad site that the DNR investigated. GES then systematically looked for the Biological and Physical indicators listed in Chapter 40 to determine if the 681.5 OHWM meets the "reasonable and prudent test" in determining the OHWM as required by the Wisconsin Supreme Court decisions summarized in Chapter 40.<sup>1</sup> In summary, GES's findings include:

(a) The DNR Staff's proposed OHWM of 681.5 feet is not supported by the facts (biological and physical indicators) on the ground nor by documentary evidence when considered under the criteria established by the Diana decision.

(b) In contrast, by carefully and properly applying the Diana criteria (using guidance from Chapter 40 when applicable) to the Tilton and Lake Mallalieu site data, the actual OHWM for the Tilton and Lake Mallalieu locations (and, by implication, for the entire Lower St. Croix) is at approximately 677 feet (1912 datum).

(c) We hypothesize that the DNR reached its erroneous conclusion of 681.5 as a result of use of incorrect and inapplicable criteria, fundamental confusion over definitions of terms (e.g. hydrophytic is not the same as aquatic), expansion of the list of OHWM indicators, and its failure to test/verify its theory in the field – i.e. by failing to place stakes at its proposed 681.5 feet and take photos of that line in relation to surroundings, so that one can observe whether

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<sup>1</sup> We note that nowhere in hundreds of pages of 'study' material does the DNR make any effort to show in a photograph where its proposed 681.5 OHWM occurs in relation to existing vegetation in the area. This would suggest either (a) the DNR study team made no attempt to test/prove the validity of its 681.5 theory in the real world, which if true would be a serious defect in the scientific quality of its "study" and calls into question the reliability of any data or other conclusions presented in this report; or (b) the DNR study team did properly test its theory in the field by staking and photographing a 681.5 contour line at each study site, but for some reason it has withheld that photographic or survey data from the public. In either case, every time GES compared the 681.5 elevation to 'the facts on the ground' (which GES did for several hundreds of feet of shoreline at two long sites) we found that the 681.5 "theory" was proven to be untrue; and that the OHWM as defined by Diana and relevant portions of Chapter 40 is obviously several feet lower than 681.5 feet.

that demarcation line meets the 'common sense' placement of the of the line defined in Diana -- where water action has caused destruction of territorial vegetation (the word "terrestrial" used in the sense that it is the antonym of "aquatic", per the Wisconsin Supreme court decision in State v. Trudeau, 139 Wis.2d 91, 102).

## Results

### Tilton Site

The Tilton site consists of just over 400 feet of shoreline consisting mainly of undisturbed natural areas, plus a small beach area with moderate disturbance due to human usage. GES visited this site on October 25, 2005, during which the water level of the St. Croix River was 677.02. GES collected additional photographs of the site on November 8, 2005 when the water level was at 675.61 feet (1912 datum). **Figure 2** is a photograph taken during the on-site investigation that shows the location of the DNR's proposed 681.5 OHWM contour on the Tilton property. **Figure 2** clearly shows significant woody terrestrial vegetation below the proposed OHWM of 681.5.

**Figure 3** is a copy of the "Tilton tree survey" (1929 datum) of the Tilton property showing the location of the significant trees (over 4" diameter at breast height) along the shoreline of the Tilton property. On the survey shown in **Figure 3** the proposed OHWM would be equivalent to the 681 contour because of the six inch difference between the 1929 data used in this tree survey versus the 1912 data used for the DNR study. Consistent with the photographic evidence, this survey clearly shows a significant amount of terrestrial vegetation (trees) below the DNR's proposed OHWM, even down to approximately the 677.5 foot (1912 datum) contour.

The majority of the trees below the 681.5 (1912 datum)/681 (1929 datum) elevation are Willow (*Salix sp.*) and eastern cottonwood (*Populus deltoides*) which are hydrophytic trees that tolerate flooding. However, the fact that this vegetation is hydrophytic does not mean it is not terrestrial vegetation for purposes of the Diana definition of the OHWM. The Merriam-Webster definition of terrestrial is "of or relating to land as distinct from air or water: living on or in or growing from land. Whereas aquatic is defined as: growing or living in water. The mature woody hydrophytic trees on the Tilton property are definitely growing from land (terrestrial) as opposed to growing in water (aquatic). These trees have evolved to tolerate flooding events but they can not survive in an aquatic environment. The Diana OHWM definition requires the destruction of terrestrial vegetation as a result of the presence or action of water. Since the survey (and our personal inspection) clearly shows dozens of mature (terrestrial) trees with bases well below the 681.5 elevation, it is clear that the OHWM must be lower than the proposed 681.5.

GES searched the Tilton site for other indicators of the OHWM as listed in Chapter 40, both above and below the DNR's proposed 681.5 elevation. Many of the trees nearer the shoreline on the Tilton site had exposed roots (**Figure 4**) due to erosion during past flood events. However, the root structure of these trees was generally anchored deep in the soil, as opposed to shallow, flat root systems indicative of the OHWM as cited in Chapter 40. The DNR cited exposed tree roots on several sites as an indicator of the OHWM. This is an example of how the indicators in Chapter 40 were expanded to include features indicative of wetlands, but not necessarily indicative of the OHWM as defined in Chapter 40.

A terrestrial species of moss in the (*Platydictya*) genus (**Figure 5**) was identified on many of the trees and rocks along the shoreline (identification per Dr. David Biesboer). The lowest elevation at which this moss was observed on the Tilton site is at 677.0. According to Chapter 40, "the lowermost elevation of these mosses is a good indicator of the OHWM". In the DNR data that GES reviewed, moss was only mentioned a few times in reference to the top elevation of moss.

**Figure 6** is a picture of Willow water roots observed on the Tilton property. These OHWM biological indicators occurred in a zone from 676.9 to 677.7 (1912 datum). Chapter 40 guidance states; "The start of the water roots will be very near the OHWM."

Evidence of other biological indicators listed in Chapter 40 (Lichens, Pancake roots, Pipe elbow roots, Pollen, Large cattail mat or Algae stain) were not observed on the Tilton site.

Of the physical indicators listed in Chapter 40, only wave cut erosional scars (**Figure 7**) were identifiable on the Tilton site. These features occurred at multiple elevations as a result of changing water levels during various flood events. None of the erosion marks were pronounced enough to be considered more or less indicative of the OHWM from a regular or reoccurring water level.

#### The Lake Mallalieu Dam Site-Union Pacific Railroad Property

The second site GES evaluated was The Lake Mallalieu Dam Site-Union Pacific Railroad Property. From the photo documentation the DNR provided in its report "The Lake Mallalieu Dam Site- Union Pacific Rail Road Property August 31, 2004", GES was able to identify and evaluate many of the same locations the DNR evaluated. **Figure 8** is from this DNR report and shows the shoreline with a water level at 675.3 feet or approximately 1.7 feet lower than the 677.02 elevation when GES evaluated the site on October 25, 2005 (**Figure 9**). These two figures show a cross section (right to left) of the shore line from the waters edge, across a rock/cobble beach where any vegetation has been destroyed by the continuous presence and action of the water, to a zone of dense herbaceous (hydrophytic but terrestrial) vegetation dominated by sedges (*Carex sp.*), moss, and scattered willow shrubs. Mature silver maples (*Acer saccharinum*) and black

willows (*Salix nigra*) dominate sandy beach deposit soils inland of the herbaceous vegetation. **Figure 10** shows the proposed 681.5 OHWM on this site. As with the Tilton site, terrestrial vegetation begins at an elevation well below the proposed 681.5 OHWM. **Figure 10** also shows the trees below the proposed OHWM are well anchored by deep root systems.

The DNR's undated; Lower St. Croix National Wild and Scenic River Ordinary High Water Mark presentation (available on the DNR's web page) identifies "exposed tree roots" as a physical indicator of the OHWM. However, this is not an indicator identified in Chapter 40; nor is it found in the Diana decision. Although flood events may erode the soil from around the base of trees, Chapter 40 advises, "Remember the highest past water level is not necessarily the OHWM." The DNR and GES identified debris from flooding caught in vegetation. This indicator, According to Chapter 40, usually occurs in proximity to, but above the OHWM.

The DNR report states that it identified adventitious roots on what appears to be a shrub (**Figure 11**). However, GES was unable to identify the location of the adventitious roots which the DNR claimed to identify and the photo was not clear enough to verify adventitious roots. Furthermore, on October 25, 2005 GES was unable to locate adventitious roots on any of the trees or shrubs along several hundred feet of shoreline at the Lake Mallalieu Dam-Union Pacific Railroad sites.

**Figure 12** is from the DNR's report and it identifies the vegetation as being dominated by upland species (clearly terrestrial). **Figure 12** also identifies an "erosion line". GES was able to locate this spot and determined that the erosion line referenced by the DNR is at an elevation above 687 feet (1912 datum). This erosion line likely occurred as a result of a major flood event, and obviously water at this level does not occur so continuously as to destroy the clearly upland vegetation and is therefore irrelevant to the OHWM determination.

The DNR identified water stains on the Lake Mallalieu dam at an elevation of 681.51, which the DNR then correlated to a stain on barge dolphins at 681.55. Chapter 40 indicates water stains on fixed objects are excellent indicators of the OHWM. It is GES's opinion that in a situation where water level measurements are not available, water stains may be helpful as a rough gauge of historical water elevations on a lake which fluctuates slowly over time. On the St. Croix River, the US Army Corps of Engineers (COE) records the water level on an hourly basis. The DNR's analysis of the COE data did not demonstrate the duration of flooding required to produce a water stain or specifically the stain recorded at 681.5 feet. GES believes on a river such as the St. Croix, which can fluctuate several feet annually, and even over the course of a few weeks, selecting the "right stain" from among multiple overlapping stains from different flood events is probably very difficult. The DNR correlated the stain elevation to measured water levels to conclude; on average, the water level would typically

be above the 681.5 for 30 days/year (**Figure 13**). This analysis is not a cause and effect relationship. Because a water stain will develop on a fixed object from the water surface down, the number of days the water level is recorded above the elevation of the stain is a comparison of the level of one event (created the stain) to an unrelated and larger event. Furthermore, Chapter 40 advises "Ordinary high water marks are generally established by the presence of water at a given elevation for a **minimum of 30-70 days** a year, over a twenty year period." The DNR's correlation tied the water stain elevation to the very minimum duration that could result in creating an OHWM. On a water body where the water surface fluctuates widely, creating many "water marks similar to OHWMs", it obviously may require more than the minimum duration to create the predominant and official OHWM.

GES is not aware of any scientific support for a conclusion that water stains are an excellent indicator of an OHWM for the Lower St. Croix River. Water stains along the St. Croix River are an indicator of questionable value, particularly where that stain "evidence" is contradicted by overwhelming evidence of "terrestrial vegetation" (biological indicator) at far lower elevations. Along the St. Croix River, the overlapping water stains which have not been correlated to the high water event that created the stain, cannot in any way meet the Diana requirement of "other easily recognized characteristic."

## Summary

To summarize the shortcomings in the DNR's methodology and findings, GES offers the following:

- The list of Biological and Physical Indicators the DNR used to identify the proposed OHWM does not appear to originate from either Chapter 40 or the Supreme Court's language in Diana. Rather, the source of the indicators relied upon in the DNR's "study" appears very similar to the lists in the 1987 Corps of Engineers Wetland Manual and/or the Basic Guide to Wisconsin's Wetlands and Their Boundaries. Although Chapter 40 is a guidance document, expanding the list of indicators to include features indicative of wetland conditions (not necessarily OHWM) expands the limits of the OHWM beyond the way it is defined in Diana. The DNR did not provide documentation that justified the use of these wetland indicators as opposed to the Diana language or Chapter 40.
- It appears the DNR has equated hydrophytic vegetation to aquatic vegetation when evaluating the vegetation along the St. Croix River. The DNR's documentation often refers to "water dependent" or "hydric vegetation" which GES infers that the DNR means hydrophytic vegetation. Many if not most hydrophytic species grow in wet soil conditions (wetlands) but are not dependent on flooding or submergence and therefore are not aquatic species. The DNR's documentation appears to be identifying the break between

hydrophytic and upland species as opposed to the break between aquatic and terrestrial as required in Diana.

- The DNR appears to rely too heavily on water stain evidence. The correlation between the water stain elevation and the duration of flooding is invalid because the flooding events above the water stain did not create the physical feature (water stain) cited as evidence of the OHWM. Additionally the water stain selected by the DNR does not relate back to the biological indicators along the shoreline as required under Diana. At the sites GES evaluated, terrestrial vegetation is present below the DNR's proposed 681.5 OHWM and therefore the water level does not persist at that level continuously enough to cause the destruction of terrestrial vegetation.
- It appears the DNR selected an OHWM at the point where the highest possible indicator was identified. Chapter 40 (page 2, paragraph 2) explains that the Diana ruling emphasized that the OHWM is "... on the bank or shore where terrestrial vegetation either begins or is destroyed." This indicates that the OHWM will be inland of the open water, but not so high as to go beyond the beginning of terrestrial vegetation.

GES respectfully submits an alternative OHWM of 677 feet (1912 datum) based on both certain DNR documentation and on evidence gathered by GES at the sites we reviewed. Our specific evidence includes:

- The occurrence of willow water roots at the Tilton site at an elevation of 676.9 to 677.7. Per Chapter 40, "The start of the water roots will be very near the OHWM".
- The occurrence of woody terrestrial vegetation down to the elevation of 677.5 on the Tilton site. Per Diana, "...the destruction of terrestrial vegetation...."
- The occurrence of terrestrial moss on the Tilton site down to an elevation of 677.0. Per Chapter 40, "...the lowermost elevation of these mosses is a good indicator of the OHWM."
- The DNR documentation of the shoreline at the Union Pacific Railroad site, documenting the zone where water was continuous enough to destroy the terrestrial vegetation, leaving sedges, moss, and shrubs beyond a small but distinct wave cut bench. GES determined the elevation at this point of the site is 677.1 feet (1912 datum).

GES appreciates the opportunity to provide Environmental Analysis and consulting services for use in making this very important and public determination of the OHWM for the Lower St. Croix River. If you have any questions or need additional information please feel free to call Scott Krych or myself at 715-647-5110.

The information contained herein represents the findings of GES during site evaluation activities conducted on October 25, 2005 at the referenced sites.

Respectfully,

Graham Environmental Services, Inc.



Kelly J. Bopray  
Professional Soil Scientist  
Wetland Scientist

11/10/05

Date

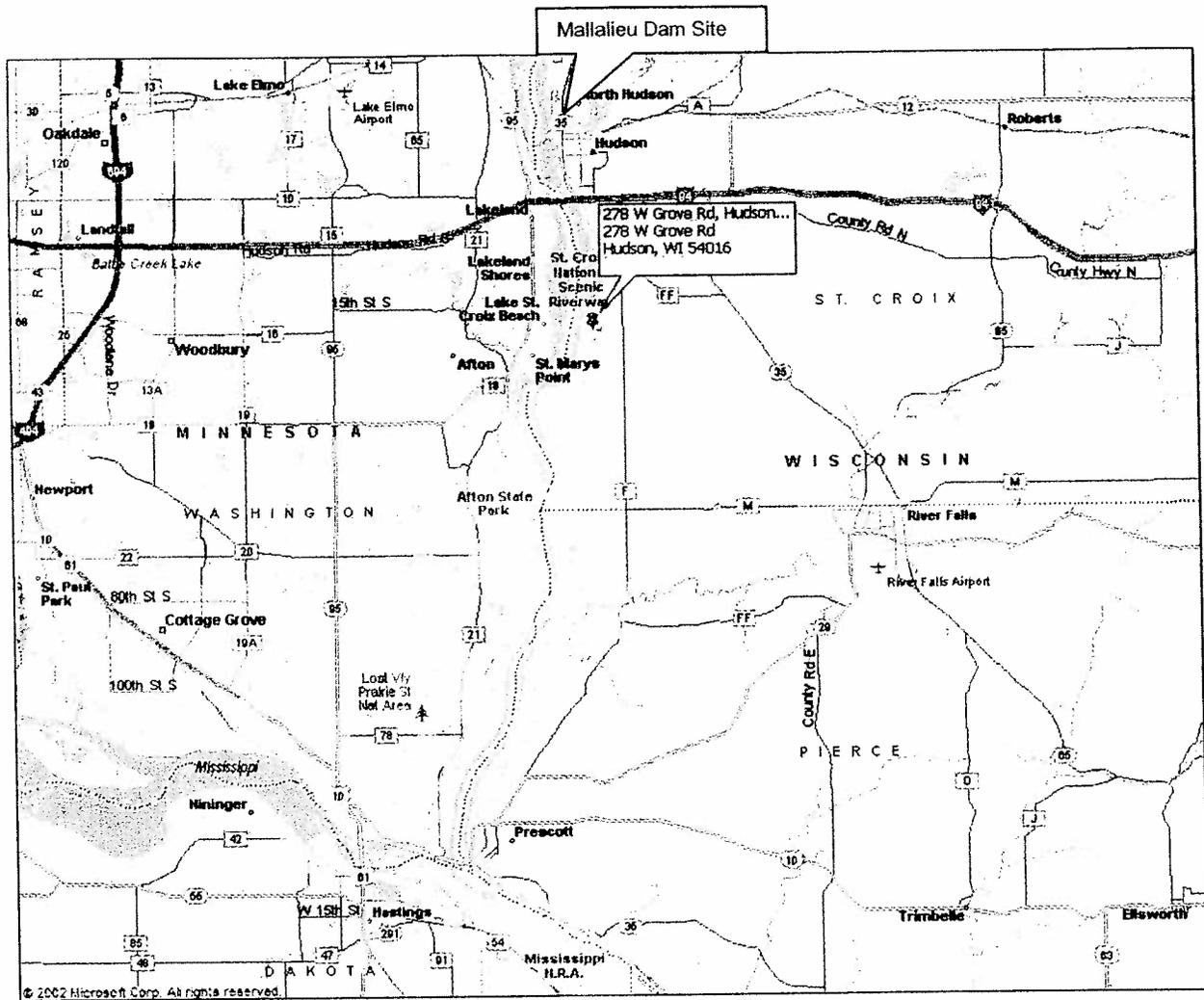
for 

Scott Krych  
Professional Wetland Scientist  
Biologist

11/10/05

Date

Enclosures



**Figure 1. Site Location Map**



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Hudson, Wisconsin

GES Project No. 2005.142



View to the south on the Tilton Site with the proposed 681.5 contour staked with wood lath. Note the presence of mature woody, terrestrial vegetation below (right) the line of lath.

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## Figure 2. Tilton Site Photograph

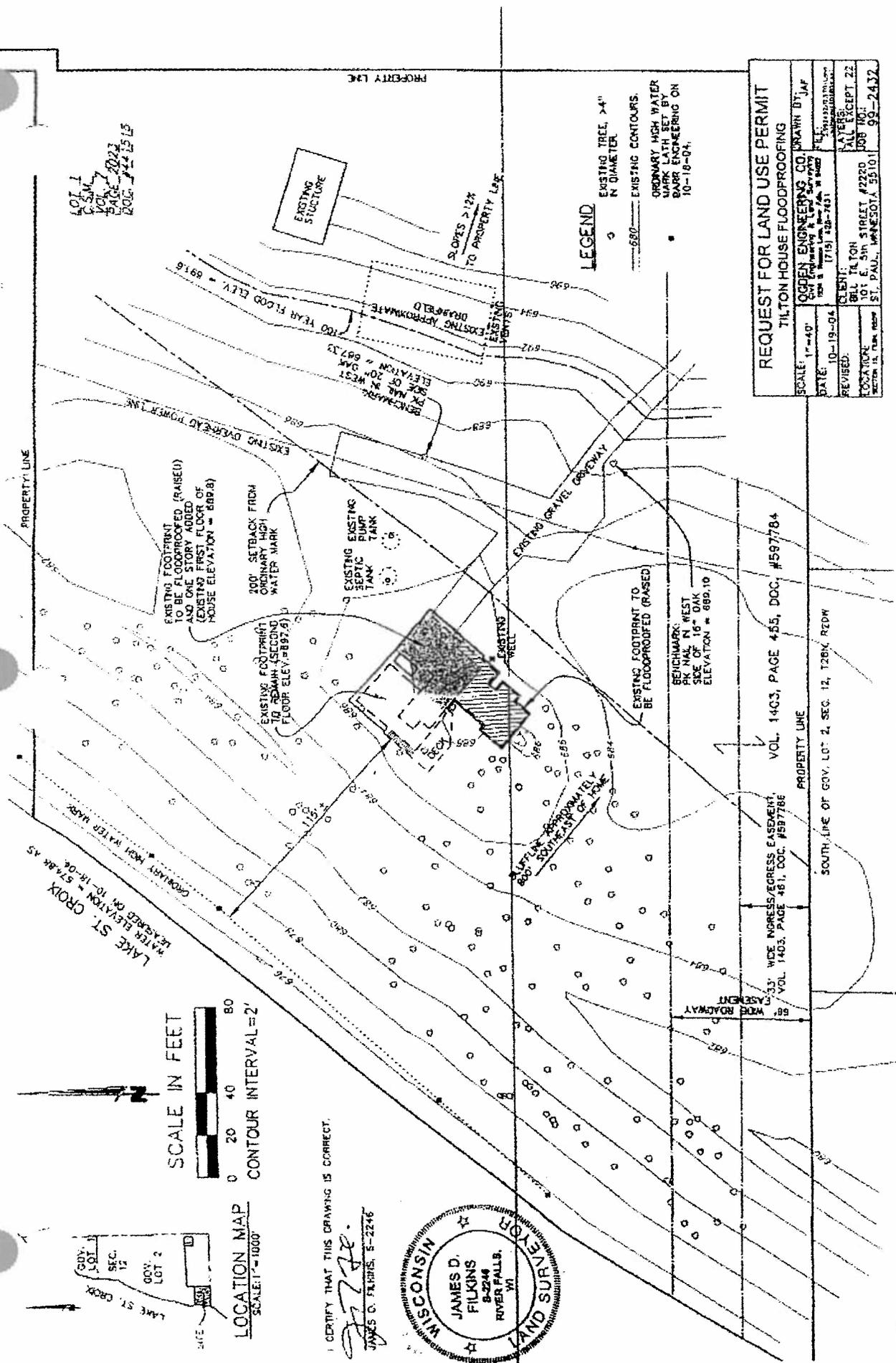


*Graham Environmental Services, Inc.*

William Tilton  
Hudson, Wisconsin

GES Project No. 2005.142

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**REQUEST FOR LAND USE PERMIT**  
TILTON HOUSE FLOODPROOFING

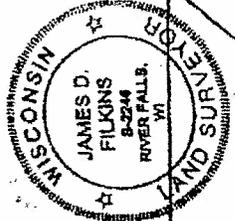
SCALE: 1"=40'	DRAWN BY: JAF
DATE: 10-19-04	CLIENT: BARR ENGINEERING CO. (715) 426-7451
REVISIONS:	DATE: 10-19-04
LOCATION: 101 E. 5th STREET, #2200	DATE RECEIVED: 10-19-04
SECTION 12, TOWN OF ST. PAUL, MINNESOTA 55101	DATE OF PERMIT: 10-19-04

SCALE IN FEET  
0 20 40 80  
CONTOUR INTERVAL = 2'

LOCATION MAP  
SCALE 1" = 1000'

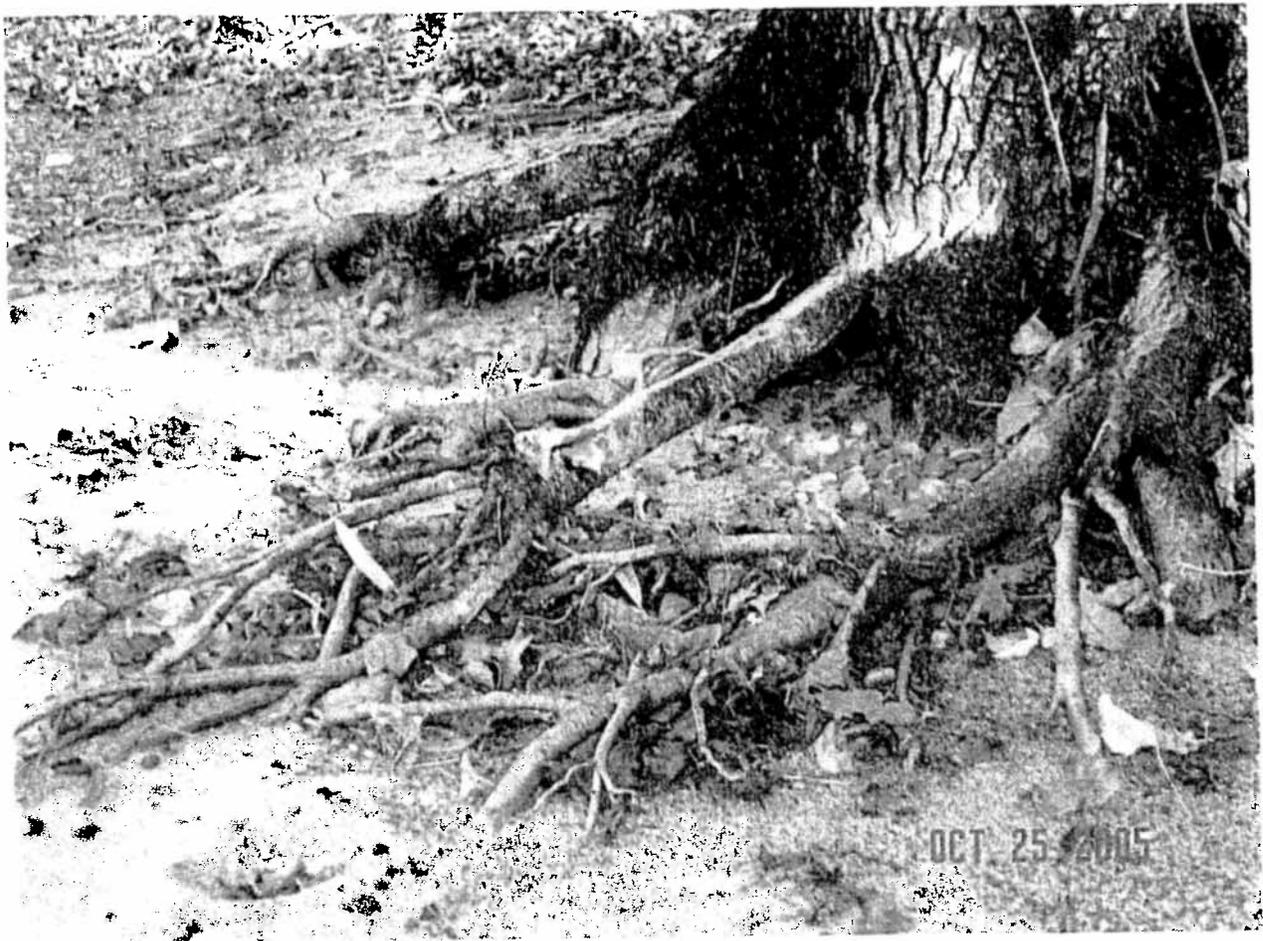
I CERTIFY THAT THIS DRAWING IS CORRECT.

*JAF*  
JAMES C. FALKS, S-2246



993000

**Figure 3.** Tilton Tree Survey; prepared by Ogden Engineering Co. Note the 1929 datum was used to prepare this survey. To convert this survey to the 1912 datum, 0.5 feet of elevation has to be added to the shown contours. The "ORDINARY HIGH WATER MARK" labeled on the drawing was determined by BARR Engineering. The DNR's proposed OHWM is 681.5, which is equivalent to the 681 contour. Note all the trees located below the 681 contour.



This photograph was taken on the Tilton site on October 25, 2005. Many of the trees along the shoreline had roots that were exposed as a result of erosion during flood events. However, the root structure is well anchored as opposed to being shallow rooted. Additionally, exposed roots by themselves are not an OHWM listed in Chapter 40 or cited in the Diana decision.

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**Figure 4. Tilton Site Photograph**



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This photograph showing *Platydictya* moss found on rocks and trees along the shoreline at the Tilton site. This photograph was taken on November 8, 2005 when the water level was 6775.61 feet. During the October 25, 2005 site visit the water level was at 677.02 feet. The wood lath in the upper right is at 677.3 feet. Per Chapter 40 "...the lowermost elevation of these mosses is a good indicator of the OHWM."



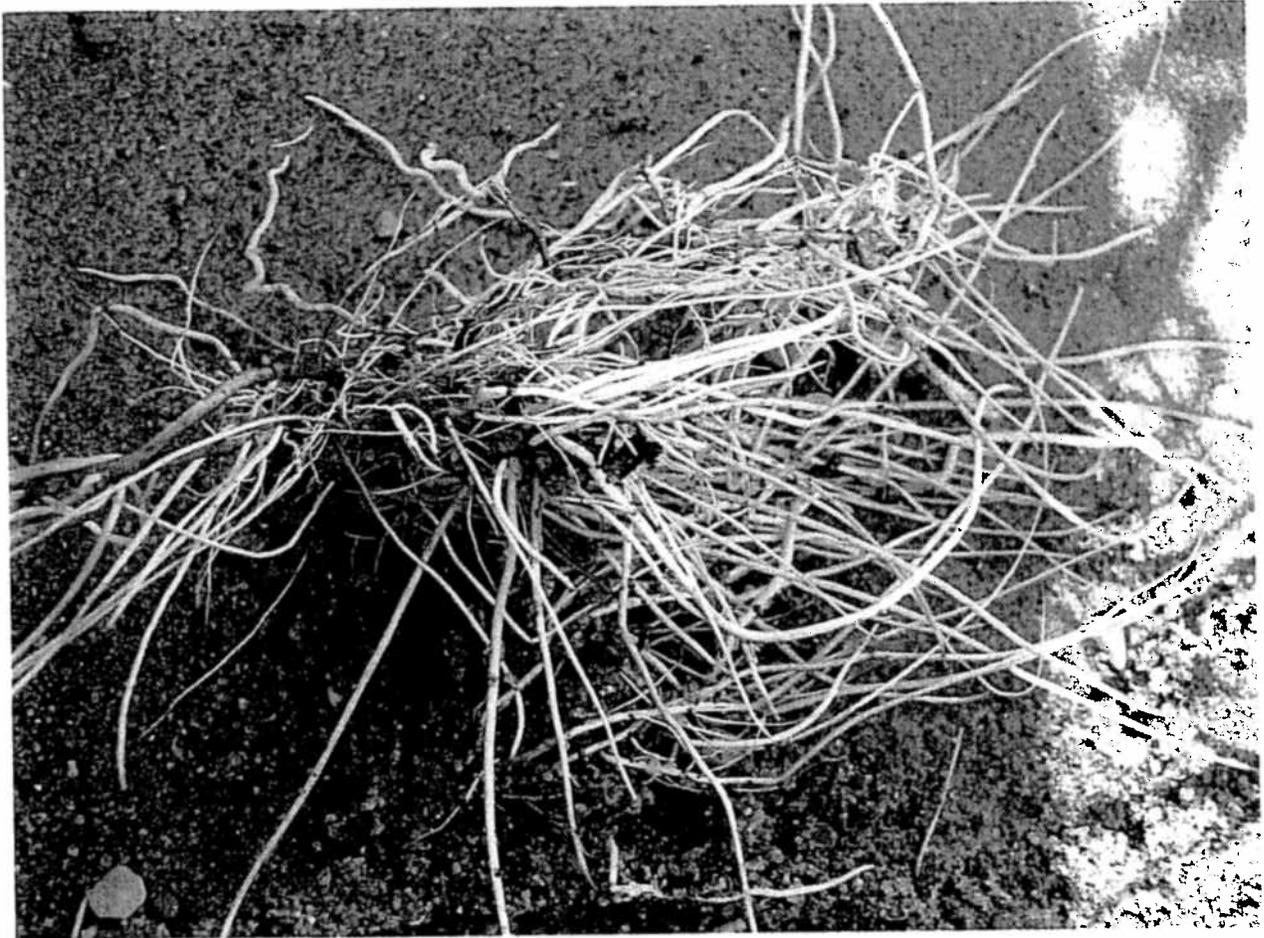
GES

*Graham Environmental Services, Inc.*

## Figure 5. Tilton Site Photograph

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This is photograph of a mass of willow water roots found along the shore line on the Tilton sited during the October 25, 2005 site visit. Clumps of roots like this were observed in a narrow band between an elevation of 676.9 and 677.7. According to Chapter 40, "The start of the water roots will be very near the OHWM".

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**Figure 6. Tilton Site Photograph**



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The Tilton site has multiple wave cut erosional scars (identified with yellow arrows) that formed as the water level changes. None of the erosional scars on the Tilton site were significantly pronounced to be indicative of the OHWM. On November 8, 2005, the water level was at 675.61 feet. The middle erosional scar is approximately at 677 feet. The DNR's proposed 681.5 OHWM is outside of the picture to the left. Erosional scars that are more permanent represent rare flood events which do not get re-worked by water at the ordinary high water level.

**Figure 7. Tilton Site Photograph**



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The rock/cobble area gave way to a heavily vegetated area which ended about 30 feet from the waters edge. The vegetation in this area consisted of water dependent species.



The above photograph was presented by the DNR in a power point presentation titled "The Lake Mallalieu Dam Site Union Pacific Railroad Property August 31, 2004". This location was also evaluated by GES on October 25, 2005 (Figure 9). The DNR noted the vegetation was destroyed or non-existent in the rock/cobble area; the middle zone is vegetated by "water dependent species": and then wooded area further upslope (left edge of photo). However, the species are wetland plants but that does not mean they are not terrestrial plants. Additionally, the DNR's proposed OHWM is well into the wooded area which is clearly vegetated by terrestrial plants.

**Figure 8. Tilton Site Photograph**



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This is a photograph of the shoreline at the Lake Mallalieu Dam-Union Pacific Railroad Property, taken from near the same location as the DNR's photograph in Figure 8. The water level on October 25, 2005 was at 677.02 which covered the rock/cobble area. The vegetated area is dominated by sedges and moss, with a few shrubs. In the background and to the left of the photograph the wooded area is dominated by eastern cottonwoods and black willows.

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### Figure 9. Tilton Site Photograph

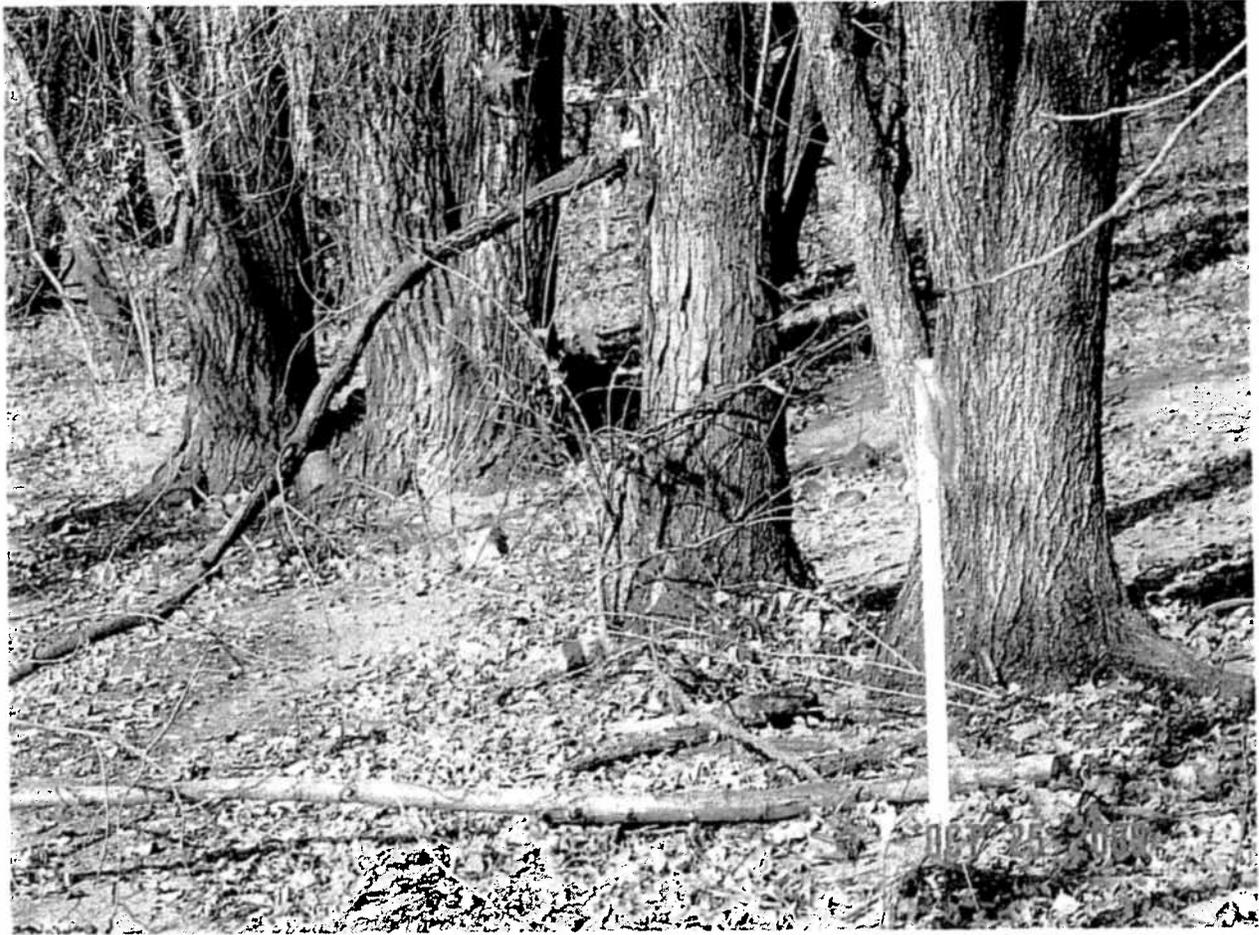


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Hudson, Wisconsin

GES Project No. 2005.142

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This photograph was taken by GES on October 25, 2005 to show the DNR's proposed OHWM at 681.5 feet on the Union Pacific Rail Road Property. A second wood lath at 681.5 can be seen in the top center of the picture. The proposed OHWM is clearly higher than the "beginning of terrestrial vegetation".

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**Figure 10. Tilton Site Photograph**



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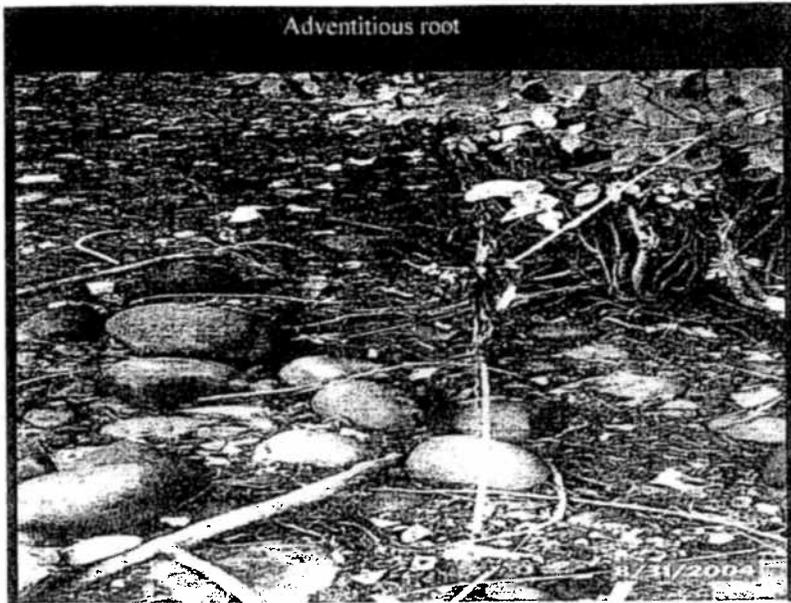


Figure 2.10  
Adventitious  
roots on a  
black willow  
caused by  
prolonged  
inundation.  
Source: WTI,  
R. Pierce.

Top, DNR's photo of adventitious roots from the power point presentation "The Lake Mallalieu Dam Site Union Pacific Railroad Property August 31, 2004. Lower right is a photo of adventitious root adapted from Basic Guide to Wisconsin's Wetlands and Their Boundaries. GES was not able to find any adventitious root on the Union Pacific Rail Road Site on October 25, 2005. Either way adventitious roots are an indicator of wetland conditions but are not listed in Chapter 40 as an indicator of the OHWM.

### Figure 11. Tilton Site Photograph



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The poison ivy growth started 80 feet from the waters edge on that day. This shows the vegetation listed below.

Sumac, <i>Rhus typhina</i>	Black locust, <i>Robinia pseudoacacia</i>
Poison ivy, <i>Toxicodendron radicans</i> L.	European buckthorn, <i>Rhamnus frangula</i> L.
Chokecherry, <i>Prunus virginiana</i> L.	

At 107 feet inland from the waters edge the slope changed to approximately 15% and rose 12 feet to the top of the bank. The dark area at the base of the woody vegetation is an erosion line.



The top photo is from the DNR's power point presentation titled "The Lake Mallalieu Dam Site Union Pacific Railroad Property August 31, 2004. The bottom photo was taken by GES of the same location on October 25, 2005. The erosion line referred to by the DNR is at an elevation above 687 feet, and is a permanent feature because the water level doesn't ordinarily reach that elevation except during major flood events.

## Figure 12. Tilton Site Photograph

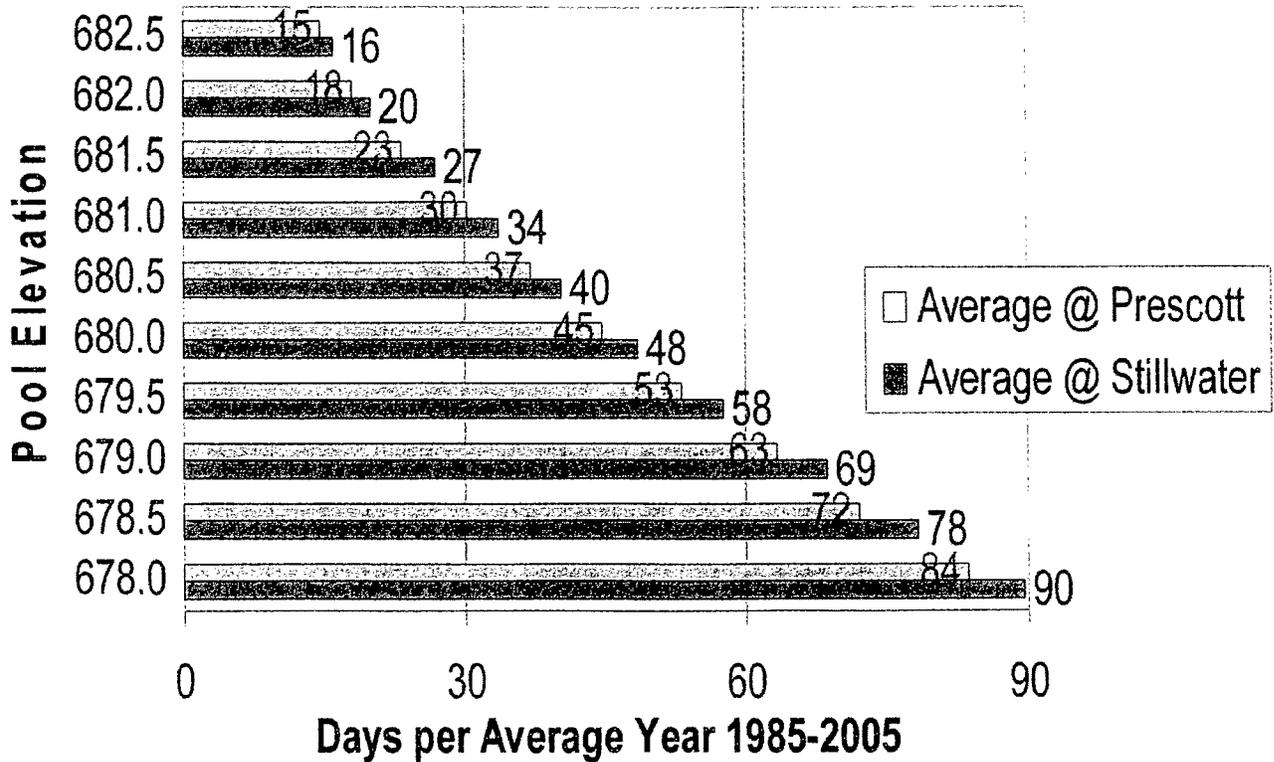


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## Days Above Selected Elevations @ Prescott vs Stillwater



The above graphic was prepared by the DNR and was presented in several of the presentations on the DNR's web site (<http://dnr.wi.gov/org/water/fhp/waterway/recordstrial.shtml> ). This graphic indicates the St. Croix River is at or above the proposed 681.5 OHWM for 23 days/year at Prescott and 27 days/year at Stillwater. Chapter 40 indicates a minimum of 30 to 70 days/year is needed to create an OHWM. GES believes that on a water body where the water surface fluctuates widely it may require more than the minimum duration to create the predominant and official OHWM.

**Figure 13. Site Location Map**



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Hudson, Wisconsin

GES Project No. 2005.142

# Appendix A

**Kelly Bopray, P.S.S.**  
**Soil Scientist**  
**Wetland Specialist**



**Overview of Professional Qualifications**

Mr. Kelly Bopray is a licensed Professional Soil Scientist with 19 years of experience with environmental projects for both public and private sector clients. Mr. Bopray's area of expertise is in characterizing soils, wetlands and landscapes for purposes of evaluating the suitability and potential impact of a project on the environment. The main types of projects he is involved with are wetland delineation and permitting for development projects, land application of wastewater and sludge, and environmental site assessments.

**Project Experience**

Mr. Bopray has conducted hundreds of wetland delineation projects throughout the Upper Midwest. These projects ranged from a simple wetland edge of an individual lot to complex monitoring of disturbed wetland conditions. Mr. Bopray has prepared or evaluated more than a dozen land application plans for various municipal and industrial clients. His experience includes preparation of EAW and Phase I environmental audits. Examples of his experience include:

- Identified and delineated wetlands for development projects throughout the Twin Cities Metro Area, greater Minnesota, and western Wisconsin.
- *Elk River Crossing* – Associated Developers Inc. Evaluated the extent of existing wetland drainage and mining impacts on a 90-acre commercial property and established the extent of regulatory jurisdiction under disturbed conditions. Negotiated wetland permits, including restoration of 5.5 acres of wetlands and construction of 4.7 acres of new wetlands. The project has proceeded with nearly the full commercial development that was originally proposed.
- *Retail Development in Forest Lake* – Wal-Mart Stores Inc. Delineated wetlands on a 17-acre commercial property in Forest Lake, Minnesota. Negotiated a Corps of Engineers individual permit for 5.7 acres of wetland impacts and 11.4 acres of off-site mitigation. Negotiated wetland approvals with local government units for both sites. Monitored construction of the mitigation site and erosion control practices on the development property.
- *Land Application Management Plan* – Del Dee Foods Inc. Prepared a management plan for the land application wastewater from a food processing facility in Appleton, Minnesota. Application rates and nutrient loading were designed to accommodate the production schedule and the Minnesota Pollution Control Agency's requirements. Demonstrated compliance with environmental concerns in order to renegotiate the facility permit to increase production capacity. Prepared annual reports on the land application operation.

- *Marianna Ranch Residential Development* – Lyman Development Company. Prepared a wetland delineation on a 153-acre property with seven wetlands and numerous closed depressions. Conducted preliminary soil investigation and on-site wastewater treatment system sizing for the planning phases of preliminary plat. Coordinated on-site soil testing of each lot and final site layout based on the soil testing results.
- Developed permit application material including evaluation of alternatives and wetland impacts, evaluation of existing wetland functions and values, and developed wetland mitigation plans under the Corps of Engineers 404 wetland permit, the Minnesota Wetland Conservation Act, and Wisconsin DNR.
- Delineated jurisdictional wetland limits, and established limits of regulatory authority on severely disturbed wetland sites in numerous MN and WI areas.
- Provided Wetland Conservation Act (WCA) administration assistance for the Cities of St. Michael and Mound, Minnesota.
- *Wastewater Treatment Operations* – AMPI. Developed a wastewater treatment biosolids management plan for a Minnesota dairy processing plant to guide the land application of biosolids and whey. Investigated construction and operational records of a wastewater treatment pond in Wisconsin to determine compliance with Wisconsin wastewater pond regulations.

#### **Professional Registrations and Affiliations**

- Soil Science Society of America
- Soil and Water Conservation Society
- Minnesota Association of Professional Soil Scientists, Executive Officer 1999-2001
- Society of Wetland Scientists
- Wetland Delineators Association
- University of Wisconsin-River Falls; Adjunct Associate Professor

#### **Education**

M.S., Agronomy: Emphasis – Soil Science, South Dakota State University

B.S., Agriculture: Major – Soil Science, University of Wisconsin, River Falls

# CURRICULUM VITAE

## SCOTT A. KRYCH, PWS

Senior Project Manager, Professional Wetland Scientist  
GRAHAM ENVIRONMENTAL SERVICES, INC.

### EXPERTISE

- Botanical and Ornithological Studies
- Ecological Investigations
- Wetland Restoration
- Wetland Delineation
- Wetland Mitigation Planning
- GPS/GIS Applications
- Regulatory Compliance Strategies
- Habitat and Ecosystem Mapping

### ACADEMIC BACKGROUND:

- BS, Biology, Mankato State University, 1986

### REGISTRATION:

- Professional Wetland Scientist, SWS, #000303

### PROFESSIONAL AFFILIATIONS:

- Wilson Ornithological Society
- Minnesota Ornithologists Union
- Wetland Delineators Association
- Society of Wetlands Scientists

### SPECIALIZED TRAINING

- Identification of Sedges and Rushes, Dr. Robert Mohlenbrock, 2004.
- Minnesota Wetland Plant Identification, Dr. Robert Mohlenbrock, 2003.
- Wisconsin DNR's Karner Blue Butterfly HCP Effectiveness Monitoring Training, 2003
- Training in Delineation of Problem and Disturbed Wetlands using 1987 Corps of Engineers Wetlands Delineation Manual. Corps of Engineers, Minnesota Board of Water & Soil Resources and Coon Creek Watershed District. 1993.
- Introduction to GPS. Dunwoody Institute, MN. 1995
- Regulatory Issues of Corridor Projects. U.W.-Madison. 1992.

### PROJECT RELATED EXPERIENCE

Mr. Krych has served as Project Manager for large biological and ecological field surveys and as Principal Investigator for threatened and endangered species on projects in the Great Lakes region for the past 16 years. He has managed and conducted field surveys for over 60 endangered and threatened species in the Chequamegon, Chippewa, Hiawatha, Nicolet and Ottawa National Forests. Mr. Krych has prepared and assisted in preparation of NEPA documents and National Forest Management Plans and has conducted surveys for endangered or threatened birds, plants and insects on over twelve large-scale projects in the Midwest. Mr. Krych has also managed and conducted wetland delineations using 1987 Corps Wetland Delineation Manual on over 2000 miles of utility corridors and on hundreds of local projects since 1989. Mr. Krych is versed in use of GIS (Arcview™), GPS (CMT PCGPS), and database (Access™) methods to map ecosystems, habitat types, land-use patterns, and endangered or threatened species locations on a number of projects located in the Great Lakes Region. He specializes in wetland delineation, regulatory assistance, habitat assessment/utilization, and the analysis of songbird and raptor communities.

- ❖ Project manager and principal investigator for endangered, threatened and special concern plant species on three projects of over 80 acres. Conducted habitat evaluation, rare species searches, and impact assessments for state-listed plants with known occurrences within the Anoka Sand Plain. Target elements included: tubercled rein-orchid (*Platanthera flava* var. *herbiola*), cross-leaved milkwort (*Polygala cruciata*), twisted yellow-eyed grass (*Xyris torta*), lance-leaved violet (*Viola lanceolata*), tooth-cup (*Rotala ramosior*), autumn fimbriatylis (*Fimbristylis autumnalis*), marginated rush (*Juncus marginatus*), tall nut-rush (*Scleria triglomerata*), willow-herb (*Decodon verticillatus*), butternut (*Juglans cinerea*), and sea-beach needlegrass (*Aristida tuberculosa*). Utilized GPS (CMT PCGPS) and GIS (Arcview™) technologies to locate

community types and identify rare plant locations. Identified and located over nine community types within 240 acres of agricultural lands, wetlands, and upland forest types Anoka Sand Plain. 2004

- ❖ Project manager and principal investigator of regional forester sensitive species within the Chippewa National Forest for Enbridge and Great Lakes Gas Transmission Company. Evaluated and surveyed locations for threatened or endangered plants and animals along 26 miles of existing pipeline corridor. Botanical survey target elements included: meander searches for 15 species of threatened or endangered plants including *Botrychium pallidum*, *B. lanceolatum* var. *angustisegmentum*, *B. simplex*, *B. rugulosum*, *B. oneidense*, *B. mormo*, *Calypso bulbosa*, *Cypripedium arietinum*, *Malaxis monophyllos* var.

# CURRICULUM VITAE

- brachypoda*, *Sparganium glomeratum* and *Taxus canadensis*. Avian target elements included; black-backed woodpecker (*Picoides arcticus*), Connecticut warbler (*Oporomis agilis*), LeConte's sparrow (*Ammodramus leconteii*), olive-sided flycatcher (*Contopus cooperi*), red-shouldered hawk (*Buteo lineatus*), and northern goshawk (*Accipiter gentilis*). Utilized GPS (CMT PCGPS) and GIS (Arcview™) technologies. Identified over 157 threatened and endangered plants at 14 locations along the existing pipeline right-of-ways. 2003.
- ❖ Project manager and principal investigator of 19 forest sensitive plant species for the Chippewa National Forest. Evaluated and surveyed 206 stands for threatened or endangered plants. Utilized GPS (CMT PCGPS) and GIS (Arcview™) technologies to verify stand locations and identify rare plant locations. Identified and located over 13 threatened and endangered plants within 4,052 acres of northern hardwood, black spruce swamp, tamarack swamp, aspen and red pine forest types. 2003.
  - ❖ Project manager and principal investigator on Loggerhead Shrike Nest Survey. Comprehensive site search for State Threatened Loggerhead Shrike nests and habitat on a 250 acre parcel located in Rosemount, MN. 2003.
  - ❖ Project manager and principal investigator for surveys of breeding birds and rare plants within the Chippewa National Forest. Managed and conducted surveys for Region 9 sensitive species and federally threatened and endangered plants along 110 miles of Enbridge Pipeline corridor in northern Minnesota. Investigations included: call/response surveys for northern goshawk and red-shouldered hawks), helicopter surveys for bald eagle (*Haliaeetus leucocephalus*) and point count surveys for songbirds. Botanical elements included: meander searches for 15 species of threatened or endangered plants including *Botrychium pallidum*, *B. lanceolatum* var. *angustisegmentum*, *B. simplex*, *B. rugulosum*, *B. oneidense*, *B. mormo*, *Calypso bulbosa*, *Cypripedium arietinum*, *Malaxis monophyllos* var. *brachypoda*, and *Taxus canadensis*. Prepared sections of Chippewa National Forest EA and BE for the project. 2000-2002.
  - ❖ Project manager and principal investigator of natural resource inventory for the City of Blaine. Evaluated and surveyed locations of wetlands, uplands and threatened or endangered plants and animals within 35 square miles of the Anoka Sandplain region of Minnesota. Utilized National Wetlands Inventory (NWI) maps, half section aerial photographs and field reconnaissance to identify wetlands or high quality ecosystems. Wetlands were classified according to guidelines established in Classification of Wetland and Deepwater Habitats of the United States (Cowardin et. al.) Identified 384 wetlands, 17 high quality upland sites, eight threatened and endangered plants at 15 locations and over 16 different community types using GPS (CMT PCGPS) and GIS (Arcview™) technologies. A general database was constructed to help the City plan for open space, greenway corridors and property acquisition. Blaine, MN. 1999-2000.
  - ❖ Project manager for wetland evaluation/environmental assessment and permitting for over 300 local projects within the Mississippi River drainage in and around the Minneapolis-Saint Paul metropolitan area. Delineated Section 404 waters of the United States wetlands using 1987 Corps Wetland Delineation Manual (Waterways Experiment Station Technical Report Y-87-1, January 1987). Permits were issued for construction based on the delineation and subsequent planning. 1989 to present.
  - ❖ Project manager for Vector Pipeline project in IL, IN and MI. Organized, planned, and managed the delineation of over 480 Section 404 Waters of the United States and Section 10 Waters along a 329.4-mile length of a proposed, natural gas pipeline route. Delineations made extensive use of GIS (Arcview™); GPS (CMT PCGPS), and database (Access™) methods. Investigator for a survey for Indiana Bat (*Myotis sodalis*) and suitable breeding habitat in select sites in Illinois and Indiana. 1999-2001.
  - ❖ Project manager for Great Lakes Gas Transmission G.L. 300 Expansion Pipeline project in MN, WI and MI. Organized, planned, and managed the delineation of over 480 Section 404 Waters of the United States and Section 10 Waters along a 166 miles of a proposed, natural gas pipeline route. Delineations made extensive use of GIS (Arcview™), GPS (CMT PCGPS), and database (Access™) methods. 1998.
  - ❖ Project investigator for Alliance Pipeline project in ND, MN, IA and IL. Assisted in organizing, managing and conducting the delineation of over 1100 Section 404 Waters of the United States and Section 10 Waters along a 850-mile length of a proposed, natural gas pipeline route. Assisted in developing GPS/GIS technologies that were used in the production of data forms compliant with 1987 COE Wetland Delineation Manual and NRCS specifications. Wetland polygons from several wetlands were seamlessly integrated into environmental worksheets prepared by the project engineer. Delineations made extensive use of GIS (Arcview™), GPS (CMT PCGPS), and database (Access™) methods., 1997-1999.
  - ❖ Principal wetland biologist for citywide wetland inventory and functions and values analysis for the City of Plymouth, Minnesota. Duties included aerial photograph interpretation, field verification, and functional analysis of approximately 90 percent of the 770 individual wetlands within the city. Plymouth, MN. 1996
  - ❖ Project manager and principal investigator of wetland delineation on over 1500 miles of pipeline right-of-way in MN, ND, WI, and MI. Wetland delineations were conducted for Great Lakes Gas Transmission projects, Lakehead Pipe Line and Northern Natural Gas projects. 1989-92
  - ❖ Project manager and principal investigator for surveys of breeding birds in the Chippewa, Hiawatha and Chequamegon National Forests. Managed and conducted auditory and visual point counts along 105 miles of Natural Gas Pipeline corridor in MN, WI and MI. 1997.
  - ❖ Project investigator for raptor surveys along natural gas pipeline corridors. Carried out surveys and impact assessments for Federal and state threatened, endangered, and sensitive species on 61 miles of natural gas pipeline proposed by Paiute Gas Corporation in Humboldt, Washoe, Pershing, Carson City, and Douglas Counties, Nevada. Species surveyed included bald eagle, golden eagle (*Aquila chrysaetos*), ferruginous hawk (*Buteo regalis*), Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), prairie falcon (*Falco mexicanus*), northern harrier (*Circus cyaneus*), common barn owl (*Tyto alba*),

# CURRICULUM VITAE

long-eared owl (*Asio otus*), northern goshawk, American kestrel (*Falco sparverius*), and burrowing owl (*Athene cunicularia*). 1992.

- ❖ Principal investigator for a cursory survey for Hine's Emerald Green Dragonflies and suitable breeding habitat in the vicinity of the Des Plaines River in Illinois. 1998.
- ❖ Project manager and principal investigator for historic osprey nesting location in the Chippewa National Forest at a proposed natural gas meter station improvement. 1996.
- ❖ Principal Investigator for threatened and endangered plants and animals on a 357-acre site in Scott County, MN. Project included, habitat mapping, botanical survey and site assessment, as part of an EAW, preceding issuance of a permit to proceed. Credit River, Minnesota. 1999.
- ❖ Principal Investigator for analysis of biotic communities, wetlands, and threatened and endangered species for preparation of federal Environmental Assessment and State of Minnesota EIS for Metropolitan Airports Commission Dual Track Airport Planning process. Conducted field investigations, reviewed literature, interviewed agency specialists, and participated in public hearings. Conducted waterfowl counts on Mississippi River and assisted in preparation of bird-aircraft hazard. 1996.
- ❖ Project Investigator for federal Environmental Assessment and State of Minnesota EIS project in Brainerd, MN. Conducted analysis of biotic communities, wetlands, and

threatened and endangered species for proposed runway expansion. Conducted field investigations and reviewed literature. Conducted waterfowl counts on Mississippi River and assisted in preparation of bird-aircraft hazard analysis. 1995.

- ❖ Project manager and principal investigator for surveys of Blanding's Turtles (*Emydoidea blandingii*). Conducted surveys and prepared mitigation strategies for Blanding's turtles and critical habitat on several sites in the Minneapolis/St. Paul metropolitan area. 1995-present.
- ❖ Project manager and principal investigator for surveys of Loggerhead Shrike (*Lanius ludovicianus* var. *migrans*). Conducted surveys and prepared mitigation strategies for Loggerhead shrikes and critical habitat on several sites in the Minneapolis/St. Paul metropolitan area. 1995-present.
- ❖ Principal Investigator: Conducted survey for raptors nesting within 0.5 miles of a proposed 35-mile right-of-way in southwest and central Nevada. Included a Northern Goshawk (*Accipiter gentilis*) call/response survey and meander search. 1993.
- ❖ Regal Fritillary (*Speyeria idalia*). Surveyed a proposed Wisconsin wastewater treatment site for adult butterflies and host plant species. 1993.
- ❖ Project manager and principal investigator on Loggerhead Shrike Nest Survey. Comprehensive site search for State Threatened Loggerhead Shrike nest on a 50 acre parcel located in Shakopee, MN. 1994.

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## PERTINENT PUBLICATIONS AND PRESENTATIONS

Timpson, M. E., J. L. Arndt, and S. A. Krych. 1998. Innovative approaches to large-scale wetland delineation projects. p.328 *In* Agron. Abstracts. ASA, Madison, WI.

Arndt, J. L., M. E. Timpson, S. A. Krych, and D. Dignen. 1998. Integrated database strategies for wetland and soil resource assessments. p.62 *In* Agron. Abstracts. ASA, Madison, WI.